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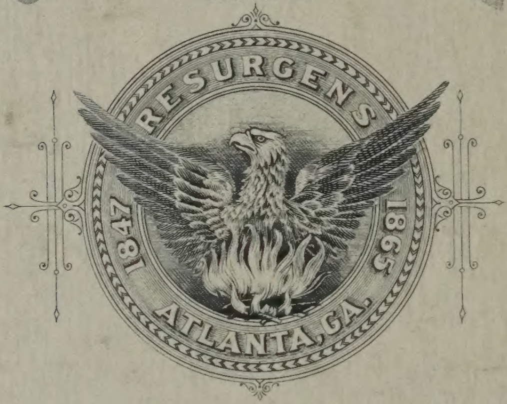
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THE IRON AGE

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Steel Trade Now Looks to 1928 to Compensate for Some of the Recession of 1927—Forces That May Make for Greater Market Stability

¶ *Nineteen twenty-seven in the steel industry showed early signs of falling behind* 1926. *With a steel ingot output of about* 43,250,000 *tons, it was* 8 *per cent under the* 46,936,000-*ton peak of the year before.*

¶ *Prices declined most of the year, and earnings were quite below those for* 1926, *in spite of the signs a year ago that steel companies were about to curb price cutting.*

¶ THE IRON AGE *composite price for finished steel averaged* 2.357*c. per lb. for the year; it was* 2.439*c. in* 1926. *Thus the year's average fell off* $1.64 *a net ton, whereas the* 1926 *average was only* 52*c. a ton under that of* 1925.

¶ *In the sheet and strip trades the revolution of continuous rolling by patented methods made the year memorable, pointing to ultimate centering of production in large companies.*

¶ *Pig iron last year sold lower than at any time since August,* 1916. *Our pig iron composite, as the year opened, was* $19.71 *per ton, and at the year's end* $17.54. *Pig iron output was about* 36,400,000 *tons; in* 1926 *it was* 39,373,000 *tons.*

¶ *With outlay for new iron and steel plant much curtailed and with production in fewer hands, the trend is toward a more stable market.*

MORE factors in the steel trade outlook for 1928 are difficult to estimate than was the case at the beginning of 1927, or of 1926 or 1925. Yet there are good reasons for the expectation that it will be a year of large activity and, barring untoward developments of which present tendencies give no sign, conforming in the main to a composite of the three years last past. Wide fluctuations from year to year are no longer likely. Counting 58,000,000 tons of ingots as theoretical capacity, 1926 was an 81 per cent year and 1927 a 74.5 per cent year.

One year ago it was said in THE IRON AGE's forecast that the expectations of the steel trade as it entered 1927 were not so high pitched as at the beginning of 1926, but that almost without exception there was the added opinion that no important recession was likely in the twelve-month. It was felt that since 1926 had outrun the high record of 1925, making two successive peak years, it would be breaking all precedents (apart from the war-time triennium 1915, 1916 and 1917) to have a new top in 1927.

Also there was warrant for the view that 1926 had brought some over-expansion of trade for which a compensating toll might be taken from 1927. The automobile industry was particularly in mind in this connection, but the recession there proved to be more than was looked for, due largely to the protracted suspension of production by Henry Ford.

Possible Compensations in 1928

Today, following the reasoning of a year ago, there is ground for the view that, as 1927 showed a recession from the very high peak of 1926, some lines of steel consumption may be expected to compensate in 1928 for what they lacked in the year just ended. Automobile and railroad demand, alike disappointing in 1927, are both counted on for increases, and the improvement agricultural machinery plants had in 1927 promises to go further. Steel construction in heavy lines need not be expected to exceed, and may not equal, the large scale of 1927. The pipe trade looks forward to another year substantially like 1927 in falling short of the peak consumption of 1926.

Is Greater Market Stability in the Making?

Reading consecutively at the year-end the weekly market reviews of THE IRON AGE for 1927 one sees that it was a year in which improvement in steel prices and consumption was constantly expected but not realized. Yet several things have been in the making, even in these past nine months of recession, that may turn out on the side of price betterment in 1928.

First, is the series of efforts producers have made to get various finished products out of the low-price cuts. While the extent of their success is largely for the future to determine, these efforts have kept constantly before both sellers and buyers the aim of the manufacturers to get prices yielding a fair profit and have tended to lessen the strain for tonnages at the expense of prices.

CONSOLIDATION TENDENCY MORE PRONOUNCED

In the second place, progress has been made in the direction of consolidation in the past year, reducing to that extent the scramble for profitless tonnage. Following the merger in July, 1926, of the Central Steel Co., Massillon, Ohio, and the United Alloy Steel Corporation, Canton, Ohio, with combined ingot capacity of 1,150,000 tons a year and assets of $80,000,000, there were persistent reports of further concentration of steel capacity in northern Ohio. The Otis, Corrigan-McKinney and Trumbull companies were commonly mentioned in connection with these plans. The expected amalgamation did not come, however, but in November the Republic Iron & Steel Co. acquired the Trumbull Steel Co., bringing the ingot capacity of the former up to 1,900,000 tons a year.

In July the American Rolling Mill Co. purchased the properties, business and patents of the Columbia Steel Co., Butler, Pa., the combined capacity of the two companies being 1,000,000 tons of sheets and stripsheets a year.

Negotiations have been under way for some time which are expected to bring about the early merger of the Columbia Steel Corporation and the Pacific Coast Steel Co., both of San Francisco, and having gross assets above $35,000,000.

On the last day of the year announcement was made that the Youngstown Sheet & Tube Co. would acquire the Inland Steel Co., the strong Chicago district independent, which Eastern steel interests had more than once sought to acquire with its ingot capacity of more than 1,500,000 tons. Then in northern Ohio a merger of six sheet and tin-plate producers was consummated in December and the Empire Steel Corporation was formed—a move that should aid in the effort to save the sheet industry from disastrous price cutting.

LITTLE NEW CAPACITY BUILDING

A third factor making for more stability in the industry is the limited scale of the additions made last year, or planned for this year, to the country's steel-making capacity. In the four years after it acquired the Midvale and Lackawanna companies the Bethlehem Steel Corporation spent $80,000,000 on new construction and improvements to increase output. The Steel Corporation appropriations in 1924, 1925 and 1926 were $75,000,000 for the building of new capacity. The past year has shown a sharp falling off in new construction; in the coming year relatively little will be done. Excess capacity will be less in evidence and demand will grow into healthier relation to supply.

A fourth constructive development of the year was the beginning of continuous sheet manufacture on a large scale. While, on its face, continuous sheet and strip rolling suggests destructive competition and the eventual elimination of smaller mills, there are indications that the patent situation will be so handled by the granting of licenses that the continuous mill may tend rather to the stabilizing of the very important market for the thinner products.

Unbalanced Steel Demand Last Year

The forecast of some leading members of the steel trade that demand in 1927 would run something like 10 per cent less than in 1926 turned out to be fairly accurate. Ingot production, as indicated on the preceding page, was about 8 per cent below that of 1926. When we consider the lack of railroad equipment buying, the slump in automobile production, the depression in the oil fields, the bituminous coal strike, the Mississippi flood, and the widespread handicap of unseasonable weather, the 1927 performance of the steel industry was remarkable. With the railroad, automobile and oil demands so unsatisfactory as all were last year it is evident that the miscellaneous and unclassified industries furnished nearly as much business as in 1926.

New uses of steel are adding to each year's demand. Steel furniture, steel sanitary equipment, steel sash and steel frame dwellings are examples. The steel requirements for craft on the Monongahela, Ohio and Mississippi Rivers are increasing. Perhaps 70,000 tons was so taken in 1927. The work of the Sheet Steel Trade Extension Committee no doubt prevented a considerable falling off in sheet consumption. The revolution in farm equipment brought on increased use of steel from that quarter last year and this promises to be greater in 1928.

SMALLEST STEEL REQUIREMENTS FOR NEW CARS SINCE 1921

Capital expenditures by the railroads were only $750,000,000 in 1927, or more than 15 per cent below those of 1926, and the decrease was reflected in nearly all steel purchases except rails. The number of freight cars ordered for domestic steam railroad use was 71,606, including those authorized for construction in railroad companies' own shops. While this was a slight gain over the 67,000 bought in 1926, it fell considerably below 78,000 ordered in 1925 and 135,000 in 1924.

A closer gage of the decline in actual steel consumption for freight cars last year is afforded by the total of 63,390 cars built and delivered by car builders and railroad car shops, 1927 being the least active year in this respect since 1921. In the preceding year 79,000 were built, while 94,000 was the total for 1925 and 104,000 for 1924.

Only 808 locomotives were ordered during the year, including export orders, and 1176 were built. Of those ordered 696 were for domestic use, as against 1301 in 1926, while 958 were built for domestic use compared with 1585 in 1926.

Railroads built 779 miles of new main line, but tore up 202 miles, leaving a net gain in trackage of 577 miles.

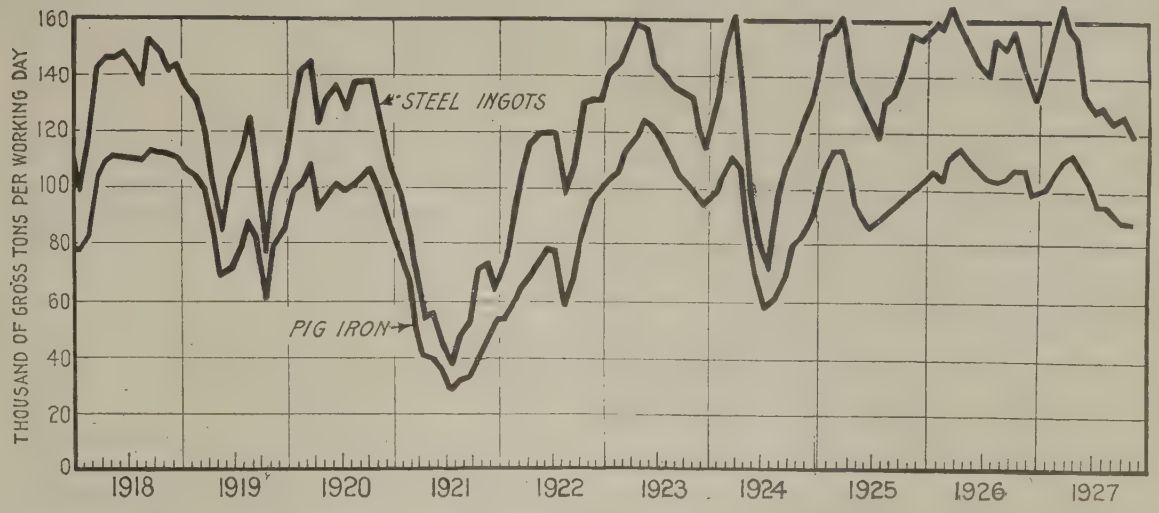
FABRICATORS' ORDERS MORE BUT SHIPMENTS LESS

A high rate of building construction is reflected by the figures collected by the Department of Commerce on 1927 contracts for fabricated structural steel. Computed bookings, based on returns from a large percentage of the fabricators, showed a total of 2,521,740 tons for 11 months and, with December estimated, the year will show approximately 2,725,000 tons, a gain of a little less than 8 per cent, compared with 2,523,250 tons in 1926 and 2,425,612 tons in 1925. Shipments last year ran more than 200,000 tons below those of 1926; in that year shipments exceeded orders.

Elsewhere the automobile, railroad, new construction and oil well and pipe line consumption of steel in 1927 is referred to, each field having a separate article. The estimate of motor cars and trucks built in the United States last year is 3,350,000, as against 4,255,000 in 1926.

Output Curve Had No Autumn Upturn

On page 3 the course of steel production last year is shown in a curve which is in contrast with those of the previous three years. All advance in the early months of the year to a March peak, then decline in spring and summer, ascending again in the autumn. The 1927 curve, however, did not turn up last fall and in that particular, as in others, it paralleled the movement of 1923. Indications now point to a continuation of the parallel, which would give in the next three months some such increase in operations as was seen in the first quarter of 1924, and was repeated in each of the three following years.



Fluctuations in Daily Average Production of Steel Ingots and of Pig Iron, During the Past Ten Years. While generally parallel, the curves are farther apart than formerly, much farther than in 1921, for instance. They are based on monthly ingot figures of the American and Steel Institute and monthly pig iron figures gathered by THE IRON AGE. *Ingots have fallen far below the high record of 1926 but the year was above the 1923-1926 average. Pig iron is 2 per cent below the average of those four years*

The year's steel ingot output THE IRON AGE estimates at 43,250,000 gross tons and that of steel castings at 1,250,000 tons (against 1,300,000 tons in 1926), making the 1927 total of ingots and steel castings about 44,500,000 tons, which compares with 48,294,000 tons in 1926.

March a Record Month in Steel

Outputs of steel ingots and pig iron are given below for 1927 and the preceding 10 years, including the last two years of the war period:

	Pig Iron, Gross Tons	Steel Ingots, Gross Tons	Steel Ingots and Castings, Gross Tons
1917........	38,621,216	43,619,200	45,060,607
1918........	39,054,644	43,051,022	44,462,432
1919........	31,015,364	33,694,795	34,671,232
1920........	36,925,987	40,881,392	42,132,934
1921........	16,688,126	19,224,084	19,783,797
1922........	27,219,904	34,568,418	35,602,926
1923........	40,361,146	43,485,665	44,943,696
1924........	31,405,790	36,811,157	37,931,939
1925........	36,700,566	44,140,738	45,393,524
1926........	39,372,729	46,936,205	48,293,763
1927........	36,400,000	43,250,000	44,500,000

On April 1, union miners in the bituminous coal fields struck to enforce their demand for the maintenance of the so-called Jacksonville scale and the strike lasted through the year except for a tentative adjustment in the Illinois district. Stocks of coal had been accumulated before the strike and non-union mines increased their operations to such an extent that there was a plentiful supply of coal throughout the year. Iron and steel production were in nowise affected by the strike and at no time did the market for coal and coke show strength.

Last year has the distinction of the largest ingot output ever made in a month—4,499,092 tons in March. The scarcely interrupted decline in the daily rate of steel ingot production that began in April is shown below in the statistics of the American Iron and Steel Institute:

Months, 1927	Daily Production, Gross Tons	Months, 1927	Daily Production, Gross Tons
January	144,611	July	127,134
February	157,557	August	128,552
March	166,633	September	124,312
April	157,494	October	126,500
May	157,430	November	119,299
June	133,387	December	......

A Hard Year for Pig Iron Producers

In pig iron production, 1927 ranks eighth among the high years, having been exceeded by 1916 and by every year in the succeeding decade except 1919, 1921, 1922 and 1924. We estimate the year's production (including charcoal iron, which is not included in the monthly statistics) at 36,400,000 tons. This compares with 39,372,729 tons in 1926.

The table below gives the number and capacity of furnaces in blast at the beginning of each month. The largest number was 223 on April 1, with a daily capacity of 113,435 tons, and the smallest, 170, on Dec. 1, with a daily capacity of 87,700 tons:

1927	Number In Blast	Daily Capacity Gross Tons	1927	Number In Blast	Daily Capacity Gross Tons
Jan. 1.....	203	98,360	July 1.....	198	100,240
Feb. 1.....	208	100,635	Aug. 1....	190	93,700
March 1...	217	106,135	Sept. 1....	187	93,800
April 1....	223	113,435	Oct. 1.....	179	90,800
May 1.....	220	112,955	Nov. 1....	172	88,300
June 1....	211	107,445	Dec. 1.....	170	87,700

Pig iron production of about 36,400,000 tons (December estimated) in 1927 (including charcoal iron, ferromanganese and spiegeleisen) was the smallest since 1924 and was exceeded in seven preceding years—1916, 1917, 1918, 1920, 1923, 1925 and 1926. Last year's output fell almost 10 per cent below the peak of 40,361,146 tons in 1923.

On Jan. 1, 1927, there were 204 furnaces in blast, while on Dec. 1 the number had declined to 170. Shutting down came rather rapidly in the last half of the year, reflecting not only the diminishing demand for steel, but smaller consumption by iron and steel foundries.

MORE FURNACES ABANDONED

The year brought further scrapping of obsolete furnace capacity, resulting in a net loss of 14 stacks. THE IRON AGE list of Jan. 1, 1927, showed 371 units as against 357 now. Of the 357 existing furnaces, 122 may be definitely rated as in the merchant class. Only 39 of the 122 were in blast on Dec. 1, and many of those which were not then in blast had been idle for the entire year, and doubtless many will go to the scrap heap before the end of 1928. Very little new capacity is being built or planned, so that the end of this year will see a further decline in the country's potential pig iron capacity.

Each year sees the end of the merchant furnace drawing near, and the time is coming when practically all of the iron made for sale will be furnished by the steel companies. The expansion of by-product coke oven capacity has made it necessary for the steel companies to keep blast furnaces going to use up the coke, and it has been cheaper for these companies to keep on making coke and iron, sometimes far in excess of their own requirements, especially in the large, modern furnaces which are capable of making 800 or 900 tons daily over long-extended periods.

PRICES LOWEST SINCE 1916

Pig iron prices showed the lowest year's average since 1916, THE IRON AGE composite price for 1927 averaging $18.55 against $20.42 in 1926, $20.58 in 1925 and $20.90 in 1924. Several months in 1916 had averages below $18. The 1927 composite was more than $7 per ton below the composite average of the eight years, 1919 to 1926, inclusive.

A significant development of the year was the growth of water shipments, together with the invasion of new territories by some furnace interests which would have been wholly at a disadvantage when shipping by rail. The Chicago district was invaded on several occasions by iron from Lake Erie ports. Large shipments from Buffalo were also made to the Detroit district.

EASTERN WATER SHIPMENTS

During the navigation season, shipments of Buffalo iron by New York State barge canal to New York, New Jersey and Connecticut points were more frequent than in preceding years, as Buffalo producers reached out for more territory to offset their loss of business in New England due to the extreme competition of Everett, Mass., Troy and Port Henry, N. Y., furnaces for that market. The Mystic furnace at Everett shipped tens of thousands of tons by barge to cast iron pipe foundries on the Delaware River above Philadelphia. thus competing actively with eastern Pennsylvania furnaces.

Lake Erie furnaces, which for most of the year were making more iron than could be absorbed in their natural territories, reached out to points where they were at a freight rate disadvantage, and in the Cincinnati district they undersold southern Ohio furnaces.

Southern iron, which was held at fairly high prices most of the year, lost some of its northern markets, but late in the year, when the Alabama producers reduced their quotations to the lowest point, with one exception, since October, 1916, they widened their markets somewhat in the territory contiguous to the Ohio River. They did not regain the opportunity, however, to ship iron in sizable quantities to points north of Cincinnati and St. Louis.

CHANGES IN OWNERSHIP

Among the changes of the past year was the acquisition of the Rogers-Brown furnaces at Buffalo by the M. A. Hanna Co., Cleveland. Another major transaction was the purchase of the Hamilton furnace at Hamilton, Ohio, by the Koppers Co. and the American Rolling Mill Co. This furnace will supply hot metal for the latter company's steel plant at Middletown, Ohio, as soon as a connecting railroad can be built. Interests affiliated with the American Rolling Mill Co. also bought the Norton furnace, long a factor in the merchant iron market of southern Ohio, and when modernized it will supply hot metal to the American Rolling Mill Co.'s Ashland, Ohio, plant. The two furnaces of this company at Columbus, Ohio, will not be needed for production of steel-making iron, but their future has not been determined.

MUCH LESS FOREIGN IRON

Foreign iron was less of a factor in the domestic market than in any of the five preceding years. Last year's receipts did not exceed 140,000 tons (last month estimated), while those of other recent years were as follows:

	Tons		Tons
1922	383,445	1925	441,425
1923	367,778	1926	445,773
1924	209,109	1927	118,769 (11 months)

Low prices here and comparatively high prices abroad left so little margin of profit that American brokers were unwilling to buy speculatively. A slight deterrent was the advance of 50 per cent in the tariff. from 75 cents per ton to $1.12½, under the flexible provisions of the tariff act, and a further retarding factor was the application of the anti-dumping duty on German pig iron after an investigation by the Treasury Department.

Scrap Had Small Fluctuations

Low cost of making pig iron in principal steel producing districts has served to keep down prices of heavy steel scrap, but other factors have also been at work, such as reduced consumption and the increased efficiency of the railroads, not only in gathering their own scrap but in transportation from all shipping points. The speculative profits of past years for handlers of scrap have been lacking, as prices of all grades have moved over a very narrow range. THE IRON AGE composite price of heavy melting steel for 1927, taking Pittsburgh, Chicago and Philadelphia markets as the bases, was $14, compared with $15.48 in 1928 and with an eight-year average of $17.35.

Efforts to Steady Prices

Prices had a good deal of attention throughout the year, nearly every product apart from rails having consideration in the effort of producers to stabilize the market. Strip makers announced an advance in February, but previously gave buyers full coverage for the second quarter at the low prices reached just after the turn of the year, and it took until well into the third quarter to complete the shipments on these protections.

In sheets an effort was made to limit the coverage given before an advance announced in the latter part of May. Buyers were given until June 30 to specify at the low prices, but in many cases the period was extended. The outcome was that no great amount of the announced advance was realized upon.

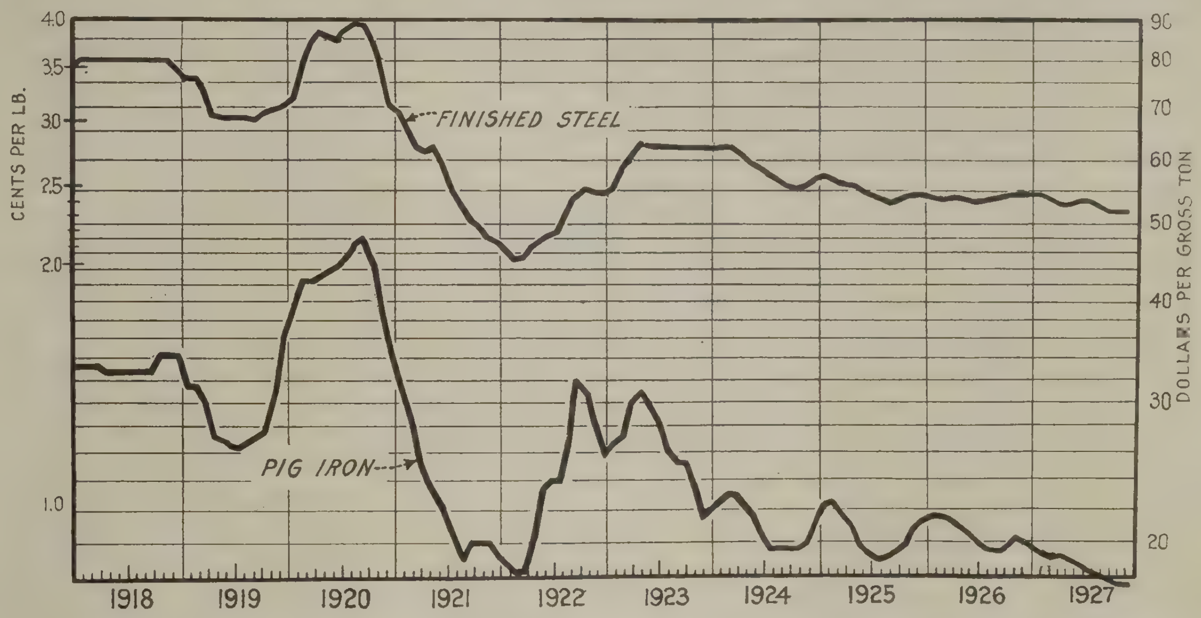
On Nov. 10 the Carnegie Steel Co. advanced plates, shapes and bars $1 a ton, or to 1.80c., Pittsburgh, but there was very general coverage well into the first quarter at the 1.75c. price.

In tin plate a reduction from $5.50 to $5.25 a box was made in December in the contract price which had nominally prevailed for three years. The new price was really an advance over some prices that had commonly been made, and it was announced that it would not be subject to concessions to the extent that had long been practiced.

Wire prices were the subject of an effort to raise the market, but by the end of the year producers had lost the ground that appeared to have been gained.

Generally speaking, it was a year of price weakness, and the average of THE IRON AGE's quotations on seven leading finished steel products was $1.64 per net ton below that of 1926.

Pig iron prices, as appears from the pig iron review on a preceding page, were the lowest since 1916.



Fluctuations Over Post-War Years in THE IRON AGE *Composite Prices of Pig Iron and Finished Steel. The relative stability of finished steel prices, when compared with pig iron, continues to be demonstrated. The highest finished steel composite figure during 1927 was 7 per cent above the lowest; in pig iron the divergence was 12.4 per cent. Since the peak early in 1923, both trends have been downward. Finished steel has lost 18 per cent and pig iron 43 per cent*

Exports Increase While Imports Decrease

Following up the gain made in exports in 1926, there was a further moderate addition to the iron and steel shipments from the United States to foreign countries in 1926. Figures for 11 months show a total of 2,012,541 gross tons, against 1,969,022 tons (11 months) a year earlier. It is true that this increase was accounted for wholly by large exports of scrap which in 11 months of 1927 exceeded the 1926 figure by 118,600 tons. Other products flowed outward in good volume, however, with varying changes from the preceding year.

Increases of 19,000 tons in tin plate, 3000 tons in wire, 25,000 tons in pig iron, and 118,600 tons in scrap were partly offset by decreases of 24,000 tons in bars, 5000 tons in plates, 19,000 tons in galvanized sheets, 12,000 tons in steel sheets, 3000 tons in hoops, bands and strip steel, 2000 tons in wire rods, 20,000 tons in structural material, 8000 tons in rails, 7500 tons in rail fastenings, 16,000 tons in boiler tubes, and 2500 tons in wire nails.

IMPORT DECLINE LARGELY IN PIG IRON

Meantime imports have shown a 34 per cent shrinkage—from 1,034,583 tons in 11 months of 1926 to 686,279 tons a year later. Nearly all of this falling off is accounted for by pig iron and scrap; together they showed a drop of 336,000 tons. Pig iron was 42 per cent of the 1926 total, and only 17 per cent in 1927.

Increases in imports of rolled products were considerable in 1927, though there was a decline of 46,000 tons in rails. Some of the increases were: 7700 tons of wire rods, 37,000 tons of structural shapes, 5400 tons of sheets, 6000 tons of hoops, bands and cotton ties, and 22,600 tons of wrought pipe. There was a decline in steel bars to the extent of 14,000 tons. Ingots, blooms, billets and slabs dropped over 50 per cent, or by more than 17,000 tons.

WHERE THE CHIEF EXPORTS WENT

As has been the case for many years, Canada was the largest buyer of our products last year, taking 38½ per cent of the total against 39 per cent in 1926. Shipments to Canada declined 11,000 tons to 771,197 tons in the first 11 months of 1927. Japan took more from us last year than in the preceding year by about 10 per cent. The total in 11 months went up to 251,153 tons, or 12½ per cent of all our exports. No other country, aside from these two, took as much as 100,000 tons.

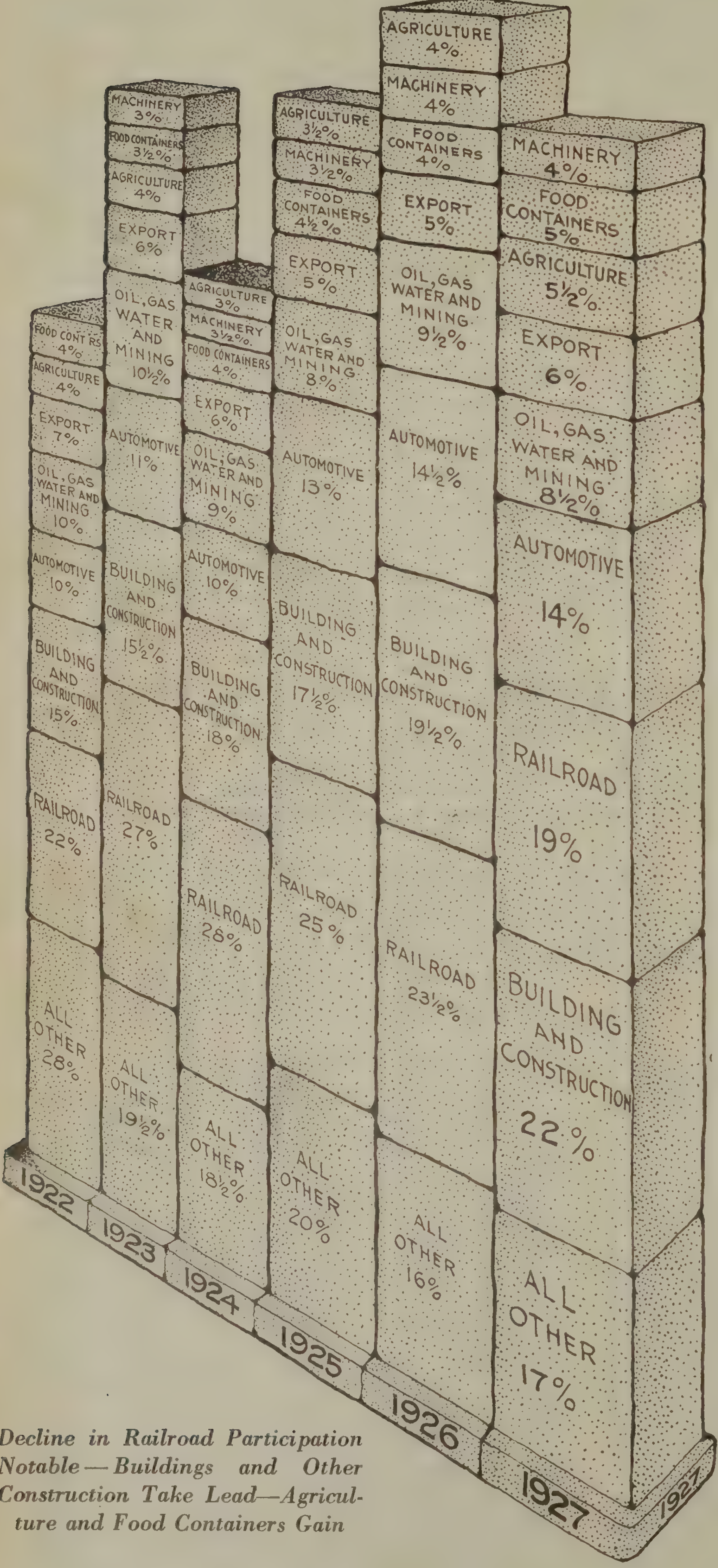
Cuba (87,480 tons) was in third position, with Argentina (75,465 tons) and Mexico (75,361 tons) following close together in fourth and fifth. In 1926 Mexico was third and Cuba fourth. Other countries taking upward of 50,000 tons in the first 11 months of last year were Brazil, Colombia, Great Britain and the Philippine Islands. China took a little more than 49,000 tons. Chile and Venezuela were beyond the 50,000-ton mark in 1926 but dropped well below it last year.

Rolled steel accounted for about 83 per cent of our exports last year, as in the year before. In imports rolled material made a heavy advance over preceding years, reaching about 57 per cent of the aggregate, compared with 35 per cent in 1926.

Belgium had a large lead as the source of imports in the first 11 months of the year, with a total of 185,939 tons. France, in second position, sent 125,411 tons, followed closely by Germany, with 121,829 tons. Other countries were far below. Canada sent 68,871 tons; India, 59,108 tons; Great Britain, 50,328 tons; Nether-

(*Concluded on page* 110)

What Steel Was Made and Where



Decline in Railroad Participation Notable — Buildings and Other Construction Take Lead—Agriculture and Food Containers Gain

SUBSTANTIAL gains in production of structural shapes and wire in 1927 were more than offset by losses in other products. As a result the year fell nearly 8 per cent behind 1926 in rolled steel output. Steel bars recorded the most notable drop—over 800,000 tons, or 30 per cent of the total decline of 2,743,000 tons.

Production is estimated at 32,039,000 gross tons, compared with 34,782,000 tons in 1926 and 32,660,000 tons in 1925. The total was above the 31,580,000 tons of 1923, but below the 33,068,000 tons of 1917 and 32,380,000 tons of 1916. No year, aside from those mentioned, has equaled the 1923 figure.

Estimates on production are based on returns from rolled steel makers accounting for 30,554,000 tons, or over 95 per cent of the year's total. This high rate affords further proof of the spirit of cooperation of the industry in providing, in confidence, information of value to the common cause. Less than 5 per cent of the industry had to be estimated. Consequently the dependability of the total figures has been improved over those of years of less abundant returns.

Moreover, a larger proportion than ever before provided detailed classification of distribution of their shipments. This group accounted for 78 per cent (24,991,000 tons), compared with 73.3 per cent last year and 65.5 per cent in 1925. The table in the center of pages 8 and 9 shows a composite of these data, as furnished by 41 companies.

To determine the final place of consumption of the large tonnages shipped by the steel makers to jobbers, careful allocation has had to be made, paying due regard to the class of material and to the customers of the jobbing industry. Because of the necessity to redistribute such large tonnages, ratio figures taken from the table covering 78 per cent of the output would be misleading. The jobbers furnish very little material to the railroads, but sell many thousands of tons to builders. The automobile plants buy practically all their re-

It Went in Nineteen-Twenty-Seven

quirements direct from the mills, but much of the oil, gas, water and mining tonnage passes through warehouses.

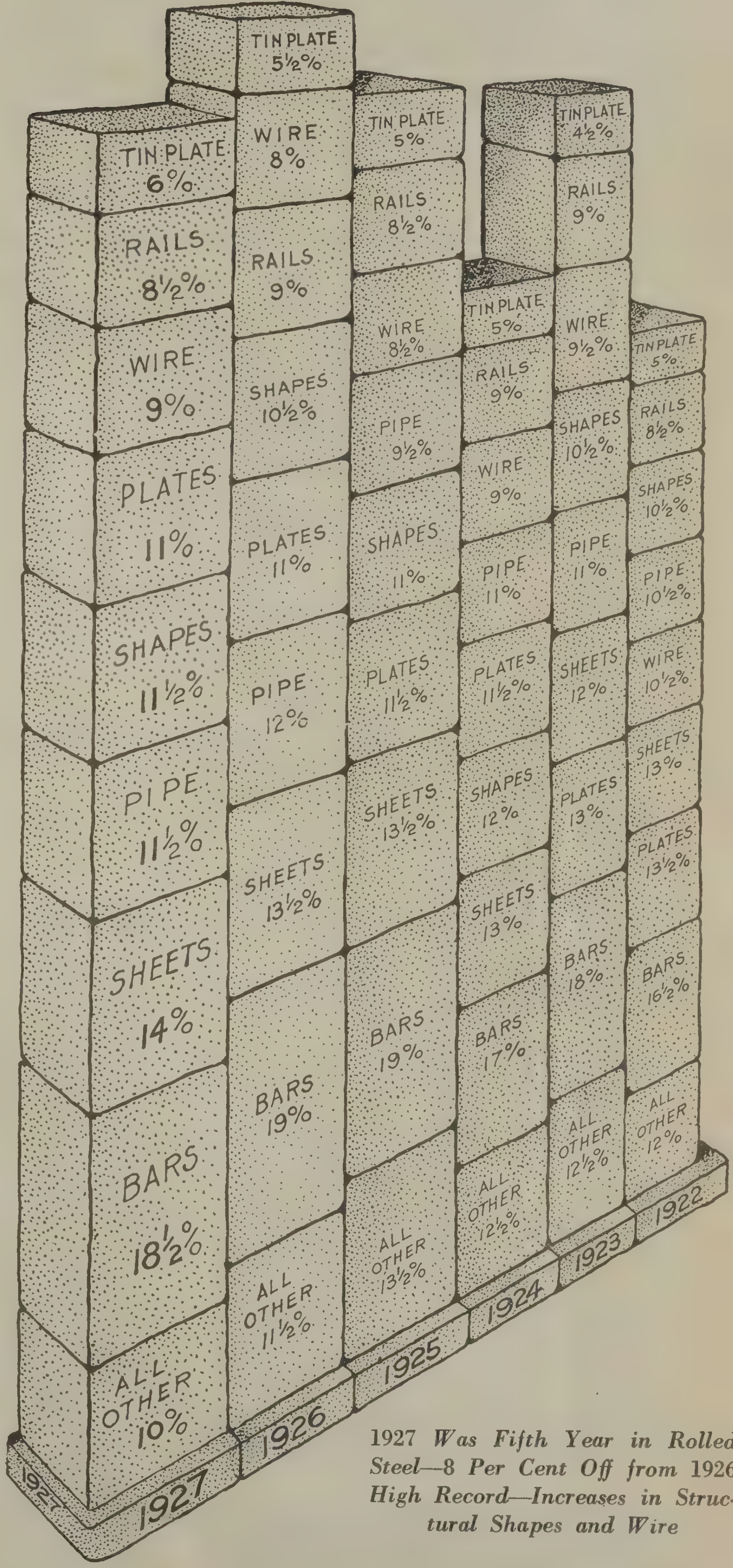
Warehouse purchases constituted 12¼ per cent of the total steel sales reported by the 41 companies which showed complete distribution of their product. More than 3,060,000 tons followed this channel on the way into ultimate service, out of 25,000,000 tons reported. Among the items thus passing through the "middleman," pipe, with more than 1,050,000 tons, represented 34 per cent. More than 500,000 tons of wire, and some 300,000 tons each of sheets, bars and shapes, were sold through the jobbing trade.

By taking more steel than ever before—more, even, than in the record-breaking preceding year—buildings and other construction have taken first place in 1927, relegating the railroads to second position. It is estimated that construction absorbed 7,050,000 tons of steel, while the railroads accounted for but 6,125,000 tons. This estimate of the complete distribution places the automotive consumption above 4,500,000 tons.

Estimates of the total production of the various forms of steel in 1927 are given in a table in this column. Bars, including concrete bars, continue to hold the top position, with over 18 per cent of the total. Sheets were in second place, with pipe, shapes and plates, closely grouped, following. In preparing this table allowance had to be made for the final conversion into finished product of such billets, slabs, sheet bars, wire rod and skelp as were sold in those forms by the principal makers.

Estimated Production in 1927

	Gross Tons	Per Cent
Heavy rails	2,559,000	8.0
Light rails	165,000	0.5
Track accessories	979,000	3.0
Plates	3,514,000	11.0
Structural shapes	3,632,000	11.3
Steel bars	5,895,000	18.4
Hoops, bands, cotton ties	732,000	2.3
Strip steel	931,000	2.9
Tin plate	1,830,000	5.7
Sheets	4,539,000	14.2
Pipes and tubes	3,713,000	11.6
Wire products	2,842,000	8.9
All other products	708,000	2.2
Total	32,039,000	



1927 Was Fifth Year in Rolled Steel—8 Per Cent Off from 1926 High Record—Increases in Structural Shapes and Wire

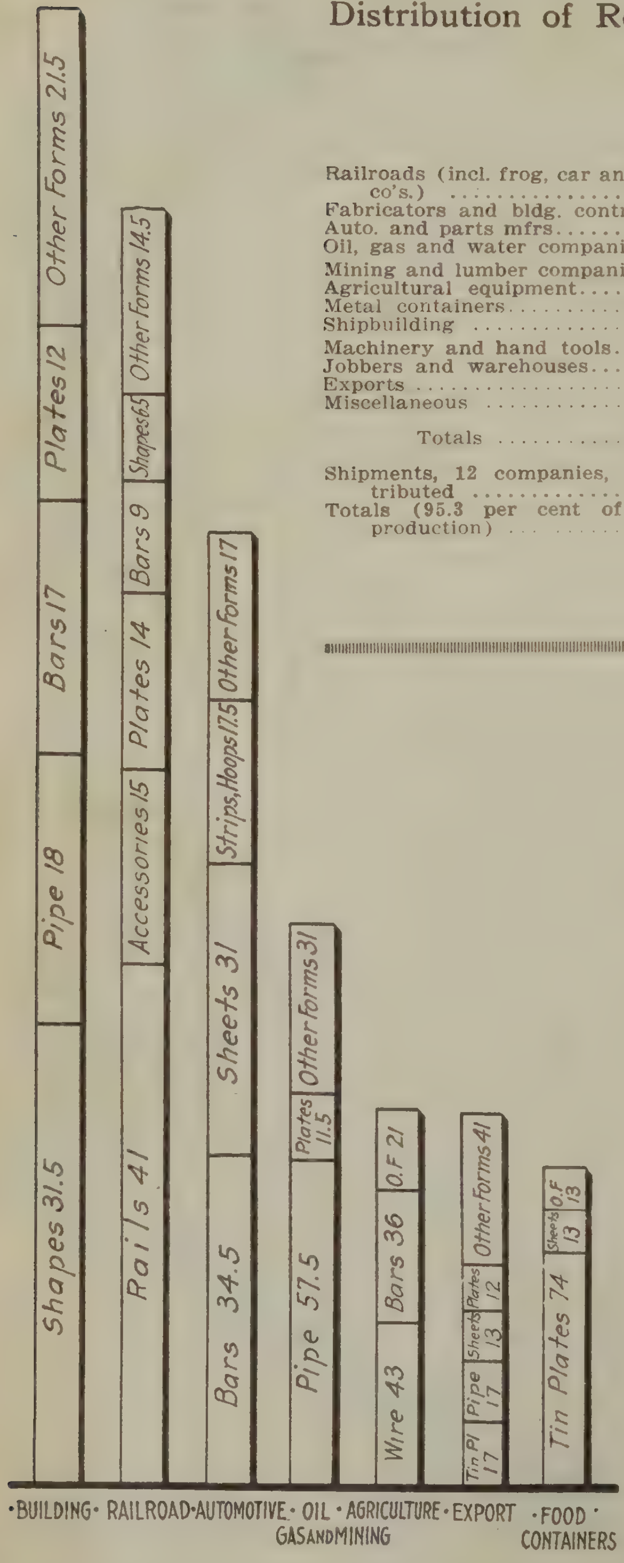
Forms of Steel Different Industries Took in 1927, *Showing Percentages Making Up the Total for Each Industry*

	Rails	Track Accessories	Plates	Shapes	Bars	Hoops, Bands and Ties	Tin Plate	Sheets	Tubes and Pipe	Wire Products	Strip Steel	All Others
Railroads (incl. cars and locomotives)	40.7	15.1	13.8	6.4	8.9	...	1.1	5.2	1.0	1.6	...	6.2
Buildings, bridges and other construction (not railroad)	...	...	11.9	31.3	17.3	0.9	1.1	8.9	18.2	6.7	1.6	2.1
Automobiles and trucks	...	...	6.1	3.8	34.6	7.6	1.0	30.7	1.1	4.3	9.7	1.1
Oil, gas, water, mining and lumber	5.7	0.5	11.5	3.3	5.5	1.2	2.8	7.3	57.6	3.4	...	1.2
Agriculture	...	...	3.5	2.8	35.7	1.7	1.1	7.8	1.9	43.1	1.4	1.0
Food containers	...	...	3.5	...	0.8	4.7	73.6	13.3	...	2.1	1.1	0.9
Shipbuilding	...	...	48.5	16.9	18.3	1.0	1.2	7.1	1.0	2.4	1.0	2.8
Machinery (electric, textile, machine tools, etc.)	...	...	10.5	10.1	46.4	2.4	1.1	6.3	5.6	12.6	1.0	4.0
Exports	8.9	1.3	11.6	9.5	9.4	1.2	16.9	13.2	16.7	9.3	...	2.0
Miscellaneous	0.5	...	11.8	7.3	18.2	2.1	2.0	25.7	7.7	17.4	5.3	2.0

Distribution of Rolled Steel in 1927, According to Shipments

Amount of Each Form Taken, in Thousands

	Heavy Rails	Light Rails	Track Accessories	Plates	Structural Shapes	Bars	Hoops, Bands and Cotton Ties
Railroads (incl. frog, car and loco. co's.)	2,335.8	2.0	867.5	661.7	265.7	351.4	11.9
Fabricators and bldg. contractors	7.0	0.8	0.5	642.3	1,710.8	759.4	49.2
Auto. and parts mfrs	....	....	0.1	132.6	29.9	1,145.9	321.8
Oil, gas and water companies	2.5	1.8	0.9	202.8	27.4	47.4	11.3
Mining and lumber companies	21.2	64.4	11.1	33.0	17.1	33.8	3.6
Agricultural equipment	0.6	0.2	0.1	37.6	11.3	196.9	21.2
Metal containers	....	....	....	39.7	1.8	4.0	65.0
Shipbuilding	....	....	....	160.8	41.3	39.7	0.7
Machinery and hand tools	0.6	1.0	0.1	70.0	51.2	361.7	15.4
Jobbers and warehouses	21.2	9.5	13.4	135.5	274.0	340.7	41.1
Exports	151.4	5.6	22.8	181.1	147.9	144.9	18.4
Miscellaneous	18.4	4.6	12.4	383.3	171.6	588.5	70.9
Totals	2,558.7	89.9	928.9	2,680.4	2,750.0	4,014.3	630.5
Shipments, 12 companies, undistributed	....	....	....	327.6	358.2	856.1	3.6
Totals (95.3 per cent of total production)	2,558.7	89.9	928.9	3,008.0	3,108.2	4,870.4	634.1



Consumption of Important Industries. For example: Of railroad purchases, 41 per cent was rails, 14 per cent plates, 9 per cent bars, etc.

Building Steel Surpassed

COMPARED with 1926, there was a considerable change in the proportions of steel taken by several important industries. Agriculture and the "tin can" interests both advanced from 4 per cent of the total in 1926 to about 5 per cent in 1927. Exports gained, through a slight advance in tonnage shipped, out of a lower aggregate of steel produced. A falling off was registered by the oil and mining group and a smaller drop by the automotive industry. The railroads took much less than in 1926, while the building industry, maintaining its enormous stride of the preceding year, absorbed a considerably larger proportion of a smaller total tonnage. Shipbuilding (not shown separately in the diagram on page 6) took 1¼ per cent of the rolled output.

Because of the decline in railroad purchasing and, to a less extent, of the mineral and the automotive groups, the four largest avenues of consumption showed a falling off in their percentage of total steel used. Instead of 67 per cent, as in 1926, they accounted for only 62½ per cent of the aggregate in 1927. This is the smallest such ratio since 1922, for the "big four" absorbed 63½ per cent of the 1925 total, 65 per cent of that of 1924 and 64 per cent in 1923. Construction activity has shown a healthy and well-nigh steady gain. From 15 per cent of all in 1922 it has advanced to 22 per cent in 1927, with the only setback (from 18 per cent in 1924 to 17½ per cent in 1925) representing actually an increased tonnage, though at a rate of gain less than was registered by other lines.

What Percentage of Each Form of Steel Was Distributed in 1927 Among the Industries

	Automotive	Railroads	Agriculture	Buildings and Construction	Shipbuilding	Food and Other Containers	Machinery	Oil, Gas, Water and Mining	Exports	Miscellaneous
Rails	...	86.7	...	0.7	...	...	...	5.3	5.8	1.5
Track accessories	...	93.7	...	...	...	...	...	1.4	2.5	2.4
Plates	8.3	23.8	1.8	23.8	6.1	1.5	3.6	8.7	6.2	16.2
Shapes	5.1	10.7	1.3	60.2	2.1	...	3.3	2.4	4.9	10.0
Bars	28.2	9.2	10.7	20.4	1.4	...	9.4	2.5	3.0	15.2
Sheets	32.4	7.0	3.0	13.6	0.7	4.4	1.6	4.3	5.4	27.6
Tin plate	2.7	3.5	1.0	4.2	...	60.6	0.8	4.1	17.4	5.7
Wire products	7.3	3.5	26.8	16.5	...	1.1	5.3	3.2	6.2	30.1
Pipes and tubes	1.5	1.7	0.9	34.3	...	...	1.8	41.2	8.4	10.2
Hoops, bands, etc	50.0	3.0	4.2	8.9	0.6	9.6	3.9	2.9	2.7	14.2
Strip steel	50.4	1.9	2.7	12.1	...	1.7	1.3	1.3	...	28.6
All other	5.8	46.0	1.9	16.5	1.6	...	6.1	4.5	5.2	12.4

of 41 Companies Producing 78 Per Cent of the Year's Output

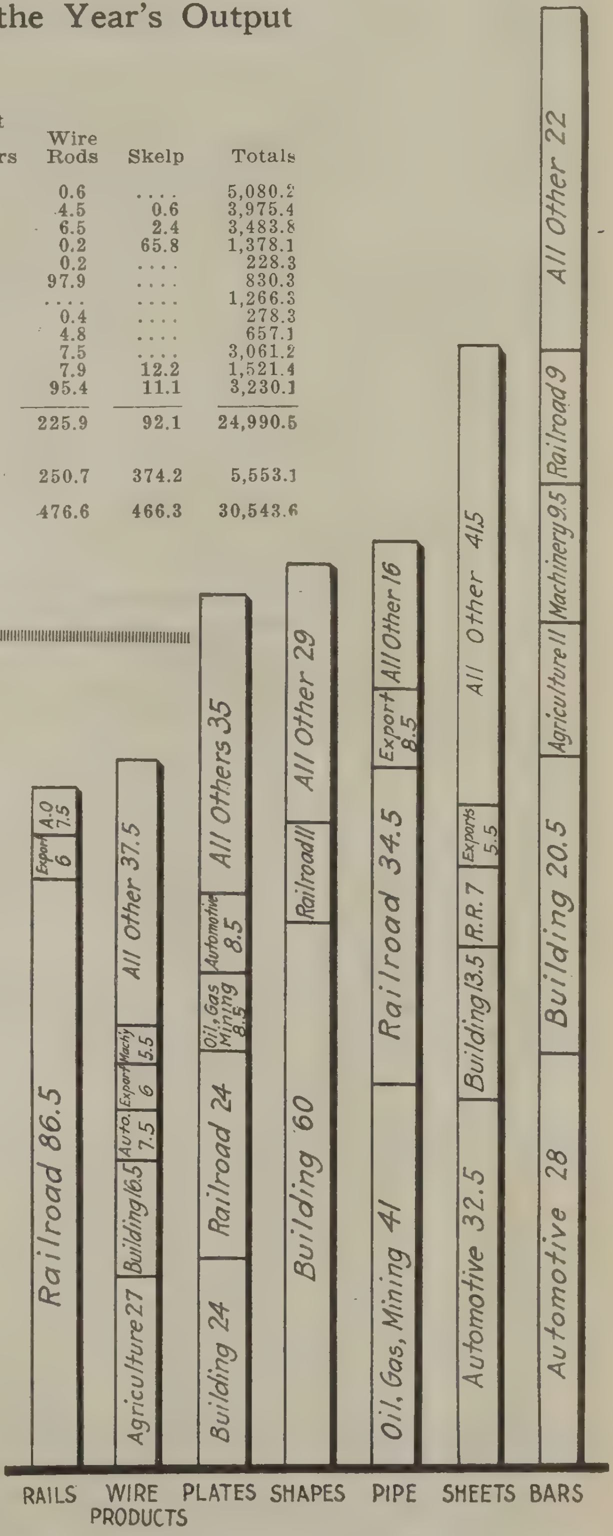
of Gross Tons, by Different Industries

Black Plate for Tinning	All Other Black Plate and Sheets	Tubes and Pipe	Wire Products	Strip Steel	All Other Finished	Billets and Slabs	Sheet and Tin Bars	Wire Rods	Skelp	Totals
7.5	178.3	46.7	44.7	14.2	245.8	45.9	0.5	0.6	....	5,080.2
8.3	360.0	42.0	191.8	90.8	83.0	16.9	7.5	4.5	0.6	3,975.4
19.6	931.3	29.9	117.8	434.0	28.0	178.1	105.9	6.5	2.4	3,483.8
62.3	85.9	812.0	22.0	0.5	14.1	21.2	....	0.2	65.8	1,378.1
0.5	10.6	5.3	19.0	0.5	6.8	1.2	....	0.2	....	228.3
3.5	72.5	3.0	335.8	18.4	7.0	24.1	0.2	97.9	....	830.3
1,000.4	95.6	0.6	23.4	12.3	1.5	3.9	18.1	....	....	1,266.3
0.3	7.2	3.4	6.8	0.5	5.1	12.1	....	0.4	....	278.3
0.3	21.6	28.9	29.8	5.2	29.7	36.8	....	4.8	....	657.1
107.3	297.2	1,052.7	501.6	61.8	32.3	36.1	129.3	7.5	....	3,061.2
285.3	209.5	182.2	119.0	2.2	28.2	2.7	0.1	7.9	12.2	1,521.4
80.7	754.3	170.5	357.1	241.5	60.0	119.5	90.3	95.4	11.1	3,230.1
1,576.0	3,024.0	2,377.2	1,768.8	881.9	541.5	498.5	351.9	225.9	92.1	24,990.5
82.7	335.9	679.5	452.3	....	154.6	751.5	926.2	250.7	374.2	5,553.1
1,658.7	3,359.9	3,056.7	2,221.1	881.9	696.1	1,250.0	1,278.1	476.6	466.3	30,543.6

Railroad Tonnage in 1927

Nearly 41 per cent of the steel tonnage bought by the railroads consisted of rails. Almost one-third of the construction tonnage was in structural shapes. Of the automobile purchases, one-third consisted of bars and nearly an equal quantity of sheets. Much more than half of what the oil and mining interests took was pipe. About 43 per cent of the agricultural tonnage was wire and more than three-fifths of the remainder was bars, mainly used in machinery manufacture. Three-fourths of the food container tonnage consisted of tin plate and half the remainder was sheets. Five-sixths of the tonnage going into shipbuilding was of plates, shapes and bars, the former greatly predominating. These facts, and many others, are brought out by the table and the diagram on page 8.

More than six-sevenths of all the rails went to the railroads, as shown by table and diagram on page 9. They took, also, nearly all the track accessories and one-quarter of the plates. Automobiles accounted for half of the hoops and bands and of the strip steel, one-third of the sheets and more than one-quarter of the steel bars. Agriculture absorbed one-quarter of the wire. Construction required three-fifths of the structural shapes, one-third of the pipe and one-quarter of the plates, and was second only to the automobile in the taking of bars. Food containers took three-fifths of the tin plate, while the oil group was the greatest purchaser of pipe, with more than two-fifths of the total. Exports ran unusually heavy on tin plate, more than one-sixth of the output going abroad.



Which Industries the Different Forms of Steel Served in 1927. Of bars, 28 per cent went to automotive plants, 20½ per cent into building, etc.

Some Improvement in Steel Trade Forecast for 1928

Greater Volume and Enhanced Prices Anticipated by Doctor Haney—General Business Betterment Expected to Help

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

ALTHOUGH 1927 was characterized by a generally declining trend in business, it is none the less true that the total volume for the year was not greatly less than in its predecessor. Industrial production was little more than 2 per cent under 1926. Manufacturing production was nearly 3 per cent less, largely because of the sharp decline in automobile production. Wholesale sales were nearly 4 per cent smaller than in 1926 (see Fig. 3). Railroad freight tonnage for the first 11 months was 2.3 per cent smaller than in the same period of the preceding year. These comparisons are indicative of the strong basic conditions in industry and manufacturing.

Some indexes of business actually showed an increase over the preceding year. Bank debits were 11 per cent greater and retail sales were between 2 and 3 per cent larger. Of course, the very large volume of trade in securities, at record breaking levels, is partly responsible for the rise in bank debits.

But, while the total volume for the year was thus by no means small, the trend during the year was downward. Comparing November, 1927, with November, 1926, industrial production and manufacturing fell about 8 per cent, and employment in factories was more than 6 per cent smaller. Freight traffic actually declined about 25 per cent (see Fig. 1). Imports, which are a good measure of industrial activity, were more than 8 per cent smaller (Fig. 6). One of the largest declines during the year occurred in automobile production, which was 53 per cent lower in November, 1927, than a year earlier. Building activity, however, had recovered by November to within 1 per cent of the same month of 1926.

The foregoing statements apply to production and trade in commodities. Speculative transactions in securities and the financial factors show a different trend. The average price of stocks was some 32 per cent higher last November than in the same month of 1926, and brokers' loans showed almost exactly the same increase. The net demand deposits of the member banks of the Federal Reserve System were 8.7 per cent larger and total loans and discounts were up nearly 7 per cent. Some phases of business, too, showed large gains. Thus bank debits, in spite of some decline toward the end of the year, were 15.8 per cent larger. Farm prices showed a notable gain of 7.9 per cent and *Bradstreet's* index of wholesale commodity prices averaged 5.9 per cent higher.

Thus at the end of the year we find the physical volume of industry and trade at a relatively low level—somewhat below normal—while security prices were very high and bank credit much extended in connection with investments in stocks and bonds and loans secured by them.

Improved Basic Business Conditions

SOME real progress toward improvement in business fundamentals was accomplished during 1927. The following impress me as being the most important points:

1. Considerable recovery occurred in farm prices, which gained on prices of non-agricultural commodities, thus correcting one of the serious maladjustments of the preceding year (see Fig. 2). On the whole, the agricultural situation appears to have turned its post-war corner.
2. The cost of living was reduced in 1927, the National Industrial Conference Board's index falling 2.4 per cent. Residential rentals were reduced materially.
3. Certain basic industries which have been depressed during recent years showed recovery. This is notably true of leather and copper. Cotton manufacturing, too, made gains during the year and wool manufacturing worked into a po-

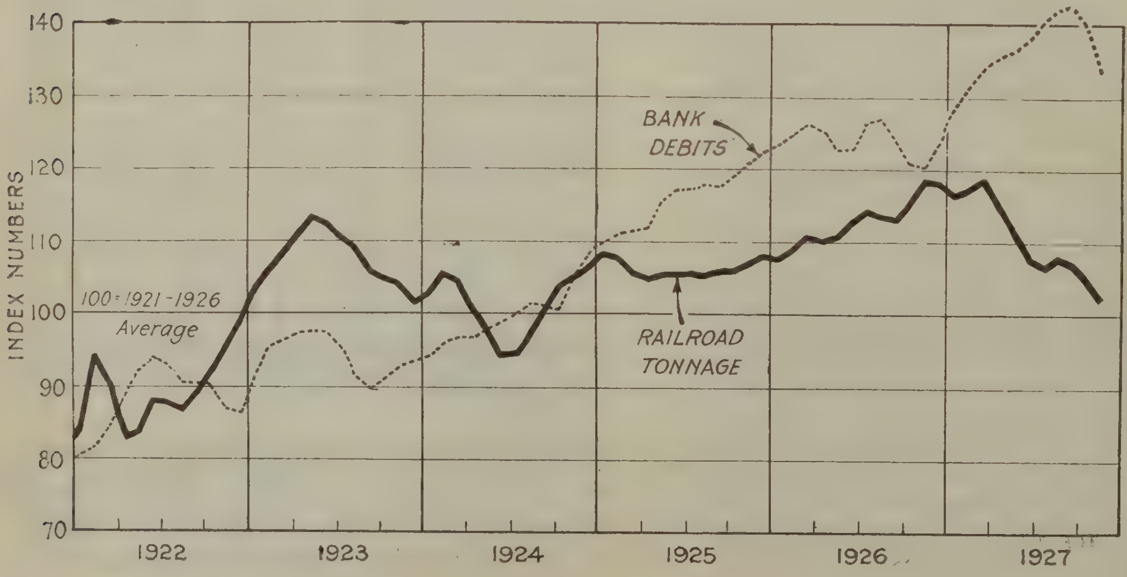


Fig. 1—While Freight Traffic for the First 11 Months Was Only 2.3 Per Cent Lower Than in 1926, November Showed a Decline of 25 Per Cent. Bank debits, on the other hand, made the highest record ever known, averaging 11 per cent above 1926

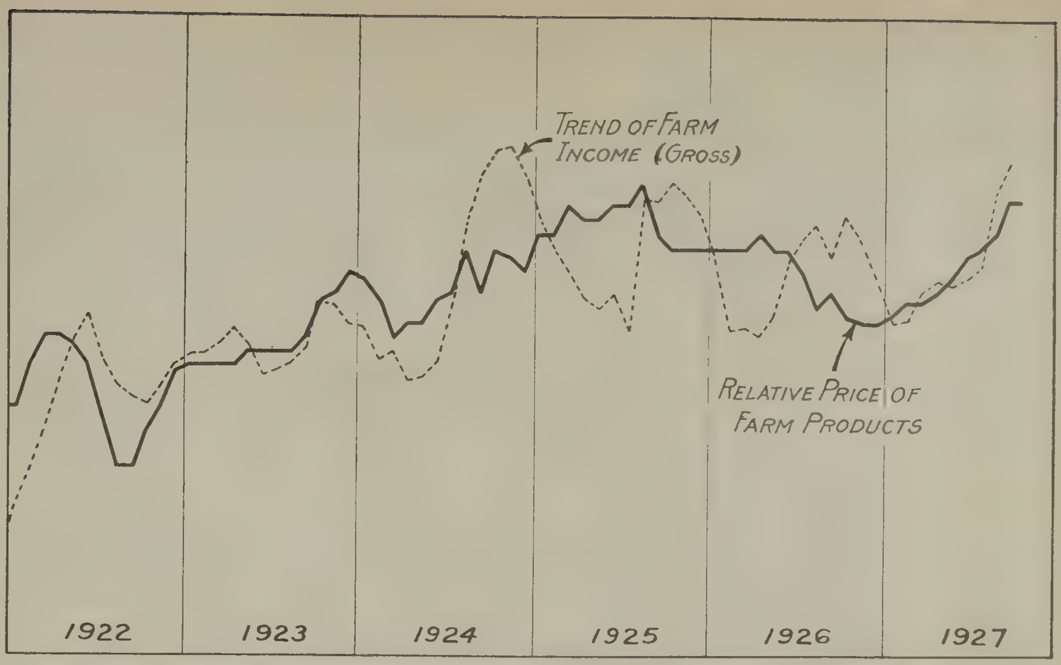


Fig. 2—Farm Purchasing Power May Be Measured by the Relation Between Prices of Farm Products and Prices of What the Farmer Buys. At present the farmer appears to have reached a more comfortable position

sition from which improvement may be expected. Perhaps the outstanding development of this sort, however, was the recovery in the cattle raising industry.

4. Improvement of European financial and industrial conditions (particularly the former) was a notable achievement, the outstanding event being the resumption of a gold basis in Italy. The chief currencies are now stabilized and this will benefit world trade.

5. In connection with the preceding point, there were clear signs of a more effective cooperation among the central banks of the leading countries and the beginning of what it is hoped will be an orderly readjustment of the gold supply of the world. Considerable gold exports occurred toward the end of the year, without indications of causing serious disturbance (see Fig. 6).

6. Within the United States progress toward a readjustment of an over-extended real estate situation appears to have been made without a crisis.

7. Industry has adjusted itself more completely to the so-called hand-to-mouth buying regime, the progress made in operating with smaller inventories being notable.

8. Progress has been made toward more effective cooperation in a number of industries, such as textiles, copper and sugar. The formation of trade organizations designed to use statistical information more effectively and to eliminate unfair competitive practices may, if not abused, mark a real advance.

Further Adjustments Needed

SOME of the maladjustments which were noted a year ago were corrected in 1927. At that time I called attention to over-production of copper, cotton textiles, oil, lard, automobiles, building, pig iron and corn. Probably it may be said that in each of these cases there is now no over-production, although some further correction may be required in cotton textiles and pig iron.

On the other hand, some of the former maladjustments still exist. Stocks of manufactured goods in producers' hands again appear to be too large for comfort, and certainly prevent the conclusion that any shortages exist. (It may be noted, however, that this is, in part at least, a natural consequence of the practice of hand-to-mouth buying.) Bank credit is even more extended than at the beginning of the year, and it is noteworthy that the large increase in bank credit has been due almost entirely to loans and investments connected with the security markets. This, in my opinion, constitutes the chief maladjustment.

Money rates still appear out of adjustment with the commodity price level, although the situation is now reversed in comparison with that which existed a year ago. At that time money rates were relatively high, now they are relatively low, and appear to be so partly

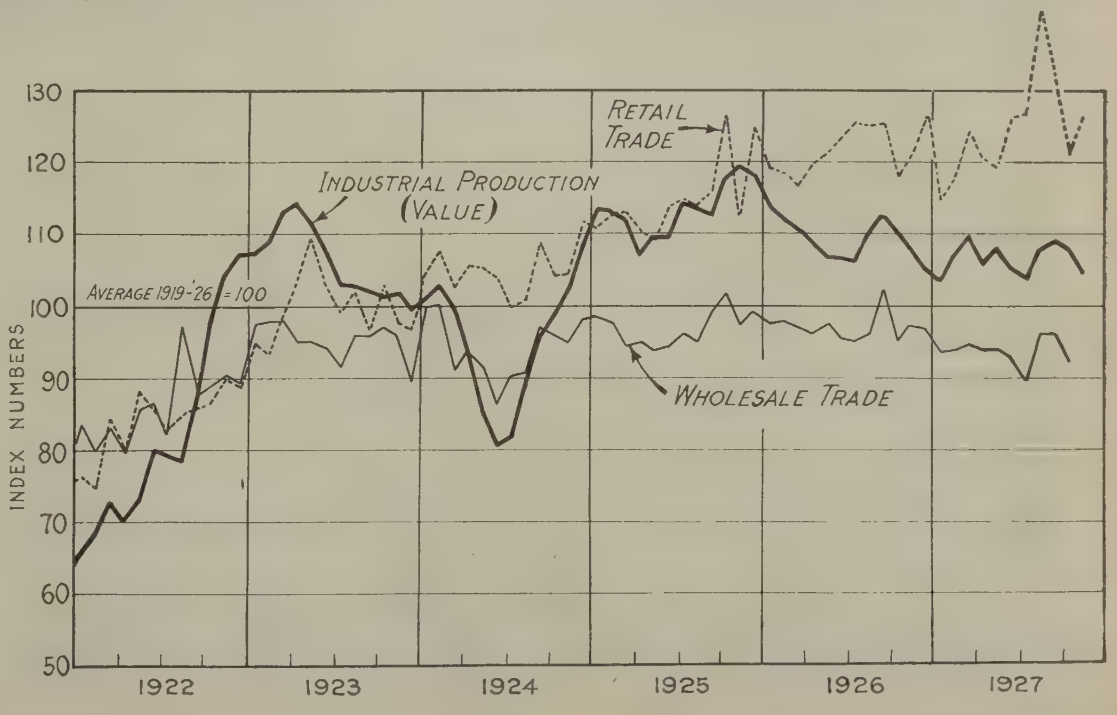


Fig. 3—Wholesale Trade in 1927 Was 4 Per Cent Below 1926, But Retail Sales Are Estimated at 2½ Per Cent Above the Previous Year. Industrial production showed a decline of little more than 2 per cent

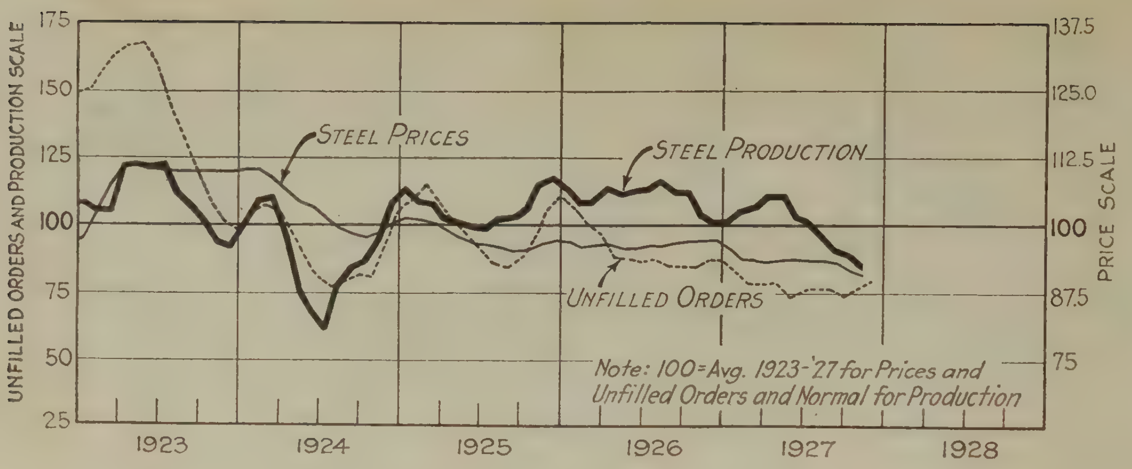


Fig. 4—Finished Steel Was Less Steady in Price in 1927, *Dropping From a Virtually Uniform* 12-*Month Level to* 5 *Per Cent Lower. Production fell off perhaps* 8 *per cent. Unfilled orders were lower, but their decline of* 18 *months has been succeeded by a rising movement*

on account of a banking policy which may well be called "artificial." It seems, too, that imports are relatively large when compared with exports (Fig. 6).

Since August, at least, the recession in business has been so clear that no one could fail to see it. The adjusted index of bank debits in that month, as shown in the first chart, was 143 per cent of the average for 1921-1926, but fell to 133 per cent in November. Railroad freight tonnage was 109 per cent and fell to 102 per cent. Here, however, the similarity between the two ceases. Railroad traffic has declined since November, 1926, while bank debits rose steadily and sharply until last August. Freight traffic is the lowest since September, 1924, while bank debits are still higher than at any time in 1926.

This is one of the most pronounced divergences on record. It goes hand in hand with the outstanding characteristic of 1927: The difference in trend between "industry" and "finance"—the one receding, the other expanding. The rise in bank debits reflects the inflation which has affected speculation and retail buying, and the relative over-extension of bank credit in these directions, while the decline in freight traffic reflects the contraction of industrial output.

This condition represents a maladjustment, but it does not seem to be necessarily serious. For one thing, it is partly due to a lower basic level of interest rates, based on the large supply and lower unit productivity of invested capital. The trend of yield on bonds (which fairly represents the basis for capitalizing a reasonably certain income) has been rather steadily downward. This has justified higher prices for equities in the invested capital which yields such income. Thus abundant funds and a lower basis for capitalization have brought higher capital values in spite of the reduced volume of business and earnings.

Of course, such trends cannot go on forever. The outward movement of gold and heavy investments abroad are tending to check the declining trend of interest rates and thus to terminate the advance in capital values. But, just as stocks and bonds went up in 1926 and 1927 while business receded, so business may expand in 1928 in spite of some recession in stocks and bonds. Moreover, before long, any increase in net earnings in business will tend to offset a decline in the basis for capitalizing such earnings.

Business Likely to Gain on Finance

WHAT seems likely, therefore, is a readjustment in the relation between business and finance which will temporarily check both the decline in the interest rate and the rise in security values sufficiently to bring them into line with business earnings. Earnings have fallen so low that a very low basis of capitalization is required to justify present security values. Therefore, what is needed for a time is higher earnings. Temporarily this will probably cause a higher interest rate and lower security values. In a few months, however, higher earnings and a cessation of rising interest rates are likely again to bring higher security values.

It is doubtful if so far-reaching a readjustment can be completed in a year. Nineteen hundred and twenty-eight will probably see the initial phase of a development which will extend over a period of years and be attended by a series of readjustments, in which gold exports, foreign competition, manipulation of money rates by the Federal Reserve Board and corresponding fluctuations in security values will be the outstanding features.

Steel Sales Unusually Stable

AS to the iron and steel industry, the year was one of rather steady and sharp recession. As the fourth chart shows, the decline began in June and the output of steel ingots in November, allowing for seasonal conditions, was the lowest since September, 1924.

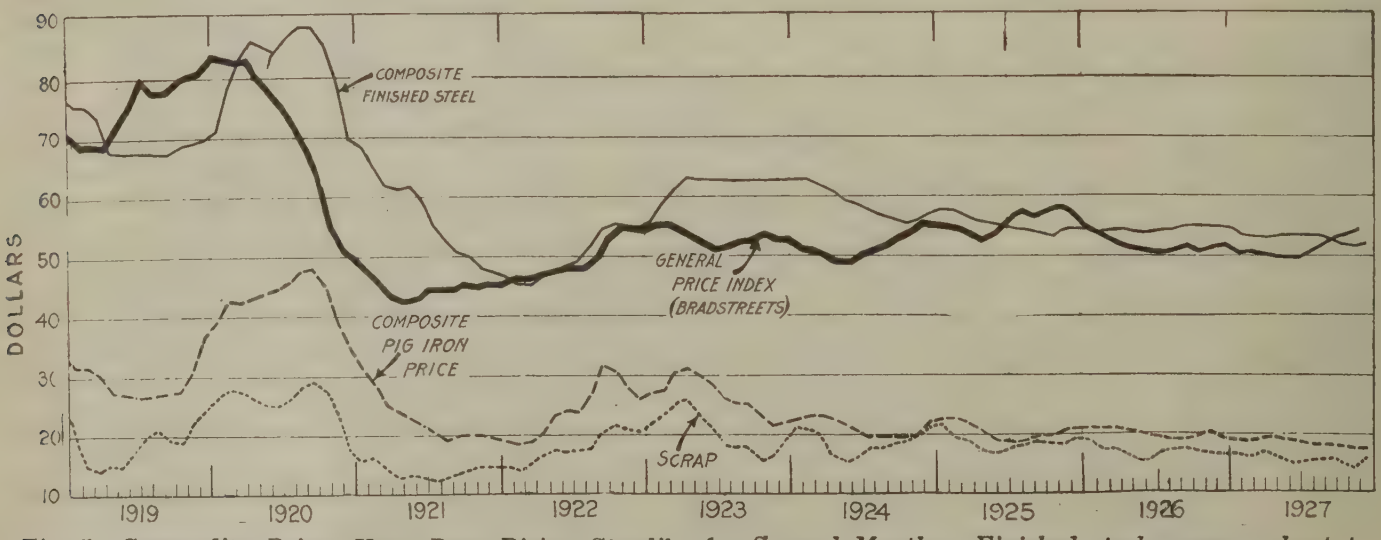


Fig. 5—Commodity Prices Have Been Rising Steadily for Several Months. Finished steel appears about to follow, but pig iron still clings to its lowest level since 1916. *Scrap has been below all records since* 1921 *but now is going upward*

Summary of Year's Developments as Outlined by Doctor Haney

1. The year 1927 was one of declining volume of industry and business profits. It lay in the course of a downward swing of a business cycle.

2. At the end of the year the recession in business, notably in steel production, had gone so far that the end of the decline appeared to be near. The absence of credit stringency, recovery in commodity prices, and improved farm purchasing power, all strengthened this conclusion.

3. The year is notable for the divergence between "business" and "financial" indexes, a rather steady expansion in bank credit and security market operations going on while industry receded. Toward the end of the year, the gradual tightening in the position of bank credit (large gold exports and high brokers' loans), and the high level of prices for many stocks and bonds, indicated the probability of higher money rates to come and a readjustment in the security markets.

4. As the new year opens, the outlook is more favorable than that which confronted 1927, for a business recession is in the last stages and is not beginning, as was the case a year ago. A recovery in the volume of industry and in business profits is probable during the first half of the year. The tightening of money markets that is to be expected may be sufficient to check the expansion in business later on; but so far as can now be seen a rising trend, followed by irregular stability, is probable. Sustained construction activity, increased automobile production, and a moderate gain in railroad buying promise increased steel business during the first half year. Stronger markets for iron and steel are probable by February.

It was 15 per cent below normal. The year began and ended with steel production lower than in 1926, and the peak reached in May was considerably under the high point reached in July and August, 1926. Much of the same situation existed in pig iron production, there being a rather sharp recession from April on. The decline in October and November was not so great as in the case of the steel output and, accordingly, the year ends with pig iron production relatively high as judged by steel-making requirements. The ratio of the average daily production of pig iron to the average daily production of steel was abnormally high most of the year. At the end, pig iron production was only 6 per cent under normal.

Unfilled orders of the Steel Corporation reached bottom in May, after a long decline which began in December, 1925. The unfilled orders have been unusually stable at a low level, but the trend was gradually upward toward the close of the year.

Sales of some of the chief items of finished steel during the first 11 months of 1927 amounted to 6,591,000 tons, which compares with 6,619,000 tons in the preceding year, and is practically the same as the volume recorded in the first 11 months of 1925. Steel sales have been unusually stable throughout the year and in November increased to a point considerably above a year ago. This is chiefly due to the recovery in building activity and in agricultural buying of farm machinery and implements.

On the whole, the activity in the steel consuming

(*Concluded on page* 109)

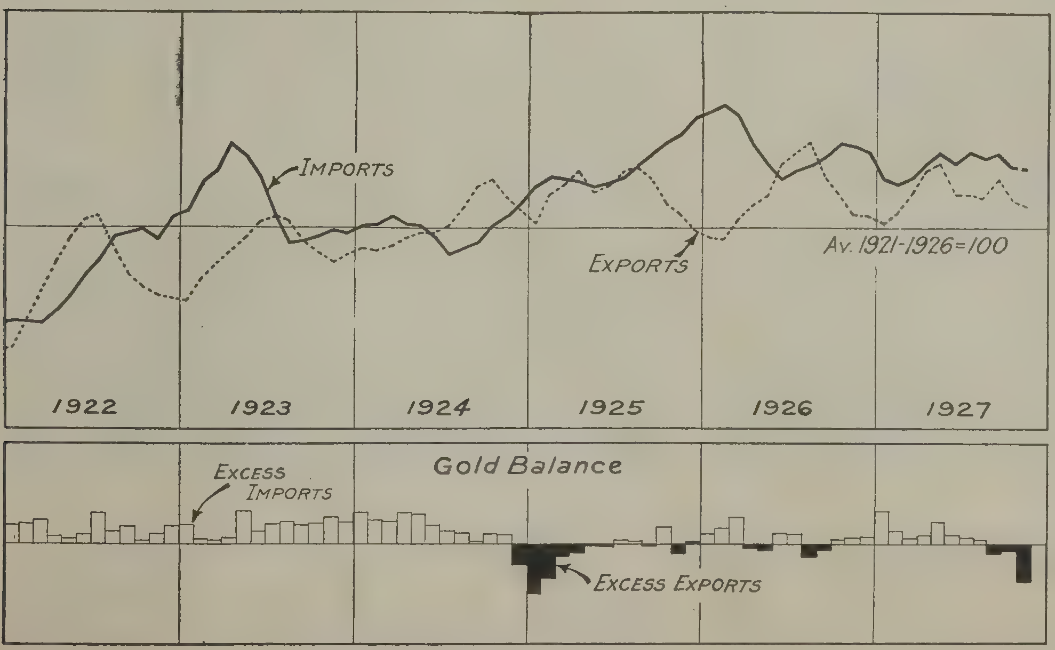


Fig. 6—Imports, Which Are Regarded as a Good Index of Industrial Activity, Were 8 Per Cent Lower in 1927 Than in 1926, But Remained Large Relative to Exports. Gold now is flowing outward in heavy volume

Aircraft of Increasing Importance to Metal Industries

To Aviation's Demands Will Be Added Those Due to Changes Air Travel Will Cause in Modes of Land Travel

BY HORACE C. KNERR*

AIRCRAFT manufacture is giving the world a new branch of the metal-working industry, already of respectable proportions and growing with increasing speed. Last year the Department of Commerce listed more than 90 manufacturers, as many distributers of aircraft, and several hundred firms interested in accessories and associated products. It is probably conservative to say that the activity of the firms listed has doubled in 1927. and that many new firms have entered the industry. Flying fields by hundreds are being established in cities and towns throughout the country. Chicago alone claims a dozen or more.

While much of this growth may be of the mushroom variety, resulting from popular enthusiasm, and therefore short lived, the importance of air transportation is such that a large and steadily growing industry is assured. The transportation of air-mail by private firms under contract to the Government today covers more than 8000 miles of scheduled routes with over 4000 miles lighted for night flying. The Army and Navy are placing large orders with private manufacturers, and the use of airplanes for private flying, both for business and pleasure, has reached astonishing figures. One manufacturer alone is scheduling a production of 100 planes per month for such use; another small town in the Middle West has five busy aircraft factories; there are some sixty odd industries in the Detroit territory engaged in aircraft construction, operation or associated activities. Such instances could be extended to a long list.

Dirigibles, although not at present greatly in the public eye, have clearly demonstrated their commercial application and are certain to take an important industrial place before many years.

Materials Developed for Aircraft Prove of Great Utility to Other Industries

The influence of aircraft on metal industries may be classified as direct, semi-direct, and indirect. Under the first heading comes the construction of planes, dirigibles, engines and accessories—that is, those things which actually fly.

Here the requirements are of the utmost severity. Design, materials and workmanship must be of the highest type. Success depends upon carrying the maximum useful load, and also upon safety, reliability and endurance. The best is ultimately the most economical.

Special grades of steel, alloys of iron and the light metals, have already been developed for the structural parts, and such development must continue. These in turn will be utilized by many branches of the metal-working industry not connected with aircraft. A special analysis of chrome-molybdenum steel of mild carbon content (known as S.A.E. 4130X) has been developed for the construction of fuselages and other structural members of airplanes, largely because of its excellent welding qualities, combined with satisfactory fabricating characteristics and exceptional strength and toughness after welding. The physical properties are subject to still further improvement by normalizing or other simple heat treatment. The original requirements for this metal were only for seamless steel tube, which is now being produced in large quantities. The necessity for joining fittings made of sheet steel to tubular members has recently created a demand for thin sheets of the same analysis, and also for bar stock.

Stainless iron and other corrosion resistant ferrous alloys have an important field of usefulness in seaplane construction.

Duralumin was developed principally for the construction of Zeppelins. As a result of a study of the metallurgy of this remarkable alloy, other wrought aluminum alloys differing in certain characteristics many other industrial fields.

Aluminum foundry alloys of high strength, such as have been placed on the market, and all are growing in applications, not only in aircraft construction but in the Lynite series, were evolved for use in aircraft construction and now find wide and highly valuable application in many industrial uses, with a far reaching influence on foundry practice because of the close technical control required, and the introduction of heat treatment. Aluminum base die castings also find an increasing outlet in instrument parts for aircraft.

These are only a few outstanding examples.

It was mentioned above that the metal industries are influenced by aircraft construction semi-directly. An instance of such effects is that on the welding industry. A few years ago the practice of building fu-

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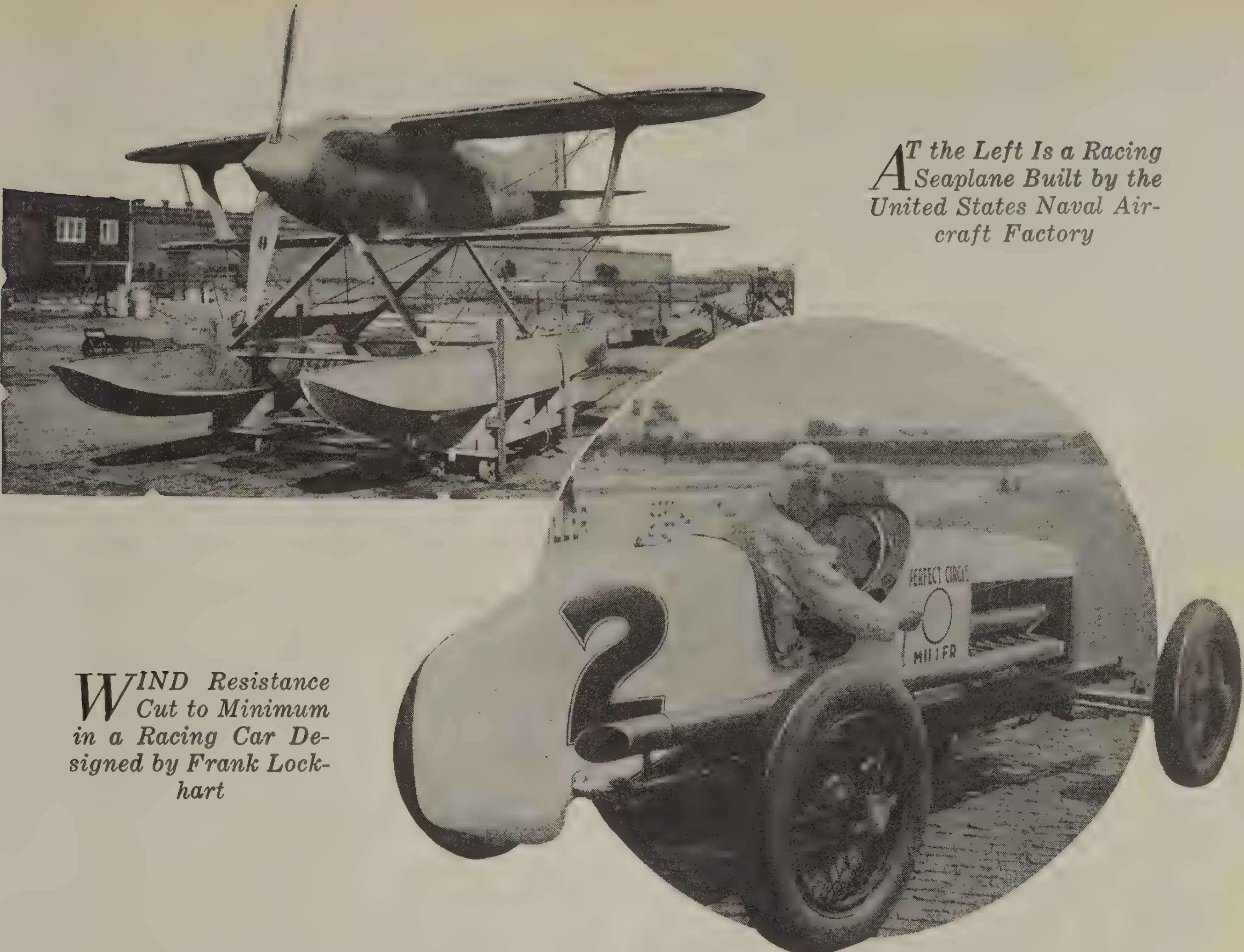
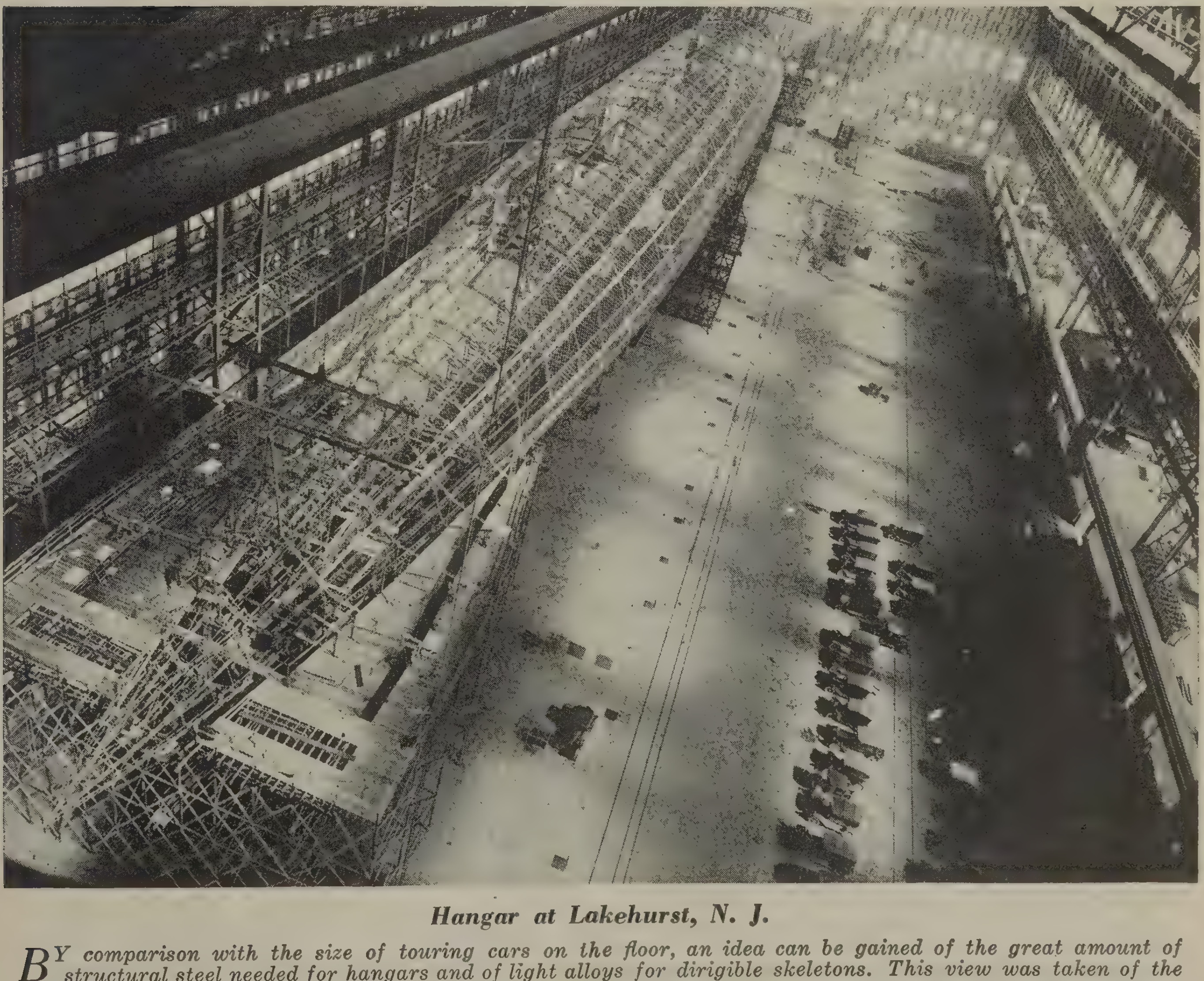


At the Left Is a Racing Seaplane Built by the United States Naval Aircraft Factory

Wind Resistance Cut to Minimum in a Racing Car Designed by Frank Lockhart

Stream-Line Forms Utilized in High-Speed Machines



Hangar at Lakehurst, N. J.

By comparison with the size of touring cars on the floor, an idea can be gained of the great amount of structural steel needed for hangars and of light alloys for dirigible skeletons. This view was taken of the Shenandoah when under construction in 1923.

The head-piece of the article shows a modern mail-carrying plane, built by Pitcairn Aviation, Inc., Philadelphia. Fuselage, struts and landing gear of alloy steel seamless tubes; Wright engine, steel propeller.

selages by the acetylene welding of seamless steel tube was introduced from abroad. This has now become general practice in America and has not only opened a new market for welding equipment, but has developed new technique and established new standards of excellence for welded structures by which industry at large is benefiting. Welding of aluminum and its alloys has also been greatly advanced through the medium of aircraft construction, one of the earliest developments being in the construction of fuel tanks of sheet aluminum.

Methods of corrosion prevention, such as electroplating with zinc and cadmium, and various protective coatings such as paints, varnishes and cellulose derivatives, find an exacting but wide field in aircraft work and the improved materials have been quickly extended to other fields.

The rigorous technical control of materials and processes demanded in aircraft construction has increased the demand for testing equipment and for pyrometers, heat treating furnaces, and other metal treating apparatus.

To all of this, obviously, is added the full line of metal-working tools and shop accessories required in the fabrication of aircraft, together with the factory buildings themselves—all of which has stimulated various metal industries in devious ways.

Aircraft of all kinds must have hangars for shelter, and adequately equipped bases, landing fields and routes for operation. This introduces a new outlet for metal of ordinary commercial grades. Airplane hangars are principally steel sheds. Landing field accessories such as fuel storage, lighting facilities at the field and along thousands of miles of routes, and repair shops call for a diversity of metal products. Hangars and mooring masts for dirigibles also entail notable tonnages of structural steel.

Trans-oceanic service both of planes and dirigibles is another matter of the near future. This, as Colonel Lindbergh and others have pointed out, will probably call for floating landing stages at intervals of a few hundred miles. These must be elaborately equipped both for the care of aircraft and the accommodation of passengers. They will probably take the form of huge floating docks or platforms and, according to plans which have been proposed, will require a metal construction dwarfing the largest ocean liners.

Twenty years ago the automobile enthusiast could hardly forecast the tremendous industry which it involves today. Neither could he predict the good roads movement which now requires not only the services of the best part of the construction industry, but which has widened the sphere and outlook of both the country man and the city dweller. One may now be pardoned for speculating upon the ultimate influence of travel by air upon human habits and thought.

Anyone, after having learned to travel in the air by the most direct route, in straight lines, at speeds from 100 to 200 miles an hour, will no longer be content to progress by the devious and halting transportation now offered by railroad train and automobile. Yet these agencies possess the indisputable advantage, from an engineering standpoint, of connection with terra firma. This is not primarily a matter of safety; properly organized airways have already demonstrated that travel by air may be made practically as safe and reliable as ground transportation. Ground vehicles do not depend upon the expenditure of power or the use of cumbersome and delicate gas containers to support them in a position of usefulness. The automobile is better adapted to everyday use by the average citizen than the airplane and requires less terminal facilities, while the railroad train has the advantage of great carrying capacity in large units. Inherently, ground methods of transportation are capable of greater speeds than aircraft, with less consumption of power per unit of useful load, and with less risk.

To realize these advantages of land travel it will be necessary for future engineers to provide straight and unobstructed lines of travel, and to reduce friction and inertia to a minimum. These things can and doubtless will be done, largely as a result of the methods and materials of construction, the ways of thinking and the commercial demands arising from the habit of travel by air. Highways, instead of following the tortuous contour of the earth, will be constructed on steel ways on level and straight lines, and probably will be inclosed as a protection against weather. Cars and trains will be of light metals or high strength alloy steels to minimize bearing friction and inertia, and construction will have streamline form to minimize air resistance. The consequent enormous demand on the metal industries, both for vehicles and for ways, is obvious.

Trends of Iron and Steel Consumption

More Than 1,000,000 Tons Annual Gain Indicated by a Group of Leading Items

STUDIED over a series of years, returns of production of various items of iron and steel entering into industry show clearly defined tendencies. In most such cases there is an increasing use of the material, in some at a much more rapid rate than the gains in other products. A few of the outstanding cases were covered in two-color diagrams in THE IRON AGE of Jan. 6, 1927. Brought up to date, the leading items indicate an increasing use of iron and steel at a rate exceeding 1,000,000 tons a year.

Many of the items included in the trend studies are not reported in tonnage. Among them are buildings (floor area), foundry equipment, steel furniture and steam pumps (dollars), mechanical stokers (horsepower), and electrical energy (kilowatt-hours). For others, reported by numbers, a tonnage figure may be estimated. This group includes locomotives (figured at 100 tons of iron and steel), freight cars (13 tons), passenger automobiles (1¼ tons), motor trucks, buses, etc. (2½ tons), enameled bathtubs (150 lb.) and steel barrels (65 lb.)

Based on the above, the annual changes in tonnage and other demands shown by the several trend lines may be estimated as follows:

	Increase Gross Tons	Decrease Gross Tons
Passenger automobiles	320,000	.....
Motor trucks	90,000	.....
Concrete bars	31,000	.....
Fabricated structural steel	82,000	.....
Wire and wire products	26,000	.....
Locomotives	.....	12,500
Freight cars	.....	11,000
Commercial steel castings:		
Railroad	2,200	.....
Miscellaneous	9,300	.....
Steel sheets	343,000	.....
Structural shapes	75,000	.....
Enameled bathtubs	12,500	.....
Steel barrels	24,000	.....
Gray iron (Ohio foundries)	23,000	.....
Iron and steel	1,038,000	23,500
Copper	11,000	.....
Tin	2,200	.....
Zinc	6,800	.....
Non-ferrous metals	20,000	.....
By-product coke	2,312,000	.....
Bituminous coal	4,823,000	.....
	Square Feet	Square Feet
Building contracts	5,424,000	.....
Industrial buildings	.....	7,070,000
	Dollars	
Foundry equipment	636,000	.....
Steam pumps	172,000	.....
Steel furniture	2,105,000	.....
		Horsepower
Mechanical stokers	.....	11,000
	Thousand Kwhr.	
Electrical energy	4,725,000	.....

Aircraft Manufacturing Increases

Civil Flying Activities Grow Tremendously in Year and Output of Planes and Engines Will Greatly Exceed 1926 Total of $24,000,000—Airways 8441 Miles

BY CLARENCE M. YOUNG*

THE new year in aviation is one of bright prospect for the United States and, indeed, for the whole world. This is especially true in regard to commercial aviation, in which vast strides have been made during the year just ended.

Through the use of the air mail entire business days have been saved in communication between the east and west coasts and also between sections connected by feeder lines joining the transcontinental route. Banking houses and jewelry stores and other organizations particularly interested in saving time in transport of valuable goods have come to rely on this new and rapid service. The cost of operation has been reduced through the building up of a great airway system in the United States so that the rate to the user is extremely reasonable.

Airplane Industry Cannot Meet Demand

So extensive have been the developments that the aircraft manufacturing industry cannot keep up with the demand for its products. Exact figures for 1927 are not yet available, but in 1926 there were 1186 planes produced. Approximate figures for 1927 indicate that at least 1525 planes have been built and that there are 1239 unfilled orders. Census statistics for 1926 show a total value of $24,161,752 for production of aircraft and engines. This was an increase of 60.3 per cent over 1925. The figures for 1927 will be much greater, and it is impossible to estimate how far those of 1928 will exceed the record of the past year.

Classification of Aircraft Manufacturers

The manufacture of aircraft and engines is only a part of this new and growing industry. The Aeronautical Trade Directory issued by the Department of Commerce indicates the ramifications of this new business. Among other details are listed the number of manufacturers of various products:

Airplanes	90
Seaplanes and flying boats	10
Aerial cameras	2
Chemicals and similar products	9
Aeronautical clothing	12
Aircraft engines	43
Engine rebuilding	8
Fabric	10
Aircraft furniture	1
Electric generators for beacon lights	5
Glue and cement	13
Goggles	4
Canvas hangars	3
Metal hangars	25
Aeronautical instruments	19
Lighter-than-air ships	5
Lighting equipment	23
Metals for aircraft	10
Ignition equipment	20
Aircraft metal wire	6
Mooring masts	1
Parachutes	3
Paints and varnishes	9
Airplane radiators	8
Airplane sirens	1
Spare parts	57
Tie rods and fittings	4
Skeleton beacon towers	10
Aircraft wheels	6
Wind indicators	3

The directory also shows 81 airplane distributers, 30 airplane dealers, and eight airport designers and constructors.

The skeleton beacon towers mentioned in the preceding list are used on airports and along the civil airways. These towers are 50 ft. high and are constructed of light galvanized structural steel. Powerful beacons are mounted on platforms at the tops of these towers to indicate the airways and assist pilots in locating airports. These beacons are usually located about 10 miles apart along the airways. A beacon is also installed at each intermediate landing field, such as are maintained by the Department of Commerce at intervals of about 30 miles.

United States Airways Total 8441 Miles

On July 1, 1927, the Post Office Department transferred its transcontinental airway, crossing the continent from New York to San Francisco, to the Department of Commerce. This included all of the equipment at the 124 intermediate fields between the two coasts. With certain contract air mail routes there were at that time 4121 miles of lighted airways. Over 1500 miles were added to this figure during the latter part of 1927. The Department of Commerce is planning lighting on still more routes and is establishing unlighted intermediate fields to facilitate operation on daytime routes.

The total length of airways in the United States is 8441 miles. The daily mileage flown over these airways is 18,926. In the calendar year 1927 there was an increase of about 23 per cent in total mileage flown over the civil airways of the United States, compared with the preceding year.

It is expected that by spring there will be over 12,000 miles of airways in operation, and that over 26,000 miles will be flown each day over these lines.

The planes operating on these routes are in most cases modern types, some of which are inclosed cabin planes capable of carrying several passengers in addition to mail, express, and freight.

The American Railway Express Co. has carried on express service since Sept. 1, in conjunction with the Colonial Air Transport, National Air Transport, Western Air Express, and the Boeing Air Transport companies, enabling manufacturers to send packages at a lower rate than could formerly be done by air mail.

Country Now Has 1016 Landing Fields

Airport development throughout the entire United States has been remarkable. This is particularly important, as no method of transportation can expand without sufficient terminal facilities and service stations. There are now 1016 municipal, commercial, Department of Commerce, Army and Navy, and marked auxiliary landing fields. There are thousands of emergency fields throughout the country on which landings have been made but which are not always maintained for such services. At least 328 cities have indicated intentions of constructing municipal airports, or commercial airports which will be available for municipal operations.

Statistics of scheduled air transportation show only a small part of the activity in the industry today. Miscellaneous flying, including "taxi" service, aerial photography, crop dusting, surveying, mapping, and many other services form the greater amount of flying in America, although it is difficult to estimate this because of the lack of reports from these many operators.

Considering all of this gratifying development in air commerce and the great opportunities now open in all phases of the industry, there is no reason why civil aviation in the United States should not soon take its rightful place as a leader in this science which was begun by our own pioneers.

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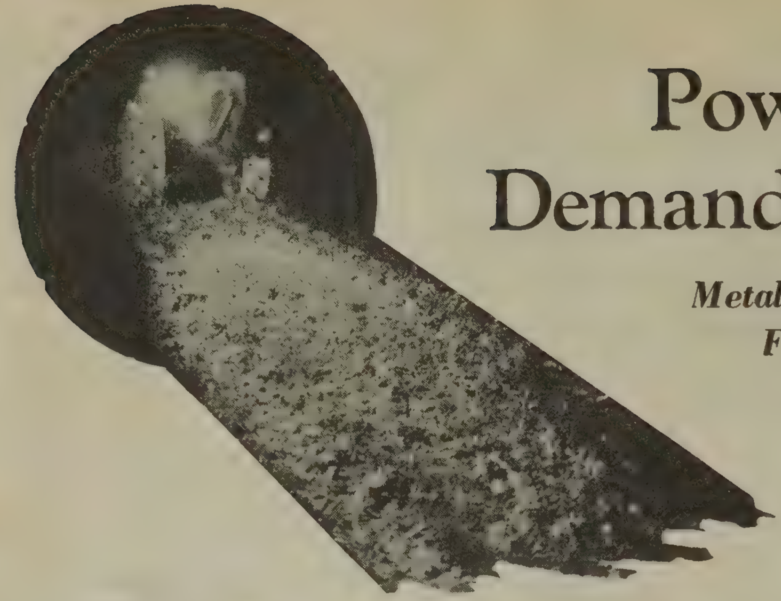

Power Farming Demands New Materials

Metallurgical Development Closely Following Automobile—Greater Stresses Met With Better Steels, Carefully Heat Treated

BY HYMAN BORNSTEIN*

THE principal development in farming during the past few years has been the rapid growth of the use of tractors, and with that has come the development of implements to be used for power farming. The extensive use of the tractor has necessitated the development of entirely new implements as well as modifications in old ones. These developments mean changes in design as well as in materials and treatment.

First, there has been a modification in the tractor itself. The tractor of a few years ago was more in line, in reference to design and materials, with the farm implements of that time. The tractor was heavy and low-grade materials were used. During the past few years, tractor development has closely followed that of the automobile, so that power has been increased while weight has been decreased. The design has been notably improved and along with that has come the use of higher grade materials.

Evolution of the Tractor Plow

One of the first implements to be designed for use with the tractor was the tractor plow. Two elements were required: A minimum of weight, consistent with performance, and a maximum of strength. This meant the employment of better materials. One of the first points of weakness was the plow frame. It was found necessary to subject these parts to heat treatment to obtain the maximum in physical properties and to specify a definite range of analysis for materials. Another one of the developments with the tractor plow was the substitution of rivets for bolts. This was to maintain a more rigid frame to meet the greater stresses encountered in power farming.

Up to about ten years ago, the steels bought for the production of farm implements were purchased on a very loose specification. The big bulk of material used was Bessemer steel and re-rolled old rail steel. The Bessemer steel was divided into two grades, soft Bessemer and hard Bessemer. A comparatively small amount of open-hearth steel was used and this was also divided into two grades, soft open-hearth and hard open-hearth. The designer of farm implements at that time concerned himself very little with the details of materials specifications. Quite frequently he might specify soft Bessemer or old rail for the material on a particular job, although the physical properties of these two materials would be considerably different.

Heat Treatment and Closer Specifications

With the development of power farming, greater stresses were set up and it was desirable to keep the weights of the implements down. As a result, detailed specifications have been worked out for the materials used in the various parts of farm implements. Along with this has come a very rapid increase in heat treatment of steel parts. With the increased use of heat treatment has come the substitution of open-hearth steel for Bessemer steel. At the present time, comparatively little Bessemer steel is being used in the farm implement industry and practically no Bessemer steel is used where heat treatment is specified.

The heat treatment carried on by farm implement manufacturers of today is considerably different from the heat treatment of ten years ago. The crude furnaces of that period have been replaced with furnaces which compare favorably with the equipment now used by the automobile industry. Automatic temperature control is the usual thing now on the heat treatment of farm implement parts, where it was practically unknown a few years ago. The pyrometer is being used to determine temperatures accurately, instead of the guess work as to temperature formerly used. Inspection methods have been improved. Hardness limits have been placed on various parts subject to heat treatment and a careful check is made to see that these specifications are maintained.

A more careful check is made of incoming materials. The testing laboratory has become an integral part of production. As a general rule, the materials are subjected to chemical analysis and then are released to the shop for production. Physical tests have been of considerable value in the improvement of design.

Why a Different Plowshare Was Needed

The development of a particular plowshare will illustrate the change brought out by power farming. This particular plowshare had been used for a number of years with considerable success, and the results in the field were satisfactory. Gradually complaints started to come in from the field in reference to breakage of this share. These complaints increased from time to time. The matter became serious enough to merit a close investigation. It was found that the use of the tractor has set up heavier stresses than this share was originally designed for and it was necessary to modify this plowshare in order to make it stand up under present conditions. In this case, it was necessary to change the design and also make a change in the material in order to secure the desired results.

For many years, the disks used for disk harrows and disk plows were made from a high-carbon steel not heat treated. Again the use of the tractor forced the development of a better disk. At the present time, practically all of these disks are being heat treated and the farmer is obtaining a much better product with

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One of the Modern Power Farming Implements Which Are Augmenting Capacity for Tilling the Soil

practically no increase in cost. In some cases, alloy steels have been used to obtain the desired physical properties. Riveting and welding are being used largely instead of bolts. Material improvement in physical properties of bolts has come about through use of higher carbon steels and through heat treatment.

By applying the lessons learned in automobile manufacture, the farm implement manufacturer is working to closer limits. The lubrication methods are considerably superior. Grease gun lubrication has become quite common. In the manufacture of disk plows, high-grade anti-friction bearings have replaced the old cast iron bearings. In the manufacture of wheels, electric welding has replaced hammer welding for tires.

More Use for High-Test Cast Iron

There has been considerable improvement in the quality of cast iron used for farm implements. Only a few years ago, high-test cast iron or "semi-steel" was little known in the farm implement industry. Today steel is used to a very considerable extent in the cupola charge and there has been a considerable increase in the strength of the iron. There is a strong tendency at present to replace castings wherever possible with forgings and pressed steel parts.

During the past ten years there has been considerable improvement in farm implements. The lessons learned in automobile manufacture have been and are being applied in the manufacture of agricultural implements. Mass production, progressive assembly, and closer limits have been borrowed from the automobile industry. More rigid specifications on materials are being used and higher grade materials are being employed. Furthermore, the use of heat treatment has increased and the quality of the heat treatment has been improved.

Business Conditions Stable—Hoover

Improvement in Farm Prices, Increased Foreign Trade, Recovery from Partial Unemployment and Sustained Volume of Building Are Reassuring Factors

"A STATEMENT of prospects requires a short catalog of the economic forces which dominate the business situation at our entry into the new year," said Herbert Hoover, Secretary of Commerce, in reviewing the outlook for 1928.

"There is an ample supply of credits at low rates; the somewhat larger stock of goods which were accumulated during the summer are being reduced; there is no consequential speculation in commodities; the crops have been abundant; wages are at a high level; we are recovering from some partial unemployment, especially in the automobile industry. There is peace in most sections of the labor world except bituminous coal; there is more peace in the international world than at any time since the war; the foreign world is recovering its economic strength and buying power, and therefore our foreign trade is steadily increasing. The phenomena usually accredited as premonitory of a slump are therefore absent.

"During the past year there have been important shifts in our own economic world which have an important bearing upon the future. While the average wholesale price of all commodities at about 50 per cent above pre-war is today the same as a year ago, yet if we divide them into agricultural and non-agricultural goods, it will be found that the average price of non-agricultural products has fallen in the 12 months from about 60 per cent above pre-war to 51 per cent pre-war; while the average of agricultural products at central markets has risen from about 35 per cent above pre-war to about 53 per cent above pre-war. However, prices on the farm show only a rise of about 30 to 39 per cent above pre-war.

"Manufacture and distribution have by savings and diminished profits accommodated themselves to this situation of decreasing prices without reduction in the average level of wages and therefore in the national buying power. But the great extent to which industry has accommodated itself to lower prices by decreased costs makes for a sounder condition for the ensuing year. Despite decreasing prices, production and consumption of manufactured commodities have been maintained upon a high level, as shown by car loadings of this class of goods, which have been about equal to those of last year.

"As to particular industries, agriculture, textiles, bituminous coal and some metals still lag behind the others. The contracts let for future execution in the construction industries are at as high a level as at this time a year ago.

"Taken in a broad sense, we enter the new year with the forces of stability dominant in the business world."

What Outlook for the Average Manufacturer?

Small and Medium-Sized Plants Hold Their Ground in Various Fields Through Efficient Management and Market Study

"THE eye of the owner maketh a fat horse." This homely epigram of the late Andrew Carnegie, epitomizing the greatest advantage of owner-management of an enterprise, reflected his skepticism concerning the economic soundness of large industrial corporations, where management is hired and ownership is widely dispersed and bereft of contact with the rank and file of employees.

Since his time, however, the trend toward larger corporate units, particularly in fields adapted to mass production, has continued. Yet it is frequently overlooked that in the fabrication of articles from iron and steel, small and medium-sized plants still greatly outnumber mass production shops. In fact, the smaller manufacturers make up the warp and woof of industrial life, and it is by no means established that as a class they face extinction or absorption into large units.

Smaller manufacturers retain an advantage over their larger competitors in the "intangibles," one of the most important of which has been cited. Their opportunities for efficiency in certain fields are as great, if not greater than those of large corporate organizations. The main motif of mass production, the reduction of costs through increases in output, is also its greatest weakness, since it is dependent upon a proportionate expansion of consumption.

A more secure policy, and one that is being followed by many manufacturers, is to place the emphasis on cost reduction per unit of labor and capital without striving for material increases in total output. An analysis touching on this and other factors affecting the economic position of the smaller manufacturer, and practical suggestions as to how he can meet current problems are outlined in the following symposium of articles.

The Future of the Smaller Manufacturer

BY VIRGIL JORDAN

DURING most of the past 25 years Americans have been suffering from a chronic megalomania, especially in economic matters. They have become more and more enamored of bigness and impressed by mere size in everything, from moving picture houses and football stadiums to manufacturing enterprises, and they have been happiest when dealing with figures from which several sets of zeros have, as a matter of course, been omitted. Both our glorification of large-scale business and industry, and the attacks upon them by over-anxious liberals and radicals, have bred in the public mind generally the idea that enterprises of enormous size are characteristic of American industry and trade and also that the rapid trend toward constantly larger enterprises is natural and inevitable and likely to go on without limit.

This axiomatic idea, however, is questionable on several grounds. In the first place, American industrial development is, practically speaking, a matter of only 50 years, and such a period is too short to warrant any conclusions as to what is characteristic, typical or inevitable for the future. Secondly, there is good reason to regard the rapid increase in size of industrial establishments and business enterprises as the product of the early period of our economic development, accompanying the building up of a new country, the rapid and extensive expansion of transportation and the first stages of application of new forms of power and machinery to production and distribution. Third, our population and therefore the market for products is becoming more and more evenly diffused geographically, while the use of electric power and internal combustion engines in manufacturing industry and transportation, as well as changes in agricultural conditions, have made it less necessary or desirable for industrial centers and centers of distribution to be crowded close to sources of materials and power or to rail transportation centers. Finally, large-scale mass production is not equally suited to all branches of industry, any more than large-scale extensive agriculture is suited to all branches of farming; and in many branches of industry it is becoming a question whether, from the point of view of economic efficiency as contrasted with engineering or technical efficiency, the limit of the scale of production has not been closely approached. One important reason for the latter question lies in the new importance which attaches to the problem of distribution in modern industry.

Mass Production Has Limitations

In the period of American industrial development which has passed, attention has been centered almost wholly upon engineering and technical efficiency in production. To most engineers and managers in industry this has meant merely an effort to increase the volume of production per plant in a given period of time, through heavy investment in expensive special purpose machinery designed to turn out large quantities of standardized products. Effort has been directed essentially toward increasing the speed of production, and the heavier the investment in machines adapted to this purpose the more necessary it has been to reduce the time consumed in production in order to keep down overhead costs. All of this was based on the illusion that mere reduction in time or increase in speed of production automatically implied a reduction in real costs. But the result has been only that overhead costs of management and organization in proportion to other costs have grown more rapidly than ever.

In cases where this process has been carried to the extreme, as in the Ford organization, changing consumer tastes and market conditions have forced cessation of operations for long periods of time and tremendous scrapping of equipment at enormous cost, because of the rigid limitations and inflexibility of this form of productive organization. What has been saved in time required for actual production has been lost in the time required for adjustment to new conditions, and above all in the time required for distribution of the product. Though in a narrow sense labor costs have been lower in such industries, diminishing profit margins indicate that total real costs have not been proportionately reduced, so that salvation has depended not really upon efficiency of production but upon volume of sales and absorbing power of the market. What has been achieved is efficiency in the engineering sense, but not economic or business efficiency.

This circumstance has brought our large-scale industries face to face with the fact that consumption or absorption of the product by the market cannot be speeded up indefinitely as production can. Some industries have unconsciously met this situation by producing goods which wear out or are used up more rapidly; but in the race between production and consumption, where it is based solely upon the time element, it is becoming increasingly evident that production is bound to be the winner and that in this case the winner is the loser. This is true in spite of the fact that the large-scale enterprises have been able to achieve great economies in distribution and marketing on the side both of buying and selling.

Inherent Advantages of Smaller Manufacturers

When the fundamental distinction between efficiency in terms of time and efficiency in terms of real costs is fully realized, I feel that it will be more and more apparent that the smaller manufacturing enterprise has certain inherent advantages which will make its place increasingly important in our industrial life. From the point of view solely of production the smaller enterprise has as good, if not better, possibilities for reduction of real costs in terms of labor, capital and management than the very large establishment. The labor supply can be in many instances more effectively recruited, the working process more closely and directly controlled, and the problems of labor administration and industrial relations are likely to entail less difficulty and overhead cost than in the larger enterprise. It is possible also for a smaller establishment to adjust its product, as well as its manufacturing processes, more flexibly to changes in market conditions. This is the most important consideration in the present industrial situation, where consumer tastes and habits are constantly shifting, and where the market for specialties is on the whole more favorable than for thoroughly standardized mass products. Moreover, with the new transportation facilities and the wider availability of electric power, the smaller establishment has a larger freedom of location in relation to its market, its source of material and labor than the larger plant. It should be emphasized also that the smaller establishment has a greater flexibility of adjustment to changing market conditions in that the overhead costs of shut-downs or part-time operation are relatively less burdensome than in the larger plant. This is simply another way of saying that the smaller establishment has the advantage of not being under such great pressure to reduce its time costs, and can concentrate upon reduction of its real labor, capital and management costs, in which it can achieve as good results as the larger plant.

THE author has been chief economist of the National Industrial Conference Board, New York, for the past seven years. He is a frequent contributor of articles on current economic questions to magazines and newspapers here and abroad, and is the author of books on the agricultural problem in the United States, the inter-ally debts and other subjects

How Smaller Plant Can Overcome Its Handicaps

The chief handicaps under which the smaller establishment has been laboring in the recent past have been those of securing its supplies of materials on favorable terms, and of advertising and selling its products in competition with the larger enterprises with more money to spend on national advertising and distribution agencies. It has been more difficult also in past years for the smaller establishment to secure on favorable terms a constant source of new capital necessary to alter its production programs and install improved methods, or to engage in scientific research. These disadvantages, however, have not been so serious as they have appeared to be and are growing less important as time goes on. For one thing, there has been developed since the war in this country such a vast and fluid capital market, under the pressure of enormous savings seeking investment, that it is becoming easier for the smaller enterprise whose financial position will stand close scrutiny, to secure all the capital it needs. The advantages of scientific research are becoming available for the smaller plant through trade organization cooperation, university cooperation, and the scientific foundations. Moreover, through the increasing spread and effectiveness of trade organization the smaller manufacturer is becoming increasingly able to secure the advantages of large-scale industries in buying and selling by means of syndicate purchasing and through industrial or trade association advertising. It is probable that some of the legal barriers now in the way of more thorough-going cooperation of small independent manufacturers in the fields of purchasing and distribution may be overcome within a short period of years. It is clear that this is necessary and the necessity is being more generally recognized. In this way there may grow up in the field of manufacture in a short time forms of cooperative organization under which the advantages of small manufacturing units in production are maintained, while those of large-scale production in buying and selling are achieved in somewhat the same way as has developed in agriculture.

Trend Toward Larger Plants Has Slowed Up

That these factors are playing a part in the development of American industry is suggested in the fact that the trend toward large-scale enterprise and industrial consolidations which went forward so rapidly up to the beginning of this century has tended to slow up markedly, even though it still continues. For instance, although the average number of wage earners per plant in steel works and rolling mills increased about 170 per cent between 1879 and 1914, the increase has been less than 35 per cent since 1914. In agricultural implement manufacturing the average number of wage earners per plant in 1914 was four times as great as in 1879, but from 1914 to 1921 it increased only 17 per cent. More striking still is the fact that the physical output per plant among iron and steel works and rolling mills in 1914 was approximately nine times as great as in 1879, but from 1914 to 1925 had increased only about 60 per cent. The fact that these plants are in many cases parts of larger organizations or have been consolidated into large corporate units to secure the advantages of a ready market for their securities or of large scale buying and selling, does not in any way reflect upon the productive efficiency of the smaller plant. Particularly interesting as bearing on the question of relative efficiency of the large and the small plant is the fact, shown by studies of the National Industrial Conference Board, that during the period 1919-23 the medium-sized manufacturing plants, especially those with an annual output ranging from $20,000 to $500,000, have gained in efficiency of utilization of labor over the group producing over $1,000,000 worth yearly, even though the per capita output in the latter is larger. In 1919, in the larger plants, the production per worker was $1,590 for every $1,000 produced per worker in all other plants, but by 1923 this had fallen to $1,481, a decline of about 9 per cent. In the plants in the $20,000 to $500,000 group, however, the relative production per worker increased about 6.3 per cent.

Thus the smaller manufacturing establishment would appear not only to have an increasingly important rôle in the future, but is at the present time of far greater importance in our manufacturing life than we usually realize. In 1925 about 93 per cent of all manufacturing establishments had a value of product at 1914 prices of less than $500,000 a year, and these establishments employed over 38 per cent of the total wage earners in manufacturing and produced over 28 per cent of the total value of manufacturing production.

Average Manufacturer Must Be Better Business Man in 1928

BY HENRY BRUERE

THE average American manufacturer, and that means the smaller manufacturer, will not have a rosy time in 1928. He has not had a particularly rosy time in 1927. There will be more of the same kind of competition for new business and for retaining old business that manufacturers have faced during the year just closed. There will be the same type of narrowed profit margins. But there will be an advantageous difference. In 1928, the producer who profits by experience will not expect a repetition of the exceptional business of 1926, and he will be prepared for the more exacting requirements of a period of business retrenchment. Every business man who is looking for profit in 1928 will have to be a better business man in the new year than he was in the year closed. I am basing this statement on the general prediction made by business analysts of a good but not glowing, business year in 1928.

There are various ways in which the average business man can suffer: By loss of his market through evaporation, that is, a ceasing of demand, such as certain automotive parts suppliers have faced recently; by running into the red due to internal inefficiencies; by loss of trade and profits as a result of the inroads of the big competitor.

There can be no satisfactory generalizations regarding all types of business beyond these minimum observations. There will also be no deadly uniformity in the conditions smaller businesses will confront. The smaller plants, that is the plants producing less than $100,000 in value of manufactured product in a year, represent 80 per cent of the manufacturing institutions in the country. They are located everywhere. You can't generalize about them except to say that they will face generally a slower business pace and, where they are in competition with them, greater eagerness for business on the part of national distributers. You can't generalize, that is to say, unless you are willing to make certain assumptions.

A Lesson from New England

For the purpose of this little friendly heart-to-heart talk, I am going to make an assumption. I am going to assume that all the average businesses in America are collectively on Jan. 1, 1928, in the same situation that collectively all business in New England was supposed to be in a year or two ago—that is to say, rather dubious about the future and not at all elated over current profits. The purpose of this assumption is to enable me to use some rather illuminating illustrative material recently gathered in New England in a study of progressive business policies in vogue there. The study was made by the Metropolitan Life Insurance Co. for the New England Council, a representative body of New England business men appointed by the Governors of the five States to promote the economic welfare of that section. The Metropolitan Life Insurance Co. sent experts around to look for good examples of energetic and enlightened business methods, which, if generally employed, would probably remove the gloom from the brow of the average Yankee manufacturer, and what is true of the size of the average manufacturer in the United States is measurably true of the size of the New England factory operations.

How Market Study Helped a Cutlery Plant

The outstanding fact of importance was the recognition by progressive business men that this is the age of the buyer's market. Time was when customers stood in line for opportunities to buy. The manufacturer surviving under today's competition studies his existing customers' wants and goes out to find new customers with a definite idea of his needs in mind, based on analyses of the uses to which the product to be sold will eventually be put. A case in point is the revival of a failing cutlery business built upon the basis of the black-handled knife formerly found on every farmer's and mechanic's dinner table. One customer formerly took one-third of the output. That customer stopped buying. How was the void to be filled? Household furnishing departments were studied. Kitchen cabinets and tea rooms were looked into. Knives were discovered in use that added gayety to the table and the kitchen because of colored handles. Black handles were changed to blue and business was recovered.

Simplification Aids a Shoe Manufacturer

Inventory burdens have been reduced by simplification. The classical example of the Regal shoe is again cited. That company used to make 2500 varieties of shoes to retail at $10. Records were kept of the foot measurements of customers. Many varieties were found to be made for non-existent feet. Poor business. Varieties were cut down from 2500 to 100. The price was cut from $10 to $6, with no reduction in quality. That has been a good move for the Regal Shoe Co.

Another plant, a woolen mill, reduced the 160 yarns, varying in color, material or counts, to 30, and production has been doubled.

Costs Reduced by Replacing Antiquated Machinery

Liberal machinery replacement policies are in force in the up-and-coming New England industries.

One company is reported to have decided after research that high costs were due to three causes:

1. The use of antiquated machinery and methods.
2. Unnecessary handling charges through widely separated departments.
3. Burdensome carrying charges on idle floor space and idle equipment.

The entire plant was rearranged; total floor space occupied was reduced one-fifth; departments were consolidated or moved to more advantageous locations; old machines were replaced with new machinery of latest design, most of them motor devices; special machines were designed for more economical dyeing of small lots.

A paper manufacturer studied consumers' habits and the retailer's viewpoint. Inquiry was made on the extent to which consumers buy paper by name or brand and the principal brands called for, one purpose being to test the effects of past advertising on stimulating demand for the product of the manufacturer making the survey.

How a Ball Bearing Maker Found a Broader Market

A manufacturer of ball bearings wished to broaden his market beyond the automotive industry by which his entire product was taken, and with this desirable end in view, experiments were conducted and demonstrative installations were made without profit. These demonstrations captured new and repeat orders, and a profitable business of substantial proportions has resulted.

These illustrations could be multiplied many times. They all point to the application of intelligent study to the problems of a waning or handicapped business. New vitality often resulted.

Average Business Often More Efficient Than Large Corporation

I remember a statement made to me at one time by Henry R. Towne, the famous founder of the Yale Towne Lock Co. We were discussing the problems of large-scale industry and he expressed emphatically the opinion that small business should be, and often was, more efficient because of its adaptability and the ingenuity of the owner or manager who was able to give it his personal supervision. Yet it is true that more small plants fail because of incompetent management than for any other reason. Actual production operations are usually better carried on than the auxiliary, although essential, functions of purchasing materials, securing actual costs, controlling overhead expenses, and marketing the product. This means that the manager, usually a specialist in production, must broaden his grasp of the business, and if there is no opportunity to do that, he must strengthen himself with competent assistants.

There is pertinent to this theme an almost threadbare subject, but one that cannot be ignored even in as brief a discussion as this. I refer to cost-determining. A competent accountant in a plant is worth his weight in platinum. Not a faithful drudge of a bookkeeper, however loyal and dependable he may be in handling collections or the bank account, but an accountant trained in cost-keeping and who is willing to keep himself posted in the development of his art. There should be not only an analysis of manufacturing costs, but of lines of product and accounts.

THE author, who is vice-president of the Bowery Savings Bank, New York, was born at St. Charles, Mo., in 1882. *He attended Cornell University and the University of Chicago, later studying law at Harvard and New York University. In* 1903 *he engaged in an investigation of industrial welfare work for the International Harvester Co. He became vice-president of the American Metal Co., Ltd., in* 1916, *serving until* 1923, *when he became third vice-president of the Metropolitan Life Insurance Co. He is the author of "The New City Government," published in* 1912.

What Foundry Cost Studies Showed

The president of the American Foundrymen's Association lately cited an analysis of his company's costs for a period of three years as demonstrating the fallacy of the practice among foundrymen of basing costs on the price of metal. He found that metal represented only 18.8 per cent of the cost of the product while labor and management represented 50 per cent. Pricing is a correlative of cost-keeping and, if properly done, will relieve a plant of unprofitable business and enable it to concentrate on the type of work it can do best.

Next to cost-keeping, I place merchandising or selling as the field greatest in need of attention. There are numerous illustrations of intelligent methods now used in this field by all types of company. Hand-to-mouth buying has compelled attention to consumers' needs and habits so as to anticipate demand for prompt delivery. Whether a manufacturer distributes through jobbers, sells to a small number of users or markets directly, he should get up to date on marketing.

A Market Study That Increased Sales

I have in mind the case of a belting company, which did the following things to strengthen its market:

1. It analyzed old ledgers and listed customers.
2. It grouped its customers by industry and the use they made of the product.
3. Old customers were grouped by territories, and lists of prospective customers in the same or allied lines were made.
4. Calls were made in territories where the lowest expense per call could be maintained with a view to the largest probable amount of orders. Sales territories were gradually enlarged, and new customers were added and new uses of the product were developed. The result was an increase of 20 per cent in sales volume.

One more illustration, this having to do with market evaporation. "A" was a manufacturer of castings for wagons. The inevitable happened. Cast iron hardware was first resorted to for filling in, and then cast iron toys. Castings are made, assembled, painted and packed for shipment to the distributer. The firm specialized on toys that can be retailed for 10c., and consequently it has established a year-around demand from the ten cent stores. The plant keeps track of style changes; thus, ten cent automobiles are made each year according to a popular style of automobile for that year.

Cutting Costs Through Personnel Control

A word should be said about securing the cooperation of employees by the systematic development of personnel work. Such cooperation can be made to reduce costs as in the case of the American Chicle Co., where there is a close coordination between the production department and personnel control. In three years, the employment department reduced the plant force about 20 per cent, securing more production and reducing turnover 50 per cent.

On each Wednesday, a budget

of the working force is prepared on the shipment schedule for the following week, submitted by the sales department. An organization chart is prepared for each department corresponding with this budget. On Friday, each foreman receives his personnel budget. The number of machines of each kind which will be run is listed; the names of the girls who will run them, and their substitutes, and the quantity of work that must be turned out in the department. On the following Monday, the schedule goes into effect, and each morning the assistant personnel director checks up to see that the schedule remains in effect, at the same time taking the absence record.

Every Manufacturer Must Keep in Touch with His World

I have tried to indicate the need for alert attention to the refinements as well as the obvious commonplaces of management. A business man, especially a manufacturer, must keep in touch with his world. He should join his trade association, and if that is wanting, help form a local association of plants having management problems in common. He should read his trade journal and a good magazine on management. He should visit other shops and talk with men of similar responsibility. He should read the economic news in a good business paper and occasionally attend a convention where pertinent management questions are discussed. The small manufacturer needs to be a student of management as well as the technical aspects of his industry. He needs competent assistants, and he must take time to analyze his business periodically and thoroughly. He should take advantage of sources of technical and management information available for little or no cost, such as have been indicated, and he should learn to use the Department of Commerce, the universities, and such agencies as the policy holders service bureau of a large life insurance company, of which I advise him to inform himself. Above everything, he should make use of the services of a progressive bank equipped to help him study and strengthen his financial practices. He should budget his business.

If he will do these things, he will survive more difficult years than 1928 is likely to prove, and he will make a profit in ordinary years if his business is soundly conceived and economically justified. Not all manufacturing, any more than all other business, deserves to persist. Not all smaller businesses should remain independent. But at least no well conceived and efficiently conducted business is likely to perish or to be overlooked when consolidations are under way.

The smaller successful business is a great national asset and a great boon to its owners and managers. It is certainly worth all the energetic and alert attention that a capable executive can bestow upon it.

Study Your Business

I sum up what I have to say to the average plant owners and managers in the sentence: Study your business; study the methods of other businesses, especially those that can afford to experiment and have applied the results of experiment, and apply them, to the extent that your good judgment dictates, to your own business. Whether you are a practical man, a technical man, a combination of both, be a student also.

The American business man is hard worked, but he still wastes a lot of time in futilities. That is all right if he can afford them. If not, why not give one movie night and one lodge night a week to studying your business and like businesses?

How Ohio Plants Are Meeting Current Problems

BY F. L. PRENTISS

A SURVEY of the business outlook for the small or medium-sized plants in the metal-working field indicates that little has been done, in northern Ohio, at least, to work out constructive plans to meet a situation that is largely due to excess capacity. There are few complaints that the moderate-sized and small plants cannot compete with large ones. However, there is a continued tendency on the part of automobile manufacturers to centralize their manufacturing at their own plants. While this tendency is not new, it is still going on and is probably felt more by manufacturers in northern Ohio than elsewhere.

Smaller plants in the automotive field, such as stamping plants, find it necessary to adopt production methods and put in equipment that will enable them to produce economically, but they take big chances if they have to make large expenditures for conveying and other equipment for special work, because they never know how long they will have the contract for a particular job. If they lose it, considerable of their equipment may be rendered almost useless. For example, one company three or four years ago went to large expense in putting in complete foundry molding units for making certain automobile cylinder blocks.

THE author has been resident editor of THE IRON AGE *at Cleveland for 20 years, and is a close student of developments in the metal-working industry.*

Now it has lost this business, because with the building of the new foundry the motor car company will make its own cylinders. This shifting of work in the automobile field, however, does not always indicate that the motor car builders themselves can make parts cheaper than outside shops.

One factor that enters into the situation in respect to the small shop in the automotive field, particularly the stamping plant, is the price of steel. The automobile manufacturer, when it takes bids for work, asks the shop at what price it figures its raw material. If a price is named that is higher than that at which the automobile company is able to buy material in large quantities, the automobile manufacturer insists that the parts maker bring pressure on the mill to obtain a price equally low. However, handicaps in buying raw material do not seem to have been serious recently, because of the condition of the steel market.

Stamping Plants Seek Specialty Business

Faced with present conditions of excess capacity, metal-working shops are groping around in search of other products, preferably those that they can make on equipment they have, so that the equipment can be kept operating.

Some of the stamping plants that specialize on production work in the automotive field are turning their attention to specialties in order to have more varied lines of work and to fill in when the automotive industry is slack. One Cleveland company that is devoted largely to automobile parts has built up a satisfactory business in stampings for moving picture machines and has recently commenced the manufacture of all-metal folding card tables to take the place of wood tables commonly used. While this seems to be a rather limited field, it helps out.

Malleable foundries have been hit as hard as any industry by their excess capacity and some are getting into specialties to help them out, particularly during periods when the demand for castings is slack. These products include pipe hangers, truck wheels, conduit boxes for electric wiring, and posts and panels for railings on highway bridges.

Ventures Into Specialty Field Not Always Successful

Contract machine shops also have been adversely affected, and operators of these shops say that they do not see much hope for the future unless they get into the manufacture of some line of special products. However, these ventures are not always successful. For example, a Cleveland machine shop developed a special machine used in the rubber industry—spent considerable money for patterns, etc.—and did remarkably well for a short time, but a change in the process in making rubber automobile tires made the machine obsolete. A complaint of the contract machine shop is that its business is overflow work and that automobile companies, particularly, do not farm out work unless they are very busy. Operators of small machine shops contend that large manufacturers often do machine work in their own plants to keep their own men employed when conditions are rather dull, although they could often get this work done outside cheaper than they can do it themselves.

Efficient Management Key to Success, Says Manufacturer

A northern Ohio company which might be classed as medium-sized and which is apparently a successful manufacturer of a varied line of products, including screw machine products, tanks and automobile and aeroplane parts, offered the following views on the outlook for the average plant:

"There is a field for the small or medium-sized plant if it is well managed and if it concentrates on one product. Good management implies low production costs brought about by proper plant arrangement and the use of modern labor-saving equipment. A small metal-working plant is in better condition to compete with a large one in any particular line if the small one is better managed than the large one.

"If a plant is quite small it cannot have separate departments for making different products, as each department requires proper supervision and men trained to do work in that department. It would not be advisable to switch foremen or mechanics from one class of work to another. If a plant is not large enough to be organized into departments for making different products, it should stick to one product. It is the ambition of about every small manufacturer to grow and get big, and many have been able to do so by confining their efforts to one line of products. Many of the large successful manufacturers in the metal-working field today started in a very small way and succeeded by efficient management. Many others are doing experimental and development work today in small shops which will eventually grow into big manufacturing companies.

"If a small manufacturer will concentrate on one product, he will be in a position to adopt production methods that will bring down his costs and enable him to compete with the large manufacturer. He should watch the new developments in labor-saving machinery. If a machine tool is brought out that will reduce his manufacturing costs and he installs that machine but his competitor does not, he has an advantage over his competitor to that extent.

A small manufacturer, if his plant is large enough to divide it up into departments, should diversify his products so that he can keep busy in some lines while others are slow. The new lines added may be either specialties or standard products.

"The small manufacturer is at a disadvantage as compared with a large manufacturer in that he has to pay more for some lines of material, such as cold-finished steel, tool steel and high speed steel. This is because the larger manufacturer is able to get lower prices by buying in larger lots. However, a shrewd small buyer can overcome this handicap to a considerable extent by closely following the market and finding what other consumers are paying for the same material. He can often get some concessions by pointing out to steel salesmen that a big competitor is buying material at a certain price and that if he is to keep in business and meet competition in the same line he must have as favorable a price.

"While an organization to carry out the details of scientific management is not practical in a small plant, the head of a one-man organization who has full responsibility for the operation of his plant, can by his efficient personal management attain the same results that are sought to be attained in a larger plant by the installation of a system of scientific management."

To sum up the views of this manufacturer, the outstanding factor in the successful operation of plant, whether small or large, is efficient management. The success of the plant depends on this. He used the term "efficient management" in a broad sense, to include adoption of production methods and the installation of up-to-date equipment which would bring down the costs of production to a minimum.

A Practical Management Program for a Small or Medium-Sized Company

IN a period in which the pressure of competition has been steadily increasing and small plants, as well as large ones, have been confronted with the necessity for greater efficiency, attention has been focused on management. In the smaller plant, where close association between employer and employee still prevails and where the initiative and enterprise of both are usually of a high order, there is still considerable skepticism regarding the employment of many of the scientific management mechanisms that have found their greatest development in large organizations. The smaller manufacturer knows that he must make further gains in the battle against costs, but he hesitates to reorganize his management methods for fear of burdening himself with a cumbersome and unwieldy routine, unadapted to his needs.

F. W. SHIBLEY, who expressed his views in this interview, is vice-president of the Bankers Trust Co. of New York, with which he has been connected since 1920. *Before that time he was for over* 20 *years an investment banker for his own account.*

A director of several large industrial corporations, Mr. Shibley has had the opportunity, both as a banker and through participation in the management of many industries, to gain a practical knowledge of industrial operations. During the late reconstruction period he joined actively in the reorganization of several important manufacturing corporations.

In an effort to clear the atmosphere for manufacturers of this class, THE IRON AGE interviewed F. W. Shibley, vice-president Bankers Trust Co., New York, a keen student of scientific management and thoroughly familiar with its practical application. The questions submitted to him, with his answers, follow:

"To what extent are the principles of scientific management applicable to a small or medium-sized plant?"

"This is an age of specialization in industry," replied Mr. Shibley, "a specialization which is being constantly extended and refined. The trend is toward larger units of operation in order to secure the benefits of mass production in the reduction of costs and to employ the services of executives possessing the exceptional ability to comprehend, organize and control the operations of a large business on a scientific basis.

"Nevertheless, human nature

does not change with fluctuating economic conditions. There will always be the desire on the part of a great many men to act independently of the economic trend and to manage and control an enterprise of which they are the dominating force, even though that enterprise is comparatively a small one. Such a business can attain a success if well managed, and it can attain a very considerable success if operated under the principles of scientific management, which imply an accurate knowledge of markets gained through systematic sales research and resulting in an accumulation of ascertained facts on which to base an annual forecast of probable sales by units and dollars, planned production based on such a forecast and control of operations as planned through a budget, corrected, if such correction is needed, at least monthly.

"No business is too small to require good management, and no management is so good that it cannot be improved by utilizing the principles of scientific management."

"Is there danger of building up too cumbersome machinery for production control?"

"Yes, if the executive management is unintelligent and inefficient, in which case the system is of little value. Under a management which understands the system, overhead can be reduced greatly, for it demands that heads of departments all down the line function properly, and when they so function, red tape with its excessive clerical expenditures disappears. The more highly refined a complicated machine becomes, the more efficiently and economically it operates. Scientific management demands that the highly paid executive heads of departments operate and control the business, doing exactly what they were hired to do."

"To what extent is it economical to scrap old equipment and plant and replace with new?"

"The limiting factors are cash working capital and the economic position in trade of the product. A new machine, as a general rule, must justify its replacement of an old one by effecting a saving equal to its cost in a period of from 5 to 10 years. In this age of mechanical progress obsolescence is much more rapid than in previous times. The economic position of the product in trade ties into this formula and becomes an essential part of the problem, for just insofar as the market potentialities of a product are assuring as to price and volume can management venture beyond the dead line of the definite amortization period as above stated."

"Is there danger in investing too heavily in special-purpose machinery?"

"There is grave danger. The reason is outlined in the answer to the previous question."

"Should the smaller plant regard as one of its advantages the lack of excessive specialization that makes it difficult and exceedingly expensive for a mass production shop to change its product in response to new demands?"

"Yes. Mass production is exceptionally effective when mass buying is obtainable. It is particularly the province of the large industrial enterprises. It does not lend itself to a small operation except insofar as the flow of production along a proper line of machinery is concerned. The profit of the small or medium-sized plant is not to be looked for in the production of staples made in quantities and sold under fiercely competitive conditions, but in specialties, the general market for which seems to be broadening.

"It should be the study of management to make the small or medium-sized plant as flexible as possible so that it will be prepared to respond quickly to style changes in its present products or to adapt itself to new products in its line."

"What kind of cost-finding system is best suited to the small or medium-sized plant?"

"The system which will be best adapted to establishing a standard cost for each item of operation under the terms of a flexible budget and which will tie into the balance sheet accurately each month. The sales dollar is a true measure of costs, and monthly comparison of actual costs with budgeted costs and standard costs will result in a short time in a reliable and accurate cost system."

"To what extent is budgeting practical?"

"Just as the forecast of sales is the dominating factor in the system of scientific management the budget is the controlling factor. It maintains the entire system in balance and is indispensable. Without the budget there cannot be effective scientific management. Opinion will dominate, not facts; therefore the budget is essential, and the cheering fact is that, being less complex in a small business than in a large enterprise, it is more understandable and its inevitable conclusions more convincing and effective."

"What purchasing policy should be followed by the smaller manufacturer? To what extent should he buy raw materials in quantity? Are zero inventories of greater importance than low material costs?"

"Purchases of materials should be made only as required by the terms of the production budget. If the manager of a business possesses sufficient excess working capital to enable him to speculate in, say, pig iron or cotton, that is his privilege as a free American citizen. If he borrows money for this purpose he does so at the risk of the solvency of his business. Under planned production and budgetary control an inventory can be turned much faster than formerly. The quickly revolving inventory minimizes even the advantages of speculative purchasing.

"In any event raw materials bought in excess of production requirements should be carried at the expense of the capital account and not the operating account. In the past, costs have been distorted both up and down through speculative purchasing of raw materials."

"What can the manager of a small or medium-sized plant do to improve his selling methods? Should he seek stabilized demand through developing a variety of products? How can he more intensively cultivate old markets and develop new ones? What advertising methods should he use? Should he support group advertising?"

"Let him study his markets and specifically let him gain a personal knowledge as far as possible of every factor entering into the distribution of his products. He must answer each one of these questions for himself. He cannot answer them intelligently unless he makes such a market study as has been suggested. Market study is not only a matter of statistics, but one of psychology. He will doubtless discover that he should develop the smallest possible number of products and that he should employ only such advertising methods as shall serve to keep his company actively in the minds of the distributers of his products or shall prove effective in selling them to consumers. He will ascertain undoubtedly that trade paper advertising is the best medium for keeping his company and its products before the trade and that applied advertising, as a sales stimulant, can be made very effective if done after intelligent market study. Advertising is being applied for the direct purpose of producing sales of a specific article in a specific market with remarkable results.

"Your last question embraces the entire territory of sales research and market study. Many managers of small plants have felt that sales research and market study were only for great corporations. It is decidedly unprogressive in them not to strive to follow the lead of the great successful industries and to learn all that is humanly possible for them to learn of the best methods of modern merchandising and distribution."

Migration of American Industry

Movement Traceable from East and West Into Indiana-Ohio-Michigan Section—South Gaining in Importance

BY SIDNEY G. KOON*

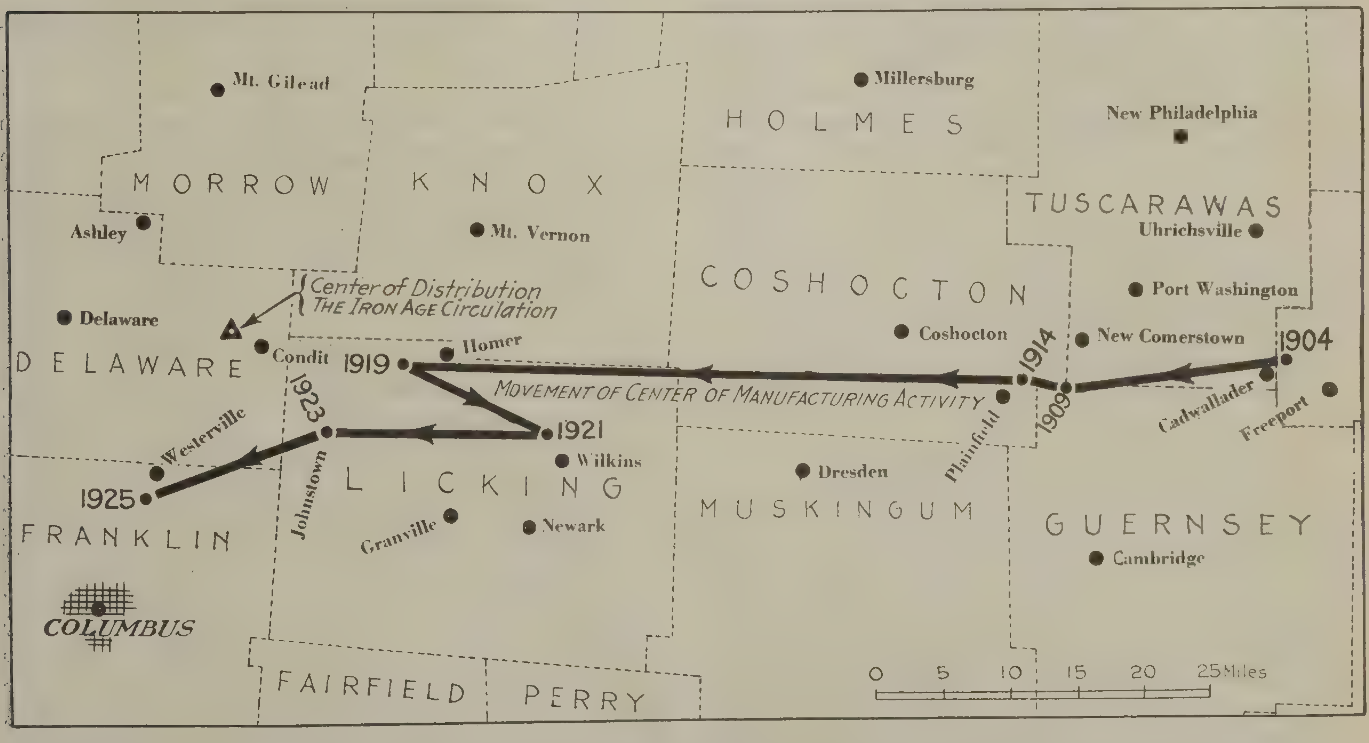
THERE have been many statements in the past year or two to the effect that the industrial center of the United States, which long has been moving at a slow pace toward the setting sun, had started to retrace its steps eastward. Specific instances have been cited of industries moving back toward the point of origin of American manufacturing and certain hazily defined trends have been discussed. In an attempt to trace this movement quantitatively several analyses have been made which are covered in some detail in later paragraphs.

Among the statements indicating a migration of industry was one by Hon. Herbert Hoover, Secretary of Commerce, in an address before the Mississippi Valley Association, Nov. 14 last. A portion of that address follows:

> "While the Panama Canal has carried great benefits to our people, we cannot ignore the fact that it has contributed also to distort the competitive relationships of the Mid-West and our seaboard business and industry. It has drawn the east and west seaboards much closer together by greatly decreasing transportation costs, and therefore tends to draw an area of Pacific's business, formerly enjoyed by the Mid-West, toward the Atlantic States. We can roughly visualize the combined effect of the canal and higher rail rates if we set up a new measuring unit in the shape of the number of cents which it takes to carry a ton of staple goods at present rates.
>
> Using that measuring rod and taking the cheapest routes, we find that before the war New York was 1904c. away from San Francisco, while now it is only 1680c. away. But a given Mid-West point, which was 2600c. away from the Pacific Coast before the war, is today 3114c. away. In effect this Mid-West point has moved 514c. away from the Pacific Coast, while New York has moved 224c. closer to the Pacific Coast. A similar calculation will show that in the same period this Mid-West point has moved 694c. away from the markets of the Atlantic seaboard and South America.
>
> All this causes certain types of Mid-West business to migrate to seaboard. It steadily tends to establish manufacture nearer to seaboard and farther from the heart of agriculture, to the mutual disadvantage of both. It likewise has a tendency to limit the area of Mid-West wholesale distribution. Individual merchants and manufacturers in the interior can give many instances of it all"

Another straw, so to speak, was made public by the Department of the Interior on Nov. 18. This states that the center of production of electricity by public utility power plants, after having moved westerly between 1907 and 1917, turned toward the southeast between 1917 and 1926.

Figures compiled by A. H. Horton of the United States Geological Survey located that center in 1907 at a point in Lake Michigan about 45 miles northeast of Chicago. Ten years later it was about 65 miles west by north of Chicago, "having moved about 85 miles in a southwesterly direction. In 1926 it was 55 miles west by south of Chicago, having moved about 20 miles in a southeasterly direction." During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Millersburg
HOLMES
New Philadelphia
MORROW
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TUSCARAWAS
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Mt. Vernon
Uhrichsville
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Port Washington
Center of Distribution
THE IRON AGE Circulation
Delaware
Coshocton
1914
New Comerstown
1904
DELAWARE
Condit
Homer
1919
1909
Cadwallader
Freeport
MOVEMENT OF CENTER OF MANUFACTURING ACTIVITY
Plainfield
1923
1921
Westerville
Wilkins
Dresden
1925
LICKING
MUSKINGUM
GUERNSEY
Johnstown
FRANKLIN
Granville
Newark
Cambridge
COLUMBUS
0 5 10 15 20 25 Miles
FAIRFIELD
PERRY

TWENTY-THREE Years Ago the Center of Manufacturing in the United States, as Shown by Distribution of Wage Earners, Was About 95 Miles East by North of Columbus, Ohio. Its progress westward with the passing years is traced on the map. It now is about 9 miles from the center of Columbus. Not far away is the center of THE IRON AGE *circulation* this period of 19 years the output increased from 10.6 to 73.8 billion kilowatt-hours, or nearly 600 per cent. Population increase during the same period was given as 34 per cent and per capita use of electricity as 122 kwhr. in 1907 and 630 kwhr. in 1926.

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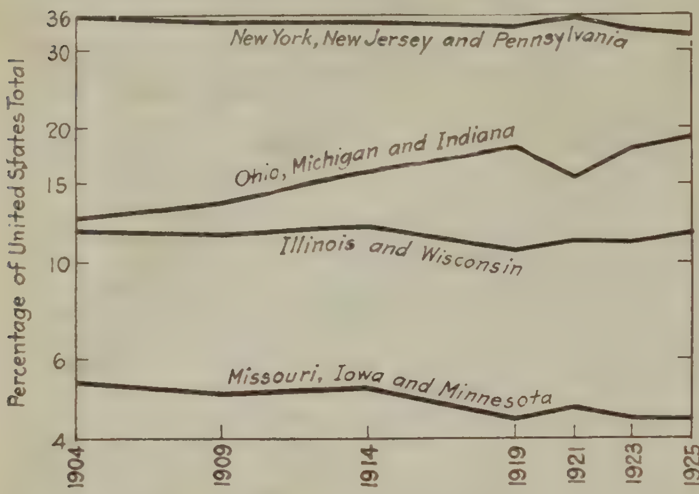
*Associate editor THE IRON AGE, New York.

Methods of Studying the Movement

BOTH general manufacturing, as reported by the United States Census Bureau, and the production of iron and steel, as reported by the American Iron and Steel Institute and THE IRON AGE, have been analyzed for the purpose of determining the movement of industry. In the iron and steel field the production of pig iron has served as the basis for one study, while the production of rolled iron and steel products is the foundation for another. General manufacturing has been taken up in an analysis which follows State lines.



ELEVEN States Produce Two-Thirds of Our Manufactures. Their relative outputs are shown in the two diagrams on this page—that above being figured from the "value added in manufacturing," while that at right is based on the number of wage earners. Both show that the heavy gains of Ohio, Michigan and Indiana are at the expense of both the eastern and western groups

It has been covered also on the basis of production in large cities, principally so that the eastern and western sections of Pennsylvania, for instance, might be separated, and similarly in some other cases.

Several methods of attack are available in any such study. The one occurring most directly to anyone undertaking this work is to use the total production of the manufacturing plants. For some reasons this is not a thoroughly satisfactory base, because there are so many duplications, particularly where the finished product of one establishment goes in as raw material in the next, and thus through several ramifications appears twice or more in the final figures. One way to get around this is to use the "value added" to the raw materials by the manufacturing process. This avoids all such duplication, but unfortunately the figures have not been available for all of the analyses desired. A third base, which in the long run ought to be practically parallel with the "value added," is had by considering the number of wage earners.

Central Point in Manufacturing

Another method of approach, which disregards separate districts but shows the movement of the center of activity of the country as a whole, gives an interesting answer. Calculations made from the 1904 census of manufacturing in the United States place its center at a point about 91 miles to the eastward and nearly 19 miles to the northward of Columbus, Ohio. A similar calculation for 1909 shows that the center had moved westward nearly 17 miles and southward about three miles, being correspondingly closer to Columbus.

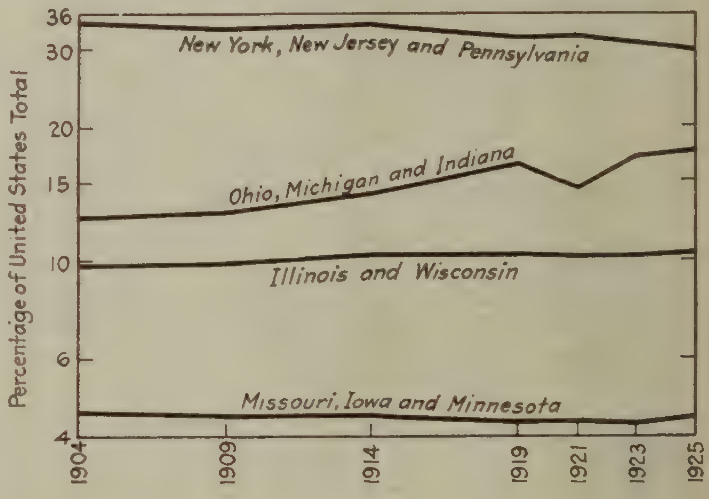
A shorter movement brought the center in 1914 to about 71 miles eastward and 17 miles northward of Columbus. The distance moved in that half-decade was only about four miles. A large jump was made in the next five years, placing the center in 1919 about 23 miles to the eastward and 18 miles northward from Columbus. During the next two years the movement to the west was interrupted, for the center, by 1921, had moved 11 miles farther east and five miles farther south.

By 1923 this eastward digression had again been reversed, the movement placing the center about 17 miles eastward and 13 miles northward of Columbus. In 1925, which is the latest date for which figures are available, the center had approached closely to the outlying portions of the Ohio capital. As nearly as it can be calculated, it was about 3½ miles to the east and 8 miles north of the center of the city.

It is interesting to note, in connection with the recent positions of this center of manufacturing activity of the United States, that the center of distribution of the circulation of THE IRON AGE also is close to Columbus. Figures for the first half of 1927 show that location to be about 10 miles east and 21 miles north of that city. It thus is in the same direction from the city as is the manufacturing center, and the two are but 15 miles apart.

Comparisons on Percentage Basis

TO eliminate the uncertain influence of varying business conditions comparisons have been made, not of the total output or number of employees or dollar value, but of the percentage of such quantities which each State or section contributed to the total for the United States. Using this method, a clearer conception is had of the relative changes up and down as among the various States and sections. It cannot, of course, take account of the fact that changes in business conditions do not affect all sections proportionately. With this single disability, however, it appears to be the most rational means of obtaining the desired result.



Rolled Iron and Steel Production

A definite movement into Indiana, Michigan and Ohio, considered as a group, is observable when studying the production of rolled iron and steel in the United States from 1911 to the present time. This movement comes from both directions, that is, both east and west. It does not come from the south, for that region itself is showing a steady growth.

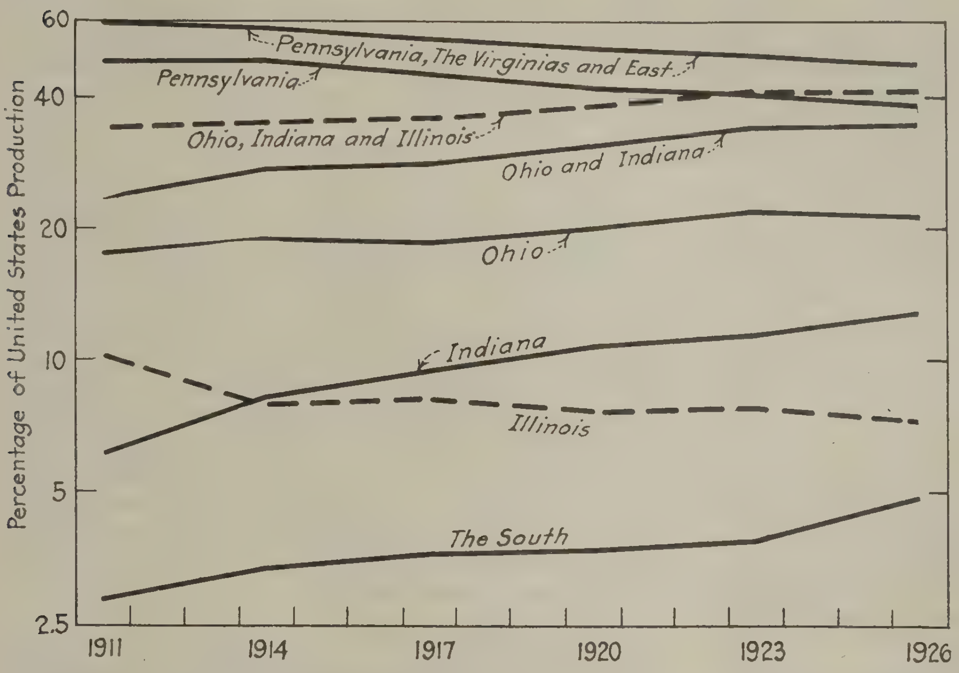
In 1911 and 1914 (the figures, for ease of calculation, were taken at intervals of three years). Pennsylvania furnished about 49½ per cent of the total. That percentage has now dropped below 39. Meanwhile Indiana has increased from 6 per cent to 13 per cent of the country's total and Ohio has advanced from 18 to about 22 per cent. As a result, even though Illinois has shown a drop comparable with that of Pennsylvania, the group of three States—Ohio, Indiana and Illinois—has now passed Pennsylvania, having a total of 42 per cent of the country's aggregate output in 1926 against only 34 per cent in 1911.

Conditions in the South show an uninterrupted gain, from less than 3 per cent in 1911 to almost 5 per cent of the total in 1926. This includes all territory south of the Ohio River, with the exception of the two Virginias. It reflects the growth in importance of the Birmingham region particularly.

Movement of Manufacturing in General

Concentrating our study upon that portion of the United States lying west of New England, north of the Ohio River and east of the Missouri River, we have a territory comprising 11 States, forming the most intensive large manufacturing area in the country. They cover 18½ per cent of the nations expanse, contain 49 per cent of its inhabitants and produce 67 per cent of its manufactured products. Three or four of the States included are large factors from the agricultural viewpoint, but contain heavy manufacturing activity also.

Taking the so-called "empire group" of New York, New Jersey and Pennsylvania, there has been a drop from 34 per cent of the total wage earners in the country in 1904, 1909 and 1914 to about 32 per cent in 1919 and 1921 and some 30 per cent in 1923 and 1925. Accompanying this decline in the eastern States of the region under discussion is an increase in Ohio and Michigan from 10 per cent of the country's total in 1904 and 1909 to about 14 per cent in 1923 and 1925. In both cases the movement was irregular, but the net change was a considerable drop in the empire group and a corresponding increase in the Ohio-Michigan group.

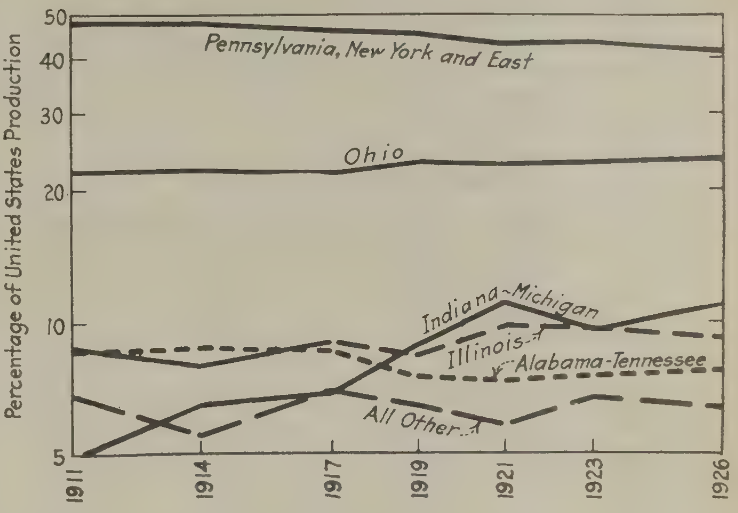


Regarding Indiana and Illinois as another group, their 10 per cent of the total employment in 1904 to 1914 inclusive has increased to 10¾ per cent in the two most recent years. This moderate gain has been made mostly by Indiana, which has gone up from 2.84 per cent of the total in the three earliest years to 3.33 per cent in the two latest years. The territory west of the Mississippi, comprising Missouri, Iowa and Minnesota, considered together with Wisconsin, has held practically uniform at about 7¼ per cent of the total number of wage earners of the country.

It thus follows that, disregarding New England, the South and the Far West, the Ohio-Michigan group has benefited in expansion of industry at the expense chiefly of the empire group. This study does not show, in the same way as with the rolling mill study, a movement from both west and east into the middle section. It does show, however, that that middle section is growing faster than the sections surrounding it and to the (relative) loss of some of them.

Study of the Cities

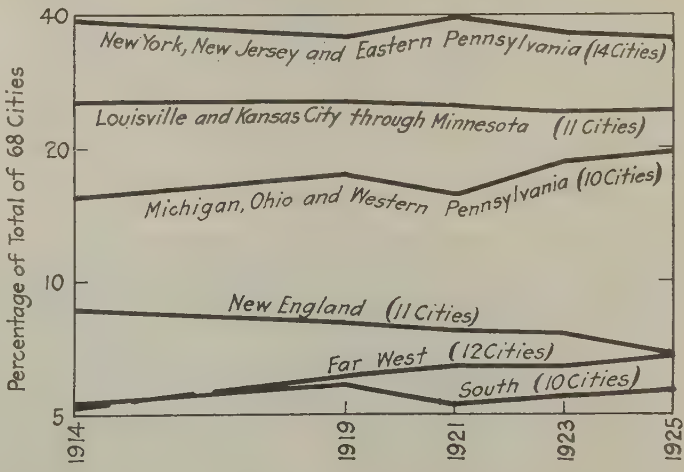
More than four-ninths of all products manufactured in the United States are produced in the 68 cities which had in 1920 a population of 100,000 or more. This does not include production of suburban areas, and in particular, so far as the steel industry is concerned, it does not include the production of the large number of small cities containing steel plants. Bethlehem and Gary and Lackawanna are notable examples. These 68 cities are here considered as divided into six groups, each of from 10 to 14 cities. Analysis of the changing volume of manufacture in the manufacturing census years 1914, 1919, 1921, 1923 and 1925 is considered for these groups separately.



PIG Iron Production, by Districts, Is Traced Above. Indiana and Michigan, as well as Ohio and Illinois, have been gaining at the expense of Pennsylvania and the East

At Left Is the Production of Rolled Steel in the United States. Ohio and Indiana show huge gains in their proportion of the total—at the expense, mainly, of Pennsylvania and Illinois

Below Is the Manufactured Product Showing of 68 Cities, Grouped in Six Sections of the Country



In some respects the study of production in the principal cities has yielded results similar to those in preceding paragraphs. Taking the census figures for 1914 to 1925 inclusive, the cities showed their highest proportion in 1921, with 46.98 per cent of the total. Their lowest came in 1925, with 44.81 per cent. All of the other census years showed between 45 and 46 per cent.

There has been a slight falling off in the territory covered by New York, New Jersey and eastern Pennsylvania, in which 14 of these cities are located. There has been a slight falling off in the section around Chicago, including eleven cities, in that area from Louisville and Kansas City, on the south, up to Minneapolis on the north. There has been a decided gain, as shown by the other studies, in the area comprised by Michigan, Ohio and western Pennsylvania, represented by ten cities.

New England's proportion has declined steadily, as shown by records of its eleven cities. The South has shown a moderate gain, represented by figures from ten cities, while the Far West and the Southwest have shown a consistent gain considerably exceeding that of the South. This western area, which contains twelve of the cities, has almost reached the New England percentage of the total, although in 1914 it was only six-tenths as great as New England.

To the tremendous expansion of the automobile industry may probably be attributed the movement which we have traced. Michigan, Ohio and Indiana, considered as a group, is the principal and predominant seat of that industry and its main auxiliary services of supply. And it is precisely into that area that we have found industry going from contiguous areas on either side.

One element which may be noted lies in the relative recession of industry in that area in 1921. Examination of automobile production figures shows a correspondingly heavy reduction in that year in the production of cars. Only 41 per cent as many cars were produced in 1921 as in 1923, whereas for manufacturing as a whole the ratio was 72 per cent. The tie-up between that one industry, which now appears to have reached its full growth, and the relative movement of manufacturing activity into the area dominated by that industry is striking.

Steel Scrap in 1927 Was $3.35 Below Eight-Year Average

New Conditions in the Trade Operate Against Speculation and Fluctuating Prices—Last Year Average Price the Lowest Since 1921

CHANGING trends in the buying and selling of scrap iron and steel, upon which attention was focused in our Annual Review Number of Jan. 6, 1927, have operated throughout the past year to minimize the high degree of speculation which formerly existed and to establish scrap trading upon a basis of quick turnover, small profits and low prices.

In only one year since the war, 1921, have scrap prices averaged lower than in 1927. Heavy melting steel, the grade in which there is the largest consumption, averaged $1.48 lower in 1927 than in 1926, taking prevailing quotations in the Pittsburgh, Chicago and Philadelphia districts as the bases for a composite price. This composite price was $14 in 1927 as against $15.48 in 1926, while the average for the years from 1919 to 1926, inclusive, was $17.355.

The downward trend of prices is not alone accounted for by the fact that the steel industry and other metalworking units which consume scrap operated at a lower rate in 1927 than in 1926. Other factors were at work. Railroads have improved their methods of gathering scrap and their shipments both from their own scrap piles and from the plants of private manufacturing companies have been prompt. Scrap consumers themselves have taken a hand in the situation by purchasing in moderate-size lots and thereby avoiding the speculative flurry which at times in the past has followed every large transaction.

Scrap Handled More Economically by Steel Plants

When brokers and dealers have only moderate-size orders in hand they do not scramble to cover and outbid each other in their anxiety to protect themselves against loss. Steel companies have quite generally adopted the policy of releasing orders or shipping instructions only as they need material and this regulation has resulted in steel plant economies because much of the scrap coming into the steel plants is unloaded directly from cars to the open-hearth charging boxes instead of being piled in the yard for rehandling as required.

While there has been no oversupply of heavy melting steel of the best grades, the supply of secondary grades has been very large at all times and the market has not been affected by the speculation which usually has accompanied any signs of a shortage.

Conditions in the trade, while operating largely to the advantage of the buyer, have reduced profits for the seller, and most particularly for the yard dealer. In former years the scrap yard existed almost wholly on the speculative features of the market, but the extremely narrow margins have left little or no opportunity for the dealer to speculate. Railroads and manufacturing companies to a large extent are preparing their scrap so that it is ready for the charging box, and this has worked to the exclusion of mixed yard scrap, which in former years was prepared in the scrap yard. Some of the largest dealers have discontinued the operation of yards, and it is only the small dealer, with a minimum of overhead expense, who can cope with the present situation.

Large Shipments by Water

Water shipments have assumed a larger importance in the past year. The Bethlehem Steel Co. has moved not less than 125,000 tons from Detroit and other cities on the Great Lakes to its plant at Buffalo, whereas in the preceding year it moved only 50,000 tons in like manner. In addition to Bethlehem's water shipments, the Otis Steel Co. brought 20,000 tons of steel scrap from Detroit to Cleveland, this being the first time that scrap from Detroit was moved to Cleveland by water. These water shipments have operated to the advantage of the purchasers in keeping prices low at the delivery points, water transportation being so much cheaper than haulage by rail.

A transatlantic shipment of alloy steel scrap from England to a Chicago steel plant, consisting of 1200 tons, was a departure. Other boat loads are to follow, relieving in Chicago the shortage of alloy scrap, which is produced there only in small quantities, and therefore is not usually separated from other steel scrap.

The Eastern market situation has been changed by the adoption of more stringent requirements by the Bethlehem Steel Co., the largest Eastern user of scrap, and further by the virtual withdrawal as a buyer of the Sparrows Point plant of that company, due to increase in Bessemer steel-making capacity to an extent which makes Sparrows Point self-contained as to scrap.

Conditions at the opening of 1928 seem to indicate that market advantages will continue to lie largely with the buyers rather than with the sellers of scrap. There is nothing at this time to point to scarcity of supply or high prices.

American Foundries Through European Eyes

Democratic Social System Mainspring of American Achievement—Sees New Market for Malleable Castings—Suggests Electric Forehearth—Stresses Need for Single Cost Language

BY MORTEN GRINDAL*

THE foundrymen's convention in Detroit in 1926 was a red-letter event in the history of international relationships in the foundry industry. For the first time organized bodies of leaders from foundries in a large number of countries came to study American plant practice. Their praise of the unforgettable days they spent while the official visit lasted has been voiced in numerous ways and in superlative terms.

The writer had the good fortune to be one of the number of delegates. While he participated in the extensive program before, during and after the Detroit meeting, he feels that the many months he spent later in the United States were of much greater value to him. It was literally impossible to digest fully the large program rushed through in the comparatively short time of the convention week. In his subsequent sojourn the writer visited 51 American foundries and one by-product coke plant. He talked with more than 1000 foundrymen, and had ample opportunity to study the many details in all conditions of American work and life which have a bearing on the resulting prosperous conditions in that field. If a short account of his experiences and views may be of any value to his American colleagues, he feels that but a small repayment is made for the very cordial and courteous treatment he received from every one of the large number of leaders of the American foundry industry with whom he came in contact.

The visits included foundries of all branches of the industry and covered plants of widely varying capacities—from an artisan's humble works in the Watchung Mountains, run by his wife, his son and himself, to the other extreme of Ford's immense foundry in the Fordson plant. The list contains a large number of jobbing foundries with the most diverse types of equipment and production—stove foundries, radiator shops, foundries for soil pipe and fittings, shops for a variety of classes of mass production using different conveyor methods, plants producing pipe in vertical sand molds and also by centrifugal methods, a number of malleable cast iron foundries, steel foundries run on a production basis and for jobbing purposes and, finally, non-ferrous shops in all branches of the field, including the manufacture of die castings. The melting units in the plants visited include virtually every known practice: the cupola, the crucible, the converter, the air furnace, the open-hearth furnace, the electric furnace and, in some cases, a combination of some of these units.

Freedom from Caste Our Greatest Asset

THE problem the writer would like to discuss first is one common to all American industries, and one which was talked about in almost every foundry he visited:

Why is it that the European workman produces more in the United States than he does in Europe? And hence, why is America the more prosperous?

Many delegations have come to America to study this question, and many learned reports with a mass of statistics have been submitted to the various local authorities. And nothing more has come of it. Not

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*Lillehammer, Norway.

one of these reports has—so far as the writer knows—touched upon what he considers the basic difference between the conditions of life in the old and the new world: the social system.

America, being fortunate in not being tied down to traditions developed through thousands of years of history, bases its activities on the spirit developed by the pioneers in their westward march of conquest, with the individual depending entirely upon his own efforts to achieve success and seeking cooperation for defensive purposes. It was the old law of the survival of the fittest, applied to the extreme. It is these fundamental principles, but little infringed on by the American society of today, which no doubt constitute the main reason for the universally recognized leadership of American enterprise.

It is easy to point to the rich natural resources of the broad American continent, but the country in Europe which possesses the most valuable resources is governed by socialistic principles. American society builds on the instinct of individual self-support: Every man for himself—sink or swim. Again, the road to the top is open to each one who is able to climb it, unhampered by conditions of breed or creed. A man's success depends mainly on his achievements, and the results he can show will determine his position in the scheme of things. The very ablest become leaders and in a nation with 120 million people there is bound to be a large number of eminent brains. Thus the American system will, without much friction, cause the individuals to segregate into the places in the social scale where they will be of the greatest service to the community and to themselves. The unlimited opportunities offered in a nation where even the chosen leading executive may come from a humble home in a country valley is naturally the best tonic for concentrated action that may be offered any ambitious youth. America thus makes the most of the greatest natural resource in any country—the human brain.

For the sake of comparison, consider for a moment the class system ruling the old countries of the world, cast to its present mold thousands of years before modern industrialism was ever dreamt of—where leaders of society and enterprise are selected by birth and not by ability, where promotion depends more on friendship and intrigue than on natural gifts, where the laborer at the bottom rung of the ladder recognizes the impossibility of ever getting a fair chance, and where he feels and believes himself abused by the community in which he lives and, embittered, resolves to be of as little service as possible. There the friendly spirit between producer and executive met with in almost every American plant is an unknown quantity. A superintendent in a malleable cast iron plant in the United States remarked to the writer: "The men in this shop are my best friends. We live for 10 hr. every day together. If these fellows aren't my friends, I have none." The writer could have no better wish for the future of the foundry industry in Europe than that such a remark could be heard as a common occurrence among the sand heaps in the shop. Is it any wonder, then, that the European workman, finding himself freed from the bonds which tied him down in his native land, feels the buoyant effect of his economic liberation, directly measured by his ability and willingness to forge ahead? Is it surprising that he works, and works hard?

American Molder Aided by Pneumatic Equipment

ALTHOUGH the American workman admittedly shows a general willingness to produce to the limit of his capacity, it has naturally been the directing intelligence of inventive spirit and administrative ingenuity which has been responsible for the great evolution in the American foundry industry in the last few decades. To aid him in his efforts, the American foundryman has today about 4 hp. at his elbow, with probably even more mechanical power per capita to come.

The first serious efforts to improve on the old method of making molds by the use of hand ramming only resulted in the construction of a number of different types of machines. The hydraulic power for molding purposes, commonly used in European countries, has evidently but a limited application in America. Though cheaper in installment and running cost, the hydraulic system has been discarded in America in favor of pneumatic power, because of the greater flexibility and speed of production made possible by use of the latter method.

Air Leakages Impede Molding Operations

It is unfortunate, though, that leakages, which never could be tolerated in a liquid pipe line, are a daily occurrence in almost every foundry having an air compressor. Air is free, and thus it is not considered of much importance that losses occur almost every minute of the working day. It is strange that such a universal slackness is shown in this connection, as it is common experience that the pressure drops below the required minimum. The writer does not remember having spoken to any foundryman who did not admit having an insufficient surplus of compressed air in his plant.

While the molding machine originally was designed for handling molds on a production basis, the sorely felt need for mechanical devices which could assist the highly paid skilled molder to increase production has resulted in at least two types of useful equipment: the jolting machine for jobbing work and the sandslinger.

Forecasts Further Improvement in Molding Machines

In recent years the design of molding machines for production work has shown few changes, seemingly indicating that this type of equipment has reached full development. It is more likely, however, that the next few years will show greater changes in molding methods than have been witnessed in any previous corresponding period. First, consider the smallest type of work, as represented in malleable castings. The molds are almost exclusively made on the power-jolt-squeeze hand rollover and hand, pattern draw machines. These machines are fast, provided the operator is a strong and speedy workman. There is really no reason why machines could not be designed so that the molder would do nothing but move levers, set cores and lift the finished and closed mold to the floor or place it on a conveyor. With all the engineering attention this problem at present receives in America, it is but a question of time when it will be solved.

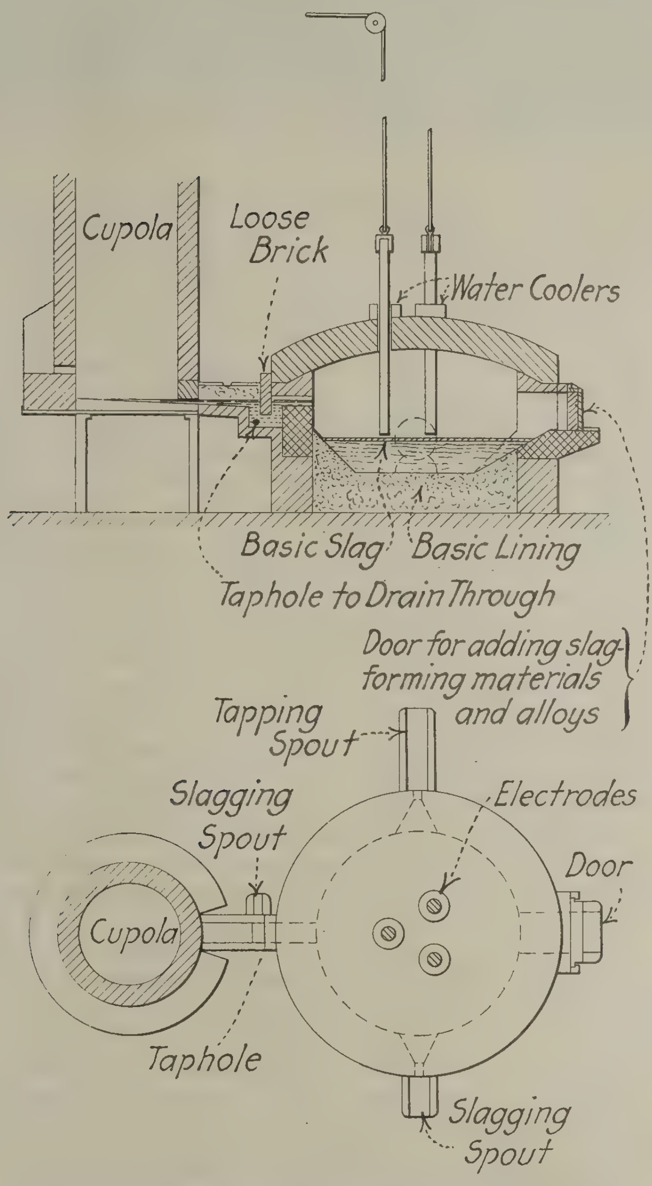
The type of work requiring a flask for each mold is a different proposition. The sandslinger solves the problem to a certain extent, as almost any mold can be rammed with the aid of this machine. It can do no more, however. Also, if it is possible to ram a mold on a jolting machine, that method will in most cases be the faster, and jolting is the best known way of making a uniformly rammed mold.

Now, as to the present position of the jolt machine for jobbing work: Generally speaking, the largest work is made on a plain jolt table, while at least one concern builds a rollover pattern draw machine suitable for medium-sized and even fairly heavy work. There seems to be room for further progress. The ideal molding machine for the jobbing foundry will probably be a jolt machine with mechanical devices to ram the upper part of the flask at the same time that the lower section is packed by jolting, the machine then rolling the flask over and drawing the pattern from the mold.

Nothing is impossible in the engineering world so long as the laws of nature are followed. There is no reason why the vast sums of money available for research work in the United States industries should not be partly utilized to devise the construction of a machine for the jobbing foundry which—utilizing the present flask and pattern equipment—will ram the mold, draw the pattern and assemble the parts, either on the machine or on the floor. When the possibility of further progress is admitted, real advance is but a question of time.

American Foundry Superior in Materials-Handling Methods

FOREIGN foundrymen witnessing at close quarters the American foundry industry in the midst of an unprecedented development cannot help but notice the many different ways material is handled in the various foundry departments. It is a well known fact, that often more than 100 times the weight of the finished casting must be handled in the routine of the work. One of the most striking differences between American and European foundry practice is the way American foundrymen have tackled the problem of relieving the workman from the backbreaking labor of handling sand and other materials, as well as the problem of intraplant transportation of castings. The future economic position of the foundry industry will mainly depend on the further developments in this field. The ways the problems may be solved seem to be legion. While a certain uniformity is noticeable in molding machine construction and uses, a pronounced individuality is plainly seen in the manner various firms have tackled their problems in handling foundry materials, perhaps naturally so. Conditions in various plants are so different. Again, firms are generally large enough to afford to spend the money for the brains, labor and materials required for the development of new methods.



An Electrically Heated Stationary Forehearth Connected with a Cupola by a Self-Slagging Spout. The metal runs in a constant stream through the spout, where it gets rid of acid slags, and enters the basic-lined forehearth. The purpose of the forehearth is to superheat, deoxidize and desulphurize the metal

American "Open-Door" Policy Contrasted with European Secrecy

A suggestion that inventors should take a 10-year vacation was recently made. People should be given time to catch up with progress. Any foundryman visiting half a hundred American foundries knows that there is a real reason for such a proposal, even though it is not practicable. The multitude of improvements and devices at present flooding American foundries paint a picture of the riotous, rapid onward rush of the current of progress. In spite of the broadminded policy of the open door almost universally adopted among American foundrymen, it has not been possible for the various leaders to absorb and utilize in their own plants the many different details developed in the plants of their colleagues. People in Europe have—to their own detriment—partly believed in secrecy. The lesson taught during the Detroit convention will go far to change the views of the European foundrymen in this respect. "Why should I not let a competitor visit my plant? If I do not learn from him more than he gets from me, I am to blame." This was one of the many sensible remarks heard in America.

Molding Sand—The Key to Closer Limits in Castings

A FEW words about molding sands—by far the most important of all foundry materials—may not be amiss. America has an enviable resource in a great variety of splendid molding and coremaking sands. The strongly bonded, yet fairly open, sand which is available has made it possible to subject the molds to far rougher handling than generally would be possible in Europe. This is highly important for the continuous foundry with its multitude of conveyor systems. The chemists have, however, through their analytical investigations made synthetic production a paying proposition in many fields. Apart from the fact that the natural resources of molding sand some day will be exhausted, there appears to be an alluring fascination in the problem of repeating the work of nature and improving upon it, by building in the factory a sand with ideal properties. The writer has seen charts of daily tests from a production foundry running entirely on a molding material built up of pure silica sand and high-grade fire clay. Although silica sand seems to be the natural basic material, it is by no means established that clay is the only good bonding substance.

Work in this field has only begun, and it is impossible to say what results research workers may achieve within the next few years. Just consider the problem of the sand burning on, or at least adhering to, the casting when removed from the mold. Cement is sometimes used to coat the mold. A titanium-nitrogen compound has been found that gives even steel castings a clean surface in green sand molds. In spite of the very difficult nature of the task, the writer believes that some day castings will uniformly strip clean from the mold, and that much heavier castings than it is now possible to make will be poured in molds that have not been subjected to a drying process.

Today instruments measuring the moisture of the sand pile are in daily use, while bond and permeability are checked by constant use of standard equipment. Presently we shall witness means of automatically adjusting the moisture and permeability of the sand as it passes the treating apparatus in the uninterrupted flow of operations.

The evolution of mass production has produced revolutionary changes in the foundry industry. Exacting demands, previously unheard of and thought impossible, are today met with in contract specifications.

Sees New Market for Malleable Castings

"QUALITY is remembered long after price is forgotten." "Quality" may be a present slogan of American industry. The trouble with the foundry industry is that it is often difficult to find terms in which to make the problem of quality clear to the buyer. This is because of the complexity of the problem, particularly so in the case of cast iron.

In the malleable cast iron field the pioneer work started by Seth Boyden has been continued uninterruptedly, with the result that American black heart malleable now is universally recognized as a very superior product. The untiring research work in this field has developed the air furnace, stoked with pulverized coal as standard practice. While pulverized fuel seems to be ideal for this class of work, it is a pity that so much heat is wasted in the stack. Again, the continuous pouring, such a desirable feature in the modern production foundry, is an impossibility under the present common melting practice. A furnace was built in Germany some time ago, based on the principle of utilizing the waste gases from the air furnace, actually superimposing a cupola on the air furnace. Unfortunately the inventors of this furnace seem to have overlooked the danger of melting with oil, as they did, having the flames playing directly over the hot iron before melting, decomposing the water vapors in the flame and thus oxidizing the metal. It is by no means unlikely that the furnace which will come to stay in the malleable plant will be a continuous melting unit, using pulverized fuel or even carbon monoxide gas.

As to the application of malleable cast iron in engineering construction, changes are evident. While smaller castings in many cases are being displaced by pressed steel or drop forgings, a new market is about to be opened, as the carbon content is gradually being lowered, now at times touching 2 per cent. Such a metal can be poured in the heaviest sections, and while malleable castings now sometimes weigh hundreds of pounds, this tendency to encroach on the field of steel castings may continue. This does not mean that such a tough metal as is demanded in heavy work will be wanted in smaller pieces, where easy machineability is of primary importance.

In the cast iron field, the quality of the available raw materials constitutes a story of constant retrogression. Beginning with the cold blast charcoal furnace, one proceeds to the coke furnace, to hot blast, increased rapidity of ore reduction, and finally a heavy addition of scrap to the blast furnace burden. While the discussion as to scrap in the furnace burden is still blazing hot between producer and consumer of foundry pig iron, the writer may state that he almost universally encountered foundrymen strongly criticizing the unreliable quality of ordinary low-priced virgin metal. One firm purchased 1200 tons of pig iron, but discovered that it was impossible to add more than 10 per cent of this iron to the charge, if trouble were to be avoided. The present situation is no doubt transient.

The greatest difficulty in the case of cast iron is that the price is the most important item—in many cases the only justification for the adoption of this material in constructional parts. The improvement in quality that has to come must be achieved in harmony with the demand for relatively cheap castings. In spite of the extensive metallurgical control common to large American plants, the greatest headway in quality has probably been made in Europe. While the pouring in heated molds, for a while strongly advertised in Germany, may not become practice in America, the all-steel charge in the cupola has been successfully tried in American plants. The study of graphite formation is bound to lead to methods resulting in the most favorable fractures, partly by addition of special alloys, while the amount and form of the combined carbon will be controlled to suit varying demands.

Proposes Electric Forehearth for Cupola

UNFORTUNATELY the cupola is not suited for the production of the highest grades of iron castings. The desirable maximum melting temperatures cannot be attained. A close control of the carbon content is very difficult, and the lower limits at times desired for this element are beyond reach. Again, the sulphur pick-up may be objectionable. Worst of all, the metal is easily oxidized. Hence the resort to air furnace practice or the electric furnace for castings of the highest quality, as for instance in the case of chilled rolls.

Duplexing and even triplexing processes are used. The trouble is that the cost of installing the electric furnace often is prohibitive, and the intermittent application of the electric current is a costly item. The writer recently worked out an idea calling for the combined use of the cupola and an electrically heated stationary forehearth, which—so far as he knows—is new and original.

As shown in the sketch, a self-slagging spout from the cupola is connected with a stationary electrically heated forehearth. The metal is melted as hot as usual in the cupola, runs in a constant stream over the spout, where it gets rid of the acid slags, and enters the basic-lined forehearth, where a basic slag covers the bath. As but a small amount of extra heat need be added, the electric energy may be applied all the time, but a relatively limited amount of current is consumed. The purpose of such a forehearth is threefold: to superheat, to deoxidize and to desulphurize the metal. If small castings are made, the forehearth may be of relatively limited capacity. For large castings the power load will increase, because of the larger cooling surface of the forehearth, the depth of the bath not exceeding 6 in. The metal is tapped when the required quantity of metal has accumulated. The construction details should be such as to allow for the addition of slag-forming materials, also to make it possible to drain the fluid slag at intervals. As alternating current of 110 volts tension is rather common in America, it may, in many cases, be possible to avoid the use of specially constructed melting transformers, although it must be remembered that the application of the current in the furnace at times subjects the transformers to rough treatment.

Should any American foundryman be interested in the above proposition, the writer would appreciate information about the results that may be derived.

Foundries Should Talk the Same Cost Language

THE foundry industry suffers as a result of rapid plant expansion during the war—hence too keen competition, with the natural destructive consequences. While probably all will agree that every order ought to leave a profit, the trouble is that the method of finding production costs has not been standardized. An American association sent a questionnaire to a number of foundries specifying certain castings, giving weights and asking the prices to be paid for all types of labor, for raw materials, etc. All the firms were requested to do was to insert the figures from their respective cost systems. The results showed differences of almost 100 per cent. No wonder the buyer at times is puzzled over the greatly varying quotations! Before real progress can be made, the same language must be talked. The system of cost-finding must be standardized. Presently this problem will be solved through cooperative efforts. "I am perfectly willing to let a competitor see my cost cards—not selling prices. Should I refuse to do so, he is entitled to think that I am not playing fair." This remark—passed by a cost accountant in a steel foundry—will be brought to the attention of foundrymen in Europe.

Over-Expansion in Steel Foundries

Consumption of Castings Has Increased 37 Per Cent Since 1913, But Active Capacity Dropped from 75 to 55 Per Cent During Same Period

BY WILLIAM J. CORBETT*

THERE are 293 individual plants in the United States in which steel castings are manufactured, and these are operated by 267 companies. The total practical capacity for the manufacture of steel castings in the United States is 198,863 net tons of good castings per month, or 2,386,356 net tons (2,130,000 gross tons) of good castings per year. Of this total capacity approximately 9 per cent belongs to companies that manufacture steel castings exclusively for their own use. In addition there are others operating steel foundries all of whose castings are not sold direct to consumers, such companies as those engaged in the manufacture of heavy machinery, and also some of the large steel mills. However, the capacity of foundries operated as separate departments of large corporations is sometimes greater than necessary for their own use, and consequently the surplus is sold in competition with foundries specializing only in the manufacture of steel castings.

Total Sales of Steel Castings Increasing Steadily

The upward trend in the production of steel castings has been quite marked. Users of metal products recognize the strides that have been made in the founding art. The quality of the products made in cast steel has improved, with consequent benefits to their users. While these accomplishments have brought increased recognition of the economy and usefulness of steel castings—and they should be more and more effectual in the future in the way of increasing consumption—the capacity of the industry has never been utilized to its full extent—in fact, the increase in capacity has been greater than the increase in sales.

Fig. 1 is constructed from data (in gross tons) published annually by the American Iron and Steel Institute. No data for the year 1927 are yet available from this source, but it can be estimated, as shown dotted, that the total for last year was below that in 1926. The trend since 1910 is indicated by the straight dotted line, determined in accordance with the customary method of calculating the secular trend of a series of statistical data. The average increase as shown by the straight line of secular trend is about 50 per cent since 1910; that is, one and one-half times as much tonnage of cast steel products was used last year as in 1910. This rate of increase will probably continue for the reasons mentioned above. Yet despite the rapid growth in the consumption of steel castings as depicted in Fig. 1, the capacity of the steel casting industry has increased even more rapidly. Existing facilities have been made more effective, and much new capacity was created during and since the war. If the total production of steel castings in 1927 was 1,320,000 net tons (estimated), only about 55 per cent of the capacity was utilized. Therefore, further increase in steel foundry capacity would be economically unjustified until there is a decided increase in the consumption of the cast steel products.

Acid and Basic Steel on a Par

The trend of production of basic open-hearth steel castings made in foundries has been upward. The output, as indicated by the line of secular trend figured from data of The American Iron and Steel Institute, is about 19 per cent greater at present than in 1910. During the last few years the consumption of open-hearth steel castings, both basic and acid, has been somewhat retarded by the reduced purchases of new railroad equipment, which absorbs a considerable proportion of the total output.

Annual production of steel castings made in foundries using acid open-hearth furnaces are strikingly parallel to those for basic open-hearth castings, and nearly equal in quantity. On the whole, the products of foundries using acid open-hearth furnaces are considered to be general miscellaneous castings, as distinguished from basic open-hearth steel castings which are largely railroad specialty castings.

The output of steel castings made by converters, crucibles and electric furnaces consists of small and medium sized carbon and alloy steel castings. These furnaces are chiefly small units and together are responsible for less than one-third of the output in weight. While converter castings had a peak production of 180,000 net tons in 1918, there has been a decrease to 64,000 net tons in 1926. This decline is due entirely to the supplanting of converters by electric furnaces and small open hearth furnaces. Under some conditions converters are slightly more costly for making steel, and severe competition compelled the steel foundries to replace them if there was a probability of reducing costs by so doing. This condition has not existed in all converter installations, since it depends on economic factors that vary.

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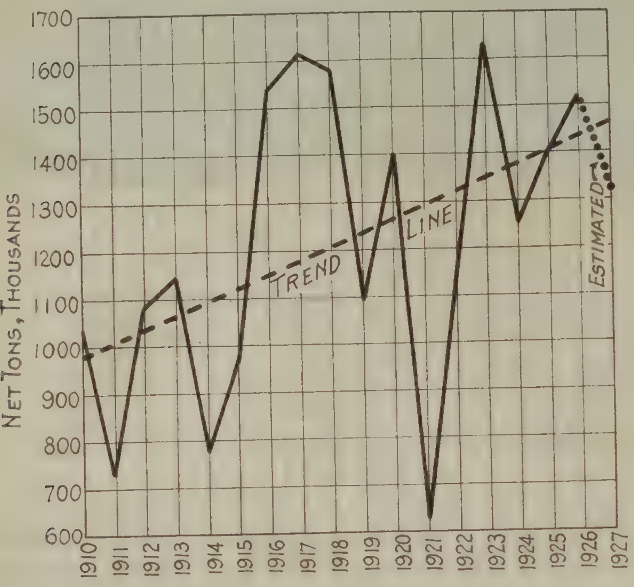
*Secretary-Manager, Steel Founders' Society of America, Pittsburgh.

Electric Steel Replacing Converter Steel

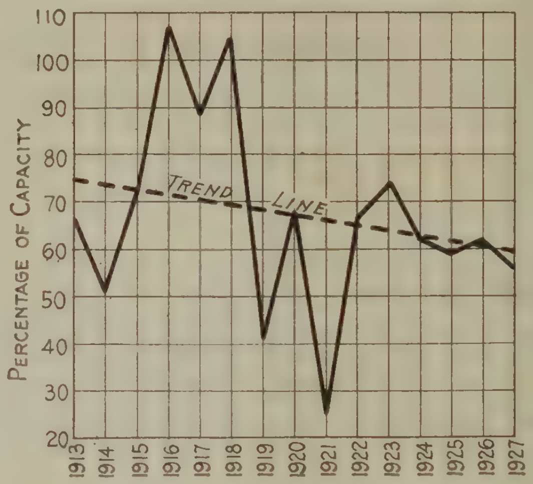
A rapid and almost continuous increase in the production of electric steel castings has been common knowledge. In 1914 it amounted to about 10,000 tons; in 1926 it was over 350,000. The most significant increase took place at the beginning of the war when many foundries were prompted to install electric furnaces. Since then the output of foundries operating electric furnaces has more than offset the decline in converter and crucible steel castings. As noted above, the electric furnace has to some extent displaced the converter because, when certain conditions exist in a certain locality at a certain time, the cost of making steel in an electric furnace is less than its cost when the converter is used. However, the important fact must be recognized that the cost of the steel in castings is a relatively small part (approximately 20 per cent) of the total value of the castings and their total cost of production. Therefore, differences in the cost of making steel in different types of furnaces exert only a minor influence on the total cost of manufacturing steel castings.



Total Annual Production in Net Tons of Steel Castings in United States. Data from American Iron and Steel Institute, with 1927 estimated

The rapid increase in electric steel castings has also been due to the fact that products previously made of other materials and assemblies of other materials have been converted into steel castings. Perhaps these new uses for steel castings have had a greater effect in augmenting the output of the smaller castings, such as manufactured in foundries operating electric furnaces, than they have influenced the tonnage of the larger castings manufactured in open hearth furnaces. It is probable that the increase in electric steel castings may not continue at the same rate as would be indicated by the trend lines, unless new uses are created for these castings. The present number of electric furnaces in operation does not justify a further increase in the capacity of this branch of the industry. This is obvious when reference is made to Fig. 2. The condition indicated therein applies to the entire steel casting industry. The rapid increase in number of electric furnaces put into operation is responsible for much of the excess capacity.

The diagram Fig. 2 is of most importance. It shows the relation of the capacity to demand for steel castings. The statistics used were taken from the publications of the Department of Commerce, and the trend as shown by the straight line was computed in the regular way. During the war a great demand for steel castings led to an increase of facilities for producing them, but at no time since the war have these facilities reached more than 74 per cent utilization. Moreover, these production facilities have been increasing since that time, causing the percentage of their utilization to gradually decrease, as shown by the straight dotted line in Fig. 2. This has occurred in spite of the increase in total consumption of steel castings shown in Fig. 1. In 1920 the demand for steel castings was close to 70 per cent of the capacity, and while the trend of consumption has increased 16 per cent since then, the capacity of the industry has grown to such an extent that in 1927 it operated at less than 60 per cent of capacity. During the latter part of last year considerably less than 50 per cent of the capacity of the steel casting industry was utilized.



Total Bookings of Steel Castings in Percentage of Total Capacity. Data from Department of Commerce

It is to be expected that the use of steel castings will continue to increase and perhaps at a greater rate than the rate of increase in population. However, it appears that in the public interest further expansion in the facilities for manufacturing steel castings should be delayed until a greater percentage of the present capacity of the steel foundries can be utilized to meet the needs of consumers.

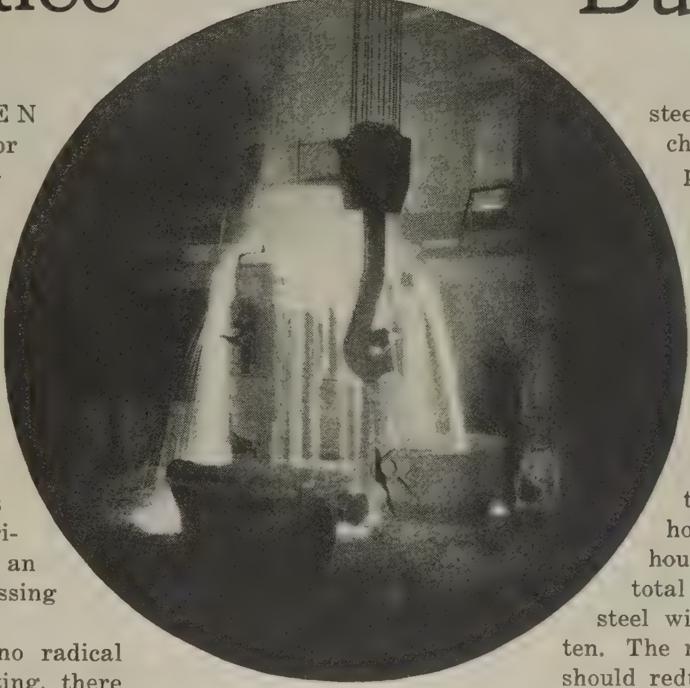
Suspension of German Mills Would Affect 200,000 Men

Hamburg, Germany, Dec. 20.—The threatened suspension of German steel mills as a result of the controversy over the proper time limit for establishment of an 8-hr. day, should not be very far-reaching. It is rather generally conceded that some compromise settlement will be reached, but should a lockout actually occur, the number of men being laid off should not be more than about 200,000.

As the blast furnaces have the 8-hr. day, there is no intention of suspending operations in this field, unless closing the steel mills forced a general curtailment of production. The threatened suspension also would not affect mills rolling plates, sheets, hoops, bands and pipe and tubes. It would apply to the plants producing steel ingots, semi-finished material, bars and shapes, and the total employed by this branch of the industry is about 200,000.

The controversy of the steel mills with the Government has affected importation, and a considerable tonnage of steel is reported to have been placed by German importers with mills in France, Belgium, Luxemburg and Czechoslovakia.

Changes in Open-Hearth Design and Practice During 1927



BY WILLIAM J. PRIESTLEY*

1927 HAS BEEN notable for an ever-increasing demand for better steel and lower prices. To meet these conditions, steel operators during the past year have analyzed more carefully than ever before the chemistry of their melting practice and sought means to reduce their costs without sacrificing the quality of their steel. Members of the various technical engineering societies have taken an active interest in discussing open-hearth problems.

While there have been no radical changes in open-hearth melting, there has been a liberal exchange of ideas of both operation and furnace design. Ideas and opinions have been wide and varied on every subject discussed, yet it is evident that steel men have come closer in accord on certain of the more important subjects.

It would be improper and impossible to attempt to review in this short article any great number of the topics discussed, but it may be of interest to single out a few of the things in which some degree of progress and development appears to have taken place this past year.

Research in Physics of Steel

A NOTABLE research program was laid out during the past year by the Bureau of Mines, the Carnegie Institute and a number of steel companies cooperating with these two institutions to make a systematic study of the physical chemistry of steel making. The field to be covered is broad and will take at least five years to complete.

During the past year six men under the direction of an advisory board published their findings on the subject of solubility of iron oxide in iron. They propose to take up next the effect of iron oxide and other non-metallics in commercial steel and the means necessary to eliminate these harmful impurities. This group of investigators reported that molten iron is saturated at 1600 deg. C. when it contains 0.30 per cent oxygen, and at 1700 deg. C. when it contains 0.45 per cent oxygen. When applied to practical operations it was pointed out that the iron oxide content of open-hearth slag should be kept as low as possible in order to make the best steel.

Advances in Furnace Design

Pre-Heaters for Air

WITH the view of shortening the time of melting charges, a well known company has presented to open-hearth operators during the past year a device for pre-heating the air before it enters the regenerator, utilizing heat in the waste gas going into the checkers.

The heaters are made with plates of non-oxidizing chrome steel. Steel containing 15 per cent chromium will withstand temperatures up to 1400 deg. Fahr.; steel containing 28 per cent chromium will withstand temperatures as great as 2100 deg. Fahr. without oxidizing. The advocates of this pre-heating device maintain that air entering the furnace from the slag pocket may reach a temperature of 2150 deg. Fahr. instead of 1900. It is said that this higher temperature of the air reduces the melting time from seven hours to six hours. With three hours taken for refining, the total time of making a heat of steel will be nine hours instead of ten. The net gain is 10 per cent and should reduce costs about 25c. per ton of ingot.

During the past year new installations of flat suspended roofs have been reported. The results obtained on the original installations were promising as compared with the commonly used sprung arched roof. Reports have been received of this new type of roof lasting for more than 400 heats.

Advocates of this type of construction think that slight modifications in the height of the roof above the fore plate may produce a faster working furnace and changes in the thickness of the roof tile may give a greater life. They claim 500 heats from a single roof may be possible.

Sloping Back Wall

The sloping back wall was adopted by many furnace men who rebuilt their furnaces during the past year. This feature entirely eliminates back wall repairs and reduces the cost of maintenance. It is nothing more than a continuation of the hearth sloping upward and backward until it reaches the rear skewback of the furnace. The slope of this extended hearth is gentle enough so as to hold the loose dolomite added from time to time for patching. The principal advantage of the sloping back wall is the elimination of the time lost in repairing back walls of brick. This increases the tonnage melted during the life of the furnace.

Isley Furnace

Another innovation pertaining to open-hearth design has received wide discussion during the past year. The Isley furnace utilizes a venturi tube placed vertically at each end of the furnace instead of the stack. There is a low pressure fan at the base of each tube. One fan exhausts the outgoing gases while the other fan running simultaneonsly furnishes a predetermined amount of air to support complete combustion.

The length of the tubes and flues may be varied so as to get the waste gas temperature as low as possible. Cases are recorded where this is as low as 400 deg. Fahr. The flues between the venturi tube and the checkers serve as recuperators and pre-heat the ingoing air on reversal of the furnace.

This type of furnace control is said to save fuel, give greater tonnage and longer life to the furnace.

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Several installations are in operation and more comprehensive data may be published later.

Future Trends in Furnace Design

The future trend of open-hearth design will be toward larger furnaces where greater tonnages will decrease overhead operating expense.

New refractories for furnace lining must be found that will withstand higher melting temperatures and quicker melting.

Ingenuity will have to work out new ways for combining and utilizing to better advantage our present sources of heat.

Furnaces must be constructed to obtain better control over atmospheric conditions for melting and refining. All these developments must come to keep pace with the steady and increasing demand for steel in its many new uses.

Production of Acid Steel

WITH the decreased production of ordnance steel we do not hear as much today about acid steel as we did several years ago. It is for this reason that it might be interesting to review here some of the things that have been said about this type of steel recently.

By far the greatest number of acid open-hearth furnaces in operation are used for making steel castings, but there are still some steel men who prefer acid open-hearth steel to basic open-hearth steel for the peculiar properties obtained for certain products.

Experience of a Cable Maker

This subject was recently brought to the attention of engineers at a discussion of the different kinds of steel used for modern long-span bridges. A well known company that specializes in the manufacture of wire and wire rope, states that after sixty years' experience it still prefers acid steel for suspension bridge cable. This company still believes in purchasing the best selected raw materials for furnace charges. It uses the purest low phosphorus and sulphur pig iron. It uses only its own selected scrap and melts the heat with low-sulphur fuel oil. It claims that acid steel properly made contains fewer non-metallic impurities, has less occluded gases, and has higher tensile strength and elastic limit than best basic steel made in its own plant. It also believes that acid steel has greater resistance to fatigue. No comparison was made between acid open-hearth and basic electric steel of the same composition.

Residual Silicon to Be Avoided

Ideas have changed in regard to the benefits once claimed from the pick up of nascent silicon in acid open-hearth steel. It is generally conceded now that the presence of silicon in this form results in the absorption of gas in the metal, which subsequently makes the steel wild and blowy unless vigorous de-oxidizers are used in the ladle.

Residual silicon and carbon are now reduced to a low point by the use of ore. This creates a boil which agitates the molten steel and liberates gas and particles of slag which had become entrapped in the metal during the melting stage. The bath may be conditioned and finished satisfactorily by the addition of lump 50 per cent ferrosilicon and lump ferromanganese to the furnace. The use of 50 per cent ferrosilicon is more economical and produces a cleaner steel than the former practice of using sand cast silicon pig. No ladle additions of any kind are needed to produce a sound and quiet steel. The time of holding the steel in the ladle depends upon the casting conditions.

Slag Low in Iron Important

While there have been no new developments in acid open-hearth steel practice, more melters have come to realize and appreciate the importance of the slag condition and how it may be used as a guide for determining the quality of their steel.

Well made acid open-hearth steel free from iron oxide will have a slag of light pea green color, correspondingly low in iron oxide. The interior of the cold slag when broken will be solid and free from bubbles.

A black slag indicates the presence of an excessive amount of iron oxide and is a warning that harmful iron oxides have not been eliminated from the steel. Ferroalloys added to metal in this condition and coming in contact with a black slag will be rapidly oxidized and a low recovery will be obtained. Lime added to a black slag will replace the iron oxide it contains and produce a green slag of the description given above.

Because of the equilibrium or balance existing between the slag and molten steel in the acid furnace, the elimination of the iron oxide from the slag will result in the elimination of this same harmful impurity from the steel. The lime is most conveniently added in the form of broken limestone. An example of this phenomenon may be seen by comparing slags to which different amounts of limestone have been added. A typical slag to which 10 lb. of limestone per ton of metal has been added showed

SiO_2	FeO	MnO	CaO
53.96	23.40	11.82	8.72

A slag to which 20 lb. of limestone per ton has been added showed

SiO_2	FeO	MnO	CaO
56.87	7.73	14.50	14.20

The steel from which the latter slag was taken did not require the addition of aluminum to the ladle. It lay quiet in the molds and passed satisfactory physicals.

High-Manganese Pig in Basic Open-Hearth

THE physical and chemical composition of pig iron best suited for basic open-hearth operation has been discussed for many years. While dissenting opinions will always rightfully exist for different practices, it appears to be generally agreed that pig iron with 1.5 to 2 per cent manganese speeds up the furnace and produces better steel than when this element is lower.

Silicon seems to be most desirable between 1 per cent and 1.25 per cent for a cold metal charge and as low as 0.80 per cent for a hot metal charge.

The carbon content has also been discussed, but steel men appear to be as far apart as ever on this subject.

It has been plainly demonstrated in many instances during the past year that alloys of manganese and silicon used together in proper amounts give better results than when used singly or not at all. It has also been shown that clean ferroalloys, free from oxides and impurities, are essential for making clean steel.

Rigid Testing Has Reacted Favorably

TALKING recently with an experienced steel man, he made the statement that while the present multitudinous tests applied to steel by modern metallurgical inspectors are hard on open-hearth melters, they have really been a blessing in disguise. They have resulted in raising the standard of melting practice and better steel is made today than ever before. Open-hearth tonnage operators are sometimes asked for quality which in years gone by would have been furnished by a specialist making high grade acid open-hearth or basic electric steel. Yet there is no doubt that much steel is rejected as the result of improper interpretation of the tests applied. If the inspector had better knowledge of steel melting and the use for which the steel is intended, it would be beneficial to all concerned.

Use of sulphur prints has decreased because they could not always be properly interpreted. Deep etching with different kinds of acids gives a better idea of the nature of the impurities in the metal, but this test may be abused if standardization of acids, temperature and immersion is not followed.

There was a time when micrographs were looked upon by practical steel men as laboratory curiosities, but many grades of forging steel are now sold subject to microscopic tests in both the etched and unetched condition. Deep etching reveals unsoundness and segregation and direction of the flow of metal. The microscope will reveal grain size and will differentiate between iron oxide, silicates and manganese sulphide. Many instances have come to the writer's attention during the past year where photomicrographs have made it possible for melters to improve the quality of their steel by changing open-hearth melting practice.

More Alloy Steel Consumed

WHILE the total steel production in the year 1927 has been below the figures of 1926 and the total amount of alloy steel going into automotive parts in 1927 was less than 1926 on account of curtailed automobile production, the alloy steel tonnage going into other lines of industry has been greater than ever before. Thus the use of alloy steel is becoming more diversified. The trend in modern engineering is to decrease weight and use higher strength materials. This can only be accomplished through the use of alloy steel.

There has been a notable growth in the use of low carbon manganese steel for both rolled products and castings. Steel of this description has been made most satisfactorily in the basic open hearth by the use of low-carbon ferromanganese and silicomanganese.

For locomotive castings where reduced weights and greater ductility are essential, zirconium treated steel has found favor.

Small percentages of chromium are added to steel castings of large sections for the purpose of obtaining closer grain and better physical properties. This practice is growing. Many buyers are again using chrome-vanadium steel after unsuccessful results when using silicomanganese steel as a substitute.

During the past year the amount of low-carbon ferrochrome used in various grades of open-hearth steel has increased 30 per cent. While nearly all stainless steel and rustless iron is made in electric furnaces, satisfactory steel with as high as 25 per cent chromium was made in an acid open hearth. This steel was used for liners and wedge bars for ball mills, jaw plates and toggle seats for jaw crushers, breast plates for rolling mills, rings and pushers for cement mills, rolls for small roll crushers, and valves and valve parts. By de-oxidizing the steel bath and conditioning the slag properly, the ferrochrome, pre-heated red hot, was added to the bath without excessive loss.

Unprofitable Year in Cast Iron Pipe

Centrifugal Output Shows Large Increase, but Total Production Was Probably Under 1926—Price Decline Unusual Feature

ALTHOUGH production of cast iron gas and water pipe in the past year is estimated to have compared favorably with the total output of 1926, possibly showing a slight decrease, the year was rather unprofitable, prices having declined more than 25 per cent. Output of cast iron pipe had been steadily climbing since the war years. In 1921 the total production of gas and water pipe was 564,138 net tons, in 1922 the total was 926,577 tons, in 1923 the million-ton mark was passed with 1,134,059 tons, in 1924 the output was 1,365,272 tons, in 1925 it was 1,414,252 tons, and in 1926, 1,534,278 tons.

A feature of the 1927 production was the growing interest of consumers in centrifugally cast pipe, output of which was larger than in any previous year. The centrifugal pipe shops were operated at a high rate, and competition among the few producers of this product was severe. The total production of pipe made under the De Lavaud and sand spun processes has been estimated at close to 400,000 net tons, the sand spun shops contributing about 25 per cent of this total. This compares with an estimated output of centrifugal pipe in 1926 of 200,000 to 225,000 net tons. Much of this increase is accounted for by the fact that the American Cast Iron Pipe Co., Birmingham, and R. D. Wood & Co., Florence, N. J., have both been active producers, whereas they contributed but little to the total output in 1926.

European pipe was not much of a factor in the East after the first quarter, although both Belgian and French pipe provided fairly active competition on the Pacific Coast for many months. However, the total brought in is estimated at about 80,000 tons, a few thousand tons less than in 1926, when the total for the 12 months was 83,873 gross tons.

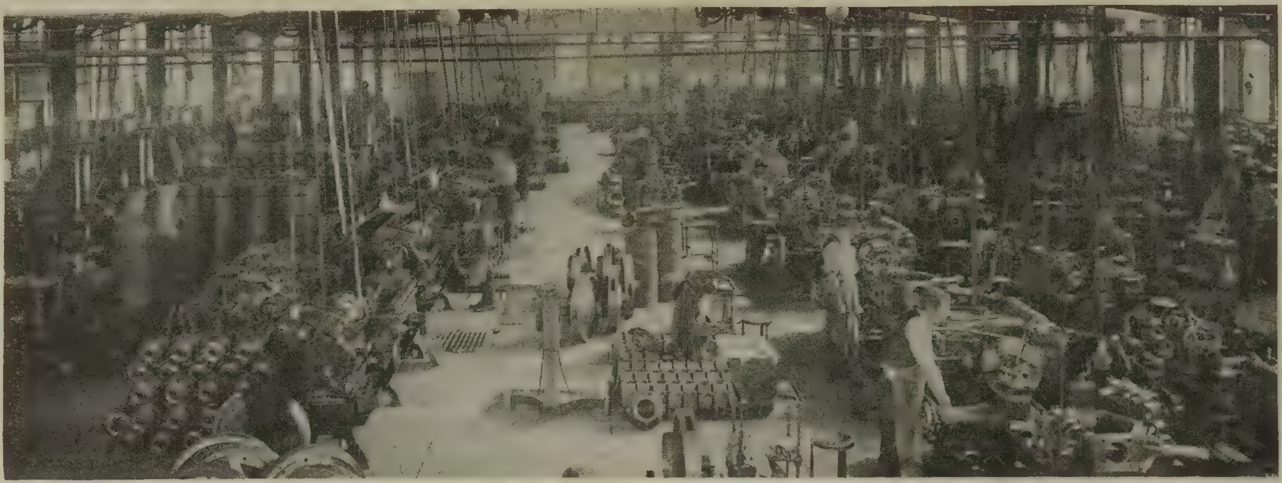
The decline of prices, particularly their rapid descent in the latter part of the year, was so great as to attract considerable attention in other branches of the iron and steel industry. From a Birmingham base of about $37 per net ton in January, the market dropped $10 to $11 per ton to about $26 in early October.

This downward movement of prices was not entirely without reaction. In the early spring some firmness developed on the smaller sizes of pipe and there was a slight tendency to advance, but it was of short duration, and as Southern makers began to be more active competitors for large tonnage business in the North, the market began to sag. By the second half of the year efforts to maintain a separate Northern base for pipe proved futile, and the Birmingham base price ruled in sales, not only in the South and at Chicago, but also in the New York and New England markets.

Municipal purchasing of pipe, uusally an important factor, failed to develop to the expected proportions. Buying by privately owned utilities, however, provided the greater part of the year's business in the East. Throughout the year, municipalities on the Pacific Coast were fairly active buyers of small lots, and one of the largest purchasers was Los Angeles, which closed on more than 15,000 tons of pipe, about one-third of which went to French and Belgian sellers. In the second half, the Pacific States Cast Iron Pipe Co., Provo, Utah, organized in 1926, became an active factor in Western business and is estimated to have booked as much as 50 per cent of the late fall orders.

As in 1926, Detroit was the outstanding municipal purchaser of pipe, closing on more than 25,000 tons during the year, part of which went to the importer of French pipe. In the Detroit awards, as in the case of other cities, centrifugally cast pipe represented a larger portion than in the past. New York was also a large buyer of pipe, closing for more than 25,000 tons in all. In the final quarter, several of the large privately owned utilities placed some sizable orders for gas and water pipe covering part of their 1928 requirements.

Expansion of the cast iron pipe industry was not of much consequence. The McWane Cast Iron Pipe Co., Birmingham, has been carrying forward a program of additional equipment and floor space, so that 8-in. to 12-in. pipe up to 16-ft. lengths can be cast as well as the smaller sizes. Early in the year R. D. Wood & Co. began large scale production in their centrifugal shop at Florence, N. J., and in the final quarter began alterations of this shop to increase its capacity.



Machine Tool Problems Working Out

Last Year Gave a Great Revelation of the Productivity and Accuracy of New Machines—What Shall Be Done About Used Tools and the Increase of Unpaid Engineering Service?

BY COL. FRANK A. SCOTT*

TOO erratic was the course of business in the year 1927 to be expressed in a short sentence. Indeed, the year will be notable for the irregularity of business trends. Among machine tool manufacturers and among metal workers generally certain groups have enjoyed a large volume; for example, the automotive industry. Others have had one of the poorest years in their history. Locomotive builders are in the latter class. Profits have been equally erratic and have not always rested in the hands of those concerns which enjoyed the largest volume of orders.

Usually, among the foremost concerns in any field of manufacture profit can be assumed when business reaches a given volume. This rule did not apply in 1927. Unstable price standards are chiefly responsible for this result; and this unsatisfactory price condition is due to the presence in this country of excess facilities in almost every line.

Menace of Excess Facilities

DURING the Napoleonic era England was the great industrial country of Europe and she supplied the world with manufactures of all kinds through that entire struggle. After those wars, however, when the productive power of the rest of the world again came into service, the excess of manufacturing facilities in England menaced her economic life for two decades, and caused severe crises, both industrial and political.

As the United States was the great producer of manufactured goods during the World War, American manufacturers have been the greatest sufferers since from the menace of excess facilities. In the stock market, to unload a weak security and get out at a loss is a common enough operation; but in the manufacturing world it is a sensitive point to suggest liquidation of plants and facilities for which the future holds out the certainty of a falling market. It appears to challenge every one to go out and drum up some new product or fresh opportunity, meanwhile marring the general welfare by marketing goods which are produced at too high a cost and sold on too low a basis.

Because of these excess facilities, prices during 1927 were generally established by the weakest or most desperate members of each group, thus creating a situation wherein many industries bear resemblance to a naval squadron, the best ships of which are held down to the speed of the slowest. The elimination of the slowest would automatically improve the fighting chances of the rest.

Lord Fisher, the great English naval authority, condemned ships too weak to fight and too slow to run away. If he had been analyzing American metal manufacturers he might have voiced similar condemnation against concerns too weak to maintain a profitable price policy and too strong to die with gratifying promptness.

European Production More Effective

EVIDENCE multiplies that other metal-working nations are steadily following the trend in our country toward more productive manufacturing units. The automotive production in England and on the Continent reflects a constant improvement in shop equipment; aircraft production the same. This acceptance of an advanced standard of efficiency in metal working has borne fruit in a steady, although not large, demand for the better grades of American machine tools. Japan has been a good customer, and as a result of a change in the policy of placing orders for Government requirements it appears that India may become at least an occasional buyer of American equipment. Russia placed some orders with American manufacturers and her demands may be expected to increase.

The Ford Factor in 1927

TO the future historian of American manufacturing progress the year 1927 will have a unique interest. In that year occurred the loss of Judge Gary, with all the changes which his going necessitates and implies; also the alteration of Mr. Ford's policy, which very clearly has established new standards that require readjustments, the full consequences of which cannot now be gaged; and last, but certainly not least significant, the presentation to American metal manufacturers by American machine tool producers of a most effective group of metal-working tools. At the very moment when the automotive industry sets itself for a new lap in its long race with costs, there appears to be at hand the stimulus which is most needed; for certainly no industry ever before had offered to it such an opportunity to re-tool its plants efficiently as is now presented to American manufacturers of automobiles.

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*President Warner & Swasey Co., Cleveland.

The action of Mr. Ford, in halting production while he re-tooled his plants for the new car, raised the question as to the adaptability of equipment, first, in his own vast factories, and, second, in the plants of those competitors whose production programs may now require readjustment.

Lessons of the Cleveland Exposition

THE most evident fact at the Cleveland exposition was that the design of the newer machine tools, whether automatic or semi-automatic, aims at flexibility and applicability to the widest possible field of work.

This moves directly against the current of that opinion expressed in recent years that design movement would be toward special machines, even special automatic machines, tooled for particular operations.

It is still too early to claim that the disadvantage of special machines, and particularly special automatic machines in the automotive plants, has been proved. But developments this year indicate that weaknesses of this type of equipment are now recognized even by those who were its strong advocates. The primary advantage of special equipment designed and tooled for a particular operation on one piece needs no comment. If the world could accept the status quo in production, special equipment would hold the stage. The fly in the ointment is that in every competitor's field a change of design by one producer forces similar action upon others, and if highly specialized equipment is being used it proves too inflexible for quick and advantageous readjustment. The expenditure of both time and money is multiplied to perhaps a dangerous degree.

Users Helped in New Development

THERE have been recurring statements, since the war, that machine tool manufacturers were redesigning their products or producing new types of increasingly effective pattern. Not even the leaders of the industry, however, grasped the full effect and meaning of these statements until the doors swung open on the Exposition at Cleveland in September. Then there were seen, many of them for the first time, machine tools of such productivity and accuracy as had never been beheld before. They were the fruitage of sixty years of American mechanical genius, thought and research; sixty years of American workmanship and American aptitude to utilize the best that is available in productive facilities. It did not require the "seeing eye" to recognize the dawn of a new era in metal working.

Users as well as makers of these machines have contributed to their development and are entitled to credit for the splendid result. The greatest acceleration toward improved design came from the automotive industry, intensified by pressure of competition in every field after the war. No other nation has had just the same experience, although England and Germany have felt similar impulses and experienced the same beneficial results in lesser degree.

Thousands of owners and executives of the great metal-working plants of our country, as well as of foreign countries, accepted the opportunity to study this equipment.

The points of origin of the machines on exhibition, as well as the home cities of the visitors, all of whom were registered, emphasized another significant change which has occurred so gradually as almost to escape notice. It is the shift westward of the center of machine tool production and market.

Twenty years ago the market probably would have centered on a line from Buffalo to Pittsburgh; now it undoubtedly would center on a line running south or southwesterly from Detroit. The oil industry in the Southwest has introduced a great number of large and effective machine tools into that section, and there are now many considerable plants producing a wide variety of metal articles in the district north of St. Louis and between the Mississippi River and the Rocky Mountains.

Thousands of Tools in the Discard

REPERCUSSIONS from the Cleveland Exposition were of many sorts. The rise in volume of orders was natural because of those withheld awaiting inspection of machines on exhibition. The psychological effect on the larger machine tool users was impressive. Personal statements and numberless letters written to machine tool producers after the exposition indicate that the thinking in the American metal-working groups is hardening around these conclusions:

The expansion of metal-working plants during the war left a large legacy of excess space and plant equipment. Optimism has sustained the hope that peacetime volume might grow up to these facilities. This has not happened. There are thousands of machine tools in American factories which now are rendered ob-

COLONEL SCOTT'S broad acquaintance with the metal-working industries, which made him chairman of the War Industries Board in 1917, *enables him to speak with unusual authority on the prospects for machine tool builders. He notes that the cost of design, manufacture, sale and servicing of the modern machine tool has risen continuously.*

On account of excess manufacturing capacity dating back to war times, the selling price has been established by the weaker producers; the result is the lowest earnings in several years. In fact, profits are so meager that rising prices for machine tools seem inevitable in 1928.

American manufacturers generally were surprised at the wealth of opportunity displayed to them at the Cleveland Machine Tool Exposition. Low-cost production in many lines, with corresponding effects on the balance sheet, will come to those who first take advantage of the new tools, unrivalled in productivity and accuracy, yet flexible enough to conform to those necessary changes in output found desirable from time to time.

solete by new developments. They never can profitably be employed again. They are scrap. Conservatism or some other restraining influence may retard their disappearance into the cupola, but that is their inevitable destiny, and the sooner they are consigned to it the stronger will be our economic position.

Good Machine Tool Business This Year

IN this frame of mind on the part of manufacturing executives lies the comforting assurance of good machine tool business during 1928. The race for production at lowest cost will be won by the plant which first obtains the advantage of the new facilities.

Over-Extension of Sales Effort and Business Without Profit

TODAY the American metal worker stands far in advance of all his competitors in other lands. He has volume, quality and low production costs. In a general sense, he has 90 per cent of his market right at home among 6 per cent of the world's population — the greatest home market ever known. Now, the problem is, can he profit while he continues to serve? He has developed his sales opportunities to the nth degree in order to secure volume. For the same purpose he has reduced his price until this year many plants that did a good volume will show a meager profit, and in certain lines there have been some notable failures. This does not apply to machine tools only, but as well to many plants in other fields.

There has been enough prosperity to go around most years since the war, but American metal workers have seemed oblivious of this. From the steel makers right through to the small fry they have intensified an already highly competitive situation by over-extension of sales efforts. This cannot continue. Industry can only advance when it is profitable. There is an opportunity here in the American metal-working field for business leadership of a high type. Schooling is needed in the development and maintenance of a code of business ethics which shall include serving the trade well, while maintaining a price level sufficiently high to sustain normal development and yield a profit.

It has been a buyer's market, with such respectable slogans as "long established quality" and "continuity of good service" passing into the discard in favor of temporary advantage in price. It is significant that the American steel industry, the greatest and probably the most efficient of any single industry now existing, should have been a conspicuous sufferer. Quality and the ability to render efficient service are frail holds on the market in any period of intense competition.

There need be no fear, however, that the steel industry and the machine tool industry will meet the fate of the goose that laid the golden egg, even though in performance they do resemble that historic bird. There is a steady movement toward a stronger position. The merging of organizations, the elimination of obsolete and surplus facilities, and a general tightening up on overhead and in sales methods are proceeding. The new year looks like a period of higher prices and better profits even though volume remains as in 1927.

The Used Tool Problem

THERE has been a concerted effort during the year by groups of machine tool manufacturers to devise a workable plan for establishing the value of used tools offered by customers in trade when new tools are purchased. The lack of system in these transactions has been a fruitful source of charges of unethical conduct, annoying to manufacturers, dealers and customers alike. It is the present belief that by establishing a proper and generally accepted method of appraisal a basis can be reached upon which all interested parties may work equitably. The situation, of course, is simpler in the case of manufacturers who sell direct; but even in this field the absence of any recognized standard of values for used tools has provoked questioning and criticism. This will be one step toward a less erratic price policy.

Industries financed by the banks and the public are subjected to automatic check and review as to their price policies and earnings. The machine tool industry, to an unusual degree, is self-contained and does its financing from within. Therefore, it must furnish its own standards and make its own tests of financial success. Dissatisfaction with earnings has been general ever since the war, and reached the peak of expression in 1927.

Engineering Service Increasing, but It Should Be Paid for

THE situation has been strained to the breaking point by the cost of marketing the new designs which have appeared since the war. Every advance in the productivity of the tool has been accompanied by greatly increased cost of engineering services. Engineers to design machine tools have always been necessary. Now, however, high-grade engineering talent is needed to study the customer's particular requirements; to suggest the exact type and size of machine to meet his needs; to lay out his special tools and holding devices, and to demonstrate the machines and instruct operators after installation. As all of these processes except demonstration precede sale, and as none of this cost can possibly be recouped by bidders who do not make the sale, the resultant effect on sales costs is obvious. Even the producer making the sale has thus far been deterred in most instances from adding the full cost of these items to his bid.

That this is not a healthy condition will be admitted without argument; that the solution must necessarily be addition to price of all honest service rendered to the customer must eventually also be admitted. That the machine tool manufacturers are themselves now alive to the dangers of their situation seems equally evident from the tone of all their publications and the addresses at the meeting of the National Machine Tool Builders' Association, held at Lenox, Mass., in October.

A fair volume of business in 1928, therefore, is certain to produce an upward swing of machine tool prices, and the volume now anticipated is more than fair. It is expected to be greater than that of 1927, and perhaps equal to 1926. All the underlying conditions which ordinarily are examined to determine the prospects for the year appear to justify this conclusion. The fact that it is a presidential year has not been overlooked.

General Electric's Pension Plan

The General Electric Co., Schenectady, N. Y., has developed a new contributory pension plan, whereby employees pay in a small part of their wages from year to year to a pension fund. It supplements the old age pension system which the company has had in effect since 1912. At the same time a pension trust has been created, and instead of carrying a reserve on its balance sheet sufficient to meet obligations to employees reaching the retiring age, the company has turned over $5,000,000 to the new trust.

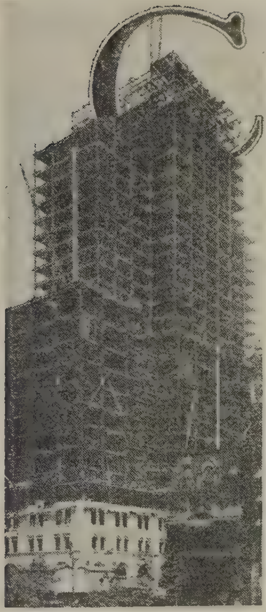
Pensions at present are computed at 1½ per cent of the earnings of employees for each year of continuous service. Under the contributory plan of additional pensions, which it is proposed to make effective Jan. 1, 1929, 1½ per cent of the annual earnings of the employees will be turned over to a board of seven, on which the employees will have representation. This money will be invested and held for the employees individually, and interest will be allowed to accumulate.

Under the new plan it is proposed to make 65 instead of 70 the retiring age for men, and 60, as at present, for women. When an employee reaches the retiring age, the custodians of the fund will pay the accumulated amount in full or in installments. If an employee leaves the service of the company or dies before reaching the pension age, the amount accumulated, with interest, will be given to him or to his estate.

Moderate Building Increase Forecast

Construction Expenditures in 1927 Decreased Less Than 2 Per Cent and Slightly Upward Trend This Year is Indicated, $7,000,000,000 Being Set as Possible Figure

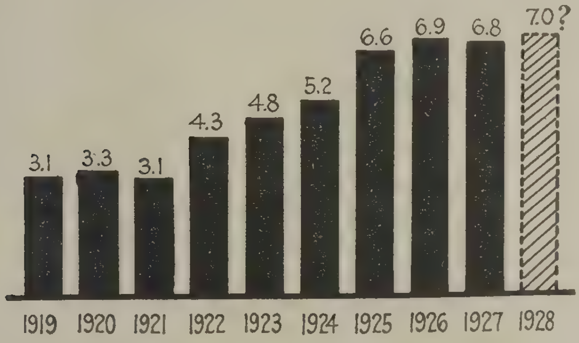
BY THOMAS S. HOLDEN*



CONSTRUCTION is investment. Construction activity measures the rate of flow of investment money into permanent improvements. Productive activities that increase the wealth of the country and accelerate its general prosperity create demands for increased improvements of every kind.

The attached charts should be of interest to the steel business from several points of view. For one thing, they picture the recent history of two industries (the construction industry and the automotive industry) which are among the best customers of the steel industry.

The most rapid growth of the automotive industry came between the years 1921 and 1923, during which production of passenger cars and trucks in the United States and Canada more than doubled. Automobile production increased very moderately between 1923 and 1926 and declined appreciably in 1927. Many economists consider the rapid expansion of the automotive industry, to the extent of doubling its previous output, as having been the chief accelerator of expanding industrial activity in recent years.



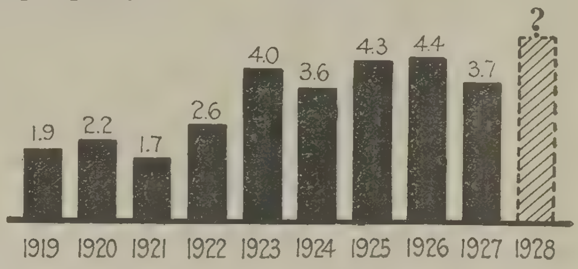
Construction Contracts in Billions of Dollars, Showing Stability From 1925 to Date

Referring to the chart of construction contracts, we see three distinct phases of three years each. The first three years shown on the chart were the years of post-war deflation. The next three years (1922, 1923 and 1924) were the years when building shortage was the dominant factor in construction demand. The third period, which began in 1925, has been a period of stability, with construction activity maintained at a very high level, and with investment considerations predominating in the creation of construction demand.

What Is the Next Stage?

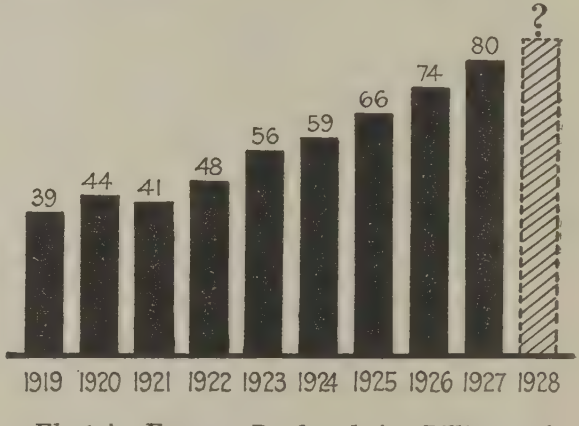
The question now before us is this: What is the next stage of development in the construction industry, decline or further expansion?

Further expansion at a moderate rate would ultimately be demanded by normal population increases and normal increases of commercial, industrial and social activity. Expansion at a more rapid rate might be the result of some influence which would utilize our enormous money and credit resources in a substantial program of increasing productive activity and accelerated prosperity.



Automobile Production in Millions of Cars, Showing Stability From 1923 to 1926, Inclusive, and Decline in 1927

The chart on production of electric energy shows uninterrupted growth from 1921 to the end of 1927. A chart showing the amount of investment money that has been flowing into the electrical industry during recent years would show an even more rapid growth than the one on amounts of energy produced. The writer has previously pointed out elsewhere the various other considerations that point to the electrical industry as being one very likely to expand considerably in the next few years and to give a considerable acceleration to general prosperity.



Electric Energy Produced in Billions of Kilowatt Hours, Showing Uninterrupted Growth From 1921

This would accelerate expanding construction activity. It would involve directly a large volume of construction of dams, power plants, transmission lines, and other work pertaining to electrical growth. Indirectly, if expansion of the electrical industry develops to such an extent as to stimulate a new era of industrial growth and increased prosperity it will create new demands for better buildings of every class—houses, apartments, factories, office buildings, schools and churches, and for community developments, consisting of both building and engineering projects, that make living more agreeable for a wealthy, prosperous people.

If this be true, then it looks as if 1928 might be a year of transition between the recent period of stabilized construction volume and the next period of expanding activity. This new year may not see large increases in construction activity, but it may very well see moderate increases, in preparation for more extensive increases later.

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*Vice-president, in charge of Statistical Division, F. W. Dodge Corporation.

Total construction expenditures in 1927 decreased less than 2 per cent from 1926. Yet a very real recession in private construction work has been going on ever since the end of 1925. Private construction expenditures decreased 6 per cent from the previous year in 1927. This recession apparently came to a halt several months ago, since which time there has been moderate improvement in the rate of contract-letting for private construction work. Records of domestic corporate bond issues (omitting refunding issues) are the best advance indicators of the trends of contract-letting for private construction. Recent increases in this class of investment funds indicate increased contract-letting. Expenditures for community construction work (including all building and engineering work financed out of public funds or donations) increased 10 per cent in 1927. Recent increases in municipal bond issues indicate that this big general class of work ought to continue through 1928 in a volume at least as great as in 1927.

Moderate Increase Over 1927 Expected

In the chart, $7,000,000,000 is set as the writer's estimate of total construction expenditures this year. It is a moderate increase over 1927, but just a little bigger than any previous year.

Various spokesmen for the automotive industry promise a record year in 1928. Increased automobile production ought to add confidence to business generally and to encourage any business men who might be hesitating about making construction contract commitments. Increased agricultural purchasing power should be an added help to increased construction.

Any stimulus to general business expansion and largely increased construction activity that may come from further growth of the electrical industry is rather likely to be felt in full force after 1928. Economically and financially, the country seems ready for such a program as sketched above, but political considerations, as yet uncharted, may be uppermost this year.

Bridge Construction Gained 70 Per Cent

Total for All Classes of Work Exceeded $7,000,000,000 as It Did in 1926—Outlook for 1928 Is for Continuance of High Rate of Building

BY ALDEN W. WELCH*

THE value of construction contracts awarded in 1927 exceeded $7,000,000,000, as did that of 1926. The industry's record years began with 1922, and there is no visible reason to believe that they have ended with 1927. In fact, the latter half of last year showed greater activity than the first half, giving a momentum that is carrying into 1928 the assurance of continued lively contract-letting in the first half of the year.

This movement is not confined to building operations, but is reflected even more actively in the domain of public works and in private work other than buildings. The latter class includes 5000 miles of gas and oil pipe lines worth $120,000,000 authorized in 1927.

As the major demand for steel for construction is in the field of heavy construction, it is the statistics of this field that will be quoted hereafter. By heavy construction is meant commercial buildings of $150,000 and industrial buildings of $40,000 and more, and for other classes of work $25,000 and more. Contracts awarded in this group totaled $3,225,000,000 last year, a rise of 13 per cent over 1926. The gain has been in every class except waterworks, where contracts fell off 14 per cent in aggregate value. The greatest gain was in bridges—70 per cent. This is easily explained by the unusually large number of outstanding bridge projects placed under contract last year. Six of these—the two over Arthur Kill, between New Jersey and Staten Island; the one between New York City and Fort Lee, N. J.; the mid-Hudson at Poughkeepsie; the Lehigh Valley Railroad over Newark Bay, N. J., and the Delaware, Lackawanna & Western over the Hackensack River—total $45,000,000. Even in road work, the steadiest of all classes, there has been a gain in volume. And returning to buildings, contracts for heavy structures total $1,700,000,000, a gain of 9 per cent.

Can the pace be maintained in 1928? There is no information in the construction industry itself to indicate that it cannot or will not be. Construction activity is largely a reflection of general business prosperity. There are, therefore, certain factors broader than those found in any one industry that can slow down construction, not to mention business in general. One of these is narrowed markets caused by European competition. The tariff may hold the line in the United States, but the foreign markets are free for all. The relation of construction to exports was emphasized by E. J. Mehren in his address before the New York Building Congress on Oct. 5, when he pointed out that high construction costs place an overhead burden on manufactured products. Fortunately, although costs are double those prior to 1915, the trend is down and has been throughout 1927.

Coincident with the rapid increase in construction volume there has naturally been a strong increase in credits. Should credit give out, deflation would begin. This, however, is a broad business factor and does not reside in the construction industry. The industry is ready and able to carry on, and expects to keep busy in 1928.

Nineteen twenty-seven was only a fair year in the electrical industry, according to E. M. Herr, president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. While the volume of business has been reasonably well maintained, the cold spring and early summer greatly reduced the volume of fan motor business—an important line in the industry—and the intense competition in all lines has held prices on much of the product below normal, resulting in reduced profits to the manufacturer. During the past year, however, increased sales of all domestic appliances, with the exception of fan motors, have been shown throughout the country.

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Better Automotive Outlook for 1928

Predictions Freely Made by Leaders of the Industry That Car and Truck Output This Year Will Total 4,400,000 to 5,000,000 Units—Ford Production Will Be Factor

BY NORMAN G. SHIDLE*

SALES volume in the automotive industry probably will be 15 to 20 per cent greater in 1928 than in 1927. Replacement parts makers, accessory manufacturers, and repair shop equipment companies, as well as car and truck factories, expect definitely increased activity during the next 12 months.

The final announcement of the new Ford model A of course is the largest single factor lending strength to predictions of marked advance in automotive volume. When Ford gets into quantity production, not only will passenger car output figures be increased materially, but the business of numerous companies making replacement parts and accessories designed to go on the Ford will be given a marked impetus as compared with the last half of 1927. And, despite the great relative increase in original equipment items on the model A as compared with the model T, there are many items which will be added through retail channels.

1928 Output May Reach 4,400,000 Units

Aside from Ford's unquestioned effect on the total vehicle production figures of the industry, the story of 1928 automotive prospects is far from revolving entirely around Ford. There is good reason to believe that the automotive industry in 1928 will build as many as 3,900,000 passenger cars and 500,000 motor trucks, and that Ford will not be entirely responsible for the increase. In considering Ford's probable contribution to the 1928 total, account must be taken of the possibility that he will not be able to get into full production as soon as expected.

The total output of passenger cars, exclusive of Fords, was nearly the same in 1927 as in 1926, although some very wide individual variations were recorded. There will be still further individual variations this year, but many of these doubtless will balance one another as they did in 1927. It is quite likely that producers in 1928, exclusive of Ford, will build at least as many and very probably quite a few more vehicles than in 1927.

Opinion in the industry, among vehicle manufacturers, parts makers, and dealers, leans strongly to the belief that 1928 automotive business will eclipse not only that of 1927 but that of the record year 1926, when 3,929,542 passenger cars and 535,006 motor trucks were built. To justify this trend of opinion, it is pointed out that 1927 in passenger car output fell below even the "off" year of 1924.

Some Predictions of a Record Year

While so important a figure as John J. Raskob has predicted a production of 5,000,000 in 1928 and while his opinion is upheld by several representative automotive men, it is the more common belief that the 1928 total will not reach such high proportions. Communications and talks with a number of important vehicle company executives indicate a rather general idea that the 1928 figure will be around 4,500,000 with a few voicing their belief in a more conservative figure.

The general opinion among parts and equipment manufacturers seems to be that 1928 will be an excellent year but that competition will be very keen, with individual efficiency and merchandising the outstanding elements in determining success.

The president of one unit parts company, for example, thinks "that competition in 1928 will be keener than in 1927, when, of course, it was very keen. This element would obviously tend to reduce profits, not only of car manufacturers but also of parts manufacturers." An accessory company executive, on the other hand, writes his belief that "car sales, car manufacturers' profits and the profits of component parts makers should all be more favorable in 1928 than in 1927. The fundamental reason is that the country is prosperous and has not been buying cars at a normal rate because of the hesitancy due to style changes, principally those of Ford. With the atmosphere cleared, following the New York show, the industry will spurt to record volume."

It is interesting that few automotive executives are bothering much about the fact that a new President will be elected in 1928.

Used Car Situation an Obstacle

The advent of the new Ford will not improve the used car situation in the opinion of most observers, as

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*Directing editor, *Automotive Industries.*

the dammed up demand for the new model will release to the used car market an unusually large number of cheap cars in the first half of 1928.

Offsetting any tendency toward limiting production which the used car situation might produce is the constantly increasing activity in automotive export markets. Last year was featured by distinct gains in overseas' sales of both vehicles and parts, even while the domestic market was sagging a bit. In the first 10 months of 1927 American automotive manufacturers sold to foreign markets about $70,000,000 worth of goods in excess of the amount sold in those same markets in the first 10 months of 1926. The total export business in cars, trucks and parts—exclusive of tires and shop equipment in which increases also have been recorded—for the first 10 months of 1927 alone reached nearly $350,000,000, to which several millions more will be added when the final returns for 12 months are accumulated.

Progress in the Foreign Field

Every automotive line has continued to make progress in the foreign field. Exports of passenger cars from the United States and Canada increased from 238,376 for 10 months of 1926 to 276,200 for the first 10 months of 1927. For the same periods truck exports went up from 61,244 to 102,880 and parts exports increased from $76,368,993 in 1926 to $88,583,362. There is every evidence that continued stabilization of world affairs will result in still further advances in export sales in 1928.

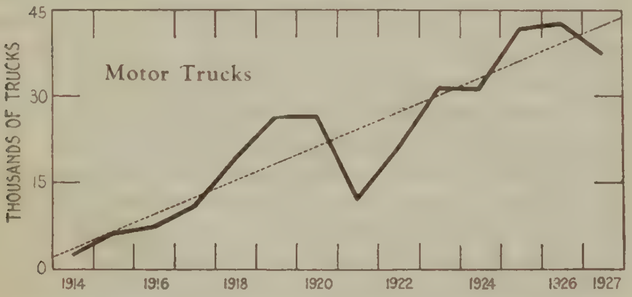
To estimate just how much plant expansion there may be in the automotive industry next year is difficult. It is certain that there will be many plants revamped, many new machinery layouts made and much new equipment purchased. The period of competition in which the parts makers, as well as the vehicle makers, find themselves is sure to result in even more intensive investigation of ways and means of cutting production costs, in study of the latest methods of doing old operations and in continued revision of factories and plants to meet changing requirements.

Selling prices seem almost certain to remain reasonably stable throughout the 1928 spring selling season. This in itself will be a big factor in keeping the industry on an even keel and in making 1928 a prosperous as well as a productive year. Some are of the opinion that there is a possibility of a slightly downward trend in prices in the lower price classes due to the new values to be found in the model A Fords at little more than the price of the model T.

There has been a growing feeling in the industry that price is no longer as powerful a sales weapon as it once was; very strong efforts to focus sales appeal on other factors have been taking effect. Consequently there is every reason to believe that no serious price readjustments are going to be made in the industry as a whole.

Automobiles and Motor Trucks Declined Greatly from 1926 High Records

BASED on an estimate of 100,000 vehicles in December, production of automobiles and motor trucks in the United States in 1927 aggregated about 3,350,000. This is a drop of 22 per cent from the 4,298,785 vehicles reported by the Department of Commerce for 1926. The figures do not include Canadian production. The output for 1927 was the lowest since 1922. It compares with 4,174,886 in 1925, with 3,505,624 in 1924 and with 3,951,014 in 1923.



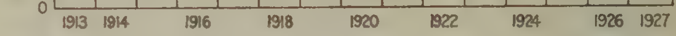
Motor Truck Production, Which Includes Buses, Has Kept Up Better Than That of Passenger Automobiles. The dotted line shows the long-time trend, mathematically determined. This last year has fallen a little below it. Figures are monthly averages

PRODUCTION OF AUTOMOBILES IN THE UNITED STATES

	1927		1926	
	Passenger Cars	Trucks	Passenger Cars	Trucks
January	199,650	39,276	277,831	31,713
February	264,171	40,582	325,122	39,057
March	345,911	48,506	387,570	46,897
April	357,009	47,728	389,833	51,473
May	357,148	46,949	375,317	45,862
June	278,728	43,218	343,708	44,192
July	236,866	31,603	319,688	39,587
August	274,350	34,432	382,651	43,954
September	226,440	33,938	352,202	43.485
October	182.941	36,669	292,562	41,859
November	108,903	24,299	222,419	33,881
December	80,000(a)	20,000(a)	139,850	28,072
Total	2,910,000(a)	447,000(a)	3,808,753	490,032

(a) December estimated.

Passenger automobiles made in 1927 in the United States, with December estimated at about 80,000, aggregated approximately 2,910,000. Trucks, with December estimated at 20,000, amounted to 447,000. The passenger car total showed a drop of nearly 24 per cent from the 3,808,753 of 1926, and made the lowest total since 1922. Trucks showed a drop of only 9 per cent and, with the exception of 1926 and 1925, made the largest total on record.



Automobile Production Fell Below 1924 in 1927, as Shown by the Monthly Averages in the Diagram. The dotted line is the long-time trend

Figures for cars and trucks separately through the first 11 months of 1927, with estimates for December and with comparisons for 1926, are given in the table.

Both trucks and passenger cars fell below their calculated "normal trend lines" in 1927. The two charts are by no means parallel, however. The well-remembered spurt in trucks in 1917 and 1918, and curtailment of "pleasure" cars, show up clearly. Whether the year 1927 would have shown a drop in either type, but for the Ford changes, is a disputed question.

Much Steel Used in Oil Fields

Less Drilling Done Last Year, but More Line Pipe and Storage Tanks Built—The 1928 Tonnage Expected to Be Approximately as Great

BY VIRGIL B. GUTHRIE*

A TREMENDOUS volume of steel tonnage was absorbed by the oil industry in 1927. Probably it amounted to almost as much as in 1926, despite curtailing of active operations in many producing fields in the country due to the overproduction of crude. To offset this decline in activity generally, there was highly intensive work in such districts as the Seminole field, Okla., in some of the California oil fields and in several new districts in Texas. Texas will probably be the most active State in development work in 1928.

The entire oil industry put about 65,000,000 barrels of crude into storage in 1927, whereas in 1926 it withdrew from its stock about 22,000,000 barrels. This volume going into storage in 1927 was for the most part in the new areas of flush production, and new steel storage had to be built to take care of it. The amount of steel used in plates in constructing big field tanks, 55,000 and 80,000 barrels capacity, was more than the 175,000 tons used for such purposes in 1926.

Drilling Wells

Wells drilled during 1927, either as oil wells, gas wells or dry holes, totaled about 23,000 and called for tonnages of pipe according to the following estimates:

District	No. Holes	Aver. Depth	Tons Each	Approx. Total	Change from 1926
Eastern States	6,500	2,000	30	195,000	5,000 less
Oklahoma	4,600	3,000	90	415,000	35,000 less
Kansas	1,370	3,000	111	150,000	50,000 less
Texas	7,000 to 8,000	2,500	33	260,000	50,000 more
Louisiana-Arkansas	1,200	2,500	35	40,000	15,000 less
Rocky Mountains	1,100	3,500	140	150,000	60,000 more
California	950	4,000	115	110,000	10,000 more

The total of pipe going into drilling wells during 1927 was therefore probably around 1,250,000 tons, which is below the total for 1926. Intensive developments in a few districts went far to offset slackening operations in many fields during the summer and fall.

It is probable that the decline in field work which has become more noticeable in the oil producing industry the last half of 1927 will continue during the early part of 1928. There are no signs as yet of a coming demand for crude which cannot be met, and more, by the fields now developed or in process of development.

Field Storages

Due to over-production in flush fields of Oklahoma and Texas and consequent storage of crude, the tonnage of steel going into storage tanks was larger in 1927 than the year preceding. Some 285,000 tons of material went into this service in Oklahoma, Texas and California, the three most active States during 1927. This figure was augmented by that tonnage going into small lease tanks, which is impossible to estimate. The total may be nearly double that bought in 1926 for similar purposes.

In Oklahoma it is estimated 21,000,000 barrels of crude storage were built in 1927, calling for around 84,000 tons of steel. Of this amount, 76,000 tons went into storage tanks in the Seminole field.

California put 10,000,000 barrels of crude into new steel storage in 1927, using 40,000 tons of steel plates.

Texas put 35,000,000 of crude into new storage at tank farms and some 5,000,000 barrels into new storage at refineries, calling for about 160,000 tons of plates for this purpose.

For 1928, it is not considered likely that nearly the amount of steel storage put up in 1927 will be built in Oklahoma, and probably not in California. Texas, however, with several new fields likely to be developed further in 1928, may overbalance the loss.

Pipe Lines

So many thousand tons of steel pipe were bought for oil and gas transport that this became the backbone of the tubular goods market. An editorial survey, published in THE IRON AGE for Dec. 22, 1927, places the tonnage required for notable projects contracted for at 300,000 tons in 1926, 575,000 tons in 1927, and 700,000 tons in prospect for 1928. Not all of the work started in 1927 was completed by the turn of the year, but at least 400,000 tons of pipe was put into trunk lines in Oklahoma, Texas and Kansas alone.

Oklahoma built 600 miles of 4-in. line, 350 miles of 6-in. line, 450 miles of 8-in. line and 150 miles of 10-in. line, these altogether requiring 64,000 tons of pipe. In addition to the usual amount of shorter lines, a 100-mile stretch of 6-in. pipe was built in California—altogether buying about 10,000 tons for these purposes. Texas had the biggest pipe line construction program, its new fields being at considerable distance from existing trunk lines, refineries, or tide water. Furthermore, some companies were compelled to increase the carrying capacity of their pipe line systems running from the Mid-continent fields through Texas to the Gulf refineries. Another company built the first division of what will be a transcontinental system of oil lines. Such activity amounted in round numbers to 1950 miles of 8-in. and 500 miles of 10-in. line. Add to this about 300 miles of gas pipe of 20-in. diameter, and the total laid in Texas consumed over 300,000 tons of steel.

Work is now starting on 200 miles of 10-in. line in Oklahoma. In Texas there is building 250 miles of 8-in. and 800 miles of 10-in. line as the year opens. Many projects are under way which will entail considerable pipe line construction in 1928, not only of oil lines, but also larger gas lines.

In Other Branches

Aside from this consumption of steel in the producing end of the oil industry—by far the greatest of any branch—the marketing branch of the industry became a good outlet for plates for small storage tanks in 1927. It is impossible to estimate the tonnage going into this use.

Refineries are demanding an increasing amount of special steel products capable of resisting high degrees of pressures and heat, and the corrosive effects of sulphur-bearing crudes. In tonnages this would not amount to any large figure, of course, but it will be a marked influence on the production of special steels.

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Better Prospects for Steel Jobbers

Moves Made by Producers to Divert Small-Lot Business to Warehouses Point to More Stable Market Conditions

BY GEORGE F. TEGAN*

STEEL jobbers look forward to the future more hopefully than at any time in the past five or six years. Although 1927 was discouraging from the standpoint of business volume and satisfactory returns, more definite progress was made in the direction of an adjustment of the respective fields of the mills and warehouses than in the previous five years combined. The mills have learned that in many instances it costs much more to take orders of warehouse size than the results warrant in either profit or good will, and in some lines they have set up charges on small-lot orders commensurate with the extra costs of handling and assembling. The purpose of these changes is to divert small-lot business back to the warehouses.

Prior to and during the war, steel merchants obtained 80 per cent of their profits, it is estimated, on business that could not be handled by the mills. Then, as a result of war-expanded productive capacity and better railroad service, out of which grew short-range buying and "zero" inventories, there came a period when there was almost no order so small that the mills would refuse it.

This was not the only way that the steel merchant was hit. One of the accompanying developments of short-range buying was a marked narrowing in the range of price fluctuations. The jobber who formerly operated on the theory that success in steel merchandising lay far more in buying right than in selling, found it impossible to buy heavily when prices appeared low and hold for an advance. The general drift of steel prices in the past five years has been downward and chances for speculative profits have been small.

The merchant has long performed a useful function, and there are few who will dispute that he will continue to do so, but conditions have so changed in recent years that this function in the future is likely to be more definitely of a complementary character, offering service that can be less economically supplied by the steel producer. The mills still will take small-lot business and can handle such business, but plainly the steps they have taken in the past year have been toward a greater diversion of such business to those better equipped to handle it.

The first step in the bridging of the difficulties between mill and merchant was taken last March, when the makers of bolts and nuts announced a new price list and a common discount to apply on large lots. This new mode of selling also provided that for broken cases the charge would be 10 per cent more than for full cases of a size. Many jobbers protested this extra charge on the score that, in order to avoid it, they would have to stock large quantities of slow-moving sizes and styles, but what they seemingly overlooked was the fact that, by making this charge for broken cases, the manufacturers were by that act divesting themselves of a kind of business that they had found extremely unprofitable and turning it over to the jobber. The warehouse was not expected to do business for less, but rather to name resale prices that would put the cost of small-lot purchases where it belonged—upon the buyer who bought in retail, instead of wholesale, quantities. Bolt and nut manufacturers went even further; to the habitually small customer they had acquired when no order was too small for them to handle, they began quoting an even higher price than the small-lot buyer could get from the jobber or merchant.

The bolt and nut prices and discount were not formulated over night, but, on the contrary, represented at least two years of intensive study, not only of producing costs, but costs of assembling, packing and shipping. One large manufacturer found that in packing alone there was a cost of $9 a ton, which had to be absorbed under the old schedule. Never before has there been a better stabilized market in these lines than in the past nine months, or a time when the merchant was able to handle them more satisfactorily.

The next effort of a similar character came last October, when the jobber was plainly recognized in a card of extras on cold-finished steel bars and shafting, distribution of which is very heavy through the warehouses. Until that time, manufacturers imposed no quantity charge for lots as small as 1 ton; when the quantity was 1999 to 1000 lb., the charge was 20c. per 100 lb., and for less than 1000 lb., 50c. per 100 lb. In the new card, which came out under date of Oct. 17, 1927, later modified to conform with a new card of extras on hot-rolled bars, the following quantity differentials were imposed: 20c. per 100 lb. for lots of less than 2 tons down to 1 ton, 40c., for lots of 1999 lb. to 1000 lb.; 75c. for lots of 999 lb. to 500 lb., and $1 per 100 lb. for lots of less than 500 lb. What could be more palpably an effort to turn the small-lot orders to the jobbers than the imposition of these quantity charges?

Encouragement to the jobbers was also given in the new card of wire nail extras announced and effective as of Dec. 1, 1927. There are no longer any base sizes of nails, i.e. sizes that sell at the base price, but the jobber who can now place a carload order, whether entirely made up of nails or mixed with other products, gets a concession of 10 per cent under the revised card.

The principal change in a new card of extras on hot-rolled bars and small shapes is in the quantity differentials, which are raised to a point where the small-lot buyer can do as well with his local jobber as by going direct to the mill. When the quantity is less than 4000 lb., but not less than 2000 lb., there is a lump sum charge for assembling and handling of $3. When the lot is less than 2000 lb., but not less than 1000 lb., the charge is $6, and for lots of less than 1000 lb. $10 is added to the net price of the lot.

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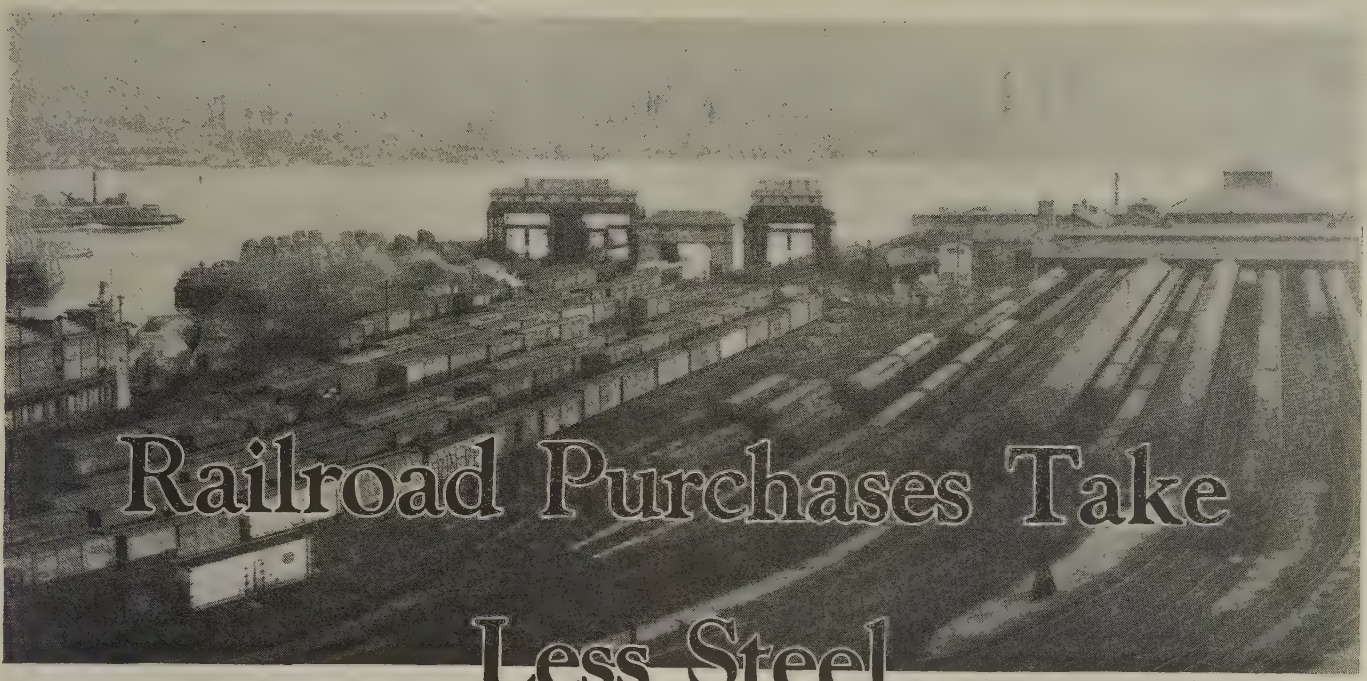
*Resident editor THE IRON AGE at Pittsburgh.



Railroad Purchases Take Less Steel

Cars Ordered Show a Slight Gain Over 1926, but the Number of Those Built Was Smallest Since 1921—Capital Expenditures of Class I Roads Fell Off 15 Per Cent

THE amount of steel taken by the railroads of the United States in 1927 was considerably less than was consumed in 1926, not excepting rails. This applies to direct purchases by the roads as well as purchases by companies engaged in the building of railroad equipment.

Capital expenditures of the Class I roads for the year were approximately $750,000,000, a decrease of $135,000,000 or 15 per cent from the 1926 record, as estimated by the American Railway Association.

Actual capital expenditures since 1920 follow:

1920	$653,267,000	1924	$874,743,000
1921	557,035,000	1925	748,191,000
1922	429,273,000	1926	885,086,000
1923	1,059,149,000	1927	750,000,000*

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*Estimated.

Equipment Expenditures Below 1926

Expenditures in 1927 for equipment, which includes cars and locomotives, amounted to $270,000,000 compared with $380,000,000 in 1926. The outlay for roadway and structures, additional track, heavier rails, additional ballast, shops and engine houses, including machinery and tools, amounted to $480,000,000 compared with $495,000,000 in 1926.

Due to the purchase of upward of 12,000 cars in in the last two weeks of the year, the total number of freight cars ordered in 1927 ran ahead of the 1926 total by nearly 5000. *Railway Age* computes the total of cars ordered for service in the United States as 71,606 compared with 67,000 in the preceding year. In addition there were 2133 cars ordered for service in Canada and 646 for export to other countries. The total of locomotives ordered was 808, including 58 for Canada and 54 for other countries.

Orders Received by Car Builders

The above figures include equipment authorized for construction in railroad companies' own shops. Orders received by the independent car builders, also deliveries, are shown in the following table, but are only for 11 months:

CARS DELIVERED

	Domestic	
	November	Jan. 1 to Nov. 30
Freight train cars	3,754	52,294
Passenger train cars	164	1,254
Interurban, subway and other heavy elec. cars	53	536
Self propelled cars	11	43
Street railway cars	57	442
Freight car repairs	124	5,947

CARS ORDERED

	Domestic	
	November	Jan. 1 to Nov. 30
Freight train cars	1,378	46,246
Passenger train cars	0	1,164
Interurban, subway and other heavy elec. cars	120	226
Self propelled cars	34	115
Street railway cars	25	490
Freight car repairs	50	5,110

The number of freight cars built and delivered in 1927 was the lowest since 1921. The total for domestic use, as estimated by *Railway Age*, was 63,390, while the figures for preceding years are as follows:

1919	82,845	1923	145,083
1920	46,784	1924	104,093
1921	39,259	1925	94,907
1922	63,866	1926	78,870

Railroads built 779 miles of new main line in 1927, but 202 miles of track were abandoned and taken up, leaving a net increase of trackage of 577 miles.

EQUIPMENT ORDERED IN UNITED STATES AND CANADA

(Compiled by *Railway Age*)

	Locomotives	Freight Cars	Passenger Cars
For service in United States	696	71,606	1,612
For service in Canada	58	2,133	143
For service in other countries	54	646	48
Total	808	74,385	1,803

EQUIPMENT BUILT*

	Locomotives	Freight Cars	Passenger Cars
Domestic	958	63,390	1,785
Canada	51	2,851	126
Export	167	1.087	50
Total	1,176	67,328	1,961

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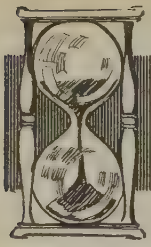
*Includes builders and railroad company shops.



High Lights of 1927—

January

PRODUCTION of 47,000,000 tons of steel ingots in 1926 exceeds previous record by nearly 3,000,000 tons . . . Manufacture of 3,750,000 passenger cars and nearly 500,000 trucks in 1926 establishes new automotive production record . . . . Comprehensive survey looking to the setting up of national and international standards for industry is announced by Secretary Hoover . . . . Bill providing for medals of honor and monetary awards for scientists in Government work is introduced into Congress . . . . Heat recovery, reduced equipment maintenance and production of better coke are purposes of dry-quenching process installed at Rochester, N. Y. . . . . Treasury Department issues anti-dumping order on pig iron from Germany; at same time rolled steel imported from Germany is declared not subject to countervailing duties.

February

NEW scrap classifications, embracing important changes in No. 2 heavy melting steel and in various grades of blast furnace scrap, are announced by Bethlehem Steel Co. . . . . Exports of machinery exceed $400,000,000 in 1926, a gain of $15,000,000 over previous year . . . . Accidents in iron and steel industry over 1910-1925 period declined 62.1 per cent in frequency and 51.9 per cent in severity, according to data issued by Bureau of Labor Statistics . . . . George W. Prentiss & Co. observe seventieth anniversary as manufacturer of wire at Worcester, Mass. . . . . Duty on pig iron is increased 50 per cent (to $1.12½) on request of Eastern merchant producers. . . . American Rolling Mill Co. announces purchase of Norton Iron Works and Ashland Steel Co. as part of extension program at Ashland, Ky.

March

ANNOUNCEMENT of new list prices on bolts and nuts brings sweeping revision to conform to present manufacturing costs and to permit single discount . . . . Companies producing 75 per cent of rolled and finished steel earned 7.37 per cent on investment in 1926 as compared with 5.93 per cent in 1925 . . . . Intermediate grade of American Society for Testing Materials is adopted as single standard for billet stock reinforcing steel . . . . General investigation of freight rates on iron and steel products in Official Classification territory is opened by Interstate Commerce Commission at Pittsburgh . . . . Standardized spindle end for milling machines is adopted by manufacturers' group of National Machine Tool Builders Association.

April

UNION miners of bituminous coal in western Pennsylvania, Ohio, Indiana and Illinois go out on strike. . . . Daily rate of steel ingot production in March, at 168,867 tons, sets new high record. . . . . Yearly pig iron production per furnace in Pittsburgh district has increased more than 50 per cent in last 24 years, survey shows . . . . Production of 3,200,000 tons of steel rails in 1926 largest since 1913 . . . . To advance standards of technical education, 150 engineering colleges unite to establish summer schools for training of teachers at the University of Wisconsin and Cornell University . . . . Superior Sheet Steel Co., Kokomo Steel & Wire Co. and Chapman-Price Steel Co. are consolidated as Continental Steel Corporation and plan ultimate ingot capacity of 250,000 tons annually . . . . Silver anniversary meeting of American Electrochemical Society is held at Philadelphia . . . . Robesonia furnace property in Pennsylvania, on which pig iron has been made almost continuously since 1793, is sold to Bethlehem Steel Co. and furnace will be dismantled . . . . Setting up of distance scales for iron and steel freight rates in Southwest by Interstate Commerce Commission brings about far-reaching changes in relationships.

May

STEEL ingots weighing 63,000 lb., converted into slabs on 206-in. plate mill of Lukens Steel Co., are believed to have set new record. . . . Hot-rolled and cold-rolled strip institutes are formed by country's leading producers with scientific rather than trade functions as their purpose . . . . United States Steel Corporation establishes department of research and technology, to be directed by Dr. John Johnston, late of Yale University . . . . Continuous rolling of sheets is begun at plant of Columbia Steel Co., Butler, Pa. . . . . Railroads adopt recommendations of Department of Commerce to revise and coordinate scrap classifications for sake of uniformity.

June

ROLLING of sheet steel from ingot to finished product in continuous process begins at new American Rolling Mill Co. plant at Ashland, Ky. . . . . New England mills and railroads ask for special consideration in concluding session of general inquiry into iron and steel freight rates held by Interstate Commerce Commission . . . . Electrified structural mills at Homestead works of Carnegie Steel Co. are started when Judge Gary passes hand over glass sphere in his New York office . . . . Advances in magnetic testing, in X-ray developments, in fatigue studies and in general research are reviewed at silver jubilee meeting of American Society for Testing Materials . . . . Chamber of Commerce of United States undertakes survey to determine extent and tendencies of industrial migration.

Metal Trades in Review

July

AVERAGE price of heavy melting steel scrap at Pittsburgh, Philadelphia and Chicago reaches $13.48 a ton, the lowest level since early in 1922 . . . . Agreement on definitions for terms relating to heat treatment is reached by American Society for Testing Materials, American Society for Steel Treating and Society of Automotive Engineers after six years of negotiations . . . . Construction contracts during June in 37 Eastern States, amounting to $632,478,000, set new high record . . . . American Rolling Mill Co. purchases Columbia Steel Co. and Forged Steel Wheel Co., with plants at Butler, Pa., and Elyria, Ohio . . . . River shipments of pig iron from St. Louis industrial district are revived after nearly a half century's intermission . . . . American Manganese Producers' Association is formed to further production, beneficiation and use of domestic manganese-bearing ores and retain existing tariff on manganese products . . . . Tariff Commission begins hearing on fluorspar at request of domestic producers that duty be increased 50 per cent . . . . Intensive development of Russian metals industry involving an ultimate expenditure of $300,000,000 in iron and steel plants is announced here.

August

DOMESTIC steel producers ask for application of anti-dumping act on imports of German rolling mill products. . . . Merger of six large manufacturers of radiators and boilers as National Radiator Corporation embraces fifth of country's output . . . . Elbert H. Gary, chief executive officer of United States Steel Corporation, president of American Iron and Steel Institute and recognized leader of industry, dies in eighty-first year . . . . Weirton Steel Co.'s strip sheet mill, rolling strip sheets up to 48 in. wide, is third continuous sheet or strip rolling mill to be put into operation during year.

September

MACHINE Tool Congress, formed to provide a forum for discussion of mutual questions by users, distributers and makers of machine tools, holds first meeting at Cleveland in connection with National Machine Tool Exposition . . . . National Metal Week observed at Detroit by joint meeting of American Society for Steel Treating, American Welding Society and Society of Automotive Engineers . . . . British steel makers announce agreement to allow rebates to all consumers who use only materials of British origin . . . . Blast furnaces and other assets of Rogers-Brown Iron Co., Buffalo, are purchased by M. A. Hanna Co.

October

PROPOSED reduction in export freight rates on iron and steel articles from Pittsburgh district to North Atlantic ports is announced. . . . Foreman training in United States has increased several hundred per cent in last year, survey shows . . . . Charles M. Schwab, chairman of Bethlehem Steel Corporation, succeeds Elbert H. Gary as president of American Iron and Steel Institute . . . . Contract is let for largest suspension bridge ever designed, spanning Hudson River at New York, which will require 70,000 tons of structural steel and 31,000 tons of wire cable . . . . Composite price of finished steel reaches 2.293c. per lb., the lowest level since August, 1922.

November

NEW billet and rod mill with delivery maximum of 4000 ft. per min., exceeding fastest previous mill by 500 ft. per min., is placed in operation at Worcester plant of American Steel & Wire Co. . . . . Composite pig iron price reaches $17.54 per ton, the lowest in more than 11 years . . . . Iron and steel division of American Society of Mechanical Engineers holds first meeting at Youngstown, Ohio. . . . Negotiations completed for amalgamation of Republic Iron & Steel Co. and Trumbull Steel Co., which will bring together total ingot capacity of 1,900,000 tons and wide range of finished products . . . . German industry approaches pre-war status with pig iron production within 23 per cent of 1913 and production of finished steel within 6 per cent of pre-war year.

December

DISCOUNT of 10 per cent on carload lots and average price advances of 15c. to 20c. a keg are embodied in new card of extras on wire nails . . . . November steel ingot production, at 119,300 tons daily, reaches lowest point since July, 1925, while daily pig iron production of 88,279 tons, is lowest since August of that year . . . . Bethlehem Steel Co. adopts mill bases on bars, plates and shapes, quoting prices f.o.b. Bethlehem, Coatesville, Sparrows Point and Lackawanna instead of on Pittsburgh base . . . . Objections of German producers to resuming 8-hr. day may lead to suspension of operations in German iron and steel plants . . . . Joseph G. Butler, Jr., pioneer steel maker of Mahoning Valley, dies on eve of eighty-seventh birthday. . . . Treasury Department finds that German steel is not being dumped into the United States . . . . James A. Farrell is elected chief executive officer of the United States Steel Corporation, succeeding the late Judge Gary.

Unemployment—A New By-Product of Prosperity

Surplus Labor Released by Technical Improvements in Production Is Gravitating to Luxury Industries—Wage Trend, Colorado Strike and Employee Representation Surveyed

UNEMPLOYMENT no longer finds its cure in prosperity. Not only is there surplus labor in overdeveloped industries like coal mining, but more and more man power is being released by technical improvements in production. A new problem in industry has arisen: What is to be done with the labor dispensed with by better methods and more highly developed equipment? Are luxury industries the logical outlet for our new unemployed?

This and other phases of current industrial relations were discussed in an IRON AGE interview with Arthur H. Young, for many years identified with employment work in the iron and steel industry and now industrial relations counsel in New York. The first question put to him was:

"To what extent has employment declined in manufacturing industries during 1927?"

"There has been a marked decline," replied Mr. Young. "Its extent is shown by the Bureau of Labor Statistics index, which receded from a high of 91.4 in March to 87.3 in October, with an estimated figure of approximately 85 in December. This was a drop between the high and low points in the year of about 7 per cent, which means roughly that at the close of 1927 there will be approximately 600,000 fewer persons employed in manufacturing industries than in March of 1927, and upward of 400,000 less than in December, 1926."

"Does this decline reflect a swing toward industrial depression?"

"No; paradoxically, the cause of unemployment at this time does not lie in a lack of prosperity—rather it is largely traceable to prosperity.

"Capital has been abundant and has gone back into production in the form of great increases in mechanization and new processing. Management is more than ever on the alert to improve methods, as well as cut costs through reduction of personnel. Properly applied incentives and employee cooperation also have increased production per man. A new phenomenon in the industrial world—technological unemployment—is the result.

"Of course, there are added to those unemployed because of the reasons just considered those affected by the coal strike, the period of shutdown at the Ford plants, and the reduction in expenditures by railroads and public utilities. This whole situation suggests that the problem of unemployment is not entirely solved by ironing out seasonal variations or by achieving business prosperity."

"If the working forces of industry are steadily being reduced, what outlet remains for the labor thrown out of employment? Will there be a new movement to the land?"

"No, the same forces that are eliminating labor in the factory are at work on the farm. The mechanization of agriculture is at hand. The tractor and tractor-drawn implements have passed through the experimental stage and are now finding general adoption. The reaper-thresher, also known as the combine, has proved a success not only in the drier plains States, but also in the moister climate of the Middle West. This equipment is materially reducing the amount of

A. H. YOUNG directs the activities of the Industrial Relations Counselors, Inc., New York, an organization that engages in research along industrial lines, makes surveys of industries and plants and acts as counsel in matters of personnel administration for a number of important industrial corporations. Mr. Young's first contact with industry was as a boy at the Joliet, Ill., works of the Illinois Steel Co. From there he went to the Minnequa plant of the Colorado Fuel & Iron Co., Pueblo, Colo., and in 1905 returned to the Illinois Steel Co., taking a position of timekeeper at its Chicago works. He was subsequently chief payroll clerk, statistician, assistant supervisor of labor, chief safety inspector and supervisor of labor and safety. In 1917 Mr. Young left the Illinois Steel Co. to become director of the American Museum of Safety and served as the Government's chief safety expert during the war.

From July 1, 1918, to July 1, 1924, Mr. Young was manager of industrial relations at the International Harvester Co., Chicago. He was a co-author of the Harvester Industrial Council Plan and was responsible for the administration of this significant development in employee representation. He was president of the National Safety Council from 1921 to 1922 and is vice-president of the American Museum of Safety. In 1919 the museum awarded him the Louis Livingstone Seaman medal for conspicuous accomplishment in safety. In July, 1924, Mr. Young became industrial relations counsel for the law firm of Curtis, Fosdick & Belknap, New York. The industrial relations staff of the firm was reorganized as the Industrial Relations Counselors, Inc., in May, 1926.

labor required per acre, thereby insuring the same yield with a smaller number of farm operatives."

"If gains in the technology of industry, as well as of farming, mean smaller working forces, what is to become of our unemployed?"

"This question cannot be answered without challenging established ideas. Chastened by our age-long struggle for mere subsistence, we instinctively recoil from any tendency toward increased consumption of luxuries. Since thrift is essential to build up new reserves of capital, luxuries have been regarded as an economic waste and a threat to sustained prosperity.

"Yet it is precisely in the purveying of luxuries and services of various kinds that labor released by industry is finding employment. Automobile manufacture, still classed by many as a luxury industry, has created a vast market for labor, not only in the building of motor cars, but in the construction and patrolling of roads, and in the operation of countless oil stations, garages, refreshment stands, road houses and hotels. It has stimulated the growth of two great sister businesses, the cement and oil industries. The far-reaching effects of the automobile are seen in every phase of our economic life. Similarly, although on a smaller scale, the radio industry is offering opportunities to surplus labor."

Luxury Industries Needed to Support Basic Industries

"Is it your opinion that luxury industries are needed to sustain mass production in the basic industries?"

"Yes. Mass production implies mass demand. It would be futile for so-called essential industries to lower costs through labor saving, if in the same stroke they curtailed their markets by releasing labor which could not find employment elsewhere. Man's mastery over nature has passed the point where the Malthusian theory can be taken seriously. We no longer believe in the fatalistic doctrine that if wages increase, population is sure to multiply until wages are forced back to a subsistence level. Mass production and its companions, waste elimination and standardization, are decreasing costs to such an extent that man can enjoy the necessities of life and a fair measure of luxuries besides. If only part of the population is required to supply the necessities, it is obvious that surplus labor is available to increase the pleasures and comforts of life.

"However, I do not wish to be misunderstood. I have been discussing broad trends. Progress toward balanced industrial relations is not a uniform, sweeping movement. In a complex organism like modern industry it is inevitable that the response to economic stimuli should be more rapid in some directions than in others.

"During the past year it has been recognized more widely than ever before that a large section of the general body of laborers has been sharing little, if at all, in the prosperity of the last few years. In an investigation made by the Bureau of Labor Statistics it was found that unskilled laborers as a class were receiving rather meager wages and were not regularly employed. The highest paid group was found in the bituminous coal mining industry and earned as much as $37.69 per full-time week. The lowest earnings were found in the same industry and ranged from $10.34 to $11.03 per week for inside and outside laborers. During the last few years employees in coal mines have averaged about 180 days per year, or the equivalent of 30 full-time weeks. In the lowest paid districts, the average weekly pay for all the industries investigated would run under, rather than over, $17 per week, while for all districts the average apparently would be about $25 per week."

Present Trend of Wages Downward

"What is the general tendency of wages at the present time?"

"From January through August, the total amounts disbursed as payrolls in manufacturing industries failed to fall off as much as employment, so that the average earnings of persons remaining at work increased over 1926. This does not mean, however, that the persons who remained at work necessarily received increases in wages, because, in many industries, it is known that unskilled laborers were the ones laid off and the average pay of those remaining on the rolls would naturally show an increase. Since August, moreover, payroll totals have been declining more rapidly than has the number of employees, and the index of average per capita earnings, constructed by the Bureau of Labor Statistics' figures, has fallen below the corresponding figures of 1926. This fact would seem to point to some cutting of wages, though published reports of agencies collecting such information continue to show a preponderance of increases of wages over decreases. The number of firms reporting to these agencies is small, however, so that there is room for question whether the reports are really representative of conditions.

"High average per capita earnings with a declining trend in the cost of living resulted in sharply rising real earnings in the first half of 1927. During the latter half of the year, however, average per capita earnings have been declining and, on the whole, real earnings have been declining in about an equal, if not greater, ratio."

The Colorado Strike and the Works Council Plan

"The coal strikes were the major industrial disturbances during 1927. Does the Colorado strike indicate a break-down of the works council plan which has been in effect in some of the largest mining operations in that State?"

"No. It cannot fairly be said that the works council plan failed. Rather, the increased mobility of pickets through the use of automobiles widened the effectiveness of organized intimidation.

"The strike was called on Sept. 4 by leaders of the Industrial Workers of the World. This general strike had its beginnings in a four-day strike called late in August as a protest against the Sacco-Vanzetti decision. Both the protest and general strikes centered originally around the communities of Aguilar and Walsenburg in which are maintained I. W. W. headquarters. The general strike meeting held at Aguilar on Sept. 4 demanded a five-day week, a 6-hr. day and a 40 per cent increase in daily wages. After an investigation by members of the State Industrial Commission of both the protest and general strikes, announcement was made that the strikes were illegal, and the leaders did not properly represent the workers. The strikers were warned against picketing and advised to return to work. Although the agitation had its inception in the southern coal fields, the movement spread into some of the northern counties, which were seriously affected by the time a strike actually occurred on Oct. 18.

"In many of the mines, both in the southern and northern part of the State, employees were loyal and preferred to continue operations, but for reasons of general safety, managements decided that it was advisable to shut down.

"On Oct. 1 the Colorado Fuel & Iron Co., in negotiations with its employee representatives, granted a wage increase, which was followed by similar action by other bituminous companies in the southern field. No action on wages was taken at this time by the lignite mines, although during the strike the Rocky Mountain Fuel Co., whose Columbine mine was the only one in the northern field to operate after the strike was called, agreed to a 50 per cent increase in wages.

"Toward the end of October the picketing activities of the strikers multiplied. The spread of the strike and maintenance of morale among the strikers are largely due to the use of the automobile in carrying organizers, speakers and large groups of strike leaders from mine to mine. The frequency of encounters between pickets and company representatives engaged in protecting property increased and there were some incendiary fires. On Oct. 24 the Governor of the State visited the scenes of the strike, and on Oct. 30 the Adjutant-General of the State announced that picketing must cease. The month of November saw some general improvement as a result of the activities of the State and organized effort of employees who desired to cooperate with managements in resuming operations.

"Just at the time when the situation seemed to be adjusting itself the head of the Law Enforcement Bureau of Colorado ordered his men to fire upon a company of striking coal miners who were advancing toward the Columbine mine and, according to press dispatches, five were killed and several wounded. This tragedy has brought the whole situation to the forefront in glaring headlines and again focused public attention upon the coal mining industry in Colorado."

Labor Unions and Employee Representation

"What is the general attitude of labor organizations toward works councils?"

"At the 1926 convention of the American Federation of Labor, held in Detroit, there was considerable discussion of employee representation, resulting in a resolution strongly condemning such arrangements and a resolution empowering the executive council to levy a special assessment to be devoted to a thorough investigation and report on the so-called company unions. There are no indications that this plan is being carried out, but instead, weak and perhaps easily vulnerable individual company plans are being attacked. At the 1927 convention, held in Los Angeles, there was no reference to the project, while expressions of endorsement were given to union-management plans of cooperation of the Baltimore & Ohio Railroad type, with expressions of desire for further developments along this line. Personally, I cannot see that bona fide employee representation and enlightened trade unionism are mutually exclusive. In any event, it is a rather wholesome outlook to view all of the principal factors in the industrial equation vying with each other for success through measures of cooperation rather than conflict."

SCRAP PRICE DECLINE CHECKED

Pig Iron and Finished Steel Are Lower Than for Some Time Past

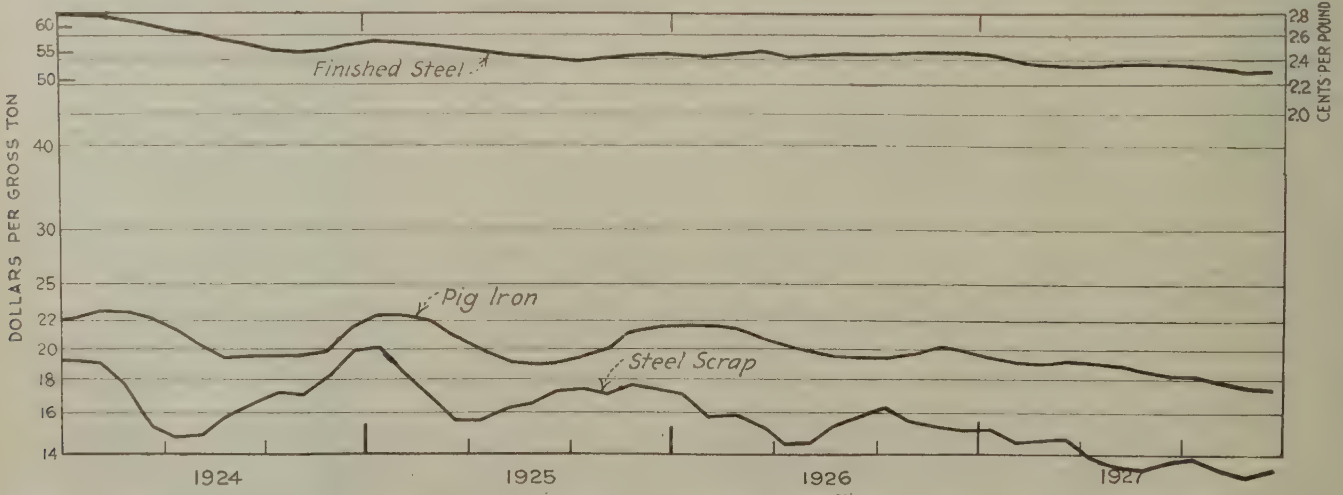
AVERAGE prices of heavy melting steel scrap at Chicago, Pittsburgh and Philadelphia have moved upward slightly from the low level of a month ago. November at $13.18 showed the lowest average for any month in several years, but December at $13.48 showed a recovery which was participated in by all three markets. It paralleled a similar, but short-lived, recovery in the third quarter. The average for the fourth quarter, however, at $13.38, was considerably lower than for any other quarter in more than five years. It compared with $14.09 in the second quarter of this year, and $13.73 in the third quarter. The average for the year was $14 a gross ton.

Pig iron reached in September the lowest level since before the United States entered the World War, and has gone still lower. The average composite price for December was $17.55, compared with $18.55 as recently as July. For the fourth quarter of the year, the average was $17.70.

Finished steel, while it has maintained a measurably uniform price for some months, was lower in November than in any month since 1922. The average was 2.299c. a lb., compared with 2.319c. for October and with 2.310c. for December.

COMPOSITE PRICES ON IRON AND STEEL PRODUCTS

	(Per Gross Ton)		
	Steel Scrap	Pig.Iron	Finished Steel, Per Lb.
1925 *average*	*$17.12*	*$20.58*	*2.465c.*
January, 1926	16.97	21.79	2.447c.
February	15.50	21.77	2.428c.
March	15.83	21.65	2.433c.
April	15.27	20.96	2.439c.
May	14.35	20.69	2.416c.
June	14.40	20.00	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average	*15.48*	*20.42*	*2.439c.*
January, 1927	15.17	19.44	2.432c.
February	14.58	19.07	2.378c.
March	14.65	19.03	2.367c.
April	14.71	19.21	2.360c.
May	13.95	19.09	2.360c.
June	13.60	18.92	2.369c.
July	13.48	18.56	2.367c.
August	13.80	18.17	2.367c.
September	13.92	18.03	2.357c.
October	13.48	17.96	2.319c.
November	13.18	17.59	2.299c.
December	13.48	17.55	2.310c.
Year's average	*14.00*	*18.55*	*2.357c.*



After Declining Irregularly Since the Beginning of 1925, with Occasional Partial Recoveries, Scrap Prices Appear to Have Reached Bottom and to Be Headed Slowly Upward. Pig iron and finished steel have been falling during the same period, but much less abruptly

Japan a Growing Producer of Steel

Industry a Quarter Century Old Is Supplying More Than Half of Domestic Requirements in Finished Steel Products

BY GEORGE S. HERRICK

IN viewing the steel industry of Japan, it is perhaps well to bear in mind that, in contrast with the other steel producing nations of the world, it is a modern development by a people who have entered into an industrial era in comparatively recent times. Although the Imperial Government, convinced of the need of some domestic production of iron and steel, founded the Seitetsu Jo at Yawata in Kiushu (usually known as the Yawata or Imperial Steel Works) in 1896, a broad expansion of Japanese production did not occur until about the time of the Russo-Japanese war, 1904 to 1906.

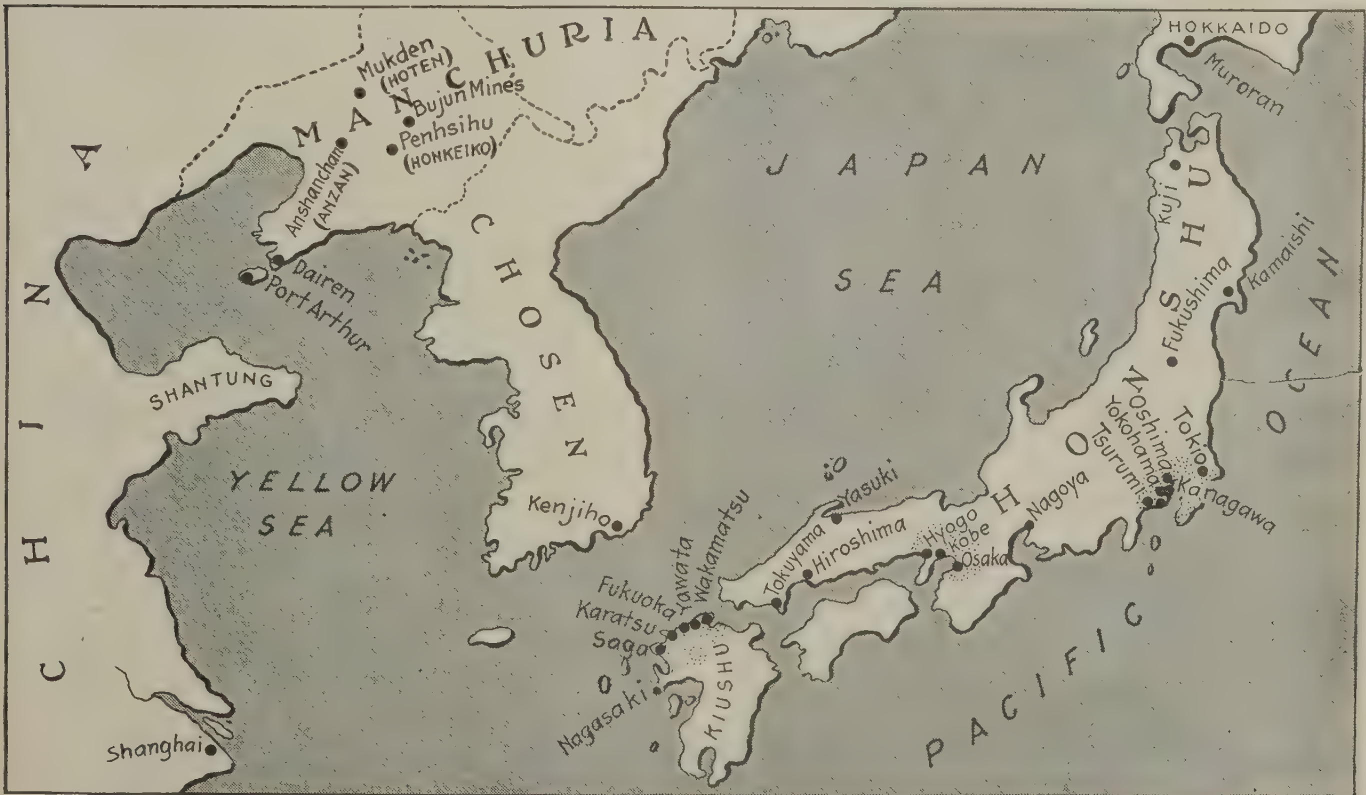
Prior to the war with China, 1894 to 1895, production of iron was in a rather primitive state, with the total output probably not more than 5000 or 6000 tons a year. By 1896, however, it is estimated that Japan's consumption of pig iron was about 65,000 tons a year and of steel products more than 200,000 tons a year, of which only about 25,000 tons of pig iron and about 1000 tons of steel products were produced domestically.

Seitetsu Jo Leading Producer

The Seitetsu Jo (Imperial Steel Works) was established by Imperial edict in March, 1896, and construction began the following February, but it was not until almost four years later that the first blast furnace, with a capacity of about 160 tons a day, was blown in. Not until 1901 did the Government works enter into the production of steel. Under the original plans the plant was to have a capacity of 60,000 tons of finished materials a year, but before construction was completed the annual capacity had been increased to about 90,000 tons.

Proving of great benefit during the war with Russia, plans were immediately laid to increase the capacity of the works to about 180,000 tons a year, expansion for which was completed about 1909. There have been additional units completed since then, so that today it is claimed that the Seitetsu Jo has a total capacity of close to 1,000,000 tons of steel ingots annually.

In 1901, according to statistics recently published by the *Japan Advertiser*, the total production of pig iron in Japan was about 57,000 tons, of which the Seitetsu Jo at Yawata contributed about 30,000 tons. Of the total output of 6000 tons of steel in this year, the Government works produced about 5000 tons. In 1910 the Seitetsu Jo supplied about 129,000 tons of the total of 189,000 tons of pig iron produced and about 160,000 tons of the 168,000 tons of steel ingot output. Private enterprise was still of little consequence. By 1913, however, the total output of pig iron was 242,676 tons, of which the Government works' share was 179,000 tons, and the total production of steel was 254,952


MANCHURIA
Mukden (HOTEN)
Bujun Mines
Penhsihu (HONKEIKO)
Anshanchan (ANZAN)
Dairen
Port Arthur
CHINA
SHANTUNG
YELLOW SEA
Shanghai
CHOSEN
Kenjiho
JAPAN SEA
HOKKAIDO
Muroran
Kuji
Kamaishi
Fukushima
HONSHU
Oshima
Yokohama
Tsurumi
Tokio
Kanagawa
Nagoya
Hyogo
Kobe
Osaka
Yasuki
Hiroshima
Tokuyama
Wakamatsu
Yawata
Fukuoka
Karatsu
Saga
Nagasaki
KIUSHU
PACIFIC OCEAN

EXCEPT for a Few Mills, the Steel Industry Is Grouped in Three Great Industrial Districts, About Yokohama, Kobe, and on the Island of Kiushu, Site of the Government Works. A steel works in Chosen and blast furnaces in Manchuria have been established and considerable expansion of these plants is planned tons, with the Government works contributing 216,000 tons.

As in the past, so today the Seitetsu Jo, representing a total investment by the Government of about 160,000,000 yen, is the leading steel interest in Japan by a considerable margin. According to the recent census (1925), the Government works employs more than 16,000 workmen on full time and about 6000 or more on part time. It has also about 12,500 miners, and the offices give employment to about 2200, including executives.

The principal products of the works, which is equipped with six blooming and billet mills, nine structural mills, one rail mill, three plate mills, two sheet mills, one wire rod and one bar mill, in addition to six blast furnaces, 29 open-hearth furnaces and two Talbot furnaces, are steel bars, plates and shapes, wire rods, rails in 12, 18, 20, 30, 45, 60, 75 and 91-lb. sections, steel axles and tires, universal plates, black and galvanized sheets, electrical sheets, tin plate and tool steel. Although the mills have equipment for the manufacture of pipes and tubes and wire, production has been suspended as an aid to private producers of these materials.

The Seitetsu Jo is the only producer of tin plate in Japan, with an annual capacity of about 250,000 base boxes. The first sales of tin plate were made in July, 1923, and in the following nine months, into March, 1924, 15,760 boxes per month were produced, of which it is reported that 65 per cent were primes, 34 per cent seconds and 1 per cent of lower grade.

The total investment in the steel industry of Japan is estimated at more than 400,000,000 yen, and as much as 500,000,000 yen, of which 160,000,000 yen or more is in the Government-owned mills of the Seitetsu Jo. While the valuation of the Government plant may be accepted as fair, as much cannot be said in all cases for privately owned companies, which have been overcapitalized. The companies, except for certain leading producers, are said to have over-valued their plant and equipment, and in many instances, during the war and post-war periods, to have borrowed money year after year from the banks to maintain dividends not warranted by the exceedingly small profits.

System of Subsidies to Steel Producers

A practice which has probably assisted to a great extent in bringing about the present unfortunate economic condition, which culminated in the failures and suspensions early this year, was the system of subsidies paid by the Government. Their object was to aid in the upbuilding of a steel industry which would tend to make Japan self-contained, produce greater industrialization to offset in part the rapid increase in population and at the same time contribute a valuable arm to the national defense.

The system is complex and extensive. In the main, private steel companies which are in a position to meet certain requirements are granted subsidies permitting a guaranteed dividend rate to shareholders.

Aided by these payments and as a result of the normal growth of a steel industry to supply part of the domestic demand, Japan is today producing black sheets of various gages, has a large galvanizing industry, and a fair output of bars and structural material, a rather large production of wire and wire nails, and a small tonnage of special materials, such as electrical steel sheets and tool steel. It is the purpose of the Government to make the country self-contained as far as possible in the production of steel, but, faced with a limited and poor iron ore supply and low-grade coal, this promises to be difficult of attainment.

Iron Ore Resources Limited

A report by the Department of Agriculture's soil bureau places the iron ore resources of Japan proper

Open-Hearth Capacity in Japan

Company	No. of Furnaces	Capacity Tons	Annual Output Max.	Annual Output Ave.
Imperial Steel Works, Yawata	2*	200	1,065,000	1,000,000
Imperial Steel Works, Yawata	11	60		
Imperial Steel Works, Yawata	6	50		
Imperial Steel Works, Yawata	12	25		
Kiushu Seitetsu Jo, Wakamatsu	3	50	112,500	70,000
Asano Zosen Sho, Tsurumi, Yokohama	3	25	56,250	53.000
Osaka Teppan Seizo Kaisha, Osaka and Tokuyama	2	25	37,500	30,000
Sumitomo Seitetsu Jo, Osaka	3	25	56,000	45,000
Kawasaki Zosen Sho, Kobe, Kawasaki Works	8	25	150,000	130,000
Hyogo Works	2	25	37,500	30,000
Kobe Seikojo Kaisha, Kobe	2	25	37,500	30,000
Nippon Kokan Kabushiki Kaisha, Kanagawa	9	25	168,750	140,000
Kamaishi Kozan Kaisha, Kamaishi	3	25	56,250	50,000
Mitsubishi Seitetsu Kaisha, Kenjiho, Chosen	3	50	112,500	90,000
Total	69		2,040,000	1,668,000

NOTE: The total of all open-hearth furnaces in Japan including capacities from 3-ton to 25-ton, not recorded in this list, is 121.

*Talbot.

Blast Furnace Capacity in Japan

Company	No. of Furnaces	Daily Output	Annual Capacity
Seitetsu Jo (Imperial Steel Works)	2	270	510,000
Seitetsu Jo (Imperial Steel Works)	1	235	
Seitetsu Jo (Imperial Steel Works)	3	200	
Nippon Seitetsu Jo, Wanishi	1	100	100,000
Nippon Seitetsu Jo, Wanishi	2	120	
Mitsubishi Seitetsu Kaisha, Kenjiho, Chosen	2	200	130,000
Anzan Seitetsu Jo, Anzan, Man.	2	300	200,000
Toyo Seitetsu Kaisha, Tobata	1	150	150,000
Toyo Seitetsu Kaisha, Tobata	1	300	
Kamaishi Kozan Kaisha, Kamaishi	2	200	130,000
Honkeiko Seitetsu Jo, Manchuria	2	130	80,000
Asano Zosen Sho, Tsurumi, Yokohama	1	150	50,000
	20	2,355	1,350,000

NOTE: Blast furnaces with a daily output of less than 100 tons are not included in this list.

Rolling Mill Capacity in Japan

(Metric Tons)

	Max. Capacity	Ave. Output
Seitetsu Jo (Imperial Steel Works) Yawata		
Blooming and billet mills:		
No. 1	210,000	147,000
No. 2	240,000	168,000
No. 3	300,000	210,000
No. 4	300,000	210,000
No. 5	300,000	210,000
No. 6	450,000	315,000
Rail mills:		
No. 1	100,000	80,000
Large structural mills:		
No. 1	90,000	63,000
No. 2	120,000	84,000
No. 3	150,000	105,000
Medium size structural mills:		
No. 1	45,000	31,500
No. 2	60,000	42,000
Small size structural mills:		
No. 1	30,000	24,000
No. 2	30,000	24,000
No. 3	45,000	36,000
No. 4	45,000	36,000
Plate mills for 5 mm. and heavier:		
No. 1	90,000	63,000
No. 2	60,000	42,000
Sheet mills for less than 5 mm.:		
No. 1	40,000	28,000
Sheet mills for 0.7 mm. and thinner:		
No. 1	26,000	18,200
No. 2 (electric sheets)	7,000	4,900
Wire rod mills:		
No. 1	50,000	35,000
Mill for flats (sheet bars or skelp):		
No. 1	37,000	29,600
Pipe:		
Small tonnage of medium sizes only.		

at approximately 70,000,000 tons, including about 750,000 tons of sand ore. Estimating the demand for pig iron and finished steel in Japan at about 300,000 tons of pig iron and 1,680,000 tons of finished products annually, the following computation of iron ore requirements might be made: For the production of the 1,680,000 tons of finished steel, it is estimated that 2,350,000 tons of semi-finished material would be required, and this would necessitate the use of about 1,900,000 tons of pig iron in addition to scrap.

The production of such a quantity of pig iron would require approximately 3,800,000 tons of 50 per cent iron ore and about 2,000,000 tons of coke. Consumption of iron ore at the rate necessary for the estimated full requirements of Japan would soon exhaust the present known resources and in addition Japanese coal is said to be for the most part high in sulphur, phosphorus and ash content and highly volatile. At present the Seitetsu Jo at Yawata is importing its ore supplies from China and the South Sea Islands.

In 1925, in addition to the imports of pig iron from Manchuria and Chosen, of which about 100,000 tons came from the Anzan Steel Works of the South Manchuria Railway Co. and the Honkeiko Seitetsu Jo (Honkeiko Steel Corporation), also in Manchuria, and about 75,000 tons from the Mitsubishi Seitetsu Kaisha at Kenjiho, Chosen, about 150,000 tons of iron was imported from the Tata, Bengal and Burn interests in India, and 50,000 tons from the Hanyang Iron & Steel Works, Hankow, China.

While there is considerable iron ore in Manchuria, most of which is hematite, the percentage of iron content is not large, being generally about 36 to 40 per cent. It is, however, worked to advantage. One deposit is at Meaoerkou, about 24 miles from Penhsihu, the site of the Honkeiko Seitetsu Jo, and according to production figures of this operation for 1921, the total output was about 67,500 tons of ore. The other mine is at Anzan (Chinese: Anshanchan), the site of the South Manchuria Railway Co.'s Anzan Steel Works, and the production of iron ore in 1921 is given as 143,364 metric tons. Both deposits are of iron ore analyzing about 36, to as high as 40, per cent iron content.

Sand Ore May Be Used for Sponge Iron

The desire to extend the ore resources of the country as greatly as possible has led to a considerable development of interest in the Anderson-Thornhill process for production of iron from sand ores. Experiments have been carried out at the Kuji Seitetsu Jo (Kuji Steel Works), recently established in the northeastern part of Japan, and some success is claimed by the promoter, M. Matsukata, although the patentees of the process are far from satisfied.

Following an investigation by an engineer of the Imperial Trade Department, it was reported that the sponge iron made was found on analysis to contain

Rolling Mill Capacity in Japan
(continued)

	Max. Capacity	Ave. Capacity
Kiushu Seitetsu Jo, Wakamatsu		
Blooming and billet mills...	210,000	147,000
Large structural mill......	75,000	52,500
Plate mill for less than 5 mm.	40,000	28,000
Mitsubishi Seitetsu Kaisha, Kenjiho, Chosen		
Blooming and billet mills...	300,000	210,000
Large structural mill.......	90,000	63,000
Plate mills for 5 mm. and heavier	60,000	42,000
Kawasaki Zosen-Sho, Kobe		
Small size structural mills, Hyogo Mill	20,000	12,000
Plate mills for 5 mm. and heavier, Fukiai Mill	60,000	42,000
Sheet mills for 0.7 mm. and thinner, Fukiai Mill	20,000	14,000
Kobe Seikojo Kaisha, Kobe		
Medium size structural mill	30,000	21,000
Small size structural mill..	20,000	16,000
Sumitomo Seitetsu Jo, Osaka		
Medium size structural mill	30,000	21,000
Wire rod mill	50,000	35,000
Pipe rolling mill...........	24,000	16,000
Nippon Kokan Kabushiki Kaisha, Kanagawa		
Medium size structural mill	60,000	42,000
Small size structural mill..	40,000	32,000
Pipe rolling mill...........	30,000	21,000
Tokio Kozai Kaisha, Fukushima-Ken, Tokio		
Medium size structural mill	20,000	14,000
Small size structural mill..	20,000	16,000
Asano Zosen Sho, Tsurumi, Yokohama		
(Kokura) Small size structural mill	30,000	24,000
(Tsurumi) Plate mills for 5 mm. and heavier.......	60,000	42,000
(Kokura) Wire rod mill...	50,000	45,000
Osaka Seitetsu Kaisha, Osaka		
Small size structural mill..	20,000	16,000
Fuji Seiko Kaisha, Hiroshima		
Small size structural mill..	20,000	16,000
Kamaishi Kozen Kaisha, Kamaishi		
Small size structural mill..	40,000	32,000
Osaka Teppan Kaisha, Tokuyama		
Sheet mills for 0.7 mm. and thinner Tokuyama Mill	20,000	14,000
Tokai Seitetsu Jo		
Medium size structural mills	30,000	21,000
Plate mills for less than 5 mm.	25,000	17,500

Wire Nail Production in Japan by Districts

	Kegs per Month
TOKIO	
Tokio Galvanizing Works	3,000
Kashiwa Galvanizing Works	3,000
Kobari Shoten......	1,500
Aoki Shoten........	1,000
All other plants.....	500
Total	9,000
OSAKA	
Amagasaki Nail Works	10,000
E. Nakayama	3,000
Yohta	1,000
Yamamoto Nail Works	900
Satake Nail Works..	800
Nakagawa Nail Works	500
Wyeda Nail Works..	500
Watanabe Nail Works	500
Nippon Densen Mfg. Co.	500
Ikeda Nail Works...	500
Ohuo Nail Works....	800
Tominaga Nail Works	1,000
Waki Wire Mfg. Co..	7,000
Ishii Tekko-Jo	800
Tekeishi Wire Mfg. Co.	800
Kito Shoten........	500
Fujiuchi Shoten.....	800
Fukuma Seikojo.....	1,000
Tokumoto Shoten...	700
Koyama Shoten.....	300
Kate Shoten........	800
Morino Shoten......	300
Shano Shoten.......	500
Kano Shoten........	800
Miki Shoten........	480
Osaka Wire Mfg. Co.	800
Shinko Nail Works..	500
Naniwa Nail Works.	800
Sagimori Shoten....	500
Mikkaichi Nail Works	1,000
U. Sakano..........	1,000
Tamura Shoten.....	480
Murata Shoten......	480
Koyama Shoten.....	800
Wakayama Nail Works	500
Mikasa Nail Works.	500
Total	42,140
WESTERN DISTRICT	
Yasuda Nail Works..	32,000
Hiroshima Nail Works	500
Matsumoto Seiko....	500
Tadozu Nail Works..	400
Okashima Nail Works	300
Tanaka Shoten......	500
Total	34,200
NAGOYA	
Nippon Nail Works.	1,600
Yoshida Nail Works.	1,500
Hokuriku Nail Works	800
Koyama Nail Works.	500
Kamezaki Nail Works	800
Total	5,200
Others	
Sakamoto Nail Works	480
Iwasa Nail Works..	480
Nyemura Nail Works	480
Seo Nail Works....	320
Ube Nail Works....	320
Imaharu Nail Works	320
Ohmura Nail Works	320
Ohsato Nail Works..	480
Sanyo Nail Works..	480
Total	3,680
Total Production of All Works...	94,220

Wire Production in Japan by Districts
(Metric Tons)

	Capacity per Month
TOKIO	
Tokio Seiko Kaisha.	1,500
Tokio Galvanizing Works	1,000
All other plants	600
Total	3,100
OSAKA AND WEST	
Inui Wire Mfg. Co..	1,500
Nippon Densen Co..	300
Osaka Teppan Kaisha	300
Settsu Galvanizing Works	350
Ebisu Gumi........	100
Waki Wire Mfg. Co.	350
Asano Steel Works..	200
S. Asada...........	50
Marino Shoten......	50
Yamada Wire Mfg. Co.	70
Takeishi Wire Mfg. Works	30
Nakatsuji Shoten...	50
Nakai Shoten.......	50
T. Sakamoto.......	30
Yamaguchi Shoten..	100
Mukai Shoten......	100
T. Yagi............	70
Yamanishi Shoten..	50
Yamamoto Shoten...	50
Moriuchi Shoten....	50
Yagifuku Shoten....	30
Akiyama Shoten....	100
Matsukawa Shoten.	30
Total	4,010

only about 80 per cent iron, while at least 90 per cent iron content would be required for successful working commercially. High cost of production is also a serious factor. Experiments, however, are being continued and satisfactory results are still expected by the Japanese promoters of the project.

Expansion After the War

Following the Armistice the industry was depressed, and to add to the troubles of the steel producers, came in 1921 the naval armament conference at Washington, with its restrictions on naval construction. Efforts to stabilize the industry and reduce competition met with little success, but in 1925 the Iron and Steel Association was organized, including as members the Seitetsu Jo of the Government and private companies. A pig iron sales organization was also established to control distribution. Subsidies to the steel makers were widely granted by the Government, and in 1926 a high tariff on iron and steel became effective as an added assistance to the industry.

Imports began to increase at this time and export trade suffered. It is estimated that about 65 per cent of the pig iron demand was supplied domestically in 1919, about 58 per cent in 1920, about 64 per cent in 1921, about 58 per cent in 1922, about 59 per cent in 1923, about 54 per cent in 1924 and about 64 per cent in 1925.

In steel bars and plates the percentage of domestic output to total consumption is estimated at about 36 per cent in 1920, about 50 per cent in 1921, about 40 per cent in 1922, about 54 per cent in 1923, about 46 per cent in 1924 and about 72 per cent in 1925. In recent years Japan has been an exporting as well as importing country in iron and steel. The total exports of pig iron and steel in 1924 were 860,691 piculs (51,295 gross tons), and in 1925, 911,204 piculs (54,306 gross tons).

Steel Mills, Blast Furnaces and Manufacturers in Japan

Seitetsu Jo (Known as Imperial or Yawata Steel Works), Yawata, Kiushu: wide range of steel products; 6 B. F., two 12-ton converters, 12 25-ton O. H., 17 60-ton O. H. and two 200-ton Talbot furnaces.

Nippon Seikojo (Japan Steel Works), Wanishi and Muroran in Hokkaido (Mitsui owned); pig iron and special steel; 4 B. F. and 12 O. H. fur.

Kamaishi Kozan Kaisha (also known as Kamaishi Tessan Kaisha), Kamaishi, Iwate prefecture; mining and steel company; pig iron, bars, shapes, special steel, cast iron pipe, ferromanganese and spiegeleisen; 3 B. F. and three 25-ton O. H. furnaces.

Nippon Kokan Kabushiki Kaisha (Japan Pipe Mfg. Co.), Kanagawa; pipe and special steel, pig iron, bars, shapes, rails and accessories; nine 25-ton O. H. furnaces.

Mitsubishi Seitetsu Kaisha (Mitsubishi Steel Co.), Kenjiho, Hokai-Do, Chosen; pig iron, steel bars, shapes and tubes; 2 B. F., three 50-ton O. H. furnaces.

Daido Denki-Sho (Daido Electric Steel Works), Nagoya, special and high speed steel, ferroalloys and steel castings.

Asano Zosen Sho (Asano Shipbuilding Co.) Tsurumi, Kanagawa; bars, shapes, wire products, castings and forgings; 1 B. F. and three 25-ton O. H. furnaces.

Kobe Seikojo (Kobe Steel Works), Kobe (formerly Suzuki owned); bars, shapes, plates, castings, forgings and special steel; 1 B. F. and four 20-ton O. H. furnaces.

Nippon Seiko-Sho (Japan Special Steel Works), Tokio; high carbon and high speed steel.

Osaka Teppan Seizo Kaisha Ltd. (Osaka Steel Sheet Mfg. Co.), Osaka and Tokuyama, (Iwai & Co., owned); sheets and steel plates; two 25-ton O. H. furnaces.

Takata Kogyo Kaisha (Takata Industrial Co.), Takata, Fukushima-Ken; pig iron and special quality steel.

Tokio Kozai Kaisha (Tokio Steel Materials Co.), Tokio; pig iron and special quality steel and art metal work.

Tobata Chuko-Sho, Ltd. (Tobata Cast Iron Works), Tobata, Fukuoka-Ken; pig iron and castings.

Toyo Seitetsu Kaisha (Oriental Steel Co.), Tobata, Fukuoka-Ken; pig iron, steel ingots and small shapes; 1 B. F. and small O. H. furnace.

Kawasaki Zosen-Sho (Kawasaki Dockyard Co.), Kobe; sheets, plates, bars, shapes, steel castings, forgings and special steel; eight 25-ton O. H. furnaces at Kobe and two 25-ton O. H. furnaces at Hyogo.

Osaka Seitetsu Kaisha (Osaka Steel Co.), Osaka; small sized shapes; four 20-ton O. H. furnaces.

Sumitomo Seitetsu-Jo (Sumitomo Steel Works), Osaka; rolled products and wire, tubes, castings, forgings and special ordnance work; three 25-ton O. H furnaces.

Anzan Seitetsu-Jo (Anzan Steel Works), Anzan (Chinese Anshanchan), Manchuria (South Manchuria Railway owned); pig iron; 2 B. F.

Osaka Tekko-Jo (Osaka Steel Works, Ltd.); shipbuilding and about 5000 tons of cast iron pipe annually.

Fuji Seiko Kaisha (Fuji Steel Works), Kawasaki; pig iron and special steel; small capacity blast furnace.

Yasuki-Seitetsu-Jo (Yasuki Steel Works), Yasuki, Shimane-Ken.

Kiso Denki Seitetsu Kaisha (Kiso Electric Steel Mfg. Co.), Nagoga; electric furnace steel castings; one 1½-ton electric furnace.

Kiushu Seitetsu Jo (Kiushu Steel Works), Wakamatsu; plates and shapes; three 30-ton O. H. furnaces.

Sumidagawa Seitetsu-Sho (Sumidagawa Steel Works), Tokio; pig iron; small capacity blast furnace.

Honkeiko Seitetsu Jo (Honkeiko Steel Corporation), Penhsihu, Manchuria; pig iron; 2 B. F.

Nippon Chuko-Sho (Japan Cast Iron Co.), Osaka; iron castings.

Nippon Seitetsu Kaisha (Japan Iron Mfg. Co.), Fukuoka Prefecture; pig iron; small capacity blast furnace.

Many Small Mills in Japan

Today there are in Japan 30 or more iron or steel producing companies in addition to the Seitetsu Joe of the Government, and numerous small manufacturers of special products, foundries, shipyards and similar plants. Of these there are 14 equipped with one or more rolling mills, including the Seitetsu Jo. There are five companies in Japan proper, with blast furnaces of 100 tons a day or more capacity, two in Manchuria and one in Chosen. There are three outstanding producers of sheets among these mills, and a fourth is reported entering into production. In all, there are 10 companies equipped with open-hearth furnaces of 25 tons capacity or larger, including the Seitetsu Jo and one company in Chosen, the Mitsubishi Seitetsu Kaisha at Kenjiho.

Pig Iron Production and Imports, 1913 to 1925

(Metric Tons)

Year	Domestic Production	Imports*	Exports	Total Consumed	Per Cent From Japanese Furnaces
1913....	242,676	273,310	358	515,628	47
1915....	320,627	172,685	400	492,912	65
1917....	462,792	235,082	3,322	694,522	62
1918....	606,428	267,741	1,146	873,023	70
1919....	612,609	348,707	1,894	959,422	64
1920....	529,875	390,298	2,514	917,659	58
1921....	480,300	276,284	3,693	752,891	64
1922....	559,310	409,606	3,699	965,217	58
1923....	610,751	429,442	5,231	1,034,962	59
1924....	598,405	520,122	6,319	1,112,208	54
1925....	685,178	400,000	....	1,085,178†	64

*Including Chosen and Manchuria.
†Exports, which are unreported, have not been deducted.

Sheet, Nail and Wire Capacity Expanded

In the past few years Japan has entered into an intensive development of wire drawing and nail making capacity, so that today, as shown in the accompanying table, there are more than 25 wire-drawing plants in Japan with a total capacity of 7110 tons of wire per month, and some of these and a few which purchase their wire in the open market bring the total of nail works to more than 60, with a total capacity of 94,220 kegs of nails per month.

Japanese efforts to establish a large sheet-rolling industry have created, perhaps, more interest in the United States and Great Britain than any other steel development effort of that country. The present rated capacity is more than 100,000 tons a year, although the actual output is considerably below this figure.

Japan remains a large consumer of light-gage black sheets, and in the past and today purchases practically all foreign requirements from the United States and Great Britain, with a limited tonnage from Germany. Great quantities of black sheets are consumed in Japan by the numerous galvanizing plants, the enameling industry and the makers of stoves and chimneys, as well as for building purposes.

Three Principal Sheet Producers

The first steel sheets rolled came from the Tokuyama mill of the Osaka Teppan Seizo Kaisha, Ltd. (Osaka Steel Sheet Mfg. Co.). This company, equipped with four stands of 28-in. rolls, 40 in. wide, prospered for several years. The company now has eight stands of rolls: two roughing, four finishing and two for cold rolling, producing heavy gages, 36 x 72 in. While the equipment can be used in rolling No. 30 gage black sheets, for which there is so much demand in Japan, none of this gage is being produced at present. The total capacity of the Tokuyama mill is placed at about 3000 tons of sheets a month, but operations are only 50 to 60 per cent of this capacity.

The Nippon Seitetsu Kogyo Kaisha (Japan Steel Industry Co.) at Yatsuya, Fukuoka prefecture, was a later arrival in the field of black sheet production, and is equipped with four stands of rolls, 26 in. in diameter by 40 in. wide; one roughing, two finishing and one for cold rolling. Sheets 36 in. wide up to 96 in. long can be rolled on this mill, and the gages range from Nos. 10 to 20. The total capacity is set at 1000 tons a month, but output is about 45 to 50 per cent of this maximum.

The greatest sheet producer, the Kawasaki Zosen-Sho, Ltd. (Kawasaki Dockyard Co.), following financial reverses in the spring during the near-panic, is reported to have temporarily suspended operation of all but its shipbuilding activities, but efforts are being made to have other large interests in Japan take over the operation of its various plants, and its idleness is generally considered to be only temporary. The equipment for sheet rolling at the Kawasaki plant consists of eight roughing, 13 finishing and seven cold rolling stands with 30 x 44-in. rolls. This company has made a definite effort to produce No. 30 gage black sheets profitably, and, according to report, some measure of success has been attained. One of the greatest obstacles to profitable operation is said to be the difficulty in securing Japanese workmen who can stand the temperatures.

Some Plants Established Before the War

Between 1901 and 1913 the Kamaishi Kozan Kaisha (Kamaishi Mining Co.) at Kamaishi, now owned by the Mitsui interests, was established. Originally it was exclusively a blast furnace company, but today, in addition to two 200-ton furnaces with a rated annual capacity of 130,000 tons of pig iron, it has three 25-ton open-hearth furnaces, as well as several smaller ones and a small-sized structural mill with an average rated capacity of 32,000 tons a year.

Another steel company established in this period was the Wanishi works at Wanishi, now a part of the Nippon Seikojo (Japan Steel Works), also owned by the Mitsui interests. This works employs about 4000 workmen and produces pig iron, forgings, ordnance and special steel. Its equipment includes three blast furnaces with a rated annual capacity of 100,000 tons.

Other companies established at this time were the Sumitomo Seiko-Sho, Ltd. (Sumitomo Steel Works), at Osaka, and which produces wire, tubes, castings, forgings and special steel, and is equipped with rolling mills for medium-sized structural shapes, wire rods and pipe. The total rated annual capacity of this company for rolled products is placed at 72,000 tons. The Nippon Kokan Kabushiki Kaisha (Japan Pipe Mfg. Co.) at Kanagawa, established prior to 1913, manufactures pipe, bars, shapes, rails and accessories, and special steel. It is equipped with the medium and small-sized structural mills and a pipe rolling mill. It has nine open-hearth furnaces of 25 tons capacity each, and an annual output rated at 135,000 tons of steel ingots.

Another of these early companies is the Kobe Seiko Jo (Kobe Steel Works) at Kobe, formerly controlled by Suzuki & Co. This mill produces bars, shapes, plates, castings, forgings and special steel. It has medium and small sized structural mills with an annual rated capacity of 37,000 tons, two 25-ton open-hearth furnaces rated with an annual output of 30,000 tons of steel ingots and one blast furnace of small capacity. The Kawasaki Zosen-Sho, Ltd., was also established in this period of expansion in the steel industry.

World War Brings More Development

After 1914, the beginning of the World War, each year saw a few new steel companies established. In 1915 the Sanyo Seitetsu Sho, Ltd., was organized under the control of Okura & Co., and the Kishimoto Seitetsu Jo and Kokura Seitetsu Jo (now Asano Zosen-Sho) were formed. In 1917 the Fuji Seiko Kaisha (Fuji Steel Co.) was built at Kawasaki to roll special steel. This plant is now equipped with a small structural mill rated at about 16,000 tons a year. Other companies established in 1917 were the Nippon Seiko-Sho (Japan Special Steel Works) at Tokio, to manufacture special quality steels; the Toyo Seitetsu Kabushiki Kaisha (Oriental Steel Mfg. Co.); Nippon Seiko-Sho (Japan Steel Works) at Wanishi and Muroran, and the Tobata Chuko-Sho, Ltd. (Tobata Cast Iron Co.) at Tobata, Fukuoka Prefecture.

Three large companies were organized in 1918, the Nippon Denki Kaisho (Japan Electric Co.) at Koriyama in Fukushima Prefecture, the Nagasaki Seitetsu Sho (Nagasaki Steel Works), and the Iwaura Seitetsu Sho (Iwaura Steel Works), but the coming of the armistice in November caused total suspension of plans for their establishment. At this period the total investment in private enterprises in the steel industry was more than 500,000,000 yen.

Plants Built in Manchuria and Chosen

From 1914 to 1918 the Japanese steel industry began to reach out into Chosen and Manchuria. The Honkeiko Seitetsu Jo, Penhsihu, Manchuria, controlled by Japanese and Chinese capital, was established on the site of a former coal-mining company as a result of the discovery of iron ore deposits at Miaoerku about 24 miles distant.

In this period, also, the Anzan Seitetsu Sho of the South Manchuria Railway Co. was under construction at Anzan (Chinese: Anshanchan). This plant did not go into operation until after the war. The Anzan plant has two blast furnaces with a capacity of 300 tons a day each, the total rated output per year being about 200,000 tons of pig iron. The present plans of the company call for expansion to an eventual capacity of about 1,000,000 tons of pig iron annually, and in accomplishment of this it has just been announced that projected blast furnace construction will increase output to 500,000 tons. The first blast furnace was blown in at the end of April, 1919; the second furnace, with about the same capacity, followed at the end of February, 1920. The works employs a total of about 2300 Japanese and Chinese workers, including officials. In establishing this plant, a new town, with roads, water and sewage disposal systems, was constructed.

In Chosen there is one outstanding steel company, the Mitsubishi Seitetsu Kaisha (Mitsubishi Steel Co.) at Kenjiho, controlled by the Mitsubishi interests. The beginning of this company was in 1911, when the Mitsubishi company purchased the iron ore mine at Kenjiho in Kokai-Do. In May, 1915, a foundry was built, and in 1918 the first blast furnace was completed. Additional construction has given this works two blast furnaces with a total annual output of about 100,000 tons of pig iron, three 50-ton open-hearth furnaces with an annual capacity of 100,000 tons of steel ingots and 50 Wilputte coke ovens with a total annual capacity of 166,000 tons of coke.

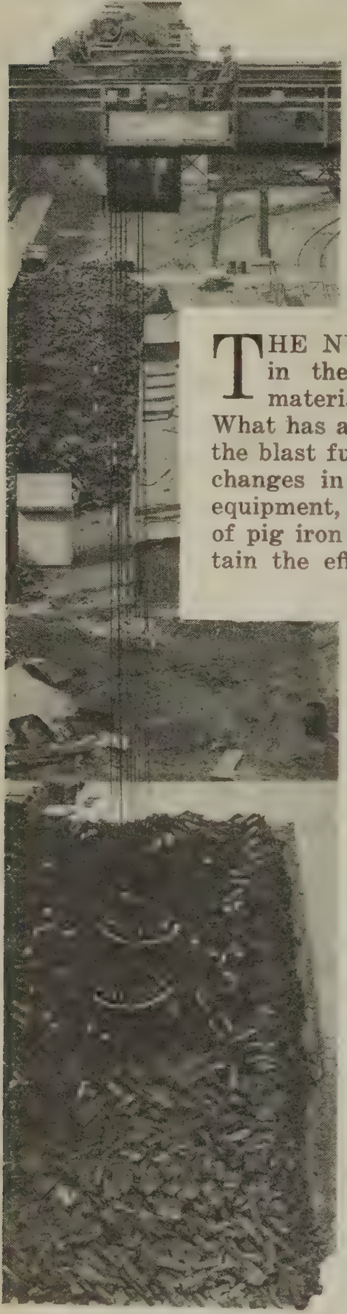
In considering the Japanese iron and steel industry it is essential to realize that at present it is largely composed of "potential" capacity. The mills are established and equipment is available, although in some cases it is not entirely modern nor in the best of condition. The actual production of this industry is on a considerably smaller scale, hampered by financial difficulties.

Credit for much of the information in this article is given to T. Usami, Mitsui & Co., New York; M. Hara, commercial attaché to Japanese Embassy, New York; Economic History of Chosen, Bank of Chosen, 1920; Economic History of Manchuria, Bank of Chosen, 1920; *Japan Advertiser.*

More Pig Iron, Better Pig Iron, Protective Freight Rates

The Common Problems of Merchant Furnaces and the Foundry Industry

BY E. J. LOWRY*



THE NUMBER of blast furnaces in the United States has not materially changed in 1927. What has assumed real importance to the blast furnace industry are certain changes in furnace construction and equipment, plus the fact that users of pig iron have determined to ascertain the effect of various factors on the quality of the pig iron they are buying.

Steep Inwalls Successful in South

As to changes in construction, the most apparent is on furnaces working on southern ores. Steeper inwalls, water-cooled, permit a more uniform stock distribution with corresponding gains in tonnage produced, lower coke ratios, and a better working furnace. The steeper inwall gives a relatively larger area at the top, thus increasing the area for charging. The additional stock which may thus be introduced acts as a recuperator on the hot gases, which in turn makes a direct saving on the fuel consumed. Stock is better distributed by this wider area when southern ores are used.

Progress may also be noted in the construction of new gas washers, which increase the overall thermal efficiency of the furnace. In combination with this there is a trend toward drying the blast furnace gases. It was shown at the meeting of the Iron and Steel Institute at Glasgow, Scotland, that the value of the gas is increased proportionately by the use of silica gel for drying the air. This conference seemed to agree that by this method the Gayley process would be considerably bettered, and even though in American practice the latter had fallen short, the silica gel process would prove of great advantage to the blast furnace operator.

Does Large Tonnage Mean Inferior Iron?

Changes in blast furnace construction are made in order to give greater and greater tonnages per square foot of hearth diameter without any ill effect upon the quality of the product. The great fear of the consumer is that large production means a sacrifice in the quality of the pig iron—whenever there is great production the consumer immediately feels that iron and steel scrap in some form must have been added to the burden. In fact this topic has formed the basis of animated meetings held by the American Institute of Mining and Metallurgical Engineers, and the American Foundrymen's Association. As the result of the latter meeting a resolution was passed inviting other societies to join with the American Foundrymen's Association in an attempt to find out just what pig iron should be and how it should be judged.

As a result of this resolution experiments are to be conducted at various blast furnaces to determine the influence of construction as well as the influence of the type of burden on the quality of the resulting pig iron. If these experiments lead to definite conclusions they will doubtless have a great effect not only upon the construction of blast furnaces, but upon the sale of pig iron to the consumer.

At the present time there is no technical method to determine *quality* in pig iron. It is purely a matter of experience which determines the applications of various pig irons. Melters generally are not prone to investigate the results of any changes in the materials entering their mixtures; consequently accumulation of information has been slow. However, the western foundrymen have as a rule become able to judge an iron reasonably well, and are willing to pay premiums for certain characteristics, whereas (as will be indicated later) the Easterners must still be initiated into the vagaries of pig iron.

Special Irons for Special Purposes

Apart from these changes to be anticipated in the future, there has been a decided change in the pig iron market recently. Southern iron no longer travels in large tonnage into northern territories. The South has become a considerable factor in the consumption of its own foundry iron. Since the introduction of the centrifugal process for pipe casting the South sometimes faces an apparent shortage in this raw material and buys tonnages from the neighboring northern furnaces. Some authorities ascribe this condition to the high freight rate from the South to the North which forced industries requiring southern irons to move South; others attribute it primarily to the invention of the centrifugal casting process. It is probably more nearly correct to say that the growing South has made markets which absorb most of the pig iron made in that district.

The development of the centrifugal process has undoubedly had its influence on the Southern pig iron market, and it will have further effects upon blast furnace operations, due to the fact that centrifugal casting requires low carbon irons. Blast furnace men will be forced to find a way to meet the requirements of this situation. Inasmuch as there are English and German furnaces operating on this type of product it is reasonable to suppose that some American furnaces will accede to the demands. Other casting processes require high carbon irons from the blast furnaces. Thus it would seem that pig iron production will become a specialty and the energetic producer will naturally meet the specifications of his consumers. This trend is clearly shown in New York State, where certain furnaces have found that by sintering the ore they have been able to meet the requirements of the most exacting consumer. The same careful preparation of materials entering the burden, as well as unique furnace operation, has shown that furnaces in the Cleveland and

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Chicago districts can well adapt their conditions to meet the requirements of the melter.

In New England the influence of brand names is fast passing. Where five years ago a buyer must know the brand and origin of a pig iron, today he is more keenly interested in the delivered price. In many instances he has gone to an extreme, just as the West had done five years before. It will perhaps take five years for the New Englander to become accustomed to do as his Western brother does, namely, to pay a premium for quality where it is justly deserved.

Slightly More Charcoal Iron Sold

Consumption of charcoal iron during 1927 will be found to be equal to that of 1926, if not greater. While the Charcoal Iron Co. of America passed into receivership, this had been anticipated, so there was no reaction felt in the market. Larger tonnage is estimated as the basis that the Wrigley charcoal iron furnace has been able to maintain operations continuously during 1927, as against an approximate six months' operation previously.

There is a growing tendency for foundry metallurgists to use charcoal iron in the production of fine castings.

High test cast iron will also have considerable effect upon the industry. Whereas cast irons of 28,000 lb. tensile strength were exceptional in past years, proper manipulation of materials has produced irons with strengths as high as 60,000 lb. Such high strength materials will be useful to the constructor and designer of modern machinery, and will enable the foundry industry to recover some of the market lost to rolled and forged steel. There is also the possibility that alloy cast iron will change the status of the foundries in this country.

Freight Rates Have Profound Influence on Furnace Activities

The freight rate structure on pig irons throughout the entire country is being contested. Furnaces in each district feel that they should have greater advantage when shipping to other districts, while those within such districts wish to prevent greater competition. The consumer, however, is hoping for this competition and wishes that greater tonnages were available for his selection.

This matter is of nation-wide importance because of its economic hearing on the world's largest industry. At times it may be forgotten that freight rates are a protection for furnaces within particular districts, which furnaces might otherwise be at a disadvantage owing to individual costs of production. During the past year the high-cost furnaces have been excluded from operation, but the medium-cost and low-cost furnaces have been fighting for business; without freight rate advantage the medium-cost furnace must necessarily have blown out.

On the other hand, the gray iron and malleable industries are well within their rights in demanding competition among pig iron producers. These branches of the foundry industry have not progressed within the last three years, mainly because of their operating costs. In order to meet competition from within and from without they have been forced to sacrifice earnings to keep in operation. Consequently they feel that a reduction in the delivered cost of raw materials might result in giving them a small profit. They now take business at cost or below, and try to break even or show a profit by using cheaper grade materials. Ultimately the engineer or the consumer finds that the product is inferior and discards it for forgings, stampings or some other material; the end result is that the foundry makes fewer castings, and the merchant furnace sells less pig iron.

A happy solution of the problem would be to district the country, and proportion freight rates to the distance in the districts, but this becomes an obvious impossibility when market conditions in each district vary with the supply and demand. The only agreeable outcome will follow when the consumer of pig iron sees that his object is the same as that of the producer. Their position is a common one, but neither has grown to understand the other's predicament.

Better Marketing Is Steel Need

Steel Sales Executives Discuss Impediments Encountered in Selling of Products at a Profit Commensurate With Large Capital Invested and Importance of the Industry

SEVERAL MEN prominently identified with the selling of steel have contributed to this issue, on invitation of THE IRON AGE, their views on the difficulties encountered in the marketing of steel products. Entirely aside from the ever-present operation of the supply and demand balance, it is frequently pointed out that there are many competitive ills for which a solution should be, but has not yet been, found. Some of the questions which our contributors discuss include:

Is the present form of steel contract a cause of market irregularity?

Would the situation be improved if steel were sold for specific requirements only?

Are the concessions usually granted to the large buyer an undermining influence on price structures?

If such concessions have become a fixed policy with many steel companies, what is the best method of handling the small buyer who often regards his tonnage as more important than do the mills and demands the lowest going price?

How can less-than-carload orders best be handled?

The problem stated in the last of the foregoing questions is now undergoing a test of the application of extras for small quantities, such as have been adopted by manufacturers of hot rolled bars, cold finished steel bars, wire nails and cold rolled strip steel. But not much progress has been made in solving some of the other problems of steel marketing, and, in the opinion of the president of an independent steel company, there is little hope of steadying the steel products market "until the steel fraternity learns that it does not pay for individuals to try to get more than their share of the business in slack times by cutting under and making unwarranted concessions in prices or terms."

"Let sales policies and prices recognize the right of the stockholder to a return on his money," says another commentator in reply to THE IRON AGE's inquiry, while still another points out that it is the scramble for the extra 10 per cent of unprofitable tonnage that "becomes a formidable menace to the entire business." He adds: "Find a market for the surplus at a price which allows a profit and the solution of the problem will be close at hand."

Comments received by THE IRON AGE are in disagreement upon some of the issues raised, but all agree that there is a problem which demands wiser sales policies if steel production is to be placed on a basis of profit commensurate with the large capital invested and the importance of the industry. The comments which follow include a letter from the purchasing agent of a company which is a large steel consumer.

Laxity Has Developed in the Merchandising of Steel

"THE desire to bring about consideration of the difficulties in the matter of marketing steel products is certainly entitled to the support and careful consideration of all producers. There has developed a laxity in our merchandising that is to be deplored, and we have educated buyers to the point of freedom in consideration of any obligation that they may have to us as producers that makes the marketing of steel products something of a joke, if it were not so serious.

"Our problems, like all other problems, can be solved by going at them in the right way and with the right disposition. I could bring up a number of objectionable methods that should be eliminated, but they are only incidental. The real solution is this—we have brains in the steel business, unquestionably, otherwise the industry would not be of the size and caliber that it is; when the executives who control this industry start out earnestly and sincerely to merchandise steel products in a sound, legitimate way, that will guarantee a reasonable and regular profit, then it will not take long to put the industry on a basis just as efficient in the selling end as now exists in the operating end.

"The reason that we have been consistently becoming worse and earnings have been going down is because the big problems in steel merchandising have not had the attention and consideration of the executives, as have matters of finance, operation, transportation, etc. I am hopeful that the time is almost at hand when the situation will be improved, because the earnings in the steel business have become a matter of unfavorable comment, not only with our stockholders but with our bankers, and even with our customers."

Rights of Stockholders to Fair Return Have Been Ignored

"THE usual excuse for the sale of steel at or near its producing costs and sometimes below is that it is one of the economic evils growing out of the fact that the country's consumptive power is not yet equal to its productive capacity. I sometimes wonder if that is the whole story. Having been trained to the belief that the first obligation of every sales executive is to the stockholders of his company, who have provided the capital for the conduct of the business of the company and actually have made the management, including the manager of sales, a trustee of the investment, I cannot escape the conclusion that the query, 'What is wrong with steel selling?' is partly at least answered by the fact that the rights of the stockholders to a fair return have been ignored.

"There may be justification at times for the acceptance of a particular piece of business at a price that does not more than bring in a new dollar for an old one. It is costly these days to keep modern steel mill equipment idle, and getting an order that will provide at least partial operation may justify a temporary concession, especially if the concession means less loss than would be entailed in complete suspension. But when profitless business continues to be taken, then it is time for the directors to make an investigation of the sales department.

"There is nothing particularly new in the condition that the productive capacity of the country exceeds its ability to consume steel; not only has that been true for the past six years, but short range buying which developed with the ability of the manufacturers to make prompt shipments at extremely short notice also has been a condition long enough for us to have accustomed and adjusted our sales habits to it. Though steel manufacturers have been laboring under this handicap for three or four years, practically no attempt has been made to add the extra cost of doing business in this fashion to the sales price. In other words, mills are transacting a jobbing business, which is forced upon them, without the remuneration which the jobber would demand for the same effort and service. Let sales policies and prices recognize rights of the stockholder to a return on his money and whether or not the country can make more steel than it can use will cease to have its unnerving effect upon sales managers and salesmen."

Says Contracts Should Be Fixed Both As to Price and Tonnage

"UNTIL the steel fraternity learns that it does not pay for the individuals to try to get more than their share of the business in slack times by cutting under and making unwarrantable concessions in prices or terms, I see no particular hope of steadying the steel products market.

"The present tendency to sell for periods of three months is a favorable factor in the marketing situation, as a consuming company ought to be able to measure its business with reasonable accuracy for such a period in advance. The inability to measure business conditions is the only excuse I know of for the instability of prices made and agreed upon between producer and consumer.

"There come times with certain companies that have to manufacture for long forward delivery and before conditions surrounding consumption have been determined that have led to the habit of period contracts, the only limitations being requirements, so as to enable the buyer to shift the burden to the seller by ordering very modestly if his business drops off and very heavily if his business improves unexpectedly or if the market price of the commodity he is buying advances.

"It would seem to be reasonable to expect that quarterly agreements be maintained at a fixed price and tonnage agreed upon just as securely as pig iron sales are maintained in both these respects.

"If there are occasions where the price of raw material for manufacture covering a long period is necessary to the buyer in order for him to be sure of his costs for future delivery and he therefore asks for a season's requirements, he should be compelled to divide the responsibility with the seller and state a minimum which he would under any circumstances take, with only a reasonable spread to a maximum which he might specify and receive if his business demanded.

"At the present time the favorable factor is the tendency toward short period agreements, which should more frequently than is now the case carry exact tonnage statements; and the unfavorable factor is the effort of certain producers to get more than their reasonable proportion of available business as related to their productive capacity, which results in demoralizing the market."

Firm or Binding Contracts Would Improve Steel Situation

"THERE is nothing wrong with the present form of steel contract; there is much wrong with the execution and enforcement of the contract. In a weak or declining market the average buyer at best considers the contract in the nature of an option and if he specifies or takes out the tonnage agreed upon he forces the seller to meet conditions or prices that did not exist when the contract was made; on the other hand, in a strong or advancing market the seller does not always religiously fulfill his agreement, and it is common knowledge that sellers often give preference to the higher priced or more desirable business. Both of these practices are unethical if not contrary to law but one will continue as long as the other.

"Under a firm or binding contract the situation would be much improved because contracts would be made only for specific requirements, or if made speculatively both parties would be prepared to take their loss as well as their gain. This is true in business generally, so it could be made to apply to steel contracts.

"It is the history of all business that is not controlled by statute as to its price or rate making that large or otherwise very desirable buyers usually obtain concessions which do not truly reflect what is commonly called the market price. It is my personal observation that the Class B buyer who aspires to be favored on a Class A basis is equally averse to having a Class C buyer placed upon the Class B basis. Such being the case, the only real solution is concerted action in the industry with classification and agreement as to the status of all buyers. This may be illegal under our present laws but if the practice is not followed openly it is followed in actual fact, and it is quite generally a recognized if not fixed policy.

"If concessions to the large buyer have become a fixed policy in the steel trade it is difficult to say what

is the best method of handling the small buyer who frequently regards his tonnage as more important than do the mills and demands the lowest going price. One who may be a small buyer to one seller may be considered of prime importance to another seller, and, in the absence of a price controlled market, difference of opinion will manifest itself most forcibly in distinction and discrimination in the classification and handling of all substantial buyers.

"In the handling of less-than-carload orders by the mills, it is not consistent to ship such orders at carload prices because of the additional expense and inconvenience involved. As to the question of less-than-carload shipment either by direct sales by mills or for the account of jobbing customers, the answer can be found only by cooperation between the mills and their customers. As an example I understand that steel pipe is rarely shipped from the mills in less than carload lots simply because the practice of carload shipments is established and is not deviated from on the slightest pretext as does occur in sheets, nails and other lines.

"In a general way the solution of any business problem lies within the industry itself, by which I mean both buyers and sellers, by cooperation on the part of all concerned, good faith in every transaction, with condemnation if not prosecution for violations of contract and unfair dealing. Let the buyer and seller both understand the nature of an obligation and then live up to it honestly."

Small-Lot Sales by Mills Blamed for Some of Industry's Ills

"THE major ills of the steel industry might be summed up in the one statement that we have 34,000,000 tons annual production of rolled products where 31,000,000 tons would suffice. The excess 3,000,000 tons must be "dumped" at a profitless price with the consequent disturbance of all price structures. Find a market for the surplus at a price which allows a profit and the solution of the problem will be close at hand.

"Under ordinary conditions approximately 80 per cent of any one year's production is actually bought for current consumption, and little effort is needed for its sale. Approximately 10 per cent is keenly negotiated for by both buyer and seller, the advantage shifting from one to the other as the immediate requirements of buyer or mill might dictate.

"The remaining 10 per cent, forced upon the sales department by the ambition of the operating department to hang up a new production record, becomes a formidable menace to the entire business. Almost frantic efforts are made to dispose of it. Numerous inexperienced salesmen are sent out to solicit from the smallest consumer, who will buy only as much as the particular job in hand requires. Frequently several such orders will total a scant carload, with the consequent higher cost of handling at the mill.

"At the risk of being classed as reactionary, I might suggest that the mills are not cooperating properly with the warehouses and distributers. Perhaps such cooperation holds the solution.

"These distributers are credited with handling about 10 per cent of the output of finished steel, or in the neighborhood of 3,000,000 tons annually. Assuming this amount of tonnage is sold from warehouse stock, it means a turnover of a stock of 1,000,000 tons three times a year. Stocks are always replenished and never completely depleted. Holding the stock in warehouses actually removes it from the market. Due largely to direct mill competition, warehouses today are carrying from 25 per cent to 50 per cent less stock than they have carried heretofore. This decreases their purchasing power, and affects directly the tonnage which might move in double-car shipments to warehouses. The mills are losing two to three tons of this desirable business for every one ton they are gaining from the small buyer, who should buy from warehouse.

"The steel industry as now organized and equipped should give careful thought to the question of retailing their surplus production. Perhaps it will be found expedient to abandon such retailing and turn it over to warehouses properly equipped to handle it, or they might find it desirable to equip their yards so as to handle such business on a profitable basis.

"When proper realinement of this question of mill and warehouse is effected, and when greater attention is given to executive sales effort, instead of the present method of getting an order by quoting or cutting prices and promising delivery, two great wrongs in the general plan of steel selling will be corrected."

Concessions to Large Buyers Soon Reflected in All Sales

"WHATEVER overproduction there is in steel plates is due to the fact that the mills in the East were equipped to take care of shipbuilding. The war put this out of business and consequently 50 per cent of our tonnage is gone. Nothing has ever come up to take its place, so you see it is not the mills' fault that there is over-capacity.

"If there is anything wrong with steel plate selling it is because there is so much competition. This is a direct result of the situation stated above.

"The present form of steel plate contract is a pernicious influence because it is nothing more than an option. In other lines of trade, such as pig iron, etc., a contract is a contract.

"The situation would be improved if steel were sold only for specific requirements. This, however, can be done only with those who use large quantities. The small buyer cannot write in and ask for a price every time he wants to buy 10 tons.

"Concessions granted to anyone are an undermining influence on price structures. It is such prices as these that get into the trade papers and which make the other buyers hammer the seller until they get the lower price. The writer does not believe that a special concession given to some buyer for a special reason is a market. It is not the market, but today a special concession in a very short time becomes the market. The small tonnage is just as important to the small buyer, and possibly more so than the special tonnage to the large buyer. I do not know how this is going to be corrected."

No Price Recognition of More Exacting Steel Specifications

"THE great error in steel selling, as I view it, is that there has been no recognition of the fact that since 1921 the industry has been making not steel the commodity, but steel the product, into which goes not merely the raw materials but all the expenditures of many years in research, experimentation and investigation that the finished product may do everything it was intended to do by those who have formulated the specifications.

"As is very well known, a large percentage of the total production of steel today is made to specifications. With machinery doing the work formerly performed by hand; with mass production the common practice of large steel consuming industries, there can be no deviations from the specifications as written by the engineers and metallurgists of these industries. The automobile manufacturer cannot afford to put a model upon the market that may come back upon his hands because the fender has yielded to the road shocks of the car in operation or the car develops other weaknesses because the steel has fallen below specifications. No longer can random lengths of bars or sheets of dimensions in excess of the design be shipped to automobile builders. There must be uniformity of length of bars and of sheet dimensions that they may go through machines and create no scrap waste.

"The steel industry has willingly met these and other precise exactions of consumers, but seemingly has overlooked in its drive toward big production and its efforts to please, that precision is expensive when allowable variations in chemical and physical properties have constantly been more finely drawn. Indeed, it seems that the mistake has been that the steel industry sales policies still are dominated by the customs in vogue when the manufacture of steel was a rule of thumb proposition rather than a very exacting science as it is today. We are definitely beyond the period when steel was sold according to whether it was hard, mild or soft, and we have got down to quarter fractions of these divisions and even smaller divisions on allowable tolerances. The cost of these reduced limits on both chemical and physical properties has not been passed on to the ultimate consumer, but has been absorbed by the manufacturers in their desire to get tonnage until the difference between red and black figures is almost as minute as the tolerances."

From a General Sales Manager

"I HAVE read an article in THE IRON AGE, issue of Nov. 24, by Saunders Norvell, president Remington Arms Co., which seems to touch some of the vital points in a general sales policy, and much of this article might be applied to the selling of steel. It is interesting to note what Mr. Norvell has to say under the head, 'Selling policies call for hard thinking higher up.'"

Steel Plate Contract Has Become Only a Loose Protection

"THE present steel plate contract is very unfavorable to the seller and it really means nothing more or less than a protection to the buyer. It is a hard matter, however, to get away from it, inasmuch as steel plates are very seldom stocked in any quantity, since carrying stock would entail a great deal more waste in preparing for fabricated jobs than there would be in the case of bars or structurals.

"It does seem funny that pig iron is contracted for as an absolute sale, but for years the plate contract has been nothing more or less than a loose protection and we certainly would welcome any move which would tend to change this situation.

"It is always possible to sell steel for specific requirements, but the unfortunate thing in connection with this is that in order to bid a man must know exactly what his material is going to cost him and, to the writer's knowledge, the matter of protection along these lines has been very much abused. The buyer may secure a protection on a certain tonnage to cover a particular job and then if he does not get this job but gets a few smaller ones, he can apply such tonnage against the protection granted, particularly if he has a very elastic conscience.

"As regards the small buyer, it undoubtedly costs the mills a lot more money to handle their business, but from the time hand-to-mouth buying originated, there has been such a scarcity of orders that there has been no trouble whatever for the smaller buyers to secure as good a price as we would quote the average large buyer. The one thing that we cannot condone is the fact that some of the larger companies insist on selling the car companies and others of that size at a price under the market at all times, and then these companies use the same prices in purchasing steel for uses other than cars.

"We feel that the less-carload business should be handled on a higher base than carload business.

"The writer recalls that during the war an executive of one of the largest companies in the country decided that he would see to it that a contract was made a contract and not simply a loose protection, but even in a period of such strenuous demand as we went through from 1915 to 1918, the steel contract continued to remain the same as it had previously been and unfortunately the same as it is today."

Problems of the Buyer Should Be Considered in Sales Policies

BY A PURCHASING AGENT

"THE present form of steel contract seems to be based on an appreciation of the problems confronting the industrial buyer at the present time, whereby he is unable to anticipate specific requirements any appreciable distance into the future. This situation is determined by the selling conditions which confront the organization of the industrial buyer and characterized by the attitude of the consumer who insists upon immediate or prompt delivery of the finished product.

"This attitude of the consumer is one phase of the prevailing policy of short term buying which has been opposed more stubbornly by the steel manufacturers than perhaps any other industry. I do not believe that the steel manufacturers can escape the disadvantages of short term buying any more than can any other lines of industry, and the present form of contract is in effect a recognition of this situation.

"The concessions granted the large buyer are a recognition of the fact that large volume purchases are entitled to better terms than the small-lot purchases. This is generally recognized in industry as being sound in principle and should not be an undermining influence on price structures. The fact that concessions to which the large buyer is legitimately entitled are sometimes extended to the small-lot buyer is not an argument against the plan of concessions to the large buyer, but rather an indictment of the selling methods of the steel industry.

"The question 'What is the best method of handling the small buyer' has apparently been taken in hand by the steel companies recently, as evidenced by the publication of differentials against small-lot orders.

"It is impossible to consider the question of selling methods as a matter distinct and apart by itself. The question of selling methods is involved with the other policies of the steel companies, such as their financial and manufacturing policies, and must reflect to a great degree the situation which obtains in these other departments of the steel organizations.

Buyer's Conditions Not Always Met

"To my mind the greatest handicap which the industrial buyer confronts in dealing with the steel manufacturers is their refusal to recognize the conditions which obtain in the industrial field whereby it is impossible in most cases to foretell specific requirements. The buyer insists that he must have immediate delivery of his requirements and the steel mill replies by sending out a printed schedule of rollings and expects the buyer to accommodate his necessities to the convenience of the mill.

"Compare, if you will, the service which a buyer purchasing equally large quantities of magnet wire and steel will receive on these two commodities. In the case of the first item, he may arrange with the manufacturer to obtain his varying specifications from mill stock and at mill prices in approximately one-third the time required to obtain his steel specifications from the steel mill. In the one case the manufacturer will maintain ample stocks of the specifications which his customers ordinarily use and is prepared to furnish these promptly. The steel mill, however, persists in bringing up the question of rolling schedules and puts the burden of getting delivery upon the industrial buyer.

"At the present time the steel mills are giving unusual service on mill shipments, due to the fact that competition has shown them the wisdom of so doing. It seems entirely probable, however, that as soon as large volumes of business are available and the order books are reasonably well filled up that they will again be quoting rolling schedules to the industrial buyer rather than making a sincere effort to procure for him the deliveries which his situation requires.

"I should like to call to your attention also the propaganda appearing in some trade publications attempting to force the industrial buyer into the hands of the steel warehouse. If they are successful in this propaganda the buyer will be forced to obtain a large portion of his requirements from warehouse stocks at a considerably increased cost. I believe that these publications owe the industrial buyer an explanation of their attitude on this question.

"As to whether a steel contract should constitute a firm sale, the statement is made that in copper, brass, lead, zinc and other non-ferrous metals all sales are firm sales. This, in my opinion, is only partially true. As a matter of fact, the dealers in the non-ferrous lines and in pig iron are found to be as considerate and willing to extend cooperation to the buyer as in any other line. I have yet to learn where buyers have been forced to take material on such contracts where it is not to the best interests of both parties concerned to do so.

"Steel industries, perhaps more than any other, are complaining of the results of present competitive conditions, although I know of no reason why they should expect to be exempt from the effects of such conditions any more than other basic industries.

"No doubt the managements directing the affairs of the steel manufacturers, characterized as they are by the greatest ability, are studying all ways and means of meeting this situation. It seems to me it would be more helpful to direct their attention to a study of the buyer's situation, and I speak especially of the industrial buyer, and endeavor to cooperate with him and assist in meeting the conditions with which he is confronted, rather than to attempt to make his situation more difficult by more stringent contract regulations, insisting that he wait on rolling schedules or forcing him into the hands of the steel warehouse."

Exports and Imports of Metal Products

Iron and Steel Most Important in Exports, but Only One-Ninth of the Imports, Which Are Dominated by Non-Ferrous Metals

BASED on dollar values exports from the United States of iron and steel products for the first seven months of 1927, at $146,151,000 represent about seven times the imports, which aggregated $21,519,000. These figures, together with those for non-ferrous metals, are shown in the table, which gives also corresponding comparisons for 1926. It will be noted that the export movement this year has increased about 6 per cent over last year, nearly all of the gain having been in non-ferrous metals. The import movement has fallen below last year to the extent of more than 8 per cent, about half the drop having occurred in non-ferrous metals.

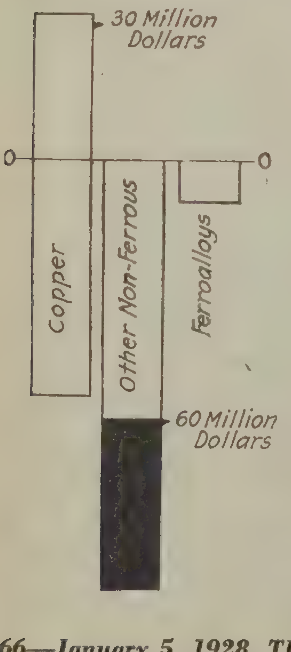
Semi-manufactures of iron and steel covered by the Department of Commerce compilation include pig iron, scrap, semi-finished steel, bars and rods, plates, sheets, including galvanized, strip steel, tin plate, etc. Manufactures of iron and steel include beams, fabricated plates, metal lath, rails and joints, pipe and tubes and fittings, including cast iron pipe, wire and its manufactures, nails, bolts, etc., and castings and forgings. Advanced manufactures include cutlery, hollowware, enameled ware, metal furniture and fixtures, stoves and furnaces, tools (cutting and other), hardware (builders' and others), chains, needles, scales and balances, screws, etc.

Of the non-ferrous exports, about two-thirds in each year was represented by copper. Of the non-ferrous imports the largest item, which covered about 40 per cent, was in tin bars, blocks and pig. More than two-thirds of the remainder consists of copper, mostly in the unrefined state, including ores and concentrates. Aluminum metal, scrap and alloy accounted each year for about 7 per cent of the non-ferrous imports and lead, mostly the ore, for a like quantity.

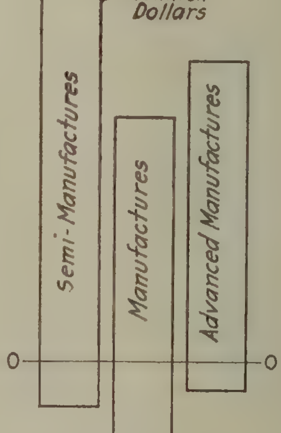
UNITED STATES EXPORTS AND IMPORTS OF METALS AND METAL MANUFACTURES
(In Thousands of Dollars)

	Exports		Imports	
	1927†	1926	1927†	1926
Iron ore	1,587	1,465	3,646	3,368
Iron and steel:				
Semi-manufactures	56,114	50,686	6,073	11,129
Manufactures	45,427	48,103	11,779	9,880
Advanced manufactures	44,610	44,694	3,667	3,869
Ferroalloys	590	461	9,243	13,857
Non-ferrous metals*	125,060	113,436	151,269	160,702
Total	273,388	258,845	185,677	202,805

*Not including precious metals.
†Seven months ended July 31.



(At Left) Excess of Exports of Copper Over Imports Is Shown Above the Zero Line, Total Imports Being Below. Likewise, total imports in the other columns are plotted below the line, with exports shown in black and excess of imports in white



Excess of Iron and Steel Exports Over Imports Is Shown Above the Zero Line, Total Imports Being Below and Total Exports the Entire Height of Each Column

New Records Last Year in World Iron and Steel Output

Iron at 84 Million Tons Exceeds Pre-War for First Time—Steel Reaches 98 Million—Expansion in Europe a Feature —American Proportion Falls

TWO new records were made last year by the world's iron and steel industry. For the first time since the war, pig iron production exceeded that of 1913. At 84,280,000 gross tons it was about 8.5 per cent in excess of the 77,720,000 tons made just before the war. Steel output rose to 98,200,000 tons or 7 per cent larger than the best previous record in 1926 of 91,790,000 tons.

The feature of these records is that they were made in spite of the fact that the American output of both pig iron and steel fell below that of 1925 and 1926.

Exports of the leading nations also made a new record last year, exceeding for the second time the pre-war volume.

European Recovery Chief Cause of Expansion in Output

GRADUAL recovery of the European steel industry from the effects of the war is the feature of an analysis of figures compiled for the world's pig iron and steel output. Based on data published and furnished by the National Federation of Iron and Steel Manufacturers of London, England, as found in the accompanying tables, the pig iron and steel production of 21 countries reached new heights.

With estimates made for the last month or two for the leading producing countries, the world's estimated pig iron output was about 84,280,000 gross tons, exceeding for the first time the 77,720,000 tons made in 1913. It was also 8.5 per cent more than the 77,670,000 tons made in 1926, which just fell short of the pre-war production.

In steel a new world record was easily achieved—approximately 98,200,000 tons or about 7 per cent larger than the 91,790,000 tons made in 1926 which was a record. The strides made in steel are demonstrated when it is realized that the 1927 steel production is about 31 per cent larger than the pre-war or 1913 output of 74,830,000.

More Steel and Iron Made in Europe

If the record of the five leading European countries —Great Britain, Germany, France, Belgium and Luxemburg—is studied, it will be found that the expansion in 1927 over 1926 was notable. In pig iron these countries are credited with 35,670,000 tons last year against 27,110,000 tons in 1926, a gain of nearly 32 per cent. In steel the same countries made 38,410,000 tons last year as compared with 29,580,000 tons in 1926, an expansion of about 30 per cent.

Taking all European countries, both the pig iron and steel output was approximately 10,000,000 tons larger than in 1926. Pig iron last year at 44,220,000 tons was 52 per cent and steel at 50,110,000 tons was 51 per cent of world total.

Outstanding in this expansion is the record of Germany and Great Britain. The forward strides of Germany last year were notable and surpass those of any other country. Both pig iron and steel production in 1927 increased from 30 to 35 per cent over the 1926 volume.

In Great Britain the recovery from the poor record of 1926 has been due to the settlement of the coal strike which nearly paralyzed the industry in 1926. Even at that, the showing is not strikingly better than in some years since the war.

In judging the European recovery as a whole, mention should be made of Russia. In that country rapid progress has been made so that the output of both pig

Table of World Production of Steel Ingots and Castings in Millions of Gross Tons

Country	1913	1923	1924	1925	1926	1927*
United Kingdom....	7.66	8.48	8.20	7.39	3.60	9.17
Germany	17.33	6.20	9.68	12.00	12.15	16.09
France	4.61	5.03	6.79	7.33	8.30	8.09
Belgium	2.43	2.26	2.83	2.51	3.32	3.64
Luxemburg	1.31	1.18	1.86	2.05	2.21	1.42
Saar	...	0.98	1.45	1.55	1.71	1.85
Russia	4.76	0.71	1.12	2.11	3.08	3.48
Poland	...	1.11	0.67	0.77	0.78	1.35
Sweden	0.58	0.27	0.49	0.47	0.49	0.48
Spain	0.30	0.47	0.53	0.57	0.68	0.70
Austria	2.59	0.50	0.37	0.46	0.35	0.50
Hungary		0.28	0.24	0.23	0.20	0.21
Czechoslovakia		0.98	1.33	1.48	1.55	1.60
Italy	0.92	1.12	1.34	1.76	1.75	1.53
United States......	31.30	44.94	37.93	45.39	48.29	44.50
Canada	1.04	0.88	0.66	0.76	0.78	0.87
Australia	...	0.20	0.31	0.35	0.35	0.42
India	...	0.22	0.34	0.45	0.52	0.55
Japan	...	0.97	1.11	1.32	1.48	1.55
China	...	0.20	0.20	0.20	0.20	0.20
Total	74.83	76.98	77.45	89.15	91.79	98.20

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*Partly estimated. Lorraine's output is included in Germany's in 1913, but in that of France since 1918.

Table of World Production of Pig Iron in Millions of Gross Tons

Country	1913	1923	1924	1925	1926	1927*
United Kingdom....	10.26	7.44	7.31	6.26	2.46	7.32
Germany	16.50	4.86	7.68	10.01	9.50	12.87
France	5.13	5.34	7.57	8.36	9.28	9.13
Belgium	2.45	2.11	2.80	2.50	3.35	3.69
Luxemburg	2.51	1.38	2.12	2.33	2.52	2.66
Saar	...	1.00	1.37	1.43	1.61	1.74
Russia	4.49	0.52	0.74	1.53	2.40	2.92
Poland	...	0.51	0.33	0.31	0.32	0.57
Norway	...	0.03	0.06	0.08	0.08	0.09
Sweden	0.73	0.30	0.53	0.45	0.49	0.47
Italy	0.43	0.27	0.34	0.50	0.50	0.51
Austria	2.34	0.34	0.26	0.37	0.37	0.40
Hungary		0.12	0.11	0.09	0.19	0.20
Czechoslovakia		0.80	0.97	1.28	1.07	1.15
Spain	0.42	0.39	0.49	0.46	0.50	0.50
United States	30.97	40.36	31.41	36.70	39.37	36.40
Canada	1.01	0.91	0.62	0.60	0.80	0.73
Australia	0.04	0.33	0.42	0.44	0.40	0.41
India	0.20	0.61	0.88	0.89	0.90	0.91
Japan	0.24	0.80	0.82	0.91	1.16	1.20
China	...	0.49	0.37	0.38	0.40	0.41
Total	77.72	68.91	67.20	75.88	77.67	84.28

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*Partly estimated. Lorraine's output is included in Germany's in 1913, but in that of France since 1918.

iron and steel in the last two years, and particularly in 1927, has reached about 75 per cent of the pre-war or 1913 volume.

France, Belgium and Luxemburg just about maintained last year, as a whole, the rates achieved in 1926.

American Outputs Fall Off

In the United States no new records were made. Conditions are reviewed in some detail on other pages. In pig iron, with an estimated output of about 36,400,000 tons last year the American total was about 43.3 per cent of the world total as compared with 50.7 per cent in 1926. In steel the probable 1927 output of 44,500,000 tons was about 45.3 per cent of the world total as against 52.9 per cent in 1926.

A tendency which has been quite marked since the war—the production of more steel than pig iron—is again a feature this year. In 1913 world pig iron production exceeded steel by 2,890,000 tons. In 1927 steel surpassed pig iron by 3,920,000 tons.

Table of Steel Exports and Imports of Leading Countries in Millions of Gross Tons

Exports	1913	1925	1926	1927*
United States	2.89	1.68	2.06	1.96
Great Britain	4.97	3.73	2.99	4.22
Germany	6.20	3.21	4.82	4.24
France	0.58	3.86	4.13	5.67
Belgium	1.55	3.15	3.71	4.50
Total	16.19	15.63	17.71	20.59
Imports	1913	1925	1926	1927*
United States	0.25	0.84	1.02	0.67
Great Britain	2.23	2.72	3.74	4.38
Germany	0.30	1.18	1.03	2.25
France	0.17	0.17	0.18	0.13
Belgium	0.87	0.53	0.60	0.63
Total	3.82	5.44	6.57	8.06
Export excess	12.37	10.19	11.14	12.53

*Partly estimated. Luxemburg included in Belgian total.

World Using More Steel, Exports Indicate

JUDGED by the exports of the six principal steel exporting nations, world consumption of steel attained a record volume in 1927. For the second time since the war the total was larger than that of 1913. One of the tables gives the details. At 20,590,000 tons world exports exceeded those of 1926 by 2,880,000 tons or 16 per cent. Compared with 1913 the 1927 total was 4,400,000 tons, or nearly 27 per cent larger.

Imports into these six countries were the largest last year ever recorded at 8,060,000 tons, easily exceeding those of 1925 and 1926 and over twice the total of 3,820,000 tons in 1913. Scrap is not included in these data.

The significant feature of the data is the fact that the excess of exports over imports of 12,530,000 tons in 1927 closely approximates the excess of 12,370,000 tons which prevailed in 1913. This would seem to indicate that the world's consumption of steel, particularly that of the non-producing nations, is now more nearly normal than at any time since the war.

One or two trends in both the exports and imports are worthy of mention. The commanding position of France as an exporter is notable—at 5,670,000 tons last year her foreign trade was nearly tenfold that of 1913 and easily led all other nations. Belgium's expansion was large last year and the British industry recovered from the effect of the 1926 coal strike. American exports were the smallest and are still less than before the war.

In imports the heavy inflow into Germany last year and the constant growth in the British receipts are prominent.

The 1927 record of both exports and imports evidently points to a greater interchange among all nations and a healthier economic condition the world over.

Coal Trade Depressed by Large Stocks and Low Demands

Strike of Union Miners Has Caused Scarcely a Ripple and Indications Point to Further Inroads on Organization's Strength

BY A COAL TRADE AUTHORITY

ABNORMALLY large stocks in the hands of consumers and a notable falling off in industrial demand combined to depress the bituminous coal market at the close of 1927 almost to the point of demoralization. The unusual situation with regard to stocks is the result of the extraordinary reserves built up in the first quarter in preparation for a nation-wide strike of union soft coal mine workers and the failure of the strike to produce the expected coal shortage.

The Government estimated that 75,000,000 tons of coal were in consumers' storage piles when the strike was called and reported more than 60,000,000 tons as yet in reserve on Oct. 1. The strike caused hardly a ripple in the coal market, and throughout the year demand, not labor, was the factor limiting coal production. Non-union output has steadily gained in volume as one area after another cast off the union and put its production on a competitive basis with the great open-shop fields of the South.

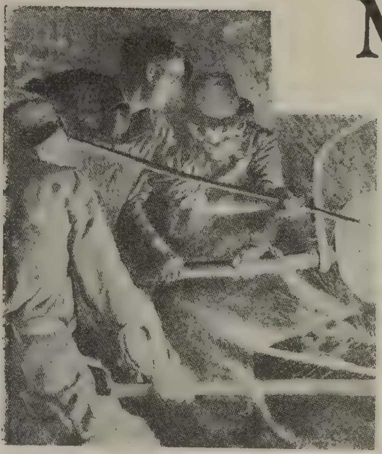
Western Pennsylvania followed northern West Virginia. Central Pennsylvania and Ohio were the next large fields to declare for the open shop and wages below the Jacksonville scale. The United Mine Workers draws revenue now only from the anthracite miners and checkoff from Illinois and Indiana and scattering small districts in the middle and far West. Recognition by the union that much valuable territory has been lost is betrayed by the anxiety of the union leaders to force a meeting with these operators.

Large Stocks and Low Prices May Continue

With stocks on Jan. 1 probably in excess of 50,000,000 tons, prices averaging below $2 and demand for less than 10,000,000 tons per week, there is no prospect for early return of prosperity in the soft coal fields. There is no indication that a boom will appear sufficient to tempt operators to abandon their program of reorganization on a non-union basis in favor of temporary profits. Thus another year may surely be expected to record still further inroads on the union's hold and even larger percentages of non-union production of bituminous coal.

Production of around 520,000,000 tons of soft coal in 1927 established no new record. Shipment of nearly 33,000,000 tons of Lake cargo coal is a new high point, however. Exports overseas were below normal. With no threat of shortage or higher prices hanging over the industrial users' heads there can be no gain in production until stocks are liquidated and demand, particularly that of the iron and steel industry, picks up.

Marked Progress in Non-Ferrous Metallurgy Last Year



Expansion in Chromium—New Uses for Nickel—Aluminum in Lighter Transportation—Electrolytic Zinc on the Horizon—More Copper Used

BY W. M. CORSE*

IT is becoming increasingly apparent that the high average of prosperity in the field of non-ferrous metallurgy is being maintained, to a great extent, by the pursuit of research and sales development methods.

Copper—*Advantages Broadcast*

THE copper industry, through the Copper and Brass Research Association, reports that the advantages of using copper, brass, bronze and other copper alloys are being more widely recognized every year. Where formerly one person was aware of the economy and advantage of using copper or its alloys, now the general public is better acquainted with their merits.

In this survey of the copper field during the past year, improvements of materials already existing and an increase of their use has been closely followed by some new uses. Brass pipe has shown a decided increase in consumption. Charts show that it has maintained for the past three years an average yearly increase of 76 per cent, and a total increase since 1923 of approximately 228 per cent. Municipalities and water companies are turning to copper, thin-walled tubing and brass pipe for service installations. The radio industry continues to consume large quantities of copper and its alloys, as does the automobile industry. Farmers are turning to copper for lightning rods, and this is a growing outlet. The building industry depends more and more on copper products where economic, lasting and beautiful installation is desired. From roof to cellar it finds its place. Copper and brass radiators are coming into favor, and a relatively new and growing market is the household refrigerator.

Lead—*No Spectacular Progress*

THERE have been no spectacular developments in lead during 1927. Continued research has resulted in the production of a soft paste white lead of high quality which will reduce costs by lowering the time and labor required for mixing. This is a considerable item when one takes into account the wide and growing use of paints of all kinds.

One use for lead which is attracting considerable attention is its appearance in the composition of lead mattresses that act as shock absorbers to neutralize vibration, especially in sky scraper construction on rock foundations. These were used experimentally by architectural engineers about 1917, and the results have been so satisfactory that lead mattresses were used in the new Graybar Building in New York, and have been specified for the new union station in Buffalo.

In other branches of the lead industry progress has continued along well established lines.

Zinc—*New Processes and Alloys*

THE main development in the high zinc alloy field last year was that of a zinc base magnesium-bearing alloy designed principally for die casting.

The use of the metal in the slab and wrought form has continued in the industries as follows: 47 per cent for galvanizing; 29 per cent for brass and other copper and nickel alloys; 14 per cent for rolling, and 10 per cent for miscellaneous purposes.

In the electrolytic field, the Bunker Hill & Sullivan Mining Co. at Kellogg, Idaho, is erecting a new electrolytic plant at which the Tainton process will be employed. This differs from existing plants in the method of solution and purification, and the use of much higher current density, which gives heavier deposits and materially decreases the size of the plant. The Anaconda Copper Co. is building an additional plant at Anaconda, Mont. Both of these are expected to be in operation in the early part of this year.

The retort method carries on in the old manner. Several companies have added sintering equipment which has materially improved their recoveries.

In England, the Coley process, a pyro-metallurgical reduction in a rotating furnace; and the Ashcroft process, a pyro-electrolytic reduction in which molten zinc chloride is electrolyzed after being produced from zinc chloride and chlorine at elevated temperatures, are being operated in semi-commercial plants.

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In Germany, the Waelz process, a fire concentration of low grade zinc material in a rotating furnace, has been installed in several commercial plants, while one plant is being erected in the United States.

Nickel—*New Outlets Developed*

A REVIEW of the nickel situation would seem to indicate that nickel has not only maintained its general high average in existing usages, but is finding new outlets in unsuspected directions.

It was believed that the development of chromium plating, which took a leap forward with the clearing up of the patent situation, would react unfavorably on nickel plating, whereas the contrary was the case. It developed in practice that chromium, plated over nickel plate, resulted in a more lasting product.

Monel metal, the well-known high-nickel alloy, reached out into an entirely new field of usefulness. This alloy, which is remarkable for its color, closely resembling pure nickel, and for its resistance to corrosion and abrasion, is being increasingly used in existing fields including dairy equipment, hotel kitchens and cafeterias—where it is used for table tops, cooking utensils, boilers, etc.—as well as in the new use first mentioned in this review last year, as traffic markers to replace the lines of white paint which have become necessary for marking traffic lanes in congested city streets. The increasing cost of maintaining painted traffic lines has resulted in a search by officials for something to lower costs and yet remain as efficient and as noticeable as the lines painted on the pavements.

Development of solid nickel-silver plumbing fixtures and equipment has made considerable progress during the past year. The advantages of a solid metal for fixtures, where future replacement costs must be kept at a minimum—such as hospitals, government buildings, etc.—is becoming recognized as not only desirable but necessary. Solid nickel-silver, with a 20 per cent nickel content, retains the color of pure nickel and no amount of polishing will take off the coating and show a different colored base, because solid nickel-silver is exactly what its name implies—solid throughout. It appears in the list of standard specifications for plumbing fixtures of the United States Government; it has had considerable use in naval hospitals and other public buildings throughout the country during the last year, and has been specified in connection with the monumental building program of the Government in Washington.

There is no question that the large amount of technical information furnished by the manufacturers of nickel has been an effective contributing cause of its growing use in established fields, and its introduction into new ones.

Aluminum and Magnesium—*Uses Expanding*

THE most interesting development in the aluminum industry for 1927 was the introduction of Alclad, a new aluminum sheet. Its application is indicated where strength and corrosion resistance are of major consideration, and it promises to be particularly useful in the manufacture of airplanes. Alclad consists of a heat-treated aluminum alloy base, with a smooth, dense, non-porous surface of very pure aluminum of uniform thickness alloyed and integral with the core, and it combines the corrosion resistant properties of pure aluminum on the surface with high strength and stiffness. Exhaustive corrosion tests show that these composite sheets are many times more resistant to moist air and salt spray than the unprotected strong aluminum alloys.

The use of aluminum sheet continues to gain in favor in the transportation field where the trend is distinctly toward weight saving. The strongest trend in this direction was experienced during the past year, and November marked the completion of 32,000 miles regular service of an aluminum car on the lines of the Cleveland Street Railway. This car weighs 30 per cent less than the same car in steel and over a 10-month period has shown a saving of 22 per cent of the power required to operate a steel car of similar capacity. A careful inspection was recently made and every aluminum part was found to be in perfect condition.

The Chicago & Joliet Railway, the Illinois Central, the Chicago & Northwestern Railway Co., the Alton and the Southern Railroads are a few that are installing cars constructed of aluminum in so far as possible.

Trend Is Lighter Weight in Transportation

This modern trend toward lighter weight in transportation of all sorts gives many advantages. A lighter train, or street car, or bus has more rapid acceleration and deceleration. This means less power for operation. With quicker starts and stops shorter running schedules can be established and maintained. Light weight means less wear and tear on the vehicle itself as well as on the track or highway. An especial advantage in the case of street railroad equipment lies in the markedly quieter operation of light weight cars.

During 1927 it has been demonstrated that structural shapes can be rolled from aluminum strong alloys in lengths of 80 ft. or more. Two special types of sheet for radio condensers were produced during 1927—these are of particularly high grade, rolled to the closest tolerance both as to gage and flatness, to permit fabrication of the most efficient variable condensers. A new top-down aluminum shingle was put on the market during the past year. The chief advantage of this shingle lies in its construction which permits it to be applied commencing at the ridge of the roof, successive rows being added moving down toward the eaves until the whole roof is covered. These can be applied at a labor cost of 50 to 70 per cent of that for other types of roofing materials. Aluminum nails have also been introduced and it is now possible to supply a complete aluminum roof and gutter job.

The existing uses of aluminum and its alloys showed increase in practically all instances. Aluminum foil, which is rapidly supplanting pure tin and composition foils, has increased in use 150 per cent during the past two years, and aluminum bronze powder as a paint pigment has taken its place with the older and more commonly known pigments. Sales of aluminum collapsible tubes have doubled over those of 1926, and 700,000 lb. of rod was used in the manufacture of screw machine products last year.

Magnesium—Expansion in Established Uses

There has been a gradual improvement in this field which has taken the form of increased uses for already established applications rather than the discovery of new uses. The sales of ingot have gained ground because of increased knowledge of the strong deoxidizing power of magnesium, and magnesium is being used in increasing quantities in high strength aluminum alloys.

The production of magnesium alloy castings has greatly increased. Parts for aircraft engines such as gear case cover, housing, etc., continue to call for increased poundage. The use of magnesium castings for aircraft engine starters has just about doubled during 1927. Aside from aviation, there is an increasing call for magnesium castings in such applications as textile machinery, the moving picture industry, etc.

The sales of magnesium wire and ribbon remain about on the same level, with the radio tube business taking the largest amount of the production. A 99.98 per cent purity is still demanded by this industry. Magnesium powder is being produced in larger quantities. In 1927 the increase will probably be approximately 25 per cent over that of 1926.

Chromium—*Two General Trends of Development*

DEVELOPMENTS in the use of chromium have gone on in two general directions: One, a wider recognition of the properties it confers on low-carbon steels for some interesting engineering applications, and the other, an expansion of the applications for the high-chromium alloys, particularly in the corrosion resistant fields.

The former trend is obviously one in line with an even more general movement, that is, the recognition of a new principle in engineering steels—the raising of alloying content and the drop in the carbon content. By means of such an adjustment, the hardness (tensile strength) formerly obtained by carbon, is now developed by the presence of the alloying elements, but with this essential difference, the increase of hardness is *not* at the expense of toughness, since the latter essential property is actually enhanced by the proper balance of alloy and carbon content.

Most convincing evidence of this revolution is to be found in many marked examples. Witness the acceptance of the so-called silicon steels in ever increasing proportions in important structures, notably some new central station construction and two of the largest suspension bridges. Chromium is able to take its place in this advance by virtue of the fact that its quality of strengthening and toughening (with proper carbon content) is extended throughout the cross section of the member.

With respect to the high-chromium alloys, the use of the nickel-chromium compositions of austenitic range seems to be coming into more general favor. This is a natural sequence because of the combination of cold working properties with more inclusive resistance to corroding media. These remarks on the nickel-chromium compositions apply particularly to the extension of chrome-iron alloys in the chemical industries; in the straight rust resisting uses the rustless irons still hold sway, with the tendency to keep the chromium content above 14 per cent.

Chromium Plating Expands

The use of chromium plating has advanced rapidly during the past year. Its use may be expected to increase at a still faster rate as a result of the consolidation of most of the important patents in the United Chromium Corporation which will enable the various licensing companies to institute a more active development program.

The element silicon is rapidly being used in many new ways. Its application in steels for alloying purposes was mentioned above; in the non-ferrous alloys its effects have been capitalized and the past year has witnessed research in several fields of non-ferrous alloys. Much remains to be done in investigation of what will probably result in improvement of brass and copper alloys by means of higher silicon content.

Cadmium plating, because of its superior rust resisting properties, is being applied more and more generally in industry. In view of the growing appreciation of the necessity for rust prevention, a rapid increase can be predicted for the use of this type of plating.

In the short space permitted it has not been possible to give a complete picture of the developments in any one industry. It has been possible only to point out the outstanding developments.

AWARDS HARRIMAN MEDALS

Schwab Praises Safety Work of Railroads in Annual Presentation

That the conduct of industry involves not merely the efficient direction of machines, but primarily the guidance, the protection and the promotion of human beings, was brought out by Charles M. Schwab in an address before the American Museum of Safety in New York on Dec. 28. The occasion was the presentation of the E. H. Harriman Memorial Medals and special certificates to railroads for safety and accident prevention work in the year ended Dec. 31, 1926.

"Amazing progress has been made," said Mr. Schwab, "in bringing about efficient and economical production. The modern scientist has enabled us to manipulate machines through his penetration for us into the secrets of chemistry and physics. But the transcendent machine is the human being, the man with feelings, with sensibilities, with hopes and fears and responsibilities. It is the human being of whom we are thinking more than ever today, and the business man is a poor manager whose primary thought is not to bring about a fuller life and a finer existence for the human beings with whom he comes in contact."

Calling attention to the promotion of healthy rivalry among railroads in attaining safety which has been brought about by the American Museum of Safety, Mr. Schwab explained that the Harriman Memorial Medals are presented annually to the Class I steam railroads which, in their respective groups, have done the most during the year to secure progress in safety and accident prevention.

The gold medal was awarded to the Norfolk & Western Railway, which in 1926 showed a reduction of 28 per cent in the number of persons killed, as compared with 1925, and of 15 per cent in the number injured. The silver and bronze medals were awarded to the Duluth, Missabe & Northern Railway and the Quincy, Omaha & Kansas City Railroad respectively, both of which had records of no passengers or employees killed during the year.

California Firm Gets Airplane Order

WASHINGTON, Jan. 3.—The Navy Department last week awarded a contract to the Douglas Co., Santa Monica, Cal., for 25 PN-10 type airplanes, with spare parts and drawings, at a total cost of $1,553,505. The planes will be equipped with two air-cooled engines of 500 hp. each, of either the Pratt & Whitney or the Wright types. The department also awarded a contract to the Hall Aluminum Aircraft Corporation, New York, for one Type-V plane, with design information, miscellaneous data and drawings, at a total cost of $131,612. This plane will be powered by twin air-cooled engines of 500 hp. each.

Copper, Tin, Zinc Markets Reviewed

Authorities in the Trade Survey Course of Production, Stocks and Prices Last Year

REVIEWS of three important non-ferrous markets for 1927 *have been written by men whose standing in the trade lends authority and interest to what they have to say. While copper is not as closely associated with the making of steel products as are tin and zinc, its importance in industry is large. The relation of all three to the economic life of the country is a commanding one and the following brief summaries are presented as of vital interest.*

Copper Market Has a Bright Future

BY H. M. BRUSH*

SO far as the copper market is concerned, the year 1927 was divided into two nearly equal parts.

The first half of the year was a period of pessimism and declining prices; the second half of the year was a period of optimism and rising prices.

The refinery price for copper on Jan. 1, 1926 was 13.025c. per lb. There was a gradual, but quite persistent fall to a low of 12.175c. per lb. on June 20. This radical fall was due to a variety of causes:

1—An unwarranted increase in the production which started in the autumn of 1926.
2—Fear of a business reaction in the United States.
3—Skepticism on the part of Europe which resulted in their reducing their stocks of visible copper, thereby supplanting American primary production to a corresponding extent.
4—Hand-to-mouth buying by both European and American buyers carried to greater lengths than ever before, thereby resulting in a decrease in the invisible supplies of copper which it is impossible to estimate, but which we know to have been in substantial amount.

Shortly after July 1 figures assembled by the American Bureau of Metal Statistics indicated that production was again being reduced because of the low price of copper, and there were many evidences that consumers had run their stocks down to a point where they would shortly be forced to buy irrespective of their opinion of the market.

The average refinery price in June was the lowest of the year, namely, 12.37c. per lb. The price has increased since then first gradually and in the last two months rapidly to its present level of 13.75c. per lb.

Production for the year 1927 would seem to have increased about 3 per cent over production for 1926, which was the record year for the copper industry. This increase is less than a normal increase and has resulted in a decrease in the world's visible stocks of probably 50,000 tons. Stocks of copper are now rather below a proper level than above it. There would seem to be no danger in this situation, however, because of the possibility of increasing production should the consumptive requirements of the world demand a greater output of copper.

The formation of the Copper Institute in 1927 will, it is hoped, be as long a step forward for the copper industry as was the formation of Copper Exporters, Inc., in 1926. The Copper and Brass Research Association is continuing its splendid work in advertising copper to the ultimate consumers. The American Bureau of Metal Statistics is continuing its thorough statistical survey of world production and consumption. Copper Exporters, Inc., through its selling organization in Europe and its office staff in New York, is fully and currently posted as to conditions in the copper market outside of the United States. The Copper Institute is preparing to compile detailed and current figures as to production, cost of production, consumption and sales data in America.

With all this information at last available it will be a sorry commentary on the ability and vision of copper producers of the world if they insist upon producing their product, which is a wasting asset, in quantities so much greater than the consumers of the world are using that prices will be forced down to a level where any considerable portion of the production must be sold at less than its cost.

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*Vice-president in charge of sales, American Smelting & Refining Co., New York.

Tin Prices Not Likely to Decline Much

BY JOHN P. WILSON*

FROM a market standpoint, tin did not do so badly during the first half of 1927, but began to react in July and August, and by early November had hit the lowest level since June, 1925. Among other reasons for the decline in price, the most important were a falling off of about 5000 tons in American deliveries and increased shipments from the Straits of somewhere between 4500 and 5000 tons.

These figures on their face are obviously bearish, but no evidence has been found of hidden supplies held off the market, and as the visible supply at the end of this year was likely to show little if any change as compared to Dec. 31, 1926, it seems probable that consumption in other countries must have absorbed not only increased production in the Straits but from other sources of supply. The *Mining Journal* of London recently computed that world supplies in 1927 were increasing at the rate of 1000 tons per month. If this is true, it would seem wise to look back a few years and try to view the situation as a whole, and get a better perspective from which to judge the future.

A fact often overlooked, but familiar to students of tin figures, is that the official statistics issued each month by the metal exchanges in London and New York do not truly picture current production and consumption. For about three years past the tin content of ores produced in Bolivia, Cornwall, Nigeria and South Africa, has annually exceeded 40,000 tons, but less than half of it comes into statistics under the caption of "Standard Supplies." Practically all of it is smelted in England and Germany, but the smelters do not make public the tonnage produced or quantities shipped by them to consumers in Great Britain and the Continent of Europe, so they also fail to appear in the figures of monthly deliveries. This failure to credit other countries with their full consumption makes America appear a veritable colossus, consuming five-eighths to two-thirds of the world's tin, and dwarfing other countries by comparison, whereas in 1924 and 1925 we actually consumed slightly less than half.

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In the table given below account has been taken of all tin entering world supplies either as refined metal or in the form of concentrates, of the visible supplies at the end of each year, and consumption in other countries is shown by difference. It is not claimed that the resulting figures are beyond criticism, but the percentage of error would seem to be small, inasmuch as visible supplies have steadily decreased during the period under review, and no evidence has been found of hoarded supplies:

	World Deliveries (Consumption)			World Supplies Coming Into Sight From All Sources
	U. S. A.	Other Countries	Total	
1922......	66,640	52,427	119,067	118,847
1923......	72,815	57,801	130,616	126,627
1924......	64,125	70,382	134,507	138,584
1925......	76,455	76,757	153,212	146,148
1926......	78,050	60,473	138,523	136,825
	358,085	317,840	675,925	667,031
Adding visible supply as of Dec. 31, 1921				25,220
				692,251
Subtracting total world deliveries......				675,925
Gives visible supply as of Dec. 31, 1926..				16,326

Thus the figures show a shrinkage in the visible supply during the five year period of 8894 tons.

As regards the situation in this country, let us bear in mind that 1927 follows the most wonderful year in our business history. In 1926 we broke all previous records of tin consumption, largely because British industry was badly crippled, and export business which otherwise would have gone to British mills came to ours. Surely we cannot hope to go on year after year breaking records. However, 1927 has not been what could be called a bad year, as our deliveries will total about 73,000 tons, which is better than any other 12 months except 1925 and 1926, and unless most of our business forecasters are badly fooled, 1928 may bring us back to somewhere near the 1926 figures.

Looking at the figures for other countries, it will be seen that in 1924 they consumed about 6000 tons more than we did, and topped us slightly again in 1925 but, for the reason stated above, their 1926 figures show a severe decline. It should be noted though that not only Great Britain, but Germany and the other great industrial countries are coming back strong. Their population vastly exceeds ours and their needs are correspondingly greater; and, what is more to the point, their credit is improving and they are better able to finance their growing business.

In conclusion, the whole world is in a period of tremendous expansion. The motor car, airplane and radio are bringing all peoples into closer communication and increasing the needs of nations for commodities and products they formerly got along very well without. Tin is produced in but a few localities, but it is used everywhere. It seems then more logical to expect for some years to come that production will continue to lag behind consumption and that no serious decline in the price level may be expected until it catches up.

Zinc Values Touched Lowest Levels in Five Years

BY A MEMBER OF THE TRADE

IN zinc, the year 1927 was characterized by a downward trend of prices, which persisted with but slight interruption and which has resulted in lower market values than are warranted, in view of production costs to the industry as a whole.

At the beginning of the last quarter of 1926, when the metal was quotable at about $7.40 per hundred pounds East St. Louis, and in the face of record consumption, the trend of quotations started on a downward course which continued with but slight reactions until November, 1927. Then $5.60 East St. Louis was reached, the lowest point touched since 1922, and a figure which approximates the average for ten years prior to 1914.

Primary spelter production for eleven months amounted to 561,200 tons, and estimating December at 50,000 tons, a total of about 610,000 tons might be expected for the year. In 1926 the total was 638,533. Domestic shipments, while not quite equal to the previous year, have been maintained in good volume, averaging about 46,000 tons monthly. Exports for 1927 will likely approximate the 1926 figure of 42,000 tons. This would indicate a probable total approaching 600,000 tons for the year just ended as compared with 625,941 for 1926.

Stocks of metal gradually increased from the low point, 14,481 tons at the end of November, 1926, to the end of June, 1927, when they reached a peak of 43,858 tons. The tide then turned and a decline began, leaving the stock on Nov. 30, 1927, at 39,320 tons.

Decreased consumption and increased stocks, no doubt, were the immediate cause of the decline in price, but the excess accumulation which, at its height never reached a month's supply, does not seem sufficient itself to account entirely for the long downward swing. The answer is probably to be found in the development of selective flotation for the treatment of complex ores and the growth of the electrolytic method for the recovery of the metal. This modification of the flotation process has made available a zinc value which was previously not only a loss but a penalty. It has enhanced the profits of many mines operating in the northern Rocky Mountain country and made profitable others which had been abandoned, resulting in a greatly increased production of zinc concentrates at a relatively low cost. The rapid increase in the electrolytic output coincides with this increasing ore supply and it is estimated that during 1928 upward of 250,000 tons of electrolytic capacity will be in operation in the Rocky Mountain region of this country and Canada.

The smelters of Continental Europe, who a few years ago were combing the world for ore, are now receiving an ample supply of zinc concentrates from Mexico and elsewhere, while production in Silesia has been stimulated by the introduction of American capital. As a consequence diminishing exports of spelter from this country probably may be expected.

To summarize: Selective flotation has made available a considerable quantity of cheap zinc concentrates particularly adapted for treatment by the electrolytic method. Properties producing such complex ores are being and will be developed, so that the relative importance of the Tri-State field—Missouri-Kansas-Oklahoma—as a basis of ore supply is likely to be lessened to some extent. Correspondingly, the slab zinc output produced by the electrolytic method is likely to be increased and the proportion produced by the retort method reduced. The principal factor determining the amount of slab zinc produced by the retort and electrolytic methods respectively will be the relative cost of mining and delivering the zinc in the concentrates produced at the smelter or electrolytic plant, and doubtless competition will be sharp in ascertaining on this basis the relative share for each method.

Further Gain in Water Shipments

River and Lake Movement of Iron and Steel Mounts—Pittsburgh District Traffic Largest on Record

WATER shipments of iron and steel showed a further gain in 1927. River traffic expanded, in the Pittsburgh district being the largest ever recorded, and there was a substantial increase in the movement of pig iron and steel, as well as scrap, on the Great Lakes. Progress was made in the canalization of the Ohio and Illinois rivers, and barge service was inaugurated on the upper Mississippi River.

While complete statistics for the river movement out of the Pittsburgh district are not available, those at hand clearly indicate a record. The figures reported monthly by the Pittsburgh district United States Engineers' office disclose that, for the 11 months ended Nov. 30, there had passed down the Allegheny River 12,967 net tons of iron and steel products; that in the same period shipments over the Monongahela River totaled 623,165 tons, while the iron and steel carried on the Ohio River from Pittsburgh as far as Wellsburg, W. Va., the limit of the Pittsburgh office survey, aggregated 628,790 tons. The grand total was 1,264,922 tons, but there was some duplication of figures in view of the fact that the Ohio River begins at Pittsburgh through the confluence at that point of the Allegheny and Monongahela rivers. Ignoring that total and taking only the tonnage carried on the Ohio River as indicative of what moved to distant down-river points, or well outside the zone that Pittsburgh producers could reach profitably by rail deliveries, the total of 628,790 tons for the 11 months exceeds the total movement on the Ohio River as reported from the several district engineers' offices at Pittsburgh, Huntington, W. Va., Cincinnati and Louisville, Ky., for all of 1926, which was 487,261 tons. It was also larger than the 1925 total of 534,817 tons.

In connection with this showing, it may be pointed out that the canalization of the Ohio River has not yet been completed between Evansville, Ind., and Cairo, Ill., and ordinarily that long stretch has a sufficient stage of water to carry heavy tows of steel only during about six months of the year. Nevertheless, the Jones & Laughlin Steel Corporation, for the first time since it started river service in the fall of 1921, maintained shipments throughout the summer of 1927, although in passing through the shallow water between Evansville and Cairo it was necessary to open completed locks behind the tows to provide enough water to carry them through to the deeper water beyond Cairo. The Federal Government, however, is making steady progress in its work on this section of the river, and present indications are that the lock and dam system and the establishment of a permanent 9-ft. stage from Pittsburgh to Cairo will be completed by 1929, as planned.

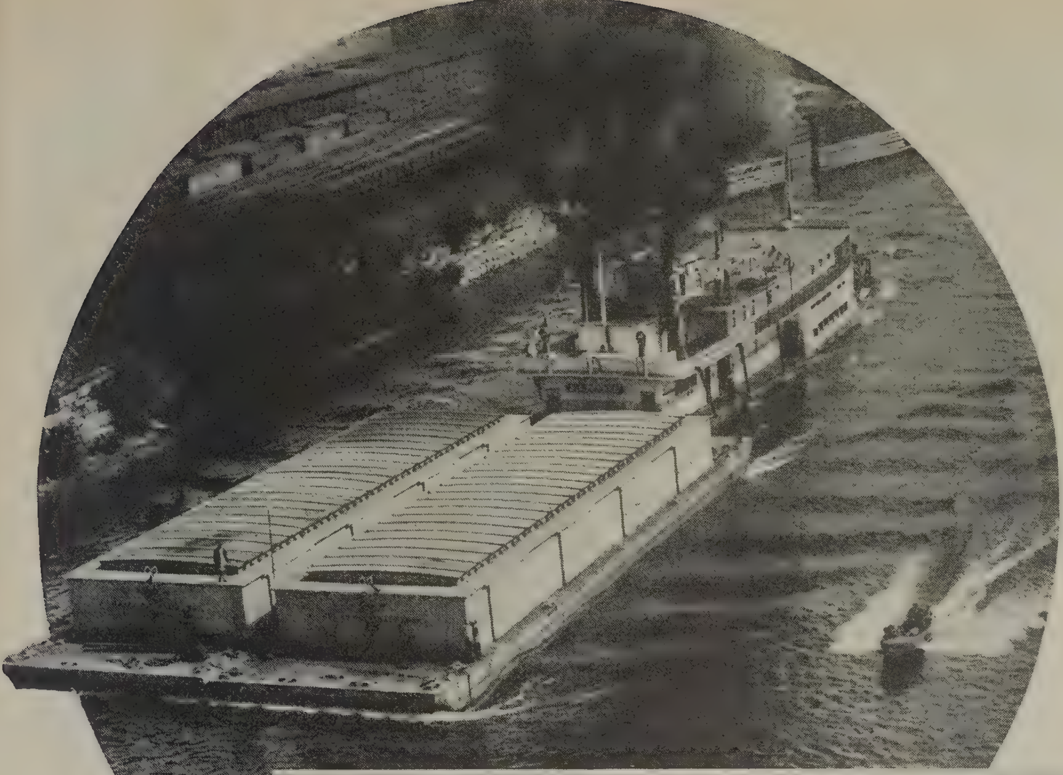
Iron and steel producers at lower Ohio River points also made more use of water transportation in 1927. One Ironton, Ohio, plant operated a towboat and a fleet of barges throughout the year to deliver pig iron and wire nails to Ohio River points. In quoting nails at Cincinnati and other cities along the river, the company made Ironton the base for prices, to which it added the regularly established barge rate charged by river packet companies. Another Ironton producer started shipping pig iron by barge in July. This company installed loading equipment on its property along the river but, instead of investing in river craft, contracted with a commercial line to handle its product.

In June a river-rail terminal at Cincinnati was formally put into operation. Here cargoes of iron and steel are transferred to railroad cars for delivery to consumers in the Cincinnati district. The terminal is used extensively by the Jones & Laughlin Steel Corporation in connection with the shipment of its products to its Cincinnati warehouse.

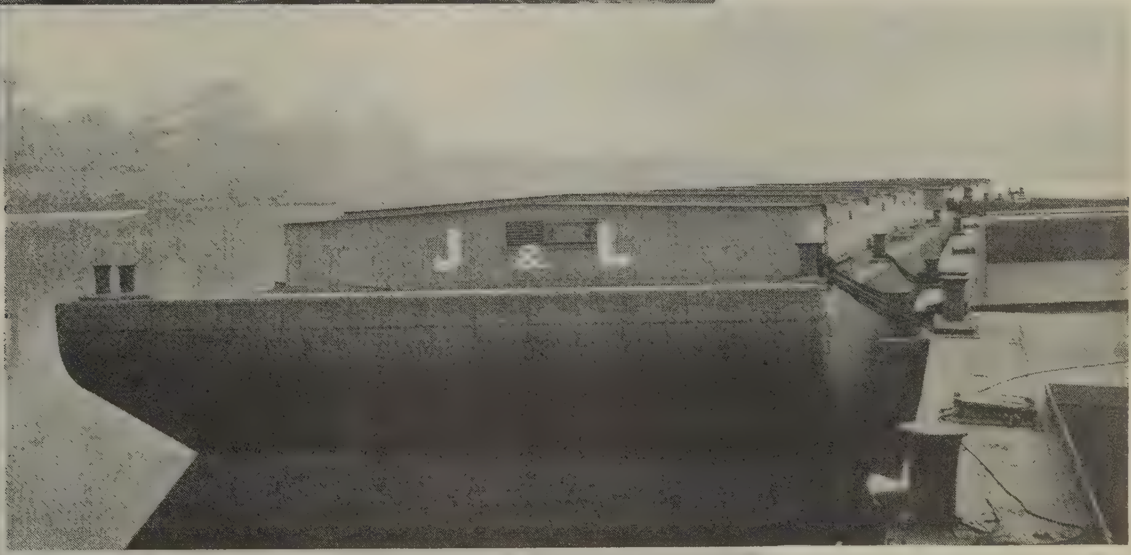
The Ohio River was also used during the year by the Granite City, Ill., producer of pig iron for shipments to points upstream as far as Louisville.

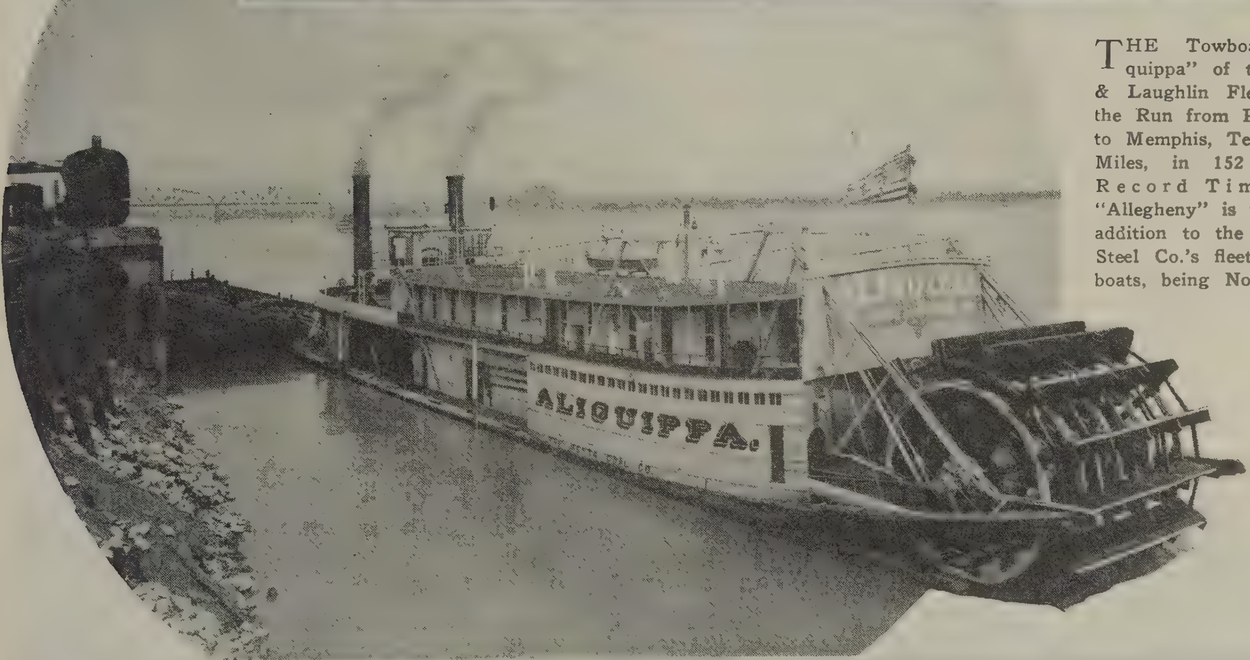
Of outstanding interest on the Mississippi River in 1927 was the inauguration of Federal barge service on the upper reaches of the stream in mid-August. In the three months during which the line was in operation a Granite City mill shipped a small tonnage of sheets to Minneapolis and Chicago district producers moved about 600 tons of various products, including fence, wire, nails, sheets, steel pipe, rail steel bars and soft steel bars. Producers in Indiana, Chicago and Peoria, Ill., shipped by rail to Dubuque, Iowa, and thence by barge to St. Paul and Minneapolis. The combined rail and water rate from Chicago to Minneapolis via Dubuque is 23½c. per 100 lb., as compared with an all-rail rate of 27½c.

At Minneapolis a river bank warehouse was con-

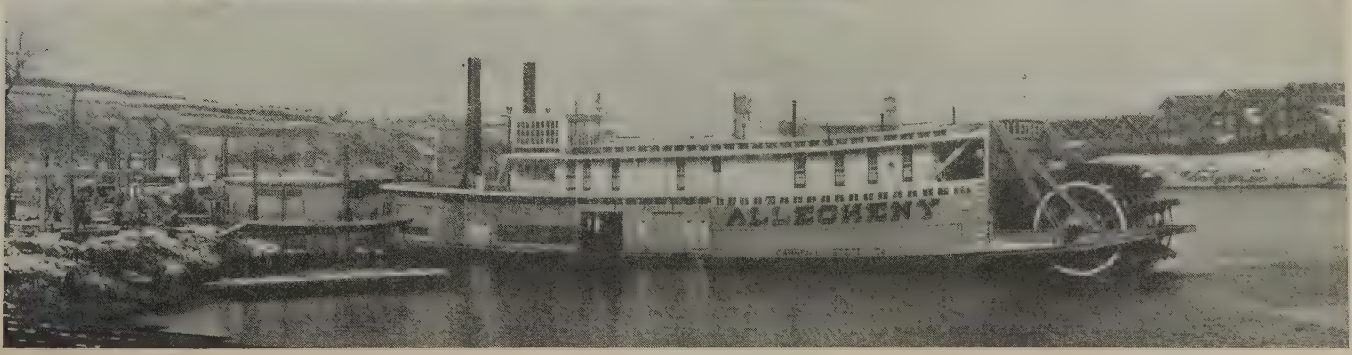


THE "Thorpe" Towing Barges from St. Paul to Minneapolis on the Upper Mississippi River (at Left). A box-type of barge, which is supplanting the coal barge as a carrier for steel, especially products damaged by exposure (below)





THE Towboat "Aliquippa" of the Jones & Laughlin Fleet Made the Run from Pittsburgh to Memphis, Tenn., 1200 Miles, in 152 Hr., a Record Time. The "Allegheny" is the latest addition to the Carnegie Steel Co.'s fleet of towboats, being No. 14.



structed, largely under the auspices of the municipality. As an inducement to iron and steel producers to use the barge line, free storage in the warehouse is offered. In addition, arrangements have been made whereby the barge company, during the winter months, will bill and load from stocks in the warehouse without charge.

The maximum draft of boats operating on the upper Mississippi River is between 4½ and 5 ft. Flood control reservoirs along this stretch of the river assure a 7-ft. channel throughout the season of navigation, which extends from April to mid-November. In this respect the upper river is more dependable than the lower stretches.

On the entire river the barge movement of all commodities in 1927 fell some 15 to 20 per cent below the total for 1926. The main causes were:

1. Spring floods adversely affected the credit of the communities along the lower stretches of the river, curtailing the volume of business transacted.
2. In September low water hampered the movement of river craft.
3. The general volume of business in 1927 was below that of 1926, which was a peak year in barge traffic on the river.

Of particular interest to the Chicago district is the work on the connecting link which is to join the Mississippi River system with the Great Lakes. In terms of money expended the State of Illinois has completed about 60 per cent of its part of the development of the Illinois River. In this stretch, locks 110 ft. wide by 600 ft. long are being built so that tows may pass through without being broken for lock passage. Two locks have been completed with the exception of mitre gates and operating machinery, and agreements have been reached with a public utility company whereby five miles of retaining wall through Joliet, Ill., and a lock and dam below that city can now be finished. A lock at Dresden Island, Ill., and a canal to be built around rapids at Marseilles, Ill., are the only projects that remain to be placed under contract by the State. South of Starved Rock, Ill., the river is ordinarily open to craft of 5 and 6-ft. draft, but the Federal Government nevertheless plans to improve that stretch with locks and dams.

Heavier Movement on Great Lakes

Nineteen twenty-seven showed a gain in shipments of steel, pig iron and scrap on the Great Lakes. One company alone moved 125,000 tons of scrap from Detroit and other Great Lakes points in the West to its plant at Buffalo, and shipped about an equal tonnage of steel in the opposite direction. A Cleveland steel manufacturer began to make shipments of steel by water to Detroit in the latter part of the navigation season and moved a total of about 30,000 tons, mostly sheets and hot and cold-rolled strip. This was handled on a boat leased by the company, and loading was done directly at the steel plant. Scrap carried by the vessel on return trips from Detroit totaled about 20,000 tons.

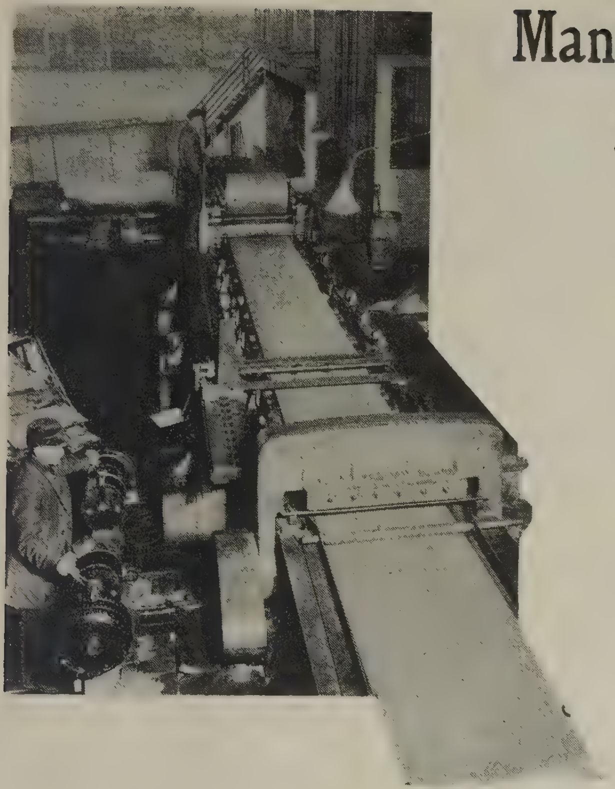
The United States Steel Corporation kept in commission four 250-ft. boats with a carrying capacity of 2000 tons each during the entire season, carrying finished steel for the Canadian trade. This Lake fleet is operated by a subsidiary, the United States Steel Products Co. It was the first year that four boats were in service throughout the navigation season, two of them having been completed in 1926. The company's Lake shipments in 1927, however, declined to 115,000 tons from a total of 130,000 tons in the previous year, reflecting a slowing up of demand. A Chicago company continued to use the Lakes for shipments of alloy steel to Detroit in the past year, and also received a 1200-ton cargo of alloy steel scrap from Great Britain.

Pig iron shipments on the Great Lakes were particularly heavy in 1927. A Buffalo producer shipped 42,000 tons, including 12,000 tons of silvery iron, to Detroit. Another Buffalo maker moved a cargo of 2000 tons to Chicago, and a third Buffalo interest made a shipment by water to Toledo, Ohio, whence it went by rail to its plant at Bremen, Ind. There were large Lake shipments from Cleveland to Chicago. One Cleveland producer shipped between 20,000 to 25,000 tons, and another 10,000 tons.

Efforts to establish a regular water transportation service between Cleveland and Detroit to carry steel from Valley and Cleveland mills have not met with success, and two dock companies in Cleveland that are equipped for handling steel from cars to Lake boats handled no tonnage whatever. One of the obstacles to water shipments to Detroit, perhaps the principal one, is the desire of large consumers in the automotive field to have a steady flow of steel from the mills to their plants. If an automobile manufacturer is using two or three cars of steel a day, he wants that number of carloads to reach his plant daily, and mills, aided by excellent transportation service, are able to make deliveries as desired.

Those interested in promoting water shipments of steel from Ohio mills to Detroit contend that as good service can be furnished by water as by rail. One plan suggested is to have three boats of about 1500 tons capacity handling steel between the two ports. This would permit shipments of a boatload every day and would insure a steady flow of steel from the receiving docks in Detroit to consuming plants. The 1500-ton cargo, according to this plan, could be made up of carlot shipments from a number of Ohio mills, which could be consigned to a number of consumers. It is stated that steel can be delivered from Valley mills by rail and water to consumers' yards in Detroit at $3.68 per ton, as compared with an all-rail rate of $5.30, or a saving of $1.62 per ton.

A Car Ferry Put into Commission During the Year by the Jones & Laughlin Steel Corporation, Connecting Its Pittsburgh and Woodlawn, Pa., Works, Permits Partial Loading at Each Plant, Eliminating Interplant Movements by Rail



Many Factors Participated in Development of Continuous Sheet

Administration of Patents and the Economic Relation of Strip Mills to New and Old Style Sheet Mills Are Future Problems of Importance

WHILE the art of rolling steel has progressed in many details during 1927, and more powerful, more productive, and more economical units have been installed at various places, the progress in the sheet industry has deservedly attracted the most attention. The sheet industry, the last of the divisions of the steel business to respond to the urgent call for improvements, has been going through an evolution which has culminated in a radical departure from the established and traditional methods, and which probably will have the same effect on the conventional sheet mills as the development of the modern continuous bar mill had on the old-fashioned hand mills.

Great Tonnages Needed

Just as the present continuous merchant mills are only economical for large tonnages, so the new method of making sheets will by the law of economics be applicable only to large tonnage plants. The old idea must be discarded that large tonnages mean inferior quality, for it has been one of the surprising discoveries of this new method that both the surface condition and the grain structure are improved.

It is strange that such a development should have been so long in coming, but possibly it had to wait for a growth in the sheet business to the point where much larger tonnages were required. Or it may be entirely possible that it was the increased knowledge and inventive genius of the new generation coming after the expensive failure of some twenty-two years ago, which coupled to all the other factors, crystallized into the achievement.

Precision Without Precedent

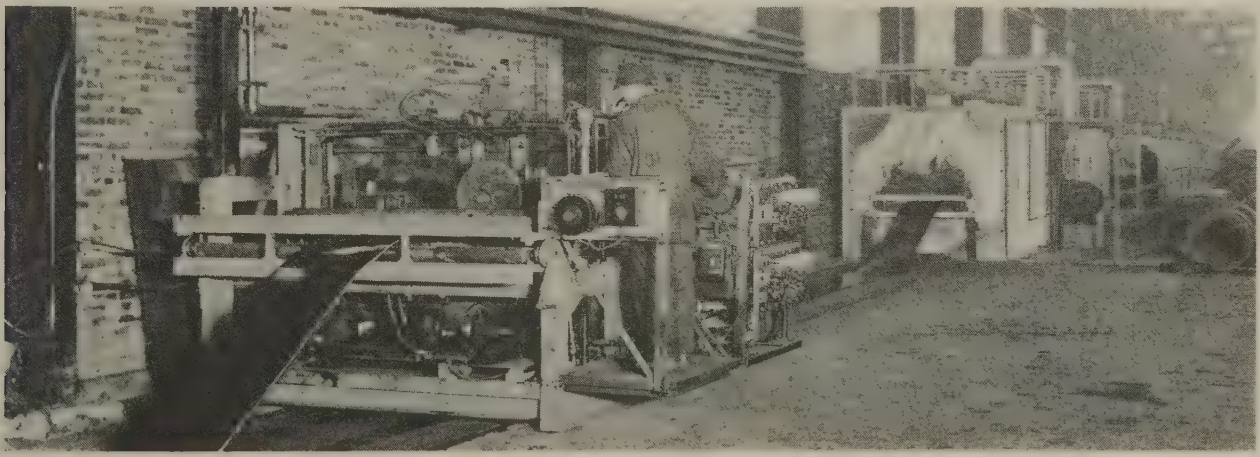
The process also has been scientifically analyzed, in the same way as with the blast furnace some years ago which resulted in better control, larger output and lower cost. Scientific appliances were developed to record rolling pressures, and instruments devised to measure roll diameters to the thousandth of an inch. These merely furnished the data which had to be interpreted and then applied to the design of the modern mills.

Rolling of long pieces of wide thin material might be done by extending the length of sheets, or by increasing the width of strips. It is interesting, in retrospect at least, to note that while there are these two avenues of approach to a solution of this problem, what seemed the most difficult was solved first. As recorded in Stephen Badlam's paper read before the American Iron and Steel Institute on Oct. 28, 1927, the sheet development has made the greatest step forward in a relatively short time, while the strip process has been gradually but steadily advancing. However, the strip process has not yet been able to reach the ratio of width to thinness that is now regularly employed for the continuous manufacture of sheets.

It will be very interesting to watch the further progress with these two methods of solving one of the outstanding problems of the steel industry, and it is entirely possible that each method will find its own economic limitations.

Some of the elements contributing to the successful operation of this improvement in rolling mill practice

(*Concluded on page* 109)



Less New Capacity in 1927

No Blast Furnaces Added—Open-Hearth Increase Was 630,000 Tons Last Year—Expansion for 1928 Very Light—Few Electric Furnaces Sold

ONLY moderate increases in capacity, both blast furnace and steel-making, for this and the year just ended, are disclosed by a review of the year's activities.

For the second year since the war, blast furnace capacity in 1927 was not increased. Only two furnaces are scheduled for possible completion this year.

In open-hearth construction, new capacity last year at 630,000 tons ranked fourth since the war. Projected additions are the smallest in the last few years.

Expansion in Steel, Iron and Rolling Mill Capacity

COMPARATIVELY lean was the 1927 record of additions to steel melting and blast furnace capacity, with the projected plans for 1928 exceedingly small. Major details of new construction and equipment completed in 1927 or planned for completion in 1928 have been sent in by companies having blast furnaces, steel plants and rolling mills, as well as some foundries. A summary of the data is given in the following paragraphs.

Open-Hearth Capacity Added in 1927

Expansion of open-hearth capacity in 1927 was larger than was indicated in our review a year ago. Only three furnaces were then reported as scheduled for building during 1927 but there were 10 furnaces completed.

The 1927 additions of 10 furnaces have an estimated capacity of 630,000 gross tons per year. This compares with 865,000 tons for 12 new furnaces in 1926. The largest year since the war was 1923, when the total additions were 875,000 tons for 19 furnaces. Last year ranks fourth among the years since the war, as shown by one of the tables. The distribution of the new additions last year is shown in another table.

The additions to open-hearth capacity in 1927 were made by the following companies:

Ford Motor Co., River Rouge, Mich., three 100-ton furnaces; Interstate Iron & Steel Co., Chicago, two 100-ton furnaces; Weirton Steel Co., Weirton, W. Va., one 200-ton furnace; Otis Steel Co., Cleveland, one 125-ton furnace; Timken Roller Bearing Co., Canton, Ohio, one 100-ton furnace; Colorado Fuel & Iron Co., Pueblo, Colo., one 90-ton furnace, and the Bonney-Floyd Co., Columbus, Ohio, one 15-ton furnace for steel castings.

Open-Hearth Units Planned

Only two open-hearth furnaces are scheduled for building in 1928. This is the smallest projected total since the war. The 1928 program compares with 3 in 1927, with 14 in 1926, with 9 in 1925, with 7 in 1924, with 17 in 1923, with 6 in 1922, with 15 in 1921 and with 22 in 1920. One of the war years witnessed the largest scheduled expansion on record—91 furnaces in 1916.

The estimated capacity of the two furnaces, planned for completion this year, is 125,000 gross tons of ingots per year. The smallest projected capacity on record, previous to this, was 217,500 tons for six furnaces in 1922. During peace years the largest contemplated additions were 3,100,000 tons for 88 furnaces in 1913, while the war maximum was 4,515,000 tons for 72 furnaces in 1917.

The additions to capacity planned for 1928 are two 100-ton furnaces now under construction by the Wisconsin Steel Co., Chicago, at its South Chicago plant.

Several companies rebuilt and increased the capacity of their open-hearth furnaces last year, one company changing a 100-ton furnace to one of 200 tons capacity and other companies materially enlarging older units.

Additions to Open-Hearth Capacity Since the War

Year	Annual Capacity, Gross Tons	Year	Annual Capacity, Gross Tons
1919	625,000	1924	375,000
1920	675,000	1925	585,000
1921	247,500	1926	865,000
1922	227,500	1927	630,000
1923	875,000		

No Increase in Blast Furnaces Last Year

For the second year since the war, no new blast furnaces were built. Last year three were projected, but the building of one was rendered unnecessary and the other two are still unfinished.

The 1927 record of no additions to blast furnace capacity duplicates the record in 1923 when none was built. In 1926 there were six new furnaces put in blast, constituting a record since the war, so far as productive capacity is concerned. In 1920 also six new furnaces were finished. The capacity of the six furnaces in 1926 was 1,255,000 tons, while that of the six in 1920 was estimated at 875,000 tons. In 1919 only two furnaces were added with one in 1921, with two in 1922 and with one each in 1924 and 1925.

The record for new blast furnaces completed in any peace year was nine in 1912, with the war record at 14 in 1917.

New Blast Furnaces in 1928

Only two furnaces are under construction for possible completion in 1928. This compares with three in 1927, with nine in 1926 and with five during the three years 1921 to 1923. The record for those projected in any one year was 25 in 1917 with the peace-time record in recent years at seven furnaces in 1913. The capacity of the two furnaces under construction is estimated at 440,000 gross tons. They are the two furnaces at the Fairfield Works of the Tennessee Coal, Iron & Rail-

Increase in Open-Hearth Capacity

	No. of Furnaces	Annual Capacity, Gross Tons
Completed in 1927:		
Independent companies	10	630,000
United States Steel Corporation	0	......
Total	10	630,000
Projected for 1928:		
Independent companies	2	125,000
United States Steel Corporation	0	......
Total	2	125,000

road Co., in Alabama, which were under construction a year ago.

Several Furnaces Rebuilt and Enlarged

A number of companies, particularly the Bethlehem Steel Corporation and the United States Steel Corporation, have rebuilt and enlarged a number of their blast furnaces. The Donner Steel Co., Buffalo, rebuilt its No. 2 furnace, increasing its annual capacity from 180,000 tons to 216,000 tons. The Reading Iron Co., Reading, Pa., augmented the capacity of its Keystone furnace about 25 per cent.

Abandoning and scrapping of blast furnaces continued last year. On Jan. 1, 1927, there were 371 furnaces on the active list. On Jan. 1, 1928, the number stands at 357, indicating a dropping of 14 furnaces during 1927.

The chief features of the reports of the various companies on new construction completed or planned are as follows:

The Steel Corporation

NEW construction and improvements completed during 1927 and under way as of Jan. 1, 1928, by subsidiary manufacturing companies of the United States Steel Corporation, are as follows:

Carnegie Steel Co.

Completed

Edgar Thomson Works: Four open-hearth furnaces rebuilt.

Duquesne Works: Modernizing 4 hot blast stoves at blast furnace No. 5.

Homestead Works: Installing 44-in. and 54-in. blooming mills, 36-in. roughing mill, 28-in.-32-in. structural and 52-in. universal structural mills in lieu of obsolete mills.

Carrie Furnaces: Blast furnaces Nos. 3 and 4 rebuilt, with auxiliary ore handling facilities.

Ohio Works: Improving operating facilities at open-hearth plant; 15 waste-heat boilers at open-hearth plant.

Upper Union (Youngstown) Works: Electrifying mills, replacing steam power.

McDonald Mills: New 12-in. strip mill.

Mingo Works: Eight 1200-hp. gas-fired boilers in blast furnace No. 2 boiler house.

Houston, Texas: New warehouse and dock.

Under Way

Edgar Thomson Works: Turbo-blowing equipment for 2 blast furnaces, replacing obsolete steam engine equipment; 15,000-kw. turbo-generator and auxiliary equipment in power station.

Duquesne Works: New central boiler plant at blast furnaces.

Ohio Works: Two 1500-ton hot-metal mixers.

Farrell Works: Modernizing rolling mill facilities and power generating equipment, including 24-in. roughing mill and 6000-kw. a. c. turbo-generator.

Clairton Works: Addition to by-product coke plant of four batteries, 87 19-ton ovens each, with tar and ammonium sulphate recovery, benzol plant and gas booster station and auxiliary facilities.

A high-tension electric power transmission system, with necessary sub-stations, is being constructed to "tie in" Edgar Thomson Works, Duquesne Works, Carrie Furnaces, the by-product coke plant at Clairton and National Works of National Tube Co.

Illinois Steel Co.

Completed

South Works: New 40-in. reversing blooming mill in No. 1 rail mill; new merchant bar mill for production of alloy steels; gas engine-driven electric generating unit addition to power station.

Gary Works: New 10-in. and 9-in. merchant mills.

Under Way

South Works: Rebuilding blast furnace No. 10 and 8 hot blast stoves at blast furnaces Nos. 5 and 6; enlarging 14 furnaces at No. 2 open-hearth plant and modernizing auxiliary facilities; two 6000-kw. gas engine-driven electric generating unit additions to No. 1 power station; equipping north end structural mills with electric drives, replacing steam power.

Joliet Works: New boiler plant.

Gary Works: Additional 30,000-kw. steam turbo-electric generating unit in power station.

National Tube Co.

Completed

National Works: Blast furnace No. 2 rebuilt; improved stock handling system at bins of blast furnaces Nos. 2 and 4.

Under Way

Lorain Works: New 32-in. mill for rolling rounds at No. 3 blooming mill; converting No. 3 lap weld mill into a seamless mill; 15,000 kw. steam turbine-driven generator and auxiliaries; extension to blast furnace boiler plant, including three 2500-hp. boilers.

American Steel & Wire Co.

Completed

Newburgh Steel Works: New scrap and mold yards at open-hearth plant.

Newburgh Wire Works: Electrification of Nos. 1 and 2 wire mills.

Cuyahoga Works: Additions to cold rolling facilities.

Central Furnaces and Docks: New boiler house, pump house, 10,000-kw. turbo-generator, electric power transmission line to Cuyahoga Works and main water and sewer lines.

American Works: Continuous wire drawing equipment for fine weaving wire.

Waukegan Works: Billet heating furnace.

Trenton Works: Equipment for making bridge wire.

Worcester, South Works: Rebuilding and improving rolling mills, including new 18-in. billet mill and new 10-in. continuous rod mill.

Worcester, Electric Cable Works: Increasing capacity for manufacture of enameled magnet wire; equipment for manufacture of super-tension power cables.

Under Way

Newburgh Wire Works: Improvements in cold finished bar department.

Cuyahoga Works: New rolling mills for large rods and narrow strips.

Anderson Works: Addition of electric welded fabric department.

Worcester, South Works: Modernizing No. 2 rod mill.

Worcester, Electric Cable Works: Equipment for manufacturing copper strand.

American Sheet & Tin Plate Co.

Completed

Gary Sheet Works: Equipping 2 double sheet mills to make full finished sheets.

Vandergrift Works: New heavy-duty unaflow engine for hot mill and sheet and pair furnaces for mills Nos. 22 to 25 rebuilt; 4 modern stoker-fired sheet and pair furnaces and equipping annealing and pickling department for finishing sheets 66-in. wide.

Scottdale Works: Motor drive for hot mills and rearranging hot mill department; modern bar storage building with electric overhead traveling crane.

Wood Works: 100-ft. continuous open annealing furnace.

National Works: Two annealing furnaces and enlarging annealing building.

Cambridge Works: Addition to boiler plant.

Under Way

Gary Tin Works: Enlargement of plant including installation of new motor-driven continuous mill with auxiliary facilities, increasing finishing capacity.

Wood Works: Motor-driven cluster-type cold mill for rolling highly finished sheets.

Tennessee Coal, Iron & Railroad Co.

Completed

Fairfield Works: Two additional soaking pits and extending building; additional spike, bolt and nut units for rail fastenings department; fifth galvanizing unit at sheet mill; modern gas exhauster and saturator equipment at by-product coke plant.

Under Way

Fairfield Works: Two new blast furnaces Nos. 5 and 6; electric power plant of two 25,000-kw. turbo-generators; addition to by-product coke plant of battery of 63 18-ton coke ovens.

Bethlehem Steel Corporation

THE subsidiary companies of Bethlehem Steel Corporation report the following principal improvements and additions completed in 1927 and under way at the close of the year.

Completed

Bethlehem Plant, Bethlehem, Pa.: 10,000-kw. turbo-generator; two Bethlehem gas-driven blowing engines; five heavy-duty roll lathes and additional machine tools for manufacture of Bethlehem auxiliary locomotives.

Steelton Plant, Steelton, Pa.: One Bethlehem gas-driven generator and gas cleaners; 10 gas producers and two waste-heat boilers at open-hearth plant.

Lebanon Plant, Lebanon, Pa.: Addition to concentrating and sintering plant.

Maryland Plant, Sparrows Point, Md.: 20,000-kw. turbo-generator and boilers; one two-strand pig casting machine; three gas producers and two waste-heat boilers at open-hearth plant No. 2; one row of soaking pits with producers; one 27-in.-24-in. four-stand continuous roughing mill and one 21-in. eight-stand continuous sheet-bar and skelp mill; 12-in. continuous skelp mill; four double sheet mills; 12 tin plate mills and two butt-weld pipe mills.

Lackawanna Plant, Lackawanna, N. Y.: One battery of 57 Koppers coke ovens and gas producers; gas producers for eight furnaces at open-hearth plant No. 1; one 54-in. blooming and two 48-in. Bethlehem structural mills with shipping yard facilities; motor drive for 12-in. bar mill and addition to fabricating shop.

Cambria Plant, Johnstown, Pa.: One battery of 77 Koppers coke ovens; three waste-heat boilers at lower open-hearth plant and lumber mill at car shops.

Coatesville Plant, Coatesville, Pa.: Motor drive for 152-in. plate mill.

Under Way

Steelton Plant, Steelton, Pa.: New stack to replace present "B" stack; coke wharf and screening station at coke ovens and two waste-heat boilers and four gas producers at open-hearth plant.

Maryland Plant, Sparrows Point, Md.: New stack to replace present "A" stack; two turbo-blowers with boiler equipment; four waste-heat boilers at open-hearth plant and two lap-weld pipe mills.

Lackawanna Plant, Lackawanna, N. Y.: Ingot stripper at open-hearth plant; 72-in. cold saw at shipping yard and new rail blooming and roughing mills to replace present mill.

Cambria Plant, Johnstown, Pa.: Three 2-strand pig casting machines and two waste-heat boilers at Franklin open-hearth plant.

Ore Mining Properties

At its ore mining properties, 25 dwellings were erected at the Cornwall Mines, Cornwall, Pa. At the same property a 1200-ft. shaft with railroad spur as well as a crushing and screening plant are under way.

Youngstown Sheet & Tube Co.

THE Youngstown Sheet & Tube Co., Youngstown, completed during 1927 at its various plants, the following construction work:

Campbell Works

Blast Furnace Plant: The enlargement of the hearth on "A" furnace to 20 ft. 6 in. The installation on "A," "B" and "C" furnaces of 6 stage A. G. McKee Co.'s gas washers; a new 10-ton trolley for No. 1 ore bridge.

Coke Plant: A complete drinking water system and installation of electric refrigeration.

Steel Plant: The installation at the sheet mills of a balanced rougher roll drive; also a mechanically operated sheet pack opening machine.

Tube Mills: The installation in the machine shop of a 60-in. planer and a bar shear; the installation in connection with the seamless tube mill of complete threading floor equipment consisting of threading and cutting-off machines, together with necessary tables for the handling of pipe.

General: The installation of an overhead crane in the forge shop; a new employment office was built at the north bridge in Campbell and a new waiting room and gate office was built at the south entrance to the plant.

Struthers Works

A complete new installation for nail washing was installed at the nail mill. A pipe bending machine for the manufacture of conduit elbows has been placed in operation.

Brier Hill Works

A continuous annealing furnace was installed in connection with the sheet mills.

Western Reserve Works

Three continuous annealing furnaces were installed.

Hubbard Works

The enlargement of the hearth on No. 1 furnace to 16 ft. was completed.

In connection with the new Valley Mold & Foundry plant at Hubbard, installation was made of one 800-hp. boiler with complete equipment.

Indiana Harbor Works

Steel Plant: A complete mold cleaning yard was installed at the Bessemer department. Twenty-five additional open-hearth charging cars were put into service. An electrically operated Mesta manipulator was installed at the 28-in. billet mill. A 1000-ton Mesta up-cut shear and accompanying tables were installed at the blooming mill.

General: An extension to the machine shop with the necessary machine tools was completed. Low head pumps were installed at the intake. A modern restaurant with electric refrigeration was completed. The sea wall inclosing the entire plant was completed, together with a quantity of sand fill. An automobile fire truck was put into service for emergency use.

Coke Plant: A complete water treating system was installed at the coke plant boiler house. A 110-ft. extension was added to the coal storage yard. A gas meter for the surplus gas was installed.

Evanston Works

Improvements in operation at the Evanston plant were made by the addition of new size roll machines, pipe straightening machines and equipment for forging and finishing at the union department.

Mayville Works

An electric power shovel was installed at the mines and a complete water treating system was put in.

New construction under way and scheduled for completion in 1928 is as follows:

A power house and boiler house at the Campbell Works. This project will consist of the complete installation of six 2000-hp. B. & W. gas-fired boilers with auxiliary equipment to enable these boilers to be operated with pulverized coal; one 18,000-kw. turbo-generator and three 60,000-cu. ft. turbo-blowers. There will also be installed in connection with the above project, a 9375-k.v.a. frequency changer together with necessary transmission lines.

At the South Chicago Plant, there is under construction, a 70-oven Koppers coke plant complete with by-product equipment.

Republic Iron & Steel Co.

The Republic Iron & Steel Co., Youngstown, reports the following improvements as having been made during 1927 and as under way or contemplated in 1928.

A new open-hearth furnace, rated at 150 tons capacity, was built to replace the old No. 1 furnace at the open-hearth plant at Youngstown.

At the Bessemer and Brown-Bonnell plants at Youngstown, a new electric crane runway was added to the roll shop and a new roll grinder installed. There has also been completed a new chemical laboratory and office building.

At the tube works at Youngstown, testing machines and 40-ft. welding skids have been completed, and a lathe has been added to the machine shop equipment. The remodeling of the four butt weld mills is now under way.

At the coke works at Youngstown, alterations have been completed to the coke screening equipment.

A 200-ton Greenawalt sintering plant has been completed at the Haselton furnaces, Youngstown. New gas burner equipment has been provided for the stoves at No. 2 blast furnace.

At the Republic coke plant, Republic, Pa., the steam-operated plant was replaced last year with an electric power plant.

At the Pioneer blast furnaces at Thomas, Ala., four Heine boilers, 784 hp., were added to the boiler plant; one 3000-kw. generator was added to the electrical equipment and one 75-ton overhead crane was installed at the pig casting machine.

Weirton Steel Co.

The Weirton Steel Co., Weirton, W. Va., completed last year the 200-ton open-hearth furnace which was under construction a year ago. It also changed one of its 100-ton furnaces to a 200-ton unit. This gives the company six 100-ton and five 200-ton open-hearth furnaces.

As announced in THE IRON AGE, Sept. 1, 1926, page 585, the company placed in operation late last year its new 48-in. wide strip mill, with three continuous heating furnaces fired by producer gas. The mill is capable of rolling hot strip up to 48 in. wide. The company states that it is regularly producing 36 in. x 16 gage hot-rolled material. The mill is complete with pickling, cold rolling, annealing and finishing facilities, and is expected to have a productive capacity of about 25,000 to 30,000 tons per month. The company reports that the entire mill is driven by power generated in its central station, located adjacent to the blast furnaces, current being transmitted to the plant under tension of 6600 volts, this voltage being used direct by the main power units, the hot mill having 18,000 hp. connected with the various drives, the other power being stepped down to 550 volts a.c. for cranes, auxiliary motors, etc. Two 1000-kw. sets are also installed, supplying 230-volt d.c. for various applications requiring this voltage. No additional productive capacity is under consideration for building this year.

John A. Roebling's Sons Co.

The John A. Roebling's Sons Co., at its Roebling, N. J., plant, last year completed the building of cleaning house No. 3 and added wire drawing benches in wire mills No. 2, 3 and 4. Heavy wire drawing benches were rebuilt in No. 1 wire mill. Tempering and galvanizing machinery was added and the material handling system was extended. All wire mills and other important buildings were equipped with sprinklers.

At the Trenton plant, Trenton, N. J., the company has nearly completed a new tinning shop. Also additional high-speed stranders were built and installed and a new general office building and a general stores building were completed.

For 1928 a 320-ft. extension to wire mill No. 4 at the Roebling plant is under construction and the galvanizing capacity will be increased. At Trenton a physical laboratory will be erected and there will be installed in it a wire rope testing machine having a capacity of 2,000,000 lb.

American Rolling Mill Co.

The American Rolling Mill Co., Middletown, Ohio, completed last year the improvements which were under way at its Ashland, Ky., and Zanesville, Ohio, plants. Certain improvements and additions which are considered necessary to the rounding out of the company's Butler, Pa., works are under way. Improvements at the company's East Side Works at Middletown, incidental to the adaptation and use of hot metal in the open-hearth department and other contemplated betterments, are reported well under way.

The building of a blast furnace at Ashland, Ky., which was contemplated a year ago, has been made unnecessary at this time because of the purchase of the Norton Iron Works.

Colorado Fuel & Iron Co.

The Colorado Fuel & Iron Co., Pueblo, Colo., added last year a new 90-ton open-hearth furnace to its melting department. It also completed the construction of a 25-in. structural mill consisting of three roughing and one finishing stand; a 10,000-kw. turbogenerator; a plant for punching hot tie plates; a repumping plant; a new quenching station at the coke plant and eight additional precipitators for blast furnace gas. The pig casting machine was rebuilt and the capacity of the sintering plant was doubled. For this year the company has under way five additions to the 25-in. mill warehouse.

Trumbull Steel Co.

The Trumbull Steel Co., Warren, Ohio, made alterations to its No. 1 hot strip mill, converting it into a new continuous mill which has a capacity to roll strip steel up to 30 in. wide. This was placed in operation June 16 and was described in the Sept. 15 issue of THE IRON AGE. To provide a mill for rolling wide material the company widened the rolls of its former No. 1 hot strip mill and added additional rolls, making the complete unit a 10-mill stand. A 45-ft. x 250-ft. cooling bed with necessary shearing and piling equipment was built at the No. 2 hot strip mill. In the cold rolling department a 4-high cold mill was erected with auxiliary equipment for wide strip steel and five double-box annealing furnaces were provided. In the sheet and tin department a continuous open annealing furnace for sheet and strip steel was erected. At the present time the company has under construction alterations to its No. 2 hot strip mill and is installing a No. 2 cold mill for wide strip, together with necessary pickling and other auxiliary equipment and shipping departments.

Otis Steel Co.

The Otis Steel Co., Cleveland, completed and placed in operation a 125-ton open-hearth furnace during the past year. Other additions made to the open-hearth department during the year included a 7½-ton Morgan floor charging machine, one 200-ton ladle crane, two 140-ton steel ladles, thirty 4-box charging cars and a 50-ton track scale. An additional 4-hole soaking pit was built at the blooming mill. Extensions were made to the sheet mill building and a motor control house was built. New equipment added to this department included two continuous normalizing furnaces, six double box annealing furnaces, two single box annealing furnaces, two scrubbers and dryers for the sheet mill, one Mesta pickler, scrubber and dryer for pickler, a 1200-hp. motor drive for sheet mill and 20 roll heaters. A polishing and buffing machine was added to the cold strip mill equipment.

Central Alloy Steel Corporation

The Central Alloy Steel Corporation, Massillon, Ohio, last year made a number of changes and adjustments in its Massillon and Canton plants, which were necessitated by the merging of the Central Steel Co. and the United Alloy Steel Corporation. At the Canton plant a 34-in. 2-high reversing mill was installed behind the blooming mill, a 15-ton electric furnace and a 30-ton ladle were added to the electric furnace department and the open-hearth department was equipped to burn coke oven gas and tar. The blast furnace is now being relined and a Dorr thickener and filter for reclaiming water sludge is being installed. The gas washer is being revamped and automatic straight line control installed. Freyn pressure burners were added to the stoves and the boiler fire boxes were enlarged.

At the Massillon works, the coke oven plant of 49 Koppers ovens and a by-product and benzol plant were completed and put in operation. A Bliss cluster mill was added to the sheet division. Other construction work by the company included the erection of a metallurgical laboratory provided with modern equipment for research work.

Jones & Laughlin Steel Corporation

The Jones & Laughlin Steel Corporation, Pittsburgh, last year completed the erection of the seamless tube mill and a 9500-hp. powdered coal fired boiler plant which was started in 1926. The rebuilding of a 44-in. blooming mill at the South Side works has already been finished. In July last year a car ferry was installed for the purpose of transporting via the river material between the Pittsburgh and Aliquippa plants.

Alan Wood Iron & Steel Co.

The Alan Wood Iron & Steel Co., Philadelphia, last year constructed at its blast furnace department at Swedeland, Pa., two 7-tray, 2-stage gas washers, including filter and sludge thickener. It placed in operation during 1927 its Schuylkill Iron Works at Conshohocken, Pa., consisting of one 32 x 60-in. hot sheet mill, one roughing and one finishing stand with 600-hp. motor. This mill was started last June. The company is installing a 1000-hp. motor on its 54-in. jobbing mill to replace steam driven equipment and expects this to be in operation by Feb. 1, this year.

Central Iron & Steel Co.

The Central Iron & Steel Co., Harrisburg, Pa., last year installed a Blaw-Knox dolomite machine for its open-hearth furnaces and laid a concrete floor with non-skid floor plates in its 42-in. universal mill, as well as completed the powdered coal installation which was started in 1925 which furnishes fuel for all reheating furnaces in the rolling mills. The ingot storage yards of the 126-in. mill and the 42-in. universal mill have been consolidated.

Bourne-Fuller Co.

The Bourne-Fuller Co., Cleveland, completed in July last year the erection of a 10-in. semi-continuous bar mill at its Union plant, this taking the place of an old 9-in. mill which was removed. Extensions were made to the mill building to provide room for the new equipment. The mill consists of 8 continuous and 4 semi-continuous stands. A large 32-ft. billet heating furnace was also erected. In addition the company built at its Union works two 75-ft. x 430-ft. warehouse buildings in which it has provided equipment for fabricating reinforcing bars. This company last year continued its work of electrifying its Upson steel plant. It has under way at the present time the installation of an electric drive for its 11-in. bar mill at its Upson plant. It completed in March the erection of a 4000-hp. reversing motor and a 3600-kw. motor generator set for driving its blooming mill. It is also putting in a 5000-kw. turbogenerator to replace two smaller units. The company last year completed the erection of a turboblower to replace steam blowing engines at its blast furnace.

Timken Roller Bearing Co.

The Timken Roller Bearing Co., Canton, Ohio, completed its new steel plant in 1927 and placed it in operation during the early part of the year. The new steel making department, housed in a new building, is equipped with one 100-ton open-hearth furnace and two 15-ton Heroult and one 7-ton Heroult electric furnace. The 5-ton Heroult furnaces formerly used have been dismantled. Changes were made in the drive on two of the mills. The drive of the 22-in. mill was changed from a rope to a gear drive and a 1500-hp. Farrel-Sykes double herringbone gear was installed. The drive of the piercing mill was changed to a 350-hp. Nuttall single helical unit. Both gear drives have Timken bearings on their shafts.

Donner Steel Co.

The Donner Steel Co., Inc., Buffalo, N. Y., completely rebuilt last year its No. 2 blast furnace, increasing its capacity from 180,000 to 216,000 gross tons per year, and equipped it with an Ingersoll-Rand turboblower, with a McKee top and with coke handling and cleaning apparatus. Early this year a new cold drawing department will be installed, as well as a 25-ton Heroult electric furnace.

Ford Motor Co.

The Ford Motor Co., Fordson, Mich., completed in December, 1927, a 12-in. mill for rolling spring steel. This it is expected will be placed in operation in a few weeks. The Ford company has under erection a 10-in. combination merchant mill for rolling bars, rods and strip steel. This will be completed about July, according to present expectations.

The company completed last year three stationary 100-ton open-hearth furnaces, bringing the total to seven furnaces, the other four being of the tilting type.

Worth Steel Co.

The Worth Steel Co., Claymont, Del., completed last year its new flanging and press shop in which is contained three spinning machines. One of these is claimed to be the largest of its kind in the country, being able to flange circles varying in dimension from ½-in. x 180-in. blank to 4-in. x 56-in. blank. On this machine it is also possible to make heads having a 20-in. straight flange. This department, besides other equipment, has two large open throat presses.

Corrigan, McKinney Steel Co.

The Corrigan, McKinney Steel Co., Cleveland, finished the erection of a 12-in. merchant bar mill, which was placed in operation in February, 1927. This completed this company's finishing mill building program, which included a 10-in. mill completed late in 1926. No other extension work was done last year and the company does not contemplate any new construction work in 1928.

Interstate Iron & Steel Co.

The Interstate Iron & Steel Co., Chicago, added two 100-ton open-hearth furnaces to its melting department last year. Early this year the company expects to complete one 18-in. continuous billet mill which has already been started.

Wisconsin Steel Co.

The Wisconsin Steel Co., Chicago, has under construction at its steel works, located at South Chicago, two additional 100-ton open-hearth furnaces which it is expected will be ready for operation about the middle of this year. No other construction is contemplated this year.

Other Steel Works Additions

The Lukens Steel Co., Coatesville, Pa., last year installed a new 84-in. 4-high tandem plate mill, which has a capacity of approximately 4000 tons per month.

The Gulf States Steel Co., at its Alabama City, Ala., works, plans to install this year four 900-hp. boilers; two 60,000-cu. ft. per min. turboblowers; electric generators of 10,000 kwhr. capacity, together with condensers, water supply reservoir and standpipes. The company also expects to completely electrify the drives on the present rod mill.

The Jessop Steel Co., Washington, Pa., last year installed a 10-in. mill and cold rolling mills which are now in production. A new pickling shop was erected and the electric furnaces department has been considerably expanded.

The Firth-Sterling Steel Co., McKeesport, Pa., has added a Swindell annealing furnace to its equipment during the last year and contemplates adding more units during 1928.

The Laclede Steel Co., St. Louis, last year completed a 5-stand, 4-high continuous 10-in. finishing mill which supplants a 5-stand, 2-high, 10-in. looping mill.

Blast Furnace Construction

ADDITIONS to capacity last year were limited entirely to enlarging and rebuilding old blast furnaces. Some of the improvements reported are as follows:

The Hamilton Coke & Iron Co., Hamilton, Ohio, succeeded the Hamilton Furnace Co. on May 10, 1927. The new company is now relining the blast furnaces and increasing the hearth diameter from 16 to 17 ft. The stoves are being relined to increase the heating capacity and pressure burners are to be added. Improvement of the gas cleaning process is also contemplated. There is under construction a coke plant consisting of 45 new Koppers ovens of the Becker type with complete by-product recovering plant together with a gas holder having a capacity of 5,000,000 cu. ft.

Witherbee, Sherman & Co., Port Henry, N. Y., are increasing the capacity of the sintering plant by the addition of two pans. When this is completed, probably in February or March, the total sintering capacity of the company is expected to be about 2000 to 2200 tons per day.

The Hanna Furnace Co., Cleveland, made several improvements during the year to its blast furnace plant at Detroit, Mich. A new two-strand pig machine was erected and slag pits were installed at both furnaces. New open top pig iron ladles were provided, these having a capacity of 90 tons or sufficient to hold the entire furnace cast. A crane was installed to serve the pig machine and pouring stand and a crane house was erected. An electric locomotive was purchased to handle the ladles.

The Reading Iron Co., Reading, Pa., enlarged the hearth of its Keystone furnace and rearranged the tuyeres, thus increasing the production by about 25 per cent. A new sintering plant was installed at this furnace for treating magnetic concentrates from the company's mine at Wharton, N. J.

The Zenith Furnace Co., Duluth, Minn., has contracted for 41 Koppers coke ovens with a capacity for carbonizing 1000 tons of coal per day. Contracts have also been let for two 10-ton coal bridges and for building an extension to the company's coal dock. It is expected that the new coke ovens will be ready for operation by next fall. It is stated that the improvements will involve an outlay of between $2,000,000 and $3,000,000.

The Toledo Furnace Co., Toledo, Ohio, started the erection last year of a 10,000-hp. boiler plant which is nearing completion. This has three units fired with blast furnace gas and two stoker-fired units. This company during the year installed a second 10,000-kw. turbogenerator in its power plant.

The Shenango Furnace Co., Pittsburgh, completed and put into operation a modern, thoroughly equipped, ingot mold foundry on its blast furnace property at Sharpsville, Pa. This is equipped to turn out 20,000 tons or more of ingot molds per month, taking molten metal from the furnaces.

Additions to Rolling Mills

MOST of the increased capacity for rolling steel was made last year by steel-making companies and details of these improvements are included under the individual reports of such companies. Only a few separate reports were received as follows:

Reading Iron Co., Reading, Pa., placed in operation last year a 16 in.-12 in. Belgian mill for rolling skelp up to 8 in. wide. This mill is equipped with automatic flying shears, weighing devices, etc. The roughing and finishing stands are motor driven and the mill will have a production of about 2500 tons of wrought iron skelp per month. This new mill takes the place of the one at Columbia, Pa., which has been abandoned. A new boiler house at the company's tube works department was completed and placed in operation in 1927. A complete new galvanizing department, including a finishing department for threading and finishing galvanized pipe, is scheduled to be completed this year.

The Oliver Iron & Steel Corporation, Pittsburgh, rearranged and added to its equipment last year for the manufacture of a full line of telephone, telegraph, electric railroad and power construction material.

Extensions to Foundries

FROM reports received, improvements and additions of any consequence to foundries were meager last year. A summary of the reports is as follows:

The Eastern Steel Castings, Newark, N. J., made last year general improvements on its open-hearth furnace for the purpose of making it more suitable for duplexing with the electric furnace. There was also installed sand handling and conditioning equipment serving the foundry by the overhead hopper system direct to the molding machines. A complete floor roller transit and storage conveyor system serving the foundry's entire molding department was added. A special high-speed monorail pouring equipment was also completed, and the chemical and physical laboratory including research department was enlarged. There has been installed a complete roller conveyor system throughout the cleaning department for the continuous movement of castings from the shake-out department to the shipping department.

The Bonney-Floyd Co., Columbus, Ohio, added a 15-ton basic open-hearth furnace to its melting department which gives the company two 15-ton furnaces and two 3-ton acid electric furnaces for its equipment.

The Reading Steel Casting Co., Reading, Pa., expects to purchase during 1928 about $15,000 to $20,000 worth additional machine tools.

The Adirondack Steel Foundry Corporation, Watervliet, N. Y., expects to install in 1928 a small electric furnace for making alloy steel castings.

Sales of Electric Furnaces Not Large in 1927

A SATISFACTORY and complete review of the electric furnace steel industry for 1927 is impossible—due to inability to secure adequate information. Fewer data are available this year than last. Therefore only a partial picture of the general situation can be presented. Such information as is available is based entirely on furnaces sold during 1927.

Duplication of records in recent years is reported by the Pittsburgh Electric Furnace Corporation, Pittsburgh, which sells the Moore or "Lectromelt" furnace. This company states that 25 furnaces of commercial size for use in the domestic iron and steel industry were sold last year. This compares with 18 furnaces in 1926, with 26 in 1925 and with 24 in 1924. There have also been sold eight laboratory size furnaces and six special furnaces which are credited to the ferroalloy and refractory industries.

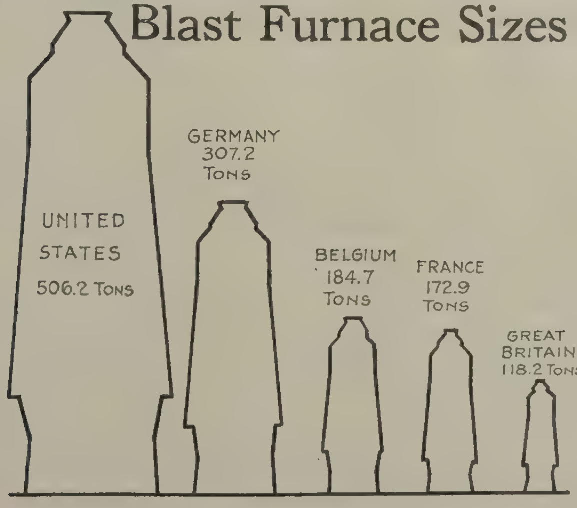
The Pittsburgh company reports that 10 furnaces have been sold for use in foreign countries. This is stated to have been "the most interesting development, all furnaces shipped abroad being in the upper range of sizes built by the company."

The Greene Electric Furnace Co., Seattle, Wash., sold one furnace in 1927 and installed two.

The development on a commercial basis of the high-frequency electric furnace seems to have made progress. The Ajax Electrothermic Corporation, Trenton, N. J., states that several commercial furnaces of 100 to 150 kw. capacity have been sold for use in melting ferrous and non-ferrous metals in England, Sweden, France and Germany. Designs are completed for a 1-ton steel melting furnace. Two 60-kw. furnaces are in use for experimental work in American laboratories.

Unofficial information is conflicting as to the sales of other furnaces. Including the Heroult and Swindell furnaces reported sold from the information available it seems that a fair estimate of the total number of electric furnaces sold last year was not more than 30.

Blast Furnace Sizes of World's Leading Iron Producers



OUTPUT of pig iron by the five principal pig iron producing countries in 1927 showed clearly the variation in size of their average stacks. Dividing total production during the major portion of the year by the average number of furnaces in blast, and the number of days covered in each case, the results are shown in the diagram. German furnaces are averaging larger than formerly, due to recent additions of several stacks comparable in size with current practice in the United States. In the remainder of Europe, however, the size is relatively small. It compares with what the United States was using 30 years ago.

Heights in the diagram are proportional to the average daily tonnage outputs of blast furnaces in the several countries.

Reduction of 20 Per Cent in Steel Export Rates Becomes Effective

WASHINGTON, Jan. 3.—Railroad rates on iron and steel products for export through Atlantic ports from Central Freight Association and Trunk Line territories were reduced 20 per cent, effective midnight, Dec. 30. The new tariffs of the carriers became operative as the result of the action of the Interstate Commerce Commission at a conference on Friday of last week refusing to suspend the schedules. Generally, the reductions amount to approximately $1 per ton. Indicative of the reductions per 100 lb. are the following: Pittsburgh-New York rate, from 25.5c. to 20.5c.; Pittsburgh-Baltimore, from 22.5c. to 17.5c.; Pittsburgh-Philadelphia, from 23.5c. to 18.5c.; Chicago-New York, from 42.5c. to 34.5c., the latter being a cut of $1.60. The schedules are filed as "experimental tariffs" and are intended to stimulate exportation of American iron and steel products. Should the schedules prove effective in this direction it is understood that they will be allowed to remain in effect. Otherwise they will be canceled by the carriers after one year. The tariffs provide for an increase of 25 per cent in the carload minimum weight, going to 45,000 lb. from 36,000 lb.

The carriers were joined by the United States Steel Products Co., exporting subsidiary of the United States Steel Corporation, and independent steel producers in the Pittsburgh and surrounding districts in asking the commission to permit the schedules to become operative. The tariffs were opposed by the Bethlehem Steel Co. and other Eastern steel makers, together with farmers' organizations of Kansas.

Ask Reconsideration of Pipe Rates to Southwest

WASHINGTON, Jan. 3.—Reconsideration of the rates prescribed on wrought iron and steel pipe in its decision in the Consolidated Southwestern cases is asked in a petition filed with the Interstate Commerce Commission by the Prairie Pipe Line Co. and the Prairie Oil & Gas Co. It is asserted that the bases prescribed bring about large increases in the rates on pipe and fittings from all producing points to destinations in the Southwest. The recent oil development in western Texas, the petition says, would be greatly hampered by the increases proposed in transporting pipe and other supplies into that section of the country.

The average of the present rates from Chicago to Kansas, Oklahoma, Arkansas, Louisiana and Texas, the petition declares, is 60.5c. per 100 lb., while it would be 71.5c. under the proposed rates. From St. Louis, the average present rate to the five States is 52.6c., which would be increased to 60.2c. The average of the present rates from Memphis is 48.5c. and would be increased to 54.6c. The average rate from Pittsburgh to Kansas, it is pointed out, would be reduced 3c. and to Oklahoma 0.5c., but to the other three States there would be substantial increases. The average increase to Arkansas, it is said, would be 1.2c.; to Louisiana, 4.8c., and to Texas, 13.2c. Taking the five States, the present average is said to be 83.4c., and it would be 87.6c. under the proposed rates. The average of the present rates from Pittsburgh to the towns from Amarillo to Sweetwater, Tex., inclusive, is 96.9c., and would be increased to $1.032.

European Hematite Agreement Possible

HAMBURG, GERMANY, Dec. 20.—Negotiations have been instituted between the Franco-Belgian Hematite Pig Iron Association, recently reorganized, and German hematite iron producers, relative to an agreement to eliminate competition in foreign markets. Although negotiations for such agreements among producers of other grades of iron have failed, success is expected in this instance.

American Exports Have Shown Substantial Growth

WASHINGTON, Jan. 3.—In an annual review for 1927, Director Julius Klein of the Bureau of Foreign and Domestic Commerce, Department of Commerce, reports that our foreign trade has continued to show remarkable growth in spite of a general lowering of world price levels and a moderate reduction in the activity of domestic business compared with 1926 figures. "Our exports have shown a substantial growth," said Dr. Klein, "indicating a further strengthening of our position in world markets, while the maintenance of our imports at about the same high level as in 1926 indicates the general prosperity of our country."

Great progress is declared to have been made in the past in increasing the efficiency of production. This is held to be true not only of the manufacturing industries but also of agriculture. The truly encouraging feature of 1927 developments, Dr. Klein said, has been the increasing interest shown in regard to methods of improved efficiency in distribution which were said to be still relatively expensive. Dr. Klein declared that there is undoubtedly a large amount of waste which could be eliminated in these processes and that substantial progress has been made toward a more careful appraisal of costs of selling, market analyses, etc.

Fifty Per Cent Increase in Cast Iron Pipe Duty Proposed

WASHINGTON, Jan. 3.—Correspondence has been taken up with the United States Tariff Commission by American makers of cast iron pipe, who are said to have in view the filing of an application seeking an increase of 50 per cent in the present duty on that product, which now carries a rate of 20 per cent ad valorem. Imports of cast iron pipe from France has been a particular source of discussion in the domestic trade. Total imports of this product for the 11 months ended with November, 1927, amounted to 78,657 gross tons, of which 61,002 tons come from France; 14,185 tons from Belgium; 1813 tons from Germany, and 1595 tons from Czechoslovakia. During the corresponding period of 1926 cast iron imports totaled 71,779 tons, while during the 12 months of 1926 the aggregate was 83,873 tons. Of this latter quantity, France supplied 57,354 tons; Belgium, 22,248 tons; Germany, 2013 tons, and Czechoslovakia, 574 tons.

German Ore Imports Have Been Large

HAMBURG, GERMANY, Dec. 20—Imports of metallic ore in the first 10 months of this year totaled more than 20,000,000 metric tons, about double the imports of 1926. The total of iron ore imports was 14,869,957 compared with 7,429,018 tons in 1926; of manganese ore 330,400 compared with 135,583 in 1926 and of copper ore 205,411 compared with 100,538 tons in 1926. Imports of all other ores this year totaled about 170,000 metric tons.

Steel Companies Get Tax Refunds

WASHINGTON, Jan. 3.—Among tax refunds of $103,858,687 made by the Treasury Department to 240,000 taxpayers, as reported by Secretary Mellon to Congress last week, are the following: J. H. Hillman & Sons Co., Pittsburgh, $899,906; American Sheet & Tin Plate Co., Pittsburgh, $54,735; Oliver Iron Mining Co., Duluth, Minn., $56,595; Carnegie Steel Co., Pittsburgh, $38,619; Alloy Steel Corporation, Canton, Ohio, $36,623; Sloss-Sheffield Steel & Iron Co., Birmingham, $36,556; the Link-Belt Co., Chicago, $61,198; Atlas Crucible Steel Co., New York, $127,352; Union Twist Drill Co., Athol, Mass., $159,426; Colorado Fuel & Iron Co., Denver, $669,130; Harrisburg Pipe Bending Co., Harrisburg, Pa., $254,767.

JOHN S. KEEFE, PRESIDENT

Succeeds W. P. Palmer as Head of American Steel & Wire Co.—Other Changes

JOHN S. KEEFE was elected president of the American Steel & Wire Co. on Dec. 28, succeeding the late William Pendleton Palmer. Mr. Keefe had been vice-president and a director of the company since 1901, maintaining headquarters in Chicago. During the illness of Mr. Palmer in the last year he has been active in the administrative affairs of the company, dividing his time between Chicago and Cleveland. He has served as chairman of the traffic committee of the United States Steel Corporation since 1903, and this, together with earlier training in traffic management, has made him one of the best informed men on transportation problems in the steel industry.

Born at Boston on Jan. 24, 1864, Mr. Keefe attended the public schools in that city. In 1880, he went to Milwaukee, and soon after was employed by the Chicago & North Western Railroad. In 1889, he was appointed traffic manager of the Illinois Steel Co., and upon the formation of the American Steel & Wire Co., in 1899 he was made its general traffic manager, holding that position until 1901, when he was elected vice-president. Headquarters of the president of the company will remain in Cleveland, but Mr. Keefe does not plan to give up his residence in Chicago immediately.

Frank Baackes, who last week was named senior vice-president in charge of commercial matters for the American Steel & Wire Co., was made general superintendent of the company at its inception, and the following year was appointed general sales agent. He was later elected vice-president and general sales agent. He was born in Germany in 1863 and came to this country in 1889. He was first employed by the H. P. Nail Co., Cleveland, and in 1894 was in charge of the erection of a wire plant at Beaver Falls, Pa., for the Hartman Steel Co. He was instrumental in the organization of the Salem Wire Nail Co., Salem, Ohio, in 1895, remaining with that company as superintendent and general manager until its absorption by the American Steel & Wire Co. of Illinois in 1897, of which he was general manager until the organization of the present company.

D. A. Merriman, Chicago, has been made general manager of sales and a director of the American Steel & Wire Co. He began his career with the Ludlow-Saylor Wire Co., St. Louis. Resigning as secretary of that company in 1893, he became manager of the Consolidated Steel & Wire Co., in which capacity he had charge of sales, traffic and mills. In 1899, when the Consolidated company was merged in the American Steel & Wire Co. of Illinois, Mr. Merriman went to Chicago as manager of sales for the new company. In 1900, he located in Seattle as president and treasurer of the Puget Sound Wire & Steel Co. When that company was acquired by the American Steel & Wire Co. in 1902, he returned to Chicago as assistant general manager of sales for the latter. He is serving his second term as president of the American Hardware Manufacturers' Association.

Henry A. Barren, the new vice-president in charge of operations of the American Steel & Wire Co., has been general superintendent since 1924. His first employment was with the old Cleveland Rolling Mill Co. at Newburgh, Ohio, when he was 15 years old. Entering Ohio State University in 1882 he spent three years on a special course in engineering and drafting, returning to the rolling mill as a draftsman. In 1891, he became master mechanic of the plant, retaining that position when it became the Newburgh Steel Works of the American Steel & Wire Co. He was made superintendent of the plant in 1901, retaining that position until Jan. 1, 1912, when he was appointed general superintendent of the company's steel works and blast furnaces in the Cleveland and Pittsburgh districts. He held this position until he became general superintendent for the company.

C. F. Blackmer has been made superintendent of wire mills for the American Steel & Wire Co. He has been active in operating capacities in the steel wire industry since 1898 and, like Mr. Keefe, the new president of the company, was originally a railroad man. Born in Worcester, Mass., he was only eight years old when his family went West and located in Colorado Springs, Colo. He grew up in that city and attended Colorado College, Colorado Springs. For the next few years he was in the employ of the Midland Terminal Railway in Cripple Creek and in 1898 went to work for the Washburn-Moen Mfg. Co., Waukegan, Ill., now the Waukegan works, American Steel & Wire Co. He was assistant superintendent of that works in 1922, when he was transferred to Duluth, Minn., to take charge of the construction of the wire plant of the Minnesota Steel Co., of which he became superintendent. He held that position until early in 1925, when he was appointed assistant manager of mills in the Pittsburgh district, embracing the mills at Farrell, Rankin, Braddock, Donora and Allentown, Pa., with headquarters in Pittsburgh. The day he was to have taken that position, George Jewett, Pittsburgh district manager, died and Mr. Blackmer was named to succeed him. In his new capacity Mr. Blackmer will be located in Cleveland.

Leslie J. Gray, who has been appointed assistant to the president, has been assistant to the general superintendent for 15 years. He entered the employ of the company more than 25 years ago in the office of the head of the operating department in Pittsburgh and was transferred to Cleveland when the office was removed there about 18 months ago.

Koppers Co. Buys Coal Properties in West Virginia

The Koppers Co., a subsidiary of the United Gas Improvement Corporation, has purchased the Houston Coal & Coke Co., Houston Collieries Co., Keystone Coal & Coke Co., King Coal & Coke Co., and the Tidewater Coal & Coke Co., all located in West Virginia and covering approximately 27,000 acres for $20,000,000. The new owner proposes to ship coal to New Haven., Conn., via Hampton Roads in 3000 ton colliers. If deeper water is provided by dredging at New Haven, larger boats will be used.

It is expected the Koppers Co. this year will become an active competitor of the New England Coal & Coke Co. and the Providence Gas Co., both of which have dominated the New England by-product foundry and domestic coke market.

Decline in Steel Shipments on Mississippi River

The Mississippi-Warrior (Federal barge) Service handled less iron and steel traffic between St. Louis and New Orleans in the first 10 months of 1927 than in the corresponding period in 1926, according to a statement supplied to THE IRON AGE by the Mississippi Valley Association, St. Louis. Shipments of bars, sheets and structural material totaled 15,223 tons in the 1927 period, as compared with 22,854 tons in the corresponding period in 1926. The movement of pipe in 1927 totaled 12,757 tons, as against 14,453 tons in 1926. No shipments of pig iron and steel blooms were reported in 1927, while 57 tons was handled in 1926. The movement of track material, however, showed a gain, totaling 686 tons for the first 10 months of 1927, as against 272 tons in the corresponding period of 1926.

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This Issue in Brief

New records set in world output of iron and steel. Pig iron production was 84.3 million gross tons, a gain of 7.6 millions over 1926. Steel output was 98.2 million gross tons, 6.4 millions over 1926.—Page 67.

Forecasts large building expenditure in 1928. Construction authority believes the total will reach seven billion dollars. 1927, with a total of 6.8 billion dollars, was only 2 per cent under 1926, the record year.—Page 43.

Prosperity of essential industries depends upon absorption of surplus labor by the luxury industries. Unless the labor released by high-production machinery finds gainful employment elsewhere, buying power will be curtailed, says industrial engineer.—Page 53.

Industry is migrating to the Indiana-Ohio-Michigan section. The march of industry is not necessarily westward, for the West, as well as the East, has contributed to the industrial growth of these three States. The center of industry is now near Columbus, Ohio.—Page 30.

Handling materials by machinery, rather than by men, characterizes American foundries, says foreign foundryman. Americans have been quick to sense the savings to be made by mechanical-handling, inasmuch as more than 100 tons of materials must be handled for every ton of castings produced. —Page 33.

Smaller enterprise has as good, if not better, possibilities for reduction of real costs than has the very large establishment. Overhead sometimes gets topheavy in the big organizations. The small manufacturer has better control of labor, and can adjust his product and manufacturing processes more quickly and economically to changes in market conditions.—Page 21.

Leadership by the ablest men is the greatest factor in American industrial supremacy, says foreign manufacturer. Here, with freedom from castes, the fittest naturally rise to the top. Europe is hampered by the selection of leaders by birth, rather than ability.—Page 32.

Automotive industry may have greatly increased output in 1928. A production of 4.5 to 5 million vehicles is predicted. The previous record was made in 1926, with slightly less than 4.3 millions. 1927 output was 3,357,000.—Page 45.

Losses are only increased by clinging to the idle hope that peace-time volume will fill up war-time excess plant capacity. Economic position of industry will be strengthened by scrapping surplus, obsolete equipment, and abandoning unprofitable and unnecessary manufacturing capacity.—Page 42.

No business, small or large, can be conducted efficiently without a budget. The small business can install a budget more easily than can a large one. It will then have facts, rather than mere opinion, by which to chart its course.—Page 26.

Keep your gains or losses on material purchases in a separate account. Speculations in materials should not be permitted to throw the operating account and the cost system out of gear, but should be entered directly in the capital account.—Page 26.

"Finance" may take in its sails in 1928, while "industry" expands, reversing the experience of 1927. Business may expand in 1928, in spite of some recession in stocks and bonds, says Dr. Haney. Deflation of "finance" will be brought about by higher interest rates.—Page 12.

Demand for better steel has been a blessing in disguise to steel makers. The standards of making steel have been raised so much in recent years that tonnage producers are now turning out steel which, not many years ago, would have been furnished by a maker specializing in high grade steel. —Page 38.

Should steel contracts be made binding? Sellers declare that profits are dangerously low and that they need the protection of contracts fixed both as to price and tonnage. But purchasing agent declares that in present era of short term buying industral purchasers need the cooperation the current form of contract gives them.—Page 62.

Brighter prospects for steel jobbers in 1928. Mills have found that small orders are costly to handle, and the tendency is to let this business go to the jobber.—Page 48.

Early improvement in general business is forecast by Dr. Haney. The P-V Line points upward. Commodity prices are not likely to show a sharp advance nor a large decline. They may advance somewhat in the early part of 1928, then recede a little, and then show irregular recovery.—Page 77.

1927 rolled steel output was **8 per cent below 1926,** the record year. Estimated output 32,039,000 gross tons. Building construction was greatest consumer, taking 22 per cent of total. Railroads took only 19 per cent, as contrasted with 23.5 per cent in 1926.—Page 6.

1927 pig iron output 7.8 per cent under 1926. Production was 36.4 million gross tons. Steel ingot output totaled 43,250,000 gross tons, 8 per cent under 1926, the record year.—Page 3.

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Steel Marketing in 1928

CLEARLY a pivotal point in steel trade prosperity in 1928 will lie in marketing practices, which are to undergo an interesting and indeed crucial test. Tonnage is not to be considered a market factor in the sense that obtained in the old days, when there were wide variations in output from year to year. When we see the fairly uniform production of the past five years, under variant trade conditions, we conclude that even with some slackening in general business steel tonnage would hold up quite well. On the other hand there is no visible chance that for this one year, at least, demand can so expand as to test the productive capacity. Steel ingot production last year was approximately 75 per cent of 58,000,000 tons, which was reported as "theoretical capacity" for the beginning of that year.

The tonnage of 1928 is likely to fall within such limits that it will not in itself exert much influence upon the price situation. This will have to be handled by the producers themselves, by more enlightened methods and a greater spirit of cooperation. Everything is now set at the opening of the new year for display of ability in these directions.

In five important lines—bars, shapes, plates, sheets and wire nails—price advances have been in the making, each product presenting its own case as to how soon actual invoice prices will equal the higher levels named. Thus the circumstances of substantial tests have already been set up.

Producers need to consider not only the individual attitudes of sellers as to price maintenance, but also the machinery by which prices are quoted, involving both the differentials or extras for size, gage, etc., in lines which are supposed to have a "base price," and also the extras to be charged on retail lots shipped by mills.

In some lines producers have recently proceeded by the cut and try method. Some extras for smaller quantities have been set up and shortly afterward modified, presumably on account of opposition by buyers. It ought to be found possible to develop in each line such extras as would not be onerous upon buyers and at the same time would protect producers from loss in making small-lot shipments. A difficulty in some products has been that the manufacturing consumer and the jobber are in different positions as to the quantity of a size required at one time, and thus a schedule of quantity extras that does not bother the average manufacturer may be quite objectionable to the jobber.

When, as in strips, there is a published list of size and gage extras and a wide variety of base prices is quoted in the open market, it is obvious that something is wrong. Such a list presupposes a uniform base price. By sufficiently long practice the principle has been established in some lines, notably in merchant bars. In 1926 it developed that with the existing schedule of gage differentials in sheets, related to 28 gage as base, there was more shading on the heavy than the light gages. The sheet industry thereupon set up new differentials, based on 24 gage, as of Sept. 1, 1926, and the matter was corrected.

Along these and related lines there is opportunity for much constructive effort in 1928. Improvement in steel marketing conditions should come from within the steel producing industry.

How Thrifty Are We?

SAVINGS of the American people in the banks and trust companies are well over $26,000,000,000, according to the savings bank division of the American Bankers' Association, this amount comparing with about $24,700,000,000 a year ago. Of the addition to national savings for the year, approximately $1,300,000,000, something like $750,000,000 represented interest on the sum already on deposit, leaving only a little over $500,000,000 to represent new deposits. The gain of $1,300,000,000 is the lowest in 12 years.

It is estimated that the premiums paid in 1927 for life insurance were considerably in excess of such payments in 1926. Building and loan savings and the purchase of corporate securities by corporate employees are also expected to show increases for 1927.

These data are becoming the subject of editorial and other comment to the effect that the American people are increasingly thrifty and are adding increasingly to their resources.

Obviously such deductions do not follow at all from the facts, which need not be questioned. A man's wealth is seldom measured by the magnitude of his bank balance. The latter is a crystallization of credit available for immediate needs. His wealth is in documents representing ownership of land, mines, buildings, factories, railroads and interests in going business concerns.

Even the deposits which give to some people credit to their account in a savings bank must be invested by the bank, directly or indirectly, in some form of real wealth. It is only the forms of real wealth that appear in a national inventory. The deposits in savings banks, or in any other banks, do not so appear at all. The answer to the inquiries whether we are nationally gaining in wealth, whether we are saving enough, whether we are sufficiently thrifty, etc., must therefore be how much we are gaining in inventory. Unfortunately the status of economic science does not permit the giving of such an answer, at least not with precision and certainly not year by year.

We may have such a paradox as gaining in savings bank deposits, life insurance, etc., and losing in national wealth. The explanation of this would be that savings bank deposits are the expression of the thrift of a certain class of people. It may be that one class is thrifty while another class is not. Indeed, one class may gain at the expense of another class. The factors that are commonly recognized as being evidences of thrift may not be so at all in national terms.

World Steel Output at New High

NEW records in the world's pig iron and steel output, and in exports as well, were made last year, due to the expansion of the industries of Europe. Several features stand out in the survey, found on other pages, covering all producing countries.

Pig iron no longer lags. At 84,280,000 gross tons for the year, the 1913 or pre-war record is exceeded for the first time, the margin being about 6,560,000 tons, or nearly 8.5 per cent. The 1927 total was larger than that of 1926 by 6,610,000 tons.

In steel the new world total was 98,200,000 tons, topping the previous record of 91,790,000 tons in 1926 by 6,410,000 tons, or about 7 per cent. The growth in the world's steel needs is emphasized by the contrast between last year and 1913. Steel production is 31 per cent, while pig iron is only 8.5 per cent, larger than that of the pre-war year.

Expansion in Europe—not in the United States—accounts for the 1927 records. While American production shrank, the European output was about 10,000,000 tons larger in both pig iron and steel than in 1926, more particularly due to increases in Germany and Great Britain.

For the second time since the war, exports of the six leading nations were larger than in 1913, establishing a new record at 20,590,000 tons. This compares with 17,710,000 tons in 1926 and contrasts with 16,190,000 tons in 1913. Especially interesting is the fact that, although imports for all the six countries were at a new high for the year, the excess of exports over imports was back to the level of the pre-war year.

With the European industry on a more nearly normal basis, with the outlook for the American industry good, and with world-wide interchange of products broader than in many years, the world's steel industry enters 1928 with brighter prospects than have marked the beginning of any year since the war.

Problems of Big and Little Business

SINCE the major articles in this Annual Review Number are written by leaders in the respective fields, it is reasonable to deduce from them broad conclusions about the condition of the metal-working industry. A review of all these contributions (together with a few which must be printed next week) shows that 1927 continued the progress toward efficient production which has marked recent history.

More rapid, more accurate machines have been built and installed and the capacity of existing plant measurably increased by refinement in detail. More power is continually being harnessed; production costs are trimmed by labor-saving devices of many sorts. The total result is that most American manufacturers can produce much, can easily produce more than they can sell easily—in other words our manufacturing capacity is over expanded. Plant and labor are working less than full time.

Hence the importance of salesmanship. Engineers and production men who can increase output are plentiful; but sales managers who can dispose of the output in old fields or recognize commercial possibilities in new ones are not so plentiful. Intense competition for the existing market has frequently driven prices down to a point where profits are unsatisfactory. Even though production costs are lowered, selling costs are increasing. Market investigations, sales promotion service work, and all the expensive incidentals required to get and hold a customer have increased apace. Hence the development of trade associations, so that whole industries can meet competition shoulder to shoulder. Hence the invention of "consumer credit" or instalment buying of luxuries under a new name.

Here are our two problems in a nutshell: Surplus manufacturing capacity; excessive selling costs.

They involve a third, which just recently has been attracting attention, namely, underemployment. With every labor-saving refinement in a mechanism comes a decreased demand for labor—usually it is the least skilled that is eliminated. An unexampled amount of road building and engineering projects have absorbed much common labor, but with the continuing "mechanization" of construction plant, of the farm, the coal mine, the factory and the home, there are fewer and fewer places for him to turn his hand. It is to be hoped that this condition will not work back through the higher grades of labor, with decreased consumer income and decreased consumer credit, in a vicious cycle.

Stating these problems by no means implies a pessimistic outlook. Knowing the difficulties in advance, a wise man can lay plans to avoid them or surmount them. And these problems are not exclusively the problems of big business. The problems of the large corporation and of the small independent are different in degree rather than in kind.

In the past the small manufacturer has frequently been obscured by the glare of the giant concern. Mr. Ford and Mr. Schwab are always news. Furthermore, statisticians are fond of pointing out that 70 per cent of the output in such and such an industry comes from 13 per cent of the plants. The implication is that the 30 per cent of output and the 87 per cent of plants are quite unimportant. As a matter of fact their extinction would precipitate a most acute industrial and sociological crisis.

While it is impossible to say where the small business ceases to be small and becomes big, an organization whose manager can call the employees by name is doubtless to be classified as "small." Many things about such an enterprise compare favorably with the great industrial giant. It may be equally efficient and prosperous. It is far more flexible, and it may develop to the highest degree individual initiative and satisfaction in a sound achievement. The problems and successes of the small business man are worth more attention than they have been given in the past, for these enterprising and independent Americans are the salt which savors the whole mass.

Billion-Ton Mark in Pig Iron

BEFORE the end of 1928 the United States will have made one billion gross tons of pig iron. At the average rate of the past five years it would require only 27 years to make this amount, but 63 years ago a million tons was made in a year and 29 years ago ten million tons. Having come years ago to occupy a very wide field, iron tonnage has not increased of late by the percentage rates that used to obtain.

The Abram S. Hewitt rule of doubling in pig iron tonnage every ten years worked very well through 1910, but since that year gains have been smaller. The following table gives an interesting retrospect, showing ten-year totals of production, with percentage increases one decade over the preceding:

Ten Years Through	Production, Gross Tons	Increase, Per Cent
1867	8,760,578	.....
1877	19,984,735	128.2
1887	42,484,217	112.6
1897	82,236,958	94.0
1907	181,470,757	120.6
1917	284,708,343	56.9
1927	335,250,000	17.7

No geometrical rate of increase could be followed indefinitely. Naturally when the industry became large it had to slow down in its percentage gains, but another principle also operated. For a long time there was little if any improvement in quality. Then as a large proportion of the pig iron came to be put into steel instead of into iron castings, and the steel came to be improved, the strength and service per ton increased, and it is now increasing. The total usefulness, therefore, is not to be measured merely by tons. The increase is much greater than the tonnage increase.

A corresponding comparison of production of steel ingots and castings is as follows:

Ten Years Through	Production, Gross Tons	Increase, Per Cent
1907	153,361,430	230.7
1917	293,799,823	95.7
1927	397,800,000	35.4

SHEET MERGER EFFECTED

Empire Steel Corporation Is Formed by Consolidation of Six Ohio Companies

THE Empire Steel Corporation has been incorporated to acquire and combine the plants of six Ohio sheet mills, for the merger of which plans have been under way for some time. The combined assets of the merged companies are approximately $20,000,000. The companies to be merged are the Mansfield Sheet & Tin Plate Co., Mansfield; the Ashtabula Sheet Steel Co., Ashtabula; the Empire Steel Co., Cleveland, and the Falcon Steel Co., Thomas Sheet Steel Co. and the Waddell Steel Co., Niles.

W. H. Davey, president Mansfield Sheet & Tin Plate Co., and the Ashtabula company, who has taken a leading part in bringing about the merger, will be president and managing executive of the new corporation. Others officers have not been selected. The location of the headquarters has not been definitely decided upon, but for the present the main office will be in Mansfield.

Approval of the merger is still to be obtained from the stockholders of the different companies, and when this is obtained the final work of consolidation will be carried out. The new company will have 60 mills, 58 being sheet mills and two, jobbing mills, and will have an annual capacity of 400,000 tons of finished products. It will also have four 75-ton open-hearth furnaces, a 32-in. blooming mill and a 24-in. sheet bar mill, these steel-making facilities being a part of the plant of the Mansfield Sheet & Tin Plate Co. All the other companies going into the combine have non-integrated plants.

The new corporation will have 550,000 no par common shares and 150,000 preferred shares of $100 par value. It has secured a charter in Ohio, and its incorporators include W. H. Davey, J. D. Waddell, Niles, president Waddell Steel Co.; A. W. Wheatley, Lima, president Empire Steel Co.; W. A. Thomas, Youngstown, Thomas Sheet Steel Co.; Lloyd Booth, Youngstown, president Falcon Steel Co.; M. C. Robinson, Ashtabula, a director of the Ashtabula Sheet Steel Co.

The tentative balance sheet of the Empire Steel Corporation as of Oct. 31, shows current assets of $3,682,820, property and equipment, $15,759,589, and other assets, $236,958. The current liabilities were given as $1,255,907, and other liabilities include first mortgage bonds, $3,650,000, and paid in surplus, $2,062,432. The capital stock to be presently issued, under the plans of the merger, includes $7,430,200 in preferred stock and 206,243 shares of common stock at a declared value of $25 a share, or a total of $5,156,081.

Ground was broken Dec. 27 for two steel buildings that will house new equipment to be installed by the Gulf States Steel Co., at its Alabama City, Ala., works. The equipment was listed in THE IRON AGE of Dec. 29, 1927, page 1794.

FABRICATED STRUCTURAL STEEL

Awards Total 36,000 Tons, With 11,500 of New Projects Up for Bids

In the last week of the year structural awards amounted to 36,000 tons, including 14,000 tons for the Chicago *Daily News* building, and 3500 tons for a bridge over the James River. Fresh projects totaled only 11,500 tons, of which the largest is 4300 tons for the Woolworth Building in Chicago. Awards follow:

New York, 5000 tons, bank building at Wall, Hanover and Beaver Streets, to Post & McCord.

New York, 1500 tons, addition to Bellevue Hospital, to Levering & Garrigues Co.

Brooklyn, 1500 tons, theater, to Hedden Iron Construction Co.

Brooklyn, 500 tons, building for E. R. Squibb & Sons, to McClintic-Marshall Co.

Utica, N. Y., 500 tons, Utica State Hospital, to an unnamed Pittsburgh fabricator.

Cleveland, 340 tons, pathological hospital for Western Reserve University, to National Iron & Wire Co.

Norfolk, Va., 3500 tons, James River Bridge, to Virginia Bridge & Iron Co.

Greenville, N. C., 165 tons, building for Greenville Foundry Co., to an unnamed local fabricator.

New Orleans, 200 tons, building for Standard Oil Co. of Louisiana, to an unnamed local fabricator.

Laurel, Miss., 350 tons, addition to Mason Foundry Co. plant, to Ingalls Iron Works Co., Birmingham.

Birmingham, tonnage being estimated, additions to city schools, to Southern Steel Works.

Chicago, 14,000 tons, building for *Chicago Daily News*, to American Bridge Co.

Chicago, 600 tons, shed for Bohnsack Brick Co., to Midland Structural Steel Co. and Blaw-Knox Co., local.

Henry County, Iowa, 325 tons, highway bridge, to Clinton Bridge Co., Clinton, Iowa.

Johnson County, Iowa, 250 tons, highway bridge, to Des Moines Steel Co., Des Moines.

State College, Pa., 860 tons, recreation building for Penn State College, to H. K. Ferguson Co.

Pittsburgh, 1000 tons, two tow-boats for Union Barge Line, to Midland Barge Co., Midland, Pa.

New Albany, Ind., 600 tons, four barges for E. T. Slider, to Midland Barge Co.

St. Marys, W. Va., 2000 tons, bridge over Ohio River, to American Bridge Co.

Cincinnati, 2000 tons, six barges for Barrett Line, to Riter-Conley Co.

Los Angeles, 550 tons, science building for University of California, to Baker Iron Works.

Hollywood, Cal., 450 tons, First National Bank, to Baker Iron Works.

Redlands, Cal., 100 tons, school auditorium, to Baker Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

St. Albans, Vt., 350 tons, three State bridges.

Bayonne, N. J., 100 tons, transmission towers for Standard Oil Co. of New Jersey.

Atlantic City, N. J., 150 tons, bridge for New Jersey State Highway Department.

Lancaster, Pa., 700 tons, passenger station for Pennsylvania Railroad.

Pennsylvania Railroad, 350 tons, bridges in Virginia.

Cincinnati, 1300 tons, Eighth Street viaduct, general contract to Foldwell & Ahlskog, Chicago.

Anderson, Ind., 500 tons, storage building, for Delco Remy Corporation.

Chicago, 4300 tons, Woolworth Building.

Chicago, 2500 tons, apartment building on Burton Place.

San Bernardino, Cal., 300 tons, Victorville bridge; F. L. Holser, Los Angeles, general contractor.

Indian Cove, Idaho, 100 tons, Snake River bridge, Perham & Rowe, St. Anthony, Idaho, general contractor.

Lovelock, Nev., 600 tons sheet steel piling for Orena Dam; Jasper-Stacy Co., general contractor.

Swan Valley, Idaho, 300 tons, Snake River bridge; bids Jan. 10.

RAILROAD EQUIPMENT

More Freight Cars Ordered—Three Roads Buy Total of 108 Locomotives

The Southern has ordered 68 locomotives, the Seaboard Air Line 25 and the Texas & Pacific 15, the largest volume of locomotive buying in some time. The Southern will build 750 freight cars in its own shops, in addition to 4750 cars ordered of car builders, and the Mobile & Ohio has bought 700 cars.

Atchison, Topeka & Santa Fe has ordered 100 caboose cars from the American Car & Foundry Co. and 100 extension side dump cars from the Magor Car Co.

Pittsburgh Railways have ordered 15 interurban passenger coaches from the St. Louis Car Co.

Central Railroad of Georgia is inquiring for 500 flat cars.

Texas Pacific is in the market for 10 caboose cars.

Seaboard Air Line has ordered 25 locomotives from the Baldwin Locomotive Works.

The Mobile & Ohio has ordered 700 freight cars, of which 250 box cars and 200 flat cars will be built by the Mount Vernon Car Mfg. Co. and 250 gondolas by the General-American Car Co. Six passenger cars also were awarded to the Bethlehem Steel Co.

Texas & Pacific has ordered 15 Texas type locomotives from Lima Locomotive Works, Inc.

Southern Railway System will build 500 gondola and 250 caboose cars in its own shop, the Lenoir Car Works. These are in addition to 4750 cars, which were reported awarded last week. This railroad has also ordered 55 Mikado, five Pacific and eight mallet-type locomotives from the Baldwin Locomotive Works.

Swift & Co. are inquiring for 300 steel underframes for refrigerator cars.

Illinois Central expects to make inquiry for 20 suburban coaches.

New York, Westchester & Boston has ordered 15 motor-passenger cars from Osgood Bradley Car Co., in addition to 10 reported last week.

Nashville, Chattanooga & St. Louis has inquired for two combination baggage and passenger cars and two baggage cars.

REINFORCING STEEL

Government Building in New York Takes 3000 Tons—3700 Tons in Cincinnati Viaduct

With 3000 tons for an Appraisers' Stores building in New York, the total of awards of reinforcing steel in the week was more than 6600 tons. Award is expected shortly of 3700 tons for a viaduct in Cincinnati. Awards follow:

Birmingham, tonnage being estimated, two city schools, to Connors Steel Co.

Chicago, 500 tons of rail steel bars, Medinah Athletic Club, to Inland Steel Co.

St. Louis, 300 tons, warehouse for Stix, Baer & Fuller Co., to Missouri Rolling Mills Corporation.

New York, 3000 tons, United States Appraisers' Stores; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

Elizabeth, N. J., 800 tons, concrete decks for bridge over Arthur Kill from Elizabeth to Howland Hook, S. I.; from Albert Volk, Inc., general contractor, to E. T. Edwards, Columbia, Pa.

Silvis, Ill., 100 tons of rail and billet steel bars, building for Swift & Co., to Olney J. Dean & Co.

Pittsburgh, 200 tons, Grant Building, to Truscon Steel Co.

Los Angeles, 1740 tons, for Puddingstone Dam, to Soule Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Cleveland, 400 tons, sales and service building for Packard Motor Car Co.

Cleveland, 500 tons, tunnel work for Cleveland Union Terminals Co.

Toledo, 400 tons, store building for Lamson Brothers.

Cincinnati, 3700 tons, Eighth Street viaduct, general contract to Foldwell & Ahlskog, Chicago.

Texarkana, Ark., 225 tons, Union Station.

Iron Output at Low for the Year

Estimated December Daily Rate Fell 1319 Tons or 1.5 Per Cent from November—No Gain or Loss in Furnaces —Year's Total at 36,232,300 Tons

WITH a large proportion of the data estimated by the producing companies, figures collected by wire on Tuesday, Jan. 3, show that pig iron production in December fell off from November 1319 tons per day or nearly 1.5 per cent. This compares with a decline in November of 1531 tons per day or 1.7 per cent.

The estimated December output was 2,695,755 gross tons or 86,960 tons per day for the 31 days as compared with 2,648,376 tons or 88,279 tons per day for the 30 days in November. As in 1926 so in 1927, December was the smallest month of the year.

The December preliminary estimate of 2,695,755 tons brings the year's total to about 36,232, 300 tons of coke pig iron, comparing with 39,070,470 tons in 1926, and with 36,403,470 tons in 1925.

Four furnaces were blown in and four blown out or banked during December, leaving the total active on Jan. 1 at 170 or the same as on Dec. 1. Of the four furnaces blown in last month, three were independent steel company stacks and one was a merchant furnace.

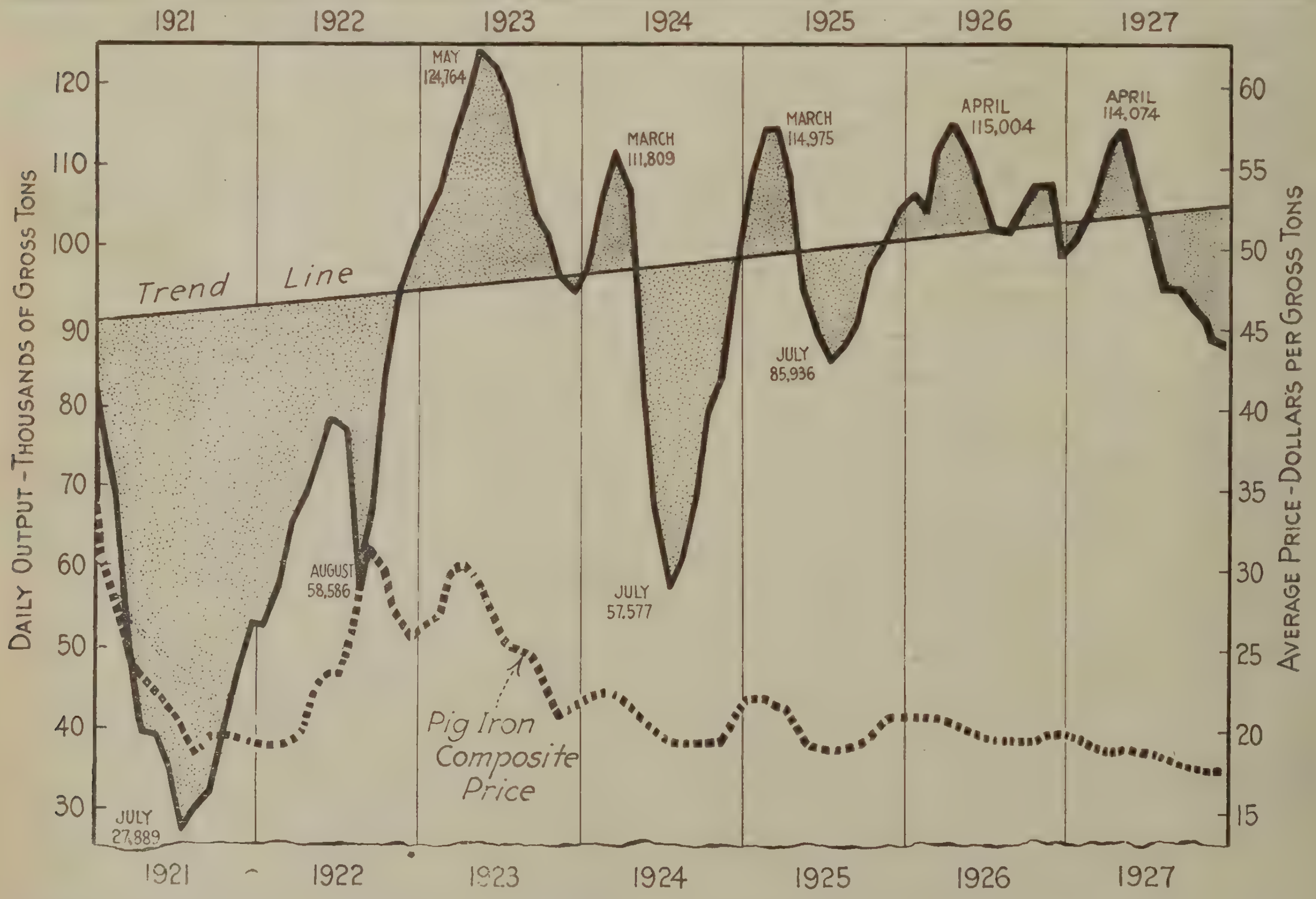
Pig Iron Production by Districts, Gross Tons

	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)
New York and Mass.	199,726	212,778	232,422	222,485
Lehigh Valley	74,316	75,748	81,829	86,398
Schuylkill Valley ...	44,238	53,269	64,260	52,256
Lower Susq. and Lebanon Valleys...	32,289	30,150	31,828	30,349
Pittsburgh district...	523,875	495,005	540,525	555,384
Shenango Valley....	58,982	64,752	77,106	83,919
Western Penna.	92,774	92,000	93,010	91,774
Maryland, Virginia and Kentucky	92,981	91,300	88,991	80,973
Wheeling district....	114,030	110,055	110,222	114,357
Mahoning Valley....	222,572	223,617	245,625	248,834
Central and Northern Ohio	295,179	306,395	324,793	311,141
Southern Ohio	32,413	32,750	32,954	25,636
Illinois and Indiana.	537,892	508,545	506,438	533,686
Mich., Minn., Mo., Wis., Colo. and Utah	140,141	126,287	121,203	122,309
Alabama	227,775	219,478	224,533	207,363
Tennessee	6,572	6,247	8,373	8,085
Total	2,695,755	2,648,376	2,784,112	2,774,949

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1925—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,930,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	2,951,160
Aug.	2,704,476	3,200,479	2,947,276
Sept.	2,726.198	3,136,293	2,774,949
Oct.	3,023,370	3,334,132	2,784,112
Nov.	3,023,006	3,236,707	2,648,376
Dec.	3,250,448	3,091,060	2,695,755
Year*	36,403,470	39,070,470	36,232,306

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in December was 1.5 Per Cent Less Than in November; Composite Price Again Decreases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

One merchant furnace and three independent steel company stacks were shut down.

Possibly Active Furnaces Reduced

One Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama and the Genesee furnace of the M. A. Hanna Co. in New York have been scrapped. This reduces the number of possibly active stacks from 359 to 357.

Furnaces Blown In and Out

Four furnaces were blown in during December, as follows: The Sharpesville furnace in the Shenango Valley, one furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania, one furnace of the National Tube Co. in northern Ohio and one furnace of the Colorado Fuel & Iron Co. in Colorado.

Four furnaces were blown out or banked during December: One furnace at the Lackawanna plant of the Bethlehem Steel Corporation and one Donner furnace in the Buffalo district in New York; the Perry furnace in western Pennsylvania, and one River furnace of the Corrigan-McKinney Steel Co. in northern Ohio.

BRITISH OUTLOOK FAVORABLE

European Competition Diminishing—Year's Imports of Iron and Steel Estimated to Have Exceeded Exports

(*By Cable*)

LONDON, ENGLAND, Jan. 2.

THE year opens with the iron and steel markets quiet following the holidays, but prospects regarded more hopefully as Continental competition with Cleveland producers has diminished. There are 40 Cleveland furnaces in blast and producers expect to blow in additional furnaces in the near future. Hematite iron is quiet and makers are inclined to grant small concessions on large tonnages. Foreign ore continues idle.

Steel business has been quiet as most works were closed during the past week. Some makers are moderately well booked, especially on small bars, rivets, bolts and nuts. Mills rolling plates and angles, however, are insufficiently well sold to permit of full time operation.

Tin plate has been moderately active, although most works closed for a compulsory holiday under the restriction of output plan. Inquiry is good and the outlook distinctly more favorable.

Galvanized sheets are quiet and demand is confined to small lots. Japanese buying of black sheets is light.

The British production of steel ingots and castings last year is estimated at 9,200,000 gross tons and of pig iron, 7,300,000 tons. Imports of iron and steel are estimated at 4,400,000 tons and exports at 4,310,000 tons. Clyde shipbuilding last year totaled 254 vessels of 464,200 tons.

Continental markets are dull following the recent holidays and quotations are inclined toward easiness with buying light. Apprehension of a suspension of German mills is less general.

The European Rail Makers' Association has booked 60,000 tons of rails for South Africa, 75,000 tons for Argentina and 52,000 tons for Belgian railroads, all for delivery through the current year. Polish output in October was 62,000 tons of pig iron, a post-war high record, and 104,200 tons of steel ingots. Production of rolled steel totaled 87,500 tons.

Will Occupy Utica Heater Plant

The Richardson & Boynton Co., New York, manufacturer of hot air furnaces, has made an arrangement with the National Radiator Corporation by which it will occupy the plant of the Utica Heater Co. at Whitesboro, N. Y. By this deal the former company will acquire 23 acres near Utica, formerly owned by the Heater company, together with a modern plant, rail sidings, etc. The Richardson & Boynton Co. recently closed temporarily its plant at Dover, N. J.

OBITUARY

B. F. Jones, Jr.

BENJAMIN FRANKLIN JONES, JR., chairman of the board of directors Jones & Laughlin Steel Corporation, Pittsburgh, died at his home in that city Jan. 1, after an illness of two weeks. He was in his office on Dec. 17 and apparently in good health.

B. F. JONES, JR.

The corporation of which Mr. Jones was the head was founded by his father, the late B. F. Jones, more than 75 years ago. From small beginnings it has grown to its present position as one of the largest independent steel companies. Unaffected by the mergers and consolidations which have taken place in the industry in the last 25 years, the business has remained one of the outstanding examples of corporate ownership kept largely within the families of the founders.

Mr. Jones was born April 21, 1868, on the North Side, Pittsburgh, then the city of Allegheny. His early education was in private schools in Pittsburgh, after which he took a preparatory course at St. Paul's School, Concord, N. H., and entered Princeton University, graduating in the class of 1891.

Upon his return from college Mr. Jones entered the employ of Jones & Laughlin, Ltd., the name of the company at that time, as treasurer and member of the board of managers. He had previously spent much time at the mills and furnaces and had a sound working knowledge of the making of iron and steel. In 1907, four years before the death of his father, Mr. Jones became president of the company and continued in that position until the organization of the Jones & Laughlin Steel Corporation, when he became chairman of the board.

Following the example of his father, who was chairman of the Republican National Committee in 1884, Mr. Jones, Jr., had been active in politics, having served as chairman of the electoral college of Pennsylvania after the campaign of 1908. Another of his interests outside of business was art, his collection of paintings being one of the most notable in Pittsburgh. He was a member of the First Presbyterian Church, Pittsburgh, and was trustee of the Allegheny General and Mercy hospitals. Although most of his business life was devoted to the manufacture of steel, he also was a director of the Union Trust Co. of Pittsburgh and the National Union Fire Insurance Co.

His club memberships included the Pittsburgh, Duquesne, Union and Allegheny clubs of Pittsburgh; the University, Princeton, Racquet and Tennis clubs of New York; the Union Club, Cleveland; Nassau Club, Princeton, and the University Club, Chicago.

In 1892 Mr. Jones was married to Sue D. Dalzell, who survives him, together with his son, B. F. Jones, 3d, and his daughter, Mrs. J. O. Burgwin; two grandchildren, Susan and Virginia Burgwin; and his sisters, Mrs. Alexander Laughlin, Jr., Mrs. Elizabeth M. Horne and Mrs. W. W. Willock, all of Pittsburgh.

MARSHALL W. WARREN, founder and president of the M. W. Warren Coke Co., St. Louis, and a pioneer coke dealer of the Middle West, died recently at his home in Webster Groves, St. Louis. He had retired from business several years ago.

Iron and Steel Markets

January Mill Operations Increase

Good Specifications in Sheets, Bars, Plates and Shapes—December Pig Iron Output Less—New World's Record in Steel

THE last month of 1927 was like December, 1926, in being the lowest of the year in steel production, but January operations now promise a larger rate of gain over December than the 8 per cent of a year ago. There was the difference, however, that 1926 had a definite autumn upturn, whereas last year there was a practically uninterrupted decline in output, beginning with April. How far this can now be compensated for is a matter of first interest to the entire trade.

Good specifications in the last 10 days of December, especially in sheets, bars, plates and structural material, have started mills at a fair January rate, many now having orders that will keep them going through the month. In the past few days the automotive industry has specified for January requirements of sheets and strips.

Companies reporting to the National Association of Sheet and Tin Plate Manufacturers now have about 750,000 tons of unfilled orders, the largest total on record apart from 800,000 tons early in 1920.

Price uncertainties remain, especially in view of the large amount of plate, shape and bar tonnage carried into the first quarter at 1.75c., which was the basis of coverage before the Carnegie advance of $1 a ton on Nov. 10.

Yet it is not overlooked that some forces may be working for a more stable market in the coming year. No new blast furnaces were built last year, and very little new steel capacity. Consolidations are likely to lessen the scramble for tonnage, and in the sheet industry the handling of the continuous mill patent situation may prove a constructive factor.

Pig iron production in December was 2,695,755 tons, or 86,960 tons a day, against 2,648,376 tons, or 88,279 tons a day in November. In December, 1926, the daily rate was 99,712 tons, or nearly 15 per cent more than last month's.

Four furnaces went out in December and four went in, leaving the number in blast on Jan. 1 at 170. One year previous it was 204.

For the year 1927 pig iron output was about 36,400,000 tons, with charcoal iron estimated. This compares with 39,373,000 tons in 1926.

In production of steel 1927 was fifth among the leading years. The estimate of 43,250,000 tons of ingots shows a drop of 3,700,000 tons from 1926, the high year, but 1927 exceeded the average of the four years that preceded it.

While American pig iron and steel production fell off last year, Europe added close to 10,000,000 tons of each product to its performance of 1926. We estimate the world's steel ingot output last year (21 countries) at 98,200,000 tons, or 6,500,000 tons more than in 1926, the previous record year. The pre-war record was 74,830,000 tons in 1913.

Following the placing of 11,500 freight cars in the pre-holiday week, three railroads have bought a total of 108 locomotives, the Southern ordering 68, the Seaboard Air Line 25 and the Texas & Pacific 15. The Mobile & Ohio has taken 700 cars, while the Southern has authorized the building of 750 cars in its own shops, in addition to 4750 recently placed with car builders.

Award of 14,000 tons of structural steel for the Chicago *Daily News* building brought up the total of fabricated steel contracts in the last week of the year to 36,000 tons. Only 11,500 tons in fresh projects appeared, the largest being 4300 tons for a building in Chicago. A viaduct in Cincinnati will take 3700 tons of reinforcing steel and a Government building in New York calls for 3000 tons.

Pig iron buying, largely by the automotive industry, continues heavy in the Cleveland district, and good orders were booked at St. Louis. Chicago district furnaces enter 1928 with the largest first quarter backlogs in several years. Prices show little change, but in some districts stocks of merchant iron on furnace banks are still heavy, those in the Valleys being estimated at 250,000 tons.

Heavy melting scrap has advanced 50c. a ton at Pittsburgh and 25c. at Chicago. Pittsburgh and particularly Ohio centers west of that city have been feeling the heavy diversion of scrap from Detroit to Buffalo, and dealers, fearing a shortage, have been scouring the market for material to cover sales made in December.

A 5000-ton Central Western transaction in gravel fluorspar indicates a market of $15 for good lots, or $1 a ton below recent quotations.

Apart from the H. C. Frick Coke Co., Connellsville coke operators generally are back to the November, 1917, scale of wages, which gives $5 for day labor, or $1 a day less than has been paid lately. In both coal and coke supply continues in excess of demand.

Exports of iron and steel products from the United States in 1927 were about 2,190,000 tons. This is the largest total in six years, exceeding 1926 by 1 per cent. Tin plate and wrought pipe were leading products, followed by structural material, rails and black sheets.

Imports of iron and steel into the United States in 1927 fell off 33 per cent from 1926, due mainly to a decrease of over 300,000 tons in pig iron. The total was about 750,000 tons compared with 1,111,000 tons the previous year. But rolled and finished steel increased 25,000 tons or 7 per cent over 1926.

Neither of THE IRON AGE composite prices is changed this week, pig iron remaining for a fourth week at $17.54 and finished steel for a third week at 2.314c. a lb. Both are far below last year's opening prices—pig iron by $2.17 a gross ton, and finished steel by $2.78 a net ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jan. 3, 1928	Dec. 27, 1927	Dec. 6, 1927	Jan. 4, 1927
No. 2, fdy., Philadelphia	$19.76	$19.76	$19.76	$22.26
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	23.69
No. 2, Birmingham	16.00	16.00	16.00	20.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	21.00
Basic, del'd eastern Pa	19.50	19.50	19.00	21.50
Basic, Valley furnace	17.00	17.00	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.51	21.26
Malleable, Chicago*	18.50	18.50	18.50	21.00
Malleable, Valley	17.50	17.50	17.50	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh	40.00	40.00	40.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90
Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh	1.80	1.80	1.80	2.00
Steel bars, Chicago	1.90	1.90	1.90	2.10
Steel bars, New York	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh	1.80	1.80	1.80	1.90
Tank plates, Chicago	1.90	1.90	1.90	2.10
Tank plates, New York	2.12½	2.12½	2.14	2.24
Beams, Pittsburgh	1.80	1.80	1.80	2.00
Beams, Chicago	1.90	1.90	1.90	2.10
Beams, New York	2.09½	2.09½	2.14	2.34
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.50

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan. 3, 1928 Cents	Dec. 27, 1927 Cents	Dec. 6, 1927 Cents	Jan. 4, 1927 Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.75	3.00
Sheets, black, No. 24, Chicago dist. mill	2.90	2.90	2.90	3.20
Sheets, galv., No. 24, P'gh	3.65	3.65	3.60	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.70	3.70	3.70	4.05
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.30
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.15	2.50
Wire nails, Pittsburgh	2.50	2.50	2.50	2.65
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.20	3.20	3.20	3.35
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	**$15.50**	$15.00	$14.50	$17.00
Heavy melting steel, Phila.	13.50	13.50	13.50	15.50
Heavy melting steel, Ch'go	**12.50**	12.25	11.75	13.00
Carwheels, Chicago	13.50	13.50	13.25	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.50	14.50	14.25	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	16.50
No. 1 RR. wrot, Phila	15.25	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	**11.00**	10.50	10.25	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$3.75
Foundry coke, prompt	3.75	3.75	3.75	4.50
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.12½	13.50
Electrolytic copper, refinery	13.75	13.75	13.75	13.00
Zinc, St. Louis	5.65	5.65	5.85	6.97½
Zinc, New York	6.00	6.00	6.20	7.32½
Lead, St. Louis	6.30	6.30	6.37½	7.62½
Lead, New York	6.50	6.50	6.55	7.80
Tin (Straits), New York	*57.75*	58.25	59.00	67.12½
Antimony (Asiatic), N. Y.	11.00	11.00	11.50	13.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Sheet Mills Have Heavy Unfilled Orders—Scrap Advances—Wages Cut in Connellsville District

PITTSBURGH, Jan. 3.—As the new year opens, price uncertainties mar an otherwise satisfactory steel market. Order books are heavy in practically all finished products, with the exception of pipe, and even in that product some makers are well supplied with line pipe business. There has been a notably heavy accumulation of orders in sheets. Companies reporting to the National Association of Sheet and Tin Plate Manufacturers have approximately 750,000 tons of unfilled orders, the greatest total with one exception—in 1920, when they were close to 800,000 tons—since the compilation of steel statistics. The American Sheet & Tin Plate Co., which represents most of the tonnage outside of the association, also had a heavy December, and the sheet branch of the industry as a whole has orders sufficient to provide a very heavy operation over most of this quarter. Orders on makers' books for tin plate, cold-finished steel bars, strips and hot-rolled bars are in good volume, and since the automobile industry has not yet figured in the orders to the full extent of expectations, much tonnage is expected to come from that source when the motor car builders swing into production schedules.

But there is less satisfaction with prices than with the volume of business. The advance long expected in bars, plates and shapes has failed to materialize, and the explanation is to be found, it is said, in over-anxiety for orders on the part of some mills, which resulted, practically, in the extension of fourth quarter contracts into this quarter. These mills appear to have accepted specifications with a promise to date shipments in keeping with buyers' requirements.

Sheet makers have little business carrying the prices they now are asking. Indeed, acceptance of business at concessions from that level has continued into the past week. Bookings of strip steel have been at low prices, and makers are obligated some distance ahead. Distributers of wire nails are too well supplied or covered to permit makers to do much business at the advances they announced a month ago. It will be another month before makers of cold-finished steel bars get the benefit of higher first quarter prices.

There has been, however, a betterment in the rate of steel plant operations, although they are still about 10 points below the level that manufacturers regard as one permitting appreciable reduction of costs, i.e., between 75 and 85 per cent of capacity.

The scrap market in the past few days has been showing fresh strength. Centers west of Pittsburgh have been feeling the diversion of scrap from Detroit to Buffalo, and the lack of reserves is reflected in a demand from those centers that has given the Detroit market a sharp upswing. Locally, dealers who are short of the market are scurrying to cover in the fear that supplies on which they had relied will go to Ohio. A mill in this district with rather exacting requirements has paid $16 for heavy melting steel, and dealers are paying $15.50 to cover sales made at the latter figure.

The coldest weather of the winter has failed materially to strengthen the fuel situation, the interesting feature of which is the posting by important Connellsville district producers of the November, 1917, scale, which cuts day labor from $6 to $5 per day.

Pig Iron.—Almost all melters of iron are covered on their requirements for this quarter, and current business consists merely of the carload lot purchases of those who rarely anticipate their needs. W. P. Snyder & Co. make the average prices of basic iron shipped from Valley furnaces in December $17 and, of Bessemer, $17.56, as compared with $17 and $17.75 in November.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Heavy deliveries against expiring contracts for ferromanganese in the past month have given leading users a good supply for the present, and current demands do not amount to much. There are still some large users who have not made formal contracts for their first half requirements. Shipments of spiegeleisen on contracts also have been heavy in the past month, and specifications for shipment this month are fairly large. Consumers are well covered on their 1928 requirements of ferrosilicon and are specifying well.

Semi-Finished Steel.—All indications point to a good movement of billets, slabs and sheet bars in the next few months, as the sheet, tin plate and strip makers are well supplied with orders and, having bought semi-finished steel rather sparingly in the past four or five months, carried only moderate supplies into the new year. As makers of wire rods have generally covered their customers for this quarter at $40, base Pittsburgh or Cleveland, the new quotation of $42 is likely to apply only on small or pick-up tonnages. Plates are not any too firm at 1.80c., and skelp, which is influenced largely by the plate market, is barely steady at that figure.

Bars, Plates and Shapes.—Mills in this and the Youngstown districts start the new year with a good volume of bar orders, chiefly in specifications on unshipped fourth quarter tonnages, but they are not so well supplied with shape and plate orders. Seemingly, some of the users of plates have concluded that they will be able to do as well on price on new purchases as in ordering out unspecified fourth quarter tonnages. There is accordingly a little more pressure for plate orders than for business in bars and shapes, and prices of plates are beginning to show irregularity. Competition has disclosed willingness on the part of some makers to go $1 a ton below the present market price on first quarter contracts and even lower on definite shipment orders. With railroad car buying on the increase, plates might have been expected to show greater firmness.

Rails and Track Supplies.—Mills are well supplied with rail business, but makers of track accessories still have room for additional orders. Demand for light-section rails still reflects the depression in the soft coal industry, but there has been no weakening in prices.

Wire Products.—Makers are well supplied with orders for nails, but activity is yet to develop in the other products. The general quotation on nails is now $2.55, base, Pittsburgh or Cleveland, and first quarter contracts have been written at that price, with the new card of extras, but it cannot be said to be established, since distributers are too well supplied to be in need of new stocks.

Tubular Goods.—Line pipe is still the backbone of pipe mill operations, as it is a little early for much buying of buttwelded pipe for building and construction work, and demand for lapwelded pipe for oil and gas well drilling awaits the formulation of plans by companies engaged in drilling.

Sheets.—Makers do not lack orders. Indeed, most of them have heavy order books, but they appear to have been built up on low-priced tonnages and the advance named on first quarter contracts, it is feared, will not become effective on any considerable part of the shipments during this quarter. Good demands are coming from the railroad car builders and from the agricultural implement industry, but business from the motor car builders, notably from the Ford Motor Co., is disappointing. Mill operations increased materially with the approach of the end of the year and are now above 80 per cent of capacity. Shipments in the past month, however, ran well under production and sales, which explains the large order books.

Tin Plate.—A material increase in mill operations denotes heavier specifications for contract tonnages of packers' can sizes. The American Sheet & Tin Plate Co. is operating above 70 per cent of capacity, and the Weirton Steel Co., between 70 and 75 per cent. Tin plate prices are very firm. Preferentials to large buyers are smaller than in other years, and there is more insistence on the full quotation to small consumers.

Cold-Finished Steel Bars and Shafting.—Makers are well satisfied with the course of the market, having obtained generous releases against unspecified fourth quarter tonnages and having secured first quarter contracts, carrying an advance of $2 a ton, from almost all buyers who order that way. Prices below 2.20c., base Pittsburgh, on new business disappeared with the end of 1927.

Hot-Rolled Flats.—Makers are well supplied with business but are not satisfied with the prices at which it was taken, particularly on wide strips, which have continued to encounter rather strong competition from plates. On the plate mill gages of strips it is still necessary to match 1.75c., base, for plates to get orders. Makers regard the general market as 2.10c. to 2.20c., base, for very narrow material, 2c. for widths of 2 in. to 6 in. and 1.80c. to 1.90c. for 6 in. and wider.

Cold-Rolled Strips.—The market appears steady at 3c., base (1 up to 3 tons), with a deduction of 25c. per 100 lb. for lots of 3 tons or more of one size, one temper and for shipment at one time. On orders where the requirements are strict and the amount bought is small, makers are still asking and getting 3.15c., base. Some makers have written no first quarter contracts at these prices, feeling that better prices will be obtainable before the quarter ends.

THE IRON AGE Composite Prices

Finished Steel

Jan. 3, 1928, 2.314c. a Lb.

One week ago	2.314c.
One month ago	2.307c.
One year ago	2.453c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 3, 1928, $17.54 a Gross Ton

One week ago	$17.54
One month ago	17.59
One year ago	19.71
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel — *Base Per Lb.*

F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
Del'd Philadelphia	2.12c.
Del'd New York	2.14c.
Del'd Cleveland	1.99c.
F.o.b. Cleveland	1.80c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.80c. to 1.90c.
F.o.b. Birmingham	2.00c. to 2.10c.

Rail Steel

F.o.b. mills east of Chicago district	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.80c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.05c.
F.o.b. Coatesville	1.95c.
F.o.b. Sparrows Point	1.95c.
F.o.b. Buffalo	1.90c.
Del'd New York	2.12½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.95c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.08c.
Del'd New York	2.09½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

All gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
All gages, wider than 2 in., to 6 in., P'gh,	2.00c. to 2.10c.
*All gages, 6 in. and wider, P'gh	1.80c. to 1.90c.
All gages, narrower than 6 in., Chicago	2.40c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.40c.

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*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.35c. to 2.80c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.20c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland) *Base Per Keg*

Wire nails	$2.50 to $2.55
Galvanized nails	4.50 to 4.55
Galvanized staples	3.20 to 3.25
Polished staples	2.95 to 3.00
Cement coated nails	2.50 to 2.55

Base Per 100 *Lb.*

Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed — *Base Per Lb.*

Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.15c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.24c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.47c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No 24, f.o.b. Chicago dist. mill	2.90c. to 3.00c.
No. 24, del'd Cleveland	2.99c. to 3.09c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.85c.
No. 24, del'd Cleveland	3.84c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.40	25-lb. coating I.C.	$17.30
15-lb. coating I.C.	14.45	30-lb. coating I.C.	18.75
20-lb. coating I.C.	15.80	40-lb. coating I.C.	20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

Per Gross Ton

Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

Base Per 100 *Lb.*

Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	$2.75 to 2.80
Spikes, boat and barge	3.10
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
Butt Weld					
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			
Lap Weld					
2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			
Butt Weld, extra strong, plain ends					
⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			
Lap Weld, extra strong, plain ends					
2	53	42½	2	28	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two-points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Old Material.—This market has been growing stronger in the past few days, partly as a result of a purchase of a fair-sized tonnage of heavy melting steel by a mill in this district with rather exacting specifications at $16, but chiefly because of nervousness among dealers over the situation that has lately developed in the Detroit market. Considerable heavy melting steel was sold here in December at $14.50 to $15.50. Because of the threat that scrap which they figured on getting will go elsewhere, dealers are now paying $15.50, and even more, to cover sales made at that price or less. Compressed sheets have been sold at as high as $15. Machine shop turnings are weak, but there is firmness in the blast furnace grades.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$15.50 to	$16.00
Scrap rails	15.00 to	15.50
Compressed sheet steel	14.50 to	15.00
Bundled sheets, sides and ends	13.50 to	14.00
Cast iron carwheels	14.00 to	14.50
Sheet bar crops, ordinary	15.00 to	15.50
Heavy breakable cast	13.00 to	13.50
No. 2 railroad wrought	15.00 to	15.50
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings		11.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	17.00 to	17.25
Railroad coil and leaf springs	17.00 to	17.25
Rolled steel wheels	16.50 to	17.00
Low phosphorus billet and bloom ends	18.50 to	19.00
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	11.50 to	12.00
Short mixed borings and turnings	11.50 to	12.00
Cast iron borings	11.50 to	12.00
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	15.00 to	15.50
Malleable Grades:		
Railroad	15.00 to	15.50
Industrial	14.50 to	15.00
Agricultural	14.00 to	14.50

Fluorspar.—Two good-sized sales of gravel fluorspar to Ohio steel-makers have developed a price of $15 for domestic material, and that price is now the quotable market on the larger tonnages. Some producers did not quote below $16 on the tonnages recently closed and are still naming that price, but it appears to be obtainable only on small tonnages. Steel-makers this winter have not bought so heavily in advance as usual, and consequently competition among producers for what is usually regarded as backlog business is rather sharp.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.55c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.40c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

Bolts, Nuts and Rivets.—Business in bolts and nuts in the past month reached good-sized proportions, firmness in prices having encouraged buyers to specify freely for shipment after Jan. 1. It was the best December several companies here had had in recent years. Revival in railroad car buying has helped demand. Rivets are rather slow, chiefly because so many large users make their own rivets.

Coke and Coal.—Outside of the H. C. Frick Co., which still is paying the scale established Sept. 1, 1922, Connellsville operators generally are back to the November, 1917, scale of wages, or $5 per day for day labor, a cut of $1 per day from what they have lately been paying. This development is not a strengthening factor in coal and coke prices, which remain low and easy also because supplies still exceed demands.

Youngstown

Valley Steel Output Gains—Fear Price War in Automobile Industry

YOUNGSTOWN, Jan. 3.—Steel manufacturers in this district are in the most cheerful mood they have been in for fully six months. Not only was December a good month in orders and specifications, but, for the first time since early in 1927, the trend of steel works and rolling mill operations is definitely upward and the prospect is for further increases in output as motor car builders swing into production on a quantity basis, as they are expected to do in the next 30 days. There is some disappointment that the Ford Motor Co. has not yet brought up the production of its new car to the point of early expectations and that its releases of steel are still light, but that feeling is tempered by a belief that if the orders are not here now they will be later. In general, it is expected that demand for steel from the automotive industry will be greater this year than it was in 1926.

Prosperity in the motor car industry means much to Youngstown steel makers, whose production runs so heavily to the requirements of that industry. The unfavorable feature of the automobile trade is the prospect of a price war among the makers of the lower-priced vehicles. In such an eventuality, it would be merely a case of history repeating itself for the automobile makers involved to seek help from the steel industry in getting the raw materials as cheaply as possible. The kinds of steel going into automobiles, notably sheets and strips, are already moving at such low prices that further recessions would be disastrous.

Good order books have been built up in sheets, strips, wire nails and bars, which, with a fair amount of pipe, business, have contributed to increased plant operations. Based on the number of open-hearth furnaces active, the Youngstown Sheet & Tube Co. is busier than for several months. This company now has 16 of its 24 units here in production. It also is starting up some idle by-product coke oven capacity, evidently to provide additional gas required for the open-hearth furnaces. The Republic Iron & Steel Co. also has a heavier operation, and the Trumbull Steel Co., which recently operated only three of its eight open-hearth furnaces, now has seven active.

The call for pig iron could be much better, as stocks of merchant iron are heavy in both this and the Shenango Valley, estimates placing them at close to 250,000 tons. Not much activity is noted in scrap, but this is explained by the fact that the leading local melters recently acquired a considerable tonnage quietly from regular sources of supply.

Loadings of revenue freight for the week ended Dec. 17, 1927, totaled 868,162 cars, according to reports filed with the car service division of the American Railway Association. This was a decrease of 9438 from the preceding week and a decline of 76,234 compared with the corresponding week of 1926. Total loadings until the above date in 1927 amounted to 50,946,044, compared with 52,338,058 in the corresponding period of 1926 and 50,523,091 in the similar period of 1925.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$40.00 to $42.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $42 to $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	0.80 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$30.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	135.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00 to $15.50
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 *f.o.b. Works*	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Mill Output Up to 76 Per Cent—Pig Iron Sales Large

CHICAGO, Jan. 3.—An increased rolling rate in rail mills again accounts for an advance in ingot production, steel mill output now being close to 76 per cent of capacity. Shipping schedules already prepared will allow additional expansion in rail production in the first two weeks in January.

Preliminary estimates by local producers indicate that ingot output in this district in 1927 exceeded 1925 by a fair margin but did not equal the tonnage produced in 1926.

Sales in the past seven days compare favorably with any like period in the last 12 months. Mills took the stand that all contracts made at less than 1.90c., Chicago, would be canceled Dec. 31. Judging by new sales made in the closing month of the year it would seem that the market is fairly well stabilized at the new levels.

Industries that have been active in the early winter months remain busy. A substantial tonnage of steel is already assured from railroad car builders, and the indications are that automobile plants and accessory manufacturers will be well engaged by the middle of this month. Specifications for soft steel bars for delivery immediately after the holidays were heavy, representing close to a 50 per cent gain over the corresponding period a year ago.

The Illinois Steel Co. has added a blast furnace at Gary, bringing the total count of active steel mill stacks to 22 out of 36.

Pig Iron.—This commodity is firm at $18.50 a gross ton, f.o.b. local furnaces, and silicon differentials are well maintained, a condition that did not exist in the fall and early winter months. Buying has been in good volume, and producers in this territory enter 1928 with the largest first quarter backlogs in several years. Taking this into account, sellers look for shipments in January to exceed those in December, which was a fair month notwithstanding the time lost by many foundries because of the holidays. The rate of Northern foundry iron production is steady.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet except in ferromanganese, in which some scattered contracting is still taking place. Prices are firm at $100, seaboard. Spiegeleisen is dull, and quotations range from $30 to $32, Hazard, Pa., for the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 18 to 22 per cent, $36.76 to $37.76.

Cast Iron Pipe.—On the whole, this market is moderately active. Business closed with contractors during the week reached 5000 tons, and several public utilities have placed small orders. It is reported that St. Louis may buy 4000 tons of 6, 8 and 10-in. pipe. Prices on going business are steady at $28 to $30, Birmingham, for 6-in. and larger diameters. No complaint is heard from buyers regarding deliveries from foundries.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $38.20; 4-in., $40.20 to $42.20; Class A and gas pipe, $4 extra.

Plates.—Swift & Co., Chicago, have come into the market for 300 steel car underframes. In the recent car buying movement about 15,000 cars have been placed on order, and of that number about 9000 will be constructed in shops that are tributary to Chicago district mills. Buyers who have recently placed orders for plates for the construction of oil storage tanks are issuing heavy specifications and are pressing mills for delivery. This market starts the new year with mill prices well fixed at 1.90c., Chicago.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—Of outstanding interest is the award to the American Bridge Co. of 14,000 tons of steel for the *Daily News* Building, Chicago. Other awards include 600 tons for a brick shed in Chicago and two highway bridges, taking a total of 600 tons, for erection in Iowa. As the new year opens small fabricators finds more tonnage in their shops than in the fall months, but much of this work was taken at the expense of prices. Up to the end of 1927 specifications for stock continued to reach mills from fabricators who wished to take advantage of low-priced contracts which producers threatened to terminate Dec. 31.

Mill prices on plain material per lb.: 1.90c., base, Chicago.

Bars.—Specifications for soft steel bars in December exceeded those of the corresponding month of last year by 50 per cent. To some extent this reflected the desire of buyers to take advantage of contracts entered at low prices that terminated with the close of 1927. Contrary to expectations at this time of the year, consumptive demand is increasing. Shipments are going forward against schedules listed by the automotive trade, and the requirements of manufacturers of farm machinery still represent close to capacity production. Mill prices for mild steel bars are steady at 1.90c., Chicago. The iron bar market is quiet, with prices firm at 1.90c., Chicago. Forward contracting in alloy steel bars continues to drag, but prices are more stable and shipments in December were about 20 per cent heavier than in the final month of 1926. Demand for rail steel bars is of moderate size. One Chicago Heights mill will be down this week for repairs to furnaces. Prices are steady at 1.80c., Chicago district mill.

Mill prices per lb.: Soft steel bars, 1.90c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Reinforcing Bars.—This market is dull. The pending list is of fair size, but sellers have learned by experience that a project may be held in check for a long time before it develops into an order. The Inland Steel Co. has taken 500 tons of rail steel bars for the Medinah Athletic Club building, Chicago. Prices are steady, but they are not up to the levels that the trade recently sought to establish. Awards and new projects are listed on page 91.

Sheets.—December closed with hot mills engaged at only 60 per cent of capacity. Release orders in the hands of producers, however, assure a sharp upturn in output with the end of the holiday season. Prices remain at the levels of a week ago, and deliveries on all finishes are prompt.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.95c. to 3.05c.; No. 24 galvanized, 3.75c. to 3.90c.; No. 10 blue annealed, 2.20c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Wire Products.—Users of wire products in the manufacturing trade are forwarding heavier releases. Jobbers are also more active and are now making room for stocks that must be in for the early spring trade. Demand for wire nails has improved, and shipments of barbed wire and staples to the Southwest are measurably heavier. Wire mill operations for the country as a whole average close to 70 per cent, or a gain of more than six points in the week. In the East operations are below the average, while in the South more than 70 per cent of capacity is engaged. Mill prices are steady and are shown on page 97.

Bolts, Nuts and Rivets.—Specifications are more liberal, giving further indication that users' stocks are low and that additional quantities will be needed to meet January requirements. Prices are steady.

Coke.—All ovens in this district are lighted, and shipments at the turn of the year show little change. Prices of by-product foundry coke are steady at $9, local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—A large user of heavy melting steel has taken 10,000 tons at $12.40 per gross ton, delivered. This tonnage was not of a strictly No. 1 grade and will not have to stand the close inspection given material by some buyers. Bidding for railroad lists brings out higher prices each week, and one just closed is not an exception. Heavy melting steel sold by the Santa Fe brought $11.60 a net ton, on track, which is equivalent to $13.50 a gross ton, delivered. As a general rule, the railroads are getting 25c. to $1 above the most recent sales to consumers. The holiday season has dampened the interest of small buyers, and dealers are concentrating on trading in the heavy tonnage grades.

Prices delivered consumers' yards, Chicago:

Per Gross Ton		
Basic Open-Hearth Grades:		
Heavy melting steel	$12.50 to	$13.00
Shoveling steel	12.50 to	13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.75 to	14.25
Hydraulic compressed sheets	10.75 to	11.25
Drop forge flashings	9.75 to	10.25
Forged, cast and rolled steel carwheels	15.50 to	16.00
Railroad tires, charging box size	15.50 to	16.00
Railroad leaf springs, cut apart	15.50 to	16.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.25 to	14.75
Coil springs	15.75 to	16.25
Low phosphorus punchings	13.50 to	14.00
Electric Furnace Grades:		
Axle turnings	12.50 to	13.00
Blast Furnace Grades:		
Axle turnings	10.50 to	11.00
Cast iron borings	10.25 to	10.75
Short shoveling turnings	10.25 to	10.75
Machine shop turnings	7.75 to	8.25
Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	14.50 to	15.00
Cupola Grades:		
Steel rails less than 3 ft	15.00 to	15.50
Angle bars, steel	14.25 to	14.75
Cast iron carwheels	13.50 to	14.00
Malleable Grades:		
Railroad	13.00 to	13.50
Agricultural	12.00 to	12.50
Miscellaneous:		
*Relaying rails, 56 to 60 lb	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angle and splice bars	13.50 to	14.00
Iron arch bars and transoms	18.00 to	18.50
Iron car axles	20.50 to	21.00
Steel car axles	15.50 to	16.00
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	11.00 to	11.50
No. 1 busheling	9.50 to	10.00
No. 2 busheling	4.50 to	5.00
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.00 to	14.50
No. 1 railroad cast	13.00 to	13.50
No. 1 agricultural cast	13.00 to	13.50
Stove plate	11.75 to	12.25
Grate bars	11.50 to	12.00
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cold-Rolled Strip.—Little difficulty is being experienced by producers in this district in maintaining the new quantity differentials. In the main, prices are stronger and are working toward 3.15c. per lb., Cleveland, for lots of 1 to 3 tons. Shipments are heavier and for the month of December showed a gain of about 20 per cent over the preceding month.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.65c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	$2.90 to 3.00
Cement coated nails, base per keg	2.90 to 3.00

Rails and Track Supplies.—Two Western railroads have placed 20,000 tons of standard-section rails, and miscellaneous orders for track accessories total 12,000 tons. Inquiry for track supplies is heavy. Rail mill operations have expanded, and rolling schedules point to still heavier output in the next two weeks.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cincinnati

Pig Iron Business Negligible—Sheet Production Improves

CINCINNATI, Jan. 3.—The usual year-end quiet prevails in the pig iron market. Activities in the past week having been almost at a standstill. Aside from the purchase of 1000 tons of foundry iron by a Louisville melter and 225 tons of foundry and charcoal iron by the Louisville & Nashville Railroad, sales have been negligible. The only important inquiry calls for 300 tons, including 50 tons of Bessemer ferrosilicon, for the local works of the Worthington Pump & Machinery Corporation. The price situation is the same as a week ago, with northern Ohio makers holding to a minimum of $16.50, base furnace, and Ironton Producers asking $19, base Ironton. In the South, furnace interests are quoting $16, base Birmingham.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Steel.—In spite of the holiday season and the inventory period, the finished steel market has been unusually active. Specifications against contracts for bars, shapes and plates have been fairly liberal. Some consumers with tonnage due on old, low-priced contracts asked that deliveries be carried over into the first quarter, but mills declined to grant this privilege. Sales have consisted of numerous small lots for which buyers are paying 1.80c. per lb., base Pittsburgh, on 100 tons or more, and 1.90c. on single carloads. No improvement in structural steel demand is discernible, and fabricators in this district are entering 1928 with a meager volume of orders on their books. Foldwell & Ahlskog, Chicago, have been awarded the general contract for the Eighth Street viaduct, Cincinnati, which will take about 1300 tons of steel. The tendency toward increased activity in the sheet market has continued. A large producer in this territory reports that operations have reached the highest point since last July, and a further stepping up of production is contemplated. While the failure of the Ford plant to attain a good rate of output has been disappointing, other automobile manufacturers have been buying sheets in moderate quantities. A well-rounded demand for sheets from

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

consumers in general is one of the most gratifying developments from the standpoint to local district mills. Since most customers are well covered for first quarter at old prices, the recently established quotations of 2.10c., base Pittsburgh, for blue annealed, 3.75c. for galvanized and 2.90c. for black, are as yet scarcely tested, although several producers report small sales at those figures. The nail market is fairly steady at $2.50 per keg, base Ironton.

Reinforcing Bars.—Foldwell & Ahlskog, Chicago, have been awarded the general contract for the Eighth Street viaduct in this city, which will require 3700 tons of bars. Other pending jobs are small, requiring 100 tons or less. Mill prices are firm, with new billet bars quoted at 1.85c., base Pittsburgh, and rail steel bars at 1.75c., base mill.

Warehouse Business.—Shipments out of local warehouses in the past year were about 10 per cent smaller than in 1926. December was a poor month from the standpoint of sales, although several jobbers declare that business was on a par with that in November. Jobbing houses in Cincinnati and Louisville put into effect on Jan. 1 the new card of extras on nails. Prices in general have accumulated strength in the past 10 days.

Coke.—By-product foundry coke during January will remain at $7.50 per net ton, f.o.b. ovens. Domestic grades also are unchanged, with No. 2 nut selling at $4.50, ovens, walnut at $5 and egg at $5.50. At Detroit, by-product domestic egg coke is well established at $6.50, Detroit ovens, for outside shipment and at $7, delivered in Detroit. The Louisville & Nashville is reported to have bought 525 tons of beehive foundry coke for first quarter delivery. Prices of beehive coke from the Wise County and New River districts are firm. Dealers expect an improvement in foundry coke specifications this month.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Although mills show no signs of willingness to pay higher prices, dealers continue to purchase material on the basis of an anticipated buying movement by consumers. Quotations on all items are firm. The Big Four has a list of 4000 tons, including 2000 tons of scrap rails, and the Norfolk & Western has 6000 tons, both of which close this week.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.75 to 9.25
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.00 to 17.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Birmingham

More Inquiry for Pig Iron—Cast Pipe, Coke and Scrap Quiet

BIRMINGHAM, Jan. 3.—Birmingham furnaces enter the new year with an improved outlook. A substantial tonnage is being carried forward and, since Christmas inquiries have been active. The smaller buyers are coming into the market, and sales to this group have been numerous. Sales continue on a $16 base. Furnace operations remain unchanged, 18 stacks being in blast. Nine of these are on foundry, eight are on basic, and one, on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	16.00

Finished Steel.—A good volume of business was booked in December, and the outlook for the first quarter is considered favorable. There has been a gradual improvement in the market for the past two months. Mill prices have not been changed within the past several weeks. Neither the Tennessee company nor the Gulf States Steel Co. has made any change in open-hearth furnace operations. The former is running an average of 11 furnaces, and the latter, four.

Cast Iron Pipe.—After the holiday curtailment, plant operations have been resumed at the same rate as previously. A number of inquiries for first quarter tonnage have been received, but bookings last week were small.

Coke.—Demand is improving slightly but the holiday lull still affects the market, which has been quiet for about three weeks.

Old Material.—Business is slow, and the resumption of regular operations in consuming plants, following Christmas, has not yet been reflected in shipments or orders. There have been no price changes recently.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.00 to $10.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	18.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Rails for rolling	12.00 to 13.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Philadelphia

Fairly Heavy Specifications For Steel As Old Year Ends

PHILADELPHIA, Jan. 3.—Except for the fact that specifications against fourth quarter steel contracts were fairly heavy in the last few days of the old year, the windup of 1927 and the beginning of 1928 have been uneventful in the local iron and steel market. Most of the Eastern mills have good rolling schedules for the next few weeks, but as the tonnage specified will go to buyers at prices lower than are now being quoted it is quite likely that further ordering will be held at a minimum until low-price shipments are completed.

Pig Iron.—The last week of 1927 was one of the quietest of the year in pig iron. Sales by the active furnaces in this district did not exceed a few hundred tons in each case. The Consolidated Machine Tool Corporation, Wilmington, Del., is inquiring for 300 tons of foundry grades for first quarter. Foundry iron remains at $19, base, furnace. Virginia foundry iron is now quoted at $20 to $20.50, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.76 to $20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X	20.76 to 21.26
Basic (delivered eastern Pa.)	19.50 to 19.75
Gray forge	19.50 to 20.00
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Plates, Shapes and Bars.—Consumers and jobbers specified freely against fourth quarter contracts in the last week of the old year. The tonnage which mills put on the books in December ran considerably ahead of that taken in November. Structural steel tonnage probably was larger than that in plates and bars because the new prices on structurals are from $2 to $4 a ton above those which have applied on recent shipments. Very little building work is in prospect at the moment. Plates are now quoted at 2.05c., shapes at 2.08c., and bars at 2.12c., delivered Philadelphia.

Sheets.—Nearly all of the principal users of sheets have covered for a considerable part of their first quarter requirements at prices which ruled before the recent advances. For some weeks, or perhaps longer, the new prices probably will rule only on small purchases. These prices are: 2.90c. for black, 3.75c. for galvanized and 2.10c. for blue annealed, Pittsburgh base.

Old Material.—The scrap market is stronger only as regards the selling ideas of brokers. No transactions have occurred to advance prices, but some brokers have gone "long" of the market with the expectation that the next important sales will be at higher prices.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.25 to	15.75
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	11.00 to	11.25
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		12.50
Stove plate (for steel works)		12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles		16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)	11.00 to	11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to	13.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire		11.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels		15.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	15.00 to	15.50

Boston

Pig Iron Sales Recede—New England Foundry Melt at 40 Per Cent Level

BOSTON, Jan. 3.—Pig iron sales in New England dropped off materially during the last week in 1927. The Mystic Iron Works and the Champlain stack again led in bookings, but the combined sales of both furnaces approximated only 1000 tons. The largest individual transaction reported was a sale of 400 tons No. 2X to a Massachusetts foundry at a price equivalent to about $16.50 at Buffalo. A Buffalo stack, which heretofore has quoted as low as $16 base, is now asking $16.50 a ton for No. 2 plain and No. 2X. Other Buffalo furnaces are holding to a $17 base both with and without differentials. There are no open inquiries of any size in the market, and indications are that all of the large melters have enough iron in stock or on order to last through the first quarter. One of the largest has enough iron to last six months. It is conservatively estimated that the New England foundry industry operated at 40 per cent of capacity during December.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	22.65 to	23.15
East. Penn., sil. 2.25 to 2.75	23.15 to	23.65
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Cast Iron Pipe.—A contract for a sewage disposal plant for East Providence, R. I., has been let to J. H. Ferguson Co., Providence, which has placed approximately 500 tons of pipe and fittings, required in the project, with the Warren Foundry & Pipe Co. Westfield, Mass., has placed 100 tons of 6-in. pipe with the same foundry. R. D. Wood & Co. were awarded 400 tons 4, 6, 8 and 12-in. Class B pipe for Worcester, Mass., at $41.30 a ton, delivered. The Warren Foundry & Pipe Co. was second low bidder at $41.70. Southern foundries are less active in soliciting business in New England. Boston has yet to place some 2000 tons of pipe and fittings. Through a typographical error, the quotations of B. Nicoll & Co. on this tonnage were reported last week at $29.25 for the 8-in. and 10-in. instead of $39.25 per ton. Most Northern pipe foundries are well booked for the first quarter. Private business continues good at $46.10 to $47.10 a ton, delivered common Boston freight rate point, for 4-in. pipe, and at $41.10 to $42.10 for 6 to 16-in., which compare with $60.10 for 4-in. and $56.10 for 6 to 16-in. a year ago.

Shapes and Plates.—Fabricators report a marked falling off in new prospects. Current bookings are light. The proposed dry goods store and office building in the Park Square district, Boston, calling for 14,000 tons of structural steel, is the largest job of its kind on record in New England. It is believed that few New England plants are equipped to handle this tonnage, and that competition from outside fabricators will be keen. The market for standard shapes and plates is firm at 1.80c. per lb., base Pittsburgh.

Bars.—It now develops that local mill representatives have booked sizable tonnages of bars for first quarter delivery. Most of these orders were taken at prices prevailing before the recent advance, but business was taken at 1.80c. per lb., base Pittsburgh. The market for reinforcing steel bars is much firmer. The commonly quoted out-of-stock price of 2.70c. per lb., base, is steadier than for several months.

Cold-Rolled Strip Steel.—Current bookings are small, and prices remain unchanged.

Mill Prices on Cold-Rolled Strip in North Atlantic States: In 1 to 3-ton lots, 3.25c. per lb., base Pittsburgh, and also, 3.25c. to 3.40c. per lb., base Worcester, Mass.

Coke.—Neither the New England Coal & Coke Co. nor the Providence Gas Co. made any change Jan. 2 in its price on by-product foundry coke. The market remains at $11.50 a ton, delivered within a $3.10 freight rate zone, which compares with $12 a month ago, and $13 a year ago. The New England Coal & Coke Co. is asking $8.50 a ton at ovens for domestic coke, the same price as a month ago. Shipments of foundry fuel in the last week of 1927 were light.

Old Material.—Little old material is offered for sale in New England, as holders of scrap look for higher prices. A small tonnage of No. 1 heavy melting steel was sold during the past week at $9 to $9.50 a ton on cars, shipping point, or $3 a ton under prices of a year ago.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.25
Scrap rails	8.75 to	9.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought	8.50 to	9.00
Machine shop turnings	6.00 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.60 to	6.00
Forge flashings	6.00 to	6.50
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Street car axles	16.00 to	17.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.00
Rails for rerolling	10.00 to	10.50
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.50 to	$15.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate	11.00 to	11.50
Railroad malleable	13.50 to	14.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

St. Louis

Pig Iron Sales Total 20,000 Tons—Rise in Scrap Continues

ST. LOUIS, Jan. 3.—The Granite City maker reports an unusually large tonnage of pig iron placed during the week—20,000 tons, including 10,000 tons sold to a steel plant in this district. The remainder consisted of orders from malleable plants, radiator manufacturers, specialty makers and jobbing foundries. Melters continue to show keen interest in the market, and the prospects are that considerable business will be placed after the first of the year. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Cold weather tends to sustain the volume of sales of domestic grades, while buying of foundry coke is rather slow.

Finished Steel.—The usual holiday lull prevails in these lines. Some specifications against contracts were received during the week, but very little new business was placed. The placing of railroad car orders in this district is expected to stimulate steel demand considerably. Warehouse business is quiet. Fabricators of structural steel are booking only a few small orders. The reinforcing bar market is quiet.

Old Material.—Scrap continues to advance. Dealers are paying higher prices and are laying down material in anticipation of a better market after the first of the year. With the placing of some railroad car orders and with others in prospect, dealers believe that consuming plants will buy soon and at higher prices. There was some buying of specialties during the week, and rolling mill grades continue in good demand. Heavy melting steel, heavy shoveling steel, No. 2 railroad wrought and miscellaneous rails are 25c. a ton higher. Machine shop turnings, steel car axles, wrought iron bars and transoms, short rails, No. 1 machinery cast and No. 1 railroad cast have advanced 50c. Unusually high prices were paid for a Missouri Pacific list of 6000 tons, and it is reported that the material was bought by a Kansas City consumer.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.25 to $12.75
No. 1 locomotive tires	14.00 to 14.25
Heavy shoveling steel	12.25 to 12.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	15.00 to 15.50
Bundled sheets	9.00 to 9.50
No. 2 railroad wrought	12.25 to 12.75
No. 1 busheling	10.50 to 11.00
Cast iron borings	9.50 to 10.00
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	7.50 to 8.00
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft.	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.75 to 16.25
Railroad malleable	12.25 to 12.75
No. 1 railroad cast	14.00 to 14.50
Agricultural malleable	11.50 to 12.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

San Francisco

Prices on Foreign Pig Iron and Coke Reduced

SAN FRANCISCO, Jan. 3.—Little business in iron and steel was transacted during the week, owing to the holidays and the approaching inventory period. Structural shapes and cast iron pipe were the most active products.

A shipment of 550 tons Indian iron arrived on the Coast this week and was divided between Los Angeles and San Francisco. Foreign shipments are increasing, and Indian iron is down $1 a ton, now being quoted at $24 to $25, duty paid.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Four thousand tons of English coke is scheduled to arrive in the middle of January, and prices on beehive are now $15 to $16, and on by-product, $12 to $13 per net ton at incoming dock.

Los Angeles placed 771 tons each of cast iron pipe with the American and Pacific States cast iron pipe companies. The Grinnell Co. was low on 350 tons of 20-in. Class B for Pasadena, Cal. Santa Clara, Cal., takes bids Jan. 9 for 1510 tons of 4 to 14-in. Class B.

The Grinnell Co. secured 625 tons of 8-in. seamless pipe for Los Angeles.

Prices remain unchanged except on iron and coke.

Buffalo

Fair Demand for Pig Iron—Leading Steel Plant Curtails Output

BUFFALO, Jan. 3.—The pig iron market remains fairly active. Several lots of 500 to 1000 tons of foundry and malleable have been placed, and new inquiries for like amounts are now before the market. A base price of $17, furnace, is being maintained on business taken in the Buffalo district, but this figure continues to be shaded in New England. It is believed that considerable first quarter contracting is still to be done.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Steel.—One of the principal steel producers now has only three open-hearth furnaces active. The other mills continue to maintain their operations, which average about 75 per cent. Inquiry is fair for bars, shapes and plates, and sheet buying has been in good volume. Bids are in for the Hecker-Jones-Jewell Co. flour mill and elevator, Buffalo, which will require 1500 tons of reinforcing bars. Other pending business in concrete bars is limited to small lots.

Old Material.—The market has been lacking in outstanding transactions, and prices remain unchanged. One of the mills continues to restrict shipments, and another, while continuing to accept shipments on old orders, has done no new buying. Reduced open-hearth

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

operations in one of the principal steel plants is one of the factors contributing to the general quietness.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.75 to 14.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	11.50 to 12.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.25 to 13.50
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 15.75
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	14.75 to 15.25
Low phosphorus billet and bloom ends	15.75 to 16.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

New York

Steel Prices Steady as New Year Opens—Merchant Stack to Go In

NEW YORK, Jan. 3.—Despite the holiday season, the last week of 1927 brought out a fair volume of pig iron buying. Sales by local brokers exceeded 5000 tons, and this total was made up mainly of small lots. In some instances pressure for deliveries indicates that melters have low stocks. Aside from spot demands, it is thought unlikely that there will be extensive buying for this quarter until foundries have completed the taking of inventories. There is only one important first quarter inquiry before the trade. This is from the Worthington Pump & Machinery Corporation, New York, and calls for between 1200 and 1300 tons. Of this amount 350 tons of No. 2 plain and 40 tons of high manganese pig iron are wanted for Holyoke, Mass., 500 to 600 tons of various foundry grades is for Buffalo, and 150 tons of No. 2 plain, 100 tons of No. 1 and 50 tons of Bessemer ferrosilicon are for Elmwood Place, Cincinnati. The No. 2 furnace of Witherbee, Sherman & Co. at Port Henry, N. Y., will be blown in Jan. 4 or 5. The price situation is substantially unchanged.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.39 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	20.89 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—The last week of the old year brought no change in the steel situation beyond the continued accumulation of tonnage specified against expiring fourth quarter contracts. The orders booked by many of the local sales offices were considerably in excess of those received in November, and mills have a larger backlog of orders for the beginning of January than they had at the beginning of December. A number of instances are cited to illustrate the firmness with which the steel companies are holding prices on plates, shapes and bars. While structural shapes on the Bethlehem basis are 2.09½c., delivered New York, efforts to purchase plates and bars along with shapes at the same price are declared to have been fruitless. Contracts have been made with some of the largest buyers at 2.09½c. on shapes, 2.12½c. on plates and 2.14c. on bars, delivered New York. Specifications on fourth quarter sheet contracts were heavier in the last two weeks of December than in the first half of the month, with the result that some consumers and jobbers will be taking deliveries on these specifications throughout January. Hot and cold-rolled strip prices remain unchanged, and other products are steadier than at any time in recent months. All in all, the steel trade enters the new year with the price situation more firmly in hand than at any time during the latter half of 1927.

Mill prices per lb., delivered New York: Soft steel bars, 2.14c.; plates, 2.12½c.; structural shapes, 2.09½c.; bar iron, 2.14c.

Reinforcing Bars.—Awards of 3000 tons of bars for the United States Appraisers' Stores, New York, to the Jones & Laughlin Steel Corporation, and of 800 tons for roadway decks on the second of the Staten Island-New Jersey bridges to E. T. Edwards, Columbia, Pa., were the outstanding transactions in this

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

market during the last week of the year. These were the last of the outstanding jobs pending, and the new year finds a comparatively small tonnage involved in inquiries. Business has been unusually quiet in the last few days. Distributers have advanced the mill price $1 a ton and are now quoting 1.90c., Pittsburgh. The Youngstown warehouse price is unchanged at 2.20c., or 2.57½c., on cars at New York, and New York warehouses are quoting 2.80c. per lb. for lots of 5 tons or more, delivered at job; 2.95c. for lots of 2 to 5 tons, and 3.24c. for less than 2 tons.

Cast Iron Pipe.—No purchases of consequence were reported in the past week, but with the holidays over a resumption of private buying and some municipal inquiry is expected. There is some export inquiry in the market, including two medium-sized tonnages of water pipe for Cuban projects. The price situation is unchanged, although most makers are fairly well booked and are able to take a more independent position.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Fluorspar.—An Ohio consumer during the week purchased 5000 tons of domestic gravel fluorspar for delivery through 1928 and another purchased 500 tons for six months. Prices are weak and unsettled, as is indicated by these sales, which were made at sharp concessions and indicate that the market is not above $15 per ton at mines for good lots, or $1 a ton below recent quotations.

Coke.—Most consumers are fairly well covered for the present, and current purchasing is light. Standard foundry coke is still quoted at $4 per net ton, Connellsville, for prompt shipment, and on a sizable tonnage slightly less might be obtained. Furnace coke ranges from $2.75 to $3, Connellsville. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, N. J., $7.91. Reports continue that by-product foundry coke prices have been shaded in a few cases, but this cannot be confirmed. Quotations on by-product foundry coke are $9.45 to $9.85 per net ton, delivered Newark or Jersey City.

Warehouse Business.—Despite the holidays, purchasing in the final week of December compared favorably with the rest of the month. Orders were for small tonnages, but total bookings were of fair size.

Old Material.—Although buying prices are substantially unchanged, the market is fairly firm, and in some instances brokers are paying slightly higher prices than a week ago. Stove plate is quoted at $12.25 per ton, delivered Phoenixville, and at $12.50 per ton, delivered Harrisburg, Pa. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered to consumers at Bethlehem, Conshohocken and Coatesville, Pa., and Claymont, Del. Yard grade is being purchased at $10.50 to $11 per ton, delivered to mills at Phoenixville and Harrisburg. On recent sales of steel axles for shipment to Milton and Columbia, Pa., $21.25 per ton, delivered, is being offered by brokers. Mixed borings and turnings continue unchanged at $10 per ton, delivered to Bethlehem and Swedeland, Pa.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.25 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.25 to 8.75
Locomotive grate bars	8.25 to 8.50
Machine shop turnings	6.50 to 7.50
Short shoveling turnings	6.50 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.25
Mixed borings and turnings	6.50 to 7.50
Steel car axles	17.00 to 17.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75 to 9.25
Forge fire	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.25
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Cleveland

Mills Have Good Backlogs—Sustained Demand for Pig Iron

CLEVELAND, Jan. 3.—The new year starts with better operations for some of the mills and prospects for fairly good business through the first quarter. Better operations in the automobile industry are counted on to stimulate the demand for steel. Specifications against expiring contracts for steel bars, plates and structural material were heavy in the past week, and several mills are comfortably filled for a month or longer. Some of the sheet mills have enough orders to keep them running nearly at capacity through January. Mills set Dec. 31 as the deadline for accepting specifications against contracts for steel bars, plates and structural shapes taken at $1 a ton lower than the present market. While there were some cancellations, many consumers ordered about all the steel they had contracted for. Some additional commitments for first quarter were made during the week at the present prices, and most consumers are now under contract.

Mills have received good specifications in the past few days from the automotive industry for sheets and strip steel for January requirements. These indicate an increase in motor car production schedules this month. Very little new business is coming from this source, as most of the automobile companies are well covered with contracts.

In the structural field, inquiry is light and prices on fabricating material are weak. Locomotive orders have stimulated the demand for plates. A Cleveland mill sold 700 tons to a locomotive builder during the week. Steel bars, plates and structural material are firm at 1.80c., Pittsburgh. The ruling Cleveland price on steel bars is 1.80c., mill, although this is being shaded $1 a ton.

Pig Iron.—Sales of foundry and malleable iron have continued quite heavy in the past week, in spite of the holiday season. The greater part of the business came from the automotive industry. Few contracts for delivery beyond the first quarter have been taken, due partly to the fact that producers have not been inclined to sell for the entire first half. However, the size of many of the orders indicate that some foundries are buying enough iron to carry them well into the second quarter. Furnaces are getting a good volume of specifications for January shipment. While the market has a firmer tone than recently, a price of $16.50, furnace, on foundry and malleable iron has not disappeared for shipment to competitive points. At least one Lake producer, however, is now quoting $17, furnace, as its minimum price. In Michigan the market still ranges from $17.50 to $18, furnace. Demand for low phosphorus iron has quieted down after a fair buying movement, and the Valley price has settled down to $26.50, furnace, for most business.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

CARNEGIE LIBRARY OF ATLANTA

Semi-Finished Steel.—Last quarter prices will probably prevail through the present quarter on sheet bars, billets and slabs, as specifications have been taken for January shipment at those prices. Following the advance in the Pittsburgh district, a local producer has advanced wire rods to $42, Cleveland. Some first quarter contracts were taken at $40 before the advance.

Sheets.—Mills received good specifications in the past week against orders placed when lower prices were ruling, but little new business came out. The market shows a firmer tone, although prices have not yet got up to the bases adopted by most producers for the first quarter. Black sheets are still available at 2.80c., Pittsburgh. Blue annealed sheets now appear to be holding at a minimum of 2.05c., or a $1 a ton advance, and most mills are holding to 2.10c. On galvanized sheets 3.65c., Pittsburgh, instead of 3.65c., Ohio mill, has become the ruling quotation.

Strip Steel.—Mills have taken considerable business in specifications against hot-rolled strip contracts, but new business is very light. Prices are still weak. Ruling quotations are 1.80c., Pittsburgh, for 6 to 12-in. strip and 2c. for narrower than 6 in. Cold-rolled strip is steady at 2.75c., Cleveland, for 3 tons and over.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are still light. Orders for rivets from locomotive builders show a slight pick-up. Rivet manufacturers have covered practically all buyers with contracts at $2.75 per 100 lb. for large rivets, and apparently have abandoned the plan of charging those who do not place contracts $5 a ton more.

Reinforcing Bars.—Three new inquiries came out during the week for work aggregating 1300 tons. Rail steel bars are unchanged at 1.65c. to 1.70c., mill.

Old Material.—Efforts of dealers to advance prices have met with success to some extent, as steel-making scrap seems to be no longer available below $13.75 for No. 1 grade. This price represents an advance of 25c. a ton. Dealers are also trying to get a little more money for blast furnace scrap, although locally this material is a drug on the market. Some fair-sized lots of scrap were sold by Detroit automobile manufacturers in the past week, and they are reported to have brought somewhat higher prices than recently prevailed.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.25 to 10.75
Mixed borings and short turnings	10.25 to 10.75
No. 2 busheling	10.25 to 10.75
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Three Gear Companies and One Drop Forger to Merge

Plans for the merger of three leading gear manufacturers—the Van Dorn & Dutton Co., Cleveland; the Fawcus Machine Co., Pittsburgh, and the William Ganschow Co., Chicago—and the Ohio Forge Co., Cleveland, maker of drop forgings, are under way. The consummation of the consolidation is expected to be announced this week. A new company, Gears & Forgings, Inc., will acquire the plants and other assets, of the four companies of which the combined resources will exceed $6,000,000. F. W. Sinram, president Van Dorn & Dutton Co., is slated for the presidency of the new company.

Canada

Heavier Contracting for Pig Iron —Scrap Market Softer

TORONTO, ONT., Jan. 3.—Advance buying has been the feature of the Canadian pig iron market during the past few days. Melters are showing more interest in first quarter needs, and contracts now being placed run into large tonnages. However, there are still a large number of Canadian consumers who have not taken action on their first quarter needs. There is nothing in the price situation that leads consumers to look for an early advance.

Old Material.—Some improvement in sales is reported by local dealers, but new business is chiefly in connection with the placing of first quarter contracts, although the large majority of consumers have yet to make known their needs for the next three months. Prices are by no means on a firm footing.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Merger of Youngstown and Inland Companies Being Negotiated

YOUNGSTOWN, Jan. 3.—In an announcement tonight regarding the proposed purchase of the Inland Steel Co., Chicago, by the Youngstown Sheet & Tube Co., President James A. Campbell of the latter company, said:

"We have opened negotiations for a union of the two plants and would be pleased if they could be carried through successfully. There is an economic advantage in putting the two companies together. Their plants lie side by side and could be operated with much less expense if they were under one management. This could be done now, since we are not in competition. It might not be possible later, if we were to enter into different lines of manufacture. We are not buying up Inland stock. We cannot do that and will not."

Weirton Steel Co. Acquires License Under Armco Patents

A statement has been given to the press in the past week to the effect that the Weirton Steel Co., which was one of the two pioneer steel companies in designing and building a modern mill for the production of wide, light sheets by continuous rolling, has taken out a license to use all the patents owned and controlled by the American Rolling Mill Co., for the continuous rolling of steel strips and sheets. The system designed by the Weirton Steel Co. was different in some respects from that in use at the American Rolling Mill Co.'s plant at Ashland, Ky., but it is stated that the taking out of the license by the Weirton company, which is the first steel company to enter into such a contract, is "to obviate patent conflict and to permit orderly development of the new and economical process."

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Jan. 3	Dec. 30	Dec. 29	Dec. 28
Lake copper, N. Y.	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.75	13.75	13.75	13.75
Straits tin, spot, N. Y.	57.75	57.87½	57.87½	57.75
Lead, New York	6.50	6.50	6.50	6.50
Lead, St. Louis	6.30	6.30	6.30	6.30
Zinc, New York	6.00	6.00	6.00	6.00
Zinc, St. Louis	5.65	5.65	5.65	5.65

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Jan. 3.—All the markets are firm as the year opens. There is, however, very little activity thus far. The copper market is quiet, but decidedly steady. Buying of tin has been moderate at slightly lower levels. Lead is unchanged and firm. The zinc market is getting stronger.

Copper.—As the year opens prices seem to be growing firmer. Nearly all the metal which was available a few days ago at 14c., delivered, is reported to be about all cleaned up and the market is almost entirely on a basis of 14.12½c., delivered in the Connecticut Valley, for electrolytic copper. There is still a little available at the lower price and the market is quoted nominally at 14c. to 14.12½c., delivered. Domestic demand has been and is still very light, which is natural at this season, and there has hardly been buying enough to test the market. There has been a fair amount of business done for export at 13.50c., c.i.f., usual European ports, which continues to be the official quotation of Copper Exporters, Inc. The market as a whole having passed through the holiday season practically without weakening is pointed to as indicative of fundamental strength.

Copper Averages.—The average price of Lake copper for the month of December, based on daily quotations in THE IRON AGE, was 14.20c., delivered. The average price of electrolytic copper was 13.78½c., refinery, or 14.035c., delivered.

Tin.—The holiday week has been a quiet one, as expected. Sales for the last week of the year ended Friday, Dec. 30, were about 700 tons, with 400 tons of this done on Thursday, Dec. 29. On that day consumers were active buyers. Today, the first active business day of the new year, the market has been exceedingly dull, with spot Straits tin quoted at 57.75c., New York. London prices today were a little lower than two weeks ago, with spot standard quoted at £263 10s., future standard at £261 5s., and spot Straits at £263 10s. The Singapore market today was £265 10s. The feature of the market in general is that some consumers are advancing their contracts for February to prompt shipment. They are, however, not buying any more metal, which may mean less demand for prompt and nearby delivery. December deliveries into consumption are reported as 4535 tons, the smallest in a long time. The quantity in stock and landing on Dec. 1 was 1573 tons. Preliminary calculations of the total visible supply indicate an increase of from 642 tons to 1139 tons for December, depending on the calculator. The figures of the London and New York exchanges place the increase at 1139 tons for December, bringing the total to 15,733 tons.

Lead.—The market is quiet and practically unchanged except possibly a little firmer in the West. Demand is light. The quotation of the leading producer is unchanged at 6.50c., New York, as the contract price, with the St. Louis range at 6.30c. to 6.35c.

Zinc.—A fair amount of inquiry is reported for the first business day of the new year. Evidently producers are assuming a firmer attitude as to prices. It is difficult now to purchase any prime Western zinc at less than 5.65c., St. Louis, with some sellers asking a little more.

Nickel.—A reduction in the price of electrolytic nickel is announced by the International Nickel Co. from 39c. to 37c. per lb. in wholesale lots. Quotations for ingot and shot nickel remain unchanged at 35c. and 36c. respectively.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 3.—A fair amount of forward business is being taken and prices are steady except in tin and antimony. The old metal market is quiet and without feature.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 59c.; lead, 6.40c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.50c. to 59.50c.
Tin, bar	60.50c. to 61.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.75c. to 8.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	63.75c.
Tin, bar	64.75c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	67.75c.
Solder, ½ and ½	37.75c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are holding at the advances of Dec. 5. There has been no revision in the quotations on zinc sheets and lead full sheets since Aug. 5 and Dec. 1 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Improvement in Steel Business Is Forecast for 1928

(*Concluded from page* 13)

industries declined irregularly throughout the year, notably in the case of railroads, automobile manufacturing, mining and oil-well drilling. The recovery in building and agriculture in the latter part of the year tended to check the decline. One of the strongest features of the steel situation is that production has been fairly well adjusted to the potential requirements of the country, except from April through July, and was relatively low toward the end of the year. This gives reason to believe that stocks of steel are small and that the industry is in a position to respond quickly to the anticipated general business improvement.

The average price of finished steel in 1927 was not so steady as in the preceding year and at the end was about 5 per cent under the average for January (see Fig. 4). There were downward readjustments at the beginning of the year and again in the fall. Clear signs of improvement in prices appeared toward the end of the year, due to curtailed production and a little better sales volume. The notable changes during the year were the generally sagging trend of the markets for bars and nails, and the sharp reductions in sheets during January and February, and again in October and November. These conditions reflected the decline in residential building and in automobile production.

Better Business Anticipated for 1928

THAT a moderate recovery will develop early in the year, and gain considerable momentum before the end of the first half, is the general hypothesis which seems to furnish the most plausible working basis for anticipating the business trend in 1928. There is at present nothing to indicate that business will not be good thereafter, but this cannot be forecast with certainty. The recovery in business will probably lead to a tightening in bank credit and to higher money rates.

It is difficult, if not impossible, to anticipate when these developments will occur. If business recovery brings an increase in commercial loans by spring, and gold exports continue during the next two or three months, money rates may be expected to advance and bring a recession in security markets before the end of the first quarter. This, however, need not be followed by a slump in business any more than it was in February, 1926.

Commodity prices are not likely to show a sharp advance nor a large decline. On the one hand, the practical completion of deflation in foreign currencies, and curtailed domestic production together with higher farm prices, will make for firmness. But, on the other hand, gold exports and the probable curtailment of bank credit, together with a large productive capacity and active competition at home and abroad, will tend to depress prices. Little more than a guess seems possible, but such a guess would be that commodity prices will advance somewhat in the early part of 1928, then recede a little, and then show irregular recovery. It does not seem that business will have to contend with a steadily declining price level, as was the case during 1926 and a good part of 1927. (See Fig. 5.)

Improvement in Steel Seems Certain

AS to the steel industry, recovery seems practically certain during the first half of the year and possibly thereafter. The expansion in the automobile industry, which is in sight, together with sustained activity in building and a general improvement in business, seem to make this as nearly certain as such things can be. Moreover, it is a reasonable probability that the oil industry has seen its worst days and will show improvement during 1928.

In the same way, railroad equipment buying will almost certainly be better next year than it has been during most of 1927. At present the rather large surplus of freight cars and locomotives held by the carriers and a low percentage of bad-order equipment seem to make any early sustained buying movement improbable. But the longer the period which elapses without replacements, the more necessary will the buying be when railroad freight traffic begins to reflect the probable expansion in general business.

I will only add that both my P-V line and the unfilled steel orders barometer, which are regular features of this department of THE IRON AGE, agree in forecasting early improvement for general business and for the iron and steel industry.

Many Factors Participated in Development of Continuous Sheet

(*Concluded from page* 77)

are (a) better constructed motors and (b) finer pieces of mechanism, both in the drives and in the mills themselves. The multiple roll backed-up mill requires machinery of a quality not at all comparable with the old-fashioned mills. In turn a higher grade of skilled mechanic is required to take care of it. He has had to throw his sledge hammer away and replace it with a micrometer and a set of feelers. The machinery manufacturers should receive much credit for their assistance in this development.

Studies in Finishing Departments

Just how far the development will carry is hard to predict, but it seems well within the bounds of possibility that the rolling of tin plate and the processing of both tin plate and high finished sheets will be affected profoundly. Concurrently with the development of the rolling mills themselves, the processing, pickling, annealing and cold rolling processes have been the subject of study, analysis and invention. As in the rolling mills, continuous operation of a sequence of processes is the achievement to be desired, simultaneously effecting an equally great reduction of labor and improvement in quality, due to scientific control.

Most of the inventions and discoveries necessary for the successful operation of the new method have been covered by patents, possibly to a greater extent than any single section of the steel industry save perhaps that of wire making. The rolling process and machinery and the subsequent processing, annealing and pickling, all come within the scope of this patent protection. It would be unfortunate if the situation were handled in any but the fairest manner, for which the leaders of the American steel industry are eminently fitted.

Schedule of the next installments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Jan. 12****—Activity in Steel Consuming Industries;* ***Jan. 19****—Position of Iron and Steel Producers;* ***Jan. 26****—General Business Outlook.*

Steel Trade Now Looks to 1928 to Compensate for 1927

(*Concluded from page 5*)

lands, 29,756 tons; and Sweden, 19,728 tons. This leaves 25,309 tons supplied from all other sources.

Machinery exports in the first 11 months are reported at $397,335,175. This is a gain of practically $30,000,000 over the corresponding period of 1926. If December shows up as well as November did, the total will be about $433,000,000 for the year. This is the largest export volume in a number of years. Agricultural implements made a large gain in 1926 and a further one in 1927, the total for 11 months having been $83,849,667. Heavy gains were made also in oil-well machinery, road-making machinery, machine tools, textile machinery, sugar mill machinery, refrigerating and ice machinery, air compressors, and type-setting machines. There were notable declines in automobile engines, electric locomotives, mining and quarrying machinery, and some of the smaller lines.

UNITED STATES EXPORTS OF IRON AND STEEL
(Gross Tons)

	1922	1923	1924	1925	1926	1927
Jan.	160,920	123,190	247,942	141,777	174,585	215,235
Feb.	133,975	133,902	164,820	102,299	157,187	166,129
Mar.	208,843	163,920	123,618	155,384	169,438	171,094
Apr.	198,830	177,471	131,276	155,375	194,449	192,339
May	230,062	203,389	154,136	150,612	173,418	202,708
June	212,295	171,183	163,770	136,847	159,506	184,364
July	157,169	168,558	137,481	139,861	194,717	190,502
Aug.	145,640	161,426	134,628	188,465	171,588	175,636
Sept.	129,475	172,499	135,979	136,791	182,071	166,352
Oct.	132,924	152,511	157,071	141,817	172,070	170,255
Nov.	127,782	186,956	123,577	171,134	219,830	177,928
Dec.	150,170	177,844	128,865	142,209	198,189	......
	1,988,085	1,992,849	1,803,163	1,762,571	2,167,048	2,190,000*

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*Estimated, as to December.

1927 Earnings Declined Sharply

Low prices and lessened production were reflected in the earnings of the leading steel companies. The contrast with 1926 was most marked in the third quarter when the United States Steel Corporation reported earnings representing a decline of $11,250,000, or more than 20 per cent, from the third quarter of 1926. Assuming that the corporation's fourth quarter profits will show a further decline, it is probable that the full year's net income will be 15 per cent under 1926. In the last three years the Steel Corporation's quarterly earnings were as follows:

Quarter	1927	1926	1925
First	$45,584,725	$45,061,285	$39,882,992
Second	46,040,460	47,814,105	40,624,220
Third	41,373,831	52,626,826	42,400,419
Fourth	....	53,503,525	42,630,840

At the annual meeting in April last year the Steel Corporation's common issue was increased by a stock dividend of 40 per cent or 2,033,210 shares and the dividend rate of $7 a year has since been maintained on the enlarged issue. This increased the quarterly dividend charge by $3,518,117. As a result only $17,775,683 was added to the surplus in the first three-quarters of 1927, as compared with $39,832,768 in the first nine months of 1926. Earnings per share of common stock in the past year were at the rate of $2.81 in the first quarter, $2.78 in the second and $2.15 in the third.

Profits of the Bethlehem Steel Corporation also showed a decline from 1926, amounting to $5,618,038, $5,048,680 and $2,788,053 respectively in the first, second and third quarters of 1927, as compared with $5,865,850, $5,348,023 and $4,550,978 in the corresponding three quarters of 1926. The $13,454,771 earned thus far in 1927, however, is almost equal to the profits for all four quarters of 1925, which amounted to $13,858,196. In the early part of the year there was some public reference to the possibility of the company beginning dividend payments on its common stock, but earnings in the third quarter at the rate of only 61c. a share on the common stock made such action a matter of the future.

The Jones & Laughlin Steel Corporation reported net profits of $9,841,816 in the first three quarters of 1927, of which $3,658,724 was earned in the first quarter, $3,576,079, in the second, and $2,607,013, in the third. This compares with $3,843,045 in the first quarter of 1926, $3,658,724 in the second and $4,257,787 in the third quarter of that year, a total of $11,759,556. The 1927 earnings represent a decrease of 16 per cent.

Net profits of the Youngstown Sheet & Tube Co., amounting to $5,857,070 in the first three quarters of 1927, were less than half of the $11,994,092 earned in the first nine months of 1926. Each quarter showed a falling off in view of the lessened demand for the company's chief products, sheets and pipe, particularly the latter, also the year's lower prices.

Republic Iron & Steel Co. earnings fell off rather sharply, particularly in the September quarter, when they were $501,992, against $1,312,266 in the third quarter of 1926. Net profits amounted to $2,534,528 in the first nine months of 1927, or about $1,250,000 less than in the corresponding period of 1926, and a little more than equaling the profits of the first three quarters of 1925.

Inland Steel Co., with net profits of $5,590,041 in the first three quarters of the year, bettered its 1926 showing for the like period by more than $500,000 and was the only one of the larger companies to show an increase. The company had considerably better earnings in both the first and second quarters of 1927 than 1926, but profits in the third quarter amounted to $1,244,021, as compared with $1,701,286 in the September quarter of 1926.

American Rolling Mill Co. Announces Refinancing Program

Announcement of a refinancing program has been made by the American Rolling Mill Co., which has sold a $25,000,000 bond issue of 20-year 5 per cent sinking fund gold debenture notes to W. E. Hutton & Co. and Harris, Forbes & Co. It is the intention of the company to call on April 1 the outstanding 7 per cent cumulative preferred stock, amounting to $11,625,300, and by July 1, the outstanding 15-year notes, totaling $6,650,000. Furthermore, from the proceeds of the bond issue will be retired the preferred stock and bonds issued in connection with the purchase last July of the Columbia Steel Co. In addition, each common stockholder of record as of Jan. 10, 1928, will be given the right to subscribe to one share at $75 for each six shares then held. Since there were approximately 926,000 common shares outstanding at the time of the company's last annual statement and one stock dividend of 5 per cent has been paid in the interim, the new subscription rights will call for the issuance of more than 162,000 new common shares at $75 a share. The money derived from the sale of common stock on this basis will be used to take care of the company's heretofore announced plans for improvements and extensions at its various plants, which will materially increase its production capacity.

Through the completion of this program, approved by the board of directors on Dec. 30, the capital structure of the American Rolling Mill Co. will be so simplified that only the common stock and the new bond issue of $25,000,000 will be outstanding. A public offering of the bond issue is expected some time in January.

Iron and Steel Prices for Sixteen Years

Monthly Averages Computed from the Weekly Market Quotations of THE IRON AGE in the Period of 1912 to 1927

IN this issue of THE IRON AGE are our two colored price charts, in which plotted lines indicate the course of prices for pig iron, billets, scrap and leading forms of finished iron and steel and non-ferrous metals in the 16 years ended with 1927. The diagrams are based on monthly averages of prices quoted week by week in our market reports from the leading selling centers. In the tables following are the monthly average prices of more than 80 products, including those on which the charts are based.

Bessemer Pig Iron at Pittsburgh, per Gross Ton (2240 lb.)

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$15.05	$18.15	$14.96	$14.59	$21.58	$35.95	$37.25	$33.60	$40.00	$33.96	$21.56	$29.27	$24.76	$24.64	$22.76	$21.26
February	14.90	18.15	15.09	14.55	21.51	35.95	37.25	33.60	42.90	31.46	21.46	29.83	25.26	24.51	22.76	20.76
March	15.09	18.15	15.09	14.55	21.75	37.70	37.25	32.54	43.40	28.16	21.46	32.02	25.14	24.06	22.76	21.16
April	15.15	17.90	14.90	14.55	21.95	42.20	36.15	29.35	43.60	26.96	22.59	32.77	24.56	22.89	21.39	21.26
May	15.13	17.70	14.90	14.59	21.95	45.15	36.15	29.35	44.03	26.16	26.36	31.87	23.89	21.76	21.14	20.96
June	15.15	17.14	14.90	14.70	21.95	54.70	36.38	29.35	44.80	24.71	26.96	30.27	22.89	20.76	20.76	20.64
July	15.20	16.70	14.90	14.95	21.95	57.45	36.60	29.35	47.15	22.84	26.77	28.46	21.96	20.76	20.39	20.26
August	15.46	16.52	14.90	15.95	21.95	54.75	36.60	29.35	49.11	21.96	29.96	28.26	21.76	20.76	19.76	20.16
September	16.15	16.65	14.90	16.85	22.26	48.03	36.60	29.35	50.46	21.96	35.27	28.26	21.76	21.06	20.01	19.76
October	17.80	16.60	14.84	16.95	24.08	37.25	36.60	29.35	49.16	21.96	35.17	26.96	21.76	21.39	20.89	19.76
November	18.02	16.02	14.59	17.51	30.15	37.25	36.60	31.26	41.10	21.96	33.52	25.26	22.13	22.64	21.66	19.76
December	18.15	15.77	14.70	19.65	35.68	37.25	36.60	36.65	36.96	21.96	29.90	24.64	23.66	22.76	21.64	19.39
Average	*15.94*	*17.12*	*14.89*	*15.78*	*23.90*	*43.64*	*36.67*	*31.09*	*44.39*	*25.34*	*27.58*	*28.68*	*23.29*	*22.33*	*21.33*	*20.46*

Basic Pig Iron, f.o.b. Mahoning or Shenango Valley Furnace, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.35	$16.41	$12.50	$12.50	$17.81	$30.00	$33.00	$30.00	$37.40	$30.00	$18.15	$25.80	$21.25	$22.00	$20.00	$18.00
February	12.25	16.30	13.19	12.50	17.69	30.00	33.00	30.00	42.25	27.50	17.75	26.25	22.00	22.00	20.00	18.00
March	12.81	16.11	13.00	12.50	18.20	32.25	33.00	28.94	41.50	24.20	17.94	30.13	21.94	21.30	20.00	18.40
April	13.00	15.87	13.00	12.50	18.13	38.75	32.00	25.75	42.40	22.88	20.00	31.05	21.55	20.13	18.63	19.00
May	13.00	15.15	13.00	12.50	18.00	41.60	32.00	25.75	43.25	22.00	24.60	29.00	20.50	18.81	18.38	18.20
June	13.12	14.50	13.00	12.59	18.00	48.75	32.00	25.75	44.00	20.75	25.00	27.38	19.63	18.05	18.00	17.88
July	13.40	14.37	13.00	12.74	18.00	52.50	32.00	25.75	45.85	19.38	24.25	25.10	19.00	18.00	17.63	17.50
August	13.94	14.06	13.00	14.06	18.00	51.20	32.00	25.75	48.10	18.20	26.60	24.75	19.00	18.00	17.50	17.30
September	14.37	14.00	13.00	14.75	18.31	42.75	32.00	25.75	48.50	19.13	32.63	24.88	19.00	18.30	17.50	17.06
October	15.98	13.90	12.81	15.00	19.88	33.00	33.00	25.75	43.75	19.19	30.90	23.50	19.00	18.63	18.00	17.00
November	16.37	13.09	12.48	15.75	25.10	33.00	33.00	28.31	36.50	19.00	27.75	20.88	19.13	19.88	18.50	17.00
December	16.50	12.71	12.50	17.50	30.00	33.00	33.00	34.25	33.00	18.63	24.81	21.00	20.90	20.00	18.50	17.00
Average	*13.92*	*14.71*	*12.87*	*13.74*	*19.76*	*38.90*	*32.50*	*27.65*	*42.21*	*21.74*	*24.20*	*25.81*	*20.24*	*19.59*	*18.55*	*17.70*

Local No. 2 Foundry Pig Iron at Chicago (at Furnace), per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$14.00	$17.90	$13.75	$13.00	$18.50	$30.00	$33.00	$31.00	$40.00	$31.50	$18.90	$28.90	$23.70	$24.00	$23.00	$20.88
February	14.00	17.31	14.00	13.00	18.50	32.00	33.00	31.00	42.25	29.00	19.00	29.75	24.50	24.00	23.00	20.25
March	14.00	17.25	14.25	12.95	18.70	36.00	33.00	29.94	43.00	25.60	20.00	31.25	24.38	23.80	23.00	20.00
April	14.00	17.00	14.25	13.00	19.00	39.25	33.00	26.75	43.00	24.00	20.50	32.00	24.10	22.50	22.00	20.00
May	14.50	16.00	14.06	13.00	19.00	43.80	33.00	26.75	43.00	22.80	22.60	32.00	22.75	21.13	21.63	20.00
June	14.50	15.62	13.69	13.00	19.00	51.00	33.00	26.75	43.40	20.75	23.25	31.25	21.25	20.30	21.10	20.00
July	14.70	14.70	13.75	13.00	19.00	55.00	33.00	26.75	45.25	19.00	24.25	27.90	19.60	20.50	21.00	20.00
August	15.37	15.00	13.69	13.44	18.40	55.00	33.00	26.75	46.00	19.55	28.60	27.00	20.38	20.50	21.00	19.50
September	16.00	15.00	13.25	13.90	18.13	54.67	33.00	26.75	46.00	21.75	32.00	26.75	20.50	21.00	21.00	19.50
October	17.00	15.00	12.94	14.63	19.63	33.00	34.00	27.75	44.50	21.00	31.40	25.00	20.50	21.63	21.00	19.00
November	17.75	14.87	12.56	17.13	25.80	33.00	34.00	31.00	39.40	20.60	29.75	23.13	21.00	22.75	21.00	18.50
December	18.00	14.30	13.00	18.10	29.50	33.00	34.00	38.75	34.50	19.63	28.00	23.00	22.50	23.00	21.00	18.50
Average	*15.32*	*15.83*	*13.60*	*14.01*	*20.26*	*41.31*	*33.25*	*29.16*	*42.53*	*22.93*	*24.85*	*28.16*	*22.10*	*22.09*	*21.64*	*19.68*

Standard Brands Eastern Pennsylvania No. 2X Foundry Pig Iron at Philadelphia, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$14.85	$18.25	$14.65	$14.25	$19.94	$30.10	$34.25	$36.15	$44.10	$33.34	$21.34	$29.76	$24.11	$25.01	$24.26	$22.76
February	14.85	18.25	14.94	14.25	20.00	31.88	34.25	36.15	45.10	31.09	21.09	30.01	24.04	25.01	24.14	22.26
March	14.92	17.77	15.00	14.25	20.05	37.31	34.25	34.39	45.53	27.59	21.26	32.30	24.16	24.21	23.36	22.26
April	15.00	17.40	15.00	14.25	20.50	41.38	34.25	31.90	46.85	26.26	23.62	32.95	23.06	22.82	23.26	22.26
May	15.18	16.75	14.81	14.25	20.50	43.60	34.25	30.70	47.10	25.71	26.09	32.76	22.67	21.51	22.89	22.26
June	15.31	16.19	14.75	14.25	19.94	48.19	34.29	29.50	47.15	25.50	27.06	30.76	21.85	21.26	22.66	22.14
July	15.70	15.60	14.75	14.31	19.75	53.13	34.40	29.08	48.15	23.55	27.92	27.68	21.26	21.26	22.26	21.51
August	15.87	15.60	14.75	14.94	19.55	53.00	34.40	29.60	51.96	20.64	32.26	25.89	21.51	21.57	22.26	21.26
September	16.59	15.83	14.75	16.00	19.50	51.67	34.40	30.70	53.51	21.22	34.83	26.26	21.76	21.96	22.26	20.76
October	17.60	15.95	14.63	16.25	20.31	34.25	38.85	32.10	52.53	22.23	32.54	24.04	21.76	22.64	22.26	20.51
November	18.25	15.56	14.50	17.12	24.90	34.25	39.15	35.35	44.99	22.74	30.39	23.01	22.64	23.64	23.56	20.26
December	18.25	15.20	14.25	19.05	29.25	34.25	39.15	40.10	35.54	21.82	28.86	24.26	24.56	24.26	23.39	20.26
Average	*16.03*	*16.53*	*14.73*	*15.26*	*21.18*	*41.08*	*35.49*	*32.98*	*46.88*	*25.14*	*27.27*	*28.31*	*22.78*	*22.93*	*23.05*	*21.55*

Southern No. 2 Foundry Pig Iron at Cincinnati, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.25	$16.95	$13.88	$12.40	$17.90	$26.10	$35.90	$34.60	$41.80	$36.75	$20.70	$27.45	$25.55	$24.05	$25.69	$22.19
February	13.31	16.69	13.81	12.40	17.90	27.53	35.90	34.60	43.60	32.63	20.00	28.68	26.55	24.05	25.69	21.69
March	13.50	16.31	14.00	12.27	17.90	31.90	35.90	33.54	43.60	29.80	19.50	30.80	26.55	24.05	25.69	21.69
April	13.75	15.65	13.75	12.34	17.90	37.40	35.90	30.65	44.00	28.00	20.38	31.05	26.35	24.05	25.69	21.69
May	14.15	14.94	13.75	12.40	17.90	41.90	35.90	29.85	45.60	26.70	22.10	30.75	25.55	24.05	25.69	21.69
June	14.25	14.06	13.63	12.50	17.34	45.15	36.08	28.39	45.60	26.38	23.00	29.30	24.05	23.25	24.59	21.69
July	14.70	13.75	13.30	12.71	16.90	49.90	36.60	28.35	45.60	24.75	22.30	28.85	22.05	22.18	24.19	21.13
August	15.06	14.06	13.25	13.71	16.70	49.90	36.60	30.40	45.78	23.50	24.35	27.68	21.55	22.55	24.19	20.94
September	15.87	14.25	13.25	14.15	17.28	49.90	36.60	31.25	46.50	23.50	29.55	26.55	21.55	22.85	24.07	20.94
October	16.80	14.35	12.90	14.78	18.03	49.38	37.60	31.60	46.50	23.50	30.85	24.68	21.55	23.43	23.69	20.94
November	17.25	13.87	12.90	16.15	22.40	35.90	37.60	34.35	42.50	22.90	27.55	23.65	21.80	24.87	23.69	19.69
December	17.25	13.95	12.50	17.10	25.90	35.90	37.60	38.60	42.50	21.75	26.93	25.05	23.85	25.49	23.69	19.69
Average	*14.93*	*14.90*	*13.41*	*13.58*	*18.67*	*40.07*	*36.52*	*32.16*	*44.47*	*26.68*	*23.93*	*27.87*	*23.91*	*23.74*	*24.71*	*21.16*

Mahoning and Shenango Valley No. 2 Foundry Iron, at Furnace, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.00	$17.50	$12.85	$13.00	$18.50	$31.00	$33.00	$31.00	$39.40	$31.88	$19.30	$27.00	$22.50	$22.38	$20.50	$18.50
February	13.00	17.00	13.19	13.00	18.31	32.00	33.00	31.00	41.50	28.00	18.88	27.50	23.00	22.00	20.50	18.50
March	13.12	16.69	13.25	13.00	18.50	34.75	33.00	29.94	41.25	25.90	19.00	30.50	23.00	21.10	20.50	18.50
April	13.25	15.55	13.25	12.75	18.50	39.75	33.00	26.75	42.80	24.75	20.75	31.00	21.80	20.13	19.00	18.50
May	13.25	14.62	13.00	12.94	18.20	42.40	33.00	26.75	44.25	23.50	23.80	30.20	20.75	19.13	18.88	18.50
June	13.25	14.06	13.00	12.69	18.13	50.25	33.00	26.75	45.00	22.10	24.00	27.63	19.63	18.30	17.96	18.13
July	13.37	13.87	13.00	12.70	18.25	54.50	33.00	26.75	45.00	20.13	24.25	25.50	19.00	18.50	17.69	18.00
August	13.69	14.00	13.00	13.62	18.25	53.20	33.00	26.75	47.00	19.63	32.60	24.88	19.13	18.50	17.50	17.60
September	14.44	14.00	13.00	14.70	18.39	47.00	33.00	26.75	49.40	21.00	34.88	24.75	19.80	18.80	17.63	17.50
October	16.10	13.84	12.90	14.87	20.00	33.00	34.00	26.75	46.50	21.00	31.80	23.60	19.50	19.13	18.50	17.50
November	16.94	13.50	12.75	15.50	25.00	33.00	34.00	31.50	40.25	20.75	27.88	21.88	19.50	20.39	19.00	17.45
December	17.25	13.50	12.75	18.30	30.75	33.00	34.00	36.75	36.20	20.00	25.63	22.00	21.20	20.50	18.80	17.25
Average	*14.22*	*14.84*	*13.00*	*13.92*	*20.07*	*40.32*	*33.25*	*28.95*	*43.21*	*23.22*	*25.23*	*26.37*	*20.73*	*19.90*	*18.87*	*18.00*

Gray Forge Pig Iron, Philadelphia and Vicinity, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$14.25	$17.65	$14.00	$13.50	$18.44	$28.38	$32.00	$33.90	$40.23	$32.78	$20.60	$27.85	$22.81	$24.00	$23.00	$21.50
February	14.25	17.31	14.00	13.44	19.00	29.75	32.00	33.90	40.50	30.90	20.50	28.37	22.50	23.63	23.00	21.19
March	14.25	16.87	14.00	13.25	19.00	31.94	32.00	32.84	43.00	26.86	20.50	29.62	22.12	23.40	22.30	21.00
April	14.37	16.56	14.00	13.25	19.13	38.50	32.00	29.65	43.00	25.26	21.25	30.37	22.00	22.63	22.00	21.00
May	14.50	15.81	13.81	13.25	19.50	40.40	32.00	29.21	43.00	25.26	23.80	29.50	22.00	21.50	22.00	21.00
June	14.62	15.37	13.75	13.25	19.25	44.31	32.00	26.25	43.00	24.69	24.25	28.00	22.00	21.50	21.90	21.00
July	14.87	14.95	13.75	13.25	18.50	50.05	32.00	25.92	43.00	22.50	25.50	26.90	21.20	21.50	21.50	21.00
August	15.37	14.62	13.75	14.50	18.50	49.56	32.00	26.60	45.46	21.20	29.00	25.50	21.00	21.00	21.40	20.60
September	15.87	14.56	13.75	15.13	18.50	44.25	32.00	27.00	47.10	20.00	31.00	25.50	21.00	21.00	21.00	20.50
October	16.87	15.00	13.62	15.25	19.35	32.20	36.60	28.69	47.10	20.50	31.00	24.20	21.00	21.25	21.00	20.25
November	17.62	14.75	13.50	16.05	23.75	32.00	36.60	32.40	44.64	22.50	29.14	23.00	21.37	22.00	22.50	19.50
December	17.75	14.58	13.50	17.63	27.69	32.00	36.90	36.10	38.74	21.69	28.14	23.00	23.10	23.00	22.50	19.50
Average	*15.38*	*15.67*	*13.79*	*14.31*	*20.05*	*37.78*	*33.18*	*30.21*	*43.23*	*24.51*	*25.39*	*26.82*	*21.84*	*22.20*	*22.01*	*20.67*

Malleable Pig Iron at Chicago, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$14.35	$17.90	$13.88	$13.00	$19.00	$30.94	$33.50	$31.50	$40.50	$32.00	$18.90	$28.90	$23.88	$24.00	$23.00	$20.88
February	14.14	17.31	13.94	13.00	19.00	31.75	33.50	31.50	42.75	29.38	19.13	29.75	24.50	24.00	23.00	20.25
March	14.00	17.25	14.25	13.00	19.40	35.40	33.50	30.44	43.50	25.80	20.00	31.25	24.38	24.00	23.00	20.00
April	14.00	17.05	14.25	13.00	19.50	39.00	33.50	27.25	43.50	24.00	20.50	32.00	24.10	22.63	22.00	20.00
May	14.40	16.00	14.06	13.00	19.50	43.60	33.50	27.25	43.50	23.00	22.60	32.00	22.75	21.25	21.42	20.00
June	14.50	15.62	13.88	13.00	19.50	50.25	33.50	27.25	43.50	21.50	23.25	31.25	21.25	20.60	21.10	20.00
July	14.50	14.65	14.00	13.00	19.50	55.00	33.50	27.25	45.25	19.00	24.25	27.90	19.60	20.50	21.00	20.00
August	15.10	15.00	14.00	13.44	19.00	55.00	33.50	27.25	46.50	19.60	28.60	27.00	20.38	20.50	21.00	19.50
September	16.25	15.00	13.25	14.30	19.00	54.75	33.50	27.25	46.50	21.75	32.00	26.75	20.50	21.00	21.00	19.50
October	17.10	15.20	13.00	15.25	19.88	33.50	34.50	28.25	45.75	21.00	31.40	25.00	20.50	21.63	21.00	19.00
November	17.87	14.87	12.88	17.13	25.80	33.50	34.50	31.50	39.90	20.60	29.75	23.13	20.88	22.75	21.00	18.50
December	18.00	14.63	12.90	18.20	29.50	33.50	34.50	39.50	35.00	19.63	28.00	23.00	22.62	23.00	21.00	18.50
Average	*15.35*	*15.87*	*13.69*	*14.11*	*20.72*	*41.35*	*33.75*	*29.68*	*43.01*	*23.11*	*24.87*	*28.16*	*22.11*	*22.15*	*21.63*	*19.68*

Lake Superior Charcoal Pig Iron at Chicago, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$16.00	$18.15	$15.25	$15.75	$19.50	$31.75	$37.50	$38.85	$48.75	$42.50	$31.10	$33.15	$29.15	$29.04	$29.04	$27.04
February	15.95	18.00	15.25	15.75	19.75	33.75	37.50	38.85	58.38	39.50	29.38	33.90	29.15	29.04	29.04	27.04
March	15.75	18.00	15.25	15.75	19.75	36.75	37.50	38.85	58.20	38.50	26.00	35.40	29.15	29.04	29.04	27.04
April	15.75	18.00	15.45	15.75	19.75	40.25	37.50	31.75	57.25	38.50	26.50	36.53	29.15	29.04	29.04	27.04
May	15.75	18.00	15.75	15.75	19.75	48.15	37.50	31.75	57.50	37.50	28.40	36.65	29.15	29.04	29.04	27.04
June	16.75	16.81	15.75	15.75	19.75	52.88	37.62	31.75	57.50	37.50	29.75	36.65	29.12	29.04	29.04	27.04
July	16.25	15.65	15.75	15.75	19.75	57.75	38.00	31.75	57.50	36.37	31.65	34.81	29.04	29.04	29.04	27.04
August	16.25	14.69	15.75	16.00	19.75	58.00	38.00	32.25	57.70	33.60	34.05	32.04	29.04	29.04	29.04	27.04
September	17.12	15.25	15.75	15.85	19.75	58.00	38.00	32.75	58.50	33.00	36.15	32.04	29.04	29.04	29.04	27.04
October	18.65	15.25	15.75	15.75	20.25	37.50	38.00	33.44	58.50	31.50	36.15	29.86	29.04	29.04	27.54	27.04
November	18.65	15.25	15.75	17.00	26.46	37.50	38.70	38.50	55.75	31.50	36.15	28.40	29.04	29.04	27.04	27.04
December	18.75	15.25	15.75	18.65	31.75	37.50	38.70	43.00	49.13	31.50	34.65	29.15	29.04	29.04	27.04	27.04
Average	*16.80*	*16.53*	*15.60*	*16.13*	*21.33*	*44.15*	*37.88*	*35.29*	*56.22*	*35.96*	*31.66*	*33.22*	*29.09*	*29.04*	*28.58*	*27.04*

No. 2 Foundry Pig Iron at Buffalo, (at Furnace) per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.50	$17.43	$12.85	$12.89	$18.75	$34.94	$33.00	$31.00	$40.90	$32.38	$19.44	$26.94	$22.25	$23.00	$21.00	$18.00
February	13.50	17.06	12.94	13.00	18.53	35.25	33.00	31.00	42.00	30.50	18.87	27.56	22.25	22.75	21.00	17.39
March	13.63	16.70	13.22	12.41	18.72	38.45	33.00	29.94	44.75	29.00	18.30	29.05	21.81	22.12	21.00	17.00
April	13.56	16.22	13.50	12.80	18.88	42.62	33.00	26.75	45.00	26.15	20.81	29.56	21.37	20.65	21.00	17.50
May	13.50	15.18	13.41	12.88	18.78	44.95	33.00	26.75	45.00	25.62	22.62	29.40	20.25	19.00	20.75	17.50
June	13.88	14.32	13.13	12.87	18.65	48.31	33.00	26.75	44.75	23.42	23.05	29.06	19.37	19.00	19.60	17.39
July	14.03	13.83	13.05	12.70	18.70	52.25	33.00	26.63	45.00	20.87	24.50	26.00	19.00	18.85	19.00	16.88
August	14.50	13.98	13.25	13.85	18.63	53.00	33.00	27.77	47.75	19.50	30.70	24.95	19.19	18.72	19.00	16.10
September	15.50	14.09	13.22	14.90	19.00	53.00	33.00	28.25	50.10	20.00	33.94	24.87	19.37	18.75	19.00	16.13
October	16.62	14.00	12.72	15.63	20.37	33.00	34.00	28.70	47.44	20.37	31.12	23.06	19.05	19.40	19.00	16.88
November	17.25	13.69	12.44	16.28	27.25	33.00	34.00	34.30	42.56	19.12	27.80	20.87	20.50	21.19	19.00	17.00
December	17.56	12.87	12.95	18.13	32.75	33.00	34.00	38.25	36.60	19.30	25.50	21.56	22.62	21.50	19.00	17.00
Average	*14.75*	*14.95*	*13.06*	*14.03*	*20.75*	*41.81*	*33.25*	*29.67*	*44.32*	*23.85*	*24.72*	*26.07*	*20.59*	*20.41*	*19.86*	*17.06*

No. 2 Foundry Pig Iron at Cleveland, (Delivered Consumer) per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.25	$17.87	$13.50	$13.44	$19.30	$31.10	$33.30	$31.40	$40.00	$33.40	$20.06	$27.87	$23.70	$23.87	$22.32	$19.50
February	13.25	17.53	13.82	13.50	19.23	32.93	33.30	31.40	41.90	30.22	20.06	29.00	24.50	23.99	22.38	19.13
March	13.25	17.16	14.25	13.47	19.05	37.06	33.30	80.58	43.15	27.80	21.55	32.15	24.50	23.47	21.81	19.90
April	13.25	16.39	14.25	13.38	19.36	40.27	33.30	27.15	43.40	26.62	20.81	32.52	24.25	22.82	20.85	19.87
May	13.30	15.62	14.38	13.38	19.45	42.90	33.30	27.15	44.53	25.50	23.75	32.21	23.25	20.87	20.00	19.50
June	13.56	14.96	14.25	13.28	19.07	50.63	33.32	27.15	44.90	24.00	24.06	30.46	21.50	20.12	19.69	19.20
July	13.81	14.69	13.75	13.20	18.79	55.80	33.40	27.15	45.20	21.31	24.75	27.44	20.25	20.00	19.50	19.00
August	14.19	14.68	13.75	14.32	18.76	55.17	33.40	27.40	48.06	20.50	31.31	26.40	20.56	20.00	19.50	19.00
September	15.45	14.75	13.75	15.27	18.92	53.15	33.40	27.65	49.86	20.75	35.94	25.87	20.81	20.00	19.50	19.00
October	16.85	14.83	13.73	15.43	20.12	33.30	34.40	28.15	47.88	20.75	34.09	25.25	21.00	20.55	19.87	18.88
November	17.59	14.40	13.51	16.61	26.20	33.30	34.40	31.90	43.46	20.56	30.47	23.35	21.31	22.32	20.60	18.50
December	17.87	13.78	13.27	18.18	31.13	33.30	34.40	36.90	36.32	19.95	27.25	23.06	22.39	22.26	20.39	18.50
Average	*14.64*	*15.56*	*13.85*	*14.46*	*20.78*	*41.58*	*33.60*	*29.67*	*44.06*	*24.28*	*26.18*	*27.97*	*22.34*	*21.69*	*20.53*	*19.17*

Southern No. 2 Foundry Pig Iron at Birmingham, Dollars per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$10.00	$13.56	$10.63	$9.50	$15.00	$23.20	$33.00	$31.00	$38.75	$32.25	$16.20	$23.25	$21.50	$20.00	$22.00	$18.50
February	10.06	13.38	10.56	9.50	15.00	24.63	33.00	31.00	40.00	28.13	15.00	24.38	22.50	20.00	22.00	18.00
March	10.25	13.06	10.70	9.35	15.00	29.00	33.00	29.44	40.00	25.30	15.00	26.40	22.50	20.00	22.00	18.00
April	10.55	12.40	10.50	9.44	15.00	34.50	33.00	26.75	40.50	23.50	15.88	27.00	22.30	20.00	22.00	18.00
May	10.94	11.69	10.50	9.44	15.00	39.00	33.00	26.75	42.00	22.20	17.60	26.85	21.50	20.00	22.00	18.00
June	11.00	10.81	10.35	9.65	14.50	42.25	33.00	25.25	42.00	21.88	18.38	25.75	20.00	19.60	21.20	18.00
July	11.45	10.50	10.00	9.75	14.00	47.00	33.00	25.15	42.00	20.25	18.25	25.00	18.00	18.00	21.00	17.44
August	11.81	10.81	10.00	10.75	13.80	47.00	33.00	27.38	42.00	19.00	20.10	23.70	17.50	18.00	21.00	17.25
September ...	12.75	11.00	10.00	11.50	14.38	47.00	33.00	27.95	42.00	19.00	26.00	22.75	17.50	18.50	20.75	17.25
October	13.50	11.25	10.00	12.13	15.50	33.00	34.00	28.00	42.00	19.00	26.80	20.63	17.50	19.38	20.00	17.25
November ...	14.00	10.63	10.00	13.40	20.13	33.00	34.00	30.75	38.00	18.40	23.50	19.60	17.75	21.00	20.00	16.00
December	14.00	10.70	9.60	14.38	23.00	33.00	33.40	35.20	38.00	17.33	22.88	21.00	19.80	22.00	20.00	16.00
Average ...	*11.69*	*11.65*	*10.24*	*10.73*	*15.86*	*36.05*	*33.20*	*28.72*	*40.60*	*22.19*	*19.63*	*23.86*	*19.86*	*19.71*	*21.16*	*17.47*

Bessemer Pig Iron, per Gross Ton, at Valley Furnace

	1922	1923	1924	1925	1926	1927
January	$19.60	$27.50	$23.00	$22.88	$21.00	$19.50
February	19.50	28.06	23.50	22.75	21.00	19.00
March	19.50	30.25	23.38	22.30	21.00	19.40
April	20.63	31.00	22.80	21.13	19.63	19.50
May	24.40	30.10	22.13	20.00	19.38	19.20
June	25.00	28.50	21.13	19.00	19.00	18.88
July	25.00	26.70	20.20	19.00	18.63	18.50
August	28.20	26.50	20.00	19.00	18.00	18.40
September ...	33.50	26.50	20.00	19.30	18.25	18.00
October	33.40	25.20	20.00	19.63	19.13	18.00
November ...	31.75	23.25	20.38	20.88	19.90	18.00
December	28.13	22.88	21.90	21.00	19.88	17.56
Average ...	*25.63*	*27.20*	*21.53*	*20.57*	*19.57*	*18.66*

Malleable Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1921	1922	1923	1924	1925	1926	1927
January	$32.00	$19.50	$27.00	$22.39	$22.39	$20.50	$18.50
February ...	28.75	19.00	27.63	23.00	22.00	20.50	18.50
March	25.80	19.00	30.50	22.50	21.50	20.50	18.50
April	25.00	19.50	31.00	22.10	20.63	19.00	18.50
May	24.10	24.20	30.20	21.00	19.25	18.88	18.50
June	22.75	24.50	28.13	19.88	18.50	18.05	18.13
July	20.88	25.13	25.40	19.00	18.50	17.75	18.00
August	20.00	29.50	24.50	19.13	18.50	17.50	17.60
September ..	20.13	33.50	24.50	19.80	18.80	17.63	17.50
October	20.50	32.70	23.30	19.50	19.13	18.50	17.50
November ..	20.20	29.00	20.88	19.75	20.38	19.00	17.50
December ..	20.00	26.25	20.00	21.20	20.50	18.75	17.50
Average ..	*23.34*	*25.15*	*26.09*	*20.77*	*20.01*	*18.88*	*18.02*

Gray Forge Pig Iron, per Gross Ton, f.o.b. Valley Furnace

	1921	1922	1923	1924	1925	1926	1927
January	$30.88	$19.00	$26.50	$22.00	$21.88	$20.00	$18.00
February ...	27.00	18.81	27.00	22.00	21.50	20.00	18.00
March	24.70	18.75	30.00	22.00	20.60	20.00	18.00
April	23.75	20.44	30.50	21.40	19.63	18.50	18.00
May	22.40	23.30	29.70	20.25	18.63	18.38	18.00
June	20.88	23.50	26.63	19.13	17.80	17.45	17.63
July	19.13	23.75	25.00	18.50	18.00	17.20	17.50
August	18.90	29.45	24.00	18.63	18.00	17.00	17.10
September ..	20.00	34.13	24.00	19.30	18.30	17.13	17.00
October	20.00	31.10	23.30	19.00	18.63	18.00	17.00
November ..	19.70	27.63	21.39	19.00	19.88	18.50	16.95
December ..	19.25	25.25	21.50	20.70	20.00	18.25	16.75
Average ..	*22.21*	*24.59*	*25.79*	*20.16*	*19.39*	*18.39*	*17.33*

Basic Pig Iron, per Gross Ton, Delivered Eastern Pennsylvania

	1922	1923	1924	1925	1926	1927
January	$20.18	$27.80	$23.00	$24.25	$23.00	$21.50
February	19.84	28.19	22.69	23.88	23.00	21.19
March	22.61	29.56	21.81	23.55	22.10	20.85
April	21.00	30.81	21.50	22.31	21.75	20.75
May	24.00	30.60	21.00	21.13	21.75	20.75
June	25.00	28.14	21.00	21.50	21.45	20.75
July	25.75	26.60	20.20	21.50	21.00	20.75
August	27.23	25.00	20.00	20.50	20.95	20.15
September ...	30.83	25.00	20.00	20.70	20.75	20.00
October	29.30	24.20	20.00	21.25	20.69	20.00
November ...	27.83	22.88	21.13	22.39	22.60	19.60
December	27.31	23.13	23.41	23.00	22.00	19.25
Average ...	*25.08*	*26.83*	*21.31*	*22.16*	*21.75*	*20.46*

Virginia No. 2X Foundry Pig Iron, Delivered Eastern Pennsylvania (Per Gross Ton)

	1921	1922	1923	1924	1925	1926	1927
January	$40.49	$27.84	$32.97	$30.17	$29.67	$28.17	$27.67
February ...	37.24	27.61	33.17	30.52	29.67	28.17	26.67
March	34.59	27.24	33.79	30.67	29.67	28.17	26.67
April	32.99	27.74	34.67	30.67	29.67	28.17	27.17
May	32.99	28.24	35.07	30.67	29.17	28.17	27.17
June	32.99	28.24	33.17	30.67	29.17	28.17	27.17
July	31.86	30.17	32.27	29.87	29.17	28.17	27.17
August	29.94	30.17	31.42	28.67	29.17	28.17	26.67
September ..	28.49	36.17	30.92	28.67	28.77	28.17	25.98
October	28.24	38.17	30.17	28.67	28.17	28.17	25.79
November ..	28.24	37.17	30.17	28.67	28.17	28.17	25.79
December ..	28.24	33.92	30.17	29.27	28.17	28.17	25.79
Average ..	*32.19*	*31.06*	*32.33*	*29.77*	*29.05*	*28.17*	*26.64*

Standard Low-Phosphorus Pig Iron at Furnace in New York State (Per Gross Ton)

	1921	1922	1923	1924	1925	1926	1927
January	$42.63	$30.00	$35.00	$27.10	$25.50	$23.25	$24.50
February ...	41.50	30.00	35.00	27.00	25.50	23.00	25.00
March	41.50	30.00	35.00	27.00	25.10	22.50	25.00
April	38.75	30.00	35.00	25.80	24.75	22.38	25.00
May	38.00	30.00	33.20	24.75	24.00	22.00	25.00
June	38.00	30.00	30.50	24.75	23.00	22.00	25.00
July	38.00	30.00	29.00	24.00	22.00	22.00	25.00
August	36.80	33.00	29.00	24.00	22.00	22.00	25.00
September ..	36.50	38.00	28.50	24.00	22.00	22.00	23.00
October	36.50	38.00	28.00	23.75	22.00	22.88	23.00
November ..	36.50	38.00	27.88	23.88	24.00	24.10	23.00
December ..	34.87	35.00	27.50	25.30	24.00	24.00	23.00
Average ..	*38.25*	*32.67*	*31.13*	*25.11*	*23.65*	*22.68*	*24.29*

THE IRON AGE Composite Iron and Steel Prices

Composite Pig Iron Price

Average of THE IRON AGE quotations on basic pig iron at Valley furnace and foundry iron at Chicago, Birmingham, Buffalo, Valley and Philadelphia. Quoted in dollars a gross ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.65	$16.49	$12.76	$12.38	$17.81	$28.88	$33.21	$31.36	$39.08	$31.18	$18.48	$26.78	$22.15	$22.44	$21.79	$19.44
February	12.61	16.31	13.18	12.38	17.76	29.75	33.21	31.36	42.35	28.45	18.14	27.20	22.84	22.50	21.77	19.07
March	12.93	16.07	13.16	12.34	18.06	32.18	33.21	30.10	42.17	25.18	18.35	30.11	22.81	21.99	21.65	19.03
April	13.09	15.74	13.13	12.37	18.15	38.56	32.71	27.11	42.93	23.73	20.00	30.83	22.31	20.95	20.96	19.21
May	13.27	14.98	13.06	12.37	18.08	41.87	32.71	26.91	43.64	22.78	23.35	29.74	21.40	19.85	20.69	19.09
June	13.36	14.35	12.97	12.45	17.91	47.95	32.71	26.46	44.09	21.73	23.95	28.23	20.27	19.22	20.00	18.92
July	13.68	13.99	12.92	12.55	17.79	52.11	32.73	26.37	45.44	20.22	23.86	25.96	19.31	18.96	19.51	18.56
August	14.15	13.93	12.91	13.55	17.63	51.43	32.73	26.83	47.38	18.97	26.69	25.19	19.40	19.01	19.46	18.17
September ...	14.74	13.97	12.83	14.28	17.82	46.93	32.73	27.11	47.83	19.89	31.78	25.02	19.46	19.39	19.46	18.03
October	16.01	13.93	12.67	14.67	19.18	33.21	34.31	27.52	45.05	19.97	30.57	23.30	19.46	19.92	19.69	17.96
November ...	16.52	13.39	12.42	15.82	24.36	33.21	34.36	30.34	38.65	19.79	27.82	21.40	19.79	21.16	20.13	17.59
December	16.63	13.06	12.39	17.34	28.63	33.21	34.26	36.13	34.51	19.11	25.70	21.88	21.60	21.54	19.94	17.55
Average ...	*14.14*	*14.68*	*12.87*	*13.54*	*19.43*	*36.11*	*33.24*	*28.97*	*42.76*	*22.58*	*24.06*	*26.30*	*20.90*	*20.58*	*20.42*	*18.55*

Composite Price of Finished Steel

Average of THE IRON AGE quotations on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. Quoted in cents a pound

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	1.424	1.771	1.451	1.383	2.06	3.384	3.549	3.371	3.158	3.057	2.059	2.469	2.783	2.560	2.447	2.432
February	1.40	1.766	1.477	1.395	2.203	3.501	3.549	3.371	3.486	2.918	2.007	2.605	2.782	2.546	2.428	2.378
March	1.394	1.786	1.473	1.413	2.447	3.739	3.549	3.282	3.743	2.764	2.014	2.721	2.746	2.537	2.433	2.367
April	1.433	1.79	1.446	1.437	2.611	4.110	3.549	3.031	3.842	2.737	2.075	2.814	2.692	2.503	2.439	2.360
May	1.456	1.727	1.424	1.433	2.75	4.562	3.549	3.021	3.804	2.764	2.113	2.793	2.639	2.460	2.416	2.360
June	1.47	1.687	1.399	1.444	2.689	5.004	3.549	3.021	3.756	2.643	2.148	2.789	2.610	2.440	2.420	2.369
July	1.504	1.667	1.40	1.471	2.64	5.334	3.549	3.021	3.885	2.455	2.169	2.783	2.563	2.435	2.431	2.367
August	1.553	1.624	1.446	1.511	2.682	5.249	3.549	3.021	3.967	2.341	2.292	2.775	2.515	2.413	2.431	2.367
September ...	1.61	1.591	1.47	1.559	2.765	5.049	3.549	3.004	3.956	2.248	2.419	2.775	2.487	2.397	2.439	2.356
October	1.659	1.559	1.446	1.634	2.856	3.470	3.55	3.052	3.81	2.218	2.461	2.775	2.464	2.405	2.449	2.319
November	1.70	1.505	1.397	1.769	3.021	3.444	3.549	3.084	3.566	2.129	2.445	2.775	2.481	2.433	2.453	2.299
December	1.725	1.463	1.366	1.941	3.278	3.441	3.461	3.11	3.114	2.107	2.439	2.775	2.540	2.450	2.453	2.310
Average ...	*1.529*	*1.663*	*1.434*	*1.534*	*2.671*	*4.188*	*3.542*	*3.115*	*3.675*	*2.532*	*2.220*	*2.738*	*2.609*	*2.465*	*2.439*	*2.357*

Billets and Finished Steel

Bessemer Steel Billets at Pittsburgh, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$20.00	$28.30	$20.13	$19.25	$32.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.30	$40.00	$37.00	$35.00	$35.00
February	20.00	28.50	21.00	19.50	33.50	65.00	47.50	43.50	55.25	42.25	28.00	39.63	40.00	37.00	35.00	33.00
March	19.75	28.50	21.00	19.70	42.40	66.25	47.50	42.25	60.00	38.40	28.00	44.38	40.00	36.70	35.00	34.00
April	20.00	28.50	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50	35.00	33.25
May	20.80	27.37	20.00	20.00	45.00	86.00	47.50	38.50	60.00	37.00	34.00	44.60	38.50	35.25	35.00	33.00
June	20.87	26.50	19.50	20.50	43.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00	35.00	33.00
July	21.50	26.60	19.00	21.38	41.00	100.00	47.50	38.50	62.50	32.25	35.00	42.50	38.00	35.00	35.00	33.00
August	22.12	26.00	20.25	23.13	44.20	86.00	47.50	38.50	61.00	29.60	36.10	42.50	37.75	35.00	35.00	33.00
September ...	23.62	24.87	21.00	24.10	45.00	66.25	47.50	38.50	58.74	29.00	39.50	41.88	36.40	35.00	35.00	33.00
October	26.00	23.30	20.00	24.63	46.25	49.38	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25	35.00	33.00
November	27.00	21.00	19.25	26.50	52.00	47.50	47.50	41.38	49.70	29.00	37.75	40.00	35.50	34.75	35.00	33.00
December	27.00	20.00	19.00	30.60	57.50	47.50	45.50	46.00	43.50	29.00	36.50	40.00	36.00	35.00	35.00	33.00
Average ...	*22.39*	*25.79*	*20.08*	*22.44*	*43.95*	*70.78*	*47.33*	*40.51*	*56.22*	*34.46*	*33.95*	*41.70*	*37.99*	*35.23*	*35.00*	*33.27*

Open-Hearth Steel Billets at Pittsburgh, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$20.00	$28.90	$20.25	$19.25	$33.00	$63.00	$47.50	$43.50	$48.00	$43.50	$28.00	$37.50	$40.00	$38.00	$35.00	$35.00
February	20.00	29.00	21.00	19.50	34.75	65.00	47.50	43.50	55.25	41.00	28.00	39.63	40.00	38.00	35.00	33.00
March	19.39	29.00	21.00	19.70	42.60	66.25	47.50	42.25	60.00	38.50	28.00	44.39	40.00	36.70	35.00	34.00
April	20.00	29.00	20.80	20.00	45.00	73.75	47.50	38.50	60.00	37.50	29.50	45.00	40.00	35.50	35.00	33.25
May	20.25	27.63	20.00	20.00	43.40	86.00	47.50	38.50	60.00	37.00	34.00	45.00	38.50	35.25	35.00	33.00
June	20.75	26.50	19.40	20.50	41.50	98.75	47.50	38.50	61.00	37.00	35.00	42.63	38.00	35.00	35.00	33.00
July	21.63	26.60	19.00	21.88	42.75	100.00	47.50	38.50	65.00	32.25	35.00	42.50	38.00	35.00	35.00	33.00
August	22.63	25.39	20.25	23.50	45.00	82.50	47.50	38.50	61.00	29.60	35.50	42.50	37.75	35.00	35.00	33.00
September ...	24.13	24.13	21.00	24.60	45.00	66.25	47.50	38.50	58.75	29.00	39.50	41.88	36.40	35.00	35.00	33.00
October	26.70	23.30	20.00	25.25	46.25	50.50	47.50	38.50	55.00	29.00	40.00	40.00	35.75	34.25	35.00	33.00
November ...	27.50	21.00	19.25	27.25	52.00	47.50	47.50	41.39	49.70	29.00	37.75	40.00	35.50	34.75	35.00	33.00
December	27.75	20.00	19.00	31.80	57.50	47.50	45.50	46.40	43.50	29.00	36.50	44.00	36.00	35.00	35.00	33.00
Average ...	*22.56*	*25.87*	*20.08*	*22.77*	*44.06*	*70.58*	*47.33*	*40.54*	*56.43*	*34.36*	*33.90*	*41.75*	*37.99*	*35.62*	*35.00*	*33.27*

Wire Rods at Pittsburgh

No. 5 Bessemer wire rods, per gross ton. The quotations for November and December, 1917, and all of 1918, are Government prices and apply also to open-hearth rods

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$24.37	$30.00	$25.50	$25.00	$43.00	$75.00	$57.00	$57.00	$60.00	$57.00	$36.00	$47.00	$51.00	$48.00	$45.00	$45.00
February	25.00	30.00	26.38	25.00	48.00	77.50	57.00	57.00	63.75	54.50	35.75	49.38	51.00	48.00	45.00	43.00
March	25.00	30.00	26.50	25.00	54.80	81.00	57.00	55.75	70.00	52.00	36.00	50.00	51.00	48.00	45.00	43.00
April	25.00	30.00	26.00	25.00	60.00	85.00	57.00	52.00	70.00	49.00	38.00	50.25	51.00	47.00	45.00	42.25
May	25.00	30.00	25.50	25.00	60.00	86.00	57.00	52.00	72.50	48.00	38.00	51.00	48.75	46.00	45.00	42.00
June	25.00	29.50	24.50	25.00	53.75	92.50	57.00	52.00	75.00	48.00	38.50	51.00	48.00	45.60	45.00	42.00
July	25.00	28.30	24.50	25.63	53.75	96.25	57.00	52.00	75.00	43.00	40.00	51.00	48.00	45.00	45.00	42.25
August	25.80	28.00	25.00	27.00	55.00	94.00	57.00	52.00	75.00	41.80	42.40	51.00	46.50	45.00	45.00	43.00
September ...	27.00	27.37	26.20	29.40	55.00	88.75	57.00	52.00	75.00	39.50	46.25	51.00	46.00	45.00	45.00	43.00
October	28.50	26.60	25.88	31.75	55.00	77.25	57.00	52.00	75.00	40.50	45.00	51.00	45.50	45.00	45.00	42.75
November	29.75	25.87	25.25	36.25	63.00	57.00	57.00	54.50	66.40	40.00	45.00	51.00	45.00	45.00	45.00	41.00
December	30.00	25.17	25.00	39.50	68.75	57.00	57.00	59.50	57.00	38.00	45.00	51.00	48.00	45.00	45.00	40.00
Average ...	*26.29*	*28.40*	*25.52*	*28.29*	*55.84*	*79.77*	*57.00*	*53.98*	*69.55*	*45.94*	*40.49*	*50.39*	*48.31*	*46.05*	*45.00*	*42.44*

Plain Wire, Base, at Pittsburgh, Cents a Pound

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	1.51	1.37	1.55	1.35	1.34	1.98	2.95	3.25	3.25	3.25	3.25	2.25	2.45	2.75	2.60	2.50	2.49
February	1.55	1.40	1.55	1.40	1.39	2.10	2.95	3.25	3.25	3.50	3.13	2.20	2.63	2.75	2.60	2.50	2.41
March	1.57	1.40	1.56	1.40	1.40	2.25	3.11	3.25	3.19	3.50	3.00	2.25	2.65	2.75	2.60	2.50	2.40
April	1.60	1.40	1.60	1.40	1.37	2.25	3.23	3.25	3.00	3.50	3.00	2.25	2.68	2.75	2.50	2.50	2.40
May	1.60	1.40	1.60	1.36	1.35	2.45	3.45	3.25	3.00	3.50	3.00	2.25	2.75	2.68	2.50	2.50	2.40
June	1.55	1.40	1.60	1.30	1.35	2.45	3.70	3.25	3.00	3.50	2.75	2.25	2.75	2.65	2.49	2.50	2.40
July	1.50	1.42	1.58	1.32	1.39	2.45	3.95	3.25	3.00	3.50	2.56	2.25	2.75	2.63	2.50	2.50	2.40
August	1.50	1.46	1.48	1.36	1.43	2.53	3.95	3.25	3.00	3.69	2.50	2.29	2.75	2.56	2.50	2.50	2.40
September	1.46	1.50	1.47	1.40	1.54	2.55	3.95	3.25	3.00	3.75	2.58	2.39	2.75	2.53	2.50	2.50	2.40
October	1.44	1.50	1.41	1.40	1.65	2.60	3.25	3.25	3.17	3.75	2.60	2.45	2.75	2.50	2.50	2.50	2.40
November	1.37	1.50	1.39	1.39	1.72	2.80	3.25	3.25	3.29	3.65	2.56	2.45	2.75	2.50	2.50	2.50	2.40
December	1.34	1.53	1.35	1.31	1.89	2.95	3.25	3.25	3.21	3.25	2.44	2.45	2.75	2.60	2.50	2.50	2.40
Average	*1.50*	*1.44*	*1.51*	*1.37*	*1.48*	*2.47*	*3.43*	*3.25*	*3.11*	*3.53*	*2.78*	*2.31*	*2.70*	*2.64*	*2.52*	*2.50*	*2.41*

Wire Nails at Pittsburgh, Dollars a Keg of 100 Lb.

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January ...	$2.00	$2.05	$1.95	$1.85	$1.71	$1.57	$1.75	$1.54	$1.54	$2.13	$3.00	$3.50	$3.50	$4.50	$3.25	$2.50	$2.70	$3.00	$2.85	$2.65	$2.64
February ..	2.00	2.05	1.95	1.85	1.75	1.60	1.75	1.60	1.57	2.25	3.00	3.50	3.50	4.50	3.21	2.40	2.78	3.00	2.85	2.65	2.56
March	2.00	2.05	1.95	1.85	1.79	1.60	1.76	1.60	1.60	2.40	3.20	3.50	3.44	4.00	3.02	2.40	2.83	3.00	2.85	2.65	2.55
April	2.00	2.05	1.87	1.85	1.80	1.60	1.80	1.60	1.56	2.40	3.28	3.50	3.25	4.00	3.13	2.40	2.93	3.00	2.80	2.65	2.55
May	2.00	2.05	1.65	1.82	1.80	1.60	1.80	1.56	1.55	2.50	3.50	3.50	3.25	4.00	3.05	2.40	3.00	2.93	2.75	2.65	2.50
June	2.00	1.97	1.70	1.80	1.75	1.60	1.80	1.50	1.55	2.50	3.75	3.50	3.25	4.00	3.00	2.40	3.00	2.90	2.68	2.65	2.50
July	2.00	1.95	1.72	1.75	1.70	1.62	1.70	1.52	1.60	2.50	4.00	3.50	3.25	4.00	2.81	2.40	3.00	2.88	2.65	2.65	2.53
August	2.00	1.95	1.80	1.70	1.69	1.66	1.65	1.56	1.61	2.58	4.00	3.50	3.25	4.25	2.75	2.48	3.00	2.81	2.65	2.65	2.55
September..	2.05	1.95	1.80	1.70	1.65	1.70	1.65	1.60	1.69	2.60	4.00	3.50	3.25	4.25	2.86	2.63	3.00	2.78	2.65	2.65	2.55
October ...	2.05	1.95	1.80	1.70	1.64	1.70	1.63	1.60	1.80	2.63	...	3.50	3.31	4.25	2.90	2.70	3.00	2.75	2.63	2.65	2.54
November .	2.05	1.95	1.80	1.70	1.55	1.70	1.59	1.50	1.87	2.85	3.50	3.50	3.50	4.05	2.84	2.70	3.00	2.75	2.65	2.65	2.50
December ..	2.05	1.95	1.85	1.70	1.53	1.72	1.55	1.51	2.04	3.00	3.50	3.50	4.12	3.25	2.69	2.70	3.00	2.85	2.65	2.65	2.50
Average..	*2.02*	*1.99*	*1.82*	*1.77*	*1.70*	*1.64*	*1.70*	*1.56*	*1.67*	*2.53*	*3.52*	*3.50*	*3.41*	*4.09*	*2.96*	*2.51*	*2.94*	*2.89*	*2.72*	*2.65*	*2.54*

Steel Rails at Mill, Open-Hearth, Dollars a Gross Ton

The extra $2 a gross ton, which was for many years charged for open-hearth rails, was annulled with the rail price announced Oct. 22, 1921

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$30.00	$30.00	$30.00	$30.00	$30.00	$40.00	$57.00	$57.00	$47.00	$47.00	$40.00	$43.00	$43.00	$43.00	$43.00	$43.00
February	30.00	30.00	30.00	30.00	30.00	40.00	57.00	57.00	47.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
March	30.00	30.00	30.00	30.00	30.00	40.00	57.00	54.50	49.50	47.00	40.00	43.00	43.00	43.00	43.00	43.00
April	30.00	30.00	30.00	30.00	30.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
May	30.00	30.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
June	30.00	30.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
July	30.00	30.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
August	30.00	30.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
September	30.00	30.00	30.00	30.00	35.00	40.00	57.00	47.00	57.00	47.00	40.00	43.00	43.00	43.00	43.00	43.00
October	30.00	30.00	30.00	30.00	35.00	....	57.00	47.00	57.00	45.25	43.00	43.00	43.00	43.00	43.00	43.00
November	30.00	30.00	30.00	30.00	38.00	....	57.00	47.00	57.00	40.00	43.00	43.00	43.00	43.00	43.00	43.00
December	30.00	30.00	30.00	30.00	40.00	....	57.00	47.00	53.00	40.00	43.00	43.00	43.00	43.00	43.00	43.00
Average ...	*30.00*	*30.00*	*30.00*	*30.00*	*34.00*	*40.00*	*57.00*	*49.29*	*54.38*	*45.69*	*40.75*	*43.00*	*43.00*	*43.00*	*43.00*	*43.00*

Soft Steel Bars at Pittsburgh, Cents a Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	1.60	1.60	1.40	1.50	1.40	1.15	1.70	1.20	1.10	2.03	3.15	2.90	2.70	2.75	2.35	1.50	2.04	2.40	2.10	2.00	1.98
February	1.60	1.60	1.35	1.50	1.40	1.12	1.70	1.20	1.10	2.31	3.25	2.90	2.70	3.00	2.15	1.39	2.20	2.40	2.10	2.00	1.90
March	1.60	1.60	1.20	1.45	1.40	1.10	1.85	1.20	1.15	2.65	3.63	2.90	2.61	3.63	2.00	1.39	2.39	2.40	2.10	2.00	1.90
April	1.60	1.60	1.15	1.45	1.40	1.16	1.84	1.15	1.20	2.88	3.75	2.90	2.35	3.75	2.05	1.50	2.50	2.29	2.05	2.00	1.89
May	1.60	1.60	1.19	1.45	1.37	1.20	1.70	1.14	1.20	3.00	4.00	2.90	2.35	3.63	2.10	1.58	2.40	2.24	2.00	1.95	1.85
June	1.60	1.45	1.20	1.45	1.25	1.20	1.60	1.11	1.21	2.75	4.25	2.90	2.35	3.50	2.05	1.70	2.40	2.20	2.00	2.00	1.81
July	1.60	1.40	1.27	1.45	1.23	1.25	1.50	1.12	1.25	2.63	4.50	2.90	2.35	3.50	1.84	1.70	2.40	2.15	2.00	2.00	1.80
August	1.60	1.40	1.32	1.40	1.20	1.30	1.40	1.19	1.30	2.56	4.30	2.90	2.35	3.25	1.74	1.88	2.40	2.13	1.95	2.00	1.80
September	1.60	1.40	1.39	1.40	1.19	1.37	1.40	1.20	1.34	2.60	4.00	2.90	2.35	3.25	1.63	2.00	2.40	2.04	1.92	2.00	1.78
October	1.60	1.40	1.51	1.40	1.12	1.45	1.39	1.15	1.44	2.75	2.90	2.90	2.39	3.13	1.55	2.00	2.40	2.00	2.00	2.00	1.75
November	1.60	1.40	1.50	1.40	1.08	1.55	1.29	1.10	1.62	2.83	2.90	2.90	2.69	2.87	1.50	2.00	2.40	2.03	2.00	2.00	1.77
December	1.60	1.40	1.50	1.40	1.12	1.66	1.21	1.07	1.84	3.00	2.90	2.80	2.75	2.35	1.50	2.00	2.40	2.10	2.00	2.00	1.80
Average	*1.60*	*1.49*	*1.33*	*1.44*	*1.26*	*1.29*	*1.55*	*1.15*	*1.31*	*2.67*	*3.63*	*2.89*	*2.50*	*3.22*	*1.87*	*1.72*	*2.36*	*2.20*	*2.02*	*2.00*	*1.84*

Tank Plates at Pittsburgh, Cents a Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	2.25	4.45	3.25	3.00	2.72	2.65	1.48	2.06	2.50	2.00	1.86	1.90
February	1.70	1.70	1.52	1.55	1.40	1.11	1.71	1.20	1.10	2.56	4.88	3.25	3.00	3.50	2.33	1.39	2.23	2.45	2.00	1.80	1.86
March	1.70	1.70	1.30	1.55	1.40	1.12	1.70	1.18	1.10	3.10	5.25	3.25	2.91	3.63	2.04	1.39	2.39	2.39	2.00	1.86	1.85
April	1.70	1.70	1.27	1.55	1.40	1.21	1.68	1.15	1.15	3.56	5.88	3.25	2.65	3.75	2.10	1.48	2.50	2.28	2.00	1.90	1.85
May	1.70	1.70	1.29	1.51	1.39	1.25	1.60	1.12	1.15	3.75	6.60	3.25	2.65	3.75	2.20	1.56	2.50	2.20	2.00	1.86	1.84
June	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.10	1.16	3.63	8.00	3.25	2.65	3.55	1.95	1.63	2.50	2.18	1.92	1.88	1.80
July	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.10	1.22	3.44	9.00	3.25	2.65	3.38	1.85	1.70	2.50	2.09	1.90	1.90	1.80
August	1.70	1.60	1.40	1.40	1.34	1.35	1.44	1.18	1.26	3.70	8.80	3.25	2.65	3.25	1.78	1.88	2.50	1.95	1.85	1.90	1.80
September	1.70	1.60	1.46	1.40	1.29	1.47	1.40	1.20	1.34	4.00	8.00	3.25	2.53	3.25	1.64	2.13	2.50	1.82	1.80	1.90	1.78
October	1.70	1.60	1.50	1.40	1.17	1.53	1.36	1.14	1.44	4.00	3.25	3.25	2.61	3.09	1.60	2.11	2.50	1.80	1.80	1.90	1.75
November	1.70	1.60	1.54	1.40	1.13	1.59	1.26	1.08	1.65	4.15	3.25	3.25	2.65	2.81	1.54	1.99	2.50	1.83	1.86	1.90	1.77
December	1.70	1.60	1.55	1.40	1.15	1.60	1.20	1.05	2.04	4.25	3.25	3.13	2.65	2.65	1.50	1.95	2.50	1.92	1.90	1.90	1.80
Average	*1.70*	*1.64*	*1.42*	*1.47*	*1.31*	*1.33*	*1.50*	*1.14*	*1.31*	*3.53*	*5.88*	*3.24*	*2.72*	*3.28*	*1.93*	*1.72*	*2.43*	*2.12*	*1.91*	*1.88*	*1.82*

Structural Shapes at Pittsburgh, Cents a Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	1.70	1.70	1.60	1.55	1.40	1.15	1.75	1.20	1.10	1.90	3.25	3.00	2.80	2.47	2.45	1.50	2.06	2.50	2.10	1.90	1.98
February	1.70	1.70	1.52	1.51	1.40	1.11	1.71	1.20	1.10	2.06	3.25	3.00	2.80	2.70	2.26	1.39	2.20	2.50	2.10	1.90	1.90
March	1.70	1.70	1.30	1.50	1.40	1.15	1.70	1.19	1.10	2.40	3.54	3.00	2.71	3.13	2.08	1.39	2.39	2.39	2.10	1.90	1.90
April	1.70	1.70	1.27	1.50	1.40	1.21	1.68	1.15	1.20	2.55	3.88	3.00	2.45	3.25	2.10	1.50	2.50	2.29	2.05	1.90	1.88
May	1.70	1.70	1.27	1.50	1.39	1.25	1.50	1.14	1.20	2.60	4.00	3.00	2.45	3.10	2.20	1.56	2.50	2.24	2.00	1.90	1.80
June	1.70	1.62	1.25	1.48	1.35	1.25	1.45	1.11	1.20	2.53	4.31	3.00	2.45	3.10	2.10	1.63	2.50	2.20	2.00	1.94	1.80
July	1.70	1.60	1.33	1.41	1.35	1.30	1.45	1.12	1.25	2.50	4.50	3.00	2.45	3.10	1.93	1.70	2.50	2.09	2.00	2.00	1.80
August	1.70	1.60	1.40	1.40	1.35	1.35	1.45	1.19	1.30	2.52	4.30	3.00	2.45	3.10	1.82	1.88	2.50	2.00	1.95	2.00	1.80
September	1.70	1.60	1.46	1.40	1.34	1.42	1.41	1.20	1.35	2.64	4.00	3.00	2.45	3.10	1.64	2.00	2.50	2.00	1.90	2.00	1.78
October	1.70	1.60	1.50	1.40	1.21	1.48	1.37	1.15	1.44	2.75	3.00	3.00	2.45	3.05	1.60	2.00	2.50	1.93	1.90	2.00	1.75
November	1.70	1.60	1.54	1.40	1.13	1.57	1.29	1.10	1.60	2.86	3.00	3.00	2.45	2.89	1.54	2.00	2.50	2.00	1.90	2.00	1.77
December	1.70	1.60	1.55	1.40	1.15	1.60	1.25	1.07	1.78	3.25	3.00	2.90	2.45	2.45	1.50	2.00	2.50	2.10	1.90	2.00	1.80
Average	*1.70*	*1.64*	*1.42*	*1.45*	*1.32*	*1.32*	*1.50*	*1.15*	*1.31*	*2.55*	*3.67*	*2.99*	*2.53*	*2.95*	*1.94*	*1.71*	*2.43*	*2.19*	*1.99*	*1.95*	*1.83*

No. 28 Black Sheets, at Pittsburgh, Cents a Pound

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	2.60	2.52	2.50	2.40	2.20	1.90	2.31	1.87	1.80	2.60	4.50	5.00	4.70	4.48	4.35	3.00	3.35	3.83	3.60	3.35	3.16
February	2.60	2.50	2.50	2.40	2.20	1.87	2.35	1.95	1.80	2.60	4.69	5.00	4.70	5.00	4.21	3.00	3.46	3.85	3.50	3.28	3.05
March	2.60	2.50	2.25	2.40	2.20	1.80	2.35	1.95	1.80	2.71	4.94	5.00	4.61	5.50	3.88	3.00	3.71	3.78	3.44	3.25	3.00
April	2.60	2.50	2.20	2.40	2.20	1.86	2.35	1.91	1.80	2.85	5.75	5.00	4.35	5.50	3.88	3.11	4.00	3.71	3.35	3.25	2.99
May	2.60	2.50	2.20	2.40	2.20	1.90	2.30	1.85	1.79	2.89	7.00	5.00	4.35	5.50	4.00	3.15	3.88	3.60	3.20	3.18	3.11
June	2.60	2.50	2.20	2.40	2.00	1.90	2.27	1.81	1.75	2.90	7.88	5.00	4.35	5.50	3.80	3.15	3.85	3.53	3.15	3.10	3.25
July	2.60	2.50	2.20	2.24	2.00	1.95	2.25	1.80	1.75	2.90	8.50	5.00	4.35	6.75	3.31	3.15	3.81	3.46	3.13	3.10	3.25
August	2.60	2.50	2.20	2.21	1.99	2.02	2.21	1.86	1.85	2.90	8.50	5.00	4.35	7.50	2.90	3.23	3.75	3.45	3.15	3.10	3.25
September	2.60	2.50	2.26	2.15	1.91	2.07	2.14	1.95	1.90	2.93	8.50	5.00	4.35	7.38	2.81	3.35	3.75	3.50	3.14	3.15	3.25
October	2.60	2.50	2.30	2.20	1.85	2.21	2.04	1.94	2.03	3.23	...	5.05	4.35	6.69	3.00	3.47	3.75	3.50	3.11	3.23	3.15
November	2.60	2.50	2.30	2.20	1.85	2.25	1.97	1.87	2.25	3.65	5.00	5.00	4.35	5.77	2.86	3.35	3.75	3.50	3.25	3.25	3.03
December	2.60	2.50	2.40	2.19	1.84	2.25	1.89	1.82	2.50	4.31	5.00	4.85	4.35	4.35	3.00	3.35	3.75	3.54	3.33	3.25	3.03
Average	*2.60*	*2.50*	*2.29*	*2.30*	*2.04*	*2.00*	*2.20*	*1.88*	*1.92*	*3.04*	*6.39*	*4.99*	*4.43*	*5.83*	*3.50*	*3.19*	*3.73*	*3.60*	*3.28*	*3.21*	*3.13*

Automobile Body Sheets, Base No. 22 Gage, f.o.b. Pittsburgh, Cents a Pound

	1921	1922	1923	1924	1925	1926	1927
January	5.20	4.35	4.70	5.35	4.75	4.50	4.18
February	5.20	4.35	4.78	5.35	4.68	4.43	4.15
March	5.20	4.35	5.00	5.35	4.46	4.40	4.15
April	5.20	4.40	5.00	5.25	4.40	4.33	4.15
May	5.20	4.45	5.35	5.10	4.40	4.29	4.15
June	4.95	4.50	5.35	5.10	4.22	4.20	4.25
July	4.70	4.60	5.35	5.06	4.15	4.20	4.25
August	4.65	4.75	5.35	4.75	4.25	4.20	4.25
September	4.45	4.85	5.35	4.72	4.25	4.25	4.25
October	4.55	4.85	5.35	4.60	4.29	4.25	4.15
November	4.35	4.85	5.35	4.60	4.40	4.25	4.12
December	4.35	4.70	5.35	4.75	4.50	4.25	4.00
Average	*4.83*	*4.58*	*5.19*	*5.00*	*4.39*	*4.30*	*4.17*

Blue Annealed Sheets, Base Nos. 9 and 10 Gage, Cents a Pound, at Pittsburgh

	1921	1922	1923	1924	1925	1926	1927
January	3.55	2.25	2.52	3.00	2.70	2.50	2.25
February	3.29	2.25	2.64	3.00	2.70	2.50	2.20
March	3.04	2.25	2.95	2.93	2.69	2.50	2.20
April	3.05	2.36	3.25	2.86	2.53	2.43	2.18
May	3.10	2.40	3.20	2.80	2.40	2.40	2.22
June	2.88	2.40	3.00	2.76	2.31	2.32	2.25
July	2.55	2.40	3.00	2.68	2.30	2.30	2.25
August	2.31	2.44	3.00	2.63	2.30	2.30	2.25
September	2.23	2.50	3.00	2.69	2.25	2.30	2.25
October	2.25	2.60	3.00	2.70	2.26	2.30	2.14
November	2.25	2.55	3.00	2.70	2.40	2.30	2.10
December	2.25	2.50	3.00	2.70	2.50	2.30	2.10
Average	*2.73*	*2.41*	*2.96*	*2.79*	*2.45*	*2.37*	*2.20*

Hot-Rolled and Cold-Rolled Strip Steel

Quoted in Cents a Pound, at Pittsburgh

	HOT-ROLLED STRIP STEEL								COLD-ROLLED STRIP STEEL							
	1920	1921	1922	1923	1924	1925	1926	1927	1920	1921	1922	1923	1924	1925	1926	1927
January	3.45	3.30	2.00	2.75	3.00	2.25	2.30	2.34	6.00	6.25	3.50	4.50	5.00	4.00	3.90	2.95
February	4.63	3.11	1.84	2.86	3.00	2.35	2.30	2.21	7.00	6.06	3.50	4.69	4.75	4.00	3.90	2.80
March	5.00	2.93	1.81	3.18	2.93	2.40	2.30	2.30	7.00	5.83	3.50	5.00	4.75	4.00	3.90	2.92
April	5.25	2.76	1.98	3.30	2.75	2.40	2.30	2.30	7.75	5.54	3.61	5.25	4.75	4.00	3.79	3.00
May	5.50	2.53	2.20	3.30	2.75	2.20	2.30	2.30	8.50	4.98	3.71	5.25	4.50	3.94	3.75	3.00
June	5.50	2.50	2.40	3.23	2.50	2.20	2.30	2.30	8.50	4.88	4.00	5.19	4.50	3.53	3.72	3.19
July	5.50	2.46	2.50	3.00	2.50	2.20	2.30	2.30	8.50	4.25	4.00	5.00	4.30	3.63	3.60	3.25
August	5.50	2.23	2.60	3.00	2.35	2.20	2.30	2.30	8.50	3.96	4.10	5.00	4.13	3.75	3.60	3.25
September	5.50	2.00	2.75	3.00	2.25	2.20	2.30	2.30	8.50	3.78	4.25	5.00	4.00	3.75	3.50	3.25
October	5.25	2.00	2.90	3.00	2.25	2.23	2.30	2.19	8.25	3.75	4.50	5.00	4.00	3.75	3.25	3.00
November	4.70	2.00	2.83	3.00	2.25	2.30	2.30	2.19	8.00	3.75	4.50	4.98	4.00	3.90	3.25	3.00
December	3.65	2.00	2.75	2.88	2.25	2.30	2.30	2.03	6.63	3.75	4.50	4.91	4.00	3.90	3.00	3.00
Average	*4.95*	*2.49*	*2.38*	*3.04*	*2.57*	*2.27*	*2.30*	*2.26*	*7.76*	*4.78*	*3.97*	*4.98*	*4.39*	*3.85*	*3.60*	*3.05*

Wrought Iron and Steel Pipe Prices

Computed from discounts as per list, with "trimmings," for carload lots; price for base size pipe, ¾ to 3-in.

Steel Pipe, per Net Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$32.30	$36.10	$35.20	$34.20	$41.39	$64.84	$88.92	$83.36	$80.64	$77.30	$51.87	$61.13	$70.30	$70.30	$70.30	$70.30
February	32.30	36.10	36.09	35.42	43.63	66.95	88.92	83.36	83.36	76.88	51.87	66.50	70.30	70.30	70.30	70.30
March	32.30	36.10	36.12	36.10	47.51	72.07	88.92	81.06	83.36	76.88	51.87	66.50	70.30	70.30	70.30	70.30
April	32.30	36.60	35.54	36.10	51.25	81.51	88.92	76.88	83.36	71.63	51.87	68.02	70.30	70.30	70.30	70.30
May	32.30	37.20	35.20	38.00	53.72	92.62	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30	70.30	70.30
June	34.20	38.00	35.20	38.00	53.72	95.21	88.92	76.88	83.36	67.62	51.87	70.30	70.30	70.30	70.30	70.30
July	34.69	38.00	35.20	38.00	53.72	105.59	88.92	76.88	83.36	64.63	51.87	70.30	70.30	70.30	70.30	70.30
August	36.10	36.53	35.20	38.00	53.72	105.59	88.92	76.88	83.36	63.91	54.74	70.30	70.30	70.30	70.30	70.30
September	37.43	36.10	35.20	38.00	55.21	105.59	88.92	76.88	83.36	60.21	57.43	70.30	70.30	70.30	70.30	70.30
October	38.00	35.95	35.20	38.00	55.58	105.59	88.92	76.88	83.36	56.50	58.74	70.30	70.30	70.30	70.30	69.54
November	38.00	35.20	34.23	39.90	56.57	91.70	88.92	76.88	83.36	56.50	61.13	70.30	70.30	70.30	70.30	68.79
December	38.00	35.20	34.20	39.90	61.01	88.92	88.92	76.88	83.36	53.96	61.13	70.30	70.30	70.30	70.30	68.79
Average	*34.92*	*36.42*	*35.22*	*37.47*	*52.25*	*81.73*	*88.92*	*78.31*	*83.13*	*66.14*	*54.69*	*68.71*	*70.30*	*70.30*	*70.30*	*70.00*

Wrought Iron Pipe, per Net Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$43.70	$49.40	$51.30	$51.30	$58.64	$83.36	$122.27	$116.71	$115.60	$135.06	$100.96	$122.56	$131.10	$131.10	$127.82	$127.82
February	43.70	49.40	51.30	51.30	62.16	85.48	122.27	116.71	119.49	136.16	100.96	127.82	131.10	131.10	127.82	127.82
March	43.70	49.40	51.30	51.30	66.03	90.65	122.27	114.41	119.49	136.16	100.96	127.82	131.10	127.82	127.82	127.82
April	43.70	50.00	51.30	51.30	69.78	101.89	122.27	110.22	119.49	125.66	100.96	129.02	131.10	127.82	127.82	127.82
May	43.70	50.48	51.30	53.20	72.25	113.00	122.27	110.22	119.49	117.63	100.96	131.10	131.10	127.82	127.82	127.82
June	43.70	51.30	51.30	53.20	72.25	114.85	122.27	110.22	119.49	117.63	100.96	131.10	131.10	127.82	127.82	127.82
July	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	111.65	100.96	131.10	131.10	127.82	127.82	127.82
August	45.60	51.30	51.30	53.20	72.25	122.27	122.27	110.22	119.49	110.22	105.74	131.10	131.10	127.82	127.82	127.82
September	46.93	51.30	51.30	53.20	73.73	122.27	122.27	110.22	119.49	105.59	116.33	131.10	131.10	127.82	127.82	127.82
October	47.50	51.30	51.30	53.20	74.10	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82	127.82
November	47.50	51.30	51.30	55.10	75.07	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82	127.82
December	47.50	51.30	51.30	55.10	79.50	122.27	122.27	110.22	119.49	100.96	120.41	131.10	131.10	127.82	127.82	127.82
Average	*45.24*	*50.65*	*51.30*	*52.88*	*70.67*	*110.24*	*122.27*	*111.65*	*119.16*	*116.55*	*107.50*	*129.67*	*131.10*	*128.37*	*127.82*	*127.82*

Cast Iron Pipe Prices, 1912 to 1927

At New York, 6-In. per Net Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$22.00	$25.00	$22.00	$20.00	$29.00	$41.50	$55.35	$65.70	$66.30	$63.30	$47.30	$54.90	$61.60	$54.60	$50.60	$48.60
February	22.00	24.75	22.00	20.00	29.33	41.50	55.35	62.70	70.30	63.30	47.30	56.50	61.60	54.60	50.60	48.60
March	22.00	23.87	22.00	20.00	29.75	43.10	55.35	62.70	71.30	63.30	47.68	57.75	61.60	53.00	50.60	47.20
April	21.25	23.50	22.00	21.60	30.50	50.88	55.35	57.70	73.90	63.30	48.80	58.50	61.60	52.60	50.60	47.35
May	21.00	23.00	20.88	22.00	30.50	55.50	56.60	54.45	76.30	62.05	49.60	58.50	61.60	50.85	50.60	45.80
June	21.00	23.00	20.50	22.25	30.50	60.75	61.44	52.03	76.30	54.30	50.80	61.35	61.60	50.60	50.60	44.42
July	22.10	23.00	20.50	22.50	30.50	65.50	61.75	50.46	76.30	52.30	53.50	62.30	60.60	50.60	50.60	42.75
August	22.00	23.00	20.50	23.25	30.50	65.50	61.75	52.33	76.53	46.05	54.10	62.62	59.60	50.60	50.60	39.65
September	23.12	23.00	20.40	24.37	30.83	65.50	61.75	54.30	77.22	46.30	54.50	63.60	56.60	50.60	49.85	37.25
October	24.50	23.00	20.00	25.25	31.50	61.00	67.70	55.30	77.22	47.30	54.50	63.60	56.35	50.60	49.60	36.50
November	24.12	23.00	20.00	26.50	35.50	56.50	67.70	58.30	77.22	47.30	54.50	63.60*	55.60	50.60	49.60	36.25
December	24.62	22.33	20.00	27.60	41.00	56.50	67.70	61.30	68.87	47.30	54.75	63.60*	55.20	50.60	49.10	37.00
Average	*22.48*	*23.37*	*20.90*	*22.94*	*31.62*	*55.31*	*60.65*	*57.27*	*73.98*	*54.68*	*51.44*	*60.57*	*59.46*	*51.65*	*50.25*	*42.61*

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*Concession of $2 to $3 per ton from this price to consumers willing to accept winter delivery.

Cast Iron Pipe, Delivered Chicago, 6-In. and Larger, per Net Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$24.67	$29.00	$25.00	$23.50	$29.00	$41.50	$54.30	$64.30	$67.55	$64.10	$42.50	$51.80	$56.20	$48.70	$49.20	$44.33
February	25.00	29.00	25.00	23.50	29.50	41.75	54.30	61.80	71.30	64.10	41.60	53.20	56.20	49.95	49.20	43.70
March	25.00	27.83	24.20	23.50	29.50	43.00	54.30	60.55	72.80	64.10	42.10	54.20	56.20	47.60	49.20	44.20
April	25.00	28.10	24.00	23.50	30.50	53.00	54.30	56.80	74.80	64.10	42.85	57.20	56.20	46.70	49.20	43.95
May	25.00	26.50	24.00	23.50	30.50	55.50	55.81	54.30	76.80	60.10	44.60	60.20	55.20	47.07	49.20	43.20
June	25.00	26.50	24.00	23.70	30.50	60.75	60.83	51.80	76.80	52.85	46.10	60.20	54.70	47.70	48.90	42.70
July	25.60	26.20	24.00	24.00	30.50	65.50	62.05	52.60	76.80	48.85	45.57	60.20	54.80	48.20	47.95	41.58
August	27.13	26.00	24.00	24.00	30.50	65.50	61.80	55.30	78.18	43.20	46.40	60.20	53.45	49.20	48.30	37.40
September	28.00	26.00	24.00	24.70	31.00	65.50	61.80	55.80	82.10	42.60	47.45	59.95	51.80	49.20	47.58	34.58
October	28.00	26.00	24.00	25.75	31.50	53.50	66.80	59.00	83.10	42.60	51.20	57.40	49.70	49.20	47.20	34.20
November	28.75	25.63	24.00	27.00	36.25	54.25	66.80	59.80	83.10	42.90	51.20	55.45	48.20	50.20	47.20	34.50
December	29.00	25.00	23.50	27.77	41.00	55.21	66.80	64.40	68.60	43.10	51.20	55.20	47.60	50.20	46.70	35.08
Average	*26.35*	*26.81*	*24.14*	*24.54*	*31.69*	*54.58*	*59.99*	*58.04*	*76.00*	*52.72*	*46.06*	*57.10*	*53.35*	*48.66*	*48.32*	*39.95*

Southern Ohio No. 2 Foundry Iron, per Gross Ton, at Cincinnati

	1921	1922	1923	1924	1925	1926	1927
January	$33.78	$22.15	$29.78	$25.18	$24.27	$23.27	$21.89
February	32.03	22.03	30.28	26.03	24.27	22.92	21.39
March	29.93	21.38	32.68	25.78	23.87	22.89	21.26
April	28.28	22.78	33.14	25.39	23.15	21.99	21.39
May	27.03	25.28	32.23	24.39	21.77	21.76	21.19
June	25.73	25.53	30.53	22.53	21.27	20.89	20.89
July	23.93	26.40	28.71	21.58	21.27	21.29	20.76
August	22.53	30.18	28.08	21.78	21.77	21.39	20.39
September	23.13	34.28	27.03	22.15	21.77	21.39	20.89
October	23.53	34.53	26.93	22.28	21.90	21.39	20.89
November	22.73	31.83	24.78	22.90	23.27	21.89	20.89
December	22.27	29.28	24.78	23.88	23.27	21.89	20.89
Average	*26.49*	*27.14*	*28.75*	*23.66*	*22.65*	*21.91*	*21.06*

Seven Years of Finished Iron and Steel, Chicago and Pittsburgh

Sheets, Bars and Beams at Chicago—Rivets, Cotton Ties and Cold-Finished Bars at Pittsburgh

Black Sheets, No. 28 Gage, at Chicago, Cents a Pound

	1921	1922	1923	1924	1925	1926	1927
January	4.73	3.38	3.69	4.17	3.75	3.50	3.45
February	4.57	3.38	3.69	4.19	3.75	3.50	3.23
March	4.40	3.38	3.90	4.14	3.75	3.50	3.25
April	4.21	3.46	4.25	4.03	3.65	3.48	3.25
May	4.38	3.53	4.19	3.99	3.48	3.40	3.37
June	4.15	3.53	4.19	3.99	3.32	3.31	3.40
July	3.76	3.49	4.19	3.84	3.35	3.30	3.40
August	3.33	3.57	4.19	3.84	3.35	3.30	3.40
September	3.19	3.69	4.12	3.93	3.35	3.33	3.40
October	3.34	3.69	4.09	3.65	3.31	3.43	3.30
November	3.38	3.69	4.09	3.68	3.43	3.50	3.19
December	3.38	3.69	4.09	3.75	3.50	3.50	3.15
Average	*3.86*	*3.54*	*4.06*	*3.93*	*3.50*	*3.42*	*3.32*

Galvanized Steel Sheets, No. 28 Gage, at Chicago, Cents a Pound

	1920	1921	1922	1923	1924	1925	1926	1927
January	5.60	6.08	4.38	4.69	5.34	4.90	4.75	4.53
February	6.77	5.88	4.38	4.69	5.34	4.90	4.75	4.40
March	7.27	5.44	4.38	5.02	5.29	4.88	4.75	4.40
April	7.27	5.18	4.46	5.28	5.21	4.75	4.75	4.40
May	7.27	5.38	4.53	5.34	5.12	4.55	4.68	4.48
June	7.27	5.13	4.53	5.34	5.14	4.39	4.55	4.50
July	8.52	4.76	4.49	5.34	5.00	4.38	4.45	4.50
August	9.27	4.33	4.67	5.34	4.94	4.39	4.45	4.50
September	9.26	4.19	4.69	5.34	5.00	4.40	4.44	4.50
October	8.56	4.34	4.69	5.34	4.75	4.41	4.54	4.45
November	7.42	4.38	4.69	5.22	4.79	4.68	4.60	4.35
December	6.08	4.38	4.69	5.24	4.90	4.75	4.60	4.20
Average	*7.55*	*4.91*	*4.54*	*5.18*	*5.07*	*4.62*	*4.61*	*4.43*

Blue Annealed Sheets, Nos. 9 and 10 Gage, at Chicago, Cents a Pound

	1920	1921	1922	1923	1924	1925	1926	1927
January	4.07	3.93	2.63	2.84	3.34	2.85	2.65	2.56
February	3.95	3.72	2.63	2.84	3.34	2.85	2.65	2.36
March	3.82	3.43	2.63	3.03	3.29	2.83	2.65	2.39
April	3.82	3.26	2.71	3.32	3.21	2.75	2.65	2.40
May	3.82	3.48	2.78	3.34	3.14	2.55	2.65	2.40
June	3.82	3.26	2.78	3.34	3.14	2.44	2.49	2.40
July	3.82	2.93	2.74	3.34	3.07	2.48	2.45	2.40
August	3.82	2.63	2.78	3.34	3.04	2.45	2.45	2.40
September	3.93	2.63	2.84	3.34	3.10	2.45	2.45	2.40
October	3.93	2.63	2.84	3.34	2.85	2.45	2.53	2.38
November	3.93	2.63	2.84	3.34	2.85	2.58	2.55	2.27
December	3.93	2.63	2.84	3.34	2.85	2.65	2.55	2.15
Average	*3.89*	*3.06*	*2.75*	*3.23*	*3.10*	*2.61*	*2.56*	*2.38*

Rail Steel Bars at Chicago Mill, Cents a Pound

	1920	1921	1922	1923	1924	1925	1926	1927
January	3.25	2.60	1.56	2.00	2.30	2.03	2.00	1.90
February	3.25	2.41	1.50	2.10	2.30	2.10	2.00	1.90
March	3.50	2.23	1.50	2.28	2.30	2.10	2.00	1.90
April	3.75	2.25	1.55	2.33	2.30	2.10	2.00	1.90
May	3.75	2.05	1.60	2.30	2.20	2.10	1.98	1.90
June	3.75	1.95	1.63	2.28	2.15	2.02	1.96	1.90
July	3.75	1.90	1.70	2.30	2.10	2.00	1.98	1.90
August	3.95	1.76	1.89	2.30	2.05	2.00	2.00	1.90
September	4.00	1.75	2.00	2.30	2.00	2.00	2.00	1.90
October	3.81	1.68	2.00	2.30	2.00	2.00	2.00	1.83
November	3.15	1.65	2.00	2.30	2.00	2.00	1.96	1.80
December	2.67	1.75	2.00	2.30	2.00	2.00	1.90	1.80
Average	*3.56*	*1.99*	*1.75*	*2.25*	*2.14*	*2.04*	*1.98*	*1.88*

Cotton Tie Prices for Twenty-Three Years

(Per Bundle of 45-Lb., f.o.b. Pittsburgh)

1905	$0.85	1913	$0.80	1920	$2.00
1906	0.85	1914	0.65	1921	1.30
1907	0.95	1915	0.85	1922	1.10
1908	0.85	1916	1.35	1923	1.60
1909	0.70	1917	2.10	1924	*1.40
1910	0.75	1918	2.10	1925	†1.25
1911	0.75	1919	1.70	1926	‡1.20
1912	0.70			1927	**1.20

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*F.o.b. Atlantic and Gulf ports.
†F.o.b. Gulf ports; $1.28, f.o.b. Atlantic ports.
‡F.o.b. Gulf ports; $1.22, f.o.b. Atlantic ports.
**F.o.b. Gulf ports; $1.21, f.o.b. Atlantic ports.

Common Bar Iron at Chicago, Cents a Pound

	1921	1922	1923	1924	1925	1926	1927
January	2.68	1.60	2.35	2.40	2.00	2.00	2.00
February	2.65	1.58	2.46	2.40	2.03	2.00	2.00
March	2.60	1.58	2.53	2.40	2.10	2.00	2.00
April	2.38	1.63	2.60	2.35	2.10	2.00	2.00
May	2.35	1.67	2.60	2.28	2.08	2.00	2.00
June	2.23	1.74	2.55	2.23	2.01	2.00	2.00
July	1.96	1.85	2.50	2.20	1.96	2.00	2.00
August	1.75	2.11	2.40	2.18	1.90	2.00	2.00
September	1.75	2.25	2.39	2.14	1.90	2.00	1.98
October	1.75	2.50	2.38	2.10	1.90	2.00	1.88
November	1.73	2.50	2.40	2.08	1.94	2.00	1.88
December	1.63	2.35	2.40	2.01	2.00	2.00	1.90
Average	*2.12*	*1.95*	*2.47*	*2.23*	*1.99*	*2.00*	*1.97*

Soft Steel Bars at Chicago, Cents a Pound

	1920	1921	1922	1923	1924	1925	1926	1927
January	2.96	2.73	1.60	2.08	2.50	2.13	2.10	2.10
February	3.45	2.57	1.53	2.21	2.50	2.20	2.10	2.03
March	3.57	2.40	1.55	2.45	2.50	2.20	2.10	2.00
April	3.70	2.43	1.60	2.84	2.38	2.15	2.10	2.00
May	3.45	2.48	1.66	2.74	2.30	2.10	2.10	2.00
June	3.45	2.37	1.75	2.60	2.25	2.10	2.10	2.00
July	3.45	2.21	1.75	2.60	2.19	2.10	2.10	2.00
August	3.47	1.96	2.05	2.60	2.13	2.10	2.10	1.98
September	3.50	1.78	2.10	2.50	2.02	2.10	2.10	1.90
October	3.31	1.75	2.10	2.50	2.00	2.10	2.10	1.85
November	3.04	1.67	2.10	2.50	2.05	2.10	2.10	1.87
December	2.73	1.60	2.10	2.50	2.10	2.10	2.10	1.90
Average	*3.34*	*2.16*	*1.83*	*2.51*	*2.24*	*2.12*	*2.10*	*1.97*

Structural Steel Beams at Chicago, Cents a Pound

	1920	1921	1922	1923	1924	1925	1926	1927
January	2.72	2.83	1.60	2.18	2.60	2.23	2.10	2.10
February	3.18	2.67	1.53	2.31	2.60	2.30	2.10	2.03
March	3.50	2.50	1.55	2.52	2.60	2.30	2.10	2.00
April	3.50	2.53	1.60	2.84	2.50	2.25	2.10	2.00
May	3.50	2.58	1.66	2.84	2.45	2.20	2.10	2.00
June	3.45	2.48	1.75	2.70	2.39	2.18	2.10	2.00
July	3.25	2.28	1.75	2.70	2.27	2.10	2.10	2.00
August	3.14	1.99	2.05	2.70	2.20	2.10	2.10	1.94
September	3.23	1.79	2.20	2.60	2.06	2.10	2.10	1.90
October	3.20	1.75	2.20	2.60	2.00	2.10	2.10	1.85
November	3.07	1.69	2.20	2.60	2.15	2.10	2.10	1.87
December	2.83	1.63	2.20	2.60	2.20	2.10	2.10	1.90
Average	*3.22*	*2.23*	*1.86*	*2.59*	*2.33*	*2.17*	*2.10*	*1.97*

Cold-Finished Steel Bars, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925	1926	1927
January	$3.60	$3.60	$1.94	$2.53	$3.00	$2.80	$2.50	$2.30
February	3.85	3.60	1.90	2.73	2.95	2.80	2.50	2.30
March	5.00	3.20	1.80	2.85	2.98	2.72	2.50	2.38
April	5.00	3.05	1.85	3.00	3.00	2.70	2.50	2.40
May	5.00	3.10	1.94	3.25	2.90	2.70	2.50	2.40
June	5.00	3.00	2.03	3.25	2.90	2.60	2.50	2.33
July	6.00	2.69	2.10	3.25	2.84	2.60	2.50	2.20
August	6.00	2.40	2.23	3.25	2.80	2.50	2.50	2.20
September	4.69	2.36	2.50	3.25	2.74	2.46	2.50	2.15
October	4.06	2.18	2.50	3.10	2.70	2.40	2.40	2.10
November	3.92	2.09	2.50	2.95	2.70	2.48	2.30	2.10
December	3.60	2.00	2.50	3.00	2.78	2.50	2.30	2.10
Average	*4.64*	*2.77*	*2.15*	*3.03*	*2.86*	*2.61*	*2.46*	*2.25*

Large Structural Rivets, Base per 100 Pounds, f.o.b. Pittsburgh

	1920	1921	1922	1923	1924	1925	1926	1927
January	$4.11	$4.13	$2.25	$3.00	$2.90	$2.60	$2.60	$2.34
February	4.33	3.90	2.18	3.00	2.75	2.60	2.53	2.30
March	4.50	3.78	2.00	3.25	2.75	2.60	2.50	2.30
April	4.50	3.55	2.10	3.25	2.65	2.58	2.50	2.75
May	4.50	3.32	2.24	3.25	2.65	2.45	2.50	2.75
June	4.50	3.03	2.36	3.25	2.61	2.40	2.50	2.75
July	4.50	2.71	2.46	3.13	2.60	2.40	2.50	2.75
August	4.50	2.50	2.65	3.00	2.55	2.40	2.50	2.75
September	4.50	2.24	3.00	2.95	2.60	2.40	2.48	2.75
October	4.75	2.36	3.12	2.75	2.58	2.40	2.45	2.75
November	4.70	2.25	3.10	2.68	2.60	2.60	2.45	3.00
December	4.44	2.25	3.00	2.90	2.60	2.60	2.40	2.75
Average	*4.49*	*3.00*	*2.55*	*3.02*	*2.65*	*2.50*	*2.50*	*2.66*

Monthly Averages of Ferroalloy Quotations

Ferromanganese (80 Per Cent) Prices in Dollars a Gross Ton, at Seaboard

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Jan. ..	$41.00	$68.00	$44.40	$68.00	$150.00	$175.00	$250.00	$255.00	$146.00	$112.50	$58.35	$105.00	$108.70	$112.50	$115.00	$100.00
Feb. ..	41.00	65.00	39.25	69.75	207.50	231.25	250.00	215.00	172.50	100.00	60.42	107.50	107.50	115.00	115.00	100.00
March .	41.00	65.00	38.50	100.00	349.60	290.00	250.00	175.00	216.25	96.00	62.50	113.75	107.50	115.00	97.60	100.00
April ..	43.00	61.00	38.00	100.00	406.25	362.50	290.00	150.00	240.00	90.00	64.37	120.00	107.50	115.00	88.00	100.00
May ..	47.50	61.00	38.00	100.00	387.50	420.50	290.00	138.40	250.00	85.00	66.87	128.00	107.50	115.00	88.00	94.00
June ..	49.25	61.00	38.00	100.00	270.00	443.75	290.00	121.00	225.00	80.00	67.50	128.75	107.50	115.00	88.00	90.00
July ...	48.88	59.00	37.20	109.00	175.00	406.25	290.00	111.00	225.00	70.60	67.50	*119.50	106.50	115.00	88.00	90.00
Aug. ..	52.40	56.38	108.33	127.25	172.00	400.00	290.00	101.25	198.75	70.00	67.50	117.50	95.75	115.00	88.00	90.00
Sept. ..	59.63	56.00	90.00	117.00	169.75	387.50	285.00	98.75	170.00	65.80	75.63	*111.25	90.00	115.00	88.00	90.00
Oct. ...	67.80	50.10	70.40	105.00	162.25	310.00	285.00	105.00	170.00	63.00	100.00	*110.00	90.00	115.00	88.00	90.00
Nov. ..	73.75	50.00	68.00	105.00	160.80	256.00	285.00	112.50	170.00	61.50	100.00	*108.75	98.75	115.00	96.60	90.00
Dec. ..	75.00	47.00	72.20	106.00	169.75	243.75	275.00	122.50	135.00	60.00	100.00	*108.25	107.00	115.00	100.00	100.00
Average	*53.35*	*58.29*	*56.86*	*105.83*	*231.70*	*327.21*	*277.50*	*142.12*	*193.21*	*79.53*	*74.22*	*114.85*	*102.85*	*114.79*	*95.02*	*94.50*

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*Price at furnace, where lower than price at seaboard.

Spiegeleisen (19 to 21 Per Cent), Dollars a Gross Ton at Furnace

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$25.00	$25.00	$30.38	$60.00	$60.00	$66.00	$51.40	$45.00	$26.00	$34.40	$38.00	$33.00	$32.00	$37.00
Feb.	25.00	25.00	36.25	68.75	61.25	60.75	58.75	40.00	38.00	35.50	38.00	33.00	32.00	37.00
March	25.00	25.00	57.00	75.00	71.25	47.00	60.00	35.00	29.40	40.00	38.00	33.00	32.00	37.00
April	25.00	25.00	65.00	75.00	80.75	45.00	67.60	34.00	32.25	45.00	36.80	33.00	32.00	37.00
May	25.00	25.00	65.00	81.00	84.00	37.40	75.00	32.00	35.00	52.50	36.00	33.00	32.00	36.24
June	25.00	25.00	61.00	82.50	89.00	31.25	75.00	32.00	36.00	48.50	35.00	32.80	32.00	35.50
July	25.00	25.00	52.50	85.00	89.00	35.00	75.00	27.00	36.00	44.00	34.20	32.00	32.00	33.50
Aug.	25.00	25.00	45.00	85.00	89.00	35.00	80.00	26.00	37.80	46.75	32.50	32.00	32.00	33.00
Sept.	25.00	26.60	45.00	82.50	83.75	35.00	82.00	26.00	38.25	43.75	31.40	31.80	32.00	33.00
Oct.	25.00	29.25	42.75	76.25	82.00	35.00	81.88	26.00	38.00	43.75	30.75	31.25	32.00	30.75
Nov.	25.00	29.25	45.40	66.00	80.25	37.00	75.62	26.00	37.50	41.25	30.25	32.00	37.40	30.00
Dec.	25.00	29.25	55.00	60.00	74.38	40.00	59.10	26.00	37.50	39.00	32.00	32.00	36.50	30.00
Average ..	*25.00*	*26.20*	*50.02*	*74.75*	*78.72*	*42.03*	*70.11*	*31.25*	*34.31*	*42.87*	*34.41*	*32.40*	*32.83*	*34.17*

50 Per Cent Ferrosilicon (Per Gross Ton, Delivered East of Mississippi)

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$80.00	$75.00	$54.00	$82.50	$75.00	$82.50	$85.00	$85.00
Feb.	85.00	93.00	55.00	83.75	75.00	82.50	85.00	85.00
March ..	85.00	92.40	55.00	90.00	75.00	82.50	85.00	85.00
April ...	85.00	86.25	55.00	92.50	75.00	82.50	85.00	85.00
May	80.00	76.40	55.00	94.50	75.00	82.50	85.00	85.00
June	80.00	69.75	55.00	90.00	75.00	82.50	85.00	85.00
July	80.00	66.00	55.00	82.50	71.00	82.50	85.00	85.00
Aug.	75.00	60.80	55.00	82.50	71.25	82.50	85.00	85.00
Sept.	75.00	60.00	55.00	82.50	72.00	82.50	85.00	85.00
Oct.	75.00	58.50	67.00	81.00	71.00	82.50	85.00	85.00
Nov.	75.00	55.80	75.00	80.63	70.00	82.50	85.00	85 00
Dec.	75.00	56.00	82.50	76.25	75.00	82.50	85.00	83.50
Ave. ..	*79.17*	*70.83*	*59.88*	*84.89*	*73.35*	*82.50*	*85.00*	*84.88*

Connellsville Coke Prices for Nineteen Years

Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94	$7.19	$3.50
February ...	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38	9.62	6.00	4.44	6.00	4.50	3.04	7.13	4.08	3.63	7.31	3.38
March	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35	3.05	3.35
April	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04	3.00	3.20
May	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00	2.91	2.94
June	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77	2.83	2.93
July	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.83	2.84	3.00
August	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06	2.95	3.00
September ..	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49	3.38	2.85
October	2.76	1.59	1.50	3.41	2.98	1.60	2.03	4.88	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13	3.63	2.85
November ..	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75	4.43	2.77
December ..	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32	3.50	2.75
Average ..	*1.94*	*1.75*	*1.49*	*2.55*	*2.42*	*1.73*	*1.73*	*3.80*	*9.22*	*6.00*	*4.58*	*11.32*	*3.45*	*7.06*	*5.33*	*3.42*	*3.78*	*3.92*	*3.04*

Prompt Connellsville Foundry Coke, per Net Ton at Oven

	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$2.00	$2.90	$1.90	$1.97	$4.40	$2.50	$2.00	$3.50	$9.75	$7.00	$6.25	$7.00	$6.38	$3.75	$8.70	$4.75	$4.88	$7.75	$4.50
February ...	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31	8.31	4.31
March	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15	4.40	4.40
April	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00	4.06	4.06
May	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00	4.00	4.00
June	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80	4.00	4.00
July	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75	4.00	4.00
August	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88	4.00	4.00
September ..	2.55	2.12	1.85	2.54	2.90	2.10	2.07	3.31	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25	4.38	4.00
October	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31	4.63	4.00
November ..	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81	5.50	3.85
December ..	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20	4.50	3.75
Average ..	*2.27*	*2.30*	*1.89*	*2.84*	*2.98*	*2.25*	*2.19*	*4.19*	*10.03*	*7.00*	*5.47*	*12.27*	*4.63*	*8.00*	*6.27*	*4.42*	*4.61*	*4.96*	*4.11*

Heavy Melting Steel Scrap Composite Price

(Average of Pittsburgh, Chicago and Philadelphia Quotations, per Gross Ton)

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$11.77	$14.02	$10.29	$10.27	$16.46	$21.73	$29.93	$17.77	$25.13	$15.04	$12.45	$20.22	$19.15	$20.08	$16.97	$15.17
February	11.46	13.06	11.39	10.39	16.10	21.35	29.92	14.75	26.00	15.21	12.46	21.46	19.21	18.27	15.50	14.58
March	11.71	13.10	11.10	10.78	17.28	23.60	29.58	14.52	25.50	13.17	13.46	24.79	17.56	16.92	15.83	14.65
April	12.44	13.39	10.83	10.61	17.42	26.63	28.47	15.79	24.42	11.63	14.71	24.00	15.20	15.48	15.27	14.71
May	12.85	12.30	10.60	10.79	16.47	27.63	28.79	15.06	23.71	12.20	15.67	20.77	14.71	15.46	14.35	13.95
June	12.94	11.60	10.57	10.78	15.25	37.21	28.87	16.54	23.47	11.47	15.52	18.94	14.88	16.09	14.40	13.60
July	12.82	11.42	10.50	11.65	15.19	36.00	29.00	19.13	24.21	11.00	15.92	17.23	16.00	16.46	15.42	13.48
August	13.19	11.46	10.42	13.00	15.35	31.30	29.00	20.25	25.88	11.57	16.30	16.58	16.58	17.23	15.88	13.80
September	13.73	11.35	10.30	13.79	15.67	31.50	29.00	18.87	26.53	12.15	18.33	16.98	17.20	17.39	16.25	13.92
October	14.90	11.00	9.71	13.62	16.90	26.60	29.00	18.67	23.73	12.88	19.20	15.15	17.08	17.08	15.58	13.48
November	14.69	10.39	9.13	14.63	20.40	27.83	28.50	20.50	20.00	12.73	18.02	15.13	18.17	17.63	15.25	13.18
December	14.00	9.97	9.50	16.20	24.13	28.87	25.00	22.77	15.92	12.29	17.94	17.37	20.08	17.39	15.08	13.48
Average	*13.04*	*11.92*	*10.36*	*12.21*	*17.22*	*28.35*	*28.76*	*17.89*	*23.71*	*12.61*	*15.83*	*19.05*	*17.15*	*17.12*	*15.48*	*14.00*

Scrap Prices at Pittsburgh, per Gross Ton

Heavy Melting Steel

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.75	$14.95	$10.90	$11.63	$17.50	$22.60	$30.00	$19.00	$26.30	$15.50	$14.30	$21.80	$21.38	$21.50	$18.63	$16.88
February	12.12	14.19	12.62	11.63	17.06	21.75	30.00	14.75	27.75	16.00	14.00	23.25	20.88	19.50	17.50	16.13
March	12.62	14.19	12.12	12.00	18.45	23.25	30.00	14.00	27.25	14.00	15.13	25.38	19.38	18.50	17.55	16.55
April	13.06	14.19	12.00	11.81	17.81	28.00	28.50	15.20	26.00	12.63	16.38	25.88	16.20	17.00	16.63	16.50
May	13.25	13.55	12.00	11.75	16.95	28.80	28.50	14.75	25.00	13.30	17.30	22.80	15.63	16.75	15.69	15.40
June	13.44	12.62	12.00	11.75	15.88	41.00	28.62	17.12	25.00	12.69	17.00	21.13	16.00	17.30	15.75	14.81
July	13.31	12.40	12.00	12.31	16.31	39.00	29.00	19.70	26.00	12.00	17.38	18.10	17.50	18.00	16.81	15.00
August	13.55	12.37	11.50	13.81	16.05	32.83	29.00	21.00	28.13	12.70	17.75	17.75	17.50	18.88	17.50	15.40
September	14.11	12.25	11.31	14.30	16.19	33.25	29.00	19.20	29.00	13.63	20.13	17.88	18.10	18.70	17.88	15.50
October	15.85	11.85	10.85	14.38	18.25	28.80	29.00	19.00	27.75	14.13	21.40	15.70	18.50	18.50	17.25	14.75
November	15.12	11.44	10.00	15.88	21.20	29.50	28.87	22.25	23.50	14.30	20.50	16.13	19.63	19.50	17.20	14.25
December	14.75	11.08	10.75	17.45	26.00	30.00	26.87	24.25	17.20	14.25	20.13	18.75	21.40	19.10	16.75	14.88
Average	*13.66*	*12.92*	*11.50*	*13.23*	*18.14*	*29.90*	*28.95*	*18.35*	*25.74*	*13.76*	*17.62*	*20.38*	*18.51*	*18.60*	*17.10*	*15.50*

No. 1 Cast Cupola Scrap

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$32.00	$25.00	$16.30	$23.30	$21.00	$19.63	$17.50	$16.00
Feb.	34.00	22.75	16.00	24.75	21.38	20.13	17.00	15.56
March	34.00	21.20	15.94	26.75	20.25	18.60	17.00	15.80
April	33.00	18.00	16.88	27.75	18.50	17.75	16.50	16.00
May	32.00	18.00	18.50	26.30	17.88	17.50	16.50	15.70
June	32.00	16.63	18.75	24.13	17.25	17.10	15.90	15.13
July	40.20	16.00	19.00	21.10	17.80	17.00	15.75	15.00
Aug.	41.25	16.20	19.00	21.38	18.00	17.50	16.80	15.00
Sept.	42.00	16.88	22.13	21.75	18.00	17.40	16.50	15.00
Oct.	39.75	17.50	24.00	19.50	18.00	17.39	16.00	14.75
Nov.	34.25	17.10	23.13	18.63	18.13	18.00	16.30	14.35
Dec.	27.25	16.13	22.38	20.00	19.10	17.70	16.00	14.38
Aver.	*35.14*	*18.45*	*19.33*	*22.95*	*18.77*	*17.98*	*16.48*	*15.22*

Compressed Sheets

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$23.00	$13.00	$11.80	$20.50	$18.88	$20.00	$17.63	$15.50
Feb.	23.75	13.00	12.00	21.75	19.63	18.00	16.13	15.06
March	23.00	12.00	13.13	23.75	17.50	17.35	15.60	15.45
April	22.13	10.50	14.63	24.75	14.60	15.63	15.25	15.56
May	22.00	10.80	15.10	24.30	13.75	15.46	14.75	14.40
June	22.00	10.13	15.13	19.88	14.38	16.30	14.60	13.75
July	21.50	9.38	15.50	16.90	15.70	16.63	15.50	14.31
Aug.	23.90	10.00	16.10	16.13	16.00	17.39	16.40	14.45
Sept.	24.25	10.06	17.88	16.00	16.55	17.40	16.50	14.50
Oct.	22.75	12.00	19.50	14.30	16.50	17.39	15.63	14.50
Nov.	19.80	12.00	19.50	14.25	17.75	18.00	16.00	13.70
Dec.	14.75	11.69	19.38	16.50	19.40	18.00	15.56	13.94
Ave.	*21.90*	*11.22*	*15.80*	*19.08*	*16.72*	*17.27*	*15.80*	*14.59*

Machine Shop Turnings

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$15.50	$10.00	$9.60	$16.90	$15.75	$17.50	$14.30	$12.00
Feb.	17.88	10.00	9.56	18.50	16.13	15.88	13.63	11.38
March	18.00	9.40	10.50	20.38	14.50	14.20	13.35	12.00
April	16.70	8.13	11.88	20.50	12.45	13.39	12.00	12.63
May	15.38	8.70	13.30	19.20	11.88	12.25	11.00	11.30
June	14.75	7.56	13.32	17.19	13.00	13.05	11.00	10.50
July	13.40	7.00	14.00	12.10	13.50	13.63	11.38	11.50
Aug.	15.25	7.85	14.00	11.44	14.13	15.00	12.80	11.80
Sept.	16.30	9.06	14.75	12.88	14.40	14.75	13.06	11.63
Oct.	15.88	9.56	16.20	11.60	14.25	14.39	12.06	11.50
Nov.	14.63	9.85	16.63	11.63	15.94	15.00	11.90	11.10
Dec.	10.50	8.88	15.63	13.75	17.20	14.30	11.56	11.00
Aver.	*15.35*	*8.83*	*13.28*	*15.51*	*14.43*	*14.44*	*12.34*	*11.53*

Cast Iron Borings

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$18.70	$13.00	$10.90	$18.40	$16.94	$17.50	$14.88	$12.50
Feb.	20.25	12.00	11.06	19.50	16.88	15.88	14.13	12.13
March	19.50	11.45	11.94	21.13	15.38	14.10	13.30	12.50
April	18.60	9.38	13.38	21.88	13.00	13.39	12.50	12.38
May	17.38	9.70	14.10	20.20	12.75	12.50	11.75	11.10
June	16.75	8.38	14.63	17.88	14.00	13.05	11.90	10.50
July	18.00	7.63	16.00	15.20	13.80	13.63	12.38	10.63
Aug.	19.63	8.30	15.70	13.88	14.75	15.00	12.75	11.00
Sept.	20.20	9.00	17.00	15.63	14.90	14.75	12.94	11.00
Oct.	19.00	10.13	18.60	13.50	15.00	14.39	12.50	11.00
Nov.	17.38	10.40	17.85	12.75	15.13	15.00	12.90	11.00
Dec.	14.00	9.25	17.50	14.88	16.70	14.90	12.13	11.00
Aver.	*18.28*	*9.88*	*14.89*	*17.07*	*14.94*	*14.51*	*12.84*	*11.56*

Low-Phosphorus Scrap, at Pittsburgh; Billet and Bloom Crops; Per Gross Ton

	1920	1921	1922	1923	1924	1925	1926	1927
Jan.	$30.80	$24.00	$17.60	$25.30	$23.60	$26.50	$24.00	$21.00
Feb.	31.75	23.75	17.13	27.50	25.13	24.75	22.25	20.25
March	31.00	21.60	17.38	32.00	24.00	23.30	22.00	20.30
April	30.25	18.63	18.88	32.25	19.40	22.13	21.13	21.00
May	30.00	18.10	20.00	28.60	19.50	21.63	20.00	20.00
June	30.00	16.88	20.00	25.88	20.13	22.00	20.00	19.25
July	31.25	15.88	20.13	22.00	20.90	22.00	20.75	19.00
Aug.	33.40	16.50	21.20	23.50	21.88	22.25	21.00	19.00
Sept.	34.25	17.25	24.25	24.38	22.60	23.00	21.67	20.00
Oct.	33.00	17.50	25.00	21.90	23.00	23.13	20.50	19.25
Nov.	30.00	17.30	24.00	20.50	23.25	24.00	20.60	18.30
Dec.	25.25	17.00	24.00	21.75	25.13	24.00	21.13	18.50
Ave.	*30.91*	*18.70*	*20.80*	*25.46*	*22.39*	*23.22*	*21.25*	*19.65*

No. 1 Railroad Cast Scrap at Cincinnati

(Per Net Ton)

	1921	1922	1923	1924	1925	1926	1927
January	$16.25	$12.00	$17.20	$17.25	$17.38	$15.75	$14.00
February	15.50	11.63	19.50	17.75	15.88	15.00	13.00
March	13.90	12.00	21.75	16.25	15.50	14.50	13.00
April	13.50	13.25	22.00	14.00	15.13	14.10	13.00
May	13.50	14.00	20.60	13.00	15.00	13.50	13.00
June	12.75	14.00	18.00	13.38	15.90	13.63	13.00
July	11.00	14.00	16.70	14.50	16.00	14.50	13.00
August	11.00	14.40	16.25	14.50	15.63	14.75	13.00
September	12.00	16.13	16.88	15.30	15.50	15.00	13.00
October	12.50	18.00	14.50	14.88	15.00	14.39	12.50
November	12.50	17.13	13.66	15.63	15.88	14.00	12.25
December	12.00	16.63	15.00	16.38	16.00	14.00	12.00
Average	*13.03*	*14.43*	*17.67*	*15.23*	*15.73*	*14.42*	*12.90*

No. 1 Machinery Cast Scrap at Cincinnati

(Per Net Ton)

	1921	1922	1923	1924	1925	1926	1927
January	$17.75	$14.00	$20.39	$20.50	$20.12	$19.75	$17.00
February	15.50	13.63	21.75	21.50	19.12	19.39	16.00
March	13.90	14.05	23.65	20.00	18.35	19.00	16.00
April	13.50	15.50	24.75	18.00	17.75	17.80	16.00
May	13.50	16.25	24.05	16.75	17.75	17.00	15.60
June	13.10	16.25	22.13	17.13	18.15	17.00	15.50
July	12.00	16.25	20.25	18.25	18.25	17.00	15.50
August	12.00	17.45	19.05	18.25	19.00	17.63	15.50
September	12.80	19.88	19.38	18.13	19.25	18.00	15.50
October	14.00	21.25	18.00	17.68	19.00	17.39	15.50
November	14.00	20.85	16.85	18.40	20.12	17.00	14.50
December	14.00	20.75	18.00	18.75	20.00	17.00	14.00
Average	*13.84*	*17.17*	*20.69*	*18.69*	*18.91*	*17.83*	*15.55*

Scrap Prices at Chicago, 1911 to 1926

Heavy Melting Steel Scrap, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$10.75	$12.60	$9.35	$9.19	$15.50	$21.12	$30.00	$17.40	$24.50	$15.13	$11.45	$19.15	$17.69	$19.44	$15.12	$13.25
February	10.75	12.13	10.50	9.56	14.75	21.50	30.25	15.06	25.00	15.13	11.38	20.33	17.88	17.69	13.88	13.00
March	10.94	12.08	9.81	9.63	16.50	23.70	29.87	15.63	24.25	12.50	12.38	23.50	16.56	16.45	13.95	12.90
April	11.56	12.50	9.80	9.15	16.50	27.00	28.75	16.41	23.75	11.00	13.75	22.50	14.10	14.81	13.19	13.13
May	12.05	11.25	9.69	9.37	15.94	28.70	28.80	15.62	23.00	11.50	14.95	19.70	13.75	15.00	12.13	12.35
June	12.12	10.44	9.75	9.44	14.80	36.50	29.00	16.69	22.95	10.81	14.56	17.88	13.63	15.75	12.45	12.00
July	11.69	10.50	9.75	10.40	14.50	33.00	29.00	19.40	24.13	10.00	15.25	17.05	14.90	15.60	14.19	12.06
August	12.25	10.56	9.69	11.56	15.25	29.60	29.00	20.88	25.35	10.60	15.95	16.00	15.50	16.44	14.00	12.30
September	12.81	10.06	9.19	11.75	16.06	31.25	29.00	19.10	24.81	11.31	18.13	16.31	16.40	16.35	14.00	12.25
October	13.95	10.00	8.50	11.75	16.81	26.00	29.00	18.25	21.50	12.44	18.40	14.15	16.13	16.00	13.00	11.69
November	13.69	9.56	8.06	13.44	20.60	27.60	28.50	20.88	18.45	12.25	17.31	14.00	17.13	16.00	13.00	11.50
December	12.88	9.00	8.43	15.63	23.00	28.37	22.75	21.80	16.20	11.13	17.25	16.06	18.95	15.75	13.00	12.06
Average	*12.12*	*10.89*	*9.38*	*10.91*	*16.68*	*27.86*	*28.66*	*18.09*	*22.82*	*11.98*	*15.06*	*18.05*	*16.05*	*16.27*	*13.49*	*12.39*

Old Steel Rerolling Rails, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.00	$16.15	$11.10	$9.62	$17.06	$27.00	$35.00	$22.10	$34.25	$15.63	$12.10	$20.40	$18.88	$21.75	$17.50	$16.38
February	12.80	15.50	11.81	9.87	17.06	27.00	35.00	16.44	34.38	15.50	12.00	21.75	20.13	19.25	16.63	15.94
March	12.75	15.00	11.56	10.25	17.65	28.00	34.75	16.38	32.30	13.30	13.31	24.63	19.13	17.86	16.50	15.60
April	12.88	14.63	11.50	10.25	18.00	32.62	33.50	17.55	32.13	12.63	14.50	23.75	16.30	16.00	16.13	16.00
May	13.50	13.95	11.31	10.25	17.38	36.50	34.00	17.75	31.75	13.40	15.70	21.70	15.00	16.88	15.19	15.20
June	13.50	12.69	11.50	10.25	15.85	46.90	34.00	18.75	32.65	12.94	15.25	19.25	14.81	17.85	15.45	14.75
July	13.50	12.25	11.50	10.30	15.25	45.19	34.00	25.15	35.00	12.25	16.13	18.00	15.50	17.44	17.19	14.88
August	14.00	12.12	11.50	12.25	15.80	39.20	34.00	29.50	38.00	12.45	16.90	17.50	16.19	19.00	17.10	15.30
September	15.00	12.25	10.75	13.35	17,06	39.75	34.00	26.80	38.13	13.13	19.38	17.38	17.30	19.25	17.39	15.19
October	16.30	12.15	10.00	13.31	18.81	34.75	34.00	27.19	33.44	14.00	20.30	15.80	17.06	18.88	16.63	14.88
November	16.50	12.00	9.50	14.44	24.50	34.80	33.50	31.25	22.90	13.80	18.38	15.06	18.19	19.44	16.50	14.50
December	16.50	11.33	9.50	16.63	28.63	35.25	27.50	31.90	16.90	12.63	17.75	17.00	20.36	19.10	16.19	14.63
Average	*14.19*	*13.34*	*10.96*	*11.73*	*18.59*	*35.58*	*33.60*	*23.40*	*31.90*	*13.47*	*15.98*	*19.35*	*17.40*	*18.56*	*16.53*	*15.27*

No. 1 Railroad Wrought, per Net Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$11.63	$12.70	$8.70	$8.69	$15.88	$23.50	$31.25	$19.10	$26.00	$13.63	$10.50	$17.75	$15.31	$17.44	$13.50	$12.50
February	11.30	12.19	9.50	8.87	14.94	23.75	31.25	15.13	27.00	13.50	10.44	18.38	15.38	16.13	12.88	12.31
March	11.44	12.13	9.06	9.00	16.20	25.90	30.75	15.88	27.10	11.60	11.50	20.88	14.06	14.60	12.95	12.10
April	12.31	12.38	9.00	8.65	17.00	30.35	30.20	16.05	27.25	10.00	12.13	20.00	12.75	13.00	12.44	12.39
May	12.75	11.25	9.00	8.94	16.50	32.60	29.75	15.69	26.38	10.40	12.90	17.60	12.00	13.44	10.94	11.35
June	12.57	10.56	9.00	9.00	15.20	41.00	29.75	16.87	25.25	9.63	12.69	15.50	11.56	14.65	11.60	11.00
July	12.06	10.55	9.00	9.15	14.94	37.75	29.75	18.60	24.88	9.25	13.63	14.60	12.80	14.19	13.31	11.39
August	12.50	10.62	8.94	10.44	15.30	33.70	29.75	20.75	24.75	10.45	14.75	14.25	13.75	16.00	13.50	11.70
September	13.13	10.19	8.37	11.00	16.38	35.50	29.75	19.50	23.88	11.50	17.62	15.63	14.80	15.50	13.50	11.25
October	14.25	9.60	7.87	11.19	17.50	28.75	30.36	19.38	20.25	13.00	17.75	13.20	14.25	14.38	12.81	10.19
November	13.50	9.00	7.56	12.94	21.00	30.90	28.68	22.88	16.85	12.20	15.81	12.50	15.50	15.63	12.50	9.60
December	13.06	8.50	7.90	15.38	25.13	31.25	24.62	24.10	14.60	10.44	15.13	15.00	16.81	13.95	12.00	10.44
Average	*12.54*	*10.81*	*8.66*	*10.27*	*17.16*	*31.25*	*29.66*	*18.66*	*23.68*	*11.30*	*13.74*	*16.27*	*14.08*	*14.91*	*12.66*	*11.35*

No. 1 Machinery Cast Scrap, per Net Ton

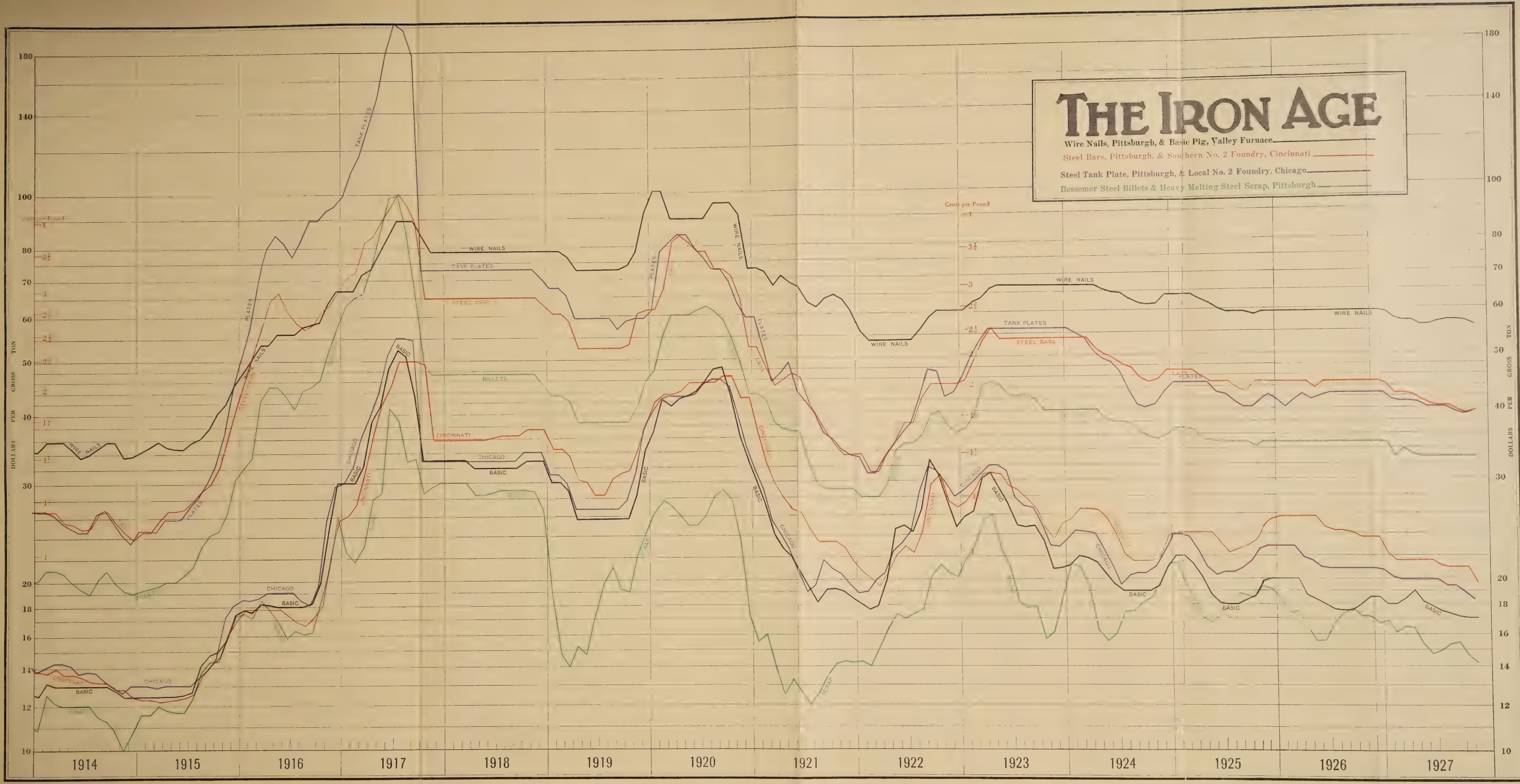
	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$11.25	$12.90	$10.20	$9.19	$13.31	$15.50	$25.90	$22.95	$37.25	$17.25	$12.90	$21.60	$20.38	$19.88	$17.00	$16.50
February	11.25	12.69	10.87	9.00	12.81	15.37	26.06	20.00	38.88	18.00	13.25	23.63	21.00	18.75	17.00	16.50
March	11.31	12.50	10.37	9.00	13.45	16.90	27.25	21.63	37.85	14.90	14.13	26.25	20.13	18.20	17.00	16.50
April	12.06	12.44	10.25	9.00	12.88	20.43	27.12	21.45	37.25	13.25	14.88	25.75	18.40	17.25	16.39	16.50
May	12.20	11.60	10.06	9.00	12.56	23.20	26.70	20.12	37.38	13.60	16.20	23.30	17.38	16.88	15.88	15.80
June	11.81	10.63	9.75	9.00	11.75	30.00	27.12	20.75	36.30	12.75	16.06	21.75	16.75	17.50	16.15	14.50
July	11.75	10.70	9.65	9.25	11.50	29.25	28.06	23.30	36.50	12.25	17.00	19.60	16.90	17.50	17.19	14.50
August	12.15	10.87	9.50	9.62	11.50	24.20	29.10	24.50	36.20	12.60	18.60	18.00	17.50	17.63	17.00	14.80
September	12.81	10.62	9.19	10.10	12.13	23.75	30.00	24.20	34.00	13.44	21.38	19.63	18.20	17.90	16.88	14.56
October	14.20	10.40	9.00	10.50	13.50	20.50	30.36	25.00	28.75	13.88	20.80	18.70	17.50	17.63	16.50	14.25
November	13.50	10.06	8.56	12.13	15.55	22.00	28.87	28.12	23.00	13.50	20.25	18.38	17.88	18.19	16.00	13.50
December	13.25	9.83	9.00	13.75	16.25	23.50	25.75	32.35	18.70	12.63	19.75	19.75	19.20	17.25	16.13	14.00
Average	*12.30*	*11.27*	*9.70*	*9.96*	*13.10*	*22.05*	*27.69*	*23.70*	*33.51*	*14.00*	*17.10*	*21.36*	*18.44*	*17.88*	*16.59*	*15.16*

Cast Borings, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$10.08	$18.48	$12.54	$16.11	$10.92	$6.38	$15.57	$13.58	$15.56	$13.39	$10.06
February	10.15	18.48	8.75	16.39	11.76	6.93	16.59	15.55	14.63	12.06	10.13
March	10.64	18.48	10.15	15.74	8.40	8.05	18.91	14.38	13.85	11.75	10.20
April	11.83	17.99	10.47	15.96	7.28	9.24	17.92	11.40	10.94	10.94	10.44
May	13.44	17.53	9.31	14.43	6.61	10.98	16.24	10.00	10.00	9.75	10.00
June	19.60	17.77	9.33	13.38	5.60	11.63	14.43	10.06	10.70	9.95	9.56
July	20.01	18.48	12.71	14.15	5.32	12.67	13.66	10.45	11.13	11.19	9.94
August	18.36	18.48	14.28	15.06	5.38	12.88	12.04	10.69	12.75	11.45	10.50
September	18.20	18.48	13.55	14.65	5.60	14.43	12.19	11.80	13.15	11.19	10.75
October	15.75	18.48	11.63	12.88	6.44	14.90	10.42	11.56	12.75	8.88	10.13
November	17.25	16.80	12.88	11.93	6.83	14.56	10.08	12.63	13.19	9.20	9.60
December	18.05	14.84	14.17	10.98	6.09	14.56	12.04	14.36	13.50	9.50	10.19
Average	*15.28*	*17.94*	*11.65*	*14.30*	*7.19*	*11.43*	*14.17*	*12.21*	*12.68*	*10.77*	*10.13*

Steel Knuckles and Couplers, per Gross Ton

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$25.20	$37.52	$24.51	$27.44	$16.39	$12.77	$24.98	$21.21	$22.88	$18.00	$16.25
February	25.20	36.89	19.32	29.68	16.11	12.39	26.53	21.77	21.00	17.13	16.00
March	26.60	35.00	19.60	27.66	13.55	14.12	28.71	20.00	18.70	16.70	15.60
April	30.67	34.00	19.21	26.32	12.47	15.68	27.93	17.40	17.63	16.44	15.69
May	33.71	34.00	17.36	25.48	13.66	16.69	25.42	17.00	17.63	15.39	14.80
June	43.83	34.00	18.20	25.20	13.16	15.89	22.55	16.63	19.00	15.30	14.25
July	45.92	34.00	20.50	27.16	11.63	17.92	21.00	17.20	18.19	17.39	14.25
August	44.24	34.00	23.52	29.01	12.21	19.21	20.87	18.00	19.50	17.50	14.40
September	40.88	34.00	21.95	27.72	13.03	21.84	21.56	19.35	19.50	17.39	14.00
October	33.38	34.00	21.43	24.51	14.84	22.96	18.93	18.25	18.63	16.06	13.25
November	33.04	34.00	23.39	20.83	14.28	21.84	17.64	19.63	18.75	15.50	13.00
December	35.67	32.55	24.86	16.95	12.60	22.12	19.88	22.78	18.25	15.50	13.69
Average	*34.86*	*34.50*	*21.15*	*25.67*	*13.66*	*17.79*	*23.00*	*19.10*	*19.14*	*16.53*	*14.60*



Fourteen Years of Prices of Pig Iron, Finished and Semi-Finished Steel and Heavy Melting Scrap

Railroad Malleable Scrap at Chicago, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.19	$15.01	$10.36	$9.11	$15.47	$19.88	$30.02	$19.71	$32.48	$16.52	$12.77	$25.26	$20.93	$21.13	$18.00	$16.06
February	11.54	14.56	11.63	8.96	14.93	19.39	30.02	16.65	33.53	17.36	12.81	26.75	21.77	20.00	17.56	16.06
March	11.69	14.56	10.71	8.89	15.62	20.10	31.24	18.07	31.92	15.46	13.87	28.56	21.00	19.10	17.60	16.00
April	12.53	14.77	10.25	8.96	15.56	22.81	31.64	17.70	30.95	13.59	15.68	28.00	19.30	17.50	17.39	15.88
May	12.94	13.55	10.24	9.12	15.05	26.10	32.82	17.08	29.68	14.11	16.80	25.54	18.13	17.63	16.50	14.45
June	13.16	12.39	10.08	9.11	13.14	35.41	33.04	17.92	28.73	12.88	16.73	24.08	16.88	18.00	16.60	13.50
July	13.16	11.87	10.08	9.97	13.03	33.73	33.28	20.94	30.24	12.53	17.51	22.51	17.00	17.88	17.81	13.63
August	13.50	11.63	9.95	11.20	12.60	33.26	34.01	22.96	32.20	13.44	19.04	20.59	17.38	19.13	17.75	14.50
September	14.07	11.41	9.24	11.48	12.88	34.44	34.01	21.22	30.95	14.63	23.67	21.71	18.20	19.10	17.39	13.69
October	15.40	10.81	8.85	11.48	13.87	28.28	34.01	21.35	26.32	15.12	24.42	19.60	18.13	18.50	16.50	13.13
November	15.19	10.43	8.68	12.75	17.92	28.67	32.68	25.89	21.78	14.67	23.11	18.91	19.00	19.19	16.50	12.55
December	15.12	10.08	8.90	15.40	20.16	30.63	25.48	28.78	16.80	12.81	22.40	20.23	20.28	18.30	16.00	12.81
Average	*13.37*	*12.59*	*9.91*	*10.53*	*15.02*	*27.72*	*31.85*	*20.85*	*28.80*	*14.43*	*18.23*	*23.48*	*19.00*	*18.79*	*17.13*	*14.36*

Old Cast Iron Carwheels at Chicago, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.25	$16.95	$11.65	$9.94	$14.63	$18.87	$30.00	$25.90	$36.13	$21.00	$15.30	$26.70	$20.50	$21.38	$18.00	$15.31
February	13.05	16.75	12.44	10.00	13.94	18.25	30.00	22.75	38.06	20.63	15.00	27.25	21.00	19.38	17.13	15.13
March	13.00	16.75	11.88	9.94	14.30	20.25	30.00	21.50	36.20	15.90	16.50	28.38	21.00	17.10	17.00	15.00
April	13.25	16.75	11.55	9.75	13.88	23.62	29.00	21.50	37.50	14.06	18.63	27.75	16.70	16.00	16.39	15.00
May	13.90	15.05	11.50	9.75	12.95	27.35	29.00	21.25	37.50	14.70	18.50	24.10	16.25	16.06	15.25	14.05
June	14.13	13.94	11.50	10.19	12.44	39.00	29.00	22.00	35.90	13.31	18.25	21.88	15.63	17.30	15.30	13.50
July	13.88	12.90	11.25	11.30	12.50	35.25	29.00	23.95	35.75	12.75	19.25	20.60	16.40	17.12	16.39	13.75
August	13.70	12.75	11.25	11.04	11.60	30.40	29.00	26.25	38.35	12.95	20.60	19.50	17.13	17.50	15.90	14.50
September	14.38	12.63	11.06	11.80	11.69	31.87	29.00	24.90	37.69	14.19	23.75	19.75	18.20	17.70	15.25	14.25
October	16.00	12.10	10.65	12.00	12.94	25.75	29.00	24.88	36.06	16.50	25.10	17.90	17.63	17.38	14.50	13.56
November	16.69	12.00	9.81	13.31	17.30	28.15	29.00	28.63	31.95	16.60	24.63	17.88	18.63	18.31	14.50	13.25
December	16.75	11.88	9.60	14.56	21.25	31.00	26.75	31.10	24.40	15.75	24.00	19.75	20.70	18.30	14.50	13.44
Average	*14.33*	*14.20*	*11.18*	*11.13*	*14.12*	*27.48*	*29.06*	*24.55*	*35.46*	*15.70*	*19.96*	*22.62*	*18.31*	*17.79*	*15.84*	*14.23*

Philadelphia Scrap Prices, 1912 to 1927, Delivered Eastern Pennsylvania

Heavy Melting Steel Scrap, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.19	$14.40	$10.40	$10.00	$16.38	$21.70	$30.00	$17.20	$24.75	$14.50	$11.60	$19.70	$18.20	$18.50	$17.00	$15.39
February	11.70	12.87	11.00	10.00	16.50	20.63	30.00	14.75	25.62	14.25	12.00	20.75	18.38	17.63	15.88	14.63
March	11.80	13.25	11.31	10.80	16.90	23.50	29.00	14.19	25.20	13.00	12.78	25.25	16.75	15.90	16.00	14.50
April	12.94	13.34	10.95	11.00	17.88	24.88	28.00	15.50	24.12	11.25	14.00	23.63	15.30	14.63	16.00	14.50
May	13.50	12.10	10.63	11.25	16.60	25.40	29.00	15.00	23.37	11.80	14.75	19.80	14.75	14.63	15.25	14.10
June	13.50	11.75	10.50	11.10	15.31	34.13	29.00	16.12	22.60	11.25	15.00	17.88	15.00	15.10	14.70	14.00
July	13.50	11.35	10.30	12.06	14.94	35.20	29.00	18.90	22.62	11.00	15.00	16.60	15.40	15.63	14.63	13.39
August	13.65	11.43	10.19	13.75	14.75	31.88	29.00	19.37	25.00	11.40	15.20	16.00	16.75	16.38	16.20	13.70
September	14.50	11.62	10.69	15.00	14.75	30.25	29.00	18.62	25.62	11.50	16.88	16.75	17.10	17.20	16.88	14.00
October	15.10	11.15	9.95	14.75	15.63	25.00	29.00	19.10	22.75	12.06	17.80	15.40	16.63	16.75	16.50	14.00
November	15.50	10.19	9.25	14.65	20.13	26.00	28.00	20.62	19.00	11.88	16.25	15.25	17.75	17.38	15.50	13.80
December	15.25	10.00	9.40	15.81	23.75	28.20	25.00	22.50	15.25	11.50	16.38	16.75	20.10	17.50	15.50	13.50
Average	*13.69*	*11.96*	*10.38*	*12.51*	*16.96*	*27.23*	*28.67*	*17.66*	*22.99*	*12.12*	*14.80*	*18.65*	*16.84*	*16.44*	*15.84*	*14.13*

No. 1 Machinery Cast Scrap, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$13.42	$14.50	$12.00	$12.00	$17.00	$20.20	$30.00	$23.80	$36.00	$23.25	$16.50	$23.20	$20.70	$20.13	$18.39	$17.00
February	13.00	14.37	12.88	12.00	17.00	20.00	30.00	23.00	40.00	23.00	16.50	24.25	20.25	18.88	17.75	17.00
March	13.12	14.00	13.00	12.00	17.00	21.75	30.00	21.25	39.20	19.40	17.13	28.25	18.63	18.00	17.50	17.00
April	13.62	13.94	13.00	11.75	17.88	26.63	29.00	22.00	38.00	18.00	17.25	26.25	17.70	17.25	17.50	17.00
May	13.75	13.60	12.25	12.13	17.50	29.00	29.00	21.50	37.75	18.00	18.40	24.30	17.00	17.00	17.25	16.80
June	13.75	13.25	12.00	12.25	16.50	33.50	29.00	22.00	37.00	17.38	19.00	22.25	17.50	17.50	17.00	16.00
July	13.75	13.00	12.00	12.38	16.00	36.30	29.00	22.10	37.50	16.50	17.50	20.40	17.50	17.63	17.00	16.00
August	13.75	12.87	12.00	13.30	16.00	33.25	29.00	24.75	39.00	17.00	18.60	20.38	17.88	18.00	17.70	16.00
September	14.96	12.81	12.00	14.00	16.00	31.00	29.00	25.00	39.25	17.00	21.50	21.38	18.00	18.00	18.00	16.38
October	14.50	13.50	11.40	14.00	16.15	28.00	29.00	25.20	38.75	17.13	22.60	19.50	17.50	18.00	17.39	16.50
November	14.75	12.62	11.00	14.50	18.50	30.00	29.00	27.62	33.80	17.50	21.00	19.25	17.88	18.00	17.30	16.13
December	15.00	12.17	11.30	16.06	20.75	30.60	29.00	30.75	24.50	16.63	20.25	20.25	19.50	18.13	17.00	16.00
Average	*13.95*	*13.39*	*12.07*	*13.03*	*17.19*	*28.35*	*29.25*	*24.08*	*36.73*	*18.49*	*18.85*	*22.47*	*18.34*	*18.04*	*17.48*	*16.48*

No. 1 Railroad Wrought, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$15.37	$16.10	$13.05	$12.00	$22.00	$26.60	$35.00	$24.20	$33.50	$20.00	$14.50	$22.10	$20.90	$20.88	$18.39	$17.00
February	14.00	15.12	14.38	12.00	21.63	25.50	35.00	21.50	36.00	19.75	14.63	24.75	21.50	20.13	17.75	17.00
March	14.12	15.25	14.00	12.50	22.13	30.75	35.00	20.25	35.90	17.20	15.38	27.50	19.00	18.90	17.20	17.00
April	15.44	15.37	13.25	12.69	23.38	36.00	35.00	21.60	35.00	17.00	15.88	27.00	18.10	17.75	17.50	16.50
May	15.75	15.00	12.63	12.94	22.50	41.40	34.00	21.00	33.50	15.20	16.90	24.20	16.63	17.50	17.25	16.50
June	15.44	14.75	12.50	13.00	20.50	51.25	34.00	21.50	33.00	14.38	17.00	22.50	16.50	18.10	16.60	16.00
July	15.50	13.90	12.20	13.44	19.50	50.60	34.00	24.40	33.00	13.50	17.13	18.80	17.70	17.63	16.50	15.75
August	15.80	14.00	12.00	14.95	20.20	45.00	34.00	26.50	33.00	14.00	18.00	18.00	18.63	17.50	17.80	15.50
September	16.31	14.68	12.38	16.50	20.00	44.00	34.00	26.50	33.25	15.00	20.88	18.50	19.00	17.70	17.88	15.50
October	16.80	14.00	11.80	16.13	21.63	37.20	34.00	26.90	29.25	15.88	22.20	17.50	18.00	18.13	17.00	15.50
November	17.06	13.00	11.50	16.50	24.13	35.00	34.00	28.37	25.00	16.00	19.00	17.38	18.38	18.50	17.00	15.30
December	16.25	12.75	11.50	20.06	26.75	35.00	33.00	30.25	20.00	14.63	19.25	18.50	20.40	18.50	17.00	15.25
Average	*15.65*	*14.49*	*12.60*	*14.39*	*22.03*	*38.19*	*34.25*	*24.41*	*31.70*	*16.04*	*17.56*	*21.39*	*18.73*	*18.44*	*17.32*	*16.07*

Old Cast Iron Carwheels, per Gross Ton

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$12.37	$16.20	$12.20	$11.00	$16.38	$21.50	$30.00	$24.60	$36.00	$25.00	$16.50	$22.30	$20.10	$19.50	$18.13	$16.38
February	12.00	15.37	12.63	10.63	16.50	20.50	30.00	23.00	40.62	24.00	15.00	24.75	20.38	18.38	17.50	16.00
March	11.94	15.00	12.50	11.00	16.70	21.50	30.00	23.00	42.40	18.50	15.94	26.50	18.75	18.50	17.50	16.00
April	12.87	14.87	12.00	11.00	17.38	25.75	29.00	23.10	40.00	18.00	15.88	26.50	17.50	17.75	17.50	16.00
May	13.90	13.75	11.75	11.38	16.70	28.00	29.00	21.00	40.00	16.80	16.70	24.20	17.00	17.00	17.25	16.00
June	14.00	13.12	11.19	11.55	16.38	34.00	29.00	22.00	38.00	18.00	17.13	22.75	17.00	17.00	17.00	15.38
July	14.00	12.30	11.00	12.38	15.63	36.20	29.00	23.20	38.50	16.50	17.50	20.40	17.30	17.25	17.00	15.00
August	14.05	12.37	11.25	13.25	15.50	34.50	29.00	24.50	40.60	16.40	18.10	20.25	17.75	18.50	17.40	15.30
September	14.25	12.75	11.25	14.00	15.50	32.50	29.00	24.50	42.75	17.00	21.75	21.00	18.00	18.50	17.50	15.50
October	14.87	12.46	10.10	13.75	15.88	29.00	29.00	24.50	40.50	17.00	22.50	19.60	17.50	18.50	17.13	15.50
November	15.00	12.00	9.50	14.05	18.88	31.25	29.00	27.75	36.40	17.20	20.50	17.75	17.88	18.50	16.60	15.50
December	15.50	12.00	10.00	15.63	22.38	32.40	28.00	30.50	26.00	16.63	20.00	19.50	19.20	18.50	16.50	15.50
Average	*13.73*	*13.52*	*11.28*	*12.47*	*16.98*	*28.93*	*29.17*	*24.30*	*38.48*	*18.42*	*18.13*	*22.18*	*18.20*	*18.16*	*17.22*	*15.67*

Metals, Tin Plate and Galvanized Sheets for Sixteen Years

Copper at New York, Cents a Pound (Lake Copper through 1919; *Electrolytic Copper,* 1920 *to Date)*

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	14.50	16.98	14.85	14.02	24.39	29.73	23.50	20.48	19.27	12.95	13.55	14.52	12.46	14.73	13.84	12.99
February	14.41	15.55	15.00	15.21	26.85	34.90	23.50	17.86	19.02	12.84	12.92	15.34	12.73	14.49	14.00	12.69
March	14.88	15.05	14.79	15.75	27.10	35.85	23.50	15.46	18.50	12.19	12.68	16.84	13.52	14.06	13.86	13.08
April	16.00	15.67	14.75	18.90	28.27	31.67	23.50	15.55	19.19	12.49	12.61	16.81	13.21	13.30	13.69	12.81
May	16.30	15.91	14.40	21.00	28.88	31.42	23.50	16.18	19.05	12.79	13.13	15.54	12.76	13.34	13.60	12.65
June	17.53	15.42	14.12	23.38	27.82	32.46	23.50	17.95	19.00	12.88	13.62	14.74	12.35	13.41	13.64	12.37
July	17.54	14.78	13.70	21.98	25.84	28.78	25.80	22.07	19.00	12.46	13.71	14.39	12.39	13.95	13.91	12.51
August	17.73	15.86	12.85	19.33	26.95	27.24	26.00	23.16	19.00	11.70	13.74	13.87	13.26	14.48	14.19	13.00
September ...	17.77	16.77	12.66	17.97	28.03	24.90	26.00	22.68	18.70	12.01	13.75	13.36	12.97	14.42	14.05	12.93
October	17.80	16.85	11.73	17.89	28.48	23.50	26.00	22.13	16.56	12.67	13.66	12.58	12.96	14.29	13.88	12.98
November	17.70	16.16	12.00	18.92	32.32	23.50	26.00	20.69	14.63	13.07	13.62	12.76	13.59	14.36	13.59	13.34
December	17.69	14.88	13.35	20.24	33.38	23.50	25.40	18.90	13.63	13.55	14.00	12.88	14.23	13.82	13.31	13.79
Average	*16.65*	*15.82*	*13.68*	*18.72*	*28.19*	*28.95*	*24.68*	*19.43*	*17.96*	*12.63*	*13.42*	*14.47*	*13.04*	*14.05*	*13.80*	*12.93*

Spelter (Zinc) at New York, Cents a Pound

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	6.52	7.15	5.29	6.59	18.19	9.94	7.88	7.38	9.62	5.83	5.06	7.28	6.78	8.10	8.75	7.03
February	6.71	6.45	5.40	8.84	20.13	10.48	7.99	6.70	9.14	5.36	4.85	7.58	7.11	7.86	8.16	7.04
March	6.98	6.26	5.28	9.29	18.40	10.77	7.64	6.52	8.93	5.20	5.00	8.19	6.85	7.68	7.69	7.06
April	6.86	5.77	5.18	11.22	18.58	9.85	7.01	6.51	8.63	5.24	5.25	7.65	6.49	7.35	7.36	6.69
May	6.86	5.47	5.06	16.14	15.86	9.46	7.32	6.46	8.08	5.28	5.45	6.99	6.13	7.30	7.16	6.43
June	6.99	5.18	5.09	22.18	12.75	9.62	8.01	6.93	7.92	4.95	5.69	6.40	6.14	7.35	7.47	6.57
July	7.26	5.38	5.02	20.58	9.83	8.95	8.69	7.90	8.18	4.77	6.12	6.43	6.25	7.60	7.76	6.58
August	7.19	5.75	5.60	14.11	8.98	8.69	8.96	7.84	8.31	4.69	6.59	6.68	6.53	7.55	7.69	6.70
September	7.53	5.82	5.50	14.16	8.22	8.34	9.60	7.57	7.82	4.74	6.91	6.81	6.54	8.12	7.76	6.56
October	7.57	5.42	4.97	13.96	9.98	8.24	9.11	7.83	7.51	5.10	7.20	6.66	6.67	8.65	7.66	6.35
November	7.48	5.29	5.12	17.15	11.90	7.95	8.70	8.14	6.84	5.18	7.48	6.70	7.14	9.04	7.56	6.09
December	7.33	5.18	5.71	16.69	11.13	7.84	8.45	8.59	6.00	5.25	7.46	6.60	7.73	8.97	7.39	6.15
Average	*7.11*	*5.76*	*5.27*	*14.24*	*13.66*	*9.18*	*8.28*	*7.36*	*8.08*	*5.13*	*6.09*	*7.00*	*6.70*	*7.96*	*7.70*	*6.60*

Lead, at New York, Cents a Pound

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	4.41	4.35	4.11	3.74	5.93	7.69	6.87	5.56	8.67	5.00	4.70	7.85	8.31	10.26	9.25	7.59
February	4.00	4.35	4.06	3.82	6.23	9.13	7.04	5.05	8.88	4.54	4.70	8.14	9.01	9.38	9.08	7.40
March	4.08	4.35	3.97	4.04	7.43	9.47	7.24	5.23	9.21	4.08	4.71	8.47	9.23	8.90	8.46	7.57
April	4.20	4.40	3.82	4.20	7.73	9.43	6.95	5.03	8.95	4.33	5.13	8.19	8.19	8.01	7.91	7.10
May	4.20	4.37	3.90	4.25	7.45	11.00	6.88	5.05	8.55	4.99	5.51	7.39	7.27	8.08	7.75	6.60
June	4.50	4.35	3.90	5.89	6.87	11.68	7.55	5.34	8.48	4.56	5.73	7.14	7.08	8.35	8.08	6.42
July	4.67	4.37	3.90	5.59	6.34	10.72	8.04	5.65	8.67	4.40	5.75	6.28	7.15	8.33	8.60	6.33
August	4.54	4.64	3.87	4.68	6.26	10.72	8.05	5.77	8.98	4.40	5.88	6.74	8.02	9.52	8.96	6.69
September ...	5.04	4.73	3.86	4.62	6.88	8.84	8.05	6.12	8.11	4.60	6.20	7.06	8.09	9.60	8.80	6.30
October	5.06	4.52	3.52	4.60	7.00	6.77	8.05	6.45	7.24	4.70	6.67	6.84	8.31	9.62	8.40	6.25
November	4.66	4.33	3.68	5.16	7.13	6.44	8.05	6.76	6.33	4.70	7.20	6.87	8.96	9.84	8.00	6.27
December	4.32	4.06	3.80	5.33	7.60	6.48	6.71	7.03	4.80	4.70	7.28	7.61	9.61	9.36	7.87	6.52
Average	*4.47*	*4.40*	*3.87*	*4.66*	*6.90*	*9.03*	*7.46*	*5.76*	*8.07*	*4.58*	*5.79*	*7.39*	*8.27*	*9.10*	*8.39*	*6.75*

Straits Tin, at New York, Cents a Pound

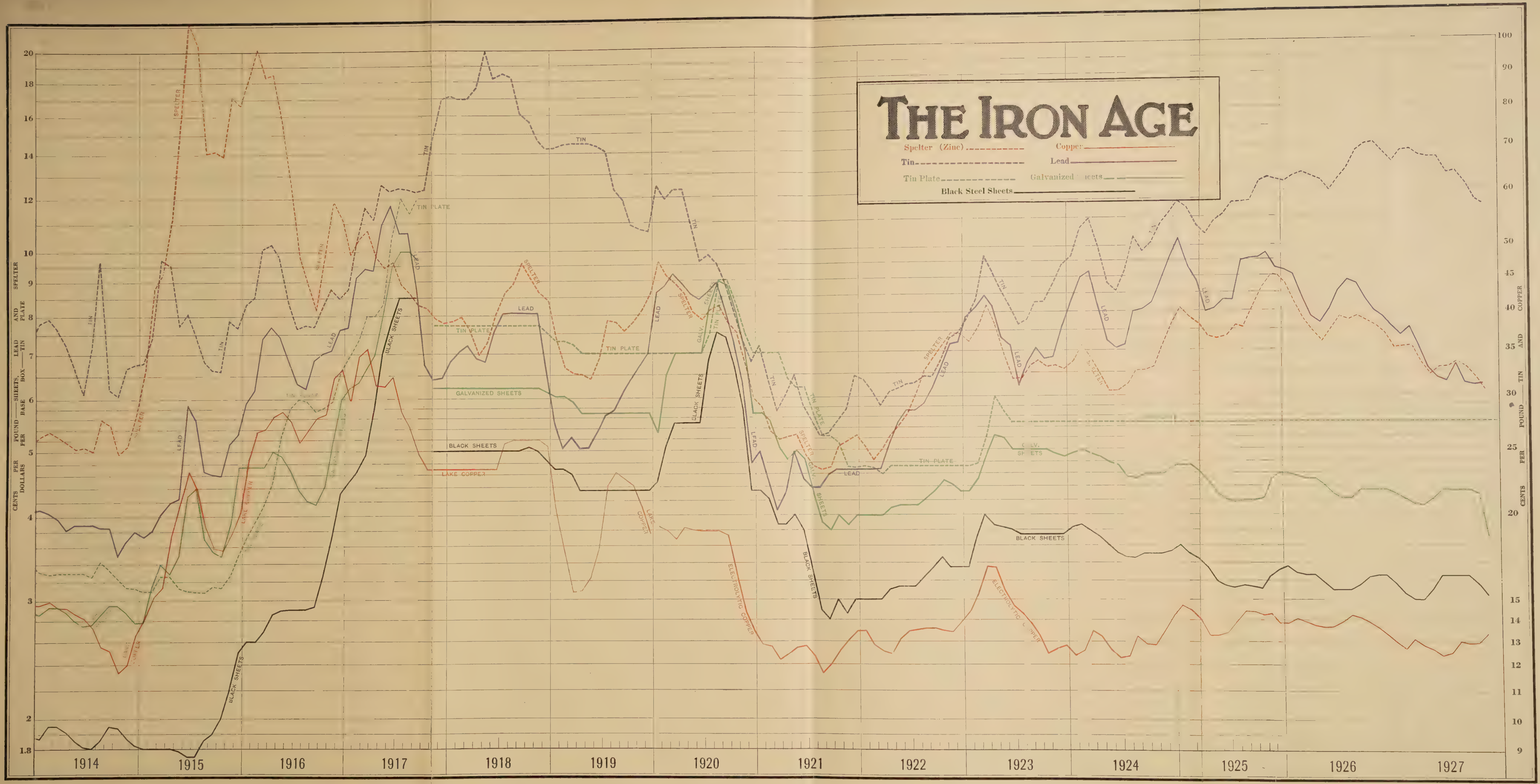
	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	44.58	50.34	39.12	34.13	41.76	44.10	85.13	71.50	62.74	35.94	32.03	39.16	48.70	58.26	62.20	66.43
February	43.56	48.71	39.82	37.25	42.60	51.47	85.00	72.45	59.87	32.16	30.74	41.98	53.41	57.09	63.65	69.05
March	42.76	46.93	38.03	48.73	50.53	58.38	85.00	72.50	61.93	28.79	29.14	48.61	55.03	53.67	64.47	69.23
April	43.64	49.04	36.10	47.64	51.51	55.82	88.53	72.50	62.12	30.36	30.58	45.84	50.02	52.27	63.35	67.88
May	45.98	49.06	33.21	38.79	49.14	63.21	100.00	72.50	54.99	32.50	30.92	43.11	44.08	54.65	62.36	67.47
June	47.44	45.01	30.60	40.26	42.07	61.93	91.00	71.83	48.34	29.39	31.46	40.97	42.74	55.93	60.63	67.42
July	44.70	41.32	35.65	37.38	38.25	62.61	93.00	70.11	49.29	27.69	31.67	38.47	46.29	58.05	62.98	64.01
August	45.86	41.63	48.34	34.37	38.88	62.53	91.33	62.20	47.60	26.35	32.36	39.33	51.89	58.12	65.17	64.41
September ...	49.16	42.63	31.13	33.13	38.65	61.54	80.40	59.79	44.43	26.70	32.36	41.60	49.24	58.27	68.89	61.43
October	50.07	40.38	30.25	33.05	41.10	62.24	78.82	54.82	40.47	27.70	34.61	41.80	50.60	62.24	70.36	58.49
November	49.87	39.75	33.28	39.50	44.12	74.18	73.67	54.17	36.97	28.93	36.76	44.09	54.25	63.30	70.75	57.49
December ...	49.86	37.12	34.01	38.53	42.55	84.74	71.51	53.80	34.04	32.41	37.48	47.16	56.03	62.94	68.68	58.54
Average	*46.46*	*44.33*	*35.80*	*38.56*	*43.43*	*61.90*	*85.28*	*65.68*	*50.23*	*29.91*	*32.51*	*42.68*	*50.19*	*57.90*	*64.29*	*64.32*

Tin Plate, at Pittsburgh, Dollars a Base Box.

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	$3.40	$3.60	$3.32	$3.10	$3.75	$7.00	$7.75	$7.35	$7.00	$7.00	$4.75	$4.75	$5.50	$5.50	$5.50	$5.50
February	3.35	3.60	3.29	3.10	3.96	7.38	7.75	7.35	7.00	7.00	4.71	4.80	5.50	5.50	5.50	5.50
March	3.30	3.60	3.30	3.25	4.19	8.00	7.75	7.26	7.00	7.00	4.60	5.23	5.50	5.50	5.50	5.50
April	3.30	3.60	3.30	3.25	4.50	8.00	7.75	7.00	7.00	6.44	4.75	6.00	5.50	5.50	5.50	5.50
May	3.33	3.60	3.30	3.15	5.30	8.40	7.75	7.00	7.00	6.25	4.75	5.70	5.50	5.50	5.50	5.50
June	3.40	3.60	3.30	3.11	5.81	10.50	7.75	7.00	7.00	6.25	4.75	5.50	5.50	5.50	5.50	5.50
July	3.43	3.60	3.27	3.10	6.00	12.00	7.75	7.00	7.50	5.69	4.75	5.50	5.50	5.50	5.50	5.50
August	3.50	3.55	3.41	3.10	5.95	11.40	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50	5.50	5.50
September ...	3.58	3.50	3.35	3.15	5.75	12.00	7.75	7.00	9.00	5.25	4.75	5.50	5.50	5.50	5.50	5.50
October	3.60	3.50	3.24	3.15	5.81	....	7.75	7.00	8.33	5.13	4.75	5.50	5.50	5.50	5.50	5.50
November	3.60	3.40	3.15	3.28	5.97	7.75	7.75	7.00	7.50	4.75	4.75	5.50	5.50	5.50	5.50	5.50
December	3.60	3.40	3.13	3.52	6.63	7.75	7.55	7.00	7.00	4.73	4.75	5.50	5.50	5.50	5.50	5.25
Average ...	*3.45*	*3.55*	*3.28*	*3.19*	*5.30*	*9.11*	*7.73*	*7.08*	*7.53*	*5.90*	*4.73*	*5.42*	*5.50*	*5.50*	*5.50*	*5.48*

No. 28 Galvanized Sheets, at Pittsburgh, Cents a Pound

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
January	2.90	3.46	2.87	2.79	4.75	6.25	6.25	6.05	5.33	5.70	4.00	4.35	4.98	4.75	4.60	4.28
February	2.87	3.50	2.95	3.16	4.75	6.38	6.25	6.05	6.50	5.56	4.00	4.54	5.00	4.75	4.53	4.21
March	2.80	3.50	2.95	3.40	4.75	6.69	6.25	5.96	7.00	5.05	4.00	4.93	4.93	4.62	4.50	4.15
April	2.86	3.50	2.91	3.29	5.00	7.00	6.25	5.70	7.00	4.88	4.11	5.25	4.88	4.45	4.50	4.13
May	2.90	3.42	2.80	3.50	4.94	8.20	6.25	5.70	7.00	5.00	4.15	5.20	4.80	4.29	4.43	4.22
June	2.90	3.38	2.75	4.28	4.69	9.50	6.25	5.70	7.00	4.88	4.15	5.00	4.76	4.21	4.28	4.35
July	3.00	3.33	2.75	4.40	4.38	10.00	6.25	5.70	8.25	4.31	4.15	5.00	4.56	4.19	4.24	4.35
August	3.12	3.24	2.85	3.71	4.21	10.00	6.25	5.70	9.00	3.90	4.23	5.00	4.55	4.20	4.23	4.35
September ...	3.21	3.16	2.95	3.56	4.18	9.75	6.25	5.70	8.88	3.81	4.35	5.00	4.60	4.20	4.33	4.35
October	3.36	3.08	2.95	3.50	4.41	....	6.25	5.70	8.18	4.00	4.50	5.00	4.60	4.23	4.35	4.26
November	3.40	2.98	2.88	3.89	5.18	6.25	6.25	5.70	7.04	3.86	4.43	4.93	4.60	4.50	4.35	4.16
December	3.40	2.90	2.78	4.75	6.00	6.25	6.15	6.70	5.70	4.00	4.35	4.89	4.72	4.60	4.35	4.13
Average ...	*3.06*	*3.29*	*2.87*	*3.69*	*4.77*	*7.84*	*6.24*	*5.78*	*7.24*	*4.58*	*4.20*	*4.92*	*4.75*	*4.42*	*4.39*	*4.25*



Carload Prices of Copper, Lead, Tin and Zinc in New York, and of Tin Plate and Black and Galvanized Sheets in Pittsburgh

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THE IRON AGE

New York, January 12, 1928

ESTABLISHED 1855

VOL. 121, No. 2

Better Forgings Produced Through Furnace Control

BY E. J. EDWARDS*

Billets Charged in Cool Furnaces and Heating Cycle Controlled by Pyrometers—Handling Equipment Also Features American Locomotive Co. Shop

RECOGNIZING that every care must be taken in the manufacture of locomotive forgings, the American Locomotive Co. has built a new forge plant at its Brooks Works, Dunkirk, N. Y. While the production consists of driving axles, engine truck and trailing axles, driving rods, crank pins, piston rods and valve motion work, the shop is completely equipped to produce commercial forgings up to 16 in. in diameter or thickness.

In 1902 a forge plant 80 ft. wide and 400 ft. long was constructed with what was then considered modern equipment. The heating facilities in this shop consisted of eight coal-fired furnaces, each with two or three doors. Over these furnaces were mounted waste heat boilers for generating steam from the hot furnace gases, the steam being used to operate the light hammers then in use. By far the larger tonnage produced in those days consisted of iron forgings; the hammers of the lighter capacity and the coal-fired furnaces were quite satisfactory for the material being forged. But with the advent of locomotives which require forgings of a larger sectional area in straight carbon as well as alloy steel, it was recognized that the heating of such material could not be handled properly in the old furnaces, nor could the proper grain refinement be obtained by hammers of such light capacity.

The new shop, which has been in operation since 1926, is 424 ft. long, 97 ft. wide and 59 ft. 7 in. high to the top of the truss. It is of modern fireproof construction throughout. Special care has been exercised in its design to provide maximum light and ventilation, as is apparent from photographs. It is interesting to note that even in midsummer there is no complaint from the workmen because of the heat. The building is equipped with a 15-ton Shaw electric traveling crane with a 70-ft. span, mounted on a runway 39 ft. from the floor. This crane runway extends outside the shop over a storage yard 150 ft. long for raw materials such as ingots, billets and bar material. A special door in the end of the building permits the crane to bring materials into the shop without difficulty.

Heating before forging is of vital importance. Steel should not be charged into a hot furnace, as this often causes internal ruptures. This is especially true for the alloys and the higher carbon steels, and even for medium steel in cold weather. To avoid damage to the billets and to insure complete control over the heating of the steel before forging, six furnaces are installed which operate in two sets of three. In normal operation there are each morning two cool furnaces ready for charging, two hot furnaces containing steel ready for the press and hammer and the remaining two cooling off. These furnaces are of the regenerative type, of Stevens design and oil-fired. The chambers are 8 ft. in depth by 14 ft. in width; the capacity of each is approximately 25 tons of steel. Each furnace is equipped with two charging doors. The flame at no time comes in direct contact with the charge in the furnace.

The above described furnaces are used for the heating of steel only. Work is not confined entirely to steel, as there is still a considerable tonnage of heavy wrought iron forgings used by railroads in the United States. To heat this wrought iron, two additional Stevens regenerative furnaces were installed at the end of the shop.

All the furnaces are equipped with Leeds & Northrup indicating and recording pyrometers. The equipment illustrated gives a complete history of the forging during heating and enables one to know the rate at which the heat was applied, the time of soaking at heat to insure proper penetration and whether or not the material was withdrawn for forging at the proper temperature. The time of soaking steel and the rate at which the temperature is increased depend entirely on the cross-section of the material. In the past this important phase of the work has not been given the serious consideration due it.

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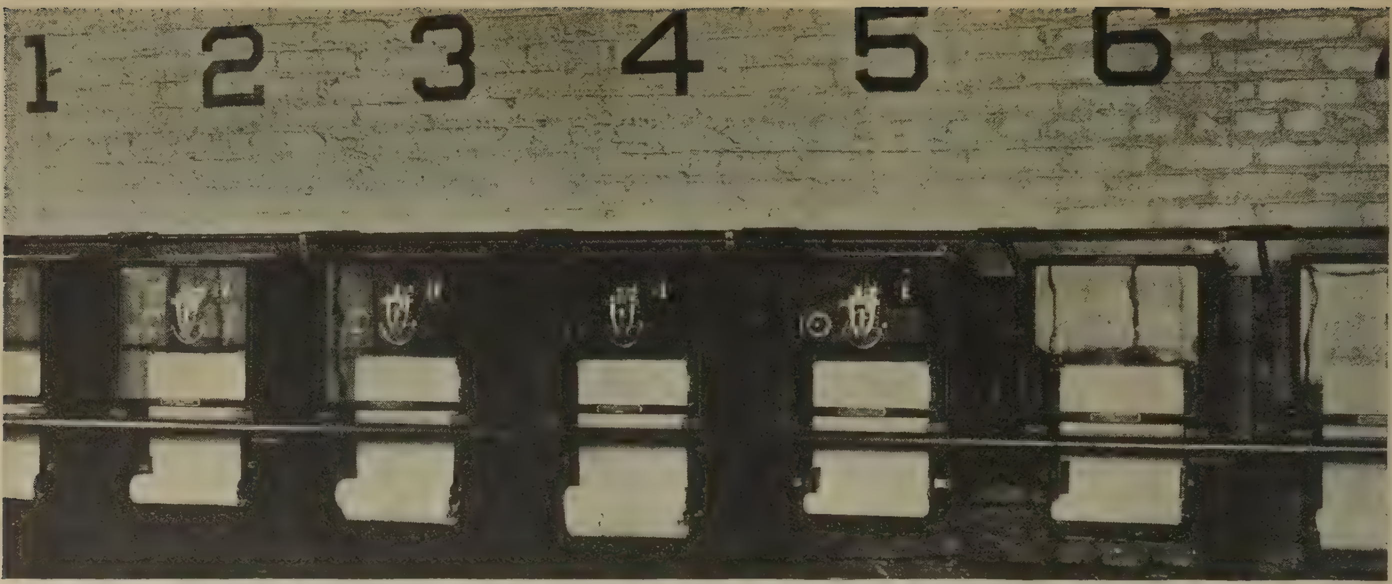
*Engineer of Tests, American Locomotive Co., Schenectady, N. Y.



Battery of Recording Pyrometers for Controlling Heating Furnaces in Forge Shop

Bristol pyrometers to record the checker temperatures and thermostatic regulators for controlling the flow of water through the furnace jambs are also provided, together with automatic shutoffs at the fuel oil burners to safeguard against explosions. This battery of furnaces has proved to be economical from a fuel and maintenance standpoint.

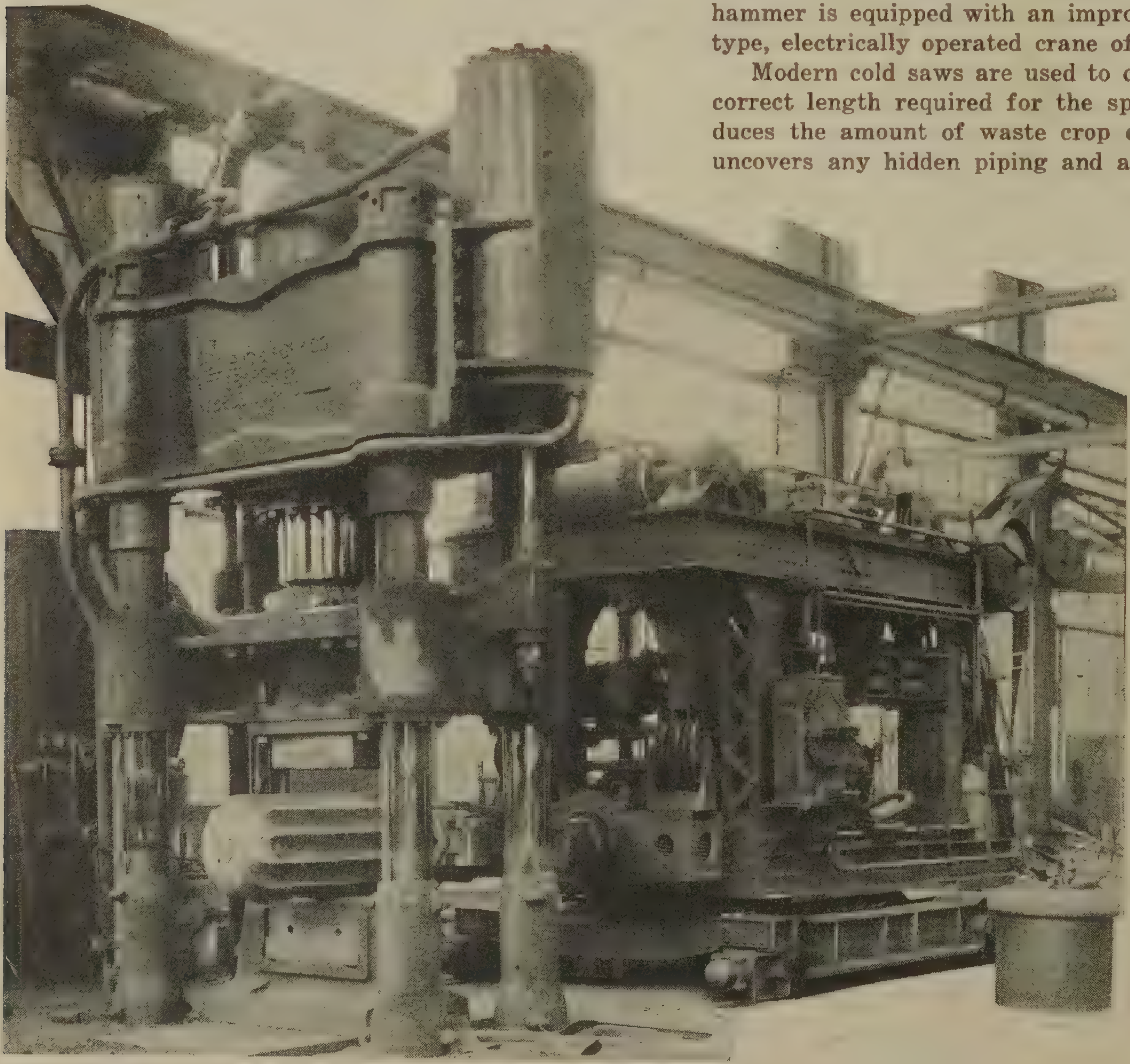
Electric Charging Machine and Manipulator

All of the large round work, such as driving and trailing axles, as well as main crank pins, are forged under a 1000-ton high-speed steam-hydraulic press made by United Engineering & Foundry Co. A manipulator of 10,000 lb. capacity, manufactured by the Alliance Machine Co., reduces materially the labor in the production of such forgings, and requires much less muscular effort on the part of those men who are needed. The manipulator moves and revolves the ingot or billet to the varied positions as required. When one end is finished, the forging is placed on a turntable alongside, and turned end for end. This scheme avoids making any tong scrap. A press of this capacity permits depth penetration and refinement in the steel, even to the center of the mass, all of which are contributing factors in producing quality.

Further to facilitate handling and reduce labor an electric charging machine operates directly in front of the furnaces on a 23-ft. gage track. This machine, with a peel 20 ft. long, is used for charging the furnaces and moves the steel from the furnace to the press or hammers as required.

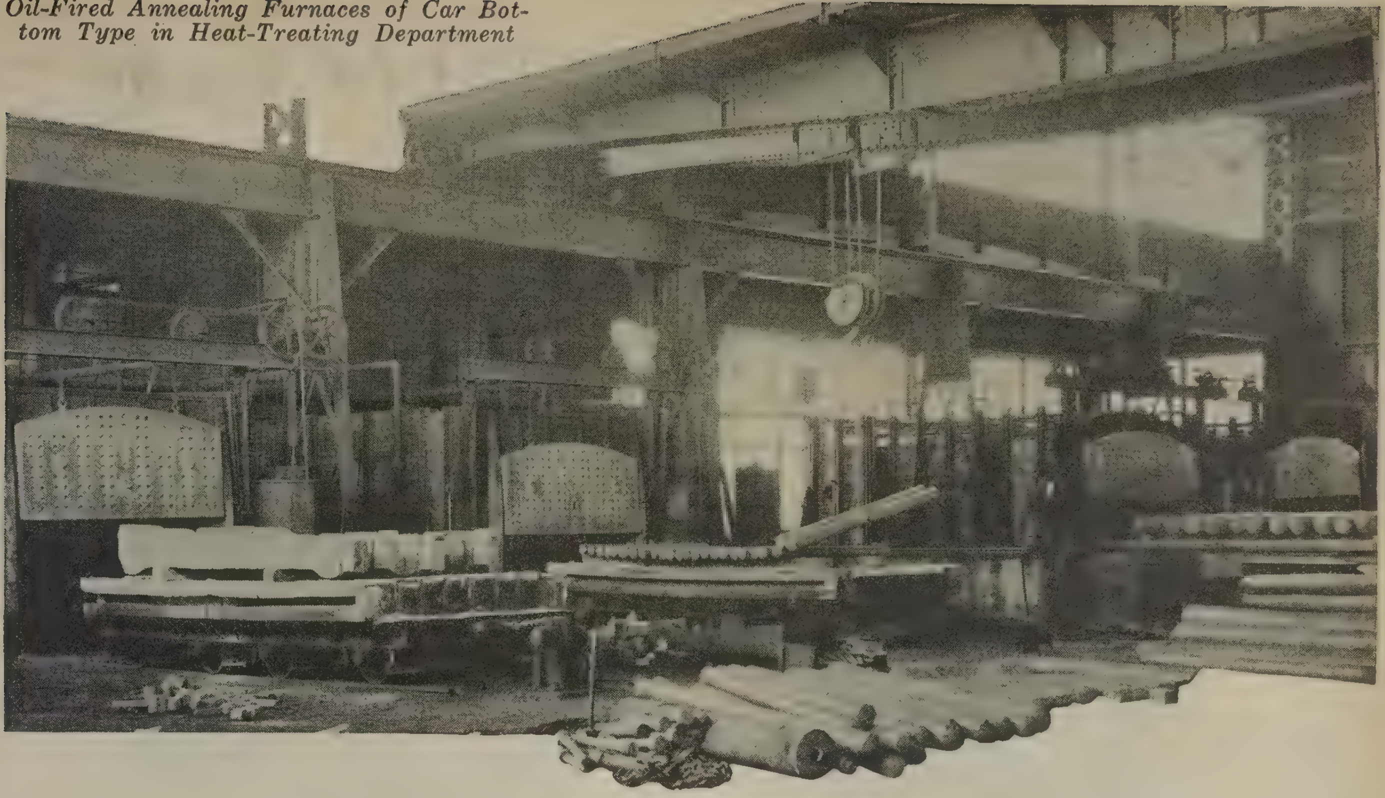
In addition to the press, the hammer equipment in this shop consists of a 12,000-lb. Erie steam hammer and three 8000-lb. steam Bement hammers for forging steel, and two 6000-lb. Bement hammers in front of the wrought iron furnaces. The heavier work is confined to the hammers of the greater capacity. Each hammer is equipped with an improved Whiting, pillar-type, electrically operated crane of 10,000 lb. capacity.

Modern cold saws are used to cut the billets to the correct length required for the specific job. This reduces the amount of waste crop ends to a minimum, uncovers any hidden piping and also reduces the cost



1000-Ton Hydraulic Press. Manipulator in right background holds fluted ingot on anvil. Turntable in right foreground

Oil-Fired Annealing Furnaces of Car Bottom Type in Heat-Treating Department



of heating for the forging. A special duplex machine for cutting axles to the required length at one setting is also installed.

Extensive Heat-Treating Department

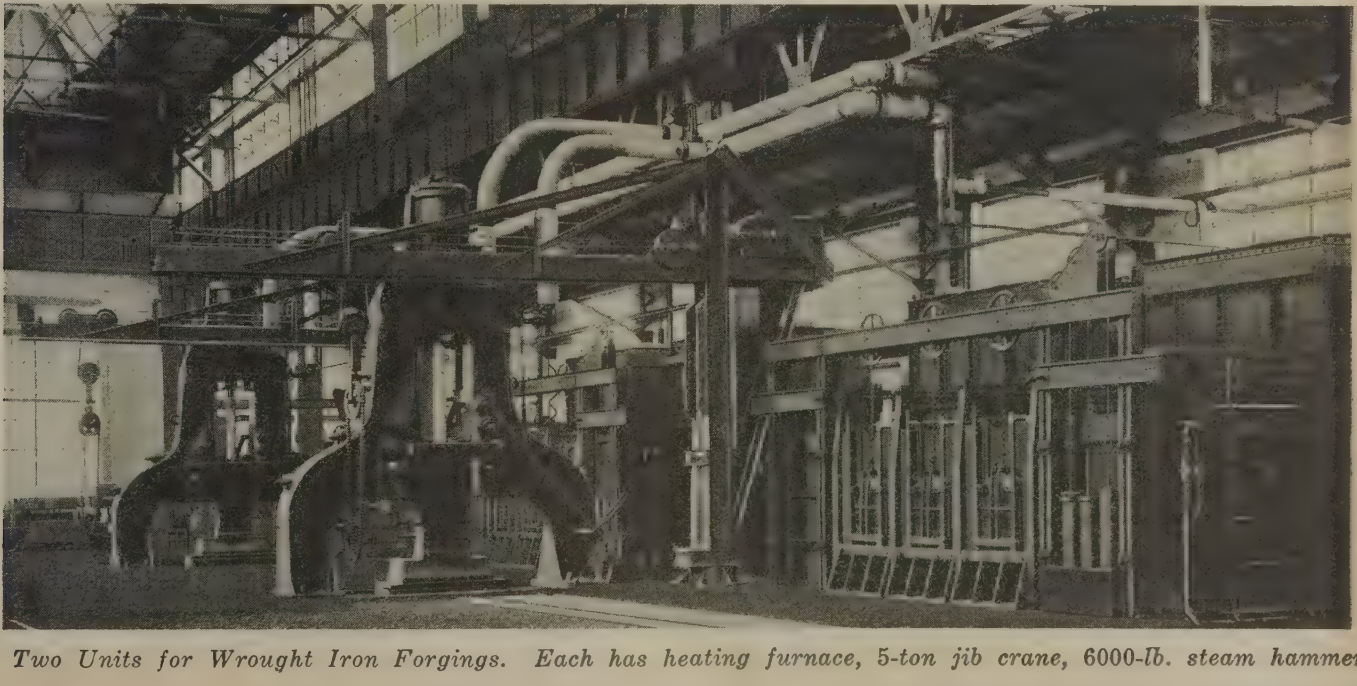
A modern forging plant would not be complete without the best in heat-treating facilities, because manufacturing is not complete until the forging has been heat treated, tested and found to meet the specified requirement.

A new heat-treating plant, 122 x 159 ft., with roof 33 ft. high, of modern fireproof construction, a complete unit in itself, adjoins the forge shop. The forgings are transferred to this heat-treating plant on cars hauled by a storage battery truck. Major items of equipment are two 10-ton electric cranes for charging the annealing furnaces—eight low-pressure, oil-fired, car-type furnaces of varied dimensions. All the furnaces are equipped with a perforated arch which keeps the flame from coming in direct contact with the materials being heated, and more evenly distributes the heat into the mass.

Forgings are loaded on the car hearth, each piece being placed on cast iron blocks which raise it about 4 in. from the hearth. Space is allowed around each of the forgings, which are charged in single tiers, all of which enables complete and uniform radiation and proper heat penetration into the forging. The annealing furnaces are equipped with Brown indicating and recording pyrometers, which write a complete history of the treatment. Each heat is also checked by the use of a Siemens water pyrometer. To avoid delays when the forgings are ready to be air-cooled, the car-body hearths are pulled out by Sprague electric car pullers, one for each furnace.

Most of the forgings are normalized and annealed, but to take care of such forgings as are specified to be quenched, a 16 x 21 x 10-ft. tank is installed. The quenching medium is cooled by a motor-driven circulating pump, which passes the liquid through cooling coils in a vertical water cooler. All of the quenched forgings are given a proof test under a drop testing machine.

Because of the exacting specifications, considerable testing is required. Test coupons are cored out with a hollow drill by means of a horizontal boring mill, which reduces the time required to a minimum. To complete the work, a modern laboratory with chemical and physical facilities is provided, all being real factors in the production of high quality forgings.



Two Units for Wrought Iron Forgings. Each has heating furnace, 5-ton jib crane, 6000-lb. steam hammer

Alloy Bearings Applied to Trains

RAILROADS have been experimentally operating passenger trains which are equipped with roller bearings in all the journals. Several trains thus equipped are on the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern and other railroads. Some facts about the particular alloy steel, nickel-molybdenum, used in one type of these roller bearings, are given in this article.

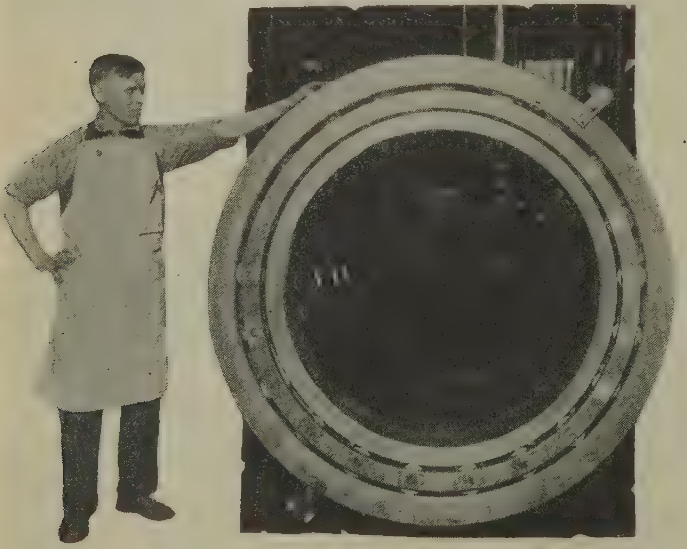
BY DR. F. C. LANGENBERG AND
CHARLES MCKNIGHT*

A COMBINATION of nickel and molybdenum in an alloy steel is not new but, due to its utilization in an industrial bearing field which is being given a great deal of prominence at the present time, it is believed that certain facts about this combination will be of interest. The authors will not attempt to give any extended bibliography on these steels, as this has been very admirably done by Dr. H. W. Gillett and E. L. Mack in their book "Molybdenum, Cerium, and Related Alloy Steels."

Nickel-molybdenum steel in the low-carbon compositions has been very satisfactorily used for several years in a number of parts such as piston pins, differential gears, ring gears, steering knuckle pins, and other carburized parts. The possibility of obtaining a fine core and a hard case after a single quench gives this composition certain advantages over other types of steel used for similar purposes. Instances are on record where large nickel-molybdenum crankshafts have been given a single quench after carburizing and a scleroscope hardness obtained between 80 and 85 after an oil quench.

Although the Society of Automotive Engineers has not yet presented a physical property chart of nickel-molybdenum steel, the data shown in the curves in the reproduced chart have been obtained from most reliable sources, and it is believed they will be of interest. The chart shows the physical properties of the core of a case-hardened steel after the treatments recommended for a steel of this composition.

Two of the illustrations show the application of two types of anti-friction bearings to a railroad journal. In both cases, the cones and races are made of nickel-molybdenum steel, case hardened. A very hard wearing surface is obtained after the proper treatment and, in conjunction with the hard wearing surface, a strength of core results which gives a high resistance to shock and impact.



Race and Cone of This Two-Ton Bearing for a Cement Mill Are Made of Nickel-Molybdenum Steel

The application of this composition is not confined to railroad bearings, as is illustrated in another illustration. This is a bearing weighing over two tons for a cement mill, in which both the race and cone are made of carburized nickel-molybdenum steel. In comparison with this bearing, it should be borne in mind that the very smallest bearings for machine tools and those in the automotive industry are likewise fabricated, and in many instances the rollers themselves are a carburized steel similar to the races and cones.

Heat-Treated: Applicable for High Temperatures

AN inspection of the physical property chart, already referred to, of the nickel-molybdenum carburized steel shows one very decided characteristic, namely, the uniformity of the elastic limit after the steel has been subjected to different drawing temperatures. This fact suggests the possibility of applying this composition for high temperature work, and with this in view certain experiments have been conducted which are outlined below.

The following chemical analysis was selected utilizing a rolled bar 2 in. in diameter:

C.	Mn.	Sul.	Phos.	Sil.	Ni.	Mo.
0.305	0.51	0.021	0.018	0.19	1.14	0.14

This was then cut into bars 12 in. long. These were then placed in a muffle furnace and given the following heat treatments:

	Deg. Fahr.
Normalize at	1,650
Quench (in water)	1,450
Draw at	900
Draw at	1,000
Draw at	1,100
Draw at	1,200
Draw at	1,300

All bars were normalized from a temperature of 1650 deg. Fahr. and then reheated to 1450 deg. Fahr., and quenched in water. Bars were then drawn at each of the following temperatures:

900 deg. Fahr.; 1000 deg. Fahr.; 1100 deg. Fahr.; 1200 deg. Fahr.; and 1300 deg. Fahr.

At least one specimen from each draw was pulled at room temperature (74 deg. Fahr.), 600 deg. Fahr., and at 1000 deg. Fahr. The table shows the draw, the temperature of the test, yield point, ultimate strength, elongation and contraction of area.

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*The authors are respectively vice-president Climax Molybdenum Co. and metallurgist, development and research department International Nickel Co., New York.

Charpy bars broken at room temperature (74 deg. Fahr.) gave the following results:

Draw, Deg. Fahr.	Ft. Lb.	Average Charpy	Remarks
900	25.32		
	25.03	25.61	
	26.20		
	25.91		
1,000	32.62		
	31.68	31.34	
	30.29		
	30.75		
1,100	39.05		Failed to break
	38.74		
	37.09	38.48	Failed to break
	39.05		
1,200	48.88		Failed to break
	47.83		
	50.11	49.01	Failed to break
	49.23		
1,300	54.56		Failed to break
	54.56	53.67	
	52.77		Failed to break
	52.77		

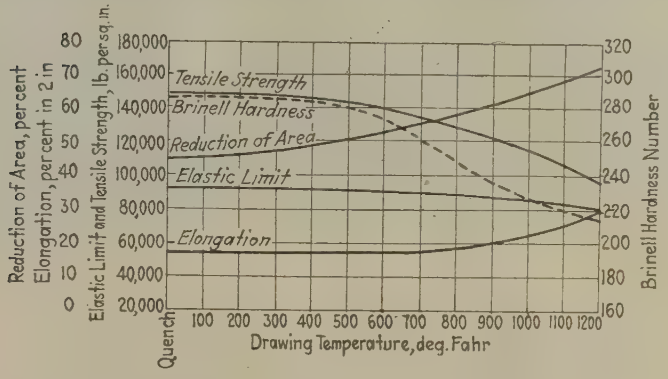
It is very obvious from an inspection of these data that nickel-molybdenum steel, in the higher carbon ranges, gives a high resistance to impact as compared to other compositions when the same physical properties as regards elastic limit and tensile strength are obtained. It is also apparent that the elastic limit at temperatures above atmospheric does not fall off as rapidly as is the case for some other compositions.

This at once suggests its use for high temperature applications, such as valve bodies and bolts. This characteristic is not being overlooked by the manufacturers of valves and fittings, and some quite interesting work is being done at the present time on the manufacture of castings, the results of which it is hoped can be made public at a later date.

Alloys in Scrap Recoverable

FROM the economical viewpoint, both nickel and molybdenum have the chemical characteristics which make them completely recoverable alloys. In other words, nickel-molybdenum steel scrap can be safely charged into any type of melting unit with the assurance that the alloying elements will be recovered in the finished heat. One plant, engaged upon the production of bearings, utilizes nickel-molybdenum steel almost exclusively.

In view of the fact that the weight of the finished bearing is only a small proportion of the metal charged into the furnace, the item of recoverable alloying elements becomes an important economic factor. In a plant fabricating its own steel, or in a plant so located that turnings and other returned scrap can be utilized, the necessity of employing an alloy steel having recoverable elements becomes exceptionally important when the article manufactured utilizes only a very small proportion of the raw material.

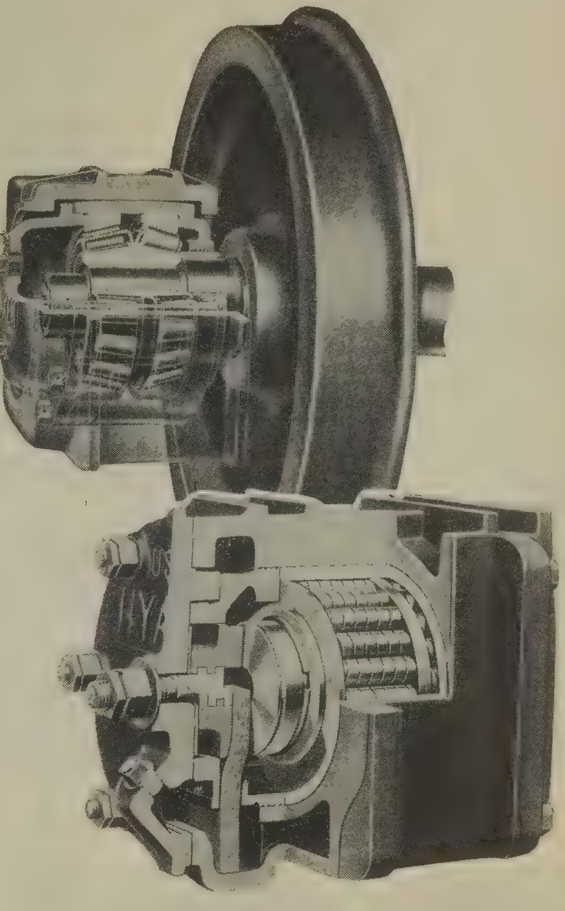


Physical Properties of Core of Case-Hardened Nickel-Molybdenum Steel, Single Treatment.

The analysis of this steel was: Carbon, 0.15; *manganese,* 0.58; *silicon,* 0.25; *nickel,* 1.62; *molybdenum,* 0.286; *sulphur,* 0.032, *and phosphorus,* 0.016 *per cent.*

The recommended heat treatment is: Forge at 2100 *to* 2200 *deg. Fahr.; normalize at* 1625 *to* 1650 *deg.; anneal at* 1550 *to* 1575 *deg. and quench at* 1450 *to* 1470 *deg. after carburizing in oil. Test pieces treated in* 1*-in. rounds*

The manufacture of ordnance was always regarded as a hazardous enterprise, due to the fact that the weight of the product shipped was so exceptionally low as compared to the weight of the product charged into the melting furnace for its fabrication. Roller bearings are very similar to ordnance in respect to the point that their finished weight does represent a very small percentage of the metal melted for their fabrication. If the application of anti-friction bearings to the railroad industry continues as is anticipated, there can be no question but what the utilization of an alloy steel having a high scrap value will be an important economic factor.



Application to Passenger Cars of Two Types of Roller Bearings Made by Two Large American Companies

Table of Properties of Heat-Treated Specimens Tested at 74, 600 and 1000 Deg. Fahr.

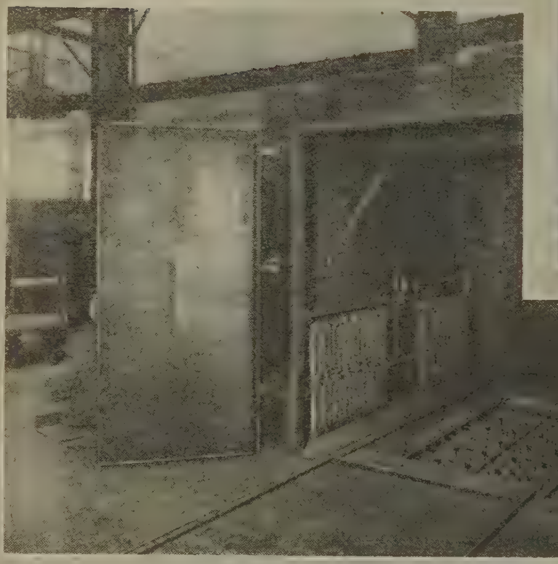
Draw Temp., Deg. Fahr.	Specimen	Temp. at Test, Deg. Fahr.	Yield Point, Lb. per Sq. In.	Ultimate, Lb. per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent
900	629- 1-1	74	105,000	140,450	17.5	64.7
	629- 1-2	74	108,000	143,950	16.5	62.3
	629- 2-1	600	123,000	144,500	27.0	75.5
	629- 2-2	1,000	53,000	71,500	24.0	87.5
1,000	629- 3-1	74	104,000	130,450	20.5	67.0
	629- 4-1	600	102,000	132,500	25.5	64.7
	629- 4-2	1,000	52,000	74,500	23.0	37.5
1,100	629- 5-1	74	102,000	123,600	21.0	69.2
	629- 6-1	600	85,000	117,500	23.5	73.5
	629- 6-2	1,000	54,000	75,000	24.5	88.7
1,200	629- 7-1	74	89,000	107,300	25.0	75.5
	629- 7-2	600	76,000	109,000	24.5	64.7
	629- 8-1	1,000	56,000	70,000	30.0	85.8
	629- 8-2	1,000	55,000	69,500	28.0	94.3
1,300	629- 9-1	74	76,000	92,900	29.5	75.5
	629- 9-2	1,000	41,000	59,500	35.0	88.7
	629-10-2	600	57,000	98,500	31.0	71.4

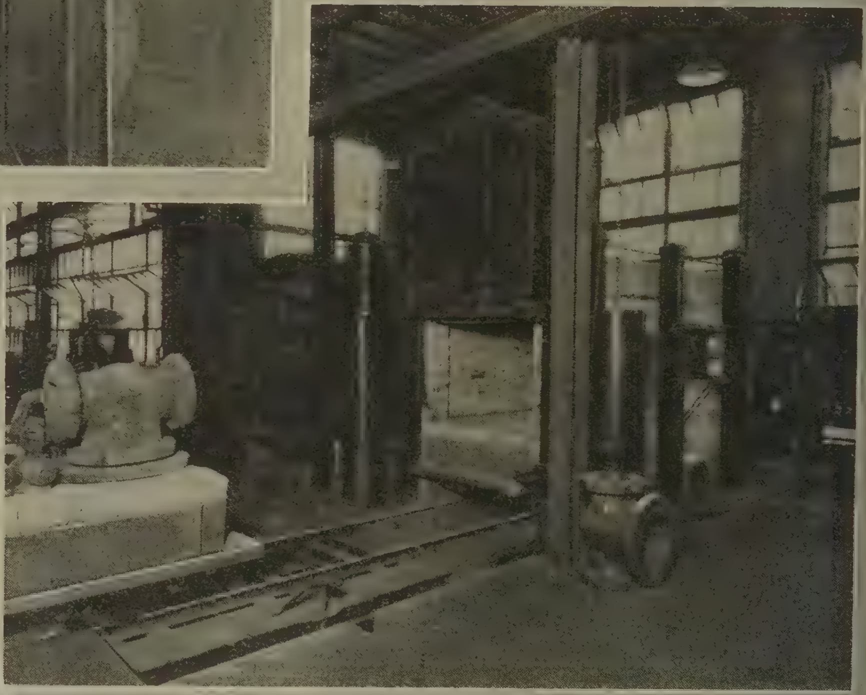
Total apparent consumption of babbitt metal in November, 1927, based on reports received by the Department of Commerce from 21 firms, was 4,505,954 lb., compared with 5,115,598 lb. in October. Total apparent consumption during the first 11 months of 1927 was 55,646,056 lb., compared with 61,426,584 lb. and 63,602,444 lb. during the corresponding periods of 1926 and 1925, respectively.

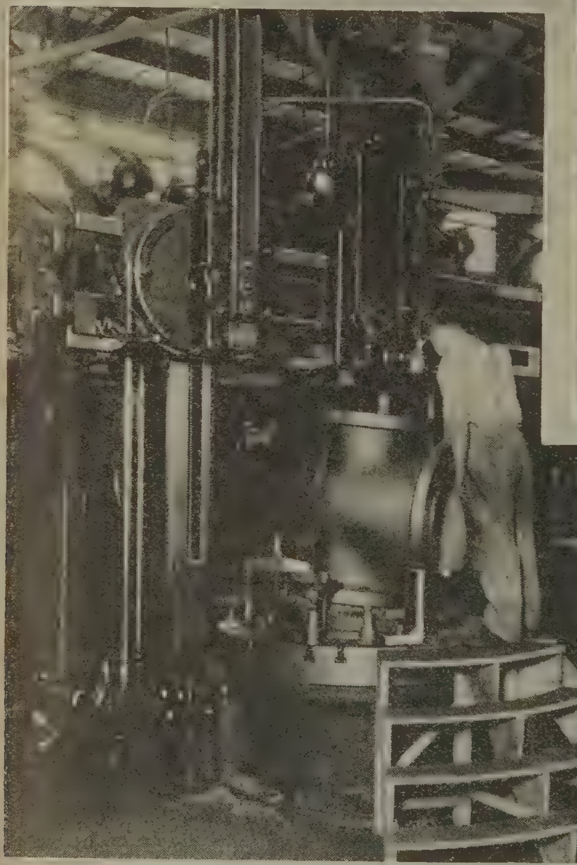
Electric Foundry of Lunkenheimer Co.

AT the Carthage plant of the Lunkenheimer Co., Cincinnati, where iron and steel valves are made, there are two 2½-ton electric steel furnaces.

INTRICATE and the more important cores are baked in electric ovens, while large, bulky cores are baked in gas-fired ovens.







FOR annealing an electrically heated furnace is used. The castings are transferred from the heated chamber to an unheated chamber for the cooling period, an arrangement making for efficient and economical operation.

INDIVIDUAL motor-driven machine tools, together with electric cranes and hoists, help to make possible one-man operation on much of the work.

Canadian Outlook Hopeful for 1928

Improvement in Steel and Related Industries Expected to Continue—Pig Iron Trade Suffers from United States Competition

TORONTO, ONT., Jan. 10.—The outlook for 1928 in Canadian industry is for a continuance of the betterment which has been in evidence for some months. While some industries have shown greater improvement than others, the industrial situation as a whole has benefited by last year's high wheat yield, the greater activity in mining operations and the increase in the supply of hydroelectric power at low cost.

In some branches of the iron and steel industry there was marked improvement in 1927, while in others operations remained at about the same level as in 1926. With the exception of the lowering of duties on a few minor products, the Government did not put further obstacles in the way of the iron and steel industry. But at the same time nothing was done to correct the situation created by tariff revisions of former years, and as a consequence the industry faced the same conditions with respect to outside competition that it had in 1925 and 1926. The reduction of the tariff on agricultural implements in April, 1925, followed by the dropping of the duty on pig iron and certain other raw materials as a compensation to Canadian implement manufacturers, deprived Canadian blast furnace operators of a part of their market, as iron from the United States undersells Canadian iron.

One of the Best Years Since 1920

From the standpoint of demand for products and plant operations, 1927 was one of the best years Canadian iron and steel mills have had since 1920. Throughout the year the principal mills at Sydney, N. S., Hamilton and Sault Ste. Marie, Ont., were in operation on almost a 100 per cent basis. Jointly these companies spent upward of $1,100,000 on plant additions and improvements. The Dominion Iron & Steel Co., Sydney, N. S., made general improvements costing $500,000; the Steel Co. of Canada, Ltd., Hamilton, Ont., spent more than $300,000 on a new sheet mill and other extensions, and the Algoma Steel Corporation, Sault Ste. Marie, Ont., remodeled its rail mill and made other changes in its equipment costing $300,000.

The Algoma Steel Corporation operated at almost full capacity from Jan. 1, 1927, until about the middle of August, when it completed rail orders on hand and blew out one of its two operating blast furnaces, shut down its rail mill and curtailed operations of open-hearth furnaces. In November the company again started up its rail mill and announced that it had 100,000 tons of unfilled rail orders on its books, sufficient to keep its mill running until spring.

The Steel Co. of Canada, Ltd., reported an exceptionally good year. Besides enjoying an active domestic business, the company closed some large orders for export.

The Dominion Iron & Steel Co. has shown a marked improvement in operations. A statement issued by company officials late in November showed that for the first time since 1925 every one of the 2600 men on the payroll of the Sydney plant was working full time six days a week, with the definite prospect that the mills would continue on that basis for the rest of the winter. At the annual meeting it was announced that the company's unfilled orders were more than 20,000 tons in excess of those it had at the beginning of 1926.

The British Empire Steel Corporation has announced that the 1928 output of its Bell Island, Newfoundland, iron mines, estimated at 1,300,000 tons, has been contracted for. Of this amount, 800,000 tons will be shipped to Germany, 400,000 tons to the company's furnaces in Nova Scotia and 100,000 tons to the United States. The company has been shipping iron ore to Germany and to the United States for several years.

Production of pig iron in Canada in 1927 showed a slight reduction from that of 1926. For the first six months, however, production proceeded at a higher monthly average than in 1926, but during the last half there was a sharp decline, due chiefly to the blowing out of furnaces at Sydney, N. S., and Sault Ste. Marie, Ont., during August, and to the closing down of one of the two furnaces at Hamilton, Ont., in September for relining. To some extent, increased importations of pig iron had an adverse effect on Canadian output. A comparison of 1926 and 1927 pig iron production figures by months is given:

(Gross Tons)

	1927	1926
January	51,717	56,644
February	50,695	49,746
March	75,637	53,251
April	77,240	67,607
May	78,987	72,762
June	69,437	70,854
July	50,997	67,232
August	63,234	58,780
September	52,470	64,187
October	38,097	79,124
November	37,989	52,347
December	*50,250	53,971
Total	696,750	737,503

*Estimated.

Production of steel ingots and castings gained about 12 per cent. Monthly outputs of steel ingots and castings are compared in the following table:

(Gross Tons)

	1927		1926	
	Ingots	Castings	Ingots	Castings
January	55,898	2,653	66,221	2,315
February	52,144	3,476	50,207	2,950
March	102,141	5,240	54,641	3,924
April	104,540	4,567	76,046	3,890
May	92,227	4,484	85,604	3,909
June	55,443	4,497	77,684	3,593
July	52,776	2,474	62,396	2,451
August	74,319	3,160	43,546	2,128
September	52,010	2,240	57,164	1,673
October	54,190	2,181	61,415	2,127
November	78,436	2,294	52,116	2,195
December	*80,250	*2,500	56,310	2,183
Total	854,375	39,766	743,550	33,338

*Estimated output.

While import figures are available only for the first nine months of 1927, they give some indication of the increase in pig iron shipments into this country. For the nine months ended with September, 1927, imported pig iron reached a total of 32,940 tons, as compared with 21,433 tons for the corresponding nine months of 1926. Of the nine months' imports, 27,887 tons came from the United States as against 13,946 tons from this source in the same period of 1926.

Improvement in Other Industries

Foundry operations throughout the year showed a slight improvement compared with 1926. In the agricultural implement industry there was general improvement and greater output. With the large crop yield in the Canadian West, this industry expects even better conditions for this year.

The index of Canadian industrial production for the first 10 months of 1927, compiled by the Dominion Bureau of Statistics, set an average monthly level of 156.3, a gain of 10.4 points over the average level of 145.9 for all of 1926, and a still broader improvement over 1925, which was 128.8.

Constituents of Annealed Steel

Frequently Include Massive Cementite in Addition to Ferrite and Lamellar Pearlite

BY JAMES J. CURRAN*

TEXTBOOKS on metallography usually focus the reader's attention on the statement that lamellar pearlite is the normal condition of the eutectoid in slowly cooled plain carbon steels. That this is by no means true is known to experienced observers, and demonstrated by the micrographs below. Spheroidized or massive pearlite may be produced in steels of any carbon content by proper anneals. Three constituents in one field represent an intermediate stage in the change from lamellar pearlite to massive cementite (spoken of in advanced textbooks as the most stable constituent containing carbon).

Massive cementite in a plain carbon steel containing less than 0.10 per cent carbon may be new to many. In the top row is the conventional appearance of a rivet steel, magnified 50 diameters, after etching 30 sec. in 1 per cent nital. The center view represents a similar view, magnified 250 diameters. The dark areas here are not fine grained pearlite, but massive cementite, as proved by the right hand view of the same specimen, after repolishing and etching in alkaline sodium picrate.

The groups below represent three carbon steels, each annealed at two different temperatures. The anneals were applied to adjoining sections of the same bar in the forged, normalized, and air-cooled condition. The microphotographs show that long heating near the critical temperature will break up lamellar pearlite and materially soften the steel. The lower six are etched 30 sec. in 1 per cent nital and magnified 250 diameters.

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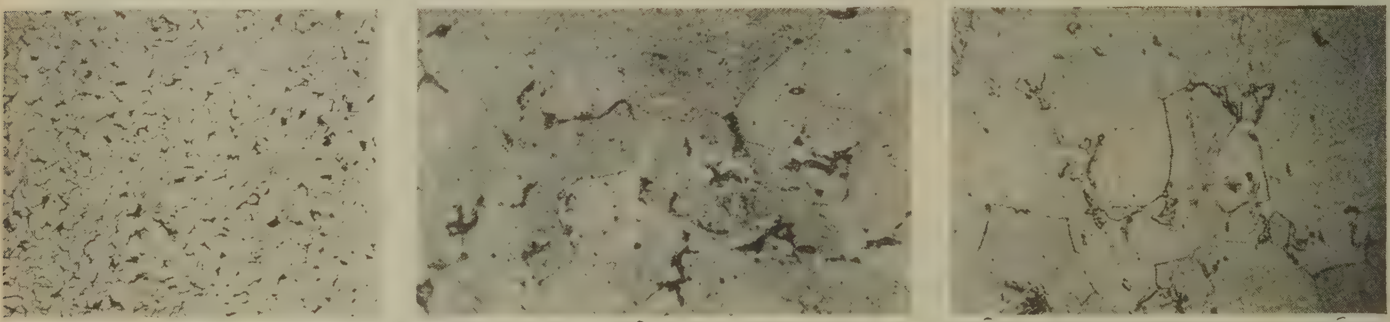
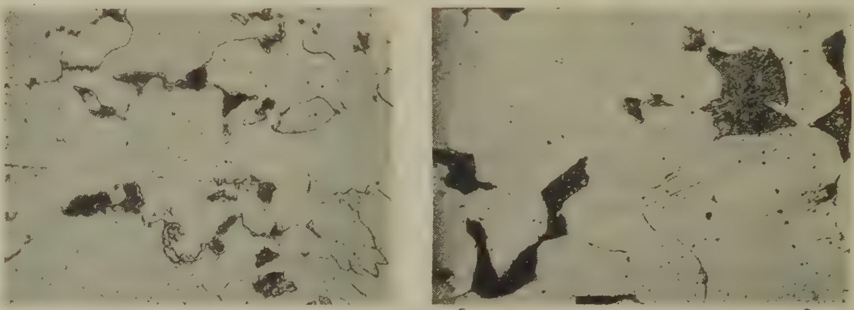
*Henry Souther Engineering Co., Hartford, Conn.



Massive Cementite in Steel Containing Less Than 0.10 Per Cent Carbon



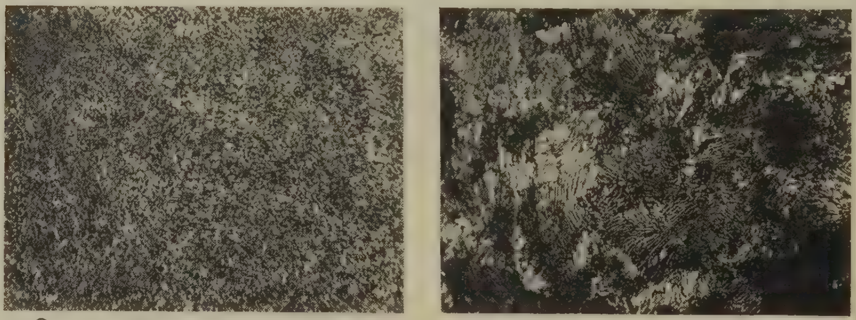
After Annealing at
1400 deg. Fahr.
87 Brinell
19 Scleroscope

Structure:
Lamellar pearlite
Massive cementite
Ferrite

After Annealing at
1700 deg. Fahr.
86 Brinell
20 Scleroscope

Structure:
Lamellar pearlite
Ferrite

Steel, 0.17 Per Cent Carbon, 0.50 Per Cent Manganese



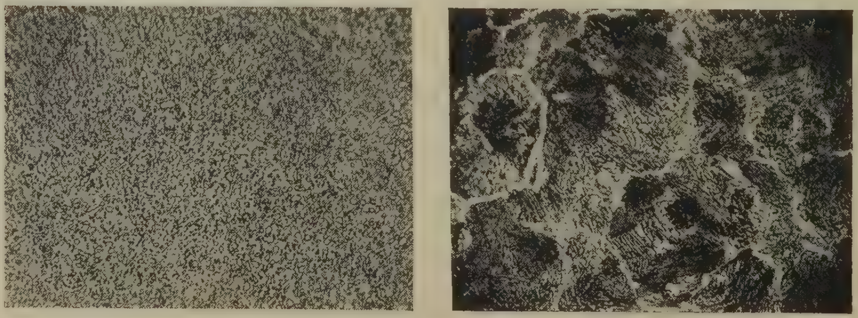
After Annealing at
1430 deg. Fahr.
170 Brinell
27 Scleroscope

Structure:
Spheroidal cementite
Ferrite

After Annealing at
1650 deg. Fahr.
228 Brinell
37 Scleroscope

Structure:
Lamellar pearlite
Traces of massive excess cementite

Eutectoid Steel, 0.91 Per Cent Carbon, 0.23 Per Cent Manganese



After Annealing at
1400 deg. Fahr.
187 Brinell
29 Scleroscope

Structure:
Spheroidal cementite
Traces of network cementite
Ferrite

After Annealing at
1650 deg. Fahr.
235 Brinell
36 Scleroscope

Structure:
Lamellar pearlite
Network excess cementite

Hypereutectoid Steel, 1.29 Per Cent Carbon, 0.40 Per Cent Manganese

No Retreat From World Steel Markets

Banker's View That Exports Be Reduced Vigorously Refuted on Ground of International Relations, Domestic Economy and Merchant Marine

BY A STEEL EXPORTER

AN ADDRESS was given before the Academy of Political Science on Nov. 18, 1927, by O. H. Cheney, vice-president American Exchange-Irving Trust Co., in New York, and published one week later in the *Annalist*. It was entitled "America in the World Steel Markets—A Warning," and asked the question "Should the American steel industry let the foreign steel producers take away its world markets?" answering it with the words "It should."

This pronouncement, while little commented on in the press, has been a subject of criticism in business circles. At THE IRON AGE'S invitation, I present some facts, which while generally well known to those engaged in foreign trade, are apparently not so well known elsewhere.

European Steel Exports Expanding Rapidly

Mr. Cheney said:

> "The export business of Europe's steel producers means the very life of Europe's fundamental industry. The recovery and maintenance of that industry is at the very heart of the recovery of international economic stability. Continued instability would be the price we would have to pay and make Europe pay for insisting on a growing export market for steel and other commodities."

Earlier in the same article it is stated that the continental European producers have recovered from the war and that in 1926 their total exports exceeded prewar totals; also, that in 1927 the world is 10 per cent ahead of 1926 in steel production. So far then from the progress of recovery of the European nations having been hindered by our comparatively small tonnage of exports of iron and steel products, the European steel industries have already secured as large a share of the total world business as even the most optimistic could have expected. Note the following figures showing the change in export trade:

Germany	1,307,000 tons in 1923	4,887,000 tons in 1926
France	778,000 tons in 1921	4,183,000 tons in 1926
Belgium	902,000 tons in 1921	3,761,000 tons in 1926
United States..	1,988,085 tons in 1922	2,167,048 tons in 1926

These figures, coupled with the declining ratio of American exports, clearly disprove any contention that American exports had made inroads on the annual increase secured by continental European manufacturers, or affected the steady increase in production and exportation of European steel.

American Sales Made on Quality Rather Than Price

The fact of the matter is that there are many customers and markets in the world which are willing to pay such a substantial premium for American quality that this export business is obtainable, with the exercise of considerable effort, notwithstanding the discrepancy of higher costs, wages, inland and ocean freight rates and discriminatory duties. Furthermore, much export trade of the United States in iron and steel products is with Canada and certain other nearby countries, which, because of their proximity, are natural markets for this country.

The article further says:

> "If our export business in iron and steel could possibly be increased, it could only be by a bitter price-cutting struggle."

Of course, the assumption here is that this struggle would be solely due to American efforts to secure more export business, whereas the fact is that for many years past there has been a bitter price-cutting struggle for export business between the various European manufacturers. So disastrous has this condition been to the European manufacturers generally—involving the selling of heavy tonnages at less than the net cost of manufacture, even at the low rates of wages and other conditions prevailing in Europe—that a number of international cartels have been formed for the limiting of production and the apportioning of estimated demand. These have not, however, been as yet successful in securing the desired effect; recent press advices are to the effect that efforts are now being made to establish joint selling agencies which will be able to maintain more satisfactory prices and apportion the orders among the various manufacturers in accordance with their cartel agreements.

During the last 25 years there has never been a time (except during the World War and the years immediately following it when European competition was discontinued) when that competition was not encountered on a basis of lower costs and consequent lower prices. It is worthy of repetition that the American exports of steel have been accomplished, not by cutting prices below those of European competitors, nor even by meeting their prices when that would involve too great a sacrifice, but principally by furnishing material of superior quality and adaptability for the purposes for which it was intended, for which foreign customers have been willing to pay a premium over the prices of cheaper but inferior European material.

Much Study Given to Technical Problems

A further criticism by Mr. Cheney is:

> "If the American steel producers could devote the knowledge and thought needed in developing export business against desperate foreign competition to solving their urgent domestic problems the returns would be many times greater." The article also suggests that "if the steel industry could strive to regain some of the market now being given up to cement it would not only increase volume but would have to gain some new efficiency in the process."

This ignores so much that is going on in the steel industry of this country that a detailed reply is unnecessary in these columns. It is, and has been for many years past, the constant and earnest endeavor of the principal American producers of iron and steel products, to solve problems of every kind in the conduct and development of their industry. The paper entitled: "Technological Problems of the Steel Industry," which was read by William A. Forbes, assistant to president United States Steel Corporation, at the Oct. 28, 1927, meeting of the American Iron and Steel Institute, is illustrative. The final statement in this pamphlet read in part:

> "The United States Steel Corporation and its subsidiary companies operate 179 laboratories devoted to chemical, physical, microscopical, metallographical and other testing, these laboratories directly requiring a total force of 2115 employees, and the rest of the steel industry of this country unquestionably has proportionately as many."

But what is of more importance, not only to the steel industry itself, but to the nation as a whole, is to have a correct appreciation of reasons for maintaining and expanding our export business in iron and steel products.

In the first place, the lowest costs of production are only possible if the mills are operated at a high percentage of capacity. Plants which are wholly or partly closed down constitute a heavy charge upon production, and increase costs. Experience has shown that export orders have frequently enabled continuous operation of mills which would have been compelled to close for an extended period had they been dependent alone on domestic orders. Continuous operation of these mills reduced the average cost of their products, and this was undoubtedly reflected in the prices at which they were sold—not only to the foreign purchasers, but also to the domestic trade—likewise in reduction of unemployment and in maintenance of high wages.

Heavy Steel Exports Necessary for Efficient Merchant Marine

Another important reason for maintaining and extending our export trade in iron and steel products is the necessity for providing outward bound heavy-weight cargo for our merchant marine. We presume that no one will question the advantage to this country of an adequate merchant marine. It is generally recognized desirable that at least 50 per cent of our inward and outward sea-going cargo should be carried in American vessels. This desirable percentage has not yet been attained; in 1920, 42 per cent of the nation's foreign trade was carried in American ships, but at present only about 30 per cent. Even this quantity is being carried at the expense to the taxpayers represented by the deficit from the operation of the fleet of the United States Shipping Board. Economical operation by private American owners under the existing laws is also extremely onerous.

A ship cannot be operated without heavy loss to its owners—or in the case of Shipping Board vessels to the taxpayers of the United States—if it can obtain a full cargo only one way and has to be operated in the other direction in ballast or with only a small, inadequate amount of cargo. Furthermore, it cannot be safely or economically operated with only what is known as measurement cargo, i.e.: light weight cargo. One of the best and most convenient classes of dead weight cargo consists of iron and steel products, the very kind which Mr. Cheney thinks we ought to cease selling for export.

It is not merely a question of the cruder forms of iron and steel, as the exports of the United States also include very respectable quantities of finished products into the manufacture of which steel largely enters. For instance, during the ten months, January to October, 1927, there were exported from the United States over $167,000,000 worth of industrial machinery and over $78,000,000 worth of agricultural machinery, all of which naturally had to compete in quality or price with similar products of European manufacturers. There would not seem to be any difference in principle between developing an export business in steel products generally, which Mr. Cheney deplores, than in machinery, or, for that matter, in automotive vehicles which apparently are approved by him. It is estimated that American exports in automobiles in 1927 will be close to $475,000,000, a gain of some $50,000,000 as compared with 1926.

Exports of Other Industries Compete with Europeans

The total value of exports of steel manufactures—except machinery and vehicles—as given by the Department of Commerce, for the first ten months of 1926, and the same period in 1927, is as follows:

	1926 (10 Months)	1927 (10 Months)
Iron and steel semi-manufactures	$73,452,000	$74,471,000
Steel mill products manufactures	66,871,000	62,015,000
Iron and steel advanced manufactures	62,715,000	61,099,000

The two latter items are understood to cover the direct exportation of iron and steel commodities now under discussion, but are inclusive of commodities which few of the steel mills export. Compare these figures with the total value of exports of industrial machinery and agricultural machinery for the first 10 months of 1927, which is $719,479,000. We also find that in the first 10 months of 1927 there were exported:

Textiles—manufactured and unmanufactured	$798,499,000
Wood and paper products.............	161,829,000
Non-metallic minerals	555,472,000
Chemicals and related products.......	109,568,000
Miscellaneous manufactured goods.....	113,143,000

It would be interesting if Mr. Cheney would give an analysis of the relative advantages and disadvantages of stopping exports of these various classes of goods, as compared with the stoppage of exports of steel, and of the resulting economic consequences to the respective industries.

Repercussions of 5 Per Cent Steel Curtailment

To refute, therefore, more specifically the question and answer in the *Annalist*, "Should the American steel industry let the foreign steel producers take away its world markets? It should," by *reductio ad absurdum*, let us assume the impossible postulate that there were an embargo against steel exports—or what is equally absurd, an agreement by all American steel manufacturers that they would do no export trade. On the basis of there being 600,000 direct employees in the steel industry and its collateral branches engaged in the production or transportation of steel or its components, there would be a theoretical reduction of 30,000 employees, due to the discontinuance of 5 per cent of the total steel production of the country now exported.

This would represent a total of 150,000 persons, consisting of such employees and their dependents, having a present annual income of approximately $50,000,000.

The recurring purchasing power of this $50,000,000 spread over the numerous necessaries of life might easily involve an eventual contraction of some $400,000,000 of commodity exchange. It is conceded that the contraction of employment would not amount to the full 30,000 people now engaged in the manufacture of export steel. A large proportion of this number would necessarily be given modified or reduced employment, but the full effect of the curtailment would be found in the increased costs of manufacture. This increase—so long as the mills of this country could not replace the lost export tonnage with domestic business—would necessarily be reflected in higher prices to the consumer, or in a reduction in profits to the steel industry. On the normal basis of operation at some 15 to 25 per cent less than maximum capacity, a competitive struggle to obtain a relatively larger share of the domestic business would naturally ensue, and bring a logical tendency in the direction of both higher costs and lower selling prices. Thus, instead of the return of 5.33 per cent on the investment which is obtained from the steel industry today (which return the article deplores as insufficient), the condition of still lower dividends would, no doubt, be created—until such time as domestic consumption, without the aid of exports, should overtake production. To what extent this curtailment in turn would create further depressing factors, coupled with a reduced volume of business due to decreased employment in the steel industry, must be left to the further imagination of the economist.

Danville Structural Steel Co. Sold to Charles M. Schwab

The Danville Structural Steel Co., which operates two plants at Danville, Pa., has been sold to Charles M. Schwab. The transaction was announced by Clarence Weymouth, Mr. Schwab's representative. The company was capitalized at $900,000 and was headed by Carlton S. Wagner, a nephew of Mr. Schwab. It was formed by a merger of the Danville Structural Tubing Co. and the Pennsylvania Brake Beam Works. The plants have been shut down temporarily for overhauling. Mr. Weymouth said that orders would soon be in hand sufficient for six months' operation.

Wabana Ore Mines Produced Record Tonnage in 1927

WASHINGTON, Jan. 10.—Between Jan. 1 and Dec. 11, 1927, the record tonnage of 1,151,923 tons of iron ore was taken from the mines of Newfoundland, according to a report received by the Department of Commerce from Consul Avra M. Warren, St. Johns. Production was confined entirely to the Wabana mines at Bell Island. Shipments totaled 1,333,622 tons, of which 800,000 tons went to Germany, 61,030 tons to the United States and 472,592 tons to the furnaces of the operating company, the Dominion Iron & Steel Co., Sydney, Nova Scotia.

Turret Lathe for Bar Work Up to 2½-In. and Chucking Work to 12-In.

A new turret lathe, designated as the 1L and intended for bar work up to 2½ in. and chucking work up to 12 in., has been added to the line of the Gisholt Machine Co., Madison, Wis. The machine is of the same general design as the company's 2L turret lathe described in THE IRON AGE of Sept. 1, page 552, and features include cross feeding or fixed center turret; power rapid traverse to the cross-slide, the side carriage and to the turret carriage.

The headstock is of rectangular box design with walls carried well above the spindle bearings. The headstock cover is a flat plate carrying only the operating levers. Spindle bearings are of the same adjustable taper design as in other of the company's turret lathes, except that tapered roller bearings are employed. The headstock drive shaft, intermediate shaft and reverse shaft are also mounted on tapered roller bearings.

The single drive pulley runs at 600 r.p.m. Twelve spindle speeds, ranging from 20 to 486 r.p.m., are provided through sliding gears and positive jaw clutches mounted on splined shafts. The spindle control lever, located just back of the spindle nose, operates a multiple-disk clutch on the drive shaft for starting or reversing the spindle, and when placed in neutral engages a brake which instantly stops the spindle. This clutch is made up of saw steel and phosphor bronze plates, running in oil, and when necessary it can be adjusted without opening the headstock.

From the headstock to the final drive of the carriages all power shafts are mounted on ball bearings. The upper of the two shafts along the front of the bed rotates at suitable speed for feeding the aprons, while the lower shaft rotates at higher speed for the rapid traverses.

The full universal, full swing, two carriage principle of the company's larger turret lathes has been employed in the design. A fixed center turret is standard equipment and a cross feeding turret is optional. Eight independent reversible feeds are incorporated in each apron, with another range of eight feeds, each slightly coarser, available through a lever at the headstock end. Longitudinal rapid traverses are provided for both carriages, with automatic stops at the extremes of travel. Rapid traverse is also provided for the in-and-out movement of the square turret tool post on the cross-slide. Engagement of the traverses is made through serrated tooth clutches of hardened steel, and a low-power friction is carried on the traverse drive shaft to cushion the traverse action and to serve as a safety. It is stated that the two carriages may collide in traversing or be run against a dead stop without danger of breakage.

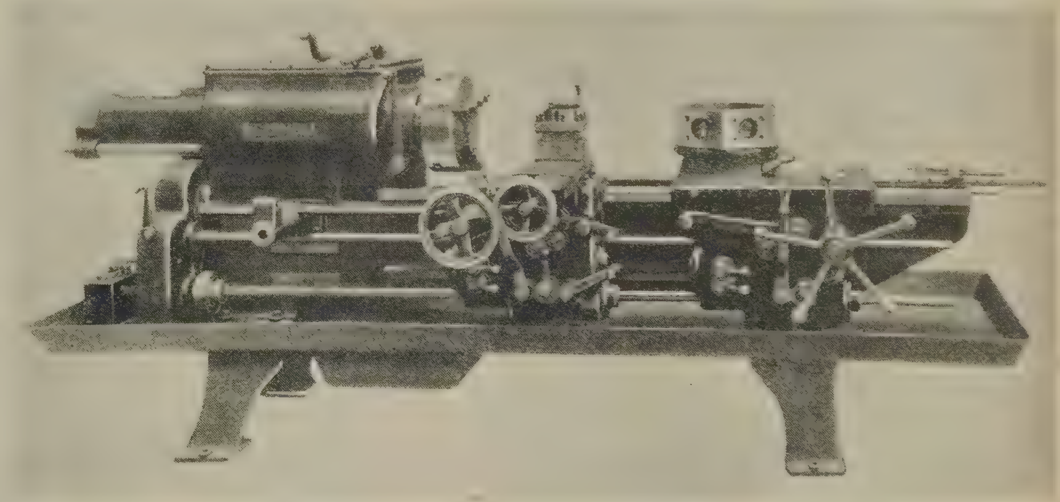
The square turret on the cross-slide automatically indexes one quarter turn as the clamping lever is released. The hollow hexagon turret is of thick section and is clamped to its base by a double-bevel steel clamping ring operated by a compound toggle. A tapered index pin seating in hardened bushings locates the turret holes central with the spindle but the strain of the cut is entirely taken by the bevel clamp ring. Automatic trips are provided for the longitudinal feeds of both carriages, and for the cross movement of both square turret and cross feeding turret.

Hardened steel plates, of 75 Rockwell hardness, cover the ways of the bed, these plates being securely attached with heat-treated alloy steel taper head screws and ground in place. Each movement of the rapid traverse lever, whether forward or back, feeds a small amount of oil by pressure from a plunger in the apron through the under side of the carriage to the ways. Dirt and chips are excluded by felt and brass wipers.

The headstock gearing and clutches run in a bath of oil, a part of which is collected in a splash box, strained and carried to the spindle bearings. Feed train and traverse drive are lubricated with fresh oil from a Madison-Kipp automatic lubricator. Each apron contains its own oil reservoir from which its gears are constantly lubricated by the splash system.

For motor drive, the motor may be mounted either on the headstock or on a special back plate and connected by Texrope, flat belt or silent chain. A 1200-r.p.m. motor of 3 to 7½-hp., depending on the nature of the work, is recommended. An improved power-operated bar feed, consisting of a screw driven carrier coupled by a flat cone friction clutch to the headstock power, is provided. An automatic chuck with master collet and size pads is operated by the same lever as the bar feed. A 12 in. three-jaw universal chuck is standard equipment for chucking work, but air chucks or wrenchless chucks can be furnished. Taper attachment, lead-screw thread chasing attachment and a complete line of bar and chucking tools are accessory equipment.

The maximum swing over the ways is 17 in.; and over the side carriage, 14 in. The maximum distance from the face of the hexagon turret to the end or the spindle nose is 45 in. The weight of the machine without tools is 4900 lb. net.



Cross Feeding Turret Is Optional Equipment. Longitudinal rapid traverses are provided for both carriages, and rapid traverse for the in-and-out movement of the square turret tool post on the cross-slide

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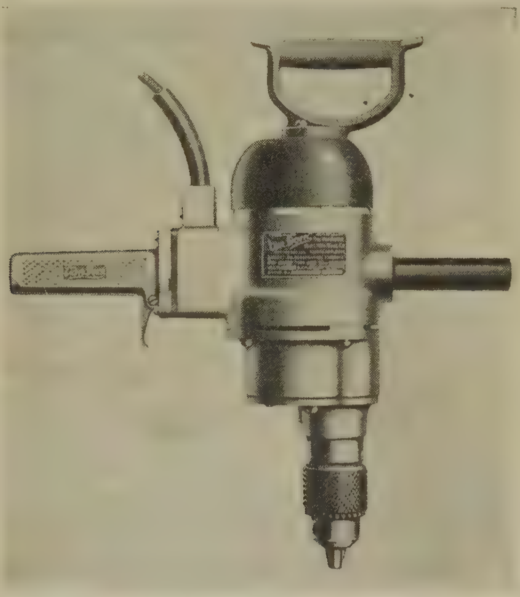
Bankers to Give Views on Scientific Management in Industry

The interrelation of finance and scientific management has been selected for discussion at a series of three meetings planned by the New York section of the Taylor Society.

The first, a dinner meeting to be held Jan. 19 at the Fraternity Clubs, New York, will be addressed by F. W. Shibley, vice-president of the Bankers Trust Co., New York, on "A Banker's View and Experience of Scientific Management in Industry." The chairman of the meeting will be Henry Bruere, first vice-president of the Bowery Savings Bank, New York. The second meeting, Feb. 16, will be devoted to "The Common Interests of Modern Banking and Business Management," and the third, planned for March 15, will be on "What Interest Has the Investment Banker in Scientific Management?"

Portable Drill for Use in Maintenance Work

A new standard ½-in. electric drill, designed particularly for maintenance work in metal-working and other plants, being adapted in power, weight and speed for use by millwrights, plumbers, electricians and general repair men, has been added to the line of the Van Dorn Electric Tool Co., Cleveland.



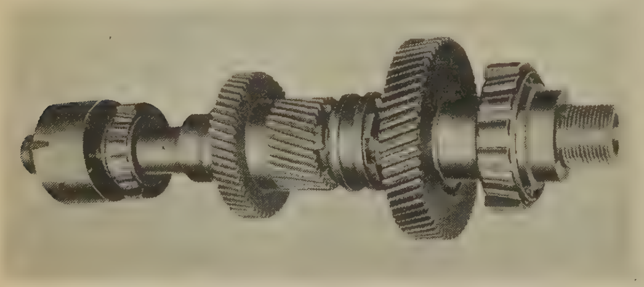
The Armature Is Mounted on Ball Bearings and Thrust Is taken on Ball Bearings

The motor operates on either alternating or direct current and has a no-load speed of 540 r.p.m. and full-load speed of 300 r.p.m. The drill has a ball bearing armature and spindle thrust, and hardened alloy steel gears. An automatic safety switch is also a feature. The capacity is for drilling up to ½ in. in steel. The weight of the machine is 14 lb., and the length, overall, is 15⅝ in. Equipment includes a combination spade and breast plate handle, a three-jaw screw-back chuck and 10 ft. of cable, with plug. The drill is furnished for 32, 110, 220 and 250 volts.

Offers Lathes with Tapered Roller Bearing Spindle Mounting

The Monarch Machine Tool Co., Sidney, Ohio, is offering its 14-in. to 30-in., inclusive, helical geared-head lathes equipped with spindles mounted in precision-type Timken roller bearings. This spindle mounting, which is optional extra equipment, is emphasized as providing greater rigidity and extreme accuracy.

These bearings are made to tolerance limits of 0.0002 in. to assure accurate spindle alinement. End thrust of the spindle is taken against the front bearing. In mounting the bearings an initial thrust load is imposed, thereby removing radial as well as end movement of the spindle. Although only infrequent adjustment should be necessary, means for adjustment are provided. With a spindle mounted in plain bearings a film of oil between the bearings and the spindle is always necessary. With the anti-friction bearings, it is pointed out, the metal-to-metal contact permits taking of heavier cuts without chatter or vibration. Ease of replacement of the roller bearings, should replacement be necessary, is another feature stressed. Filtered oil is supplied to both spindle bearings.

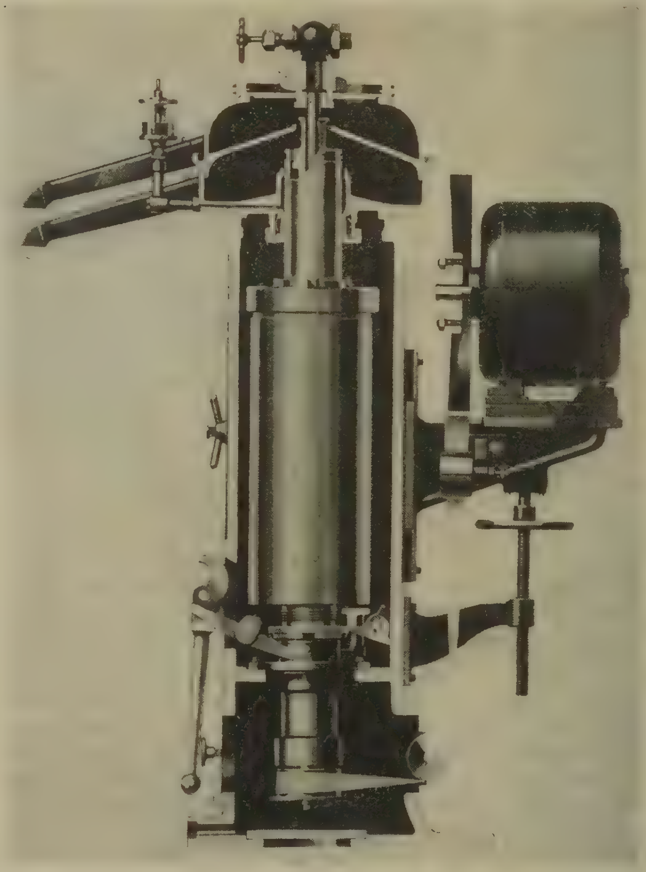


End Thrust of the Spindle Is Taken Against the Front Roller Bearing

Centrifugal Separator and Clarifier for Cutting Oils and Compounds

A centrifugal separator and centrifugal clarifier adapted for use in metal-working plants for the removal of dirt, sand and other foreign material from cutting and lubricating oils and cutting compounds, is being marketed by the Positive Machinery division of the National Acme Co., Cleveland.

The machine combines two units and may be converted conveniently from a separator into a clarifier, although it also clarifies during the separating operation. Features include a bowl of large capacity to permit long runs without cleaning, and facilities for the handling of the large bowl by one operator, without the use of chain blocks. The filter cylinders, which are continuously self-cleaning, centrifugally, are pointed out as combining the filtering principle with centrifugal force. Material is forced through 100 in. of travel or four centrifugal treatments in thin layers during one passage. Simplicity of design and ruggedness are also features emphasized. The step bearing rides on two ball bearings and the bowl is supported by a large bronze bearing. Bowl, cylinders and pulleys are statically and dynamically balanced. The top bearing is designed to assure uniform operation when the machine is mounted on a portable truck or otherwise subjected to uneven operating conditions. A patented handbrake is provided at the bottom of the bowl to stop the machine quickly.



Clarifier of Stationary Type with Side of Housing Removed. The base measures 20 in. square and the height to the intake is 53 in.

Multiple-speed or constant-speed driving motors may be furnished. In the case of multiple-speed motors bowl speeds are indicated by means of a scale, and on constant-speed motors by standard diameters of pulley, three of which are furnished. A tachometer may be attached to the motor shaft.

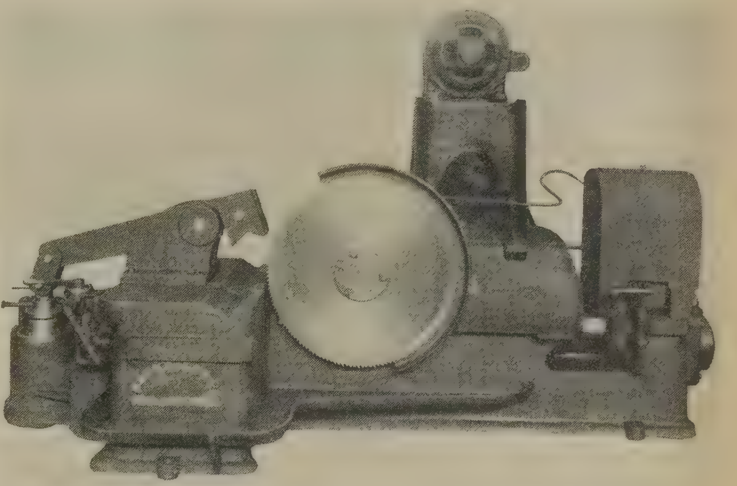
The separator is converted into a clarifier by interchanging the separating disk with the clarifying disk, and removing the middle pan with its spout. For cloudless products, the standard inner cylinders in the clarifier and separator are replaced with filter cylinders. The clarifier is fitted with a strainer, which may be removed conveniently for cleaning without disturbing the hose connection. A motor-driven pump, flexible metal hose for attachment to the intake, and a control valve, are furnished. The flexible hose may be detached and the machine fed by gravity.

High-Speed Sawing Machine for Billets and Other Material

High production, due not only to fast sawing but also to quick handling of material and rapid functioning of the machine between saw cuts is the main claim for a new semi-automatic high-speed sawing machine of the Espen-Lucas Machine Works, Philadelphia.

The machine was designed for use in cropping the ends and the sawing to length of cast, solid and tube billets, it being required to supply an extruding mill at the rate of two sawed billets per minute. The machine saws through 7 in. diameter solid billets in 7 sec., and the time required for clamping and unclamping is 3 sec. The output is dependent therefore upon facilities for passing the work through the machine. With suitable apparatus the complete cycle of operations has been made in 15 sec.

Features include quick-return and quick-feed traverse to the saw carriage by the maker's low pressure (hydraulic) oil feed system. A quick-acting clamp which may be operated either by air or oil pressure is incorporated. All controls are at table end. Material may be passed from the machine without the workman touching it. The drive may be either by direct or alternating current motor, by constant, multi or variable-speed motor.



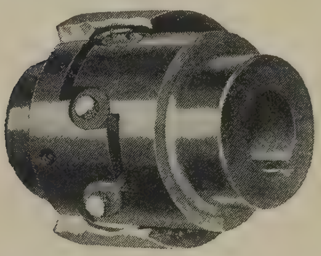
Rapid Traverse of Saw Carriage Is by Hydraulic System

Coupling with Wide Range of Flexibility

Unusual range of flexibility is claimed for the L-R flexible coupling here illustrated, which has been brought out by the Lovejoy Tool Works, 319 West Ohio Street, Chicago. Angular misalinement up to 7½ deg. in each direction; parallel misalinement of 1/16 to 3/16 in. and endwise shaft movement of ¼ to ¾ in., are said to be made possible without loss of efficiency.

The device is a jaw coupling with radially disposed loosely floating resilient rollers, placed between jaws which extend from the flanges parallel with the shafts. This arrangement is intended to assure rolling contact between the rollers upon relative movement caused either by misalinement or end movement of the shaft. Either solid rubber or rubber covered metal rollers are employed, as conditions require, and an external sleeve is provided to prevent the flying out of idle rollers under centrifugal force. The coupling may be used for rotation in either direction, half the rollers being under compression and the other half being idlers.

It is stated that inasmuch as the force is transmitted by compression, and relative movement of the shafts is accomplished by a rolling movement of the power transmitting elements, not only end thrust in the shaft will be absent, but also radial thrust. It is claimed that the life of the coupling is therefore long and the coupled equipment made safe and shockproof.



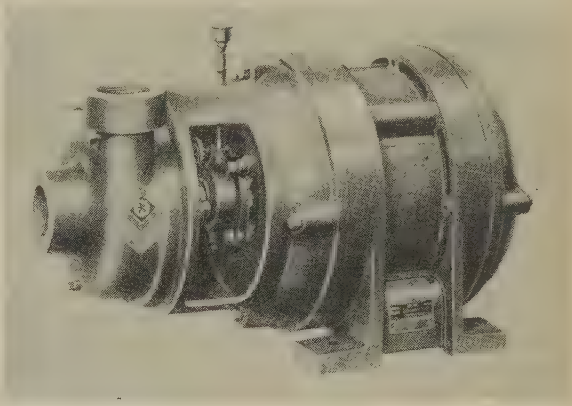
Floating Rollers Between the Jaws Are Important Elements

Other features include noiseless operation; balance, permitting any speed; and convenience of replacing rollers without removing members. No lubricant is required. The device is available in several sizes for shafts up to 5 in. in diameter.

The Kalman Steel Co., Chicago, has purchased the plant and assets of the Sykes Metal Lath & Roofing Co., Niles, Ohio, and is reported to be considering a plan to consolidate its Youngstown and Niles properties and create a fabricating unit.

Centrifugal Pump With Pump and Motor Combined in One Unit

Centrifugal pumping units which combine motor and pump, arranged as illustrated, have been brought out by the Allis-Chalmers Mfg. Co., Milwaukee. Compactness is a feature, the complete machine being not much larger than a motor alone. In these machines, which are designated as the type SSU, the pump impeller is fastened to one end of the extended motor shaft, which is of liberal diameter, and the pump casing is bolted to an integrally cast extension of one of the motor end housings. This arrangement is emphasized as providing simplicity of construction, eliminating a base plate, coupling and pump bearings, and as assuring alinement between the pump and motor. The motor bearings, which are the pump bearings as well, are oversized Timken tapered roller bearings. They have ample thrust and radial capacity, and are mounted in dust and grease tight housings. Renewal of the lubricant is necessary only at infrequent intervals.



The Pump Impeller Is Fastened to One End of the Extended Motor Shaft

The pumps are available in 1¼-in. x 1¼-in.; 1½-in. x 1½-in.; 2-in. x 2-in.; and 2½-in. x 2½-in. sizes, and can be used with 1-, 1½-, 2-, 3-, 5- and 7½-hp. motors. Capacities range from 25 to 200 g.p.m. against heads from 50 to 100 ft.

Pratt & Whitney Airplane Motors to Be Built in Germany

The Pratt & Whitney Aircraft Co., Hartford, Conn., announces that it has sold the manufacturing rights in Germany to its airplane engines to the Bavarian Motor Works of Munich. The Bavarian Motor Works is one of the oldest engine building concerns on the Continent. For several years it has made water-cooled engines for aircraft, but negotiated for rights to manufacture the Pratt & Whitney air-cooled motors rather than to develop a design of its own. The Pratt & Whitney company is producing two sizes of radial air-cooled engines, the 400 hp. "Wasp" and the 500 hp. "Hornet."

European Mills Face a Struggle For Foreign Markets in 1928

Decline of Home Demand May Make Germany Larger Exporter While Britain Seeks to Regain Lost Customers—France Must Retain Heavy Exports

Great Britain

ALTHOUGH still seeking some effective means of stemming the flow of Continental iron and steel into their domestic market and struggling to regain export markets lost during the coal strike, British producers look forward to 1928 with confidence that it will be better than last year. Among the proposed solutions to the British problem of meeting foreign competition at home and abroad are tariff protection, mergers and syndicates.

A YEAR ago the British iron and steel industry was slowly awakening from the lethargy ensuing from months of virtual idleness enforced by the coal strike. A number of blast furnaces had resumed operations, and order books for iron and steel generally were well filled as a result of a gradual accumulation of orders gathered during the period of inactivity. Makers were looking forward to some months of developing prosperity and on all sides the future was regarded with confidence.

Unfortunately few of these expectations were realized, and for the past six months makers have been struggling to keep their heads above water. The domestic demand has been of some assistance, but the volume of export trade has been of little consequence. The inevitable result of the coal strike last year was that a part of the business normally coming to British works was diverted to other channels, particularly to the Continent, and in addition to foreign producers gaining a foothold in markets which hitherto had been considered as British preserves, more than 4,000,000 tons of semi-finished and finished material was imported. In fact, a continuous stream of iron and steel products of all kinds entered Great Britain throughout the year. Faced with this serious situation, British producers naturally have urged "protection," and it is still being discussed in many quarters.

Efforts Made to Reduce Imports

Strong, but hitherto unsuccessful, efforts have been made to keep out foreign products, and representations have been made to Parliament for relief under the "Safeguarding of Industries Act." While the Government so far has been unwilling to act, it is by no means certain that this attitude may not be modified as increased pressure is brought to bear.

An influential group of the heavy steel makers has endeavored to stem the tide of imports and to encourage consumers to place their orders with domestic mills by granting them a rebate on a varying scale provided they fulfill certain obligations. However, the margin between the prices of British and foreign material is generally too great for the plan to be of much real assistance, although certain ship owners, swayed by patriotic rather than economic motives, have fallen into line and a number of new shipbuilding contracts have been booked. Railroad programs also have called for considerable quantities of material, but these do not compensate for the lack of export business, which is the mainstay of the industry.

A solution of the problem undoubtedly lies in a reduction of costs, but high wages, heavy taxation and burdensome overhead charges are serious obstacles. Another suggestion for restoring the industry to its former position lies in the direction of syndicates and mergers, with the attendant scrapping of high-cost units in favor of the more economical plants.

Competition of Foreign Iron Serious

The pig iron market has to a great extent suffered in a like manner. At the beginning of 1927 most furnaces had full order books and domestic users had closed heavy contracts for Continental pig iron, but once the sellers had cleared their books of the strike accumulation, they experienced much difficulty in securing new business. Throughout the year imports of pig iron were heavy, and for many months now the Scottish market, a very important outlet for Cleveland iron, has been virtually lost to the Middlesbrough furnaces.

Toward the end of the year the Cleveland producers evolved a plan of allowing a rebate of 2s. 6d. (61c.) per ton on sales for export and for Scotland, a decision which caused a great deal of dissatisfaction among other consumers and merchants. But this was only a preliminary to eliminating the Scottish merchant altogether, for at the end of November the Middlesbrough producers announced that in the future they would not sell iron to Scotland through merchants, but only through their own agency to be established in Glasgow. This agency is now operating, but whether or not it will be successful remains to be seen.

British Mills Watch International Cartel

British iron and steel makers have had a watchful eye on Continental developments, especially the operation of the International Steel Cartel and the efforts of Germany to secure the establishment of international sales offices for various materials. That the established offices for certain products have not worked very satisfactorily, however, is evidenced by the collapse during the autumn of the International Wire Syndicate, while the Pig Iron Syndicate, because of the abstention of the German furnaces, has never been more than a loose agreement.

An International Wire Rod Cartel was eventually set up and is now operating, but there is still one large group not included. Throughout the year efforts were made to establish a cartel for semi-finished products and beams, but as a result of the inability of the Belgian producers, and to some extent of the French also, to reach an agreement among themselves, no real progress was possible.

The present outlook in the British iron and steel trade is for better business in 1928 than in 1927, which indeed, was almost without exception one of the worst years financially ever experienced. Efforts will undoubtedly be made to curtail the volume of iron and steel imports, and British sellers will endeavor to reestablish themselves in certain foreign markets.

Germany

VIEWING the extraordinary activity of the most prosperous year since the war, German mills are inclined to believe that, despite the continued heavy domestic demand, the end of this period of prosperity is approaching. Should their domestic market in 1928 cease to be the great factor that it was in 1927, German producers are prepared to seek again a larger foreign trade.

THE past year was the most prosperous since the war, with general industry operating at maximum capacity and with the metal-consuming industries, including shipbuilding, machinery manufacture and building construction, unusually active. As a result of the extraordinarily heavy domestic demand for iron and steel, Germany temporarily became a large importer and a relatively smaller exporter. Throughout the year the blast furnaces and steel plants had orders booked for several months ahead, and unemployment in the metal-working branches of the labor unions declined from 16 per cent at the beginning of the year to about 4 per cent at the end.

Although coal production showed a slight decline during the year, the total output of coal probably exceeded the 1926 figure, with 114,400,000 metric tons mined in the first nine months compared with 104,600,000 tons in the same period of 1926. Export of coal at low prices was made possible by the profitable level of the domestic market, and competition with British sellers was severe, no progress having been made toward an international understanding.

Throughout the year the pig iron market was active, but in the second half, British competition began to be a factor in export sales. In exports of steel, the principal competition came from French and Belgian mills. In neither pig iron nor steel, however, did foreign competition affect the domestic market, but in the export field prices were made unprofitable and the limited tonnage of German steel that was available for shipment abroad was sold at much lower prices than prevailed at home. A system of rebates on material delivered by the steel syndicate to manufacturers converting for export was continued, the rebates increasing as the disparity between German and other Continental prices became greater.

Establishment of 8-Hr. Day Postponed

With the iron and steel industry so unusually active labor became restive and there was a slight increase in strikes, but the steel mills were unaffected. Wages advanced steadily, but on the whole remained rather low. On Oct. 1, the average weekly wage of skilled workers in the iron and steel industry was 47.97 m., about $11.40, and of unskilled labor, 33.31 m., about $8. At the blast furnaces the 8-hr. day was in effect, but the steel mills continued on the 10-hr. day. In July the Government decreed the 8-hr. day for steel plants, to be adopted by Jan. 1, 1928. Claiming that the time allowed was too short for the necessary reorganization, the mills threatened toward the end of the year to suspend operation unless the time limit was extended. This resulted in objections by labor, and, finally, only a few days before the new year, the Ministry of Labor, while making no change in the 8-hr. day order, decided to postpone the effective date, especially for steel mills not employing the basic Bessemer process. Under the ruling, mills are permitted to apply for extension of time, provided they can show that it is impossible for them to comply with the conditions immediately. Meanwhile, the ministry will carry out an extended survey of the industry, which will probably require several months, during which there will be progressive application of the 8-hr. decree.

Year of Heavy Production

Production in 1927 was in excess of 1926 output. Pig iron production in the first 10 months of 1927 was 10,833,463 metric tons as against 7,595,430 tons in the corresponding period of the previous year; steel ingot output was 13,537,954 metric tons as compared with 9,780,437 tons in 1926, and the production of rolled products was 10,687,093 tons as against 8,190,629 tons.

Prices of iron and steel in domestic markets changed but little. In the fall, pig iron quotations were reduced slightly, first as a result of competition from a German producer not a member of the pig iron syndicate and later because of competition from British iron. Apart from local price adjustments, the steel ingot price established by the Ingot Steel Syndicate at its foundation in 1925 was maintained without change.

One of the most active branches of the industry was iron mining, which had been severely depressed during 1926. The year saw a heavy demand for semi-finished material, bars, shapes, wire rods, wire and heavy and medium-gage sheets. Light-gage sheets were quiet and, as a result of sharp competition, prices later in the year developed a tendency toward weakness.

In foreign trade an export surplus was maintained, but it was considerably smaller than in 1926. During the first nine months of the year, imports of iron and steel totaled 2,070,359 metric tons, while exports were 3,489,001 tons, leaving an average monthly export surplus of 157,627 tons, compared with an average surplus in 1926 of 340,000 metric tons a month. The surplus of machinery exports over imports was more than maintained in 1927, with only 40,455 metric tons imported in nine months and 327,819 tons exported.

Domestic Mergers and New Cartels Numerous

During the year, mergers of large companies continued and additional cartels and syndicates were formed in Germany. In the formation of international cartels, however, little was accomplished. The inclusion of German pig iron producers in the Franco-Belgian Pig Iron Entente was proposed, but no action was taken. The International Steel Cartel was something of a disappointment to the German membership. As it had failed completely to maintain profitable prices, it was decided in the fall that separate selling syndicates should be established for all products which the international cartel controlled, and negotiations are still under way with moderate prospect of success. In furtherance of this plan for separate syndicates, an International Wire Rod Cartel was formed during the year, but it did not become effective until late in the fall.

Some of the dissatisfaction of German members with the International Steel Cartel probably came from the heavy penalties for overproduction, which Germany had to pay into the treasury of the cartel. The fine fixed at the time the cartel was established in 1926 was $4 per ton for all production in excess of the quota. In 1927 the cartel took into consideration the position of the German mills, which were being forced to overproduce to meet unusually heavy domestic demands, and for that part of the excess production consumed in the domestic market the fine was reduced to $2 and later to $1 per ton.

There have been several important company mergers, some of which were begun in 1926 but not completed until 1927. The Edelstahlwerke A. G. was established through a merger of producers of special quality steel, and two large corporations were established, one the Mitteldeutsche Stahlwerke, controlled by the Vereinigte Stahlwerke, the other the Oberschlesische Huettenwerke, a combination of Eastern companies. A close association, which is expected to develop into one or more corporations, was formed by 30 railroad car-building companies. Efforts to establish a thin-sheet syndicate failed, so that this product is the only important steel material with no association.

While preparatory investigations and hearings began for reduction of the present tariff in accordance with recommendations of the Geneva Economic Conference, it is understood that iron and steel duties will not be changed.

Prospects for business in iron and steel during the coming year are considered doubtful. At the end of 1927 steel works had orders sufficient to occupy them for a number of months, but there were distinct signs of a slackening of demand. Should the domestic market become less active as the year progresses, German competition for orders in the international market will undoubtedly increase proportionately.

France

FACED with excessive stocks held by consumers, a result of the heavy buying movement which developed during the unstable financial situation of 1926, *producers of iron and steel experienced a steadily declining market in* 1927 *until the closing months of the year. Greater exports aided in the maintenance of operations, but despite all efforts French producers were unable to reach the maximum of the quota allotted them by the International Steel Cartel.*

ALTHOUGH 1927 was a year of greater financial stability, the gradual rise of the franc, which began in the fall of 1926, brought a slackening of business. In the past year there have been occasional upward movements, but in most cases these have been of short duration. Confidence in the financial future of the country has been restored, and there is no longer a desire to turn money into raw materials or manufactured products. The sudden change in the financial situation, however, found both producers and consumers with heavy stocks of material as a result of the large purchases made in 1926, when actual material was a far safer investment than paper francs of indeterminate value.

For most of the year consumers have been able to satisfy their requirements from these large stocks, with only occasional small purchases, and it was not until early in October that there was a slight improvement in domestic demand, accompanied by more firmness in prices. Following this temporary recovery, purchasing declined again, but there is still considerable strength to prices, largely on account of the belief of producers that the cessation of buying was caused by the holiday period.

Year of Declining Prices

A comparison of domestic and export prices as of Dec. 1, 1926, and Dec. 1, 1927, shows a considerable decline in both in the intervening 12 months. In the domestic field phosphoric foundry iron receded from 587 fr. ($23.07) per metric ton to 420 fr. ($16.50) per metric ton, and hematite has dropped from 690 fr. ($27.12) to 535 fr. ($21.03) per ton. Thomas steel billets, which were quoted at 780 fr. ($30.65) per ton in December, 1926, declined to 485 fr. ($19.06) per ton in December, 1927. Merchant steel bars, which were 860 fr. per metric ton (1.53c. per lb.), reached 560 fr. per ton (1c. per lb.) in December, 1927. Other products show corresponding reductions.

Export prices also registered a decline in the 12 months. Phosphoric foundry iron, which was £4 5s. ($20.74) per ton, f.o.b. Antwerp, Dec. 1, 1926, was only £3 to £3 2s. ($14.64 to $15.13) Dec. 1, 1927. Thomas steel blooms dropped from £4 12s. 6d. ($22.57) to £3 17s. 6d. ($18.91) per ton, and billets from £5 4s. ($25.38) to £4 3s. 6d. ($20.37) per ton. Beams, which were £5 11s. 6d. to £5 12s. 6d. per ton (1.23c. to 1.24c. per lb.) in December, 1926, dropped to £4 7s. to £4 8s. 6d. per ton, (0.98c. to 0.99c. per lb.). Thomas steel bars declined from £5 12s. 6d. (1.23c. per lb.) to about £4 15s. per ton, (1.05c. per lb.). Even the low prices of Dec. 1, 1927, were not the minimum quotations of the year, the lowest levels in most products having been reached in October and early November, after which there was a slight recovery caused by increased buying preceding the holiday period.

Steel Cartel Only Partial Success

Despite its lack of anything like effective control over Continental market conditions, the International Steel Cartel, established Sept. 30, 1926, added several of the smaller producing countries in Europe to its membership in 1927, so that today it includes a good share of the steel industry of the Continent and its meetings attract wide attention. However, as an agency for controlling steel production and, indirectly, prices, it has given only partial satisfaction to its membership. Germany, to meet the demands of its domestic market, exceeded the cartel quota throughout the year and, as a consequence, was fined for output in excess of its allotment. French producers, on the other hand, were unable to reach the maximum quota allowed them, but even with reduced output, production was larger than demand.

As a solution there has been an effort to establish separate selling syndicates or ententes to control certain products. The European Rail Makers' Association, which was in existence prior to formation of the International Steel Syndicate, has apparently been funcioning reasonably well, and in October, following long negotiations, the International Wire Rod Cartel was formed. The most desirable of separate syndicates, however, would be agencies for handling semi-finished material, bars and beams, and with their formation in view numerous meetings were held during the year. There is a growing belief among producers that, unless they enter international selling syndicates, there is little prospect of stronger prices, especially for export.

Iron Ore Output Shows Increase

Production of iron and steel in 1927 is estimated to have been slightly smaller than in 1926. Ore output, however, is estimated to have been in excess of the 1926 output, with an estimated total production for the 12 months of about 43,700,000 metric tons, based on a monthly average of 3,649,000 tons for the first nine months of the year. The monthly average in 1926 was 3,213,000 tons.

Iron and Steel Production Smaller

During the year the number of blast furnaces in the country increased by three, to a total of 220. Based on an average monthly output of 773,700 metric tons, the total pig iron production for the 12 months is estimated at 9,300,000 tons, or slightly less than the 9,393,000 tons in 1926.

Steel ingot output is also estimated at slightly less than the 1926 total. On the basis of statistics for 10 months, the production for the entire year is estimated at 8,230,000 tons, compared with 8,380,000 tons in 1926.

Imports Smaller and Exports Increase

Imports of pig iron and ferroalloys were larger in 1927 than in 1926, 30,034 metric tons of pig iron having been received in the first 10 months as compared with 20,700 tons in the corresponding period in 1926, while receipts of ferroalloys were 24,554 tons and 18,486 tons respectively. Imports of rails were also larger than in the previous year, but receipts of steel ingots, semi-finished material, bars, hoops, sheets and wire rods all registered considerable declines.

Export tonnages were all larger than in 1926. A total of 715,219 tons of pig iron was exported, compared with 555,958 tons in 10 months of 1926. Shipments of pig iron to the United States were only 2976 tons in 10 months of 1927, compared with 22,493 tons in 1926. Exports of semi-finished material, beams and bars to the United States were slightly larger than in 1926. Of a total of 2,386,710 metric tons exported in 10 months, the United States received 36,362 tons. This compares with 31,782 tons shipped to the United States in the corresponding 10 months of 1926 out of total exports of 1,612,495 tons.

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Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Activity in chief consuming industries has been fairly well sustained, though spotty.

Car and locomotive buying in December made a large gain over recent stagnation.

Automobile production declined 20 per cent in November; general manufacturing in other lines fell off only 4 per cent.

Building volume continues large; industrial building is relatively small; structural sales have held up, making 1927 the best year, except for 1925.

Outlook for pipe in petroleum States should improve, as present activity is at about bottom; mining demand has not been good.

Iron and steel exports have helped out somewhat; imports are less than a year ago.

DEMAND has two aspects, namely, quantity and value. To be really strong, demand must involve large quantities and also a readiness on the part of buyers to pay a good price. This generalization is stated here for the reason that the only improvement in the demand for steel seems to lie in the quantity that consumers are willing to take, and on the whole the steel market is still a "buyers' market." We are on record as anticipating a stronger demand early in 1928, and still expect such a development. The rising trend in unfilled orders results from a continued fair volume of new business and a moderate production. Together with prospects of a general business improvement, they make an upturn in the steel business probable.

It must be recognized, however, that no real strength of a sustained character is to be expected in the steel markets until the business of the chief consuming industries picks up. Of this there is not yet much evidence. There has been a spurt in equipment buying and prospects for expansion in automobile production are quite definite, but that is about all. It is to be hoped meanwhile that the steel makers will not become too optimistic in anticipating expanded buying, for if they do they will continue to find the price side of demand unsatisfactory. (This observation seems pertinent, because of the upward trend of steel production in December.)

Production Adjusted to Steel Demand

OUR composite demand line, based on an estimate of the activity of the chief iron and steel consuming industries, declined in November to the lowest point since the latter part of 1924. This fact amply explains the slackening in the steel business in that month and the accompanying decline in production. Fortunately, however, it can again be stated that the production of steel ingots appears to have been amply adjusted to requirements. In other words, the production curve in the first chart lies well below the composite demand line. Indeed, there is some reason to believe that the actual buying of steel a few months ago was even less than the activity in the consuming industries would normally have required, and that in the last two months orders and sales have been better than the current activity in those industries would have indicated.

Declines of considerable magnitude occurred in railroad freight traffic, in manufacturing activity, and in the automobile industry in particular. General manufacturing, exluding the automobile industry, declined about 4 per cent more than usual in November, while the decline in the automobile industry was over 20 per cent. On the other hand, mining (including petroleum production) gained more than usual for the season, and machine tool orders showed an appreciable upward trend. Exports of iron and steel in November were up slightly more than usual.

Conditions in Particular Industries

The outlook for the near future is moderately encouraging. There has already been a good recovery in the buying of *railroad equipment*, which proves that the carriers had postponed some necessary purchases. It continues to seem highly probable that equipment buying will be better in 1928 than in 1927 and that a considerable gain will develop by spring, when railroad

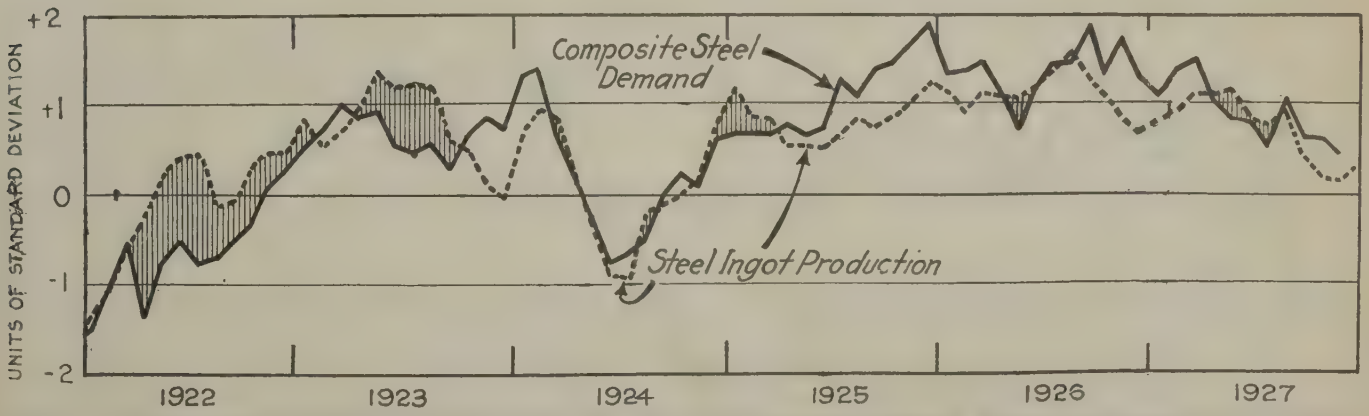
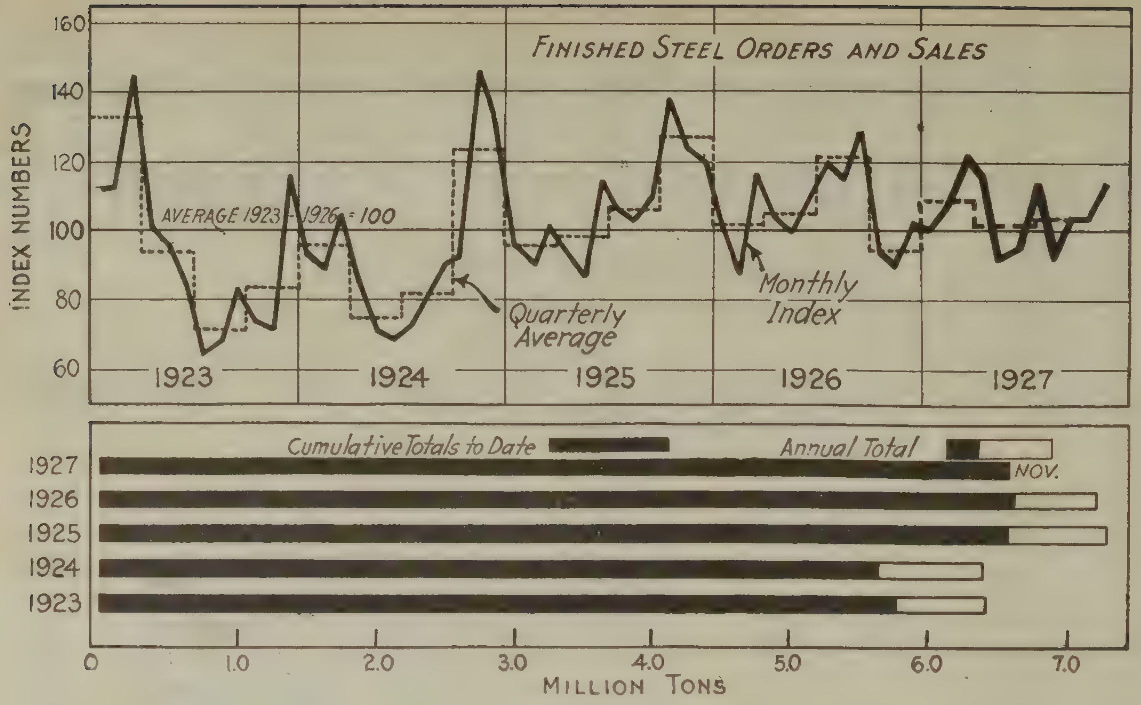


Fig. 1—Current Steel Production Is Still Below the Curve of Composite Demand, Which Has Fallen to the Lowest Point Since 1924. The outlook for the near future is moderately encouraging



Fog. 2—For the First Time Since 1924 the Trend from August to December Has Been Upward in Sales of Finished Steel. The fourth quarter may equal the first

traffic should be on the up-grade. For the present, however, it is to be remembered that not only is traffic small and earnings much reduced (only 3.7 per cent annual rate on the investment in November), but that the surplus of equipment available is also rather large.

Building activity promises to continue in about normal volume. *Automobile* production is almost certain to expand considerably in the spring. Great sales effort and production programs are already in evidence and the recent wave of price cutting at least promises numerous sales. Probably the hopes of all automobile manufacturers cannot be realized and severe competition is almost a foregone conclusion. The prospect is for a large volume of automobile steel, but with a great pressure from the manufacturers for low prices.

General manufacturing (excluding the iron and steel and automobile industries) was sharply lower in November and will probably show a further decline in December. It has fallen below normal. In general, however, supplies of commodities are rather small and, as retail trade continues to show large consumer buying, and as our business barometers indicate improvement during the first half of the year, it seems that the steel industry should benefit.

Both the *mining and oil* industries appear to be fairly well stabilized but, as everyone knows, are in a depressed condition. Gradual improvement is to be expected in the oil and copper industries at least. The gasoline situation is fundamentally strong, but supplies of crude petroleum and fuel oil are so large that it will be the part of wisdom to restrict drilling operations for some time.

Agriculture continues to show moderate improvement and affords favorable prospects to the manufacturers of agricultural machinery and implements, which should mean continued good buying of steel from that quarter.

The expansion of steel production abroad makes it continue probable that *exports* will be irregular, and sustained only by making low prices. A continued good volume of foreign trade in automobiles and machinery, however, will help to sustain the demand from domestic manufacturers.

Orders and Sales May Have Exceeded 1926

SALES of finished steel made a rather good showing in the latter part of 1927—at least insofar as tons are concerned. A little study of the second chart will demonstrate that this is the first year since 1924 that the trend between August and December has been upward, or that it could be said that November orders were the largest since July. The upswing has not been nearly so sharp as in 1924—that could hardly be expected, in view of the well sustained volume during the past year—but it has nevertheless been clear-cut.

The December figure, of course, is still uncertain, but it seems possible that the orders and sales may show a further gain in that month and may even equal the March volume. In that event, the fourth quarter total may be as large as, or larger than, the first quarter. If so, that will constitute a very favorable indication. Reasons for moderate optimism concerning the December figures are found in current reports of large equipment orders and in a large gain in the unfilled orders for steel sheets. There is reason to suppose that increased business for car and locomotive

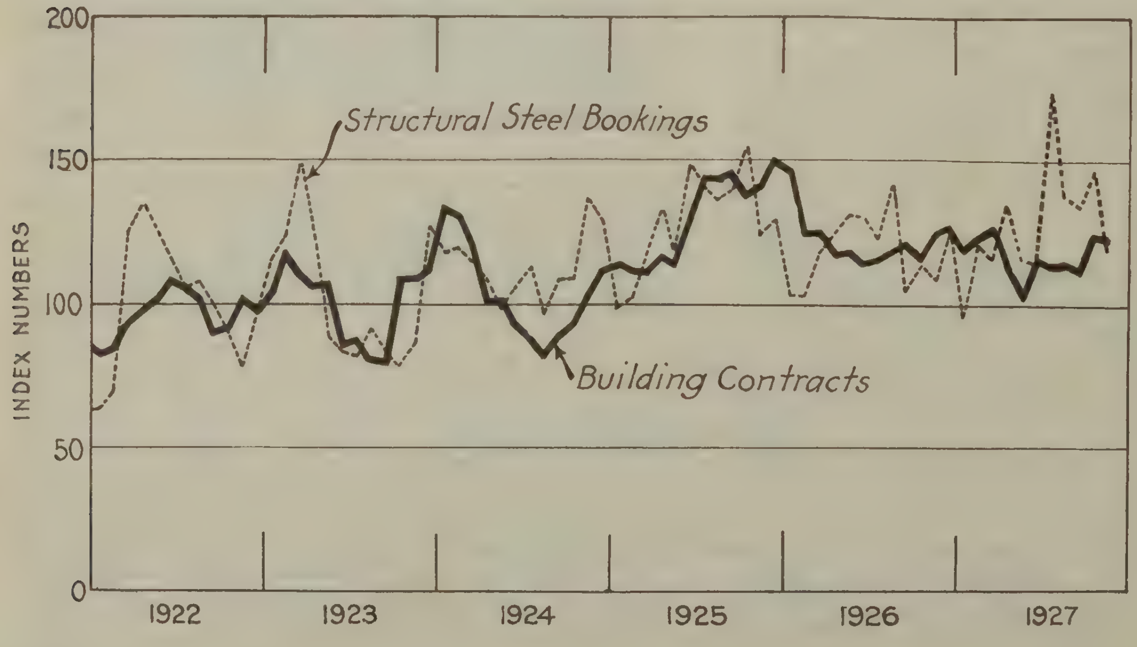


Fig. 3 — Building Contracts Showed a Seasonal Drop in December. Structural steel bookings show good volume and should resume a high level in the spring. The total for 1927 was the best except for 1925

manufacturers and expanded programs of automobile manufacturers will have been reflected in the December steel business. Coupled with a good volume of structural steel business in that month, these facts indicate a gain.

Production Has Been Moderated to Demand

It follows also that our estimate of orders and sales for the year 1927 may equal or even exceed the 1926 total. This would mean that the quantity of plates, steel castings, sheets and fabricated structural steel *sold* has been well sustained. It would also mean that, in view of the decreased ingot production, the stocks of steel have probably been reduced. It tends to confirm indications given by our composite demand line to the effect that the production of steel has been moderate in comparison with the demand.

November sheet sales increased and were the largest of any month of the year except March. The bookings of steel castings also gained but, though the tonnage was the largest since July, it still was rather small for the season. There is every preliminary indication of a further increase in December. Fabricated structural steel awards declined in November. Though considerably above a year ago, the 213,100 tons made a good showing. Judging by weekly trade reports, the official figures for December awards should show an appreciable increase. The poorest showing was made in the case of fabricated plates. It remains to be seen whether the spurt in equipment buying will be reflected in the December business in this line.

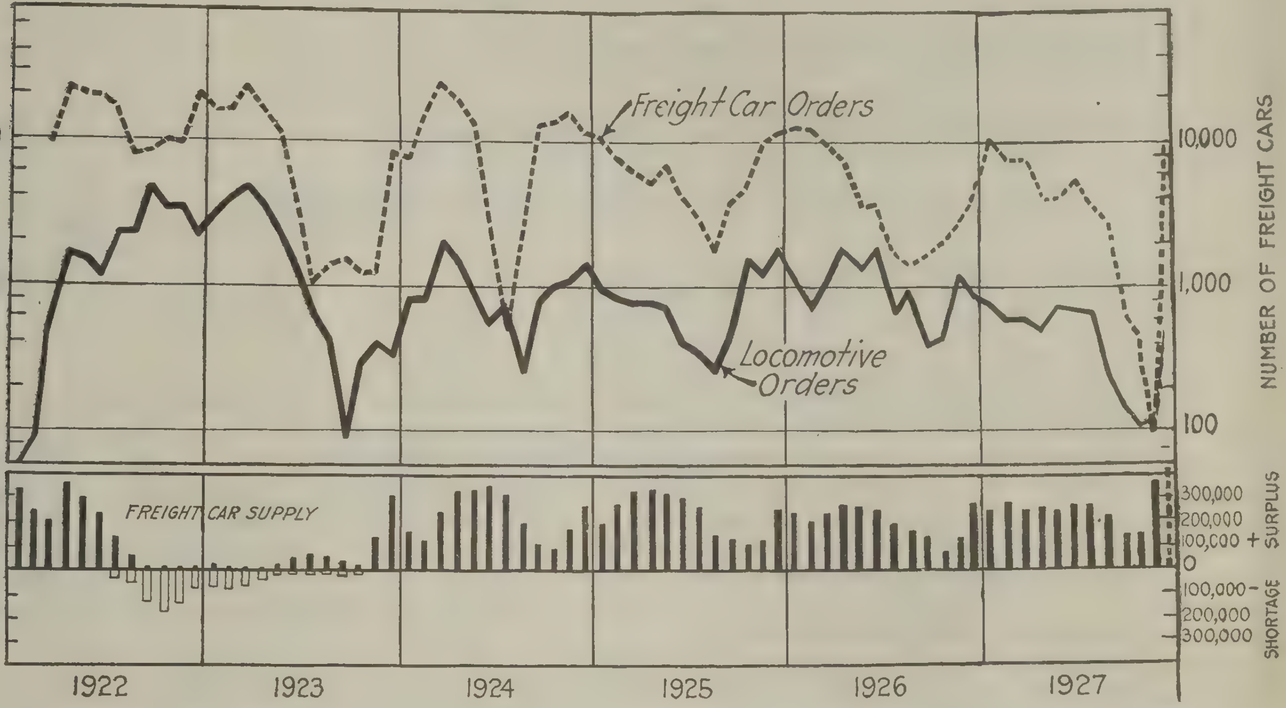


Fig. 4—Locomotive and Railroad Car Orders Gained Decidedly in December, as Forecast a Month Ago, with Consequent Betterment in Demand for Certain Steel Products

Construction Has Held Up Well

TWO curves, showing the trends of building contracts and the bookings of structural steel, as presented in the third chart, came together again in November. Once more the fundamental relation between the two sets of statistics is shown, and incidentally the fact that the two statistical series are fundamentally accurate is indicated.

December building figures showed a large decrease in speculative operations, particularly in residential building. Probably, however, the December drop was not much more than seasonal. A decrease of over 10 per cent in building contracts (floor space) is normal for December, and total contracts awarded last month were not that much below November. Our adjusted index is 125.6 per cent of the average for 1921-25, against 122.9 in November, and 127.4 a year ago. It is now certain that the year ended a little lower than did 1926 and, of course, much below the peak reached at the end of 1925, when the index was 150.4. The total volume of the year, however, may fairly be called good.

Large Structural Steel Sales

This showing for the year is due to the large volume of public works, bridges, roads and miscellaneous industrial construction. The situation is clearly illustrated in the unusually wide divergence of the structural bookings from the total building contracts awarded between June and November. Total structural steel sales in 1927 have been exceeded only in 1925.

The outlook for the first half of 1928 is good. Though some tightening of money rates is to be expected in the spring, the money markets are easy at present and are likely to continue so during January. The considerable let-up in speculative building during 1927 is likely to be followed by a more normal growth this year, especially as the outlook for agricultural sections seems good and the well-being of the general mass of the people is well sustained.

Car and Locomotive Orders Pick Up

AS shown in the fourth chart, orders for railroad equipment gained decidedly in December. Official figures indicate an increase in locomotive unfilled orders, in spite of larger shipments. It seems reasonable to infer that this development should bring greater strength to the market for plates.

McClintic Marshall Co. has started to erect the structural steel at the two new open-hearth furnaces to be constructed at the plant of the Wisconsin Steel Co., Chicago. These furnaces are to be known as Nos. 6 and 7.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Jan. 19****—Position of Iron and Steel Producers;* ***Jan. 26****—General Business Outlook;* ***Feb. 16****—Activity in Steel Consuming Industries.*

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This Issue in Brief

Better forgings produced by charging billets into cool furnaces. Charging into a hot furnace often produces internal ruptures. Locomotive builder varies soaking time and rate of temperature increase in accordance with cross-section of the material, keeping a detailed record of the heating cycle.—Page 127.

1927 was best year since 1920 for Canadian steel industry. And outlook for 1928 is promising. Steel output was 12 per cent above 1926, but pig iron production fell off 5.5 per cent, due principally to competition from United States.—Page 133.

Lamellar pearlite is not the normal condition of the eutectoid in slowly cooled plain carbon steels, says metallurgist. Declares text books are incorrect, and supports his contention by micrograhps. Spheroidized or massive pearlite may be produced in steels of any carbon content by proper anneals, he declares.—Page 134.

American machinery increasingly popular abroad. Exports for first 11 months show increase of 30 million dollars over same period of 1926, a gain of more than 8 per cent.—Page 177.

Abandon export steel business, urges American banker. This would help Europe recover and would make for international economic recovery, he declares. Steel exporter points out that Europe's export steel trade is progressing very nicely, even with the small share of business we are taking. The loss of this business, representing about 5 per cent of our output, might throw many Americans out of employment, and would increase our costs of manufacture.—Page 136.

Dr. Haney warns steel makers against over-optimism in anticipating expanded buying. Otherwise the price side of demand will continue to be unsatisfactory.—Page 143.

Anti-friction bearings, applied to railroad cars, show high resistance to impact. Nickel-molybdenum steel bearings withstand temperatures above the atmospheric without a rapid decline in elastic limit.—Page 131.

Price cuts in automobiles will result in great pressure being brought to bear by automobile manufacturers for low prices on raw materials, says Dr. Haney. The prospects are that along with considerable expansion in automotive industry by spring, will come severe competition and insistence on low prices.—Page 144.

End of their prosperity is approaching, German iron and steel makers believe. Heavy domestic demand gave the German iron and steel industry the most prosperous year since the war. They are prepared to seek again a larger foreign trade, when home sales lessen.—Page 141.

Cuts forging billets exact length required, and thereby reduces heating costs. By this practice, locomotive builder also reduces to a minimum the amount of waste crop ends and uncovers any hidden piping.—Page 128.

Finished steel sales show upward trend from August to December for first time since 1924. Sales made a rather good showing in latter part of 1927, says Dr. Haney, and fourth quarter may have been as large, even larger, than the first.—Page 144.

Will England be forced to abandon her free trade policy with regard to steel? English iron and steel industry has suffered heavily from imports, and is bringing strong pressure to bear on Parliament to provide "protection."—Page 140.

American exports of rolled and finished steel fell off 6 per cent in first 11 months as compared with 1926, while imports increased 1.5 per cent.—Page 175.

Sharp decline in pig iron imports. In first 11 months of 1926 we imported 430,990 gross tons. In the same period of 1927 only 118,769 tons came into the country.—Page 175.

More than a half million ton gain in Steel Corporation's unfilled orders. Total at Dec. 31 was 3,972,874 tons, highest since March, 1927. Increase in December of 518,430 tons was greatest monthly gain in three years.—Page 163.

Avoids tong scrap in making heavy forgings, by turning forging end for end. Manipulator moves and revolves the ingot or billet in the press, to the varied positions required. When one end is finished, the forging is placed on a turntable and the ends reversed.—Page 128.

Gain of 50 per cent in machine tool exports over 1926. Shipments for first 11 months of 1927 were valued at $9,897,000, as compared with $6,408,000 for same period of 1926.—Page 177.

Steel output increased 1.6 per cent in December. Average daily rate was 121,167 gross tons, as compared with 119,299 tons in November.—Page 167C.

ESTABLISHED 1855

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Shall We Stop Steel Exports?

FOR inscrutable lack of Americanism, naive willingness to become almoner of the property and labors of others, and for fiscal and economic statesmanship well worthy to bear the label "made in Germany," commend us to the proposal that the United States retire in favor of Europe from the steel markets of the world. Here for years the policy of increasing our trade with foreign lands in all that we produce has been held up as patriotic and in all ways desirable. Administrations at Washington have come and gone; but whatever the party in power, there has been an unvarying pressure upon the country's consular agents in every quarter of the globe to exert themselves to the utmost to increase the use of American products to the largest possible extent. The American manufacturer, or his agent, as he has crossed oceans to cultivate trade relations with white men, black men, yellow men and brown men, in whatever country or clime, has had cooperation in any and all ways, of our Government's representatives abroad.

At Washington, all appropriations committees, whether under Democratic or Republican control, have vied with each other in making large outlays for the extension of the work of the Department of Commerce. Nothing has ever developed, in all these years of persistent effort to increase American exports, indicating that the expansion of the use of American steel in foreign countries was not an achievement ranking as high as any other in the campaign for a larger place for the products of American invention and labor in the lives of distant peoples. And men in the steel trade have not forgotten that back in 1915, when the United States Circuit Court of Appeals gave its decision at Trenton, refusing the Government's petition to dissolve the Steel Corporation, great stress was put by the court on the corporation's contention that the building up of an export trade in steel was one of the main reasons for forming a consolidation completely integrating all the materials and processes necessary for the manufacture of all forms of finished steel.

It need hardly be said that all the thinking of American men of business on this subject has been one way and that their pride in the building up of foreign markets for our steel products is just that which they have taken in every other advance of American trade in foreign lands. When they read recently that a New York banker had publicly advocated that our steel manufacturers retire from foreign steel markets, so that European steel companies might have undisputed possession, it was natural that a motive should be sought for so amazing a proposal. Certainly the reasons given, as reviewed in the article on another page, are far from adequate explanation—about as far from being adequate, indeed, as the statements concerning conditions in the American steel trade are from the actual facts.

Something more than $100,000,000 of securities of European steel companies have been marketed in the United States, far the larger part of the proceeds going to Germany. Is it seriously urged that the interests of these stockholders should outweigh those of the tens of thousands of American steel workers engaged in the production of export steel, or of the thousands of holders of stocks in companies which have built up our foreign trade in steel?

Do these workers and these holders of domestic steel securities agree that the European situation calls for such a policy of scuttle by the men whose high enterprise has won for American steel the favor in which it stands today in the markets of the world? If it is decided that this country should do more than it has already done in helping Europe, why ask a single industry to make the contribution? Let the whole people be generous together.

PANAMA Canal traffic has reached such volume, and shows such a steadily rising trend, that serious thought is being given to the probability that transisthmian carrying capacity will have to be increased in the near future. Whether this will take the form of an additional flight of locks at Panama, paralleling the dual flights now in use, is undecided. There are many who believe that in the interests of strategic safety an entirely new canal should be built, at a different location. Naturally, the Nicaragua route comes to mind, because it once was almost decided upon instead of that at Panama. And the United States Government has an option on that route. A far look ahead is called for. But no longer will the question of cost be paramount, for the Panama Canal, despite its enormous costs of construction, is now paying a good dividend.

Smaller Steel Companies Grow

IT may have been noticed that in the annual summaries of new construction published by THE IRON AGE the largest steel companies have been conspicuous by their almost complete absence from the lists of builders of new steel-making capacity. In the summary for 1927, which appeared a week ago, the largest new construction was by the Ford Motor Co., and not one of the six largest steel companies appeared at all. The case was not exceptional. A summary of the annual reports covering the nine post-war years shows that these six companies contributed scarcely more than 25 per cent of the total new construction for steel making, yet these six companies represent 85 per cent or more of the total steel production.

By no means should it be inferred that these large steel makers were backward in making improvements, for the case in general was quite otherwise. Their efforts were directed to refinements and economies through the improvement of existing plant, and there is no doubt that their actual ability to make steel was increased. The point is that, despite the large capacity that was left at the end of the war, the highly competitive condition and the heavy cost of construction, smaller companies have been able and have seen fit to grow.

Just as was the case for years after the Steel Corporation was formed twenty-seven years ago, when "the independents" grew apace, so in these recent years the smaller producers have been growing more rapidly than the larger producers.

According to our annual summaries, new construction of steel-making units in the nine years 1919 to 1927 inclusive gave new capacity capable of producing 5,105,000 gross tons in a year. A small portion of this was in open-hearth furnaces for steel castings, and there was also the United States Government construction at Charleston, W. Va. The total steel ingot capacity was approximately 5,000,000 tons. The largest companies contributed only the following:

Steel Corporation	650,000
Bethlehem	400,000
Inland	250,000
Republic	50,000
Total	1,350,000

Neither the Youngstown Sheet & Tube Co. nor the Jones & Laughlin Steel Corporation appeared at all. The six companies contributed about 27 per cent of the grand total. In 1922 there was some new construction by the Steel & Tube Co. of America, absorbed the following year by the Youngstown Sheet & Tube Co.

Conspicuous among contributors to the remaining 73 per cent was the Weirton Steel Co., which only began building its steel plant in 1919, but now has seven 100-ton and four 200-ton open-hearth furnaces, representing not far from one-fourth of all the post-war new construction there has been. Then there are the Ford Motor Co., with about 400,000 tons, Colorado Fuel & Iron Co., McKinney, Andrews, Lukens, Interstate, Mansfield, Otis, Wisconsin, Trumbull and others.

Moreover, the new construction by the larger companies was chiefly special in character. The Steel Corporation's new construction, but one-eighth of the total, was confined to Gary, Ind., and Fairfield, Ala. Bethlehem's was only at Sparrows Point.

We do not have here a case of the large growing larger. If they grow stronger it is due to their refinements and reductions in costs through getting greater outputs from existing units.

Poisons for Metal

LUCKY is the blast furnace operator who has not been blamed at some time or other for unsatisfactory steel made from his pig iron. Even though the sulphur and phosphorus were within the specification, something "poisoned" the metal beyond the ability of the open-hearth to cure. Nitrogen is often blamed, although it is possible that this gets into the steel from case-hardened scrap. With specifications for physical properties and surface finish becoming constantly more severe, the steel maker must turn his attention to both the pig iron and the scrap he uses. So much alloy steel is coming back to the furnaces from wrecked automobiles and scrapped war equipment that the "pick-up" of nickel, chromium and other elements is influencing the resulting steel.

This problem is not alone with the steel maker. The user of secondary metals in the non-ferrous industry is also facing it. His troubles range all the way from innocuous nickel in brass (picked up from nickel-plated articles), and from antimony getting into bearing bronzes from particles of babbitt to real poison like aluminum coming from various sources into bronze fittings for high-pressure service.

The word poison is used with some hesitation, despite its common colloquial use. Also W. A. Forbes, in the paper on the "Technical Problems of the Steel Industry," presented before the last American Iron and Steel Institute meeting, devoted some space to the properties of the ferrite grain and the action of certain unspecified "poisons." Nevertheless, the word should be used with caution, for it is impossible to range all the elements into categories, one of which would be called poisons and the other foods. As recalled recently in these columns, manganese has too long borne an undeserved reputation as an undesirable citizen. Furthermore, aluminum, while ruinous to steam-tight brasses, is a very useful foundry addition to other analyses frequently cast into plumbing fittings.

Such are the manifold and various ways in which metals and alloys are influenced that it is not surprising to note the trend in recent metallurgical research toward the production of large metallic crystals of extremest purity. Only by knowing what are the properties of each metal in its utmost simplicity can the effect of each additive element be measured. Eventually we may be able to predict when and how an alloying element is poisonous—that is to say, modifying the original properties for the worse—or a food, enabling the metal to grow stronger and better. Or it may be found that such prediction is possible only in certain rare instances. But the day when all such things are known is far distant. In the meantime much precise and painstaking work will be needed, taxing the best ability to perform and interpret. Furthermore, specifications must frequently be adjusted, as the supposed effect of certain elements or treatments is found to be wrongly appraised, either from over-emphasis or entire neglect.

Small Growth in Coal Tonnage

PRODUCTION of anthracite and bituminous coal in the United States last year was substantially the even amount of 600,000,000 net tons, and as closely as can be estimated stocks were the same at the end of the year as at the beginning. There was about 21,000,000 tons excess of exports over imports, so that the apparent consumption of coal in the United States, including coal coked, was about 580,000,000 tons. Consumption in 1926 was approximately 614,000,000 tons, so that there was a decrease of about 34,000,000 tons or 5 to 6 per cent. The decrease in production was about 9 per cent. As is well known, there were unusual exports in 1926 and some stocking in anticipation of the coal strike.

The decrease in coal consumption from 1926 to 1927 need not be dwelt upon, as that decrease was small and very close figuring is impossible. We have the long range comparison, which is accurate and measures important trends of progress in coal economy.

Last's year's total coal production of 600,000,000 net tons was exceeded in five preceding years—1917, 1918, 1920, 1923 and 1926. As early as 1910 production was 500,000,000 tons, and the average production in four years, 1910 to 1913 inclusive, was 520,000,000 tons. There is an increase of 1 per cent a year, over a period long enough to be indicative of the general trend. In the twenty years preceding, or from the quadrennium through 1893 to the quadrennium through 1913, there had been an annual average increment of 5.7 per cent.

In sharp contrast with this slowing down, almost to the vanishing point, in the increase in coal consumption, is the fact that the power requirements of the country have been rapidly increasing in these recent years.

It is not a case of water power making serious inroads upon coal consumption. Hydraulic power largely creates its market, and the present developed water power is only about 12,000,000 hp., or 21 per cent of the total primary power, with 5 or 6 per cent being internal combustion power and the remainder steam, out of a total of about 57,000,000 hp. of primary power, excluding steam railroads, as ascertained by the Federal Power Commission.

The almost stationary volume of coal production, with steadily increasing service obtained from coal, in power generation, metallurgical and other operations and in heating of buildings of all sorts, is representative of steady and important improvement in methods of utilization. This will continue, both because much utilization is still far below the best standard, and because from year to year the best standards are improved.

The futility of expecting growth in coal demand to do anything at all toward righting the miserable situation that exists as to the production and marketing of coal is obvious. The best mines will in fact increase in tonnage. The solution has yet to be found. There is no economic barrier of the public being unable to pay higher prices for coal. A ton of coal renders so much more service than formerly that its intrinsic value is increased. We have it, in fact, that coal can be produced more cheaply than at present, when mine operation is so irregular, and the public is well able to pay more money for coal. Thus there is ample latitude for the solution of a problem which accumulating years of experience suggest is incapable of solving itself.

Hazards of Employee Stock Ownership

OWNERSHIP by 800,000 American employees of a billion dollars worth of their companies' securities, an average of $1,250 per employee stockholder, may carry with it occasional instances of hazardous investment, in the opinion of the National Industrial Conference Board, which has made a study of employee stock purchase plans. For this reason some corporations have avoided responsibility by distributing their employees' investments in the securities of a group of companies, instead of putting all the eggs in one basket.

The chief benefit from the sale of stock to employees, the report states, lies in promoting the habit of saving. This is more important even than the direct influence which stock ownership may exert on the employee's interest in the company's affairs and his attitude toward the management. The purchase of stock helps wage earners to provide against old age, it aids them in acquiring an independent source of income during the active years of their earning capacity. The feeling of security obtained through such savings, many employers reported, definitely reflects itself in the quality of their products.

As to hazards of investing in industrial securities, where such investments represent life savings, the report states that certain risks in employee stock purchase plans are found to exist, particularly those due to general fluctuations in the securities market, although a few companies have taken measures to protect employee stockholders against declines in the market price. There is also always the chance of the employing company's business declining, in which case the employee's stock likewise may fall in market value and yield.

It is to overcome this latter risk, the board finds, that some companies have devised plans under which employees may buy securities of various other companies as well as their own, thus diversifying the investment so that it will not be wholly dependent upon the fortunes of the employing company. Such plans, in some instances, have resulted in heavy stock purchases during recent years.

Securities of certain industries, where the product is not a staple need and the demand is subject to sharp fluctuations, may be subject to considerable risk. For instance, textile mills that specialize on certain kinds of dress goods may be thrown into idleness by a whim of fashion, as has happened in more than one case in the past few years. In other industries the buying of raw materials involves a speculative factor because of rapid declines or advances in prices. But in industries where no violently disturbing element beyond a change in the degree of national prosperity is to be feared, and where management is capable, no employee need fear that his savings are not wisely and safely invested.

CORRESPONDENCE

Ethics of Engineering Contracting

To the Editor: There is a growing tendency on the part of most buyers to violate what engineering contracting companies have termed the "buyers' code of ethics." This has become particularly acute in the last 10 years, or, in other words, since the war.

In placing large contracts, involving considerable engineering and manufacturing skill, the procedure usually is as follows:

The purchaser, having only a meager idea of what is necessary to meet his requirements, first submits his problem to several of the engineering contracting companies in a brief specification, outlining in general terms what the machinery is to accomplish and asking that recommendations and bids be submitted accompanied by complete specifications with drawings in sufficient detail to show what is proposed.

The very best talent is required to design the required machinery, draw the specifications and make proposal drawings detailed sufficiently so that bids may be compared and analyzed.

Conferences between the bidders and the purchaser are usually held both preceding and following such bids, at which ideas are exchanged, but always at the expense of the bidders.

When all bids are received and analyzed the purchaser discovers that there is one, or perhaps two, unusual and outstanding designs which fully meet the requirements, while the others are ordinary and not worth considering. The prices for the unusual designs, however, are higher per pound than the prices for the ordinary and worthless; so the purchaser selects the unusual design, but rejects the bids.

New inquiries incorporating the unusual design and specifications thus appropriated are then submitted to builders of this class of machinery and also to "jobbing manufacturers" not capable or qualified to submit a design and proposition on the original inquiry. This enables the jobbing manufacturer with a small shop, with no engineering staff overhead, and who has nothing to contribute to the general fund of engineering, to underbid the reputable engineering contractors, with the result that the purchaser then either offers the business to one or more of the experienced builders *at the low price*, or, rather than pay more than the lowest pound price, actually places the contract with the inexperienced and improperly manned shop. In the latter case the final result is usually a loss to the inexperienced jobbing shop and the delivery of unsatisfactory equipment to the purchaser, all of which would have been avoided if the contract had been placed with a reputable builder at a fair price.

This method of buying, in the long run, is also harmful to the buyer. It eliminates competition by weakening the leading firms, which, in most cases, are substantial buyers of the products of the purchaser. It kills the initiative of leaders in improving designs, and makes it impossible for engineering contracting firms subjected to such unfair competition to carry the necessary staff of trained engineers to develop new lines. In other words, if pound price is the ultimate determining factor in purchasing, what advantage is there in offering specially designed and more efficient equipment?

It is possible for a builder to copyright his drawings, but this is rather impracticable. He can cover special features by patents. However, unless such patents are basic, they are of little value and often mean endless litigation with its attending expense and the time of busy men whose efforts would otherwise be used on productive work.

These unfair buying practices, if continued, will force engineering contracting firms to become jobbing shops and will compel buyers to do their own engineering development, for which they are unfitted. In the first place, their efforts in this age of specializing and sharp competition should be centered on their products and their markets. They do not have the benefit of interchange of ideas which the engineering contractor obtains in solving similar problems for others, and consequently they are likely to make many experimental installations which, unknown to them, have already been proved to be failures.

Wouldn't it be much better economically for all if the process of evolution were left in the hands of the engineering contractors with an assured fair reward for their services when they solve unusual problems and submit outstanding designs with their original bids, rather than to appropriate such designs without recompense and use them as clubs against their originators?

ENGINEERING CONTRACTOR.

British Iron and Steel Companies Having Hard Sledding

Financial statements for the past several years, covering six of the leading iron and steel manufacturing companies of Great Britain, are listed in a recent number of *Economist* (London). Only one company of the six has paid any dividends on common stock in the past three years. In the case of that one, the rate was reduced from 10 per cent to 5, and even then it was paid out of surplus in one year. Some of the individual results follow:

> Bolckow-Vaughan & Co. have run in "red ink" for the past six years. During that period they have not paid any dividends on common stock. During the three latest years they have paid no preferred dividends and the last year preferred dividends were paid, they were cut in half.
>
> Dorman, Long & Co. have paid no common dividends in three years. During one of those years they ran a heavy deficit, while only one year of the three provided any surplus whatever after paying interest charges.
>
> Cargo Fleet Iron Co. has paid no dividends in six years. The last two years have shown deficits after providing for interest and other charges.
>
> South Durham Steel & Iron Co. showed an operating deficit in one of the last three years, while another year gave a deficit after interest and other charges were paid. This company has not suspended common dividends, but cut them in half two years ago.
>
> Baldwin's, Ltd., has paid no common dividends in six years and no preferred dividends in the last two years. Manufacturing operations have yielded a profit, but not enough to take care of interest, depreciation, etc. As a result, two of the last three years have shown a heavy drain on surplus, while the other year showed only a small addition to it.
>
> United Steel Companies, Ltd., has paid no common dividends in six years and no preferred dividends in five years. The last year of preferred dividends showed a heavy cut in the rate. The last three operating years have shown heavy drafts on surplus, after paying interest and other charges.

Iron and Steel Markets

Further Gain in Steel Output

Sustained Railroad Buying and Heavy Awards of Concrete Bars and Structural Steel Feature Week—Mills Face Price Test on Automobile Steel

STEEL mill operations have shown a further gain, reflecting the recent bulge in specifications against fourth quarter contracts. Steel ingot production in Pittsburgh and nearby districts has risen to 75 per cent of capacity, or almost 15 points above the low point of last month. The Steel Corporation has lighted two blast furnaces in the Valleys and has added the second in two weeks at Chicago.

Sheet manufacturers have fully 900,000 tons of unfilled business, with independent mill operations averaging close to 90 per cent of capacity. Substantial increases have been registered also in the schedules of mills producing hot-rolled bars, cold-finished bars and strip steel. At Chicago, rail output averages 80 per cent. Production of tin plate and pipe, however, is showing relatively little improvement.

Comfortably filled order books and heavier mill engagement do not offset the fact that present commitments are at prices below those now quoted. Apart from sheets and strip, for which specifications at fourth quarter contract prices are still being accepted, the bulk of specifying has been completed, and current activity is limited chiefly to shipping instructions.

Little fresh buying has developed, but it is recognized that mill quotations face a real test as a result of efforts of the automotive industry to shift the burden of recent concessions in motor car prices.

Encouraging developments are a continuation of railroad equipment buying, further rail purchases, large placements of fabricated steel and concrete bars and increased activity of farm implement manufacturers.

In fact, good-sized railroad purchases, together with the first quarter instalment on large tin plate contracts, help to explain the gain of 518,430 tons in the Steel Corporation's unfilled orders in December. Rollings against the rails bought will be spread over a period of several months. It is significant that the gain in unfilled tonnage is the largest since that of December, 1924, which was 785,000 tons.

Railroad equipment orders for the week call for 1800 cars, of which the Texas & Pacific bought 1000 and the Southern 500, bringing the latter's total up to 5950, including those ordered in December. The Central of Georgia and the Union Pacific have each inquired for 500 cars. The Rock Island and Illinois Central are expected to come into the market for about 3000 cars each.

Rail purchases include 13,800 tons by the Cotton Belt and 10,000 tons by the Western Pacific, with about 100,000 tons yet to be placed by various Western roads, not all of which have issued definite inquiries.

The Pennsylvania Railroad has inquired for its first quarter steel requirements amounting to 25,000 tons of plates, 8000 tons of bars, 2000 tons of shapes and smaller lots of other products.

Structural steel awards total 44,500 tons, inclusive of 9000 tons of shields for the Fulton Street tunnel, New York, while fresh inquiries aggregate 45,500 tons, of which 8000 tons is for a building in Chicago and 7800 tons for New York subway construction. The Fulton Street tunnel also calls for 54,000 tons of cast iron segments, awarded to two companies, and 2000 tons of special bolts.

Reinforcing steel awards of more than 21,000 tons include two projects of unusual size, the Coyote Point bridge across San Francisco Bay, calling for 8500 tons, and a viaduct in Cincinnati, 3500 tons.

Pig iron shipments are increasing in the Detroit district because of demands from foundries engaged in automobile work. The week's buying included 25,000 tons at Cleveland, 15,000 tons at Philadelphia and upward of 12,000 tons at St. Louis.

Small sales of malleable iron in the Valley district brought that grade down 25c. a ton, but a stiffening tendency in prices is noted in some other districts, particularly in eastern Pennsylvania, where an advance of 50c. on foundry grades has been announced, and at Cleveland, where recent large sales have lessened the efforts of Lake furnaces to sell in competitive markets. Buffalo iron is at a minimum of $16.50 in New England and adjacent districts.

Production of steel ingots in December, at 3,150,345 tons, or 121,167 tons a day, showed a gain of 1.6 per cent over the November output of 3,101,764 tons, or 119,299 tons daily. In December, 1926, average daily production was 133,337 tons and the peak rate of 1927, in March, was 166,663 tons.

A new price schedule on 12 to 24-in. hot-rolled strip in No. 12 gage and heavier has been adopted by some mills in an effort to equalize quotations with those on two keenly competitive products, blue annealed sheets and light plates. The new prices are based according to gage on prices of 1.80c. on plates and 2.10c. on blue annealed sheets. A concurrent move was an advance of $1 a ton in the prices of strip not covered by the schedule.

A price of $33, mill, on sheet bars, or a reduction of $1 a ton, has appeared at Cleveland, and as low as $32 has been reported in the Valleys.

THE IRON AGE pig iron composite price has advanced to $17.59 a ton, from $17.54 of the past four weeks, its low of recent years. The finished steel composite remains for a fourth week at 2.314c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jan. 10, 1928	Jan. 3, 1928	Dec. 13, 1927	Jan. 11, 1927
No. 2, fdy., Philadelphia..	$19.76	$19.76	$19.76	$22.26
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	21.00
Basic, del'd eastern Pa. ..	19.50	19.50	19.00	21.50
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.51	21.26
Malleable, Chicago*	18.50	18.50	18.50	21.00
Malleable, Valley	*17.25*	17.50	17.50	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill.......	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	36.00
Forging billets, P'gh.....	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	**42.00**	40.00	40.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago.......	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	1.80	1.80	1.80	2.00
Steel bars, Chicago.......	1.90	1.90	1.90	2.10
Steel bars, New York.....	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh...	1.80	1.80	1.80	1.90
Tank plates, Chicago.....	1.90	1.90	1.90	2.10
Tank plates, New York...	2.12½	2.12½	2.12½	2.24
Beams, Pittsburgh	1.80	1.80	1.80	2.00
Beams, Chicago	1.90	1.90	1.90	2.10
Beams, New York........	2.09½	2.09½	2.09½	2.34
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan. 10, 1928 Cents	Jan. 3, 1928 Cents	Dec. 13, 1927 Cents	Jan. 11, 1927 Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.75	2.90
Sheets, black, No. 24, Chicago dist. mill.........	**3.00**	2.90	2.90	3.20
Sheets, galv., No. 24, P'gh	3.65	3.65	3.60	3.75
Sheets, galv., No. 24, Chicago dist. mill.........	**3.85**	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.25
Sheets, blue, 9 & 10, Chicago dist. mill.........	**2.20**	2.15	2.15	2.50
Wire nails, Pittsburgh....	**2.55**	2.50	2.50	2.65
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh..	**3.25**	3.20	3.20	3.35
Barbed wire, galv., Chicago dist. mill.........	3.25	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$15.25*	$15.50	$15.00	$17.00
Heavy melting steel, Phila.	13.50	13.50	13.50	15.50
Heavy melting steel, Ch'go	12.50	12.50	12.00	13.25
Carwheels, Chicago	**14.00**	13.50	13.50	15.25
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh....	14.50	14.50	14.25	16.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	**14.50**	14.00	14.00	16.50
No. 1 RR. wrot, Phila....	15.25	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	**11.50**	11.00	10.50	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.75	$2.75	$2.75	$3.50
Foundry coke, prompt....	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	**14.37½**	14.25	14.25	13.25
Electrolytic copper, refinery	**13.87½**	13.75	13.87½	13.00
Zinc, St. Louis...........	5.65	5.65	5.75	6.85
Zinc, New York..........	6.00	6.00	6.10	7.20
Lead, St. Louis..........	6.30	6.30	6.32½	7.47½
Lead, New York.........	6.50	6.50	6.50	7.65
Tin (Straits), New York..	*56.12½*	57.75	58.50	66.87½
Antimony (Asiatic), N. Y.	**11.25**	11.00	11.37½	14.00

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Larger Orders and Operations in Steel Industry Offset by Unsatisfactory Price Situation

PITTSBURGH, Jan. 10.—Relatively full order books in most finished steel products and a substantial increase in rolling mill and steel works operations do not offset the facts that the orders and operations are based on low prices and that the efforts to establish a more profitable price level have not been particularly successful. While manufacturers are cheerful about the volume of business, they find it rather difficult to become optimistic over prices, especially as one of the results of the automobile price war has been a demand from motor car companies for help in carrying on the struggle. The steel industry faces a severe test on prices, for if it yields to the demands of the automotive industry, prices to other consuming industries cannot be well maintained.

Makers of hot rolled strips are making an effort to stiffen prices and some have actually come out with an advance. The year is too young for the low-priced business entered late last year to be worked out and the advances made in the closing weeks of the old year are yet to become fully effective. It was supposed that 4c., base, for automobile body sheets had represented a minimum based on costs, but in the week there have been reports of concessions of as much as $2 a ton, and the formal first quarter prices on common finishes remain an objective rather than an actual basis.

Steel ingot production in Pittsburgh and nearby districts has risen nearly to 75 per cent of capacity, or almost 15 points above the low point of last month. There is almost a full operation of independent sheet mills, although it is commented upon that the current demands do not call for an operation of much more than 75 per cent. Bar mill schedules have come up in remarkable fashion, in keeping with the fact that makers of cold-finished bars are running some 15 to 20 per cent better than in December, which in turn showed an appreciable gain over the months before. Strip mill operations also have grown substantially. Tin plate and pipe mills, however, are limbering up rather slowly. The Carnegie Steel Co. has put on two furnaces in the Valley districts and now has 24 of its 51 furnaces in blast.

Pig iron is slow both in point of demand and shipments, since the melt of the foundries has not increased much. Scrap prices have weakened again, as they usually do after buyers cover and withdraw from the market. The interesting event of the week in fuel is the posting of a new wage scale by the Pittsburgh Coal Co., which reduces the pay to most of the company's workmen. Wage scales in the coal mines in this part of the country have become largely individual and the adjustment just announced by the Pittsburgh company is based on its own scale rather than upon the wages paid by other operators.

Pig Iron.—Except for some activity in malleable iron, which has developed a drop of 25c. per ton in the price, the local market has been devoid of feature. The melt of foundry iron is not heavy, and as the larger consumers are covered at least through the present quarter of the year, shipments as well as sales suffer. Producers still are making an effort to get $17.50, Valley furnace, for No. 2 foundry and in a few instances they have obtained that price, at points where the freight from the furnace is low. In the Pittsburgh district proper, however, $17.25, Valley furnaces, appears to be all that can be got. A few single carloads of malleable iron have been sold in the past week at $17.50, Valley furnace, but on the worth-while tonnages makers have not been able to do better than the price of No. 2 foundry, with which malleable grade for some time was alined. The market for malleable iron here is a limited one and consumers often have a chance to buy iron grading close to malleable analysis at less than the price of standard iron. There is no open market activity in basic iron and little in Bessemer.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—A few steel makers have not contracted for supplies for this half of the year, but most of them are covered. Some have sufficient stocks to carry through the first quarter. There is a fairly good movement of ferrosilicon and spiegeleisen on contracts.

Semi-Finished Steel.—Open market activity is limited, but heavier operations of sheet, tin plate and strip mills are reflected in larger demands by non-integrated manufacturers. Prices of billets, slabs and sheet bars are unchanged. The regular quotation on wire rods is $42, base Pittsburgh or Cleveland, but large users are so well covered at lower prices that only occasional small sales are being made at the higher figure. Skelp prices are no more than steady at 1.80c.

Wire Products.—All makers in this area are quoting nails at $2.55, base, per keg, Pittsburgh or Cleveland, plus the card of extras adopted as of Dec. 1 last. First quarter contracts, which have been numerous, carry that price, but so far as current shipments are concerned there are few, if any, except at the old base prices and the old card of extras. Jobbers have so heavily augmented their stocks that there must be a considerable movement into consuming channels before the mills can hope to benefit much from the new schedule. There is only moderate activity in other wire products, but some betterment is noted in spring wire as automobile builders increase their production schedules.

Rails and Track Supplies.—Winter track-laying has not been as extensive this year as last and there is not as much ordering of spikes, tie plates and track bolts as at this time last year. Light-section rails are slow, but prices are firmly held as they are on other products under this heading.

Tubular Goods.—There is no sign of a revival in demand from the oil industry, and, except in the sections of the country favored by mild weather, no appreciable gain in the demand for standard-weight pipe. Mills have not recently added much pipe line business, but several of them have fair-sized backlogs in this product. A Youngstown mill last week started shipments on an order for 30,000 tons of 10-in. pipe for a line from Mexia, Tex., to Healdton, Okla., for the Sinclair Pipe Line Co. Boiler tubes and mechanical tubing are only moderately active.

Sheets.—Order books of makers, already heavy as result of the sales of last month, have been further swelled in the past week by some good-sized orders from automobile body builders. This business, however, is largely in releases on orders placed some time ago, when the price receded to 4c., base Pittsburgh. Ideas entertained by makers that they might be able to negotiate first quarter contracts at a higher price have vanished in the past week and body sheets, at least for this quarter, are not now considered likely to be any higher; indeed, there are reports that even that price has been shaded to the extent of $1 to $2 a ton. Estimates that sheet steel manufacturers were starting the new year with 1,000,000 tons of unfilled business are regarded as too high by some producers, but it is noted that many of the independent mills are operating full and independent mills as a whole are averaging close to 90 per cent. The American Sheet & Tin Plate Co. has not yet reached a 70 per cent operation of its sheet mills.

Tin Plate.—Mill operations are gaining momentum, but it is a gradual process and 75 per cent is probably a liberal estimate of the present gait. It was much higher a year ago, but there is not the tendency to produce in advance of specifications now.

Cold-Finished Steel Bars and Shafting.—There is a good movement of screw stock on contracts carrying prices $2 a ton below those now quoted. While makers encountered some resistance in securing first quarter commitments at 2.20c., base, they appear to have been successful in maintaining that price and in securing a full complement of such business.

Cold-Rolled Strips.—Business is better, but prices are simply steady, as there was a little too much coverage during December for makers to make a successful stand for an advance at this juncture.

Fluorspar.—Domestic gravel fluorspar now is freely available at $15 per net ton at mines, or $20.25, delivered Pittsburgh, Youngstown and Buffalo. Producers who have been naming higher prices have gone to $15, and it develops that on some recent business of size even that price was shaded by 50c. per ton. In their argument for an increase in the import duty on foreign spar, domestic producers placed their costs several dollars a ton higher than the prices some of them have accepted lately.

THE IRON AGE Composite Prices

Finished Steel

Jan. 10, 1928, 2.314c. a Lb.

One week ago	2.314c.
One month ago	2.307c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 10, 1928, $17.59 a Gross Ton

One week ago	$17.54
One month ago	17.54
One year ago	19.39
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel	*Base Per Lb.*
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
Del'd Philadelphia	2.12c.
Del'd New York	2.14c.
Del'd Cleveland	1.99c.
F.o.b. Cleveland	1.80c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.
Billet Steel Reinforcing	
F.o.b. Pittsburgh mills	1.80c. to 1.90c.
F.o.b. Birmingham	2.00c. to 2.10c.
Rail Steel	
F.o.b. mills east of Chicago district	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.80c.
Iron	
Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.05c.
F.o.b. Coatesville	1.95c.
F.o.b. Sparrows Point	1.95c.
F.o.b. Buffalo	1.90c.
Del'd New York	2.12½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.95c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.08c.
Del'd New York	2.09½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
All gages, wider than 2 in., to 6 in., P'gh,	2.00c. to 2.10c.
*All gages, 6 in. and wider, P'gh	1.80c. to 1.90c.
All gages, narrower than 6 in., Chicago	2.40c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.40c.

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*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.35c. to 2.80c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.20c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55
	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence	*Base to Retailers Per Net Ton*
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed	*Base Per Lb.*
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.24c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.47c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.99c. to 3.09c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.
Metal Furniture Sheets	
No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.
Galvanized	
No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.
Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.
Automobile Body Sheets	
No 20, f.o.b. Pittsburgh	4.00c.
Long Ternes	
No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.40	25-lb. coating I.C.	$17.30
15-lb. coating I.C.	14.45	30-lb. coating I.C.	18.75
20-lb. coating I.C.	15.80	40-lb. coating I.C.	20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.05 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.05 to 3.10
Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	$2.75 to 2.80
Spikes, boat and barge	3.10
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv
		Butt Weld			
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			
		Lap Weld			
2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			
		Butt Weld, extra strong, plain ends			
⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			
		Lap Weld, extra strong, plain ends			
2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two-points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

	Cold Drawn		
1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		
	Hot Rolled		
2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Hot-Rolled Flats.—Hot strip mills are attempting to stabilize prices on wide strip and equalize them with blue annealed sheets and light plates by the adoption during the week of new prices on strip 12-gage and heavier, 12 to 24 in. wide. These are based according to gage on a plate price of 1.80c. and a blue annealed price of 2.10c. At the same time some mills announced an advance of $1 a ton on strip 6 in. and wider and the narrower widths. Releases on contracts are heavier than they have been and this month is showing up better than December.

Old Material—The market is hardly as strong as it was a week ago. One buyer who covered then and another who previously covered are not disposed to buy in competition with the dealers who sold them. Heavy melting steel is quotable at no more than $15.50, and dealers who were paying that price a week ago to cover short sales are now offering $15.25. Blast furnace grades are firm. It is difficult to interest foundries in purchases at more than the recent prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$15.25 to	$15.50
Scrap rails	14.75 to	15.00
Compressed sheet steel	14.25 to	14.50
Bundled sheets, sides and ends	13.25 to	13.50
Cast iron carwheels	14.00 to	14.50
Sheet bar crops, ordinary	15.00 to	15.50
Heavy breakable cast	13.00 to	13.50
No. 2 railroad wrought	15.00 to	15.50
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings		11.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	17.00 to	17.25
Railroad coil and leaf springs	17.00 to	17.25
Rolled steel wheels	16.50 to	17.00
Low phosphorus billet and bloom ends	18.50 to	19.00
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	11.50 to	12.00
Short mixed borings and turnings	11.50 to	12.00
Cast iron borings	11.50 to	12.00
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	15.25 to	15.50
Malleable Grades:		
Railroad	15.25 to	15.50
Industrial	14.75 to	15.00
Agricultural	14.25 to	14.50

Bars, Plates and Shapes.—Bars continue to make the best showing of these products in orders and in mill schedules, but both plates and shapes have enjoyed a substantial betterment over the specifications for December. The current movement of these products is chiefly on shipping instructions against contracts or coverages for the fourth quarter. With the exception of plates, there are no suggestions that any first quarter business has been entered at less than 1.80c. and the concessions in plates have been exceptional. The Carnegie Steel Co. has issued a new card of extras on bars, adopting the quantity extras recently announced.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Bolts, Nuts and Rivets.—Bolt and nut business is improving but the demand for rivets still is rather slow. Prices are firm.

Warehouse Business.—Prices of sheets out of local warehouses were advanced 10c. per 100 lb. late last week. Warehouse quotations on nails also have been stiffened in keeping with the new base price and card of extras issued by the mills. Jobbers report some improvement in business with the turn of the year.

Coke and Coal.—Except that slack coal is a little less plentiful and commands more money, the general situation is about as it has been for some time, with ample supplies of both coal and coke and not much strength in prices.

Demand for Adirondack Ore Not Increasing, Says Decision

WASHINGTON, Jan. 10.—Statistics of the production of Adirondack iron ore do not afford much support to the claim of the Delaware & Hudson Co. that there is an increased demand for this ore, said the Interstate Commerce Commission in a decision made public recently denying the application of that company to acquire control of the Buffalo, Rochester & Pittsburgh Railway. It was contended by the applicant that shipments of Adirondack ore to the Pittsburgh district would largely increase "because the deposits of Lake Superior hematite ore, chiefly used in that district, are disappearing rapidly and their iron content is gradually decreasing, the standard having been 65 per cent in 1888 and being now 51.5, with the prospect of soon being reduced to 50 per cent." It was declared that it would therefore be necessary in the future to mine and utilize ores lower in iron content that can be concentrated and marketed economically at present, "and this will bring into the market increasing quantities of the Adirondack ores." The decision said that the record shows that there is practically an unlimited supply of low phosphorus, magnetic iron ore in the Adirondacks, "roughly estimated at 2,100,000,000 tons, from which almost any grade of iron can be made, while there are no Lake Superior ores from which low phosphorus iron can be made."

In stating that statistics do not support the claim of increased demand for Adirondack ore, the commission presented a table showing shipments, in tons, of iron originating on the Delaware & Hudson line in the years 1915 to 1925, inclusive, as follows:

1915	630,747	1921	109,241
1916	1,264,175	1922	180,385
1917	1,224,929	1923	562,877
1918	1,185,415	1924	202,148
1919	1,003,068	1925	342,026
1920	774,591		

Bethlehem to Offer Cash Prizes in Accident Prevention Work

The Bethlehem Steel Corporation has announced a series of gold awards for progress during 1928 in accident prevention. These awards will be made quarterly under a new plan to be inaugurated throughout the entire Bethlehem organization.

The organization will be divided into 11 groups, and the plan provides that the group making the greatest percentage of reduction in time lost due to accidents during each quarter of 1928 will be awarded a prize of $1,000 in gold. To the groups making the second and third best showings will be awarded prizes amounting to $500 and $250 respectively. A permanent trophy will be awarded to the group making the greatest reduction in the time lost due to accidents for the entire year 1928.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.15 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	135.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Business and Prices Gain Strength —Operations Increase

CHICAGO, Jan. 10.—Chicago district steel mills, having eaten heavily into stocks of iron on the ground, are now watching the production of pig iron more closely. The Illinois Steel Co. has blown in its No. 9 stack at South Chicago, the second to be lighted in two weeks. The Inland Steel Co. is bringing its fourth stack in blast this week. These raise the active steel mill blast furnaces to 24 out of 36. In merchant pig iron the situation is different, and though shipments are on the upturn, furnace stocks are large. The operators of the Mayville furnace announce that the one unit in blast there will be blown out about the middle of the month.

Orders for railroad equipment include 1000 freight and 15 passenger cars, and fresh inquiry is for 500 freight and 20 passenger cars and 200 underframes. Business not yet in the form of definite inquiry includes 3000 freight cars for the Rock Island and at least an equal number of freight cars and additional suburban coaches for the Illinois Central.

Judged by the volume of business received and the price structure, the local steel market shows added signs of strength. In plates, shapes and bars 1.90c., Chicago, is well established and users, notably fabricators, are taking steps to pass on the advance in steel prices. Specifications are heavier than shipments, the latter representing 75 per cent of ingot capacity. Individual orders are larger as consumers feel the pinch of extended deliveries, which in the case of mild steel bars now are from two to four weeks.

Pig Iron.—Liquidation of charcoal furnace stocks, largely to middlemen, continues, with delivered prices that exceed by only a small margin the current quotations on Northern foundry iron. It is reported that close to $20, delivered, is being done at points where the freight rate is about $2.50, making the furnace price not far from $17.50 a ton. Local furnaces are taking no recognition of this competition and are holding to $18.50 on their products. Sales of Northern iron are at a steady rate and inquiry for the second quarter is more active. Shipments are gaining slowly and it is noticeable that malleable foundries, long out of the market, are in need of pig iron.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Coke.—Contract and spot prices for by-product foundry coke are steady at $9, local ovens, and $9.50, delivered in the Chicago switching district.

Ferroalloys. — Spiegeleisen is showing added strength at $31, Hazard, Pa., in tonnage lots, and at $32 in carloads for the 19 to 21 per cent grade. Ferromanganese is quoted at $100, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Cast Iron Pipe.—It is reported that the low bid at Milwaukee on 5000 tons of 6 to 16-in. class C pipe was $25.85, Birmingham, or $34.35, delivered, which is about $2 a ton below the minimum obtained for the last several weeks. At Kenosha, Wis., the National Cast Iron Pipe Co. took 440 tons of 6- to 12-in. pipe in 16-ft. lengths at a base price of $28, Birmingham, or $36.50, delivered. Among fresh inquiries is 2000 tons of 4 to 8-in. class B pipe for Yellow Springs, Ohio, and 600 tons of 4 to 30-in. class B pipe for Portsmouth, Ohio. Indications are that a fair winter buying movement is getting under way. Deliveries are prompt in all sizes. One foundry in Birmingham has lost almost a week's production because of cold weather.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $38.20; 4-in., $40.20 to $42.20; Class A and gas pipe, $4 extra.

Plates.—Oil storage tanks for western Texas take 3000 tons of plates just purchased. Tank builders are well engaged and are issuing heavy specifications. Producers of steel are feeling the effect of recent car orders. Specifications are not heavy at the moment but car builders are actively preparing schedules against which shipments are to be made in the near future. The Texas & Pacific Railroad has ordered 500 gondola cars from the Pressed Steel Car Co., also 200 box, 300 flat and 15 passenger cars from the American Car & Foundry Co. Among fresh inquiries are 500 gondola cars for the Central of Georgia and 200 underframes for the Santa Fe. Plate mills are well engaged but still lag a little behind the rate of output of the other heavy tonnage products. Specifications from the general manufacturing trade are expanding slowly and plate requirements by structural fabricators show a decided improvement over the closing weeks of 1927. Prices are steady at 1.90c., Chicago.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—A stir is being created in the local structural market by the possibility that fabricators will withdraw old quotations and put prices on a higher level. In some measure this is a reflection of the determination of mills to hold the recent advance in steel prices, but it also indicates that shops cannot much longer stand operation at low profit or none at all. This move has brought prospective builders and architects to realize that prices for structural steel are low and many projects have been hastened into the market. Greater activity is shown in the preparation of plans for the Marshall Field & Co. warehouse and estimaters expect plans on the Steuben Club building in the next week or so. New projects in Chicago include 6000 tons for the Forman Building, 3000 tons for an addition to the Drake Hotel, and 1800 tons for an extension of the Illinois Bell Telephone Co.'s holdings. Bridge contracts account for 3800 tons. Highway improvement programs include a large number of bridges and fabricators expect a substantial volume of business from that source during the coming spring and summer months. Prices are steady at 1.90c., Chicago.

Mill prices on plain material per lb.: 1.90c., base, Chicago.

Reinforcing Bars.—Prices for billet steel reinforcing bars are stronger at 2.30c. to 2.75c. out of Chicago warehouses. Sales are in small volume, but they measure well up to what can be expected at this time of the year. Bending shops have turned the year with shipments that represent about 55 per cent of fabricating capacity. Outstanding among new projects is 500 tons for a warehouse for Meyer-Marvis, Chicago. Competition in rail steel reinforcing bars is keen and prices range 1.80c. to 1.85c., Chicago Heights mills. New business and fresh inquiry are shown on page ....

Bars.—Mill deliveries of mild steel bars are extending and now range from two to three weeks. Sales continue active and like specifications are in excess of current shipments. Practically all classes of users are taking larger quantities though the most noteworthy improvement is from the automotive trade and accessory manufacturers. Farm implement makers are taking shipments in excess of the schedules previously arranged for the early weeks in January. The bar iron market is without feature and asking prices are 1.90c., Chicago. Shipments of alloy steel bars are growing as the automotive trade swings into heavier production. Output in the Chicago district is at 70 per cent. Bookings at rail steel bar mills are heavier than a year ago. Delivery is prompt and prices are steady at 1.80c., Chicago Heights mills.

Mill prices per lb.: Soft steel bars, 1.90c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Sheets.—Mills have heavy order books but specifications are in small volume and rolling schedules are difficult to arrange to maintain output at 70 per cent of hot mill capacity. Producers feel that a more active demand is near at hand and that the cause for the delay in specifications lies in the nearness of the inventory period and adjustments following the holiday period. There is little of note in the price situation. Order books are well loaded at lower quotations than are now being asked. Delivered prices in Chicago are 3.90c. for galvanized, 2.25c. to 2.35c. for blue annealed, depending on the width, and 3.05c. for black sheets. Stocks in the hands of manufacturers and jobbers are reported as small. Deliveries range from two to three weeks, depending on the grade.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cold Rolled Bars.—Producers have heavy bookings and specifications are growing in volume, affording an increase in output this week. Prices are steady at 2.20c., Chicago.

Wire Rods.—Sales are moderately active, with the bulk of orders taken at $43, Chicago mill base.

Wire Products.—Orders are in such volume that the 70 per cent rate of output reached a week ago is being maintained. There is a quickening in demand from practically all parts of the country, the Northwest excepted. Mill stocks are not being increased. Jobbers are alert to the possibility of an active spring demand and are rounding out and in some cases expanding stocks. Railroad purchases are heavier by a small margin and shipments to the manufacturing trade show improvement. Orders for nails are considered good for this time of year.

Rails and Track Supplies.—Rail purchases in the week totaled 19,000 tons. The outstanding order, from the Cotton Belt Railroad, was distributed as follows: Bethlehem Steel Co., 5000 tons; Illinois Steel Co., 4500 tons, and Inland Steel Co., 4300 tons. Fresh inquiry and business that is in the making in territory tributary to Chicago district mills total not less than 100,000 tons. Rail mill output is now close to 80 per cent of capacity. Four Western railroads have closed for 15,000 tons of track accessories, and pending inquiry gives promise of an active market for several weeks to come. Production of track supplies is lagging at 60 per cent of capacity. For the first time in months there is a moderate demand for iron tie plates and several lots have been purchased.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Old Material.—This market is taking on more life. Individual purchases are not large but they are numerous and are being made principally by foundries and users of specialties. A notable development in the week is the greater activity shown by malleable foundries which are now openly seeking supplies of scrap. Dealers continue to look for added strength and they do not hesitate to bid up railroad lists. A sale of 2000 tons of cast iron borings is reported at $11.25, delivered, an advance of 50c. since the last consumer purchase. A scarcity exists in short rails and iron grades, notably iron angles, arch bars and axles. Railroads are said to have obtained close to $13.50, delivered, for heavy melting, which is a reflection of a belief in the trade that two steel mills and possibly a third will soon be in the market.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel	$12.50 to	$13.00
Shoveling steel	12.50 to	13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.75 to	14.25
Hydraulic compressed sheets	10.75 to	11.25
Drop forge flashings	9.75 to	10.25
Forged, cast and rolled steel carwheels	15.50 to	16.00
Railroad tires, charging box size	16.25 to	16.75
Railroad leaf springs, cut apart	16.25 to	16.75
Acid Open-Hearth Grades:		
Steel couplers and knuckles	15.00 to	15.50
Coil springs	16.50 to	17.00
Low phosphorus punchings	14.25 to	14.75
Electric Furnace Grades:		
Axle turnings	12.50 to	13.00
Blast Furnace Grades:		
Axle turnings	10.75 to	11.25
Cast iron borings	10.75 to	11.25
Short shoveling turnings	10.50 to	11.00
Machine shop turnings	7.75 to	8.25
Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	15.00 to	15.50
Cupola Grades:		
Steel rails less than 3 ft	15.50 to	16.00
Angle bars, steel	14.75 to	15.25
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	13.75 to	14.25
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	18.75 to	19.25
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	11.50 to	12.00
No. 1 busheling	9.50 to	10.00
No. 2 busheling	4.50 to	5.00
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	13.50 to	14.00
No. 1 agricultural cast	13.50 to	14.00
Stove plate	12.00 to	12.50
Grate bars	11.75 to	12.25
Brake shoes	12.00 to	12.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	$2.90 to 3.00
Cement coated nails, base per keg	2.90 to 3.00

Koppers Co. Not Affiliated with U. G. I.

The statement appearing on page 85 of THE IRON AGE of Jan. 5 to the effect that the Koppers Co. is affiliated with the United Gas Improvement Co. calls for correction. The two companies are entirely separate and the only connection between them is the fact that the Philadelphia City Council recently authorized the building of a coke plant in Philadelphia, which will be financed and erected by the Koppers Co., while the gas produced will be sold to the United Gas Improvement Co. Details of that transaction were published in THE IRON AGE of Dec. 29 last, page 1831.

Employees of the General Electric Co. who have been in its service for six months or more are holders of about $30,000,000 worth of General Electric Securities Corporation bonds, according to a statement of J. R. Lovejoy, president of the corporation and vice-president of the General Electric Co. Bondholders number 27,000, or about 42 per cent of the company's employees, and the average holding per person is approximately $1,000.

New York

Large Orders Placed for Iron and Steel for Tunnel

NEW YORK, Jan. 10.—The inventory period, which for some foundries will last until the middle of the month, has adversely affected pig iron buying. Sales by local brokers during the week totaled only 3500 tons. Deliveries against contracts are moving forward in good volume, however, and in some cases iron that had been held up has been released for shipment. The Worthington Pump & Machinery Corporation, New York, has closed for 300 tons for its Cincinnati plant and about 500 tons for its Buffalo works, but has not yet bought against its inquiry for 400 tons for Holyoke, Mass. The New York Central Railroad is in the market for 235 tons for delivery at Frankfort, N. Y., or Elkhart, Ind. The iron called for includes 75 tons each of No. 2 plain and No. 2X, 50 tons of No. 1 and 35 tons of 8 per cent silicon. The Baldwin Locomotive Works is asking for prices on 2000 to 4000 tons for its plant at Eddystone, Pa. Prices are slightly firmer, with $16.50, base furnace, the usual minimum on Buffalo foundry iron, and with some sales bringing $17. No sales of eastern Pennsylvania foundry iron have been reported at less than $19, base furnace, and a number of producers have advanced prices to $19.50. The Mason & Hanger Co., contractor, New York, has divided an order for 54,000 tons of cast iron segments for the Fulton Street subway tunnel connecting Manhattan and Brooklyn between the Davies & Thomas Co., Catasauqua, Pa., and the Bethlehem Steel Co. The No. 2 furnace of Witherbee, Sherman & Co. at Port Henry, N. Y., was blown in Jan. 3.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—The market has seen little activity since the first of the year, and the small pending tonnage offers no immediate prospect of increased business. A State office building in Manhattan will require 120 tons. With small buying, distributers have had no difficulty in holding to the recently established mill price of 1.90c., Pittsburgh, and are quoting 2.20c., Youngstown warehouse, or 2.57½c., on cars at New York. Out of New York warehouses, the price is 2.80c. per lb. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Cast Iron Pipe.—Little new business is in the market, but most makers of gas and water pipe are fairly well sold up for 30 to 60 days and prices are maintained with $28 per ton, base Birmingham, about the minimum. The Department of Purchase, New York, opened bids Jan. 9, on about 2200 tons of pipe and fittings. On the five sections covering pipe, bids were as follows: Section 1, 260 tons of 12-in., low bid $37.10 per ton, National Cast Iron Pipe Co.; section 2, 595 tons of 8-in., low bid $39.80, Donaldson Iron Co.; section 3, 595 tons of 8-in., low bid $39.80 per ton, Donaldson Iron Co.; section 4, 595 tons of 8-in., low bid $37.10 per ton, National Cast Iron Pipe Co.; section 5, 80 tons of 6-in., low bid $37.65 per ton, National Cast Iron Pipe Co. On the fittings low bidders were R. D. Wood & Co., Thomasville Iron Co. and the Talladega Foundry & Machine Co. The Middlesex Water Co., Woodbridge, N. J., has taken bids on about 600 tons of water pipe. Charles A. Tenney & Co., Boston, recently closed on about 3000 tons of pipe for public utilities.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Finished Steel.—Somewhat of a lull has followed the fairly heavy specifications of the last week or two of December. Mill shipments of bars, shapes and plates are largely against fourth quarter contracts, little new buying having developed. The extent to which sheet manufacturers covered their customers for first quarter at former prices will militate against the placing of much business at the new prices for some time to come. A buyer of galvanized sheets, with 200 tons to place, is reported to have been able to cover his requirements at 3.65c., Pittsburgh, regardless of the fact that he had no contract. Some makers of hot rolled strip steel have advanced prices to 1.85c., Pittsburgh, for sizes wider than 6 in. and to 2.05c., Pittsburgh, for the narrower widths. Extras on gages which meet competition of light plates and blue annealed sheets have also been put into effect, making these widths approximately the same in price as the competitive prod-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ucts. In structural steel the principal letting was 9000 tons for shields for the Fulton Street tunnel of the New York subway system, which will be fabricated by the American Bridge Co. Bids are being taken on an additional 7800 tons for subway work.

Mill prices per lb., delivered New York: Soft steel bars, 2.14c.; plates, 2.12½c.; structural shapes, 2.09½c.; bar iron, 2.14c.

Warehouse Business.—The new year has begun with a good volume of purchasing from stock. There is a moderate demand for structural material in small lots and plate users are quite active. Quantity extras on cold rolled shafting and screw stock have been revised so that the minimum quantity on which no extra is charged is 4000 instead of 6000 lb. An extra of 20c. per 100 lb. applies on purchases of less than 4000 lb. and more than 2000 lb.

Coke.—Standard foundry is substantially unchanged at about $4 per net ton, Connellsville, for prompt shipment. Furnace coke, which developed some strength on the recent report that output was being curtailed, is again obtainable at less than $3 per ton, Connellsville. The local producer of by-product coke has reduced prices from $8.75 per ton, f.o.b. ovens, to $8.30 per ton for foundry coke and to $8 per ton for screened sizes. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, N. J., $7.91. By-product foundry coke, on the new basis of $8.30 per net ton, f.o.b. ovens, is quoted at $9 to $9.40, delivered Newark or Jersey City.

Old Material.—New contracting is confined to small tonnages of material. Prices are firm and unchanged with a fair volume of tonnage moving to eastern Pennsylvania consumers. No. 1 heavy melting steel continues at $13.50 per ton, delivered to Bethlehem, Coatesville, Conshohocken, Pa., or Claymont, Del. On shipments to a consumer in Lebanon, Pa., forge fire is being purchased at $10.50 per ton, delivered, and specification pipe at $12.50 to $13 per ton. Yard grade of heavy melting steel is quoted at $11 per ton, delivered Phoenixville or Harrisburg, Pa. Mixed borings and turnings are quiet at $10 per ton, delivered to Bethlehem or Swedeland, Pa.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.25 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.25 to 8.75
Locomotive grate bars	8.25 to 8.50
Machine shop turnings	6.50 to 7.50
Short shoveling turnings	6.50 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.25
Mixed borings and turnings	6.50 to 7.50
Steel car axles	17.00 to 17.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75 to 9.25
Forge fire	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.25
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Steel Business Improved—Sheet Bars $1 Lower—Wide Strips Higher

CLEVELAND, Jan. 10.—The steel industry is feeling the effects of the increase in production schedules by automobile manufacturers and is getting a good volume of specifications from that source, particularly for forging bars, sheets, hot and cold rolled strip and alloy steel. With heavy specifications for steel bars, plates and structural material before the expiration on Dec. 31 of contracts at 1.75c., Pittsburgh, an expected lull in orders developed in the past week. However, mills during the week took a fair amount of small-lot business at 1.80c., which appears to be holding firmly in this market. Sheet and hot-rolled strip buyers were not restricted in their low-price contracts to December specifications; consequently they are still sending in good orders for these products at lower prices than the mills are now asking. Stamping plants in this territory are now running at capacity on automotive work and most of the forge shops are busy. The Ford Motor Co. is ordering steel more freely than recently and during the week placed specifications with an Ohio mill for 1000 tons of sheets.

Concessions of $1 or more a ton have appeared on sheet bars. Hot strip mills are attempting to stabilize prices on wide strip and equalize them with blue annealed sheets and light plates by the adoption during the week of new prices on strip 12-gage and heavier, 12 to 24 in. wide. At the same time they announced a price advance of $1 a ton.

A projected Detroit River tunnel will require 4000 tons of structural material. Lake shipyards have an inquiry for a fire tug for Chicago requiring 250 tons of plates.

Pig Iron.—The market is still moderately active, although the heavy buying movement that lasted for several weeks has subsided. Cleveland interests during the week sold approximately 25,000 tons of foundry and malleable or about half as much as during some of the previous weeks. A Michigan foundry purchased 5000 tons, but a large share of the week's orders were small lots. Most consumers are now covered for the quarter. Inquiry has fallen off, although one producer is quoting on about 12,000 tons. Some of the Lake furnaces that have good order books are showing less disposition to reach out for business in highly competitive districts where they must absorb a high freight rate. A few of the Lake furnaces are now holding to a minimum of $17 for foundry and malleable iron and to the regular silicon differentials. While $16.50 has not entirely disappeared, $16.75 seems to have become the more common minimum quotation. In Michigan there is a range of $17.50 to $18. Some small lot sales are reported in the Valley district at $17.25. Shipping orders, which dropped off in December, have increased materially in the past week. The Corrigan, McKinney Steel Co., has relighted a furnace that was out for repairs and has now all of its Cleveland furnaces in blast.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—On Jan. 1 there was 6,604,339 tons of Lake Superior ore on docks at Lake Erie ports as compared with 7,139,610 tons on the same date a year ago. Shipments from these docks during December were 340,322 tons as compared with 562,404 tons in December, 1926.

Semi-Finished Steel.—A price reduction on sheet bars of $1 a ton or more from the $34 price that prevailed during the last quarter has been made by a Cleveland producer, which reports the closing of contracts with most of its trade at an average price of $33, Cleveland, the price depending on the location of consumer's plant. Billets and slabs are being quoted on the same price basis. Sheet bars are reported available from another source for early shipment on a Youngstown basis of $32.

Sheets.—Mills are getting heavy specifications against low-priced contracts placed late in the year and a moderate amount of small-lot business at the new prices. The market has a firmer tone and small-lot sales are being made at 2.90c., Pittsburgh, for black and 2.05c. to 2.10c. for blue annealed. Some galvanized sheets have been sold at 3.75c., Pittsburgh, although these are still available at 3.65c. Consumers bought so freely at the old prices that not much of a test of the market on round-lot business is expected for several weeks.

Cold Rolled Strip.—Demand has been stimulated by the increased production by automobile manufacturers and orders are more plentiful than for some time. Prices are steady at 2.75c., Cleveland, for three tons and over and at 3c. for smaller lots.

Reinforcing Bars.—Several good jobs are still pending but inquiry is light. On billet steel bars, quotations of 1.75c., Cleveland, are still reported. Rail steel bars are unchanged at 1.65c., mill.

Warehouse Business.—Orders are light but are expected to pick up as soon as inventories are over. Jobbers have placed in effect the new extras on steel bars but as yet have made no advance on sheets to reflect the higher mill prices.

Old Material.—A Valley district mill has purchased heavy melting steel for a month's needs at $15.25 for No. 1 material, or the same price it paid in December. Local mills are making no new purchases, but they have started this month to take shipments of steel-making scrap on contracts more freely. Considerable of the Detroit scrap that was going to Buffalo when Lake boats were running is now being shipped to Canton and Valley district consumers. While the market generally has a firm tone quotations are unchanged and there is not much expectation of higher prices. Dealers are able to buy heavy melting steel for shipment against outstanding orders at the prices which they have paid for several weeks.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.25 to 10.75
Mixed borings and short turnings	10.25 to 10.75
No. 2 busheling	10.25 to 10.75
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Hot Rolled Strip.—A new price schedule on hot rolled strip steel, 12-gage and heavier, 12 in. to 24 in. wide, has been adopted by some of the mills to equalize prices on wide hot strip with two keenly competitive products, light plates and blue annealed sheets. Quotations shown in the new schedule are 3/16 in. or No. 7-gage, 2c., Pittsburgh; No. 8 gage, 2.10c.; Nos. 9 and 10 gages, 2.20c.; Nos. 11 and 12 gages, 2.25c. These prices probably will be quite generally adopted. At the same time some of the mills announced an advance of $1 a ton in the regular price on strip not covered in the above classification. The new prices are 1.85c., Pittsburgh, for material 6 in. and wider and 2.05c. for narrower than 6 in.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts have increased since the first of the year and some makers have been able to increase their operations. Considerable business is coming from the automotive industry. Prices are firm. Nearly all buyers are now under contract. Rivet orders show some gain.

Fluorspar.—The only activity in gravel fluorspar was in car lots, which have brought $15, mines, indicating that the market has settled to that price for small lots. The market has not been tested on a large tonnage.

Coke.—The recent cold spell has stimulated the demand for by-product coke for domestic use but the price is unchanged at $4.50, ovens, for egg size. Connellsville foundry coke is weak, with a price range from $3.75 to $4.50, except for premium brands, some of which are quoted as high as $5.35. Foundry heating coke ranges from $2.75 to $3.25.

Philadelphia

Steel and Pig Iron Improved—Pennsylvania Railroad Inquires

PHILADELPHIA, Jan. 10.—Sentiment is decidedly better both in steel and pig iron as a result of the moderate improvement in purchasing since the beginning of the year. In some cases mills report more contracts for first quarter than in any previous quarter for the past year or more, consumers apparently being convinced that prices will not be lower during the current quarter and therefore are willing to protect themselves. Some structural steel contracts made at lower prices in the fourth quarter are being held open to allow more time to fabricators, who have been unable to completely prepare specifications on certain construction work.

Requirements of the Pennsylvania Railroad for first quarter, bids on which open Jan. 20, call for about 25,000 tons of plates for car and locomotive work, about 8000 tons of bars, 2000 tons of shapes and small lots of bands and spring steel. Bids were opened Jan. 6 on 1100 tons of blue annealed, black and galvanized sheets, 250,000 track bolts, 1,600,000 spikes, 24,000 wrought steel freight car wheels, and 460 piston heads.

Pig iron is more active and a good tonnage was booked in the past week. Prices have been advanced 50c. a ton on foundry iron, but the new level is as yet untested. Scrap buying shows no improvement but prices are firmer.

Pig Iron.—Purchases in the past week are estimated at more than 15,000 tons, the greater part of which was in small tonnages. Consumers are specifying more freely against contracts. An advance on foundry iron of 50c. a ton to $19.50, base, has received no test and most outstanding quotations are at the former level. One of the larger foundry iron purchases of the past week was about 2000 tons by the East Penn Foundry Co., Macungie, Pa., divided between two furnaces. The Baldwin Locomotive Works is inquiring for about 4000 tons of floor iron, 2.50 to 3 per cent silicon, and cylinder iron, 1 to 1.40 per cent silicon. A number of inquiries for a few hundred tons each are also reported and some

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c. to 2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel, squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c. to 4.35c.
Galvanized sheets (No. 24)	5.10c. to 5.20c.
Blue annealed sheets (No. 10)	3.15c. to 3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

small lots of low phosphorus have been closed. Basic iron is unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.76 to $20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X	20.76 to 21.26
Basic (delivered eastern Pa.)	19.50 to 19.75
Gray forge	19.50 to 20.00
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Purchasing continues small and is almost entirely for immediate requirements. Quotations are $33 per ton, Pittsburgh, for rerolling billets and $38 per ton, Pittsburgh, for forging quality.

Bars.—Quotations are firm at 1.80c. per lb., Pittsburgh, or 2.12c., delivered Philadelphia. The list of the Pennsylvania Railroad includes about 8000 tons of bars for first quarter. Consumers are quite freely making contracts for first quarter.

Shapes.—Slight irregularity of prices is evident with quotations of 2.07c. to 2.08c. per lb., base, delivered Philadelphia.

Plates.—The price of 2.05c. per lb., delivered Philadelphia, is being maintained, quotations being based on 1.95c., Coatesville mills. In cases where a Pittsburgh base would be of advantage to a consumer, Eastern mills have been willing to quote on a basis of 1.75c. per lb., Pittsburgh. On the Pennsylvania Railroad list of first quarter requirements is a total of 25,000 tons of plates.

Sheets.—There is a moderate demand for sheets, but prices are not strong. Blue annealed sheets are quoted at 2.10c. per lb., base Pittsburgh, on widths up to 40 in. Wider than 40-in. sheets are on a 2.20c. per lb. Pittsburgh base. Buyers have offered to enter into contracts at 2.10c., base, per lb., but some mills show unwillingness to go below 2.15c. on first quarter contracts. This is also evident in black sheets, which are currently quoted at 2.75c. to 2.80c. per lb., base Pittsburgh, but for which makers are asking 2.90c. per lb., base, on contracts. Galvanized sheets are quiet and fairly firm at 3.75c. per lb., Pittsburgh base.

Warehouse Business.—There is considerably more activity and prices are slightly firmer on most products.

Old Material.—Unaffected by the slight improvement that has appeared in the new material field, the scrap market continues quiet and prices substantially unchanged. No. 1 forge fire, railroad grate bars and stove plate are slightly stronger.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.25 to 15.75
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00 to 11.25
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 12.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 15.50

Imports.—In the last week of December and the first week of January a total of 3932 gross tons of pig iron was received at this port, of which 2831 tons came from India and 99 tons from the Netherlands. In the same period 7400 tons of Algerian iron ore was received, 100 tons of British ferromanganese, 45 tons of shapes from France and 21 tons of steel bars and 11 tons of iron bars from Sweden.

Another Increase in Steel Corporation's Unfilled Orders

A fairly large increase in the unfilled orders of the United States Steel Corporation is reported for December. The total on Dec. 31 was 3,972,874 tons, an increase of 518,430 tons over the 3,454,444 tons on Nov. 30. This compares with one of 113,404 tons in November. A year ago the unfilled orders were 3,960,969 tons. The following table gives the unfilled tonnage by months, commencing with January, 1925:

	1927	1926	1925
Jan. 31	3,800,177	4,882,739	5,037,323
Feb. 28	3,597,119	4,616,822	5,284,771
Mar. 31	3,553,140	4,379,935	4,863,564
April 30	3,456,132	3,867,976	4,446,568
May 31	3,050,941	3,649,250	4.049,800
June 30	3,053,246	3,478,642	3,710,458
July 31	3,142,014	3,602,522	3,539,467
Aug. 31	3,196,037	3,542,335	3,512,803
Sept. 30	3,148,113	3,593,509	3,717,297
Oct. 31	3,341,040	3,683,661	4,109,183
Nov. 30	3,454,444	3,807,447	4,581,780
Dec. 31	3,972,874	3,960,969	5,033,364

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

Automotive Parts and Accessories Manufacturers Are Merged

The Kingston Products Corporation, Kokomo, Ind., has been formed as a consolidation of the Kokomo Brass Works, Byrne, Kingston & Co. and the Kokomo Electric Co., all of Kokomo. The three companies have been closely allied for more than 25 years, but the merger will bring about closer cooperation by the engineering, executive and sales organizations than was possible before.

Products of the Kokomo Brass Works, which have been marketed by Byrne, Kingston & Co., include carburetors, Oil-Vac fuel feeding systems and tractor governors. The company also makes a varied line of water and oil pumps, motor parts and bronze, brass and aluminum castings. The Kokomo Electric Co. manufactures coils, switches, ignition points, generator cutouts, car heaters and B current supply units for radio sets.

J. Paul Johnson, president of the new company, is prominently identified with Kokomo industry, being an officer and a director of the Hoosier Iron Works, the Kokomo Malleable Iron Works, the Kokomo Stamped Metal Co. and the Kokomo Lithographic Co. Karl Krebser, vice-president and factory manager of the new company, has been associated with the Kokomo Brass Works for 23 years, the last eight as general factory manager. Paul T. Burke, the new secretary and general sales manager, has been general sales manager of Byrne, Kingston & Co. for 10 years. Frank C. Ryan, treasurer, has served four years as Chicago branch manager for the three merging companies and more recently has been assistant general manager of the brass works. The rest of the personnel of the three companies will remain practically unchanged.

Campbell Heads Interstate Commerce Commission for 1928

Johnston B. Campbell has been elected chairman of the Interstate Commerce Commission for 1928, succeeding John J. Esch. Mr. Campbell presided at the general investigation of freight rates on iron and steel products in Official Classification territory which was conducted during the first half of 1927. The commission is at present engaged in an examination of the testimony and briefs introduced into the case.

San Francisco

Large Steel Bookings Feature First Week of New Year

SAN FRANCISCO, Jan. 7 (*By Air Mail*).—Bookings have involved some good-sized tonnages, starting the new year encouragingly. The outlook in most lines is hopeful. Outstanding among the awards were 8500 tons of reinforcing steel for the Coyote Point bridge, San Francisco, taken by the Bethlehem Steel Co.; 2100 tons of shapes for two bridges near Seattle, Wash., for the Simpson Logging Co., placed with the United States Steel Products Co., and 1100 tons of shapes for an apartment at Long Beach, Cal., awarded to the McClintic-Marshall Co.

Tabulations of building permits for 1927 show that the majority of the cities on the Pacific Coast were ahead of the aggregate for the previous year. Los Angeles led the other cities with a total of $123,027,239. Seattle and Portland issued $29,070,080 and $28,973,155, respectively.

Pig Iron.—Sales and inquiries this week were limited to unimportant lots. No changes in prices are noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Demand for structural steel continues good, and during the first week of the year over 4000 tons was placed. Among the larger projects pending are 2200 tons for the Northern Life Insurance Building at Seattle; 4000 tons for the Capwell Store at Oakland, Cal., and 500 tons for a plant at Tacoma, Wash., for the Union Bag Co. Imports of structural shapes in October totaled 2041 tons, compared with 2482 tons for September. Of this total, 1417 tons was delivered in the San Francisco district. Prices on domestic material remain firm at 2.35c., c.i.f. Coast ports.

Plates.—The Steel Tank & Pipe Co. of Oregon was awarded 600 tons of 20 to 30 in. riveted pipe for the Port Townsend, Wash., pipe line. Another 400 tons may be placed unless wood stave pipe is decided upon. The only other award was booked by the Pacific Coast Engineering Co., Oakland, for 175 tons for 20 in. pontoon pipe for the U. S. Engineers' Office, San Francisco. The only pending project of importance is the Petroleum Securities Co.'s inquiry for oil storage tanks for its new Richmond plant. From 700 to 2500 tons of material is involved, depending upon the number and size of the tanks. An award is expected soon. Prices appear to be uniform at 2.25c., c.i.f.

Bars.—Imports of bars, both merchant and reinforcing, for October aggregated 1316 tons, compared with 4822 tons for the previous month. Of this total, Los Angeles took 854 tons and San Francisco 404 tons. One of the largest reinforcing bar awards placed during the past year was booked by the Bethlehem Steel Co. and called for 8500 tons for the Coyote Point bridge across San Francisco Bay. The largest pending inquiries involve 835 tons for the North Branch Canal Project, Ellensburg, Wash., and 750 tons for the Veterans' Hospital at Portland, Ore.

Cast Iron Pipe.—Demand for cast iron pipe continues good. Awards were not heavy, but some large lots are pending. Santa Ana, Cal., placed 231 tons of 6 and 12 in. B pipe with the American Cast Iron Pipe Co.; the National Cast Iron Pipe Co. booked 350 tons of 20 in. B for Pasadena, Cal., and B. Nicoll & Co. took 129 tons of 6 and 10 in. B for Eureka, Cal. Pending business follows:

Portland, Ore., 2825 tons, 6 to 24 in. B. Bids opened.

The Dalles, Ore., 340 tons, 4 to 12 in. D. Bids Jan. 9.

Spokane, Wash., 1246 tons, 2 to 12 in. B. Bids Jan. 12.

Nogales, Ariz., 373 tons, 2 to 10 in. B. Bids opened.

El Segundo, Cal., 125 tons, 4 to 10 in. B. Bids Jan. 13.

Lynwood, Cal., 217 tons, 6 to 10 in. B. Improvement Long Beach Boulevard; O. U. Miracle, San Diego, Cal., low bidder.

Los Angeles, 401 tons, 2 to 10 in. B, County Water Works District No. 10. United States Cast Iron Pipe & Foundry Co.. low bidder.

San Diego, Cal., 155 tons, 4 to 6 in. B, improvement Boundary Street. Bids Jan. 16.

San Diego, Cal., 271 tons, 2 to 10 in. C, improvement Twenty-eighth Street. Bids Jan. 16.

San Diego, Cal., 264 tons, 2 to 6 in. C, improvement Muir Avenue. Bids Jan. 23.

San Diego, Cal., 153 tons, 6 to 10 in. B, improvement Main Street; Butterfield Construction Co., San Diego, low bidder.

Importations of cast iron pipe in October totaled 2043 tons, compared with 2301 tons for the preceding month. Los Angeles took 1182 tons of this total.

Steel Pipe.—The only inquiry of importance involves from 200 to 400 tons of 3½ to 16 in. plain-end line pipe for the Petroleum Securities Co.'s new plant at Richmond, Cal. The Grinnell Co. booked 625 tons of 8 in. seamless pipe for Los Angeles. Imports of tubular goods in October were 1533 tons, of which San Francisco took 1172 tons.

Rails.—The Western Pacific has placed 10,000 tons of 85 lb. rail with the Colorado Fuel & Iron Co. and, in addition, has placed 400,000 rail anchors, totaling about 600 tons, with various Eastern producers. No action has been taken by the Southern Pacific Co., San Francisco, on its inquiry for 28,000 kegs of track spikes and 3200 kegs of track bolts, totaling 3120 tons. This company will open bids on Jan. 10 for 880,800 tie plates, totaling close to 4500 tons.

Coke.—Demand for foundry coke reflected the same quiet condition that prevailed in the pig iron market, and sales and inquiries were limited to small lots for prompt shipment. Imports in October totaled 7658 tons. Of this total Los Angeles took 2946 and San Francisco 2916 tons. Prices continue unchanged.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Birmingham

Cold Weather Retards Foundry Operations in Alabama

BIRMINGHAM, Jan. 10.—Cold weather retarded the return of foundry operations to a normal schedule following the holidays, and this has affected the pig iron market both from the standpoint of sales and of shipments. Only a small amount of business was booked last week, although there were numerous inquiries which are expected to produce new tonnage within the next week or so. Shipments have been correspondingly low. Birmingham furnaces have sold considerable iron for the first quarter and the outlook is satisfactory. Quotations continue on a $16 base. Eighteen furnaces are in blast, the same as during the past two months.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	16.00

Finished Steel.—There has been a resumption of buying since the first of the year and the outlook is favorable. Prices are unchanged. Structural steel fabricators and reinforcing bar manufacturers report only a small amount of new business, but are looking forward to an early improvement. The Tennessee company has been awarded a liberal share of the new rail and car orders and now has considerable advance tonnage in these lines as well as in miscellaneous steel lines. This company is now averaging seven open-hearth furnaces at Ensley and four at Fairfield. The Gulf States Steel Co. is operating four at Alabama City.

Cast Iron Pipe.—Judged by November and Decem-

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ber inquiries, first quarter tonnage is expected to be of fair volume. Only a small amount of business has been placed to date. Birmingham plants obtained 2000 tons from St. Louis, the only order of any consequence. Plants have been slow in resuming operations but are now back at about the same basis as in early December. The base price is around $28.50. Inquiries for first quarter are encouraging and there have also been some for second quarter.

Coke.—There is a general improvement in foundry coke demand and shipments. Surplus stocks have been used up and foundries are back in the market. Early in December there was a curtailment of buying and shipments that continued during most of that month. There has been no change in the price, $5 per net ton.

Old Material.—Business has been slow in developing. Demand is about at the same level as in December. Prices have not changed.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.00 to $10.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	18.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Rails for rolling	12.00 to 13.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

St. Louis

Pig Iron Sales Increase—Steel Demand Is Light

ST. LOUIS, Jan. 10.—The new year made a good start in pig iron sales. Producers say that indications point to a price advance. The Granite City maker's sales for the week totaled 12,000 tons, of which about 2000 tons was basic, 750 tons malleable and the remainder foundry. The largest order was 5000 tons of foundry iron for a Southern Illinois melter. Shipments of the Granite City maker for December were the heaviest of any month last year, and its unfilled orders amount to more than 100,000 tons. A leading Southern interest sold 450 tons last week.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—With zero weather prevailing in St. Louis and vicinity, sales of domestic grades of coke were greatly stimulated. Buying of foundry grades is small.

Finished Iron and Steel.—Specifications against contracts for plates, shapes and bars have been light, and new business much lighter. Warehouse business is very quiet. The only inquiry before the market is from the Wabash Railroad for plates, shapes, bars and billets for the first half. The new year has brought very little for the fabricators of structural steel, who need business badly. The only award of the week was 300 tons for a pontoon for the Mississippi River Commission. A pending sewer project will require 600 tons of reinforcing bars.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

Old Material.—Substantial tonnages of steel grades, miscellaneous rails and specialties were taken by some of the mills in the St. Louis district, and the buying movement is expected to continue, now that orders for car equipment have been placed with factors here. Dealers' stocks are said to be low. Railroad lists include: Baltimore & Ohio, 16,000 tons; Wabash, 1780 tons; Kansas City Southern, 200 tons; Ann Arbor, 130 tons; Frisco, 27 carloads, and Chicago & Eastern Illinois, 20 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.75 to $13.25
No. 1 locomotive tires	14.00 to 14.50
Heavy shoveling steel	12.75 to 13.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.50 to 15.00
Railroad springs	15.25 to 15.75
Bundled sheets	9.00 to 9.50
No. 2 railroad wrought	12.75 to 13.25
No. 1 busheling	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.50 to 9.00
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft	16.00 to 16.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.75 to 16.25
Railroad malleable	13.00 to 13.50
No. 1 railroad cast	14.00 to 14.50
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Canada

Canadian Steel Mills Start New Year with Good Backlogs

TORONTO, ONT., Jan. 10.—Although only a week has passed since the beginning of the year the general trend of business in iron and steel is steadily working up to the level at which it stood before the holiday season. Indications are that practically all lines of industrial enterprise will reach higher levels than in 1927. Canadian mills start the new year with unfilled orders greatly in excess of those they had at the beginning of 1927.

The Canadian Locomotive Co., Kingston, Ont., has received an order from the Alberta Government for four locomotives. Canadian mills are carrying on active campaigns for business in foreign markets. H. J. Kelly, general manager Dominion Iron & Steel Co., Sydney, N. S., announces that his company has received an order for 900 tons of steel rods for Japan. The Dominion Iron & Steel Co. started the year with 88,000 tons of orders on its books.

Pig Iron.—While the market has not yet fully recovered from the holiday recession, some improvement in sales of foundry and malleable iron is reported. Spot demand is limited and the majority of orders are for one or two car lots. About 50 per cent of the contract consumers have covered for first quarter.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.00
No. 2 foundry, sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Consumers are holding their purchases to a minimum. Foundries are stock taking and until this has been accomplished dealers do not expect a strong demand for scrap from this source. Some buying for first quarter delivery has been done, but the majority continue to "buy as you go." Prices are unsettled and until they reach a firmer level there is little prospect of any general strengthening in demand.

Cincinnati

Order Placed for 3700 Tons of Bars—Pig Iron Dull

CINCINNATI, Jan. 10.—With many consumers having covered their first quarter requirements, while others are waiting to determine better their needs before making future commitments, the pig iron market is dull, and dealers are of the opinion that sales this month will be small. Price considerations have been of minor importance, since quotations in the last three weeks have not been altered. An Ironton, Ohio, furnace has sold two lots of foundry iron totaling 700 tons, while the Norfolk & Western and the Worthington Pump & Machinery Corporation have closed for 600 and 300 tons, respectively. Southern Ohio makers continue to quote $19, base furnace, and Lake Erie producers are asking $16.50, base furnace. Southern iron is still on the basis of $16, Birmingham, but sales have been inconsequential.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—In practically all consuming industries there is a feeling of optimism which has helped to give a somewhat better tone to the market, despite the absence of sizable bookings. Aside from 1300 tons for the local Eighth Street viaduct and 600 tons for the building of the Cincinnati Young Women's Christian Association, both of which will be supplied by the McClintic-Marshall Co., structural steel lettings have been of small proportions. Fabricating shops in this district are operating on a curtailed basis. Sales of bars, shapes and plates have been firmly maintained at 1.80c., base Pittsburgh. In the sheet market orders have fallen off, but producers have sufficient backlogs to justify present increased operating schedules. Black sheets are being quoted at 2.90c., base Pittsburgh, blue annealed at 2.10c. and galvanized at 3.75c., but transactions at those figures have been scarce. Considerable tonnage of nails was closed previous to the enforcement of the new card of extras, so that activities at the moment, as far as new business is concerned, are light. Common wire nails continue at $2.50 per keg, base Ironton or Pittsburgh. Demand for cold-rolled bars has shown an improvement in the past week.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will supply about 3700 tons of new billet bars for the Eighth Street viaduct in this city, the largest award locally in over a year. For a municipal sewage disposal plant at Dayton, Ohio, the West Virginia Rail Co. will furnish about 1500 tons of rail steel bars. New billet bars are quoted at 1.80c., base Pittsburgh, and rail steel stock at 1.70c. to 1.75c., base mill.

Warehouse Business.—The first week of the year has brought little business to local warehouses, and jobbers do not anticipate a pickup in sales for another week. Prices are unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Coke.—Specifications and orders for by-product foundry coke have increased in the past week, much of the betterment in demand having come from automobile companies or allied industries. Cold weather also has had a stimulating effect on by-product domestic coke sales, which have been the best of the season. A large user of by-product foundry coke in Cleveland has contracted with the Ashland, Ky., maker for its coke requirements during the first half of 1928. Prices of New River and Wise County beehive coke are unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Dealers are reported to be paying slightly more for railroad scrap this month than in December. This action is supported by speculative possibilities rather than on developments indicating mill buying in the immediate future. The market has been almost devoid of transactions. The Chesapeake & Ohio will sell a small list this week.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.75 to 9.25
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.00 to 17.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Boston

Pig Iron Sales at Low Point—Some Scrap Grades Weaken

BOSTON, Jan. 10.—Pig iron sales in New England in the past week did not exceed 1200 tons, the smallest amount for any similar period in months. There is no open inquiry of importance, and the largest single order placed was one of 150 tons of No. 2X. Four or five foundries are privately negotiating for several hundred tons, but the general outlook for the next month or two is not particularly encouraging unless there is a material increase in the New England melt. Efforts of furnaces east of Buffalo to lift prices have not been very successful, because one Buffalo company is still offering No. 2 plain and No. 2X iron at $16.50 a ton, furnace, although not as actively as heretofore. Eastern

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

and western Pennsylvania, Virginia and Alabama iron are still bringing a premium over Buffalo and east of Buffalo iron, but sales have tapered off. Foreign iron is no longer an important factor in this market. Furnaces east of Buffalo therefore dominate New England.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to $21.91
Buffalo, sil. 2.25 to 2.75	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—A large demand for domestic fuel, due to cold weather, reduced the New England Coal & Coke Co.'s and Providence Gas Co.'s reserve piles. Domestic coke is $8.50 a ton at ovens. New England ovens report a small increase in the movement of foundry coke at $11.50 a ton delivered within a $3.10 freight rate zone.

Importations.—Importations of pig iron at this port in December were 643 tons of Dutch, which compares with 781 tons in November, 1927, and 1071 tons in December, 1926. Imports for 1927 aggregated 23,623 tons, contrasted with 57,534 tons in 1926 and 90,621 tons in 1925. Thus importations last year were 33,911 tons smaller than in 1926 and 66,998 tons smaller than in 1925.

Importations of ore by months last year were: January, 16,052 tons; February, 6600 tons; March, 13,527 tons; April, 13,125 tons; May, 13,650 tons; June, 8300 tons; July, 30,852 tons; August, 34,227 tons; September, 25,805 tons; October, 23,447 tons; November, none, and December, 8850 tons, a total of 194,435 tons. The slump in importations in the last two months of the year was due to the fact that the Mystic Iron Works bought Port Henry, N. Y., ore instead of foreign.

Importations of coal in December were 21,089 tons, as against 8713 in November, bringing the total for 1927 up to 66,374 tons. In addition to pig iron, ore and coal, 16,056 pieces of foreign pipe were received at Boston in 1927.

Following are the receipts of foreign pig iron at Boston by months during 1927, together with comparisons, figures in tons:

	1927	1926	1925
January	....	4,061	8,212
February	12,350	10,659	13,701
March	....	10,810	11,365
April	110	6,332	6,167
May	1,027	3,979	6,179
June	1,848	4,936	7,967
July	1,979	2,423	4,869
August	2,262	6,347	8,248
September	1,239	2,805	6,747
October	1,384	1,801	6,264
November	781	2,310	7,137
December	643	1,071	3,765
Totals	23,623	57,534	90,621

Shapes and Plates.—The Boston & Maine Railroad has announced a $6,010,000 reconstruction program made necessary by the floods of last year. Included in this total is $2,050,000 for 92 bridges, of which about a quarter will be permanent replacement structures. Owing to the open winter, fabricators are busier than usual at this time, but the major portion of their work involves small tonnages. Prices on plates and shapes remain firm at 1.80c. per lb., base Pittsburgh.

Reinforcing Bars.—Owing to the firm position taken by steel mills, the local market for reinforcing bars is stronger. The going price from stock is 2.75c. per lb. base, whereas it was 2.70c. a week ago.

Pipe.—Boston has yet to award approximately 2000 tons of pipe and fittings, bids for which were opened last month. Pawtucket, R. I., has awarded Allen & Reed, Inc., Providence, R. I., a contract for its new water system calling for approximately 700 tons of pipe. The contractor is still negotiating. Massachusetts opens bids Jan. 12 on about 400 tons of 6 to 12-in. pipe for a State hospital. Private water pipe business is good, with small lots of 4-in. pipe going at $45.10 to $46.10 a ton delivered to common Boston freight rate points, and 6 to 12-in. stock at $41.10 to $42.10. On large tonnages, however, foundries are cutting these prices, especially when competing with Southern pipe makers, who are again active in New England. The Charles H. Tenny interests are reported to have bought 2000 tons of gas pipe.

Cold Rolled Strip Steel.—Makers of cold rolled strip steel report good bookings and anticipate a satisfactory volume of sales during the next three or four months.

Mill Prices on Cold-Rolled Strip in North Atlantic States: In 1 to 3-ton lots, 3.25c. per lb., base Pittsburgh, and also, 3.25c. to 3.40c. per lb., base Worcester, Mass.

Old Material.—Business is less active than it was a month ago. Most dealers are holding material for higher prices. In contrast with such expectations, the market for some grades is weaker. Strictly No. 1 heavy melting steel, which a week ago sold as high as $9.50 a ton on cars, shipping point, today is mostly $9, with an occasional sale at $9.25. The withdrawal of a Portland, Me., rolling mill from the market has weakened prices for street car axles, while textile machinery cast is so plentiful the price has dropped about $1 a ton to $14 to $14.50 a ton, delivered. Good breakable No. 1 machinery cast is bringing $15 a ton, delivered, but ordinary grades generally go at $14. A Buffalo consumer is bidding $14.50 a ton, delivered, for railroad malleable, but that price is out of line with the New England delivered price of $13 to $13.50. Prices on pipe have an unusually wide spread. Some brokers are paying $8 to $8.50 a ton on cars, while the best others offer is $7.50 to $8. The latter price has predominated in recent transactions.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.25
Scrap rails	8.75 to 9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.60 to 6.00
Forge flashings	6.00 to 6.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Street car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Rails for rerolling	10.00 to 10.50
Cast iron borings, chemical	10.00 to 10.50

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	14.00 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Railroad malleable	13.00 to 13.50

Buffalo

Increase in Steel Plant Operations —Pig Iron Steady

BUFFALO, Jan. 10.—Pig iron prices are holding at $17 base for foundry and $17.50 for malleable for this district. An inquiry for 4000 tons has been issued by the Baldwin Locomotive Works. A Toronto inquiry is for 1000 tons of foundry and malleable, and an inquiry from a northern New York consumer is for 500 tons of foundry. Another inquiry for 500 tons of foundry is also pending.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—A better tone is noticeable and there has been an increase in operations. On bars,

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

shapes and plates 1.90c. is holding firmly and considerable business has been placed. Increase in automobile production accounts for some of this. Operations of sheet mills are now at about 80 per cent. It is reported that 1500 tons of reinforcing bars for the Hecker-Jones-Jewell mill and elevator has been placed. A new hospital at Marcy, N. Y., will require 300 tons of reinforcing bars and 560 tons of structural steel.

Old Material.—A mill which has been restricting scrap shipments is now accepting some tonnage. The market is particularly weak for stove plate, cast scrap and the various foundry grades. There has been an increase in open-hearth furnace operation, and dealers look for steel scrap purchasing before the end of the month. Railroad lists of the Erie and New York Central, which closed last week, brought fairly good prices. Some of the dealers, short on heavy melting steel, bought this grade, paying more for it than the price obtained by them as sellers.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.75 to 14.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	11.50 to 12.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.25 to 13.50
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 15.75
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	14.75 to 15.25
Low phosphorus billet and bloom ends	15.75 to 16.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Pacific Northwest

Construction Activities Appear Promising for This Year

SEATTLE, Jan. 6 (*By Air Mail*).—The industrial outlook for the Pacific Northwest is regarded as encouraging. A large amount of State and county work, most of which will take more or less steel, is planned, while the local building outlook is quite promising, with work in prospect totaling about $15,000,000. Pulp and paper mills to be built in Washington this year will take considerable steel, one job already placed calling for 1500 tons.

Although demand for steel during the last two or three months has been light, prices have held quite steadily, except for the recent revision to meet the method of quoting now practised by the Bethlehem Steel Co., which has brought plates and shapes down about $2 a ton on a delivered basis.

Pig Iron.—Very little is doing in the local foundry trade, and only occasional small lots of pig iron are being sold. Utah basic and No. 2 foundry are quoted at $24 to $25 per gross ton, delivered Seattle.

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing bars	2.90c.
Black sheets (No. 24)	4.50c.
Galvanized sheets (No. 24)	5.00c.
Blue annealed sheets (No. 10)	3.75c.
Rivets, button and cone head	5.00c.
Rivets, tank	55-5 per cent off list
Common wire nails, base per keg	$3.25
Cement coated nails, 100-lb. keg	3.25

Plates.—The local market is quiet and not much work is in sight. The water line for the new pulp mill at Port Townsend, Wash., will be two-thirds wood and one-third steel, the latter amounting to 700 tons; it was taken by the Bethlehem Steel Co. Tank plates are quoted at 2.25c. to 2.30c., Seattle.

Structural Shapes.—The largest job placed in the week was 2300 tons for two bridges for the Simpson Logging Co., one over Vance Creek and the other over the Skokomish River, both in Washington, and taken by the United States Steel Products Co. Work on which bids have gone in includes 1500 tons of shapes for the new pulp and paper mill of the Pacific Bag & Paper Co. at Tacoma, Wash., and the new Northern Life Building, 2200 tons. Plain material is 2.30c. to 2.35c., Seattle.

Bars.—Bids are expected to be asked in a week or so on about 2500 tons of reinforcing steel for the Bon Marche department store. Work pending includes about 1000 tons for the Weaver Street bridge in Seattle, 1000 tons for the Beacon Hill tunnel, Seattle, and about 700 tons for an addition to the Elks' Temple in Seattle. Reinforcing steel bars are 1.85c. to 2.25c., the price depending on the size and desirability of the order.

Sheets.—Prices are somewhat uneven, with No. 24 galvanized usually at 4.35c., No. 24 black at 3.50c. and blue annealed at 2.75c., all c.i.f. Seattle.

Hoops and Bands.—The local market is disturbed by foreign competition at prices much lower than those named by domestic mills. Domestic hoops and bands are quoted at 2.73c., Seattle.

Warehouse Business.—Local jobbers report trade as only fair, but are looking for early betterment following the inventory period, when stocks carried by consumers will have to be replenished.

Old Material.—The local scrap market is practically stagnant. The Pacific Coast Steel Co., the leading local consumer, is said to be covered for three months or longer. In the absence of sales nominal prices are as follows: Heavy melting steel, $9.50 to $10, and cast iron scrap, $12.50 to $13, delivered, Seattle.

Detroit Scrap Prices Higher; Pig Iron Shipments Larger

DETROIT, Jan. 10.—Increased buying, while not in large tonnages, has given the scrap market in this district added strength with the result that most grades registered an increase of 25c. a ton.

Automobile production is on a higher basis and pig iron shipments in the district for the month will be larger than any month since July.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$12.00 to $12.50
Borings and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	16.00 to 17.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.75 to 11.25
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Navy Asks for Bids on Steel

WASHINGTON, Jan. 10.—The Bureau of Supplies and Accounts, Navy Department, has asked for bids, to be opened on Jan. 17, for 2317 tons of special treatment steel plates; 300 tons of steel shapes and 56 tons of steel flats. The plates are for use in modernizing the battleships Oklahoma and Nevada and are to be delivered to the Philadelphia and Norfolk, Va., navy yards. The shapes and flats are to be used in the construction of light cruisers Nos. 28 and 29, building at Mare Island, Cal., and Puget Sound, Wash., navy yards, where the steel is to be delivered by the bidders.

Of 2700 employees of the Commonwealth Steel Co., Granite City, Ill., 1076 have a service record with that company of from five to 25 years.

Declares Freight Rates on Crop Ends Should Be Same as for Billets

WASHINGTON, Jan. 10.—Rates on standard and less than standard lengths of square round-cornered iron and steel billets, in mixed carloads, shipped in Official Classification territory, are unduly prejudicial to the extent that they exceed the applicable commodity rates on billets weighing 150 lb. and over in carloads, according to a proposed report to the Interstate Commerce Commission by George M. Curtis, attorney-examiner. The report followed a complaint by the Carnegie Steel Co., the Illinois Steel Co. and the Interstate Iron & Steel Co., while the Donner Steel Co. and the Central Alloy Steel Corporation intervened on the side of the other producers. The question at issue related to what constituted crop ends within the meaning of the description of them in applicable commodity tariffs. The railroads, since Jan. 1, 1927, have charged the regular commodity billet rates on standard length and the fourth class less-than-carload rate on shipments of less than standard-length billets when shipped in mixed carloads, assessing the same rate for the crop ends as for iron and steel bars.

The steel companies contended that the shorter lengths are crop ends under the commodity tariff description. The railroads maintained that they are not crop ends unless the end or fishtail be left attached as a part of the short length containing usable sound billet material. The attorney-examiner said that it is apparent that the weight of the fishtail, "which is mere scrap, is relatively small as compared with the shorter lengths in the cutting of the standard billets of dimensions that will permit the forgers to separate them into usable multiple lengths. There appears to be no sound reason for shipping the usual imperfect ends as a part of the shorter lengths." The railroads also had contended that the short-length pieces of billets are not readily distinguishable in the car from iron and steel bars. The examiner declared that the complainants and interveners, in good faith, shipped the shorter lengths of billets as crop ends under their interpretation of what constituted crop ends under the provisions of the tariffs that permitted the shipment of imperfect ends with billets at billet rates and which did not specifically state that a crop end must be in whole or in part of imperfect metal.

Black & Decker Mfg. Co. Acquires Van Dorn Electric Tool Co.

The Van Dorn Electric Tool Co., Cleveland, manufacturer of portable electric tools, has been acquired by the Black & Decker Mfg. Co. of Towson, Md. Assets of the two companies are placed at $6,000,000. The Black & Decker company has specialized in the manufacture of portable electric drills and other associated tools, and has been closely connected with the automotive trade, while the Van Dorn Electric Tool Co. has built a line of electric drills, electric reamers and other similar tools to meet the demands of large industrial enterprises such as automobile factories, shipyards, locomotive shops, car shops, etc.

S. Duncan Black, president Black & Decker Mfg. Co., announces that there will be no changes in personnel or general activities of the two organizations. Included in the purchase of the Van Dorn Electric Tool Co. are the factories, complete tool equipment, inventories, land and all assets as of the date of purchase. Van Dorn electric tools of the same styles and designs will continue to be manufactured at the Cleveland plant, having the same Van Dorn identity as heretofore, and will be marketed through the existing Van Dorn sales organization and distributers. Likewise there will be no changes in the Black & Decker line of products or sales and distributing organization and each company will continue its activities as in the past.

Franklin Schneider will continue as president of the Van Dorn Electric Tool Co., and F. H. Zulauf will be vice-president and general sales manager. Lyman Bellows is sales promotion manager.

The Black & Decker Mfg. Co., whose production plants and administrative offices are at Towson, Md., have branches in 17 cities in the United States and Canada, a warehousing and distributing plant on the Pacific Coast, a manufacturing plant in Canada and a subsidiary, Black & Decker, Ltd., of Slough, Bucks, England. R. W. Procter is sales manager of the Black & Decker company, and W. C. Allen is sales supervisor.

54,000 Tons of Cast Iron Segments Ordered for Tunnel

The Mason & Hanger Co., New York contractor, which will build the Fulton Street tunnel as a part of New York's subway system, has contracted with the Bethlehem Steel Co. and the Davies & Thomas Co., the latter of Catasauqua, Pa., for 54,000 tons of cast iron segments, the order being divided equally. The contractor has also awarded to the American Bridge Co. an order for tunnel shields, amounting to about 9000 tons of fabricated plates and shapes, while 2000 tons of special bolts will be furnished by the Oliver Iron & Steel Co., Pittsburgh. Deliveries will extend over a long period as the contracting company has four and a half years in which to complete the tunnel.

C. M. Schwab Honored by Arbitration Association

Charles M. Schwab was the guest of honor at a luncheon of the American Arbitration Association at Hotel Astor, New York, Jan. 5. When a movement to promote arbitration of business disputes was launched six years ago, Mr. Schwab gave it support, although other leading business men regarded the idea as visionary. For the initial printing expenses of the association Mr. Schwab contributed $500, and a year later he gave $5,000. Since that time he has continued to give his financial support and personal influence to promote the cause of arbitration.

"I have all respect for the courts," said Mr. Schwab in addressing the gathering, which included 500 members and guests of the association, "but I feel that it takes a real business man to decide a real business dispute. I would choose some one who knew something about the business to settle a controversy, not some one who needed to be educated to know something about that business."

In commenting on the essential honesty of most business men, Mr. Schwab said: "The American business man is honest, upright and square-dealing, and I have every confidence in him and in the prosperity and peace of our country. After 50 active years in business, I have not been soured by my experiences."

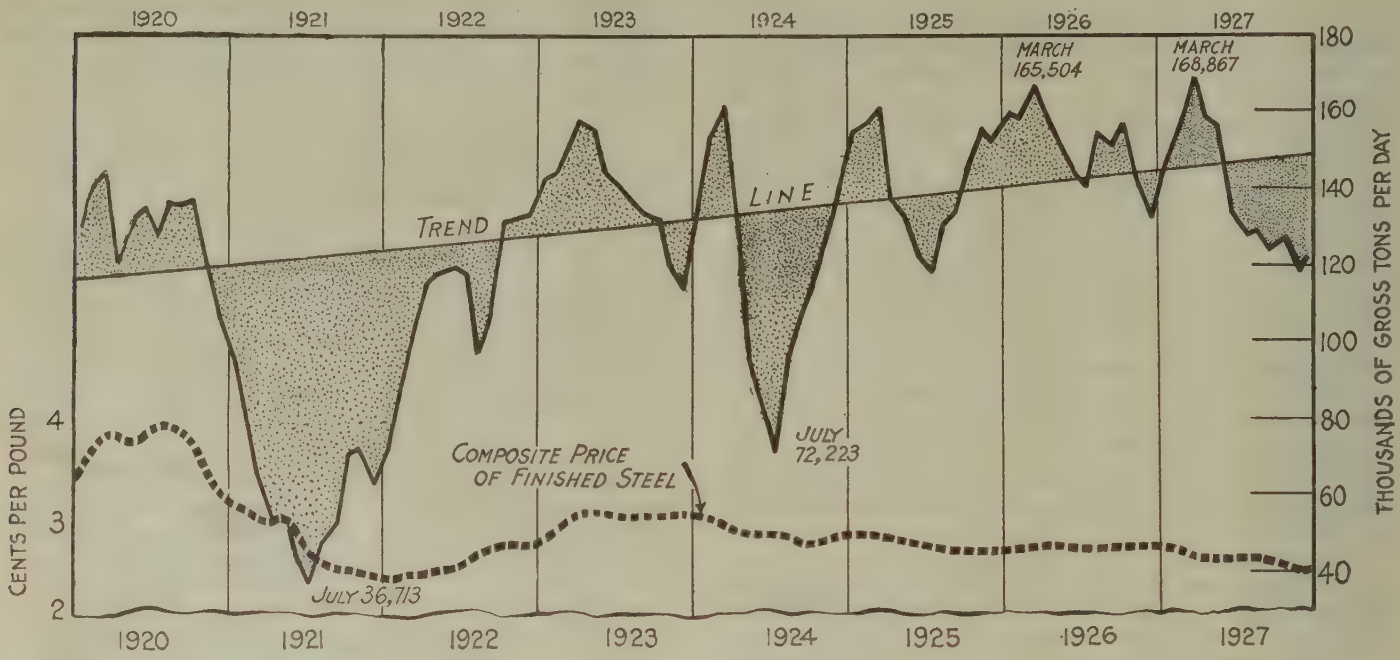
He said that he learned from Andrew Carnegie to approach life in a happy frame of mind and to seek the friendship of his fellow men. He recounted how Mr. Carnegie had received a letter from a director of his company complaining that the directors were not serious enough at board meetings. By way of reply, Mr. Carnegie, who was in Florence, Italy, at the time, sent a picture of a laughing monk to be hung in the board room. The accompanying advice was that whenever the directors felt serious-minded they should look at the picture and remember that the monk, possessing no worldly goods beyond his robe, could still laugh at life.

Mr. Schwab believes in arbitration of labor disputes, but said that in his company it had never been necessary to arbitrate, although there are provisions for doing so under the employee representation plan. In expressing his feeling of fellowship toward his workmen, he said: "The aristocracy of today is not one of birth or wealth, but is made up of those who do things for the welfare of their fellow men."

As a concluding ceremony of the luncheon, Felix M. Warburg, chairman of the board of directors of the society, presented a Commercial Peace medal to Mr. Schwab.

Production of bituminous coal in the United States in 1927 was more than 1 per cent above the average production of the five preceding years, as shown by the Bureau of Mines.

Production of Steel Ingots in December Showed Another Gain, the Third in the Second Half of 1927. It Still remains far below the line representing the calculated trend of consumption



Another Increase in Ingot Production

Daily Rate of 121,167 Tons Was 1.6 Per Cent Above November —Calendar Year, 7.7 Per Cent Under Last Year

PRODUCTION of steel ingots in the United States in December is calculated by the American Iron and Steel Institute at 3,150,345 gross tons. This is based on returns from companies which in 1926 produced 95.40 per cent of the total tonnage. With 26 working days, the December production was 121,167 tons a day. This compares with 119,299 tons in November and 126,500 tons in October, and with 133,337 tons a year ago. December was the third month in the second half of 1927 to show a gain, while the trend was steadily downward. August was 1 per cent above the daily rate of July and October was nearly 2 per cent above September. Thus the last six months showed alternate losses and gains.

For the calendar year, the calculated output is given by the institute at 43,040,916 gross tons, or an average of 138,395 tons a day. This represents a decline of 8.3 per cent below the calculated figures for 1926, which stood at 46,936,205 tons, or an average of 150,920 tons a day. This drop is reduced to 7.7 per cent when allowance is made for the electric and crucible ingot tonnage, which no longer is reported by the institute, but which was reported in 1926.

Bessemer steel showed a decline of 10.5 per cent from 1926; open-hearth steel, of 7 per cent.

Estimating production in December of electric and crucible steel ingots at 700 tons a day, the December total ingot output would appear to be about 122,000 tons a day. This is nearly 9 per cent under the figure for December, 1926. Details of the past two years are shown in the table.

Production of Steel Ingots

(Gross Tons)

	Reported by Companies Which Made 95.40 Per Cent of the Steel Ingots in 1926		Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Months 1927	Open-Hearth	Bessemer		
Jan.	3,041,233	545,690	3,759,877*	144,611*
Feb.	3,042,232	565,201	3,781,376*	157,557*
March ..	3,701,418	590,716	4,499,092*	166,633*
April ...	3,340,852	565,634	4,094,849*	157,494*
May	3,272,810	557,683	4,015,192*	154,430*
June ...	2,822,477	486,047	3,468,055*	133,387*
July	2,595,692	436,446	3,178,342*	127,134*
Aug.	2,805,657	505,584	3,470,903*	128,552*
Sept. ...	2,611,976	471,455	3,232,108*	124,312*
Oct.	2,641,920	495,798	3,289,013*	126,500*
Nov.	2,477,253	481,830	3,101,764*	119,299*
Dec.	2,557,130	448,299	3,150,345*	121,167*
Total..	34,910,650	6,150,383	43,040,916*	138,395*
1926				
Jan.	3,326,846	581,683	4,132,210	158,931
Feb.	3,023,829	556,031	3,785,051	157,710
March ..	3.590,791	635,680	4,468,617	165,504
April ...	3,282,435	601,037	4,105,799	157,915
May	3,201,230	516,676	3,927,979	151,076
June ...	3,036,162	498,764	3,734,153	143,621
July	2,911,375	526,500	3,634,993	139,807
Aug. ...	3,145,055	627,273	3,986,966	153,345
Sept. ...	3,089,240	612,588	3,913,383	150,515
Oct.	3,224,584	630,526	4,074,544	156,713
Nov.	2,915,558	592,239	3,705,744	142,529
Dec.	2,788,479	493,172	3,466,766	133,337
Total..	37,535,584	6,872,169	46,936,205	150,920

*Excluding crucible and electric steel ingots.

1927 Production of an American Tin Plate Plant in India

The Tin Plate Co. of India, Ltd., Golmuri works, Jamshedpur, India, made 925,000 boxes of sheared and acceptable black plate in the year 1927. This production was made with less than 1.5 Europeans per hot mill per shift, and the plant was shut down one week in the middle of the summer for a general overhauling. The above production was therefore made in 51 weeks. The plant consists of six double mills with mechanical doublers, as described in THE IRON AGE of Oct. 30 and Nov. 6, 1924, in extracts from a paper on "An American Tin Plate Plant in India," read by Frank L. Estep, New York, before the American Iron and Steel Institute.

Decline in Industrial Coal Stocks

Bituminous coal stocks in industrial hands are estimated by the National Association of Purchasing Agents to have decreased about 3,400,000 tons between Nov. 1 and Dec. 1, to a total of 55,225,000 tons, which is the lowest for any recent month. Industrial consumption during November is estimated at 35,514,000 tons, or about 1 per cent less than in October. Production of November is given at 47,100,000 tons. It is estimated that the steel mills have on hand a supply for about 55 days, the by-product coke plants and the railroads for about 41 days, electric utilities and coal-gas plants for 69 days and other industries for 47 days.

DECEMBER PIG IRON DATA

Steel-Making Iron Made Last Month—Manganese Alloy Output Expanded—Capacity Active on Jan. 1

BELOW are additions to pig iron data for December, published in THE IRON AGE Jan. 5. The amount of steel-making pig iron made last month was 1,987,652 gross tons, or 64,818 tons per day. This compares with 1,938,043 tons, or 64,600 tons per day, made in November. The total steel-making pig iron produced in 1927 was 27,345,888 tons, which is 2,725,256 tons, or about 9 per cent, less than the 30,071,144 tons made in 1926. Details are given in one of the tables.

Capacity Active on Jan. 1

Later returns show that one more furnace went out of blast in December—the Utah furnace of the Columbia Steel Corporation—bringing the number active on Jan. 1, 1928, to 169. It is estimated that the capacity of these 169 furnaces was 86,835 tons per day, as compared with 87,700 tons per day for the 170 furnaces active on Dec. 1, 1927.

Larger Ferromanganese Output

More ferromanganese was made in December than in any month since August. The total was 20,992 tons, bringing the 1927 production to 291,840 tons. This compares with 315,828 tons made in 1926. The December spiegeleisen output was also the largest since August at 6816 tons. The 1927 total was 99,368 tons, which exceeds the 1926 production of 74,096 tons by over 32 per cent.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1926		1927	
	1926	1927	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,599,876	2,343,881	29,129	7,746	31,844	7,486
Feb. ...	2,272,150	2,256,651	22,309	7,084	24,560	7,045
Mar. ...	2,661,092	2,675,417	24,064	7,339	27,834	7,650
Apr. ...	2,677,094	2,637,919	24,134	7,051	24,735	12,907
May ...	2,687,138	2,619,078	23,159	6,999	28,734	9,788
June ...	2,465,583	2,343,409	25,378	5,864	29,232	10,535
½ year.	15,362,933	14,876,355	148,173	42,083	166,939	55,411
July ...	2,461,161	2,163,101	26,877	3,699	26,394	9,350
Aug. ...	2,424,687	2,213,815	23,557	4,372	21,279	9,104
Sept. ..	2,436,733	2,090,200	25,218	2,925	20,675	6,037
Oct. ...	2,578,830	2,076,722	28,473	6,295	17,710	6,129
Nov. ...	2,484,620	1,938,043	31,903	7,565	17,851	6,521
Dec. ...	2,322,180	1,987,652	31,627	7,157	20,992	6,816
Year..	30,071,144	27,345,888	315,828	74,096	291,840	99,368

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*Includes output of merchant furnaces.

Coke Furnaces in Blast

	Jan. 1		Dec. 1	
Furnaces	Number in Blast	Capacity per Day	Number in Blast	Capacity Per Day
New York:				
Buffalo	12	5,060	14	6,250
Other N. Y. and Mass.	2	800	2	835
New Jersey..........	0	.....	0	....
Pennsylvania:				
Lehigh Valley.......	4	2,110	4	2,070
Spiegeleisen	1	220	1	200
Schuylkill Valley....	4	1,425	4	1,475
Susquehanna Valley.	2	960	2	940
Ferromanganese ..	1	65	1	65
Lebanon Valley	0	....	0	....
Ferromanganese ..	0	....	0	....
Pittsburgh District..	27	16,565	27	16,500
Ferro. and Spiegel	2	330	2	335
Shenango Valley....	5	2,250	4	1,830
Western Pennsylvania	5	2,815	6	2,860
Ferromanganese ..	2	280	1	195
Maryland	5	2,360	5	2,310
Wheeling District......	6	3,690	6	3,660
Ohio:				
Mahoning Valley....	12	7,200	12	7,450
Central and Northern	17	9,800	17	10,210
Southern	4	1,065	4	1,100
Illinois and Indiana...	27	17,350	27	17,170
Mich., Wis. and Minn..	7	3,040	7	2,850
Colo., Mo. and Utah...	3	1,300	3	1,290
The South:				
Virginia	1	220	1	235
Ferromanganese ..	0	....	0	....
Kentucky	1	370	1	360
Alabama	18	7,360	18	7,310
Ferromanganese ..	0	....	0	....
Tennessee	1	200	1	200
Total	169	86,835	170	87,700

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1923—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84.358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year....	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	95,199
Aug.	111,274	60,875	87,241	103,241	95,073
Sept.	104,184	68,442	90,873	104,543	92,498
Oct.	101,586	79,907	97,528	107,553	89,810
Nov.	96,476	83,656	100,767	107,890	88,279
Dec.	94,225	95,539	104,853	99,712	86,960
Year	109,713	85,075	99,735	107,043	99,266

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
November, 1926........	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,818	22,142	86,960

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*Includes pig iron made for the market by steel companies.

Shifting Currents in Pig Iron Imports

Imports of pig iron in November, at 16,142 tons, showed a decline of less than 9 per cent from November, 1926, in spite of the fact that imports for the 11 months ended Nov. 30 were less than 28 per cent of the corresponding total in 1926. November imports in 1927 were about one-seventh of the total for the first 11 months, whereas in 1926 the November tonnage was only one-twenty-fifth that of the 11 months.

India furnished more than half the total incoming tonnage in November, contrasted with only one-ninth of the total last year. In November, 1926, Germany furnished more than half of the total, contrasted with only a little over 2 per cent a year later. As a matter of fact, Germany's pig iron shipments reaching the United States in November, 1926, came within 10 tons of the total from Germany reaching the United States in the first 11 months of 1927.

In the 11 months India has furnished us with just under half our total imports. Netherlands has supplied almost half the remainder and Great Britain more than half that not furnished by India and Netherlands. In contrast with this, Germany led in 1926 with more than one-third the total for the first 11 months. Great Britain was second, India third, and Netherlands fourth.

Imports of Pig Iron by Countries of Origin
(Gross Tons)

	Nov., 1927	Nov., 1926	11 Months Ended November	
			1927	1926
India	9,245	1,879	58,583	83,108
United Kingdom	3,173	4	18,388	92,043
Germany	340	9,701	9,711	146,876
France	.....	1,116	3,000	28,449
Netherlands	2,882	2,955	25,929	65,355
Sweden	502	25	1,673	2,950
Canada	.....	530	689	4,719
Belgium	.....	1,350	699	7,488
All other	.....	.....	97	2
Total	16,142	17,560	118,769	430,990

Shipments of electric industrial trucks and tractors in December are reported by the Department of Commerce at 96, compared with 98 in November and with 118 a year earlier. Totals for the two years were 1259 in 1927 and 1415 in 1926, showing a decline of 11 per cent. There was a drop of 188, or 14½ per cent, in domestic shipments, but a gain of 32, or 32½ per cent, in exports, which advanced from 98 to 130 units.

FABRICATED STRUCTURAL STEEL

Year's Business Opens With 44,500 Tons of Awards and 45,500 Tons of New Projects

Business for the year has begun with a good tonnage of both awards and new projects. A total of 44,500 tons is reported closed in the past week and new projects call for about 45,500 tons. One of the largest contracts placed was 9000 tons for the Fulton Street tunnel in New York. Among the larger inquiries is 7800 tons for a subway section in the Bronx, New York, and 8000 tons for a building in Chicago. Awards follow:

Thomaston, Me., 150 tons, Lawrence Cement Co. plant unit, to New England Structural Co.

Lawrence, Mass., 400 tons, two Boston & Main Railroad bridges, to Boston Bridge Works, Inc.

Somerville, Mass., 400 tons, high school addition, to Boston Structural Steel Co., Inc.

Cambridge, Mass., 100 tons, garage for Windshield Co., to New England Structural Co.

Boston, 500 tons, North Station, to American Bridge Works.

State of Vermont, 300 tons, three State bridges, to Standard Engineering & Construction Co., Toledo.

New York, 19,270 tons reported to the Structural Steel Board of Trade; 11,920 tons in the following awards not previously reported: Apartment buildings at 118 East Fortieth Street, at Fifty-fifth Street and First Avenue and at 440 West Thirty-fourth Street, to Paterson Bridge Co.; West Thirty-sixth Street station of New York Edison Co., to Levering & Garrigues Co.; Neurological Institute on Fort Washington Avenue and school on Reservoir Avenue, to Hedden Iron Construction Co.; babies' hospital at Broadway and 168th Street, to A. E. Norton, Inc.; apartment buildings at 141 West Seventy-ninth Street, 136 East Seventy-ninth Street, 1070 Park Avenue, 3 East Eighty-fourth Street, 323 East Forty-third Street and on Montgomery Place in Brooklyn, business building at 142 West Fifteenth Street, garage at 2236 Nostrand Avenue in Brooklyn and building at Greenspoint Avenue and Queens Boulevard, to Harris Structural Steel Co.; boiler house for Brooklyn Edison Co. on Hudson Avenue, Brooklyn, factory building in Columbia Heights, Brooklyn, high school at Oyster Bay, L. I., ice storage building at 512 West Nineteenth Street and school at Forest Hills, L. I., to McClintic-Marshall Co.; Masonic Temple at Forest Hills, laundry building on Seventh Avenue, Brooklyn, and theater at 243 West Forty-seventh Street, to George A. Just Co.

New York, 9000 tons, Fulton Street tunnel, reported let to American Bridge Co.

New York, 2500 tons, commerce building for College of the City of New York, to an unnamed fabricator.

Perth Amboy, N. J., 150 tons, factory building, to Belmont Iron Works.

Philadelphia, 500 tons, building for Broad Street Trust Co., to Montgomery Iron & Steel Co.; reported last week to an unnamed fabricator.

Dover, N. J., 110 tons, viaduct for State Highway Commission, to Fort Pitt Bridge Works.

State of New Jersey, 115 tons, highway bridges, to Bethlehem Steel Co.

Philadelphia, 100 tons, building for Quaker City Iron Works, to Belmont Iron Works.

Harrisburg, Pa., 1750 tons, North office building, to Lehigh Structural Steel Co.

Chicago, 1800 tons, addition to Illinois Bell Telephone Co. building, to Hansel Elcock Co.

State of Vermont, 350 tons, two highway bridges, to Shoemaker Bridge Co.

Southern Railway, 100 tons, bridges, to Virginia Bridge & Iron Co.

Hopewell, Va., 300 tons, building for Atmospheric Nitrogen Co., to Virginia Bridge & Iron Co.

Nazareth, Pa., 180 tons, pack house for Nazareth Cement Co., to Bethlehem Construction Co.

State of Texas, 1000 tons, tanks for Standard Oil Co. of New Jersey, to an unnamed fabricator.

Memphis, Tenn., 300 tons, pontoons for Mississippi River Commission, to Mississippi Valley Structural Steel Co.

Cincinnati, 1300 tons, Eighth Street viaduct, to McClintic-Marshall Co.

Cincinnati, 600 tons, building for Young Women's Christian Association, to McClintic-Marshall Co.

Cleveland, 230 tons, garage for Cleveland Railway Co., to Austin Co.

Pomeroy, Ohio, 1000 tons, bridge over Ohio River, to Mount Vernon Bridge Co., Mount Vernon, Ohio.

Duluth, Minn., 700 tons, additions and improvements for Zenith Furnace Co., to Lackawanna Structural Steel Co., Buffalo.

St. Paul, Minn., 1000 tons, Cedar Avenue bridge, to Crown Iron Works, local.

Chicago, Rock Island & Pacific, 500 tons, two bridges, to American Bridge Company.

LaCrosse, Wis., 400 tons, Hunter's bridge over Black River, to George E. Palmer Co., Minneapolis.

Seattle, 2100 tons, two bridges over Vance Creek and Snohomish River for Simpson Logging Co., to United States Steel Products Co.

Port Townsend, Wash., 2800 tons of steel plates for city water line, to Steel Tank & Pipe Co.

Foss, Ore., 350 tons, railroad logging bridge for Hammond Lumber Co., to Wallace Bridge & Structural Steel Co.

San Francisco, 175 tons plates, pontoon pipe for United States Engineer Office, to Pacific Coast Engineering Co.

San Francisco, 125 tons, apartment building, Hermann and Buchanan Streets, to Golden Gate Iron Works.

San Francisco, 130 tons, apartment building, California and Broderick Streets, to Central Iron Works.

San Francisco, 118 tons, apartment building, Pine and Hyde Streets, to Central Iron Works.

Los Angeles, 150 tons, Shaber Cafeteria building, 618 South Broadway, to Union Iron Works.

Long Beach, Cal., 1100 tons, apartment building, Ocean Boulevard, to McClintic-Marshall Co.

Bakersfield, Cal., 200 tons, hangars for Kern County, to Western Pipe & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

White River Junction, Vt., 1700 tons, bridge.

Cambridge, Mass., 175 tons, Third Street bridge.

Fitchburg, Mass., 200 tons, theater and stores.

Stamford, Conn., 125 tons, service station.

Scarsdale, N. Y., 225 tons, school.

New York, 7800 tons, section 1, route 106, subway in Bronx; bids close Jan. 27.

New York, 1400 tons, office building at Broadway and Fourteenth Street.

New York, 1000 tons, theater at Third Avenue and Fifty-eighth Street.

New York, 725 tons, business building at Third Avenue and 189th Street.

New York, 350 tons, loft building at 427 West Fifty-fourth Street.

New York, 200 tons, office building at Sedgwick Avenue and 167th Street.

New York, 100 tons, bank building at Ninth Street and Sixth Avenue.

East Orange, N. J., 1000 tons, apartment building.

Philadelphia, 500 tons, Northeast Title & Trust Co. building.

New York Central Railroad, 2000 tons, bridge at South Bend, Ind.

Rochester, N. Y., 700 tons, high school.

Detroit, 4000 tons, Detroit-Windsor tunnel.

Marcy, N. Y., 560 tons, United States hospital; Felton Construction Co. low bidder.

Marinette, Wis., 500 tons, Chandler-Ogden bridge connecting with Menominee, Mich.; Klug & Smith Co., Milwaukee, engineer.

Chicago, 3000 tons, Willoughby Building, Madison Street and Michigan Avenue.

Chicago, 1800 tons, addition to Illinois Bell Telephone Co. building.

Chicago, 3000 tons, addition to Drake Hotel.

Chicago, 8000 tons, Forman Building; Graham, Anderson, Probst & White, architects.

St. Louis, 500 tons, Arsenal Street viaduct.

Chappell, Tex., 500 tons, highway bridge.

Quanah, Tex., 500 tons, power house for Lake Paulina Power Co.

Stege, Cal., 110 tons, plant for Western Industries Co.; bids opened.

Seattle, 2200 tons, Northern Life Insurance Building; bids opened.

Tacoma, Wash., 500 tons, plant for Union Bag & Paper Co.; bids being received.

Tacoma, 1500 tons, for Pacific Bag & Paper Co.

Ellensburg, Wash., 155 tons, Kittitas Main Canal, United States Bureau Reclamation; bids Feb. 10.

Port Townsend, Wash., 400 tons plates, additional, for pipe line.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Jan. 10	Jan. 9	Jan. 7	Jan. 6	Jan. 5	Jan. 4
Lake copper, delivered	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.87½	13.87½	13.87½	13.87½	13.87½	13.87½
Straits tin, spot, N. Y.	56.12½	56.75	....	56.50	56.62½	57.37½
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.30	6.30	6.30	6.30	6.30	6.30
Zinc, New York	6.00	6.02½	6.00	6.00	6.00	6.00
Zinc, St. Louis	5.65	5.67½	5.65	5.65	5.65	5.65

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Jan. 10.—Thus far this year the markets have been generally quiet but firm. A spurt of buying appeared in copper last week, but the market has turned quiet again, with prices steady. Tin quotations are lower, with buying fairly good. The lead market is quiet and unchanged. Demand for zinc is very light, but prices remain steady.

Copper.—Late last week a fair demand for electrolytic copper sprang up, particularly from abroad, and as a result the market was firmly established on a basis of 14.12½c., delivered in the Connecticut Valley. Practically no metal is available below this level. Domestic demand was better last week, but thus far this week inquiry and buying have been light and the market is very quiet. The quotation for Copper Exporters, Inc., is unchanged at 13.50c., c.i.f., usual European ports. Lake copper is quiet but firm at 14.25c., delivered.

Tin.—Sales for the week ended Saturday, Jan. 7, were fairly good, amounting to about 1100 tons. Friday was probably the best day at 350 tons, with 150 tons sold on Saturday. Purchases were confined largely to two or three consumers. Fair buying by one consumer on Thursday, Jan. 5, was followed by purchases from another on Friday and Saturday. Dealers left the market almost entirely alone, and the rank and file of consumers were uninterested. Yesterday, Monday, the market was stagnant, with about 100 tons sold, and today it was also very quiet, with spot Straits tin quoted at 56.12½c., New York. London quotations today were: Spot standard, £254 10s; future standard, £254, and spot Straits, £254 10s. The Singapore price was £260 5s.

Lead.—Demand is very light and producers are not inclined to force the market. The quotation of the leading interest is continued unchanged at 6.50c., New York, as its contract price, and independent producers are quoting 6.30c. to 6.32½c., St. Louis.

Zinc.—Buying of prime Western zinc is very moderate and the market is exceedingly quiet but very steady, with quotations holding fairly firm at 5.65c., St. Louis, or 6c., New York, for early delivery. There is a slight premium for future positions. Ore at Joplin is quoted at $35, with production and sales about 7000 tons each last week.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Chinese metal for all positions is quoted at 11.25c., New York, duty paid.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 10.—Sales are moderately active except in tin and zinc. Prices for tin are off 1c. and antimony has advanced. The old metal market is quiet and prices are unchanged.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 58c.; lead, 6.40c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.00c. to 59.00c.
Tin, bar	60.00c. to 61.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	63.75c.
Tin, bar	65.75c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	67.75c.
Solder, ½ and ½	37.75c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since the revision of Dec. 5. There has been no change in the zinc and lead full sheet prices since Aug. 5 and Dec. 1, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

REINFORCING STEEL

More Than 21,000 Tons of Awards and About 6000 Tons of Bars In New Projects

In the total of 21,300 tons of awards in the past week, those outstanding were 8500 tons for the Coyote Point bridge across San Francisco Bay and 3700 tons for the Eighth Street viaduct in Cincinnati. Only two of the new projects, totaling close to 6000 tons, call for as much as 1000 tons. A bridge and a tunnel, both in Seattle, will take 1000 tons each. Awards follow:

Ocean City, N. J., 713 tons, boardwalk, to Truscon Steel Co.

Camp Devens, Mass., 500 tons, two battalion buildings, to Bancroft & Martin Rolling Mill Co.

Providence, R. I., 150 tons, jewelry manufacturing plant, to Truscon Steel Co.

Pittsburgh, 160 tons, warehouse for Donaldson Transfer & Storage Co., to Electric Welding Co.

Cincinnati, 3700 tons, Eighth Street viaduct, to Jones & Laughlin Steel Corporation.

Dayton, Ohio, 1500 tons, municipal sewage disposal plant, to West Virginia Rail Co.

Cincinnati, 125 tons, Linwood School, to Pollak Steel Co.

New Orleans, 200 tons, port of New Orleans, additions to wharves, to Connors Steel Co., Birmingham.

Chicago, 500 tons of rail steel bars, Providence High School, to Calumet Steel Co.

Chicago, 150 tons, Washington Park distribution station for Commonwealth Edison Co., to Concrete Steel Co.

Chicago, 200 tons of rail steel, Powhattan Hotel, to Inland Steel Co.

Milwaukee, 126 tons, University extension building, to Concrete Steel Co.

Milwaukee, 290 tons, Lincoln High School, to Concrete Steel Co.

Chicago, 170 tons of rail and billet steel bars, garage building on Howard Street, to Olney J. Dean & Co.

Denver, Colo., 285 tons, Bureau of Reclamation at Denver, United States Department of Interior (believed to be for use at Orland, Cal.), to Laclede Steel Co.

San Francisco, 8500 tons, Coyote Point bridge across San Francisco Bay, to Bethlehem Steel Co.

Oakland, Cal., 100 tons, mausoleum, Mount View Cemetery, to San Francisco jobber.

Seattle, 150 tons for Queen Anne High School, to Northwest Rolling Mills, Inc.

Seattle, 100 tons for bridge work, to Northwest Rolling Mills, Inc.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

New York, 120 tons, foundations for State office building at Center, Leonard, Baxter and Worth Streets; bids closed Jan. 10.

Philadelphia, 146 tons, building for La Salle College.

Philadelphia, 775 tons, building for Quaker City Cold Storage Co.; bids in.

Buffalo, 150 tons each, bridges at Bailey Avenue and Buffalo Creek; bids in.

Marcy, N. Y., 300 tons, United States hospital; Felton Construction Co., Buffalo, low bidder.

Chicago, 500 tons, warehouse for Meyer-Marvis.

Evanston, Ill., 100 tons, Pembridge Hotel.

Grafton, Wis., 120 tons, Milwaukee River bridge; bids close Jan. 31.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.50c.	12.875c.
Copper, light and bottoms	9.75c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	8.75c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

St. Louis, 600 tons, 350 tons rail and 250 tons billet steel, Arsenal Street viaduct over River Des Peres; Board of Public Service to open bids Jan. 17.

Seattle, 1000 tons, Weaver Street bridge.

Seattle, 1000 tons, Beacon Hill tunnel.

Seattle, 700 tons, Elks' Temple.

Seattle, 110 tons, addition to high school; bids received.

Seattle, 180 tons, garage, Fifth and Virginia Streets; bids received.

Ellensburg, Wash., 118 tons, Kittitas Main Canal, United States Bureau Reclamation; bids Feb. 10.

RAILROAD EQUIPMENT

Total of 1800 Cars Bought and 1000 Under Inquiry

The Southern Railway has awarded 500 automobile box cars in addition to 5450 ordered in December. The Texas & Pacific has closed on 1000 gondola, flat and automobile cars. Pending business includes 500 gondola cars for the Central of Georgia Railway and 500 flat cars for the Union Pacific.

Great Northern is in the market for six Mallet type locomotives.

New York, Ontario & Western will buy six 4-8-4 locomotives.

Chicago Great Western is asking for prices on 50 stock car underframes and five caboose car underframes.

Union Pacific will purchase 500 flat cars, 10 dining cars and 10 coaches.

Southern Railway has ordered 500 automobile box cars from American Car & Foundry Co. These are in addition to 5450 freight cars placed late in December.

Louisville & Nashville has placed an order for 100 ballast cars with Rodger Ballast Car Co.

Texas & Pacific has ordered 500 gondola cars from Pressed Steel Car Co.; 300 flat, 200 automobile and 10 platform caboose cars from American Car & Foundry Co., and three dining and five baggage and express cars from American Car & Foundry Co.

Pacific Fruit Express has placed an order for 100 underframes with Pacific Car & Foundry Co.

Texas Co. has ordered 200 insulated 10,000-gal. tank cars from American Car & Foundry Co.

Fruit Growers Express is in the market for 480 steel underframes.

Mobile & Ohio has ordered eight six-wheel switching locomotives and five Mikado-type locomotives from American Locomotive Co.

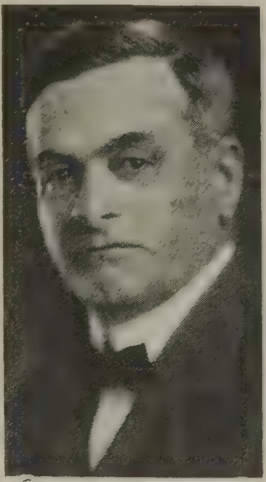
Central of Georgia Railway is in the market for 500 gondola cars.

Atchison, Topeka & Santa Fe will buy 200 underframes.

Rhode Island Industrial Safety Conference to Be Held Jan. 17

Methods for the prevention of industrial accidents in representative New England plants will be discussed at the Rhode Island Industrial Safety Conference, to be held at the Hotel Biltmore, Providence, on Jan. 17. Among the papers scheduled is one on "Relation of the Management to Accident Prevention," by Frank A. Viall, Brown & Sharpe Mfg. Co., Providence.

PERSONAL



C. D. DYER

Charles D. Dyer, for almost 25 years active in the affairs of the Shenango Furnace Co., Pittsburgh, and a well known figure in the merchant pig iron business as well as in the iron ore and Lake transportation industries, on Dec. 31 resigned as vice-president and director of the Shenango company and as a director of the Lake Carriers Association, the Lake Protective Association and the Great Lakes Towing Co. Mr. Dyer is not retiring from business, as he has several private interests to which he will devote his attention, and he will have an office at 616 Oliver Building, Pittsburgh. His leaving the interests with which he has been so closely identified for so many years, however, will be regretted by all with whom he has been associated, and the service he rendered during the war period will long be recalled. As president of the American Pig Iron Association in 1917 and 1918 and as Pittsburgh representative of the sub-committee of the American Iron and Steel Institute on pig iron, iron ore and Lake transportation, he worked in conjunction with the War Industries Board. Few were more active in the direction of pig iron production and distribution than Mr. Dyer. He was general freight agent of the Crucible Steel Co. of America in 1904, when he was selected by W. G. Park and the Union Trust Co., Pittsburgh, receivers for the Clairton Steel Co., as manager of that company. At the end of the receivership the company was taken over by the Carnegie Steel Co., and now is the Clairton works of that company. His ability in this activity attracted the attention of William P. Snyder, who had been president of the Clairton company, and with the termination of his duties as manager for the receivers, he joined the old Shenango Furnace Co., as assistant president under Mr. Snyder. When the present corporation was formed in 1906, he became vice-president and a director. He also has been secretary and a director of the Shenango Steamship Co. and will retain those offices. Besides being a director, he was a member of the executive committee of the Lake Carriers Association and the Great Lakes Towing Co. and of the advisory committee of the Lake Protective Association.

Kenneth Jensen has been appointed general manager of the Kensington Steel Co., Chicago, manufacturer of special and manganese steel castings. This is a newly created position. Mr. Jensen has had 10 years of experience in the engineering, manufacturing and selling departments of the company.

Percy C. Brooks, president of the E. N. T. Fairbanks Co., St. Johnsbury, Vt., has been elected a vice-president of Fairbanks, Morse & Co., Chicago.

Harry Dwight Smith, founder and president of Fuller & Smith, Cleveland, withdrew from the organization on Dec. 31, after an association with it of 20 years. His interests have been acquired by associates.

George W. McIntyre is in charge of a new sales office opened by the Reed-Prentice Corporation, Worcester, Mass., at 1508 New York Evening Post Building, 75 West Street, New York. He was identified for many years with the Niles-Bement-Pond Co., at New York and Chicago.

Francis J. Drago, associated in various capacities with the Jacobs Mfg. Co., Hartford, Conn., maker of chucks, in the past two years, has been made assistant treasurer of the company.

L. A. Green, formerly president L. A. Green Railway Equipment Co., Pittsburgh, has been appointed general manager of the Industrial Equipment Corporation, Carnegie, Pa.

Harry R. Patterson, for the past 15 years superintendent of the Rockdale works, American Steel & Wire Co., Joliet, Ill., has been appointed superintendent of the Rankin and Braddock, Pa., works, succeeding Edwin H. Broden, who has been appointed Pittsburgh district mill manager of the company. Mr. Patterson has been with the company for about 25 years and went to the Rockdale works from the Trenton, N. J., plant of the company.

Elmer C. Wayne, manager of the Pittsburgh office of Gould's Pumps, Inc., Seneca Falls, N. Y., has resigned and will be succeeded by John B. Foley, formerly his assistant. Mr. Wayne will become connected with the Pittsburgh office of the Massachusetts Mutual Life Insurance Co.

L. H. Waldrip has opened an office for the Driver-Harris Co., Harrison, N. J., at 7016 Euclid Avenue, Cleveland.

F. E. Flynn, manager of the strip steel departments of the Weirton Steel Co., Weirton, W. Va., has resigned to become assistant vice-president and general manager of operations for the Trumbull Steel Co., Warren, Ohio.

John Van Horne, recently in the Atlanta, Ga., office of the Lincoln Electric Co., Cleveland, has been transferred to Moline, Ill., where he will be located at 514½ Fifteenth Street, handling sales in Moline and Rock Island, Ill., and Davenport, Iowa.

Eugene D. Milener, for several years associated with the Consolidated Gas, Electric Light & Power Co., Baltimore, has been appointed industrial gas research representative for the American Gas Association, New York.

J. E. Lewis, president Harbison-Walker Refractories Co., Pittsburgh, has been elected a director of the American Arch Co., New York.

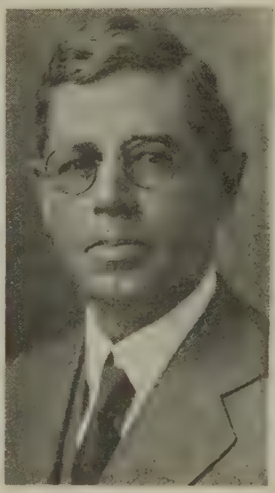
L. A. Quinn, who has been acting manager of the Birmingham, Ala., office of the Niles-Bement-Pond Co., New York, has been made sales manager in that district.

Edwin H. Broden has been appointed manager of the Pittsburgh district wire mills, American Steel & Wire Co., succeeding C. F. Blackmer, recently made general superintendent of wire mills. Mr. Broden was born in Cleveland and was graduated from the Central High School in that city, later taking special courses at Yale University. He has been with the American company and its predecessors for 33 years. He was chief draftsman H. P. Nail Co., Cleveland, from 1895 to 1898; chief draftsman and engineer in the Lake Shore district, Cleveland, from 1898 to 1901; assistant constructing engineer National Wire Corporation, New Haven, Conn., from 1901 to 1905; chief draftsman Newburgh Wire Works, Cleveland, from 1905 to 1906; chief draftsman Allentown works, Allentown, Pa., from 1906 to 1907; engineer attached to general superintendent's office, Pittsburgh, in 1907; assistant superintendent Rankin works, Braddock, Pa., from 1907 to 1913; superintendent Braddock works, Braddock, Pa., from 1913 to 1916, and superintendent Rankin works from 1916 to 1925. On Feb. 15, 1925, the Rankin and Braddock works were consolidated under one management and Mr. Broden was made superintendent, holding that position until his recent promotion. He is a member of the American Society of Mechanical Engineers and of American Iron and Steel Institute.

William Henry Harrison, formerly senior mining engineer of the United States Bureau of Mines, and later senior valuation and appraisal engineer of the Bureau of Internal Revenue, has resigned his connections with the Treasury Department and returned to private consulting practice, with offices in the National Press Building, Washington.

M. J. Schmitt, recently in charge of the Milwaukee branch of the Kearney & Trecker Corporation, Milwaukee, has been appointed assistant sales manager. He will continue to look after the Milwaukee territory and will be assisted by R. F. Shaw, who is being transferred from the Chicago branch.

George L. Pollock, vice-president and treasurer of the Burnside Steel Foundry Co., 1300 East Ninety-second Street, Chicago, resigned, Jan. 1, to become vice-president of the Nugent Steel Castings Co., 3100 South Wood Street, Chicago. He had been associated with the Burnside company since its founding. Previously he served for a time in the purchasing department of the Chicago, Burlington & Quincy Railroad and later was purchasing agent of the Wheeling & Lake Erie Railway, of the Chicago & Western Indiana Railroad and of the Belt Railway of Chicago.



G. L. POLLOCK

Horace A. Frommelt has been appointed director of personnel for the American Steel Foundries, Wrigley Building, Chicago, and much of his immediate work will be concerned with industrial training. He was for a number of years apprentice superintendent for the Falk Corporation, Milwaukee, and more recently has been engaged in consulting work at St. Louis.

W. A. Spuehler has been elected vice-president and treasurer of the Burnside Steel Foundry Co., Chicago, succeeding George L. Pollock. N. J. Finley has been named secretary of the company.

Arthur E. Hageboeck, secretary and treasurer of the Frank Foundries Corporation, Moline, Ill., was the speaker at the monthly meeting of the Wisconsin Gray Iron Research Group, held in Milwaukee on Jan. 11. His subject was "Cost Control in the Gray Iron Foundry."

A. G. Dulliver, night superintendent at the motor plant of the Chevrolet Motor Co., Flint, Mich., has been appointed superintendent of the motor division, succeeding Harry Nickerson, who has been made works manager for the Oakland Motor Car Co., at Pontiac, Mich. I. B. Smith has been named plant superintendent for the Oakland company.

Col. William A. Starrett, of Starrett Brothers, New York, will be the principal speaker at the January meeting of the Credit Association of the Building Trades of New York.

John T. Chidsey, president and general manager of the Root Co., Bristol, Conn., was recently the guest of honor at a banquet given by executives and foremen of the company, commemorating the twentieth anniversary of its present organization.

Harvey Hubbell, Jr., has been elected president and treasurer of Harvey Hubbell, Inc., Bridgeport, Conn., succeeding his father, the late Harvey Hubbell, Sr. The younger Mr. Hubbell was associated with his father in the management of the business for a number of years, and no changes in the established policies of the company are contemplated.

W. G. Guthrie has resigned as factory and production manager of the Peerless Motor Car Corporation, Cleveland, to become regional production manager for the General Motors Export Co. in Europe. He will have supervision of the company's manufacturing plants in Germany, France, Denmark, Sweden, Egypt and Spain. His headquarters will be in London. Previous to his association with the Peerless company, Mr. Guthrie was connected with the Buick and Oldsmobile divisions of the General Motors Corporation.

Earl F. Varnum, employment officer of the Commonwealth Steel Co., Granite City, Ill., has been made assistant to the general manager. He began his service with the Commonwealth company in 1910 as timekeeper and was assistant in the safety and fellowship department from Jan. 1, 1913, until May, 1915, when he was put in charge of the employment department, of which he will retain general supervision. Milton Allen, formerly assistant, succeeds him as employment officer.

Collis Johnson, sales manager for the Stockland Road Machinery Co., Minneapolis, has been appointed to a similar position for the Howard-Cooper Co., Portland, Ore.

Leonard W. Williams has retired from the pig iron firm of Park & Williams, Inc., Real Estate Trust Building, Philadelphia, and about Feb. 1 will become a partner in the firm of Stone, Williams & Kays, Philadelphia, which will deal in real estate. The firm of Park & Williams was organized in 1916 by Mr. Williams and Laird U. Park, and the latter will continue the business without change of name. The firm is sales agent for the merchant pig iron produced by the Alan Wood Iron & Steel Co., Philadelphia, and also district sales agent for the Superior Sheet Steel Co., Canton, Ohio, and the Vulcan Mold & Iron Co., Latrobe, Pa. Mr. Williams served under J. Leonard Replogle during the world war in the pig iron section of the War Industries Board.

Dr. John A. Mathews, vice-president Crucible Steel Co. of America, addressed the Indianapolis chapter of the American Society for Steel Treating on Jan. 9, his subject being "The Role of Chromium in Alloy Steels."

O. Z. Klopsch, associated with the Wolverine Tube Co., Detroit, spoke on "The Quenching of Steel" at a meeting of the Cincinnati chapter of the American Society for Steel Treating on Jan. 5.

Walter S. Hollaender has become vice-president and secretary of the Cincinnati Metal Co., Cincinnati. He was formerly connected with the Hilb Smelting Co. of that city.

J. F. Lincoln, vice-president of the Lincoln Electric Co., Cleveland, spoke before the Worcester, Mass., section of the American Society of Mechanical Engineers on Jan. 10.

Dr. Frederick C. Langenberg, vice-president Climax Molybdenum Co., New York, talked on the meaning and value of impact testing with special reference to its use in the study of nickel steels before the Boston chapter, American Society for Steel Treating, on Jan. 6.

Walter T. Noble, since 1890 superintendent of the E. D. Jones & Sons Co., Pittsfield, Mass., and associated with that concern since 1872, has resigned. He is 75 years of age. Harry M. White, assistant superintendent, who has been with the company 28 years, will succeed Mr. Noble.

Hugo W. Weimer, formerly assistant chief engineer Allis-Chalmers Mfg. Co., and later chief engineer Power & Mining Machinery Co., Milwaukee, has become affiliated with the Hunter Machinery Co., Milwaukee, in a consulting capacity, to design sand and gravel plants. The Hunter company has just been appointed exclusive agent for Wisconsin and Michigan of the Galland-Henning Co. line of screens, washers, elevators, etc., and is also representative of Sauerman drag scrapers and cableways and Northwest cranes and shovels.

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John Gold, chief metallurgist Weirton Steel Co., Weirton, W. Va., has been appointed operating manager of the strip and stripsheet mill division, succeeding Frank E. Flynn, who resigned recently to become assistant to Charles Elliott, vice-president and general manager Trumbull Steel Co., Warren, Ohio. Mr. Flynn, before joining the Weirton Steel Co. about 10 years ago, had been with the Superior Steel Corporation, Carnegie, Pa. Mr. Gold is a graduate of Pennsylvania State College and became chief metallurgist of the Weirton company at the close of the World War.

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Milton C. Ryer, since 1903 manager of the Denver, Colo., branch of the Crucible Steel Co. of America, resigned Jan. 1, and has taken up residence at La Jolla, Cal. He entered the employ of the Crescent Steel Co. at Denver in 1896, and when that company was taken over by the Crucible organization in 1900 he continued in the sales department of the latter company.

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J. A. Hammond and E. R. Geib have been appointed assistant managers in charge of carbon brush and specialties sales, and illuminating carbon sales, respectively, for the National Carbon Co., Cleveland. The company has also announced the appointments of E. C. Friday, J. L. Green and V. J. Nolan as district managers in charge of the branch offices at New York, Chicago and Pittsburgh respectively, and of J. B. Collins as sales engineer in charge of the Birmingham, Ala., office.

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L. C. Hassler, formerly chief engineer of the R. H. Beaumont Co., Philadelphia, has been transferred to the company's western headquarters in Chicago, and will devote himself to sales in that territory. William P. Alexander, who resigned from the Beaumont organization in May, 1927, has returned to the company and will be engaged in sales work in the Philadelphia, Baltimore and Washington district.

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Alexander P. Moore, former ambassador to Spain, has been elected a vice-president of the Pittsburgh Steel Products Co., with headquarters in New York, according to an announcement by Homer D. Williams, president of the Pittsburgh Steel Co., the parent organization.

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H. C. Baldry, vice-president Flour City Ornamental Iron Co.; George E. Buzza, president and treasurer of the Buzza Co.; T. D. Crocker, assistant general manager Northern States Power Co.; R. G. Mitchell, vice-president Dodson-Fisher Co.; W. Edward Nelson, president B. F. Nelson Mfg. Co.; G. W. Robertson, president and treasurer of the Robertson Tool Co., and S. V. Wood, president Minneapolis Electric Steel Casting Co., all of Minneapolis, have been elected directors of the Manufacturers' Association of that city.

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S. W. Calhoun has been appointed Southeastern district representative for the Foote Brothers Gear & Machine Co., Chicago. He will have charge of sales in Tennessee, Kentucky, Virginia, North and South Carolina and southern West Virginia, with headquarters at Asheville, N. C.

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David Pride has been appointed manager of works Superior Steel Corporation, Carnegie, Pa. Since 1918 he has been assistant general superintendent of the City mills, Carnegie Steel Co., and previously had been superintendent Lower Union mills and master mechanic Upper Union mills of the same company.

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C. F. Blackmer, recently promoted to the general superintendency of wire mills for the American Steel & Wire Co., was the guest of his former associates of the operating and sales departments in the Pittsburgh district at a dinner given at the Union Club, Pittsburgh, on Jan. 7. Mr. Blackmer heard many expressions of esteem from those with whom he has been closely associated during the past three years, and Edwin H. Broden, who succeeds him as Pittsburgh district mill manager, presented him with a chair for his new home in Cleveland on behalf of these friends. E. A. Niven, Pittsburgh district sales agent of the company, was toastmaster.

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Clinton M. Finney recently was elected comptroller, Warren H. Jones, secretary, and Edward J. Mulligan, assistant secretary of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Finney formerly was with the Worthington Pump & Machinery Corporation, New York, of which he was comptroller from 1919 to 1926 and vice-president during the past two years. Previously he was secretary and treasurer of the Mack Truck Co. and treasurer of the George V. Cresson Co. He is a graduate of the University of Pennsylvania. Mr. Jones has been assistant secretary of the Westinghouse company since 1911 and previously was secretary to Robert Mather, former chairman of the board. Mr. Mulligan started work in the office of George Westinghouse 25 years ago and recently was secretary to James C. Bennett, lately elected a vice-president of the company.

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George F. Anglin, for the past four years Pittsburgh manager of the Torrington Mfg. Co., Torrington, Conn., and of the Blake & Johnson Co., Waterbury, Conn., before its merger with the former concern, has joined the machinery and equipment sales department of Mackintosh-Hemphill Co., Pittsburgh. He has had 20 years of experience in various operating capacities with the Bethlehem Steel Co., Bethlehem, Pa.; the Sharon Steel Hoop Co., Sharon, Pa.; the Pittsburgh Crucible Steel Co., Pittsburgh, and the Pittsburgh Knife & Forge Co., Pittsburgh.

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D. F. Smith, formerly assistant in the motor division of the railroad department, Erie, Pa., works, General Electric Co., has been appointed general superintendent of that plant.

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A. H. Grayburn, assistant secretary and assistant treasurer of the Norma-Hoffmann Bearings Corporation, Stamford, Conn., has resigned, as of Dec. 31, and has become identified with the Hope Engineering & Supply Co., Mount Vernon, Ohio, and New York. A. H. Ritter, New York district manager for the Norma-Hoffmann company, goes to Stamford as assistant secretary, and will be succeeded in New York by F. W. Mesinger from the Stamford office. Norman Bell, assistant sales manager, has also been made assistant secretary. E. C. Lenon will be in charge of orders, shipments, credits and collections at Stamford.

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E. C. Godfrey, formerly sales representative at Detroit for the Pratt & Whitney Co., Hartford, Conn., has been appointed sales manager of the Automatic Nut-Thread Corporation, 3617 North Eighth Street, Philadelphia, manufacturer of automatic nut tapping machines.

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H. C. Woodside, long identified with the Pittsburgh Steel Co., has severed that connection to become manager of sales for the Sheet Metal Specialty Co., a subsidiary of the Follansbee Brothers Co., Pittsburgh. He will make his headquarters at the Follansbee, W. Va., plant. He was a member of the sales staff of the Pittsburgh Steel Co. in Pittsburgh from 1903 until 1921, when he resigned to become sales manager of the Northwestern Barbed Wire Co., Sterling, Ill. He retained that position until 1924 and for the next two years was engaged in the wire and heavy hardware business on his own account as head of the H. C. Woodside & Co., with headquarters in Chicago. In 1926 he returned to the Pittsburgh Steel Co. as special representative.

OBITUARY

William Banfield, a pioneer in the American tin plate and sheet steel industries and for 20 years vice-president and general manager in charge of construction and operations for the Follansbee Brothers Co., Pittsburgh, died in a Cleveland hospital on Jan. 4. He was born in Staffordshire, England, in 1854 and followed his father, who had come to this country in 1872, to work in the first tin plate mill in the United States, which was built by Rogers & Burchfield at Leechburg, Pa. From 1872 until he retired in 1924, Mr. Banfield was active in the operation of tin plate and sheet mills. He rose from heater to manager of the mill at Leechburg, which passed from its original owner to Kirkpatrick & Co. In 1885 he organized Wallace, Banfield & Co., which bought an idle mill at Irondale, Ohio, and operated it until 1894, when it was taken over by the American Tin Plate Co. For the next five years he was district manager in charge of six plants of that company. The Chester Rolling Mill Co., Chester, W. Va., which he organized in 1900, was taken over by the American Sheet Steel Co. In 1904, Mr. Banfield joined the Follansbee Brothers Co., Pittsburgh, and superintended the building of its plants at Follansbee, W. Va., and at Toronto, Ohio. He wrote a review of the American tin plate industry, which was published in THE IRON AGE, Feb. 28, 1924. Following his retirement from the steel industry, he devoted his time to private interests in and around Steubenville, Ohio.

WILLIAM BANFIELD

Samuel Howard Bell, secretary of the Warren Foundry & Pipe Corporation, 11 Broadway, New York, and assistant secretary of the Warren Foundry & Pipe Co., Wharton, N. J., died suddenly at Wharton on Jan. 9. He was associated for a number of years with the Johnstown Iron Works, Johnstown, Pa., and later with the Ingersoll-Rand Co., New York. He was secretary of the Replogle Steel Co. before that company was taken over last year by the Warren Foundry & Pipe Corporation.

Marvin Hughitt, formerly chairman of the board of the Chicago & North Western Railroad and one of the pioneer railroad builders of the West, died at his home in Lake Forest, Ill., on Jan. 6, in his ninety-first year.

Willard Brown, chief engineer of the Bourne-Fuller Co., Cleveland, died Dec. 28 after an illness of several weeks. He had been in poor health for two years. He was born in Newark, N. J., and was graduated from the Stevens Institute of Technology, Hoboken, N. J., in 1895 as a mechanical engineer. From 1896 to 1898 he served as assistant mechanical engineer for the King Bridge Co., Cleveland, and the next year as a draftsman for the Lorain Steel Co. In 1899 he became assistant chief engineer of the Dominion Iron & Steel Co., Sydney, N. S., and two years later was made superintendent of construction for the Colorado Fuel & Iron Co., Pueblo, Colo. In 1902 he became superintendent of construction for the old Garret-Cromwell Engineering Co., Cleveland, and later served five years as chief engineer of that company. In 1912 he became chief engineer of the Upson Nut Co., Cleveland, which was later taken over by the Bourne-Fuller Co. For many years he had been an active member of the Cleveland Engineering Society and had served two years as one of its directors.

Charles J. Webb, vice-president International Seal & Lock Co., Chicago, died Jan. 3, on board a liner bound for Honolulu, Hawaii.

Gustav Haarmann, president of G. Haarmann & Co., Inc., Holyoke, Mass., died in that city on Dec. 17, aged 67 years. He was born at Menden, Prussia, and went to Holyoke in 1884, where he became foreman for C. H. Bausch & Sons. In 1900 he went into the structural iron business under the name of Haarmann & Derichs, retaining that connection until the present Haarmann organization was founded in 1913.

Robert F. Devine, president of the Erie Forge & Steel Co. and the Erie Forge Co., Erie, Pa., died Jan. 3, at St. Vincent's Hospital in that city, following an operation for appendicitis. He was born at Lake Run, Pa., Sept. 17, 1860, and as a boy went to work in the coal mines near his home. Later he learned the blacksmith's trade and worked in Philadelphia, Kansas City, and in Seattle, Wash., where he started a shop of his own. In 1895 he returned to the East and became superintendent of the Frankford Steel & Forging Co., Ellwood City, Pa. He left that company in 1903 and organized a company to take over the Erie Forge Co., Ltd. In 1912, he founded the Erie Forge & Steel Co.

David Z. Norton, director of Oglebay, Norton & Co., Cleveland, iron ore miners and shippers, and formerly associated with the late E. W. Oglebay in a partnership bearing the same name, died Jan. 6, aged 77 years. He had been ill about 10 days and his death was hastened by the shock caused by the passing away of his wife, who died suddenly in New York earlier in the week. He was born in Cleveland and was graduated from Kenyon College, Gambier, Ohio. In 1868 he became a messenger for the Commercial National Bank in Cleveland and, rising rapidly, became cashier of that institution. He left the bank in 1890 to become associated with E. W. Oglebay, a pioneer in the Lake Superior iron ore industry. Oglebay, Norton & Co. was organized to succeed Tuttle, Oglebay & Co., and Mr. Oglebay took Mr. Norton into the firm as a partner to direct its financial affairs. In 1924, when the partnership was changed into an incorporated company, Mr. Norton was named as one of its directors and both he and Mr. Oglebay retired from active connection with the company. Mr. Norton was a leader in business, civic and social life of Cleveland and did much to aid the city's commercial development. He was a director of the American Shipbuilding Co., Columbia Steamship Co., Union Trust Co. and the National Refining Co., and a trustee of Western Reserve University, Adelbert College, Western Reserve Historical Society, Cleveland School of Art and Cleveland Museum of Art. He is survived by two sons and a daughter, one of the sons Robert C. Norton, treasurer of Oglebay, Norton & Co.

D. Z. NORTON

Richard J. Thomas, pioneer foundry owner of Milwaukee, died Dec. 29, aged 78 years. He established the Thomas & Yale brass foundry in 1872, and the Thomas Brass & Iron Co. in 1879. In 1915 he formed the Maas Carbonator Co., of which he was president and active head until his death.

John J. Chandler, vice-president of the Hoggson & Pettis Mfg. Co., New Haven, Conn., died at his home in that city on Dec. 18. He joined the company as an apprentice in 1881 and had served it continuously since that time.

Exports and Imports Both Increase

November Higher Than October—11-Month Total of Exports 2 Per Cent Above 1926; Imports 33 Per Cent Lower

WASHINGTON, Jan. 7.—With exports of iron and steel products for the 11 months ended with November aggregating 2,012,541 gross tons, the total for last year will reach 2,195,000 tons, if the monthly average of 182,958 tons for the 11-month period was maintained through December. As exports for the calendar year 1926 amounted to 2,167,048 tons, a moderate gain is indicated for 1927. Imports for the 11 reported months of last year totaled 686,279 tons, making a monthly average of 62,389 tons. This, if continued through December, would make a total of 749,000 tons, a sharp drop from the 1,111,090 tons imported in 1926, due largely to the decline in incoming shipments of pig iron.

Exports in November, 1927, were 177,928 tons, against 170,255 tons in October. For the 11 months the 2,012,541 tons may be compared with 1,969,022 tons for the corresponding period of 1926. Imports in November rose to 61,882 tons from 52,503 tons in October. For the 11 months the total of 686,279 tons is compared with 1,034,583 tons for the 11-month period of 1926.

Of the November exports, 71,457 tons went to Canada, representing 39 per cent of the total. For the 11 months ended with November of last year exports to Canada aggregated 769,921 tons, or 38 per cent of the total, comparing with 781,653 tons exported to Canada during the 11 months of 1926, when approximately 39 per cent of the total went to that country.

Of the imports in November 13,088 tons came from Belgium, which led all other countries. France was second with 11,693 tons and India third, with 9245 tons. Canada sent 8338 tons; Germany, 7179 tons; Great Britain, 6153 tons. In the finished lines structural shapes, with a total of 14,479 tons, represented the largest import movement in November, the greater portion coming from Belgium. Manganese ore imports for the month amounted to 26,802 tons of concentrates. This includes 63 tons of concentrates from Cuba, which now are separated, as are other manganese imports, into gross weight and concentrates.

Tin plate exports amounting to 18,121 tons were the largest of any single outgoing product in November. Japan led as the destination of tin plate exports, taking 2790 tons for the month. Canada took 2114 tons. For the 11 months tin plate exports to Japan totaled 48,942 tons, while shipments of this product to Canada amounted to 40,081 tons. Exports of casing and oil line pipe in November amounted to 6226 tons, Colombia taking 1603 tons; Soviet Russia, 647 tons; Argentina, 628 tons; Venezuela, 623 tons; and Mexico, 400 tons. Exports in November of welded black pipe amounted to 6531 tons. Japan took 1674 tons; United Kingdom, 1060 tons; Colombia, 487 tons; and Cuba, 306

Exports of Iron and Steel from the United States

(In Gross Tons)

	November		11 Months Ended November	
	1927	1926	1927	1926
Pig iron	8,090	3,724	47,913	22,557
Ferromanganese	27	70	1,566	743
Scrap	15,392	6,234	215,635	97,027
Pig iron, ferroalloys and scrap	*23,509*	*10,028*	*265,114*	*120,327*
Ingots, blooms, billets, sheet bar, skelp	15,359	14,981	96,003	95,038
Wire rods	620	2,547	14,680	16,851
Semi-finished steel	*15,979*	*17,528*	*110,683*	*111,889*
Steel bars	10,642	15,028	103,138	126,818
Alloy steel bars	622	463	5,449	4,605
Iron bars	144	571	3,778	4,797
Plates, iron and steel	11,794	16,301	124,188	129,452
Sheets, galvanized	10,458	19,223	142,601	161,473
Sheets, black steel	9,614	15,368	144,316	156,195
Sheets, black iron	978	1,300	14,657	16,535
Hoops, bands, strip steel	4,138	4,372	40,409	43,703
Tin plate; terne plate	18,121	28,116	238,275	219,047
Structural shapes, plain material	13,846	15,482	133,759	146,504
Structural material, fabricated	9,236	4,259	63,826	71,010
Steel rails	10,799	23,385	159,822	168,112
Rail fastenings, switches, frogs, etc.	2,835	3,343	31,423	38,918
Boiler tubes, welded pipe and fittings	17,762	31,188	239,494	255,716
Plain wire	3,517	1,709	32,591	29,433
Barbed wire and woven wire fencing	4,421	2,956	48,265	49,127
Wire cloth and screening	146	188	2,101	1,813
Wire rope	480	490	4,171	4,446
Wire nails	1,092	704	8,624	11,115
Other nails and tacks	592	492	7,579	7,394
Horseshoes	39	56	509	627
Bolts, nuts, rivets and washers, except track	979	929	11,022	12,295
Rolled and finished Steel	*132,255*	*185,923*	*1,559,812*	*1,659,135*
Cast iron pipe and fittings	2,752	2,834	26,352	30,910
Car wheels and axles	893	1,234	15,834	16,004
Iron castings	800	571	10,202	8,432
Steel castings	351	498	6,432	7,010
Forgings	348	90	4,517	2,500
Castings and forgings	*5,144*	*5,227*	*63,337*	*64,856*
All other	1,041	1,124	13,410	12,815
Total	177,928	219,830	2,012,541	1,969,022

Imports of Iron and Steel into the United States

(In Gross Tons)

	November		11 Months Ended November	
	1927	1926	1927	1926
Pig iron	16,142	17,560	118,769	430,990
Ferromanganese*	2,469	4,365	25,689	36,521
Ferrosilicon‡	308	1,692	6,965	11,784
Ferrochrome†	20	....	435	524
Scrap	6,404	7,661	56,741	80,318
Pig iron, ferroalloys and scrap	*25,343*	*31,278*	*208,599*	*560,137*
Steel ingots, blooms, billets and slabs	1,187	639	11,785	29,150
Iron blooms, slabs, etc.	....	....	91	323
Wire rods	2,812	1,190	16,915	9,206
Semi-finished steel	*3,999*	*1,829*	*28,791*	*38,679*
Rails and splice bars	343	2,078	15,504	61,794
Structural shapes	14,479	15,348	147,319	110,645
Boiler and other plates	241	259	3,491	4,151
Sheets and saw plates	1,226	1,170	14,466	9,056
Steel bars	5,654	7,785	83,380	97,136
Bar iron	230	456	3,398	5,033
Hoops, bands and cotton ties	2,113	4,312	31,696	25,522
Tubular products (wrought)	2,919	5,029	48,363	25,755
Nails, tacks, staples	286	714	5,441	4,898
Tin plate	4	41	1,054	2,090
Bolts, nuts, rivets and washers	19	5	330	356
Round iron and steel wire	294	442	3,666	3,824
Barbed wire	32	176	3,766	2,850
Flat wire; strip steel	138	411	2,399	3,491
Steel telegraph and telephone wire	....	90	32	1,125
Wire rope and strand	107	106	2.028	2,431
Other wire	19	47	1,128	1,478
Wire cloth and screening	....	33	....	313
Rolled and finished steel	*28,104*	*38,502*	*367,461*	*361,948*
Cast iron pipe	4,042	9,378	78,657	71,779
Castings and forgings	394	272	2,771	2,353
Total	61,882	81,259	686,279	1,034,896
Manganese ore*	26,802	20,091	276,723	327,252
Iron ore	199,568	185,835	2,488,871	2,350,406
Magnesite (dead burned)	3,902	2,132	40,121	66,685

*Manganese content only.
†Chromium content only.
‡Silicon content only.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

	November, 1927	January Through November	
		1927	1926
North and Central America and West Indies	*93,131*	*1,007,544*	*1,033,183*
Canada and Newfoundland	71,765	771,197	782,579
Cuba	5,138	87,480	83,962
Mexico	6,472	75,361	94,210
Guatemala	152	5,791	9,859
Salvador	110	3,688	15,854
Panama	1,426	17,695	8,060
British West Indies	847	11,755	9,296
Other West Indies	5,855	22,756	16,031
Other Central America	1,366	11,821	13,332
South America	*31,063*	*321,186*	*326,684*
Argentina	7,199	75,465	53,655
Brazil	9,513	67,143	52,855
Chile	4,121	39,724	56,324
Colombia	5,674	53,888	60,723
Peru	2,059	30,431	34,888
Venezuela	1,623	41,432	57,806
Other South America	877	13,103	10,433
Europe	*9,887*	*187,541*	*126,562*
France	195	4,413	8,934
Italy	50	40,069	22,747
Rumania	324	1,708	2,421
Russia	687	8,096	2,870
Turkey	673	3,634	3,013
United Kingdom	4,670	62,599	58,534
Other Europe	3,288	67,022	28,043
Far East	*41,663*	*479,141*	*465,199*
Australia	1,603	25,002	27,064
British Malaya	242	7,721	14,020
China	4,389	49,095	39,385
Dutch East Indies	2,215	33,347	37,324
India	3,383	26,423	35,436
Japan	23,707	251,153	227,555
Kwangtung	184	18,625	20,001
Philippine Islands	5,135	56,632	53,605
Other Asia and Far East	805	11,143	10,809
Africa	*2,181*	*17,129*	*17,394*
British South Africa	605	7,961	8,898
Egypt	1,346	4,468	5,588
Portugese East Africa	191	3,766	2,295
Other Africa	39	934	613
Total	177,928	2,012,541	1,969,022

tons. Galvanized pipe exports totaled 2945 tons, Brazil taking 519 tons, and Cuba, 332 tons. The remainder was widely scattered to various foreign markets. Exports of steel rails in November were only 10,799 tons, of which Brazil took 4223 tons. Japan took only 67 tons. But for the 11 months Japan was the leading destination of rail exports, taking 28,560 tons, or 18 per cent of the total of 159,822 tons.

Sheet and Tin Mill Wages Decline 3 Per Cent

YOUNGSTOWN, Jan. 10.—Tonnage rates for sheet and tin mill workers in Mid-western mills decline 3 per cent to 25½ per cent above base, for January and February, following the bi-monthly settlement. The average selling price of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ended Dec. 20 was $3 per 100 lb., against $3.10 two months previously.

Coal Production of 1927 Below Previous Year

Total production of bituminous coal in the last calendar year is estimated by the National Coal Association at 519,500,000 net tons. This is within about 500,000 tons of the 1925 total of 520,053,000 tons. It represents, however, a decline of 9 per cent from the 1926 total of 573,367,000 tons. Output for the last week of the year was estimated at 7,700,000 tons, holidays accounting for a drop of more than 2,000,000 tons from the preceding week.

Decreased Imports of Iron Ore

November imports of iron ore are reported by the Department of Commerce at 199,568 gross tons. This is a reduction of nearly 29,000 tons, or 13 per cent, from the October total of 228,275 tons. It represents, however, a gain of nearly 8 per cent from November, 1926, when the total was 185,835 tons. For the 11 months ended Nov. 30 imports were 2,488,871 tons, an increase of 6 per cent over the total of 2,350,406 tons for the corresponding period in 1926. Tonnage from Cuba fell off more than 25 per cent in 1927, but the difference was more than made up by increased imports from French Africa, with a smaller increase from Chile. Spanish ore imports decreased to only one-third of last year's total, and represent but a little more than 1 per cent of the year's total. Imports from Sweden were more than five times as great as in 1926.

Sources of American Imports of Iron Ore

(In Gross Tons)

	November		11 Months Ended November	
	1927	1926	1927	1926
Spain	....	....	27,165	82,412
Sweden	....	....	217,272	39,491
French Africa	26,599	19,883	446,420	305,845
Canada	3,007	40	19,665	16,428
Cuba	22,500	22,000	362,613	489,000
Chile	141,300	121,800	1,307,700	1,253,400
All other	6,162	22,112	108,036	163,830
Total	199,568	185,835	2,488,871	2,350,406

Electric Power Output Growing

November production of electric power by public utility power plants is reported by the United States Geological Survey at 6860 million kilowatt-hours. While this is a reduction of nearly 1 per cent from the 6928 of October, it represents a larger send-out per day than in October, and the highest daily send-out for any month in the history of the industry. September, October and November respectively have made high records in this respect, each being above the previous maximum, which was that of December, 1926. Water-power accounted for about 36 per cent of the November production, compared with 34 per cent in October and 33 per cent in September.

Plants Operated Without Lost-Time Accidents

During the month of November, 1927, the following plants of the American Sheet & Tin Plate Co., employing a total of 7448 men, conducted operations without a single lost-time accident: Aetna-Standard works, Bridgeport, Ohio; Cambridge works, Cambridge, Ohio; Dover works, Dover, Ohio; Chester works, Chester, W. Va.; Guernsey works, Cambridge, Ohio; Leechburg works, Leechburg, Pa.; Mercer works, Farrell, Pa.; roll and machine works, Canton, Ohio; Pennsylvania works, New Kensington, Pa.; Pittsburgh works, New Kensington, Pa.; Sabraton works, Morgantown, W. Va.; Scottdale works, Scottdale, Pa.; Wellsville works, Wellsville, Ohio; Gary sheet mill, Gary, Ind.

November was the fourth consecutive month during which the Gary sheet mill had no lost-time accidents.

The following plants, employing a total of 5002 men, were operated during November with only one lost-time accident: Laughlin works, Martins Ferry, Ohio; Farrell works, Farrell, Pa.; Shenango works, New Castle, Pa.; American works, Elwood, Ind.

Stock Bonus for Crane Co. Employees

Announcement has been made to the employees of Crane Co., Chicago, who have been with the firm for more than 10 years, that they are to receive one share of stock for each year of service from the private holdings of R. T. Crane, Jr. About 9000 employees will participate in the gift. A similar distribution was made by Mr. Crane in 1925. At that time $3,800,000 was distributed among 3800 employees.

"A Night for the Ladies," with the men as hosts, has been arranged jointly by the Metropolitan section of the American Society of Mechanical Engineers and the Women's Auxiliary, for the evening of Jan. 17. The meeting, which will be held at the Engineering Societies Building, New York, will be preceded by an informal dinner at the Fraternity Clubs, New York.

Machinery Exports Make Gains

November, $2,000,000 Ahead of October—11 Months, $30,000,000 More Than Last Year—Imports Higher

WASHINGTON, Jan. 7.—Making a gain of more than $2,000,000, exports of machinery in November were valued at $36,187,195, as against $33,995,216 in October. For the 11 months ended with November the value was $397,335,175, a gain of almost $30,000,000 over the corresponding period of 1926. Exports of power-driven metal-working machines in November numbered 952, valued at $1,535,322, as listed in THE IRON AGE table, comparing with 782, valued at $1,084,961, exported in October. The total value of exports of power-driven metal-working machinery in November was $2,326,537, compared with $1,274,446 in November, 1926, while for the 11 months period of each year the values were $17,987,725 and $13,113,626, respectively.

Industrial machinery exports in November, as listed by the Division of Statistics, Department of Commerce, were valued at $17,101,313, against $16,733,510 in October and $16,156,170 in November, 1926. For the 11 months ended November the value was $184,259,948, compared with $164,069,871 for the corresponding period of 1926.

Total imports of machinery and vehicles in November were $2,143,574, against $1,948,535 for November, 1926. For the 11-month periods the values were $25,481,005 and $24,013,591, respectively. Imports of industrial, office and printing machinery in November were valued at $1,246,168, against $1,156,170 in November, 1926. For the 11-month periods the values were $15,242,261 and $15,011,478. Imports of machinery listed in THE IRON AGE table were $1,315,110 in November, compared with $1,495,195 in October. For the 11 months ended with November the value was $17,188,212, compared with $16,096,841 for the corresponding period of 1926.

Belgian Mill Prices Firmer in Active Market

ANTWERP, BELGIUM, Dec. 28.—The threat of German steel mills to suspend Jan. 1, as a result of the controversy over the 8-hr. day, has brought out heavier buying than for some time. Consumers are seeking to cover their requirements for at least part of the first quarter, and mills have been able to adopt a firmer position on prices.

The fact that the International Steel Cartel has decided to make no increase in allotments for the first quarter of 1928 is expected to aid in the maintenance of prices, and, with German steel mills operating on an 8-hr. day, their costs should be slightly higher.

Russia and Bulgaria Buy German Pipe

HAMBURG, GERMANY, Dec. 26.—The Mannesmann Tube Works, which recently received an order from the Russian Government for about 51,000 tons of tubes, has been successful in booking an order from the Bulgarian Government for tubular products and street car equipment valued at about $850,000.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	November		11 Months Ended November	
	1927	1926	1927	1926
Locomotives	$103	$47	$4,687	$4,838
Other steam engines	129	398	1,314	1,263
Boilers	67	235	1,627	1,630
Accessories and parts	37	186	590	1,711
Automobile engines	446	476	10,600	12,182
Other internal combustion engines	590	859	7,642	8,509
Accessories and parts	208	358	3,037	3,958
Electric locomotives	129	168	1,158	2,498
Other electric machinery and apparatus	610	654	6,796	6,757
Excavating machinery	568	273	4,548	4,248
Concrete mixers	78	63	1,043	694
Road making machinery	224	127	2,583	1,635
Elevators and elevator machinery	415	424	4,542	4,785
Mining and quarrying machinery	929	1,193	12,211	13,754
Oil well machinery	919	1,913	15,973	13,929
Pumps	572	548	6,012	5,562
Bending and power presses	155	83	1,168	1,260
Forging machines	99	71	966	991
Machine tools*	1,535	638	9,897	6,408
Other metal-working machinery and parts	560	393	4,483	4,275
Textile machinery	1,088	733	10,374	9,354
Sewing machines	688	736	8,180	7,946
Shoe machinery	190	115	1,562	1,227
Flour-mill and gristmill machinery	56	37	520	792
Sugar-mill machinery	1,064	498	5,454	3,710
Paper and pulp mill machinery	268	593	3,491	3,369
Sawmill machinery	64	68	739	900
Other woodworking machinery	148	139	1,319	1,122
Refrigerating and ice making machinery	431	610	6,183	4,588
Air compressors	585	439	5,465	4,350
Typewriters	1,744	1,290	18,539	16,537
Power laundry machinery	66	41	1,365	1,176
Typesetting machines	438	176	4,093	3,348
Printing presses	474	390	5,609	5,712
Agricultural machinery and implements	5,497	4,585	83,850	80,701
All other machinery and parts	15,011	13,109	139,717	142,041
Total	$36,187	$32,664	$397,335	$367,757

*Details of principal items in another table.

Exports of Power-Driven Metal-Working Machinery

	November, 1927		October, 1927	
	No.	Value	No.	Value
Engine lathes	136	$264,480	77	$114,299
Turret lathes	39	152,569	12	56,916
Other lathes	58	110,253	28	68,218
Vertical boring mills and chucking machines	15	36,671	5	6,198
Thread-cutting and automatic screw machines	109	134,763	121	150,069
Knee and column type milling machines	22	52,409	35	48,629
Other milling machines	74	196,801	45	56,982
Gear-cutting machines	36	85,490	31	70,104
Vertical drilling machines	79	28,797	33	50,672
Radial drilling machines	6	22,539	17	26,629
Sensative drilling machines	26	11,971	28	1,032
Other drilling machines	47	55,113	55	95,773
Shapers and slotters	28	48,612	26	57,837
Planers	..	....	2	4,116
External cylindrical grinding machines	80	184,206	68	142,140
Internal grinding machines	148	117,304	50	106,554
Metal-working tool-sharpening machines	49	33,344	149	28,793
Total	952	$1,535,322	782	$1,084,961

Imports of Machinery into the United States

(By Value)

	November		11 months Ended November	
	1927	1926	1927	1926
Metal working machine tools	$31,675	$27,228	$391,021	$391,597
Agricultural machinery and implements	234,602	335,112	5,044,056	4,675,682
Electrical machinery and apparatus	168,421	59,374	1,648,796	767,288
Other power-generating machinery	54,583	3,009	272,766	75,467
Other machinery	510,693	581,046	7,484,801	8,159,138
Vehicles, except agricultural	315,136	205,099	2,346,772	2,027,669
Total	$1,315,110	$1,210,868	$17,188,212	$16,096,841

Quiet Rules in European Markets

British Tin Plate Mills Closed Under Tonnage Restriction Scheme—Exports Very Light

(By Cable)

LONDON, ENGLAND, Jan. 9.

WITH the holidays ended, demand for Cleveland pig iron is improving and some consumers are entering into six months' contracts. Export sales of pig iron are still poor, but some increase is noted. The Scotch pig iron trade is depressed and 10 blast furnaces have been blown out, leaving only 21 active out of 85.

Foreign ore continues quiet. Jones & Colver, Sheffield, are reorganizing financially and a receiver has been appointed on behalf of the holders of debenture bonds.

The Union of German Iron and Steel Manufacturers estimates the world pig iron output in 1927 at 84,600,000 metric tons and the steel ingot and castings production at 100,500,000 metric tons.

Tin plate is moderately active and inquiry is good, but actual sales represent only a portion of capacity, as most mills were closed all last week and some are remaining closed during the current week in compliance with the three weeks stoppage under the restriction of output plan. Galvanized sheets are quiet but prices are being maintained. Black sheets continue inactive.

Continental iron and steel markets are quiet and some products are inclined to easiness. British consumers of semi-finished material are not interested in more than small lots for prompt shipment. Export demand for finished iron and steel is poor.

German Tariff Reduced on Motor Cars but Increased on Parts

HAMBURG, GERMANY, Dec. 26.—Import duties on automobiles and motors will be reduced Jan. 1, but duties on all parts of cars and motors will be advanced on Jan. 15. This schedule affects several of the foreign assembly plants in Germany, notably those operated by American companies. The new duty on cars is 1000m. per 1000 kg. for countries, such as the United States, with which Germany has commercial treaties.

Polish Customs Regulations

Poland has reinstituted a custom regulation providing a reduction of 80 per cent from the normal tariff on machinery and apparatus not manufactured in that country but constituting the complete equipment or part of equipment for a newly established factory or its department, according to a report received by the Department of Commerce, Washington, from L. J. Cochrane, assistant trade commissioner, Warsaw. This regulation, to remain in effect until March 31, also applies to machinery or apparatus imported to reduce manufacturing costs or increase industrial production.

German Works Experiments with New Steel Process

HAMBURG, GERMANY, Dec. 26.—Considerable interest has been aroused by the report that the Hoesch Eisen und Stahlwerk, Dortmund, has begun experiments with a new process for the production of steel which will greatly reduce costs. Patents have been acquired by the Hoesch interests, and a small plant is being constructed for experimental production. Commercial output under these patents is said by the Hoesch company to depend entirely upon results of the exhaustive experiments planned.

German Alloy Steel Makers Unable to Advance Prices

HAMBURG, GERMANY, Dec. 26.—Tool and alloy steel makers recently announced an advance of 10 per cent in export prices, but this was almost immediately withdrawn because of recent price reductions by foreign competitors. A satisfactory volume of shipments to customers in the Far East and South America is reported.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.		$4.27		
Bilbao Rubio ore*	1 0½		4.99		
Cleveland No. 1 fdy.	3 7½		16.44		
Cleveland No. 3 fdy.	3 5		15.83		
Cleveland No. 4 fdy.	3 4		15.59		
Cleveland No. 4 forge	3 3½		15.46		
Cleveland basic (nom.)	3 15	to £3 15½s.	18.27	to	$18.39
East Coast mixed	3 10½		17.17		
East Coast hematite	3 11		17.29		
Rails, 60 lb. and up	7 15	to 8 0	37.75	to	38.96
Billets	6 0	to 6 10	29.22	to	31.66
Ferromanganese	13 10		65.75		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to	28.01
Tin plate, base box.	0 18	to 0 18½	4.39	to	4.50
Black sheets, Japanese specifications.	13 5	to 13 10	64.53	to	65.75
			C. per Lb.		
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	10 10	to 11 0	2.28	to	2.39
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to	1.69
Steel hoops	10 10	to 11 0	2.28	to	2.39
Black sheets, 24 gage	10 5	to 10 10	2.23	to	2.28
Galv. sheets, 24 gage	13 0	to 13 5	2.82	to	2.88
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)					
Belgium	£3 1s.	to £3 2s.	$14.85	to	$15.10
France	3 1	to 3 2	14.85	to	15.10
Luxemburg	3 1	to 3 2	14.85	to	15.10
Basic pig iron (nom.):					
Belgium	2 18	to 2 19	14.13	to	14.38
France	2 18	to 2 19	14.13	to	14.38
Luxemburg	2 18	to 2 19	14.13	to	14.38
Coke	0 18		4.39		
Billets:					
Belgium	4 7	to 4 7½	21.19	to	21.31
France	4 7	to 4 7½	21.19	to	21.31
Merchant bars:			C. per Lb.		
Belgium	4 17	to 4 18	1.07	to	1.08
France	4 17	to 4 18	1.07	to	1.08
Luxemburg	4 17	to 4 18	1.07	to	1.08
Joists (beams):					
Belgium	4 8	to 4 10	0.97	to	0.99
France	4 8	to 4 10	0.97	to	0.99
Luxemburg	4 8	to 4 10	0.97	to	0.99
Angles:					
Belgium	4 17½		1.08		
⅛-in. plates:					
Belgium (a)	6 4	to 6 5	1.37	to	1.38
Germany (a)	6 4	to 6 5	1.37	to	1.38
$\frac{3}{16}$-in. ship plates:					
Belgium	5 19	to 6 0	1.32	to	1.33
Luxemburg	5 19	to 6 0	1.32	to	1.33
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

Machinery Markets and News of the Works

D. L. & W. ISSUES LIST

Eastern Railroad Inquires for About 30 Machine Tools

Ohio Company Buys 15 Presses for Making Automobile Stampings—Business Generally Is in Fair Volume

THE new year has started with fair promise for the machine tool trade. Business has shown no sudden spurt, but the volume of buying has been up to expectations. Many prospective buyers are still hesitant about placing orders for machines for which they have recently inquired, but in some respects sales resistance is not so marked as during the closing months of last year.

An inquiry for 30 miscellaneous machine tools has been circulated by the Delaware, Lackawanna & Western Railroad, but other roads are slow to make known their 1928 shop requirements. The Norfolk & Western has added three boring mills and several other machines to recent purchases and the Texas & Pacific has bought a radial drill and a steam hammer. The Missouri Pacific is placing orders against a recent list. Railroads in the Chicago area have given no indication yet of submitting lists to the trade for prices.

Fifteen presses totaling about $100,000 in value have been purchased by the Mullins Mfg. Co., Salem, Ohio, for use in executing a large order for automobile stampings. The Timken Roller Bearing Co., Canton, Ohio, has bought three engine lathes. The Firestone Tire & Rubber Co. and the Goodrich Tire & Rubber Co., both of Akron, Ohio, are figuring on lists of equipment. The Goodrich requirements are said to be for a Western plant. The Studebaker Corporation and the A. O. Smith Corporation are active buyers in the Chicago market.

Price advances occupy the attention of many machine tool manufacturers. Practically all planer companies have made upward revisions, while turret lathe builders have quite generally followed the lead of a Cleveland company in advancing prices about 10 per cent.

New York

NEW YORK, Jan. 10.

THE Delaware, Lackawanna & Western Railroad has distributed quite widely an inquiry listing about 30 items of miscellaneous shop equipment on which it asks for prices. Excepting the list of the Norfolk & Western, against which purchases were recently made, this is the largest railroad inquiry in the East in some months. Too little time has elapsed since the holidays to determine whether the new year will bring an increasing volume of machine tool buying. So far this month indications point to no particular change from the December rate, but there is a good deal of pending business on which action may be taken soon if improvement in general business conditions encourages manufacturers to go ahead.

Texas & Pacific Railroad has ordered a 5-ft. radial drill and a 2500-lb. steam hammer from Niles-Bement-Pond Co., and same company has sold to Southern Pacific a 300-lb. Beaudry hammer. Other sales include a 13 x 30-in. Pratt & Whitney lathe to Massachusetts Institute of Technology; Oliver disk sander to Hartford, Conn., fire department; No. 2 Pratt & Whitney jig borer to Detroit automobile company; jig borer to an electrical manufacturer in Ohio; two die sinking machines to a forging company in Massachusetts.

Columbia Air Liners, Inc., care of Charles A. Levine, 233 Broadway, New York, has purchased one-story factory at Thirty-sixth Street and Forty-eighth Avenue, Long Island City, totaling about 10,000 sq. ft. floor space, for manufacture of commercial and military aircraft. Initial production will be devoted largely to assembling. It is purposed to take over additional buildings on adjoining site for expansion.

Kent Automatic Parking Garage, Inc., 350 Madison Avenue, New York, awarded general contract to Fred T. Ley Co., 578 Madison Avenue, for a twenty-four-story service, repair and garage building on East Forty-third Street, to cost $1,600,000 with equipment. Wilbur G. Hudson Engineering Corporation, 30 Church Street, is engineer.

Poldi Steel Corporation of America, 151 Bank Street, New York, has purchased a two and one-half-story building, 45 x 100 ft., on West Eighteenth Street, and will remodel for a new storage and distributing plant.

Huntoon Ice Co., 91 Seventh Avenue, New York, filed plans for a three-story unit, 50 x 92 ft., on West Nineteenth Street, to cost about $60,000 with equipment; Russell G. Cory, 30 Church Street, architect and engineer.

Samuel Rosenblum, 51 Chambers Street, New York, architect, has plans for a five-story automobile service, repair and garage building, 100 x 108 ft., to cost approximately $200,000 with equipment.

Atlantic Gypsum Products Co., 40 Central Street, Boston, manufacturer of structural building materials, has awarded general contract to Donnell-Zane Co., 225 Broadway, New York, for a six-story plant at 150th Street and East River, to cost close to $75,000 with equipment; H. J. Brown, company engineer.

Ovens, power equipment, conveying and other machinery will be installed by the Gotham Cake Co., Long Island City, in a two-story building, totaling 17,000 sq. ft. of floor space.

Meisner & Uffner, 4197 Park Avenue, New York, architects, are drawing plans for a two-story automobile service, repair and garage building, to cost close to $200,000 with equipment.

Fire, Dec. 31, destroyed portion of storage and distributing plant of Mayer Malbin, Long Island City, N. Y., plumbing equipment and supplies, with loss estimated at $30,000.

H. Hartzberg & Son, New York, manufacturers of twisted wire brushes and brooms, have leased 20,000 sq. ft. in building at 41-45 East Eleventh Street for a new plant.

William A. Geisen, 603 East Tremont Avenue, New York, architect, has plans for a two-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

Western Electric Co., 195 Broadway, New York, has awarded general contract to Karl W. Koch, Inc., 153 West Seventy-second Street, for another addition to its plant at Kearny, N. J., one story, 97 x 346 ft., to cost upward of $300,000 with equipment.

Chevrolet Motor Co., Flint, Mich., has plans for a one-story addition to its assembling plant at Bloomfield, N. J., 90 x 220 ft., to cost more than $80,000.

Board of City Commissioners, City Hall, has plans for a marine terminal on Hudson River water front, with elevating, conveying, loading and other freight-handling equipment, to cost $10,000,000; Philip Guise, City Hall, city engineer.

Board of Education, 19 Winans Street, East Orange, N. J., has filed plans for a three-story mechanical shop, with

The Crane Market

PURCHASING has been light both in overhead and locomotive cranes, but there is a fair volume of inquiry for single pieces of equipment. Pending business includes two overhead cranes for Public Service Production Co., Newark, N. J., 120-ton crane for Roseland and 65-ton crane for West Orange, N. J. New York Central Railroad has asked prices on 25-ton locomotive crane for Ohio. Among older inquiries still active are 60-ton electric and 10-ton hand power crane for E. L. Phillips & Co., 50 Church Street, New York; 40-ton locomotive crane for export to Russia, inquired for by Amtorg Trading Corporation, 165 Broadway, New York; 150-ton overhead crane for Phoenix Utility Co., 71 Broadway, New York, and two 15-ton lumber handling cranes for Franklin Lumber Co., Newark, N. J. In Chicago, A. Finkl & Sons have issued inquiry for 40-ton electric overhead crane.

Among recent purchases are:

General Electric Co., Schenectady, N. Y., six 5-ton, low headroom, three 10-ton, standard overhead cranes and four small electric traveling wall cranes for West Philadelphia, reported purchased from unnamed builders.

Limestone Products Co., Newton, N. J., 10-ton crawl-tread steam shovel from unnamed builder.

Livingston Sand & Gravel Co., Livingston, N. J., 10-ton crawl-tread locomotive crane from unnamed builder.

Arundel Corporation, Baltimore, two railroad type steam shovels with 3½ to 5-cu. yd. dippers, reported purchased from Bucyrus-Erie Co.

Rutland Railroad, Rutland, Vt., railroad steam shovel, reported purchased from unnamed builder.

Erie Railroad, New York, 15-ton overhead crane from Niles Crane Corporation.

American Smelting & Refining Co., 120 Broadway, New York, 5-ton, 39-ft. span, 3-motor overhead crane for Mexico, from Western builder.

Commonwealth Edison Co., Chicago, 50-ton, electric overhead crane for Southwest station to Western builder.

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metal, woodworking and other departments, to cost $90,000 with equipment.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has plans for a one-story addition to its plant at Harrison, N. J., to cost $25,000. Bids will be asked in spring.

Merger is being arranged between Passaic Metal Ware Co., Brook Avenue, Passaic, N. J., and Consolidated Can Corporation, 189 Academy Street, Brooklyn. Both plants, it is understood, will be continued and an expansion program carried out.

Clarence D. Chamberlin, aviator, has leased space in the Elasticap Building, Twelfth Street and the Hudson River, Hoboken, N. J., for airplane manufacture, including experimental and assembling departments. Motors will be constructed by Charles B. Kirkham, with plant at Garden City, L. I., formerly chief engineer for Curtiss Aeroplane & Motor Corporation, Buffalo.

Nicholas Bernard, Inc., 166 Central Avenue, Newark, manufacturer of metal novelties and toys, has leased a portion of building of United Radio Corporation, 235-49 Elizabeth Avenue, for a new plant. It is understood that present works will be removed to new location and additional equipment installed.

Harco Steel Co., Inc., Elizabeth, N. J., has completed its shop at 1180 East Broad Street, and is installing machinery and equipment for fabrication of structural steel and ornamental iron.

Safety Carboy Holder & Truck Corporation, 78 Franklin Street, New York, has been taken over by M. Becker and will be operated as manufacturer of special type of barrel holder, tipper, rocker and incinerator.

Ever Ready Machine & Die Co., 608 Humboldt Street, Brooklyn, manufacturer of dies, jigs, tools and metal stampings, has purchased a building, 50 x 100 ft., at Collier and Newell Streets, which it will occupy in about 60 days.

Philadelphia

PHILADELPHIA, Jan. 9.

BIDS have been asked on general contract by Philadelphia Rubber Works Co., Land Title Building, Philadelphia, for an addition to plant at Oaks, Pa., to cost close to $40,000.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has acquired about 81 acres at Front Street and Champlost Avenue, and will use portion of site for new car repair and reconditioning shops, car barns, terminal trackage, etc.

Hydraulic Tool Shop, Island Road and Botanic Avenue, Philadelphia, has awarded contract to H. H. Wehmeyer, Inc., 509 West Cumberland Street, for a one-story machine shop addition.

Board of Trustees, Drexel Institute, Thirty-second and Chestnut Streets, Philadelphia, is considering erection of a four-story mechanical engineering building, to cost approximately $350,000 with equipment.

Ludington Philadelphia Flying Service, Inc., Atlantic Building, Philadelphia, has awarded general contract to Airport Equipment Co., Pennsylvania Building, for a one-story shop and hangar at Municipal Flying Field.

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, in conjunction with Pennsylvania Power & Light Co., Allentown, Pa., has begun construction of new power substation and switching station at Plymouth Meeting, Pa., covering 45 acres, for interchange of power; transmission line to carry 220,000 volts will be built. Entire project will cost upward of $2,000,000. Philadelphia company will also complete new power substation at Westmoreland Street and Hunting Park Avenue, to cost more than $350,000 with equipment.

Association of Motorbus Owners of Philadelphia and Vicinity, and Del-Bridge Bus Association, both represented by Harold S. Shertz, Liberty Building, Philadelphia, attorney, have acquired jointly a site at Thirteenth and Filbert Streets, and will have plans drawn for a multi-story bus terminal, service and repair garage building, to cost close to $1,000,000 exclusive of land.

H. H. Ward Co., Inc., Chester, Pa., manufacturer of metal cornices, ceilings, etc., has awarded a general contract to William Provost Jr., Crozer Building, for a three-story addition, 60 x 140 ft., to cost approximately $70,000 with equipment; Ballinger Co., 105 South Twelfth Street, Philadelphia, architect and engineer.

Bellanca Aircraft Corporation, Arlington, S. I., has taken out a charter under same name in Delaware, with capital of $1,000,000, to construct and operate a plant at New Castle, about six miles from Wilmington, Del., where 350 acres has been purchased, with 1100 ft. frontage on Delaware River. Work will begin at once on initial units, to cost more than $100,000 with equipment, designed largely for assembling. It is said that present plant at Arlington will be continued for time being. New company is headed by Giuseppe Bellanca. Henry B. and Frank V. duPont, Wilmington, are interested in organization.

Lawrence Township Board of Education, Lawrenceville, N. J., plans the installation of manual training equipment in a new junior high school to cost $300,000, for which appropriation has been voted. P. E. Williams is supervising principal.

In connection with steam-operated electric generating plant at Churchtown, near Pennsville, N. J., to cost about $7,000,000, American Gas & Electric Co., 30 Church Street, New York, plans construction of a steel tower transmission line to Atlantic City, for service to Atlantic City Electric Co., an affiliated organization, to cost close to $1,000,000.

Lee Motor Co., Collegeville, Pa., recently formed by Lee Templeton and John Keyser, both of Norristown, Pa., will proceed with erection of one-story plant for manufacture of airplanes, with division for motor assembling, specializing in popular-priced units to sell for about $1,500.

Pocono Metal Mfg. Co., East Stroudsburg, Pa., manufacturer of sheet metal stampings, etc., will rebuild portion of its plant recently destroyed by fire, with loss of $25,000, including equipment.

Danville Structural Steel Co., Danville, Pa., recently acquired by Charles M. Schwab, head of Bethlehem Steel Corporation, Bethlehem, Pa., will be extended and improved under new ownership, with early resumption of production. Property comprises former Danville Structural Tubing Co. and Pennsylvania Brake Beam Works, consolidated last spring as the Danville Structural Steel Co. C. Clarence Weymouth will be in charge of operations. Carlton S. Wagner has been head of Danville company.

William Christensen Co., Inc., York, Pa., has been organized to fabricate structural steel, ornamental iron and brass and bronze products. It has taken over plant formerly operated by William Christensen and is not in market for any additional equipment.

Buffalo

BUFFALO, Jan. 9.

MANUAL training equipment will be installed by Board of Education, Genesee Building, Buffalo, in a two-story high school to cost close to $1,000,000. F. J. & W. A. Kidd, 522 Franklin Street, architects.

Twin States Gas & Electric Co., Bennington, Vt., has plans for a new power plant in vicinity of Hoosick Falls, N. Y., reported to cost in excess of $150,000, with transmission lines. Morton C. Tuttle Co., Park Square Building, Boston, is engineer.

Larrabee Truck Corporation, Binghamton, N. Y., recently formed has arranged for stock issue to total $625,000, proceeds to be used for acquisition of Larrabee-Deyo Motor Truck Co., with local plant. New company has purchased former plant of Fiat Motor Co., Poughkeepsie, N. Y., and proposes early removal to that location. Company will operate its own body-manufacturing department.

Niagara, Lockport & Ontario Power Co., Buffalo, will take over and consolidate Western New York Utilities Co., operating at Batavia, Lockport, Medina and vicinity. Plans are under advisement for expansion, including transmission line construction.

Board of Education, Municipal Building, Rochester, N. Y., is said to be planning installation of manual training department in three-story Benjamin Franklin high school to cost $2,000,000, for which bids are being asked on general contract until Feb. 23. Gordon & Kaelber, Hiram Sibley Building, are architects.

Coplan Steel Co., Ogdensburg, N. Y., is said to be arranging for a recapitalization of company, to be followed by early resumption of operations at the local mill and development of full capacity.

Board of School Trustees, District No. 1, 44 Main Street, Waterloo, N. Y., is considering installation of manual training equipment in two and three-story high school to cost $390,000; Carl C. Ade, 89 East Avenue, Rochester, N. Y., architect.

J. A. Zurn Mfg. Co., Erie, Pa., has been formed under State laws by John A. Zurn, 221 West Twenty-first Street, to take over and expand company of same name, with plant at Fourteenth and German Streets for manufacture of plumbing equipment and supplies, gas burners, etc., with capital of $300,000. Plans have been completed for an addition to cost close to $250,000 with equipment, for which Wilbur Watson & Associates, 1614 Prospect Avenue, Cleveland, are architects and engineers. Officials of new company will include John A., M. A., E. F., and C. A. Zurn.

Kendall-Lamar Corporation, Potsdam, N. Y., has been organized to succeed Ira H. Kendall in manufacture of milk handling apparatus. Plant is already established and equipped.

The Rome Brass & Copper Co., Rome, N. Y., through action of its stockholders in authorizing the transfer of 30,000 shares of preferred stock, has concluded arrangements for the purchase of the Rome Mfg. Co., also at Rome. The sale had previously been sanctioned by the stockholders of the Rome Mfg. Co. Radiators are the chief product of the Rome Mfg. Co.

Detroit

DETROIT, Jan. 9.

BIDS will soon be asked on general contract by Consolidated Paper Co., Monroe, Mich., for a four-story addition, to cost more than $350,000 with equipment. Forster & Wernert, Nicholas Building, Toledo, Ohio, are architects and engineers.

Wolverine Tube Co., 1411 Central Avenue, Detroit, manufacturer of seamless copper and brass tubing, tubing parts, etc., is considering an expansion and improvement program to cost close to $300,000.

Hudson Motor Car Co., 10617 Knodell Avenue, Detroit, is completing plans for a two-story addition, 100 x 500 ft., to cost more than $300,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Board of Education, Rochester, Mich., plans installation of manual training equipment in a three-story high and grade school to cost $225,000, for which bids will soon be asked on general contract. Van Leyon, Schilling & Keough, 3440 Cass Avenue, Detroit, are architects.

Michigan Carton Co., Battle Creek, Mich., manufacturer of cartons and other cardboard containers, has work under way on a one-story addition, 65 x 160 ft., to cost more than $60,000 with equipment. M. J. Morehouse, 343 South Dearborn Street, Chicago, is architect.

Lansing Ice & Fuel Co., Lansing, Mich., is planning extensions and improvements in its ice-manufacturing division, to increase capacity close to 25 per cent.

Michigan Fertilizer Co., Lansing, Mich., has work under way on a new two-story unit, 166 x 416 ft., to cost upward of $65,000 with machinery. Following completion of this building company is considering another one-story unit for sulphuric acid production, to cost close to $35,000.

Kewaunee Mfg. Co., Adrian, Mich., manufacturer of laboratory furniture and equipment, has awarded general contract to Robb & Ott, Adrian, for a one-story top addition to cost about $25,000. Headquarters are at Kewaunee, Wis.

Federal Forge Co., Lansing, Mich., is planning extensions and betterments to increase capacity for production of larger forgings.

Swift Electric Welder Co., manufacturer of butt and spot welding machines, formerly at Fort Street and Mount Elliott Avenue, Detroit, has removed to Boulevard Temple Building, West Grand Boulevard and Twelfth Street.

New England

BOSTON, Jan. 9.

THE machine tool market in this territory so far this year has shown no signs of activity. Local houses apparently have accomplished more business than those in other New England States, yet few sales were reported the past week. New inquiries are about as scarce as orders, and manufacturers negotiating for metal-working equipment late in 1927 seem to be in no hurry to resume. Industry is slowly gathering momentum, however, and the trade looks for more activity before the end of the month.

Small tool sales are at a minimum, and it is reported that unused stocks in manufacturers' hands are small.

Angle Novelty Co., 209 Lunenburg Street, Leominster, Mass., contemplates a plant addition.

Welker Hoops, Inc., Middletown, Conn., has leased former plant of Westinghouse Electric & Mfg. Co., Middletown, and will manufacture an automobile gear shift.

What Cheer Chemical Co., Grotton Avenue., Pawtucket, R. I., has plans for a new rendering plant for which handling equipment will be required. Plans are private.

Laconia Car Co., Laconia, N. H., has under consideration manufacture of small wood and steel motor boats for use with outboard motors.

Plans are nearing completion for a three and six-story technical high school, 143 x 238 ft., at Fall River, Mass. Dr. William Pritchard is chairman of school committee.

Washburn Wire Co., Phillipsdale, R. I., has taken out permit for a one-story rod mill, 108 x 135 ft., for which general contract recently was let to Austin Co., reported to cost upward of $100,000 with equipment.

American Oil Products Co., 230 Milk Street, Boston, has awarded general contract to W. F. Condon & Sons Co., 222 Putnam Avenue, Cambridge, Mass., for a one-story storage and distributing plant, with compounding department, at Somerville, Mass., 57 x 135 ft., to cost about $60,000. Monks & Johnson, 99 Chauncy Street, Boston, are architects and engineers.

Watertown Electric Co., 7 Main Street, Watertown, Boston, has plans for a two-story repair shop, with service and garage facilities, to cost about $65,000 with equipment.

Yale & Towne Mfg. Co., Stamford, Conn., manufacturer of builders' locks and hardware, hoists, etc., is having plans drawn for a three-story addition, to cost upward of $200,000 with equipment. John Gamble Rogers, 154 East Forty-sixth Street, New York, is architect. Headquarters are at 9 East Fortieth Street, New York.

Cadillac Automobile Co. of Rhode Island, Providence, has taken over property at 128-36 Broadway, and plans construction of service, repair and sales building, to cost in excess of $100,000 with equipment.

S. D. Warren & Co., 101 Milk Street, Boston, manufacturers of paper, have plans for a two-story addition to their mill at Westbrook, Me., to cost more than $75,000 with equipment.

New England Power Co., Worcester, Mass., has applied for permission to issue stock in amount of $1,700,000 for extensions and improvements, including completion of steel tower transmission line from Bellows Falls, Vt., to Pratt Junction, Mass., to cost $650,000; similar power line from Ayer to Tewksbury, Mass., on which work has begun, to cost $344,000; and completion of power substation at Pratt Junction, to cost $476,000 with machinery.

Chapman Valve Mfg. Co., Indian Orchard, Mass., has arranged for increase in capital from $1,500,000 to $3,000,000, a portion of proceeds to be used for expansion.

Samuel Marshall, Inc., 43 Tremont Street, Boston, has plans for a one-story automobile service, repair and garage building, 145 x 190 ft., at Medford, Mass., to cost approximately $100,000 with equipment.

Manchester Tool Co., Manchester, Conn., has been organized to manufacture tools, particularly reamers. It is operating a factory at 161 Adams Street.

Phelps Foundry Co., Ansonia, Conn., has been formed to manufacture brass and bronze castings. Manufacturing contracts have not yet been made.

Chromium Process Co., Waterbury, Conn., has been organized to engage in electro-deposition of chromium. It is occupying Maxim Munitions plant at Derby, Conn., and is not in need of materials or equipment.

Cincinnati

CINCINNATI, Jan. 9.

MACHINE tool builders have booked a fair number of orders in the past 10 days, although many buyers are hesitant about purchasing tools for which they have recently inquired. Many companies report that outstanding quotations total an impressive sum and if they are successful in closing a reasonable percentage, production should go ahead on at least a moderate basis. Operations of local plants have not changed much in the last month and probably will continue during the next few weeks on a restricted working schedule.

Price advances still occupy attention of many manufacturers. Practically all planer companies have made upward revisions, and builders of turret lathes have followed the lead of a Cleveland maker in increasing list prices. This decision has resulted in some business being placed prior to enforcement of new schedules, which became effective a few days ago.

Norfolk & Western Railroad has added three boring mills and several other machines to its previous purchases, and the Texas & Pacific has bought a 5-ft. Right Line radial drill and a 2500-lb. single frame steam hammer. Magor Car Co. has taken a 53-in. heavy boring mill.

Newman Mfg. Co., 418 Elm Street, Cincinnati, manufacturer of ornamental bronze, has purchased plant of Safe Cabinet Co., Norwood. Buildings, with a total floor space of 146,000 sq. ft., will be remodeled and company will remove its offices and factory to new location.

American Laundry Machinery Co., Norwood Station, Cincinnati, has purchased Perry Laundry Machinery Co., Fairhaven, Mass., for $500,000, and will consolidate with its organization. It is understood that Fairhaven plant will be maintained as a branch. Emmanuel J. Perry, heretofore head of acquired company, will become identified with purchasing interest. American company has recently acquired property at Seattle and plans erection of a new factory branch, storage and distributing plant at that place, to cost more than $45,000.

Linde Air Products Co., 30 East Forty-second Street, New York, is reported contemplating new plant at Portsmouth, Ohio, to cost more than $200,000 with machinery.

Perry Derrick Co., Dayton, Ky., manufacturer of derricks and kindred heavy machinery, has awarded general contract to C. A. Rawlings, Fort Thomas, Ky., for a three-story addition, to cost upward of $75,000 with equipment. E. C. Landberg, 9 East Fourth Street, Newport, Ky., is architect.

Steam Appliance Transit Corporation, Lexington, Ky., recently formed by John R. Humphrey, 1109 Slashes Road, and associates, with capital of $150,000, is contemplating erection of a one-story repair plant, to cost more than $50,000 with equipment.

Stimpson Computing Scale Co., Breckenridge and Logan Streets, Louisville, will build an addition to cost approximately $100,000 with equipment, and will soon take bids on general contract. O. D. Mock, 221 South Fifth Street, is architect.

City Council, Knoxville, Tenn., is considering construction of a municipal automobile service, repair and garage building, to cost upward of $75,000 with equipment; City Engineering Department, City Hall, in charge.

International Aircraft Corporation, 909 Keith Building, Cincinnati, has plans for a new plant and remodeling and improving present buildings.

Knoxville Power & Light Co., Knoxville, Tenn., is said to be planning an expansion and improvement program to cost about $1,500,000.

Thompson Grinder Co., Main and Zischler Streets, Springfield, Ohio, manufacturer of grinding equipment, etc., has awarded general contract to A. G. Samuelson for a one-story addition, to cost about $20,000 with equipment. Lloyd Zeller, Springfield, architect.

F. & A. Air-Jack Mfg. Co., Dayton, Ohio, has been organized to manufacture patented air-jacks and has a factory in operation.

St. Louis

ST. LOUIS, Jan. 9.

BIDS will be received by Board of Public Service, City Hall, St. Louis, until Feb. 1, for a one-story boiler plant for city sanitarium to cost $150,000. A. A. Osburg, City Hall, is city engineer.

Charles G. Kruckemeyer Machine & Parts Co., Minerva Avenue, has awarded general contract to Truscon Steel Co., Syndicate Trust Building, for a one-story addition to its machine shop, 55 x 170 ft., to cost about $35,000 with equipment.

Union Cooperage Co., Second and Penrose Streets, St. Louis, has plans for a two-story addition, 80 x 115 ft., to cost approximately $50,000 with equipment.

Imperial Casket Co., 1415 St. Louis Avenue, Kansas City, Mo., has awarded general contract to W. K. Martin, Dwight Building, for a new two-story plant, to cost $45,000 with equipment. W. J. Koch, Mutual Building, is architect.

Cape Silica Co., Cape Girardeau, Mo., is reported planning construction of two additional plant units, following completion of initial works now in progress. Present mill will cost close to $75,000 with machinery.

Arkansas Cold Storage Co., Little Rock, Ark., has plans for a three-story cold storage and refrigerating plant, to cost $85,000 with equipment.

City Council, Sterling, Kan., plans extensions and improvements in municipal electric light and power plant, with installation of additional equipment, to cost in excess of $40,000. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

W. S. Merkle, 414 North Twefl̶th Boulevard, St. Louis, consulting engineer, has plans for a hydroelectric generating plant in south central part of State, for a company whose name is temporarily withheld. Transmission system will be built for service at Argyle, Meta, Freeburg, and vicinity. Entire project will cost upward of $1,250,000.

Independent Plumbing & Heating Supply Co., 1119 Locust Street, has asked bids on general contract for a two-story storage and distributing plant with pipe cutting and threading shop and other departments, to cost $130,000 with equipment. D. R. Harrison, Ambassador Building, is architect.

Western Refrigeration Co., Twenty-first and Campbell Streets, Kansas City, Mo., will erect a one-story ice-manufacturing and refrigerating plant, to cost close to $50,000 with equipment. Ralph H. Oliver, 115 South Dearborn Street, Chicago, is architect.

Hemp & Co., 1945 South Vandeventer Avenue, St. Louis, manufacturers of heating equipment, have awarded general contract to Widmer Engineering Co., Laclede Gas Light Building, for a two-story and basement plant, and alterations and improvements in existing factory, to cost about $45,000.

American Stove Co., Kingshighway and Daggett Street, St. Louis, has let general contract to Grone Construction Co., Syndicate Trust Building, for a one-story and basement addition, 88 x 120 ft., to cost close to $40,000 with equipment.

Cleveland

CLEVELAND, Jan. 9.

MACHINE tool manufacturers and dealers have taken a fair amount of business in single machines since the start of the year and quite a little new inquiry has come out. There is more active demand for machines from the automotive industry from manufacturers of stampings, forgings and other parts. However, little business is coming from automobile manufacturers, as is indicated by reports that the market in the Michigan territory continues dull.

Mullins Mfg. Corporation, Salem, Ohio, which has taken a large order for automobile stampings, has purchased 15 presses, including two double-crank toggle presses, amounting to approximately $100,000. Timken Roller Bearing Co., Canton, Ohio, the past week purchased three engine lathes. Firestone Tire & Rubber Co., Akron, bought a 24-in. shaper and is figuring on quite a list of equipment for its new Pacific Coast plant. Goodrich Tire & Rubber Co., Akron, is also reported to be securing estimates for equipment for a Western plant. Increased activity of drop forge shops is reflected in some demand for die sinking machines.

Plans have been filed by E. F. Hauserman Co., 6810 Grant Avenue, Cleveland, manufacturer of metal partitions and kindred metal goods, for rebuilding its two-story plant recently damaged by fire, to be 165 x 200 ft., to cost $65,000 with equipment.

Akron-Neon Co., Akron, Ohio, recently organized, is planning operation of a local factory for production of special gas-electric signs, to cost about $20,000.

Wilking Carriage Works, Inc., 102 North Third Street, Marietta, Ohio, will erect a two-story addition, 63 x 68 ft., for production of automobile and motor truck bodies, to cost approximately $25,000.

Timken Roller Bearing Co., Canton, Ohio, has approved plans for a one-story addition, to cost $300,000 with machinery.

Beans Foundry Co., Martins Ferry, Ohio, is completing an addition for production of steel castings, designed to double the present capacity. Foundry, heretofore, has been devoted exclusively to iron castings.

Universal Portland Cement Co., 210 South La Salle Street, Chicago, is reported to have plans under way for a new mill in Cuyahoga River Valley section, vicinity of Cleveland, to cost upward of $1,750,000 with equipment.

Carbon Sales Division of National Carbon Co., Inc., Cleveland, has opened sales offices in connection with its brush service plants at 357 West Thirty-sixth Street, New York; 551 West Monroe Street, Chicago; 3 Barker Place, Pittsburgh, and 1824 Ninth Avenue, North, Birmingham.

Gustav Schaefer Wagon Co., 4180 Lorain Avenue, Cleveland, will rebuild portion of plant recently destroyed by fire, with loss reported more than $250,000 including equipment.

South Atlantic States

BALTIMORE, Jan. 9.

AN expansion and improvement program for power plants, transmission lines and other electric facilities is being planned by Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore. Company is interested in new hydroelectric generating plant to be constructed on Susquehanna River by Pennsylvania Water & Power Co., Holtwood, Pa., on site south of last noted place, to cost close to $20,000,000 with transmission system. J. E. Aldred is chairman of board of Consolidated company.

American Oil Co., American Building, Baltimore, has plans for a two-story storage and distributing plant for lubricating oils in the Curtis Bay district, to cost approximately $40,000 with equipment.

Carolina Cement Co., care of J. A. Acker, chief engineer of New Egyptian Portland Cement Co., Port Huron, Mich., recently formed by Mr. Acker and associates, has arranged for purchase of property on Trent River, near New Bern, N. C., for a cement mill, to cost close to $2,500,000 with equipment. It is purposed to have one unit ready for service next fall.

Purchase division, Bureau of Standards, Washington, is asking bids until Jan. 20 for two 500-hp. watertube boilers to operate at 200 lb. pressure, with superheaters and soot blowers, for new power plant.

Board of Awards, office of city register, Baltimore, is taking bids until Jan. 18 for a one-story equipment storage and distributing plant, with repair shop. C. H. Osborne is chief of bureau of buildings.

Central Chemical Co., Hagerstown, Md., manufacturer of fertilizers, will erect a new unit at its branch plant at Money Point, near Norfolk, Va., to cost in excess of $100,000 with machinery.

Lavonia Cotton Mfg. Co., Lavonia, Ga., has completed plans for complete electrification of its mill, to cost close to $50,000 with equipment. J. E. Sirrine & Co., Greenville, S. C., are engineers.

Savannah River Lumber Co., Savannah Bank & Trust Building, Savannah, Ga., has plans for a new one-story unit at its mills at Port Wentworth, Ga., to be used largely for production of stock for automobile bodies, to cost $250,000 with machinery. Installation will include handsaws, surfacers, cut-offs, tenoners and other wood-working machinery. It is also proposed to install steam-electric power plant, with two watertube boilers, generators and accessory apparatus.

Lexington Water Power Co., Columbia, S. C., has begun work on a hydroelectric power development on Saluda River, about 10 miles from city, to develop initial capacity of 130,000 kw. and ultimate output of more than 200,000 kw. A transmission line will be built for service to Broad River Power Co., an affiliated organization. It is purposed to have first portion of plant ready for service in about 18 months. Entire project is estimated to cost $20,000,000. Company is operated by General Gas & Electric Corporation, 50 Pine Street, New York.

Standard Metal Weather Strip Co., 1511 Guilford Avenue, Baltimore, has acquired three buildings on 1½ acres near Broadway and line of Pennsylvania Railroad, with main two-story structure, 52 x 69 ft., and will remodel for a new plant. Present works will be removed to new location and considerable additional machinery installed.

E. H. Jacobs Mfg. Co., Danielson, Conn., manufacturer of textile loom equipment, plans enlargement in its branch plant at Charlotte, N. C., and will take over additional space for production facilities.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Jan. 17 for 38,000 ft. steel wire, 6370 lb. copper wire, and 39,000 ft. telephone cable, for Brooklyn Navy Yard, schedule 8290; also for turbine cylinders for Mare Island, Puget Sound and Brooklyn Navy yards, schedule 8289.

Carolina Power & Light Co., Raleigh, N. C., plans extensions and improvements in power plant and system in vicinity of Asheville, N. C., to cost about $200,000 with equipment.

Electric City Ice Co., Anderson, S. C., recently formed by J. M. King, Seneca, S. C., and associates, plans construction of an electrically operated ice-manufacturing plant to cost about $45,000.

Chicago

CHICAGO, Jan. 9.

SALES resistance is less marked and machine tool sales are more numerous than in the closing days of 1927. Both inquiry and purchases, however, are scattered. Railroads in the Chicago area give no indication of submitting lists to the trade. In the St. Louis district orders are being placed against the requirements of the Missouri Pacific and the Texas & Pacific. Studebaker Corporation has closed for a few items for use in the production of a new eight-cylinder engine. A. O Smith Corporation, Milwaukee, will buy a few small machine tools and is indicating interest in several large machines. Marmon Motor Car Co., Indianapolis, Ind., is disposing of 800 used tools through a local dealer.

Naylor Spiral Pipe Co., 9145 Chauncey Street, Chicago, will build an addition, 71 x 200 ft., to cost $35,000.

Simplex Mfg. Co., 213 West Austin Boulevard, Chicago, manufacturers of roof flashing, will erect addition, 50 x 107 ft., to cost $14,000.

Plant of Belleville Enameling & Stamping Co., Belleville, Ill., was recently damaged by fire, loss being estimated at $200,000.

Capital Plumbing & Heating Supply Co., Chicago, has acquired property at Clybourn and Chester Avenues for a new two-story plant, to cost close to $100,000 with equipment.

K. & S. Mfg. Co., 1333 South Cicero Avenue, Chicago, operating a wood-turning plant, has engaged Joseph J. Novy, 2434 South Ridgeway Avenue, architect, to prepare plans for a two-story addition, to cost more than $100,000 with machinery.

Cooper Mfg. Co., Marshalltown, Iowa, manufacturer of automobile parts and equipment, will rebuild portion of plant recently destroyed by fire, with loss estimated upward of $75,000 including equipment.

Woolery Machine Co., Como and Twenty-ninth Avenues, Minneapolis, Minn., manufacturer of railroad hand cars, inspection cars and other railroad equipment, has plans for a one-story addition, 50 x 170 ft., to cost about $35,000, and will begin work in spring. It is planned also to build a one-story warehouse and distributing unit. Jensen & Foss, Essex Building, are architects.

Stickney & Co., Rockford, Ill., recently organized by Charles A. Stickney, 848 Haskel Avenue, and associates, are planning early operation of a local plant for manufacture of refrigerating equipment, water-softening apparatus, etc.

Central States Power & Light Co., Iowa Falls, Iowa, will begin work on an addition to its local steam-operated electric generating plant, to cost approximately $250,000 with equipment. Extensions will be made in transmission lines.

Northern Pacific Railroad Co., St. Paul, Minn., is reported planning a new sand and gravel-washing plant at Horton, Mont., to cost $75,000 with equipment. Pioneer Sand & Gravel Co., Horton, is interested in project and will be active in construction and operation of unit.

Continental Ice Co., Savanna, Ill., will proceed with a new ice-manufacturing plant, to cost more than $300,000 with equipment.

Fort Dodge Foundry, Fort Dodge, Iowa, which has been idle two years, has been reorganized and reopened as Fort Dodge Steel & Foundry Co., under management of T. C. Hicks, formerly superintendent Fort Dodge Steel & Culvert Co. It will specialize in iron, semi-steel and non-ferrous castngs, all types of grates, machinery castings and some alloy products. New equipment has been installed.

American Nut & Lock Co., 709-711 South Washington Street, Decatur, Ill., has been incorporated with $100,000 capital by Lester L. Barton, William E. Janssen and Henry

W. Orberg to manufacture a locknut invented by J. H. Fernferon of Sweden. Production will begin in two months.

Herman Nelson Corporation, Moline, Ill., manufacturer of Univent and Unit heater products, has let contract for a one-story addition, 120 x 126 ft., with two-story section, 56 x 120 ft., to cost about $43,000.

T. L. Knudtson Engineering Co., Chicago, has established headquarters at 1624 Milwaukee Avenue, and will maintain warehouse with stock of laundry machinery, boilers, engines, etc. It specializes in designing and equipping laundries and engages in power plant engineering.

Indiana

INDIANAPOLIS, Jan. 9.

CONTRACT has been let by Crescent Stove Works, Park Street and Belt Line Railroad, Evansville, Ind., to E. C. Dubber, 1104 East Columbia Street, for a new one-story and basement foundry, to cost about $24,000 with equipment.

Citizens Gas Co., Majestic Building, Indianapolis, is considering extensions and improvements in its artificial gas works, including installation of additional equipment, to cost $300,000. It is expected to begin work in spring.

E. A. Barger, 325 West Sixth Street, Gary, Ind., has plans for a two-story automobile service, repair and garage building, 125 x 125 ft., to cost approximately $100,000 with equipment.

Indiana Electric Corporation, 2 West Washington Street, Indianapolis, has arranged for a bond issue of $2,600,000, a portion of fund to be used for extensions and improvements, including transmission lines.

Air-More Products Co., Indianapolis, has been organized with capital of $100,000 to take over and consolidate Indiana Dry Cleaning Equipment Co., manufacturer of dry-cleaning machinery, exhaust fans, air compressors, etc., and Brandon Air Compressor Co., manufacturer of gasoline filling station equipment, paint spray machines, air compressors, etc., and will occupy plant of the first noted company at 3402 Northwestern Avenue, where production will be concentrated. New company will continue same line of production and will carry out an expansion program. Fred A. Sublette is president of new organization; John E. Brandon, vice-president; and Cleo McLean, engineer and production manager.

Gary-Chesterton Chemical Co., Chesterton, Ind., is said to have plans for rebuilding its plant destroyed by fire several weeks ago, with loss in excess of $90,000 including equipment.

Board of Education, Mount Vernon, Ind., is said to be planning installation of manual training equipment in a two-story high school to cost $200,000, for which bids will soon be asked on general contract. N. S. Spencer & Son, 180 North Michigan Boulevard, Chicago, are architects.

Chrysler Motor Corporation, Detroit, will proceed with a one-story addition, 100 x 300 ft., at its branch plant at Newcastle, Ind., to be equipped as a new die shop. Present department will be remodeled for general production. Extensions will also be made in power station at plant. Entire program will cost more than $85,000. Frank D. Brebner is plant manager.

Muncie Cap & Set Screw Co., Muncie, Ind., has changed its name to Acme Machine Products Co.

Chromolite Corporation, 403 West Michigan Street, Indianapolis, has been organized to do chromium plating. Factory has been acquired and production will begin within six weeks.

Gulf States

BIRMINGHAM, Jan. 9.

PLANS are being completed by Fort Worth Gas Co., Fort Worth, Tex., for a one-story equipment storage and distributing plant, with machine shop, to cost upward of $100,000 with equipment.

Muldoon Fullers' Earth Co., First National Bank Building, Houston, Tex., is planning installation of equipment for development of Fullers' earth properties at Muldoon, Tex., where more than 500 acres has been secured. The initial plant will include loading and mining machinery, grinding mill, drying plant, conveying and sacking equipment, etc.

Texas Central Power Co., Frost National Bank Building, San Antonio, Tex., is said to be planning construction of a new power house in vicinity of Brownsville, Tex., to cost about $45,000 with equipment.

Fire, Dec. 31, destroyed the peanut oil manufacturing plant, peanut butter mill, peanut-shelling mill and other portions of plant of Woldert Pecan Co., Tyler, Tex., with loss reported at $150,000 with equipment.

Birmingham Boiler & Engine Co., 3001 North Seventh Avenue, Birmingham, has taken out permit for a one-story addition, 90 x 140 ft., to be equipped as a steel fabricating works.

Central Florida Light & Power Co., Dunnellon, Fla., is reported planning construction of a new ice manufacturing plant at Inverness, Fla., to cost more than $40,000 with equipment.

Ovens, power equipment, conveying machinery will be installed in a one and two-story plant, 100 x 200 ft., to be constructed by McGough Bakeries Corporation, 731 North Twenty-sixth Street, Birmingham, to cost $200,000.

Casner-Chevrolet Co., 400 East Yandell Boulevard, El Paso, Tex., local representative for Chevrolet automobile, has plans for a two-story service, repair and sales building, 115 x 120 ft., to cost close to $100,000 with equipment. Trost & Trost, Two-Republic Building, are architects.

San Antonio Public Service Co., San Antonio, Tex., is completing plans for expansion at its Comal steam-operated electric power plant, near New Braunfels, Tex., including installation of a 30,000-kw. turbo-generator and accessory equipment, to cost upward of $500,000, including transmission line construction. It is understood that contracts for equipment will be placed soon.

Roxana Petroleum Corporation, Shell Building, St. Louis, has taken an option on 600 acres at Houston, Tex., and is reported considering a new oil refinery at that location.

Gulf States Utilities Co., Beaumont, Tex., is arranging an expansion and improvement program to cost close to $1,200,000, including power stations, transmission lines, gas plants and ice-manufacturing plants. It is purposed to make extensions in the ice-manufacturing plant at Orange, Tex., as well as enlarge electric power plant at that place.

Rockwood Stone Co., Rockwood, Ala., will soon begin erection of a new limestone finishing mill, one story, 160 x 400 ft., to cost close to $125,000 with machinery. Leo F. Caproni, 1056 Chapel Street, New Haven, Conn., is consulting engineer.

National Specialties Corporation, 908 Republic Bank Building, Dallas, Tex., recently organized, plans operation of a local factory for manufacture of electric flashing signs.

Bastrop Ice & Storage Co., Cypress Street, Bastrop, La., has approved plans for a one-story addition to its ice manufacturing plant, 90 x 115 ft., to cost $45,000 with equipment.

Graver Corporation, East Chicago, Ind., has established Texas headquarters at 201 Petroleum Building, Fort Worth, and has discontinued office at Houston.

Milwaukee

MILWAUKEE, Jan. 9.

WHILE expectations of improvement in demand for machine tools have not been realized much past the stage of more active inquiry as yet, indications point toward early betterment of sales. The automotive industries are particularly prominent in inquiries now being put out to cover requirements within the next three to four months. Sales so far this year have been of satisfactory volume, and consist largely of single items to a wide variety of shops. Sentiment is more hopeful than perhaps for five or six months past.

Worden-Allen Co., Milwaukee, manufacturer of structural steel and general contractor and consulting engineer, has an expansion program which contemplates doubling size and output of its works at Capitol Drive and Port Washington Road. Details are not yet available, but a new issue of $600,000 of preferred stock has been authorized to supplement the present capitalization of $600,000 common stock. Eugene W. Krueger is president, and E. F. Zuleger, general manager.

Simmons Co., Kenosha, Wis., manufacturer of steel beds, furniture, etc., has started work on an addition costing $250,000. Branch works at Richmond, Va., are being consolidated with main works, and purchasing department, which was moved to Chicago several years ago, is being returned to headquarters in Kenosha plant.

Founders Sand & Supply Co., Detroit, Mich., has purchased 52 acres of limestone deposits at Sturgeon Bay, Wis., and will establish plant for quarrying and shipping directly by Great Lakes vessels. Investment of approximately $250,000 is contemplated.

Fraser Co., 667 East Water Street, Milwaukee, designer and builder of cereal mills, elevators, etc., has general contract for an $80,000 addition to plant of Commercial Milling Co., 203 Randolph Street, Detroit, Mich. Bids for a five-story extension are being taken until Jan. 20.

Northern Conveyor Co., Janesville, Wis., has postponed indefinitely construction of an addition to cost $40,000; plans by W. H. Blair, local architect.

Quality Aluminum Co., 405 Lincoln Avenue, Waukesha, Wis., is taking bids for a foundry addition; cost is not revealed.

Common Council, Neenah, Wis., has appropriated $30,000 to municipal waterworks commission for purchase of a new power unit, generator, pump and motor to replace obsolete steam pumping and boiler equipment. Specifications will be issued about Jan. 23; H. S. Zemlock, city clerk.

Board of Education, Watertown, Wis., is asking bids until Feb. 8 for a two-story addition, 50 x 167 ft., to Junior High School. Plans are by Edward Tough, architect, Madison, Wis. Dr. F. F. Schlueter is president of board.

Common Council, Wauwatosa, Wis., suburb of Milwaukee, has approved bond issue of $120,000 for construction of an additional water supply unit. Plans are being prepared by J. E. Lowther, city engineer, and call for a deep well, pumping plant and elevated steel tank and tower. Bids probably will be asked early in March; A. V. Brigham, city clerk.

Tools of Jolite, Inc., Milwaukee, has been organized by L. C. Mayhew, 327 Prospect Avenue, and associates, to manufacture machinery, tools, dies, implements, etc., employing a special metal. Plans are being made for establishment of a shop and purchase of equipment.

War Department, Washington, has ordered construction of a waterworks system at Camp Williams, formerly Camp Douglas, Wis., at a cost of $70,000. Plans for well, pumping plant, steel storage tank, etc., are being drawn by Maj. H. C. Hengel, State military architect, 445 Milwaukee Street, Milwaukee. Adj. Gen. Ralph M. Immell, State Capitol, Madison, Wis., is in charge.

Wisconsin Iron & Wire Works, 1660 Booth Street, Milwaukee, has changed its name to Wisconsin Ornamental Iron & Bronze Co.

Pittsburgh

PITTSBURGH, Jan. 9.

FIRE, Dec. 31, destroyed the building occupied jointly by H. P. Gazzam Machine Co., and Stewart-Thomas Foundry Co., 3200 Penn Avenue, Pittsburgh, spreading to adjoining plant of General Bronze Co., with total loss in excess of $75,000 with equipment.

Fokker Aircraft Corporation, Glendale, W. Va., headed by Anthony H. G. Fokker and Major Lorillard Spencer of Atlantic Aircraft Corporation, Hasbrouck Heights, has awarded general contract to R. R. Kitchen & Co., Wheeling, W. Va., for initial units of its plant at Glendale, totaling about 100,000 sq. ft. of floor space, to cost close to $300,000 with equipment. C. W. Bates, 77 Twelfth Street, Wheeling, is architect.

Carbide & Carbon Chemical Corporation, South Charleston, W. Va., manufacturer of industrial gases, oxygen, etc., is said to be planning to rebuild portion of plant destroyed by fire Jan. 1, with loss upward of $350,000 including equipment. Headquarters are at 30 East Forty-second Street, New York.

Mayer Body Corporation, 6461 Frankstown Avenue, Pittsburgh, is having plans drawn for a one-story addition to its automobile body works, to cost more than $25,000.

Rochester & Pittsburgh Coal & Iron Co., Indiana, Pa., has been formed with capital of $17,243,000 to take over and consolidate local company of same name and Jefferson & Clearfield Coal & Iron Co., Brookville, Pa., with properties in Jefferson and Clearfield Counties. Company will operate 12 mines and plans expansion. L. W. Robinson is chairman of board, and B. M. Clark, Indiana, president.

Pittsburgh & Lake Erie Railroad Co., Pittsburgh, has plans for a one-story car repair shop at Woodlawn, Pa., to cost approximately $45,000 with equipment; A. R. Raymer, Smithfield and Carson Streets, Pittsburgh, chief engineer.

Pacific Coast

SAN FRANCISCO, Jan. 4.

PLANS have been filed by Southern California Edison Co., Los Angeles, for a one-story power and switching substation near Irvine, Cal., to cost $110,000 with equipment.

Kimball Pump Co., 1010 East Sixty-second Street, Los Angeles, has awarded general contract to Austin Co. of California, Inc., for a one-story addition.

Doheny-Stone Drill Corporation, Los Angeles, manufacturer of oil drilling equipment, tools, etc., has awarded contract to Llewellyn Iron Works for initial unit of plant at Torrance, to be one story, 180 x 360 ft., to cost about $225,000 with equipment. An outdoor crane runway will be installed, with adjoining smaller unit, 60 x 90 ft. A complete heat-treating division will be provided. Hamm, Grant & Bruner, Ferguson Building, Los Angeles, are architects.

Pacific Fruit Express Co., 65 Market Street, San Francisco, subsidiary of Southern Pacific Co., has plans for a one-story ice-manufacturing and pre-cooling plant, 165 x 440 ft., at Fresno, Cal., with car-icing platform 3300 ft. long, to cost close to $1,000,000 with equipment; engineering department of company in charge.

Crane Creek Lumber Co., Lakeview, Ore., Frank Boutin, manager, is planning construction of a new lumber and saw mill in vicinity of Alturas, Modoc County, Cal., with logging and transportation facilities, to cost $400,000 with machinery.

Provo Ice & Cold Storage Co., Provo, Utah, is considering an addition to its cold storage and refrigerating plant, to cost $50,000 with equipment.

Spokane Lead & Zinc Co., Spokane, Wash., is completing plans for a hydroelectric power development on Clarks Fork, branch of Columbia River, near Metaline Falls, Wash., to provide capacity of 50,000 hp. for mining operations in that section. A transmission line will be built. Entire project is reported to cost more than $3,500,000.

Karpen & Brothers, 636 West Twenty-second Street, Chicago, and Los Angeles, manufacturers of furniture, have plans for a four-story factory at Huntington Park, near Los Angeles, to cost approximately $275,000 with equipment. Hamm, Grant & Bruner, Ferguson Building, Los Angeles, are architects.

F. A. Fullerton, business manager, Milton, Ore., is asking bids until Jan. 23 for one 1000-kw. electric generator, direct-connected to hydraulic turbine and exciter, for a municipal hydroelectric power project, together with governor, gate valves, and accessory equipment. Bids for other equipment will be called later. John H. Lewis, Railway Exchange Building, Portland, is engineer.

Tom G. Taylor Co., Portland, Ore., plans construction of a 120-ton pulp and paper mill in Georgetown district, Seattle, at estimated cost of $3,000,000.

J. A. Roake, Oregon City Foundry, Oregon City, Ore., has purchased property near Canemah Park and will erect a foundry and machine shop, each 48 x 65 ft. Fire partially destroyed the former plant.

Craig Shipbuilding Co., Long Beach, Cal., is having plans prepared for a new foundry, 88 x 97 ft., to replace a building recently destroyed by fire.

Cutler-Hammer Mfg. Co., Milwaukee, manufacturer of electric motor control apparatus and kindred equipment, has opened sales offices at 970 Folsom Street, San Francisco; 229 Boyd Street, Los Angeles, and 2203 First Avenue South, Seattle. Complete stocks of company's standard items will be carried in all offices.

Multnomah Iron Works, Thirtieth and Nicolai Streets, Portland, Ore., has been organized to manufacture drag saws, concrete mixers and electric washing machines. It does not operate a foundry in connection with plant.

Canada

TORONTO, Jan. 9.

SALES of machine tools the past week were comparatively light, but new interest and inquiries were more general and leading builders and dealers look for a continuation of the good demand that prevailed the past year. Considerable buying is yet to be done by the automotive industry of this country for additions under way. Tool buying for mining operations was a strong feature of the 1927 market, and, according to indications, this will continue for some time. The Canadian National Railways have not completed their purchases for the Point St. Charles shops at Montreal, and lists from this quarter are expected at an early date.

Canadian Salt Co., Sandwich, Ont., will build an addition to cost approximately $300,000; architect not yet appointed.

Public Utilities Commission, Palmerston, Ont., is planning installation of several electrically driven water pumps.

A. E. Wheeler, New York, consulting engineer, is preparing plans for erection of a concentrator, with capacity of 500 tons, at Rouyn, Que., for Noranda Mines. Contracts have been awarded to Canadian Bridge Co., Walkerville, for fabricating and erection of steel frame-work, and contract for a part of machinery has also been let.

Chrysler Corporation of Canada, Ltd., Windsor, Ont., has awarded contracts in connection with additions to its plant to cost $200,000. A two-story reinforced concrete building, 101 x 400 ft., is so designed that two additional stories can be added later. Border Construction Co., Walkerville, Ont., is general contractor. Pennington & Boyde, architects and engineers.

Anglo Newfoundland Development Co., Ltd., Grand Falls, Newfoundland, has started work on a new power development plant with capacity of approximately 100,000 hp.

Department of Public Works, Ottawa, Ont., S. E. O'Brien, secretary, will start work soon on an addition to Esquimalt Dry Dock, Esquimalt, B. C.

Foreign

CAPACITY of works in Chile of Anglo-Chilean Consolidated Nitrate Corporation, 120 Broadway, New York, will be increased from 300,000 to 500,000 tons per annum, at a cost of more than $1,000,000. E. A. Cappelen Smith, an official of company, has left for plant site to supervise expansion.

Cork Industrial Development Association, Cork, Ireland, in conjunction with Cork County Committee of Agriculture, plans construction of two new beet sugar mills in different parts of county, one plant to be under direction of each organization. Projects will cost close to $1,750,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference England No. 60182; also, at American Consulate, London, England, William L. Cooper, commercial attaché.

Tokio Electric Light Co., Tokio, Japan, has been formed with capital of 407,140,000 yen (about $203,570,000) to take over company of same name and Tokio Electric Power Companies. New organization will carry out an expansion and improvement program, including power plants and transmission systems.

Ministry of Labor, Prague, Czechoslovakia, is considering additional terminal facilities at harbor of Bratislava, project to be carried out in conjunction with Bratislava Chamber of Commerce. It is purposed to form a joint stock company with capital of 4,000,000 crowns (about $120,000), to handle enterprise, which will include a two-story and basement warehouse terminal, about 89 x 310 ft., with traveling crane, elevating, conveying and other equipment. American Consulate, Prague, Karl L. Rankin, assistant trade commissioner, has information regarding project.

A company at Rotterdam, Netherlands, has obtained a concession to construct and operate an electric generating plant at Menado, Celebes, Netherland East Indies. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Netherland East Indies No. 35-X; also at American Consulate, Batavia, Donald Renshaw, trade commissioner.

Aalborg Portland Cement Works, Jutland, Denmark, is arranging for increase in capital to 4,800,000 kroner (about $1,250,000), a portion of fund to be used for expansion and improvements.

The Dominican Government plans construction of a breakwater approximately 3000 ft. long and other harbor improvements for port of Santo Domingo, also construction of harbor improvements to ports of Puerto Plata and San Pedro de Marcoris, for which an appropriation of $2,000,000 has been made. J. G. White Engineering Corporation, New York, is in charge.

The Osaka Ventilating Co., Itachibori, Japan, is planning to build a new shop for the manufacture of fans, blowers and other ventilating equipment and is desirous of receiving literature and prices on machines for riveting, welding and sheet metal working. H. Ohta is manager.

Tuthill & Co., Inc., 225 Broadway, New York, has been appointed general agent in North America for Mansfeldscher Metallhandel, Berlin, and Mansfeld Mining Co., Eisleben, Germany. Mansfeld companies produce and refine copper, lead and silver and mine coal and potash. Company also manufactures semi-finished and finished copper, brass and silver materials and operates non-ferrous rolling mills in Germany.

NEW TRADE PUBLICATIONS

Spur Gears.—Boston Gear Works, Norfolk Downs, Mass. Leaflet 7-27, covering hardened and ground tooth spur gears for heavy duty. The pinions are generated ground by a special process and warping due to hardening is said to be eliminated by the hardening process.

Motor Drive Equipment.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1140, devoted to reversing motor planer drive constant voltage equipment. Advantages of direct-connected motor drive are given as increased output, decreased power consumption, wide range of speeds, ease of control and lower maintenance.

Reinforcing Lath.—Milwaukee Corrugating Co., Milwaukee. Catalog 20-D, being a technical data book for architects, engineers and contractors, which features the company's ¾-in. stay-rib No. 3 reinforcing lath.

Mechanical Sledges.—Chambersburg Engineering Co., Chambersburg, Pa. Leaflet describing the Chambersburg mechanical sledge for all sorts of hand forging in foundries, forge shops, machine shops, repair shops, mines, etc.

Fabricated Steel.—R. C. Mahon Co., Detroit. Catalog of 24 pages illustrating industrial and commercial buildings erected by the company and factory equipment, including low-temperature drying ovens, spray booths, shaving exhaust systems and special factory handling equipment. The Mahon steel roof deck, complete roofing and roof maintenance service and fire doors are described and illustrated.

Electrical Products. — Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2102 dealing with the company's various types of flexible fixture hangers; folder 52, describing the new Obround condulet in which the cover opening is unobstructed, and advance sheets 94, 95 and 96, devoted to safety hand lamps and fixture hanging condulets.

Materials Handling Equipment.—American MonoRail Co., Cleveland. Catalog A, 64 pages, covering overhead conveying equipment, including monorail systems, switches, trolleys, curves, turn-tables, transfer cranes, chain hoists, monorail lifts, electric hoists and various parts and accessories.

Electrical Spraying.—Electric Sprayit Co., 217 Iron Street, Detroit. Folders describing the operation of a hand spraying device operated by a small electric motor, which drives a fan at high speed and atomizes the liquid or powder being sprayed.

Motor Starting Switches.—Allen-Bradley Co., Milwaukee. Leaflet, dealing briefly with the type J-1552 across-the-line motor starting switch. There are several photographs and descriptions of varied installations.

Air-Operated Chucks. — Logansport Machine Co., Logansport, Ind. First of a series of three circulars showing the application of the company's air-operated chucks. The chucks are pictured in operation on various types of machine tools.

Adamite Dies.—Mackintosh-Hemphill Co., Pittsburgh. Brief bulletin devoted to the application of adamite dies for pressed metal work. Special emphasis is given to the use of these dies for cold forming in a considerable variety of metal works.

Pressed Metal Products.—Youngstown Pressed Steel Co., Warren, Ohio. Bulletin describing factory equipment manufactured by the company. Of particular interest are corrugated pressed steel platforms, solid and sectional boxes for transport work and tote pans.

Water Hammer Drills.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin 81-M, describing the Sullivan T-3 water hammer drill, a late development in a drifting or tripod drill for mining, quarrying and contracting service. The machine will drill 14-ft. holes for 1¼-in. powder readily and will go deeper under favorable conditions.

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THE IRON AGE

New York, January 19, 1928

ESTABLISHED 1855 VOL. 121, No. 3

Moderate-Sized Plant Modernizes

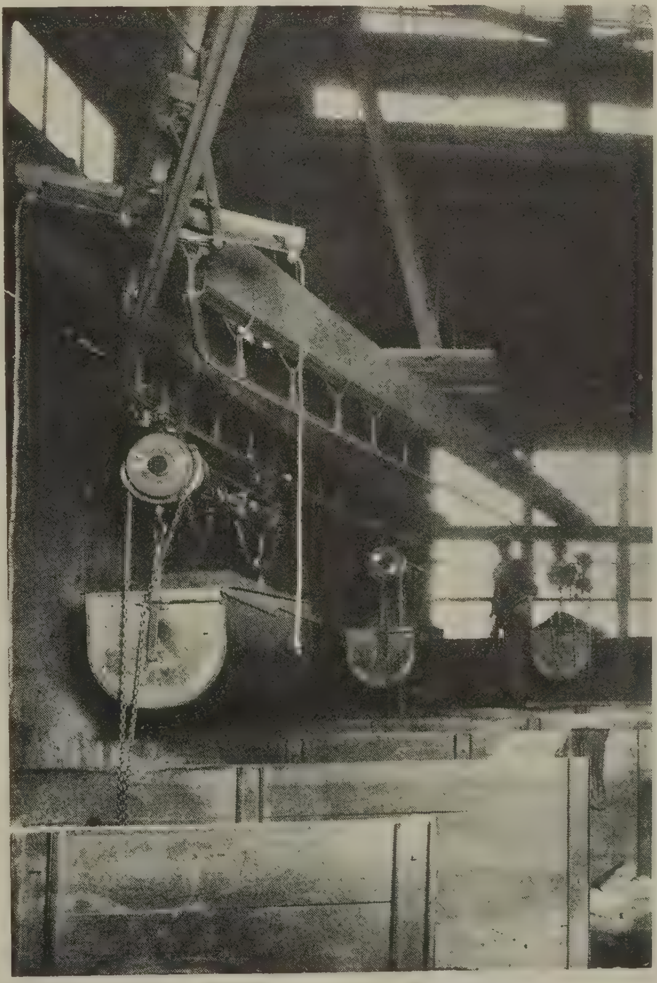
By Installing Simple Conveyors and Trolleys, Regrouping Machinery and Instituting Four-Shift Working Day

IN a period when manufacturing operations within an industry are undergoing radical changes, it becomes necessary for the small and medium-sized plants as well as for the large companies to adopt the innovations which have proved successful. At least they can adapt to their own peculiar needs the general principles underlying the new system. Upon their ability to bring about these changes economically frequently depends their continued prosperity.

Modernizing Without Rebuilding

Such a situation confronted the officials of the American Foundry Co., Indianapolis, a few years ago. In their foundry, old standard practices were being followed consistently in the manufacture of automobile cylinder blocks. Then came the introduction of many new customs into the foundry industry, such as the continuous pouring process, and various labor-saving devices in the molding room. The problem of lowering production costs would have been easier if a new foundry could have been built. But the question of revolutionizing an old one so that operations conform strictly to the newest, approved practice is more difficult. Nevertheless the American Foundry Co. has answered it satisfactorily without the necessity of financing the erection of a new foundry.

The buildings were substantially constructed of brick. The overhead structure, however, was not sufficiently strong to support heavy cranes or other equipment which would impose an undue burden. It was decided, therefore, to install an overhead monorail system which would reach into practically every department of the plant. The rails of this track (manufactured by the Louden Machinery Co., Fairfield, Iowa) are hung from the wooden roof trusses as shown in the various views. At the same time new equipment was introduced and continuous molding established.



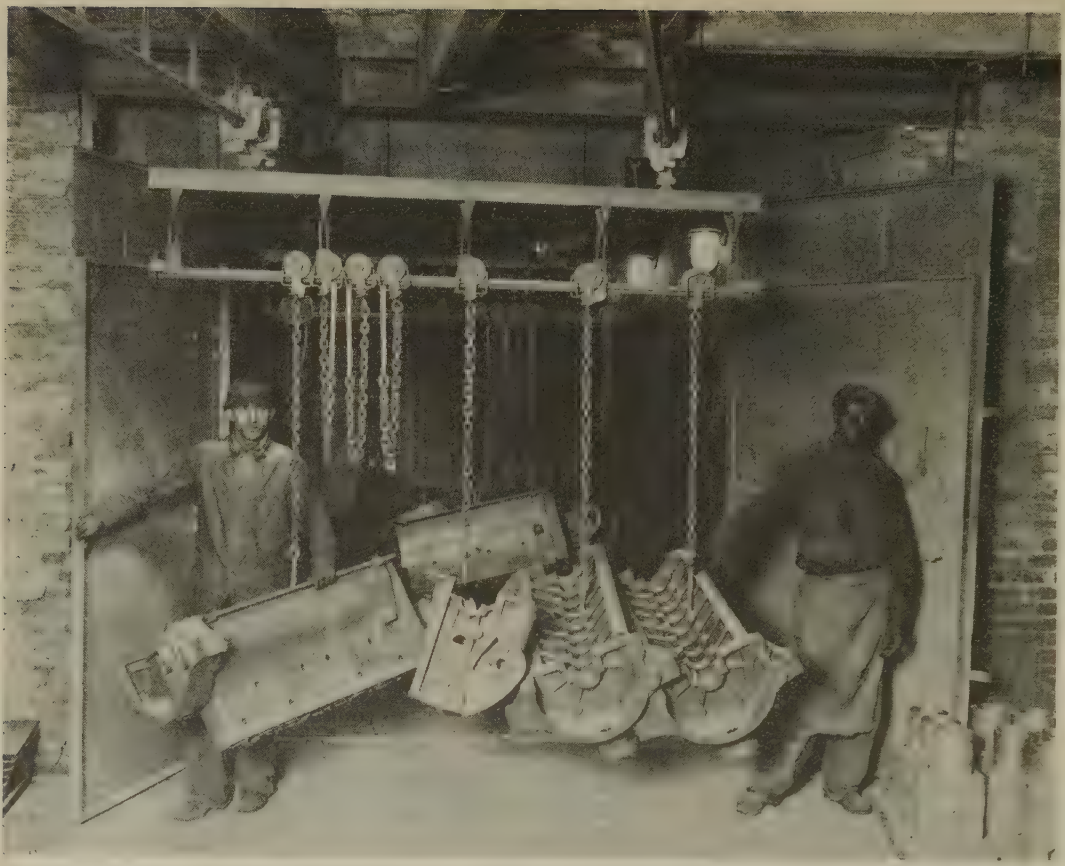
SAND Is Taken From Shakeout or From Storage to Mixing Plant in Buckets. Note switching device

It might seem that much time would be required to effect these changes. But the work was so coordinated that the foundry closed on Friday afternoon after operating on the old basis and opened Monday morning ready to produce castings by new methods.

Four-Shift Day an Important Innovation

The main foundry floor is divided into two portions of equal size, the division line running the length of the structure. Along this central line are located the molding machines. The workmen are grouped into three sections, consisting of the molding gang, the pouring gang and the shakeout gang. They operate on four shifts a day arranged as follows: 7 a. m. to 9 a. m.; 9 a. m. to 11 a. m.; 11:30 a. m. to 1:30 p. m.; 1:30 p. m. to 3:30 p. m. During the first period the molding gang works on one floor, with the pouring gang following about two rows behind. At the same time the shakeout gang is busy on the other floor, getting it ready for the pouring and molding gangs to use it at nine o'clock. When the second period arrives, the locations of the gangs are reversed, the molding and pouring gangs occupying floor No. 2 and the shakeout gang, floor No. 1.

Because of the continuous pouring system and of the shifting of the men from one section of the



CARRIAGES Move Broadside Through Sand Blast. Double turntable brings trolleys into line for monorail

floor to another, production has been doubled without increasing the amount of molding floor space, the number of necessary flasks has been reduced 50 per cent without decreasing the output of castings, and night work has been entirely abandoned.

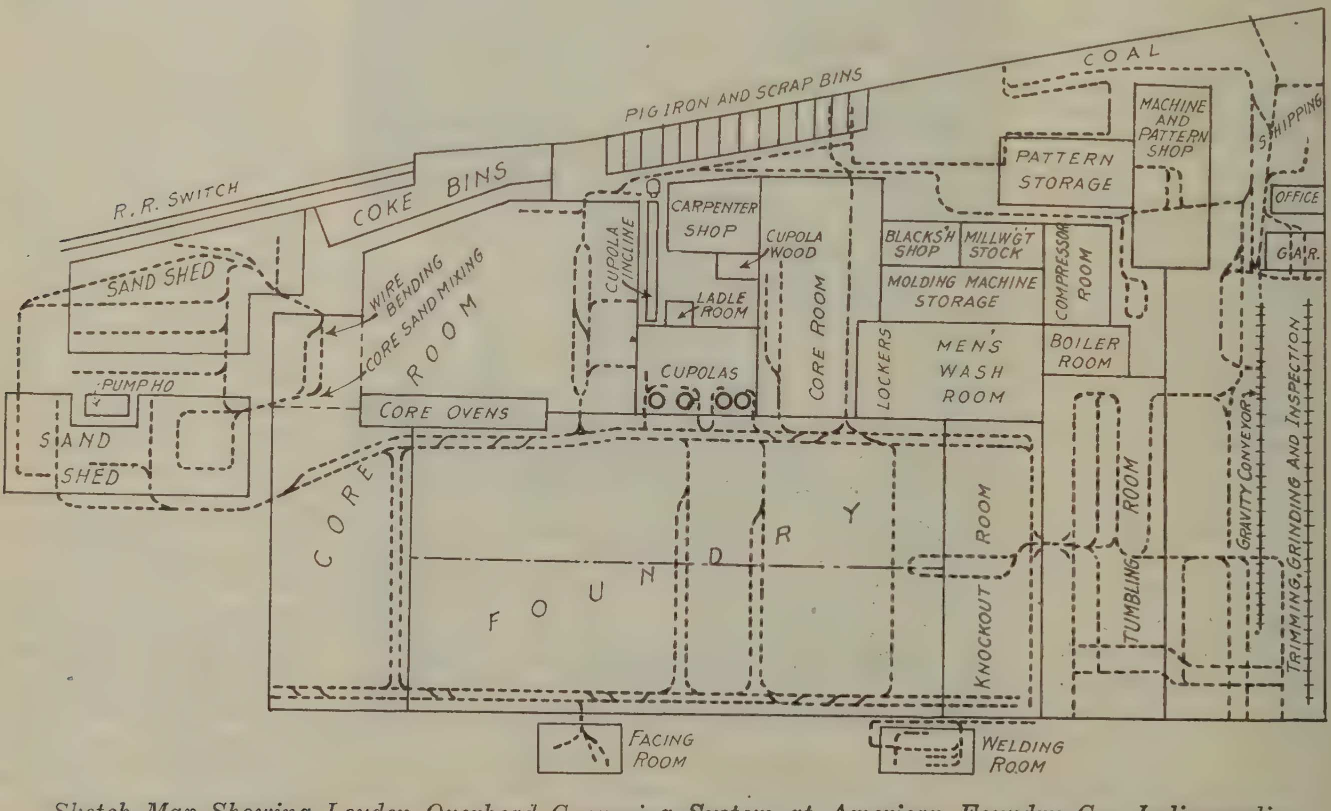
Monorail Handles Material in Production

In the practical working out of production problems at the American Foundry Co., the monorail system has been so interwoven into the various operations that it cannot well be separated from them and is deserving of detailed study. On trolleys suspended from the rails are numerous kinds of carriers which differ according to the particular service being performed. These carriers are moved about by man-power. Traffic is sufficiently heavy so that two main lines of track are necessary in the greater part of the plant. Many switches cross from one line to the other so that material can be delivered to almost any portion of the plant. Switches are controlled by rope pulls, as shown in one of the views.

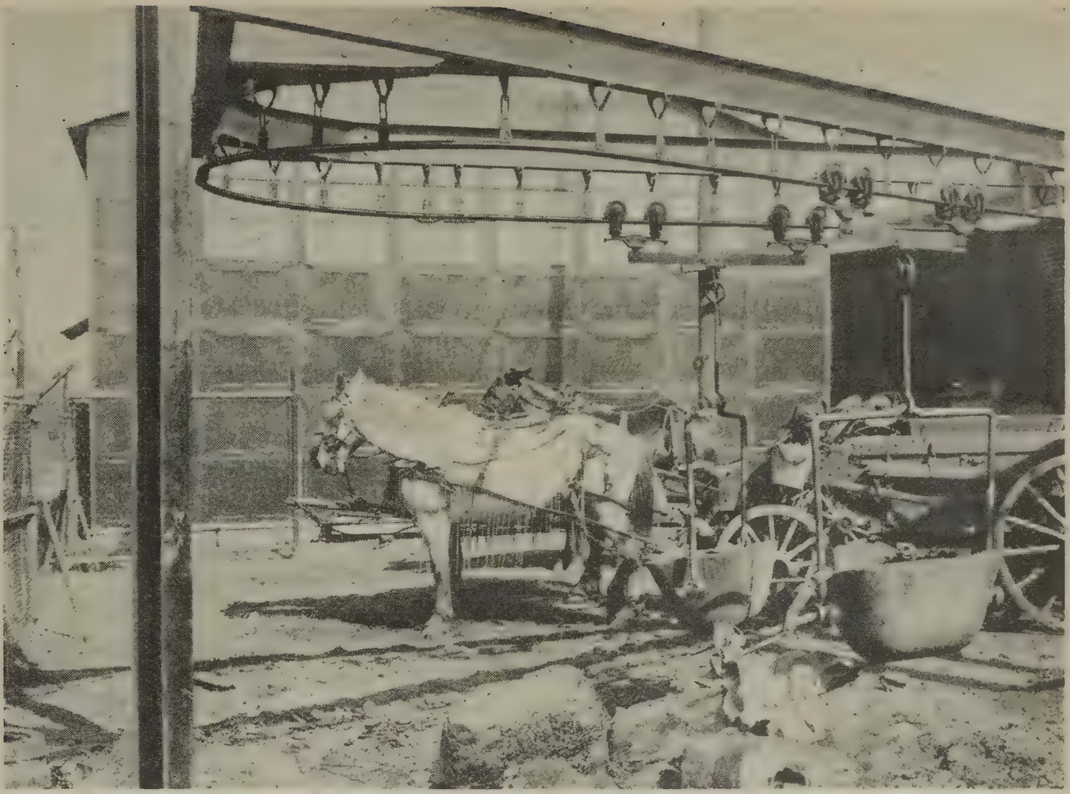
The heat is tapped into a ladle hanging from the monorail in front of the cupola. A workman then hooks the ladle and pulls it to the pouring floor, where it is lifted by an air hoist on an overhead crane to the pouring position. When empty, the ladle is taken by the crane back to the monorail conveyor, on which it is transported to the cupola.

Castings taken from the molds by the shakeout gang are placed on a platform, and then carried by monorail conveyor to the knockout room.

A slight variation is noted in the arrangement for moving cylinder blocks through the sand blast room. Instead of a single rail there are two paralleling each other. From them is suspended a crosswise carrier from which dangle a number of chains. Attached to


COAL
PIG IRON AND SCRAP BINS
MACHINE AND PATTERN SHOP
SHIPPING
PATTERN STORAGE
OFFICE
GAR.
R. R. SWITCH
COKE BINS
CARPENTER SHOP
CUPOLA INCLINE
CUPOLA WOOD
BLACKS'H SHOP
MILLW'G'T STOCK
COMPRESSOR ROOM
MOLDING MACHINE STORAGE
SAND SHED
WIRE BENDING
CORE SAND MIXING
ROOM
LADLE ROOM
CORE ROOM
LOCKERS
MEN'S WASH ROOM
BOILER ROOM
PUMP HO
SAND SHED
CUPOLAS
CORE OVENS
CORE
FOUNDRY
KNOCKOUT ROOM
TUMBLING ROOM
GRAVITY CONVEYOR
TRIMMING, GRINDING AND INSPECTION
FACING ROOM
WELDING ROOM

Sketch Map Showing Louden Overhead Conveying System at American Foundry Co., Indianapolis



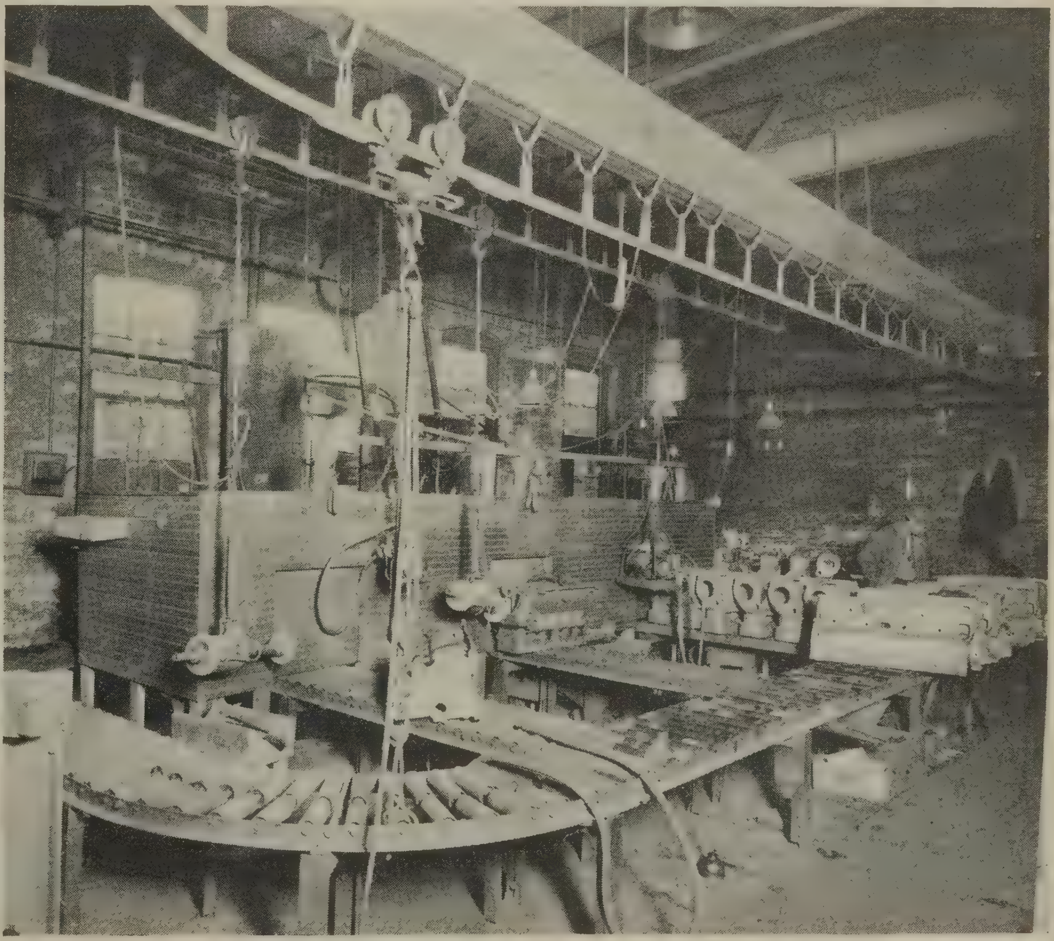
CUPOLA Slag Caught in Pots, Transported Outside, Cooled and Dumped

each chain is a cylinder block. Each block can be turned completely around during the sand blasting and then shuttled to one end of the carrier so as to make room for the next block. When all of the blocks are sand blasted, the carrier is taken on the parallel monorails to two turntables, operating in unison, which transfer the trolleys so that the carrier can be run off at right angles on a single rail to the grinding department.

In the finishing room use is made of both overhead transport and gravity conveyors. Running the full length are three Logan conveyors of the latter type, each handling a different kind of casting. On the journey down the gravity conveyor the castings are taken off by hand at several points for grinding and other machining work, and at the end the monorail again picks up the cylinder block and carries it into the shipping room. A number of blocks may be handled at once on a chain hoist suspended from the monorail. The hoist is equipped with a long bar having numerous hooks, and from each hook is suspended a cylinder block. Blocks are taken by hand truck from the door into the railroad car for shipment.

Core and facing sand is handled from bins by monorail conveyor in bottom dump buckets with a capacity of 1900 lb. Some buckets are divided into compartments, each of which contains a special kind of sand. In this way special mixes can be proportioned and dumped into the muller.

In the preparation of facing sand the monorail



EXAMPLE of the Effective Use of Overhead and Roller Conveyors in Finishing and Reclamation Departments conveyor is also indispensable. Drag molds are knocked out at a spot adjoining the conveyor, and sand is shoveled into a bucket and moved on the monorail to a steel hopper feeding the mixing equipment. Tempered sand is deposited in boxes holding 14 cu. ft. suspended from the monorail, whereby they are moved to the molding floor. An air hoist sets them down next to the molding machines. During the process just described the sand is shoveled but once. Only two men are needed for the entire operation. One delivers the sand to the facing room and brings it back to the molding floor; the other operates the mixing machinery.

Unique Slag Disposal

The usual practice in smaller foundries is to let the slag drop into a hole in the floor. This hole is kept full of water, and the slag becomes a stringy, spongy mess which is shoveled into wheelbarrows and dumped. At the American Foundry Co. a cast iron dump bucket is spotted under the weep hole of the cupola and the slag runs into it. When the bucket is full it is pulled out on the monorail conveyor to the dump yard, where the slag, still in the bucket, is allowed to cool. The bucket is then tripped and the slag drops out in one large lump. At intervals the lumps are loaded onto wagons and hauled away.

These are the methods by which the company has solved the problem of producing castings economically. In fact, the accomplishments can be definitely measured. The amount of floor space has been reduced considerably without decreasing the volume of output. Man-power has been cut to a minimum through the operation of an adequate conveying system. If it is necessary to curtail activities at any time, this foundry has no expensive transportation equipment and there are no skilled operators lying idle but contributing substantially to overhead expenses. The general arrangement at this foundry, therefore, is designed to meet, in an admirable way, the needs of the company, and is sufficiently elastic to respond readily in a period of either expansion or contraction.

South's Importance in Iron and Steel Detailed in Survey

Department of Commerce Publishes Book Which Is the First of Nine Regional Investigations of Industrial Growth

WASHINGTON, Jan. 14.—An interesting fact about the iron and steel industry of the Southeast is that it is growing up in an area which not so many years ago did not consider itself industrially important, nor was it so looked upon by other sections, says a review of the industry made in a publication, "Commercial Survey of the Southeast," issued by the Department of Commerce. The survey, well illustrated, comprises 477 pages, and is the first of a new series of nine regional analyses covering the whole country.

The purpose of the survey is to present a picture of the fundamental economic conditions within the southeastern trade area, with particular reference to the marketing of products. Particular emphasis is laid upon commodity movements, sales problems, indexes of income, and consumption.

The chief outlook of the iron and steel industry in the Southeast is declared to rest upon capitalizing and encouraging opportunities for the manufacture of numerous items required for consumption and production as the whole South develops. The growth and expansion of the textile and knit-goods and allied industries throughout the Southeast are declared to furnish one of the most important industrial markets in that area for hardware, building materials and goods required for plant operation and maintenance. On the other hand, it is said, this development has offered a market for specialized machinery and supplies, of which over 90 per cent is still purchased from New England. It is stated that evidence of the character of allied development which is taking place in connection with the iron and steel industry may be found in the already established plants manufacturing sugar-mill, vegetable-oil mill, and cotton-compress machinery, cotton gin, agricultural equipment, ice-making, textile, lumbering, mining and miscellaneous machinery, stoves, heaters and furnaces, chemicals, and railroad-car equipment at various points in the Southeast, but chiefly centered around Birmingham. The iron and steel area, it is pointed out, promises to be a concentrated manufacturing section, with an increasing consuming population, having a purchasing power determined by current income.

Iron and Steel Second Only to Lumbering

The review explains the advantages looking to the building up of the iron and steel industry by reason of the close proximity of raw materials and lower freight rates, together with labor and markets. Grouping all phases of iron and steel production in Alabama makes the industry, as a whole, second only to lumbering in the average number of industrial wage earners in 1925. Those engaged in the production of iron and steel and their products average more than 27,500, large numbers of whom are negroes, both skilled and unskilled workers. In the value of product the iron and steel industry has no rival, yielding an output of about $194,000,000 in 1925. The industry in Tennessee employed somewhat more than 5800 with an output of $26,500,000.

These facts, it is stated, all indicate that this industry is more closely confined to the location of raw materials than any other among the industries of the Southeast, and so far the important development is limited to the Birmingham area, Anniston, Gadsden and Chattanooga. These centers are declared to be representative of the present status of this industry in the South. Alabama, it is said, is the third State in the United States in the number of blast furnaces, most of which are in the Birmingham district, and Tennessee is eighth.

This industry, it is pointed out, does not end with pig iron production, since nearly 80 per cent of the total output is carried into further states of manufacture in the same plants, which usually operate steel works, rolling mills and foundries. The leading products in order of tonnage, it is stated, are rails, wire rods, plates and sheets, merchant bars, structural shapes, hoops, bands, cotton ties and bars for reinforcing concrete.

Copies of "Commercial Survey of the Southeast" may be obtained for $1 each from the Superintendent of Documents, Government Printing Office, Washington.

Construction Decreased 1 Per Cent in 1927

Contracts awarded for new building and engineering work in 1927 in the 37 States east of the Rocky Mountains totaled $6,303,055,100, according to the F. W. Dodge Corporation, New York. This was a drop of 1 per cent from the record total of 1926, and an increase of 5 per cent over 1925. For the entire country, 1927 construction volume was estimated at $6,800,000,000, a loss of 3 per cent from 1926.

New construction begun in December in 37 States amounted to $477,363,800, a 3 per cent increase over November, but a decrease of 11 per cent from December, 1926. Of last month's total 43 per cent was for residential buildings, 19 per cent for public works and utilities, 18 per cent for commercial buildings, 6 per cent for industrial projects and 5 per cent for educational buildings.

Improvements in Ferrous Sintering

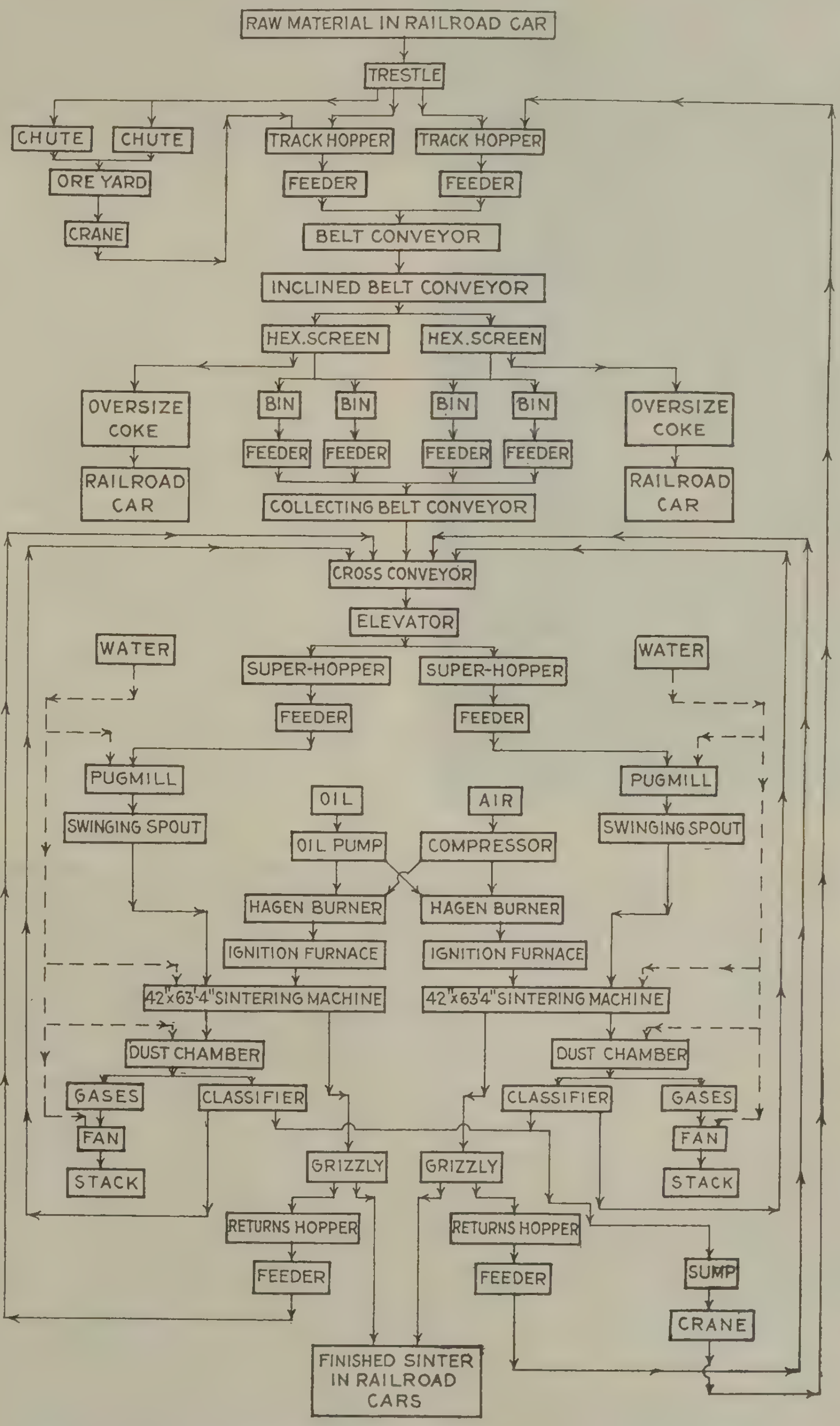
Continuous Dwight & Lloyd Process Shows 500 Per Cent Production Increase—Profits to Be Had

BY EDWARD J. TOURNIER*

INCREASE in daily production of sinter from 180 tons to 1200 tons on a single sintering machine is due primarily to two factors, both having to do with the mechanics of the process rather than with its chemistry. The chemical constituents and physical structure of sinter have been already discussed in the pages of THE IRON AGE and, so far as recent investigation of these properties shows, the 500 per cent increase in production cannot be thus accounted for. The largest of the early sintering machines had a grate area of 90 sq. ft., while the latest large-size machine has a grate area of 380 sq. ft., an increase of over 300 per cent.

The first factor is the improvement in materials control and the second is the improvement of sintering machines. Materials control extends not only to the raw materials, but also to the sintering mixture. Closely related to materials control is the regulation of ignition and air supply. The second factor consists in the increase in machine dimensions, synchronizing of machine speeds with the control of sintering materials and improved regulation of air blast.

Continuous production of sinter having the proper structure and a minimum of fines depends to a large extent on close observation of raw materials and sintering mixture and on instant alteration of any of the functions of mixing, sintering or ignition equipment and of the fan or blower.


RAW MATERIAL IN RAILROAD CAR
TRESTLE
CHUTE
CHUTE
TRACK HOPPER
TRACK HOPPER
ORE YARD
FEEDER
FEEDER
CRANE
BELT CONVEYOR
INCLINED BELT CONVEYOR
HEX. SCREEN
HEX. SCREEN
OVERSIZE COKE
BIN
BIN
BIN
BIN
OVERSIZE COKE
FEEDER
FEEDER
FEEDER
FEEDER
RAILROAD CAR
RAILROAD CAR
COLLECTING BELT CONVEYOR
CROSS CONVEYOR
ELEVATOR
WATER
SUPER-HOPPER
SUPER-HOPPER
WATER
FEEDER
FEEDER
PUGMILL
PUGMILL
OIL
AIR
SWINGING SPOUT
OIL PUMP
COMPRESSOR
SWINGING SPOUT
HAGEN BURNER
HAGEN BURNER
IGNITION FURNACE
IGNITION FURNACE
42"x63'4" SINTERING MACHINE
42"x63'4" SINTERING MACHINE
DUST CHAMBER
DUST CHAMBER
GASES
CLASSIFIER
CLASSIFIER
GASES
FAN
FAN
STACK
GRIZZLY
GRIZZLY
STACK
RETURNS HOPPER
RETURNS HOPPER
SUMP
FEEDER
FEEDER
CRANE
FINISHED SINTER IN RAILROAD CARS

Flow Sheet of Continuous Sintering Plant, American Sintering Co., from the Raw Material in Railroad Cars to the Finished Sinter, Also in Railroad Cars

Flue dust is admittedly an ore waste which up to the present has been unavoidable. It constitutes a burden on pig iron production costs, principally in the loss of the ore value. All flue dust can be sintered to a physical state superior to natural ores, at a fraction of the unit cost of equivalent ore.

Profits from sintering current make of flue dust are still greater than that from stock pile dust. In addition to the net gain on ore values reclaimed, this saves (1) cost of transportation to and from stock piles, (2) losses from the elements and (3) loss of unreclaimable dust from the ground storage.

Further, the use of 100 per cent sinter in the blast furnace will effect economies not believed possible heretofore. Indeed, the use of all-sinter is an accomplishment of very recent date. It is being done, however, by the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., where only sinter is used in the blast furnace. The E. & G. Brooke Iron Co., Birdsboro, Pa., uses 100 per cent sinter part of the time.

The continuous sintering process makes possible the high-quality sinter required to accomplish the results just mentioned, by reason of instant control of the complete cycle of operations, such as —

a—Proportioning the constituents of the charge,
b—Regulation of proper moisture,
c—Proper depth of bedding on the grates,
d—Correct intensity and distribution of ignition,
e—Constant observation and means of adjustment,

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*Mechanical engineer, 110 Clinton Avenue, Clifton, N. J.

f—Control of time element of sintering zone,
g—Automatic synchronism of proportions and volume of feed to the demands of the sintering machine.

In addition, it makes possible the automatic control of uniformity of the sintering charge, provides means for inspection of grates outside of the sintering zone, and also makes provision for the replacement of grates without interruption of operations. The continuous discharge in a relatively small stream facilitates effective screening.

Sintering Machine Improvements

PREVIOUS to 1917 sintering machines were made in two sizes: 42 in. x 22 ft. and 42 in. x 25 ft. 6 in., the dimensions being those of the windbox area. Pallets were carried on wheels having plain journals. Pallets of the upper strand in the sintering zone were actuated by a pair of sprockets at the drive end of the machine, in engagement with the rollers of a pallet. The body of the latter served as a pusher for the entire load of sintering material in front of it.

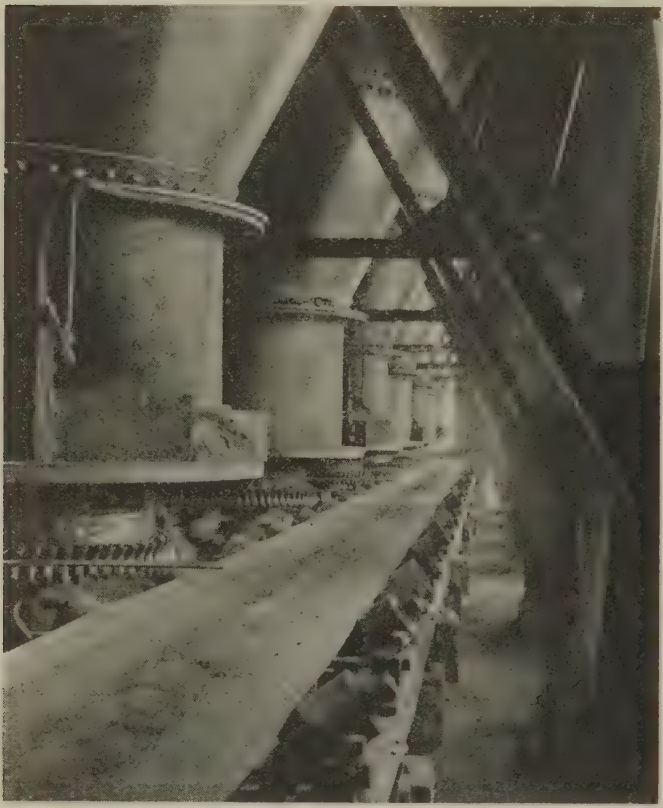

Fig. 1—Revolving Disk Feeders and Collecting Belt in Bin Building of Sintering Plant

The return strand traveled back by gravity on an inclined track to the starting point. Here the pallets engaged the sprocket teeth and were lifted into working position on the top of the machine. The transmission connecting the drive shaft to the countershaft consisted of several trains of spur gears between the pallet strands. The total reduction in average speed was approximately 2000 to 1, the low-speed gears being of the annular type connected to the drive sprockets.

Due to this construction, the drive shaft is not subjected to torsional strains. It therefore need not be so large as would be required with power transmitted through a spur gear on the shaft. At the same time, however, the intermediate gears, brought within the space between the strands of pallets, are exposed to the abrasive dust and grit from dropping sinter.

New Drive Avoids Dust Trouble

In the present design, sintering machines are operated through two countershafts and spur-gear reductions. The first countershaft is connected to a speed reducer which eliminates the intermediate gear trains. The larger size drive shaft required, because of the overhung gear drive, is offset by the freedom from abrasive dust trouble, and by the advantage of the inclosed speed reducer. The latter are usually Cleveland worm gears or Falk herringbone gears.

Pallets have been redesigned so as to be fitted with Hyatt or Timken roller bearings, and also as to the wind seal arrangement. In addition, the method of bringing the pallet to the sintering zone has been changed. The ends of the pallets have been designed so that they come in contact with faces on the sprocket teeth shaped in the form of a gear tooth. The wheels of the pallets roll on a curved track at the drive end of the machine, and the sprocket teeth in engagement with the back of pallets propel the latter around the curve.

This new arrangement eliminates a great deal of friction. It also avoids the occasional stoppage of the return pallet strand, immediately at the point of engagement with the sprockets.

Present designs of sintering machines are made in sizes of 42 in. x 57 ft. 4 in.*, 42 in. x 63 ft. 4 in. and up to 72 in. x 76 ft. 6 in. Accompanying the increase in grate areas, there has been also a gradual speeding up from the original 20 or 30 in. per min. to the present 90 in. per min. average speed.

How a Custom Plant Operates

To indicate more readily how the various function controls are effected, it is possibly best to describe briefly the equipment of a typical plant sintering flue dust. The American Sintering Co., Hubbard, Ohio, has developed a successful business devoted exclusively to the custom sintering of flue dust. The plant consists of trackage, trestles, conveying and mixing equipment, two 42 in. x 63 ft. 4 in. sintering machines, ignition system, blower, synchronizing controls, electrical equipment and dust-settling system. The flow sheet indicates diagrammatically the materials in process.

All incoming flue dust and outgoing sinter are sampled and weighed over a recording scale. When the flue dust is received in greater quantities than the capacity of the storage bins, it is dumped from the trestle into an ore yard alongside the track. It is reclaimed by a crane which drops it into track hoppers under the trestle.

Dust that can be handled in the plant is dumped into other track hoppers on the trestle. Each track hopper is fitted with a revolving disk feeder which feeds the material on to a collecting belt conveyor. The latter discharges to an inclined belt running at at angle to the collecting conveyor. The inclined conveyor discharges the flue dust into two revolving hexagonal screens for taking out over-size coke, which drops through a chute into railroad cars. It drops the fines into square storage bins, of which there are four, each having a capacity of 250 tons. Each bin is fitted with a revolving disk feeder at the bottom.

All feeders discharge to a collecting conveyor which takes the material into the sintering plant, where it is transferred to an inclined cross conveyor. This belt takes the material to a vertical belt and bucket elevator, which discharges to a double hopper over the sintering machines. The double hopper has a patented loading device, arranged so that, when material enters in excess of the requirements of the two sintering machines, a trigger arrangement will break an electrical circuit, thereby stopping the feeder motor. As soon as the level of the material in the hopper drops below a certain fixed point, the circuit is closed and the feeders are restarted.

The feed hopper is fitted with two revolving disk feeders, one for each sintering machine, the discharge from each feeder being received by a pug-mill which mixes and moistens the flue dust. Each pug-mill discharges to a sintering machine through a swinging spout, which distributes the material uniformly on the grates of the sintering machine.

Two heavy-duty type sintering machines are used. These machines, especially designed for the American Sintering Co. by the American Ore Reclamation Co., are 42 in. x 63 ft. 4 in. over the sintering zone, or the equivalent of approximately 222 sq. ft, suction area. Each machine is fitted with 84 grate-carrying pallets mounted on Hyatt roller bearing wheels, and is driven through two spur-gear reductions and one Cleveland worm-gear reducer. The latter is connected to a 10-hp.

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*A machine of this size, at the New Castle, Pa., plant of the Carnegie Steel Co., was illustrated and described in THE IRON AGE of Jan. 17, 1918, page 200.

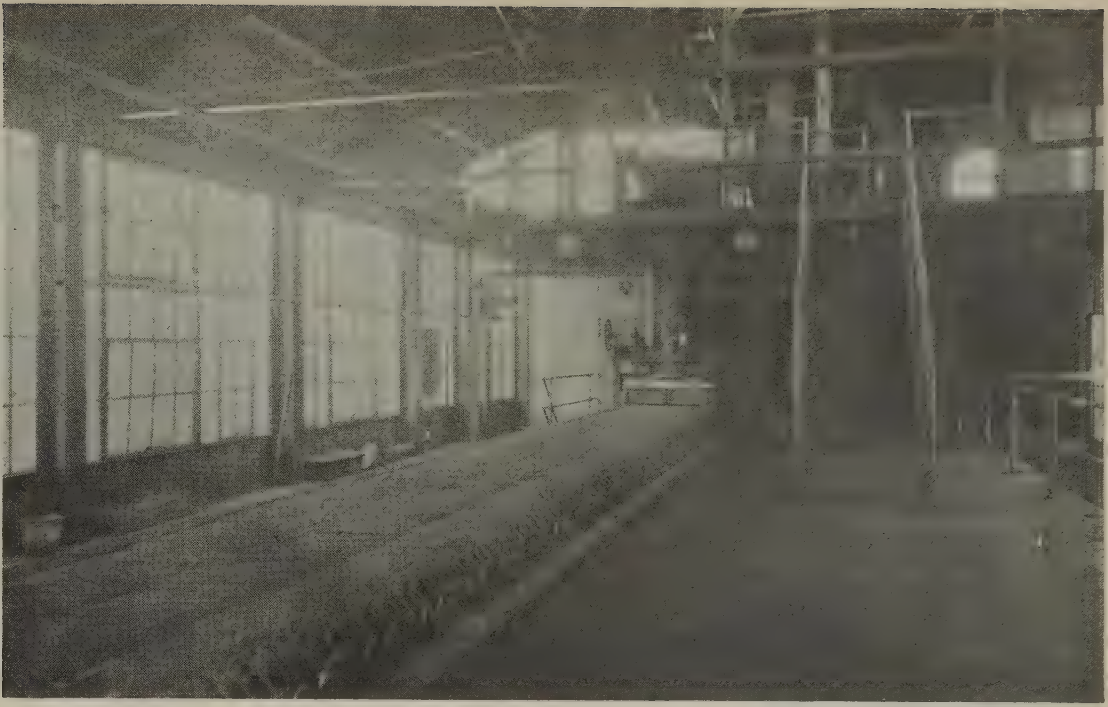


Fig. 3—Top Strand of Continuous Sintering Machine on Operating Floor of the Sintering Plant at Birdsboro, Pa., of E. & G. Brooke Iron Co.

motor by a flexible coupling. The sintering charge on each machine is ignited by an ignition furnace using fuel oil. The oil consumption is about 0.6 gal. per ton of sinter.

Combustion gases are drawn into a dust-collecting chamber through ten suction pipes on each machine. The gases within the chamber are divested of heavy particles by the reduction of velocity and the reversal of direction. These heavy particles then fall on to a film of water covering the sloping side of the chamber. The water and dust are washed into a Dorr rake classifier, where the fine particles are raked out of the water and on to the cross conveyor last mentioned. The latter returns the sludge to the bucket elevator, which in turn places the material for retreating.

Each dust-settling chamber is connected by a 60-in. gas main to a Buffalo 100-in. double-inlet, center-plate wheel fan having a capacity of 60,000 cu. ft. of free air per minute, under a pressure of 20 in. water gage. Each of the two fans is equipped with spherical, self-alining, water-cooled bearings. Each fan is directly connected to a 300-hp. motor by a flexible coupling.

Overflow water from the Dorr classifier flows through a tunnel into a sump, where the remaining fine particles of material are settled out. Periodically the sump is cleaned out by aid of a locomotive crane, which takes the sludge from the sump to railroad cars. The latter are then shifted to the trestle and discharged into the track hoppers.

Taking Care of the Product

Finished sinter is discharged over stationary grizzly bars into railroad cars. The fines are collected in so-called return hoppers, fitted at the bottom with revolving table feeders. These feeders drop the material on to the cross conveyor coming from the storage bins. This conveyor is at all times covered with flue dust, which serves as a protective layer against the hot returns. In this way sinter returns again enter the stream of the material to be treated.

In flue dust, the carbon content is usually higher than is required for maximum sinter production. The returns, which consist largely of fine particles of sinter containing no carbon, serve to lower the average carbon

(Concluded on page 243)

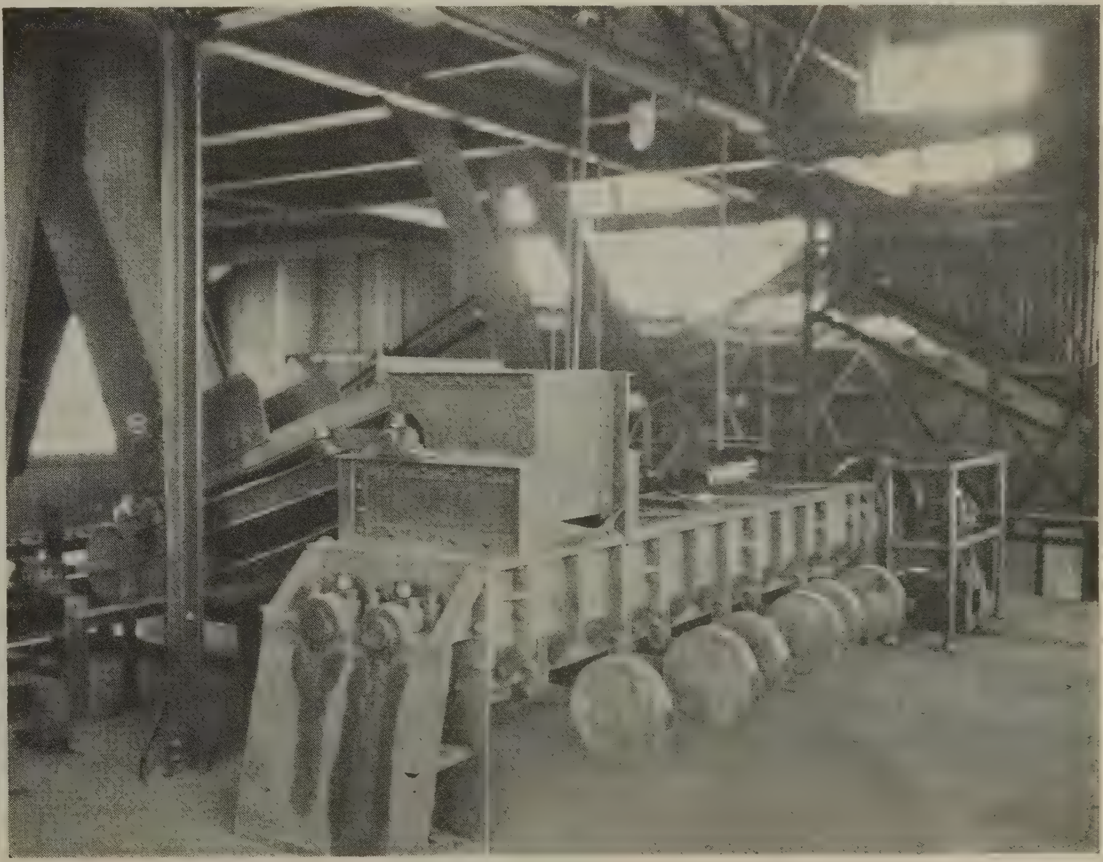


Fig. 2—Cast Iron Pug Mill, in Plant Shown at Top of Page, Which Prepares the Raw Material for the Sintering Process by Grinding It to Proper Size Before Delivering to the Ignition Strand

Manufacture Effectively Coordinated by Simple System

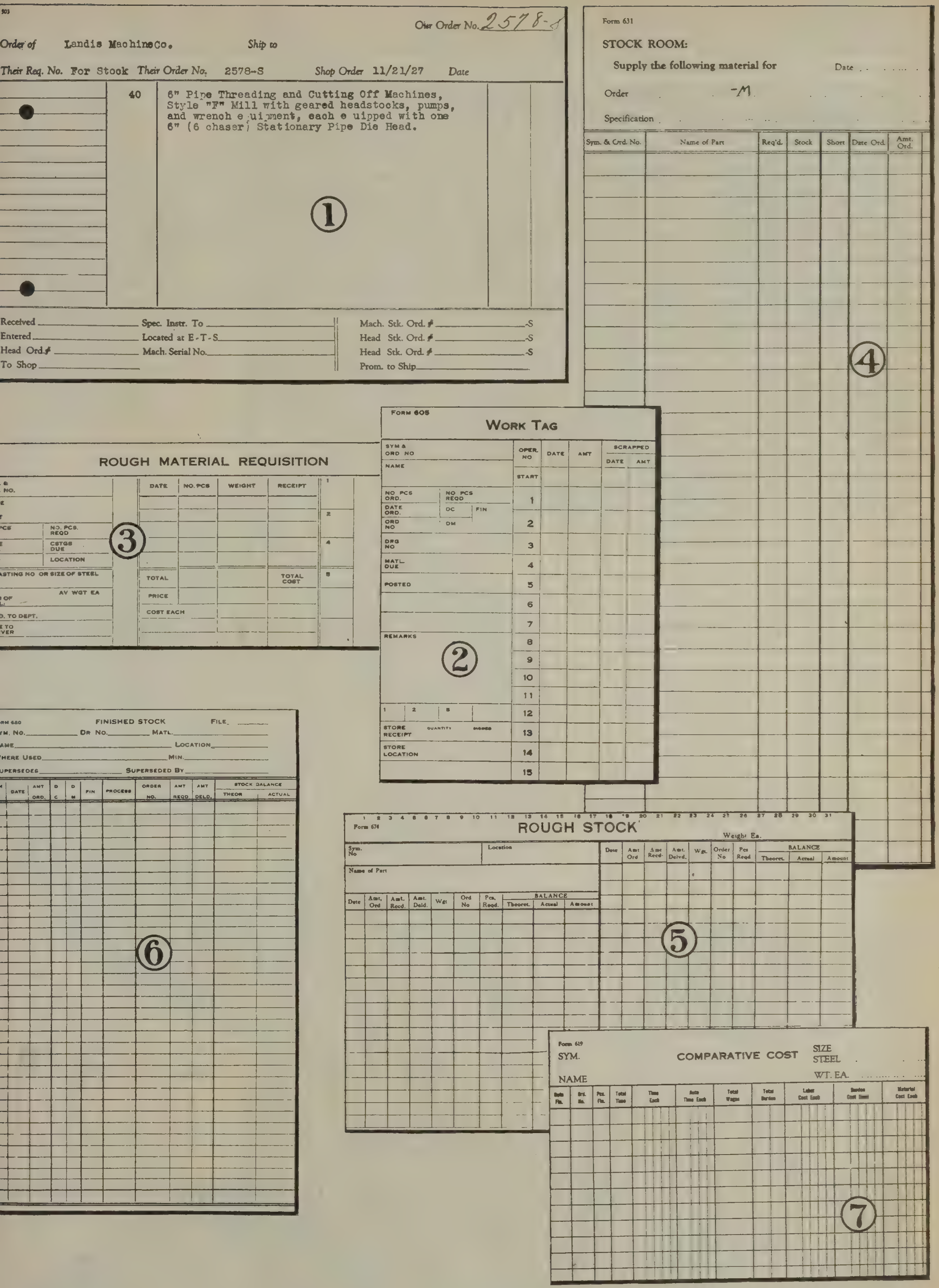
It is generally recognized that system, although a basic mechanism of administration, may be elaborated to the stage of too much "red tape," which acts to slow up rather than facilitate production. Avoidance of such over-elaboration has been a fundamental consideration of the Landis Machine Co., Waynesboro, Pa., in developing a production order system for the coordination of its manufacturing operations.

At this plant production orders are issued and returns collected by a central department. Each manufacturing unit receives copies of orders to be manufactured and is responsible for executing its operations economically, the latter being watched closely by the general superintendent through current cost records. Production for the most part is in lots for stock. The amount of stock carried is based on the sales experience of the previous few years, tempered by considerations of the immediate future outlook as arrived at by study of general conditions in the industries served by the company.

Manufacture comprises three more or less distinct divisions or departments according to products as follows: Pipe and bolt threading and cutting machinery, pipe die heads and chaser grinding machinery; chasers; die heads, marketed under the trade names of Land-Matic, Lanco, etc. Of the machinery, some 16 basic designs are produced and from these 300 different combinations, such as one, two or three-head machines, belt or motor drive, with or without lead screw, etc., can be furnished.

The machinery and pipe die heads, the production system connected with which is outlined in the following paragraphs, are manufactured in the general machine shop. The equipment in this shop is arranged according to the group plan, with milling machines in one group, turret lathes in another, etc. Manufacture is supervised by the general foreman

As Machines Are Assembled They Are Sent to the Testing Department to Be Tested for Accuracy of Alinement, etc., on the Class of Work for Which the Machine Is Intended



903

Our Order No. 2578-S

Order of Landis MachineCo. Ship to

Their Req. No. For Stock Their Order No. 2578-S Shop Order 11/21/27 Date

40 6" Pipe Threading and Cutting Off Machines, Style "F" Mill with geared headstocks, pumps, and wrench equipment, each equipped with one 6" (6 chaser) Stationary Pipe Die Head.

①

Received
Entered
Head Ord.#
To Shop
Spec. Instr. To
Located at E-T-S
Mach. Serial No.
Mach. Stk. Ord. # -S
Head Stk. Ord. # -S
Head Stk. Ord. # -S
Prom. to Ship

Form 631

STOCK ROOM:

Supply the following material for Date

Order -M

Specification

Sym. & Ord. No.	Name of Part	Req'd.	Stock	Short	Date Ord.	Amt. Ord.

④

Form 605

WORK TAG

SYM & ORD NO
NAME
NO PCS ORD.
NO PCS REQD
DATE ORD.
DC
FIN
ORD NO
OM
DRG NO
MATL DUE
POSTED
REMARKS
1 2 3
STORE RECEIPT QUANTITY SIGNED
STORE LOCATION

OPER. NO	DATE	AMT	SCRAPPED DATE	SCRAPPED AMT
START				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

②

ROUGH MATERIAL REQUISITION

NO.
NO. PCS. REQD
CSTGS DUE
LOCATION
CASTING NO OR SIZE OF STEEL
AV WGT EA
TO DEPT.

DATE	NO. PCS	WEIGHT	RECEIPT
TOTAL			TOTAL COST
PRICE			
COST EACH			

③

FINISHED STOCK FILE

SYM. NO. DR NO. MATL.
NAME LOCATION
WHERE USED MIN.
SUPERSEDES SUPERSEDED BY

DATE	AMT ORD.	D C	D M	FIN	PROCESS	ORDER NO.	AMT REQD.	AMT DELD.	STOCK BALANCE THEOR	STOCK BALANCE ACTUAL

⑥

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Form 674

ROUGH STOCK

Weight Ea.

Sym. No.
Location
Name of Part

Date	Amt. Ord	Amt. Recd.	Amt. Deld.	Wgt	Ord No	Pcs. Reqd.	BALANCE Theoret.	BALANCE Actual	BALANCE Amount

Date	Amt Ord	Amt Recd.	Amt. Delvd.	Wgt.	Order No	Pcs Reqd	BALANCE Theoret.	BALANCE Actual	BALANCE Amount

⑤

Form 619

SYM. COMPARATIVE COST SIZE STEEL

NAME WT. EA.

Date Fin.	Ord. No.	Pcs. Fin.	Total Time	Time Each	Auto Time Each	Total Wages	Total Burden	Labor Cost Each	Burden Cost Each	Material Cost Each

⑦

AFTER the General Production Schedule Has Been Drawn Up, Manufacturing Orders, Shown in Fig. 1, Are Issued. The work tag, Fig. 2, with time tickets, blue prints and operation sheets, is sent to the general machine shop, and material is requisitioned on the form shown in Fig. 3. The stores or stockroom requisition, Fig. 4, is issued to both stores and erecting department. The perpetual inventory of rough and finished material, respectively, is kept on the cards shown in Figs. 5 and 6. Cost records for every individual part of the machines and die heads are kept on cards, Fig. 7. In the case of abnormal cost of any item, the general superintendent is notified and a number of assistant foremen in charge of operations on the various groups of equipment.

The company maintains a production engineering department, which, in addition to being responsible for tool design, jigs and fixtures, etc., also analyzes operations, makes up standard operation-sequence sheets, determines standard speeds and feeds for various classes of work and makes time studies for use in establishing bonus rates. In this connection it should be mentioned that all workers are on a standard hour rate, with bonus for completing the work within the standard time, and an additional bonus for work done in less than the set time.

Production Orders Issued by Central Department

In the case of the machinery and pipe die heads, the production for stock schedule is drawn up every three or four months. Manufacturing orders are issued and records of finished parts and machines are kept by a production order department, operated in connection with the cost department. Schedules for stock, as well as for sales, are submitted by the management to the production order department, which makes up the general manufacturing order shown in Fig. 1. Several copies of this order are made, one each for the secretary (in charge of sales orders), the erecting and other departments.

Detail manufacturing orders are then issued for lots of individual parts that make up the machines listed on the general order. These detail orders include a rough casting order for the foundry, and a "work tag," Fig. 2, for the machine shop, which authorizes that department to proceed with the machining of the castings, forgings and other material. Materials obtained from outside sources are requisitioned through the purchasing department.

The work tag, time tickets, blue prints and the operation sheets furnished by the production engineering department are then sent in a tranparent envelope to the general machine shop foreman. The operation sheets, not shown, specify the sequence of operations for a given part, the sub-department and number of the machine on which the work is to be done, and the speed and feed to be used.

From the general machine shop foreman the envelope and its contents go to the assistant foremen in charge of the various divisions of the work. The latter see that all materials, tools, jigs and fixtures etc., are on hand for the prompt start of operations. When the assistant foreman is ready for material, he notifies the rough stores department, which delivers it immediately to the machines. This material has been assembled and held in readiness at the stores department, having been requisitioned by the production order department on the form shown in Fig. 3 at the same time that the detail orders were sent to the general machine shop. Jigs and fixtures are drawn ahead from the tool crib and set-ups are made in most cases by the workmen on the machines.

After machining, the parts are sent to the finish inspection department to be tested for size, and in some cases for hardness. The latter tests are to determine the condition of case hardened and other heat-treated parts after the machining operations. As each lot is inspected, the results are reported to the production order department, which posts the information in its record of the finished parts available. The inspected parts are delivered to the finished stock department.

When issuing the detail manufacturing orders, the production order department also issues the store or stock requisition shown in Fig. 4. This lists the various parts and sub-assemblies needed for the complete machines. It is forwarded to the erecting department foreman, giving him the authority to draw the necessary parts and sub-assemblies for each lot of machines.

Erection of the machines is in a large department which, like other sections of the plant, is arranged for the convenient and rapid movement of materials. As individual machines are assembled they are sent to the testing department to be tested for accuracy of alinement, adjustment, etc.—on the actual work for which the machine is intended. The machine is then moved to the painting department, and finally to stock, the production order department being notified accordingly.

Perpetual Inventory Kept

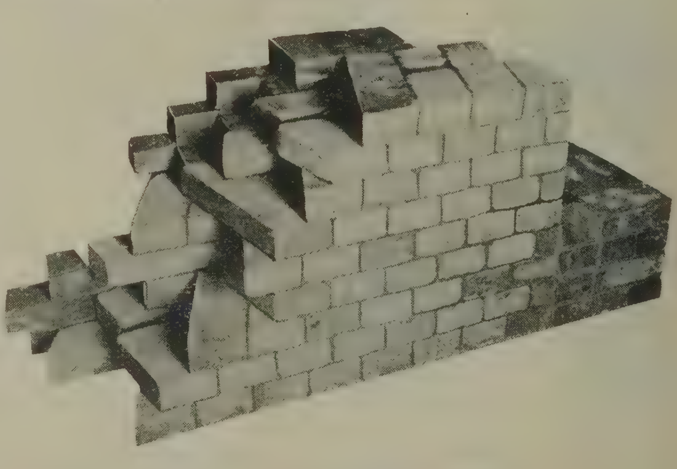
A perpetual inventory of all rough material to be machined or otherwise processed, as well as of finished parts and sub-assemblies, is kept by the production order department on the cards shown in Figs. 5 and 6, respectively. Records pertaining to finished machines and die heads are kept in loose-leaf ledger form. This ledger shows the number and location in the plant of completed machines and other products. Shipments from stock are recorded in the ledger, and note is made of the name of the customer in order to have convenient data for use in case of repairs, or duplication of the order in the future.

Close attention has been given to the matter of cost records, the system established being simple and thorough, as in the case of the production order routine outlined above. Cost ledgers are tied in with the general accounting system. Cost comparisons are frequently drawn up by the cost department for the superintendent and other executives, who use this in the general control of operations. The system includes the comparative cost cards shown in Fig. 7, which are kept for every individual part going into each machine and die head. These records, maintained over a period of years, permit convenient comparison of current costs with those of former periods. In case of deviation from what has been established as the normal cost of any given manufactured part, the cost department notifies the superintendent on a form provided for this purpose. This form shows the abnormal cost for lots of parts as they are manufactured and permits the superintendent to remedy matters before or while the next lot is in production.

Bricks with Bias Ends for Furnace Wall Construction

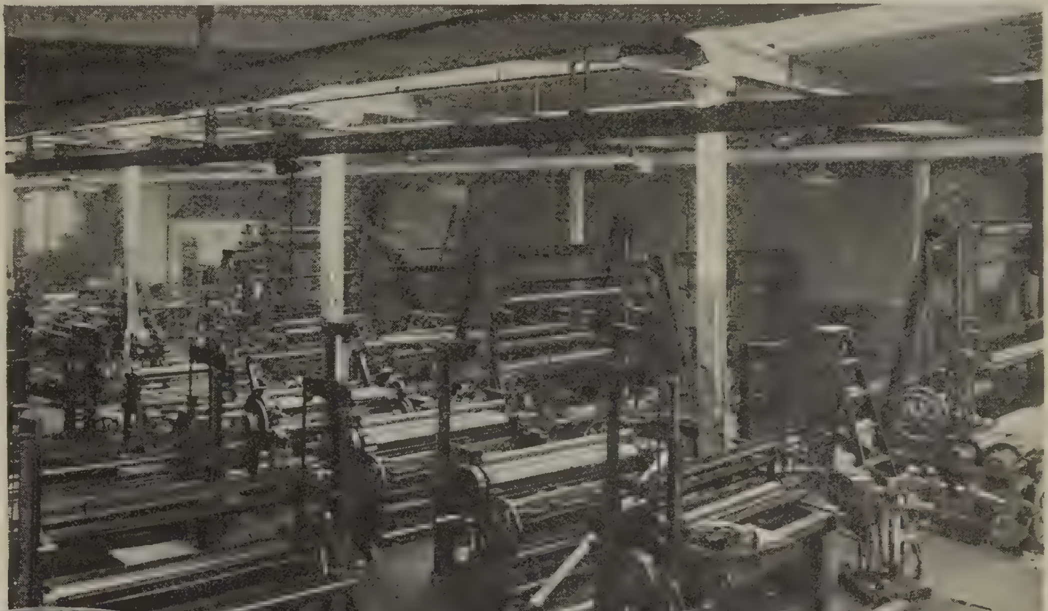
In the opinion of a great many engineers, one of the most difficult problems of furnace construction is to make fire brick stay "put" under actual working conditions. There is always the tendency for walls to loosen up and joints to open, resulting in heat losses, slag penetration and eventual disintegration. This problem of a stronger wall has been met by General Refractories Co., Philadelphia, by a unique shape called Biasbrix. As shown in the illustration, Biasbrix are laid up on an angle, one brick overlapping and tying together three others in a self-locking construction, that serves to produce a wall of unusual strength with tight joints.

Although different in shape, Biasbrix are found to meet requirements as readily as the ordinary straight brick in any thickness of wall from 4½ in. to 27 in. They seem to be particularly well suited for hollow wall construction, where a strong bond is of paramount importance.

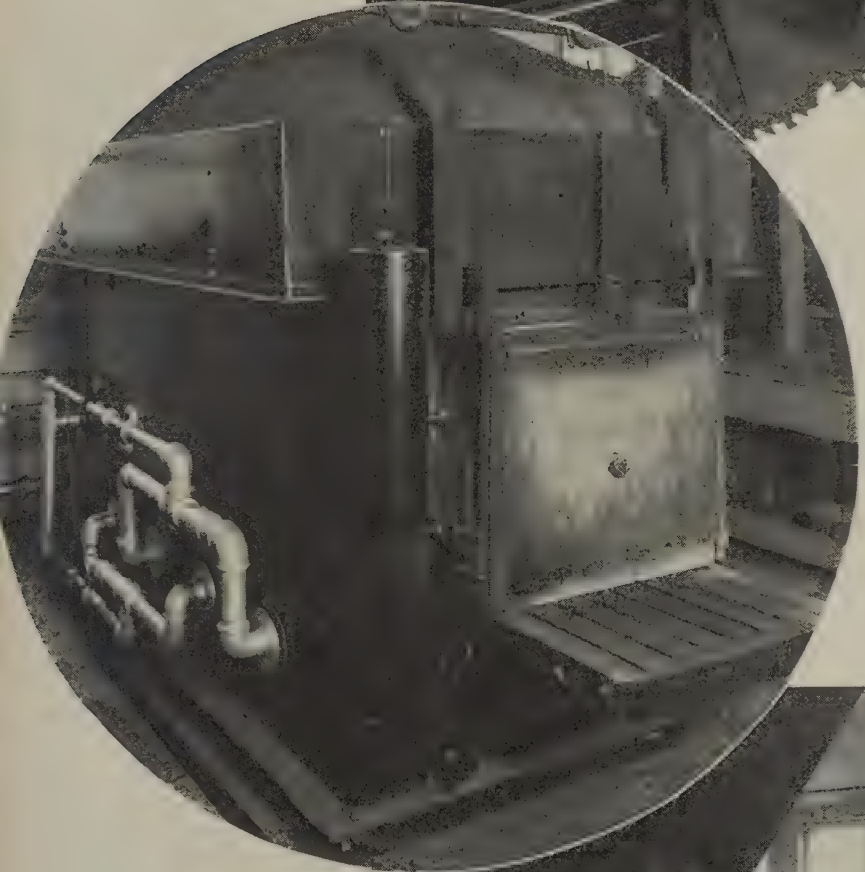


Hollow Wall Laid with Biasbrix

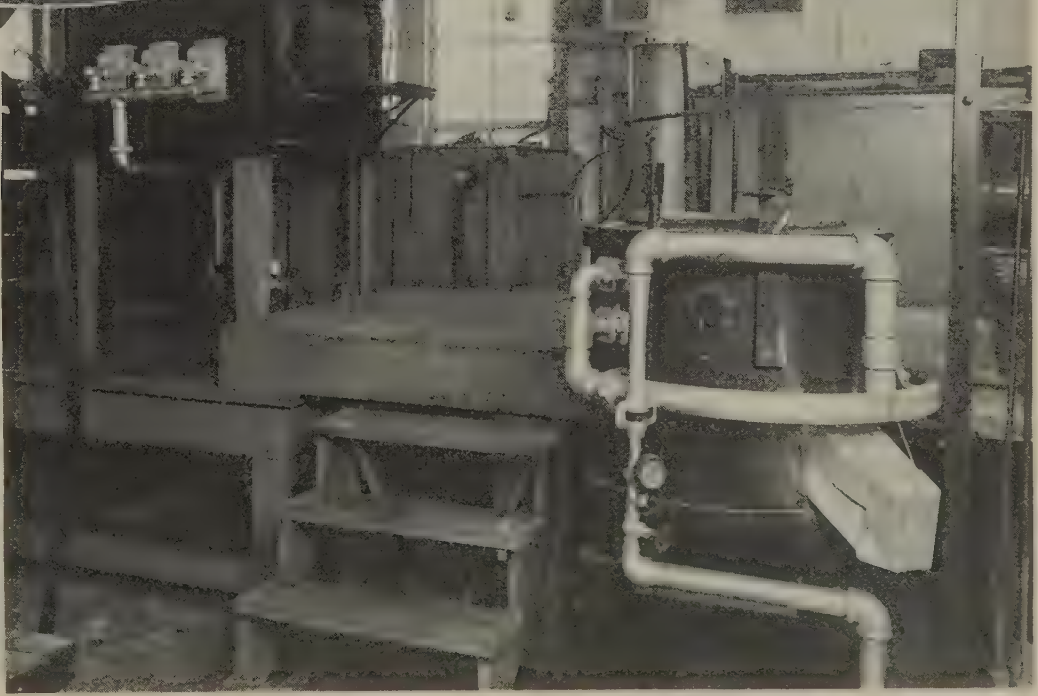
Gas Hardening Furnaces in Brooklyn Plant



THE Cameron Machine Co., Brooklyn, N. Y., makes slitting and roll winding machines. Some of its products are shown in this view of the assembly room of Camachines, as they are called in a coined name derived from the company's name.



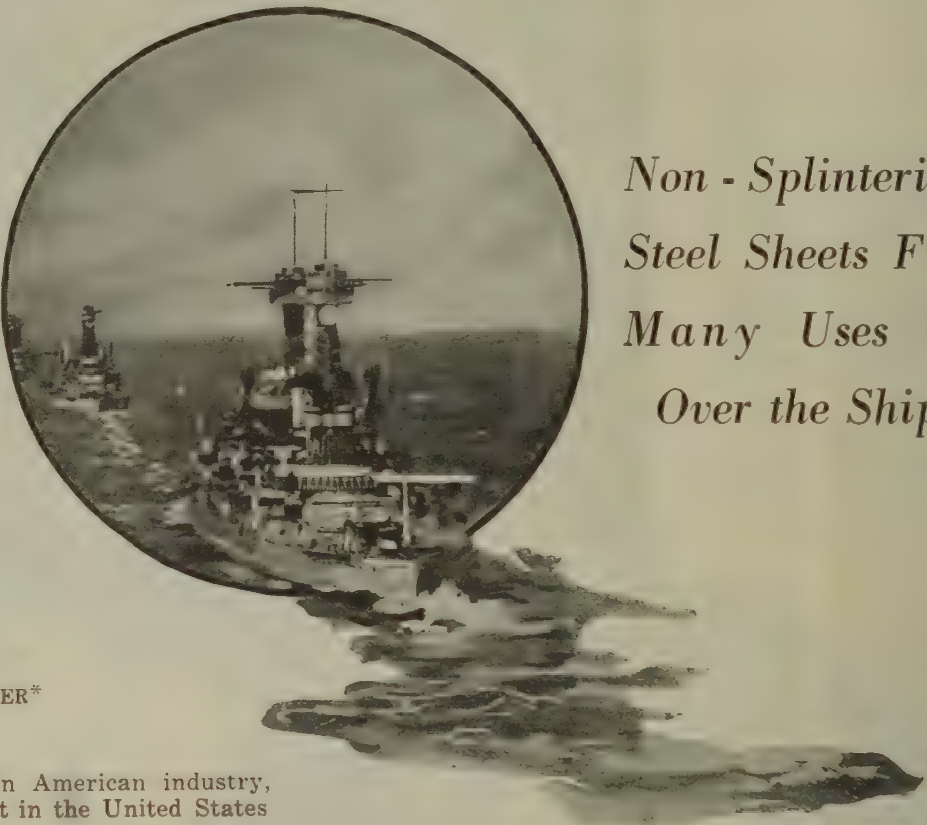
FOR the pack hardening or carbonizing of the platon rolls, cutting cylinders, etc., the steel parts are packed in bone or bonite, in air tight pots, and then heated for varying lengths of time up to 17 hr., when they are cooled from 12 to 24 hr., depending on the size. They are then heated again in another furnace and quenched in brine and oil for the final hardening. Gas is used for fuel under the Surface Combustion system, employing refractories which are kept at incandescence by the gas combustion. The venturi tube method of control is shown. Marked economies over open flame combustion are claimed.



A GAS fired furnace is employed for hardening the high-speed steel tools for the machine shop. Lead pots, similarly fired, are used for heat treating the cutters and other high-speed steel. Recording pyrometers are fitted to all the furnaces. The piping is painted with silver paint, to give instant notice of any leaks, as gas discolors such paint.

American Navy Uses More Sheet Steel

Its Quality of Absorbing Vibration Without Damage an Important Feature—



Non-Splintering, Steel Sheets Find Many Uses All Over the Ships

BY G. K. SPENCER*

SHEET steel, indispensable in American industry, also plays an important part in the United States Navy. Thin and sturdily tough, it hums to the cadence of whirling dynamos and turbines, while it also holds its steady place under the strain and tension of gunnery concussions.

One month before this was written, the battleship Nevada, for the first time in a modern navy, fired her guns† dead ahead. Ships habitually fire to port or starboard, so that the recoil can be absorbed by the roll of the ship. But in firing dead ahead the ship cannot roll; it must "sit back upon itself," and absorb the shock within its confines. It is equivalent to the ship's actually being hit by the shell. The Nevada was chosen for the test, to discover if a modern battleship could fire dead ahead without seriously damaging herself.

When the Nevada had fired dead ahead, she sat heavy in the sea, her bows submerged, her gun crews stunned momentarily by being cast against the sides of their turrets. But when the gun captains sang out through the voice tubes to the bridge, "Bore clear!" it was known that an American ship had successfully performed an internationally feared experiment. Now, if an enemy "crosses our T," or passes his fleet dead ahead of us, we know that we can fire on him.

Below decks the investigators found that all glass in the ship had been shattered, even wired glass. Slight strains were observed in beams and other pieces. But the sheet steel members had not yielded the fraction of an inch which was expected of them under the storm they endured.

Sheet Steel Held Its Position

In the main control room the sheet steel partitions were well in place; in the torpedo rooms the sheet steel partitions had not so much as cracked their paint. And so with the sheet steel partitions of the radio rooms, the fire rooms, and on all the gun decks. Sheet steel holds. In moments of disaster it never splinters —quite an estimable quality where confined space

ABOVE the Sailor's Head Is a Sheet Steel Coping Which Wards Off Wind and Rain from the Destroyer's Bridge (Heavy Seas, Too, of Course). The navy has found that shells cannot splinter it

Housings on Masts (at Head of Page) Are of Sheet Steel might cause accidents to assume greater proportions if splinters were to fly about.

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*Maritime Air Service, Oakland, Calif.

†These guns, of 14-in. bore, throw a 1400-lb. projectile at a muzzle velocity of 2700 ft. a sec. The kinetic energy, for one gun, is 70,800 foot-tons. Five guns bear dead ahead.—EDITOR.

A piece of sheet steel from a Pittsburgh plant was placed on a hill on one of the naval proving grounds recently and fired upon with shell, without splitting in any manner, the bits of shell simply holing it, but not splintering it. This vindicated the naval policy of using sheet steel for cabinets, files, desks and all ship office equipment. In the event of the ship being in action with an enemy and shell pouring through the spaces reserved for control offices, the desks can be crumpled into cruel masses without sending splinters through the air to the further injury of personnel.

As a consequence of this policy, and also because the Bureau of the Budget insists on the economical operation of the Navy, every piece of office equipment of all combat ships—battleships, light cruisers, destroyers, submarines—is of sheet steel. If an enemy never shells them, then the equipment will last as long as the ship. In fact, if naval ships were to be scrapped today, the sheet steel office equipment could all be dismounted, detached and placed in other ships. It is not intended in the naval estimates ever to replace office equipment in the combat ships.

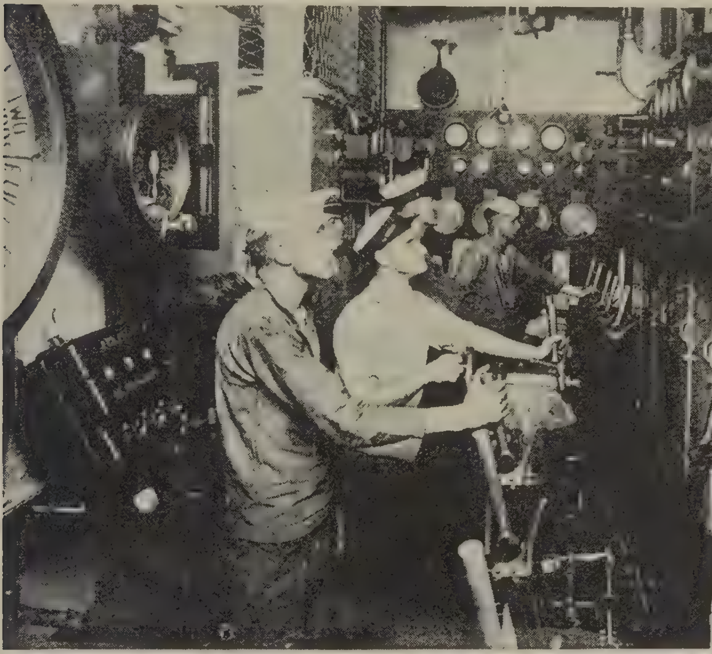
Desks, Lockers and Bunks of Sheet Steel

Seven first line destroyers of the Navy were wrecked on the rocks at Honda Head, Cal., in 1923. The ships were thoroughly "done up." Some even were turned upside down in several fathoms of water, with their hulls torn miserably, heavy loss of life having attended the accident. Pictures of the wreck on the morning after it occurred demonstrated how thoroughly the ships had been destroyed by wind, water and rocks. And yet, the sheet steel desks from those ships are today doing duty on other ships. They were not even bent—by storm, wreck or salvaging crews. And they had to be detached by divers under water.

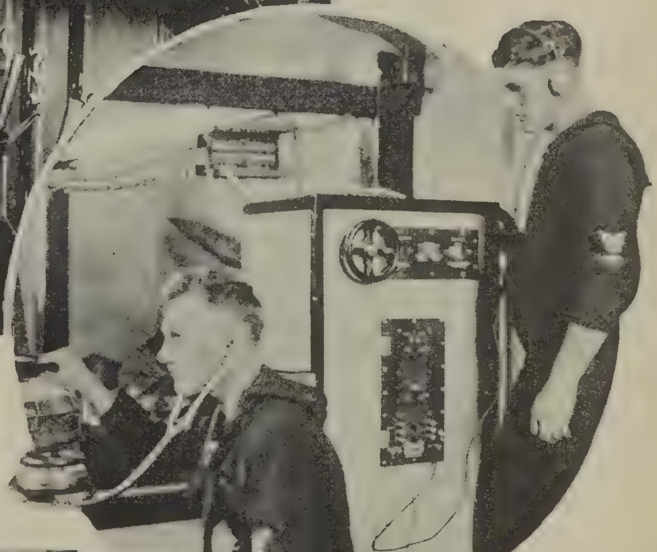
Your naval officer, after an arduous watch on deck, the bridge or the engine room, tumbles into a sheet steel bunk, made fast to the bulkhead in his room. The sailors pack their belongings in sheet steel lockers. The old-time sea chest is gone. In its place, the neat sheet steel locker possesses the dual advantage of indestructibility and not attracting vermin. Long rows of such lockers are mounted in all ships except aircraft and submarines.

A destroyer of the first line utilizes sheet steel for its bread, potato and vegetable lockers, and for its partitions below decks. All water and wind sheds on destroyers were recently converted, at the various navy yards on the Pacific and Atlantic coasts, to sheet steel construction.

Previously it had been termed objectionable to place sheet steel above destroyer bridges, to shelter personnel from wind and seas. Canvas was used to create an overhead which would serve as a wind and water shed. After the tests with shell on sheet steel, all destroyers



IN Right Foreground Is Shown Sheet Steel Partition in Main Control Room of U. S. S. Tennessee. Minor partitions throughout the ship are of this material



SONIC Direction Finding Equipment (Below), Made with Sheet Steel Cabinet

NAVAL Mess Room (Left), Showing Sheet Steel Lockers. Each battleship carries many hundreds of such lockers of the battle fleet on the Pacific Coast took turns going to the Bremerton Navy Yard to receive sheet steel overheads on their bridges. Sheet steel will not splinter in war and in peace it will last as long as the ship. As recently as three years ago our destroyers used canvas overheads on their bridges. Today they are all of sheet steel.

Observation Posts and Sounding Apparatus

Simultaneously, the observation posts in the cage masts of the battleships were converted to sheet steel, light and durable. Protection from enemy fire in the masts is naturally not seriously considered. It does not matter how heavy the sides of the observation lofts may be—if an enemy shell hits, it will carry that particular post away. In fact, lightness may save it more than weight, in the event of a hit.

With the advent of the sonic depth finding apparatus, by which vessels may make soundings by casting an oscillation toward the bottom of the sea and receiving it in another instrument, the Navy turned to sheet steel for the construction of this equipment. It did likewise with the direction finding apparatus, by which submerged microphones bring to a central collecting instrument the sounds made by the propellers of other vessels moving at sea. By this instrument, we discover if other ships are near, what type of vessels they are, and the speed and direction in which they are moving. The casements for these fittings are of sheet steel, the first two of the type being fitted on the Zeilin and Corry, of the battle fleet destroyer squadrons.

After the tests, within the fighting forces of the Navy, of sheet steel equipment for the office or "control" personnel, it was decided to make the ruling effective throughout the Navy, ashore in the Naval Districts, as well as afloat. Ashore it was not considered necessary to scrap all the desks immediately, but rather to replace them with sheet steel material as they are removed after long service. Consequently, all Naval Districts ashore today utilize sheet steel filing equipment, while retaining to a certain extent wooden desks. These latter will gradually disappear on land as they have at sea.

Metal Industries Expect 1928 to be "Fair" or "Good"

Business Survey by National Metal Trades Association Discloses Many Optimistic Opinions on Outlook for This Year

MEMBERS of the National Metal Trades Association, comprising many of the large metal-working industries of the country, are divided in their opinions as to the business outlook for 1928 between "fair" and "good." Of the replies received to a list of questions sent out from the association's office, 52.2 per cent predicted 1928 would be a "good" year, 34.75 per cent inclined to the view that it would be a "fair" year, while the remainder were divided between "extra good" and "poor" 7.25 per cent for the former and 5.8 per cent for the latter.

Many of the replies indicated reasons for expecting better business and only a few expressed the view that 1928 business conditions would not be so good as those in 1927. Broadly, the opinions indicate a belief that 1928 will be fairly prosperous, with no extraordinary increases or decreases in sales or operating volumes.

Among the conditions upon which optimistic expectations for 1928 are based are: Good crops, relatively cheap money, a flexible credit structure, small inventories, better possibility of export, low commodity prices and increase in stock orders; while actual orders booked and inquiries received recently, together with the possibility of increased automobile production, were taken into account also.

Some Companies Expect to Make Up for 1927 Recession

"Conditions in related trades exert a large influence on the prosperity of the metal trades," says a bulletin in which the association's questionnaire is analyzed, "and it is interesting to note that even in those industries faced with the most adverse conditions reported, there is still an underlying expectation of a steady flow of business. For instance, members associated with the coal mining and oil producing industries, both affected by overproduction in 1927, report good prospects for 1928. On the other hand, members in the automobile field report an excellent outlook for 1928, due to low production in 1927 and to the absorption of used cars. The re-entry of Ford into the market, coupled with new designs announced by other manufacturers, are factors expected to take up the slack caused by the 1927 recession.

"Members in close touch with the railroads and the textile industries report increasing activity in their markets, which leads to a general feeling of improved conditions for 1928. Members supplying the building trades do not feel an equal degree of optimism on the assumption that the general building shortage has been overcome. On the other hand, the extent of building permits being issued for 1928 erection opens the door for larger possibilities in metal building materials."

Replies to the questions sent by the association to its members showed that fully 50 per cent of those expecting a fair or good year base their expectations upon general economic soundness of American industry as a whole, and upon the special conditions obtaining in various members' own industries. About 30 per cent base their expectations upon the outlook in industries which they serve, while 15 per cent base their hopes on orders and inquiries already received. A few mention the political situation as affecting their business.

Some members reported a larger volume of business in 1927 than in 1926 with less profit, while others reported a smaller volume of business with greater profit. An increase in productive efficiency of plants was reported by 67 per cent of those replying, and the most important reasons underlying such increase in efficiency were: New or improved machinery, incentive plans of wage payment for workmen and supervisors, improved methods and processes, new buildings and equipment, better supervision, better tools, changes in personnel and training of employees.

Increased productive efficiency reduced the number of employees in 73 per cent of the cases where new methods or equipment have come into use, while 10 per cent definitely stated the saving in labor amounted to 5 to 10 per cent. A good many replied that increased quality production absorbed any saving brought about by greater plant efficiency.

Suggestions for improving working conditions and stabilizing business included the following:

Better education and training for all employees
Closer contact between management and men
General refusal to accept business at less than profit-making figures
Stop regulatory legislation
Better wages to employees through use of incentive plans of wage payment
Better purchasing practices
Standardization
Consolidations
Greater cooperation between employers
Production control
Budgeting
Renovating plant during slack productive periods
Improved cost finding
Personnel research
Better supervision
Better employment methods
Exercise caution in expansion
Developing new machinery

Inspection of Aircraft Tubing

Mild Carbon Can Be Separated from Alloy Steels After Normalizing by Testing Individually for Rockwell Hardness

BY HORACE C. KNERR*

IN the manufacture of seamless steel tubing such as is used in aircraft construction, and for many other purposes where accuracy and high quality are essential, the first operation is to pass the hot billet through a piercing mill, from which it emerges as a short, crudely formed tube or hollow billet. This is subjected to one or more stages of hot rolling over a rod, during which it is reduced to about 3 in. diameter, ¼ to ⅜ in. wall, 15 ft. or more long.

Manufacture Requires Repeated Handlings

Subsequent stages of manufacture consist in cold drawing through a die and over a mandrel to successively lighter walls and smaller diameters. The tube must be annealed after each pass to remove the hardness produced by cold work, and must be pickled after each annealing to remove scale or oxide. After pickling and rinsing the tube is coated inside and out with a lubricant, preparatory to the next cold pass. A tube of thin wall and small diameter may go through this series of operations as many as 25 times before reaching its final dimensions.

As the tubes are elongated on each passage through the die, they soon become too long for the draw bench or annealing furnace, and must be cut in two. These halves again are drawn and in their turn are cut in two when they reach a limiting length. From a single original billet weighing 75 to 100 lb., as many as a dozen or twenty tubes of thin wall may therefore be produced.

Many lots of tube in different stages of manufacture are passing through the cold drawing mill at one time. The lots are handled in bundles, consisting of a few dozen to a few hundred tubes, according to their size and weight. Each bundle is identified by a tag and a job card, on which its progress is recorded. The utmost care is given to the segregation of tubes of various types or analyses of steel in their progress, but in spite of this, human fallibility sometimes results during the many handling operations in placing a tube of one analysis in the wrong bundle, after which it loses its identity. This chance is not confined to the tube manufacturer's plant, but exists also in the user's shops and stock rooms.

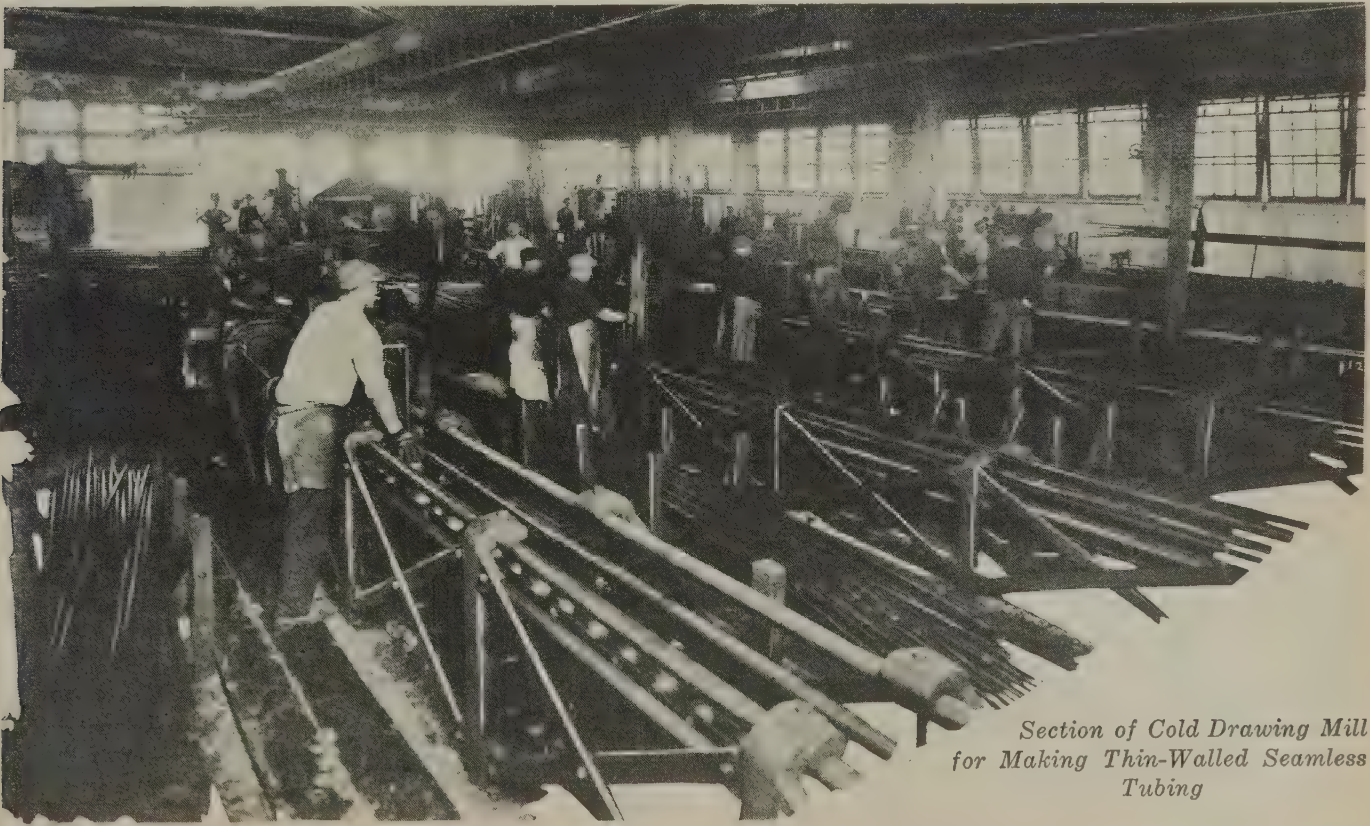
Segregation of Stock

In order to avoid the possibility of mixing tubing of ordinary commercial grades with those of the higher grades required for aircraft use, one of the Summerill Tubing Co.'s mills is devoted exclusively to the production of the latter. It is a complete unit in itself, including draw benches, annealing furnace, pickling tanks and necessary auxiliaries.

The aircraft industry, including the Army, Navy and commercial builders, have at present standardized on seamless tubing in three types of composition, as listed in the table of specifications. Any or all of these steels may be in progress through the mill at one time.

Because of its satisfactory fabrication qualities, and its excellent physical properties either as cold drawn, slightly tempered after drawing, normalized, or oil quenched and tempered, chrome-molybdenum steel is finding wide application, not only in the construction of aircraft, but in a wide variety of industries where requirements are exacting.

The two alloy steels do not differ widely in their physical properties, either as drawn or after like heat treatments. If one or more tubes of one type became mixed with tubes of the other type, and heat-treated accordingly, the properties obtained while not the best would not cause danger. Moreover, no trouble should



Section of Cold Drawing Mill for Making Thin-Walled Seamless Tubing arise from mistaking an alloy steel tube for one of mild carbon steel, since its physical properties would be superior.

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*Consulting metallurgical engineer, Summerill Tubing Co., Bridgeport, Pa.

But if a tube of a mild carbon steel became mixed with a lot of either 3½ per cent nickel steel or of chrome-molybdenum steel, serious results might follow, since its strength would be much less than that of the alloy steel for which the structure was designed. Therefore it is imperative to apply a final test to *each individual tube* in a lot of alloy steel of either type, to insure that no mild carbon steel tube is present. (Of course, the same situation exists with tubing, bar stock and finished parts in the aircraft manufacturer's plant.)

Positive Identification of Nickel Steel

There is a very simple, convenient and reliable test for the identification of nickel steel. This consists in putting a drop of 50 per cent nitric acid on the cleaned surface, soaking up the drop after reaction is completed (in about thirty seconds) on a sheet of filter paper or white blotting paper, and applying to the wet spot on the paper a few drops of a di-methyl-glyoxime solution. This is made of 1 gm. di-methyl-glyoxime, 60 cc. of 80 per cent acetic acid, 30 cc. concentrated ammonia and 10 gm. ammonium acetate. If nickel is present the spot will turn strawberry pink; in the absence of nickel, the spot is reddish brown. The indication is quite distinct and positive when the test is properly performed, and a large number of pieces can be tested in a short time.

Unfortunately, no simple, rapid and thoroughly reliable chemical test seems to be available for identifying chrome-molybdenum steel.

Hardness of Normalized Chrome-Molybdenum Tube

Consideration has therefore been given to the hardness test as a means of identification. Neither the Brinell nor the scleroscope test is suitable for use with thin-walled tubing, but the Rockwell hardness test is well adapted to the purpose.

Preliminary experiments showed that no clear distinction could be drawn between the Rockwell hardness of mild carbon and chrome-molybdenum steel tubes, as they came from the mill after drawing. However, after normalizing, i.e., heating above the critical range and allowing to cool in the air with free circulation, chrome-molybdenum steel tubes of aircraft sizes show a Rockwell hardness of 90B or over, while mild carbon steel gives a hardness below 80B. (When it is not practicable to normalize the whole tube or its end, a sample may be cut, normalized in a small laboratory furnace and tested.)

The investigation verifying this test over the range of thickness and diameter of tubes used in aircraft construction has additional interest in showing the physical properties obtainable by normalizing these steels.

Tests of Thin-Walled Tubes

Nine mild carbon steel tubes and nine chrome-molybdenum steel tubes were tested in three diameters representative of aircraft sizes (½, 1 and 1¾ in.), each diameter in three wall thicknesses (B.W.G. 20, 16 and 11; respectively 0.035, 0.065 and 0.120 in.). Tubes were taken at random from stock, suitably numbered and cut into sections 10 in. long.

A series of eighteen specimens, as above mentioned, was normalized at each of the following temperatures: 1400 deg. Fahr., 1490, 1580 and 1660. The specimens were held at temperature for 15 min., withdrawn individually and supported horizontally about 2 ft. above the floor so as to permit free circulation of air. They cooled to blackness within 1 min. or less. The tubes were not tempered after normalizing.

Some very light scale was produced during cooling. The scale on the chrome-molybdenum steel peels off freely, while that on the carbon steel adheres. This serves as a fair but not very positive distinction. It is important to remove this scale both inside and out at the point tested.

Rockwell hardness tests in triplicate using 1/16-in. ball, 100 kg. load, were taken on all specimens, including a set from the tubes in the original condition (as delivered by the last drawing bench). Individual readings on any specimen usually fell within plus or minus 2 points of the average.

For thin-walled tubes, a special anvil was used, consisting of a rounded head supported on a curved arm in such a way that the end of a tube may be slipped over the head, which then supports the wall from the inside. The head has a radius of about ¼ in., but is slightly flattened on top, so that it makes the least possible indentation on the inner surface of the tube. Another special anvil for small tubes consisted of a piece of hardened drill rod, 3/16 in. diameter, ½ in. long, extending horizontally from an upright arm. Readings taken with these anvils on a test block of known hardness are two to five points lower than with a flat anvil, due to a scarcely perceptible indentation made by the anvil on the under side. However, the results on such special anvils are consistent, so that a correction can be made. No other equally practicable method was found to test thin-walled tubes.

No specimen of the annealed carbon steel lot showed a hardness exceeding 80B. Three specimens of annealed chrome-molybdenum steel lot showed a hardness less than 90B, which were set aside as doubtful for further investigation.

No consistent relation between hardness and tensile strength of normalized tubes was observed, except the following general ones: Rockwell hardness over 90B corresponds to tensile strength over 95,000 lb. per sq. in. Rockwell hardness under 80B corresponds to tensile strength under 75,000 lb. per sq. in. This, however, is a check on the satisfactory strength of normalized chrome-molybdenum steel tubes.

Specifications for Standard Aircraft Tubing

	Mild Carbon	3½ Per Cent Nickel	Chrome-Molybdenum
Specification—			
U. S. Army Number	57-180-1	......	57-180-2
U. S. Navy Number	49-T-1	49-T-2	......
S. A. E. Steel Number	1025	2330	4130 X
Chemical Composition—			
Carbon	0.20 to 0.30	0.25 to 0.35	0.25 to 0.35
Manganese ...	0.50 to 0.80	0.50 to 0.80	0.40 to 0.60
Phosphorus (max.)	0.045	0.040	0.040
Sulphur (max.)	0.050	0.045	0.045
Nickel	......	3.25 to 3.75	......
Chromium	......	......	0.80 to 1.10
Molybdenum ..	......	......	0.15 to 0.25
Minimum Physical Properties—			
Tensile strength	55,000	125,000	95,000
Yield point (dividers) ..	36,000	100,000	60,000
Elongation in 2 in., per cent.	22	12	12
Heat treatment..	Normalized or As Drawn	Quenched and Tempered	Normalized or As Drawn

Normalizing Temperature Range

When the mechanical properties were plotted against normalizing temperatures for tubes of a given diameter, little effect on the hardness or tensile strength values was found within the range of 1490 to 1660 deg. Fahr. At 1400 deg. Fahr. there is a general tendency for all values to fall. This temperature is too low for satisfactory results. Any temperature between 1500 and 1600 deg. Fahr. would appear to be satisfactory for normalizing, although narrower limits could readily be maintained.

In general, hardness and strength tend to increase with decreasing wall thickness, but there are numerous exceptions to this rule, due perhaps to slight variations in composition, or other factors. Within the range of ½ in. to 1¾ in. at the various gages and temperatures, diameter has little effect on the strength of tubes of either analysis under test.

Chemical analyses of each tube under test were made. The carbon steel tubes ranged from 0.17 to 0.31 per cent carbon, and each gave negative results in a qualitative analysis for chromium, molybdenum, nickel, vanadium and tungsten.

It is significant that one tube, namely 1¾ in. by 0.120 in., from those supposed to be chrome-molybdenum steel tubes, contained only 0.06 per cent chromium and 0.07 per cent molybdenum and was therefore defective in composition. The four specimens from this tube showed inferior physical properties, and Rockwell hardness in the neighborhood of 80B. The proposed test therefore served to distinguish this tube from the good ones.

Inspection of Chrome-Molybdenum Tubing Before Shipment. Each tube is normalized and given Rockwell hardness test

Another tube from the chrome-molybdenum steel lot showed erratic Rockwell hardness, although the tensile properties were excellent and the composition normal. Under the Rockwell inspection test this tube would have been withheld, subject to further test or other disposition by the manufacturer, and therefore without risk to the purchaser.

Conclusions

The results indicate that, within the range of diameters from ¼ in. to 1¾ in., and thicknesses from 0.015 in. to 0.120 in.:

1. After normalizing, that is, allowing to cool freely in air, from a temperature between 1490 and 1650 deg. Fahr., tubes of 4130X steel may be distinguished from tubes of 1025 steel which have been mixed with them by means of a Rockwell hardness test. The former will exceed 90B, while the latter will be less than 80B. Any tubes of intermediate hardness may be regarded as doubtful, subject to further verification, or rejected.

2. Without normalizing, the Rockwell hardness does not clearly distinguish between tubes of these two steels.

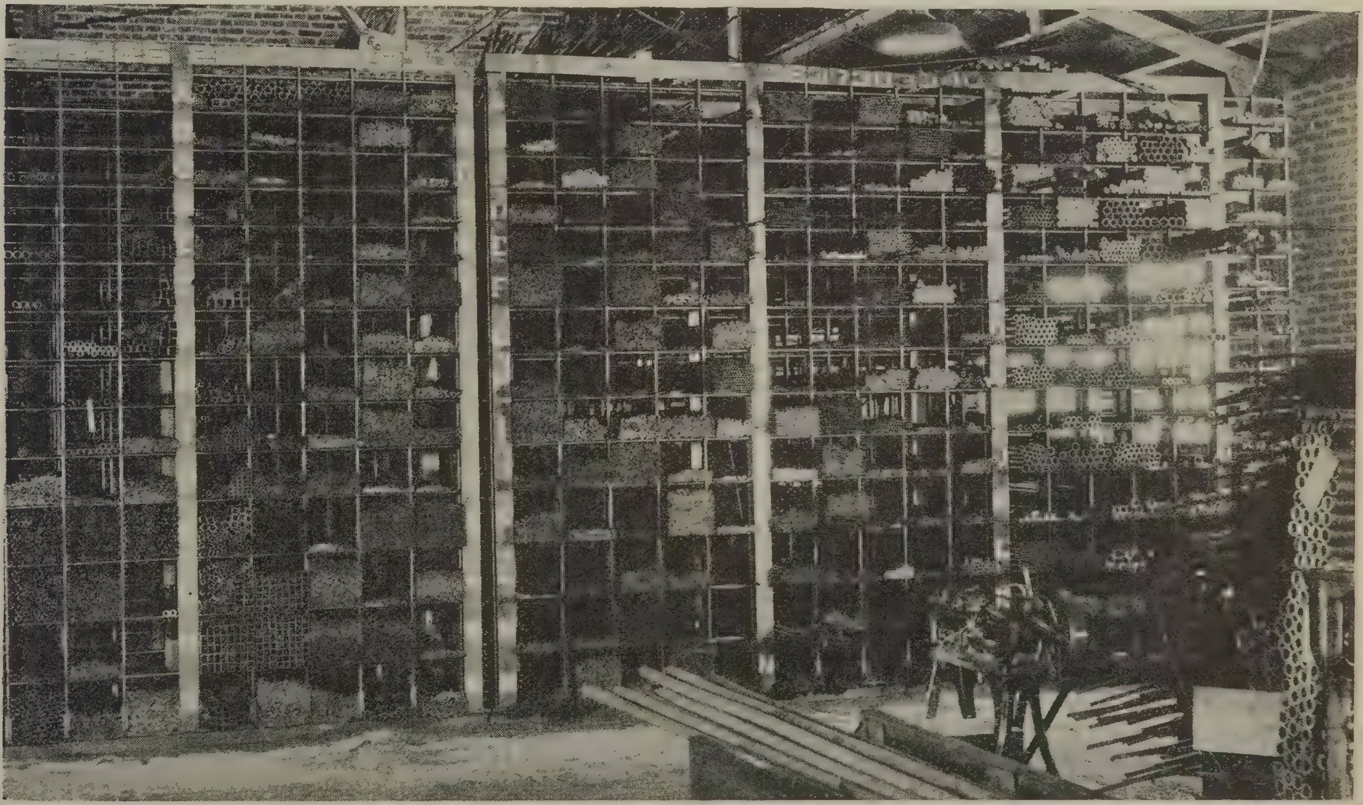
3. Rockwell B hardness is not directly proportional to tensile strength for either type of steel, but if the hardness is above 90B, after normalizing at 1490 to 1660 deg. Fahr., the tensile strength of 4130X tubes is above 95,000 lb. per sq. in.

4. The normalizing range is wide, variations in temperature between 1490 and 1660 deg. having little effect on hardness or tensile values. A temperature between 1525 and 1575 deg. Fahr. is to be preferred, so that scale will be a minimum.

5. The test is rapid, inexpensive and can be performed by a relatively unskilled operator. Errors, should any occur, are likely to cause the rejection of good tubes due to low hardness readings, rather than the acceptance of inferior tubes.

6. This test is not suitable for separating chrome-molybdenum steel tubes from tubes of high carbon or other alloy steel, as these would probably have similar hardness values after normalizing.

The Rockwell hardness test described has been approved by the Navy Department, and is being applied to every tube of chrome-molybdenum steel No. 4130X, before shipment by the Summerill Tubing Co. After more than six months of this practice, during which thousands of tubes have been tested, there has not been an instance when the test failed in its reliability when properly performed.



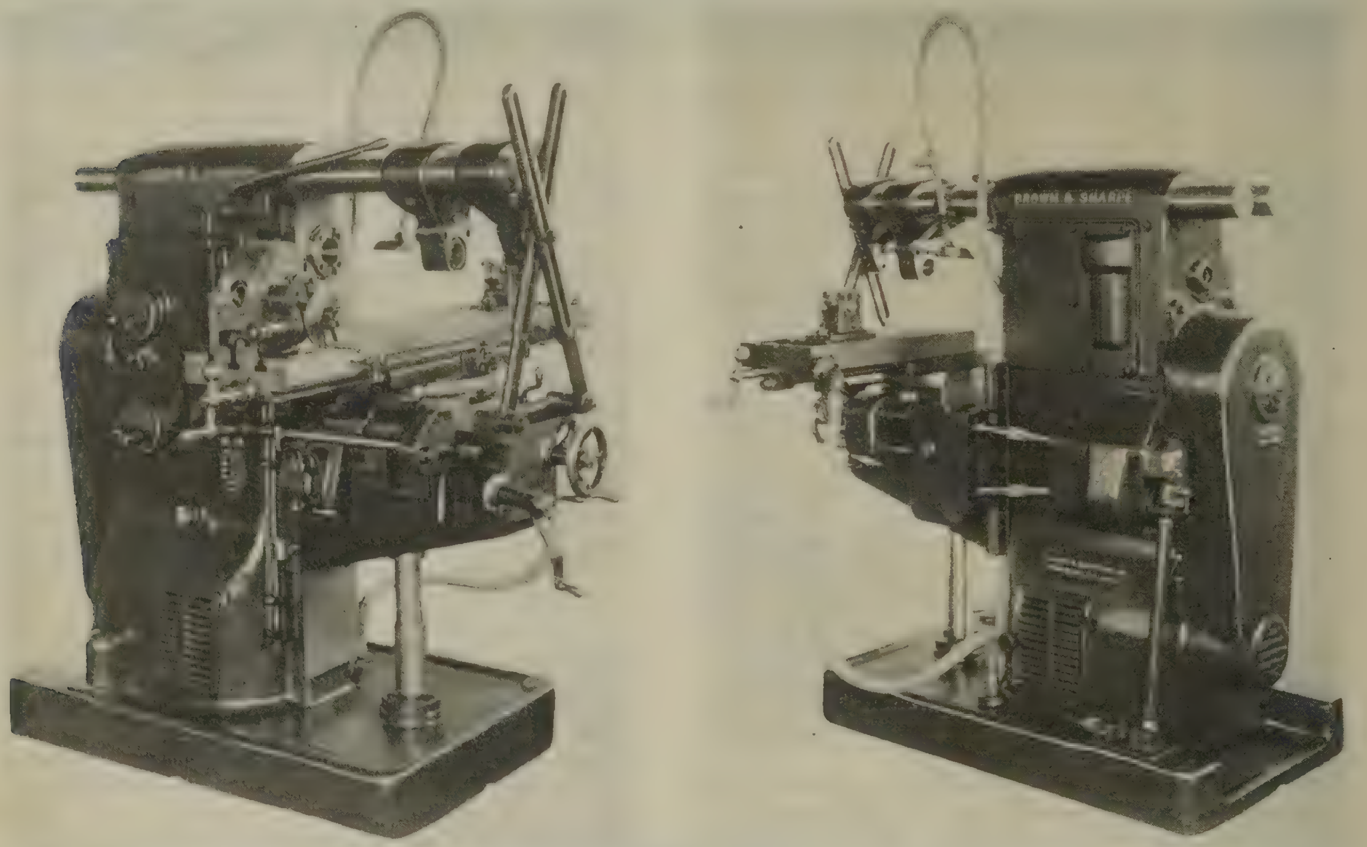
Stock Racks in Warehouse. A wide variety of sizes and shapes, often in more than one analysis, is demanded by the trade

NEW MILLING MACHINES

Dual Feed Control—Either at Front or Rear of Table—An Outstanding Feature

A NEW line of milling machines with features that simplify control and facilitate operation has been brought out by the Brown & Sharpe Mfg. Co., Providence. The line is designated as the Standard and includes Nos. 2-A and 3-A universal and Nos. 2-B and 3-B plain machines.

Features intended to facilitate operation include a single lever for speed changes (in two series); and a single lever for feed changes at each of the operating positions, front and rear of the table. Direct reading dials indicate rate of feed and speed engaged. Power fast travel is provided in all directions, this being gear driven through safety clutch. Directional feed engagement levers for all feeds are provided at front and rear of table, and the knee is arranged for clamping from front or rear of the table.



Feed Changes Are Made by Rotating the Lever at the Front or at the Rear of the Table. One revolution in either direction accomplishes a change, and direct reading dials indicate the feed in use. Power fast travel is provided on all three feeds

The dual feed control permits the operator to make feed changes from either the front of the machine, in the normal operating position, or at the rear of the table, for face milling, boring, etc. Changes are made by the simple rotation of a single lever and the feed in use is shown on a direct reading dial directly above either control lever. Only the feed in use is shown, which is a convenience not only for the operator, but also for the foreman, who can see at a glance if suitable feeds are being used for the work in process. All controlling levers are always thrown in the direction of the movement of the table, which further simplifies operation of the machines.

One revolution in either direction of a single lever on the left side of the machine gives a change of spindle speed, and a direct reading dial above the lever indicates the speed for which the machine is set. Two series of speeds are available, the change from one to the other being made by shifting the back gear lever. Spindle reverse is controlled by a small handle just below the speed change lever.

Oiling of the machine is by means of a simplified system. All units in the column and driving clutch are automatically supplied with filtered oil and a gage is provided to indicate whether the pump is working. The inside of the column is coated with a special enamel to prevent grit in the casting getting into the lubricating system, while the complete inclosure of the column mechanism prevents the entrance of foreign matter. The knee mechanisms are lubricated by a pump which automatically forces oil to all moving parts. The entire saddle mechanism and table bearings are oiled from a single conspicuously placed well at the front.

The cutter coolant system is designed to provide either a flood supply or a thin stream. In either case, it is delivered at low pressure and the pump arrangement is simple and requires little attention. The pump is always immersed and automatically stops when the spindle stops.

The machines are of rugged construction and all assemblies are of unit construction. It is equipped with a double overarm and the standardized spindle end and is adapted for motor drive. Sliding gear feed and speed transmissions; all-gear drive, with heat-treated alloy steel gears; and anti-friction bearings from the driving pulley to the spindle, as well as in the feed and power fast travel mechanisms, are other features. The spindle runs in phosphor bronze bearings. Power is transmitted through a dry type multiple disk clutch, which is self-compensating for wear. The elevating screw is of one-piece construction, completely inclosed, which construction is said to provide unusual accuracy in vertical adjustments.

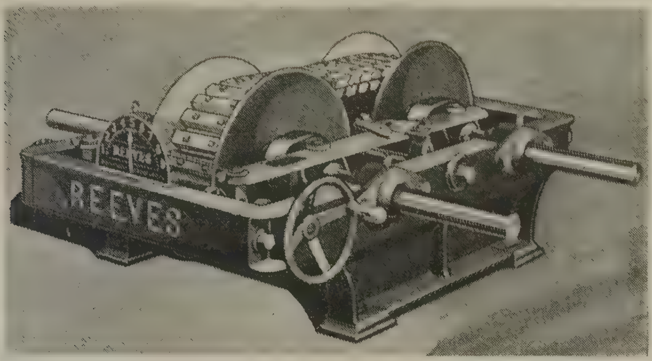
Steel Foundry Operates 100 Days Without Lost-Time Accident

Employees of the Union Steel Casting Co., Pittsburgh, recently observed the successful completion of 100 days without a lost-time accident with a safety rally at the plant. Safety drives by the company were inaugurated in November, 1926, and the 100-day period, ended Nov. 30, 1927, established a new record. At present the plant employs 400 men, and the effectiveness of the campaign is further stressed by the fact that jobbing steel foundries are generally classed as "extra hazardous." Safety work at the Union plant is in charge of D. J. Evans, superintendent. He is assisted by K. C. Wickline, safety engineer, and by a safety committee consisting of all department foremen and their assistants, together with the officers of the Employees' Beneficial Association.

Improved Model of Reeves Variable-Speed Transmission

Improved features intended to provide additional strength, greater compactness and higher efficiency have been incorporated recently in the variable-speed transmission of the Reeves Pulley Co., Columbus, Ind.

A new double-block center-pull V-belt is said to provide more than twice the surface contact against the driving disks of the transmission, assuring maximum strength, quietness and a more efficient transmission of power. Through this double-block construction the center line of pull is at the center of the belt body, and the load is evenly distributed above and below. The end tips of the belt block are shaped by a special process to conform to the curved surface of the driving disks, providing a snug fit which is said to assure positive flow of power at all speeds. High efficiency is also attributed to the fact that the belt can be run at slack tension, which lengthens the life of the belt and reduces the load on the driving parts of the transmission.



A New Double-Block Center-Pull V-Belt Has Been Provided and Bearing Housings Are Now in the Frame Sides

The new transmission is equipped with a splice-block of the double-pin interlocking type, with cast aluminum blocks and tool steel plates. The machine is shorter and narrower than previously. Reduction in width has been accomplished by setting the frame bearing housings in recessed grooves in the frame sides. This brings the bearing housings closer together and, in addition to the saving in space, makes the drive shafts stronger and more rigid. The overall length of the transmission has been materially reduced by eliminating excess clearance between the ends of the disks and the frame. The feet of the new frame are planed to accurate dimensions.

Improvements have also been made in lubrication. The bore of the disk hub is now grooved spirally, providing more uniform lubrication to all parts of the disk hub bore, shaft, and driving keys. This is said to provide free sliding of the disks on the shafts and to facilitate shifting of speeds. Standard equipment includes a speed indicator which is mounted on the transmission frame.

New England Foundrymen Elect Officers

The New England Foundrymen's Association held its thirty-second annual meeting and dinner on Wednesday evening, Jan. 11, at the Exchange Club, Boston. The only business transacted was the election of officers for 1928, the evening being given over largely to entertainment. H. S. Chafee, Builders' Iron Foundry, Providence, R. I., retiring president, presided until his successor, Charles F. Miller, Universal Winding Co., Providence, was elected. Carl H. Neumann, Union Mfg. Co., New Britain, Conn., was elected vice-president. George H. Gibby, Gibby Foundry Co., East Boston, was reelected treasurer, and Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., reelected secretary, positions they have held many years.

The executive committee for the year consists of Ernest F. Stockwell, Barbour-Stockwell Co.; William W. Brierly, Millbury Steel Foundry Co., Millbury, Mass.; H. A. Lincoln, Sullivan Machinery Co., Claremont, N. H.; Luther J. Anthony, Glenwood Range Co., Taunton, Mass.; and Charles A. Reed, Rogers Brown & Crocker Brothers, Inc., Boston.

Yale K24C Tractor Has 4-Wheel Drive and Sturdy Frame

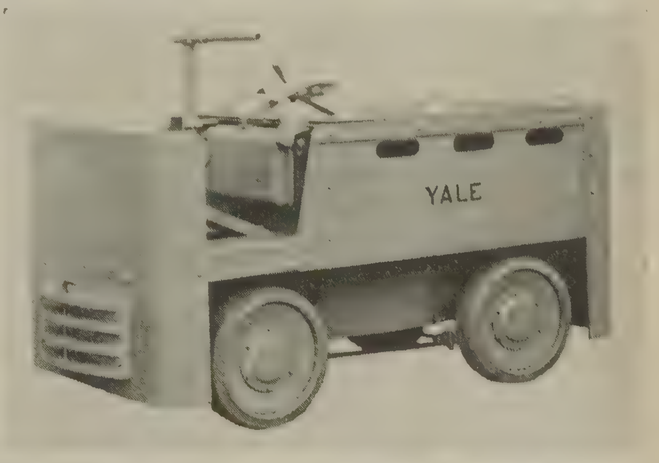
A four-wheel drive tractor has been brought out by the Yale & Towne Mfg. Co., Stamford, Conn., to meet the demand for an electric tractor of heavier type. The machine is capable of an ultimate drawbar pull in excess of 4000 lb., depending upon road surface conditions. It will operate a continuous drawbar pull of 1000 lb. without danger of overheating. By driving all four wheels of the machine, it is possible to get the maximum of traction with a given overall weight. This feature is particularly advantageous when the tractor is driven outdoors, between buildings, over ice and snow. It has the same advantage when operating over floors covered with oil.

With four-wheel brakes, not only has the machine power to pull on slippery surfaces, but it has also the power to stop. As the brakes operate through the differentials, they properly equalize, regardless of the condition of the lining. A spring automatically applies these brakes when the operator either raises his foot pedal or steps off the machine. Disarrangement of the linkages between foot pedal and brake lever would in no way hazard the driver. Should this linkage fail, the brakes would immediately apply and give warning that something was wrong.

Steering is through a lever handle arranged to fold up out of the way if the driver wishes to leave his seat. Construction of this folding linkage is rugged. The steering knuckles on all four driving wheels are equipped with ball flush bearings. This is important, as it permits the driver to whip his machine quickly in tight places, thereby gaining every inch of the turning radius of which this machine is capable.

Two standardized driving units are connected in parallel at the controller. Employment of standard units allows a maximum of interchangeability in the hands of the customer. He need maintain but one set of repair parts for all of his Yake truck and tractor models. This machine is regularly furnished with a 48-volt motor, and a 23 to 1 gear ratio.

The frame construction is unique in that the pressed steel side members or main supporting members are strong and integral parts with the axle yokes. This gives the frame a depth of 18 in., producing a member capable of standing jolts and jars in addition to the bending stresses to which it is subjected. The bumpers are heavy, being made of ½-in. plates. A triple bumper casting front and rear gives a range of coupling height to meet most requirements.



Both 4-Wheel Drive and 4-Wheel Brakes Feature This Electric Tractor

The Aluminum Co. of America has bought two 45,000-kva. water-wheel alternaters and seven 15,000-kva. transformers from the Westinghouse Electric & Mfg. Co., and two 45,000-hp. water-wheels and the governors from the Allis-Chalmers Mfg. Co., for its Calderwood, Tenn., hydroelectric development.

The National Foreign Trade Council will hold its fifteenth annual convention at Houston, Tex., April 25-27. O. K. Davis, India House, Hanover Square, New York, is secretary.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output (adjusted) increased sharply in December and probably will continue upward.

Unfilled orders showed the largest increase in three years, indicating, on the basis of past history, that prices are due to advance.

Pig iron production continues below normal, but still is large in comparison with ingot output and price recovery does not seem imminent.

Finished steel prices are still too low for a proper relation with their raw materials.

IN a good many respects the conditions now prevailing in the iron and steel industry are like those which usually are found at the bottom of a downward swing, just preceding an upward turn. It is usual in this industry for production to expand before prices rise. This is particularly true in the case of finished steel prices. In 1921, the production of steel ingots showed a rising rate about seven months before the average price of finished steel began to advance, and in 1924 there was a similar period of about four months. At present the reasons for this lag are being illustrated.

Sensing the apparent fact that steel prices have gone about as low as can be expected, buyers have placed large orders at those prices and steel production has been stepped up accordingly. The market now awaits the usual "testing period" when buyers will be asked to take steel at the higher prices, to avoid which they recently made purchases. If the usual sequence of events is to follow, the market will stand the test and prices will advance further.

Higher Prices Expected

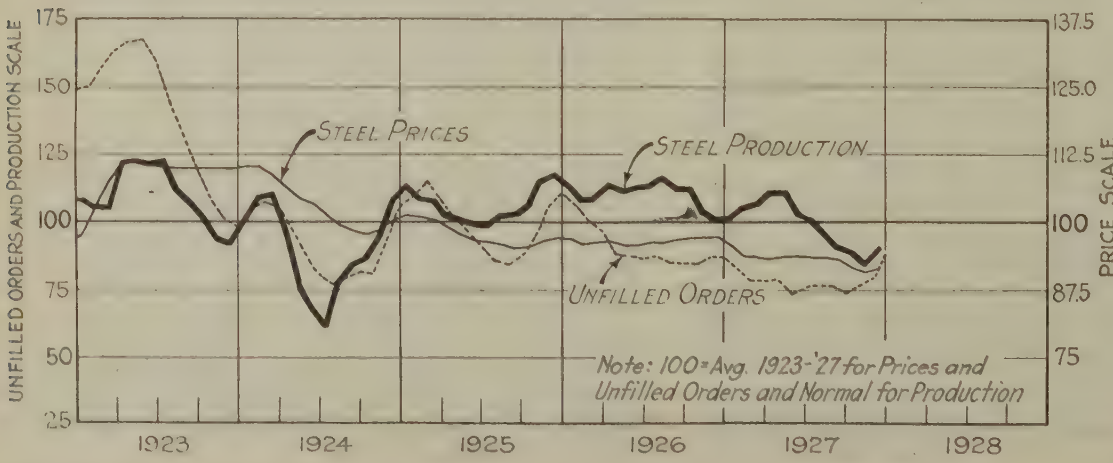
We have from time to time suggested that production has been so well adjusted to consumption, and that as a result there has been so little accumulation of stocks, that the usual lag between increased production and higher prices is not likely to occur at this time. The fact that THE IRON AGE composite price of finished steel rose in December at the same time that production increased seems to give some force to this suggestion.

It is also true, however, that there has been no such severe curtailment of production as occurred in 1921, or even in 1924, and that consequently there is no great shortage. It may well follow that, while the decline in prices has been checked earlier than in most other similar periods, there will also be a less sharp expansion in the demand for steel, and that the anticipated rise in prices will not gain such momentum as would otherwise be the case. For example, we see no prospect whatever of such an advance in steel prices as occurred in 1922.

Production Curve in Steel Is Headed Upward

DISREGARDING trade sentiment and the hopes and doubts which it involves, the cold statistical record looks favorable. One depending entirely on the showing made in the first chart would necessarily draw this conclusion. It should be noted that the chart gives a truer picture of the trend of the steel industry than can be secured from the usual statistical statements. The merely seasonal variations which occur from month to month are practically eliminated. In the case of steel production, allowance is made for the normal annual rate of growth which occurs over a long period. Each of the "curves" is measured from the average for an appropriate period of years. Thus, without attempting any forecasting, the chart is important as revealing the present true underlying position and trend of the industry.

It shows that the December average daily production of steel increased more sharply than in any previous month in over a year. Our adjusted index is 89.8 per cent of normal, against 85.1 per cent in November. It compares with 103.7 a year ago, but last year the trend in December was downward. In view of the sub-normal rate of production, and the infrequency with which the production curve reverses itself after



Note: 100=Avg. 1923-'27 for Prices and Unfilled Orders and Normal for Production

Fig. 1—Steel Production Increased More Sharply in December Than in More Than a Year. Prices, after Sagging for months, seem to have turned upward. Unfilled orders have made up all the loss of the earlier months in 1927

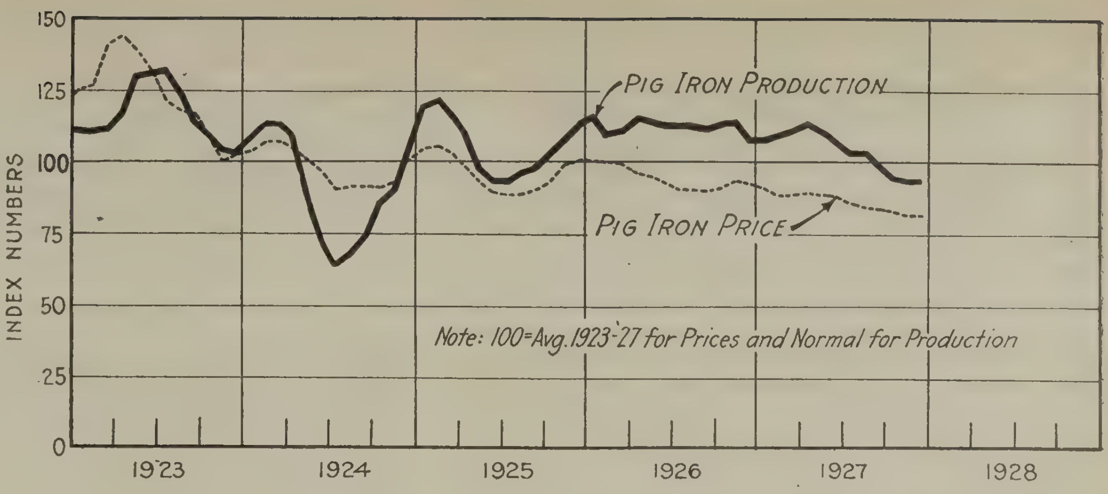


Fig. 2—Smaller Reduction in Output and in Prices of Pig Iron May Indicate an Approaching Upward Turn for Both. No real recovery in the pig iron market is anticipated before steel production advances considerably

such a turn as occurred last month, it seems highly probable that the curve will continue upward.

Unfilled Orders Made Up 1927 Loss

This probability is increased by the sharp rise in unfilled orders. Usually the unfilled orders of the Steel Corporation gain about 4 per cent in December, and such a gain may be called a seasonal occurrence. Actually there was an increase of about 15 per cent last month, and the adjusted index becomes 87.6 per cent of the average for the last five years, in comparison with 79.3 per cent in November and with 87.4 per cent in December, 1926. Unfilled orders have made up all of the loss during 1927. In recent years the adjusted index of unfilled orders has risen in December only twice—in 1924 and in 1925. In both these cases, however, production was above normal and unfilled orders were considerably higher than they now are. Also steel prices were higher and had advanced more in the preceding month or two. It thus seems reasonable to expect that this time a further increase in unfilled orders will occur.

But the fact that the price situation is still in doubt, and that several important products are none too strong marketwise, still leaves a question as to whether there will be any large expansion in forward buying. As yet the activity in the chief consuming industries as a whole has not clearly turned upward.

As to prices, the December average of finished steel prices was 91.5 per cent of the average for the last five years. This compares with 91.1 per cent in November. The advance is small and is not firmly established. Judging both by present conditions and by the performance of the steel market under similar circumstances of the past, the upward trend for a few months is likely to be slight. But the increase in unfilled orders, coming at the same time that production is subnormal, and the fact that steel is cheap in comparison with the general run of commodities, indicate that any changes in the average are likely to be upward.

Pig Iron Continues Below Normal

We present in this issue a revised chart of pig iron production and prices. The normal trend of production has been recomputed and has been based on the average daily production. Of course, the merely seasonal variations have been eliminated. The production curve thus represents the most up-to-date presentation of the true trend of the monthly output of pig iron. The estimated normal monthly output is taken to represent 100 per cent. The price curve is based on The Iron Age composite price of pig iron and the average for the five years 1923-1927 is taken as 100.

The close general parallelism between production and price is at once apparent. Usually a decline in prices *precedes* or accompanies a decrease in production. Usually, too, a rise in price *follows* or accompanies an increase in production. Almost always, when production rises above the normal level, weaker prices result. It will be noted that during 1926 and 1927, when production was continuously above normal, prices were almost continuously sagging.

In December the average daily production of pig iron was around 87,000 gross tons. This was a decrease of over 1000 tons from the November rate, and was 9 per cent below the line of normal growth. Usually

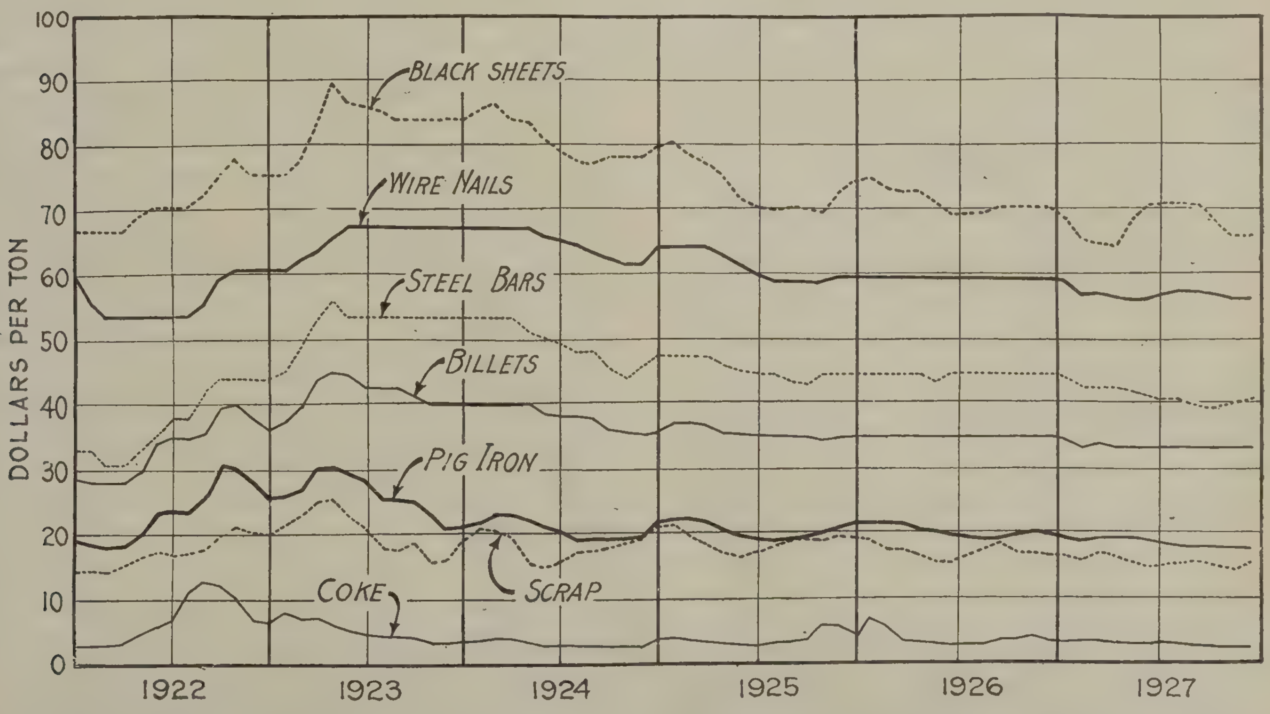


Fig. 3—Finished Steel Prices (in Particular, Sheets, Nails, Plates and Bars) Continue Too Low with Regard to Semi-Finished and Raw Materials. Readjustment of the price structure is not likely to come from further reduction in fuel, pig iron and semi-finished lines

the December average daily pig iron production decreases about 1.6 per cent. As the actual decrease was slightly less than this, the adjusted index shows a fractional gain, being 93.4 per cent of normal against 93.2 per cent the preceding month.

Prices Appear to Have Reached Bottom

THE IRON AGE composite price of pig iron averaged $17.54 in December, which is 6c. lower than the average for November. It is only 82 per cent of the average for the five years 1923-1927. There is, however, good evidence that the decline in pig iron prices has finally been checked. During the last four weeks of December the price remained unchanged, and in the first week of January one of the most notable events in the iron and steel industry was the advance of the average to $17.59.

It is probable that the gradual turn in the production curve, the current rate being considerably below normal, marks a real change in trend, and that further gains will occur. Exactly the same remark applies to pig iron prices.

We think it is to be regretted that the production of pig iron has not been curtailed further, and that it is still a little large in comparison with steel production. The relatively sharp upturn in steel production has, however, reduced the disparity between the two, and another month of expansion in steel, with the pig iron output remaining about steady, would wipe it out entirely. But we can anticipate no real strength in the pig iron market until steel-making requirements do increase relatively to the production of this raw material.

Finished Steel Too Low in Price

MOST notable in the steel price structure continues to be the fact that most kinds of finished steel are too low in price. This is especially true of such products as sheets and nails. Bars and plates, also, are cheap, but the spread over the price of the raw material is not so unsatisfactory as in the more highly finished products.

Coke and pig iron prices seem to be definitely at bottom levels. It is hardly conceivable that they can fall below the recent low points. Billets are but little below their normal price relationship as regards these raw materials, but apparently are well stabilized at existing levels. It seems that we may safely assume that fuel, pig iron and semi-finished steel will not decline further.

But the prices of sheets and nails are also as low as they can be expected to go in comparison with their raw materials. The spread between the two in November and December was about as little as it has been in any recent year. Lower prices for these products seem impossible unless semi-finished steel prices are reduced.

Canadian Steel Company Plans $10,000,000 Expansion; Wants Higher Tariff

TORONTO, ONT., Jan. 17.—The Algoma Steel Corporation, Sault Ste. Marie, Ont., has under consideration a program of plant improvements to cost $10,000,000 to $12,000,000 and has at the same time applied to the Advisory Tariff Board of the Dominion Government for increased tariff protection on three items, alloy steel, spring steel and axle steel for automobiles and structural steel sections above 35 lb. per yd.

J. D. Jones, vice-president of the company, in making this announcement, said:

"We have a definite proposal before the Government that if it will give us adequate protection on these structural sections we shall immediately undertake to extend our facilities and permit our mills to roll sections up to and including 15-in. I-beams and channels, and these facilities will be placed in operation six months after the Government puts its stamp of approval on our appeal.

"This is one of the first and most important steps in the rounding out of manufacturing of the steel commodities which are required by the Dominion, and which involves an expenditure of from $10,000,000 to $12,000,000. This should be very carefully considered on account of the fact that the United States Steel Corporation today has very definite plans for the extension of its facilities at Ojibway, which is adjacent to Windsor, Ont., and that the Steel Corporation contemplates putting in units which will be a duplicate of the units which the Algoma Steel Corporation contemplates installing, but not with the basic pig iron and ingots back of them. This means that the United States Steel Corporation intends to use its blast furnaces and open-hearth furnaces and primary mills of its plants adjacent to the Great Lakes to furnish the raw material for the finishing units that it contemplates installing at Ojibway. This will mean that the adjacent facilities of the mills in the United States, with their large production and low-cost capacity, will be brought into competition with the established basic steel industries of Canada, namely, those at Sault Ste. Marie and Hamilton, Ont., and Sydney, N. S."

The expansion plans of the Algoma Steel Corporation include changes which will make possible the extensive use of the low-grade iron ore to be found in the Algoma district. A power plant development on the Soo River is a part of the building program.

Proposed Youngstown-Inland Merger Still Under Negotiation

YOUNGSTOWN, Jan. 17.—The proposed merger of the Youngstown Sheet & Tube Co. and the Inland Steel Co. is still under negotiation, but according to James A. Campbell, president of the former company, it was nearer a conclusion two weeks ago than it is now. In his latest statement on the matter, Mr. Campbell expresses the opinion that there has been altogether too much publicity about the negotiations and also too much guessing about the probable terms of the transaction. He says that neither he personally nor his company has been buying Inland stock, and he further clarifies the situation by stating that it is not the intention of the Youngstown Sheet & Tube Co. to buy the Inland Steel Co., but simply to bring about a consolidation of the two companies through an exchange of stock, the exchange to be based upon book values rather than the market value of the stock.

Since the two companies are only slightly competitive in products, he believes that a consolidation would be less likely to encounter Governmental opposition than if the two companies were engaged in making virtually the same products. Mr. Campbell also asserts that no other companies are being considered in connection with this merger. It is rather commonly believed in the steel trade here that the Youngstown-Inland consolidation will finally be consummated, it being pointed out that on several occasions in the course of the negotiations obstacles have arisen and have been overcome.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Jan. 26****—General Business Outlook;* ***Feb. 16****—Activity in Steel Consuming Industries;* ***Feb. 23****—Position of Iron and Steel Producers.*

Slight Gain in European Markets

Improvement in France, But Export Business Lags—Cartels a Large Factor—More German Unemployment

(*By Cable*)

LONDON, ENGLAND, Jan. 16.

THE pig iron market is quiet, but domestic demand is expected to increase by the end of the current month. Export is still poor generally, although the Continent has bought some hematite. Foreign ore continues dull.

Finished iron and steel demand is poor except for some moderate sales of small rounds and bars. Plate mills are in need of orders, but there is no substantial demand. Rail mills are fairly well occupied.

December exports of pig iron were 38,116 gross tons, of which 3720 tons went to the United States. Total December exports of iron and steel were 351,795 gross tons. Total exports of iron and steel for 1927 were 4,200,000 tons and imports of iron and steel were 4,400,000 tons.

Tin plate is quiet and prices are inclined toward easiness for forward delivery. Some mills are sold out for first half, but others are less favorably situated. Galvanized sheets are moderately active as a result of orders from Bombay, but other markets are small buyers. Black sheets continue quiet.

Continental iron and steel markets are quiet, but prices are fairly well maintained, as works are well booked with orders. The German Wire Rod Cartel has advanced its price 2s. 6d. (61c.) per ton. German domestic prices of iron and steel are advancing. A South African order for German rails is reported to total 65,000 tons of rails and 35,000 tons of steel sleepers, a total value of £500,000.

GERMAN UNEMPLOYMENT GAINS

Market Continues Active—Mills Expect Efficiency to Offset 8-Hr. Day

BERLIN, GERMANY, Jan. 2.—Producers in the Rhineland are of the opinion that the first few months of this year will show a continuation of the heavy domestic demand for steel that has been so marked during the past year. Later, however, a decline in domestic consumption would not be unexpected. Unemployment is increasing rather rapidly. In the first half of December the total of unemployed advanced to about 1,000,000 from 750,000.

As the year closed the steel market was quiet, following the decision to postpone the effective date of the 8-hr. day law and the consequent removal of the threat of suspension by rolling mills. While suspension was still a possibility consumers hastened to build up stocks as a protection. There has been a sharp decline in business in the building trades, and unemployment in the construction unions has increased from 5 per cent to about 25 per cent in the past two months.

Prices of steel products are unchanged. Mills will endeavor to keep costs at the present level, even with the 8-hr. day, by more efficient operation, but in many quarters an early advance in prices is regarded as a possibility. Following the settlement of a disagreement between the Pig Iron Syndicate and the Roechling interests, which was responsible for reductions in prices of foundry iron a few months ago, the market has advanced 4 to 6m. ($1 to $1.50) per ton.

In the International Steel Cartel the Central European group of producing countries, led by Austria and Czechoslovakia, has expressed a desire to withdraw from membership. This group greatly increased its output in 1927, and heavy penalties for overproduction are expected in 1928. Production by the cartel in the second and third quarters of last year totaled 16,344,515 metric tons, while the combined quotas for that period were 14,643,000 metric tons.

Reparations Deliveries Aid German Foreign Trade

HAMBURG, GERMANY, Jan. 3.—Deliveries by German manufacturers on reparations account are evidently proving of considerable aid in developing foreign markets, according to statements by various companies. These deliveries, which have been made for the most

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.		$4.27	
Bilbao Rubio ore*	1 0½		4.99	
Cleveland No. 1 fdy.	3 7½		16.44	
Cleveland No. 3 fdy.	3 5		15.83	
Cleveland No. 4 fdy.	3 4		15.59	
Cleveland No. 4 forge	3 3½		15.46	
Cleveland basic (nom.)	3 15	to £3 15½s.	18.27	to $18.39
East Coast mixed	3 10½		17.17	
East Coast hematite	3 11		17.29	
Rails, 60 lb. and up	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18	to 0 18¼	4.39	to 4.45
Black sheets, Japanese specifications.	13 5	to 13 10	64.53	to 65.75
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	10 10	to 11 0	2.28	to 2.39
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	10 5	to 10 10	2.23	to 2.28
Galv. sheets, 24 gage	13 0	to 13 5	2.82	to 2.88
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

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*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)				
Belgium	£3 1s.	to £3 2s.	$14.85	to $15.10
France	3 1	to 3 2	14.85	to 15.10
Luxemburg	3 1	to 3 2	14.85	to 15.10
Basic pig iron (nom.):				
Belgium	2 18	to 2 19	14.13	to 14.38
France	2 18	to 2 19	14.13	to 14.38
Luxemburg	2 18	to 2 19	14.13	to 14.38
Coke	0 18		4.39	
Billets:				
Belgium	4 7	to 4 7½	21.19	to 21.31
France	4 7	to 4 7½	21.19	to 21.31
Merchant bars:			C. per Lb.	
Belgium	4 17	to 4 18	1.07	to 1.08
France	4 17	to 4 18	1.07	to 1.08
Luxemburg	4 17	to 4 18	1.07	to 1.08
Joists (beams):				
Belgium	4 8	to 4 10	0.97	to 0.99
France	4 8	to 4 10	0.97	to 0.99
Luxemburg	4 8	to 4 10	0.97	to 0.99
Angles:				
Belgium	4 17½		1.08	
⅛-in. plates:				
Belgium (a)	6 4	to 6 5	1.37	to 1.38
Germany (a)	6 4	to 6 5	1.37	to 1.38
3/16-in. ship plates:				
Belgium	5 19	to 6 0	1.32	to 1.33
Luxemburg	5 19	to 6 0	1.32	to 1.33
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

part to Rumania, Jugoslavia, Greece, Italy, France and Belgium, have provided a good method of advertising German products. As an example, it is pointed out that German typewriters were practically unknown in Italy until a large reparations order was executed. Now Italy is purchasing about one-third of its total imports in Germany.

American typewriters are largely used in Jugoslavia, but recently an order was placed for 2100 German machines to be applied to reparations account. It is said that German locomotives have been introduced into South Africa, Egypt and other countries which have bought elsewhere in the past. German manufacturers of equipment of all kinds are being invited to seek reparations orders, as they generally lead to future purchases that compensate for the initial losses incurred because of delivery on reparations.

GERMAN CARTEL FINE HIGH

Report Shows German Penalty for Over-Production Still $4 a Ton—France Receives Refund

HAMBURG, GERMANY, Jan. 3.—The report of the International Steel Cartel for the second and third quarters of 1927 has been published. Although Germany was promised a reduction of fines for over-production to $1 per ton, provided exports did not exceed 28 per cent of the total German output, the balance sheet of the cartel shows the former fine of $4 per ton.

Over-production figures in this report are: Germany, 1,061,252 metric tons; Belgium, 159,180 metric tons; Luxemburg, 35,749 metric tons, and the Saar, 101,369 metric tons. France was again under its quota by 438,029 tons. The following comparison is based on a payment of $1 for every ton of steel produced, $4 per ton for excess production, and 2 per ton refund for underproduction:

Cartel Member	Production Payments	Fines for Excess	Distribution
Germany	$8,165,246	$4,245,008	$9,023,204
France	4,128,471	........*	6,516,410
Belgium	1,851,680	646,720	2,415,885
Luxemburg	1,251,249	142,996	1,734,797
Saar	947,869	405,476	1,208,361

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*France received a refund for production under the quota of $876,058.

The net loss to Germany, after receiving the funds distributed to members, is equivalent to 1.74m. (43c.) for each ton of steel produced; the loss to Belgium, 0.16m. (4c.) per ton; to the Saar, 0.65m. (16c.) per ton, and to Luxemburg, 1.14m. (28c.) per ton. France received refunds equivalent to 1.32m. (33c.) per ton of steel produced.

Germany Making Agreements to Exchange Coal for Ore

HAMBURG, GERMANY, Jan. 3.—The agreement between the United Steel Works Corporation and the Austrian Alpine Montangesellschaft, under which there is an exchange of German coke and coal for about 60,000 tons of Austrian iron ore a month, is to be further extended. Negotiations have also been started with Sweden for a similar agreement, under which a fixed tonnage of iron ore would be exchanged for coke and coal. Such agreements are also being discussed with French producers.

Germany Divides Turkish Tube Order with France

HAMBURG, GERMANY, Jan. 3.—The German Tube Syndicate has booked an order from the Turkish Government for 12,000 tons of tubes. As a result of an agreement with French mills, the latter will receive 4000 tons of the total order. British competition for this business was keen, and the difference between the British and German bids is reported to have been small.

FRENCH BUSINESS IMPROVES

Export Trade Still Quiet—Reestablishment of Comptoirs May Permit International Agreement

PARIS, FRANCE, Jan. 3.—The business outlook for the next few months is viewed with considerable optimism by most producers of iron and steel. Stocks of consumers have been reduced to a rather low level, and prior to the holidays some important purchasing was being done, which is expected to continue during the first quarter. The financial condition of the country is better, and legal stabilization of the franc is expected before many months. Prices are consequently firmer than for some time.

Foreign trade continues in moderate volume, but prices are showing a slight downward tendency on some products. The export market in rails has been favorably influenced by the recent sales of the European Rail Makers' Association, which has booked about 75,000 tons for Argentina and 60,000 tons for South Africa.

Since the failure of negotiations for the formation of international selling syndicates for semi-finished material and beams, because of lack of organization among French mills, efforts have been made to revive the national agreements on heavy rolled products which existed in 1921. These negotiations have been successful and, according to reports, these reorganized associations will be functioning soon. This is considered a step favorable to the organization of the international syndicates.

Pig Iron.—Domestic business has been good, and the base price of phosphoric foundry iron advanced 5 fr. per ton to 425 fr. on Jan. 1. No change in prices of hematite iron is expected. Exports of pig iron have gained, and foundry iron is firmer at £3 2s. 6d. ($15.22) per ton, f.o.b. Antwerp.

Semi-Finished Material.—Buying has been light, and export prices are nominal. The domestic market is also quiet, with prices showing some softness.

Finished Material.—Buying has been heavier than usual at this season, possibly as a result of the reports that prospects for the formation of selling syndicates are better. Believing that, with such syndicates in existence, minimum base prices might be established at once, buyers are willing to enter into contracts at the present level. Beams are slightly firmer for export at £4 7s. to £4 9s. per ton (0.96c. to 0.97c. per lb.), f.o.b. Antwerp, and small lots are reported to have been closed at as high as £4 10s. per metric ton (0.98c. per lb.). Steel bars are steady and unchanged at £4 17s. to £4 17s. 6d. per ton (1.07c. to 1.08c. per lb.), f.o.b. Antwerp. The light sheet market is improving domestically, but export sheet business is still small.

German Enforcement of 8-Hr. Day Faces Many Obstacles

WASHINGTON, Jan. 17.—While the arbitration decision announced by the German Ministry of Labor in an effort to enforce the 8-hr. working day has not as yet been formally accepted by either steel makers or the workers, there is a general impression that both parties will accept, according to a radiogram received by the Department of Commerce from the commercial attaché at Berlin. It is expected, however, that the period of tension will continue over several weeks.

Meanwhile there has been some localized trouble, notably at the Groebitz plant of the Mitteldeutsche Stahlwerke, in which the workers deserted the mills at the end of an 8-hr. shift. Operators thereupon announced that the plant was to be closed down and along with it the Riesa plant. Under the terms of the arbitration the Sunday holiday in the steel industry is limited to 12 hr. On the other hand, the overtime premium is set at 25 per cent, or double the previous rates. The decision also provided for a general increase of 2 per cent in the wage scale and included provision for compensation for the time lost during 1927 in effecting the shortening of working hours. The most important phase of the situation at this time, the radiogram says, is operating costs.

CARTELS A TRADE FACTOR

This Form of European Competition Needs Careful Watching, Says Dr. Klein

WASHINGTON, Jan. 17.—The extensive character and ramifications of European steel cartels, described as formidable weapons designed to meet the competition of the American steel industry, were explained by Dr. Julius Klein, director of the Bureau of Foreign Commerce, Department of Commerce, when he appeared before a House subcommittee of the Committee of Appropriations. These cartels, said Dr. Klein, were intended to offset the American industry not simply as to uniformity of sales policies, market quotas and prices, but also "with an agreement as to vital factors of more economical production through interchangeability of technical personnel, patent rights, and related matters."

Dr. Klein appeared before the subcommittee to seek appropriations for the bureau for the fiscal year 1929. While the subcommittee in its report made adverse recommendation regarding Dr. Klein's proposal for an increase in the number of commodity trade commissioners, it recommended an increase in appropriation over that proposed by the Bureau of the Budget.

Dr. Klein emphasized the growing European competition and urged the necessity of increasing the specialized staff of the bureau to meet the situation as it exists and as it promises to develop, pointing out that it is becoming greater in intensity. He listed numerous commodities which are "cartelized" in Europe and are conspicuous in the American field of export. He said that steel, of course, is one of the biggest items of American export trade.

So far as the work of the bureau in general is concerned, Dr. Klein said, there are two or three developments which will require "very careful attention."

Stiffening of European Competition

"The first," he declared, "is the unmistakable evidence of a stiffening of European competition, notably in the development of cartels or combinations, of which there are press announcements almost every week. This is one of the outstanding trade factors that we must watch this next year, and I earnestly hope the committee will give it most careful consideration.

"I found, for example, on the Pacific Coast the greatest alarm regarding the steel situation because of the competitive difficulties. Recently there has been a very marked increase in European exports of steel to the Pacific Coast by way of the Panama Canal. The importation of German and Belgian steel has jumped in some cases nearly 100 per cent in the last 12 months to certain points on the coast; and this development is typical, I think, of what we may expect in certain lines of industries affected by these cartels or these international trusts."

Greatest Alarm Over International Cartel

"Not until the cartel became international was it a source of serious alarm to us," said Dr. Klein. "Now what is happening? Europe is much concerned because of this enormous advantage that we have with our great domestic market and this vast possibility for mass production, and consequently it is striving rather blindly toward comparable advantages. That is to say, they want to bring all of the European factories together. In other words, it has now become an international issue over there."

Declaring that most of the continental countries, Germany, Belgium, France, Luxemburg and Czechoslovakia, have joined the steel cartel, Dr. Klein said that England has not yet formally joined the group but there are constant intimations that she will. Other cartels, about 12 of them, have since been organized, Dr. Klein said, among organizations controlling raw steel, rails, tubes, wire, aluminum, copper and enamel ware.

"I do not think it is a thing over which we need be too seriously alarmed; that is to say, it is nothing to justify a panicky reaction," Dr. Klein declared. "As yet, I think the situation can be met by the great advantages that we have in this country; but it is certainly a situation that we will have to watch very closely, and this is my purpose in bringing it up at this time. We have simply got to be informed on the subject immediately, so as to know what is going on within these specialized industries."

Europeans in Drive for Foreign Markets

Another phase of competitive effort that required attention, Dr. Klein said, regards individual governments in Europe which are preparing, "with a seriousness and intensity never manifested until this year for a new drive for foreign markets." Reference was made to different movements in this direction, among them the setting up by the British of the Imperial Marketing Board which is to receive $5,000,000 annually for 10 years for the purpose of developing trade between different parts of the British Empire.

"The British Empire is easily our largest customer," Dr. Klein stated. "If my memory serves me, we sell not less than 44 per cent of our total exports to units of the British Empire, and any move like that is a matter of very considerable interest to us. Incidentally, this $5,000,000 fund is a good deal more than the appropriation of the whole Bureau of Foreign and Domestic Commerce."

He said the commercial rapprochment that is being stimulated among the different units in the British Empire is something to which no exception could be taken. On the contrary, he said, if it helps the prosperity "of our best customer it will obviously help us." Yet he said the situation should be watched carefully. Dr. Klein also dealt with discriminations against American products through tariffs and regulations of different countries. Among other things he said that although the British are very active in Australia and India, where they have advantage in the way of lower tariffs, the United States' share of Australian imports rose from 11 per cent of her total imports just before the war to 22 per cent today.

EXPORT BUSINESS SMALL

Small Lots of Tin Plate Sold to Far East—Japan Inquires for Oil Well Supplies

NEW YORK, Jan. 17.—Export business continues small. There has been some small-lot buying by Cuban consumers, and Japanese merchants have recently been asking for prices on light-gage black sheets and tin plate. A current inquiry from Japan covers a wide range of oil well supplies, including 475 tons of seamless oil well casing and 46,000 ft. of ⅜ to 3-in. gas pipe for the Northern Karafuto Oil Co. The South Manchuria Railway Co. has awarded 100 miles of 100-lb. rails to European mills, but placed about 157 tons of anti-creepers in the United States. The Chosen railroad, recently in the market for rails and accessories, has placed 1676 tons of tie plates and about 46 tons of guard rails with American mills. A small lot of 82-lb. high T-rails for the same railroad is reported to have gone to a Continental mill.

Both Japanese and Chinese merchants have been fairly active purchasers of small lots of tin plate at prices ranging from $5.25 to $5.35 per base box, c.i.f. Japanese or Chinese port. While there has been some inquiry from Japan for light-gage black sheets, the market here is about $77 per ton, c.i.f. Japan, and the British quotation is still $73 to $74 per ton, c.i.f.

New York importers of European steel have been booking only small orders lately. Continental prices are still from 1.68c. to 1.73c. per lb. for Thomas steel bars and 1.58c. to 1.63c. per lb., duty paid, for shapes. There is some small business being done in low-carbon wire rods and hot-rolled hoops.

A bibliography of factory cost accounting and production engineering, compiled by Paul M. Atkins, consulting industrial engineer, Chicago, has been published by the Society of Industrial Engineers, 608 South Dearborn Street, Chicago. Of the 90 pages (6 x 9 in.), 13 are devoted to a general bibliography, 42 to production engineering and 35 to cost accounting. Each of the last two sections of the bibliography is subdivided topically.

British Iron and Steel Output Small in December—Totals for 1927

LONDON, ENGLAND, Jan. 14 (*By Cable*).—December production of both pig iron and steel declined sharply from previous months. Pig iron at 559,100 gross tons was the smallest for the year except January. At 604,900 tons the lowest steel production for any month of 1927 was recorded.

The 1927 pig iron total was 7,293,500 tons and that of steel was 9,099,000 tons. How these compare with previous years is shown in the following table in gross tons:

	Pig Iron Tons	Steel Ingots and Castings Tons
1913—Average monthly.......	855,000	638,600
1920—Average monthly.......	669,500	755,600
1922—Average monthly.......	408,500	490,100
1923—Average monthly.......	620,000	706,800
1924—Average monthly.......	609,900	685,100
1925—Average monthly.......	519,700	616,400
1926—Average monthly.......	203,500	296,700
1927—Average monthly.......	607,800	758,200

Unfilled Orders of Independent Sheet Mills Largest in Eight Years

The formal report of the National Association of Sheet and Tin Plate Manufacturers confirms earlier information that the end of 1927 would see unfilled orders of approximately 750,000 tons. The actual figure as disclosed in the monthly report is 745,393 tons, equal to more than two months' full operation and the largest tonnage the companies reporting have had on their books at one time in almost eight years. Sales in December gained heavily, reaching an aggregate of 530,197 tons, almost 200,000 tons more than in November and almost 300,000 tons more than in October. The excess of sales over shipments in December was approximately the same as the increase in unfilled orders, sales running 308,508 tons over shipments, while the increase in the unfilled orders was 308,087 tons. Never before since the association has been issuing reports has there been such a close relation between the difference between sales and shipments and the change in unfilled orders. The December figures with comparisons follow:

	December	November	October
No. of mills	719	718	719
Capacity per month.....	472,064	485,350	472,500
Per cent reporting......	72.6	72.6	72.6
Sales	530,197	344,519	234,358
Production	260,130	232,041	245,765
Shipments	221,689	224,789	232,626
Unfilled orders..........	745,393	437,306	308,264
Unshipped orders.......	97,630	92,678	95,462
Unsold stocks..........	52,474	52,996	50,518
Percentages to Capacity			
Sales	154.7	97.8	68.4
Production	75.9	65.9	71.7
Shipments	64.7	63.8	67.9
Unfilled orders..........	217.5	124.2	89.9
Unshipped orders.......	28.5	26.3	27.9
Unsold stocks..........	15.3	15.0	14.7

Government Publishes New Book on Trade Associations

WASHINGTON, Jan. 17.—The Bureau of Foreign and Domestic Commerce has issued the second edition of "Trade Association Activities," prepared by Irving S. Paull, J. W. Millard and James S. Taylor. Indicative of the growing cooperation between the Government and business, this compilation was brought about through the efforts of more than 500 officers of trade associations and 50 officials representing 17 Federal departments. There were others also, including those in the legal and other professions. The subject of trade association activity is treated comprehensively in the book's 365 pages. Trade associations throughout the country, their activities, accomplishments, etc., are listed.

In a foreword, Secretary of Commerce Hoover says that the purpose of the new and previous publications is to indicate the successful service of trade associations in public interest.

Bituminous coal mined in the first week of January is reported by the United States Bureau of Mines at 9,803,000 net tons. This is about in accordance with recent weeks, but is 10 per cent below the figures of a year earlier.

Bill to Authorize Educational Orders for War Department Needs

WASHINGTON, Jan. 17.—The shortage in the War Department's reserves of munitions, equipment and raw material which recently was reported to President Coolidge by Secretary Davis has prompted a bill just submitted to Congress by the department. The measure would authorize the Secretary of War to place educational orders for equipment, munitions and accessories with industries of the country to familiarize them with their production and to advance the industrial mobilization program of the War Department. The bill would provide for the placing of these orders with industrial companies regardless of the general requirement that the lowest bid be accepted. The Secretary of War pointed out that the new type of artillery guns and carriages can be manufactured more cheaply by the Government than by private industry, but contended that part of those needed should be made by private companies so that they might acquire knowledge of the methods and requirements and thus be prepared for mass production in the event of an emergency. Secretary Davis also pointed out that rifle ammunition of the present type differs considerably from that used in the World War and yet no private producers have manufactured it.

Battelle Memorial Institute for Industrial Research

Announcement has been made of the organization of the Battelle Memorial Institute at Columbus, Ohio, which has been formed to perpetuate a trust arising from the wills of Col. John Gordon Battelle, his wife and his son, Gordon Battelle.

Colonel Battelle was active in the iron and steel and coal industries, and his son, whose death in 1923 made the estate available, was also an active figure in the iron and steel trade in the Middle West, being a director of the American Rolling Mill Co., and the Inland Steel Co., and other companies.

Under the terms of the will the institute is to be located in Columbus. A tract of about five acres, opposite the campus of the Ohio State University, has been secured and the construction of the first two buildings, to cost about $500,000, will be undertaken in the spring. Dr. Gerald Wendt, dean of the school of chemistry and physics, Pennsylvania State College, has been selected as director and it is planned to begin operations at the institute by the fall of 1928. Otto C. Darst, Columbus, has been designated as the architect.

The first building will stand as a memorial to the Battelle family, and will comprise administrative offices, auditorium, library, museum, machine shop, stock rooms and a number of laboratory suites. The second building, to adjoin the first, will have individual laboratories and an engineering shop, the latter to be provided with balconies and an electric overhead crane.

It is stated that although the main object of the Battelle institute will be industrial research under the fellowship system, similar to that at the Mellon Institute, the income from the funds of the institute itself will be devoted to long-distance industrial research for the benefit of American industry and for scientific research. The board of trustees includes Joseph H. Frantz, Earl C. Derby, Harry M. Runkle and Gerald B. Fenton, all of Columbus. Bishop J. W. Hamilton, formerly president of the American University, Washington, and J. Clare Miller, Ashland, Ky., are also trustees.

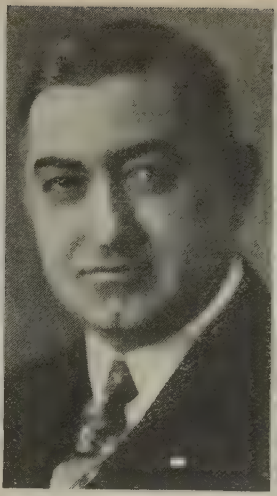
1927 Car Loadings 2.6 Per Cent Under 1926

Complete reports of the car service division of the American Railway Association show that 51,714,302 cars were loaded with revenue freight in 1927. This was a decrease of 2.6 per cent from 1926, but an increase of 0.9 per cent over 1925. For the week ended on Dec. 31, 1927, loadings amounted to 679,600 cars, a decrease of 149,406 cars from the preceding week and 54,681 cars from the corresponding week of 1926.

A. F. COOKE,
Vice-president

J. M. CLEM,
Vice-president

WILLIAM GANSCHOW
Vice-president



S. C. DALBEY
Sec. and Treas.

F. W. SINRAM,
President

Large Gear Interests Merge as Gears & Forgings, Inc.

Ohio Forge Co. Also Included in Consolidation of Van Dorn & Dutton Co., Fawcus Machine Co. and William Ganschow Co.

FORMATION of Gears & Forgings, Inc., as a consolidation of the Van Dorn & Dutton Co., Cleveland; the Fawcus Machine Co., Pittsburgh; the William Ganschow Co., Chicago, and the Ohio Forge Co., Cleveland, has been announced. Preliminary plans for this merger were mentioned in THE IRON AGE of Jan. 5. Inclusion of the Ohio Forge Co. in the new organization enables it to control the manufacture of industrial gears from the raw materials to the finished products, and, as one of the country's largest manufacturers of gears, the new company will be able to realize the advantages of large scale production and geographical location.

The Constituent Companies

The Van Dorn & Dutton Co., founded in 1897, has a plant at Cleveland, and manufactures industrial gears of all types. The company has been particularly active as a maker of gears for machine tools, and has specialized in analyses of machine tool power transmission problems.

The Ganschow company, organized some 50 years ago, was one of the first gear manufacturing companies in Chicago. Beginning as a maker of general industrial gears, it has extended its products to include spur gear and worm gear speed transformers and cut gears of all types and materials. The company has plants at Chicago and Peoria, Ill.

The Fawcus Machine Co. is a maker of large industrial gears, herringbone gears and special machinery. With plants at Pittsburgh and Ford City, Pa., the company now produces, in addition to a wide line of gears, special steel mill equipment, including mills, strip coilers, gear transmissions of from 100 to 15,000 hp., tandem sheet mill drives, and machinery for mechanically operated bridges. It also engages in engineering of heavy mechanical devices for various purposes. It was organized in 1901.

In 25 years the Ohio Forge Co. has expanded from a one-hammer shop to a seven-unit plant equipped with modern forging machinery. Its location adjoins the plant of the Van Dorn company at Cleveland, affording direct control of material in the new organization.

Personnel of New Company

F. W. Sinram, chosen president of Gears & Forgings, Inc., has been president and general manager of the Van Dorn & Dutton Co. for a number of years and has been largely responsible for its expansion and growth. One of the organizers of the American Gear Manufacturers' Association, he was its first president and held that office from 1917 until 1923, when he was elected honorary president for life. He has been active in the work of standardization of gear design, and was prominent in Secretary Hoover's gear standardization program. Mr. Sinram's headquarters will be at the company's general offices on Woodhill Road, Cleveland.

A. F. Cooke, formerly vice-president and general manager of the Fawcus company, who will be first vice-president of the new corporation and manager of the Fawcus Division, has also been active in the American Gear Manufacturers' Association, particularly as chairman of its herringbone committee. As the former president of the William Ganschow Co., William Ganschow, second vice-president of the new company and manager of its Ganschow Division, has spent the greater part of his life in the gear-making business. He served on the first gear standardization committee of the association. J. M. Clem, third vice-president, founder and general manager of the Ohio Forge Co., will serve as manager of the consolidation's Ohio Forge Division. His interest has been largely with the operating divisions of the Ohio Forge Co., while S. C. Dalbey, who has been active in the commercial development of the forge company, will be secretary and treasurer of Gears & Forgings, Inc.

T. E. Leighton, formerly secretary of Van Dorn & Dutton, will be assistant secretary and treasurer of the new company, and C. F. Goedke, recently secretary of the Ganschow organization, will be district sales manager with headquarters in Chicago. The officers, together with H. B. Newell, for many years assistant to Mr. Cooke in the Fawcus company, will constitute the directorate of the new company. Mr. Newell will also be chief engineer.

Compressed Gas Manufacturers to Hold Annual Meeting

The fifteenth annual meeting and dinner of the Compressed Gas Manufacturers' Association will be held at the Hotel Astor, New York, Monday, Jan. 23.

Following an address of welcome by the president, John C. Minor, at 10.30 a. m., three papers are to be presented as follows: "Improving the Physical Properties of Steel by Testing Beyond the Elastic Limit," by Dr. F. C. Langenberg, metallurgist Watertown Arsenal and vice-president Climax Molybdenum Co., New York; "Corrosion," by C. E. MacQuigg, manager Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., and a liquid oxygen demonstration, by G. E. Harcke, Air Reduction Co., New York.

An afternoon session will be devoted to such topics as dry ice and the fire hazards of methyl chloride as a refrigerant, together with an address by Merritt Lum of the McGraw-Hill Publishing Co. on "Sound Industrial Marketing." A business session will follow the afternoon technical session.

The annual dinner is scheduled for 7 p. m. in the north ballroom at the Hotel Astor.

COPPER INDUSTRY IN 1927

Total Stocks Fell Off—Exports Increased but Imports Declined—Domestic Consumption Low

OUTSTANDING features of the copper industry in 1927, according to the United States Bureau of Mines, were a relatively maintained production, a decrease in imports of refined copper, an increase in exports of metallic copper, a decrease in total stocks and a falling off in domestic withdrawals.

Stocks of refined copper available for consumption were 22,000,000 lb. larger at the beginning of 1927 than at the beginning of 1926. The small drop in refined copper output and the decrease in imports of refined copper made less copper available for consumption and, together with the increase in refined copper exported, entirely offset the decrease in domestic withdrawals. Therefore, the increase in stocks of refined copper in 1927 was relatively the same as in 1926, approximately 22,000,000 lb.

The smelter production of copper from domestic ores in 1927, as determined by the Bureau of Mines from reports of the smelters showing actual production for 11 months and estimated production for December, was 1,696,000,000 lb., compared with 1,740,000,000 lb. in 1926. The 1927 production is 2.5 per cent less than that of 1926, but, with the exception of 1926, is the largest peace-time production on record. The estimated smelter production from domestic ores for December, as reported by the smelters, was 145,000,000 lb., which is 4,000,000 lb. higher than the average for the 11 months preceding.

The production of new refined copper from domestic sources, determined in the same manner as smelter production, was about 1,739,000,000 lb., compared with 1,731,000,000 lb. in 1926. In 1927 the production of new refined copper from domestic and foreign sources amounted to about 2,318,000,000 lb., compared with 2,322,485,000 lb. in 1926, a decrease of nearly 4,500,000 lb., or 0.2 per cent. The production of secondary copper by primary refineries decreased from 225,118,000 lb. to about 216,000,000 lb. in 1927, or 9,000,000 lb., so that the total primary and secondary output of copper by the refineries was a little over 0.5 per cent lower in 1927 than in 1926, being about 2,534,000,000 lb., compared with 2,547,603,000 lb.

Imports and Exports

The imports of manufactured copper during the first 11 months of 1927, according to the Bureau of Foreign and Domestic Commerce, amounted to 660,326,768 lb., a monthly rate of 60,000,000 lb., compared with 779,441,803 lb. for the entire year 1926, a monthly rate of 65,000,000 lb. The total imports for 1927 will very likely show a decrease in quantity approximating the monthly average for the year.

The exports of metallic copper during the first 11 months of 1927 amounted to 965,434,212 lb., compared with 960,220,112 lb. exported during the entire year 1926. If the exports of metallic copper in December equaled the monthly average for the first 11 months of the year, nearly 88,000,000 lb., the total for 1927 was about 1,053,000,000 lb., an increase of about 10 per cent over the exports in 1926.

Refineries report that at the end of 1927 approximately 168,000,000 lb. of refined copper would be in stock, an increase from 146,000,000 lb. at the end of 1926. It is estimated that stocks of blister copper at the smelters, in transit to refineries, and at refineries, and materials in process of refining, would be about 380,000,000 lb. on Dec. 31, compared with 455,000,000 lb. at the end of 1926, a decrease of 75,000,000 lb. Therefore, a decrease of 53,000,000 lb. in total smelter and refinery stocks is indicated.

The quantity of new refined copper withdrawn on domestic account during the year was about 1,442,000,000 lb., compared with 1,570,000,000 lb. in 1926, a decrease of 128,000,000 lb., or approximately 8 per cent. However, domestic withdrawals in 1927, with the exception of those in 1926, were larger than those of any other peace-time year.

Fewer Mechanical Stokers Sold in 1927

WASHINGTON, Jan. 16.—Mechanical stokers to the number of 83, with 32,202 hp., were sold in December, according to reports received by the Department of Commerce from 12 establishments, compared with 67 stokers and 16,955 hp., sold in November. The December rating was the highest since August. Of the number sold in December, 29 with 4799 hp., were installed under firetube boilers and 54 with 27,403 hp., under watertube boilers. For the calendar year, 1261 mechanical stokers, with 462,918 hp., were sold, comparing with 1361 with 546,228 hp., sold in 1926.

1927 Construction Costs Slightly Above Previous Year

Construction costs rose slightly during 1927, according to statistics compiled by the Associated General Contractors of America, Washington. The average of these costs at the conclusion of the year was exactly twice as high as the corresponding figure for 1913 and was identical with that of 1921.

Sharp Drop in Locomotive Sales Last Year

Shipments of railroad locomotives are reported by the United States Department of Commerce to have aggregated 1074 units in 1927. This is a reduction from 1926 of 39 per cent, the figure in that year having been 1755. The decline covered all the groups, except steam locomotives for export, which increased from 167 to 171. The sharpest drop was in electric locomotives for export, which fell off one-half, from 59 to 29. Steam locomotives for domestic roads dropped 46 per cent from 1352 to 726, while electric locomotives for American use declined 16 per cent from 177 to 148. Orders on hand at the end of the year were 232, compared with 398 a year earlier and with 780 at the end of March, 1926.

Wholesale Prices Almost Stationary

December averages of commodity prices, as reported by the United States Bureau of Labor Statistics, show 96.8, compared with 96.7 in November, both being referred to the average of 1926 as 100. Both months were lower than in December, 1926, when 97.9 was recorded.

Metals and metal products showed a considerable advance, from 97 in November to 98.4 in December. This was due almost entirely to non-ferrous metals and to automobiles, both of which are shown to have advanced two points or more. Except for an advance of 2.6 points in hides and leather products, all the other main groups of commodities showed only fractional changes, mostly downward. Building materials advanced slightly, while fuels showed a small decline.

Further Reduction in Trackwork

Shipments of trackwork for heavy rails in 1927 were the smallest for several years, according to a report of the American Iron and Steel Institute. The total is given as 140,950 net tons, compared with 178,588 tons in 1926 and 171,394 tons in 1925. A total of 211,662 tons was shipped in 1923. Monthly shipments fell off during the last four months of 1927 to successively lower figures each month than had been recorded within the three-year period. December, with 8263 tons, was the lowest of all.

Class I railroads on Dec. 31 had 464,005 surplus freight cars in good repair and immediately available for service, the Car Service Division of the American Railway Association has announced. This was an increase of 57,311 cars, compared with Dec. 24, when there were 406,694 cars.

Better Marketing Is Steel Need

Consideration Given by Sales Executives to "Profitless" Selling —One Sees Mergers As a Step Toward Stabilization

IN THE IRON AGE *of Jan. 5 appeared a number of contributions from steel selling executives commenting on the difficulties encountered in the marketing of steel at profitable prices. Two other letters on this subject are presented below in which the hope is expressed that mergers in the industry will work toward economic stabilization, and that cooperation along proper lines among steel producers will also prove to be an important factor in educating both sellers and buyers that stable and profitable prices for steel will help to create more prosperous conditions for both. The letters follow:*

Sees Mergers as an Aid to Steel Price Stabilization

"The profitless prices existing in the steel industry today in most cases have been established by some producers who are striving desperately to stay in the running and hoping for a more profitable period in order to recoup their losses, or put up an appearance of capacity operation and seeming prosperity in order to negotiate an advantageous merger with some other company.

"It is to be noticed that this same condition exists not only in the steel industry, but in practically all lines of endeavor—particularly, we refer to the coal industry. The present low prices in the coal industry are dictated by the small and inefficient producer, and the only solution to this problem in the steel, or any other industry, is the consolidation or merging of many of the small producers under one head and to have these merged companies operated economically.

"It is within the ability of all of the steel companies to stabilize steel prices at a profitable level if they will simply recognize the published prices and refuse to accept a buyers' market. This, however, can only be done when the smaller units have been consolidated into larger units and the management of the various large units recognizes that it is futile and hopeless to try to make a profit in the steel business as long as selling prices are lower than the cost of production.

"Present indications show a trend toward steel producers' merging with manufacturers of various types of articles using the steel produced from the integral unit. The main reason for this is to overcome the tendency of buyers to dictate the price they are willing to pay for their raw material; and if present buyers persist in this effort, they will, in a few years, find the steel companies in competition with them rather than a source of supply for them.

"The cutting of steel prices does not create a particle of extra business for the steel industry as a whole, and the greatest amount of buying is never done on a declining market. It is only after the turning point of prices that many of the buyers come into the market in order to secure the best prices they can before there is an increase of any size; and it is generally shortly after this turning point that the industry as a whole enjoys the greatest prosperity, measured in the highest percentage of operation. This increase in operation is generally reflected throughout the country in various other industries by better employment and larger sales of finished material or equipment of various kinds.

"Therefore, if the buyers of steel products in the United States could be educated to the point of being willing to pay at all times a profitable and stable price for steel commodities, the average prosperity of the country would be greater at all times than under existing conditions. This would permit a better general average of employment throughout the country and would tend to increase the faith of the buying public in the future, purchasing not only for immediate needs, but for future requirements.

"It is to be hoped that under the leadership of Charles M. Schwab, the new president of the American Iron and Steel Institute, who is a great advocate of cooperation, the institute will appoint a committee to work out some plan whereby this general scheme of education for stabilizing operating conditions and prices may exist without violating any of the laws of our country."

Says Demand for Capacity Operations Brings Profitless Selling

"It is our opinion that it is not the selling of steel that is wrong so much as the manufacture, and by that I mean that most sales managers are influenced by the attitude of operating officials who insist that they must run to capacity in order to obtain low costs. Obviously this policy followed by all steel producers results in a scramble for the available business and generally drives prices to a point where no profit exists and where all manufacturers are generally on the same footing so far as operations are concerned. I believe it is the feeling of most men handling sales problems in steel that much more intelligent policies could be formulated and followed if the operating demand for capacity operations could be removed.

"The present form of steel contract of course is not a contract at all. It surely has a pernicious effect on the market, as shrewd buyers, when they sense a price advance coming, will cover for their estimated requirements with as many producers as are foolish enough to offer them options, so that advances in price do not affect them, at least for three to six months after higher prices are established.

"No doubt if all forms of rolled steel could be sold in the same manner as pig iron, copper and zinc, much more stable markets would result.

"Concessions granted to large buyers undoubtedly have an undermining influence on price structures and in our opinion should be entirely eliminated.

"The pipe situation is better than most lines in steel, for the simple reason that there are comparatively few producers and those who are in the industry apparently have rare judgment in the handling of their business."

Institute of Metals to Discuss Secondary Metals

Secondary metals will be the topic of a symposium headed by E. R. Darby, Bunting Brass & Bronze Co., Toledo, Ohio, at the annual meeting of the Institute of Metals Division, American Institute of Mining and Metallurgical Engineers, New York, Feb. 20 to 23. H. M. St. John will describe the practices and problems of reclaiming such secondary metals as are used at the plant of the Detroit Lubricator Co.; Don C. Blackmar will consider the economic side of plant handling of waste materials; C. O. Thieme will discuss the contamination of metal scrap, the effect on the value, and suggested means of control, while T. A. Wright will discuss the sampling and evaluation of secondary non-ferrous metals. J. P. Dunlop, of the United States Bureau of Mines, will present statistics on the amount of secondary non-ferrous metals now recovered in this country, showing what a large proportion of the metal used is derived from secondary sources.

Since the reliable information available on these topics is very meager it is expected that the attendance at these sessions will be large and that all present will participate in the discussions so as to increase the general fund of knowledge. The institute urges that all interested in the secondary metal business, whether members of the institute or not, attend these sessions, as the members will be glad to have their cooperation.

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This Issue in Brief

Doubles output of moderate-sized plant by relatively simple, quickly-made changes. Overhead monorail system hung from wooden roof trusses, regrouping of machinery, and institution of four-shift working day enable foundry to modernize without rebuilding. Change from old to new basis was made in two days.—Page 187.

Steel prices are likely to move upward, Dr. Haney indicates. His forecast is based on the fact that unfilled orders have increased sharply, output is subnormal, and steel is cheap in comparison with average price of other commodities.—Page 206.

Over-extension of sales effort is blamed for low profit level. There is enough prosperity to go around, says machinery builder, but metal workers have intensified an already highly competitive situation by unwise extension of sales efforts.—Page 220.

Rockwell hardness test provides a simple means of preventing the mixing of mild carbon seamless tubing with alloy steel tubing for aircraft use. In normalized state, chrome-molybdenum tubing shows a hardness of not less than 90B, while mild steel is below 80B.—Page 202.

"Fairly prosperous" year is expected by majority of members of National Metal Trades Association. More than half the members replying to questionnaire believe business will be "good" in 1928; 7.25 per cent expect "extra good" business, and 34.75 per cent say "fair."—Page 200.

Severe shock caused by guns being fired dead ahead fails to injure sheet steel used in battleships. Steel, non-splintering and enduring, displaces wood and canvas for partitions, desks, bunks, wind sheds, etc., on war vessels.—Page 199.

Sintering will reduce pig iron-making costs, says engineer. All flue dust can be sintered, he declares, at a fraction of the unit cost of equivalent ore, and that the use of 100 per cent sinter in the blast furnace will effect economies not believed possible heretofore.—Page 191.

"Comparative cost" card warns production head when cost of any manufactured part runs above normal. The card shows comparative costs over a period of years, and moves him to investigate before or while the next lot is in production.—Page 196.

Foundry of moderate size finds economical way to dispose of slag. Instead of emptying it into a hole in the floor, a cast iron dump bucket is spotted under the weep hole of the cupola. When the bucket is full, it is pulled to the dump yard, on a monorail conveyor, and emptied after cooling.—Page 190.

Watch European cartels, warns Dr. Klein, asking Congress for larger appropriation for foreign trade work. The enormous advantage the United States has with its great domestic market has instigated the formation of international combinations. All Europe is combining in drive for foreign markets.—Page 211.

Pig iron prices appear to have reached bottom, says Dr. Haney. However, he does not anticipate any real strength until steelmaking requirements increase relatively to iron output.—Page 208.

Producton efficiency increase is reported by majority of National Metal Trades Association members. Two-thirds of those replying to questionnaire say increase is due to plant extensions, new processes, wage incentive plans, etc.—Page 200.

The South is steadily increasing in importance as a market for industrial equipment and supplies. Close proximity of raw materials and consuming markets is a considerable factor in rapid expansion of manufacturing in Southeast.—Page 190.

Unfilled sheet orders attain largest volume in eight years. Independent producers report almost three-quarters of a million tons of orders on hand at beginning of year, equal to two months' full operations.—Page 212.

Will lower automobile prices start another cycle of price-cutting in metal trades supplying motor car builders? If lean profits are not to be further shaved, this is the psychological moment for a move just opposite to that of forcing prices down.—Page 218.

Is "more consolidations" the solution to profitless prices in steel industry? "Yes," says steel sales executive. When some units are eliminated prices will improve, he believes.—Page 215.

A simple way to identify nickel steel. Apply a drop of 50 per cent nitric acid to the steel. Blot it. Then coat the wet spot with di-methyl-glyoxime solution. If nickel is present the spot will turn strawberry pink. If nickel is absent, the spot will be reddish brown.—Page 202.

Smaller plants are cutting costs by making increasing use of material-handling equipment. The mistaken impression is fast disappearing that the use of labor-saving devices in moving materials is only for the larger plants. The flexibility of present-day material-handling equipment enables it to be adapted quickly and cheaply to changing conditions.—Page 219.

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What Price Automobile Trade?

FROM many sources comes the prediction that 1928 will be a big year for automobiles. Mr. Raskob of General Motors even says it will be a 5,000,000-car year. Since not a little of the reaction of 1927 was blamed on Mr. Ford's shutdown, the inference is that general business will be quickened by any prosperity that comes to the motor industry this year.

But a small cloud already appears. Competition among the low-priced cars made by Ford, Chevrolet, Willys and Durant is to be most keen; there have been predictions, indeed, of something like a price war. This reminds those who sell to the automobile companies (steel mills, foundries and parts manufacturers) of other times when price reductions in finished cars meant increased pressure for lower prices on new materials, parts and other supplies. Is history to repeat itself, and 1928 find that the lean profits made by the metal-working industries in 1927 are to be further shaved to maintain motor-car surpluses intact?

Some leaders among the motor car builders are far-seeing enough to know that their industry is more than the big assembly plants; that it includes the organizations which make stampings, forgings and castings, and that the industry generally can not prosper if these essential adjuncts become profitless. Only last week Walter P. Chrysler was quoted by *Automotive Industries* as saying:

"When parts and accessory manufacturers don't get a reasonable profit on the units they sell to car manufacturers, it isn't a good thing for the industry; every branch of the industry should be getting fair returns to preserve a healthy condition for all."

Men who are in the habit of meeting the purchasing agents of the big motor companies will hardly expect to have the prices they receive under their contracts raised without notice. Nevertheless, they will agree with Mr. Chrysler's sentiments and, if their salesmanship has any better basis than the brute argument of a lower price, will see to it that added volume of business gives them added income. In all probability there will be a great demand in 1928 for parts and accessories, and for the bars and sheets to make them. Already this portion of the industry is going strong; some of the stamping plants are running 24 hours a day. With this urge for production, it is clearly not the time for any attempt to force prices down closer to the rock bottom from which they have been so thinly separated all through 1927.

In fact, it is the psychological moment for just the opposite move. Efforts for higher prices are quite likely to be resisted strongly by automobile purchasing departments and there may be strong threats to place the work elsewhere. But often underneath such maneuvering there is the intention to stretch a point to stick to old business friends, because they can be relied upon to produce acceptable materials, worthy of the car they are built into, and with deliveries that can be depended on to meet production schedules. Such service as many parts and materials manufacturers are giving cannot be continued without reasonable profit, and seldom can it be duplicated satisfactorily by a competing firm at a lower price.

Mr. Chrysler is right. We commend his utterance not only to those metal-working companies to which the automotive industry gives such large employment but to those steel manufacturers who sell sheets, bars and other products to the car builders. After all they have done in the past year to secure better selling and better distribution it should not be easy now to start them again on the vicious circle of price-cutting to increase volume, to get costs down, to get more business, and so on in the demoralizing process that in the end profits buyer no more than seller.

Profits from Improvements

EARNINGS of fourteen leading producers of iron and steel represented barely 4½ per cent on investment in the third quarter of 1927, and the fourth quarter returns were probably even less favorable. A condition is indicated that calls for remedies. Much attention has been given to the reduction of costs, but heavy outlays in improvements for that purpose are sometimes ill-advised.

It is so readily taken for granted that improvements will pay for themselves that the chances of their not doing so are frequently overlooked. Whether the outlay be for a plant addition, decreasing production costs or increasing tonnage and thus distributing overhead, or for a new type of mill replacing the current type, the expenditure should be got back within a relatively short period of years, since further improvements in methods or equipment may be developed.

Investment in plant and equipment is justified when additional profit accumulates to pay the cost of the improvement. But in some cases price cuts are based on the decreased cost and legitimate earnings are sacrificed. The computations on which the earning power resulting from the expenditure was based are nullified by the sales policy, and the company is injured by one department's failure to cooperate with another department. Moreover, competitors following a more enlightened policy are deprived of profits to which they are entitled and their ability to finance improvements is curtailed. The net result, unfortunate for the individual producer, may be unfortunate for the trade at large.

Methods of selling the various finished steel products are influenced by a complicated market with intricate details. By no means is it to be inferred in each instance that lower prices are to be attributed to the sellers, sometimes few in number, with recently improved equipment and reduced costs. Producers with older equipment in many cases may be responsible. They may feel more menaced than the lower-cost producers and indulge in more strenuous and unintelligent competition than they would otherwise practice. By so doing, however, they cut off the opportunities they might have for making similar improvements, besides destroying the earning power of the improvements already made.

It is as disadvantageous to the country at large as it is to the industry itself for the steel market to move in such fashion. Improvements may even become burdens if they are forthwith made the basis of new price cuts.

Materials Handling in Smaller Plants

DIMINISHING margins between costs and selling prices have cut heavily into profits in manufacturing in the past three years. As a result, it has been found necessary to cut costs in every available way. This has been accomplished in the main without cutting wages. One of the principal elements in this campaign has been a larger and larger utilization of materials-handling equipment.

Formerly it was considered almost axiomatic that equipment of this character could be installed only by large companies having heavy financial resources. More recently it has come to be realized that this point of view is erroneous. Smaller companies are making great use of labor-saving devices in moving materials from one process to the next, from receiving platform to storage or to process and from the finishing operation into warehouse or to shipping platform. An interesting example is covered in our leading article of this week.

A principal feature of materials handling in its present-day form is the flexibility both of the individual units and of systems. This makes it possible to alter the use to which certain elements are put as soon as changing conditions call for it. One company, which has a large amount of overhead tramrail in use, is reported to be making changes continually as requirements of one department or another call for it. In fact, it is said that there is less than 50 ft. of straight tramrail in any one section in that plant, although several miles of system are used.

Where it is possible to relocate tramrail on short notice and at low expense in this manner, it is obvious that small systems, consisting of one or two or half a dozen short stretches of such overhead track, may be utilized in a smaller plant, and at a cost commensurate with the extent of use. Expansion in plant or in product would be accompanied as a matter of course by increased handling facilities, as required.

Electric lift trucks, together with an assortment of skids to be handled by these trucks or by the tramrail system or both, form another convenient means of utilizing power in place of brawn in a small plant. Initial cost, together with upkeep and operating expense, may be proportioned to the needs and to the quantity of material to be handled. These machines can go where it would not be feasible to put rails except in an extensive system. They can negotiate moderately rough ground outside the buildings, if necessary. In some instances they have been used to carry materials for two or three blocks over city streets. Thus, their flexibility is great and their help to the smaller plant should be correspondingly large.

A Too Costly Navy

A COMPLETE discussion of the naval program recently presented to Congress would require volumes. Much of it will be undertaken in the forthcoming hearings and debates at Washington. It is to be hoped that the next few months will bring the American public into a better acquaintance with the real function of the Navy. The country will have also to decide how much it should spend for a merchant marine, for the two problems of commerce and Navy are closely interlinked.

It is necessary now to consider whether the proposed plans can be harmonized with the public statements of our national officials. It has been said frequently by members of the administration that the United States has not and does not intend to enter upon a naval competition. Yet the 1928 issue of Brassey's *Naval Annual* (a recognized technical authority) says that recently there has arisen "serious competition in the new type of 10,000-ton, 8-in. gun cruisers" capable of developing high speeds. This book gives the following data:

	Nearly Completed	Building	Authorized	Total
Great Britain..	5	8	1	14
United States..	2	6	..	8
Japan	0	6	1	7
France	1	3	1	5
Italy	0	2	..	2

To this table a supplementary item should include the ten 34-knot scout cruisers of the Memphis class, displacing 7500 tons and mounting 6-in. guns, completed about four years ago.

The feeling that the navies are over-reaching themselves in this matter was expressed in the cheers which greeted the announcement made before the House of Commons that the British Admiralty had decided to authorize but one of the three projected cruisers in 1928.

In the face of this situation and sentiment, the general board of our Navy asks Congress to lay down twenty-five more of these ships by 1933, and coolly says it does not intend to indulge in any competition.

Despite the official assurance that this program (including an important number of auxiliary ships) is devised entirely to meet our own needs, and should not lead to competitive building, it is proper to ask whether 250,000 tons of modern cruisers would, in fact, be regarded by the other great powers as a serious threat. One who is acquainted with the proceedings at the Geneva conference to limit auxiliary naval craft (summarized in THE IRON AGE for Sept. 15, 1927) cannot help but conclude that the powers would so regard an overpowering strength in any category.

It should be remembered that the United States representatives proposed at Geneva that the cruiser tonnage be limited to 250,000 tons total, or at most 300,000 tons. They could not agree with the British minimum counter proposal to limit total cruisers of all sizes to 400,000 tons.

Now contrast our Geneva protestations of a desire for 250,000 tons of cruisers with our present project: 18 first-line cruisers already built or building, with a total displacement of 155,000, plus 25 of the 10,000-ton boats in the new Navy proposal. Forty-three cruisers in all with a total tonnage of 405,000. If the present proposals represent our real needs, as the Navy experts keep reiterating, then our needs have grown amazingly in the last seven months, or else there was a blunder in not snapping up the British offer of parity at 400,000 tons made at Geneva. (Of course, the Japanese were strongly opposed to signing any such expansion agreement in a conference to "limit" armaments, but if Japanese sentiment can be disregarded now, it could equally well be disregarded then.)

It is difficult for the layman, even for the naval expert, to arrive at any appraisal of our country's *needs* in the way of a fleet. It should be remembered that the fast 10,000-ton cruisers are exceedingly formidable warships, more pugnacious than the full-fledged battleship of 25 years ago. The term "light cruiser" therefore misrepresents the craft. British experts look upon them as secondary ships for combat purposes, and believe that the eighteen battleships now authorized require twelve to sixteen of the 10,000-ton cruisers to round out their battle fleet. Since we have parity with Great Britain in battleships, and since we have eight first-line cruisers now under way, and ten scout cruisers in commission, our *needs* for combat purposes are fairly well met.

Consequently it may be concluded that the new twenty-five ships are for commerce protection, which task Great Britain relegates to much less aggressive ships weighing about 5000 tons. Whether our trans-oceanic shipping is extensive and important enough to warrant a cruiser-building program costing us $400,000,000 in initial outlay (and even more to the other nations in their efforts to keep up), and arousing in addition the suspicions of the maritime powers, is a question worthy of careful thought.

Furthermore, protection against what? Just now we do not fear Great Britain, and "for the rest, Anglo-American friendship *must* be maintained."

Guidance for Business

NEVER were so many facts and so much advice put before American business men on the course of industry and trade as they have been considering in the past few weeks. And never were leaders in industry more put to it for satisfying answers to their questionings of the new year. What Col. Frank A. Scott says in this paragraph from his contribution to THE IRON AGE of Jan. 5 was written for the machine tool trade, but may well be pondered on by leaders in every department of iron and steel manufacture, and in all the industries which have iron and steel for their raw materials:

> There has been enough prosperity to go around most years since the war, but American metal workers have seemed oblivious of this. From the steel makers right through to the small fry they have intensified an already highly competitive situation by over-extension of sales efforts. This cannot continue. Industry can advance only when it is profitable. There is an opportunity here in the American metal-working field for business leadership of a high type. Schooling is needed in the development and maintenance of a code of business ethics which shall include serving the trade well, while maintaining a price level sufficiently high to sustain normal development and yield a profit.

The Road That Taps Katanga

AN important event of Nov. 27 was the completion of the Benguela Railway to the Angola-Belgian Congo border in Africa. The Belgian Congo Government is now rushing its own part of the line, about 460 miles in length, which will link the Benguela Railway with the line that runs eastward to Beira. When this has been done there will be an east-west transcontinental line, about 2600 miles in length across the southern half of Africa; and since it passes right through the great copper ore region of Katanga, the metal thereof will have to be carried only about 1250 miles by rail and 4900 miles by sea, instead of 1350 miles by rail and 8000 miles by sea as heretofore.

This is an event reminiscent of the uniting of our own Pacific railroads, which were connected about 60 years ago, and for which the inspiration was likewise the opening of mining regions. Ever since Jason and his Argonauts went in search of the Golden Fleece, which we believe to have meant placer mines, the metals, precious and base, have always been the incentive to great pioneering.

Robert Williams conceived the Benguela Railway twenty-five years ago. Until three or four years ago he had to struggle for the money with which to build it. Then it became appreciated that Katanga was one of the greatest copper regions ever discovered and that its exploitation was being retarded not only by the roundabout and costly transportation for its service, but also by the physical incapacity of all available lines to carry the tonnage that it offered. So at length the new line was vigorously adopted and consummated. It will greatly cheapen Katanga copper and will swell the world's supply.

That is not altogether welcome to American copper producing interests, but they are sufficiently sporting to view the success of other fellows with good grace. The Katanga mines are controlled in Belgium and have done much to rehabilitate that chivalrous little country, where they are regarded as something akin to holy. In consequence, brokers who have suggested that they might be sold at a fine figure to some American colossus have been regularly given the cold shoulder.

Metricists Bearding the Lion

GREAT BRITAIN apparently is going through the throes of agitation in favor of compulsory use of the metric system, just as is the United States. At a recent meeting of the "Decimal Association" in London it was pointed out that the use of metric weights and measures was made lawful for general trade in Great Britain 30 years ago. But "the trading community as a whole have not manifested any eagerness to take advantage of this permissive legislation," to quote from one report read at the meeting.

As in the United States, the metric system has not appealed in Great Britain to those who make largest use of weights and measures in carrying on exacting work. It has been permissible in the United States much longer than in Great Britain; but here, too, it has failed to make headway. It simply does not fill the needs in general of manufacturers of most products. If it did, it would long ago have been adopted as standard.

Proponents argue that it is essential in developing foreign trade. That this assumption is false is shown by the fact that Great Britain and the United States, the two great exporting countries of the world, have built up their enormous overseas commerce without the use of the metric system. Together they control one-third (42 per cent, if the British Dominions be included) of all the external trade of the three-score or more of countries participating in foreign trade. This proportion is not diminishing, in spite of the dire predictions of the metricists. Neither is it likely to do so.

Road-Building Developments Create New Uses for Steel

Exhibit of Equipment at Cleveland Emphasizes the Growing Demands of Builders Upon Steel Makers and Other Metalworking Manufacturers

THE prominence that the building of road-making machinery has attained, the growing demands of builders of this equipment upon steel makers and other manufacturers in the metalworking field, the large number of metalworking industries that supply parts or equipment for road building and the building of road-making equipment and the increased use of iron and steel, including new uses in the road building industry, were some of the impressions gained by a visit at the exposition held in connection with the twenty-fifth annual convention of the American Road Builders' Association held at the Public Hall, Cleveland, last week. The exhibit, for years conspicuous for its size, was larger than ever before. The machinery and other equipment displayed amounted to 300 carloads.

Conveying and handling equipment including cranes of many types, conveyors, hoists, elevators, tractors, industrial locomotives, trucks, trailers, steam shovels, buckets and winches were shown in a large number of exhibits. Other manufacturers showed concrete mixers, excavators, crushers, graters and other special machinery used in road building.

The tendency among builders of road making machinery, as indicated by the exhibit, is to improve their labor-saving machines by improved design and construction and the use of better materials to withstand hard service. Many of the machines were equipped with high friction bearings, the use of which has spread rapidly in this field and several makers of roller bearings had exhibits.

The wide scope of the exhibits gave some indication of the number of metalworking industries that share in the benefits of road-building activities. The products of these industries included axles, stampings, truck bodies, bins, chipping hammers, air compressors, pneumatic and electric drills, motors, engines of various types, forgings, gears, pumps, screens, manganese and alloy steel castings and reinforcing steel wire mesh. Steel castings were exhibited by a number of foundries.

New uses for steel and possibilities for greater uses in certain fields were shown in some of the exhibits and quite a few indicated that manufacturers of some general lines, such as stamping, are turning their attention to specialties. A number of exhibits of pressed steel road, curb and sidewalk forms and other forms used in concrete construction indicate that considerable steel is being used in that particular field. Another exhibit was a steel paving guard to protect the edges of paving. Galvanized culverts and perforated steel drain pipe were shown by several manufacturers and centrifugally cast culvert pipe was exhibited by the American Casting Co., Birmingham. Stamped steel liner plates to take the place of timbering in tunnel construction were shown by the Commercial Shearing & Stamping Co., Youngstown. A snow fence with boards of galvanized sheets attached to pressed steel supports is a new product to replace the wood fence that has long been used for this purpose. This was shown by the Northfield Iron Co., Northfield, Minn. One manufacturer showed a track for use particularly by contractors on short sections of muddy roads that would otherwise be impassable for trucks. This is made of heavy gage curved troughs providing traction for wheels, the troughs being held in parallel position by corrugated struts. It is built in 10-ft. sections for easy handling and raising.

Metal wheels of numerous types were shown and some of these types indicated a broadening of the field for these wheels as a substitute for wood wheels. Manufacturers report considerable increase in the demand for steel wheels with rubber tires for use on threshers and other portable machines that are hauled on concrete roads. Among the numerous exhibits of steel wheels by French & Hecht, Davenport, Iowa, was a new rubber-tired wheelbarrow wheel.

Cable guard rail for protecting the dangerous points in highways is now affording considerable outlet for steel, not only for the cable but also for the supporting members. A guard rail having supports of malleable castings constructed with springs and equalizers to afford resiliency in order to absorb the forces of severe impact was exhibited. The Cleveland Hardware Co., Cleveland, showed a line of anchor rods, cable I bolts and other drop forge parts that it has brought out for use in erecting cable guard rails. Another new drop forge product exhibited by this company is an open eye snap for use in attaching tire chains to truck wheels.

Iron and Steel Markets

Better Balanced Steel Market

With Increasing Demands from Automobile Industry and Heavier Requirements in Other Consuming Lines, Steel Output Continues to Broaden—Prices Firmer

FINISHED steel requirements are not only growing in volume, but are becoming better balanced. Avenues of consumption that only recently were taking relatively small tonnages of steel are making heavier drafts on mill production.

The outstanding example is the automobile industry with its steadily mounting demands. Railroad buying is also a major market factor, with a continuance of rail contracting and the promise of additional large purchases of cars and locomotives. In tin plate, increased specifications for March and April shipment have brought output up to 75 per cent of mill capacity.

While demand for tubular products continues to lag, the oil industry is taking more well pipe and two large line pipe inquiries, one of them for 14,000 tons, have appeared in southern California. Oil storage tanks, particularly for western Texas, call for a steady flow of plate tonnage. Meanwhile better farmer buying is reflected in the high output of implement plants, and a sustained volume of construction work is indicated.

Steel output continues to gain, although at a retarded rate. At Chicago, a leading center for railroad buying, two steel works blast furnaces have gone in, making a total of five blown in since Jan. 1, and ingot output has reached 80 per cent of capacity. At Pittsburgh the Carnegie Steel Co. has lighted a furnace and is preparing to blow in another. In the Youngstown district, however, a recession in new orders and specifications has delayed further increases in production. The operations of Steel Corporation plants are estimated at 78 per cent, as against 75 per cent a week ago.

Steel specifications from the motor car industry, in the case of some mills, are almost double the releases of last month. Bars, sheets, strip steel, alloy steel bars and bolts and nuts have all been affected by the increasing requirements of automotive plants. With a large supply of cars needed to stock dealers with new models, heavy automobile production seems assured for the first quarter at least. Current output is estimated at 20 to 25 per cent above January, last year, when 238,926 cars and trucks were manufactured. Automobile parts plants are operating at full capacity, and a Cleveland drop forge company has placed an order for 3500 tons of alloy steel bars. The gain in automobile output has brought the index of employment in Detroit to the highest point since the summer of 1926.

Fresh business in steel from other sources, although in reduced volume following heavy specifying in December, exceeds expectations. A fair volume of small-lot orders for bars, plates and shapes is coming from buyers who underestimated their needs or, in adhering to a hand-to-mouth buying policy, failed to take advantage of lower prices.

Prices generally are well maintained, and in some lines are stronger. Makers of cold-rolled strip have announced an advance of $3 a ton, and, following the stiffening of prices on plate mill sizes of wide strip, the plate market is more firmly established at 1.80c., Pittsburgh. Stronger prices on hot and cold-rolled strip will mainly affect second quarter business, since most mills are well booked for the current quarter. Similarly, an effort to advance plates, shapes and bars, now regarded as an early possibility, would have comparatively little effect on invoiced prices until next quarter.

For recent railroad car orders 15,000 tons of plates has been scheduled at Chicago mills. While the week's car buying was confined to a few hundred cars, an inquiry for 2000 refrigerator cars from the Pacific Fruit Express is expected to be the forerunner of another bulge in equipment buying. The Illinois Central's expected inquiry may call for 4000 cars.

Rail orders totaled about 25,000 tons at Chicago, of which 15,000 tons was for the Pere Marquette, while at Cleveland the Nickel Plate ordered 11,500 tons. Additional rail inquiry now definitely before Chicago mills from Western roads amounts to 75,000 tons.

Chicago and Cleveland have led in pig iron sales, and the total of first quarter buying at Chicago in December and so far this month has exceeded 300,000 tons, while at Cleveland 25,000 tons has been added to recent heavy purchases. Ohio and Michigan foundries producing automobile castings are increasing their melt, and furnaces which serve them expect to reduce their stock piles, as they probably will ship more iron this month than they make. New York iron sales were 10,000 tons, and at Philadelphia buying has been increased to take advantage of quotations made before the 50c. price advance on foundry grades, now effective.

Structural steel lettings at Chicago totaled 13,000 tons. At Cleveland 20,000 tons is required for three buildings for the Cleveland Union Terminals Co., bringing the total of pending fabricated steel work to more than 41,000 tons.

Fabricated structural steel bookings of 205,165 tons in December brought the year's total to 2,750,700 tons, or 72 per cent of capacity. This exceeded 1926 by nearly 8 per cent and, except for 1925, is the highest total on record.

Greater strength in foundry iron in eastern Pennsylvania has advancd THE IRON AGE pig iron composite price to $17.67, from $17.59 last week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jan. 17, 1928	Jan. 10, 1928	Dec. 20, 1927	Jan. 18, 1927
No. 2, fdy., Philadelphia	**$20.26**	$19.76	$19.76	$22.26
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	21.00
Basic, del'd eastern Pa	19.50	19.50	19.50	21.50
Basic, Valley furnace	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	21.00
Malleable, Valley	17.25	17.25	17.50	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh	42.00	42.00	40.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh	1.80	1.80	1.80	2.00
Steel bars, Chicago	1.90	1.90	1.90	2.10
Steel bars, New York	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh	1.80	1.80	1.80	1.90
Tank plates, Chicago	1.90	1.90	1.90	2.10
Tank plates, New York	2.12½	2.12½	2.12½	2.24
Beams, Pittsburgh	1.80	1.80	1.80	2.00
Beams, Chicago	1.90	1.90	1.90	2.10
Beams, New York	2.09½	2.09½	2.09½	2.34
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan. 17, 1928 Cents	Jan. 10, 1928 Cents	Dec. 20, 1927 Cents	Jan. 18, 1927 Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.80	2.90
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	2.90	3.10
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.75
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.70	3.95
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.15	2.40
Wire nails, Pittsburgh	2.55	2.55	2.50	2.65
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.25	3.25	3.20	3.35
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$15.00*	15.25	15.00	16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	15.50
Heavy melting steel, Ch'go	12.50	12.50	12.25	13.25
Carwheels, Chicago	14.00	14.00	13.50	15.50
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.00	16.50
No. 1 RR. wrot, Phila	15.25	15.25	15.25	17.00
No. 1 RR. wrot. Ch'go (net)	*11.00*	11.50	10.50	12.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$3.50
Foundry coke, prompt	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.25	13.50
Electrolytic copper, refinery	13.87½	13.87½	13.75	13.12½
Zinc, St. Louis	*5.62½*	5.65	5.67½	6.52½
Zinc, New York	*5.97½*	6.00	6.02½	6.87½
Lead, St. Louis	6.30	6.30	6.30	7.45
Lead, New York	6.50	6.50	6.50	7.65
Tin (Straits), New York.	*54.25*	56.12½	58.12½	66.50
Antimony (Asiatic), N. Y.	*11.00*	11.25	11.25	15.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Automobile Industry Specifying Steel Freely—Price Tendency Firmer

PITTSBURGH, Jan. 17.—There is active specifying of steel by the motor car industry and some manufacturers serving that industry find this month has almost doubled the tonnage releases of last month. Otherwise the steel market is in one of those digestive periods that almost invariably follow heavy specifications and are attended by heavier shipments than new orders. In bars, plates, shapes, sheet and wire nails, the market is quieter than it has been though there has been some acceleration of shipments from the mills directly into consumption. The situation also is somewhat irregular as to steel works and rolling mill operations. While the larger units have succeeded in getting ingot production up to about 75 per cent of capacity, the smaller companies still lack sufficient business to furnish a 65 per cent operation.

If there is a definite tendency to prices, it is higher. Sheet makers have succeeded in getting full quotations on small lots of the ordinary finishes and some satisfaction is taken from the fact that on a recent railroad inquiry for black sheets the price named by 12 of the 13 mills which quoted was 2.90c., base, Pittsburgh. Following the recent revision of hot rolled strip prices, cold rolled strip makers have announced a minimum price of 2.90c. on lots of three tons and over and 3.15c. on less than three tons. Incidentally, the adoption of prices on wide strips, based on plates at 1.80c., has done much to clarify the price situation in the latter product. Wide strip makers seeking business in plate mill sizes and gages usually encountered 1.75c., base, on plates, the price that consumers still are enjoying on tonnages specified prior to the end of last month, and to get orders it was necessary to meet or go below that price.

It would not be surprising if in the effort to correct what is commonly said to be an unfavorable price situation, manufacturers with an eye to second quarter business would soon stiffen up on plates, shapes and bars. The recent strengthening in strip prices is largely for its effect upon second quarter tonnages. It is pretty generally conceded that order books in sheets are too heavy for higher prices to become effective in this quarter and the situation is not greatly different in wire nails. Higher prices are asked on reinforcing bars.

Motor car builders continue to exert considerable pressure against steel prices in the effort to maintain profits in the face of lower prices for the cars, but there is no evidence of success in that direction.

The Carnegie Steel Co. recently lighted one of its Carrie furnaces and is said to be getting ready to start another of that group. These furnaces serve the Homestead Works, which lately has had a considerable increase in mill operations. In the Youngstown district an independent steel works furnace was scheduled to start this week, but lighter orders brought a postponement.

There is little activity in the pig iron market. Scrap prices are yielding under the lack of consumer interest in supplies and freer offerings, which encourage dealers to defer covering against short sales. Slack coal is firm in price, but the coal and coke market as a whole still labors under an excessive supply.

Pig Iron.—A Grove City, Pa., consumer recently closed for about 1500 tons of foundry iron, most of which was of special analysis for engine cylinders. In the sale was 500 tons of No. 1 foundry, which was sold at $18.25, with the sale based at Sharpsville, Pa., having a freight rate to destination of $1.39, compared with $1.64 from other Valley points. This is the only recent sale of importance, other transactions in foundry iron running to single carloads. Only small sales of Bessemer and malleable iron are noted and interest in basic iron is very low. Some talk is heard of an advance in prices, but the market this week gives no real evidence of such a development.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—A good movement of the commonly used ferroalloys is noted on contracts in keeping with the larger consumption incident to heavier steel works operations. Producers have yet to benefit from the December advance of $10 a ton in ferromanganese, as much of the material now moving to consumers is against December specifications on old contracts or sales made for December shipment at about the time the advance was made. A few consumers have not yet contracted for tonnages for first half of 1928 shipment.

Semi-Finished Steel.—The decline in sheet bars reported from Cleveland has not extended to this or the Youngstown district, where producers still are quoting $34. At Youngstown a fairly large movement at that price is reported. Pittsburgh no longer is much of a market for sheet bars, as the few mills that buy them are covered by requirement contracts with regular sources of supply and their buying is no longer subject to open competition. The tonnage here is greater in billets and slabs and no sales are noted at under $33, base. Wire rods are priced at $42, base Pittsburgh or Cleveland, but only a few small sales are being made at that price, as most users are covered for this quarter at a lower figure.

Rails and Track Supplies.—The Nickel Plate road is in the market for 3000 to 4000 tons of spikes and tie plates. Generally, the demand for track supplies is of moderate proportions, but producers have fair-sized orders for shipment later with the starting of rail laying. The local standard-section rail mill is running well and has sufficient business to carry it well through the spring months. Light section ralis are slow. Prices are firm.

Wire Products.—Manufacturers are well satisfied with the price situation, for while they are yet to profit much by the higher schedule on nails, at least they are encountering no deviations from that schedule. Shipments of nails are heavy, with distributers still getting the benefit of the old price and the old card of extras, since the current movement is largely on specifications on old contracts.

Tubular Goods.—The volume of pipe business does not vary much, but some makers note a slightly improved demand for oil country pipe, especially from California. Oil statistics are favorable on the score of production, but unfavorable in the amount above the ground. Standard-weight pipe will do better as building and construction activities increase. Boiler tubes still are slow but some improvement is reported in mechanical tubing as automobile builders increase production.

Sheets.—Continued gain in the orders from automobile and automobile body builders is the bright spot in the situation. Strictly new business is moderate, because so many consumers are already covered against their requirements for this quarter and generally at lower prices than now are asked. Prices show the firmer tendency that usually accompanies full order books, although it is not possible yet to quote a single price on each grade. Some business in black sheets is being taken at 2.90c., base, Pittsburgh, and that price was quoted by 12 of the 13 mills that entered prices against the New York Central inquiry. The American Sheet & Tin Plate Co., last week operated 72 per cent of its sheet mills and independent companies at approximately 90 per cent.

Tin Plate.—Tin plate mill operations still are on the increase in keeping with the fact that specifications for March and April shipments are fairly heavy. This branch of the industry now has at least 75 per cent of capacity engaged. Prices are firm.

Cold-Finished Steel Bars and Shafting.—As there were heavy specifications last month for shipment in January it was expected this month would see a substantial lessening in orders, but the more common experience of makers here is that orders and releases are not materially smaller than in December. Prices are firmly maintained. The leading maker of turned and ground shafting has announced an advance of $2 a ton effective Jan. 16, and now is quoting carloads, f.o.b. mill, 1 3/16-in. to 1½-in., 2.90c., base; 1 9/16-in. to 1⅞-in., 2.75c.; 1 15/16-in. to 2⅞-in., 2.60c., and 2 15/16-in. to 7-in., 2.45c., the prices being subject to the standard card of extras dated Dec. 24, 1927. This calls for an extra of 10c. per 100 lb. for shipments of less than carload lots and for quantity extras for lots of 4000 lb. and has obviated the necessity of the former charge of 25c. per 100 lb. for less than carload lots.

Bolts, Nuts and Rivets.—The movement of bolts and nuts has shown measurable improvement this month over December, but the same betterment has not occurred in rivets. Prices are firm.

Bars, Plates and Shapes.—New releases and specifications have been lighter in the past week, but this is regarded merely as the result of the fact that consumers have been getting heavy shipments against orders given last month. The plate market appears firmer

THE IRON AGE Composite Prices

Finished Steel

Jan. 17, 1928, 2.314c. a Lb.

One week ago	2.314c.
One month ago	2.314c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 17, 1928, $17.67 a Gross Ton

One week ago	$17.59
One month ago	17.54
One year ago	19.39
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
Del'd Philadelphia	2.12c.
Del'd New York	2.14c.
Del'd Cleveland	1.99c.
F.o.b. Cleveland	1.80c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c.
F.o.b. Birmingham	2.00c. to 2.10c.

Rail Steel

F.o.b. mills east of Chicago district	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.80c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.05c.
F.o.b. Coatesville	1.95c.
F.o.b. Sparrows Point	1.95c.
F.o.b. Buffalo	1.90c.
Del'd New York	2.12½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.95c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	2.08c.
Del'd New York	2.09½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
All gages, wider than 2 in., to 6 in., P'gh,	2.00c. to 2.10c.
*All gages, 6 in. and wider, P'gh	1.80c. to 1.90c.
All gages, narrower than 6 in., Chicago	2.40c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.40c.

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*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.35c. to 2.80c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.20c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.24c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.47c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.99c. to 3.09c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.40	25-lb. coating I.C.	$17.30
15-lb. coating I.C.	14.45	30-lb. coating I.C.	18.75
20-lb. coating I.C.	15.80	40-lb. coating I.C.	20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per 100 Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.05 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.05 to 3.10
Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	$2.75 to 2.80
Spikes, boat and barge	3.10
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

since the recent announcement of wide strip makers of an observance of 1.80c., base, on the plate mill sizes of wide strips. Structural lettings have not yet reached proportions that mean heavy drafts upon the mills for plain material. Reinforcing bars are held for higher prices and only regular mill distributers now are able to get supplies at less than 1.90c., base.

Old Material.—The market still shows a tendency to soften, as there is no consumer interest and the only demand is from dealers who have short orders to cover. They are not being pressed for shipment and have cut their bids. The steel mills, with greater operations than a month or so ago, are producing more scrap and a good deal of compressed and bundled sheet scrap is being offered. For heavy melting steel, mills are not allowing more than $15 on overshipments and few dealers will go higher to cover short sales. The leading consumer of machine shop turnings in this district is offering only $10, but there is no evidence that sales have been made at less than $11. Heavy breakable cast scrap, which sold recently at $14, delivered Wheeling, cannot be sold at more than $13.75 now and one user still offers only $13. Dealers short of heavy axle turnings are offering up to $14, but that is more than consumers will pay.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.00 to $15.25
Scrap rails	14.50 to 14.75
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.75
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	17.00 to 17.25
Railroad coil and leaf springs	17.00 to 17.25
Rolled steel wheels	17.00 to 17.25
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.50 to 12.00
Cast iron borings	11.50 to 12.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	15.00 to 15.25
Industrial	14.50 to 14.75
Agricultural	14.00 to 14.25

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Hot-Rolled Flats.—Specifications from the automotive industry are extremely heavy. Good as was the start of last year, this year is better, and it is not uncommon to find makers whose order books this month are double those of December. Most mills now are on a basis of 2.10c., base, for strips narrower than 6 in., and 1.90c., base, for 6 in. to 12 in. For very narrow stock the range is from 2.10c. to 2.30c.

Cold-Rolled Strips.—Mills are well committed against probable production for this quarter and are getting such heavy specifications that in some cases deliveries are not made as promptly as was the case recently. An announcement of a minimum price of 3.15c., base, or 2.90c. on three tons or more, is a sign of dissatisfaction with present prices.

Coke and Coal.—So much of the demand for coal is in run of mine grade that the supply of slack coal is pretty scant and producers are able to sell it at better prices than have lately prevailed. But the coal market as a whole shows no improvement either in prices or demand and it is frequently necessary for companies that are keeping mines in operation to sell accumulations at sacrifice prices. The beehive oven coke market also is dull and depressed. Producers without regular consuming connections find it very difficult to dispose of their outputs except at lower prices than they would name against an inquiry.

Spang, Chalfant & Co., Standard Seamless Tube Co., Oil Well Supply Co. Merge

PITTSBURGH, Jan. 16.—A merger that has long been rumored was consummated today when Spang, Chalfant & Co., Inc., one of the oldest manufacturers of welded pipe in the country, and the Standard Seamless Tube Co., one of the leading seamless pipe manufacturing companies, were consolidated under the name of Spang, Chalfant & Co. As part of the transaction the new company has acquired an interest in the Oil Well Supply Co. and obtains a voice in the management of a company maintaining 90 distributing branches in the oil producing districts in this country and abroad.

There were reports as long ago as the middle of last year that a merger of these two pipe companies was under negotiation, but verification was lacking. In view of the strong drift toward seamless pipe to replace welded pipe, it had been expected that Spang, Chalfant & Co. would eventually follow other welded pipe manufacturers in installing seamless pipe making capacity. The merger provides this capacity and incidentally obviates an addition to the total seamless pipe producing units, which in some quarters are believed to be numerous enough already.

Spang, Chalfant & Co., Inc., which this year observes the hundredth anniversary of its founding, operates the old Etna Iron & Tube Works, Etna, Pa., just outside the Pittsburgh city limits to the north, which was established in 1828. Besides four trains of 16-in. and 12-in. skelp mills, which have not been operated in recent years, the plant contains three buttwelding and four lapwelding furnaces, with an estimated annual capacity of 300,000 tons of sizes ranging from ⅛ in. to 24 in.

The Standard Seamless Tube Co. has a plant at Ambridge, Pa., containing two complete seamless pipe units, which are estimated to be capable of producing 300,000 tons of pipe from 1 in. to 14 in. in diameter annually. This company, which originally produced seamless steel boiler tubes, has in recent years specialized in oil country pipe.

Sharon Steel Hoop Co. to Issue $7,000,000 Bonds

The Sharon Steel Hoop Co., of which Severn P. Ker is president, is negotiating a bond issue of $7,000,000 to refund existing obligations and provide working capital for extensions. Ground has been broken for a new cold rolled strip mill, while work has started on an enlargement of the company's pickling plants.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.15 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.30

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	135.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Ingot Rate at 80 Per Cent—Steel Orders Show Increase

CHICAGO, Jan. 17.—The Steel Corporation has blown in two blast furnaces, one at Gary and one at South Works. These bring the number of stacks lighted since the first of the year to five and make the total count of active steel mill furnaces 26 out of 36. Further evidence of improvement in this market is given by the fact that ingot output has reached 80 per cent of capacity. Producers point to fresh sales that are 40 per cent above the average week in 1927 and new specifications that are 66 per cent heavier as indications that the rate of ingot production will be well maintained if not bettered in the immediate future.

Soft steel bar output at 85 per cent of capacity leads other heavy tonnage finished steel products, though structural material does not lag far behind. Unusual activity in building projects, noted a week ago, is undiminished. Notable among new developments is the announcement that a 42-story home will be erected for the Chicago Civic Opera. Rail purchases totaled over 25,000 tons, of which 15,000 tons was ordered by the Pere Marquette. The Rock Island will buy 50,000 tons. Fresh car inquiry includes 2000 refrigerator cars, 500 automobile and 500 hopper car bodies. The budget of the Chicago, Rock Island & Pacific provides $6,500,000 for new equipment and the number of cars that may be purchased by the Illinois Central is now placed at 4000.

Pig Iron.—First quarter buying in December and the first half of January has exceeded 300,000 tons. This movement is well sustained and interest in second quarter requirements is on the increase. Of special interest is the greater activity both in contracting by and in shipments to the malleable foundries. The Mayville furnace, well supplied with a large stock of iron on the ground, was blown out Tuesday, leaving two Federal, two Iroquois and the Zenith furnace the only active merchant stacks in this district. Scattered sales of charcoal iron are being made at $24, furnaces, and less is heard of cuts in prices for purposes of liquidating stocks. Foundry iron prices are strong at $18.50, f.o.b. local furnace. Producers have oversold output at present rate, but furnace stocks are large and so will forestall blowing in additional stacks in the immediate future.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Buying of these commodities is quiet and prices are steady. Specifications are of good size and in some instances shipping schedules have been exceeded.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Specifications for steel from car builders are now beginning to take a prominent place in this market. In the week 15,000 tons have been scheduled for rolling and inquiries as to deliveries indicate that heavier requirements will be needed at an early date. The railroad equipment market from the viewpoint of large inquiries and purchases is dull, current business being confined to miscellaneous small lots from widely scattered sources. About 2000 tons of plates will be required for a high line syphon at Takoma, Wash., and definite inquiry has come from Louisiana for 2000 tons of oil tankage plates. An oil producer in western Texas has closed for 3000 tons of plates for tank construction, and several new projects are in the making in that territory. The last two weeks have brought about a material improvement in the position of local plate mills. Miscellaneous demand is holding steady and at the same time orders from fabricators and car builders have piled up so that deliveries in certain sizes of sheared plates are now from two to three weeks and some universal mill products cannot be had in that time. Plate mills are engaged at close to 70 per cent of capacity.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—This week is outstanding in structural awards. In Chicago close to 13,000 tons was placed, including 4500 tons for the first four floors of the Woolworth Building, 3200 tons for an apartment building, 3000 tons for an office building and 1700 tons for a lift bridge. Unusual activity prevails among architects and engineers, who, in an effort to rush the placing of steel contracts, are submitting line drawings for estimates. Although prices for fabricated steel were no higher on recent lettings, there is a wider spread between the high and low bids, with average figures measurably higher than at the turn of the year. Highway bridge work gives further promise in two new inquiries calling for a total of 2700 tons.

Mill prices on plain material per lb.: 1.90c., base, Chicago.

Reinforcing Bars.—Awards are more numerous with rail steel bar producers taking the bulk of going business at prices that range 1.80c. to 1.85c., Chicago Heights mills. Henry Ericsson, a local contractor, will build the Campbell Soup Co.'s Chicago plant, for which 3000 tons of bars will be required. A sale of 400 tons of billet steel bars gives further proof that prices for round tonnages are not being held at the level which the trade had hoped to maintain. Warehouse quotations range from 2.25c. to 2.75c. New projects are numerous and estimators are well engaged. Warehouse shipments average 55 per cent of capacity. New awards and recent projects are shown on page 243.

Bolts, Nuts and Rivets.—Specifications for these commodities are heavier because of the larger requirements by railroads and the automotive industry.

Rails and Track Supplies.—Two railroads with terminals in Chicago have purchased 10,000 tons of standard-section rails. Fresh inquiry has come out in the last few days and the total now before Western mills is not less than 75,000 tons. Rail mill output is a shade over 80 per cent of capacity. Scattered orders for track fastenings total 10,000 tons. Inquiry is brisk and more than offsets current shipments. Tie plate production has been stepped up to 75 per cent of capacity and angle bar output is at 60 per cent. Taking the Middle West as a whole, orders for light rails are small, but in the week a sharp demand has come from the southern Illinois coal mining district. A few scattered sales of iron tie plates have been made, but inquiry is dull and does not indicate an active market in the immediate future.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Wire Products.—Specifications from the jobbing trade are smaller as distributers find that a further expansion of stocks is not warranted at this time. New orders are split about even between those for immediate delivery and shipments for the future. Business is recovering in the flood areas of the Mississippi River Valley, notably in and around Memphis, Tenn. Distribution of wire products is in fair volume in the Southwest, where the spring demand will soon be felt, and in the Middle West, with the exception of portions of the Missouri River Valley. Orders from the far Northwest are numerous, considering the time of the year, but business is dull in the territory surrounding Minneapolis. Any lessening in the rate of shipments to jobbers is offset by the increased requirements of the manufacturing trade. As a general rule, prices are steady at 2.45c., Chicago, for plain wire and 2.60c. for nails, but cutting in the latter commodity has not been wholly eliminated from the nearby market, and at St. Louis concessions in prices have been made in a few instances on wire.

Bars.—Automobile producers and accessory manufacturers have taken their full quotas for the first half of January and they are now arranging shipping schedules for February. Indications are that requirements in February will well overbalance those of January. The demand for mild steel bars is such that local mill capacity is engaged at 85 per cent of capacity, about four points above the current rate of ingot output. Prices are firmly established at 1.90c., Chicago. Sales of iron bars are of fair size at 1.90c., Chicago. Specifications, however, are light. Alloy steel bar specifications are the heaviest in many weeks and local mills are operating at 75 to 80 per cent of rated output. Prices are steady. The rail steel bar market is quiet. Sales are confined to small lots and specifications are light. Both Chicago Heights mills continue to operate on a double turn basis, but at reduced hours per shift. Prices, except for hard steel bars used for concrete reinforcement, are stronger. Average orders are being taken at 1.80c., Chicago Heights mills, and smaller lots command 1.85c.

Mill prices per lb.: Soft steel bars, 1.90c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Sheets.—The size of order books has little bearing on the immediate requirements of users and local producers are having trouble in scheduling hot mills. Output is close to 75 per cent of capacity and this rate is difficult to maintain in view of the character of specifications received from day to day. Producers look for some relief when weather favorable to outdoor construction prevails in the near South and in the Southwest.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Coke.—By-product foundry coke is in greater demand and prices are steady. Core oven heating coke is in fair demand but prices are weak, common quotations ranging from $7 to $7.50, delivered.

Cast Iron Pipe.—The trend in cast iron pipe prices is downward, as shown by recent quotations at Milwaukee and at Jackson, Mich. The National Cast Iron Pipe Co. was low bidder on 5000 tons of 6-in. to 16-in. pipe for Milwaukee at $25.85, Birmingham, or $34.35, delivered. At Jackson 110 tons of 6-in. class B pipe brought out a low bid of $26.70, Birmingham, or $34.65, delivered. It is said that Minneapolis will soon come into the market for a round tonnage, and Osseo, Wis., will close bids Jan. 27 on 12,000 ft. of 6-in. and 1000 ft. of 8-in. pipe. The American Cast Iron Pipe Co. is low bidder on the total tonnage asked by Portsmouth, Ohio, but it is reported that figures were taken three ways and that the award may be split. Two contractors near Chicago have placed large orders for immediate delivery, but for use in the spring. This market is moderately active in small tonnages, but this support comes principally from public utilities. Pipe foundries report that deliveries are extending and that the average is about three weeks for a spread of sizes.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $36.20; 4-in., $38.20 to $40.20; Class A and gas pipe, $4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	$2.90 to 3.00
Cement coated nails, base per keg	2.90 to 3.00

Old Material.—Sales of heavy melting steel aggregating 35,000 tons to three local mills have brought to an end, at least temporarily, the upward trend in prices in the Chicago scrap market. Prices in these transactions ranged from $13 to $13.25. Dealers, in an effort to cover, immediately cut offered prices to $12.50 to $12.75, and they have had little difficulty in getting the tonnages required. A weak spot also developed in another direction, namely, in cast iron borings. Closing down of the last Mayville stack has cut off that channel and is diverting a flow of borings from Milwaukee to Chicago. Producers of this grade suddenly reached the conclusion that this is the time to unload. These factors, combined with others, suddenly converted the local market from one in which there existed a scarcity of borings to one of which there is a surplus.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.00 to 15.50
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.75 to 8.25
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	15.25 to 15.75
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Brake shoes	11.75 to 12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Acquires Hamilton Bridge Works

The Hamilton Bridge Works, Ltd., Hamilton, Ont., has been acquired by James Playfair, president of the Canadian Vickers Co., and his associates, F. M. Ross and Drury & Co., according to an announcement by Ian Hendrie, vice-president of the Hamilton company. He stated that the change of control would not likely result in disruption of the present staff, and that the project would probably be financed by a public bond issue. The company was founded in 1874 and reorganized in 1925.

New York

Pig Iron Sales About 10,000 Tons—Steel Trade Quiet

NEW YORK, Jan. 17.—Sales of pig iron by local brokers during the week totaled nearly 10,000 tons, as compared with only 3500 tons in the previous week. While melters are still cautious, limiting their purchases to relatively small tonnages, they are commencing to see more business ahead and are taking a proportionately keener interest in the iron market. Some foundries that bought only recently are adding to their purchases, and others, which have been out of the market for from four to six months, are again issuing inquiries. Demand is principally for shipment during the current quarter, although a few inquiries for next quarter have appeared. The New York Air Brake Co., for example, is in the market for 1000 tons of malleable for second quarter delivery at Watertown, N. Y., and a Montreal company with American affiliations is asking for prices on 1000 tons of iron for shipment by boat after the reopening of navigation. The Thatcher Co. has bought against an inquiry for 500 tons of foundry for delivery at Garwood, N. J. The Delaware, Lackawana & Western Railroad is in the market for 100 tons of No. 2 plain for shipment to Scranton, Pa., and the Baltimore & Ohio Railroad wants a similar tonnage for Baltimore delivery. The Worthington Pump & Machinery Corporation has finally closed against its inquiry for 400 tons for Holyoke, Mass., but is still in the market for 90 tons of Bessemer iron for shipment to Harrison, N. J. Foreign low phosphorus is stronger, now being quoted at $24, duty paid, port of entry. Eastern Pennsylvania foundry iron has been sold within the week at $19, base furnace, although producers are making a stronger effort to maintain a minimum price of $19.50. Buffalo foundry iron still ranges from $16.50 to $17, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—There has been practically no inquiry thus far this year for ferromanganese, quotations for which are firm at $100 for seaboard or furnace. There has been a little business done in spiegeleisen and there are a few inquiries before the market. Prices are firm at $31 to $32 for the 19 to 21 per cent alloy.

Cast Iron Pipe.—Prices have developed a slight weakness. A Southern producer of gas and water pipe is reported to have quoted under $28 per ton, base Birmingham, but most makers are maintaining $28, base, as a minimum. There is some private purchasing of water pipe, but mostly in small lots.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—The advance of the mill price on reinforcing bars, to 1.90c., Pittsburgh, announced by distributers in this territory several days ago, was responsible for the placing in the last week of 2000 tons for subway work. Igoe Brothers, Concrete Steel Co. and McClintic-Marshall Co. shared in this award. Covering for these jobs is said to be the last which will be allowed at the old price, and new work is being quoted at a basis of 1.90c., Pittsburgh. There has been no change in the New York or Youngstown warehouse prices.

Warehouse Business.—There has been a slight decline in purchasing. Black and galvanized sheets continue to sell at silght concessions in New York, but in New Jersey the base prices of 4.20c. per lb. for black and 4.95c. per lb. for galvanized are fairly well maintained. Occasionally blue annealed sheets are shaded 5c. to 10c. per 100 lb.

Coke.—Prices are unchanged at about $4 per net ton, Connellsville, for standard foundry and at $2.75 to $3 per ton, Connellsville, for standard furnace grade. Purchasing is light. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, $7.91. By-product foundry coke is quoted at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Finished Steel.—Not much new business has been placed during the week, but specifications against contracts continue to come to district sales offices at a fairly good rate and consumers are taking shipments

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.10	$5.85
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

against commitments in a way that indicates a generally higher level of manufacturing operations than prevailed in December. Mill operations in the East on plates and shapes have improved noticeably this month, and in structural steel there are sufficient projects under consideration to produce a hopeful feeling that a continuing improvement will develop. Among new structural projects is 5000 tons for the Lefcourt Building at Fifth Avenue and Forty-third Street, while the largest award locally is 2900 tons for subway work. December awards of fabricated steel, not including subways, bridges and similar general construction work, as reported to the Structural Steel Board of Trade of New York, totaled 36,900 tons for the metropolitan area, compared with 37,000 tons in November, 1927, and 34,000 tons in December, 1926. The total for 1927 in the New York district was 512,431 tons, compared with 374,476 tons in 1926, a gain of more than 37 per cent. Prices on plates, shapes and bars are unchanged, while sheet quotations are working toward 2.90c. on black and 3.75c. on galvanized, although these prices have not yet obtained on all transactions. Blue annealed sheets are firm at 2.10c. for widths under 40 in.

Cold rolled strip steel manufacturers have announced an advance in price of $3 a ton, effective Jan. 25, making the new quotations 2.90c. per lb., Pittsburgh or Cleveland, for lots of three tons or more and 3.15c. for less than three tons. The Worcester, Mass., mill will quote, as usual, 15c. per 100 lb. above these prices at mill.

Mill prices per lb., delivered New York: Soft steel bars, 2.14c.; plates, 2.12½c.; structural shapes, 2.09½c.; bar iron, 2.14c.

Old Material.—Prices on all grades of scrap are firm, but show no tendency to advance. The market is quiet. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered to Bethlehem, Coatesville, Conshohocken, Pa., or Claymont, Del. Yard grade is being purchased by brokers at $11 per ton, delivered Harrisburg, Pottsville or Phoenixville, Pa.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.25 to 8.50
Machine shop turnings	6.50 to 7.50
Short shoveling turnings	6.50 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.25
Mixed borings and turnings	6.50 to 7.50
Steel car axles	17.00 to 17.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75 to 9.25
Forge fire	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

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*Net base, including boxing and cutting to length.

Cleveland

New Steel Business Exceeds Expectations—Pig Iron Active

CLEVELAND, Jan. 17.—Consumers are placing a fair amount of small-lot orders for steel bars, plates and structural material at 1.80c., Pittsburgh. Some of this business is coming from buyers who will need more steel than they covered for in their December specifications and some from consumers who, following their hand-to-mouth buying policy, did not take advantage of the lower prices prevailing last month.

The volume of new business exceeds expectations in view of the fact that many buyers have enough material coming in against December specifications to last them for several weeks. The 1.80c., Pittsburgh, price quoted by outside mills appears to be holding firmly, although it has not yet been tested by round lot sales to fabricators and other large consumers. Local mills continue to quote steel bars at 1.80c., Cleveland, but there are still reports that this is being shaded $1 a ton.

Automobile companies are specifying liberally for steel bars, sheets and strip steel, but they can obtain good deliveries and are not ordering very far ahead. A heavy production of motor cars appears to be assured for at least the first quarter, as a large output will be required to stock dealers with new models. The real test of new prices on sheets and hot-rolled strip steel will not come before March or April, as motor car manufacturers and parts makers are covered for the quarter at the old prices.

The outstanding inquiry in the structural field is for 20,000 tons for commercial buildings in connection with the Cleveland Union Terminals project. Several other good sized lots are expected to be required for this project during the year.

Pig Iron.—Sales by Cleveland interests during the week totaled over 25,000 tons, or about the same as the previous week. There is more activity in Michigan than in other sections. The business came mostly from small foundries, as many of the larger consumers had previously covered for first quarter. Producers as a rule have good order books for the quarter, and a somewhat firmer stand is being taken on prices. While $17 is the common Lake furnace quotation, for foundry and malleable iron, $16.50 has not disappeared in competitive sections in southern Ohio and Indiana, and silicon differentials are still being waived or split. One producer has advanced its price in Michigan to $18. Shipping orders show considerable gain and some furnaces expect to ship more iron than they make this month. Foundries in the automotive industry have increased production, although some are not yet operating at full capacity. Heavy specifications are coming from this source.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Coke.—One maker of premium foundry coke in the Connellsville district has reduced its price 25c. a ton to 5.10, at which it is taking contracts for first quarter. Other grades are unchanged, with $3.75 a minimum. Heating coke ranges from $2.75 to $3. The market is inactive.

Alloy Steel.—The speeding up of the automotive industry has resulted in a good demand for alloy steel bars. Forge shops in this territory are well filled with automotive work and considerable business is coming from that source. Sales during the week included a 3500-ton lot placed by a Cleveland drop forge plant. Regular quotations are holding well.

Bolts, Nuts and Rivets.—Bolt and nut makers are getting good specifications from the automotive industry, railroads and jobbers. There is practically no new business, as nearly all buyers are under contract. Prices are firm. While rivet specifications have improved somewhat, they are still rather light.

Rails.—The Nickel Plate Railroad has purchased 11,500 tons of rails for its 1928 requirements and has taken an option on 7000 tons additional, the total being about the amount that it placed a year ago. One-half the tonnage was placed with Steel Corporation mills and the remainder equally divided between the Bethlehem Steel Co. and the Inland Steel Co.

Semi-Finished Steel.—Most consumers are covered for early requirements and specifications are good. There is a range in local prices on sheet bars, depending on location of consumer's plant, some buyers getting a concession of $1 or more a ton from the $34 price that prevails in the Youngstown district.

Sheets.—The automotive industry is now taking a large tonnage of sheets and specifications from other consumers are fairly good. However, sales are light, as most buyers are under first quarter contract at the old prices. While 2.90c., Pittsburgh, for black and 2.10c. for blue annealed sheets are the general quotations, concessions of $1 to $2 a ton are still appearing in these grades. Galvanized sheets are being offered at 3.65c., Pittsburgh, and a fair number of sales are being made for February and March shipment. Automobile body sheets are firm at 4c., Pittsburgh.

Strip Steel.—Specifications for hot rolled strip from the automotive industry are heavy, but most consumers are covered at lower prices than are now asked, and not much test of the present prices is expected before March. The common quotations are 1.85c., Pittsburgh, for material 6 to 12 in. wide and 2.05c. for under 6 in. For 12 in. and wider material, mills quote the plate base on 12 gage and heavier and a 2.10c. blue annealed base for lighter than 12 gage. Cold rolled strip is in good demand. An advance to 2.90c., Cleveland, for three tons and over has been announced and will become effective Jan. 25.

Fluorspar.—Several small-lot sales of gravel fluorspar are reported at $15, mines, but on a large tonnage a price of $14.50 would be available.

Reinforcing Bars.—An inquiry has come out for 745 tons for the Whitehouse Crossing grade elimination work, Cleveland. An inquiry from the Cleveland Union Terminals Co., Cleveland, for 1600 tons is still pending. Prices on new billet steel bars are irregular. Rail steel bars are unchanged at 1.65c., mill.

Warehouse Business.—Sales improved somewhat the past week, probably because of completion of inventories. Regular prices are being well maintained. Galvanized sheets are in good demand.

Old Material.—Scrap is moving better than for some time, mostly in steel making grades, against contracts placed some time ago. A Cleveland mill, which because of its exacting specifications pays higher than the going common market for scrap, has purchased a moderate tonnage of heavy melting steel at $14.75. Because of expectations by producers and dealers of a better demand and higher prices after the first of the year, scrap did not come out freely for a time, and dealers paid $14.10 for heavy melting steel a few days ago, but the market now shows less firmness. The supply has become more plentiful and $14 is again the ruling quotation. Small lots of blast furnace scrap are moving at $10.75. Efforts are being made in the Youngstown district to secure a reduction of the present freight rate of $3.53 on scrap from Detroit to that district, and a meeting sponsored by the Youngstown Chamber of Commerce was held in that city today to consider the matter. Much of the scrap that formerly went from Detroit to the Youngstown district was diverted to Buffalo last year being shipped by water, and if Youngstown mills can secure a reduction in the rail rate they will be in a better position to compete with Buffalo for the Detroit scrap during the lake shipping season.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.25 to 10.75
Mixed borings and short turnings	10.25 to 10.75
No. 2 busheling	10.25 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c. to 2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel, squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Philadelphia

Pig Iron Advance Brings Out Orders—Railroads Inquire For Barges

PHILADELPHIA, Jan. 17.—Pig iron and steel markets are moderately active, stimulated by a continued demand for small tonnages. Railroad purchasing seems to provide the stimulus for much of the present activity. Steel casting plants are operating on small orders from railroads and shipyards have submitted bids on inquiries for car floats, barges, tugs and lighters from the Pennsylvania and New York Central railroads. The Reading Co. is inquiring for 1000 kegs of railroad spikes.

Bars.—There is a fair volume of purchasing, with orders ranging up to 75 and 100 tons in some instances. The basis of 1.80c. per lb., Pittsburgh, or 2.12c. per lb., delivered Philadelphia, is well maintained. A moderate demand for reinforcing bars is developing.

Shapes.—Mills are quoting 1.95c. per lb., base, Bethlehem, and 1.92½c. per lb., base, Pottsville, or 2.07c. to 2.08c. per lb., delivered Philadelphia. Prices are being well maintained, but there are outstanding contracts at lower figures. Some large business is in prospect including the Newark Bay and the Tacony-Palmyra bridges. Fifteen barges inquired for by the New York Central Railroad will require a sizable tonnage of 12-in. channels.

Pig Iron.—The advance to $19.50, base, for foundry iron, reported last week, is evidently being maintained by eastern Pennsylvania producers and some small tonnages have been booked at the new level. A producer of basic iron has advanced the price to $19, base furnace, but no sales are reported. A recent inquiry from a steel castings plant calls for from 3000 to 4000 tons of low phosphorus iron. The Federal Steel Foundry Co., Chester, Pa., recently closed on about 300 tons of this grade. Purchases of foundry iron have included about 1000 tons by the American Engineering Co., Philadelphia, about 1000 tons by the Hajoca Corporation, Philadelphia, and 300 tons by the Consolidated

Machine Tool Co., Wilmington, Del. The Baldwin Locomotive Works is reported to have placed 4000 tons of floor and cylinder iron with two makers.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Plates.—Prices are reported firm at 1.95c. per lb., base, Coatesville and Sparrows Point, or 2.05c. per lb., delivered Philadelphia. Bids have been opened by the Pennsylvania Railroad on six 330-ft. and six 250-ft. steel car floats, two steel tug boat hulls and one steam lighter hull. Buying by oil companies is reported to be improving.

Sheets.—Buying is fair with prices still ranging from 2.75c. to 2.90c. per lb., base Pittsburgh, on black and 3.75c. to 3.85c. per lb., base, on galvanized. Blue annealed sheets are quoted on a basis of 2.10c. per lb., on sizes narrower than 40 in. and at 2.20c. per lb., base, Pittsburgh, for wider than 40 in.

Warehouse Business.—There has been slightly less activity in the past week and prices still show a tendency to softness. Based on recent sales from stock, sheets are not quotable at more than 4.25c. per lb., base, for black, 5.10c. per lb., base, for galvanized and 3.15c. per lb., base, for blue annealed.

Ferromanganese.—Purchasing is small. The price is unchanged at $100 per ton, seaboard.

Imports.—In the week ended Jan. 14, a total of 9135 gross tons of manganese and chrome ore arrived at this port, of which 4945 tons was manganese ore from British West Africa, 2000 tons chrome ore from Portuguese Africa and 2190 tons chrome ore from Greece. A thousand tons of pig iron arrived from India and 25 tons of ferromanganese from Great Britain. Steel imports included 281 tons of shapes, 59 tons of bars, 33 tons of hoops and bands and 29 tons of steel ingots from Belgium, 33 tons of steel ingots from France and seven tons of steel scrap from Germany.

Old Material.—Purchasing is of small tonnages with occasional exceptions, such as the reported sale by a large dealer of 1000 tons of cast iron carwheels at $16.50 per ton, delivered eastern Pennsylvania. A small tonnage of couplers and knuckles is reported to have been closed by one dealer at $16.50 per ton, delivered. In general, the market shows but little change from the quietness of the past few months.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.25 to 15.75
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 12.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 15.50

Third Arbitrator Appointed in Hudson Valley-Tutein Case

David A. Schulte, president Schulte Retail Stores Corporation, New York, has been appointed the third arbitrator in the case of E. Arthur Tutein, Inc., vs. the Hudson Valley Products Corporation, Troy, N. Y. The selection was made by Charles M. Schwab who, as president of the American Iron and Steel Institute, was asked to make the appointment following the failure of the arbitrators designated by the parties to the dispute to agree on a third.

The case had its inception in June, 1927, when the Hudson Valley company cancelled a contract with E. Arthur Tutein, Inc., for the exclusive sale of its products. Subsequently United States Senator Robert F. Wagner was appointed arbitrator for the Hudson Valley company, and Sherman L. Whipple, Boston, arbitrator for the Tutein company. The board of arbitration, now complete, has not yet selected a time for the commencement of hearings.

Continental Can Plans Purchase of United States Can Co.

The Continental Can Co., New York, is negotiating for the purchase of the United States Can Co., Norwood, Ohio. Directors of the latter company have approved the transaction and have called a meeting of stockholders for Jan. 21 to consider the offer made by the Continental company. If the deal is consummated, it will bring together the second and third largest manufacturers of cans in the United States. Assets of the United States Can Co. are estimated at $7,000,000 and plants are maintained at Norwood, Ohio; Chicago; St. Louis; Baltimore and Roanoke and Buchanan, Va.

The Continental company also has plans under advisement for the erection of a four-story plant, 140 x 160 ft., on West Thirty-fifth Street, Chicago. The site is adjacent to the proposed factory of the Campbell Soup Co., Camden, N. J.

Pig Iron Association to Discontinue Statistical Activities

The American Pig Iron Association has issued a statement announcing its intention of discontinuing its statistical activities. Reason for this action is attributed to the "closing down of a large number of the merchant furnaces in the country since 1920, and the further fact that many steel plants are engaged in the sale of merchant iron, making it impossible to collect dependable statistics of the production, sale and shipment of the product or procure any accurate knowledge of the stock on hand."

A meeting of the members of the association was held in Cleveland on Jan. 17 to determine its future policy and the disposition of its cash on hand. No statement was made at the close of the meeting.

Ask for 50 Per Cent Increase in Cast Pipe Duty

WASHINGTON, Jan. 17.—Formal application has been filed with the Tariff Commission by domestic producers of cast iron pipe for an increase of 50 per cent in the present 20 per cent import duty on that product. The growing volume of cast iron pipe imports, particularly from France, has created apprehension on the part of American producers. Total imports of cast iron pipe for the 11 months ended with November, 1927, were 78,657 gross tons, of which 61,002 tons came from France and 14,185 tons from Belgium. This compares with a total of 71,799 tons for the 11 months ended with November, 1926.

Of the French imports during the 11-month period of last year 35,428 tons came through Atlantic ports; 18,558 tons through Pacific ports and 7015 tons through Gulf ports. The imports from Belgium took a different movement, 12,119 tons coming through Pacific ports and only 2065 tons through Atlantic ports. For the 11 months of 1926 imports of French pipe totaled 48,861 tons and Belgian imports 18,386 tons.

San Francisco

Pipe Line to Take 14,000 Tons—2000 Cars Soon in Market

SAN FRANCISCO, Jan. 14 (*By Air Mail*).—Buying of steel products so far this year has shown a substantial improvement over the volume placed during the last two weeks of 1927, and the outlook is encouraging. The Pacific Fruit Express will shortly be in the market for 2000 refrigerator cars.

Building and construction activity on the Pacific Coast this year may exceed operations for 1927. Estimates of prospective construction work in San Francisco, based on plans now on the architects' boards, placed the total for the year at over $60,000,000, while estimates on the more important projects in Los Angeles and other southern California cities, show more than $65,000,000 worth of work in sight.

Pig Iron.—Sales and inquiries call only for small lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—During the week seven awards of fabricated steel totaled 1160 tons. An award is expected next week on 6000 tons for an office building in San Francisco. Foreign shapes are about 1.60c., c.i.f., duty paid, while domestic material is firm at 2.35c., c.i.f. Coast ports.

Plates.—An inquiry of the Petroleum Securities Co., Los Angeles, for tanks for its new Richmond, Cal., plant involves from 700 to 2500 tons of plates. Plate prices are firm at 2.25c., c.i.f., this figure applying on large and small lots.

Bars.—The Pacific Fruit Express Co., San Francisco, has taken bids on 475 tons of merchant bars and bands and on 45 tons of plates and 105 tons of sheets. The Bethlehem Steel Co. obtained an additional 1500 tons for the Coyote Point bridge across San Francisco Bay, bringing the total to 10,000 tons.

Cast Iron Pipe.—Considerable activity is noted in the cast iron pipe market, and awards this week included 1510 tons of 4 to 14-in. class B pipe for Santa Clara, Cal., placed with J. Tobin, Oakland, Cal.; 401 tons of 2 to 10-in. class B pipe for the Los Angeles County Water Works District No. 10, booked by the United States Cast Iron Pipe & Foundry Co., and 153 tons of 6 and 10-in. class B pipe for the improvement of Main Street, San Diego, Cal., placed with the Butterfield Construction Co. of San Diego. The United States Cast Iron Pipe & Foundry Co. was low bidder on 2825 tons of 6 to 24-in. pipe for Portland, and probably will be awarded the contract for DeLavaud pipe. It was also low on 340 tons of 4 to 12-in. class D pipe for The Dalles, Ore. Bids were opened this week on 1246 tons of 2 to 12-in. class B pipe for Spokane, Wash., and on 125 tons of 4 to 10-in. class B for El Segundo, Cal. Chowchilla, Cal., will open bids on Jan. 20 for 188 tons of 4 to 8-in. class B pipe and San Diego, Cal., will take bids on Jan. 30 for 369 tons of 4 to 8 in. class B pipe for the improvement of streets in Paradise Hills. Prices remain around $35 a ton delivered on 6-in. and larger.

Steel Pipe.—The Petroleum Securities Co., Los Angeles, probably will award a contract shortly for 650 tons of 3½ to 16-in. plain-end line pipe for its new Richmond, Cal., plant. The General Petroleum Corporation, Los Angeles, has an inquiry out for 75 miles of 12 to 16-in. line pipe, and this company has decided to construct two 8-in. lines, each 90 miles long, from the Rincon oil fields to its Los Angeles refinery, involving about 14,000 tons.

Track Materials.—The Southern Pacific Co. has not yet taken action on its inquiry for 3120 tons of track spikes and bolts, bids on which went in Dec. 26. It opened bids this week on 880,800 tie plates, about 4500 tons.

Coke.—Sales and inquiries are confined to small lots. Prices are unchanged.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Birmingham

Pig Iron Shipments Increase—Steel Trade Slowly Improving

BIRMINGHAM, Jan. 17.—The pig iron market during the past week or 10 days has not been very active. Some tonnage in small amounts has been coming in, but no general movement has developed. This is due partly to December buying, to the last quarter carry-over, and to the slow resumption of normal operations. Quotations remain on a $16 base. Shipments last week were greatly improved as compared with other weeks since mid-December.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	16.00

Finished Steel.—Conditions continue gradually to improve. Inquiries indicate satisfactory prospects. No tonnage of any consequence was booked by structural steel fabricators during the week. Prices are unchanged.

Cast Iron Pipe.—Two pressure pipe manufacturers report that inquiries are fair; another reports that they have not been up to expectation. There have been numerous small orders. Plant operations are now on the same schedule as before Christmas.

Coke.—There has been a general improvement both in foundry and domestic coke. Cold weather stimulated domestic buying, while restricted December buying is being reflected in the present foundry demand. Quotations continue at $5 per ton.

Old Materials.—Conditions appear more favorable. There were more inquiries last week, but buying was not heavy enough to affect prices.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.00 to $10.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	18.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Rails for rolling	12.00 to 13.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb	50

St. Louis

Pig Iron and Steel Trade Active—Much Heavier Iron Melt

ST. LOUIS, Jan. 17.—Melters in the St. Louis industrial district report a greatly improved business, the pig iron trade continues good, and prospects are for a steady flow of buying. Plants catering to the railroad car trade, wheel foundries, implement makers and radiator concerns are showing a much heavier melt. A steel mill on the East Side is now operating two open-hearth furnaces, and will put on another, having sufficient orders booked now to operate all until June 30. Stove foundries have halted buying temporarily on account of inventory taking. Pig iron makers believe that prices will go higher. Sales of the Granite City maker during the week totaled 8500 tons, all for first quarter shipment. The largest sale was 3000 tons of foundry iron to an East Side melter. All sales were of foundry iron, including 200 tons of malleable. A leading Southern interest sold 800 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Domestic coke demand is reported less active as a result of warmer weather. Metallurgical grades are moving in fair quantities now that the melt of pig iron is increasing.

Finished Iron and Steel.—The Wabash Railroad has bought the necessary bolts, spikes and rail joints for 20,000 tons of rails recently purchased. The orders went to the Illinois Steel Co., Inland Steel Co. and Bethlehem Steel Co. on the same basis as the rails were allocated. The rail joints were purchased from the Rail Joint Co. to be rolled by the mills. The Granite City mill reports starting the new year with a heavy backlog of orders for sheets and plates, and with large specifications against contracts. The car-building trade is also active. Warehouse business is light. Business with structural fabricators is extremely dull.

Old Material.—A leading mill in the district has bought about 7500 tons of melting steel for delivery within the next 60 days. This has had the effect of halting the steady advance of this item. Present prices paid by dealers probably will continue until such time as they are covered on this order or until some other large consumer comes into the market for tonnage. The market generally is strong. The only price changes are an advance of 50c. a ton on iron rails and 25c. a ton on No. 1 machinery cast. Railroad lists include: Rock Island, 4800 tons; Chicago & Alton, 1000 tons; Pullman Co. (St. Louis), 200 tons; and Mobile & Ohio, 100 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.75 to $13.25
No. 1 locomotive tires	14.00 to 14.50
Heavy shoveling steel	12.75 to 13.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.50 to 15.00
Railroad springs	15.25 to 15.75
Bundled sheets	9.00 to 9.50
No. 2 railroad wrought	12.75 to 13.25
No. 1 busheling	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Iron rails	14.00 to 14.50
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.50 to 9.00
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft.	16.00 to 16.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	16.00 to 16.50
Railroad malleable	13.00 to 13.50
No. 1 railroad cast	14.00 to 14.50
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Canada

Railroads Placing Equipment Orders—Pig Iron More Active

TORONTO, ONT., Jan. 17.—Canadian railroads are now giving attention to their equipment needs. The Canadian Pacific Railway has placed orders involving an expenditure of upward of $3,000,000, comprising the following: 20 coaches, 5 cafe parlor cars, 15 palace horse cars, 300 automobile cars, 200 freight refrigerator cars, 50 75-ton Hart Otis ballast cars. The cars will be built by the National Steel Car Co. and the Canadian Car & Foundry Co. Other orders placed include: Newfoundland Railroad, three steam self-propelled passenger cars; and Alberta Government Railways, two cabooses. The Dominion Coal Co. is having 30 automatic drop slide dump cars, built by the Eastern Car Co. The Algoma Central & Hudson Bay Railroad is contemplating ordering some locomotives. The Toronto, Hamilton & Buffalo Railroad is negotiating for three freight locomotives.

Pig Iron.—Sales are steadily increasing in the Canadian pig iron markets. Single car orders predominate, but there is also a good sprinkling of orders for 200 to 500 tons for immediate delivery. As the Canadian demand for pig iron tends to improve, outside competition also has become more active. The production of pig iron in Canada continues on the same level as it did throughout the greater part of last month. Five blast furnaces are blowing in Canada. Prices are firmer.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.00
No. 2 foundry, sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Sales for the week again showed improvement over those of the previous week. The improved demand has not brought with it a more active buying movement on the part of dealers, but on the contrary the latter are holding their purchases to a minimum. Prices are somewhat weak, but have not been changed.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Youngstown

New Business Lighter But Mills Are Operating at Good Rate

YOUNGSTOWN, Jan. 17.—New business is somewhat lighter than it has been recently with steel companies here, but this development is commonly regarded as the natural sequence of the fact that consumers are pretty well covered against current requirements and are pausing to let consumption catch up before making further commitments. There has been no letdown in steel works or rolling mill activities, but it is possible that the putting on of additional productive capacity has been delayed by the recession in new orders and specifications.

The price situation is less disturbing to producers than it was a short time ago, for while present bookings carry prices that yield only a small profit on plant operations as low as those over most of the last half of 1927, the margin is somewhat increased by the fact that there is now an engagement of approximately 75 per cent of steel-making capacity, as compared with less than 50 per cent at the low point of about two months ago. Sheet mill operations in this district are very high and there is a good schedule for the bar mills, while makers of strip steel also are busier than they have been in several weeks. Pipe mill capacity is not heavily taxed, since business is good only in line pipe. Tin plate production, in spite of recent improvement in demand, is well under that at this time last year.

Sheet bars are moving with more freedom as a result of the fuller sheet mill schedules. Makers here insist that the price is $34, or $34.50 delivered in the immediate Youngstown district. Mills no longer produce many billets or slabs for the market.

Pig iron business is steady, with makers still quoting No. 2 foundry and malleable iron at $17.50, furnace, and basic at $17. Some business in foundry iron has been taken at $17.50 for shipment at low freight rates. For shipment to more distant points, $17.25, furnace, has had to be done. Similarly on basic iron, considerably less than the equivalent of $17, Valley furnace, has been done at some destinations. A Sharon, Pa., steel foundry recently bought 1000 tons of basic iron at $17, furnace, or $17.50 delivered.

The scrap market has weakened and heavy melting steel now is not salable at more than $15.50. While dealers are asking $15 for compressed sheet scrap, it looks as if they would have to be content with less, as the increased activity of the sheet mills is resulting in increased offerings, and a rising scale of productive activity in the motor car industry is bringing out freer offerings from that direction. Lake navigation being closed, Detroit scrap can move only to its natural rail markets, or to Mansfield, Canton, Massillon or Youngstown. Incidentally, an effort is being made by scrap consumers in those centers to obtain a downward revision of railroad rates on scrap from Detroit, and a meeting is to be held today in Cleveland to consider the matter. This meeting will be followed by a formal presentation of the case to Central Freight Association officials in Chicago.

Boston

Cast Iron Pipe Active—Pig Iron Unchanged—Scrap Weaker

BOSTON, Jan. 17.—A sale of 900 tons of special Buffalo pig iron was the largest transaction of the past week. Several smaller lots of Buffalo iron were sold at $16.50 to $17, furnace, for No. 2X, and at $17 and $17.50 for No. 1X, also small lots of Mystic and Champlain irons, but the aggregate was unimportant. Quite a tonnage in pending business is reported. The advance of 50c. a ton on eastern Pennsylvania iron places it at a further disadvantage here, and sales are confined to scattered small lots for mixture purposes.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.91 to	22.41
East. Penn., sil. 1.75 to 2.25		23.15
East. Penn., sil. 2.25 to 2.75		23.65
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—No increase in the movement of by-product foundry coke is noted. Prices remain unchanged at $11.50 a ton, delivered within a $3.10 freight rate zone. Indications are there will be a change in the price before Feb. 1, but producers are not ready to say in which direction. Railroads have put into effect new rates on fuel from Holyoke, Mass., and Manchester, N. H., an indication of increased competition between gas companies and by-product ovens for domestic coke business. Owing to mild weather, stocks of domestic fuel at Everett, Mass., and at Providence, R. I., have increased. Domestic coke is still on a basis of $8.50 a ton at ovens, Everett.

Cast Iron Pipe.—Wilmington, Mass., has closed with the Warren Foundry & Pipe Co. for approximately 2000 tons of 6 to 14-in. water pipe, and Boston has ordered 900 tons of 8-in., 50 tons of 10-in., 800 tons of 12-in. and 50 tons of 30-in. pipe and 250 tons of fittings. The Warren Foundry & Pipe Co. was second low bidder on the Boston business, B. Nicoll & Co. being the lowest. No other open municipal business was closed the past week, but some good tonnages went privately, the aggregate sales running in excess of 6000 tons. Medford, Mass., closed bids Wednesday, Jan. 18, on 250 tons of 6 to 12-in. water pipe. It is reported that Stone & Webster, Inc., is about to close on its 1928 gas pipe requirements, which will be about 2000 tons. Private water pipe sales are at $45.10 to $46.10 a ton, delivered common Boston freight rate points, for 4-in. and $41.10 to $42.10 a ton for 6 to 12-in. Concessions of $1 a ton or more are made on larger pipe. The usual $5 differential is asked on class A and gas pipe.

Shapes and Plates.—Fabricators took no large tonnages in the past week, but indications are that several good tonnages will be closed this week. For a new court house at Providence, R. I., calling for 1000 tons of steel, some low fabricated steel prices have been quoted. Railroads are specifying freely against plate contracts. The New Haven recently placed some sizable tonnages. There is a big gasoline tank business, however, but little money in it for the fabricator owing to keen competition. Boiler shops are securing some stack business. The market for standard shapes and plates is firm at 1.80c. per lb., base Pittsburgh.

Warehouse Business.—Warehouse prices are steadier than they have been in months. Most sellers are now holding to list prices.

Cold Rolled Strip Steel.—Prices are steady and unchanged.

Mill Prices on Cold-Rolled Strip in North Atlantic States: In 1 to 3-ton lots, 3.25c. per lb., base Pittsburgh, and also, 3.25c. to 3.40c. per lb., base Worcester, Mass.

Reinforcing Bars.—About 5000 tons of bars involved in the Sears, Roebuck & Co. plants at Boston and Cambridge is not yet placed. Current activity is confined to small tonnages, which in the aggregate are fairly satisfactory. Prices remain firm on a basis of 1.90c. a lb., Pittsburgh, or 2.26½c., delivered common Boston freight rate points. Warehouse prices range from 2.70c. to 2.75c., base, mostly 2.75c.

Old Material.—Most of the transactions in heavy melting steel the past week were at $9.10 a ton on cars, shipping point, while the average range of quotations is $9 to $9.25. Current activity is largely confined to that material and long bundled skeleton, scrap rails, steel turnings, mixed borings and turnings, forged scrap, forged flashings and specification pipe. Supplies of scrap in first hands are comparatively small, and a feeling persists among dealers that it would not take much of an increase in buying to lift values. In contrast, further weakness was reported yesterday from the Pittsburgh district.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.25
Scrap rails	8.75 to 9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.60 to 6.00
Forge flashings	6.00 to 6.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Street car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Rails for rerolling	10.00 to 10.50
Cast iron borings, chemical	10.00 to 10.50

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	14.00 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Railroad malleable	13.00 to 13.50

Cincinnati

Foundries Making Automobile Castings Increase Melt—Scrap Higher

CINCINNATI, Jan. 17.—While foundries associated with the automotive industry have increased operations, jobbing foundries in this district are running on a sharply curtailed basis. Consequently the general demand for foundry iron has been light. Prices are attracting little comment, because the situation is such that no downward turn is anticipated and, on the other hand, the condition of the market does not encourage an advance. Lake Erie iron is being sold at $16.50, base furnace, and southern Ohio iron at $19, base furnace. The schedule on Tennessee and Alabama iron is unchanged at $16, base Birmingham. A central Indiana foundry is reported to have closed for 1400 tons. Inquiries include 800 tons for a Dayton, Ohio, company and 500 tons for the American Seeding Machine Co. at Springfield, Ohio, the former specifying second quarter delivery.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Increasing signs are evidence of a gradually strengthing market. Now that consumers have completed inventories and are in a position to know definitely their immediate requirements, mills are receiving numerous requests for prompt shipment of material. Usually specifications ask for January and February deliveries, although a few users have anticipated their needs for the entire first quarter. The outlook for sheet producers in this district is particularly bright. There is a well balanced demand from the automobile industry, while railroads and electrical manufacturers have been liberal purchasers. In fact, all consuming lines have come forward with orders so that mills necessarily have had to increase operating schedules to meet delivery promises. In some cases backlogs are sufficient to insure continuance of production on the recently established scale for two weeks. Another indication of stability is the fact that consumers who had failed to protect themselves at the old prices are now paying the new prices with little protest. There is some shading of quotations in galvanized sheets, but this is the exception rather than the rule, most orders being booked at 3.75c., base Pittsburgh. In blue annealed stock the ruling price of 2.10c. on widths up to 40 in. has not been questioned, while black sheets are steady at 2.90c. Bars, structural shapes and plates are firm at 1.80c., base Pittsburgh. The structural steel market is quiet, but several important jobs are in the making. Common wire nails are being held at $2.55 per keg, Ironton or Pittsburgh, with barge rates applying on shipments to consuming points along the Ohio River.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Warehouse Business.—There has been a slight improvement in sales, but business remains at a low point. Tank plates is the only commodity for which there is a pronounced demand. Irregularities which have existed for a considerable time in common wire nails have practically disappeared, and jobbers are maintaining the published price of $2.95 a keg. Quotations on other products are firm.

Coke.—Expansion of activities in foundries producing automobile castings has brought about an increased movement of by-product foundry coke since Jan. 1, and present indications are that shipments this month will run considerably ahead of those in December. The domestic coke market, however, is glutted with material which has not been sold on account of the mild weather. Sales of Wise County and New River beehive coke have been small.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel has advanced 25c. a ton and several other items also have gone to higher levels in the past week. While stronger prices are largely attributed to the speculation of dealers, the stepping up production in steel plants in this district, with the probability of the need for more scrap, has been a factor.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.75 to $12.25
Scrap rails for melting	12.50 to 13.00
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.50 to 12.00
Short rails	17.00 to 17.50
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	12.25 to 12.75

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Buffalo

Steel Works Operations Average 70 Per Cent—Scrap Stronger

BUFFALO, Jan. 17.—Inquiry is light for sizable tonnages of pig iron, but a number of small lots are pending. The New York Air Brake Co. has been seeking 1000 tons of malleable for its Watertown, N. Y., plant. Another Watertown melter bought 500 tons of foundry. A few small inquiries came out of New Jersey. The Donner Steel Co., which banked a furnace the first of the month, will have it back in blast by the early part of February. On Buffalo district quotations $17 is firmly held.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—General business is good, with mill operation continuing to average around 70 per cent. The Lackawanna plant of the Bethlehem Steel Co. has been able to maintain an uninterrupted output of 85 per cent for some weeks and the Seneca Iron and Steel Co. is likewise operating at this rate. Other mills are around 50 or 60 per cent. Bars, shapes and plates are steady at 1.90c. Bolt and nut prices are fairly firm, though there has been some shading. Pipe specifications are holding up well, though the general plumbing and supply business is not active. Black sheet prices range between 2.80c. and 2.90c., and the price on auto body sheets for prompt delivery is 4c. Reinforcing bar makers expect to take considerable business in the near future, as some sizable jobs are being figured.

Old Material.—Dealers have been making rather an active market in steel, some of them having paid as high as $15 to $15.50 for No. 1 heavy melting steel, applying it against orders taken at $15. There has been no new buying by the mills, but shipments to one mill have gained a little. The steel rail market shows a little strengthening, with the price now $16.50 to $17. Railroad lists closing the end of the week brought higher prices than the mills have paid, No. 1 steel selling at $15.25.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.25 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.50 to 14.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.50 to 14.00
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 15.75
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	14.75 to 15.25
Low phosphorus billet and bloom ends	15.75 to 16.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

The Struthers Furnace Co. has established headquarters in the office building at Struthers, in connection with the merchant stack, and has abandoned its offices in the City Bank Building, Youngstown. Plans are being developed to start the furnace in the spring.

Detroit

Steady Improvement in Business—Automobile Schedules Increased

DETROIT, Jan. 17.—Conditions in the steel market in the Detroit area are showing improvements, as reflected by the steady increase in production in the automotive industry. For the first time since the summer of 1926 the employment index for the area shows an increase over figures for the preceding year. For the week ended Jan. 3 this increase was 960 compared with the corresponding week in 1927.

The Hudson Motor Co. is scheduling a larger production than for any previous year. The Hudson Essex Co.'s present schedule is almost double that of last year, and the number of men employed will soon reach 20,000 at the present rate of increase.

The Ford Motor Co.'s payroll now amounts approximately to 83,000 men, with 50,500 at the Fordson plant, 27,800 at Highland Park and 4700 at the Lincoln plant. The increase since Dec. 22 amounts to 5700.

Prices in the alloy steels have not changed from previously quoted figures, but are firmer. The question of deliveries is now becoming important, a condition which has not existed recently. Practically the same conditions apply to auto body sheet and blue annealed sheet.

The demand for structural shapes, bars and plates is not as active as in December. Prices remain firm at 1.80c., Pittsburgh, for large lots and 1.90c. for carloads and less. Most of the present volume is made up of small orders.

Pig iron booked for the quarter is on a par with the same period in 1927 and melters are specifying increased tonnages.

Automotive shops are on a high production basis and radiator, stove and furnace manufacturers are getting into production and will show a volume considerably above the last quarter of 1927.

The market on old material in the district remains firm with no advances registered during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$12.00 to $12.50
Boring and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	16.00 to 17.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.75 to 11.25
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Automotive Output High

With a good start given to motor car sales by public interest in the new products exhibited at the New York show, says *Automotive Industries*, production at the factories is at a high level for the season. It is estimated that current output is 20 to 25 per cent above the rate of the corresponding period of 1927. The carry-over of unsold cars into 1928 was exceptionally moderate, and dealers in many lines are in position to stock cars for demonstration as well as deliveries.

Motor vehicle registrations in the United States totaled 23,302,668 on Jan. 1, 1928, according to figures compiled by *Automotive Industries*. This compares with 22,046,957 at the beginning of 1927. Passenger cars alone totaled 20,333,988, against 19,207,808 on the earlier date, while trucks and buses at 2,968,680 compared with 2,839,149 at the beginning of 1927.

Discussion of "What Is the Limiting Temperature in Central Station Operation" will be led by V. T. Malcolm, metallurgical engineer Chapman Valve Mfg. Co., Indian Orchard, Mass., at a meeting of the power division of the American Society of Mechanical Engineers to be held at the Engineering Societies Building, New York, on the evening of Jan. 30.

OBITUARY

William Schwanhausser, chief engineer of the Worthington Pump & Machinery Corporation, New York, died on Jan. 15 at the Peck Memorial Hospital, Brooklyn, after an illness of three months. He was 73 years of age. Born at Wurzburg, Bavaria, Mr. Schwanhausser received apprenticeship training in a sugar machinery manufacturing plant in that country, and later attended the Polytechnic Institute in Mittweida, Saxony, from which he received an M.E. degree. After coming to this country, he was employed by Osterheld & Eichmeyer, Yonkers, N. Y., where he assisted in the development of engines, pumps, typewriters and other equipment. Later he served for eight years as assistant general superintendent of the Otis Elevator Co. In 1885 he was placed in charge of the manufacture of trade pumps for the Worthington Pump Works, Brooklyn. He took charge of the Worthington plant in Germany in 1895 and in 1906, was made chief and consulting engineer of the International Steam Pump Co., which later became a part of the present Worthington organization. He was a member of the American Society of Mechanical Engineers, the Institute of Mechanical Engineers of Great Britain, the Naval Architects of Great Britain and Germany, the Technical Society of New York and of the Verein Deutscher Ingeneure of Berlin.

W. SCHWANHAUSSER

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Alexander E. Outerbridge, Jr., for nearly 40 years metallurgist for William Sellers & Co., Inc., Philadelphia, died on Jan. 15 at his home in Chestnut Hill, Pa. He was born in 1850 and had devoted his life to metallurgical work prior to partial retirement some years ago. Last month he was awarded the William H. McFadden gold medal of the American Foundrymen's Association in recognition of his contributions to the knowledge of cast iron metallurgy. Coincident with this award a more detailed account of Mr. Outerbridge's career appeared in The Iron Age of Dec. 15, 1927, page 1704.

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Charles A. Knill, associated for nearly 40 years with Charles A. Besly & Co., 118 North Clinton Street, Chicago, died at Rochester, Minn., on Dec. 24.

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Richard J. Dibowski, secretary, a director and one of the founders of the Wadsworth Electric Mfg. Co., Covington, Ky., died recently at his home in that city, aged 53 years. He was a director of the Associated Industries of Kentucky and was prominently identified with civic and social activities in that State.

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J. A. Hellstrom, president of the Richard Mfg. Co., Bloomsburg, Pa., and also chief engineer of the Wheeling Mold & Foundry Co., Wheeling, W. Va., died recently at his home in Wheeling. He was a graduate of the University of Stockholm, Sweden, and came to this country shortly after finishing his college training to enter the service of the Baldwin Locomotive Works, Philadelphia. He was later associated with the Cambria Iron Co., the Du Bois Iron Works and the Jones & Laughlin Steel Co. He went to Wheeling as chief engineer of the Mold & Foundry company in 1905. He had been associated with the Richard company for 10 years.

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Julius Jonson, for 20 years president and general manager of the former Jonson Foundry & Machine Co., 118th Street and Harlem River, New York, and well known as an engineer and an inventor, died at his home in Mount Vernon, N. Y., on Jan. 2. He was born in Germany in 1843 and came to the United States when he was four years old. He was graduated from the Maryland Institute of Design, Baltimore, and during the Civil War was in charge of the construction of engines for Federal gunboats. After the war he was associated for several years with the Cumberland Coal & Iron Co., Cumberland, Md. After locating in New York he served as assistant engineer in the Department of Public Works, and was prominently identified with the construction of street railroads. He is credited with the invention of the crossing gate for railroads.

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Allen H. Moore, former chairman of the standardization committee of the General Electric Co., Schenectady, N. Y., died Jan. 10 at his home in Albany, N. Y., aged 62 years. He had been in failing health for several months.

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Mallory P. Spencer, general sales manager of the Halcomb plant of the Crucible Steel Co. of America, Syracuse, N. Y., died Jan. 8, from the effects of monoxide gas, inhaled in his garage. He was 45 years of age.

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Harry Benjamin, president of the Harry Benjamin Equipment Co., St. Louis, died recently at his home in that city after a long illness. He was born at New Orleans, June 10, 1862, and attended the public schools of New Orleans and Cincinnati. At an early age he entered the office of the Block Pollak Iron Co., Cincinnati, advancing to the position of assistant purchasing agent and treasurer. In 1906, when that firm opened a branch office in St. Louis, he took charge, serving until 1911, when the firm was liquidated. He then organized its successor, the Harry Benjamin Equipment Co., specializing in the handling of railroad equipment and metals.

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Charles G. Tiefel, a director of the Todd Co., Rochester, N. Y., and for many years superintendent of the old firm of O. W. Todd & Co., manufacturers of the protectograph, died in Rochester, on Dec. 27, aged 66 years.

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J. Howard McFeely, vice-president in charge of sales for the McFeely Brick Co., manufacturer of silica brick, with plants at Latrobe and Port Matilda, Pa., died Dec. 26, at his home in Pittsburgh. He was born in Steubenville, Ohio, 50 years ago but had resided in Pittsburgh since boyhood.

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William A. Cooper, for more than 40 years connected with the Alan Wood Iron & Steel Co., Philadelphia, died Dec. 29 at the age of 73. Until three years ago he was for many years manager of the Schuylkill Iron Works department of the company at Conshohocken, Pa. He was a member of the committee on corrosion of iron and steel of the American Society for Testing Materials.

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Herman Belmer, president of the H. Belmer Co., Cincinnati, jobber of wire goods, died at his home in that city Jan. 7, following an illness of six months. He was 86 years of age. Born in Germany, he came to the United States at an early age and located in Cincinnati. Soon after the Civil War, in which he served with the First Ohio Volunteers, he founded the H. Belmer Co., which for many years has been one of the leading wire jobbing houses in the Cincinnati district. He also was formerly vice-president of the Cincinnati Barbed Wire Fence Co.

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James Doherty, formerly vice-president in charge of sales for the Utica Heater Co. and well known in the stove and heater trade both in Canada and the United States, died suddenly at his home in Chicago on Dec. 26. He was born at Uttoxeter, Ont., and after gaining business experience in his father's company he joined the staff of the Utica Heater Co. and was appointed to the Boston office in charge of New England territory in 1907. In 1912 he went to Sarnia, Ont., as manager of the Doherty Mfg. Co., Ltd., and effected a considerable enlargement of the plant. After two years he joined the Utica company at its Chicago office, eventually becoming vice-president in charge of sales. While at Chicago he perfected various improvements in smokeless heating boilers which have been made the standard practice of the National Radiator Corporation, with which the Utica Heater Co. was recently merged.

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John W. Murray, for 26 years superintendent of the spike and bolt department at the Joliet, Ill., works, Illinois Steel Co., died Jan. 6 in a Chicago hospital after an illness of four weeks. He was born at Springfield, Ill., March 1, 1867, and had been an employee of the Illinois company at Joliet since 1885.

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William Wieman, president Wieman & Ward Co., Pittsburgh, coal and coke dealer, died at his home in Sewickley, Pa., Jan. 12. Mr. Wieman was born in Columbus, Ohio, in 1874, but had been located in Pittsburgh and identified with the sale of pig iron, coal and coke for the past 25 years. He was associated with the iron, steel and fuel brokerage firm of Banning, Cooper & Co. before he went into business for himself about 12 years ago.

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Frederick Brune, inventor of labor-saving devices for the sheet metal industry, died at his home in Milwaukee on Jan. 10, aged 70 years. He had been a director of the Barnes Zinc Products Co., Chicago, but retired a year ago.

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Herbert G. Thomson, president of the Anchor Post Fence Co., New York, died on Jan. 11, immediately following an attack of acute appendicitis which he suffered when leaving the Grand Central Terminal in New York. He was 57 years of age and had been associated with the Anchor Post company and its predecessor since his graduation from the Sheffield Scientific School of Yale University in 1892. He became president of the company in 1902.

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Daniel Kennedy, president and founder of the Kennedy Valve Mfg. Co., Elmira, N. Y., died on Dec. 14 at Hot Springs, Ark.

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Everett J. Neville, formerly vice-president and general manager of the C. O. Bartlett & Snow Co., Cleveland, died Jan. 13 in Oakland, Cal. For several years he had represented the Universal Crane Co., Elyria, Ohio, as manager of its California sales. A son, C. J. Neville, is superintendent of the Bartlett & Snow plant.

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Dan Shea, president of the Dan Shea Boiler Works, Inc., Memphis, Tenn., which he founded nearly 50 years ago, died on Jan. 11. He was 71 years of age.

Fabricated Structural Steel Bookings Make High Total in 1927

Washington, Jan. 17.—Computed bookings of fabricated structural steel in 1927 totaled 2,750,700 tons, representing 72 per cent of capacity, as against 2,553,540 tons in 1926, representing 67 per cent of capacity, according to the Department of Commerce. The increase in the year's total was 7.7 per cent, placing 1927 second only to 1925 in aggregate tonnage booked. Shipments in 1927 are computed at 2,626,680 tons, or 69 per cent of capacity, as compared with 2,842,920 tons, or 75 per cent of capacity, in 1926.

Bookings in December were 205,165 tons, according to reports received from 184 firms with a capacity of 274,865 tons, as against 187,188 tons in November, according to reports from 199 firms with a capacity of 279,110 tons. Computed bookings in December totaled 238,500 tons, as compared with 213,060 tons in November, while computed shipments were 225,780 tons for each month.

Philadelphia Foundrymen Appoint Committees for Convention

Arrangements in connection with the thirty-second annual convention and exhibition of the American Foundrymen's Association to be held in Philadelphia, May 14 to 18, were discussed at a meeting at the Union League, Philadelphia, Jan. 13, when representative manufacturers were the guests of G. H. Clamer, president Ajax Metal Co., and past president of the A. F. A.

C. E. Hoyt, executive secretary of the association, informed those present that indications point to the largest exhibit in the history of the organization.

Local committees were appointed and tentative plans for receiving and entertaining delegates were discussed. The chairmen of local committees are as follows:

G. H. Clamer, Ajax Metal Co., general committee; T. H. Addie, American Manganese Bronze Co., golf committee; Ralph Belleville, Joseph Dixon Crucible Co., ladies entertainment committee; J. A. Davies, Westinghouse Electric & Mfg. Co., hotel committee; Frederick M. Devlin, Philadelphia Hardware and Malleable Iron Works, entertainment committee; C. F. Hopkins, Ajax Metal Co., finance committee; B. H. Johnson, Cresson-Morris Co., plant visitation committee; Walter L. Kalbach, transportation committee; Laird U. Park, Park & Williams, Inc., reception committee; Earl S. Sparks, Metal Manufacturers' Association of Philadelphia, publicity committee.

A. W. Berresford Elected President of Engineering Council

The American Engineering Council at its annual meeting held in Washington, Jan. 10 and 11, elected A. W. Berresford, electrical engineer, New York, as president for 1928. Mr. Berresford, who is a past president of the American Institute of Electrical Engineers, succeeds Dr. Dexter S. Kimball, dean of the college of engineering, Cornell University.

Vice-presidents of the council are: L. P. Alford, New York; O. H. Koch, Dallas, Tex.; I. E. Moultrop, Boston, and G. S. Williams, Ann Arbor, Mich. H. L. Howe and L. W. Wallace, Washington, were again named treasurer and executive secretary, respectively. James T. Grady, Columbia University, New York, continues as publicity director.

Among other activities of the council was the discussion and vote of approval of a bill pending in Congress which would place the proposed National Hydraulic Laboratory in the Bureau of Standards. The council also favored in principle that section of a House bill which provides for the establishment of a bureau of labor statistics in the Department of Labor, but withheld indorsement for the creation of a safety museum.

Plans Arbitration for Steel Industry

Arbitration in industrial disputes soon may be adopted in the steel industry, according to Charles M. Schwab. Speaking at a luncheon at the Lawyers Club, New York, given by United States Attorney Charles H. Tuttle and the American Arbitration Association, Mr. Schwab said that he hoped to introduce a resolution at the next meeting of the American Iron and Steel Institute, officially bringing arbitration into use in the industry. He pointed out that in his own experience with the Carnegie and Bethlehem companies he had always found this method of settling disputes preferable to industrial litigation, and that the procedure when carried throughout the industry, would help to bring about good will both within and among the companies.

The application of motion study both in industrial and retail fields will be discussed and illustrated by motion pictures at a meeting of the management division of the American Society of Mechanical Engineers, to be held at the Engineering Societies Building, New York, on the evening of Jan. 30. One of the speakers will be J. A. Piacitelli, engineer Barber Asphalt Co., Maurer, N. J.

FABRICATED STRUCTURAL STEEL

New Projects Involve 41,400 Tons With 20,000 Tons for Cleveland Terminal Work

Awards, amounting to 22,750 tons in the last week, included 10,500 tons for an apartment and two office buildings in Chicago. Three buildings for the Cleveland Union Terminals Co., requiring 20,000 tons, brought the total of new projects to 41,400 tons. Awards follow:

Pennsylvania Railroad, 500 tons, bridges at Philadelphia, 200 tons, to an unnamed fabricator; bridges at Cape Charles, Va., 200 tons, to American Car & Foundry Co., and bridge at Woodlawn Avenue, Philadelphia, 100 tons, to Bethlehem Steel Co.

State of New Jersey, 200 tons, bridges for State Highway Commission at Clinton, N. J., to Bethlehem Steel Co.

Philadelphia, 460 tons, Tourison Building, Market Street, to Montgomery Iron & Steel Co.

Hagerstown, Md., 125 tons, boiler house, to Jones & Laughlin Steel Corporation.

State College, Pa., 800 tons, recreation building for Penn State College, to Bollinger-Andrews Co., Pittsburgh; previously reported awarded to H. K. Ferguson Co.

San Antonio, Tex., 3000 tons, Smith Brothers building, to an unnamed bidder.

La Salle, Ill., 350 tons, building for Marquette Cement Mfg. Co., to Rock Island Bridge Co., Rock Island, Ill.

Boston, 150 tons, building for McMillen Co., to Lehigh Structural Steel Co.

Cambridge, Mass., 175 tons, Third Street bridge, to Boston Structural Steel Co.

Bristol, R. I., 100 tons plates for yacht, to Lukens Steel Co.

New York, 2900 tons, section 11, route 101, subway; from Arthur A. Johnson Corporation, general contractor, to American Bridge Co.

New York, 2500 tons, commerce building for College of the City of New York, to Taylor-Fichter Steel Construction Co.; reported last week to an unnamed fabricator.

Kearny, N. J., 500 tons, three buildings for E. I. duPont de Nemours & Co., to Belmont Iron Works.

Somers Point, N. J., 150 tons, bridge; from F. W. Schwiers, Jr. & Co., general contractors, to Bethlehem Steel Co.

Cleveland, 110 tons, Pattison-Leitch Co. warehouse addition, to Jones & Laughlin Steel Corporation.

Chicago, 4300 tons, Woolworth Building, to American Bridge Co.

Chicago, 3200 tons, apartment building at 1500 Lake Shore Drive, to American Bridge Co.

Chicago, 3000 tons, Willoughby Building, to American Bridge Co.

Chicago, 1700 tons, Clark Street bascule bridge, to American Bridge Co.

Ellensburg, Wash., 285 tons, North Branch canal project, United States Bureau of Reclamation, to unnamed fabricator.

Seattle, 672 tons, Argo Crossing, to Hofius Steel & Equipment Co.

San Francisco, 160 tons, apartment building, Gough and Bush Streets, to Golden Gate Iron Works.

San Francisco, 140 tons, apartment building, Broderick and Haight Streets, to Herrick Iron Works.

San Francisco, 100 tons, apartment building, Scott Street, to Dyer Brothers.

San Francisco, 225 tons, apartment building, Leavenworth and O'Farrel Streets, to Central Iron Works.

Culver City, Cal., 150 tons, City Hall, to Brombacher Iron Works.

Los Angeles, 100 tons, apartment building, Bronson and Franklin Avenues, to Brombacher Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Philadelphia, 150 tons, building for Abingdon Hospital.

Philadelphia, 800 tons, building for Army and Navy Y. M. C. A.

Cleveland, 700 tons, Whitehouse crossing grade elimination.

Cleveland, 20,000 tons, department store, medical office and garage buildings for Cleveland Union Terminals Co.

Lincoln, Neb., 1000 tons, section of State Capitol Building.

Cambridge, Mass., 450 tons, Lever Brothers plant addition.

Leominster, Mass., 100 tons, theater.

Lynn, Mass., 580 tons, Lynn Gas & Electric Co. power house addition.

Linden, Mass., 450 tons, boiler house for Linden Gas & Electric Co.; Stone & Webster, general contractors.

Boston & Maine Railroad, 1800 tons, bridge at Westboro, N. H.; bids to be retaken.

Providence, 1000 tons, Court House.

New Rochelle, N. Y., 400 tons, bridge to Glen Island for Westchester County Park Commission.

New York, 5000 tons, Lefcourt Building at Fifth Avenue and Forty-third Street.

New York, 900 tons, Proctor's Theater at Third Avenue and Fifty-eighth Street.

Ithaca, N. Y., 700 tons, residential building for Cornell University.

Philadelphia 350 tons, Stanley Theater on Frankford Avenue.

Chicago, 1400 tons, Sheridan Towers apartments.

Sand Point, Idaho, 1000 tons, highway bridge.

Yakima, Wash., 2000 tons, high line syphon.

Meyers Falls, Wash., 1700 tons, highway bridge.

San Francisco, 700 tons, second unit of apartment building, Chestnut and Hyde Streets; general contract to Dinwiddie Construction Co.

San Francisco, 180 tons, shapes for stock for Pacific Fruit Express Co.; bids in.

RAILROAD EQUIPMENT

Inquiries for 2300 Freight Cars — Canadian Pacific Purchases 550

Purchases by the Canadian Pacific of 550 freight cars was the outstanding transaction of the week. Pending business continues to increase, the outstanding inquiry coming from the Pacific Fruit Express for 2000 refrigerator cars. Details of the week's business follow:

Union Pacific will buy 23 4-12-2 type locomotives, six gas electric motor cars and eight trailers.

Pacific Fruit Express has issued an inquiry for 2000 refrigerator cars.

Southern Pacific is in market for 300 box car underframes and superstructure parts.

Quarahuy Eitaquy Estrado de Ferro, Brazil, has ordered one Pacific-type locomotive from Baldwin Locomotive Works.

Chicago, Burlington & Quincy will purchase six baggage, three combination passenger-baggage and 150 ballast cars.

St. Louis-San Francisco is inquiring for 30 air-dump cars.

South African Railways are inquiring for 100 40-ton gondola cars.

Great Northern will buy eight 30-cu. yd. air-dump cars.

Canadian Pacific has placed an order for 200 refrigerator cars, 15 palace horse cars and five parlor-café car frames with National Steel Car Corporation, and 300 automobile cars, 50 Hart-Otis ballast cars and 20 first-class passenger car frames with Canadian Car & Foundry Co.

New York Central has placed an order with American Car & Foundry Co. for rebuilding 33 steel underframe passenger coaches.

Mobile & Ohio has ordered three 72-ft. mail and baggage gas-electric rail motor cars from St. Louis Car Co.

Chicago & Alton is inquiring for two postal cars and seven combination baggage and mail cars.

Western Pacific has purchased four café cars from Pullman Car & Mfg. Corporation.

Atchison, Topeka & Santa Fe is inquiring for from 150 to 200 underframes.

Chesapeake & Ohio has made inquiry for 500 70-ton hopper car bodies and for repairs to 500 sets of 70-ton trucks.

Pig Iron Freight Rates Are Declared Reasonable

Washington, Jan. 17.—In a decision announced today the Interstate Commerce Commission held that the rate of $2.60 per gross ton on imported pig iron from Mobile, Ala., to Birmingham and Bessemer, Ala., and the rate of $3.93 from Mobile to Anniston, Ala., are not unreasonable. Shipside delivered rates are $4.16 and $4.49, respectively. Complaint was made against the rates by the United States Cast Iron Pipe & Foundry Co.

In another decision today the commission held that the rate of $2.90 per ton on pig iron from Indiana Harbor, Ind., and South Chicago, Ill., to Holland, Mich., is not unreasonable. Complaint against this rate was made by the Holland Furnace Co.

Electric hoist orders in December reported by members of the Electric Hoist Manufacturers' Association increased nearly 22 per cent over the previous month in number and nearly 20 per cent in value. Shipments were 26.5 per cent less in December than in November.

NON-FERROUS METAL MARKETS

The Week's Prices Cents per Pound for Early Delivery	Jan. 17	Jan. 16	Jan. 14	Jan. 13	Jan. 12	Jan. 11
Lake copper, New York....	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*..	13.87½	13.87½	13.87½	13.87½	13.87½	13.87½
Straits tin, spot, N. Y.	54.25	54.87½	....	55.20	55.62½	56.25
Lead, New York...........	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis............	6.30	6.30	6.30	6.30	6.30	6.30
Zinc, New York............	5.97½	5.97½	5.97½	5.97½	6.00	6.00
Zinc, St. Louis............	5.62½	5.62½	5.62½	5.62½	5.65	5.65

*Refinery quotation; delivered price ¼c. higher.

New York, Jan. 17.—None of the markets is particularly active. The price tendency is fairly steady in all but tin. In the face of small demand, copper prices hold firm. Sales of tin have been fairly heavy at the lowest prices in many months. Conditions in lead are unchanged, and the zinc market is a little softer.

Copper.—Very light demand both at home and abroad has been the history of the past week. Leading producers are all adhering to 14.12½c., delivered in the Connecticut Valley, and it is not possible to buy any large quantity of copper lower than this level. There have been a few sales of small quantities of electrolytic copper at around 14.05c. to 14.07½c., delivered, but the business has not been sufficient to establish a market. In fact, the general situation is such that prices are largely nominal. Copper Exporters, Inc., maintains its official quotation unchanged at 13.50c., c.i.f. usual European ports. There have been more inquiries for Lake copper today than yesterday and the quotation is unchanged at 14.25c., delivered. Statistics for December showed an increase in stocks of refined metal of about 4400 tons. The feature of the statistics was the exports for the month. At about 63,600 tons the total was the largest on record.

Tin.—Rapidly falling prices in spot Straits tin the past week have brought the quotation, which was 54.25c., New York, today, to the lowest price since May 19, 1925. Sales have been moderately heavy, the total for the week ended Friday, Jan. 13, having been 1300 tons, with 150 tons sold on Saturday. The cause of the decline is that stocks are heavy in many large centers of the world so that the technical situation has been weakened. As a result, sentiment is very bearish. Yesterday and today the market has been only moderately active, with 250 and 200 tons sold on each day respectively. In last week's sales, consumers were the principal buyers, dealers being disheartened at the decline in prices. There has been no support to the market and many of the larger houses, here and in London, have been anxious sellers. Prices in London today were about £7 per ton less than a week ago, with spot standard quoted at £247, future standard at £246 5s. and spot Straits at £247. Arrivals thus far this month have been 2945 tons, with 6500 tons reported afloat.

Lead.—The market is quiet and unchanged. No inquiries of magnitude are reported. Late last week consuming demand revived temporarily. The leading interest continues to quote 6.50c., New York, as its contract price, with the price in the outside market at 6.30c., St. Louis.

Zinc.—Demand is so light that quotations are nearly nominal and are a little lower than a week ago, at 5.62½c., St. Louis, or 5.97½c., New York, for prime western for early delivery. Consumers are fairly well covered for their nearby requirements. Stocks of ore in the Joplin district at over 51,000 tons on Jan. 1 were the largest ever recorded. Despite this, production for the week ended last Saturday was 12,000 tons, with sales about 8100 tons. The price stands at $36 per ton, the same as the previous week. When prime western touched 5.60c., St. Louis, late last year, ore was at $33 per ton.

Nickel.—Ingot nickel in wholesale lots is quoted at

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c. to 57.50c.
Tin, bar	58.50c. to 59.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	61.25c.
Tin, bar	63.25c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	65.25c.
Solder, ½ and ½	36.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass ond copper products are still being quoted at the advances of Dec. 5. Prices on zinc and lead full sheets have not changed since Aug. 5 and Dec. 1, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	9.75c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	8.75c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The market is quiet and Chinese metal for spot delivery is quoted at 11c., with futures at 11.25c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots, is quoted at 23.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 17.—Prices in this market are steady except in tin. Sales of copper are in fair volume. The old metal market is quiet and prices are holding at the levels of last week.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 56.75c.; lead, 6.40c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Chicago Building Will Take 3000 Tons—New Inquiries Total 7900 Tons, and Awards 5400

Including 1900 tons for subway work in New York and 1200 tons for a sewer at Akron, Ohio, last week's awards amounted to 5400 tons. Outstanding in the 7900 tons added to pending work was a canning building in Chicago which will require 3000 tons. Awards follow:

NEW YORK, 1000 tons, section of subway; from Arthur A. Johnson Corporation, general contractor, to Igoe Brothers.

NEW YORK, 400 tons, two sections of subway, 200 tons from Atwell, Gustin & Morris, general contractors, and 200 tons Moranti & Raymond, Inc., contractor, to Concrete Steel Co.

BROOKLYN, 500 tons, section of Chase Street subway; from Carleton Co., general contractor, to McClintic-Marshall Co.

WAMPAUM, PA., 300 tons, State highway bridge, to Truscon Steel Co.

AKRON, OHIO, 1200 tons, sewer work, to Concrete Steel Co.

CHATTANOOGA, TENN., tonnage being estimated, Fort Wood apartment building, to Connors Steel Co.

CHATTANOOGA, TENN., tonnage being estimated, Read creamery plant, to Connors Steel Co.

BIRMINGHAM, tonnage being estimated, Kennedy school, to Connors Steel Co.

LANCASTER, S. C., tonnage being estimated, filtration plant, to Connors Steel Co., Birmingham.

NEW ORLEANS, tonnage being estimated, addition to Poydras Street docks, to Connors Steel Co.

CHICAGO, 450 tons, Kelly public school, to an unnamed bidder.

AUSTIN, ILL., 100 tons, Post Office building, to Olney J. Dean & Co.

COOK COUNTY, ILL., 160 tons of rail steel bars for road work, to Calumet Steel Co.

EVANSTON, ILL., 100 tons of rail steel bars, Pembridge apartment hotel, to American System of Reinforcing.

ELLENSBURG, WASH., 835 tons, North Branch canal project, United States Bureau of Reclamation, to unnamed interest.

ALAMEDA, CAL., 250 tons, factory for N. Clark & Sons, to Badt-Falk Co.

SAN FRANCISCO, 100 tons, arena, Post and Steiner Streets, to local jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 250 tons, Chevrolet garage and service station at Fifty-sixth Street and Eleventh Avenue; general contract to Turner Construction Co.

CAMDEN, N. J., 900 tons, building for Camden Cold Storage Co.

PHILADELPHIA, tonnage unstated, piers for Tacony-Palmyra bridge.

PHILADELPHIA, 300 tons, building for Army and Navy Y. M. C. A.

PHILADELPHIA, 350 tons, building for Abingdon Hospital.

CLEVELAND, 745 tons, Whitehouse crossing grade elimination.

WHITE PLAINS, N. Y., 200 tons, community building for Westchester County Park Commission.

BOSTON, 100 tons, stores on Newbury Street.

BUFFALO, 125 tons, school No. 47; being figured.

BUFFALO, 150 tons, stadium for Buffalo high schools; plans being prepared.

ROCHESTER, N. Y., 180 tons, State hospital; bids closed Jan. 18.

CHICAGO, 3000 tons, building for Campbell Soup Co.; Henry Ericsson, general contractor.

CHICAGO, 100 tons, Women's Athletic Club; Phillip Maher, architect.

CHICAGO, 186 tons, office building at Washington Boulevard and LaSalle Street.

CHICAGO, 600 tons, Passavant Hospital; Holabird & Roche, architects.

EVANSTON, ILL., 200 tons, Boltwood public school.

EVANSTON, 300 tons, apartment building at corner of Hinman Avenue and Grove Street.

SAN FRANCISCO, 475 tons, merchant bars and bands for Pacific Fruit Express Co.; bids in.

Improvements in Ferrous Sintering

(Concluded from page 193)

content. They also serve to make the charge more porous and to provide the necessary binder to the material, thus preventing an excessive amount of material being drawn through the grates by suction. No special attempt is made to place a protection or hearth layer on the grates, except that, in distributing the material on the grates, it is so baffled against a forged screen that the coarser particles of returns are screened out and roll down on the grates ahead of the flue dust.

Daily production of the plant described averages about 800 tons of sinter, which may well be considered a good performance, especially as custom sintering is subject to many circumstances not present in privately operated plants.

Although it is not possible to present the exact cost figures of the plant in question, they will not vary materially from the table. The figures represent cost in cents per ton of sinter, based on favorable conditions.

Ignition fuel	2c.
Labor	36
Repairs	24
Power	17
Overhead and royalty	21
	100c.

(To be continued)

PERSONAL

W. G. Maguire, since 1923 president of the St. Louis Gas & Coke Corporation, St. Louis, has resigned and will be succeeded by M. D. Curran, who has been vice-president, general manager and a director. Mr. Maguire will remain a director of the company but will devote his time to the Utilities Power & Light Corporation, of which the Gas & Coke corporation is a subsidiary. He has been associated with the latter company and its predecessors since 1916, having previously been manager of the St. Louis branch of the Domhoff & Joyce Co., Cincinnati. Mr. Curran went to the St. Louis company in 1923 as general superintendent of operations at Granite City, Ill. In 1925 he became vice-president in charge of operations, and the following year, vice-president and general manager. He was actively in charge of the building of the company's second blast furnace and its electric power plant in 1926, and has also been prominently identified with other large engineering projects relating to the gas and light activities of the parent company and its other subsidiaries. Mr. Curran, who is not yet 35 years of age, was born at New Straitsville, Ohio, and was graduated from the Corning, Ohio, high school. He entered the department of mining and metallurgical engineering at Ohio State University in 1909 and, during the summer months of his college years, worked in the coke ovens of the Connellsville district. He also withdrew from the college for a year to work in the ore mining properties of the Republic Iron & Steel Co. in the Mesabi range. He returned to the Republic company, following graduation from Ohio State University in 1914, as burden clerk at the Hazleton furnaces, Youngstown. In less than a year he was made chief chemist of the company's coke plant. In 1916 he became assistant coke oven superintendent for the Toledo Furnace Co., Toledo, Ohio, and two years later was made superintendent of its coke oven plants. In 1920 he became assistant general superintendent of the company's complete operations, holding that position until he went with the St. Louis company in 1923. He has been a director and vice-president of the St. Louis Coal & Iron Co., the company's coal mining subsidiary, and now assumes the presidency of that company. It is understood that Mr. Curran plans to move the general offices of the Gas & Coke corporation back to St. Louis from Chicago where they were taken about a year ago.

W. G. MAGUIRE

M. D. CURRAN

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Joseph B. Deisher, 24 Roslyn Street, Rochester, N. Y., has been appointed by the American Foundrymen's Association as representative of the malleable foundry industry on an advisory committee to the Department of Commerce. He is one of the three representatives of the iron and steel industry on this committee who are available to the department for consultation and advice concerning their respective branches of the industry. Mr. Deisher for a number of years was connected with the Symington Co., Rochester, and later was associated with the engineering department of the Malleable Iron Research Institute at Albany, N. Y. He recently returned from Europe, where he represented the American Radiator Co. as a specialist on foundry work. Since then he has been engaged in general consulting practice on gray iron foundry work.

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H. F. T. Erben, assistant vice-president of the General Electric Co., retired on Jan. 1, after more than 40 years of service with that company. At the time of his retirement he was also vice-chairman of the General Electric manufacturing committee. B. L. Delack has been appointed manager of the Schenectady, N. Y., plant of the General Electric Co., and E. A. Wagner has been made manager of its Pittsfield, Mass., plant. C. N. Gregory has been named manager of the New Haven, Conn., sales office, succeeding Frederic Cutts, and R. B. Ransom has been appointed resident agent in charge of the Hartford, Conn., office, succeeding Mr. Gregory.

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Charles A. Fisher, since last April president of the Jones & Laughlin Steel Corporation, Pittsburgh, has resigned. A desire to retire from active business is Mr. Fisher's reason for severing a connection that began in 1898. He was then 22 years old and started with the company as a bookkeeper, successively serving as assistant auditor, assistant treasurer, treasurer, assistant to the president and, before his election to the presidency, as vice-president in charge of finances. For 10 years he was closely associated with the late William Larimer Jones, whom he succeeded as president of the company.

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James R. White, for nine years vice-president of Rickard & Co., New York, industrial advertising agency, on Jan. 1 became secretary of Jenkins Brothers, 80 White Street, New York, valve manufacturers. During his association with the Rickard organization Mr. White was in charge of the direction of Jenkins advertising. Associates in Rickard & Co. tendered Mr. White a testimonial dinner at the Hotel Vanderbilt, New York, on Dec. 30.

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G. A. Roush has received a leave of absence from the metallurgical faculty of Lehigh University, Bethlehem, Pa., and will devote his time to the development and gathering of exhibits on mining and metallurgy for the Museums of Peaceful Arts, New York. He is open to suggestions concerning suitable materials or models showing industrial progress in ore smelting and metal working.

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E. K. Swigart has been elected chairman, and H. M. Swigart, president of the Oilgear Co., Milwaukee.

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Charles H. Leinert, president of the Leinert Valve Co., Inc., 310 South Michigan Avenue, Chicago, has been appointed district representative in that city for the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

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Horace C. Knerr, consulting metallurgical engineer, Philadelphia, will address the Cleveland chapter, American Society for Steel Treating, on "Aircraft Metallurgy," Friday evening, Jan. 20.

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Lon Sloan has been placed in charge of a district sales office recently opened at 223 Railway Exchange Building, Chicago, by the Hendrick Mfg. Co., Carbondale, Pa., manufacturer of steel grating, stair treads and kindred products.

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Samuel Porcher, assistant vice-president in charge of purchases, stores and insurance for the Pennsylvania Railroad, has retired from active service under the company's pension regulations. He has been in the railroad's service for 46 years.

T. G. McDougal has been appointed vice-president in charge of spark plug ceramic development for the AC Spark Plug Co., Flint, Mich., and will also have supervision over the company's foreign plants at Birmingham, England, and Paris.

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John F. Edgerton, president of the National Association of Manufacturers, will be the principal speaker at a meeting of the Central Illinois Unit in Decatur, Ill., Jan. 27, at which manufacturers, bankers and representatives of commercial associations will be guests.

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F. M. Kimball has been appointed advisory manager, and J. E. N. Hume, manager, of the motor division of the industrial department, recently created by the General Electric Co., Schenectady, N. Y. The new division will have general supervision of all motors handled by the company's industrial department. K. H. Runkle has been appointed manager of mining and steel mill sales, succeeding Mr. Hume. These appointments were effective Jan. 1.

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T. C. Crosby, formerly in the Tulsa, Okla., office of the Graver Corporation, East Chicago, Ind., has been placed in charge of the sale of tanks and steel plate equipment in the new office which has been opened by the company at 201 Petroleum Building, Fort Worth, Tex. H. E. Clark, recently in the company's Houston, Tex., office, will handle sales of refinery equipment, and C. J. Hutcheson, who has been in the home office, will be in charge of water softening and filtering equipment sales at Fort Worth.

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Joseph Zubaty, who has been in charge of speedometer and other instrument development of the AC Spark Plug Co., Flint, Mich., for a number of years, has been appointed chief engineer of the company. Before becoming associated with the AC company, Mr. Zubaty was chief engineer of the H. & M. Farman Co., Paris, a leading French airplane manufacturer, and was prominent in the development of the Farman airplane and automobile engines. He is a graduate of Prague University in Czechoslovakia.

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J. M. Telford has been made sales manager in Illinois for the Austin Western Road Machinery Co., Chicago, and will have headquarters at Springfield. He has represented the company in the upper peninsula of Michigan for a number of years.

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L. F. Rains has been appointed acting general manager of the Columbia Steel Corporation, San Francisco, succeeding H. D. Botchford, who recently resigned on account of ill health. Mr. Rains was formerly manager for the corporation at Salt Lake City, Utah.

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G. H. Hutchins, who has been in active charge of all sales of coke for foundry, industrial and domestic consumption of the Semet-Solvay Co., New York, has resigned.

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W. A. Riddell, president W. A. Riddell Co., Bucyrus, Ohio, maker of road and clay machinery, and president of the Frederick Iron & Steel Co. and the Frederick Engineering Co., Frederick, Md., makers of centrifugal pumps, has been elected a director of the Engineers National Bank of Cleveland.

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N. McE. Sage, of the Raytheon Co., Cambridge, Mass., has been elected president of the Atlas Tack Corporation to succeed W. E. Maxson, who has resigned.

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Charles A. Roberts, plant superintendent of the Gurney Heater Mfg. Co., Framingham, Mass., has resigned. He has been succeeded by M. L. Doelman, formerly with the Union Radiator Co., Johnstown, Pa.

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Julian A. Pollak, vice-president Pollak Steel Co., Cincinnati, has been re-elected president of the Cincinnati River-Rail Transfer Co., which owns and operates a terminal at Cincinnati for the transfer of freight from Ohio River barges to railroad cars or motor trucks.

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Col. George G. King has been elected president of the Peters Cartridge Co., Cincinnati, manufacturer of ammunition, succeeding W. E. Keplinger, who recently resigned. Colonel King has been identified with the company since its organization and for a number of years has been works manager and a member of the board of directors.

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Carl H. Casberg, for the last two years superintendent of the machine laboratory at the University of Illinois, has been made manager of the shop laboratories at the university, the appointment to be effective Feb. 1. He succeeds the late Bruce W. Benedict. Mr. Casberg was graduated from the University of Wisconsin in 1916.

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Edward L. Leeds, formerly vice-president and director of the Niles-Bement-Pond Co. and vice-president of Pratt & Whitney Co., and Brent A. Tozzer, until recently New York sales manager for the Niles Tool Works Co. and the Pratt & Whitney Co., have engaged in business under the name of Leeds Tozzer & Co., Inc., and have taken offices at 75 West Street, New York. They will specialize in machinery engineering work and will represent manufacturers of heavy machinery. Both have had long experience in the machine tool industry.

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Fred H. Oberschmidt has been appointed manager of the Pacific Coast district office of the Cutler-Hammer Mfg. Co., Milwaukee. His headquarters will be at 970 Folsom Street, San Francisco.

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Flavel M. Woodworth and Eugene F. LaPorte, employees of the Pratt & Whitney Co., Hartford, Conn., were recently honored by the company for their long terms of service. Mr. Woodworth has completed his sixtieth year of continuous service. He started as an apprentice and has been employed in the planer department for 40 years. Mr. LaPorte, who has been with the company for 50 years, began as a messenger boy, and in later years has been a special messenger for the company.

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William W. Dodge has been appointed sales representative in western New York for the C. O. Bartlett & Snow Co., Cleveland, and will have his headquarters at Warsaw, N. Y. After graduation from Cornell University he served an apprenticeship in the shops of the Dodge Mfg. Co., Mishawaka, Ind., and was subsequently associated with that company in various capacities, having been for some years vice-president and Chicago district manager. Recently he has devoted his time to the design and sale of material handling equipment.

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F. X. Devlin, recently purchasing agent for the Federal Motor Truck Co., has been made district sales manager at Chicago for the H. C. Atkins Mfg. Co., St. Louis, and will have charge of the company's pipe nipple sales in northern Indiana, northern Illinois, western Michigan, Wisconsin and Minnesota.

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Robert W. Bier has been placed in charge of the Chicago office of the Erie Ball Engine Co., Pittsburgh, at 1540 Monadnock Block. He is a graduate of the Carnegie Institute of Technology and has been identified with the Erie company for several years in both the sales and engineering departments.

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G. S. Carrick, lately president and general manager of the Carrick Engineering Co., Chicago, has been appointed general manager of the industrial department of the American Arch Co., Inc., New York, and will have charge of matters relating to the company's furnace products. After graduation in 1909 from Purdue University, Lafayette, Ind., he served in the power plant and industrial sales departments of the Westinghouse Electric & Mfg. Co., East Pittsburgh. In 1913 he entered the combustion engineering field, engaging particularly in power plant work, later organizing the Carrick company, which specialized in the automatic control of combustion for boiler plants and furnaces.

Eugene G. Grace, president Bethlehem Steel Corporation, will be the principal speaker at the annual banquet of the Engineers Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Monday evening, Jan. 30. His talk will be on the need of broader business training for engineers.

S. W. Utley, president American Foundrymen's Association and vice-president Detroit Steel Casting Co., was the speaker at the regular monthly meeting and dinner of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, on Jan. 16. His subject was "Why Initiative Deserves Profit."

T. M. Girdler was elected president of the Jones & Laughlin Steel Corporation, Pittsburgh, at a meeting of the board of directors held on Jan. 12. At the same meeting W. J. Creighton was made a vice-president and director of the company, and W. C. Robinson, a director. William D. Evans and William L. Jones, Jr., were elected to the executive committee, and W. H. Dupka, who has been assistant comptroller, was made comptroller and assistant secretary. These changes are incident to the death of B. F. Jones, Jr., chairman of the board, whose place, it was said following the meeting, will probably remain vacant until the annual meeting of the corporation in April. The new president was graduated in mechanical engineering from Lehigh University, Bethlehem, Pa., in 1901, and immediately became associated with the Buffalo Forge Co., Buffalo, N. Y. Shortly afterwards he was sent to London, England, as sales engineer and assistant to that company's London representative. In 1902 he returned to this country to become identified with the Oliver Iron & Steel Corporation, Pittsburgh, remaining with that company until 1905, when he went with the Colorado Fuel & Iron Co., Pueblo, Colo. Two years later he became general superintendent of the Atlantic Steel Co., Atlanta, Ga., remaining with that company until 1914, when he joined the Jones & Laughlin company as assistant to the general superintendent of the Aliquippa works, Woodlawn, Pa. Later he was successively assistant general superintendent and general superintendent of that works and general manager of all plants and properties of the company. Two years ago he was elected vice-president in charge of operations and a director and, a year ago, was made a member of the executive committee. W. C. Robinson, the new director, is president of the National Metal Molding Co. and a director of the Mellon National Bank and the Union Trust Co., Pittsburgh. Mr. Creighton, the new vice-president, has been with the corporation since 1900 and for several years has been its comptroller.

T. M. GIRDLER

Stanley P. Rockwell, president of the Stanley P. Rockwell Co., Hartford, Conn., spoke before the Providence Engineering Society on Jan. 18, his subject being the "Rockwell Dilatometer and the Volcrit Method of Heat Treatment."

Walter C. Kimball, for two and a half years vice-president in charge of sales for the International Heater Co., Utica, N. Y., has resigned to become associated with William A. White & Sons, real estate agents, 45 Cedar Street, New York.

Arthur C. Pletz has been appointed sales manager of the Niles Tool Works Division of the Niles-Bement-Pond Co., with headquarters at Hamilton, Ohio. For nearly two years Mr. Pletz has been in charge of the miscellaneous tool department at Hamilton, and before that was general manager of the Morris Machine Tool Co., Cincinnati.

Joseph A. Janney, Jr., has purchased the interest of Joseph A. Steinmetz in the firm of Janney-Steinmetz & Co., Philadelphia, engineers. With the dissolution of the partnership the business will be conducted under the name of Joseph A. Janney, Jr.

Carl F. Dietz, president, and Robert T. Kent, general manager, of the Bridgeport Brass Co., Bridgeport, Conn., have resigned. Ralph Day, manager of the Hastings plant of the American Brass Co., Hastings-on-Hudson, N. Y., has been appointed general manager of the Bridgeport company, but a new president has not been selected. Mr. Day had been associated with the American Brass Co. for 22 years, and before going to the Hastings plant about five years ago, was in charge of the company's Waterbury, Conn., branch.

J. W. Berscheld, for the last three years superintendent of the Scott Street plant at Joliet, Ill., of the American Steel & Wire Co., has been made superintendent of both the Scott and Rockdale plants of the company. At the Rockdale works he succeeds H. R. Patterson, whose transfer to the superintendency of the Rankin and Braddock, Pa., works of the company, was mentioned in THE IRON AGE last week. Mr. Berscheld's appointment marks the final step in the consolidation of the Steel & Wire company's Joliet plants which was begun three years ago by the merging of their accounting departments.

J. Frank Rogers has resigned as manager of the gas producer division of the Wellman-Seaver-Morgan Co., Cleveland, and has been succeeded by Victor Windett, who has been engineer of that division since 1917. Mr. Rogers had been with the company since 1901.

J. G. Stromp, formerly general manager of sales for the J. E. Moss Iron Works, Wheeling, W. Va., has become associated with the Pittsburgh Screw & Bolt Corporation, Pittsburgh, and will be attached to its New York sales office.

Edward L. Ryerson, Sr., chairman of the board of Joseph T. Ryerson & Son, Inc., is critically ill at his home, 38 Banks Street, Chicago.

M. L. Mozier has temporarily withdrawn from the active direction of pig iron sales of the Hudson Valley Coke & Products Corporation, Troy, N. Y., on account of the illness of Mrs. Mozier.

E. J. Lowry, metallurgist Hickman, Williams & Co., New York, addressed the Connecticut Foundrymen's Association on the metallurgy of pig iron at Meriden, Conn., Jan. 13.

Form Large Engineering and Construction Firm

United Engineers & Constructors, Inc., has been formed by a combination of the United Gas Improvement Contracting Co., Philadelphia; the Public Service Production Co., Newark, N. J.; Dwight P. Robinson & Co., Inc., New York, and the Day & Zimmermann Engineering & Construction Co., Philadelphia. Dwight P. Robinson will be president of the new corporation, which will have its principal office at Broad and Arch Streets, Philadelphia. The company will maintain branch offices in many cities of North and South America, and will participate in all forms of engineering and construction activity.

Machinery Markets and News of the Works

MARKETS MORE ACTIVE

Agricultural Machinery and Automobile Parts Makers Buy Tools

Price Advances on Certain Lines of Machinery Have Stimulated Recent Placing of Orders

AGRICULTURAL machinery manufacturers in the Chicago district and makers of automobile parts in the Michigan-Ohio territory have been more active in machine tool markets in the past week, resulting in an increase in the volume of sales. A tractor manufacturer in central Illinois bought about $200,000 worth of new equipment, while other farm machinery manufacturers have bought in smaller lots. The International Harvester Co. has enlarged its replacement program at its McCormick plant in Chicago and a Milwaukee road machinery company has prepared a large list of tool requirements.

The Cleveland and Detroit markets have been stimulated by the present activity among manufacturers of automobile parts, most of the plants in that field now operating at capacity. Some business in small lots has been placed by automobile companies in Detroit.

From Cincinnati comes the report that sales dropped off in the past week, but inquiries are numerous and machine tool builders are of the opinion that sales during this quarter will attain fairly liberal proportions. The largest order reported from Cincinnati is 10 18-in. lathes bought by an Ohio wheel manufacturer.

Some of the recent ordering has resulted from price advances, buyers taking advantage of the opportunity to act upon outstanding quotations at the former prices. A Cleveland manufacturer of turret lathes reports a heavy volume of single machine orders, largely from the New York and Chicago territories, following the recent announcement of a 10 per cent price advance.

The National Machine Tool Builders' Association reports that December was the best month of 1927 for net orders. The business for the entire year was about 85 per cent of the 1926 volume. "General opinion," says the association's report, "is that 1928 will see a greater volume of business than 1927."

New York

NEW YORK, Jan. 17.

THERE has been a fair volume of inquiry since the beginning of the month, so that prospective business is considered good. Mergenthaler Linotype Co., Brooklyn, continues as a purchaser of machine tools and equipment. In making changes from belt to motor drive in its shops the company is reported to have ordered more than $85,000 worth of electrical equipment. Purchases of tools have thus far included six turret lathes and a number of engine lathes, and two milling machines are about to be placed. General Electric Co., Schenectady, N. Y., is reported in the market for five tools for Pittsfield and two for Schenectady.

Inquiry from railroads is confined to the list reported last week from the Delaware, Lackawanna & Western. New York Central has not been purchasing recently and is not expected to be in the market again for several weeks. The list of the Delaware, Lackawanna & Western includes the following: For East Buffalo, a 42-in. sizing shear, wheel press recording gage, and 50-ton drop table; for Utica, N. Y., motor-driven floor grinder; for Keyser Valley, Pa., an 18-in. riveting machine, rotary pump, hose dismounting machine and 30-in. engine lathe; for Scranton, Pa., motor-driven floor grinder, 50-ton bushing press, 54-in. horizontal milling machine, 50-ton hydro-pneumatic forcing press, 32-in. vertical turret lathe, two 16-in. engine lathes, 13 x 16-in. hack saw, 4-ft. radial drill, 14-in. sensitive drill, 20-in. engine lathe, band saw, flexible shaft grinder, nibbling machine, spring testing machine, 8000-lb. steam hammer, sand separator and swing frame grinder; for Kingsland, N. J., 42-in. vertical turret lathe, 10 x 36-in. universal grinder and double axle lathe; for Hoboken, N. J., slitting shear.

Recent purchases have included a used Pratt & Whitney thread milling machine and used cutter grinder by a company in Chicago; Stanley No. 2 drill by Boston & Maine Railroad; shop-worn, 6-ft. Niles universal radial drill by an iron company in Pennsylvania; two Ransom R. W. grinders by a company in Rochester; a No. 1 deep-hole drilling machine by an automobile manufacturer in Detroit, and a 16 x 60-in. Pratt & Whitney lathe by a Cleveland manufacturer. Niles Tool Works Co. recently purchased three 20 x 72-in. and two 20 x 96-in. lathes from Pratt & Whitney Co. Sperry Gyroscope Co., Brooklyn, and Ludlow Valve Mfg. Co., Troy, N. Y., recently purchased turret lathes.

Brooklyn Union Gas Co., 176 Remsen Street, Brooklyn, N. Y., has plans for a four-story gas producer plant, 55 x 160 ft., at 396-98 Gardner Avenue, to cost $500,000 with machinery.

John J. Dunnigan, 2382 Grand Concourse, New York, architect, has begun erection of two-story automobile service, repair and garage building on Webster Avenue, to cost about $150,000 with equipment.

Simmons Machine Tool Co., Albany, N. Y., has acquired former plant of General Railway Signal Co., on adjoining site for expansion.

Plattsburg Power & Electric Co., Plattsburg, N. Y., has purchased hydroelectric generating plant of Peck Brothers, textile manufacturers, Shushan, N. Y., and plans expansion in that section, including transmission line construction.

C. J. Wolf, 2 Crary Street, Mount Vernon, N. Y., architect, has plans for one and two-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

Indian Refining Co., 17 State Street, New York, operating an oil refinery at Lawrenceville, Ill., with capacity of 15,000 bbl. per day, is disposing of a bond issue of $1,600,000, a portion of proceeds to be used for expansion.

William Shary, 41 Union Square, New York, architect, will soon begin construction of six-story automobile service, repair and garage building at 310 West Thirty-ninth Street, to cost close to $200,000 with equipment.

Board of Education, Valley Stream, N. Y., is considering installation of manual training equipment in four-story high school to cost $250,000. Fred Wiedersum is architect for board.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has purchased entire block of property on Harlem River, adjoining its generating plant at 201st and Academy Streets, for future expansion.

Elevating and conveying machinery, power and other equipment will be installed in two-story storage and distributing plant, 115 x 202 ft., to be erected by United Grocers Co., Inc., 7981 Clifton Place, Brooklyn, at Evergreen, L. I., to cost $160,000. Allmendinger & Schlendorf, 852 Monroe Street, Brooklyn, are architects.

Mohawk-Hudson Power Corporation, Albany, N. Y., will acquire Schodack Light & Power Corporation, Castleton,

The Crane Market

THERE is an increasing number of overhead crane inquiries in the market, but purchasing has not yet developed to any extent. Business in locomotive cranes is still quiet. The Public Service Production Co., Newark, N. J., which has been inquiring for a 120-ton overhead crane for Roseland and a 65-ton crane for West Orange, N. J., has asked for bids on a 120-ton crane for Metuchen, N. J. The 13 cranes for the West Philadelphia plant of the General Electric Co., reported placed last week, are understood to have been distributed as follows: Four 2-ton traveling wall cranes to the Box Crane & Hoist Corporation, three 10-ton electric overhead cranes to the Niles Crane Corporation, nine 5-ton underhung electric cranes to the Northern Engineering Works and one 5-ton overhead crane to the Milwaukee Electric Crane & Mfg. Corporation. At an opening of bids by the Government of Porto Rico on a 15-ton, 24-ft. span electric crane, the low bid was submitted by the Box Crane & Hoist Corporation.

Among recent purchases are:

E. L. Phillips & Co., 50 Church Street, New York, 10-ton hand power crane for Long Island Lighting Co., from New Jersey Foundry & Machine Co.

Turbine Equipment Co., 30 Church Street, New York, 3-ton, 24-ft. span hand power crane from Box Crane & Hoist Corporation.

Norfolk & Western Railway Co., Roanoke, Va., 15-ton, 78-ft. span and 10-ton, 18-ft. span, overhead electric cranes from Niles Crane Corporation.

Midland Barge Co., Pittsburgh, 40-ton electric gantry crane from Orton Crane & Shovel Co.

Weil-McLain Co., Michigan City, Ind., three 5-ton and one 7½-ton electric cranes from Erie Steel Construction Co.

Carnegie Steel Co., Pittsburgh, 10-ton, 46-ft. span, magnet handling crane for its Edgar Thomson works, from Alliance Machine Co.

N. Y., and consolidate with system. Plans are under consideration for expansion in last noted district, including transmission lines.

Lexington Electric Products Co., 419 East Twenty-fourth Street, New York, manufacturer of switchboards, electric panels, etc., has acquired the two and three-story factory at 6-26 Chapel Street, Newark, and will remodel for a new plant. An additional unit will be erected to increase floor area to 75,000 sq. ft.

W. P. Katz, 2 Hudson Street, Yonkers, N. Y., architect, is completing plans for a two-story automobile service, repair and garage building, 75 x 100 ft., to cost $200,000 with equipment.

Atlantic Cement Products Co., Hicksville, L. I., has begun erection of new plant, to cost about $200,000 with conveying, hoisting, loading and other machinery.

Public Service Electric & Gas Co., Terminal Building, Newark, plans construction of a three-story power substation at New Brunswick, N. J., to cost close to $90,000 with equipment.

Municipal Council, Belleville, N. J., has plans for a one-story repair shop, to cost more than $25,000 with equipment. Paul B. West, 24 Commerce Street, Newark, is architect.

Samuel H. Kulman and James Moran, Newark, have leased space in new building at Frelinghuysen Avenue and Empire Street, totaling 115,000 sq. ft., for plant to manufacture lunch wagons and dining cars.

Dominick & Haff, Inc., and McChesney Co., both at 144 Orange Street, Newark, manufacturers of plated and silverware products, flat ware, etc., have merged with Reed & Barton Corporation, Taunton, Mass., manufacturer of kindred products. Present plants will be continued and expansion carried out.

Clinton B. Cook, Asbury Park Trust Building, Asbury Park, N. J., architect, has filed plans for a four-story automobile service, repair and garage building, 100 x 150 ft., to cost approximately $225,000 with equipment.

Combustion Utilities Co. 60 Wall Street, New York, manufacturer of power plant and furnace equipment, etc., has awarded general contract to Austin Co., for initial building of new plant at New Brunswick, N. J., 50 x 125 ft., to cost upward of $75,000 with equipment.

Huff Airplanes, Inc., 497 Division Street, Perth Amboy, N. J., Ira R. Crouse, treasurer, has begun foundations for a one-story unit at its proposed plant on portion of tract of Pardee Steel Corporation, 190 x 260 ft., to cost more than $80,000 with equipment.

Hygienic Tube Co., 88 McWhorter Street, Newark, manufacturer of composition, mechanical and other tubing, has revised plans for a new plant at Avenue L and Mary Street, 100 x 100 ft., reported to cost about $45,000 with equipment. Alfred Peter, 207 Market Street, is architect.

M. K. Frank, 15 Park Row, New York, has been inquiring for a narrow gage mine locomotive, saddle tank, steam-driven.

Gabrieleen Co., Inc., 245 Fifth Avenue, New York, has been formed to take over Gabriel Corporation and will manufacture hair waving machines and supplies. Company has factory in Newark, and arrangements have been made for purchase of materials.

Zoll-Roe Co., Inc., 150 Spring Street, New York, has been organized to manufacture tools, appliances and metal products. At present it is engaged in refinishing passenger and freight elevator cabs and dipping of handles and miscellaneous small products.

E. L. Phillips & Co., New York, have ordered from Semet-Solvay Engineering Corporation, New York, quantity of 16-in., 20-in. and 30-in. pipe and fittings with Van Stone flanges. Larger sizes of pipe will have seams electrically welded both inside and out.

Associated Machine Tool Co., 187-189 Seventh Street, Brooklyn, has changed its name to L. J. Hoy & Co. Company deals in new and second-hand machinery.

Wellman-Seaver-Morgan Co., Cleveland, has moved its New York office from 522 Fifth Avenue to 30 Church Street.

Long Island Lighting Co. will equip its plant at Bay Shore, N. Y., with Steere welded steel pipe and fittings.

Philadelphia

PHILADELPHIA, Jan. 16.

BIDS have been asked on general contract by Pennsylvania Railroad Co., Philadelphia, for a new cold storage and refrigerating plant to cost in excess of $150,000. Day & Zimmermann, Inc., Sixteenth and Walnut Streets, is engineer.

Tidewater Oil Sales Corporation, 11 Broadway, New York, is said to be arranging for construction of three-story storage and distributing plant, 65 x 105 ft., to cost upward of $60,000 with equipment.

Keystone Index Card Co., 3225-27 Race Street, Philadelphia, manufacturer of office equipment, has acquired adjoining property, 50 x 100 ft. and 50 x 175 ft., for expansion. It is said that present buildings on sites will be razed and factory extension built.

Day & Zimmermann, Inc., Sixteenth and Walnut Streets, Philadelphia, engineer, is asking bids until Jan. 31 for a boiler plant, pumping station, steel water tank and tower, and miscellaneous equipment for a State cantonment and utilities at Graterford, Pa., acting for Board of Trustees, Eastern State Penitentiary of Pennsylvania.

General Gas & Electric Co., 50 Pine Street, New York, is completing plans for a steam-operated electric power house at Holland, N. J. It will be operated under direction of New Jersey Power & Light Co., Dover, N. J., an affiliated organization, and will comprise two 42,000-kw. generating units, condensers, boilers, pumping machinery and accessory equipment. Work will begin early in spring. Project will cost more than $5,000,000, including transmission lines.

Roberts & Manders Stove Co., Eleventh Street and Washington Avenue, Philadelphia, has awarded general contract to Cameron Engineering Co., Fifteenth and Chestnut Streets, for a one-story addition to plant at Hatboro, Pa., to cost $45,000.

Dielectric Products, Inc., Wilmington, Del., care of John F. Porter, 1303 Franklin Street, recently formed under State laws by Mr. Porter and associates with capital of $100,000 and 10,000 shares common stock, no par value, has acquired property at Newport, near Wilmington, for a new plant to manufacture insulating greases and affiliated products used in production of high tension cables. Initial plant is reported to cost more than $75,000. J. E. Hammond is first vice-president; R. E. Glover, secretary, and Lewis Rumford, treasurer.

Harrisburg Light & Power Co., Harrisburg, Pa., is arranging an expansion and improvement program, including additions in power plants and transmission lines, to cost more than $1,000,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Jan. 24 for safety valves and spare parts for Philadelphia and Norfolk navy yards, schedule 8342.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene apparatus, subsidiary of Union

Carbide & Carbon Corporation, has acquired property at Harrisburg, Pa., for a one-story plant to cost $27,000, for which superstructure will begin at once. An adjoining portion of site will be used for one-story factory branch, 80 x 100 ft., for Linde Air Products Co., another subsidiary, manufacturer of industrial oxygen, etc., to cost more than $30,000. Both organizations are reported planning similar units at Allentown, Pa.

Board of Education, Altoona, Pa., has authorized purchase of property for a new West Side senior high school, for which plans will soon be drawn, to cost $800,000. Manual training department is being considered.

Buffalo

BUFFALO, Jan. 16.

BIDS have been asked on general contract by General Drop Forge Co., 1738 Elmwood Avenue, Buffalo, for one-story machine shop to cost $50,000, with adjoining department for shipping service. Ernest McGeorge, 3030 Euclid Avenue, Cleveland, is architect and engineer.

Buffalo Cement Co., Ltd., 110 Franklin Street, Buffalo, contemplates rebuilding portion of crushing plant destroyed by fire Jan. 10, with loss close to $75,000 including equipment.

Standard Milling Co., 49 Wall Street, New York, has plans for a new flour mill at Buffalo, to cost in excess of $200,000 with machinery. A. E. Baxter Engineering Co., Ellicott Square, Buffalo, is architect and engineer.

Curtiss Aeroplane & Motor Co., Inc., Kail Street, Buffalo, is arranging an expansion program for its affiliated organization, Curtiss Aeroplane Export Corporation, and has disposed of stock totaling about $500,000. C. M. Keys, president of parent company, is chairman of board of subsidiary organization; C. W. Webster, president; and J. A. B. Smith, treasurer.

Binghamton Airways, Inc., 140 State Street, Binghamton, N. Y., has been organized to manufacture and repair airplanes and aeronautical equipment. Company may erect hangar in near future. No contracts have as yet been let.

Detroit

DETROIT, Jan. 16.

CONTRACT has been let by Hupp Motor Car Corporation, 3641 East Milwaukee Avenue, Detroit, to Everett Winters, Inc., 1651 East Grand Boulevard, for one-story addition to cost about $65,000, for metal-stamping.

Zimmerman Mfg. Co., Owosso, Mich., manufacturer of turned wood products, has acquired a local plant formerly occupied by Sorg Engine Co., and will remove and expand its works at that location. Zimmerman company has lately disposed of its factory to Michigan Rubber Co., which will establish plant for production of hard rubber specialties.

Chris Smith & Sons Boat Co., Algonac, Mich., is completing an addition for marine engine manufacturer and will begin operations soon. Plant will be devoted to eight and six-cylinder motors, of 150 and 200 hp. rating, respectively. Company is arranging production schedule of about 1700 fast boats during 1928, and will develop other divisions of works on that basis.

Grand Rapids Gas Light Co., Grand Rapids, Mich., is arranging fund of about $300,000 for extensions and improvements in artificial gas plant and system, including additional equipment installation.

Warner Aircraft Co., 4042 West Jefferson Avenue, Detroit, is said to be planning installation of machine tools and other equipment.

New Way Motor Co., Lansing, Mich., will make extensions and improvements in plant, including re-tooling for production of a new type of gasoline engine, two-cylinder, non-vibrating. Works have heretofore been devoted to manufacture of single cylinder motors.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, welding apparatus, etc., has begun work on a new two-story plant, 48 x 98 ft., at Grand Rapids, Mich., to cost more than $45,000.

Cadillac Sales & Service Co., Wayne Street, Pontiac, Mich., has plans for a two-story service, repair and garage building, to cost $200,000 with equipment.

AC Spark Plug Co., Flint, Mich., will carry out an expansion program in spark plug and speedometer departments, utilizing space heretofore given over to tile manufacture. Company will also develop facilities for production of ammeters, oil gages, thermo gages and instrument panels for motor cars and motor boats.

Board of Education, Owosso, Mich., contemplates installation of manual training equipment in a new two-story high school to cost $165,000, for which plans will be drawn by William B. Ittner, 911 Locust Street, St. Louis, architect.

City Council, Fordson, Mich., has plans for a municipal power house in connection with a group of city buildings. John Kasurin, Empire Building, Detroit, is architect.

Kalamazoo Stove Co., Kalamazoo, Mich., has disposed of stock issue of about $300,000, giving controlling interest to Keane, Higbie & Co., Buhl Building, Detroit, investment bankers, and plans are under consideration for expansion.

Hunter Hiderian Air Sea Plane Co., 263 Park Avenue East, Pontiac, Mich., has been formed to manufacture air seaplanes and parts. It is preparing to begin work on its first model and will soon be in market for aircraft motors, sheet aluminum, tubes, rods, angle irons, etc.

New England

BOSTON, Jan. 16.

THE machine tool market in this territory is very quiet. Some improvement is noted in inquiries, but for the most part these are for single items. Inquiries are in hand for heavy-duty equipment, the first received in Boston in several months, and one maker of boring mills reports the sale of two machines to a Western automobile manufacturer. General Electric Co., Pittsfield, Mass., has inquiries out on a number of machines, the business, if placed, to be handled through Schenectady. Other New England plants of the company are expected to buy considerable equipment this year.

Small tools are moving more freely than a week ago, but the market is far from active.

Plans have been completed for a three-story, 57 x 115 ft., addition for Continental Baking Co., Somerville, Mass., for which conveying and other equipment is required. Plans are private.

Equipment of the Vibro Insulator Co., Worcester, Mass., has been sold at public auction. Machinery included a Leland-Gifford four-spindle high-speed drill; two Becker No. 4B and No. 5 vertical millers; Cincinnati universal grinder. Good prices prevailed.

Cambridge Salvage & Supply Co., 91 Broadway, Cambridge, Mass., has plans for a three-story and basement manufacturing and storage plant, 65 x 100 ft. Plans are private.

Fire recently destroyed plant of Coffin Valve Co., Neponsit district, Boston, including foundry and machine shop.

Worcester Wire Works, Inc., 230 Ludlow Street, Worcester, Mass., will build a two-story wire manufacturing plant, 70 x 210 ft., to cost $30,000.

Broadway Iron Foundry Co. and Barbour Stockwell Co., Cambridge, Mass., have consolidated and gray iron equipment of Broadway company has been transferred to Barbour plant, 205 Broadway. Brass foundry and machine shop will be transferred later. R. C. Bird, president Broadway Iron Foundry Co., will be associated with merged company in an official capacity. Property of Broadway company will be sold.

Welker-Hoops Mfg. Co., Middletown, Conn., manufacturer of automobile equipment, cap pistols, etc., has taken over former local plant of Westinghouse Electric & Mfg. Co. for manufacture of new gear shift for automobiles.

Brockton Gas Light Co., Brockton, Mass., plans a one-story addition to its steam power house, to cost in excess of $100,000 with equipment. C. H. Tenney Co., 200 Devonshire Street, Boston, is engineer. Company also plans new automobile service, repair and garage building, 125 x 125 ft., for company use, to cost approximately $75,000. Same engineer will draw plans.

Carpenter Steel Co., Hartford, Conn., has taken out permit for one-story factory branch and distributing plant, to cost about $30,000, for which general contract recently was let to Lawrence & Coe Construction Co., 43 Farmington Avenue. Main mill of company is at Reading, Pa.

Standard Box Co., 28 Gerrish Avenue, Chelsea, Mass., manufacturer of paper boxes and containers, has plans for a two-story addition, 100 x 142 ft., to cost about $80,000 with machinery; Eisenberg & Feer, 46 Cornhill Street, Boston, architects.

New York Power & Light Corporation, Albany, N. Y., has purchased Ridgefield Electric Co., Ridgefield, Conn., and Washington Electric Light & Power Co., Litchfield, Conn., and will consolidate. Plans are under way for expansion, including transmission line construction.

C. V. Badger, 191 Merrimack Street, Haverhill, Mass., architect, has revised plans for a new two-story plant, 60 x 115 ft., for manufacture of acids and kindred chemical specialties, for company whose name is temporarily withheld, to cost $60,000 with machinery.

New England Concrete Pipe Corporation, 79 Milk Street, Boston, has plans for a power house at its works at Newton, Mass., 150 x 160 ft., to cost about $70,000 with equipment; John H. Rogers, 10 State Street, Boston, architect.

E. Ingraham Co., 392 Main Street, Bristol, Conn., manufacturer of clocks, clock movements, etc., will soon take bids for one-story addition, 25 x 160 ft., to be equipped as a press department. Max J. Unkelbach, New Britain, Conn., is architect.

Peerless Unit Ventilation Co., Inc., formerly at Long Island City, N. Y., has moved its main office and factories to 718-734 Crescent Avenue, Bridgeport, Conn. New York office is now at 369 Lexington Avenue.

Boston Gear Works Sales Co., Norfolk Downs, Mass., manufacturer of Standardized power transmission equipment, has let contract for a three-story addition to Clark & Smith, Inc., Quincy, Mass.

Eppley Laboratory, Newport, R. I., has been organized to manufacture precision instruments. Plant has been erected and some new equipment purchased.

South Atlantic States

BALTIMORE, Jan. 16.

BIDS have been asked on general contract by Bethlehem Shipbuilding Corporation, Baltimore, for first unit of its one and two-story addition. Other shops will be built later. Entire project will cost close to $1,000,000 with machinery.

Maryland Paper Mills Co., 5 Hopkins Place, Baltimore, Robert A. Wilson, secretary and treasurer, recently organized, has engaged R. Munson, 609 Southern Building, Washington, engineer, to prepare plans for new units at Glen Burnie, Md., comprising pulp mill to cost about $150,000, and paper-making unit, to cost upward of $250,000 with equipment. Work will soon begin on first unit for paper-bag manufacture, to cost approximately $80,000 with equipment. William W. Ormsbee is president.

J. Glenn Beall, Irving Prichard, Frostburg, Md., and associates, are completing plans for new plant at Mount Savage, Md., for production of large diameter, vitrified sewer pipe, drain tile, etc., reported to cost more than $40,000. Contract for raw material has been made with Union Mining Co., Mount Savage.

Constructing Quartermaster, Fort Benning, Ga., is asking bids until Feb. 3 for construction of 1,000,000-gal. capacity steel standpipe, 50 ft. diameter, and 70 ft. high, with valves, blow-off and mechanical accessories, circular 1.

Carolina Power & Light Co., Raleigh, N. C., has purchased South Carolina Power & Light Co., Kingstree, S. C., and will consolidate with its organization. Expansion is planned in last-noted district, including transmission line construction.

City Commission, Charlotte, N. C., is completing plans for a one-story municipal automobile service, repair and garage building, 115 x 310 ft., to cost about $90,000 with equipment. Robert L. Brown, commissioner of public works, in charge.

Southeast Georgia Power Co., Alma, Ga., recently organized, has acquired local power plant and contemplates extensions and betterments, including installation of additional machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Jan. 24 for chain hoists for Eastern and Western yards, schedule 8329; also for machine screws, nuts, etc., for Norfolk Navy Yard, schedule 8359; and 10 arc welding sets for Mare Island Yard, schedule 8328.

City Council, Dillon, S. C., plans installation of pumping machinery and accessory equipment for municipal waterworks expansion.

Celluloid Corporation, Amcelle, Cumberland, Md., subsidiary of Celanese Corporation, is completing plans for new plant, 300 x 1000 ft., for production of cellulose acetate, to cost more than $1,500,000 with equipment. Company recently acquired control of Celluloid Co., with plant at Newark, N. J.

Ovens, power equipment, conveying and other machinery will be installed in plant to be erected at Norfolk, Va., by Gardner Bakeries, Inc., 219 Cumberland Street, to cost more than $175,000. Company is operated by General Baking Co., 342 Madison Avenue, New York.

Georgia Power Co., Atlanta, Ga., is completing an expansion program to cost more than $12,755,000, including power plants, transmission lines, substation equipment and other work. New power substation will be built at Atlanta, and similar plant at Marietta, enlarged. New gas-generating equipment and vertical retorts will be installed at Atlanta gas works.

Citizens' Crystal Ice Co., Inc., Roanoke, Va., is considering equipment for pulverizing and burning powdered fuel, and is desirous of getting in touch with manufacturers.

J. L. Gray, Gastonia, N. C., is planning purchase of automatic machines for finishing cast gears of steel, brass and other metal.

Ohio Brass Co., Mansfield, Ohio, has opened an office at 721 Healy Building, Atlanta, Ga., as headquarters for its sales representatives in that section.

Hampton Roads Steel Co., 1086 West Thirty-fifth Street, Norfolk, Va., has been organized to operate warehouse and fabricate structural steel and reinforcing bars and deal in metal lath, steel joists and other steel products.

Rome Electric Range Co., Rome, Ga., has been organized to manufacture electric ranges. Company has plant on North Second Avenue, and will begin manufacture immediately.

St. Louis

ST. LOUIS, Jan. 16.

OFFICIALS of B. F. Mahoney Aircraft Co., San Diego, Cal., are organizing a company under Missouri laws, with capital of $500,000, to construct and operate a new plant for production of Ryan airplanes at Bridgeton, near St. Louis, one and two-stories, to cost about $60,000 with equipment. It is proposed to remove San Diego business to new location.

Board of Education, Ada, Okla., is considering installation of manual training equipment in two-story high school, to cost $200,000, for which bids will soon be received on general contract. Albert S. Ross, 116 Main Street, is architect.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., has plans for one-story machine shop at its works at Guthrie, Okla., to cost upward of $40,000 with equipment. H. W. Wagner, Topeka, is chief engineer.

Standard Brass Mfg. Co., Thirteenth and Chestnut Streets, Kansas City, Mo., will proceed with erection of a one-story foundry and machine shop, 100 x 130 ft., to cost more than $50,000 with equipment.

Board of Education, Kearney, Neb., has plans for one-story addition to its manual training school to cost about $35,000. H. M. McClure, Kearney, is architect.

Willard Storage Battery Co., M. E. Smith Building, Omaha, Neb., has awarded general contract to A. C. Busk Construction Co., 520 North Fifty-first Street, for one-story factory branch and service works to cost $30,000. Headquarters at St. Clair Avenue and East 131st Street, Cleveland.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., is arranging an expansion and improvement program, including installation of third generating unit at Horseshoe Lake power plant, to develop capacity of 87,500 hp., extensions in transmission lines, and installation of equipment in Broadway substation to double present output.

Union Wire Rope Co., Kansas City, Mo., has disposed of its rolling mill to Consolidated Rolling Mill Co., Mexico City, Mexico, which will remove equipment to last noted city.

Arkansas Power & Light Co., Little Rock, Ark., plans extensions and improvements in Pine Bluff, Ark., district, including transmission line construction and enlargements in Woodward and Dixie power substations, to cost $400,000.

Clark-McWilliams Co., Clarksville, Ark., is said to be planning to rebuild tipple at its Igo mine recently destroyed by fire, with loss at $40,000 including equipment.

J. A. Werme Iron Works, 1426 West Main Street, Oklahoma City, Okla., has plans for one-story addition, 90 x 300 ft.

Choctaw Culvert & Machinery Co., Memphis, Tenn., is considering erection of new plant at Pine Bluff, Ark., for manufacture of metal culverts and affiliated products, to cost close to $35,000 with equipment.

Kansas Power & Light Co., Atchison, Kan., will make extensions and improvements in ice-manufacturing plant, with installation of additional machinery to cost $70,000.

Universal Traffic Control Co., Oklahoma City, Okla., has removed its factory and general offices to St. Louis, latter to be maintained in Title Guaranty Building. It makes automatic signals for directing street traffic.

Bell-Davis Machinery Manufacturers, Inc., Pleasant Hill, Mo., has been formed to make shingle mill attachments for standard make saw rigs; Bell-Davis saw rigs; and its collapsible anchors. Company is assembling products at present, but expects to erect factory in spring. It is in market for steel wheels for trucks carrying portable rigs and also gears and steel frame materials.

Cleveland

CLEVELAND, Jan. 16.

MACHINE tool sales and inquiries continue fairly good, although business is confined largely to single machines. The market has been stimulated by present activity of manufacturers of automobile parts. Most of the plants in this field are now operating at capacity. Some business in small lots has come from automobile companies in Detroit territory, which bought very little machinery the last months of 1927. An order for several drilling machines was placed the past week by a Cleveland screw manufacturer. A local builder of turret lathes reports a heavy volume of single machine orders, mostly from New York and Chicago territories. This business has resulted from quotations made before the recent price advance. No inquiry is coming from railroads in this territory.

Valve Bag Co., Toledo, Ohio, manufacturer of paper valve bags, bag-filling machines, etc., has arranged for preferred stock issue of $1,500,000, a portion of fund to be used for expansion. Company operates plants at Toledo, Oakmont, Pa., and Windsor, Ont. Carl G. Hartman is vice-president and general manager.

East Ohio Gas Co., 1405 East Sixth Street, Cleveland, has plans for a one-story and basement repair works at Dennison, Ohio, to cost about $27,000 with machinery. C. J. Marr, 139 North Broadway, New Philadelphia, Ohio, is architect.

Northern Ohio Produce Co., 806 Broadway, Cleveland, C. Haas, president, plans installation of a cold storage and refrigerating plant in its produce terminal, to cost upward of $2,500,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Street, are architects and engineers.

Ohio Public Service Co., Elyria, Ohio, will take bids in spring for a one-story equipment storage and distributing plant, with repair facilities, to cost close to $80,000 with equipment. R. S. Silsbee, Elyria Savings & Trust Building, is architect.

Department of Public Service, Elyria, Ohio, James A. Hewitt, director, plans installation of an electric power plant, two stories, 32 x 42 ft., with electrically-operated pumping units in connection with a sewerage disposal works. Entire project will cost more than $750,000. George B. Gascoigne, Leader Building, Cleveland, is engineer.

Board of Education, Cadiz, Ohio, plans installation of manual training equipment in high school, for which bids have been asked on general contract, to cost $250,000. C. W. Bates, 77 Twelfth Street, Wheeling, W. Va., is architect.

Pittsburgh

PITTSBURGH, Jan. 16.

INQUIRY for machine tools the first two weeks of the new year have been more numerous than sales, only a few small orders having been placed since the first of the month. So many inquiries and requests for prices for estimating purposes are out that it is believed considerable business will develop before spring. There are 11 or 12 items in the Westinghouse Electric & Mfg. Co.'s quarterly list which remain to be placed. In heavier lines is the wide strip mill to be installed by Wheeling Steel Corporation, and announcement is expected shortly of the closing of three seamless pipe mill units in Pittsburgh district mills.

General contract has been let by Fort Pitt Steel Casting Co., McKeesport, Pa., to Austin Co., for a one-story foundry addition, 60 x 200 ft.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has purchased 80 acres in Wilkins Township, and is reported planning expansion in that section.

Ready Mixed Concrete Co., South Twenty-second Street, Pittsburgh, has awarded general contract to Hughes-Foulkrod Co., Stevenson Foster Building, for new four-story plant, to cost close to $50,000 with equipment.

Board of Education, Glassport, Pa., plans installation of manual training equipment in two-story high school, for which bids are being taken on general contract, to cost $200,000. H. C. Clepper, Century Building, Pittsburgh, is architect.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, operating Carbide & Carbon Chemicals Corporation, South Charleston, W. Va., is said to be planning expansion program at last-noted plant, to cost more than $5,000,000, including construction of new works on Blaine's Island, where property was secured several months ago.

Pittsburgh Knife & Forge Co., Coraopolis, Pa., has changed its name to Pittsburgh Forgings Co.

Columbia Steel & Tube Corporation, 233 Broadway, New York, is completing new pipe works in Stanton Park district, Steubenville, Ohio. Building will have 22,000 sq. ft. of floor space and will be used for cutting and other mechanical operations, storage and distributing service. Equipment has been purchased and pipe and tubing will be secured under contract from Wheeling Steel Corporation, Wheeling, W. Va.

Chicago

CHICAGO, Jan. 16.

SALES of machine tools are more numerous with agricultural machinery manufacturers the principal buyers. A tractor manufacturer in central Illinois has placed $200,000 worth of orders and some requirements are still to be met. The International Harvester Co., principally at its McCormick plant in Chicago, has enlarged its replacement program. Another large industrial list has been prepared by a road machinery manufacturer at Milwaukee. Stephens-Adamson Mfg. Co., Aurora, Ill., has purchased a number of machine tools. Orders and inquiry from railroads are dull. The St. Paul is asking for prices on a micro-grinder and a heavy-duty veneer press.

Over 400 surplus machine tools are being offered for sale by the Kelly-Springfield Truck & Bus Co., Springfield, Ohio, adding a further burden to a market already well supplied with used tools.

Price advances of 10 per cent are announced on two lines of screw machines and turret lathes.

Plant of Central Foundry Co., Marshalltown, Iowa, was destroyed by fire Jan. 2 with estimated loss of $200,000.

Business of William L. Procunier, 18 South Clinton Street, Chicago, manufacturer of safety tapping chucks and attachments, has been incorporated under title of Procunier Safety Chuck Co., and will continue manufacture of tapping devices, quick change chucks and stud setting tools.

Michael Tauber & Co., 317 South Market Street, Chicago, has removed to 411-423 South Market Street.

Murray Iron Works Co., engineer, founder and boilermaker, Burlington, Iowa, has purchased turbine business of Standard Turbine Corporation, Scio, N. Y., and has removed equipment to Burlington, where turbines will be manufactured in future.

Bids will soon be asked by Reiter Co., Elgin, Ill., manufacturer of water softening and purifying equipment, for a two-story addition, to cost about $50,000 with machinery.

Manufacturers' Brass Foundry Co., Chicago, recently organized, has leased a one-story building, 55 x 100 ft., at 2721-23 Poplar Avenue, for establishment of a plant.

Galesburg Coulter-Disc Co., Galesburg, Ill., manufacturer of shovels, sheet steel products, disk blades for agricultural equipment, etc., has arranged for sale of common stock issue to total $2,375,000, portion of fund to be used for expansion.

Goldberg & Cohen, Inc., 2139 Ogden Avenue, Chicago, manufacturer of automobile bodies, has plans for a one-story addition, 75 x 100 ft., to cost close to $40,000 with equipment.

J. I. Case Threshing Machine Co., 102 Eighth Street, Des Moines, Iowa, has plans for a three-story addition, to cost $40,000. C. V. Johnson, Commonwealth Building, is architect. Headquarters are at Racine, Wis.

Fisher Governor Co., South First Avenue, Marshalltown, Iowa, manufacturer of engine governors, will soon begin erection of a one-story addition, to cost close to $45,000 with equipment; Harry Reimer, Kibbey Building, architect.

Richardson Rod & Reel Co., 536 Lake Shore Drive, Chicago, manufacturer of steel fishing rods, tackle, etc., is completing plans for a two-story factory, 62 x 120 ft., to cost close to $50,000 with equipment. Van Gunten & Van Gunten, 26 East Huron Street, are architects.

Great Northern Utilities Co., Shelby, Mont., has plans for one-story ice-manufacturing and cold storage plant, to cost about $45,000 with equipment.

Century Brass Works, Inc., 518 Fifth Avenue South, Minneapolis, Minn., has work under way on a one-story addition, to cost $50,000 with equipment. General contract recently was let to Splady & Haagenson, 609 Marquette Avenue.

Grigsby-Grunow-Hinds Co., 4534 Armitage Avenue, Chicago, manufacturer of radio equipment, has leased plant of Yellow Truck & Coach Mfg. Co., totaling 260,000 sq. ft. floor space, for establishment of a new plant. Yellow Truck company is completing erection of new works at Pontiac, Mich., and will remove to that point early in March, when leasing company will take possession.

Indiana

INDIANAPOLIS, Jan. 16.

PLANS are under consideration by Union Fiber Co., Winona, Minn., for new fiberboard mill at Wabash, Ind., one story, 50 x 100 ft., to cost about $45,000 with equipment.

G. I. Sellers & Sons Co., Elwood, Ind., manufacturer of kitchen cabinets, etc., has arranged for a preferred stock issue of $500,000, portion of fund to be used for expansion.

Van Camp Packing Co., 2002 South East Street, Indianapolis, is said to have acquired control of Richland Cotton Oil Co., Richland, Ga., and will continue operations as subsidiary. Plans are under advisement for expansion, including facilities for larger output at Richland.

Cartmen, Burcaw & Moore, Inc., 540 North Meridian Street, Indianapolis, contractor, has filed plans for three-story and basement automobile service, repair and garage building, 90 x 140 ft., to cost $150,000.

Hygrade Lamp Co., Salem, Mass., manufacturer of incandescent lamps, has purchased Triumph Lamp Works, Indianapolis, and will take immediate possession. It is purposed to discontinue production at acquired plant and machinery will be dismantled and removed to Salem, where operations will be concentrated and plant expanded.

Noblitt-Sparks Industries, Inc., Indianapolis, has been formed to take over and succeed to Indianapolis Pump & Tube Co., 603 East Washington Street, with branch plants at Greenwood, Columbus and Seymour, Ind., manufacturer of pumps, tubing, automobile heaters, coaster wagons, etc. Operations will be extended. Noblitt is president; and Frank H. Sparks, secretary-treasurer.

L. Harry Warriner, 673 Broadway, Gary, Ind., architect, has plans for a three-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

City Council, Anderson, Ind., is reported having plans for extensions and improvements in municipal light and power house, including establishment of auxiliary station for service in South Anderson, to cost more than $200,000 with equipment.

Interstate Public Service Co., Goshen, Ind., has concluded arrangements for purchase of Midway Electric Co., Shipshewanna, Ind., and will consolidate with its organization. Plans are under way for expansion in latter district, with installation of additional equipment and transmission line construction.

Oakes-Swenson Co., 1479 East Nineteenth Street, Indianapolis, has been formed to manufacture metal stampings, including drawn work, and engage in heat treating. It will also design and make dies. Factory and equipment have been purchased.

Harrison Steel Castings Co., Attica, Ind., has been formed to take over assets and business of National Car Coupler Co., Attica, and will continue manufacture of miscellaneous steel castings, Hinson emergency knuckles and National couplers. J. W. Harrison is president.

Delaware Brass & Aluminum Co., Muncie, Ind., has changed its name to Beckett Bronze Co. It manufactures screw machine products.

Gulf States

BIRMINGHAM, Jan. 16.

PLANS are under way by Missouri-Kansas-Texas Railroad Co., Dallas, Tex., for extensions and improvements in its shops at Waco, Tex., to cost $50,000 with equipment; Albert T. Clifton, Waco, managing director, in charge.

Texas Central Power Co., Frost Building, San Antonio, Tex., is said to be contemplating a new cold storage and refrigerating plant at Raymond, Tex., to cost approximately $90,000 with machinery.

Clarence W. King, Shreveport, La., architect, has plans for a three-story automobile service, repair and garage building, 115 x 150 ft., to cost about $100,000 with equipment. It will be occupied under lease by S. & L. Service & Storage Co., 200 Edwards Street, Edward R. Lowe, manager.

Gulf States Utilities Co., Beaumont, Tex., has arranged for preferred stock issue of 30,000 shares, a portion of proceeds to be used for extensions and improvements. Company has work under way on an addition to its Neches power plant to increase capacity by 47,000 hp.; extensions will be made in transmission lines for connection with system of Houston Lighting & Power Co., Houston, Tex.

Wichita Falls Foundry & Machine Co., Barwise Street, Wichita Falls, Tex., is completing plans for one-story addition to its machine shop, 30 x 80 ft., and will install new equipment.

South San Antonio Ice Mfg. Co., San Antonio, Tex., is planning erection of one-story plant to cost $60,000.

R. B. George Machinery Co., Dallas, Tex., will erect a new one-story plant to cost close to $40,000 with equipment. J. A. Pitzinger, Dallas, is architect and engineer.

West Texas Utilities Co., Dallas, operated by Central & South West Utilities Co., Allen Building, is completing plans for one-story steam-operated electric generating station at Lake Pauline, near Quanah, Tex., with initial capacity of 15,000 kw. and ultimate output of 45,000 kw. Four transmission lines will be built and a power substation and switching plant. Entire project will cost more than $3,000,000.

United Public Service Co., 100 West Monroe Street, Chicago, has purchased Southern Ice & Fuel Co., South Royal Street; City Ice Co., and ice plant of Weinacker Ice & Fuel Co., all at Mobile, Ala. Plans are under advisement for extensions and improvements and installation of additional equipment. George E. Wells, St. Louis, is consulting engineer.

Board of Levee Commissioners, Yazoo-Mississippi Delta, Clarksdale, Miss., J. W. Cutrer, president, is asking bids until Feb. 1 for a drainage pumping plant, including both oil engine-driven and electrically operated equipment, oil engines of full Diesel type, vertical construction; synchronous electric motors; pumping units to have capacity of 50,000 gal. per min. Work to include motor-generator set, vacuum pump, electric switchboard, oil tanks, and auxiliary equipment. W. L. Head is chief engineer.

Houston Lighting & Power Co., Houston, Tex., is planning an expansion and improvement program to cost more than $5,000,000, including enlargements in Deepwater generating plant and installation of equipment to cost about $2,500,000; new power substations and extensions in present stations, $500,000; transmission lines, $200,000; distributing lines, $355,000; stores, shops and other mechanical buildings, $410,000; substation feeders, $400,000, and miscellaneous work.

Dock Commissioners, New Court House, New Orleans, have filed plans for a one-story equipment storage and distributing plant, with shop and repair facilities, to cost more than $100,000 with machinery.

Town Council, Lake Placid, Fla., is asking bids until Jan. 25 for equipment for a municipal waterworks, including pumping apparatus, and elevated steel tank and tower with capacity of 100,000 gal., including valves, fittings, etc. Bishop Engineering Co., Orlando, Fla., is engineer.

Sinclair Pipe Line Co., Sinclair Building, Tulsa, Okla., is said to be planning installation of pipe line, with booster stations, etc., from Mexia, Tex., oilfields to Healdton, Tex., with increase in present main trunk line in Mexia district, to cost more than $1,500,000.

Milwaukee

MILWAUKEE, Jan. 16.

MODERATE activity is reported in the machine-tool market, with improvement generally noted. Prospects are more promising, and there is a substantial increase in inquiry. The automotive industries as yet are providing only a small volume, but many companies are asking for prices and delivery specifications on prospective needs, and some of this business is expected to be placed before the close of the month. Demand is better than in the October-December period and averaging at least as well as in January, 1927.

Maynard Electric Steel Casting Co., Milwaukee, has increased its capitalization from $210,000 to $500,000 in contemplation of enlargement of its plant at Kilbourn Road and Chicago & Northwestern tracks. Details have not been definitely determined, but it is stated that present capacity of 1000 tons a month will be approximately doubled.

City of DePere, Wis., closes bids Jan. 27 on one 4-in. single stage centrifugal pump of 500 gal. per min. capacity, direct connected to one S5 4-cylinder Continental commercial engine with power take-off, clutch and pulley for belt driving compressor. M. A. Maes is city clerk.

Manitowoc Portland Cement Co., Manitowoc, Wis., has engaged Manitowoc Shipbuilding Corporation to design and erect an extension to its main building, to cost about $500,000 with equipment; work to begin at once.

Great Northern Railway Co., St. Paul, Minn., is taking bids for construction of 240 additional concrete tanks, 110 ft.

high and 13 ft. diameter, at its grain elevator in Superior, Wis. Workhouse also will be enlarged and additional machinery installed to handle enlarged storage capacity. Project calls for an investment of upward of $800,000.

Common Council, Stoughton, Wis., has authorized board of public works to obtain estimates on modern machinery and equipment for municipal light and power plant. A complete replacement is contemplated at a probable cost of $40,000 or more. Edgar Norman is city clerk.

F. C. Steiner, County highway commission, Oshkosh, Wis., closes bids Jan. 24 for furnishing a portable stone crushing plant with a capacity of 300 yd. in 10 hr., and bin, screen, track and cars, conveyors, etc.

Max P. Janisch, vice-president and general manager Special Stamping & Mfg. Co., 1919 St. Paul Avenue, Milwaukee, is principal incorporator of Steelstamp Corporation, Milwaukee, which has organized to manufacture stampings, dies, etc. John Schwan and B. B. Janisch are other principals. Plans have not yet been made known.

McCusker-Foulkes Co., 235 Cambridge Avenue, Milwaukee, has contracted for erection of a repair and service shop addition, 50 x 125 ft., to its automotive sales and service building. Architect is Verner H. Esser, 82 East Wisconsin Avenue, local.

Board of Regents, University of Wisconsin, Madison, has released a fund of $10,000 for preparation of plans for new mechanical engineering building. Arthur Peabody is State architect. M. E. McCaffrey is secretary of board.

Common Council, Rhinelander, Wis., has engaged Burns & McDonald, consulting engineers, Kansas City, Mo., to design and supervise construction and equipment of a municipal filtration plant costing about $90,000. A referendum on a bond issue in this sum will be held in April.

Cincinnati

Cincinnati, Jan. 16.

MACHINE tool orders dropped off the past week with result that business the first half of January was less than that in the early part of December. Inquiries, however, are numerous and it is believed that sales in the first quarter of 1928 will attain fairly liberal proportions. Increased buying of equipment by companies in Detroit district is noted and prospective bookings from that source are the largest in several months. A wheel manufacturing company is reported to have bought 10 18-in. lathes from a Sidney, Ohio, builder. With few exceptions, local manufacturers state that customers have taken only one or two machines each. A few scattered orders have been received from European countries, but in the aggregate they are not of large volume.

Crosley Radio Corporation, Colerain Avenue and Sassafras Street, Cincinnati, has begun manufacture of a portable, hand-operated refrigerating unit to be known as Icyball. New branch of business will not interrupt or interfere with manufacture of radio receiving sets, company's main product.

Following recent acquisition of John J. Bruce Foundry Co., Colerain Avenue, Cincinnati, by Shepard Elevator Co., with plant on adjoining site devoted to ball bearing elevator manufacture, purchasing company has arranged for continuance of operations at foundry and will carry out an expansion program. Considerable portion of production will be given over to elevator castings for Shepard company.

Tietig & Lee, Merchants' Building, West Sixth Street, Cincinnati, architects, have plans for a new eight-story and basement automobile service, repair and garage building, to cost close to $500,000 with equipment.

Steel Products Engineering Co., Springfield, Ohio, has plans for a one-story addition, to cost in excess of $35,000 with equipment.

Volunteer Portland Cement Co., Knoxville, Tenn., is disposing of a bond issue of $600,000, a portion of proceeds to be used for expansion.

Tennessee Electric Power Co., Chattanooga, Tenn., is arranging an expansion and improvement program, including power plants and transmission lines, to cost approximately $5,000,000.

Mead Pulp & Paper Co., Chillicothe, Ohio, is reported planning an early call for bids for a new mill at Sylva, N. C., to cost more than $750,000 with equipment.

Everwear Mfg. Co., Springfield, Ohio, manufacturer of swings and playground equipment, is said to have plans for a one-story addition, 50 x 50 ft., to cost close to $30,000 with equipment.

Kentucky Chemical Co., 410 East Tenth Street, Covingington, Ky., is said to be planning a new one-story plant at Brighton, near Cincinnati, to cost more than $50,000 with equipment.

Board of Trustees, Betelle Memorial Institute, 186 East Broad Street, Columbus, Ohio, plans installation of a machine shop and other manual training departments in a new three-story building, to cost more than $200,000. O. C. Darst, 150 East Broad Street, is architect.

Ohio Brass & Copper Co., 222 Post Square, Cincinnati, has been acquired by Chase Brass & Copper Co., Waterbury, Conn., distributer of brass and copper products of Chase Companies, Inc., Waterbury. Business will be continued in same location in Cincinnati under management of Henry E. Heitz, president of Ohio company, and will be known as Cincinnati branch of Chase Brass & Copper Co. Complete stock of Chase products will be carried.

Pacific Coast

San Francisco, Jan. 11.

AN expansion and betterment program is being arranged by Certainteed Products Co., Richmond, Cal., manufacturer of roofing, etc., to cost close to $100,000, including new buildings and equipment. Ralph Bergen is plant manager. Headquarters are at 100 East Forty-second Street, New York.

A-G Mfg. Co., Los Angeles, manufacturer of electrical equipment and appliances, has awarded general contract to William P. Neil Co., Inc., 4814 Loma Vista Street, for a new one-story plant, 90 x 135 ft., to cost about $40,000 with equipment. Headquarters are at 303 West Hudson Street, Seattle.

Municipal Power and Light Bureau, South Broadway, Los Angeles, will proceed with construction of steam-operated electric power plant at San Pedro Harbor, for stand-by service, to cost upward of $500,000 with equipment. E. F. Scattergood is chief engineer.

Mesick & Mahy Mfg. Co., 1431 South Wall Street, Los Angeles, manufacturer of plated ware, has filed plans for a three-story addition, to cost about $45,000 with equipment.

Grant Oil Tool Co., Los Angeles, manufacturer of oil-drilling equipment, is completing plans for a one-story factory, 48 x 170 ft., to cost about $35,000 with equipment. H. M. Banfield, Bryson Building, is architect.

Arizona Edison Co., Globe, Ariz., is disposing of bond issue of $1,700,000, portion of proceeds to be used for extensions and improvements, including transmission line construction, and acquisition of other properties.

Priest Rapids Ice & Cold Storage Co., White Bluffs, Wash., is considering erection of an addition to cold storage and refrigerating plant, to cost close to $30,000. Work will begin in spring.

Allis-Chalmers Mfg. Co., Milwaukee, has secured property at First Avenue South and Atlantic Street, Seattle, as site for a three-story factory branch and distributing plant, 60 x 150 ft., to cost approximately $100,000 with equipment. Work will begin in spring. Local offices at 115 Jackson Street, Rex T. Stafford, Seattle manager.

San Diego Consolidated Gas & Electric Co., San Diego, Cal., has secured permission to issue common stock in amount of $2,000,000, portion of fund to be used for extensions and improvements.

Texas-Louisiana Power Co., Fort Worth, Tex., is reported planning a new steam-operated electric power house and ice-manufacturing plant in vicinity of Duncan, Ariz., to cost more than $100,000.

Peck & Hills Furniture Co., 800 North Spring Street, Los Angeles, is considering erection of new seven-story factory branch and distributing plant, 120 x 240 ft., near Denny Way, Seattle, to cost approximately $500,000 with machinery.

Engineering, Research & Equipment Co., 655 Roosevelt Building, Los Angeles, has been organized to do general engineering research business and manufacture equipment for oil refining and gasoline extraction. Equipment contracts have been made.

Austin-Western Road Machinery Co., Chicago, has opened branch office at 354 Belmont Street, Portland, Ore., in charge of F. B. McBath. It also expects to establish sub-branches at Seattle and Spokane, Wash.

Canada

Toronto, Jan. 16.

MACHINE tool sales on replacement account are increasing, but for the most part are in units of one or two. Inquiries are somewhat better. The railroads have recently purchased some tools, and more extensive buying is looked for within a few weeks.

Copies of tender forms and specifications from D. H. Ross, trade commissioner, Melbourne, Australia, for machinery required by Supply and Tender Board of South Australia, Adelaide, for railroad shops of the State, are available at Department of Trade and Commerce, Ottawa, Canada. List includes one 10-in. combination turret lathe with electrical equipment; one vertical turret lathe and thread-cutting attachments with electrical equipment; one precision facing, boring and milling machine; one draw-stroke shaping machine with electrical equipment; one double-head centering machine with electrical equipment. Tenders close March 21. Last available mail leaves San Francisco Feb. 21, and is due at Adelaide March 19.

Ratepayers of Wheatley, Ont., have authorized expenditure of $84,000 for construction of waterworks plant and system. A. W. Connor & Co., Metropolitan Building, Toronto, are engineers.

P. McConnell, Pitt Street West, Windsor, Ont., will build a machine shop, 60 x 80 ft., at a cost of $10,000.

E. G. M. Cape & Co., 10 Cathcart Street, Montreal, have been awarded general contract for construction of a one-story building, 135 x 150 ft., for Northern Electric Co., 121 Shearer Street, to cost $70,000.

C. H. Taylor, 193 King Street East, Toronto, will build two machine shop additions, one one-story, 30 x 34 ft., and the other two stories, 12 x 30 ft. A. Switzer, 62 Melbourne Avenue, Toronto, has general contract. Equipment will be purchased.

Preston Electric Porcelain Co., Centre Street, Preston, Ont., will start work immediately on erection of a one-story factory, 121 x 360 ft., to cost $100,000. H. G. Duerr, 1010 Lumsden Building, Toronto, is architect.

Bids will be received until Jan. 25 by executive committee, City Hall, Montreal, J. Etienne Gauthier, city clerk, for one 30 m. g. d. electric pump. Specifications at office of Montreal Water Board, 259 Joseph Street, Verdun, Que.

Nova Scotia Tramways & Power Co., Halifax, N. S., is completing arrangements for erection of an addition to its coking plant.

Plant of Hastings Paper Mills Ltd., Thurlow Township, Ont., was recently destroyed by fire with loss of $100,000.

Western Canada

Plant of Alberta Wood Preserving Co., Calgary, Alta., was recently destroyed by fire with loss of $200,000.

Bartholomew, Montgomery & Co., Standard Bank Building, Vancouver, B. C., have been awarded general contract for construction of a hydroelectric power plant at Cambore Creek, near Revelstoke, B. C., for Teddy Glacier Mines, Ltd. Building will be one and one-half stories, 40 x 65 ft. and cost about $50,000. Contract includes erection of power house and dam. F. J. Bartholomew, 510 Hastings Street, Vancouver, is architect.

Foreign

BIDS are being asked by Victorian Government Railways, Melbourne, Australia, until Feb. 22, for one electric butt welding machine, complete with all accessories.

Colonial Government, Nassau, Bahama Islands, has authorized fund of about $160,000 for extensions and improvements in local electric light and power plant, including new machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Bahamas No. 264689; also, at American Consulate, Nassau, M. E. Gyr, consul.

Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, will place orders soon for railroad construction machinery and equipment for Turkestan-Siberian Railway line, amounting to about $1,000,000. A railroad delegation has arrived in United States to select equipment, headed by A. A. Lazarevsky, chief engineer, new lines department, Soviet Commissariat for Transportation; L. M. Perlman, assistant chief engineer; and S. M. Ivanov, vice-president, Turkestan-Siberian Railway.

Mexican Light & Power Co., Mexico City, Mexico, is arranging an expansion program to cost about $7,000,000, including rebuilding several generating stations, transmission and distributing lines, and installation of new machinery. Present gross capacity of 195,000 hp. will be considerably increased.

Two steel companies in Czechoslovakia are arranging for joint construction of a new rolling mill at Karlshutte, primarily for production of fine sheet steel, and will begin work soon. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Czechoslovakia No. 60119; also, at American Consulate, Prague, Czechoslovakia, K. L. Rankin, assistant trade commissioner.

Bids will be received by New Zealand Government Railways, Wellington, until April 21, for machine tools, including one 13-in. combination lathe, two capstan lathes, six vertical medium drilling machines, four vertical drilling machines, one plate edge planing machine, two die-sinking machines, three crank shaping machines, two locomotive wheel balancing machines, one slotting machine, two nut-tapping machines, one hydraulic riveter, four electric welding sets, 30 belt-driven spring power hammers, 11 pneumatic power hammers, two sand slinger molding machines, and two electric lifting magnets.

NEW TRADE PUBLICATIONS

Industrial Signal Systems.—Hansen Mfg. Co., Princeton, Ind. Catalog 8, describing in detail the various types of signal systems and timing devices for use in maintaining punctuality and discipline economy in industrial plants and school buildings.

Fire Fighting Equipment.—Pyrene Mfg. Co., 560 Belmont Avenue, Newark, N. J. Bulletin announcing the Phomene accumulator, an automatic foam fire protector for use in all types of industrial plants. The accumulator is charged with dry powder and a water line connection is made at the bottom which mixes automatically.

Valves.—Homestead Valve Mfg. Co., Homestead, Pa. Catalog 34, describing the company's line of valves for use in power plants and process or general industries. Listed for the first time are the Homestead protected seat hydraulic operating valve with remote control attachment, the larger size quarter-turn plug valve equipped with gear operating device and the Ross air valve.

Washing Machinery.—Nielsen Industries, Inc., Maccabee Building, Detroit. Brief bulletin describing the company's Lightning washer for cleansing buildings, automobiles and various other articles on which spray work is possible.

Power Transmission Machinery.—Winfield H. Smith, Inc., Springfield, N. Y. Circular describing the company's line of light power transmission machinery. Illustrations of speed reducing gears, hangers, pillow blocks and other equipment for use in installations of small horsepower capacity are included.

Air Filters.—Reed Air Filter Co., Inc., Louisville, Ky. File sheet 30D3, providing data and specifications on the automatic self-cleaning Reed Streamline air filter. Unusually practical is the information on determining the size of filter required.

Industrial Heating Appliances.—American Gas Furnace Co., Spring and Lafayette Streets, Elizabeth, N. J. Bulletin illustrating some of the company's late designs of furnaces, heating and carbonizing machines, etc. Brief descriptions of the machines are included.

Gas Handling Equipment.—Connersville Blower Co., Connersville, Ind. Bulletin 33, devoted to a gas booster designed for use in plants where pressure is low or where gas is distributed to various departments through considerable lengths of piping. A special feature is the arrangement for equalizing pressure in oil reservoirs and thus preventing lubricating oil from working into the gas line.

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THE IRON AGE

ESTABLISHED 1855

New York, January 26, 1928

VOL. 121, No. 4

Steels for Locomotive Forgings

Must Be Sound and Clean under Fracture and Deep-Etch Test, Heated with Deliberation, and Finally Normalized and Annealed for Highest Qualities

BY E. J. EDWARDS*

DESIGNING engineers will, I believe, agree that there are few machines built today where the service required of the forgings is more severe than in the modern locomotive, which in freight service may haul a train of 100 to 125 loaded freight cars at 35 to 50 miles per hour. The new Hudson-type passenger locomotive shown in the head piece, furnished by the American Locomotive Co. to the New York Central Railroad in November, 1927, will pull 25 Pullman cars at a rate of 65 miles per hour. Its wheel base is 83 ft. 7½ in., the engine alone weighs 349,500 lb., and it has a maximum tractive effort with booster of 53,200 lb. No more than two or three years ago, the average run was approximately 100 to 150 miles. Today, the modern passenger locomotive is called upon for 400 to 800 miles in one trip.

The American Locomotive Co. has built a new forge and heat-treating plant at Dunkirk, described in detail in THE IRON AGE, Jan. 12, 1928, p. 127, where special care is taken to secure a product that will meet the exacting requirements of the various railroad specifications. While the larger tonnage produced is locomotive material, the shops are in a position to make forgings for other machinery manufacturers in various designs up to 16 in. in diameter or thickness.

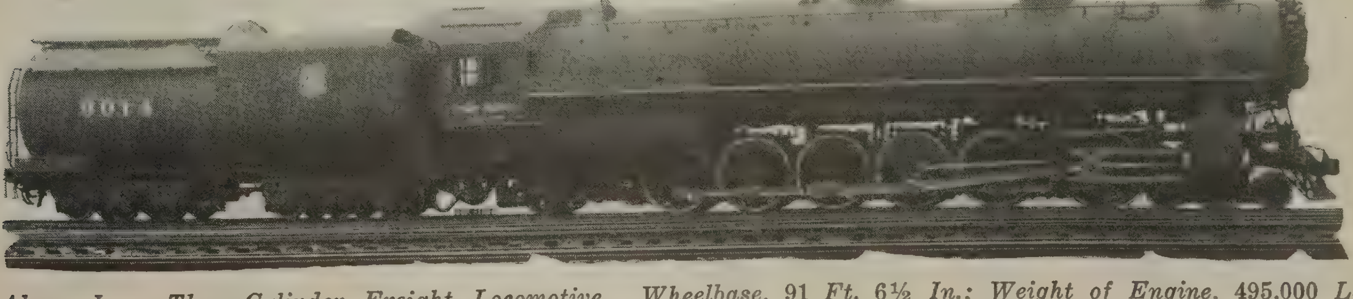
Change from Wrought Iron Brought Many Problems

It should be stated that up to 25 years ago nearly all locomotive forgings were made of wrought iron. Scrap, carefully selected from old rolling stock, with new bars as required, was piled into faggots, heated to welding temperature and forged into billets under a steam hammer. Enough of these billets were then wired together, reheated and rewelded into a piece big enough for the forging required. The piece was then delivered to the machine shop without heat treatment.

Since that time the demand for stronger and better parts has grown continuously. In 1908 one of the leading railroads specified steel of the following analysis (ladle test):

Carbon	0.35 to 0.50 per cent
Manganese	0.40 to 0.60 per cent
Phosphorus	less than 0.05 per cent
Sulphur	less than 0.05 per cent

At that time little attention was given to check



Above Is a Three-Cylinder Freight Locomotive. Wheelbase, 91 Ft. 6½ In.; Weight of Engine, 495,000 Lb.; Maximum Tractive Effort, 96,650 Lb.

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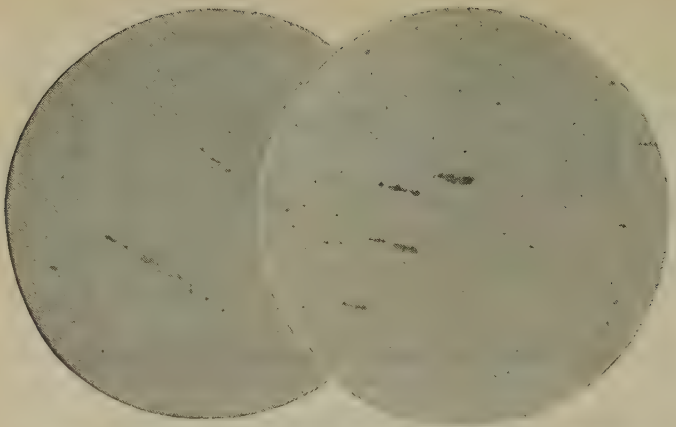
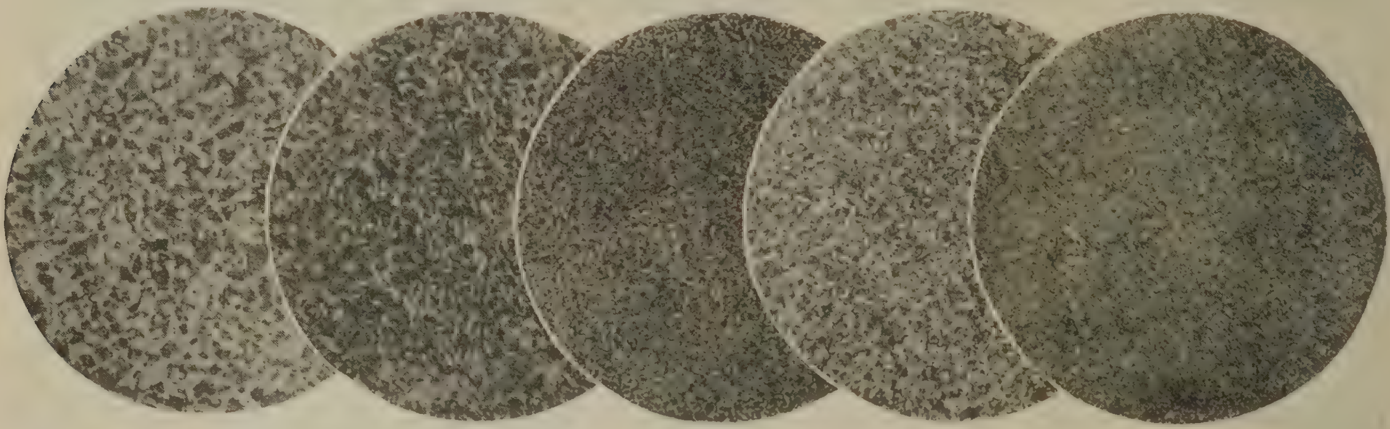
*Engineer of tests American Locomotive Co., Schenectady, N. Y.



Non-Metallics in 0.52 Carbon Steel Driving Axles. Left, an acid steel; right, a basic steel. Unetched; **60** ***diameters***

analyses, the amount of segregation was not determined, nor was it certain that a sufficient top and bottom discard was being made to insure only sound dense metal, free from segregation. Little or no attention was given to the rate of heating the billets, the time of soaking at heat, or the final temperature of forging. An occasional tensile test was made for record purposes but was not used as a basis of acceptance or rejection. A forging made under such conditions was placed in service without ever having seen an annealing furnace. Suffice it to say that a medium carbon steel in such a state was not fit for the purpose intended.



Microstructure of Normalized and Annealed Forgings, All at 60 Diameters

ELECTRIC CARBON STEEL

14-In. Crank Axle	
C	0.36
Mn	0.56
P	0.014
S	0.023
Si	0.42
Yield	45,550
Ultimate	81,030
Elongation	29
Reduction	55

CARBON STEEL

13-In Driving Axle	
C	0.52
Mn	0.64
P	0.25
S	0.040
Yield	52,790
Ultimate	89,780
Elongation	24
Reduction	37

VANADIUM STEEL

6-In. Piston Rod	
C	0.49
Mn	0.85
P	0.024
S	0.021
V	0.19
Yield	61,680
Ultimate	97,140
Elongation	27
Reduction	58

CHROME-VANADIUM

10 x 6-In. Side Rod	
C	0.34
Mn	0.73
P	0.048
S	0.030
Cr	1.07
V	0.14
Yield	59,440
Ultimate	98.660
Elongation	25
Reduction	53

NICKEL STEEL

12-In. Crank Pin	
C	0.36
Mn	1.22
P	0.030
S	0.031
Ni	2.32
Yield	62,100
Ultimate	96,600
Elongation	28
Reduction	61

In 1907 or 1908 it also began to be recognized by railroad men that annealing was necessary in order to refine the crystalline structure of the metal. To do this, driving axles were placed into a flange furnace, wherein the flame came in direct contact with the metal. After heating to a cherry red, the axle was allowed to cool in the furnace or in the air. Crude though this practice was, an improvement was seen in the quality of the driving axles and it was not long before the other important forgings, such as rods, crank pins and piston rods, were annealed.

At about the same time forgings in nickel and vanadium alloy steels were made. Such forgings were annealed only. Some of these are, I believe, still in service, but the analysis of the nickel steels apparently was not properly balanced, with the result that such forgings did not find favor.

Late in 1909 or early in 1910 a large number of quenched and tempered chrome-vanadium forgings were made for engines then being built. Results were most disappointing, as a large percentage failed in service. The failures were due to thermal ruptures which were no doubt present in the forging previous to the heat treating, defects which were intensified by the internal strains set up in the quenching.

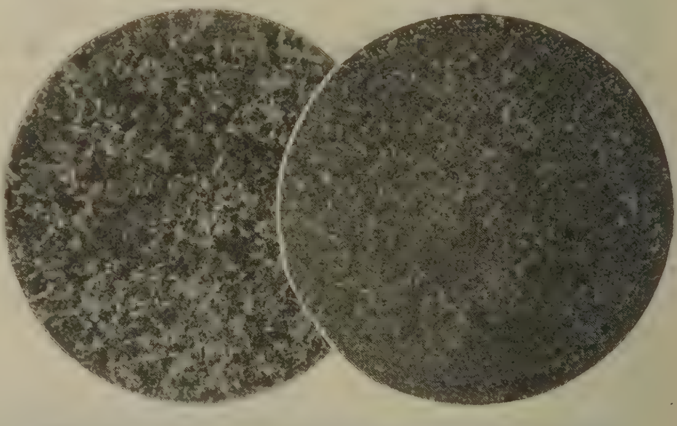
Soon thereafter a considerable tonnage of quenched and tempered carbon steels was specified, but again the service results were disappointing. A large number of failures were attributed to internal strains, set up during the rapid cooling of the metal.

Sound Steel Selected at the Source

The above deals with the past. Let us now consider just what is being done to insure a better locomotive forging today and tomorrow.

The raw materials used consist of ingots and blooms of steel (and bar iron for the manufacture of such wrought iron forgings as are still required). Before placing an order with a new manufacturer for blooms or bar material, an investigation is made to learn definitely just what he can do when producing high quality material of the requirements specified. No order is placed unless we are reasonably sure he can deliver, and unless he agrees to abide by our inspection methods.

Corrugated ingots of acid steel made in our own open-hearth furnaces at Latrobe, Pa., are used in the



Microstructure of Quenched and Drawn Forgings

CARBON STEEL

10 x 6-In. Side Rod	
C	0.47
Mn	0.56
P	0.010
S	0.024
Si	0.16
Yield	57,450
Ultimate	94,900
Elongation	28
Reduction	57.3

CHROME VANADIUM

10 x 6-In. Forging	
C	0.27
Mn	0.58
P	0.022
S	0.024
Cr.	0.88
V	0.16
Yield	91,420
Ultimate	110,100
Elongation	24
Reduction	68

manufacture of the larger forgings. This of necessity means that an excellent quality of raw material is used in melting, for it must be remembered that in the acid open-hearth none of the phosphorus or sulphur is removed. We believe that a well made acid heat is preferable to a basic heat, one of the reasons being the smaller amount of slag and dissolved oxides present in the finished steel. Unetched specimens, such as shown on page 256, will bear out this statement.

Specially designed hot tops limit the pipe and draw segregation well toward the top of the ingots. Surface defects are removed by chipping. In making the top discard, the crop is removed by cold sawing, allowing 4 or 5 in. for a fracture test at the very center of the ingot, as shown in the illustration. Each ingot is given an individual identification number; drillings are then taken for chemical analysis as described later. This insures only the use of sound steel and material free from segregation. Should the analysis or fracture show a segregated or piped condition, an additional discard is made in the same manner by cold sawing and breaking until a sound unsegregated steel is discovered. This precaution is in itself a method of inspection rarely found in work of this nature, but we believe quite indispensable if highest quality is to be attained.

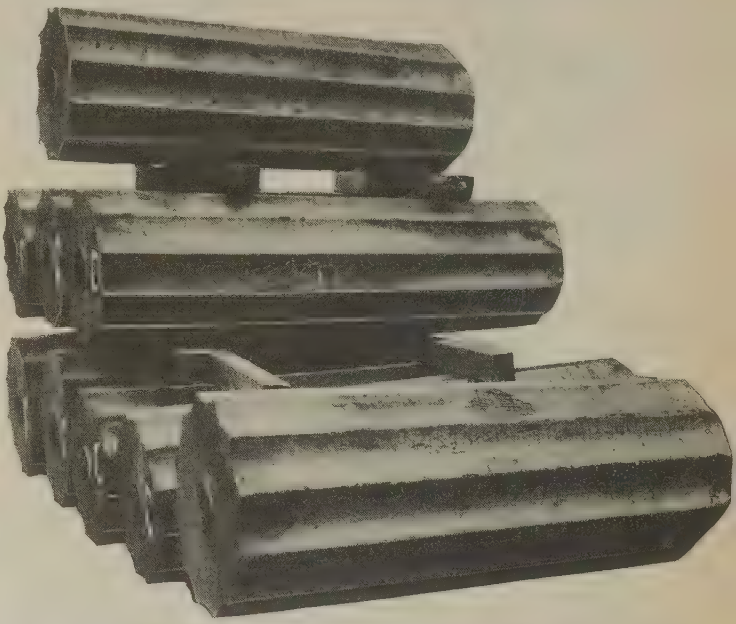
Ingots are charged into cold, oil-fired furnaces, and the heat applied slowly to avoid internal ruptures and to insure uniform penetration of the heat throughout the mass. Forging is done under a hydraulic press of 1000-ton capacity as shown in the previous article.

Deep-Etch Test on Forging Blooms

Most of the driving rods, crank pins and piston rods are made from rolled blooms or billets in alloy steel as well as straight carbon. It is our practice to make full-sized cross-section macro-etchings at the mill on all alloy steel heats. Three specimens, cut from different ingots, two being taken adjacent to the top discard and one from the lower part of the ingot, give a good indication of the quality of the heat. In this connection, it is interesting to note that the American Locomotive Co. was a pioneer in including the deep-etch requirement in a material specification.

As regards the macro-etching (or deep-etch test), it is next to impossible to establish a standard requirement. However, our mill inspectors, who are really specialists in this type of testing, have become sufficiently proficient so that the amount of questionable steel accepted has been reduced to a minimum.

The test has worked out to the advantage of the steel makers, however, who have been able to correct bad practices and thus produce more uniform, higher grade metal. We believe that the deep-etch test is the only one which will detect thermal ruptures produced during casting, reheating or blooming mill work—defects which we know were responsible for hundreds of failures in the harder steels when they were first being made.

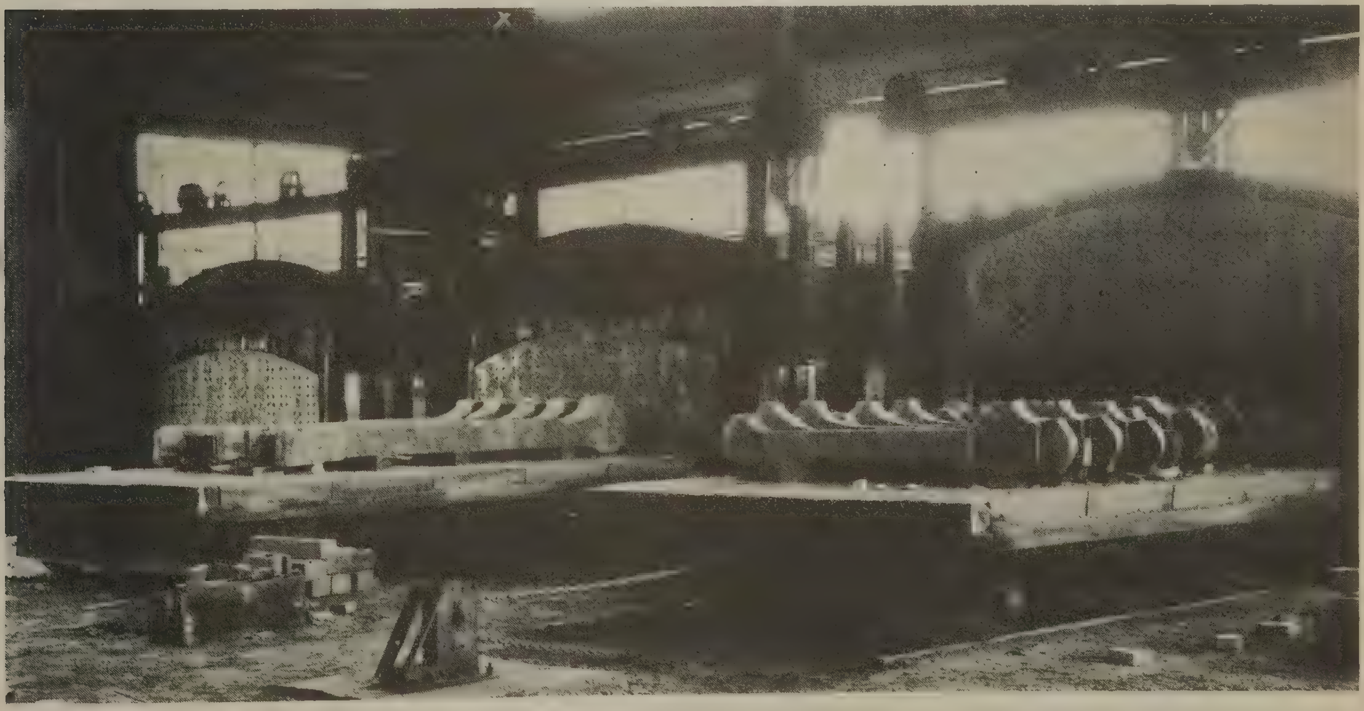


Hot Top Acid Steel Ingots Cropped for Fracture Test at Center

Carbon Segregation Limited to 15 Per Cent

Drillings for chemical analysis are taken from a ⅝-in. hole from three billets adjacent to the top discard and from one or more additional billets close to the bottom, selected at random in each heat of alloy or carbon steel. Samples are drilled half way from center to edge, as well as at the dead center. The analysis at the half-way point must show a composition within the chemical range specified, while the carbon content at the center must not vary more than 15 per cent from that actually found at the half-way point. Acceptance or rejection as regards segregation is based entirely on the check analysis; ladle analysis is reported for record only.

An unusual requirement of the American Locomotive Co. specification for straight carbon steel blooms



Side Rods Ready for Heat Treatment

be made from one top-cut and one bottom-cut billet in each heat. By "top-cut" billet is meant the section adjacent to the discard from the top of the ingot, while the "bottom-cut" may be taken from any other billet cut further down in the ingot. Minimum physical requirements specified for such tests are as follows:

	Annealed	Unannealed
Tensile strength, lb. per sq. in. ..	80,000	82,000
Elongation in 2 in., per cent.....	18	15

Tests are cut from full-sized cross-sections, and the manufacturer may furnish either annealed or unannealed specimens. When annealed specimens are furnished, the manufacturer is expected to anneal a full-sized cross-section of the billet, and take the test coupon therefrom.

Best heating and forging practice is of course essential to make a good part out of sound steel. In the article published in THE IRON AGE of Jan. 12, 1928, p. 127, the equipment was described whereby the ingots or billets may be heated according to a definite schedule and then pressed or forged in a way that the ingot structure is broken up, even to the very center of the piece. All heating is done under strict pyrometric control in furnaces which prevent direct contact of flame and metal.

Our forefathers handed down a legend that a reduction of at least four to one in cross-sectional area was necessary to produce a desirable forging from a billet or a reduction of five to one in cross-sectional area when making a forging direct from the ingot. An investigation recently conducted by the writer indicates that we can get equally as good results with a reduction as low as three to one from the ingot. This is of vital importance because we all recognize that the larger the ingot the greater is the tendency for segregation.

Heat-Treatment Practices

Forgings, after being allowed to cool in the air, are removed to the heat-treating plant, where they are given the desired heat treatment required to meet the various specifications.

Experience has proved that the straight anneal will not produce a desirable grain structure. Because of the large section represented by a locomotive forging, such large internal strains are developed on quenching that ruptures frequently occur. It has been demonstrated that in order to obtain the better grain refinement (which naturally means better physical properties, especially ductility) and to avoid the terrific strains set up in quenching, it is necessary to normalize and anneal. This more dependable practice is well worth the cost of such a treatment.

Co., therefore, is to normalize and anneal both the alloy and straight carbon steels unless otherwise specified by the customer. The forgings are treated in oil-fired furnaces, where the flame does not come in direct contact with the metal. The rod or axle is supported on cast iron blocks about 4 in. from the hearth, as shown in the photograph; a little space is also allowed between each piece so as to permit complete radiation around the mass. The piling of more than one tier on top of the other is not permitted. To normalize we hold the forging at the desired temperature a time equal to 1 hr. per inch of thickness or diameter, withdrawing the car and cooling rapidly on the car to a temperature below the critical range. A subsequent anneal at a temperature below the critical is then given to meet the specified physical properties.

To assist in getting uniform structure in heavy masses it is the practice to hollow-bore round forgings; the larger the cross-section the larger the diameter of the hole. A good rule is to have the inner bore one-fifth the outer diameter. This not only promotes uniform heating and cooling, but removes that portion of the steel where physical defects are most often found. Even this expedient does not remove the danger of thermal rupture in quenching a dense alloy steel forging 8 in. thick in the wall.

Testing the Finished Forgings

For testing it is the practice to forge (attached to the forging itself) a prolongation of a sectional area equal to that of the body of the forging. Such prolongations are made on approximately 25 per cent of the production so as to enable the inspector to choose at random those which are to be tested.

A modern laboratory permits complete physical, chemical and microscopical testing.

Microphotographs and the corresponding physical and chemical properties shown in this article are representative of the results being obtained. The size of the rod, axle or pin from which each test is made is also of importance, because while such structures may easily be duplicated in laboratory pieces, it is not so easy to get them in commercial production on heavy masses, sampled half way from the center to the surface.

That the views shown are by no means special may be inferred from a letter recently received from the engineer of tests of a Western railroad. He is one of the few who specify the grain size as determined under the microscope. His laboratory had independently investigated 131 forgings on 35 locomotives delivered during the course of several months, and the verdict was that the uniformity was very satisfactory.

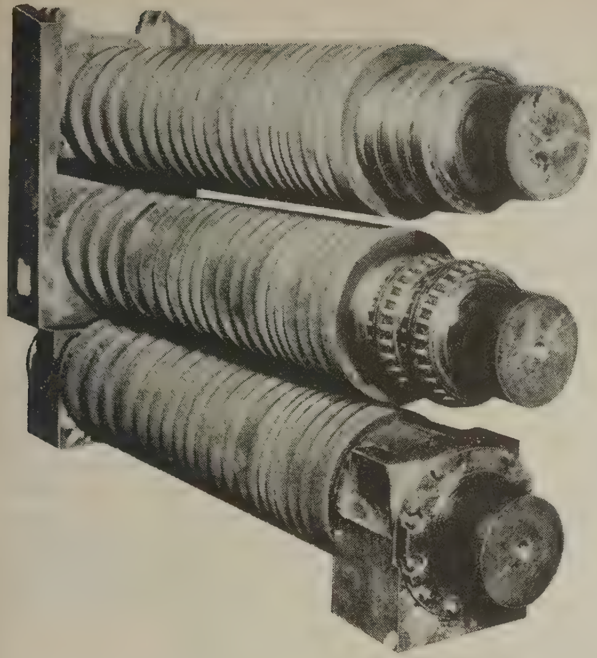
Water Shipments of Steel Greatly Increased in 1927

THE issuance by the United States Engineers' Pittsburgh office of the report of the commerce of the Allegheny, Monongahela and Ohio Rivers within the jurisdiction of that office, for December, completes the record for 1927. Of particular interest to the iron and steel industry is the expansion in the use of the inland waterways for the transportation of its products.

The total tonnage moved in the Allegheny River in 1927 was 2,955,695 net tons, and included 13,867 tons of iron and steel products; of the total Monongahela River tonnage of 24,492,968 tons, the iron and steel item was 689,087 tons, and in the 9,624,134 tons moved on the Ohio River there were 697,262 tons of iron and steel products.

Figures of the Ohio River tonnage represent closely the shipments beyond the confines of the Pittsburgh district and as they pertain to iron and steel are a good measure of the efforts Pittsburgh district steel companies have been making to break through the cordon of high railroad freight rates and to find an outlet for their products beyond the limits imposed by the railroad freight charges.

The total traffic of the Ohio River as reported to the Pittsburgh office by lock-keepers between Pittsburgh and Wellsburg, W. Va., locks beyond latter point being under the jurisdiction of the Huntington, W. Va., office, for 1927 of 9,624,134 tons, compares with 9,306,900 tons in 1926 and 7,647,325 tons in 1925. The 1927 Ohio River total iron and steel shipments of 697,262 tons compares with 315,221 tons in 1926 and 377,403 tons in 1925. The gain in total Ohio River tonnage in 1927 over 1926 was 311,234 tons; the increase in iron and steel tonnages was 382,041 tons. In other words, last year's total gain in Ohio River traffic was supplied by iron and steel. The combined total of Ohio River shipments of iron and steel products for 1925 and 1926 was 692,624 tons, or 4638 tons less than the 1927 total.



Roller Bearings Cut Down Power Waste

As Applied to Roll Necks, Pinion Stands and Hot Saws in Steel Mills

BY S. M. WECKSTEIN*

CONSIDERING the percentage of driving power that is wasted in overcoming friction in the average type of machine used in the production of steel, it is not surprising that the possibilities of anti-friction bearings as applied to this service are of such great importance from the standpoint of operating and maintenance economy. The idea of applying them is not particularly new, but the difficulties in the way, especially in the case of the heavy-duty machines such as rolling mills, hot saws, finishing mills, and similar types were so great, that up until a comparatively short time ago it was regarded as impractical.

About three years ago, however, the engineers of the Timken Roller Bearing Co. started a series of experiments on a large scale, with a view toward developing a type of bearing that would successfully meet all the very exacting requirements of the service. Since the company is itself a large producer of steel, its own plant became available as a laboratory where the bearings could be tested under actual service conditions over any period of time considered necessary to assure accurate and definite information. As a result of these experiments, bearings have been produced for a number of different services, the most notable among them being a type especially suitable for the roll necks of rolling mills.

Since the first development of these bearings, a number of installations have been made in mills of various types all over the country, and results in the way of increased production, decreased operating costs, and improved maintenance economy have been obtained that have more than justified the predictions made for the bearings in the early stages of their development. This is true not only in the case of rolling mills, but of a number of other types of machines to which either these, or bearings of a similar nature, have been applied. Before going into details concerning these results, a description of the bearings themselves and their methods of application should be interesting if for no other reason than because it gives the best idea of the way in which the difficulties and limitations imposed by the service requirements were overcome.

Roller Bearings Suited to Roll Necks

PROBABLY the most difficult application, from the standpoint of mechanical as well as of load requirements, was that made to the roll necks of various types of rolling mills. However, as can be seen from Fig. 1, the bearing as actually developed for this purpose is exceedingly simple, both in construction, and as concerns the mechanical operations necessary to install it. It consists essentially of two double cones or lower races, four sets of tapered rollers with individual cages, and three cups, one of which is double. The assembly is a simple three-part operation, the cups, cones, and rollers being all assembled inside the bearing chuck. Therefore, the complete assembly may be slipped on and off the roll neck as a unit without in any way disturbing the bearing adjustment.

Since the projected area of the two double cones is nearly equal to that of the roll necks, the unit pressure per square inch permits a loose fit of the cones on the neck without any danger of chafing. By virtue of this construction, not only is the assembly of the rolls in the mill rendered a simple matter, but their removal, or the removal or replacement of a bearing, is also facilitated.

While this is especially true in the case of new mills, which can be designed with particular reference to this type of assembly, it is also true of such existing mills as lend themselves to an anti-friction application. No great modification in construction is necessary in such cases to permit the replacement of the bearings formerly used by the new roller bearing. Fig. 2 shows a typical method of mounting the rolls in the mill.

Another interesting feature of these bearings is their compactness. Their width has been kept well within the limits imposed, without any sacrifice of their ability to withstand any of the radial or thrust loads likely to be encountered in service. With regard to the latter type of load, experience has shown that the thrust capacity of the bearings is such that they can easily handle the maximum peak thrust loads met with.

The construction of the bearing has permitted the

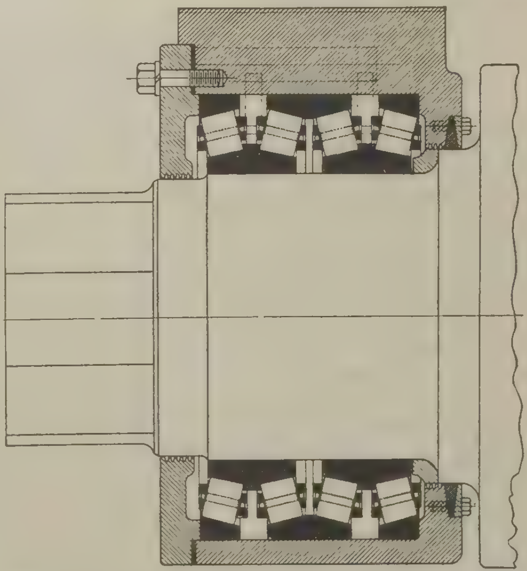


Fig. 1—Section of Chuck and Bearing Developed for Use on Roll Necks

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*Industrial equipment engineer Timken Roller Bearing Co., Canton, Ohio.

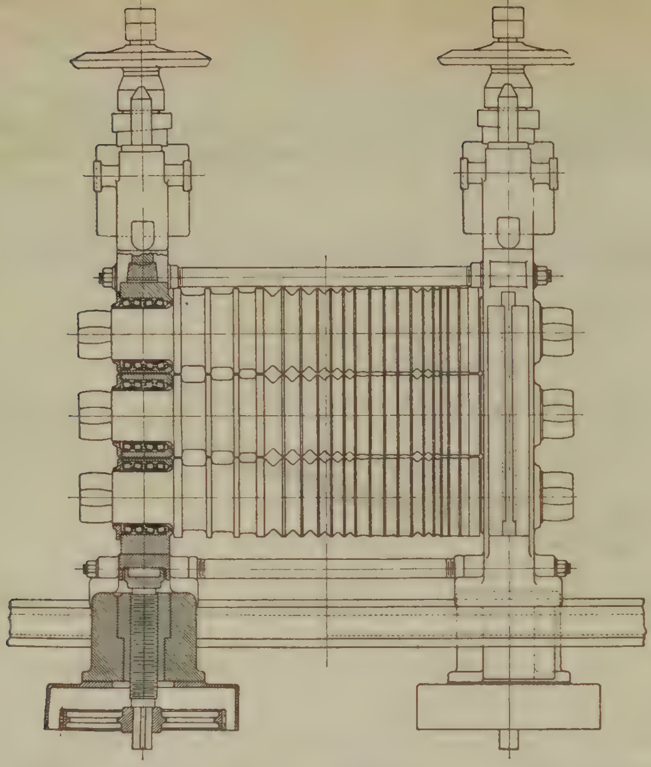

Fig. 2—Typical Application of Bearings to a 3-High Rolling Mill

incorporation of yet other features that add greatly to its effectiveness from a service standpoint. The chuck can be designed so as to form a practically grease-tight inclosure around the roll neck itself, with the result that grease can be forced into the assembly until the pressure becomes such as positively to prevent the entrance of either water or scale into the bearing or housing. The same holds true, of course, in the case of dust or other foreign matter that may be deposited on the housing from the mill atmosphere. As a result the necessity of frequent inspections or renewals of the lubricant is eliminated.

Some of the Advantages Claimed

The advantages obtained from the use of these bearings may be listed in the order of their importance: Improved continuity of service, considerable saving in power consumption, and decreased lubrication and maintenance cost. With regard to the first, experience has already proved that not only are the delays from shutdowns due to bearing failures or troubles materially decreased, but the machines can be worked steadily over longer periods of time without the necessity for inspecting or rehabilitating the bearings. In fact, the frequency with which the machine is out of service for any such cause becomes a matter of how often the rolls must be re-dressed instead of how often the bearings need attention.

As to the second point, the early experiments showed that savings in power consumption up to as high as 60 per cent might be expected, a prediction that has since been borne out by the average savings obtained from a number of installations having widely varying service conditions. In one case on record where accurate operating costs were kept, it was found that the cost of power for operating a 16-in. three-high, breakdown mill with plain bearings amounted to $8,029 for a year, while the cost for the same mill under identical working conditions, but with Timken bearings replacing the plain ones was only $4,335.66 for the same length of time, or a saving of $3,693.34 for power. These figures were obtained in a plant where the kilowatt-hour rate is fairly representative of that paid by the average steel plant. Another case can be cited where the saving in power required to operate a mill formerly equipped with plain bearings amounts to about 62 per cent.

The improvements claimed in the matter of maintenance and lubrication are just as marked, and have been equally justified by the results obtained in practice. Concerning the former, while conditions in various plants vary to a degree that prevents the making of any definite statement as to the percentage of saving that can be expected in any particular case, there are certain factors common to every case that will serve to give an indication of where some of the savings may be looked for. For instance, the costs for babbitt and that for the labor required to re-babbitt plain bearings are totally eliminated and, as has already been intimated, it is a much simpler matter to handle the bearings off and on to the roll necks, so that labor costs for this operation should be less. The same difficulty of determining percentage savings exists in the case of lubrication cost, and for the same reasons. It may be said, however, that results indicate that the comparative ratio seems to be of the order of one to ten, in favor of the roller bearing.

Roller Bearings for Pinion Stands Simpler

THE load characteristics of pinion stands are such as to permit the use of a bearing that is simpler in construction than that designed for mill roll necks. Not only are the radial loads smaller, and less given to sudden high peaks, but the thrust loads, although they are somewhat the same in character, are of less magnitude, being principally those reflected through the couplings from the roll necks on one side, and from the speed reduction gears on the other.

The bearings used in this case may be either of the single or double type, depending on load conditions. That is, they may consist either of a single cone, tapering toward a central apex, two sets of rollers and cages, and two individual cups, one for each set of rollers, or of two double cones with four sets of rollers. One method of mounting is shown in Fig. 3. The same simplicity characterizes the mechanical details of mounting as that described in connection with the roll neck bearings, with the addition that the construction of the chuck or housing may be even simpler because of the lighter service requirements.

Conditions for Hot Saws Hard to Meet

LOAD characteristics of hot saws are such as to make the bearing requirements of this class of equipment very difficult to meet. In the first place, the high speed of the saw, coupled with the fact that heavy peak loads are imposed with great suddenness, requires that the saw arbor be very rigidly held with regard to either vertical or horizontal movement, because otherwise the severe thrust loads imposed by the natural whip of the saw blade under load would be increased out of all proportion, and the saw blade itself might be destroyed.

In the second place, the operating temperatures are high enough to exert a decided influence on the performance of the saw. Owing to the construction which must be employed, it is unavoidable that enough heat to

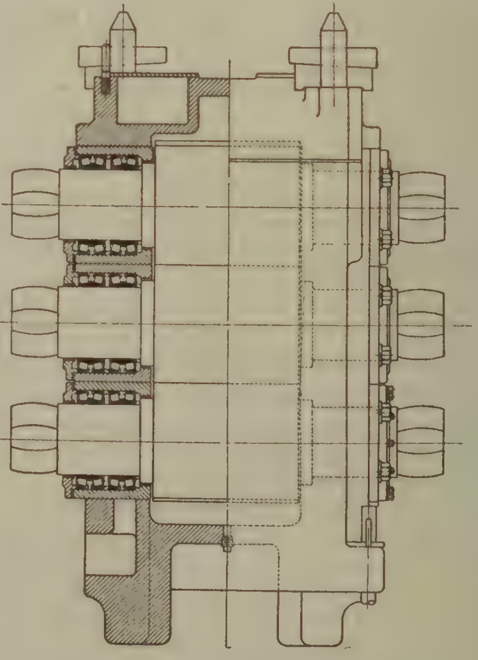

Fig. 3—Method of Applying Bearings to Pinion Stands

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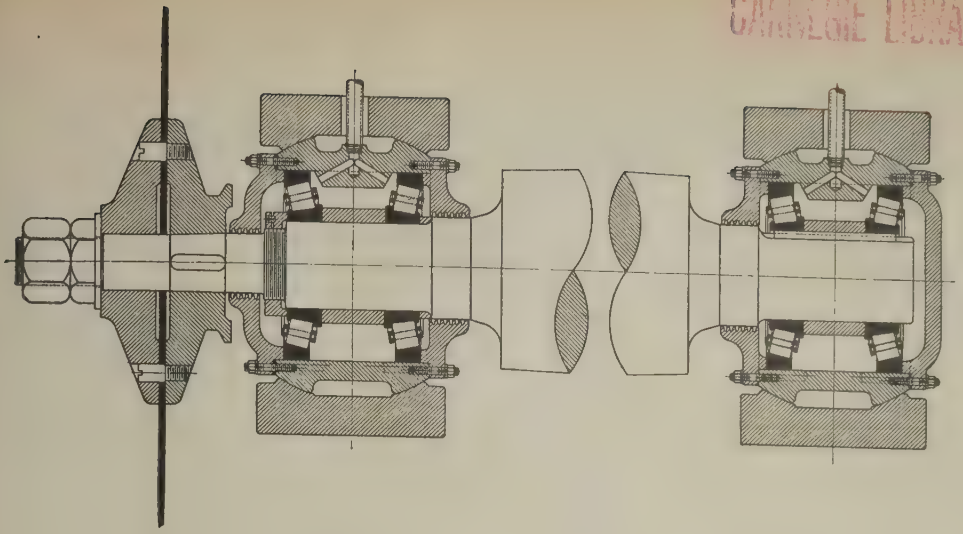


Fig. 4 — Typical Mounting of Bearings on a Hot Saw

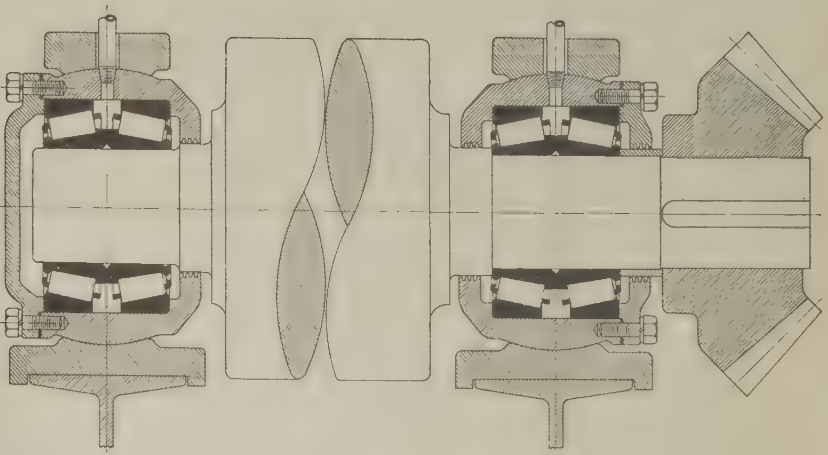


Fig. 5 — (At Right) Typical Mounting for Mill Table Rollers

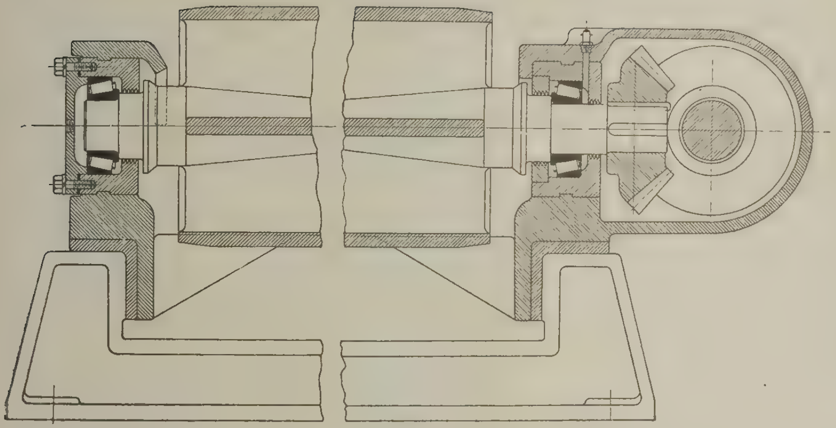


Fig. 6—(At Left) Single Bearing Mounting on Table Roller

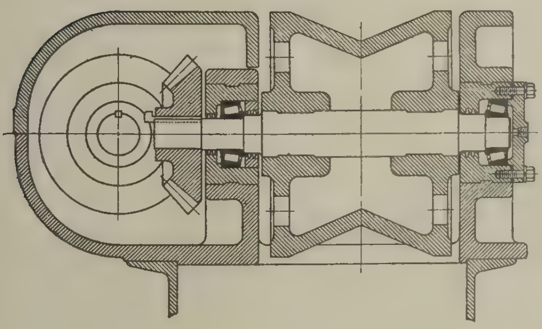


Fig. 7—(Above) Bearing Mounting on Tube Mill Table Roller

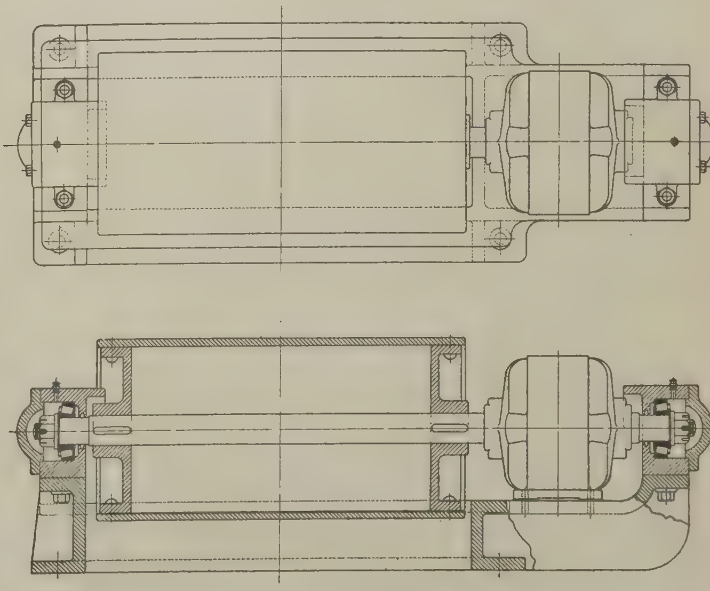


Fig. 8—(Below) Indirect Mounting on Hot Bed Table Rolls

cause material expansion will be transmitted to the saw arbor proper, and thence to the driving shaft. Provision must be made for allowing this expansion to take place without affecting the rigidity with which the saw arbor is held. Heat in addition makes the lubrication problem somewhat more involved than is ordinarily the case.

A typical mounting of tapered roller bearings which has been developed to meet these conditions is shown in Fig. 4. The bearings used are of the single type arranged with opposed tapers to take care of the thrust loads. By examining the layout it will be seen that every precaution has been used to insure absolute rigidity at the saw end of the arbor. The bearing cones are a press fit, and are held in place horizontally by spacers. The outside cone is further held by a threaded nut that clamps the assembly in place. It will also be seen that the construction of the housing and end caps is such as to provide for a circulatory lubrication system.

The matter of shaft expansion has been taken care of by the method of installing the outboard bearing. In this case the cones are keyed to the shaft, allowing the latter to float in the bearing. Therefore, the shaft can expand longitudinally through this bearing, so as to compensate for the rigidity with which it is held in the inboard bearing. At the same time such expansion cannot disturb the horizontal relation of the saw arbor to the work.

This type of installation is already working successfully in several instances where the saws have been used in actual production work over quite a long period of time. Results obtained from these installations indicate that average bearing life should be longer, with less expense for repairs and maintenance, and that, on the whole, lubrication costs are improved. The degree of improvement depends somewhat on the kind and method of lubrication used. Where grease is the lubricant, the ratio is about one to ten in favor of the tapered roller bearing, and even where oil is used, the improvement is of a material character.

Auxiliary Equipment Can Use Roller Bearings

IN addition to the major machines, which have just been described, several bearing arrangements have been developed which are suitable for use on various types of auxiliaries. As in the other cases, the bearing arrangement for the different types has been more or less conventionalized, as a result of thorough-going studies of load conditions and service, but it is adaptable to modifications to meet special requirements. Of the auxiliaries, the ones lending themselves best to bearing application are the table rolls used in connection with the various types of mills. Several arrangements have been developed for various rolls, a few of which will serve to give a general idea of the methods of application.

A characteristic layout for a mill table roller is shown in Fig. 5. In this case, two single bearings are mounted back to back, the cones being a press fit on the roller shaft. The reason for this arrangement is, that while the majority of the load is of course radial, a fair amount of thrust is caused, when the rollers are suddenly reversed, by the tendency of the driving pinion to try and back out of mesh with the side shaft gear. This condition is of course aggravated when the reversal takes place with the roller loaded, as is often the case. The bearing layout for approach table rollers is practically the same as that just described, because since the rollers are nearly always started under load, the loading characteristics are, with the exception of reversals, identical.

Two applications where the bearing problem is solved very easily are shown in Figs. 6 and 7 respectively. In both these cases the loads, both radial and thrust, are very much lighter, and the construction of the bearing supports is such as to more easily assure proper bearing alinement—consequently, a single bearing can be used.

In the case of the hot bed table rolls for strip mills, a mounting similar to that shown in Fig. 8 is suggested as good practice. The indirect method of bearing mounting is used, that is to say, the bearings are so mounted that a slight expansion of the table rolls, and possibly of the housing, due to heat radiation from the load, will cause the bearing cones to move axially away from the cups, and eliminate the possibility of the bearings seizing. This method of mounting has proved very successful in service.

Similar applications have also been made to other auxiliary equipment such as tilting transfer tables, blast furnace bull wheels, straightening machine idler rolls and piercing mill holding chucks, to give a few examples. Since both the load characteristics and the bearing arrangement in most of such cases would merely duplicate those already described, particular details concerning them would not be especially interesting. They are merely mentioned to give an indication of the extent to which the anti-friction idea can be carried in the average steel plant.

As to the results obtained in improving operating expense and practice by applying roller bearings to auxiliaries, while individually they are naturally less remarkable than in the case of roll neck bearings, in the aggregate they show a proportionate gain from both standpoints, and for very much the same reasons. In fact, a plant where even the auxiliaries alone have been so equipped may reasonably expect to find that the power conditions and general operating economy have been materially improved.

Boiler-Corrosion Problems

PROGRESS report of sub-committee No. 5 on "Corrosion of Boilers and the Effect of Treated Water in Accelerating or Relieving These Troubles" was presented recently by Frank N. Speller, metallurgical engineer National Tube Co., Pittsburgh, chairman of the committee, during the annual convention of the American Society of Mechanical Engineers at New York. The following list of boiler-corrosion problems for investigation was approved, the problems being arranged approximately in order of importance:

1—Determine the corrosion rate and hydrogen-gas evolution *in the absence of* dissolved oxygen through the range of acidity and alkalinity in general practice and with a temperature range from 140 to 450 deg. Fahr., on the heat-transfer surfaces of the water cycle in steam plants. In this problem the determinations should be made on distilled water and on water containing varied amounts of the common impurities.

2—Repetition of No. 1, with dissolved oxygen present in varied amounts within range usually found in practice. Investigation and development of method for determining very small amounts of oxygen in solution.

3—Determine in the field dissolved oxygen in locomotive and stationary boilers at various points in the circulating system. Include boilers of various types. The field tests on boilers should include some of the same type operating at various pressures.

4—Study the variations in hydrogen-ion concentration, and alkalinity of acidity by titration at boiler temperatures, compared with these factors in the same water at normal temperature (68 deg. Fahr.). Investigate the influence of high concentration of common salts on these variables at high temperatures. An automatic recording device for measuring hydrogen-ion concentration in steam boilers under operation is desirable.

5—Study in laboratory and field the formation of protective films deposited from water on heating surfaces. The relation between dissolved oxygen, alkalinity, chlorides and protective scale formation should be investigated.

6—Study pitting found under boiler scale, particularly in locomotives operating in certain geographical sections.

7—Electrolytic prevention—cause and effect.

8—Corrosion in boilers, caused by organic materials.

9—Study action of inhibitors (organic and inorganic) at boiler temperatures.

The sub-committee appointed to study plans for an experimental boiler to be used in carrying out certain parts of the boiler-water studies has been at work, but has not yet made a final recommendation.

Measuring a Billionth of an Inch

Device Required to Study Changes in Length of Permalloy—When Magnetized Has Extreme Sensitivity

EQUIPMENT to measure changes in length of the order of a billionth of an inch has recently been devised by P. P. Cioffi of Bell Telephone Laboratories. If it were possible to get paper so thin, over a million sheets piled on top of each other would be required to equal a piece of ordinary tissue paper in thickness! This length is just about a tenth of the diameter of an atom.

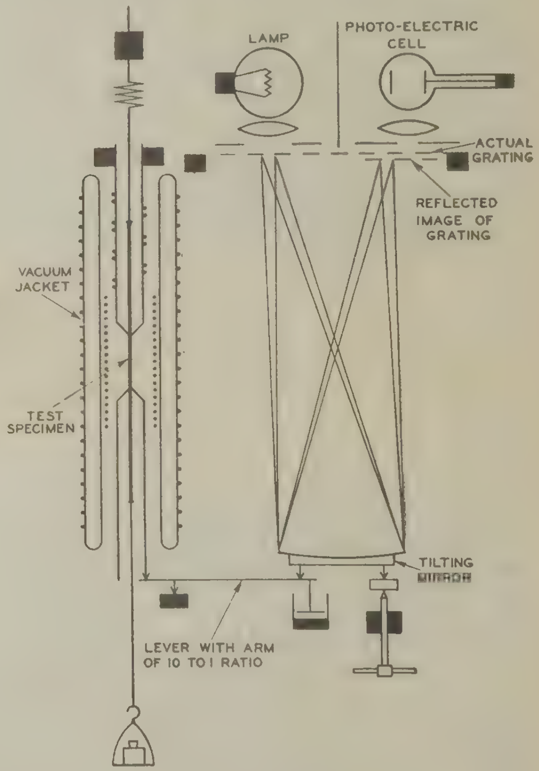
The need for so refined an instrument arose from studies of magnetic materials, a subject of the greatest practical importance to the American Telephone & Telegraph Co. Magnetic materials are required not only for the many forms of telephone receivers but for many types of equipment associated particularly with long distance telephony.

At Left—Equipment to Measure Atomic Distances Designed by P. P. Cioffi, of Bell Telephone Laboratories

Until recently it had been thought that pure iron was the most magnetic material it was possible to obtain. When G. W. Elmen of Bell Telephone Laboratories discovered permalloy, all previous theory was overthrown. This is an alloy containing 79 per cent of nickel and 21 per cent of iron, which has magnetic qualities far superior to pure iron alone. Cioffi's apparatus is used in building up a new theory to account for these remarkable properties.

Two fundamental facts were available as foundational material. When a metal is magnetized a loss occurs which evidences itself as heat. In addition a small change in the dimensions of the metal is detectable. The change is not over one part in 100,000 but is in opposite directions in iron and nickel; the former expands while the latter contracts in a magnetic field. The myriad tiny atoms composing the metal apparently turn or twist under the action of a magnetic field and, while those of iron turn so as to make the total length greater, those of nickel reverse the action. Permalloy, which neither contracts nor expands and shows very little heat, may be pictured as the well ordered scheme where little groups of iron and nickel atoms cooperate in their movements so that there is no wasted effort. The iron atoms acting in one way slip by the nickel atoms acting in another so that friction is a minimum.

The equipment is designed to measure changes of length in a piece of wire about 4 in. long. One end of the 4-in. section is fixed in position and to the other end a clamp is attached which connects to the short arm of a lever. The long arm of this lever tips a concave mirror as the wire changes its length. Light from an incandescent lamp, after passing through a suitable lens, falls on the mirror at a small angle from the perpendicular and is reflected back to a position somewhat offset from the lamp, where a photoelectric cell is mounted. Between the light source and the mirror is a grating with alternate opaque and transparent lines, each half a millimeter thick. The image of this grating falls on the mirror and is reflected back to an extension of the same grating in front of the photoelectric cell. When the images of the transparent lines are reflected back to another group of transparent lines, full light will fall on the cell. When, on the other hand, they fall on the opaque lines, no light will be transmitted. Only a very small movement of the mirror is required to cause this change from full light to no light. The photoelectric cell gives off a current proportional to the light falling on it, and this current is indicated by a sensitive galvanometer. The galvanometer indication thus serves to divide the width of one bar of the grating into a large number of smaller divisions.

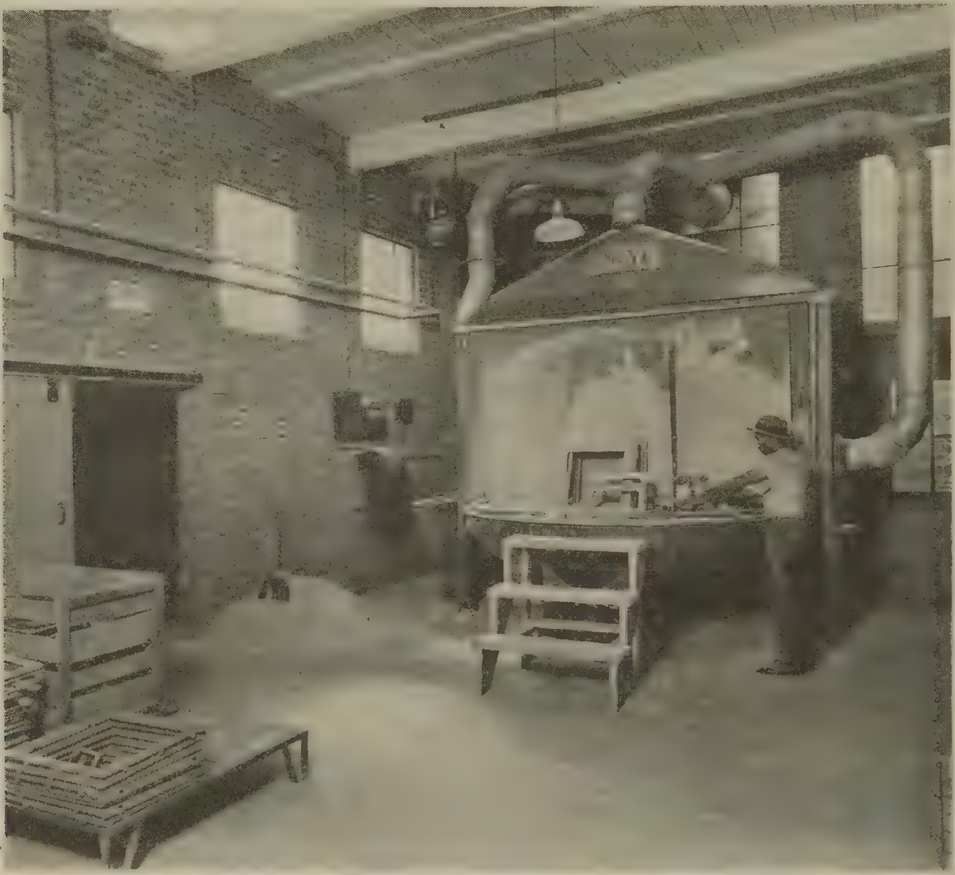


At Right—Diagram Showing How Small Change in Test Specimen Is Magnified at the Photo-Electric Cell

As imperceptible temperature changes cause expansion sufficient to tilt the mirror, every precaution is taken to keep the temperature of the wire constant. It is surrounded by a vacuum cylinder like a thermos bottle with an opening at each end, and in addition a special electrical compensating coil is used to maintain constant temperature. The entire equipment is mounted on a spring suspension so that building vibrations will not affect it.

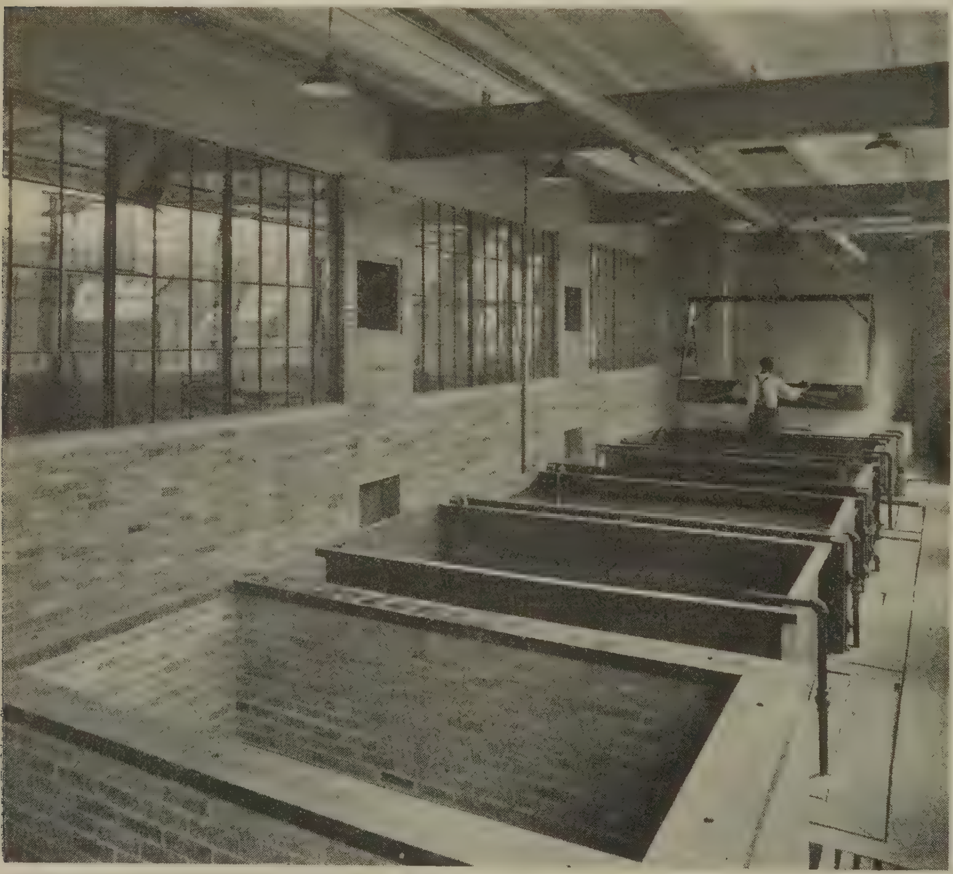
Enameling Metals With the Aid of

Plant Designed for Minimum



Operating the Sand-Blast Equipment. The door at left leads to the sand bin, which is protected from the weather. Lift-truck skids for handling material will be noted in the foreground

Pickling Room, with Brick Dryer in the Foreground. Overhead is a tramrail with electric hoist and special non-corrosive tray for handling material into and out of the vats and dryer



CONVENIENT handling of materials was made a primary factor in the layout of the new plant of the Louisville Enameled Products Co., Louisville, Ky., as will be seen from the plan. The plant is one story, except for the office at one end. The use of conveyors forms the central feature of the design, while provision for expansion has been made. The building is of brick and steel, 120 x 168 ft., with ample natural lighting.

Castings or sheets for enameling go through the sand-blast room, which has a concrete sand bin close alongside arranged for direct unloading from railroad cars. The sand blasting unit, made by the Sly Mfg. Co., Cleveland, has a rotating table on which material is passed into the blasting chamber.

Pickling takes place in a separate room, served by an overhead tramrail with electric hoist. Material on trays is dipped in the successive tanks one after the other as needed and then is dried. The tramrail extends out to the black stock storage, to facilitate handling material into and out of the pickling process.

Enamel is mixed in the mill room, which contains three 500-lb. mills and two of 300 lb., with space for an additional mill. This room and the pickling room are both close to a dip tank and a line of four spray booths in which a second coat of enamel is sprayed upon the parts requiring it.

Pickle Room Has Large Over-Capacity

Monel metal baskets are used in the pickle room, which has been operating only 5 hr. a day to serve other departments operating 10 hr. Considerable expansion in output is correspondingly available. A double-strength cleaner is used and reports indicate freedom from rusting. Two "venturafin" steam units in the walls of the room eliminate vapor. A dryer is used with exposed gas burners, which are operated merely during the time that the basket of ware is in the dryer. Efficiency in drying is claimed from the fact that there are no covers or hearth plates to be heated.

Automatically Controlled Conveyors

Handling Costs and High Output

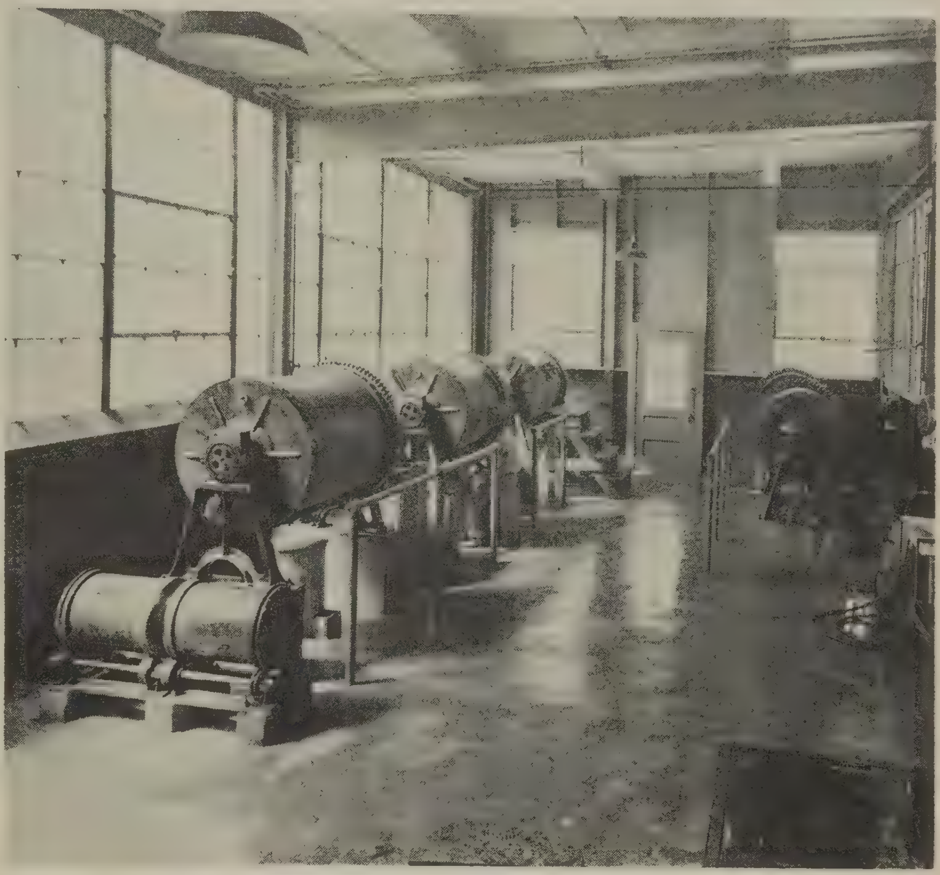
As the mills in the mill room are set with a valve clearance of about 36 in., the average-size 33-gal. can can be put underneath for unloading the mills. They are not so high, however, as to be difficult to operate. The cans are equipped with rollers for ease of handling. For loading the mill, 100-lb. cans are used. The mills all have direct electric drive. The floor of this room slopes from the center to two sides, which permits flushing without leaving water around. There are two 25-lb. laboratory mills for experimental work on colors.

There is an enamel dipping tank for flat sheets and other material, which has a revolving rack on top. The dipper hangs the dipped ware on this rack so that it will drain back into the tank. After one side of the rack is filled, it is turned around for loading the other side. By this time the ware on the first side has dripped sufficiently so that it is ready to be placed in the dryer. The dip tank itself is porcelain enameled in a blue ground coat.

Two of the spray booths are 8-ft. booths with two pedestals in each. This is for the purpose of supplying the sprayer with continuous work and permitting him to devote all his time to spraying. A helper loads and unloads the pedestals, while the sprayer, using one gun, steps back and forth from one to the other. This arrangement has yielded large production. De Vilbiss spraying units are used.

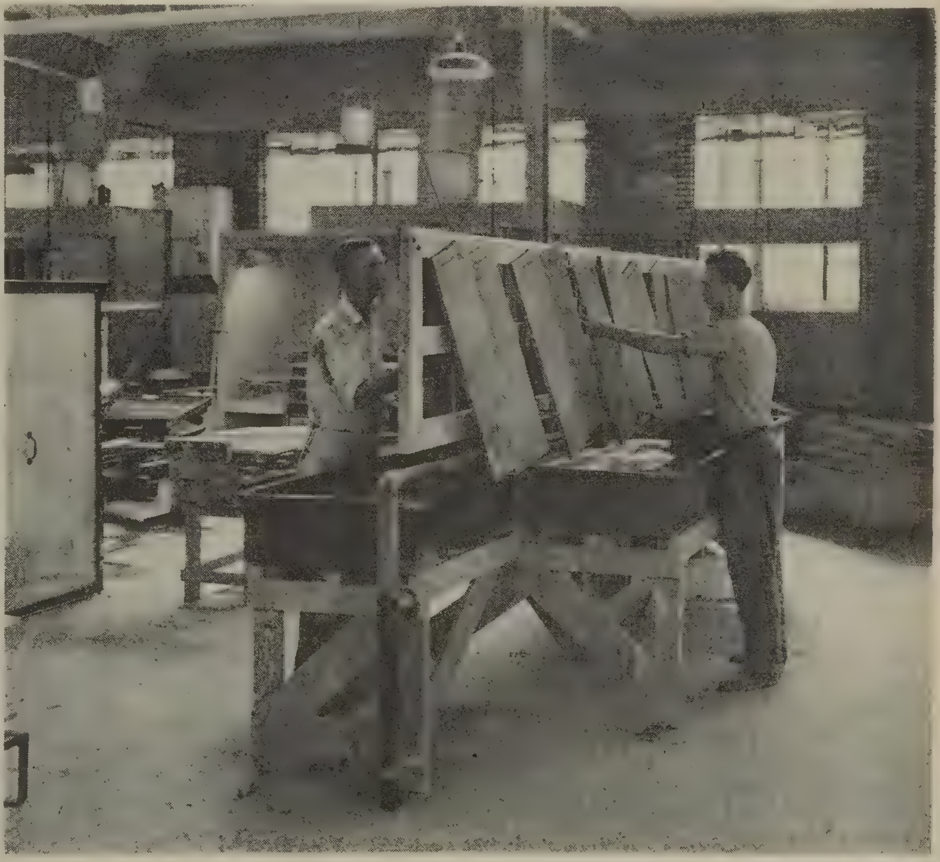
Power Conveyors Make Drying Automatic

Conveyors are used to carry the ware into the dryers immediately after spraying. All sizes and shapes of castings and sheets are run through this equipment. A hurricane dryer is used, 40 ft. long, with material passing through it on a power conveyor. Air is blown through a duct in the bottom of the dryer at 3000 cu. ft. a minute, being heated by steam to 190 deg. Fahr. With steam pressure varying from 10 to 15 lb., the temperature of the dryer is kept at about 170 deg. The speed of the conveyor is varied from 15 in. to 5 ft. a



The Five Mills Were So Placed That They Could Be Discharged Directly into 33-Gal. Cans. These cans are on casters to facilitate handling. In foreground at left is a double grinding cylinder

Dipping Tank with Rotating Rack. The man at left is placing a dipped piece upon the rack. The man at right is removing pieces after dripping. In rear is one of the spray booths



min., depending upon the character of the material going through.

A small room-type dryer along one side of one of the hurricane dryers is heated by radiation from the latter. This is used for storing clean castings and for other miscellaneous drying needs. Sliding doors permit access to any part of this room, which is 30 ft. long.

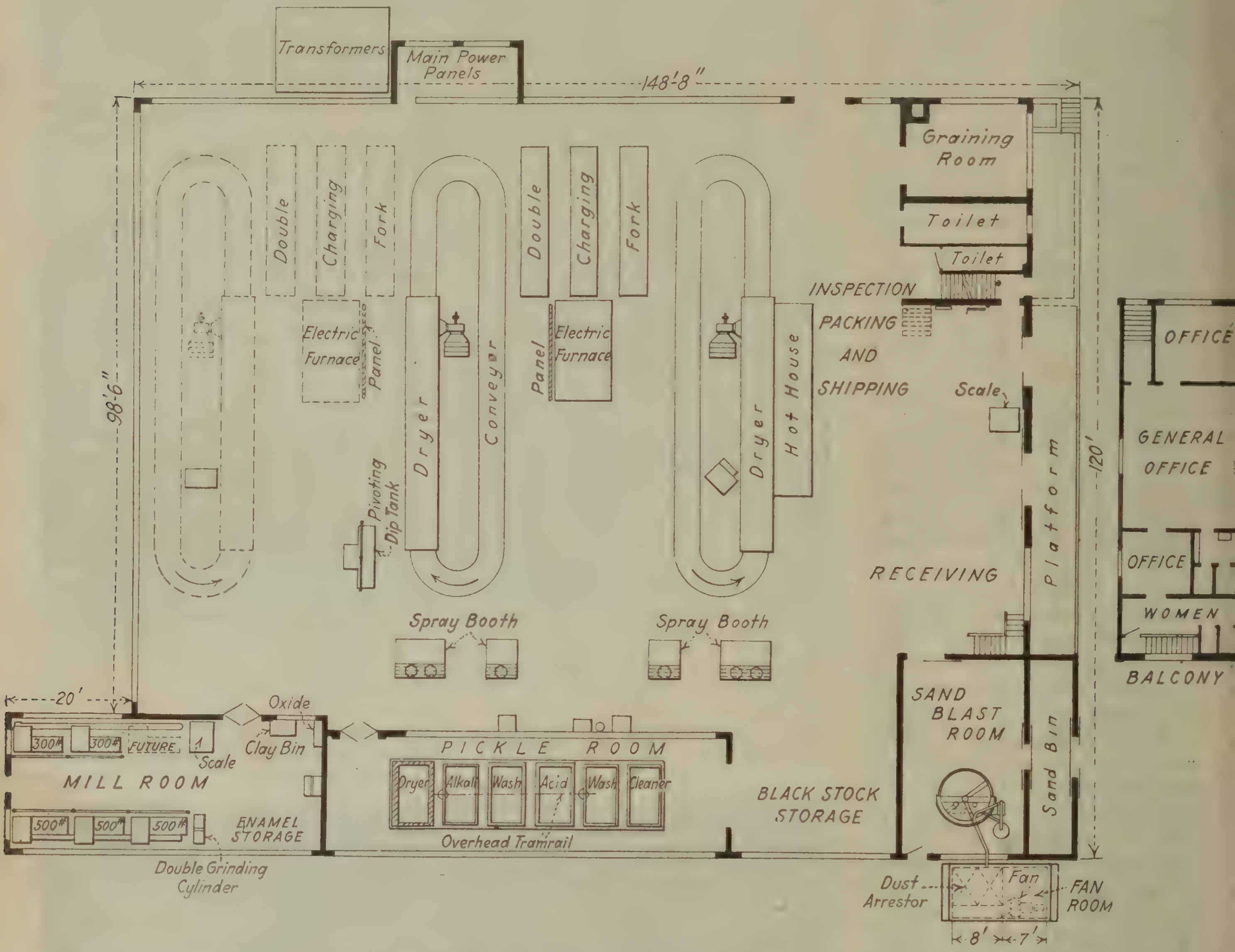
Burning on the Enamel Coatings

A box-type firing furnace heated with General Electric units, and measuring 5 x 12 ft. inside, is installed in the center of the plant. Provision is made for a second similar unit later. Cars are used to hold the material being fired. The connected load is 340 kw. on a 220-volt circuit. The heating elements are placed top and bottom, with none in the sides. In this furnace, cast iron ground coats are burned on at 1360 deg. Fahr., and cover coats at 1300 deg. At these temperatures the loading forks are double-decked, the furnace being loaded clear up to the door. The burning operation is reported to take 16 min.

Cast iron white is put on with one ground coat and one cover coat. Many of the colors are put on in one coat direct on the iron. These cast iron pieces are burned at night, as the furnace is used on the day shift for burning coatings on sheet iron and steel.

For this latter purpose, a temperature of 1580 deg. is used for the ground coat and 1520 deg. for the cover coat. The furnace is set automatically for 2½ min. for the white and 4 min. for the ground coat. Absence of warping is reported. By using long-point bars it is possible to place long narrow pieces on edge between the points. This permits the use of much larger quantities of material at a single burning. The furnace is turned on at 7 a.m. on Mondays and in 25 min. is up to the temperature for sheets, production in it being started at 7:25 a.m. At the end of the shift, the controls are set for cast iron and by the time the night force arrives the furnace is down to the required point.

In laying out the equipment for this plant, particular pains were taken to arrange the apparatus for the easiest operating conditions possible. The firing furnace was so placed as to give the burners the advantage of daylight on the forks. The conveyor dryers were arranged to bring the ware conveniently up to the forks. The whole design, layout and installation were the work of the Ferro Enamel Supply Co., Cleveland.


Transformers
Main Power Panels
148'-8"
98'-6"
120'
20'
Double
Charging
Fork
Double
Charging
Fork
Electric Furnace
Panel
Panel
Electric Furnace
Dryer
Conveyor
Dryer
Hot House
Pivoting Dip Tank
Graining Room
Toilet
Toilet
INSPECTION
PACKING
AND
SHIPPING
Scale
OFFICE
GENERAL OFFICE
OFFICE
WOMEN
BALCONY
Platform
RECEIVING
Spray Booth
Spray Booth
Oxide
Clay Bin
300#
300#
FUTURE
Scale
MILL ROOM
500#
500#
500#
ENAMEL STORAGE
Double Grinding Cylinder
PICKLE ROOM
Dryer
Alkali
Wash
Acid
Wash
Cleaner
Overhead Tramrail
BLACK STOCK STORAGE
SAND BLAST ROOM
Sand Bin
Dust Arrestor
Fan
FAN ROOM
8'
7'

Layout of the Plant, with Provision for Expansion. Materials move toward the left at lower part of plan, thence toward the top, and finished goods are shipped out from the same platform which takes incoming materials. The office, shown detached, is a second floor over the receiving department

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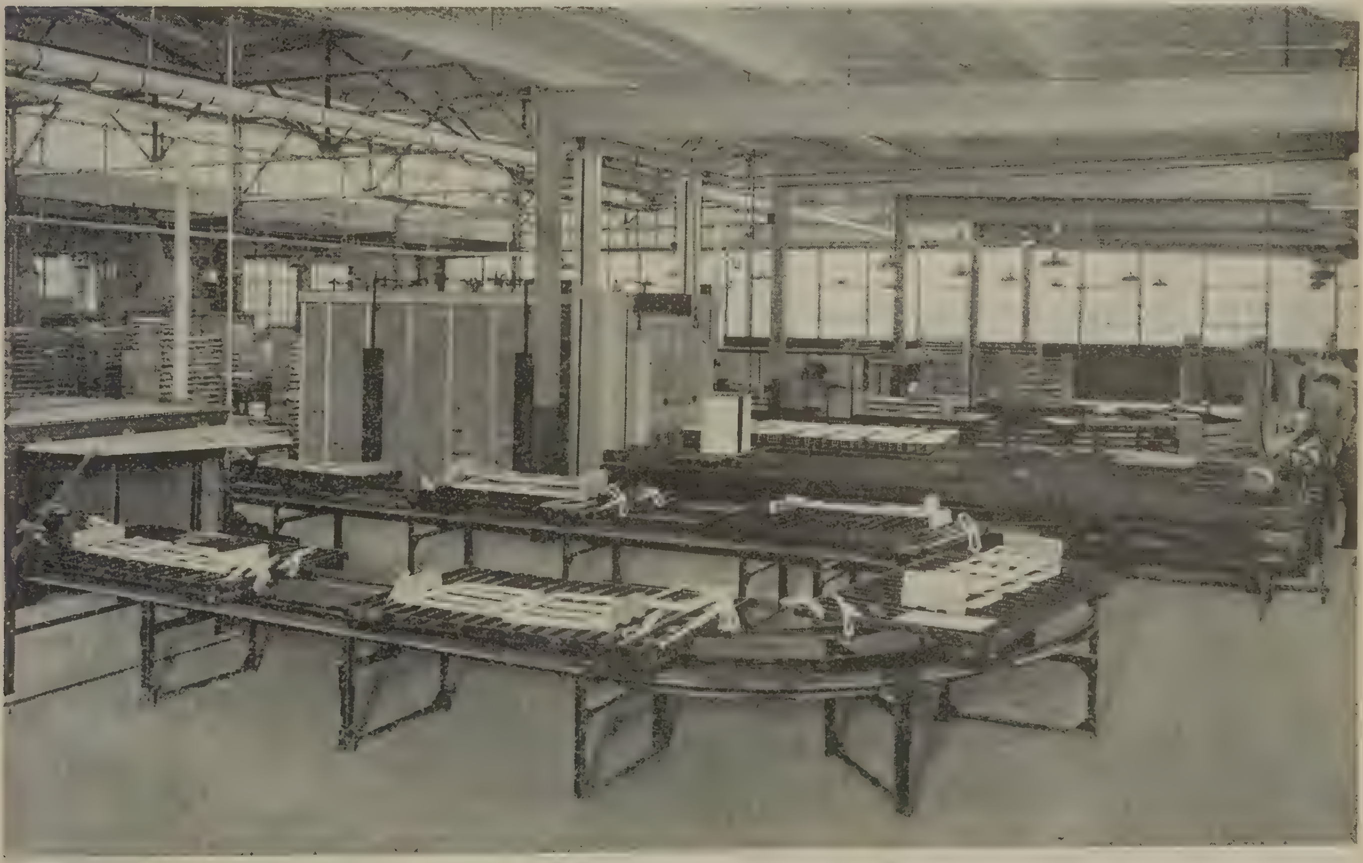
Consumption of steel in Argentina during the past two and one-half years has had a steady growth, according to a statement prepared by the Iron and Steel Division, Department of Commerce, based on a report received from Commercial Attache H. Bentley MacKenzie. The increased use of steel is attributed largely to greater activity in the building trades and the expansion of industries fabricating a variety of steel products from imported steel.

Although there was a decline in the number of persons employed in Illinois factories in December, wages remained at peak levels, according to a report by the bureau of labor statistics of the Illinois Department of Labor. The number of factory workers in December touched the lowest point of any month in five years.

SPRAY Booths and Drying Oven (Above), Showing Convenient Arrangement for Placing the Sprayed Material Upon the Conveyor Serving the Oven. *The speed of conveyor is adjusted to suit the time the material must remain in the oven*

Exit from Drying Oven (Below). In the background is the electrically heated firing oven for burning on the coating. It is served by a car on which the material is carried into the oven



By-Product Coke Capacity Gains Little

FIGURES on by-product coke oven capacity, revised by The Iron Age *and given below, show that construction of new capacity paused after the unusual activity of 1926. While ovens now standing and in course of construction have capacity for carbonizing 83,826,638 net tons of coal annually, with a resultant estimated yield of coke of 58,555,726 tons (compared with 81,663,703 tons and 57,631,422 tons respectively at the end of 1926), there actually has been more dismantling than construction, since the total number of ovens built and building as of Jan. 1, 1928, is 12,756 compared with 12,833 one year before. At the end of 1927 there were 238 ovens under construction.*

Iron and Steel Company By-Product Coke Plants

Name and Location	No. of Ovens	Kind of Oven	Annual Capacity Net Tons Coal	Annual Capacity Net Tons Coke
Ashland By-Product Coke Co.				
Ashland, Ky.	108	Semet-Solvay	803,000	602,000
Bethlehem Steel Co.				
Bethlehem, Pa.	424	Koppers	2,502,080	1,787,520
Steelton, Pa.	180	120 Semet-Solvay	423,360	302,400
		60 Koppers	404,320	288,960
Sparrows Point, Md.	360	Koppers	2,446,080	1,747,200
Lackawanna, N. Y.	231	60 Semet-Solvay	442,400	315,840
		171 Koppers-Becker	1,439,200	1,028,160
Johnstown, Pa.				
Rosedale	208	120 Cambria-Improved	658,560	470,400
		88 Semet-Solvay	696,640	497,280
Franklin	231	50 Koppers	259,840	185,472
		104 Cambria-Improved	406,560	291,648
		77 Koppers-Becker	537,600	383,040
Total Bethlehem Steel Co.	1,634	Total	10,216,640	7,297,920
Central Alloy Steel Corporation				
Massillon, Ohio	49	Koppers-Becker	438,000	290,000
Canton, Ohio	47	Koppers	280,000	196,000
Total	96	Total	718,000	486,000
Central Iron & Coal Co.				
Holt, Ala.	60	Semet-Solvay	290,000	220,000
Colorado Fuel & Iron Co.				
Minnequa, Colo.	120	Koppers	860,000	600,000
Columbia Steel Corporation				
Provo, Utah	56	Koppers-Becker	613,000	400,000
Corrigan-McKinney Steel Co.				
Cleveland	204	Koppers	1,300,000	1,000,000
Donner-Hanna Coke Corporation				
Buffalo	150	Koppers	1,000,000	700,000
Ford Motor Co.				
Dearborn, Mich.	240	120 Semet-Solvay	840,000	630,000
		120 Wilputte	985,000	739,000
		Total	1,825,000	1,369,000
Gulf States Steel Co.				
Alabama City, Ala.	37	Koppers	263,370	186,138
Hamilton Coke & Iron Co.				
Hamilton, Ohio	†45	Koppers-Becker	416,000	291,200
Inland Steel Co.				
Indiana Harbor, Ind.	203	130 Koppers	890,000	623,000
		73 Koppers-Becker	620,900	434,650
		Total	1,510,900	1,057,650
Ironton By-Product Coke Co.				
Ironton, Ohio	60	Semet-Solvay	730,000	547,000
Jones & Laughlin Steel Corporation				
Pittsburgh	360	60 Wilputte	438,000	306,600
		300 Koppers	2,000,000	1,400,000
Woodlawn, Pa.	122	Koppers-Becker	1,100,000	770,000
Total	482	Total	3,538,000	2,476,600
Otis Steel Co.				
Cleveland	100	Semet-Solvay	475,000	356,250
Perry Iron Co.				
Erie, Pa.	37	Wilputte	300,000	210,000
Pittsburgh Crucible Steel Co.				
Midland, Pa.	100	Koppers	667,000	446,900
Portsmouth By-Product Coke Co.				
Portsmouth, Ohio	108	Semet-Solvay	770,000	559,000
Rainey-Wood Coke Co.				
Swedeland, Pa.	110	Koppers	800,000	560,000
Republic Iron & Steel Co.				
Youngstown, Ohio	204	100 Koppers	667,000	466,900
		104 Koppers-Becker	957,500	670,000
Thomas, Ala.	57	Koppers-Becker	720,500	504,350
Total	261	Total	2,345,000	1,641,250
St. Louis Gas & Coke Corporation				
Granite City, Ill.	80	Roberts	750,000	525,000
Semet-Solvay Co.				
*Benwood, W. Va.	120	Semet-Solvay	270,000	189,000
Sloss-Sheffield Steel & Iron Co.				
Birmingham, Ala.	120	Semet-Solvay	1,000,000	750,000
Toledo Furnace Co.				
Toledo	94	Koppers	560,000	392,000
Trumbull-Cliffs Furnace Co.				
Warren, Ohio	64	Koppers-Becker	636,000	414,000
Weirton Steel Co.				
Weirton, W. Va.	83	Koppers-Becker	830,000	581,000
Wheeling Steel Corporation				
East Steubenville, W. Va.	145	94 Koppers	610,000	427,000
		51 Koppers-Becker	346,750	242,725
		Total	956,750	669,725
Wisconsin Steel Co.				
South Chicago	88	Wilputte	578,000	404,600
Woodward Iron Co.				
Woodward, Ala.	230	170 Koppers	1,051,200	735,840
		60 Wilputte	371,000	259,700
		Total	1,422,200	995,540
Youngstown Sheet & Tube Co.				
Youngstown, Ohio	390	Koppers	2,319,000	1,083,000
Indiana Harbor, Ind.	190	†70 Koppers-Becker	740,000	518,000
		120 Semet-Solvay	893,000	620,000
Mayville, Wis.	108	United-Otto	499,000	394,000
Total	688	Total	4,451,000	2,615,000
Zenith Furnace Co.				
West Duluth, Minn.	106	†41 Koppers-Becker	350,000	245,000
		65 United-Otto	225,000	158,000
		Total	575,000	403,000

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*Idle.

Name and Location	No. of Ovens	Kind of Oven		Annual Capacity Net Tons Coal	Coke
United States Steel Corporation					
American Steel & Wire Co.					
Cleveland	180	Koppers		1,360,000	950,000
Carnegie Steel Co.					
Clairton, Pa.	1,482	768 Koppers 714 Koppers-Becker		10,500,000	6,531,000
Illinois Steel Co.					
Gary, Ind.	838	700 Koppers 138 Koppers-Becker		5,942,200	4,545,800
Joliet, Ill.	280	Koppers		1,727,000	1,313,600
Total	1,118		Total	7,669,200	5,859,400
Minnesota Steel Co.					
Duluth, Minn.	90	Koppers		510,000	375,000
National Tube Co.					
Lorain, Ohio	208	Koppers		1,581,000	1,120,000
Tennessee Coal, Iron & Railroad Co.					
Fairfield, Ala.	497	434 Koppers 63 Koppers-Becker		3,462,400	2,436,250
Total United States Steel Corporation.	3,575		Total	24,082,600	17,271,650
Total all companies	9,604		Total	66,305,460	46,028,423

Commercial or Gas Plants

Name and Location	No. of Ovens	Kind of Oven		Annual Capacity Net Tons Coal	Coke
Alabama By-Products Corporation					
Tarrant, Ala.	149	100 Koppers 49 Koppers-Becker		669,000 500,000	468,300 350,000
			Total	1,169,000	818,300
Battle Creek Gas Co.					
Battle Creek, Mich.	18	Koppers-Becker		88,700	62,100
By-Products Coke Corporation					
South Chicago	230	120 Semet-Solvay 110 Koppers-Becker		700,000 1,000,000	525,000 700,000
			Total	1,700,000	1,225,000
Camden Coke Co.					
Camden, N. J.	37	Koppers		205,800	144,100
Central Indiana Gas Co.					
Muncie, Ind.	22	Klonne		40,000	28,000
Chicago By-Products Coke Co.					
Chicago	105	5 Koppers-Becker 100 Koppers		800,000	600,000
Citizens Gas Co.					
Indianapolis	121	80 Wilputte 41 Semet-Solvay		394,200 224,475	295,650 168,356
			Total	618,675	464,006
*Coal Products Mfg. Co.					
Joliet, Ill.	53	35 Koppers 18 Wilputte		225,000 115,000	157,500 80,500
			Total	340,000	238,000
Connecticut Coke Co.					
New Haven	†61	Koppers-Becker		416,000	291,200
Consolidated Gas Co.					
Hunts Point, N. Y.	74	Koppers-Becker		638,750	447,100
Consumers Power Co.					
Jackson, Mich.	63	Koppers-Becker		257,500	180,250
Diamond Alkali Co.					
Alkali, Ohio	46	Koppers-Becker		431,430	303,021
Domestic Coke Corporation					
Fairmont, W. Va.	60	Koppers		400,000	280,000
Empire Coke Co.					
Geneva, N. Y.	46	Semet-Solvay		146,000	102,200
Hudson Valley Coke & Products Corporation					
Troy, N. Y.	55	Foundation		540,000	380,000
Indiana Consumers Gas & By-Products Co.					
Terre Haute, Ind.	60	Koppers		400,000	280,000
Laclede Gas Light Co.					
St. Louis	64	56 Koppers 8 Piette		320,000 40,000	224,000 28,000
			Total	360,000	252,000
Linton Gas Co.					
Linton, Ind.	3	Gas Machines		15,000	10,500
Lynn Gas & Electric Co.					
Lynn, Mass.	11	Koppers-Becker		54,000	37,800
Michigan Alkali Co.					
Wyandotte, Mich.	39	Koppers-Becker		324,000	226,800
Milwaukee Coke & Gas Co.					
Milwaukee, Wis.	180	80 Semet-Solvay 100 Koppers		343,000 679,000	240,100 475,300
			Total	1,022,000	715,400
Minnesota By-Products Coke Co.					
St. Paul, Minn.	65	Koppers		400,000	280,000
New England Fuel & Transportation Co.					
Everett, Mass.	451	400 United-Otto 51 Wilputte		650,000 372,000	455,000 260,610
			Total	1,022,000	715,610
North Shore Coke & Chemical Co.					
Waukegan, Ill.	43	†31 Koppers-Becker 13 Semet-Solvay		165,000 55,000	115,500 38,500
			Total	220,000	154,000
Northern Indiana Gas & Electric Co.					
Fort Wayne, Ind.	19	Koppers-Becker		94,300	65,000
Philadelphia Suburban Gas & Electric Co.					
Chester, Pa.	25	Roberts		165,000	120,500
Providence Gas Co.					
Sassafras Point, R. I.	40	Koppers		240,000	168,000
Rochester Gas & Electric Corporation					
Rochester, N. Y.	60	Koppers-Becker		274,000	191,800
Seaboard By-Products Coke Co.					
Kearney, N. J.	165	Koppers		1,200,000	840,000
Seattle Lighting Co.					
Seattle, Wash.	20	Klonne		70,000	42,350
Semet-Solvay Co.					
Detroit	216	Semet-Solvay		1,423,000	1,081,000
Buffalo	120	Semet-Solvay		1,053,000	795,000
*Dunbar, Pa.	110	Semet-Solvay		240,000	173,000
Ensley, Ala.	240	Semet-Solvay		730,000	547,000
Tennessee Products Corporation					
Alton Park, Tenn.	24	Semet-Solvay		175,000	125,000
Utica Gas & Electric Co.					
Utica, N. Y.	42	Koppers-Becker		200,000	110,000
West Boston Gas Co.					
Framingham, Mass.	15	Koppers-Becker		47,523	33,266
Total all companies	3,152			17,521,178	12,527,303
Grand total	12,756			83,826,638	58,555,726

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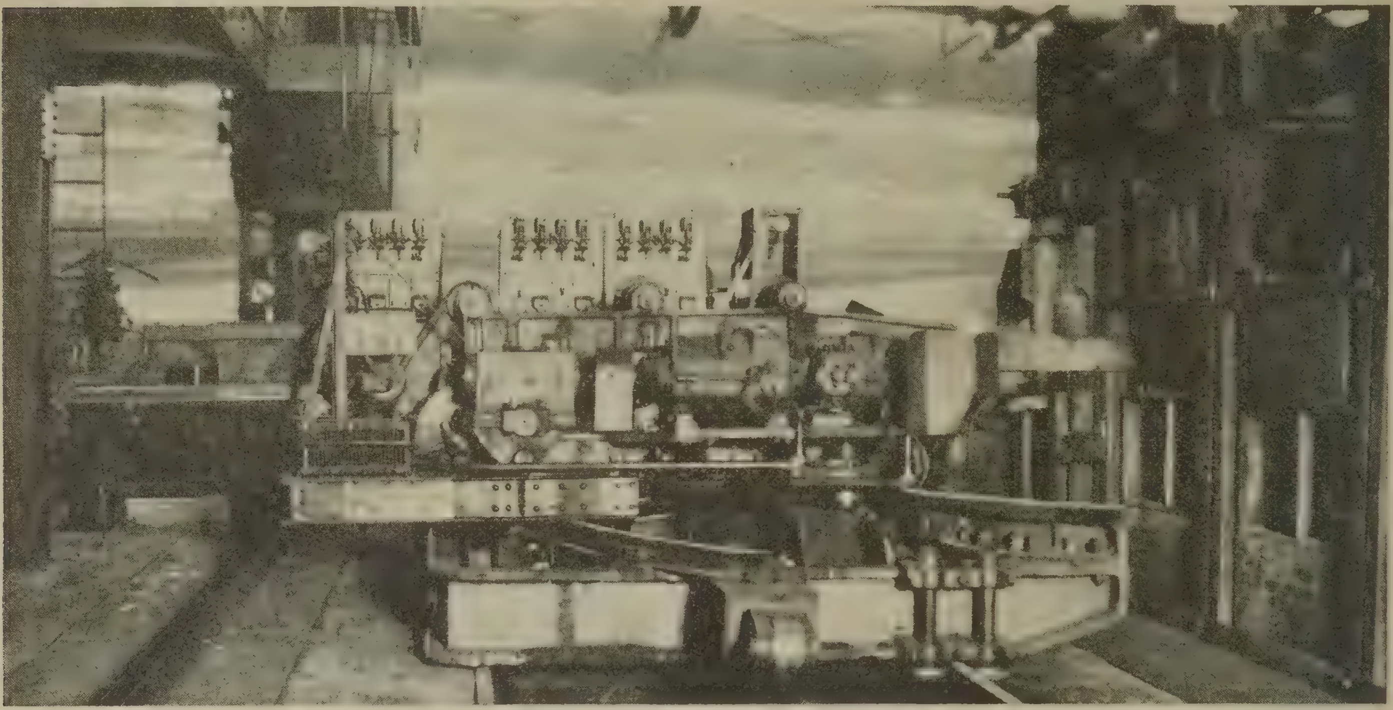
*Idle. †Building.



Pivoting Type of Ingot-Turning Machine for Furnaces Heating Steel to Be Pierced for Making Seamless Tubes

INGOT-TURNING MACHINE

Labor Saving Equipment for Furnaces Serving Pilger Tube Mills

IN manufacturing seamless tubes on Pilger mills, tapered round ingots of a diameter approximately one-half larger than the finished product are generally used. These are heated, preliminary to the piercing process, in a continuous heating furnace having a long inclined hearth. The taper on these ingots prevents their rolling down the inclined hearth in a line parallel to the walls, their natural path being rather in the arc of a large circle.

To meet this situation it has been customary to provide the side walls of the furnace with a series of doors or poke holes, spaced 3 or 4 ft. centers. Through these holes bars are inserted and the ingots thus straightened on the hearth and rolled down toward the discharge end. This is all done by hand labor. The extreme heat as well as the size of ingots required for large tubes makes it difficult to maintain a suitable force of men, and the operation is slow and in general unsatisfactory.

To overcome this difficulty, the Wellman-Seaver-Morgan Co., Cleveland, has recently developed and put into successful operation two fully mechanically operated "barring" or ingot turning machines, for eliminating the strenuous hand labor described.

These machines are typically American, being of "steel mill" design, i.e., they are of cast steel construction and extremely rugged. Traveling on an inclined track parallel with the furnaces, and having the same slope as the furnace hearth, they perform all the functions previously done by hand, with greater speed and ease, and in addition eliminate several men from the force required to handle each furnace.

Each machine consists of two carriages. The lower one is a massive one-piece steel casting mounted on four wheels, engaging the main inclined track. These wheels are driven in pairs by two motors. On the upper surface of the lower carriage is carried a section of circular track, the radius point being located at the center of the furnace wall. The upper carriage travels on this curved track and carries a long wedge-shaped bar which can be moved in and out of the furnace. Swinging about the radius point, the bar can be rocked vertically and also turned about a horizontal axis. Each motion has its independent motor, all under direct control of the operator, who is located at the rear and to one side of the center of the upper carriage.

Location of the pivot point of the bar, when swinging in a horizontal plane, is such that extreme angularity may be obtained, regardless of its position in relation to the furnace. To facilitate changing bars, a quickly detachable connection is provided between the bar and its supporting spindle.

Three of the larger ingots may be straightened on the hearth or rolled down its inclined surface at one time by each machine. In case ingots become partially welded together, they may be "sliced" or separated by the bar, due to its shape.

Most of the drives are of the worm type. The worm reductions, as well as all spur gear reductions, operate in oil baths contained in cast steel housings. Due to governing clearances, these machines are compact, yet all parts are readily accessible for inspection or repair. The salient features of construction are protected by pending United States patents.

Welsh Tin Plate Industry to Adopt American Methods

As a result of a recent decision made by Welsh steel and tin plate manufacturers to meet foreign competition in the tin plate trade, engineering work on a large scale is expected in South Wales centers. The introduction of steel strip mills in America has revolutionized the tin plate industry, reducing costs about 2s. (48c.) per standard box. Steel strip 1/16 in. thick, at a cost of little over that for bars, cuts out most of the work in preparing the steel for conversion into tin plate, and Welsh makers fully appreciate the fact that they must adopt the new methods or be driven out of world markets.

It is understood that an outlay of $5,000,000 or more in new plant at the steel works will be involved, and as the majority of the independent steel and tin plate firms cannot face such an outlay, an influential committee has been appointed to see what can be done to meet the need by combination.

The Llanelly Steel Co. is laying down six new sheet mills and a new bar mill alongside its existing works, on the latest American principles. These mills are designed for a continuous process, to yield high output and cheapen production costs.

Wire netting and woven wire, including chain link fencing, are included in a list of goods affected by a recent first order-in-council of the United Kingdom requiring a mark of origin under the Merchandise Marks act, 1926, according to the London Board of Trade Journal, says a statement issued by the Department of Commerce, Washington.

SHEET PACK OPENER

Ten-Sheet Packs Up to 148 In. in Length and 48 In. or More in Width Opened Rapidly

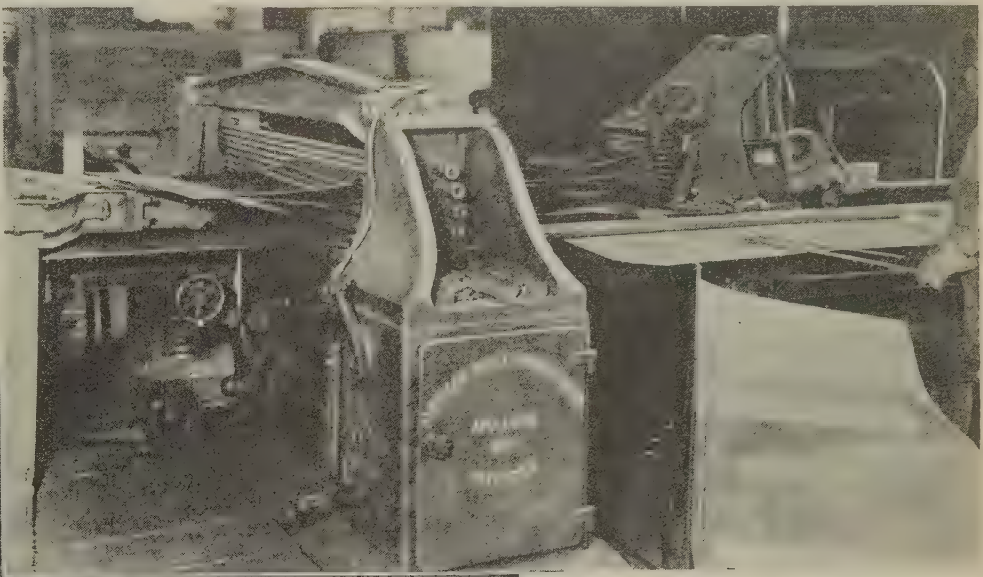
VISITORS to the sheet mills at the Campbell works of the Youngstown Sheet & Tube Co. have been interested in a mechanical sheet pack opener which is in operation there. Results so far attained indicate that another step has been made in the reduction of manual labor in sheet mill operation. This opener was developed and patented by the American Sheet Opener Corporation, Apollo, Pa., and is being built and marketed by the United Engineering & Foundry Co., Pittsburgh. Another machine of this design has been in use for two years at the plant of the Apollo Steel Co., Apollo, Pa.

Two major units of the machine are a set of horizontal rods arranged one above the other and a traveling motor-driven gripper head into which the sheets are introduced between the rods. The rods serve as the separating agency with the backward movement of the gripper head. A pair of pinch rolls carry the packs from a storage platform to a man who inserts the slightly opened sheets through the rods to the gripper head.

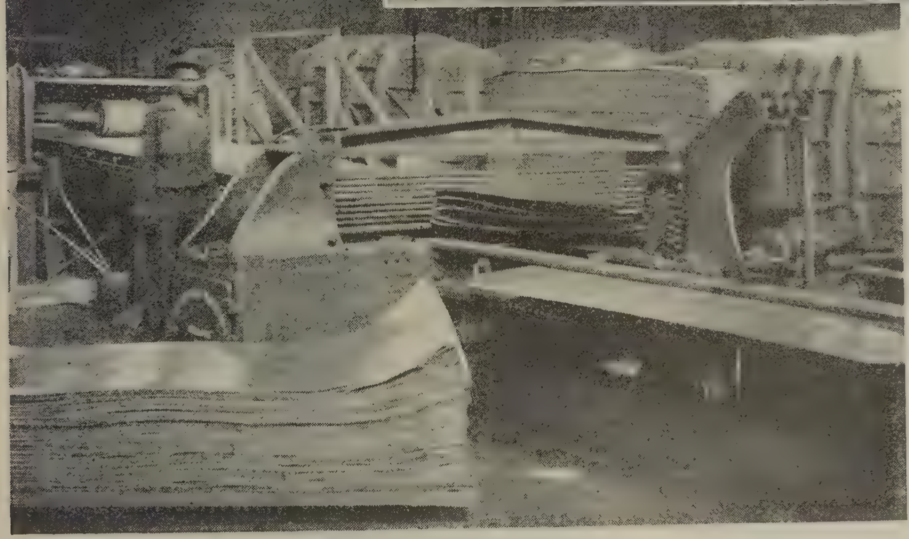
The machine calls for a crew of three men, one to operate it, one on the storage platform and the third to pile the opened sheets as they come through the separating rods. A crew of five men, consisting of the operator, two men on the storage platform and two for piling the separated sheets, has been used. The two extra men meant a smoother operation as the sheet packs are slightly opened by the platform men before they are passed to the operator and the movement to the operator was more constant than it would have been with one man serving. With two men handling the opened sheets, more even piling was possible than if one man was doing the work.

In ordinary sheet mill practice one shear serves two mills and at each shear there is one pack opener. In a 12-mill plant there would be six openers, or 18 for a three-turn day. This mechanical opener will handle the output of 12 mills or six shears and on a basis of three men to the crew or nine for a three-turn day it is pointed out that the labor item is exactly halved. The use of the machine means that instead of opening and piling the sheared packs at the shears, they will be taken after shearing and stacked on the platform of the opener. The mechanical method of opening is rapid.

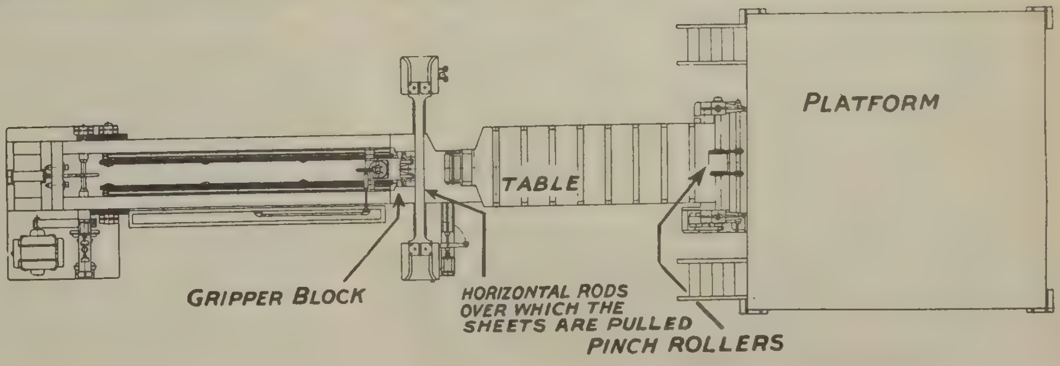
From a pile of sheared sheet packs, the platform man takes a pack and slightly opens it on one end. He then feeds it to the pinch rolls which deliver it to the



BACKWARD Movement of the Gripper Block Pulls the Sheets Over the Rods and Separates Them



FROM the Platform, the Slightly Opened Pack Goes Through the Pinch Rollers to the Machine Operator, Who Enters the Ends of the Sheets Through the Rods. A sweeper arm then pushes the sheets into the openings in the gripper blocks. The ends of the sheets are clamped before the backward traverse of the gripping head

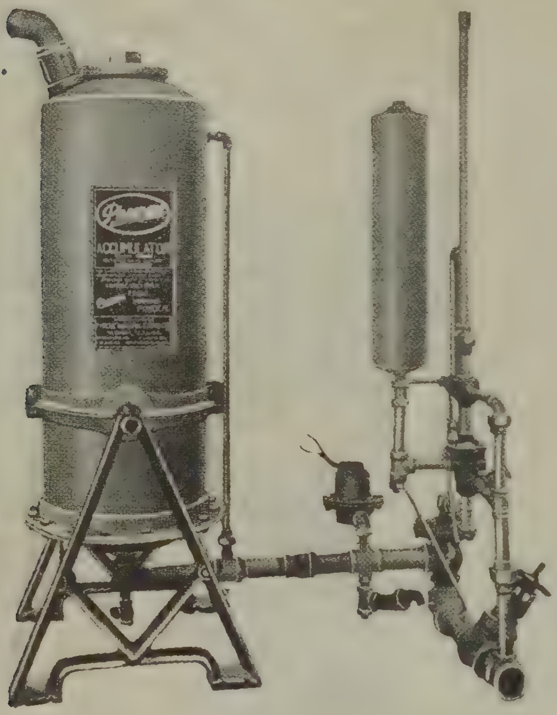


THE Arrangement of the Various Elements of the Mechanical Opener May Be Noted from Plan View at the Right machine operator, who inserts a spacing fork between the open sheets and enters them through the rods. An air-operated sweeper arm pushes the sheets into the openings in the gripper blocks. The ends of the sheets then are clamped in the block, a backward movement of which pulls the sheets over the rods and separates them.

The gripper head and the pinch rolls are motor-operated, while the grippers and the cylinders operating the sweeper arm are actuated by compressed air.

Foam Protection for Flammable Liquid Hazards Is Demonstrated

A demonstration of the Phomene accumulator system for protection of flammable liquid hazards was given jointly by the Globe Automatic Sprinkler Co., Philadelphia, and the Pyrene Mfg. Co., Newark, N. J., at the latter's plant, 109 Meeker Avenue, Newark, on Jan. 19. A feature of the exhibition was the extinguishing of oil fire in a 30-ft. tank section by means of the new foam extinguisher system. Protection of flammable liquid hazard from external ignition and the automatic quenching of fires in a spray booth and a dip tank were also demonstrated.



The Large Tank on the Left Is Capable of Producing 2400 *Gal. of Foam*

The Phomene accumulator system, shown in the accompanying illustration, is 5 ft. 3 in. high and has a base area, including the automatic valve, of 9 sq. ft. The large tank is filled with a charge of 280 lb. of Phomene foam-making powder, capable of producing 2400 gal. of foam. When water is admitted through the pipe connecting the tank with the automatic valve, foam is generated in the accumulator and discharged through the outlet at the top of the tank. As was shown in the demonstration this outlet pipe may be extended to any desired length and equipped with any sort of a spraying or discharging system which may be most suitable to the installation.

In case of very dangerous hazards two or more tanks may be used and the discharge pipes or sprays placed in any position desired. The accumulator is so designed that the chemical reactions are 90 per cent complete before the foam mixture is discharged from the tank, thus precluding the possibility of unreacted chemicals being discharged upon the fire.

The automatic valve, designed and manufactured for the unit by the Globe Automatic Sprinkler Co., turns the water on at the first indication of fire at the hazard and also turns it off when the foam discharge has been completed. Just back of the point where the water connection is made in the horizontal pipe, shown in cross section in the illustration, is a balanced diaphragm valve normally held closed by the water pressure in the smaller pipe attached perpendicularly to the main water connection. This smaller pipe may be continued as a ¾-in. line to the hazard, terminating in one or more standard sprinkler heads.

When a fire starts, the rupturing of these heads will allow the pressure in the small pipe to fall. The valve will then open, admitting water to the accumulator and at the same time sounding an alarm bell. The sprinkler line will not discharge water on the hazard, but will drain through a small valve. An electrical thermostatic device may be provided for faster use and where the hazard is exposed to freezing temperatures.

The accumulator will operate properly, it is claimed, on an applied water pressure of 25 lb. per sq. in. or higher, the most desirable pressure being 50 to 60 lb. per sq. in. The rate of discharge is about 1000 gal. per min., but may be varied by regulation of the water pressure.

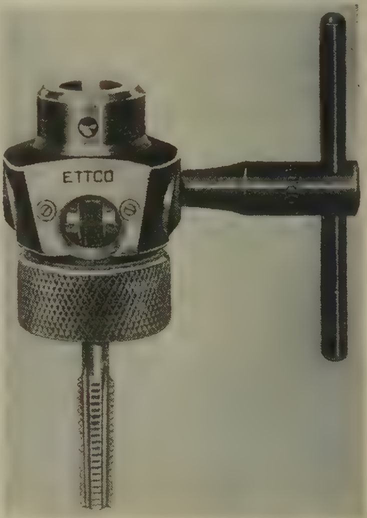
Tap Holding Chuck

The Eastern Tube & Tool Co., 594 Johnson Avenue, Brooklyn, N. Y., is adding to its line the tap-holding chuck here shown, one feature of which is the arrangement whereby the operator can see the two floating jaws gripping the square on the shank.

The square of the tap is held by the two floating jaws which are tightened with a key and the grip is said to be positive. The jaws operate by means of a right- and left-hand thread and are free to float transversely, as their only function is to grip the square and prevent the tap from rotating. The tap is centered by three jaws inclosed in the knurled collar. The two gripping jaws for the square of the tap are of alloy tool steel, heat-treated and ground to an accurate fit in the body. The lower centering jaws are also of alloy steel, heat-treated and ground.

Three sizes of the tap chuck are manufactured. The smallest, the No. 1, is for round shanks up to ¼ in. and taps ⅜ in.; the No. 2 size is for round shanks ⅜ in., and taps, ½ in.; and the No. 3 size has capacity for round shanks ½ in. and taps ⅝ in. Two larger sizes are being designed. The chucks can be furnished with backs threaded, tapered backs or with Morse taper shanks. Provision is made for pinning the threaded shanks securely in place. The chucks are also manufactured with the back extended 1 in. to permit use in tap holders of screw machines. The tap chuck fits directly into the tap holder and is held by a set screw.

Drills, Reamers and Other Tools Can Be Used in the Chuck by Grinding a Flat on the Shank

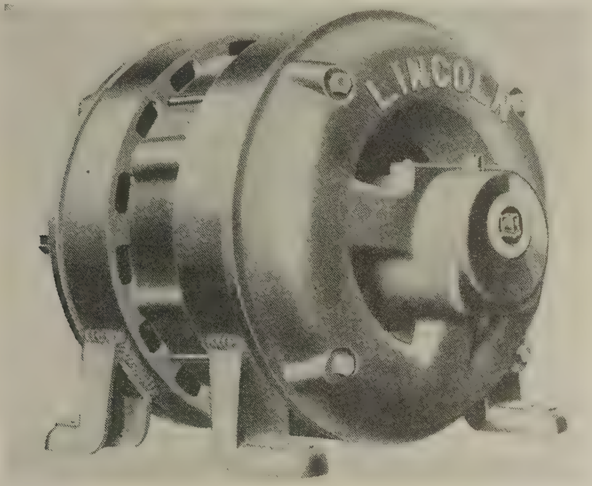


In using the chuck, the tap or other tool is inserted and then centered by turning the knurled collar. The floating gripping jaws are then tightened on the square of the tap by means of the key.

Motor Designed to Start Directly Across the Line

The Lincoln Electric Co., Cleveland, is marketing a new motor, named the Switch Start, which is available in sizes from ½ to 30 hp. and for two or three phase, 60 cycles.

This motor is designed so that it can be started directly across the line without the use of a starting compensator, starting resistance or other voltage-reducing device, with starting current below the requirements of the National Electric Light Association. It is stated that operating characteristics, such as power factor, efficiency, maximum torque, temperature rise, etc., have not been sacrificed in order to secure low starting currents. Tests are said to show that starting torques from full load to better than 250 per cent of full load, depending on the horsepower and speed, are possible without exceeding the N. E. L. A. requirements as to starting currents.



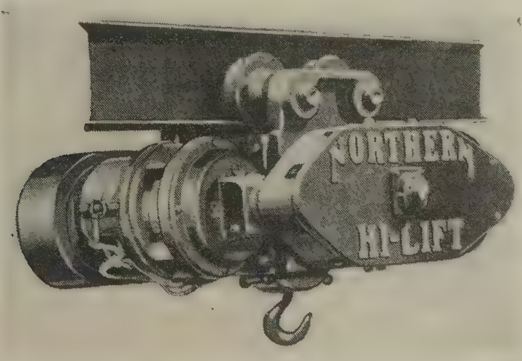
The Motor Is Available in Sizes from ½ to 30 Hp.

Comparison of the speed torque curves of the new motors with the ordinary self-start motors is said to show that the former has equal or slightly higher torque at zero speed. The curve of the Switch Start motor then shows a gradually increasing torque up to the maximum torque point, which is desirable for starting many types of machinery. High pull-out torque, which is of importance in that the motor will not stall on sudden high overloads, is also claimed. Comparatively low temperature rise under continuous full load is attributed not only to the electrical design but also to the welded steel construction which permits greater circulation of air. The motor is normally equipped with sleeve bearings, but ball bearings can be furnished. Larger shafts, larger bearings and waterproofing insulation are also claimed for these motors.

Compact Electric Hoist With High Hook Lift

Compactness and accessibility, as well as rigidity and high hook left, are features of a new series of Hi-Lift hoists being marketed by the Northern Engineering Works, Detroit. One and two motor designs are available.

The hoists are mounted on a plain I-beam trolley and have current collectors. They are provided with two brakes, a motor check brake attached to the end of the hoist motor armature shaft, and a mechanical load brake in the hoisting gear train. This brake, of positive friction disk ratchet type, is similar to that on other of the company's hoists. A feature is the one-piece unit casting now used for the gear train and motor support, the sides of which being cast integrally, assure permanent alinement. This casting is arranged so that the shroud fits over the ends of the drum, which eliminates the possibility of the hoisting rope creeping over the ends of the drum. The hoist is suspended by a substantial cast steel hanger piece. The motor and gear train are connected by a flexible coupling, which compensates for any slight misalinement.

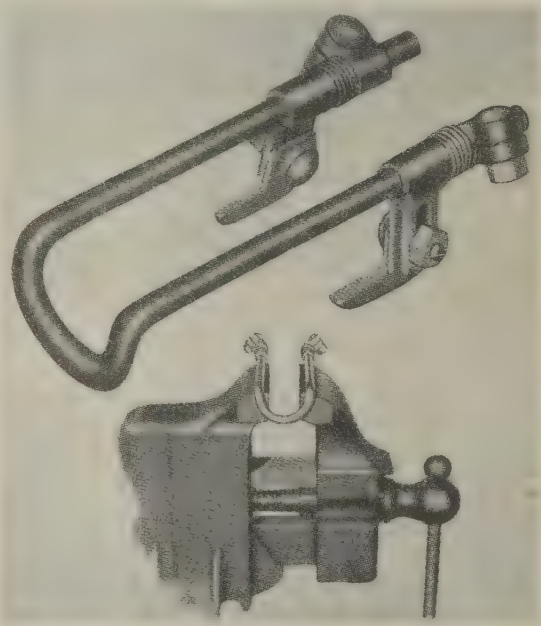


The Load Hook May Be 14 In. from Under Side of Beam to Center of Hook

The load hook is capable of being pulled up within 14 in. from the under side of the beam to the center of the hook. Two stops are provided, one to prevent the load hook from going up too high, and the other to prevent it from completely unwinding the rope and starting it up on the wrong side of the drum. Gear covers are split horizontally and can be removed conveniently for inspection or removal of the gearing, without disturbing the other parts. Another feature is the method of attaching the rope to the drum whereby the cable with the end thimbles can be installed conveniently. The lower limit stop includes a spring-actuated tripper which springs out after the last layer of rope is off the drum. This makes contact with the levers for the upper limit stop, controlling the downward movement of the load block.

Work Support for Use in Vises

A work support for use on any standard vise and intended to increase the holding power, particularly on work of eccentric shape or stock with very little gripping surface, is being marketed by A. F. K. Fountain Works, Milwaukee.



The Holding Power, Especially on Stock of Irregular Shape, Is Increased

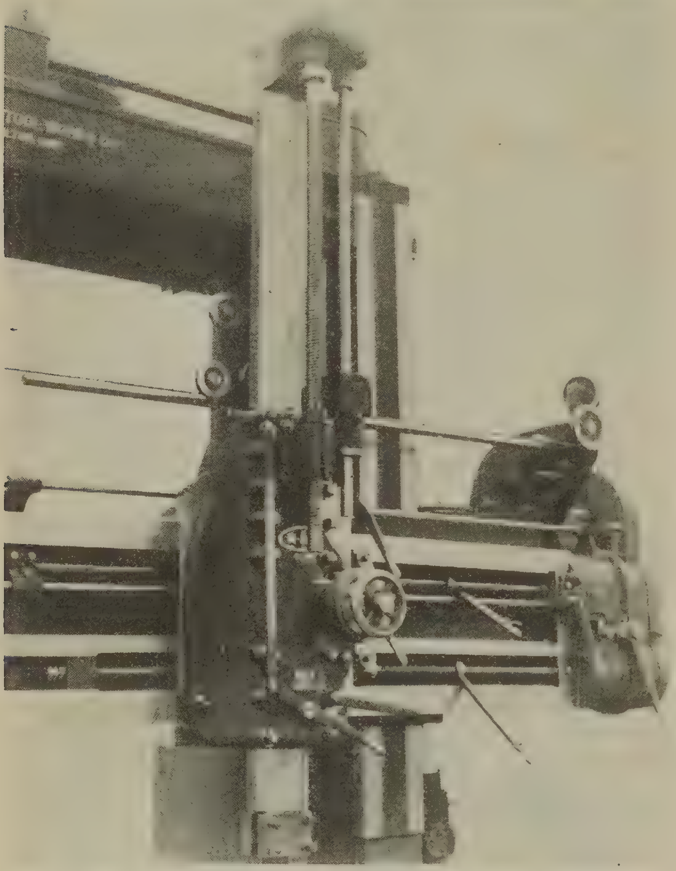
The arrangement of the device, which may be conveniently attached and removed from the vise, may be noted from the accompanying illustrations. The supporting yoke is of nickel steel, case hardened to prevent distortion. The corrugated adjustable clamps are malleable iron castings and are held by 5/16-in. bolts. The torsion springs are of piano wire. It is claimed that thin brass tubing can be held firmly without slipping, crushing or marring. The support shown is for stock of from ¼ to 2 in. in diameter, although supports for larger stock can be furnished.

The thirteenth international convention and Inform-A-Show of the National Association of Purchasing Agents will be held at Kansas City, Mo., May 28-31. Headquarters of the association are at 11 Park Place, New York.

12-Ft. Boring and Turning Mill with Thread-Chasing Attachment

Equipment of the right-hand head with a thread-chasing attachment is a major new feature of the 12-ft. boring and turning mill illustrated which has been brought out by the Niles Tool Works Co., division of the Niles-Bement-Pond Co., Hamilton, Ohio. In general design the machine follows the new 18-in. and 20-in. boring and turning mills described recently in THE IRON AGE. The thread-chasing attachment is of the lead-screw type and gives leads up to 2 in.

Features in common with the larger mills include double table tracks, with pressure lubrication; sliding gear feed boxes, with gears running in oil; and forged steel bars. The crossrail is of square box section with bearing on the face of the housings and extending back between the housings. There are separate motors at the back of the rail for rapid traverse of the bars and saddles; direct-reading micrometer dials for saddle and bar movements; limit switch for elevation of crossrail; entirely inclosed drive box with all steel gears and pressure lubrication; steel table gear; and inclosed rail elevating gears on the top brace.


The Thread-Chasing Attachment Is On the Right-Hand Head and Is of Lead Screw Type

The machine is driven by a 35-hp., direct current, 4 to 1 variable speed motor, giving table speeds ranging from 0.56 to 10.8 r.p.m. A 7½-hp. motor is employed for the crossrail and two 5-hp. motors, one for each head, for rapid traverse of saddles and bars. A ½-hp. motor drives the oil pump.

Feed and traverse movements of bars and saddles are obtained through large friction clutches housed at the end of the rail, but for the chasing mechanism positive motion is provided through an additional train of shafts and gears. Threads are engaged by half nuts closed by a lever at the base of the saddle. A handwheel on the saddle releases the bar rack pinion when the chasing attachment is in use. Three leads are furnished, but these may be varied by means of additional gear ratios.

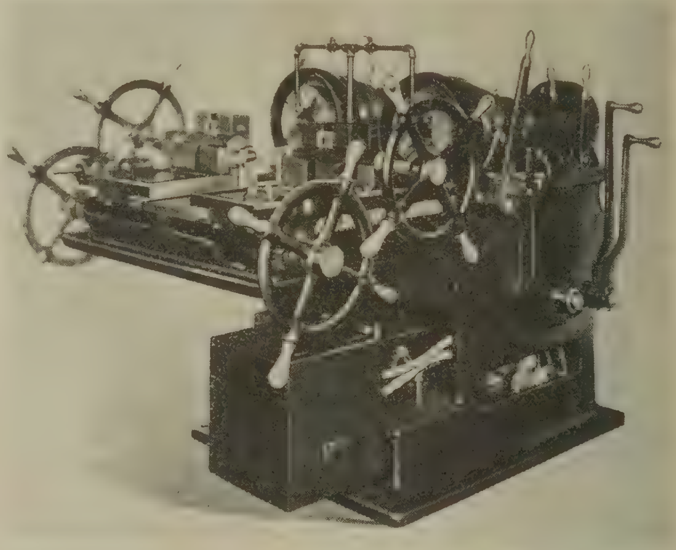
Bituminous coal mined in the second week in January is reported by the United States Bureau of Mines at 10,871,000 net tons. This is a gain of more than 10 per cent over the preceding week, but lacks 20 per cent of the large output of the corresponding week a year ago.

Double-Head Bolt Threader With Eight Speeds for Each Head

The Williams Tool Corporation, Erie, Pa., is bringing out the double geared-head bolt threading machine illustrated, which is provided with eight spindle speeds for each head and is arranged for complete control from either side of the machine.

Features of the company's Rapiduction single-head bolt threader, previously described in THE IRON AGE, are incorporated but the double-head unit is intended for a wider range of threading production. Two sizes of the machine are available, the smaller being for cutting ⅜-in. to 1½-in. threads and the larger for threads ranging from ½ in. to 2 in. inclusive. In cutting long threads two set-ups may be handled at the same time, and another source of saving claimed is in set-up time when two different sizes are being run through together with frequent change from one size to the other. Production is facilitated by having complete control from either side, and the convenient selection of any one of eight spindle speeds is pointed out as permitting maximum production on each size of bolt being threaded. The driving motor is mounted in the base of the machine and is entirely inclosed to prevent damage from chips and dirt. It is provided with an adjustable base to permit keeping the driving chain tight at all times. All driving gears are of hardened steel, and run in a bath of oil. Die heads are lubricated by means of a chain-driven pump mounted in the base of the machine, beside the motor. The oil from the die head is returned through a strainer to the pump and used over again.

Simplicity of the automatic die heads is another feature emphasized. Automatic compression springs open and close the dies and the heads are adjusted to the size bolt to be cut by pulling the control lever forward. An automatic trip lever gives the operator instant control, a light push automatically disengaging the die head without necessitating shutting down the machine. The trip rods on the carriages disengage the die head automatically after each threading job. By loosening the locking screw the dies for either head can be removed and changed in a few seconds, without removing the large die holders. If one die is snipped it can be replaced without removing any other die from either head.


Complete Control from Either Side Is Provided. The driving motor is inclosed in the base

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The mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association is to be held Friday, Feb. 17, at the William Penn Hotel, Pittsburgh. In the morning there will be separate round table discussions of blast furnace and of coke oven topics, while the afternoon session will be devoted to topics of joint interest to blast furnace and coke oven operating men.

A. E. Kelly, New York district representative of the Donner Steel Co., Buffalo, in the sale of pig iron, will move his office on Feb. 1 from 2 Broadway to 39 Cortlandt Street.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. The P-V line continues to rise.
2. Unfilled orders increased more than usual in December.
3. Commodity prices average firm to rising; pig iron markets stronger.
4. The farm situation is favorable.
5. Retail trade gained in December and was above normal.
6. Building activity is well maintained.
7. Money is still easy; Federal Reserve ratio recovers.
8. Continued caution in business.
9. Continued strong financial position of most leading companies.

Unfavorable Factors

1. Bank credit is over-extended in the direction of the security markets; brokers' loans large.
2. A rising trend in money rates is seen in the recent advances in time loan and bank acceptance rates.
3. Considerable unemployment exists and reduced purchasing power of factory laborers.
4. Small business profits.
5. Decline in December exports.
6. Large manufacturers' physical inventories, on the average.
7. Disturbed political conditions.

SUCH favorable factors as those above are the more fundamental as affecting industry and business. The more "barometric" indications promise business expansion during the first half of the year, but some financial readjustments will probably be required and may occasion irregularity.

Ingot Output Responds to P-V Line

STEEL production has gained, following by about seven months a rise in the P-V line. This is a rather slow response, but about the same period of time elapsed between the upturn of the P-V line in 1921 and the beginning of expansion in steel production in August of that year.

The rise in the P-V line means that the supply of commodities has been so reduced in comparison with the demand that markets are, on the average, stronger. The measurements used for determining the relative position of demand and supply are broad and general and apply necessarily only to the average condition. But we have supposed that the iron and steel industry is so broadly related to industry in general that the indications of the P-V index would apply to it. Experience thus far has justified this supposition.

At present, for example, a long period of curtailment in the railroad equipment industry and in automobile manufacturing has so reduced supplies that the technical position of the markets for these commodities is stronger. Temporarily, at least, the demand has increased and is stronger relatively to supply. Surpluses have been reduced. Current additions to supply are small. Buyers have waited and have used up or have allowed to become obsolete the units they are now operating. The situation is thus stronger. These two items of manufactured products are largely made of steel and the steel makers benefit by the situation.

Much the same may be said of hundreds of manufactured articles. Even building operations in many lines have been sufficiently readjusted, and for a long enough period to suggest that at least a normal volume is to be expected.

Less Active Demand in Later Months

As to the more distant future, it will be noted that the P-V line is "tapering off." In the course of time, as industrial activity expands, supply will gain on demand and the intensity of demand will ultimately decline. Judging by the past, there will eventually come another period of curtailment. Steel makers, like other producers, will some time find themselves turning out more products than buyers will take at profitable prices. This condition will probably be anticipated several months in advance by the P-V line. As yet, the trend

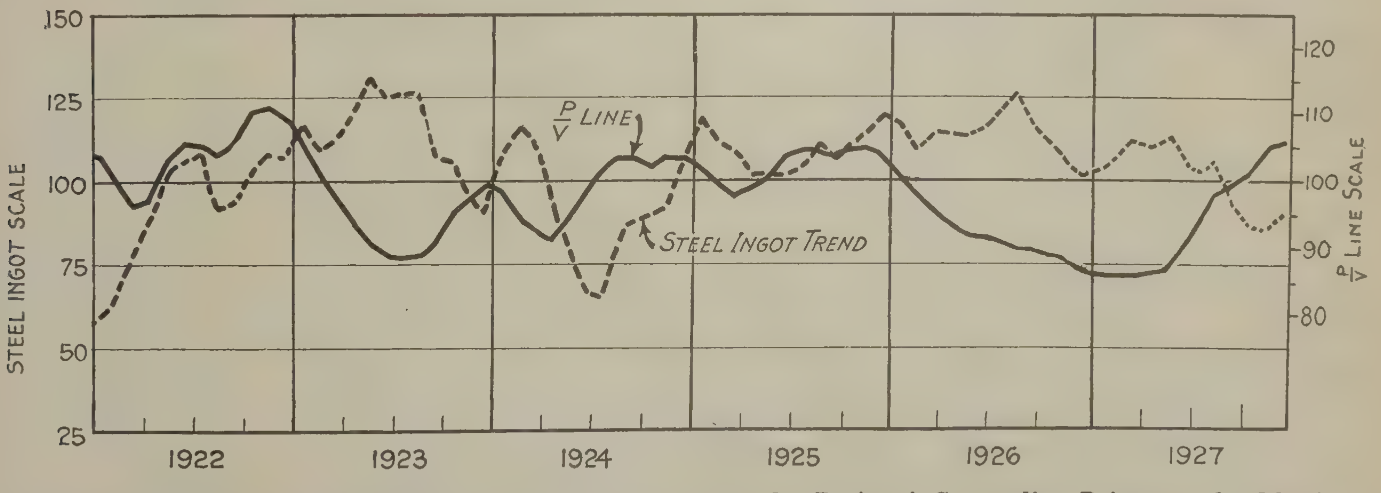


Fig. 1—Upward Movement of the P-V Line (Representing the Ratio of Commodity Prices to the Physical Volume of Trade) Has Continued for Eight Months. Steel production has responded sluggishly and good tonnages, with better prices, may be expected for some time

of that line is upward and seems likely to continue so for another month or two.

Even when it begins to decline there will be a period of several months before the results are apparent in business. The point is that *the basis seems to have been established for at least six months of expanding steel production.* We would guess that the industry might go ahead until August, at least. But much depends on the moderation of operations: The slower the steel makers are to expand operations in excess of the current requirements of steel consumers, the longer the rising trend—also the more satisfactory the market prices.

Aside from the inevitable hazards of foreign complications and domestic political developments, the chief uncertainty in all this reasoning lies in the financial situation. Any great tightening in bank credit, attended by a serious decline in security markets, would naturally react unfavorably on business. At present there are some indications that bank credit is tightening. Time loans have risen and the bank acceptance rate has been marked up one-eighth. The Federal Reserve banks have sold a considerable quantity of Government securities, which tends to bring firmer money markets. For some months the Federal Reserve ratio has shown a declining trend.

Incidentally, the security markets have been hesitant of late, if not slightly reactionary. But we are impressed with the localized character of the financial trouble. The inflation has been confined to the security markets and credit is not really tight. There is no indication that any drastic curtailment of bank credit will be required to check speculative excesses. In short, while firmer money is probable, the present outlook is for no such advances in money rates as would operate as a check on business.

Not until business expands sufficiently (1) to bring its requirements up to a point where funds will become scarce and (2) to bring production to a point where there are prospects of over-supply markets and declining dividends, are we likely to see any prolonged major financial recession. At present no such expansion exists and credit strain is potential and prospective rather than actual. It is possible that business expansion may proceed without much retardation from the financial situation.

Buoyant Indications of Several Elements

EVERYTHING in the second chart points upward. In the first place, and most important, the unfilled orders barometer (which is the rate of change in the monthly unfilled orders of the Steel Corporation), has risen sharply. Being above the base line, this means an actual increase. The sharpness of the increase is obvious and is the more noteworthy in that the usual percentage of gain for December is not counted. The gain, allowing for seasonal variation, is the sharpest since that which occurred in November, 1924. It contrasts with a decline in December, 1925, and again in December, 1926.

Such gains in unfilled orders, both logically and in fact, have usually accompanied rising prices for steel. The suggested rule appears to be without exception, when the trend of unfilled orders is backed up by a corresponding trend in scrap prices. Heavy melting steel scrap at Pittsburgh averaged $15 a ton in December, against $14.19 in November, and got as high as $15.50 toward the end of the month. This would seem to be a confirmatory trend. Thus far in January, however, scrap prices have weakened somewhat and at present are back to $15. The relapse is due probably to speculative conditions. The expansion in steel production and the firmer tone in pig iron markets seem to indicate that, in spite of some irregularity, scrap prices will move up during the next few months. If this conclusion proves accurate, we have advances assured in both scrap and unfilled orders, and indications of further improvement to come in the steel industry are strong.

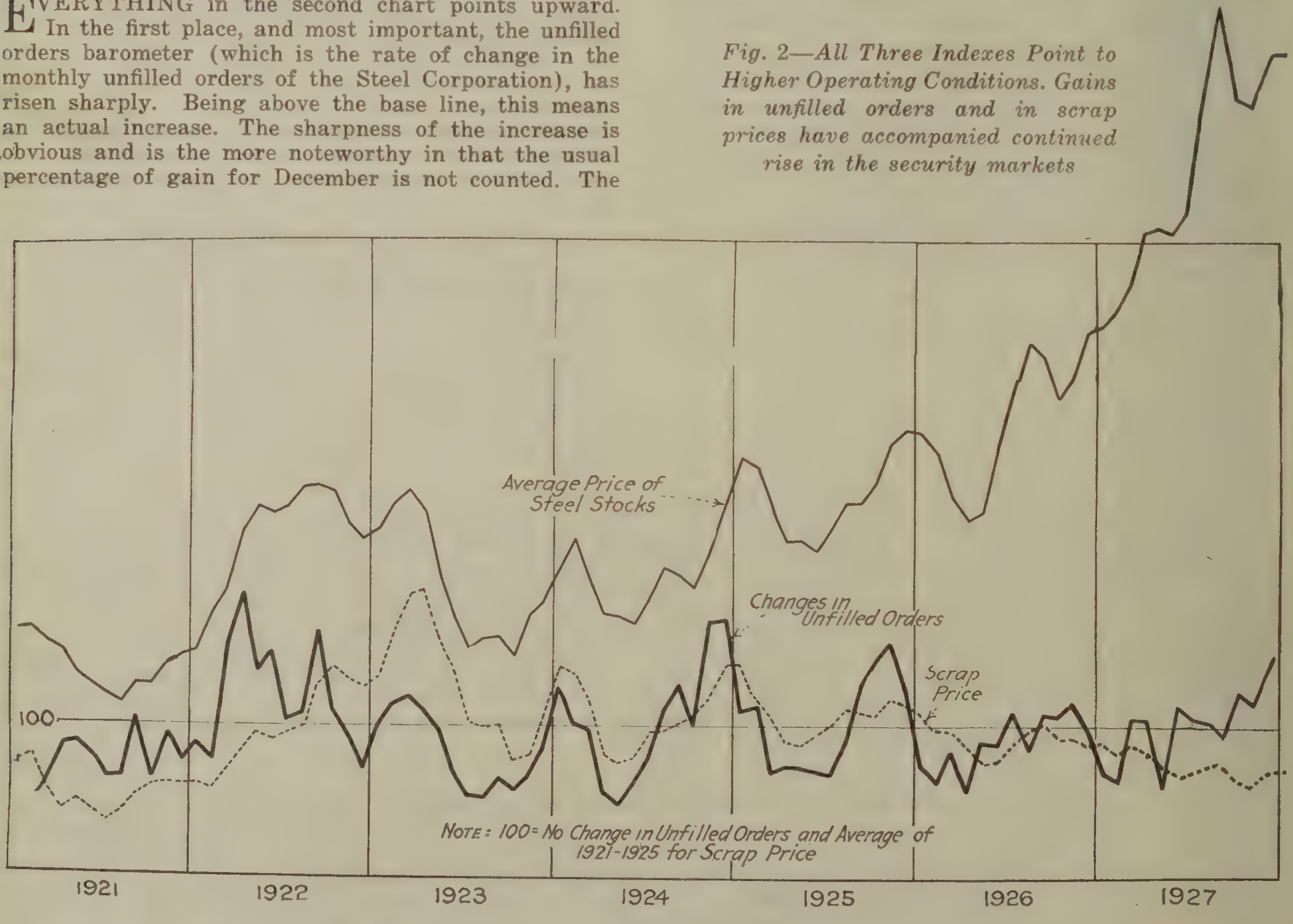
The action of a representative group of steel stocks has been influenced by the general speculative situation. The stock market has been adjusting itself to the uncertainties of the credit situation and steel stocks have moved in sympathy. Judging by the foregoing barometers, the sounder steel issues are likely to do somewhat better than the average of other stocks, and to show strength, pending more decidedly unfavorable developments in the money market.

Retail Trade Outstripping Wholesale

FURTHER grounds for assurance as to business are seen in the third chart, which shows the relative positions of industrial production, wholesale trade and retail trade. The most favorable item is found in retail trade, which made a good recovery in December. It increased much more than usual for the season and, except for the August peak, is at the high point of recent years. This increase in retail sales is marked in the case of the mail order business, while department store sales have barely held at the normal level.

While retail trade has picked up, the trend of industrial production continued downward through December. This is particularly true of *quantity* of production. When current prices are applied to the quan-

Fig. 2—All Three Indexes Point to Higher Operating Conditions. Gains in unfilled orders and in scrap prices have accompanied continued rise in the security markets



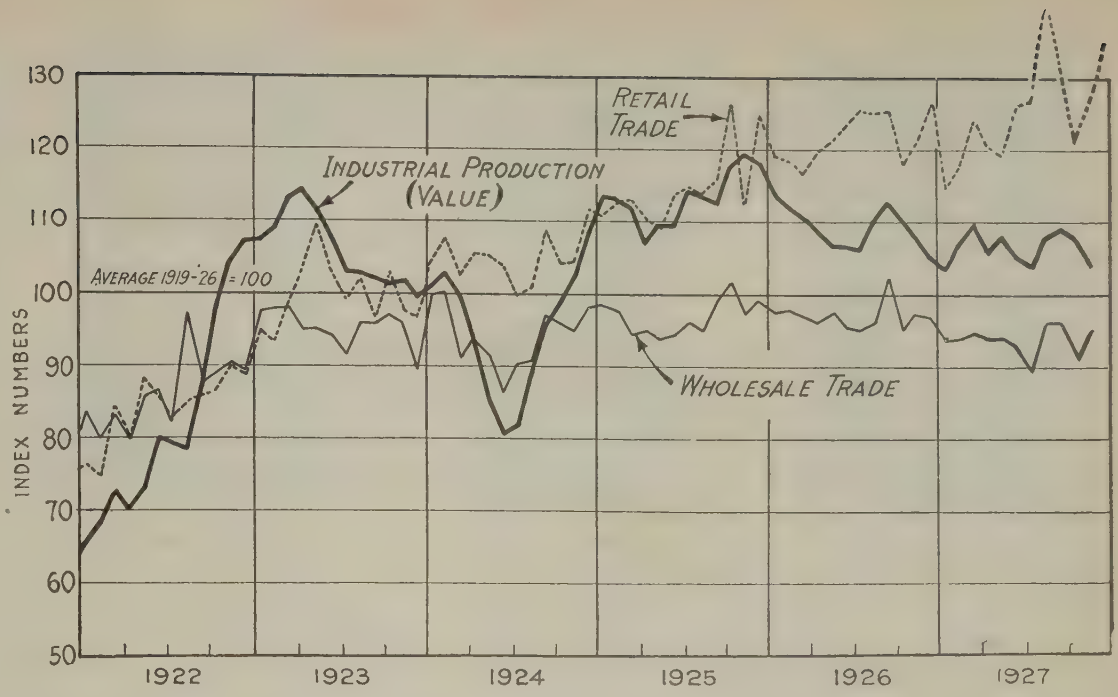


Fig. 3—Favorable Indications Are Seen from the Relations of Retail Trade, Wholesale Trade and Industrial Output. Retail trade has gained more largely than usual. Wholesale business continues slow, while industrial production is a little above normal

tity of industrial materials produced, we find that the curve of industrial production *value* is moving irregularly and that the trend during the past year has been rather "sidewise." This in itself suggests that production is not badly out of line with demand, since the markets for industrial products are strong enough to allow prices to be maintained. Moreover, the production value curve is so much below the retail sales curve that its position in this respect tends to support the foregoing suggestion.

Wholesale sales, however, are relatively low, in spite of the gain which occurred in November.

Employment in Ohio Showed Little Change in December

December employment reports from 64 Ohio foundries and machine shops disclosed practically no change from November, although there was a decline of 14 per cent from December, 1926. Increases in Cincinnati, Cleveland and Columbus were offset by decreases at Dayton and Toledo, while Cincinnati was the only city showing an improvement over December, 1926. Twelve Ohio steel works and rolling mills showed a continuation of the decline which started in June, employment being 4 per cent less than in the corresponding month of 1926 and 20 per cent less than in May, the peak month of 1927. Among automobile and automobile parts manufacturers there was an improvement in employment in December for the first time since May, 1927. The betterment amounted to 28 per cent compared with November, but showed a loss of 11 per cent from December, 1926. The reports are received monthly by the Bureau of Business Research of Ohio State University for publication in its bulletin.

Protest Tin Plate Freight Rate Between California Cities

WASHINGTON, Jan. 24.—A protest has been filed with the Interstate Commerce Commission by the California Transportation Co. and the Sacramento Navigation Co. against a suspended rate of 9c. per 100 lb. on tin plate, in minimum carloads of 80,000 lb., to Sacramento from San Francisco and Oakland, Cal., and certain intermediate points. The rate of 9c., suspended until May 10, was proposed by the Western Pacific Railroad. The existing rate from San Francisco is 18.5c., 36,000-lb. minimum. The protestants state that the Western Pacific Railroad staked its case on the "asserted belief that the United States Steel Products Co. would inaugurate its own barge service unless it reduced the rate." It is contended by the protestants that the type of steel barges owned by the Steel Products Company is not adapted to navigation on the Sacramento River and that that company could not possibly save over $1,250 per year if it established the service.

Blaw-Knox Co. Merges with Andrews-Bradshaw Co.

The Blaw-Knox Co., Pittsburgh, manufacturer of steel and iron products, buckets, machinery, etc., has concluded arrangements for a merger with the Andrews-Bradshaw Co., 530 Fourth Street, Pittsburgh, manufacturer of steam purifiers and other steam specialties. The latter company will retain its identity and will operate as a division of the Blaw-Knox Co. Grant D. Bradshaw will remain as president; L. F. Kuhman, vice-president, and R. W. Andrews, secretary and treasurer. Production will be carried out at the Blaw-Knox plant.

Timken Roller Bearing Co. to Spend $4,000,000 for Expansion

The Timken Roller Bearing Co., Canton, Ohio, has authorized an expenditure of $4,000,000 to be devoted to increasing the production facilities. The greater part of this expansion program concerns the company's plant at Canton, where both the steel mill and the bearing manufacturing plant will be considerably enlarged. Among other features a new substation of greater kilowatt capacity will be built for supplying electric power for both the steel mill and the factory. The contracts for steel construction alone amount to $300,000 or more.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Feb. 16****—Activity in Steel Consuming Industries;* ***Feb. 23****—Position of Iron and Steel Producers;* ***March 1****—General Business Outlook.*

Sound Competition Is Prime Need

Continuance of Prosperity Demands Elimination of "Deficiteer" —Trade Association Activity Salutary

BY MAGNUS W. ALEXANDER*

IS LARGE business volume a safe criterion of business prosperity and is growing business competition a conclusive proof of decline in our prosperity?

The foundation of business prosperity is competition. It is important, however, that it be the right kind of competition. If constructive, it will stimulate trade and bring into play the best human faculties and the highest technical and economic intelligence; if destructive, it will undermine business, cause unethical methods to be used and breed economic ill-health.

Competition today is making itself felt to such a degree that, while activity is reaching steadily higher levels, many branches of industry are complaining that theirs is a "profitless prosperity." The fact is that in recent years about two in every five manufacturing corporations have either made no profits or have incurred a deficit. Analysis by the research staff of the National Industrial Conference Board of income tax returns to the Federal Government shows that in 1920, 37 per cent; in 1921, 54 per cent; in 1922, 41 per cent; in 1923, 37 per cent; in 1924, again 41 per cent, and in 1925, 39 per cent of all manufacturing corporations reported no net income. During these six years, for every $100 earned by successful concerns, $32 was lost by the unsuccessful corporations.

The board's analysis further shows that manufacturing corporations in 1925 not only operated on a distinctly narrower profit margin per dollar of sales than in 1923, the last previous "good" year, but that the average net income of 99.89 per cent of them—that is, all those with less than $5,000,000 net income in the year 1925—was nearly 11 per cent smaller than in 1923.

The reports of earnings during the second quarter of 1927 of several hundred corporations are now available. An examination of these shows that a few outstanding organizations are doing better, but by far the majority show a profit rate that is below what they were earning in the same period during 1926.

In certain lines, goods have actually been placed on the market at below production costs. This naturally stimulates a far-reaching question: Is it economically sound or socially desirable that over a consecutive period of time goods be sold without profit or at a loss? And this leads to a further observation of some interest. During the world war the word "profiteer" was coined. Has not the time come when in the same way we should hold up to scorn the "deficiteer," the man or organization who, either counting upon ability to withstand losses longer than some competitors or in ignorant or willful disregard of consequences, sells at a price below what the commodity is fairly worth or even below production cost?

Many trade groups, awakening to the seriousness of the situation as it has confronted them in their particular industrial branches, have been attempting through education in cost accounting to teach producers how to fix fair selling prices. Others, through the establishment of business standards and codes of ethics, are aiming to develop a moral plane of fair dealing that will put a stigma upon the individual or organization that indulges in unfair trade practices. Business men themselves have been urging the wisdom of restraint so as to assure a sustained period of moderate prosperity in preference to brief periods of boom prosperity with their inevitable grief. It is significant indeed that within the last year the chairman of the Federal Trade Commission has appealed for authority to add to the commission's powers by permitting it to prevent uneconomic, as distinguished from illicit, practices. Certainly, the experience of the petroleum industry and of the coal industry in the last few years has emphasized that we are reaching a stage when collective action may be required to safeguard basic industries from disorganization and possible disaster following upon the shortsighted policy of a few producers. While competition is the life of trade, it should be economically and socially fair, and should not be tainted by the leprosy of the profiteer or of the deficiteer.

I think it to be true that, while the competitive struggle has been increasing, the standards of business dealing have also steadily been elevated. Am I not right in claiming that it would be considered unethical today to do things which a generation ago would have been justified as measures of self-defense in business—such as "knocking your competitor's product," or "shading" in a secret transaction the established price to a few of one's customers, or "spying" on a competitor's salesmen, or "enticing away" customers unfairly?

I think the influence of the trade association movement in setting and maintaining those higher standards of business conduct generally, which have heretofore had to depend more on the personal honor of a few and the influence exerted by them, has been the most potent single factor in this transformation. Many of the trade associations have not only given clear definition to the guiding principles of business morality, but they have brought the steady pressure of group opinion to bear upon their enforcement. They have cleared the field for the rational determination of business policies, without enjoining the sacrifice of independence. They have done this especially by assembling reliable, trade-wide statistics upon all aspects of current conditions concerning which information is essential to the formulation of sound judgment. They have eliminated ambiguities from trade terminology and standardized collateral features of ordinary commercial transactions.

The immediate outlook is for more, rather than less, business competition. This should not frighten, but should stimulate us. It should make us apply scientific methods and intelligence wherever possible, prevent waste and inefficiency, improve and invent for the more effective satisfaction of the rising demands of the people and for the release of human labor where practicable, and train labor for more skilled tasks, staff personnel for efficiency, and executives for managerial capacity.

If, as claimed, sound competition is the cornerstone of business activity and thus the road to the achievement of a stable and prosperous condition of business, so a prosperity that permeates the country widely fosters and makes possible a healthy and stimulating competition. A high social service is, therefore, being rendered by keeping competition sound and prosperity widely diffused, for in the state of business and of competition are bound up the fortunes and well-being of the people of the United States.

Present conditions contain a challenge, but the challenge is essentially to the business men. Such challenges are not new in our national economic life. We have overcome similar problems before. We ought to be able to overcome them again. If it is true, as some assert, that there is more business genius in the United States than elsewhere in the world, that genius ought to be applied to the betterment of the business organization and to the development of such standards of business conduct as will bring forth the best of which management is capable. It will then be more fully recognized that competition and prosperity in business are compatible factors and not antagonistic forces and that, even under keenly competitive conditions, there can be a substantial business prosperity.

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*President National Industrial Conference Board, New York. Abstract of address before Michigan Manufacturers' Association, Detroit, Dec. 8, 1927.

R. J. WYSOR

F. E. FIEGER

J. Z. COLLIER

S. S. MARSHALL

New Jones & Laughlin Operating Officials

R. J. WYSOR, since 1925 assistant general manager of the Jones & Laughlin Steel Corporation, Pittsburgh, has been made general manager of all works and properties of the corporation, succeeding T. M. Girdler, the corporation's new president. Mr. Wysor's successor as assistant general manager is Frederick E. Fieger, for the past five years general superintendent of the Aliquippa works, Woodlawn, Pa. J. Z. Collier, who has been general superintendent of the South Side works, Pittsburgh, becomes head of the Aliquippa works, and is succeeded by S. S. Marshall, Jr., who has been assistant general superintendent of the South Side plant. H. D. Stark takes the position vacated by Mr. Marshall.

Mr. Wysor was born in Dublin, Va., in 1885, and received his technical training at Virginia Polytechnic Institute, Blacksburg, Va., from which he was graduated in 1906. For the next four years he was chemist and assistant chief chemist at the Duquesne works, Carnegie Steel Co. Leaving that company in 1910, he was for two years engaged as metallurgist for the Panama Canal Commission and then joined the Bethlehem Steel Co., serving for four years as chief chemist and engineer of tests, for two years as superintendent of blast furnaces and for one year as superintendent of the service department at the Bethlehem works. From 1919 until 1923 he was assistant general manager of the Maryland plant, Sparrows Point, and with the acquisition of the Midvale Steel & Ordnance Co. by the Bethlehem company in 1923, he was transferred to the Cambria works, Johnstown, Pa., as assistant general manager. He joned the Jones & Laughlin corporation in 1925 as assistant general manager.

Mr. Fieger is a native of Pittsburgh and has been with the Jones & Laughlin corporation since 1917. His connection with the steel industry began in 1901, when he went to work in the engineering department of the American Tin Plate Co., which later was merged with the American Sheet Steel Co. into the present American Sheet & Tin Plate Co. He left that company to engage in consulting engineering in Pittsburgh in 1909. In 1913 he joined the Whitaker Glessner Co., Portsmouth, Ohio, as chief engineer, and two years later became general manager of that plant, which is now the Portsmouth works, Wheeling Steel Corporation. He became superintendent of the wire department, Aliquippa works, Jones & Laughlin Steel Corporation, in 1917. A year later he was made superintendent of steel works, in 1920, assistant general superintendent, and in 1923, general superintendent of the Aliquippa works.

Mr. Collier, who was born in Atlanta, Ga., in 1887, was graduated from the Georgia School of Technology in 1906 and in 1907 went to Pittsburgh to enter the employ of the Westinghouse Machine Co. He joined the Jones & Laughlin organization in 1918 as assistant chief engineer at the Aliquippa works and later served as steel works and blooming mill superintendent. He was appointed assistant general superintendent at the South Side works in 1923 and general superintendent on Jan. 1, 1926.

Mr. Marshall's experience has been solely with the Jones & Laughlin corporation, with which he has been identified since 1903, when he went to work in the engineering department of the Eliza Furnaces, Pittsburgh. Later he became superintendent of construction for works on the north side of the Monongahela River and still later, general master mechanic of the Soho department. He was made assistant general superintendent at the North Side works in 1917 and assistant general superintendent of the South Side works in 1925.

George M. Laughlin, Jr., Elected Chairman of Jones & Laughlin

George M. Laughlin, Jr., vice-president Jones & Laughlin Steel Corporation, has been elected chairman of the board to succeed the late B. F. Jones, Jr. Mr. Laughlin, who was born in Pittsburgh, is a son of the late Major George M. Laughlin, one of the early partners in the business, who was actively connected with the organization until his death in 1908. The new chairman attended St. Paul's School, Concord, N. H., and Yale University, joining the steel company in 1893 in the operating division, where he continued in various executive positions until he became a vice-president in 1921. Some years prior he was made a director and member of the executive committee.

To Install Recuperator for Bar-Heating Furnace

A Rust refractory recuperator is to be installed in conjunction with a bar-heating furnace at the plant of the Steel Co. of Canada, Ltd., Hamilton, Ont. The furnace will be provided with a perforated arch through which highly preheated air from the recuperator will enter the combustion chamber, mixing with the coke oven gas which will be used as fuel.

After passing through the furnace, the waste gases travel downward to the recuperator, which is situated beneath the furnace. The gases then pass horizontally through the recuperator waste gas flues and thence to the stack.

Air for combustion enters the recuperator at the bottom and passes vertically upward through the air flues in refractory tile. From the recuperator the preheated air is led upward to the perforated roof and enters the furnace chamber at this point.

Column construction is used in building the recuperator, each tile being ground at the top and bottom to make a positive gravity seal. The work is to be done by the Rust Engineering Co., Pittsburgh.

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This Issue in Brief

Greater sales volume at the expense of profits. Though volume output reduces production costs it also tends to lower prices, and prices and profits have declined faster than it has been possible to reduce manufacturing costs. Selling prices are bound to suffer so long as operating heads are permitted to press sales departments for more business as a means to lower costs.—Page 282.

Steel has not lost in competition with cement. Structural steel shipments have increased steadily since 1913. Shipments of 1927 more than doubled those of 14 years ago, while the gain in Portland cement shipments relatively was not so great.—Page 283.

Welsh tin plate industry plans to spend $5,000,000 on modernization. Will adopt American methods, realizing that they must do so or be driven out of world markets.—Page 270.

Old-fashioned beer bottle gives way to stainless steel container. German brewers find that the quality of the beer is not affected by Krupp stainless steel "V2A." Containers are collapsible, occupy less room than bottles, and are more durable.—Page 311.

Praises trade associations for their wholesome influence on business. They have been the most potent single factor in the raising of standards of business conduct, says head of National Industrial Conference Board.—Page 278.

Lower zinc prices due chiefly to increasing application of differential flotation. Shrinkage of one-third of value in less than two years is ascribed to low cost of producing electrolytic zinc from complex ores by the new process.—Page 282.

Labor cost reduced 50 per cent by mechanical sheet pack opener. New machine enables three men to do the work formerly done by six.—Page 271.

Competition and prosperity are compatible. The prospect of greater, rather than less, competition should not frighten, but should stimulate business, says chief of National Industrial Conference Board. But competition must be sound, which demands the elimination of the "deficiteer," he who sells at a price below what the commodity is fairly worth.—Page 278.

Good forgings can be made with a three to one reduction from the ingot. Locomotive builder finds that the five to one reduction, a trade practice of long standing, is not necessary. The use of the smaller ingot reduces the tendency for segregation.—Page 258.

Drastic curtailment of bank credit to check speculative excesses will not be required, economist believes. While firmer money is probable, the present outlook is for no such advance in money rates as would operate as a check on business, says Dr. Haney.—Page 276.

Saves 46 per cent of power cost in rolling mill operation by using anti-friction bearings. Power cost on 16-in. three-high breakdown mill with plain bearings was $8,029 per annum, and $4,335 when roller bearings were used.—Page 260.

Reduces cost of lubricating hot saws by applying anti-friction bearings. Where grease is the lubricant, the ratio is about one to ten in favor of the tapered roller bearing, says bearing manufacturer. Even where oil is used, the improvement is considerable.—Page 262.

Billionth of an inch measured by photoelectric device. New invention registers a change in length of metals, under higher temperature, as small as one-tenth of the diameter of an atom.—Page 263.

Fewer motor vehicles made in 1927 than in any other year since 1922. The total of cars and trucks produced was 3,393,887, which was 21 per cent under 1926.—Page 312.

Enameling costs reduced by use of automatically controlled conveyors. Power conveyors of the roller type carry the ware into the dryers after spraying.—Page 266.

Scrap prices will move up during the next few months, Dr. Haney believes. This is indicated, he says, by expansion in steel production and firmer tone in pig iron markets.—Page 276.

Gain of 2.6 per cent in by-product coke capacity in 1927. The 12,756 ovens now built or under construction have a capacity of 83,826,638 net tons of coal annually, giving an estimated yield of 58,555,726 tons of coke.—Page 268.

Straight anneal of heavy forgings will not produce a desirable grain structure, says locomotive builder. He declares that the terrific strains set up in quenching make it necessary to normalize and anneal.—Page 258.

Finds deep-etch test invaluable in guarding against acceptance of questionable steel. Forging manufacturer believes that this test is the only one which will detect thermal ruptures produced during casting, reheating or blooming mill work.—Page 257.

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Competition and Business Volume

THE cure for too much competition is not more competition. However, it is one thing to counsel restraint in competition and another to practice it. Every manufacturer is confronted with the need for business and will not relax his efforts to get it so long as there is danger of losing ground to competitors. Moreover, it is natural for him to feel that he is on the defensive and unable as an individual to change a market situation until others take the initiative.

One result of the keenness of competition has been the reduction of costs through increases in production. To obtain a greater volume of business, installment selling has found wide adoption. Yet even with the aid of mass output, made possible by enabling the public to anticipate its buying power, prices have declined faster than it has been possible to reduce manufacturing costs.

It is beginning to be realized that increased volume of business is not the solution of the manufacturer's difficulties. Other ways of reducing costs are being sought. The present tendency toward consolidations is one manifestation of this effort. More attention is also being given to the possibilities of introducing manufacturing economies without expanding production.

That much can be done in this direction is indicated by the advances made in the technique of tanning leather, the output of which is limited by the available quantity of hides. Even where the supply of raw material is not a factor manufacturers are looking for operating economies that are not dependent on larger production. A leading automobile manufacturer some years ago purchased a site for a body factory, but deferred construction because his existing plant facilities were not fully employed. Finally, he succeeded in rearranging operations so that the body works might be housed in the present plant, thus obviating a heavy investment in new construction.

The automobile industry, which has been conspicuous in developing mass production methods, is well aware that there are definite limits beyond which the volume of business cannot be economically expanded. Although it is increasingly cautious in adding plant capacity, its problem is complicated by a fickle market. The models of a given manufacturer may capture the fancy of buyers one year and prove unpopular the next. As a result, there is an uneven demand on the industry, and companies pressed to fill orders are tempted to make excessive investment in equipment and plant.

The situation in the automotive field is cited to show that there is no simple solution of the problem confronting industry today. The policy of the individual manufacturer from day to day will continue to be dictated by realities, not by mere theories. Much will be gained, however, if he stops seeking volume for volume's sake. So long as operating heads are permitted to press sales departments for more business as a means to lower costs, selling prices are bound to suffer.

Zinc on the Toboggan

METAL producers have been worried over the steady decline in lead and zinc prices going on ever since January, 1926. Some rather heroic measures have been taken by the zinc people, even to the limitation of output by Oklahoma miners, but to little avail. From a high of 9.04c. per lb. for November, 1925, the price of prime Western spelter in New York has declined until during the current week it was quoted below 6c. Here is a shrinkage of one-third in value in a little over two years. When is it going to end?

It appears that, despite the continuous growth in world's consumption of zinc, the world's supply of metal—or of high-grade concentrates ready to be changed quickly into metal—has increased even faster. Most worthy of note, for it indicates the cause of the above situation, is the rapidly spreading application of differential flotation to the treatment of complex ores. The high-grade zinc concentrate so made, excessively fine in particle size, is converted to metal much more easily via the electrolytic tank than via the retort. Furthermore, the flotation concentrates are produced mostly in mountainous regions where fuel is dear but water-power plentiful. Hence the growing output of electrolytic zinc and the stagnant condition of the retort plants.

Thus zinc is going through one of those recurrent periods in industrial history when new discoveries in methods of production make available a larger output than the world needs at the time. New uses to consume the surplus are yet to be discovered. We cannot doubt that this extra zinc will be absorbed and put to useful work, but it will take time. Meanwhile over-production, or the threat of over-capacity, will tend to depress the selling price.

Electrolytic zinc has been likened by some to electrolytic copper, and drawing on such a supposed analogy, predictions have been made that retort zinc will disappear. But the cases are not parallel. Electrolytic copper is needed because the electrical industry, the principal copper buyer, requires great purity in its metal for carrying current and only electrolytic refining can give that great purity. On the other hand, zinc of high purity had to fight for its market. In a copper refinery, impure anodes of Bessemer metal are refined with the consumption of relatively little current. In an electrolytic zinc plant, the roasted ore is leached, the solution purified and the zinc deposited from the electrolyte, but only at the expense of much electric energy. With such handicaps, the amount of electrolytic zinc reaching the market from its first appearance in 1916 has been rather moderate, and only from those places where ample power and suitable ore existed side by side.

Differential flotation upset this balance in 1926 and 1927. There are available in many mining districts great tonnages of complex sulphide ore containing lead, zinc, copper, iron, silver and gold, in all combinations of percentages. Even though the total of the metals contained in such an ore is large, it could not profitably be smelted for any one of them. But now a separation can be made into clean lead, zinc and copper sulphides which can be shipped to separate smelters, and good recoveries are made on all the metal content. Obviously when the mining and concentrating charges are divided among the three metals, and the precious metals credited, the cost per pound of making either the copper, lead or zinc turns out to be less than for pure ores of any of the metals smelted direct in the old way.

Trying times are ahead of the high-grade zinc mines, strange as it may seem, for the commanding position in the market will be taken by what in effect is "by-product zinc." Operators in well established Oklahoma camps can meet and agree to curtail their production, but it would be as hard as stopping a gold rush to get the rejuvenated mines in the Rocky Mountains to forego their long awaited bonanza profits—at least until they have had some years of prosperity and acquire a perspective.

Steel and Cement Consumption

THAT the production of Portland cement has increased much more in the past 15 years than the production of steel is a fact that presumably is generally recognized. Any inference that the gain has been at the expense of steel is erroneous. In a general way it may be said that construction work has come to represent a larger proportion of our total industrial activity than formerly. Since 1913 there has been substantially the same increase in ton-mileage of freight movement as in the total production of steel, but both the quantity of structural steel fabricated and the quantity of Portland cement manufactured have increased in much greater ratio. They have approximately doubled since 1913, while the gains in freight movement and total steel production have been less than 50 per cent. The increase in construction work has swelled the output of structural steel and cement alike.

When cement is thought of as a competitor of steel, fabricated structural steel is particularly in mind. It is acknowledged that the use of other forms of steel is stimulated by the increasing employment of cement. A direct comparison of the consumption of fabricated structural steel and Portland cement is therefore strictly in point and reasonably conclusive. Such a comparison is made below for the 15 years beginning with 1913. The first column of the table shows lettings in net tons of fabricated structural steel through 1923 and the shipments of the fabricating shops in subsequent years, compilation of statistics of shipments having begun only with 1924. The second column shows the shipments, in barrels, of Portland cement. The third column gives for each year the number of barrels of cement per ton of fabricated structural steel. The index for 1913 was 70.3, and none so high was shown afterward except for the off-year 1921, when cement dropped only a trifle while steel dropped a great deal.

	Fabricated Structural Steel Net Tons	Portland Cement Shipments Barrels	Barrels Cement to 1 Ton Steel
1913.......	1,260,000	88,689,377	70.3
1914.......	1,266,000	86,437,956	68.2
1915.......	1,797,600	86,891,681	48.2
1916.......	1,838,160	94,552,296	51.5
1917.......	1,663,200	90,703,474	54.5
1918.......	1,639,680	70,915,508	43.2
1919.......	1,602,720	85,612,899	53.5
1920.......	1,684,800	96,311,719	57.1
1921.......	1,113,000	95,507,147	85.6
1922.......	2,112,960	117,701,216	55.7
1923.......	2,188,800	135,912,118	62.0
1924.......	*2,411,390	146,047,549	60.5
1925.......	*2,796,090	157,295,212	56.2
1926.......	*2,842,920	162,187,090	57.1
1927.......	*2,626,680	170,922,000	65.0

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*Shipments; figures for previous years are for lettings.

It may be mentioned as a detail that consumption of cement increased slightly more than is indicated by the record of shipments, by reason of increased imports and decreased exports, but the difference is not sufficient to alter the fact that in recent years fabricated structural steel has had a higher ratio to cement than in 1913 and 1914.

The foregoing comparison, while favorable to steel, does not tell the whole story. The use of cement in road building and on the farm has greatly increased, these two classes accounting for nearly, if not quite, one-half the total cement consumption. Cement thus used does not take the place of structural steel, but does stimulate the use of other forms of steel, including in particular reinforcing steel, while it also calls for the construction of much machinery.

Relative Coal and Gas Consumption

REFERENCE was made in THE IRON AGE of Jan. 12 to the almost stationary rate of coal production, the annual gain in the past dozen years having been only about 1 per cent. The smallness of the gain, while the requirements of the country have been increasing greatly, is due, as indicated, to improvements in methods of utilization. It is of interest to measure in a general way the saving in coal that has been made by the use of gas, this being entirely distinct from savings effected by burning coal more advantageously for heating and power purposes.

Approximations can be made sufficiently close to indicate the general relationships between coal and the different forms of gas. The measure is necessarily in British thermal units.

Last year's coal production, bituminous and anthracite in the United States, was approximately 600,000,000 net tons. In round figures about 21,000,000 tons was exported, 5,000,000 tons was used directly in the manufacture of coal gas and about 74,000,000 tons was used in making beehive and by-product coke. This left 500,000,000 tons as used direct for the production of heat, in steam raising, melting, heating buildings, etc. This amount of coal represented approximately 13,000 trillion B.t.u. This figure furnishes a convenient quantitative reference for measuring gas fuels.

Surplus coke oven gas, for use outside the ovens, supplied about 215 trillion B.t.u., and coal, oil and water gas about 150 trillion. Natural gas can be estimated only roughly, as returns are slow on its production; but a fair approximation is 1300 trillion B.t.u. There is a total of 1665 trillion B.t.u., which is about one-eighth as large as the heat involved in the 500,000,000 tons of coal used direct.

For a complete count of our thermal disposition petroleum should also be considered. Its production represents slightly more than one-fifth of the total thermal equivalent of the fuel we get from the ground; but the thermal units directly consumed cannot be estimated closely with data now available, because there are large and varying imports and exports, and some petroleum is used in making the manufactured gas reckoned above. Suffice it to say that the readily produced supplies are expected to diminish in a few years. Afterward at greater expense more can be obtained and the working of oil shales will follow. Then, however, the cost will be much higher and it will be correspondingly more advantageous to push by-product coking much further.

As to progress by replacing beehive coking with by-product coking, that work is nearly completed, for last year less than 15 per cent of the total coke was beehive. The proportions were half and half only about nine years ago, for in 1918 and preceding years beehive largely predominated, while in 1919 and following years by-product has been predominant. The fact remains, however, that by-product coking is still pursued chiefly for the production of coke for metallurgical purposes, gas being a by-product. For producing coke to be used as fuel by-product coking is still in its infancy.

Blast furnace gas has not been considered in this cursory examination of relationships. It is a large item in its particular field. Real technical progress may be made at any time in reducing the amount, for increasing attention is being paid to the point that the blast furnace looks too much like a gas producer.

Blacksmithing Skill Still Essential

RECENT articles in THE IRON AGE on the production of heavy forgings—especially the one by E. J. Edwards in the current issue—emphasize the fact that the fundamental considerations underlying sound forge practice are no different now than they ever have been. First get good sound metal; second, heat and forge it with skill; and third, cool it properly. The prime difference between the modern plants and the primitive smithy is that formerly the blacksmith regulated all these essential steps by relying upon his skill and his knowledge of the traditional lore of the art. Naturally the blacksmith and armorer was then highly respected for his accomplishments and his value to society.

In this day of specialization the functions of the blacksmith have been divided. An illustration can be drawn from the cutlery industry in Sheffield. This whole English industry depends upon the fundamentals listed above, but there the production of fine steel is in the hands of one group, the working of the blades is done by men whose fathers have been smiths for generations back, and the final hardening, grinding and polishing is done by still another group of experts who do nothing else.

Our present articles are interesting in tracing this development further; in showing how the technically educated chemist, metallurgist and mechanical engineer have assumed control of the forging operations, devised tests for sound steel, built correct furnaces, laid down proper heating and cooling programs, installed adequate temperature regulators and powerful machinery for handling and shaping the hot metal. The result is forgings of uniformity and quality unapproached in the olden days of control by tradition.

This does not mean that skill is no longer required. The hammer man, or forgeman, or blacksmith may be told when to withdraw a piece from the furnace by a clock and a pyrometer chart, but he still must know how to handle the piece most effectively, where to direct the blows, how often to turn the piece about, and when to stop the work either when it reaches the desired shape or becomes too cool. The manufacture of hollow forgings on a mandrel, such as pressure vessels, hollow shafts and gun tubes, is a matter of especially high art. This skill, coupled with great muscular strength, is admirable, and makes the word "blacksmith" still a title of honor. It is regrettable that many of these men who know so much about forging are still in the wrought iron era of metallurgy and know so little about the heat treatment and properties of plain carbon steel, to say nothing of the important alloy steels.

For it is this ignorance which has militated against the wider adoption of high-strength heat-treated parts in locomotives. Even though progressive manufacturers are amply competent to produce such parts, the operating officials have not yet been able to insure them against abuse by the railroad engineers, repair men and blacksmiths who handle these machines subsequently. Obviously a heat-treated axle or side rod is a positive menace after having been straightened or heated for any reason by one of these old timers who have neither the equipment nor the knowledge necessary to reheat-treat the part correctly. Equally plain it should be to progressive railroad men that they will be unable to effect important economies so long as they permit this condition of inadequate repair knowledge to persist.

Barbour Stockwell Co. Buys Broadway Iron Foundry

Purchase of the Broadway Iron Foundry Co., Cambridge, Mass., by the Barbour Stockwell Co. of the same city is announced. The Broadway Foundry, established in 1864, was one of the pioneer foundries of Greater Boston. The plant will continue to be operated for the present, with Robert C. Bird as manager. Mr. Bird's father began this business during the Civil War. In 1895 his son, Robert, was made president of the company.

Eventually the plant will be dismantled and the business transferred to the Barbour Stockwell Co. plant. The latter now becomes, it is said, the largest general machinist and iron foundry business in New England. The foundry department will make castings in brass, bronze and aluminum, in addition to the regular production of gray iron and semi-steel. All the other departments—engineering, research, pattern, machine and instrument—will continue their usual activities.

Comprehensive Program Formulated for Power Transmission Association

The preparation of a practical handbook on the subject of mechanical power transmission is an important activity to be undertaken by the Power Transmission Association's board of advisory engineers, which is headed by William Staniar, transmission engineer of E. I. du Pont de Nemours & Co., Wilmington, Del. "While the theory has not changed there is a great difference in the design and present-day practice, which makes it very desirable to have an up-to-date reference book giving practical data on the use of our products," said W. H. Fisher, secretary of the T. B. Wood's Sons Co., Chambersburg, Pa., in his presidential address at the annual meeting of the association, held at the Hotel Commodore, New York, Dec. 7.

Publishing of information relating to the economies and efficiencies of the various mechanical power transmission methods, appurtenances and accessories was also recommended by the association's advisory engineers. This information would serve to point out the economy that can be effected by the efficient use of the group and direct methods of drive. It would aim to advise users impartially of the newest developments in equipment by which greater efficiency and economy may be obtained, and to emphasize the necessity of good engineering practice to simplify the transmission of power by the correct uses of equipment. It would also provide data regarding lubrication and general maintenance of mechanical transmission equipment, and information on obsolescence. Important general test data now in possession of individual members would be published for the benefit of the association and power users.

It was also recommended that a study be made of the best method of assisting users of transmission equipment in their efforts to obtain the best service, and eliminate losses from incorrect use or poor condition. The development of simple apparatus for testing alinement of shafting was suggested. In this connection it was thought that electrical manufacturers should provide a simple method for alining motors.

Another proposal was the publishing of a list, covering principal industries, showing representative good examples of the use of the various types of belting and transmission equipment. Promotion of standardization and simplification was advocated. It was suggested also that the American Society of Mechanical Engineers create a professional division or section of its present Power Division to provide a forum for the discussion of transmission problems.

Ask Modification of Decision in Consolidated Southwestern Cases

WASHINGTON, Jan. 24.—Modification of the decision of the Interstate Commerce Commission in the Consolidated Southwestern Cases is asked in a petition filed yesterday by the East Side Manufacturers' Association, made up of members of the industrial district of St. Louis, and by the Steel Consumers and Shippers' Conference, made up of scrap consumers in Arkansas, Louisiana, Oklahoma, Texas, Missouri and Kansas. The East Side Manufacturers' Association asks that the commission add spiral columns or column hoops, knocked down or collapsed; iron or steel joints for concrete road construction, and iron and steel pins and joists to a list of articles included in the finding. The scrap consumers ask that the report be modified to the extent that wherever rates are in effect upon a lower basis than those prescribed there shall be no warrant for an increase in such rates.

LeBlond Interested in Airplane Motors

CINCINNATI, Jan. 23.—Plans have been formulated by R. K. LeBlond to establish a plant at Cincinnati in which airplane motors for commercial type planes will be built. Whether the new plant will be a part of the R. K. LeBlond Machine Tool Co., or a separate division of it, has not been determined. Negotiations now are under way for acquiring the assets of the Detroit Aircraft Engine Co., which has been declared bankrupt. Glenn Angles, owner of the patents of the motors, and Robert Winters, both of whom have been associated with the Detroit company, have become affiliated with the LeBlond interests. The motors, which are of the radial air-cooled type, are somewhat similar to the Wright whirlwind engine and are to be made in two series of three sizes, ranging from a 50-hp. three-cylinder motor to a 165-hp. nine-cylinder engine.

Michigan Engineering Conference

The third Michigan Engineering Conference, sponsored by 23 engineering groups, will be held at the Hotel Statler, Detroit, Jan. 27 and 28.

The program includes addresses and papers on the relation of the engineer to management; welding; the X-ray as an engineering tool; commercial aviation, and electrification of steam railroads. Alexander Dow, president of the Detroit Edison Co. and president of the American Society of Mechanical Engineers, will preside at the afternoon session, Jan. 27.

Iron and Steel Markets

Plates, Shapes and Bars Advanced

Price Increase of $1 a Ton Expected to Drive in First Quarter Specifications—Structural Orders and Railroad Buying Feature Market

PRICE advances, heavier production and a further broadening of consumption are salient features of a stronger steel market.

Following an advance of $1 a ton on plates, shapes and bars, announced last Thursday by Steel Corporation mills, similar action has been taken by most independents. Since the new prices—1.85c. at Pittsburgh and proportionately higher quotations at other basing points—are limited to orders taken for delivery during the current quarter, the inference is that another advance is contemplated, with 2c., Pittsburgh, as a possible objective on second quarter business.

The initial effect of the higher prices will probably be a release of specifications against first quarter contracts, as well as the clinching of orders that were withheld pending additional signs of market strength. In fact, the volume of new business closed since Jan. 1 has probably been underestimated by the trade. Though heavy specifications were entered against expiring contracts in December and shipments against fourth quarter commitments are still being made, the gain in the Steel Corporation's unfilled tonnage this month promises to be substantial even though it fall considerably short of the sharp increase reported Dec. 31.

Construction work and railroad buying are conspicuous as sources of tonnage business. The week has been one of the largest on record in lettings of fabricated steel work, and it has added 100,000 tons to rail mill backlogs. The largest rail order, 40,000 tons, placed by the Rock Island, was divided, 35,000 tons going to the Gary mill and the remainder to the Indiana Harbor producer. Rail commitments of American mills, it is estimated, are fully 150,000 tons larger than at this time a year ago. Railroad equipment buying promises to continue to be an important market factor, with orders for 3000 cars from the St. Louis-San Francisco and 1000 from the Central of Georgia in early prospect. Steel specifications received from car builders by Chicago mills during the week total 13,000 tons.

Better farmer buying is reflected in the steel consumption of implement manufacturers, which is 10 per cent heavier than a year ago. There is a good flow of business from the automobile industry, although motor car output has not increased so rapidly as was anticipated. At Cleveland, demand for sheets and strip from stamping plants and other parts makers is not so heavy as earlier in the month, when liberal specifications for early needs were released. At Chicago, however, the automotive trade has passed the farm implement industry as the leading taker of bar shipments.

Demand for tubular goods lags, and pipe mill operations do not exceed 60 per cent of capacity. Steel mill output generally, however, has shown a further gain. Steel Corporation plants are running at 82 per cent of capacity, as compared with 78 per cent last week and 75 per cent two weeks ago.

Award of 57,800 tons of steel for the Cleveland Union Terminal to the Steel Corporation's fabricating subsidiary brought the week's total of structural contracts to more than 103,000 tons. Other outstanding lettings were 15,000 tons for a building in Boston, 8000 tons for a bank in Chicago and 7000 tons for subway work in New York. Among new inquiries for 23,000 tons is 7000 tons for a bascule bridge in Milwaukee.

Efforts of manufacturers of hot-rolled and cold-rolled strip steel to obtain higher prices are chiefly with an eye to second quarter business, since with few exceptions they are committed against probable production in this quarter. The objective of hot-rolled strip makers is 1.90c., Pittsburgh, for wide material and 2.10c. for narrow sizes, but orders for delivery in this quarter are being accepted at $2 a ton less. The advance of $3 a ton on cold-rolled strip, effective Jan. 25, has not been generally followed and, like the move on hot strip, is regarded as an aim for second quarter.

Following the advance of $1 a ton on hot-rolled bars, makers of cold-finished steel bars and shafting may soon announce an advance of $2 a ton in an attempt to obtain a wider spread between their raw material and finished product. Meanwhile, 2.20c., Pittsburgh, is being firmly maintained.

Pig iron markets are less active, as consumers are nearly all covered for their first quarter needs, but the week brought sales of 19,000 tons at Cleveland. Lake Erie iron is being offered in Chicago at slightly less than $18 for shipment by water when navigation opens, and slight weakness has developed in New England. At Birmingham, basic iron has declined $1 to $15.

Old material prices have not developed the strength that the scrap trade expected would result from increased operations at steel plants.

The competitive position of American steel in export markets has been favorably affected by growing firmness in European prices concurrent with the introduction of a shorter working day in German mills.

Exports of iron and steel in 1927 were 2,180,969 gross tons, a slight gain over the 2,167,213 tons of 1926. Imports fell off from 1,110,049 tons in 1926 to 750,467 tons in 1927, due largely to reduced incoming tonnages of pig iron. Tin plate was the largest export item in 1927, with 254,131 tons, and wrought pipe provided 248,415 tons.

No change occurred this week in either of THE IRON AGE composite prices.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jan.24, 1928	Jan.17, 1928	Dec.20, 1927	Jan.25, 1927
No. 2, fdy., Philadelphia..	$20.26	$20.26	$19.76	$22.26
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.50
Basic, del'd eastern Pa. ..	19.50	19.50	19.50	21.50
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.50
Malleable, Valley	17.25	17.25	17.50	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill.......	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	36.00
Forging billets, P'gh.....	38.00	38.00	38.00	40.00
O.-h. billets, Phila.	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	42.00	42.00	40.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago.......	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	1.80	1.80	1.80	1.90
Steel bars, Chicago.......	1.90	1.90	1.90	2.10
Steel bars, New York.....	2.14	2.14	2.14	2.24
Tank plates, Pittsburgh...	1.80	1.80	1.80	1.90
Tank plates, Chicago.....	1.90	1.90	1.90	2.10
Tank plates, New York...	2.12½	2.12½	2.12½	2.24
Beams, Pittsburgh	1.80	1.80	1.80	1.90
Beams, Chicago	1.90	1.90	1.90	2.10
Beams, New York........	2.09½	2.09½	2.09½	2.24
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.25

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan.24, 1928 Cents	Jan.17, 1928 Cents	Dec.20, 1927 Cents	Jan.25, 1927 Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.80	2.85
Sheets, black, No. 24, Chicago dist. mill.........	3.00	3.00	2.90	3.10
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.75
Sheets, galv., No. 24, Chicago dist. mill.........	3.85	3.85	3.70	3.95
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.20	2.20	2.15	2.40
Wire nails, Pittsburgh....	2.55	2.55	2.50	2.60
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.65
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.45
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh..	3.25	3.25	3.20	3.30
Barbed wire, galv., Chicago dist. mill.........	3.25	3.25	3.25	3.35
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.00	$15.00	$15.00	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	15.00
Heavy melting steel, Ch'go	12.50	12.50	12.25	13.50
Carwheels, Chicago	14.00	14.00	13.50	15.50
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.00	16.50
No. 1 RR. wrot, Phila....	15.25	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	10.50	12.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$2.65*	$2.75	$2.75	$3.25
Foundry coke, prompt....	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	14.25	14.25	14.25	13.37½
Electrolytic copper, refinery	13.87½	13.87½	13.75	13.00
Zinc, St. Louis...........	**5.65**	5.62½	5.67½	6.40
Zinc, New York..........	**6.00**	5.97½	6.02½	6.75
Lead, St. Louis..........	6.30	6.30	6.30	7.30
Lead, New York.........	6.50	6.50	6.50	7.50
Tin (Straits), New York.	**55.37½**	54.25	58.12½	65.25
Antimony (Asiatic), N. Y.	11.00	11.00	11.25	14.50

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Market Makes a Better Showing—Advance of $1 on Plates, Shapes and Bars

PITTSBURGH, Jan. 24.—The steel market is making a showing in keeping with the developments in main consuming lines that were expected to contribute to a good year. Predictions of good business were founded largely on expected expansion in railroad rolling stock purchases, the recovery by the motor car industry of the ground it lost in 1927, improvement in the oil industry, a fairly well sustained amount of building and construction, and the stimulating effect of a prosperous agricultural year. Improvement yet is to show in the oil industry, and building and construction work has not reached large proportions, but there is reflection of the increased buying power of the farmers. The automobile industry, although not yet in the stride of production of which it is capable, has registered a substantial rally from the low point of late last year and there is fairly full reflection of expectations as to railroad car buying.

It is early for complete rounding out of anticipated business, but despite that fact the steel industry has moved up to an ingot production averaging approximately 75 per cent of capacity, and the trade naturally looks confidently ahead to further expansion as the consuming industries not now active reach a better stride.

Events of the week have been chiefly in connection with prices. The Carnegie Steel Co. advanced prices of bars, plates and shapes $1 a ton to 1.85c., base, Pittsburgh, as of Jan. 19, and in this move, which made the new base effective only for the remainder of this quarter, there was prompt following by independent companies. Definitely stronger price ideas are entertained by strip steel makers, but these are with reference to second quarter business, since with few exceptions manufacturers are committed fully against probable production for this quarter. Following the advance in hot rolled bars, it is probable that makers of cold-finished bars will soon seek higher prices. Sheet makers are hampered in getting advances in this quarter by the fact that they are heavily obligated against what they will produce.

A striking argument for the need of better steel prices comes in the report of the Jones & Laughlin Steel Corporation for the final quarter of last year, when that company, despite its size and the fact that it is entirely self-contained, failed to earn its dividend requirements for the period by more than $300,000. It was the first time since the company began reporting earnings four years ago that it has not shown a surplus in every quarter.

Good specifications are reported for sheets, strips, cold finished steel bars and tin plate, and the new demand for wire products, apart from nails, is reported to be better than it has been, but the effect of heavy specifications last month in bars, plates, shapes and wire nails is reflected now in rather moderate shipping releases. With February requirements just ahead, plus the advance in the prices of the heavy tonnage products, the remaining days of the month should be marked by an increase in specifications. Some mills are yet to complete shipments against fourth quarter tonnages of bars, plates and shapes, but it is commonly said that low-priced orders in these products as well as in cold finished steel bars will be well completed by the end of the month.

Pig Iron.—The only business of consequence lately before the market was an inquiry from the Pressed Steel Car Co. for 1000 tons of car wheel iron running low in silicon and high in manganese. This business is reported to have gone to steel companies, but there is no information as to the price. Iron for that purpose usually is off-grade basic and the price is determined by the price of standard basic. Otherwise business has been almost entirely of lots of one or two carloads, with some melters who ordinarily buy ahead now depending on spot offerings. Prices are unchanged. The Carnegie Steel Co. is reported to be making ready to start a furnace at its Farrell, Pa., works.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Consumers of the commonly used ferroalloys are specifying against contracts very steadily and some users of spiegeleisen are exceeding their monthly quotas. Producers are holding firmly to $100, seaboard, for ferromanganese.

Fluorspar.—A good-sized lot of domestic gravel spar, recently placed by an eastern Ohio steel company, went at $14.50 per net ton, at mines, and apparently that is the ruling price on tonnages of more than a carload. Although most steel companies are usually willing to pay a premium for domestic fluorspar, they now are able to get it at practically the same delivered price as the foreign material. Foreign spar at $16, Atlantic seaboard, is $19.66, delivered Pittsburgh district, while domestic spar at $14.50 at mines is $19.75, delivered in this district.

Semi-Finished Steel.—Users of wire rods who elected to depend upon the spot market and did not avail themselves of a chance to cover for this quarter prior to the advance to $42, base Pittsburgh or Cleveland, have found it necessary to pay the higher price. Several fair-sized tonnages have been sold at $42, base, in the past week. Pittsburgh and Youngstown steel companies are quoting large billets and slabs at $33 and sheet bars and small billets and slabs at $34. The open market in these forms of steel is no broader than it has been for some time because of the fact that so many non-integrated manufacturers are tied up to regular sources of supply and the business no longer is competitive. Pipe skelp also moves largely on private arrangements between producers and consumers.

Bars, Plates and Shapes.—The advance in these products of $1 a ton to 1.85c., base Pittsburgh, announced by the Carnegie Steel Co. last Thursday, has been followed by the independent producers in this district and in all cases it became effective upon announcement and was for business placed for shipment during the remainder of this quarter. All manufacturers still have some tonnage priced at 1.75c., base, to work off, and have not advanced very far into 1.80c. business. Specifications lately have been a little slow, as is quite natural in view of heavy December specifications for January shipment, but last week's advance is counted on to stimulate shipping instructions, which usually expand in the last week of each month. The mills are said to have an objective of 2c., base, on second quarter contracts. Reinforcing bars now are priced at 1.95c., base, to other than recognized mill distributers, but the market still is quotable at a range of 1.90c. to 1.95c., since there has been business within the week at the lower figure.

Rails and Track Supplies.—Little new tonnage in standard-section rails remains to be bought by roads which normally place part or all of their requirements in Pittsburgh, but the local producing unit has a good order book and is running practically full. Light-section rails are slow and sales usually are of single carloads. Track accessories seem to wait on the opening of the track-laying season for specification. Spikes still are quoted at $2.80, base, per 100 lb., but it is understood that a preferential of $2 a ton has been and still is being extended to the steam railroads, as distinct from sales to jobbers. Railroads also are able to buy track bolts at less money than jobbers.

Wire Products.—New business in nails is of moderate proportions, with jobbers still getting shipments on December orders and specifications, but there has been considerable quickening in the demand for other wire products, notably plain wire, while the increasing production of automobiles is bringing a better demand for spring wire. Wire prices, recently weak in the Middle West, are reported to have strengthened and against recent sales at $2.35, base, per 100 lb., Chicago, it is now said that $2.45 is the ruling price.

Tubular Goods.—It is a little early for much demand for pipe in connection with building and construction work and oil country pipe waits on some definite improvement in the oil industry. Several pipe line projects are mentioned, but they are not moving very rapidly toward mill order books. Locomotive boiler tubes are doing a little better and mechanical tubing is selling fairly well as the motor car industry shapes plans for increased production. There is nothing new as to prices.

Sheets.—Specifications against late 1927 orders are coming in freely, but shipments on these specifications are supplying almost all of the current requirements and new business does not amount to much. It still is difficult for the mills to get the prices they announced on first quarter business, not only because wants not covered by contract are so few and small, but because there are few makers who will refuse to extend original orders to apply to new requirements that develop. Mill operations have receded slightly in the past week, partly because of the fact that production the fore part of the month was a little too heavy for the specifications. Some fair-sized orders are coming from automobile body builders, but demand from that source still has room to expand, since production of motor cars has not mounted nearly as rapidly as might be imagined from the optimistic utterances as to car sales. What is wanted, however, is wanted in a hurry, indicating light stocks in consumers' hands.

THE IRON AGE Composite Prices

Finished Steel

Jan. 24, 1928, 2.314c. a Lb.

One week ago	2.314c.
One month ago	2.314c.
One year ago	2.396c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 24, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.54
One year ago	19.30
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.05c.
Del'd Philadelphia	2.12c. to 2.17c.
Del'd New York	2.14c. to 2.19c.
Del'd Cleveland	1.99c. to 2.04c.
F.o.b. Cleveland	1.80c. to 1.85c.
F.o.b. Buffalo	1.90c. to 1.95c.
F.o.b. Birmingham	2.00c. to 2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.80c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.05c.
F.o.b. Birmingham	2.00c. to 2.10c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.05c. to 2.10c.
F.o.b. Coatesville	1.95c. to 2.00c.
F.o.b. Sparrows Point	1.95c. to 2.00c.
F.o.b. Buffalo	1.90c. to 1.95c.
Del'd New York	2.12½c. to 2.17½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.05c.
F.o.b. Birmingham	2.00c. to 2.10c.
F.o.b. Buffalo	1.90c. to 1.95c.
F.o.b. Bethlehem	1.95c. to 2.00c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.08c. to 2.13c.
Del'd New York	2.09½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
All gages, wider than 2 in., to 6 in., P'gh,	2.00c. to 2.10c.
*All gages, 6 in. and wider, P'gh	1.80c. to 1.90c.
All gages, narrower than 6 in., Chicago,	2.30c. to 2.40c.
All gages, 6 in. and wider, Chicago.	2.10c. to 2.20c.

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*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.20c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per 100 Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	$2.75 to 2.80
Spikes, boat and barge	3.10
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Tin Plate.—Mill operations are sustained at about 75 per cent of capacity. Specifications are largely in for March quotas and it will be another fortnight before they begin to come along for April shipment. Some light on the prospects is likely to develop at the canners' convention, which is being held this week in Chicago.

Cold-Finished Steel Bars and Shafting.—There has been little or no recession in the specifications from the high rate attained last month. Producers are well satisfied with the price situation. It seems that in getting contracts for this quarter at 2.20c., base Pittsburgh, much resistance was encountered in the Detroit district, as that price represented an advance of $2 a ton, while other steel products were either unchanged or lower. But there was no weakening in the price. It is now likely that another advance will be made to cover the recent advance in hot-rolled bars, and as makers believe they are entitled to a greater spread between the hot and cold bar price, the advance probably will be $2 a ton, against $1 a ton in hot-rolled bars.

Bolts, Nuts and Rivets.—Improved railroad demand gives the market for bolts and nuts an activity it has recently lacked. Rivets still are rather dull, but prices of all three lines are firm.

Hot-Rolled Flats.—The objective of producers is 2.10c., base, Pittsburgh, for material narrower than 6 in. and 1.90c., base, for widths 6 in. to 12 in., but there continues to be acceptance of orders for delivery in this quarter at concessions of $1 to $2 per ton from those prices. Specifications against orders placed late last year continue to run well ahead of those of last month, but there is rather general dissatisfaction among mills over the price returns.

Cold-Rolled Strips.—Announcement by one large producer of an advance of $3 per ton to 2.90c. for lots of three tons or more and to 3.15c. for lots of one to less than three tons, has not yet been generally followed by other makers. The new prices are regarded as applying on second quarter business. Orders for this quarter still are being taken at 2.75c. and 3c.

Coal and Coke.—Beehive oven coke producers still are finding it difficult to market their outputs, which, though small by ordinary comparisons, are large in view of the fact that offerings of by-products ovens are liberal. Single carloads of beehive oven furnace coke are salable at $2.75, but on larger lots the prevailing price is $2.65. Spot beehive oven foundry coke is readily obtainable at $3.75 to $4. There is a fairly firm market for slack coal, but in other grades the market is as dull and favors buyers as much as ever.

Old Material.—Blast furnace scrap is not easily sold except at a concession from recent prices and machine shop turnings have been sold as low as $10.50, this also marking a decline from prices of a week ago. In other grades, prices are substantially unchanged, except that sales of the railroad specialties no longer are easily made at more than $17. Consumer interest is low and dealers, not being pressed for deliveries on old sales, are not offering the market much support.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$15.00 to	$15.25
Scrap rails	14.50 to	14.75
Compressed sheet steel	14.00 to	14.25
Bundled sheets, sides and ends	13.00 to	13.25
Cast iron carwheels	14.00 to	14.50
Sheet bar crops, ordinary	15.00 to	15.50
Heavy breakable cast	13.00 to	13.50
No. 2 railroad wrought	15.00 to	15.25
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings	10.50 to	11.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	16.75 to	17.00
Railroad coil and leaf springs	16.75 to	17.00
Rolled steel wheels	16.75 to	17.00
Low phosphorus billet and bloom ends	18.50 to	19.00
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	11.00 to	11.50
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	11.50
No. 2 busheling	10.00 to	10.25
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	15.00 to	15.25
Malleable Grades:		
Railroad	15.00 to	15.25
Industrial	14.50 to	14.75
Agricultural	14.00 to	14.25

Hearing in Pig Iron Dumping Case

Hearings were held before the Customs Court at Philadelphia, Jan. 10 and 11, on a charge of violation of the anti-dumping act brought against Hickman, Williams & Co., pig iron brokers, Philadelphia. The defendants imported more than 5000 tons of German pig iron last summer through the port of Norfolk, Va. The admission was made that the iron was bought at less than prevailing prices in Germany, but the argument was advanced that lower prices for wholesale lots are specifically permitted under the provisions of the Federal act.

Invoices of domestic sales by the German producer showed prices that were in no case more than seven marks higher than the price paid by the American importer. These sales, moreover, covered small lots, the largest calling for 400 tons.

Jones & Laughlin Report Deficit of $340,333 for Last Quarter

The Jones & Laughlin Steel Corporation, Pittsburgh, reports a deficit after the payment of dividends of $340,333 for the quarter ended Dec. 31, while its surplus for the year of $4,293,002 compares with $8,578,235 in 1926. Net income for the final quarter of last year was $1,397,123, or $340,333 less than the quarter's dividend requirements. Surplus at the end of last year amounted to $53,413,072, compared with $49,270,070 at the end of 1926.

Decline in Malleable Castings Production in 1927

WASHINGTON, Jan. 24.—Production of malleable castings by 134 identical plants in 1927 totaled 631,388 tons, while bookings aggregated 564,158 tons, against 715,384 tons and 607,949 tons respectively in 1926, according to the Department of Commerce. Shipments were 609,134 tons and 684,582 tons. The rated capacity in 1927 was 1,253,849 tons, so operation was at 50.4 per cent. Capacity in 1926 was 1,307,889 tons, and operation was at 54.7 per cent.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c. to 1.85c.
Sheared	1.80c. to 1.85c.
Universal	1.80c. to 1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.15 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.30

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Western Mills Advance $1 on Heavy Steel Products—13,000 Tons for Cars

CHICAGO, Jan. 24.—Announcement was made last Thursday by the Illinois Steel Co. that, effective at once, prices for plates, shapes and bars were advanced $1 a ton on all new business for delivery before April 1, and that second quarter prices would be made public later. Independent mills have followed suit. This move has tended to accelerate specifying, though temporarily at least it is acting as a checkmate to buying. A test of the new prices is lacking.

The St. Louis-San Francisco's car order is being delayed while alternative bids are being taken on hopper cars of smaller capacity. Specifications from car builders call for the immediate delivery of 5000 tons of sheets, 4000 tons of plates, 2500 tons of shapes and 1500 tons of bars.

In heavy steel products total specifications against first quarter contracts equal those of a week ago. Accumulation of plates, shapes and bars by buyers through speculation prior to Dec. 31 at fourth quarter contract prices was not heavy and has had little effect on this market in the opening weeks of the year. In sheets the situation is different and it has taken the first three weeks of 1928 to write off the bulk of tonnage carried into the new year on old contracts.

A $10,000,000 bond issue has been underwritten on Chicago's new opera house, and brokers are expecting a $10,000,000 preferred stock issue this week.

Pig Iron.—Orders for second quarter iron, presumably for water shipment after the opening of navigation, are being solicited in this market at a shade under $18, base, delivered. It is rather commonly believed that sellers are accumulating orders against boat shipments which may assume large proportions in the second and third quarters. With the closing down of the second Mayville furnace, Milwaukee users of iron are again paying the freight rate from Chicago, which is $1 a ton, or 27c. above the rate that prevailed from Mayville. Local furnaces report active sales, the bulk being for second quarter delivery. Both orders and shipments are the highest so far this year. A price of $18 was named on about 20 cars of mill iron produced when a new stack was blown in. Local merchant furnaces are holding rigidly to $18.50 a ton.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—On the whole this market is quiet. It is reported in some quarters that an advance in ferromanganese is not unlikely.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—This market is unusually active and mills which are fortified with well balanced order books are not now promising deliveries in less than three to four weeks, an extension of 10 days since a week ago. Car builders have entered specifications for 4000 tons and an order for 5000 tons of wide plates for use in oil tank construction is for delivery at the earliest convenience of the producers. Miscellaneous users are feeling the pinch of short range specifications and in some cases are now getting additional requirements piecemeal as mills find it desirable to apportion weekly rollings. Definite inquiry has developed for 2500 tons of plates for tank construction in Texas and several new projects are developing in that territory. Another factor contributing to the strength of the plate market is the increased activity of fabricators. Local producers have all fallen in line with the new prices and quotations now are 1.95c., Chicago, for 100 tons or more and 2.05c. for smaller lots. These apply only on current business for delivery in the first quarter. In view of contracts already closed mills will benefit by this increase only on spot business over the next two months.

Mill prices on plates per lb.: 1.90c. to 2.05c., base, Chicago.

Structural Material.—Fabricating plants tributary to Chicago mills have received contracts calling for 12,000 tons of steel. The largest award was the Forman Bank Building, Chicago, taking between 8000 and 8500 tons. A shop in Minneapolis will ship 2500 tons for erection at Fresno, Cal. Among active projects are the Steuben Club, 4500 tons, and an office building, 2400 tons, both in Chicago, and a bridge across the Illinois River at Pekin, Ill., 1700 tons. Recent bids by fabricators clearly indicate a stiffening in prices brought about not alone by changes in mill quotations but also by the determination of fabricators to widen margins of profit. Awards in the past three weeks have added heavily to shop books. Car builders have ordered out 2500 tons of structural shapes. Chicago mills have announced that effective at once spot prices on structural shapes for delivery during the remainder of this quarter are 1.95c. to 2.05c., Chicago, depending on the tonnage desired. The bulk of shipments in this quarter, however, will be at the old schedule, which was $1 a ton lower.

Mill prices on plain material per lb.: 1.90c. to 2.05c., base, Chicago.

Reinforcing Bars.—The Calumet Steel Co. was awarded 3000 tons of rail steel reinforcing bars for the Campbell Soup Co.'s plant in Chicago. Contractors on State and county road work in Illinois are preparing for spring work and the trade expects 3000 tons of bars to be placed in the next few days. The bulk of this tonnage will go to hard steel bar producers who are asking 1.85c. for bars that are to go into slabs and 1.90c. for bars to be used in bridges and culverts. Billet steel reinforcing bar awards are few, but active projects are numerous, and the outlook is favorable. The announcement of higher prices at mills is spurring dealers to put up warehouse prices. New business and fresh inquiry are shown on page 304.

Bolts, Nuts and Rivets.—Specifications are heavier following increased demand from the railroads, automobile manufacturers and car builders. Prices are steady.

Rails and Track Supplies.—Rail output is steady at 82 per cent of capacity. Buying is light but fresh inquiry, including 35,000 to 40,000 tons required by the Rock Island, is active. Specifications for track accessories are large and tie plate production is now close to capacity. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Wire Products.—Demand for wire products is broadening and mill output has been advanced to 65 per cent of capacity. The bulk of business from the jobbing trade comes from the South and Middle West, the Northwest being winter-bound. A more extensive use of wire is noted in the manufacturing trade. The price situation is less well defined than a week ago. St. Louis remains the battle ground for producers in the South and in the Middle States. Shading in wire prices has developed in Iowa, though the volume of business transacted is not large. In the local market prices for both wire and nails are holding moderately well though buyers of nails in some instances are now exercising protective agreements made in December at prices that range from $2.45 to $2.50, Chicago.

Bars.—There is little of note in this market except in the announcement by Chicago producers that spot sales of soft steel bars during the remainder of this quarter are to be $1 above quotations on which present contracts are based. As a general thing users are well covered and therefore the tonnage that will be shipped against the new prices will be small as compared to total deliveries over the three months period. The new quotations are 1.95c., Chicago, to 2.05c., depending on the tonnage. Specifications, including 1500 tons from car builders, are steady but sales are measurably smaller. The automobile trade has assumed leadership over agricultural machinery manufacturers in bar shipments. No change is noted in the ability of mills to make deliveries. Producers of iron bars have not followed the lead of soft steel bar mills in advancing prices, but this move is under consideration and may take place before the end of the week. Production of alloy steel bars has been advanced to 85 per cent of mill capacity. Sales in rail steel bars are dragging, but specifications are heavier and now equal production. Mill output has not been increased, although stocks are not considered large for this time of the year. Fence post order books have expanded rapidly in the last week. Prices are steady at 1.80c., Chicago Heights mills.

Mill prices per lb.: Soft steel bars, 1.90c. to 2.05c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Sheets.—Current buying is small and specifications do not bulk larger than a week ago. Hot mills are operating at only 65 per cent of capacity. Prices are steady and deliveries are prompt.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cold Rolled Bars.—Prices are firm at 2.20c., Chicago. Shipments are gradually growing larger but current buying is of small proportions. Deliveries have extended and now range from seven to 10 days on orders that have to be made up. Producers have well-assorted stocks on hand and are drawing against them in preference to expanding production.

Cold Rolled Strip.—Local producers announce that effective Jan. 25 cold rolled strip in widths up to 12 in. and in lots of one to less than three tons will be quoted at 3.15c., base f.o.b. Cleveland, or 3.45c., delivered Chicago. A deduction of 25c. per 100 lb. will be allowed on items of three tons or more. Users are being notified of this change, thus affording them opportunity to cover at the old schedule. Buying is brisk and specifications are the heaviest in many months. Deliveries are extended to four or five weeks.

Cast Iron Pipe.—This commodity is only moderately active at prices that show no improvement. Inquiry for small tonnages is a trifle more brisk but projects are slow in developing into orders. The McWane Cast Iron Pipe Co. is reported to have taken 2000 tons for Yellow Springs, Ohio. Portsmouth, Ohio, is holding bids open on 600 tons. Minneapolis is taking figures on 3500 ft. of 4-in. to 24-in. pipe That city usually buys centrifugal pipe but on this occasion bids are also asked on the sand cast product.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $36.20; 4-in., $38.20 to $40.20; Class A and gas pipe, $4 extra.

Hot Rolled Strip.—Prices are weak and common quotations on all gages wider than 6 in. are 2.10c. to 2.20c. and on narrow widths 2.30c. to 2.40c.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	$2.90 to 3.00
Cement coated nails, base per keg	2.90 to 3.00

Coke.—The Chicago market is active and by-product foundry coke is quoted $9, f.o.b. local ovens, and at $9.50, delivered in the switching district.

Old Material.—Although a fair amount of inquiry is before the trade, it develops slowly. Interest in this market centers in the efforts of dealers to cover orders recently booked. Trading in heavy melting steel is at $12.50 to $12.75. Prices as a general rule lean toward the weak side, primarily because of lack of buying interest. Speculation is in evidence as brokers continue to bid up railroad lists. An oversupply of cast iron borings is causing prices to sag. Malleable users are buying little following purchases made under the condition that shipments would be made promptly. Although the immediate demand for short rails is smaller there still exists a shortage. Included in railroad lists are 9000 tons offered by the St. Paul, 4000 tons by the Burlington and a blank list by the Michigan Central.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	15.25 to 15.75
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Brake shoes	11.75 to 12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Youngstown-Inland Merger on Eve of Consummation

YOUNGSTOWN, Jan. 24.—Since Monday morning L. E. Block, P. D. Block and other officials of the Inland Steel Co., Chicago, have been in conference with President James A. Campbell and officers of the Youngstown Sheet & Tube Co. relative to a merger of the two concerns. Here it is believed that the merger is virtually assured, only details remaining to be worked out. Mr. Campbell, it is expected, will head the consolidation. It was announced tonight that a statement would be issued Wednesday.

New York

Bethlehem Advances Heavy Steel Products $1—Pig Iron More Active

NEW YORK, Jan. 24.—The pig iron market continues to show gradual improvement. Shipping orders are heavier and the volume of inquiry is growing. One large melter is in the market for 2500 to 3000 tons of foundry iron for delivery during the four months beginning March 1. Other inquiries, made up largely of relatively small individual lots, total 4000 tons. Sales by local brokers during the week were in good volume, totaling 7500 tons compared with 10,000 tons in the previous week. The New York Air Brake Co. closed for 1000 tons of malleable for second quarter delivery at Watertown, N. Y. Another melter closed for 1000 tons of foundry for next quarter. The New York Central Railroad bought about 300 tons against its inquiry for Frankfort, N. Y., and Elkhart, Ind., and the Delaware, Lackawanna & Western Railroad placed 100 tons for its Scranton, Pa., shops. The Worthington Pump & Machinery Corporation purchased 90 tons of Bessemer for its Harrison, N. J., plant. Efforts of sellers to obtain a minimum of $19.50, base furnace, on eastern Pennsylvania foundry iron, and of $16, base furnace, on Buffalo foundry are increasingly successful.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—With consumers well covered for their immediate needs of ferromanganese, sales are confined to carload and small lots in which there has been a fair business done. The same is true of spiegeleisen and the prices for both alloys are unchanged at $100 for ferromanganese and at $31 to $32 for spiegeleisen. Specifications on contract for these and other ferroalloys are reported to be improving.

Finished Steel.—The Bethlehem Steel Co. on Monday announced an advance of $1 a ton on plates, shapes and bars at its mill basing points in the East and at Johnstown, Pa., for shipment during the remainder of first quarter. This follows the advance of the same amount by mills in the Pittsburgh, Youngstown and Chicago districts. Other Eastern mills are expected to follow Bethlehem's action. New mill prices are: 1.95c., Buffalo, on plates, shapes and bars; 2c., Bethlehem, on structural shapes; 2c., Coatesville and Sparrows Point, on plates, and 1.85c., Pittsburgh, for shipment from Johnstown. Delivered prices at New York on the new basis are 2.14½c. per lb. for shapes and 2.17½c. for plates, but these prices will not affect much of the tonnage to be shipped this quarter because of the heavy contracting done at former prices. Consumers and jobbers in the New York district are taking shipments in good volume against specifications filed with the mills a few weeks ago, but these shipments are providing for most of the current needs and new requirements are not in large volume. The leading Eastern producer of plates and shapes reports substantial improvement this month in the volume of business on its books, and points to a fair accumulation of active structural steel projects under negotiation. The amount of new tonnage coming out for bids in the past week was very light. The largest structural award was 7000 tons for a New York subway section to be fabricated by the McClintic-Marshall Co.

Mill prices per lb., delivered New York: Soft steel bars, 2.14c.; plates, 2.12½c.; structural shapes, 2.09½c.; bar iron, 2.14c.

Reinforcing Bars.—The market is seasonably quiet and there are few pending jobs involving good-sized tonnage. On the run of mill business prices are being well maintained on a basis of 1.90c. per lb., Pittsburgh. Distributers are quoting 2.20c., Youngstown warehouse, or 2.57½c., on cars at New York. Out of New York warehouse, the price is 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Warehouse Business.—Demand is irregular, some jobbers reporting a moderate volume of purchasing, while others find but little activity. Prices show no change.

Coke.—Most consumers are fairly well covered on contract and there is but little inquiry for prompt shipment coke. Standard foundry is still quoted at about $4 per ton, Connellsville, and standard furnace at $2.75 to $3 per ton, Connellsville. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, $7.91. By-product foundry coke is quiet and unchanged at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.10	$5.85
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Cast Iron Pipe.—Although recent quotations of Northern makers have figured back to less than $28 per net ton, Birmingham, the actual freight rate involved was small and the Northern foundry price was close to $30 per ton, base. The City of New York has awarded 2200 tons of pipe to the National Cast Iron Pipe Co. and the Donaldson Iron Co., the low bidders. The New Haven Water Co., New Haven, Conn., is inquiring for about 2000 tons of 6, 8, 16, 36 and 42-in. water pipe. Stone & Webster, Inc., Boston, and the Adirondack Light & Power Co., Amsterdam, N. Y., are in the market for about 1000 tons of pipe each.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Old Material.—Prices of all grades show little change. Brokers shipping mixed borings and turnings to Swedeland, Pa., have advanced buying prices to $10.50 per ton, delivered, and machine shop turnings are being purchased at $10.50 to $11 per ton, delivered Phoenixville and Harrisburg, Pa. A dealer who was paying $13 per ton for specification pipe delivered to a Lebanon, Pa., consumer has reduced the offering price from 25c. to 40c. per ton. No. 1 heavy melting steel and yard grade of heavy melting steel are unchanged. Thus far the scrap market has failed to reflect the improvement in business reported by the steel mills.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.25 to 8.50
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.25
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.50 to 17.00
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75 to 9.00
Forge fire	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Cleveland

Structural Steel Award of 57,800 Tons for Cleveland Terminal Project

CLEVELAND, Jan. 24.—An order for 57,800 tons of structural steel was placed today by the Cleveland Union Terminals Co. with the American Bridge Co. for construction work in connection with the Cleveland Union Depot project. This included the station proper and other work in addition to buildings covered by an inquiry for 20,000 tons reported last week. Deliveries are to start May 1.

Independent mills generally have followed the Carnegie Steel Co. in advancing steel bars, plates and structural material to 1.85c., Pittsburgh, for delivery throughout the first quarter, and the indications are that these prices will be adhered to except for steel on which quotations or contracts were made before the advance. Local bar mills have made a similar advance to 1.85c., Cleveland. One Ohio plate mill has not yet made the advance. A large proportion of consumers are under contract for the quarter at 1.80c. Some of the mills will about complete shipments this month against specifications placed in December at 1.75c.

Some of the mills report a gain in specifications this month over December, although expiring contracts brought out a heavy tonnage during the latter month. Mills continue to get a good volume of specifications from the automotive industry in Michigan. Locally the demand for sheets and strip steel from stamping plants and other parts makers is not as heavy as earlier in the month, when consumers gave heavy specifications for early needs. Plates in small lots are moving better than for several months, business having improved with boiler and tank shops. The Sinclair Refining Co. has placed 42 stills with three shops. These will require 1700 tons of plates. Inquiry in the structural field has become more active.

Pig Iron.—Buying fell off somewhat the past week, but sales by Cleveland interests totaled about 19,000 tons. Activity subsided in the Michigan territory, where buying has recently been heavy, but showed a gain in the Buffalo territory. A few foundries are now showing interest in second quarter contracts. While some consumers have covered for the entire first half, the aggregate tonnage placed for delivery beyond March was small. However, many foundries evidently have covered in their first quarter contracts for enough iron to carry them well into the second quarter. A Muncie, Ind., foundry is inquiring for 3000 tons of malleable iron for the second quarter and a Fort Wayne consumer wants 500 tons of foundry iron. Other inquiries are light. There is virtually no change in the price situation, although the market is firmer in Michigan, where there is still a range of $17.50 to $18. Quotations on foundry and malleable iron by Lake furnaces range from $16.50 to $17, but producers are not going to the lower figure except for shipment to points where they are at a freight disadvantage. Regular silicon differentials are not being adhered to. Foundry operations show some gain in the northern Ohio territory and this has resulted in better shipping orders. Shipments to Michigan automobile foundries continue heavy.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—Specifications continue good from the automotive industry and fair from other consumers. Although most buyers are under contract at the old prices, quite a little new business is being taken, mostly in black sheets with special finishes. The market shows a firmer tone except on galvanized sheets, 2.90c., Pittsburgh, for black and 2.10c. for blue annealed now being generally adhered to. Galvanized sheets are still available at 3.65c., Pittsburgh.

Strip Steel.—The demand for hot-rolled strip steel is heavy from the automotive industry but there is not much new business as most consumers are under contract. Prices are firm at 1.85c. for material 6 in. to 12 in. wide and at 2.05c. for narrower than 6 in. Several of the independent mills have not yet joined in advancing cold-rolled strip to 3.15c., base, but are still quoting 3c. as a Cleveland base price and 2.75c. for three tons and over.

Fluorspar.—The gravel fluorspar market has been fairly active the past week and most consumers are now covered for the first half. Sales included 2000 tons to a Cleveland mill and two other lots, one for 3000 tons and the other for 500 tons, all at $14.50, mines. Makers are still asking $15 for car lots.

Warehouse Business.—The demand shows a fair gain in practically all lines. The advance in mill prices on steel bars, plates and structural material has not resulted in any change in warehouse prices. Galvanized sheets continue to move in very good volume.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Reinforcing Bars.—Considerable work is still pending and one 300-ton inquiry developed during the week. Rail steel bars are still quoted at 1.65c., mill, makers not having followed the advance made on billet steel bars.

Old Material.—The market has a weak tone, but prices have not declined. There is no new demand from consumers. Scrap is coming out more plentifully at prevailing prices, but dealers are not buying much material to fill old orders. Dealers are now paying $15 for heavy melting steel for Youngstown delivery, a reduction of 25c. a ton from a week ago, but they are unable to buy blast furnace scrap below $10.50. Offerings of scrap by the automotive industry in Michigan for February are heavy, reflecting the increase in plant operations. Lists out for closing this week aggregate over 16,000 tons. These include the Buick Motor Car Co., 6000 tons; Dodge Brothers, Inc., 4000 tons; Chrysler Corporation, 2400 tons, and the Chevrolet Motor Car Co., 3700 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Iron Ore.—Lake Superior ore consumed during December amounted to 3,992,099 tons, a gain of 178,462 tons over the previous month. Consumption in December, 1926, was 4,562,020 tons. Furnace stocks Jan. 1 amounted to 30,977,605 tons. On Jan. 1 there were 37,581,944 tons of ore on hand at furnaces and Lake Erie docks as compared with 38,425,751 tons on the same date a year ago. Central district furnaces during December consumed 1,906,341 tons, a gain of 65,177 tons over the previous month. Lake front and Canadian furnaces used 1,882,547 tons, an increase of 120,561 tons, and all rail furnaces consumed 138,791 tons, an increase of 4608 tons. Eastern furnaces consumed 64,420 tons, or a decrease of 11,884 tons as compared with November. On Dec. 31 there were 144 furnaces in blast using Lake ore, a gain of two for the month.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c. to 2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel, squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts from practically all sources shows considerable gain this month over December, and makers say that their January business will be the best of any month since last June. The demand for rivets also shows some improvement. Practically all orders are in the form of specifications against contracts placed at regular prices.

Semi-Finished Steel.—Specifications for sheet bars show a gain and the leading local producer has started up two additional open-hearth furnaces, now operating 10 of 14. The ruling quotation is $33, Cleveland, or $1 a ton below the last quarter price. Billets and slabs are unchanged at $33.

Coke.—The demand for by-product coke for domestic use is very dull and one Valley producer has shut down some of its ovens. The market is not firm, with $4.50 the nominal quotation for egg size. Connellsville foundry coke is moving slowly with prices unchanged at $3.75 to $5.10, ovens.

Philadelphia

All Mills Not Yet On New Price Basis—Pig Iron Quiet

PHILADELPHIA, Jan. 24.—A few eastern Pennsylvania producers of plates and shapes have not yet followed the recent advance of $1 a ton by the leading interest, but general adherence to the new level is expected in a few days. Consumers not already fully covered at the former basis of 1.80c. per lb., Pittsburgh, have been protected with first quarter contracts, so that no real test of the new level of prices is expected until second quarter contracts are considered.

Sheets still exhibit a tendency to weakness, although local consumers in the field of automobile body building and radio manufacture have been making some small purchases in addition to their contracts. With most consumers of pig iron well covered for the first quarter, current business is mostly in carload lots. The scrap market continues quiet, but with steel mills beginning to make small increases in operations, dealers foresee more firmness in prices.

At the opening of bids by the Pennsylvania Railroad, Jan. 20, on 25,000 tons of plates, 8000 tons of bars and 2000 tons of shapes, quotations were on the basis of 1.80c. per lb., Pittsburgh. For delivery in the Chicago district, the leading interest quoted 1.95c. per lb., Chicago, the new price effective the day of the opening of bids.

Pig Iron.—With the exception of the usual number of orders for carload lots of foundry iron the market is quiet, most consumers having covered their requirements for the present. The Standard Steel Works Co., which inquired for 3000 to 4000 tons of low phosphorus iron, is understood to have closed on 3500 tons with a large eastern Pennsylvania producer. Purchases at present being confined to small lots, the basis of $19.50 per ton on foundry iron is evidently being maintained without difficulty. No sales of basic are reported. About 400 tons of Virginia iron was closed in this district last week.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Purchases are still of small tonnages, but have been slightly larger in number recently. Prices are unchanged at $33 per ton, Pittsburgh, for rerolling billets and $38 per ton for forging quality.

Bars.—The advance to 1.85c. per lb., base, Pittsburgh, by the Carnegie Steel Co., has been followed by the independent producers of bars and a good flow of specifications against contracts is reported. Bids on 8000 tons of bars in the list of the Pennsylvania Railroad ranged from 1.95½c. to 2.05c. per lb., base, delivered Altoona, Pa., or 1.80c. per lb., base Pittsburgh, Johnstown, Struthers, Midland, Pa., Buffalo, Cleveland and Youngstown or f.o.b. Pennsylvania Railroad tracks.

Shapes.—All eastern Pennsylvania mills have not yet followed the advance of $1 a ton to 1.85c. per lb., Pittsburgh, 2c. per lb., Bethlehem, or 2.13c. per lb., delivered Philadelphia. There are a number of small fabricated projects under consideration and some large bridge work. Contract for the Detroit tunnel, which will require about 4000 tons of sheet steel piling, is reported to have gone to a New York contractor. Prices on 2000 tons of shapes on the Pennsylvania Railroad list were 1.95c., Bethlehem; 1.90c., Lackawanna, N. Y.; 1.80c., Pittsburgh; 1.75c., Pottsville; 1.95c., Phoenixville, and 1.80c., f.o.b. Pennsylvania Railroad tracks.

Plates.—The new quotation on plates of 2c. per lb., base, Coatesville, or 2.10c. per lb., Philadelphia, is effective with eastern Pennsylvania producers except for two mills, which are expected to advance in a few days. Specifications against contracts are reported in satisfactory volume. Bids on 25,000 tons of plates for the Pennsylvania Railroad were 1.80c. per lb., Pittsburgh, Harrisburg, Johnstown, Coatesville, Conshohocken, Pa., Cleveland, Youngstown and Steubenville, Ohio, Claymont, Del., and Weirton, W. Va., or f.o.b. Pennsylvania Railroad tracks.

Sheets.—Although local consumers including radio and automobile body makers have been purchasing small lots in addition to their contracts, the market still shows weakness. Makers of blue annealed sheets are endeavoring to maintain the 10c. per 100 lb. extra for widths greater than 40 in., but occasional concessions are reported. Black sheets are fairly firm at 2.75c. per lb., Pittsburgh. Galvanized sheets at 3.75c. per lb., base, are reported showing a tendency to weakness. Concessions have been given on desirable business.

Warehouse Business.—Following the brief period of activity that began with the new year, demand for material from stock has shown a slight decline. Prices are substantially unchanged, but competition for desirable orders is still keen and concessions are obtainable.

Imports.—In the week ended Jan. 21 a total of 2675 tons of iron, chrome and zirconium ores arrived at this port, of which 1750 tons was iron ore from Persia, 800 tons chrome ore and 125 tons zirconium ore from Brazil. Pig iron totaled 4750 tons; 2850 tons of British, 1495 tons of Indian and 405 tons of Dutch. Steel imports were all from Belgium and included 137 tons of shapes, 106 tons of bars, 52 tons of strip steel and 17 tons of bands.

Old Material.—Prices of all grades of scrap are showing a tendency toward firmness although demand has not increased. Consumers are reported to have good stocks of scrap on hand, but with better operation dealers foresee the development of some purchasing. Prices are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.25 to 15.75
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	13.00
Stove plate (for steel works)	13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 12.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 15.50

W. H. DAVEY HEADS MERGER

New Empire Steel Corporation Elects President and 19 Directors

The Empire Steel Corporation, recently formed to merge six Ohio sheet mills, effected its organization at a meeting held in Cleveland, Jan. 23, by the election of a board of 19 directors and W. H. Davey, president of the Mansfield Sheet & Tin Plate Co., as president.

Other companies involved in the merger are the Ashtabula Steel Sheet Co., Ashtabula, Ohio; Thomas Sheet Steel Co., Waddell Steel Co. and Falcon Steel Co., Niles, and the Empire Steel Co., Cleveland.

With Mr. Davey there are on the directorate: H. S. Pickands, Pickands, Mather & Co, Cleveland; A. I. Davey, vice-president Mansfield company; C. F. Ackerman, Mansfield banker; C. H. Henkel, Mansfield attorney; M. C. Robinson, director of the Ashtabula company; Samuel, John, Harold and F. A. Davey, Mansfield; J. D. Waddell, president, and R. L. McCorkle, vice-president, Waddell Steel Co.; W. R. Jenkins, secretary Mansfield company; A. W. Wheatley, Lima, president Empire Steel Co.; E. C. Werner, Delphos, Ohio; C. S. Thomas, chairman of the Thomas Sheet Steel Co.; C. F. Smith, Youngstown, temporarily representing W. A. Thomas, president of the Thomas company; Lloyd Booth, president, and Paul Wick, vice-president, Falcon Steel Co.

Meetings of the stockholders will be held next week to ratify the merger, but it is stated that this will be merely formal action, as proxies have been secured from owners of the required number of shares. The merger will become operative as of Nov. 1, 1927. Headquarters will be in Mansfield.

SMALL INCREASE IN EXPORTS

Gain of 1927 Over 1926 Was Less Than 1 Per Cent—Imports Declined

WASHINGTON, Jan. 24.—Exports of iron and steel products from the United States during 1927 totaled 2,180,969 gross tons, against 2,167,213 tons in 1926. Imports for the two years amounted to 750,467 tons and 1,110,049 tons, respectively, according to preliminary figures of the Department of Commerce. Exports during December were 168,428 tons, compared with 177,928 tons in November. Imports in December totaled 64,188 tons, against 61,882 tons in November.

Tin plate was the principal item exported last year, with a total of 254,131 tons. Other products exported in large quantities during the year were boiler tubes and welded pipe, 248,415 tons, and scrap, 238,303 tons. Of the more outstanding imports structural shapes, with a total of 161,848 tons, led. Pig iron, 133,068 tons, and steel bars, 91,497 tons, were second and third. Receipts of cast iron pipe, 81,769 tons, were less than those of 1926 by 2104 tons.

Scrap made up the largest item of exportation in December, with 22,668 tons. Exports of boiler tubes and welded pipe aggregated 18,154 tons, and those of tin plate, 15,856 tons.

In the import movement in December structural shapes, totaling 14,529 tons, led, with pig iron, 14,299 tons, second. Receipts of steel bars totaled 8117 tons, cast iron pipe, 3112 tons, and "other pipe," largely seamless tubes, 1725 tons.

Engineering and other progress in modern Iceland will be outlined by Earl Hanson, explorer, at a meeting of the railroad division of the American Society of Mechanical Engineers, to be held at the Engineering Society Building, New York, March 1. Vilhjalmur Stefansson and other explorers have also been invited to address the meeting. In addition to engineering projects, Mr. Hanson will discuss special technical problems, manufacturing requirements, import and export trade and the economic possibilities of the island. He will also outline a proposed railroad project.

San Francisco

Oil Tanks Take 1000 Tons of Steel—Cast Iron Pipe Awards

SAN FRANCISCO, Jan. 21 (*By Air Mail*).—Oil storage tanks, awarded by the Petroleum Securities Co. of Los Angeles for its new Richmond, Cal., plant, call for 1000 tons of plates and shapes. The Western Pipe & Steel Co. got the business. Other awards included 1250 tons for a medical building in Los Angeles, taken by the Union Iron Works; 2237 tons of cast iron pipe for Portland, Ore., taken by the United States Cast Iron Pipe & Foundry Co., and 1521 tons of cast iron pipe for Spokane, Wash., divided between the latter company and the Pacific States Cast Iron Pipe Co.

Pig Iron.—Inquiries and sales during the week involved small lots only. The market is quiet. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—The only structural steel award of importance, other than the medical building in Los Angeles, mentioned above, was taken by Herrick Iron Works and called for 350 tons for the Women's Athletic Club, Oakland, Cal. Awards during the week totaled 2110 tons. Pending business is of fair proportions, the largest new inquiry involving 270 tons for an apartment house in San Francisco. Plain material is firm at 2.35c., c.i.f. Coast ports.

Plates.—The award of oil storage tanks by the Petroleum Securities Co. involved two 80,000 bbl. and five 21,000 bbl. tanks. In addition, three 100,000 bbl. tanks will be erected, the material for these tanks having been purchased and fabricated over a year ago. The Steel Tank & Pipe Co. sold 250 tons additional for the Port Townsend, Wash., pipe line, bringing the total to 850 tons. Bids will be taken on Jan. 27 for the second unit of this project, involving about 16,000 ft. of 24 in. riveted pipe. Prices continue firm at 2.25c., c.i.f.

Bars.—The largest reinforcing bar award involved 326 tons for the Stony Gorge Dam at Orland, Cal., 281 tons going to the Pacific Coast Steel Co. and the balance to the Laclede Steel Co. Pending business exceeds 6000 tons. Prices in the San Francisco district are by no means firm, and out-of-stock material continues to be quoted around 2.25c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. took 2237 tons of 6 to 12 in. De Lavaud and 18 to 24 in. class B pipe for Portland, Ore. Spokane, Wash., placed 1253 tons of 1¼ to 8 in, class 150 pipe with the Pacific States Cast Iron Pipe Co. and 268 tons of 12 in. class 150 to the United States Cast Iron Pipe & Foundry Co. The Walworth Co. of Oregon took 340 tons of 4 to 12 in. class D pipe for The Dalles, Ore., and Roy & Titcomb, Inc., Tucson, Ariz., secured 373 tons of 2 to 10 in, class B pipe for Nogales, Ariz. The United States Cast Iron Pipe & Foundry Co. was awarded 100 tons of 4 to 10 in. class B pipe. New and pending business includes 1244 tons of 6 to 12 in. class C and D pipe for Vancouver, B. C.; 651 tons of 4 to 12 in. class B for Lafayette, Colo., and 130 tons of 4 to 8 in. class B for Chehalis, Wash. Bids have been opened on 188 tons of 4 to 8 in. class B for Chowchilla, Cal., and on 271 tons of 2 to 10 in. class C pipe for the improvement of Twenty-eighth Street, San Diego, Cal. R. H. Downer, San Diego, was low bidder on 155 tons of 4 to 6 in. class B pipe for the improvement of Boundary Street, San Diego.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Steel Pipe.—Lafayette, Colo., will take bids on Jan. 31 for 146 tons of 4 to 12 in. standard pipe and will also take alternate bids on cast iron pipe.

Coke.—A large shipment of English beehive and by-product coke is due on the Coast next week and will be divided between consumers in the Los Angeles and San Francisco districts. Most of this shipment is to apply against contracts placed some time ago. Demand is fair. Prices are unchanged.

Birmingham

Basic Pig Iron $1 Lower—Plates, Shapes, Bars $1 Higher

BIRMINGHAM, Jan. 24.—New pig iron business is scattered and irregular. There is some tonnage in small lots, but most of the requirements for January and part of February have been placed. Quotations for foundry are still on a $16 base. Basic iron is being quoted by one producer at $15. The other two producers of basic are using their own production. The Tennessee Coal, Iron & Railroad Co. blew out Bessemer No. 1 furnace on Jan. 20. This company is operating only six of 12 blast furnaces. There are now 17 furnaces in blast in Alabama.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Plates, bars and structural shapes have again been advanced $1 per ton. Inquiries are holding up well and new business has been in fair volume. The Tennessee company has placed another open-hearth furnace in operation and now has 12 producing, eight at Ensley and four at Fairfield. The Gulf States Steel Co. continues with four.

Cast Iron Pipe.—Considerable tonnage in prospect from the larger cities is slow in materializing. Dallas, Tex., opened bids last week on a tonnage.

Coke.—Quotations remain at $5. The new by-product unit of the Tennessee Coal, Iron & Railroad Co., consisting of 63 Koppers ovens of the Becker type, will be completed in February.

Old Material.—Buying was a little better last week and more tonnage was moved.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/16-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Better Business in Plates for Oil Tanks —Scrap Is Weaker

ST. LOUIS, Jan. 24.—Sales of pig iron during the last week included 2100 tons, mostly malleable, booked by the Granite City maker, and 1400 tons sold by a leading Southern maker. Melters of malleable are beginning to enter the market. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Another cold wave has brought a revival of buying of domestic grades of coke. Buying of industrial grades is only fair.

Finished Iron and Steel.—The advance of $1 on bars, plates and shapes made by subsidiaries of the United States Steel Corporation and by the Inland Steel Co. is regarded by some interests as stimulating to sales, while others feel that the time is not ripe for higher prices. The Granite City mill, which has not advanced its price on plates, reports a better business on this item as the result of renewed interest in the oil trade. Business is extremely dull with fabricators of structural steel, and operations of their plants in the district are between 40 and 50 per cent of capacity. New reinforcing bar trade is light.

Old Material.—The combination of a halt in buying by consumers and the dumping of a great amount of old material in this market caused a weakness in the market and lower prices. Railroad lists were heavy, and many dealers in the territory contiguous to St. Louis, who had been holding for higher prices, decided to sell at the same time, seeming to sense a break in the market. A leading mill bought a round tonnage of melting steel at the lower prices. Railroad lists include: Chesapeake & Ohio, 5800 tons; Wabash, 1800 tons; Great Northern, 64 carloads; Nickel Plate, 30 carloads; Memphis Street Railway, 300 tons; Chicago, Milwaukee & St. Paul, 1200 tons; Terminal Railway Association (St. Louis), 2800 tons, and Frisco, 17 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.50 to $13.00
No. 1 locomotive tires	14.00 to 14.50
Heavy shoveling steel	12.50 to 13.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	15.00 to 15.50
Bundled sheets	9.00 to 9.50
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	10.50 to 11.00
Cast iron borings	9.25 to 9.75
Iron rails	14.00 to 14.50
Rails for rolling	15.25 to 15.75
Machine shop turnings	8.00 to 8.50
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft.	15.75 to 16.25
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	14.00 to 14.50
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Port Henry-Waterbury Pig Iron Freight Rate Held Reasonable

WASHINGTON, Jan. 24.—The rate of $3.65 per gross ton on pig iron from Port Henry, N. Y., to Waterbury, Conn., is not unreasonable, according to an opinion of the Interstate Commerce Commission made public last Saturday in which it ordered dismissal of a complaint by the Manufacturers' Foundry Co., Waterbury. The complainant sought reparation and a future rate on the basis of the rate of $3.15 from Port Henry to Bridgeport, Conn.

Buffalo

Plates, Shapes and Bars Now $1 Higher at Lackawanna Mill

BUFFALO, Jan. 24.—A Buffalo furnace is understood to have taken 1000 tons of malleable pig iron for the Watertown, N. Y., plant of the New York Air Brake Co. for second quarter delivery. The Worthington Pump & Machinery Corporation has placed 700 or 800 tons, of which about 200 tons was for the Buffalo plant. A New England consumer bought 200 to 300 tons of foundry iron. Inquiry has narrowed to small lots.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—The Bethlehem Steel Co. has announced an advance of $1 a ton on plates, shapes and bars, making its present quotation at the Lackawanna plant 1.95c. for the remainder of the quarter. Inquiry for bars, shapes and plates holds at about the same volume. Sheet inquiry is good, and very little black sheet business is going at less than 2.90c. Automobile body sheets range from 4c. to 4.10c. Sheet mill operation continues at 85 per cent. Wire mills report good shipments of wire cloth and poultry netting. The fence department of the Wickwire company is being moved from Clinton, N. Y., to Buffalo.

Old Material.—There has been a strengthening in prices, headed off by No. 1 heavy melting steel, which is now $15 to $15.50. One of the mills has called for increased shipments and dealers who now have to buy against this old order are paying as much for the scrap as they are receiving. Foundry grades are very quiet and production of turnings and borings is very light.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.25 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.50 to 14.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	11.50 to 12.00
No. 1 busheling	14.00 to 14.50
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25

Acid Open-Hearth Grades

Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	15.75 to 16.00

Electric Furnace Grades

Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00

Blast Furnace Grades

Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	9.00 to 9.50

Rolling Mill Grades

Steel car axles	16.25 to 16.75
No. 1 railroad wrought	12.50 to 13.00

Cupola Grades

No. 1 machinery cast	14.50 to 15.00
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50

Malleable Grades

Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Cincinnati

Slight Increase in Pig Iron Sales—Scrap Market Weaker

CINCINNATI, Jan. 24.—The pig iron market has a better tone. This is evidenced by a slight increase in sales during the past week. While the foundry melt in this district is still at a low point, indications are that operations will expand by the end of the month. Open inquiries are meager, but small-lot buying is being done by many consumers to tide them over the first quarter. At Ironton, Ohio, the one active furnace is reported to be piling considerable iron, and another producer has reduced its stock pile a fair amount in the past few months. The price there remains firm at $19, base furnace. Northern Ohio makers are understood to be selling some iron in southern Ohio at $16.50, base furnace, although there is a more noticeable tendency to quote higher figures. Tennessee and Alabama iron are unchanged at $16, base Birmingham, but sales north of the Ohio River have been unimportant. The movement of silvery iron from Jackson County furnaces is only fair. Prices are steady at $25, base furnace, for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The announcement of an increase of $1 a ton in the prices of bars, structural shapes and plates and the expansion of the demand for sheets have been factors in giving added strength to the finished steel market. There has been an improvement in the position of many small fabricators in the past week, an influx of jobs ranging from 100 tons downward having been responsible for the betterment. However, there has been a noticeable absence of sizable projects, although indications are that several good inquiries will come out within the next few weeks. Sheet consumers are specifying more heavily against first quarter contracts, and the outlook is favorable for continued operations of mills in this territory at a high rate of production. While some of the bookings have been from automobile manufacturers, buying has been well distributed among all consuming industries and jobbers. Prices are holding well in all varieties of sheets except galvanized stock for roofing purposes, in which a deviation from the established quotations have been noted in the South. Local wire jobbers are continuing to receive common wire nails by barge from Ironton, Ohio. Mills are asking $2.55 per keg, base Pittsburgh or Ironton. Sales of cold-rolled bars have increased somewhat, and orders for spikes have been liberal.

Warehouse Business.—There has been an improvement in sales in the past week, and jobbers now are of the opinion that the volume of business in January will exceed that of December. Prices are unchanged.

Coke.—While by-product foundry coke specifications from the automobile industry have been fairly good, the improvement in that direction has been offset by the curtailment of production in jobbing foundries. The result is that shipments in January will be little more than in December. Sales of by-product domestic grades have been about 50 per cent above those of December. The present scale of prices probably will remain undisturbed during February, although no formal announcement has been made.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Signs of weakness have cropped out. Steel mill operations are trending upward slowly, but plants are willing to buy scrap only on an exceptionally desirable basis. A Portsmouth, Ohio, company last week purchased heavy melting steel and cast iron borings at delivered prices of $14.25 and $11.50, respectively. Foundries nearby are taking scattered lots of material, but in the aggregate their consumption has been small.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.75 to $12.25
Scrap rails for melting	12.50 to 13.00
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.50 to 12.00
Short rails	17.00 to 17.50
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	12.25 to 12.75

Canada

Forward Buying of Pig Iron Declines—Scrap Prices Are Weak

TORONTO, ONT., Jan. 24.—Fully 75 per cent of the melters of pig iron are estimated to have covered their requirements for the near future, and the volume of forward buying has declined. Sales during the past week were mostly small lots for prompt shipment. Production of pig iron in Canada has received a setback due to an explosion in No. 3 furnace at the plant of the Algoma Steel Corporation, Sault Ste. Marie, Ont., and until repairs are made the company will have only one furnace in blast. Price shading on pig iron is believed to be less prevalent than last month.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.00
No. 2 foundry, sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Toronto and Montreal scrap markets show very little change. Hamilton, Ont., consumers are taking more interest. Prices are weak, but have not been revised.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Eastern Pig Iron Selling at Low Prices in New England

BOSTON, Jan. 24.—Pig iron sales in New England the past week were not much more than 3000 tons, 90 per cent being by furnaces east of Buffalo. While a firmer tendency is noted in other sections of the country, prices on iron from furnaces east of Buffalo are weaker in New England because of keen competition and varying freight rates. At certain New England points No. 2X has been sold on a delivered basis equivalent to $16.50 a ton furnace, Buffalo, or less. No. 2 plain was offered last week at $21.02 a ton delivered, as against $21.41 for Buffalo iron, while No. 1X is available at $21.40 delivered, contrasted with $21.91 to $22.41 for Buffalo iron and $24.15 for eastern Pennsylvania iron. There is no established basis, for while these low prices prevail, others equivalent or almost equivalent to the full Buffalo furnace quotations have been obtained. A New York furnace took 300 tons, silicon 2 to 2.50, from a New Hampshire machinery manufacturer, against a lower bid from the Mystic stack, which helps to illustrate the mixed condition of the market. Iron sold the past week calls for deliveries running into the second quarter. A Worcester, Mass., plant is expected to close on 1000 tons this week, part No. 2 plain and part No. 2X.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to $21.91
Buffalo, sil. 2.25 to 2.75	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15
East. Penn., sil. 2.25 to 2.75	23.65
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Shapes and Plates.—McClintic-Marshall Co. and the New England Structural Co. jointly have been awarded the fabrication of 15,000 tons of steel for the New England Building to be erected in the Park Square district, Boston. This tonnage is the largest ever awarded in New England for a building. The Bethlehem Steel Co. will furnish the plain material. The market for plates and standard shapes is 1.80c. to 1.85c. per lb., base Pittsburgh.

Coke.—Contrary to intimations made last week by by-product foundry coke interests that a change in price was expected before Feb. 1, it is definitely established the price will remain at $11.50 a ton delivered within a $3.10 freight rate zone until March 1. No improvement in the movement of foundry coke is reported. The price for domestic coke remains at $8.50 a ton ovens, Everett, Mass., or the equivalent.

Cast Iron Pipe.—Watertown, Mass., has placed 1000 tons of 6 to 16-in. pipe with the Warren Foundry & Pipe Co. Massachusetts has purchased 400 tons of 6 to 12-in. pipe from the United States Cast Iron Pipe & Foundry Co. for a hospital. Medford, Mass., has placed 250 tons of 6 to 12-in. pipe with R. D. Wood & Co. Malden, Mass., closes bids today on 300 tons of pipe, various sizes. Stone & Webster, Inc., has yet to close on 2000 tons of gas pipe for its 1928 requirements. Private water pipe business continues quite brisk. For large pipe the market remains unsettled. On private business 4-in. pipe is selling at $45.10 to $46.10 a ton, delivered common Boston freight rate points, and 6 to 12-in. at $41.10 to $42.10. The usual $5 differential is asked on class A and gas pipe.

Cold-Rolled Strip Steel.—Sales have quickened somewhat for deliveries extending late into the first quarter. The undertone of the market is firmer.

Imports.—Receipts of pig iron at Boston for the first half of January were 1282 tons, made up of 750 tons of English, 237 tons of Dutch and 295 tons of Indian. Imports in the first half of December were 594 tons.

Mill Prices on Cold-Rolled Strip in North Atlantic States: In 1 to 3-ton lots, 3.25c. per lb., base Pittsburgh, and also, 3.25c. to 3.40c. per lb., base Worcester, Mass.

Old Material.—Old material is slightly more active. With the exception of scrap rails, which are about 25c. a ton cheaper, scrap prices are holding and in some instances are firmer. Skeleton the past week moved more freely, generally at $6 to $6.50 on cars shipping point, and in at least one instance at $7, and this statement applies also to forge flashings. Pipe is more active and 50c. a ton higher. Steel turnings generally are selling at $6 to $6.50 a ton on cars, but one broker is paying $6.10. The shafting market, dull a week ago at $13 to $13.50 a ton because of the withdrawal of a Maine mill from the market, today is $13.25 to $14 for Pennsylvania delivery. For New England delivery, there is an abundance of textile machinery cast at $14 to $15 a ton delivered, with $14 to $14.50 having been paid. No. 1 machinery cast was sold the past week at $16 a ton, delivered on a high freight rate, whereas the average transaction is at $14.50 or $15. A Massachusetts brake shoe maker is paying $11 a ton for stove plate. The Boston & Maine Railroad closed bids today on 80 cars of miscellaneous material.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.25
Scrap rails	8.50 to 8.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	6.00 to 6.50
Forge flashings	6.00 to 6.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.00 to 10.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	11.00
Railroad malleable	13.00 to 13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3,365c.
Tees	3.365c.
Zees	3.465c.
Soft Steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

The American Demag Corporation, 310 South Michigan Avenue, Chicago, was recently incorporated to sell in the United States the products of the Demag Co., Duisburg, Germany. The German company is a leading builder of steel plants, rolling mills, seamless tube mills, cold drawing machinery and harbor dock equipment in Europe. It recently acquired the Thyssen Machine Co., builder of heavy mill machinery and gas engines. H. A. Brassert & Co., Chicago, are affiliated with the American corporation and K. W. Atwater, who has been one of the American representatives of the German company, is vice-president.

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Pacific Northwest

Expected Improvement in Steel Business Slow to Develop

SEATTLE, Jan. 20 (*By Air Mail*).—The increase in steel orders expected this month has failed to materialize, and conditions in the local steel trade are quiet. While the outlook is hopeful there is nothing in sight to indicate when conditions will improve.

Pig Iron.—Sales are few and involve small lots only. Prices remain unchanged. Utah No. 2 foundry and basic are quoted at $24 to $25 per gross ton, Seattle delivery.

Plates and Shapes.—The local market is very quiet. The only worthwhile jobs placed in the past week were 1000 tons of shapes for the new plant of the Union Bag & Paper Co. at Tacoma, taken by the United States Steel Products Co. and 672 tons for the Argo crossing in Seattle. Much new work is in sight, but it is very slow in coming out. Shapes are quoted at 2.30c. and plates at 2.25c., Seattle delivery.

Sheets.—Demand is very quiet for black and blue annealed, but for galvanized is fairly active. Prices are unchanged: No. 24 galvanized at 4.35c.; No. 24 black, 3.50c., and Nos. 9 and 10 blue annealed, 2.75c., Seattle.

Bars.—New work is entirely in small lots, but a good deal is in sight which may not be placed for some time. The new Bon Marche store, the Beacon Hill tunnel, two large apartments and additions to the Elks' Temple and the Olympic Hotel will take 5000 tons or more. Prices range from 1.85c. to 2.25c., depending on the size and desirability of the order.

Hoops and Bands.—Foreign hoops have been sold for delivery at nearby consuming points at $3 per ton or more below domestic prices. Domestic hoops and bands are quoted at 2.73c., Seattle.

Detroit Scrap Market Weak; Pig Iron Shipments Large

DETROIT, Jan. 24.—Prices on old material in this district have not changed during the past week, but the tone of the market is slightly weaker. This has no doubt been brought about by high operations at producing plants and also because mills and furnaces have not bought as heavily or as far in the future as was expected.

Pig iron shipments are on a high basis with indications that the February melt will be above that of January.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling Steel	$12.00 to $12.50
Boring and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	16.00 to 17.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.75 to 11.25
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Navy Department Awards Steel

WASHINGTON, Jan. 24.—The Carnegie Steel Co. has been awarded the contracts to furnish 2317 tons of special treatment plates and 110 tons of shapes for modernization of the battleships Oklahoma and Nevada. The Pacific Coast Steel Co. has been awarded a contract to supply 137 tons of shapes and the Bethlehem Steel Co. 102 tons of shapes for light cruisers Nos. 28 and 29. There are additional small tonnages still to be awarded for the latter two ships.

Carnegie Steel Co. Making Floor Plate

The Carnegie Steel Co. has engaged in the manufacture of floor plate of the raised pattern type which is furnished in thicknesses ranging from 3/16 to 3/4 in. and in widths to 66 in.

FEWER CASTINGS IN 1927

Bookings 12 Per Cent Below 1926 for Commercial Steel Castings—Output Down 16 Per Cent

WASHINGTON, Jan. 24.—Showing an increase of 14,025 tons, orders for commercial steel castings totaled 74,939 tons in December, against 60,914 tons in November. For the 12 months they aggregated 875,146 tons, compared with 996,266 tons in 1926, according to reports received by the Department of Commerce from 123 manufacturers. Production in December amounted to 56,414 tons, against 56,935 tons in November. For the year the total was 920,657 tons, compared with 1,095,166 tons in 1926.

Bookings in December represented 56 per cent of capacity, against 46 per cent in November. Of the December bookings, 38,266 tons was for railroad specialties, representing 64 per cent of this class of capacity, against 26,752 tons, or 45 per cent, in November. Bookings of railroad castings for the year amounted to 358,422 tons, or 50 per cent of capacity, against 382,478 tons, or 53 per cent, in 1926. Bookings of miscellaneous castings in December totaled 36,673 tons, or 50 per cent of capacity, against 34,162 tons, or 47 per cent, in November. For the year, bookings of miscellaneous castings totaled 516,724 tons, or 43 per cent of capacity, compared with 613,788 tons, or 70 per cent, in 1926.

Of the December output 18,671 tons was in railroad specialties, representing 31 per cent of capacity, against 18,046 tons, or 30 per cent of capacity, in November. Production of railroad specialties last year aggregated 343,716 tons, or 48 per cent of capacity, against 403,416 tons, or 56 per cent, the year previous. Production of miscellaneous castings in December amounted to 37,743 tons, or 52 per cent of capacity, against 38,889 tons, or 53 per cent, in November. Nineteen hundred and twenty-seven production of this kind of castings totaled 576,941 tons, or 66 per cent of capacity, against 691,750 tons, or 79 per cent, in 1926.

Obermayer Contest for Foundry Devices Announced for 1928

The 1928 Obermayer prize of the American Foundrymen's Association will be given to the person submitting a device, drawing or model of some jig or method, which, in the opinion of the judges, embodies the best ideas for economical production of castings. The entries in this prize contest will be on display at the Philadelphia meeting the week of May 14. Devices which have been prize winners in the past were:

Rochester meeting, 1922: A fixture for making green sand cores of two fittings in a single box.

Cleveland meeting, 1923: A device used in making 12-in. chilled mine car wheels.

Milwaukee meeting, 1924: A roller gagger and core rod mold former.

Syracuse meeting, 1924: A continuous device for recording temperatures of iron at the cupola spout.

Detroit meeting, 1926: A safety device for raising cupola drop bottom doors.

Those who contemplate entering this contest should notify the secretary of the American Foundrymen's Association, 140 South Dearborn Street, Chicago.

Record Production of Portland Cement

Production of Portland cement in the United States in 1927 is reported by the Bureau of Mines at 171,908,000 bbl. This is an increase of about 4½ per cent over the 1926 production of 164,530,000 bbl. Each in turn was a new high record. Nearly one-quarter of the entire amount came from eastern Pennsylvania, New Jersey and Maryland, which produced slightly less than in 1926, when the contribution of this area was a little more than one-quarter of the total.

Production reached a peak in August, 1927, at 18,315,000 bbl. This was about 7 per cent ahead of the highest month of 1926, which was July, with 17,134,000 bbl. Five months of 1927 exceeded the largest month of any previous year.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Jan. 24	Jan. 23	Jan. 21	Jan. 20	Jan. 19	Jan. 18
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.87½	13.75	13.75	13.75	13.75	13.80
Straits tin, spot, N. Y.	55.37½	55.62½	....	55.00	54.50	54.37½
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.30	6.30	6.30	6.30	6.30	6.30
Zinc, New York	6.00	6.00	5.95	5.95	5.97½	5.97½
Zinc, St. Louis	5.65	5.65	5.60	5.60	5.62½	5.62½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Jan. 24.—Practically all of the markets are quiet but firm. Concessions in copper have practically disappeared and export sales have increased. Some activity in tin has developed, with prices a little higher. The lead market is unchanged. Some strength has appeared in zinc after a week of lower prices.

Copper.—Sales yesterday and today of considerable electrolytic copper for export have somewhat changed the complexion of the market. A few custom smelters, who were shading the price of leading producers, have practically ceased such tactics and the market is virtually on a basis of 14.12½c., delivered in the Connecticut Valley. Sales during the week, as low as 14c., delivered, are noted, but the volume was not large. There were also some sales at the price of leading producers. Export demand amounted to about 2500 tons Monday, and today it was expected that this total would be equalled, Germany being the principal buyer. As a result of the export demand, inquiry from domestic consumers has become somewhat more lively. The official quotation of Copper Exporters, Inc., is unchanged at 14.50c. c.i.f. usual European ports. A fair business has been done in Lake copper recently and the quotation is unchanged at 14.25c., delivered, with some sales at 14.30c.

Tin.—Sales for the week ended Saturday, Jan. 21, were about 1200 tons. The business consisted mostly of trading between dealers, consumers being quite inactive. Some London houses were anxious for orders and pressed hard to obtain business. Most of the week the market was sluggish and heavy despite the fair amount of business done. Prices in the week have advanced, although transactions yesterday and today have been in very moderate volume. Spot Straits tin was quoted today 55.37½c., New York. Arrivals thus far this month have been 4015 tons, with 5675 tons reported afloat.

Lead.—The market has been moderately active and a fair business has been done for January and early February delivery. The quotation of the leading interest is unchanged at 6.50c., New York. Prices in the outside market are 6.30c., St. Louis, although during the last week some resale metal changed hands as low as 6.25c.

Zinc.—Yesterday and today the market for prime Western zinc is a little stronger, following quotations last week which, at 5.60c., St. Louis, were equal to the low level of 1927. Partly because of better conditions in the ore district, quotations yesterday and today were on a basis of 5.65c., St. Louis. Although the price of ore is still $36, Joplin, production and sales were each about 12,000 tons last week. Producers of zinc report a fair amount of inquiry and business.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—A fairly large consuming demand recently is reported, but market quotations are practically unchanged for Chinese metal at 11c. for spot and 11.25c. for futures, New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots is quoted 23.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 24.—A fair volume of business is being transacted in all commodities except lead. Inquiry

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	57.50c. to 58.50c.
Tin, bar	59.50c. to 60.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	60.50c.
Tin, bar	62.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	65.25c.
Solder, ½ and ½	36.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

No changes in mill prices of bronze, brass and copper products have occurred since the advances of Dec. 5. Zinc sheets and lead full sheets have not changed since Aug. 5 and Dec. 1, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machne rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

for zinc for delivery in March and April is brisk. The old metal market is dull and prices are weak.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 56.75c.; lead, 6.35c.; zinc, 5.70c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.25c.; pewter, No. 1, 34c.; tin foil, 40c.; block tin, 50c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 9500 Tons Include 8000 Tons For Plants in Chicago and Boston

Awards of more than 9500 tons included 5000 tons for the Boston-Cambridge, Mass., plants of Sears, Roebuck & Co. and 3000 tons for the Campbell Soup Co. plant in Chicago. New projects reported totaled only about 900 tons, less than any week since the first of the year. Included in new business was 400 tons for an apartment building in Chicago. Awards follow:

BOSTON-CAMBRIDGE, 5000 tons, Sears, Roebuck & Co. plants, to Concrete Steel Co.

PROVIDENCE, R. I., 125 tons, Court House, to Truscon Steel Co.

ROCHESTER, N. Y., 180 tons, State hospital, to unnamed local contractor.

PITTSBURGH, 360 tons, Grant Building; 160 tons to Truscon Steel Co., and 200 tons to Carlem Engineering Co.

CHICAGO, 3000 tons of rail steel bars, plant for Campbell Soup Co., to Calumet Steel Co.

MARSHALLTOWN, IOWA, 200 tons, hotel, to Concrete Engineering Co.

ST. LOUIS, 220 tons, apartment buildings, to Laclede Steel Co.

ORLAND, CAL., 326 tons, Stony Gorge dam; 281 tons to Pacific Coast Steel Co., and 45 tons to Laclede Steel Co.

SEATTLE, 100 tons, Bartell Drug Co., to Pacific Coast Steel Co.

SEATTLE, 110 tons, Queen Anne High School addition, to Pacific Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BUFFALO, 100 tons, seven County bridges; bids opened Feb. 7.

CHICAGO, 400 tons, apartment building at 222 Chestnut Avenue.

RIVERSIDE, CAL., 120 tons, Victoria Avenue bridge; bids opened.

SEATTLE, WASH., 2500 tons, Bon Marche department store; bids soon.

SEATTLE, 1000 tons, Weaver Street bridge; bids being taken.

SEATTLE, 1000 tons, Beacon Hill tunnel; bids being taken.

ELYRIA, OHIO, 300 tons, sewage disposal plant.

Total apparent consumption of babbitt metal in 1927 was 60,111,843 lb., as against 65,934,782 lb. in 1926, according to reports received by the Department of Commerce from 31 firms. Sales by manufacturers in 1927 amounted to 47,003,959 lb., and consumption by producers to 13,107,884 lb., comparing with 50,555,110 lb. and 15,379,672 lb. respectively in 1926. Total apparent consumption in December was 4,465,787 lb., compared with 4,505,954 lb. in November.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	9.75c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	8.75c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

RAILROAD EQUIPMENT

Inquiries for About 500 Cars But Orders Are For Minor Lots

Although expectations are that railroad equipment buying will show a new spurt soon, the week's business amounted only to a few small purchases and inquiries for about 500 cars. Details follow:

Government of Siam has ordered eight locomotives from Baldwin Locomotive Works.

Wilson & Co., Chicago, have made inquiry for 300 40-ton refrigerator cars.

Northern Pacific has ordered 50 caboose car underframes from Siems-Stembel Co.

Western Lumber Co. has ordered one Prairie-type locomotive from Baldwin Locomotive Works.

Great Northern has placed an order for eight 30-cu. yd. air-dump cars with Koppel Industrial Car & Equipment Co.

Sloss-Sheffield Steel & Iron Co. has ordered one consolidation type locomotive from Baldwin Locomotive works.

Toronto, Hamilton & Buffalo has placed an order for two 2-8-4-type locomotives with Montreal works of American Locomotive Co.

Texas & Pacific has ordered two business cars from American Car & Foundry Co.

Southern Railway has ordered one baggage and mail car from Bethlehem Steel Co., in addition to 25 cars reported some time ago.

Standard Oil Co. of New Jersey is inquiring for 12 all-steel 50-ton box cars.

Republic Iron & Steel Co. is inquiring for 50 70-ton gondola car bodies.

Manila Railroad has ordered 50 flat cars from Gregg Co. and has made inquiry for 50 box cars.

Lake Superior & Ishpeming will buy 250 ore cars.

New York, Westchester & Boston Railway has ordered 10 additional electric passenger cars from Westinghouse Electric & Mfg. Co.

Universal Pipe & Radiator Co. Plans Expansion

The Universal Pipe & Radiator Co., 420 Lexington Avenue, New York, has proposed to its stockholders an increase in the authorized common stock of the company from 400,000 to 3,000,000 shares, for the reported purpose of acquiring additional properties. In a letter to the stockholders of the company calling a special meeting for Feb. 15, President Louis B. Ladoux said in part:

> In connection with the rapid growth of the business of your company, the management has for the past few years pursued a policy of diversification with the idea of offsetting the seasonal fluctuations in the building and allied trades. In line with this policy, the business of the company has recently been extended to include through its subsidiaries, the manufacture of railroad brake shoes, the operation of by-product ovens and the manufacture of artificial stone for ornamental purposes. Plans for further expansion are being considered which, if consummated, would greatly strengthen your company.

The Universal Pipe & Radiator Co. was incorporated in 1923 to take over the properties of the Iron Products Corporation, the Central Foundry Co. and the Central Radiator Co. It is also the holding company of the Essex Foundry Co., Newark, N. J., the Molby Boiler Co., Lansdale, Pa., and the Chattanooga Iron & Coal Corporation, Chattanooga, Tenn.

FABRICATED STRUCTURAL STEEL

Cleveland Award of 57,800 Tons Brings Week's Total to 103,000 Tons

Marked by two structural steel awards of unusual size, 57,800 tons for the Cleveland Union Terminals, Cleveland, and 15,000 tons for a building in Boston, the week's total of fabricated steel contracts exceeded 103,000 tons. Other outstanding awards were 8000 tons for a bank building in Chicago and 7000 tons for subway work in New York. Awards follow:

ALLERTON, N. J., 350 tons, Packers' Island bridge for New Jersey State Highway Commission, to Phoenix Bridge Co.

PHILADELPHIA, 115 tons, Fern Rock Terminal for Department of City Transit, to Montgomery Iron & Steel Co.

CLEVELAND, 57,800 tons, railroad station, department store building, garage and Huron Road viaduct, as part of Cleveland Union Terminals project, to American Bridge Co.

BOSTON, 15,000 tons, New England Building, to McClintic-Marshall Co. and New England Structural Co.

NEW YORK, 900 tons, tunnel shields for Fulton Street tunnel, to Biggs Boiler Works Co., Akron, Ohio.

NEW YORK, 7000 tons, section 13, route 107 of subway, to McClintic-Marshall Co.

NEW YORK, 700 tons, apartment building on East Twenty-second Street, to Easton Structural Steel Co.

NEW YORK, 700 tons, apartment building on Forty-third Street, to Harris Structural Steel Co.

NEW YORK, 550 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: Office building at Franklin Avenue and Fifteenth Street, Flushing; apartment building on Scotland Road, East Orange, State Bank at Eighth Avenue and Forty-third Street and inclosures for sledge beds for Barnes Engineering Co. at Lodi, N. J., to Lehigh Structural Steel Co

FLUSHING, N. Y., 200 tons, apartment building, to an unnamed fabricator.

STATE OF NEW JERSEY, 150 tons, highway bridge, to Bethlehem Steel Co.

BALTIMORE & OHIO RAILROAD, 1500 tons, bridges at Philadelphia, to Shoemaker Bridge Co.

NEW YORK CENTRAL RAILROAD, 750 tons, bridges in Indiana; 250 tons to Fort Pitt Bridge Works, and 500 tons to Bethlehem Steel Co.

BUFFALO, 500 tons, marine towers for Hecker-Jones-Jewell flour mill, to Kellogg Structural Steel Co.

CHICAGO, 8000 tons, Forman National Bank building, to Hansell-Elcock Co., local.

CHICAGO, MILWAUKEE & ST. PAUL RAILROAD, 250 tons, girder spans, to American Bridge Co.

LA CROSSE, WIS., 400 tons, highway bridge, to McClintic-Marshall Co.

CHIPPEWA FALLS, WIS., 400 tons, power house gates for Northern States Power Co., to Minneapolis Steel & Machinery Co.

COLUMBIA, MO., 100 tons, Columbia Theater, to St. Louis Structural Steel Co.

NILES FERRY, TENN., 300 tons, bridge for Tennessee Highway Commission, to St. Louis Structural Steel Co.

STATE OF TEXAS, 500 tons, highway bridge across Brazos River, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

BILLINGS, MONT., 300 tons, bridge over Snake River at Swan Valley, to unnamed fabricator.

LOS ANGELES, 1250 tons, Medical Building, to Union Iron Works.

OAKLAND, CAL., 350 tons, Women's Athletic Club, to Herrick Iron Works.

RICHMOND, CAL., 1000 tons, plates and shapes for two 80,000 and five 21,000-bbl. tanks for Petroleum Securities Co., to Western Pipe & Steel Co.

FRESNO, CAL., 2500 tons, building for Western Fruit Exchange Co., to Minneapolis Steel & Machinery Co.

STEGE, CAL., 110 tons, plant for Western Industries, Inc., to Jansen Iron Works.

OLYMPIA, WASH., 100 tons, bridge over Nooksack River, Whatcom County, to Wallace Bridge & Structural Steel Co.

PORT TOWNSEND, WASH., 250 tons of additional plates for pipe line, to Steel Tank & Pipe Co.

TACOMA, WASH., 1200 tons, for Pacific Bag & Paper Co., to United States Steel Products Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 150 tons, bank and office building, Sixteenth and Locust Streets.

PHILADELPHIA, 250 tons, telephone building, Seventeenth and Tioga Streets.

PHILADELPHIA, 250 tons, Ninth Bank and Trust Co. building.

PHILADELPHIA, 150 tons, addition for West Philadelphia Title & Trust Co.

PHILADELPHIA, 500 tons, Northeastern Title & Trust Co. building; general contract to Frank G. Stewart, local.

BUFFALO, 200 tons, three Erie County bridges.

ERIE, PA., 600 tons, factory extension for J. A. Zurn Co.

CLEVELAND, 200 tons, laboratory for American Gas Association.

CLEVELAND, 100 tons, Kresge store building.

CLEVELAND, 200 tons, Steel Improvement & Forge Co., factory building.

LEXINGTON, KY., tonnage unstated, memorial building for University of Kentucky.

STATE OF NEW HAMPSHIRE, 1000 tons, highway bridges.

BOSTON, 150 tons, highway bridge for city.

NEW YORK, 700 tons, chapel for Fordham University.

EAST ORANGE, N. J., 200 tons, municipal building.

ALBANY, N. Y., 500 tons, garage.

ROCHESTER, N. Y., 175 tons, State Hospital.

GARY, IND., 700 tons, Lake County Court House.

CHICAGO, 4500 tons, Steuben Club.

CHICAGO, 2400 tons, office building at Jackson Boulevard and Franklin Street.

CHICAGO, 700 tons, Home Syndicate Garage.

PEKIN, ILL., 1700 tons, bridge across Illinois River.

BLOOMINGTON, IND., 700 tons, building for University of Indiana.

MILWAUKEE, 7000 tons, Sixteenth Street viaduct, with bascule span; bids close Feb. 10 on fabrication and delivery only; bids on erection later.

BOISE, IDAHO, 233 tons, bridge over Clark Fork River, Sanders County; bids in.

SAN FRANCISCO, 270 tons, apartment building, Pacific and Laguna Streets; bids being taken.

FABRICATED STEEL PLATES

Bookings 3 Per Cent Lower in 1927—Gains in Oil Storage Tanks Offset Elsewhere

WASHINGTON, Jan. 24.—Bookings of fabricated steel plates totaled 497,697 tons in 1927, representing 51.5 per cent of capacity, against 513,913 tons or 51.9 per cent in 1926, according to reports made to the Department of Commerce by 51 firms. Of the 1927 orders, 210,974 tons were for oil storage tanks, comparing with 175,367 tons in the preceding year; 26,364 tons for refinery materials and equipment, as against 36,829 tons; 42,905 tons for tank cars, as against 42,938 tons; 39,212 tons for gas holders, as compared with 47,524 tons; 6924 tons for blast furnaces, as against 14,406 tons; and 171,318 tons for stacks and miscellaneous purposes, as against 196,849 tons.

Bookings in December totaled 35,648 tons, or 44.1 per cent of capacity, comparing with 27,341 tons, or 33.8 per cent of capacity in November.

Shipments in December were 42,694 tons, as compared with 37,986 in November. Production in December amounted to 47,876 tons, against 40,845 tons in November. The December monthly capacity was 100,685 tons, with 47.6 per cent operated, as against 100,778 tons, or 40.5 per cent, operated in November.

December bookings were distributed as follows: Oil storage tanks, 13,367 tons; refinery materials and equipment, 1554 tons; tank cars, 3764 tons; gas holders, 3490 tons; blast furnaces, 385 tons; stacks and miscellaneous, 13,085 tons.

Plan World Congress of Engineers

More than 75 prominent engineers have accepted membership on the American committee of the World Congress of Engineers, to be held in Tokio, Japan, in November, 1929. Dr. Elmer A. Sperry, chairman of the division of engineering of the National Research Council, is chairman of the permanent committee and Secretary of Commerce Hoover is honorary chairman. Maurice Holland, secretary of the research council's division of engineering, is secretary of the American committee.

Advancement of international cooperation in the study of engineering science and problems, and stimulation of a sense of brotherhood among the engineers of the world are the announced purposes of the congress.

PERSONAL

Charles E. Stuart has resigned as president, treasurer and a director of the Central Alloy Steel Corporation, Massillon, Ohio, and has been succeeded by B. F. Fairless, formerly vice-president and general manager. S. S. French has been elected a director to succeed Mr. Stuart on the board and will become vice-president and treasurer. Mr. French will continue as president of the Berger Mfg. Co. division of the corporation. Mr. Stuart was one of the two organizers of the Central Steel Co., Massillon, Ohio, in 1914, and became its secretary and treasurer. Later he was made vice-president and in 1926 succeeded F. J. Griffith as president, the latter becoming chairman of the board. When the Central Steel Co. and the United Alloy Steel Corporation were merged later in the same year as the Central Alloy Steel Corporation, Messrs. Stuart and Griffith retained the same official positions with the new organization that they had held with the Central Steel Co. Mr. Fairless, after his graduation at Ohio State University, taught school for a time and went with the Central Steel Co. at the time of its organization, as a civil engineer. He worked his way up to the position of vice-president and general manager. After the merger he became vice-president and general manager of the new corporation and in the latter capacity had charge of operations of both the Massillon and Canton plants. He will continue as general manager of the company.

B. F. FAIRLESS

Laurence Thompson has resigned as Cleveland district manager of the United States Electrical Tool Co., Cincinnati, to become Cleveland district engineer for the New Haven Sand Blast Co., New Haven, Conn. After Feb. 1 he will be located at 355 Erie Building.

C. E. Stuart, who resigned recently as president of the Central Alloy Steel Corporation, Massillon, Ohio, and W. H. Crawford, secretary of the Reliance Mfg. Co., Massillon, sailed from New York Jan. 25 for an extended Mediterranean cruise.

Milton H. Pettit, vice-president Nash Motors Co., Kenosha, Wis., has been appointed general manager of the company. He joined the Nash organization as a vice-president in charge of plants and production, July 1, 1926, having previously served in the same capacity with the Simmons Co., Kenosha.

John A. Coe, president of the American Brass Co., Waterbury, Conn., has been made president of the Waterbury Savings Bank to succeed the late Robert F. Griggs.

Robert W. Adams, manager of the Providence, R. I., office of the General Electric Co., was the speaker last week before the Worcester, Mass., section of the American Institute of Electrical Engineers.

Thornton E. Stokes, for the past two years Southern sales manager of the Lawrenceburg Roller Mills Co., Lawrenceburg, Ind., has been made sales promotion manager for the Continental Steel Corporation, Kokomo, Ind.

Earl A. Emerson, vice-president of the Armco International Corporation, Middletown, Ohio, has been elected president of the Foreign Trade Association of the Cincinnati Chamber of Commerce. He succeeds Charles D. Oesterlein, vice-president and general manager of the Oesterlein Machine Co., who becomes a member of the board of directors. The association also elected H. G. Moebus, export manager of the Andrews Steel Co., as vice-president, and Robert S. Alter, vice-president of the American Tool Works Co., as a member of the board of directors.

R. C. Storch, traffic manager of the R. K. LeBlond Machine Tool Co., Cincinnati, has been elected secretary and treasurer of the newly organized Greater Cincinnati Freight Association.

Howard W. Edwards, treasurer of the Edwards Mfg. Co., Cincinnati, maker of sheet metal products, has been named second vice-president of the Cincinnati Chamber of Commerce.

William Reis has been appointed purchasing agent of the R. K. LeBlond Machine Tool Co., Cincinnati, succeeding the late F. W. Weimann. Mr. Reis has been associated with the purchasing department of the company for a number of years.

William C. Oberg, for the past nine years superintendent of the roll department, Homestead works, Carnegie Steel Co., has been appointed to a newly created position of superintendent of roll departments, with jurisdiction over the roll shops in the several plants of the company. Mr. Oberg will make his headquarters at the company's general offices in Pittsburgh. He was a roll designer at the Homestead works before his promotion to the superintendency of the shop, and joined the Carnegie company after having been with the Pittsburgh Rolls Corporation for several years.

Philip E. Bliss, since 1923 vice-president of the Warner & Swasey Co., manufacturer of turret lathes and screw machines, Cleveland, has been elected president, succeeding Col. Frank A. Scott, who has been made chairman of the board. Ambrose Swasey and Worcester R. Warner have alternated as chairman for a number of years and will continue to participate actively in the company's management as directors. They recently passed their eighty-first birthdays. Mr. Bliss has been associated with the company for 18 years and has served in practically all of its departments. He was cashier and later auditor, and in 1917 was made treasurer, holding that position until he became executive vice-president in 1923. He was born in Cleveland in 1885 and attended Ohio Wesleyan University, Delaware, Ohio. He has taken an active interest in the National Machine Tool Builders' Association, and last September was elected its president. He is a member of the Society of Automotive Engineers and of the Cleveland Engineering Society.

PHILIP E. BLISS

C. E. Luttrell, for five years manager of the Knight-Luttrell Iron Co., Atlanta, Ga., has been placed in charge of the iron and steel department of Thomas F. Seitzinger's Sons, Atlanta, dealers in iron, steel and metals.

H. C. Atkins, president E. C. Atkins & Co., saw manufacturers, Indianapolis, and other officials of the company entertained the Atkins Pioneers, an organization of old-time employees of the company, at dinner at the Hotel Severin, Indianapolis, Saturday night, Jan. 14. The Atkins Pioneers was organized in 1906, with 62 charter members who had served the company 20 years or more, and it now has 228 male members and a women's auxiliary consisting of 18 members who have served 10 years or more. At the dinner there were talks by H. C. Atkins, who is honorary president of the Atkins Pioneers, and by William J. Strack and C. A. Newport, president and secretary respectively of the Pioneers, and also by W. A. Atkins, general factory director of E. C. Atkins & Co.

Harold E. Boyd has resigned as employment manager of the Republic Metalware Co., Buffalo, and as lecturer in industrial management in the evening session of the University of Buffalo, to become industrial engineer with the Nashua Gummed & Coated Paper Co., Nashua, N. H. During his 11 years with the Republic company, Mr. Boyd held the positions of time study man, head time study man, educational supervisor, efficiency engineer, assistant to general manager and office manager.

VICTOR WINDETT

Victor Windett, newly appointed manager of the gas producer division of the Wellman-Seaver-Morgan Co., Cleveland, as announced in THE IRON AGE last week, has been engineer of that division since 1917. He is a graduate in mechanical engineering of the Massachusetts Institute of Technology. Following his college course, he was connected with the Illinois Steel Co., Chicago, in operating and engineering work and designed and supervised the construction of that company's ore docks. As Chicago representative of Julian Kennedy, blast furnace engineer, he superintended the building of the Lake Shore plant of the Iroquois Iron Co. Later he was resident engineer of the American Coke & Gas Construction Co. in the building of the Otto Hoffman coke oven plant at Mayville, Wis., for the Northwestern Iron Co. He spent some time as engineer and contractor at New Orleans and in other points in Louisiana on drainage, water, sewerage and levee construction work, in the Chicago district on various public work, including harbor and bridge work, and on the United States locks at Sault Ste. Marie, Mich. During the World War he supervised the building of open-hearth furnaces at the Watertown, Mass., arsenal for the Wellman-Seaver-Morgan Co. and of sulphuric acid plants at Cuba City and at New Diggings, Wis., for the Leonard Construction Co., Chicago.

W. B. Speirs, formerly associated with the Delaware, Lackawanna & Western Railroad in various capacities, has been appointed district manager of the Newark, N. J., office of the Elwell-Parker Electric Co., Cleveland. He succeeds D. D. Ritson. The company's Newark office is in the Military Park Building.

Ires Prosser has been appointed Southeastern representative of the Botfield Refractories Co., Philadelphia. His territory will extend from North Carolina to San Antonio, Tex., and his headquarters will be at Atlanta, Ga.

E. R. Goldapp, associated for 12 years with the Portland Wire & Iron Works, Portland, Ore., has been made manager of the company. He takes over the duties of T. Harry Banfield, who has succeeded the late C. J. Parker in the management of the Parker-Banfield Co., owner of the Portland Wire & Iron Works. Before becoming associated with the latter company, Mr. Goldapp was identified with the Portland Sheet Metal Works, Portland.

J. B. Cooper, formerly in the Los Angeles office of the Allis-Chalmers Mfg. Co., Milwaukee, has been placed in charge of a new district sales office opened by the company at 308 Heard Building, Phoenix, Ariz. His territory will include Arizona, New Mexico and northern Mexico. The company also has opened a branch office at 619 Frost National Bank Building, San Antonio, Tex., in charge of Earle R. Hury. G. C. Culver is manager of another new office at Grand Rapids, Mich.

Daniel W. Northup, president Henry G. Thompson & Son Co., New Haven, Conn., has been elected president of the recently organized Hack Saw Manufacturers' Association of America. The association is now working, under the auspices of the Department of Commerce, for the improvement of conditions in the industry.

Dr. Thomas Stockham Baker, president Carnegie Institute of Technology, Pittsburgh, will spend six weeks in Europe during February and March in the interests of the organization of the second International Conference on Bituminous Coal, to be held at Pittsburgh the week of Nov. 29.

Charles Pasche, secretary and treasurer Davenport Locomotive & Mfg. Corporation, Davenport, Iowa, has been elected president of the company, succeeding E. Parmly, Jr., and will also continue as its treasurer. Mr. Pasche has been associated with the company since 1901.

Frank W. Gorman, formerly with the Mine & Smelter Supply Co., El Paso, Tex., has been appointed district sales representative at El Paso for the Ohio Brass Co., Mansfield, Ohio. He succeeds L. M. Keating, who has been transferred to the general sales department at Mansfield.

Joseph H. Donberg, recently with Louis E. Emerson & Co., Chicago, machinery dealers, has organized his own company under the name of Joseph H. Donberg & Co., with temporary quarters at 1426 South Harding Avenue, Chicago. The company will deal in new and used machine tools and equipment.

C. M. MacChesney has been elected secretary of the Acme Steel Co., Chicago, succeeding Donald MacMurray, who was vice-president and secretary. Mr. MacMurray remains vice-president. L. H, Whiting has been elected a director of the company, succeeding H. G. Merrill, resigned.

Myron C. Taylor, chairman of the finance committee of the United States Steel Corporation, has been elected vice-president of the New York Genealogical and Biographical Society to take the place of the late Elbert H. Gary, who held the position for many years.

Dr. W. R. Ingalls, director of the American Bureau of Metal Statistics, 115 Broadway, New York, sailed recently for Europe on a professional trip. He will return about April 1.

E. H. Wachs, since 1911 secretary of the Stocker-Rumely-Wachs Co., 117 North Jefferson Street, Chicago, dealer in machine tools, and C. R. Gregg, until recently in charge of machinery sales in the Chicago district for Joseph T. Ryerson & Son, Inc., are now managing the Stocker-Rumely-Wachs Co.

William Butterworth, president Deere & Co., Moline, Ill., who left this week for a trip to the Hawaiian Islands, will be speaker at a meeting of the Western division of the Chamber of Commerce of the United States in Honolulu. Mr. Butterworth is vice-president of the United States Chamber.

Total exports from the United States in 1927 were valued at $4,866,160,000 and imports at $4,184,453,000, according to the Department of Commerce. Exports were higher and imports lower than in 1926.

OBITUARY

Edward Larned Ryerson, chairman of the board of Joseph T. Ryerson & Son, Inc., Chicago, died on Jan. 19 at his home in that city. Death followed a stroke of apoplexy which he suffered on Jan. 14. He was the youngest son of Joseph Turner Ryerson, founder of the firm which bears that name, and was born in Chicago Nov. 24, 1854. After graduation in 1876 from the Sheffield Scientific School of Yale University, he entered his father's business and two years later was made a partner in the firm. At that time the company name was changed to Joseph T. Ryerson & Son. The younger Mr. Ryerson succeeded his father in the management of the business upon the death of the latter in 1883, and when the company was incorporated in 1888 he became president. In 1911 he retired from the presidency to become chairman of the board. Throughout an active life in the business world Mr. Ryerson maintained contacts with the civic and cultural life of his city and was a member of many associations and clubs. He was a director and member of the executive committee of the Illinois Merchants' Trust Co., Chicago, and was at one time a trustee of the Chicago Commons Association. He was a trustee and for a number of years vice-president of St. Luke's Hospital, and was one of the founders and honorary president of the Foundation for Architecture and Landscape Architecture of Lake Forest, Ill., which provides professional education to promising youths. He was a member of the Chicago Art Institute and a vice-president of the American Institute of Graphic Arts. He was a governing member of the Chicago Symphony Orchestra, a trustee of the Chicago Historical Society and since 1914 had been president of the Newberry Library, Chicago. Mr. Ryerson is survived by his widow, three sons and one daughter. The sons, Joseph T., Donald M. and Edward L., Jr., are president, vice-president and general manager and vice-president respectively of the Ryerson company.

EDWARD L. RYERSON

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Thomas Arthur Jones, president and general manager of the Sackett Screen & Chute Co., Chicago, and vice-president of the W. A. Jones Foundry & Machine Co., Chicago, died on Jan. 19 at his home in River Forest, Ill. He was born Dec. 12, 1864, in Susquehanna County, Pennsylvania, and there attended the public schools and Wyoming Seminary. He went to Chicago in 1892 and became associated with the W. A. Jones company. He served as secretary for many years and later was president. In 1918 he took over the active management of the Sackett Screen & Chute Co., conducting this business until his death.

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Frank Billings, for 30 years prominently identified with the iron ore industry in Cleveland as president of the Tod-Stambaugh Co., died suddenly at his home in that city Jan. 19, aged 74 years. He attended the public schools of Chicago and the University of Chicago, having moved to that city from Hastings-on-the-Hudson, N. Y., where he was born. Later he went to Cleveland, and in 1894 he became president of the Tod-Stambaugh Co., remaining at the head of that company until Jan. 1, 1925, when its ownership passed to the M. A. Hanna Co. His associate in the Tod-Stambaugh Co. was Col. Carmi A. Thompson, who was vice-president and general manager. Mr. Billings was a director of the Union Trust Co. and the Guardian Trust Co., Cleveland, and was connected with various industrial corporations.

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Harvey Mundie, secretary-treasurer of the Mundie Foundry & Machinery Co., Peru, Ill., died Jan. 6 as a result of an automobile accident.

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Frederick W. Sumner, president of the Sumner Iron Works, Everett, Wash., died recently at his home in that city, aged 77 years. He was a native of Wisconsin and went to Everett in 1893, where he established the Sumner Iron Works.

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Charles C. Roundy, president of the Sargent, Osgood & Roundy Co., Randolph, Vt., and well known in the agricultural implement industry of New England, died Jan. 19 at his home in Worcester, Mass. He was born at Springfield, Vt., 65 years ago.

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James W. Corrigan, president Corrigan, McKinney Steel Co., Cleveland, died suddenly Jan. 24 of heart failure at the age of 47. He had been head of the company since early in 1925, when he acquired a minority interest which, added to his large stock holdings, enabled him to wrest control of the company from the late Price McKinney. Shortly afterward the name was changed from the McKinney Steel Co. to the present name. Mr. Corrigan had been vice-president of the McKinney Steel Co., which was the successor of Corrigan, McKinney & Co., of which his father, the late James C. Corrigan, was one of the founders, but he did not take an active part in the business until he acquired control. Since he became president he had given close attention to the company's affairs.

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Charles Leon Snow, who was treasurer of the Air Reduction Co., Inc., 342 Madison Avenue, New York, until his retirement last year, died at his home in New York on Jan. 6. He was born at Portland, Me., in 1875, and attended the Portland high school and Dartmouth College, having been graduated from the latter institution in 1898. He became associated with the New York office of the Western Electric Co., remaining with that company until 1913, when he became general auditor in charge of the Minneapolis division of the Interstate Co. His connection with the Air Reduction company dated from 1916 and in 1920 he was made treasurer, holding the latter position until his retirement on account of failing health.

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William Parker Ward, mining engineer and a pioneer in the production of ferromanganese in the United States, died on Jan. 17 at his home in Savannah, Ga., aged 83 years.

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William J. Henry, president Oswego Tool Works, Oswego, N. Y., and of the Henry Forge & Tool Co., and the Crouse-Pope Foundry Co., both of Auburn, N. Y., died in the Auburn City Hospital on Jan. 18, following an operation. For a number of years he was president of the Henry & Allen Mfg. Co., but sold his interests in that concern some 10 years ago and organized the two Auburn companies in which he was active until his death. In 1927 he secured a controlling interest in the Oswego Tool Works, a concern for which his Auburn plants had made forgings for many years.

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Robert Bentley, president Ohio Iron & Steel Co., Lowellville, Ohio, and a director of the Youngstown Sheet & Tube Co., Youngstown, died at his home in the latter city on Jan. 21. He was born at Youngstown on Aug. 30, 1854, and after attending the public schools in that city he entered the employ of the First National Bank. He organized the Ohio Iron & Steel Co. in 1879 and was actively associated with it until his death. He was also prominently identified with many other financial and industrial organizations in the Mahoning Valley.

STEEL TREATERS' PROGRAM

Technical Papers Scheduled for First Semi-Annual Meeting to Be Held at Montreal Feb. 16-17

FIFTEEN technical papers have been obtained for the first semi-annual meeting of the American Society for Steel Treating to be held at the Mount Royal Hotel, Montreal, Canada, Feb. 16 and 17. The program is as follows:

Thursday, Feb. 16.

Morning Session: Alfred Stansfield, chairman.

"A Development of the Structure of the Micro Constitutents of Metals," by R. G. Guthrie, Peoples Gas Light & Coke Co., Chicago.

"Medium Carbon Pearlitic Manganese Steel," by Jerome Strauss, United States Navy Yard, Washington.

"Steels for Case Nitrification," by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

Afternoon Session: R. M. Bird, chairman.

"The Manufacture of Stainless Steel Castings in the Various Industries," by V. T. Malcolm, Chapman Valve Mfg. Co., Indian Orchard, Mass., and V. O. Homerberg, Massachusetts Institute of Technology, Cambridge.

"X-Rays and the Constituents of Stainless Steel," by E. C. Bain, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

"Hardness Testing," by H. M. German, Universal Steel Co., Bridgeville, Pa.

Evening Session.

"Heat Treatment of Forgings and Castings for Selective Directional Adjustment of Residual Stresses," by W. J. Merten, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"The Modern Trend in Metallurgy," by Dr. F. C. Langenberg, Climax Molybdenum Co., New York.

Friday, Feb. 17.

Morning Session: Dr. J. A. Mathews, chairman.

"Effects of Antimony, Arsenic, Copper and Tin in High-Speed Tool Steel," by H. J. French and T. G. Digges, Bureau of Standards, Washington.

"Some General Thoughts on Fusion Welding," by S. W. Miller, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

"Types of Failure of Steel," by Robert Job, Milton Hersey Co., Ltd., Montreal.

"Some Failures of Locomotive Parts and Study of Same under the Microscope," by F. H. Williams, Canadian National Railways, Montreal.

Evening Session: E. F. Cone, chairman.

"Alloy Steel for Boilers," by Charles McKnight, International Nickel Co., New York.

"The Effect of Heat Treatment on the Properties of Chromium-Molybdenum Sheet Steel," by F. T. Sisco and D. M. Warner, Wright Field, Dayton, Ohio.

"A Note on the Hardness and Impact Resistance of Chromium-Nickel Steel," by B. F. Shepherd, Ingersoll-Rand Co., Phillipsburg, N. J.

Previous to the technical sessions, there will be the usual meeting of the board of directors on Wednesday, Feb. 15, as well as sessions of the recommended practice committee and the publication committee. The early bird's dinner is, as usual, scheduled for Wednesday evening followed by the choice of a theater or a tobogganing party. Several plants are to open their doors for visitations on Friday afternoon, Feb. 17.

Foundry Conference To Be Held by University of Wisconsin

A second annual foundry conference has been arranged by the department of mining and metallurgy of the college of engineering and the university extension division of the University of Wisconsin, Madison, Wis., for Jan. 31, Feb. 1, 2 and 3. It is to be held in the laboratories of the department of mining and metallurgy. Organized especially for foundry superintendents, managers, foremen, chemists, metallurgists and others interested in foundry problems, it will follow the plan of the first conference held last February. The round table method of presenting the subject matter will be used, and a group leader will lead the discussion. Some of the topics to be taken up are cupola practice, sand conditioning, malleable and steel castings, ferrous and non-ferrous metallography with laboratory work, the heat treatment of steel, cost accounting, routing and planning, brass and bronze castings, and aluminum and light metal castings.

Testing Society's Group Meetings at Washington March 20-23

Plans are being made by the American Society for Testing Materials to hold the usual spring group meeting of committees at Washington, from Tuesday, March 20, to Friday, March 23. With the meetings starting on Tuesday it will be possible to schedule the sessions of the metals and non-metals committees during the same week, a plan that has worked out successfully in recent years at similar meetings at Cleveland, Providence and Philadelphia.

Coming Meetings of Institute of Metals

The annual general meeting of the Institute of Metals (British) will be held in London on March 7 and 8, and the autumn meeting in Liverpool, Sept. 4 to 7.

During the past year the membership of the institute increased from 1801 to 1903. It is anticipated by the council that the present year, the twentieth of the institute's existence, will witness the enrollment of the two thousandth member.

The Quad-City Foundrymen's Association met Jan. 23 at the Davenport Chamber of Commerce, Davenport, Iowa, to discuss apprenticeship.

Foundrymen to Organize Research for Gray Iron Industry

In consideration of a proposed organization devoted to cast iron research for the betterment of the product of gray iron foundries, the board of directors of the Philadelphia Foundrymen's Association at its last meeting named a cast iron research committee and instructed this committee to take the necessary steps to assure the holding of a meeting for the discussion of this subject. B. H. Johnson, Cresson-Morris Co., Philadelphia, chairman of committee, has sent a notice to all the foundry associations of the country asking them to send a delegate to attend a meeting in Philadelphia on Tuesday, March 13, as the guest of the Philadelphia Foundrymen's Association, to discuss any research activity that may benefit the gray iron industry and to determine a method of procedure.

COMING MEETINGS

February

American Ceramic Society. Feb. 5 to 11. Thirtieth annual meeting held concurrently with meeting of National Brick Manufacturers Association, Hotel Ambassador, Atlantic City, N. J. Ross C. Purdy, 2525 North High Street, Columbus, Ohio, secretary.

Foundry Equipment Manufacturers' Association. Feb. 7. Annual meeting, Hotel Cleveland, Cleveland. H. Cole Estep, Penton Publishing Co., Cleveland, secretary.

Midwest Power Conference and Chicago Power Show. Feb. 14 to 17. Hotel Stevens, and exhibition at Coliseum, Chicago. George F. Pfisterer, secretary.

American Society for Steel Treating. Feb. 16 and 17. Semi-annual meeting, Mount Royal Hotel, Montreal, Canada. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

American Institute of Mining and Metallurgical Engineers. Feb. 20 to 23. Institute of Metals Division, Engineering Societies Building, New York. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

European Markets Continue Quiet

Inquiry Active in Many Lines, but Orders Slow—Poland Has All Its Blast Furnaces Operating

(*By Cable*)

LONDON, ENGLAND, Jan. 23.

PIG iron is quiet, but inquiry is improving and Cleveland foundry and forge producers are anticipating improved business soon. Hematite stocks are heavy and prices have weakened. Foreign ore is dull.

Finished iron and steel are quiet generally, especially the plate market, but there is a fair demand for light material and structural and engineering steel for domestic use. Mills rolling plates and shapes are seeking to meet competition in export markets and are reported to be devising a plan of selling below cost, receiving compensation from a fund to be levied on domestic production. Confirmation, however, is lacking and full details are not yet available.

Tin plate business is quiet, but inquiries are fair. Most sellers are asking up to 18s. 3d. ($4.45) per base box, f.o.b. works port, for forward shipment. Buyers, however, expect to purchase at about the official minimum of 17s. 9d. ($4.33) per base box, f.o.b. works port.

Galvanized sheets are quiet, but inquiry is improving and most makers have agreed on a minimum price of £13 per ton (2.82c. per lb.) for No. 24 gage corrugated sheets in bundles. Black sheets are dull and unchanged.

Overseas demand for Continental iron and steel has increased, particularly for bars, which are firmer in tone, but British exporters are quiet and have but little moving. In semi-finished material, Continental mills are reported to be well sold.

In Poland all 18 blast furnaces in the country were operating at the end of the year. The Polish Government is considering erection of a large shipyard near Danzig. Belgian mills have been awarded 2000 tons of rails for Sweden by the European Rail Makers' Association.

The German steel ingot output in December was 1,368,000 tons, bringing the year's production to 16,305,000 tons. Friedrich Krupp A. G. and Otto Wolff & Co. combined are negotiating with Rumania for deliveries of railroad material totaling £2,000,000.

British Market Inactive—Pig Iron Depressed

LONDON, ENGLAND, Jan. 6.—Recovery from the holiday period is still awaited by iron and steel producers. Sentiment in all markets is much improved, although the problem of meeting the competition of Continental producers is still unsolved. As an example of the seriousness of foreign competition in the British domestic market, total exports of Cleveland iron in 1927 were 250,000 tons, although prices declined a total of £1 ($4.87) per ton during the year, while imports of pig iron for the 12 months totaled 570,000 tons. At present there are only 40 furnaces in blast on the Northeast coast, and of the 31 furnaces in blast at the year's end in Scotland 9 have been blown out. In a normal pre-war year the average operation in Scotland was about 85 furnaces.

There has been a slight improvement in the volume of inquiry for finished products in the past few days, but export business is slack, particularly in heavy material. The capacity of plate mills is still greatly in excess of normal demand, and a considerable tonnage of foreign plates continues to be received by consumers. Mills producing lighter materials are fairly well engaged, and structural steel fabricators are active.

British shipbuilding in 1927 is estimated at 1,300,000 tons, about double the tonnage of the previous year, when the coal strike was in progress. In 1925 the total was 1,084,000 tons, and in 1924, 1,439,885 tons. Included in the production of last year was a large floating dock for the Singapore naval base.

Luxemburg Prices Firm with Market Quiet

LUXEMBURG, Jan. 4.—The improvement in business which began in October of last year reached a climax in the rather heavy purchasing in December occasioned by the threat of a suspension of German steel production because of the proposed enforcement of the

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	17½s.			$4.27		
Bilbao Rubio ore*..	1	0½	to £1	1s.	4.99	to	$5.11
Cleveland No. 1 fdy.	3	7½			16.44		
Cleveland No. 3 fdy.	3	5			15.83		
Cleveland No. 4 fdy.	3	4			15.59		
Cleveland No. 4 forge	3	3½			15.46		
Cleveland basic (nom.)	3	15	to 3	15½	18.27	to	18.39
East Coast mixed...	3	8	to 3	10	16.56	to	17.05
East Coast hematite	3	8½	to 3	10½	16.68	to	17.17
Rails, 60 lb. and up.	7	15	to 8	0	37.75	to	38.96
Billets	6	0	to 6	10	29.22	to	31.66
Ferromanganese ...	13	10			65.75		
Ferromanganese (export)	13	0	to 13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to 5	15	26.18	to	28.01
Tin plate, base box.	0	18	to 0	18¼	4.39	to	4.45
Black sheets, Japanese specifications.	13	5	to 13	10	64.53	to	65.75
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.66	to	1.77
Boiler plates	10	10	to 11	0	2.28	to	2.39
Tees	8	2½	to 8	12½	1.77	to	1.99
Channels	7	7½	to 7	17½	1.60	to	1.71
Beams	7	2½	to 7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to 7	15	1.58	to	1.69
Steel hoops	10	10	to 11	0	2.28	to	2.39
Black sheets, 24 gage	10	5	to 10	10	2.23	to	2.28
Galv. sheets, 24 gage	13	0	to 13	5	2.82	to	2.88
Cold rolled steel strip, 20 gage, nom.	14	0	to 14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)							
Belgium	£3	1s.	to £3	2s.	$14.85	to	$15.10
France	3	1	to 3	2	14.85	to	15.10
Luxemburg	3	1	to 3	2	14.85	to	15.10
Basic pig iron (nom.):							
Belgium	2	18	to 2	19	14.13	to	14.38
France	2	18	to 2	19	14.13	to	14.38
Luxemburg	2	18	to 2	19	14.13	to	14.38
Coke	0	18			4.39		
Billets:							
Belgium	4	7	to 4	7½	21.19	to	21.31
France	4	7	to 4	7½	21.19	to	21.31
Merchant bars:					C. per Lb.		
Belgium	4	18	to 4	19	1.08	to	1.09
France	4	18	to 4	19	1.08	to	1.09
Luxemburg	4	18	to 4	19	1.08	to	1.09
Joists (beams):							
Belgium	4	8	to 4	10	0.97	to	0.99
France	4	8	to 4	10	0.97	to	0.99
Luxemburg	4	8	to 4	10	0.97	to	0.99
Angles:							
Belgium	4	17½			1.08		
⅛-in. plates:							
Belgium (a)	6	4	to 6	5	1.37	to	1.38
Germany (a)	6	4	to 6	5	1.37	to	1.38
$\frac{3}{16}$-in. ship plates:							
Belgium	5	19	to 6	0	1.32	to	1.33
Luxemburg	5	19	to 6	0	1.32	to	1.33
Sheets, heavy:							
Belgium	6	1			1.34		
Germany	6	1			1.34		

(a) Nominal.

8-hr. day in rolling mills. With this threat removed, the steel market gradually became quiet. Mills have a good tonnage of business on their books and consequently are maintaining prices.

Semi-finished material continues quiet, with the market at £4 7s. to £4 9s. 6d. ($21.19 to $21.80) per ton, f.o.b. Antwerp. Beams are at the same level, and bars range from £4 17s. to £4 18s. per ton (1.08c. to 1.09c. per lb.), f.o.b. Antwerp. Severe competition from German and Dutch sellers of sheets has caused a slight decline in prices, particularly on the heavy gages.

Production of pig iron in November, 1927, was 221,217 metric tons, with 39 out of 47 furnaces in blast. Steel ingot output was 207,402 tons.

BELGIAN PRICES WEAKER

Mills Offer Concessions and Better Deliveries—German Competition Increases

ANTWERP, BELGIUM, Jan. 7.—The market is quiet and prices are unchanged, although slightly weaker. Export business is rather inactive, and mills are beginning to show more interest in securing additional tonnage, offering earlier deliveries and occasionally shading prices. In general, however, producers are fairly well booked as a result of the heavy purchasing at the end of the year.

A feature of the present market is the reappearance of German mills as serious competitors for a share of export trade. The prospect of intensified competition for foreign business has apparently caused some consumers to refrain from buying in expectation of still lower prices.

Pig Iron.—Domestic buying has been light, but prices are well maintained as a result of the limited tonnage available from the furnace syndicate. Export business continues quiet, with quotations on foundry iron ranging from £3 to £3 2s. ($14.61 to $15.10) per metric ton, f.o.b. Antwerp. This price is apparently too high to interest foreign users, so that sales are restricted. Bessemer iron, with sulphur at 0.08 per cent is quoted at £2 17s. to £2 19s. ($13.89 to $14.38) per metric ton, f.o.b. Antwerp.

Semi-Finished Material.—The lack of any sizable purchasing of billets or blooms renders determination of prices difficult. With practically no activity in billets, prices are nominally £4 6s. 6d. to £4 7s. 6d. ($21.07 to $21.31) per metric ton, f.o.b. Antwerp. Blooms are also quiet, with the market about £3 18s. ($19) per ton for 6-in. and larger to £4 2s. ($19.97) per ton for 4-in. blooms. Sheet bars are quite active, and, with mills well booked, the market ranges from £4 8s. to £4 9s. ($21.43 to $21.68) per ton, Antwerp.

Finished Material.—Small purchases of steel bars are bringing £4 17s. 6d. to £4 18s. 6d. per ton (1.08c. to 1.09c. per lb.), f.o.b. Antwerp. Desirable business, however, could probably be closed at 1s. (24c.) per ton less. Beam prices are maintained at £4 7s. to £4 9s. per ton (0.96c. to 0.98c. per lb.), f.o.b. Antwerp. The hoop market is fairly active, with hot-rolled material quoted at £5 17s. 6d. per ton (1.29c. per lb.), f.o.b. Antwerp. Wire rods are quoted at £5 10s. per metric ton (1.21c. per lb.), f.o.b. Antwerp. Sheet prices show less strength, particularly on the heavy gages, large tonnages of which have been offered by German mills.

Stainless Steel Containers Adopted in Germany

HAMBURG, GERMANY, Jan. 7.—Recent tests by breweries are said to show that containers made of Krupp stainless steel "V2A" do not affect the quality of beer. Several large breweries are preparing to use large stainless steel containers in making export shipments. The containers are being designed so that they may be folded when emptied and returned flat. They are expected to reduce costs of shipping beer, as they will occupy less room and be subject to less damage than bottles.

BRITISH TRADE AT PEAK

Production, Exports and Imports of Steel Reach Post-War Maximums in 1927

WASHINGTON, Jan. 24.—Nineteen twenty-seven marked the peak of the post-war activity of the British iron and steel industry, says a statement prepared by J. Joseph W. Palmer of the Iron and Steel Division, Department of Commerce. Production of both iron and steel reached levels not attained since the easing off from the intensive activity of the war years. Exports and imports likewise reached post-war heights.

The year was marked also by the first concerted effort on the part of the British industry to reduce the tonnages of foreign iron and steel imported for fabrication. It was proposed, Mr. Palmer points out, and put into effect as of Sept. 1, that the British steel makers should pay a rebate to fabricators who purchased all of their steel from British mills up to Jan. 1. On the latter date it was proposed to have a casting up of accounts. No announcement has been made as to the result of the plan.

Imports had been mounting steadily and in 1927 reached a total of 4,406,125 tons, an increase of 17.8 per cent over imports in 1926. The December, 1927, import trade, in reaching the lowest figure for any month of the year, 280,520 tons, registered a loss of 4244 tons as compared with November. The 1927 increase in import trade was participated in by all but two of the 19 classifications into which the trade is divided, rails and wire. The largest increase was in raw and semi-finished steel.

Exports in 1927 were 4,199,665 tons, the highest since the war and 40.2 per cent greater than in 1926. During December, however, British exports fell off sharply to 351,795 tons, a decrease of 47,259 from November.

The largest gain in exports in 1927 was in steel rails, 277,870 tons, which is considered to be particularly significant as rails was one of the few items in the import trade to show reduced tonnage and during the year Continental rail manufacturers were making special efforts to develop their export markets. The second largest increase was shown in plates and sheets, 195,748 tons.

Production of pig iron and steel ingots and castings was well maintained over the whole of 1927. The totals registered for both pig iron and steel for the year, 7,289,600 tons and 9,086,300 tons respectively, represent the largest tonnages recorded in the post-war period.

Two-Thirds of Swedish Ore Exports Go to Germany

HAMBURG, GERMANY, Jan. 7.—Of the total exports of Swedish iron ore last year, 9,690,000 tons, Germany received 68 per cent. The remaining 32 per cent went to Czechoslovakia, Poland, Great Britain, France and other smaller consumers of Swedish iron ore.

French Ferrosilicon Exports Increase Despite Syndicate

HAMBURG, GERMANY, Jan. 7.—Although the European Ferrosilicon Syndicate recently published a report that the competition of French producers, who are not members, had been of less consequence since formation of the syndicate, export statistics indicate the contrary. During the first 10 months of 1925 French ferrosilicon exports were 1480 metric tons, in 10 months of 1926, 2013 tons, and in 10 months of 1927, 3607 tons.

Revenue freight loaded in the first week of January is reported by the American Railway Association at 754,062 carloads. Because this period this year included a holiday, it shows a sharp falling off from the corresponding figures of the two preceding years. Comparing it with the weeks which had the similar holiday, however, the total this year is above either of the two preceding years.

FAR EAST BUYS TIN PLATE

Both Chinese and Japanese Merchants Active—Oil Well Supply Order Placed Here

New York, Jan. 24.—There is still a fair volume of tin plate business from the Far East. Chinese merchants have been in the market for tin plate waste waste, and one exporter in New York has received an order for about 5000 boxes of waste waste from a purchaser in Shanghai. Current tin plate purchases in Japan are confined to small lots, but the Nippon Oil Co., according to recent cabled reports from Japan, will be in the market for its quarterly requirements about the end of this month. Export quotations on tin plate range from $5.20 to $5.30 per base box, c.i.f. Japanese or Chinese port. There is a moderate volume of inquiry from Japan for light-gage black sheets, but no purchases of consequence are reported at the present level of American mill quotations. While $77 per ton, c.i.f. Japan, might be shaded on a desirable tonnage in bundles of 13 sheets each, the British market is still lower.

The Northern Karafuto Oil Co., Japan, has placed 470 tons of oil well casing and about 48,000 ft. of gas pipe with an exporter in New York for delivery from American makers.

New York importers of European steel report sales of only a small tonnage of bars and shapes. The greater part of this business is in small lots sold from the dock or delivered from stocks maintained here by the importers. Prices of Continental steel range from 1.65c. to 1.75c. per lb., base, for Thomas steel bars and 1.55c. to 1.65c. per lb., base, for structural material, duty paid, New York. Sales from the dock or from stock bring up to 2c., or more, delivered. A fair business is being done by importers in hoops and bands, wire rods and strip steel. The only outstanding construction inquiry is about 4000 tons of reinforcing bars for a bridge near Boston. Although foreign bids for the bars have been accepted, it is believed that domestic material will be purchased. Importers of European sheet steel piling are submitting bids on several hundred tons for the Tacony-Palmyra bridge near Philadelphia. The reinforcing bars for this bridge are expected to go to domestic mills.

A list of inquiries for equipment required in railroad, highway and waterway construction in Colombia has been issued by the Colombian Government Bureau of Information, 1440 Broadway, New York. Included in the list are locomotives, railroad cars, steel bridges, barges, concrete mixers, rails and pipe. Translations of the inquiries, which are in Spanish, are being made and will be available in a few days. Bids on the equipment specified must be in the hands of the Minister of Public Works, Bogota, Colombia, before certain dates in March, April and May.

Newton Bill May Pass; Would Permit Collective Purchases Abroad

Washington, Jan. 24.—Proponents of the Newton bill to permit collective purchases by domestic consumers of commodities under foreign control are predicting that the measure will pass at this session of Congress. It is supported by Secretary of Commerce Hoover and Secretary of Agriculture Jardine, as well as by a number of important business organizations. The legislation is proposed as an amendment to the Webb-Pomerene export act, which permits American exporters to consolidate for the marketing of their products in foreign markets. At a hearing last week Secretary of Commerce Hoover said the bill would promote trade and not restrain it. No iron and steel or related interests were represented at the hearing.

German Steel Prices to Be Advanced

Washington, Jan. 23.—German iron and steel interests are reported to have decided upon an increase of 3m. (71c.) per ton in base prices on rods and structural shapes at a recent meeting, according to a radiogram received by the iron and steel division, Department of Commerce, from Fayette W. Allport, Berlin, commercial attaché. This action is a direct result of the pending readjustment of working hours and wage scales to conform to the 8-hr. day decree.

Steel Workers and Machinists Included in Immigrants

Of 27,758 aliens admitted to the United States in November, 1927, 203 were iron and steel workers and 214 were machinists. In the five-month period from July to November, 828 iron and steel workers and 983 machinists were admitted. But in November 33 iron and steel workers and 41 machinists went out of the country and in the five-month period 150 steel workers and 295 machinists departed.

British machine tool production and exports remained practically the same during 1927 as during the two previous years, according to a cablegram received by the Industrial Machinery Division, Department of Commerce, from Commercial Attache William L. Cooper, London. Imports to Sept. 30 increased 16 per cent, the American share of the total imports being 64 per cent or the same as last year. American sales were largely in the way of special purpose tools such as millers, grinders, gear cutters, honers and crankshaft balancing machines.

British Developing New Uses for Stainless Products

New uses for stainless and corrosion-resisting steels are continually being discovered in Great Britain. Rustless iron studs for traffic direction purposes on the roads are now established in popularity, and they are always bright, no matter how wet or damp the weather. Stainless steel is now used in pen manufacture, and there has recently been put on the market a fountain pen with a stainless steel point, which brings the selling price very low in comparison with the cost of a gold point. There is a steady demand for pen steel in thin sheets.

Smallest Year in Automobile Production Since 1922

Washington, Jan. 23.—Motor vehicles to the number of 3,393,887 were produced in the United States in 1927, comparing with 4,298,799 in 1926, according to the Department of Commerce. Of the 1927 production, 2,938,868 were passenger cars and 455,019 were trucks, comparing with 3,808,753 and 490,046 respectively in 1926.

Production in the United States in December totaled 133,178 motor vehicles, of which 105,784 were passenger cars and 27,394 were trucks. This compares with a total of 134,381 in November, of which 109,742 were passenger cars and 24,639 were trucks. The December total was the lowest for any month since February, 1922.

December production of automobiles in Canada, as reported by the Dominion Bureau of Statistics, was 2277 passenger cars and 1158 trucks, compared with production in November of 5173 passenger cars and 1444 trucks. Production in December, 1926, was 6052 passenger cars and 1700 trucks.

PRODUCTION OF AUTOMOBILES IN UNITED STATES AND CANADA

	1927	1926	1925	1924	1923
Passenger cars:					
U. S.	2,938,868	3,808,753	3,760,459	3,203,049	3,631,728
Canada ..	146,870	164,483	139,311	117,765	129,228
Motor trucks:					
U. S.	455,019	490,046	505,245	397,869	388,527
Canada ..	32,556	40,609	22,078	17,481	17,210
All motor vehicles:					
U. S.	3,393,887	4,298,799	4,265,704	3,600,918	4,020,255
Canada ..	179,426	205,092	161,389	135,246	146,438

The National Metal Trades Association will hold its annual convention at the Hotel Astor, New York, April 25-26. J. E. Nyhan, Peoples Gas Building, Chicago, is secretary.

Machinery Markets and News of the Works

AUTOMOTIVE PURCHASES

Motor Car Companies Come Into Market for Machine Tools

Railroads Are Buying Very Little but Two Western Roads Will Soon Issue Large Lists

WITH renewed buying interest among automobile manufacturers and prospects that railroad purchasing will soon be in larger volume, the machine tool industry expects that February will bring further business improvement.

Automobile companies placed a number of orders during the week. The Ford Motor Co. bought special machinery for making rear axles; Dodge Brothers, Inc., added tools to increase manufacturing capacity for one of its models, and purchases also were made by the Packard Motor Car Co. Cincinnati machine tool builders received orders from the automobile industry for 13 17-in. lathes and 12 special lathes.

Railroad purchases consisted chiefly of single tools bought by the Missouri Pacific, Texas & Pacific and Central Railroad of New Jersey. At Chicago two lists are expected soon from Western roads covering a total of about $750,000 worth of shop equipment.

The Mergenthaler Linotype Co., Brooklyn, was the largest purchaser in the East, closing for about $100,000 worth of lathes, grinders, radial drills and milling machines.

The Firestone Tire & Rubber Co., Akron, Ohio, which will equip a new plant at Los Angeles, Cal., announces that purchases will be made on the Pacific Coast.

New York

NEW YORK, Jan. 24.

SELLERS of machine tools report a satisfactory number of inquiries for single tools and a moderate volume of purchasing. The outstanding buyer in this district is the Mergenthaler Linotype Co., Brooklyn, which is reported to have closed in the past week on tools valued in excess of $100,000. Included in this total, which represents part of the company's requirements, were 17 lathes reported purchased from the Monarch Machine Tool Co., three lathes from the Hendey Machine Co., a number of LeBlond grinders, also several radial drills and milling machines.

Purchasing by railroads is still inactive. The New York Central is still out of the market and no action as yet reported on the list of about 30 tools and other equipment for Delaware, Lackawanna & Western. Central Railroad of New Jersey has closed on a 30-in. x 16-ft. lathe and 2-in. Acme double bolt cutting machine with the Niles-Bement-Pond Co., and Pullman Car & Mfg. Corporation has bought a 32-in. Acme shaper from the same company.

Other purchases of tools have included a No. 2 axle lathe by Lehigh Coal & Navigation Co. and a No. 3 axle lathe by a company in New Jersey, two Cincinnati high-speed tapping machines by an Indiana company, a 6-in. vertical shaper by a Chicago manufacturer, a 12-in. vertical shaper by a Detroit motor car company and a No. 2 jig boring machine by a Cleveland manufacturer.

Contract has been let by Union Railway Co., 2396 Third Avenue, New York, to Andrew J. Robinson Co., 15 West Thirty-eighth Street, for a one-story shop and extensions and improvements in power house at its repair works, West Farms Road and 172nd Street, to cost $30,000.

O'Brien Electric Co., Inc., 505 West 125th Street, New York, manufacturer of electric equipment, has acquired four-story building at 327 West 126th Street, and will remodel for a new plant.

Tolhurst Machine Works, Inc., has been organized with capital of 100 shares of stock, no par value, to take over and expand company of same name with New York headquarters at 30 Church Street, and main plant at Troy, N. Y., manufacturer of centrifugal machinery, etc., to which will be added boilers, engines, and affiliated equipment. Incorporators include George S. Montgomery, Jr., Roy C. Wilson and I. F. Willey, Fifty-third Street and Lansdowne Avenue, Philadelphia, Pa.

Bacu Ice Co., Elm Place and High Street, Poughkeepsie, N. Y., has plans for three-story ice-manufacturing and cold storage plant, to cost more than $75,000; C. J. Cooke, 25 Cannon Street, architect.

Franklin, Gates & Heindsmann, 2526 Webster Avenue, New York, architects, have plans for two one-story automobile service, repair and garage buildings, 100 x 200 ft., to cost about $185,000 with equipment.

American Zinc, Lead & Smelting Co., 331 Madison Avenue, New York, has authorized plans for extensions and improvements in plant at East St. Louis, Ill., including installation of additional machinery, with storage equipment for sulphuric acid, etc., to cost approximately $725,000. It is purposed to remove portion of plant at Hillsboro, Mo., to East St. Louis and concentrate production there.

Hopwood Retinning Co., 56 Commerce Street, Brooklyn, has awarded general contract to Julius Auserhl, 13911 Queens Boulevard, Jamaica, L. I., for a one-story addition, 55 x 100 ft., including improvements in present works. John E. Cahill, Butler Building, Jamaica, is architect.

Officials of Standard Oil Co., of New Jersey, 26 Broadway, New York, have formed Stanco Products Co., with capital of $10,000,000, to manufacture and develop certain oil specialties heretofore produced by parent organization. An expansion program will be carried out. F. H. Bedford will be president of new company, and C. L. Bowman and A. J. Van Wynan, vice-presidents.

Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, has awarded general contract to H. K. Ferguson Co., for a new one and two-story plant, 85 x 150 ft., at Elizabeth, N. J., to cost close to $50,000 with equipment. Manufacture will be carried out under special chemical process.

Lancia Motors of America, Inc., New York, lately formed under State laws with capital of $3,000,000 by interests connected with Lancia Motors Corporation, 140 West Fifty-seventh Street, has acquired a plant at Poughkeepsie, N. Y., with floor space of 129,000 sq. ft. on 14-acre tract, and will use for a new assembling plant for Lancia automobiles of Italy. It is purposed to have works ready for service by July, with facilities for an output of 250 cars per month.

American Telephone & Telegraph Co., 195 Broadway, New York, is arranging a construction and expansion program to cost $38,000,000, including aerial wire and pole lines, $4,341,000; long-distance cable lines, conduits, buildings and equipment, $19,791,000; switchboards, telephone and telegraph instruments, $9,519,000; line work, wire and pole replacements, etc., $4,345,000.

Harry Albanese, Inc., 63 Whipple Street, Brooklyn, plumbing equipment and supplies, has plans for a two-story factory, 25 x 100 ft., to cost about $23,000 with equipment. Laspia & Samenfeld, 269 Broadway, are architects.

Barozzi Drying Machine Co., 940 Van Wagenen Avenue, North Bergen, N. J., has plans for a two-story addition, 50 x 100 ft., to cost close to $50,000 with equipment. P. O. Simone & Co., 100 Sip Avenue, Jersey City, N. J., are architects.

The Crane Market

THERE are several inquiries for large capacity overhead cranes such as the two 120-ton and one 65-ton cranes for the Public Service Production Co., Newark, N. J., and a 150-ton crane for the Phoenix Utility Co., New York, but the greater number of current inquiries are for cranes ranging in capacity from 5 tons to 15 tons. The New York Edison Co., New York, has been asking for prices on a small capacity monorail hoist with bucket. The New England Public Service Co., Augusta, Me., is in the market for a 10-ton, 28-ft. span hand power crane with two 20-ton trolleys.

The Central Board of Purchases, Milwaukee, has rejected all bids on two electric traveling cranes for a new incinerating plant and is advertising for new quotations.

Among recent purchases are:

Blue Ridge Coal & Coke Co., Bluefield, W. Va., 30-ton, wide gage locomotive crane from Ohio Locomotive Crane Co.

E. H. Clement Co., Charlotte, N. C., 5-ton crawl-tread locomotive crane from Browning Crane Co.

Consolidated Gas Co., New York, 10-ton crawl-tread locomotive crane, from an unnamed builder.

Atlantic Aircraft Corporation, Hasbrouck Heights, Teterboro, N. J., has leased portion of former textile mills at Passaic, N. J., totaling 30,000 sq. ft., for expansion. New factory will be used primarily for production of wings, frames, etc., for airplanes of Fokker type, as manufactured by company. Major Lorillard Spencer is president.

Consolidated Safety Pin Co., 46 Farrand Place, Bloomfield, N. J., has plans for three-story addition, 35 x 74 ft., to cost about $45,000. Floyd Y. Parsons, 1123 Broadway, New York, is architect.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is arranging an expansion and improvement program to cost $22,000,000, including extensions in power plants, substations and transmission lines, etc. Gas division of company will expend close to $4,500,000 for expansion and betterments in artificial gas plants and system. Plans are under way for two-story equipment storage and distributing plant, with repair department, for electrical division at Jersey City, two-stories, 125 x 192 ft., to cost $150,000.

V. and R. Tedeschi, 25 Mercer Street, Newark, have plans for two-story machine shop, 68 x 100 ft., to cost $45,000 with equipment. J. B. Acocella, 9 Clinton Street, is architect.

Wesley & Winter, 90 Mechanic Street, Newark, manufacturers of paper goods, have leased an adjoining three-story factory for expansion.

Philadelphia

PHILADELPHIA, Jan. 23.

PLANS are maturing for a four-story mechanical engineering building at Drexel Institute, Philadelphia, to cost $350,000 with equipment, and Board of Trustees, Dr. K. G. Matheson, president, will ask bids soon on general contract. Simon & Simon, 249 South Juniper Street, are architects.

Pennsylvania Railroad Co., Philadelphia, C. E. Walsh, room 415, 15 North Thirty-second Street, purchasing agent, is asking bids until Feb. 2 for steel transmission towers, contract 7-1928.

Silverman & Levy, 313 South Smedley Street, Philadelphia, architects, will soon take bids for four-story automobile service, repair and garage building, to cost in excess of $125,000 with equipment.

Philadelphia Stock Yards Co., Thirtieth Street, Philadelphia, is considering construction of an abattoir with cold storage and refrigerating division; elevating, conveying and other mechanical equipment, to cost $1,000,000.

Campbell Soup Co., Camden, N. J., has authorized plans for a new group of multi-story factory units, with power house on Delaware River waterfront, vicinity of its present plant, to cost more than $2,500,000 with machinery, including conveying, elevating, and other mechanical equipment, can machinery, etc. Plans for first unit, totaling 20 acres of floor space, have been filed. Company has also awarded contract to Henry Ericsson Co., 228 North La Salle Street, Chicago, for six-story factory, 245 x 340 ft., on West Thirty-fifth Street, Chicago, to cost approximately $1,000,000 with equipment. Other units will be built later at last-noted location.

Board of Education, Princeton, N. J., is considering installation of manual training equipment in new two-story high school to cost $750,000, for which superstructure will soon begin; Ernest Sibley, Bluff Road, Palisade, N. J., architect.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines, is completing plans for establishment of new works division for production of airplane motors of company design.

Shenango Motor Co., West Washington Street, New Castle, Pa., will soon take bids on general contract for five-story service, repair and garage building, 85 x 170 ft., to cost about $200,000 with equipment.

Glen-Gary Shale Brick Co., Reading, Pa., has arranged for bond issue of $600,000, portion of proceeds to be used for expansion and improvements. Two plants are operated at Reading; one at Shoemakersville; and one at Harrisburg, Pa., with total output of 300,000 brick per day; expansion program calls for machinery and facilities to increase gross capacity to 430,000 brick daily.

Bridgeport Iron Works, Inc., Bridgeport, Pa., recently formed by A. I. Pollock, South and Eden Streets, Pottstown, Pa., and associates, will operate a local steel fabricating plant and general iron works. G. Plantau Middleton, 637 West Philadelphia-Ellena Street, Germantown, Philadelphia, is also interested in company.

Sun Oil Co., Finance Building, Philadelphia, has acquired 65 acres of sulphur bearing land at Boling Dome, Tex., and proposes installation of equipment for development and plant for sulphur recovery.

McClintic-Marshall Co., Pottstown, Pa., has work under way on one-story addition for assembling service, 125 x 600 ft., at its local steel fabricating works, to cost more than $150,000.

Owens Aircraft Corporation, Glenside, Pa., has been formed to manufacture airplanes. Company plans to lease plant in Philadelphia and will be in market for usual materials and standard parts used in aircraft construction. Factory equipment will also be purchased.

South Atlantic States

BALTIMORE, Jan. 23.

ARRANGEMENTS have been made by Arlington Ice & Fuel Co., Baltimore, recently organized, for purchase of plant of Zimmerman Ice Co., local. New owner will remodel and install additional equipment for capacity of 100 tons per day.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has arranged for a preferred stock issue of $10,000,000, portion of fund to be used for expansion and betterments, including completion of new unit at power plant on Gould Street. Company is negotiating for purchase of Northern Maryland Power Co., operating at Havre de Grace and vicinity and plans extensions in that territory.

A. S. Lee Co., Norfolk, Va., plans rebuilding portion of its lime and fertilizer plant destroyed by fire Jan. 15, with loss of $50,000 including machinery.

U-Drive-It Co., 310 Monticello Avenue, Norfolk, Va., has awarded general contract to Claiborne & Taylor, Atlantic Life Building, Richmond, Va., for a two-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

Ahoskie Supply Co., Ahoskie, N. C., has inquiries out for a squaring shear for installation at its plant.

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Feb. 7 for reduction gear units and spares for Mare Island, Puget Sound and Brooklyn Navy Yards, schedule 8343; until Jan. 31 for wire rope for Eastern and Western yards, schedule 8332; until Jan. 31 for gasoline engines and spares for submarine base, schedule 8357, and until Feb. 7 for bolts and nuts for Eastern and Western yards, schedule 8333.

Champion Fibre Co., Canton, N. C., is said to be arranging expansion and improvement program at local mill to cost about $200,000, including new steam-operated electric power plant, for which foundations will soon be laid. Headquarters at Hamilton, Ohio.

Board of Trustees, Loyola College, Evergreen and Charles Streets, Baltimore, has plans for a three-story and basement mechanical engineering building, to cost approximately $150,000 with equipment. Lucius R. White, Hearst Tower Building, is architect.

Morganton Furniture Co., Morganton, N. C., has plans for one-story addition, 80 x 260 ft., to cost about $45,000 with equipment.

Board of Education, Atlanta, Ga., is considering installation of manual training equipment in two-story William A.

Bass junior high school to cost $160,000, for which superstructure will soon begin. G. Lloyd Preacher & Co., Wynne-Claughton Building, are architects.

International Harvester Co., 6065 Michigan Avenue, Chicago, is said to be planning establishment of a factory branch and distributing plant at Raleigh, N. C., with service and repair department. It is proposed to establish a local assembling works later.

General Equipment Machinery Co., Inc., 116 Northeast Sixth Street, Miami, Fla., has taken over machinery department of I. E. Schilling Co., and will act as distributer of machinery and equipment. Plans are under way for establishment of a branch office at Jacksonville, Fla.

Bids are being asked by Bureau of Yards and Docks, Navy Department, Washington, until Feb. 8 for a one-story motor-testing building, 25 x 161 ft., at naval air station, Pensacola, Fla., specification 5524.

Board of Awards, City Hall, Baltimore, is disposing of a bond issue of $1,500,000, proceeds to be used for a municipal airport, including hangars, mechanical and repair shops, pumping station and other structures, with equipment.

West Knitting Corporation, Syracuse, N. Y., plans construction of a one-story steam-operated electric power plant at its proposed mill at Wadesboro, N. C., entire project to cost in excess of $100,000. R. C. Biberstein, 1614 Elizabeth Avenue, Charlotte, N. C., is architect.

Edisto Public Service Co., Denmark, S. C., has acquired electric light and power plant at Allendale, S. C., and plans expansion and improvements in that section, including transmission line construction.

Wood Mfg. Co., Norfolk, Va., has acquired property at Planters Avenue and Cromwell Road, and plans erection of one-story furniture manufacturing plant, to cost $80,000 with equipment.

Piedmont Print Works, Inc., Taylors, S. C., is asking bids until Jan. 30, for a new local textile print mill, including one and two-story machine shop, 100 x 150 ft., and boiler plant. J. E. Sirrine & Co., Greenville, S. C., are architects and engineers.

D. Q. S. Brick Co., Berlin, Md., is planning purchase of additional equipment, including motor-driven, 24-in. gage locomotive, about 2-tons capacity; crawler type digger, about ½-yd. capacity; side-dump clay cars, etc.

Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, has plans for new works in Curtis Bay district, Baltimore, where 30 acres was purchased several months ago. It will be devoted to production of chrome and magnesite brick and will cost close to $1,000,000 with machinery. Contract for two tunnel kilns has been let to American Dressler Tunnel Kilns, Inc., Cleveland, and awards for machinery and operating equipment will be made soon.

Buffalo

BUFFALO, Jan. 23.

BIDS will soon be asked on general contract by Houde Engineering Corporation, 237 Winchester Avenue, Buffalo, manufacturer of automobile shock absorbers, for a two-story addition, 210 x 225 ft., to cost upward of $200,000 with equipment. G. Morton Wolfe, 1377 Main Street, is architect.

Hecker-Jones-Jewell Milling Co., St. Clair Avenue, Buffalo, has taken out permit for a new grain elevator to cost $950,000, including elevating, conveying and other machinery.

United States Radiator Corporation, Dunkirk, N. Y., has arranged for increase in capital from 200,000 to 400,000 shares of stock, no par value, portion of proceeds to be used for expansion and improvements.

Roessler & Hasslacher Chemical Co., Buffalo Avenue and Twenty-sixth Street, Niagara Falls, N. Y., manufacturer of industrial chemicals, has awarded general contract without competition to Wright & Kremers, Inc., Pine Avenue and Main Street, for a one-story addition, 110 x 350 ft., to cost more than $65,000 with equipment.

Willett W. Wetmore, 364 Voorhees Avenue, and S. M. Quackenbush, 1580 Amherst Street, Buffalo, have formed W. W. Wetmore Corporation, with capital of $25,000 and 500 shares of stock, no par value, and plans early establishment of plant for manufacture of heating equipment.

Erie County Board of Supervisors, Buffalo, has made available appropriation of $30,000 for equipping shops for additional industries at County penitentiary at Mill Grove. Walter W. Nicholson is commissioner of corrections.

Fire, Jan. 21, caused loss of $40,000 to boiler plant of Otis-Sawyer Co., Oswego, N. Y., manufacturer of small heating boilers.

New England

BOSTON, Jan. 23.

ALTHOUGH trade is far from active, more machine tools were sold in this district the past week than in the previous month and a half. Inquiries are more numerous than at any time since last October and include two 18-in. and several larger lathes, radial drills, boring mills and a large planer from New England railroads, and quite a list of smaller machines from numerous manufacturers. Some companies inquiring for equipment last October have renewed negotiations, and in many instances old quotations will not hold. There is a small inquiry out from the city of Boston for school equipment and it is intimated a large list will shortly be forthcoming.

Recent sales include a new jig borer to a Vermont shop, squaring shear, 28-in. Prentice drill, 14-in. x 6-ft. lathe, saw table to greater Boston users, all used tools; a used two-spindle drill to a Maine shop, two small used presses and several new and used bench lathes to Rhode Island and southern Massachusetts plants. The Pneumatic Drop Hammer Co. has sold two 200-lb., one 300-lb. and one 100-lb. hammers to a Providence manufacturer, one 500-lb. and one 350-lb. hammer to an Indiana plant, and one 500-lb. hammer to a Cincinnati manufacturer and expects to close on several other machines before Jan. 31. Demand for forges is more active than in many weeks. Small tools, gages, etc., are selling better than in two months.

Plans have been completed for one-story, 93 x 95 ft., automobile body and paint shop, at Somerville, Mass., for P. J. Kiley, 101 Washington Street. Plans are private.

Work has started on a one-story, 60 x 90 ft., light manufacturing plant, Dorchester district, Boston, for John F. Duby, 15 Hancock Street, Dorchester, metal and other specialties. Miller & Levi, 46 Cornhill, Boston, are architects.

Plans are nearing completion for a jewelery manufacturing plant at Providence, R. I., for the Jewelers Supply Co., 37 Garnet Street. C. R. Makepeace, 907 Grosvenor Building, Providence, is engineer.

Plans are in progress for an artificial ice making plant at Lynn, Mass., for North Shore Ice Co., 46 Lake Avenue. Plans are private.

Work has started on a four-story, 30 x 101 ft., addition for Edison Electric Illuminating Co., 39 Boylston Street, Boston. Bigelow, Wadsworth, Hubbard & Smith, 11 Beacon Street, Boston, are architects.

Sessmee Lock Co., Hartford, Conn., will increase its capitalization from $500,000 to $750,000 to provide additional working capital. Hartford Machine Co. is at present manufacturing company's product.

Contract has been let by George Muench, 575 Pacific Street, Stamford, Conn., manufacturer of special machinery and parts, to Genovese & Rich, 1 Bank Street, for one-story addition, 50 x 100 ft. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Department of Public Buildings, City Hall, Boston, plans construction of an equipment storage and distributing works, with automobile service and repair departments, to cost in excess of $200,000 with equipment.

Central Maine Power Co., Augusta, Me., is reported planning a hydroelectric power development at Bingham, Me., for ultimate capacity of 100,000 hp., to cost more than $8,000,000 with power dam and transmission lines.

Cambridge Sheet Metal Co., 295 Franklin Street, Cambridge, Mass., manufacturer of automobile bodies, etc., has awarded general contract to M. J. Ryan, 763 Massachusetts Avenue, Boston, for one-story addition, 60 x 85 ft., to cost about $25,000 with equipment.

Central Falls Mfg. Co., 121 Lincoln Avenue, Central Falls, R. I., contemplates early rebuilding of portion of woodworking plant and power station recently destroyed by fire, with loss of about $100,000 including machinery.

Herbert C. Hearne, 1389 Main Street, Springfield, Mass., architect, has plans for a three-story automobile service, repair and garage building, 110 x 140 ft., to cost in excess of $125,000 with equipment.

Hartford Gas Co., Hartford, Conn., is planning increase in capital from $500,000 to $3,750,000, a considerable part of proceeds to be used for extensions in artificial gas plants, storage facilities and lines.

Hamden Tool & Metal Works, Hamden, Conn., recently formed by Carl R. Olson, 960 Dixwell Avenue, New Haven, Conn., will soon complete a one-story plant to specialize in manufacture of steel and brass shells.

Connecticut River Power Co., Waterbury, Conn., comprising recent merger of Connecticut Light & Power Co., Connecticut Power Co., Somers Electric Co., and other utilities, has secured permission for a hydroelectric power plant at Windsor Locks, Conn., to develop an initial capacity of 50,000 hp., to cost about $5,000,000 with transmission lines.

W. H. Hunt & Son, 197 Washington Street, Salem, Mass., architects, are completing plans for a one-story automobile service, repair and garage building, 120 x 150 ft., to cost about $100,000 with equipment.

Bassick Mfg. Co., 2638 North Crawford Avenue, Chicago, manufacturer of lubricating equipment, grease cups, etc., subsidiary of Stewart-Warner Speedometer Corporation, 1826 Diversey Boulevard, has purchased plant of Columbia Phonograph Co., Bridgeport, Conn., for about $350,000, and will remodel for main plant. It is understood that plants of parent company at Meriden, Conn., and Newark, N. J., will be removed to Bridgeport, where operations will be concentrated.

Chicago

CHICAGO, Jan. 23.

ADDITIONAL signs of activity in the machinery market are noted as the third week in January closes. From a rather small beginning the early part of the month sales have steadily mounted and inquiry is now of such proportions that dealers are looking forward to February with optimism. Orders for the most part are widely scattered and of small size. Absence of railroad buying in this district has been marked, but it is understood that two Western railroads are preparing to issue lists that will represent expenditures aggregating $750,000. The St. Paul Railroad is asking for prices on a Williams, White & Co. No. 11 punching machine and a 24-in. x 4-in. double-wheel grinder. At least three manufacturers are in the market for tool room equipment. A hardware specialty manufacturer has purchased a 14-in. x 8-ft. lathe.

Beckwith Iron Works, 544 West Seventy-Ninth Street, Chicago, will build an addition, 40 x 180 ft., to cost $5,000.

Plans are said to be under way for rebuilding portion of plant of Belleville Enameling & Stamping Co., Belleville, Ill., recently destroyed by fire, with loss close to $200,000 with equipment.

Reliance Die & Stamping Co., 501 North La Salle Street, Chicago, has asked bids for a three-story plant, 90 x 255 ft., to cost upward of $125,000 with machinery. A. A. Wickland, 5 South Wabash Avenue, is engineer.

Samuel Olson & Co., 2418 Bloomingdale Avenue, Chicago, manufacturers of conveying and elevating machinery, pneumatic tube systems, etc., have plans for a one and two-story addition, to cost approximately $150,000 with equipment. Waller Co., 510 North Dearborn Street, is architect and engineer.

City Council, Willmar, Minn., is selecting an engineer to prepare plans for extensions and improvements in municipal electric light and power plant, and waterworks, including installation of additional machinery. Hans Gunderson is city clerk.

Atomized Fuel Corporation, 20 North Twelfth Street, Fort Dodge, Iowa, will soon begin superstructure for a new one-story plant, 35 x 126 ft., to cost about $85,000 with equipment.

Manning Light Co., Manning, Iowa, has acquired local property as site for electric light and power plant to cost $200,000, on which work will soon begin.

Viking Pump Co., Cedar Falls, Iowa, is completing plans for a one-story addition, to cost about $21,000 with equipment.

Simplex Mfg. Co., 213 West Austin Avenue, Chicago, manufacturer of roofing specialties, metal flashings, cornices, etc., has asked bids on general contract for a new one-story plant, 50 x 110 ft., to cost $35,000 with equipment. A. E. Strobel, 53 West Jackson Boulevard, is architect.

Board of Education, Rochester, Minn., is considering plans for central power and heating plant for schools to cost $130,000. Bond issue is being arranged.

Chicago, Rock Island & Pacific Railroad Co., 179 West Jackson Boulevard, Chicago, is arranging fund of $775,000 for new locomotive and car repair shops and engine houses at different points during the year. Another fund of $700,000 is being appropriated for new yards, including mechanical facilities; $6,500,000 for new equipment, and $1,650,000 for repairs and reconditioning of present equipment.

Biflex Products Co., North Chicago, Ill., manufacturer of automobile bumpers and other automotive accessories, has disposed of a note issue of $700,000, a portion of proceeds to be used for expansion. Company is acquiring all assets of L. P. Halladay Co., Decatur, Ill., manufacturer of kindred equipment, and will continue operation as a division.

Central Illinois Public Service Co., Springfield, Ill., has arranged for a bond issue of $29,000,000, portion of fund to be used for expansion and improvements, including transmission line construction.

Page Sales Service, Chicago, dealer in overhead electric travelling cranes, hand power cranes, magnetic pulleys, foundry machinery and flexible couplings, has moved its office from 14 East Jackson Boulevard to 608 South Dearborn Street.

Cincinnati

CINCINNATI, Jan. 23.

MACHINE tool builders report that business is quiet, and from present indications bookings this month will fall below those in December. However, many companies which recently raised prices anticipated a lull in buying this month, because consumers closed for equipment before the new schedule became effective. Furthermore, many industrial buyers are slow in making purchases, even though inquiries were issued some time ago. Definite signs of renewed interest on the part of automobile makers are appearing. Two companies in the Detroit district have brought a total of 13 17-in. lathes, while another manufacturer has placed an order for 12 special lathes. As soon as factories get into production on new models and ascertain the amount of business they can depend on in the early part of the year, further buying of machine tools is expected.

Aside from a sale of three engine lathes to the Missouri Pacific and another transaction involving a 5-ft. right line radial drill and a 2500-lb. single frame steam hammer for the Texas & Pacific, orders from carriers have been negligible. The Macor Car Co., Passaic, N. J., has contracted for a No. 3 axle lathe and the Lehigh Coal & Navigation Co., Philadelphia, for a No. 2 axle lathe. Many machine tool executives are of the opinion that an upward turn in business will not come before Feb. 1.

Bids have been asked by Cincinnati Street Railway Co., Dixie Terminal Building, Cincinnati, for a one-story equipment storage and distributing plant with repair facilities and automobile service and garage department, to cost $50,000 with equipment. Garber & Woodward, Leverone Building, are architects.

Department of Water, Cincinnati, is asking bids until Feb. 2 for two pumping units, capacity 30,000,000 gal. per day. Plans are under way for pumping machinery for sewage disposal plant to cost $70,000.

Volunteer State Oil Co., Atlantic and Erie Streets, Knoxville, Tenn., contemplates construction of new storage and distributing plant, with pumping station and other mechanical equipment.

Crane Enamelware Co., Chattanooga, Tenn., subsidiary of Crane Co., Chicago, is reported planning an addition in Alton Park district, to cost upward of $300,000 with machinery.

Battelle Memorial Institute, care of Otto C. Darst, 186 East Broad Street, Columbus, Ohio, architect, has plans for two research buildings including machine shop, engineering shop with electric crane, laboratories, etc. Entire project will cost close to $500,000; work to begin in spring.

Fire, Jan. 9, destroyed portion of building at 907-11 Main Street, Cincinnati, occupied jointly by C. & D. Auto Supply Co., and Pick Pen Co., with combined loss reported more than $125,000.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Feb. 6 for two electric furnaces for heat-treatment of aluminum alloys, with alternate bids for three and four such units, circular 202; until Jan. 31 for miscellaneous engine parts, circular 197; until Feb. 1 for inverted Liberty engine spare parts, circular 199 and until Feb. 3 for three dynamometer scales, 3000-lb. capacity, circular 201.

Neuhoff Packing Co., 1308 Adams Street, Nashville, Tenn., will soon begin erection of addition to cold storage and refrigerating plant to cost about $45,000.

Stowers Lumber & Mfg. Co., Harriman, Tenn., is said to have authorized plans for rebuilding portion of hardwood flooring mill and millwork plant, recently destroyed by fire with loss of $70,000. It is proposed to purchase a standard metal building; also, electric generator, motors, wood-working machinery, etc.

Wombell Automotive Parts Co., Lexington, Ky., contemplates erection of one-story addition and improvements in present plant, with installation of additional equipment.

Knoxville, Tenn., Wiley W. Thomas, purchasing agent, will receive sealed bids up to March 1 on a considerable quantity of used equipment, including pumping machinery, boilers, filters, motors, cranes, etc.

Gulf States

BIRMINGHAM, Jan. 23.

WORK will begin on a one-story addition to the plant of Mason Foundry Co., Laurel, Miss., to cost close to $30,000 with equipment.

Pasotex Petroleum Co., recently formed by Standard Oil Co. of California, 225 Bush Street, San Francisco, is reported planning construction of a new refinery near El Paso, Tex., to cost close to $750,000 with equipment.

Standard Ice Co., Houston, Tex., will build one-story ice-manufacturing plant, to cost approximately $100,000 with machinery. E. Q. Staph is consulting engineer.

Colbert County Board of Education, Tuscumbia, Ala., Robert Hudson, superintendent, has plans for a vocational school for negroes at Leighton, to cost more than $75,000 with equipment.

River Falls Power Co., River Falls, Ala., has applied for permission to proceed with construction of auxiliary steam-operated electric power plant, to cost $150,000 with machinery.

Cities Service Gas Pipeline Co., operated by Cities Service Co., 60 Wall Street, New York, has arranged for bond issue of $12,000,000, portion of fund to be used for expansion in pipe lines and properties in Texas Panhandle district, including compressor stations. Company has recently completed building a line from section noted to Wichita, Kan.

City Council, Vernon, Tex., will receive bids until Feb. 6 for one 360-hp. Diesel engine, direct-connected to electric alternator, with belt-driven exciter, switchboard and auxiliary equipment, for service at municipal light and water plant.

Houston Gas Securities Co., Houston, Tex., operating Houston Gulf Gas Co., and Houston Gas & Fuel Co., has purchased plants and properties of Southern Gas Co., San Antonio, Tex., for $3,500,000. Acquired company has begun new pipe line to Austin, Tex., and vicinity, which will be completed by purchasing organization. Latter company will also make other extensions and betterments in natural gas properties and distribution, including pipe line construction.

Florida Cold Storage Co., Orlando, Fla., is said to have plans for a new cold storage and refrigerating plant, to cost in excess of $300,000 with machinery. Lockwood, Greene & Co., Johnston Building, Charlotte, N. C., are architects and engineers. W. O. Overstreet is president.

Northern Texas Traction Co., Third and Main Streets. Fort Worth, Tex., is said to be planning a new bus terminal, with service, repair and garage divisions for motor bus service, to cost in excess of $200,000 with equipment.

Central Power & Light Co., First National Bank Building, Victoria, Tex., has plans for extensions and improvements in ice-manufacturing plant. Ice conveyor will be installed in connection with other equipment.

Central States Power & Light Co., Kahl Building, Davenport, Iowa, has purchased four ice-manufacturing plants of Laurel Ice & Packing Co., Laurel, Miss., two being located at Laurel; one at Ellisville, Miss., and another at Heidelberg, Miss. New owner is reported planning expansion and improvements, including installation of new equipment.

Phillips Petroleum Co., Bartlesville, Okla., will construct and operate three new plants for production of carbon black, in Carson, Hutchinson and Gray Counties, respectively, each to include machine and mechanical shops, tool houses, equipment storage and distributing plants, pipe lines and compressor stations. It is proposed to have units completed within six months, with cost placed in excess of $250,000 with equipment.

City Council, Orlando, Fla., is said to have plans under way for municipal airport on 50-acre tract at Lake Underhill, recently acquired, with hangars, machine repair and mechanical shops, pumping station and other buildings, to cost in excess of $100,000 with equipment.

East Plains Gas Co., Amarillo, Tex., is planning construction of a pipe line about 60 miles long, for natural gas service at Wewaka, Farnsworth, Spearman and vicinity, to cost $350,000 with equipment.

Seaboard Coal Co., 25 Broad Street, New York, is reported planning construction of coal terminal on former site of plant of Alabama Drydock & Shipbuilding Co., Mobile, Ala., with elevator type of loading equipment, conveying machinery and other mechanical equipment, to cost about $150,000.

Canadian Ice Co., New Orleans, is completing plans for one-story ice-manufacturing plant, 60 x 120 ft., to cost close to $100,000 with machinery.

Contractors' Rock Asphalt Co., John Wills, 913 South Fortieth Street, Birmingham, recently organized with capital of $275,000, is planning development and operation of asphalt mines in vicinity of Florence, Ala., to cost in excess of $75,000.

Pittsburgh

PITTSBURGH, Jan. 23.

ORDERS have been coming in fairly well for machine tools on which original inquiries were made the latter part of last year. Some dealers already have put the month down as a good one and there are few who do not report improvement in sales compared with December. An exceptionally lively inquiry is noted for heavy rolling mill equipment, although for the most part prices asked at this time are chiefly for estimating purposes.

Carnegie Steel Co. has revived the project of an open-hearth furnace plant for its Mingo, Ohio, works, which it is believed will mean installation of a new blooming mill, besides cranes and other auxiliary equipment. Jones & Laughlin Steel Corporation is said to have elaborate plans on paper for betterments and extensions at its Aliquippa works. Mention is made also of another seamless pipe unit at Gary works of the National Tube Co.

American Rolling Mill Co., Middletown, Ohio, has bought 50 type CL carbon circuit breakers, capacities ranging from 1200 to 10,000 amperes, from Westinghouse Electric & Mfg. Co.

Contract has been let by Automatic Gas-Steam Radiator Co., Fulton Building, Pittsburgh, to Rust Engineering Co., 311 Ross Street, for a one-story plant, 100 x 200 ft., to cost $55,000 with equipment.

Board of Education, Farrell, Pa., contemplates installation of manual training equipment in new high school to cost $500,000, for which plans will soon be prepared. H. W. Bovard, president.

Chicago Pneumatic Tool Co., Franklin, Pa., is continuing expansion program at its local plant and has let contract to Hughes-Foulkrod Co., 421 Seventh Avenue, Pittsburgh, for two one-story additions, 40 x 53 ft., and 35 x 70 ft., to be equipped as a foundry and power house, respectively, to cost in excess of $75,000. Headquarters are at 6 East Forty-fourth Street, New York.

Dravo Contracting Co., Neville Island, Pittsburgh, plans immediate expansion in its steel barge plant at Wilmington, Del., including construction of four additional shipways, wth shops and operating facilities.

Milwaukee

MILWAUKEE, Jan. 23.

EVIDENCES of an improving demand for machine tools are appearing, and the volume of sales is growing more satisfactory as the season advances. Interest among automobile manufacturers is showing a healthy increase following the national and local shows. There is no disposition to buy heavily, but the fact that some shops are now going beyond urgent replacement needs is regarded as encouraging. Inquiry generally is improved and the trade considers February prospects relatively good.

Metro-Nite Co., Hammond and Hopkins Avenues, North Milwaukee, Wis., manufacturer of paint ingredients from stone, is letting contracts for equipment of a $50,000 addition. Requirements include one bucket elevator, screw conveyor, pan conveyor, belt return conveyor and several 65-ton steel bins. Contract for set of screens has been placed with Sturtevant Mill Co., Boston, Mass.

Allover Mfg. Co., 1200 Irving Place, Racine, Wis., manufacturer of hair clippers, expects to make immediate repairs and replacements to offset damage of $10,000 or more to plant and equipment on Jan. 16.

Northwestern Motor Co., Eau Claire, Wis., builder of heavy-duty gas engines, is erecting a one-story addition, 50 x 66 ft. General contractors are Walker & Olson, 716 Churchill Street, local.

J. A. Barnes Machine Co., 123 Marion Street, Oshkosh, Wis., has sold its machine shop and real estate to Oshkosh Auto Parts Co., and is preparing to build a new shop early in spring.

Manitowoc Board of Industrial Education, Manitowoc, Wis., is about to select an architect to make plans and estimates for new unit of vocational training school, to cost $250,000 with equipment. A. L. Nimtz is vocational director.

Common Council, Stoughton, Wis., has engaged Power Engineering Co., Minneapolis, Minn., to take charge of modernizing municipal electric light and power plant and recommend replacement equipment. Work is estimated to cost upward of $30,000.

Wisconsin Power & Light Co., Madison, Wis., has been granted permission to construct and operate a 20,000-hp. hydroelectric generating plant on Wolf River, in Menominee Indian Reservation, near Shawano, Wis. Mead & Seastone, Madison, Wis., are consulting engineers.

Terminal Warehouse Co., 274 South Water Street, Milwaukee, is preparing to call for bids about Feb. 15 for construction of a new storage building, 147 x 323 ft., five stories and basement, accommodating railroad tracks, and 420 ft. of docks at West Water and Buffalo Streets. Investment will exceed $1,000,000. E. D. Fryer is president and general manager.

Adjutant General's Department, State of Wisconsin, Madison, will be ready for bids Feb. 18 for construction and equipment of a waterworks system in State military reservation at Camp Douglas, Wis., to cost $70,000. Specifications include two 200-gal. electric motor-driven pumping units, 50,000-gal. steel storage tank, 8000 lin. ft. of 6-in. cast iron mains. Work is in charge of Maj. Henry C. Hengels, State military architect, 445 Milwaukee Street, Milwaukee.

Board of Industrial Education, Neenah, Wis., has directed John D. Chubb, architect, Chicago, to revise plans for new senior high and vocational training school to cost $250,000. Original bids were rejected and new bids will be taken about Feb. 15. Mrs. J. F. Dillingham is secretary of board.

Cleveland

CLEVELAND, Jan. 23.

A FAIR amount of activity in machine tools has developed in the automotive industry in Detroit the past week. Stimulation of the market in that city appears to be due to increase in motor car production. Automobile companies which placed fair sized orders include the Ford Motor Co., which bought special machinery for making rear axles; Dodge Brothers, Inc., equipment for increasing manufacturing capacity for one of its models; and Packard Motor Car Co.

In this territory there is a moderate demand for single tools. Some business in vertical milling machines and shapers is coming from rubber mold manufacturers in Akron. The Firestone Tire & Rubber Co. has announced that equipment for its new Los Angeles plant will be purchased on the Pacific Coast. Turret lathes continue to move in fair volume, a local manufacturer having taken quite a few single machine orders since the recent price advance.

Contract has been let by Forest City-Walworth Foundries Co., 4500 Euclid Avenue, Cleveland, to Super-Built Construction Co., 1836 Euclid Avenue, for a two-story addition, 85 x 100 ft., to cost about $50,000 with equipment. Paul Schmidt, address noted, is engineer.

Sanymetal Products Co., Urbana Road, Cleveland, has awarded general contract to Austin Co., for a one-story addition, 75 x 220 ft., to cost about $70,000 with equipment.

Baltimore & Ohio Railroad Co., Baltimore, is planning construction of a locomotive house with repair facilities, power plant, steel water tank and tower, and other mechanical facilities at Youngstown, Ohio, to cost upward of $250,000. Work will be carried out in connection with expansion program in this district to cost approximately $1,000,000.

Mills, Rhines, Bellman & Nordhoff, Ohio Building, Toledo, architects, have plans for a two-story automobile service, repair and garage building to cost close to $100,000 with equipment.

Officials of Fairfield Engineering Co., Marion, Ohio, manufacturer of mechanical equipment, have formed Grain Mfg. Co., to manufacture special farm equipment for production of grain products. A portion of Fairfield works will be given over to production. H. B. Walker is president and treasurer.

Cleveland Railway Co., Hanna Building, Cleveland, has awarded general contract to Austin Co., for three-story automobile service, repair and garage building, 100 x 125 ft., to cost about $200,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Street, are architects and engineers.

Artcraft Sign Co., East Kibby Street, Lima, Ohio, is considering construction of a one and two-story addition, 60 x 180 ft., to cost more than $40,000. A two-story office building, 60 x 70 ft., is also planned.

Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, will soon begin erection of four-story power substation, 56 x 130 ft., to cost $100,000 with equipment.

General Instrument Co., Akron, Ohio, has been organized to manufacture oil, gasoline and other liquid gages for industrial purposes. It will also make indicating gages for domestic oil burners and dash gages for automobiles. No plant will be built at present, but company will assemble parts purchased elsewhere, particularly die castings and stampings.

Indiana

INDIANAPOLIS, Jan. 23.

PLANS are being considered by Ames Shovel & Tool Co., Anderson, Ind., for three one-story additions, to cost close to $100,000 with equipment. Work is expected to begin early in summer. E. F. Miller, Farmers' Trust Building, is architect. Headquarters are at 1 Court Street, Boston.

V. M. Nussbaum & Co., 220 Montgomery Street, Fort Wayne, Ind., have inquiries out for a 200-kva. steam engine-generator set, non-condensing engine unit, generator to be 220-volt, 3-phase, 60-cycle.

Fire, Jan. 20, destroyed portion of plant of Case Radio Co., Marion, Ind., operated by Indiana Mfg. & Electric Co., with loss reported at $250,000 including equipment; boiler plant also destroyed.

Bishop, Knowlton & Carson, 312 North Meridian Street, Indianapolis, architects, have completed plans for three-story and basement automobile service, repair and garage building, to cost about $100,000 with equipment.

Parts Corporation, 733 Virginia Avenue, Indianapolis, manufacturer of automobile parts, has plans for two-story addition, 35 x 225 ft., to cost approximately $60,000 with equipment. Foltz, Osler & Thompson, J. F. Wild Building, are architects.

Following recent organization of Servel, Inc., Evansville, Ind., to take over and operate Servel Corporation, manufacturer of electric refrigerating equipment, plans are being arranged for concentration of all production at local plant, including motor-driven compressor type and electrolux absorption type refrigerating units and parts. Other works will be discontinued. Col. Frank E. Smith is president of new company, and W. F. Thatcher, vice-president.

J. W. Lanahan and G. R. Dumphy, Vincennes, Ind., automobile dealers, have purchased a half block of property in business district and plan erection of multi-story service, repair and garage building, to cost close to $100,000 with equipment.

City Council, Muncie, Ind., plans installation of pumping machinery, power and other equipment in connection with proposed sewage disposal works, to cost more than $2,000,000. Pearce, Greeley & Hanson, 6 North Michigan Avenue, Chicago, are engineers.

St. Louis

ST. LOUIS, Jan. 23.

PLANS are being considered by Gould Castings Corporation, Gould Road and Quincaro Boulevard, Kansas City, Kan., for one-story foundry addition, to cost about $25,000 with equipment.

Southwestern Sales Corporation, Atlas Life Building, Tulsa, Okla., has approved plans for a one-story generating plant, to cost more than $40,000 with equipment. Charles S. Dilbeck, Tulsa Building & Loan Association Building, is architect.

Galion Iron Works & Mfg. Co., 1321 West Ninth Street, Kansas City, Mo., has arranged for increase in capital from $1,500,000 to $3,000,000, portion of fund to be used for expansion.

Central States Utilities Corporation, operating Central States Pipe Line Corporation, Wetumka, Okla., and other electric light and power utilities in Oklahoma, Missouri, Arkansas, Iowa, and other States, is arranging for bond issue of $3,000,000, portion of fund to be used for expansion and improvements, including transmission line construction.

Neligh Electric Light Co., Neligh, Neb., has approved plans for a steam-operated electric power plant, 40 x 110 ft., to cost approximately $100,000 with equipment.

J. A. Semmelmeyer Belting Co., 6630 Waterman Avenue, St. Louis, manufacturer of mechanical belting, is considering erection of one-story addition, 100 x 120 ft., to cost close to $40,000 with equipment.

National Milling Co., 2221 Front Street, Toledo, Ohio, is reported planning a new flour mill at Kansas City, Mo., to cost more than $600,000 with machinery. Company is affiliated with National Biscuit Co., New York.

Camden Ice & Coal Co., Camden, Ark., has engaged George E. Wells, Security Building, St. Louis, consulting engineer, to prepare plans for rebuilding portion of ice-manufacturing and cold storage plant recently destroyed by fire.

Board of Education, Wellington, Kan., plans installation of manual training equipment in new high school to cost $275,000, for which plans are being completed by Schmidt, Boucher & Overend, Fourth National Bank Building, architects.

Continental Gas & Electric Corporation, Kansas City, Mo., operating Kansas City Power & Light Co., Iowa-Nebraska Light & Power Co., Panhandle Power & Light Co., and other utilities, is disposing of bond issue of $36,000,000, portion of fund to be used for expansion in power plants and system.

Ovens, power equipment, conveying and other machinery will be installed in new plant, 140 x 150 ft., to be erected at Tulsa, Okla., by C. J. Patterson Corporation, 4050 Penn Street, Kansas City, Mo., baker, to cost close to $100,000; and in similar plant of like size at Oklahoma City, Okla., to cost same amount.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., is said to be arranging an appropriation of $250,000 for extensions in engine house and shops, freight houses and yards at San Angelo, Tex., with installation of additional equipment. H. W. Wagner is chief engineer.

Detroit

DETROIT, Jan. 23.

OFFICIALS of Hess Aircraft Co., Wyandotte, Mich., have formed Alliance Aircraft Co., to acquire property at Alliance, Ohio, for new plant for assembling, for which site will soon be secured. It is reported to cost in excess of $40,000.

Pere Marquette Railroad Co., Detroit, has awarded general contract to Owen-Ames-Kimball Co., Grand Rapids, Mich., for extensions and improvements in engine house and shops at Grand Rapids, to cost about $75,000 with equipment.

Monroe Paper Products Co., West Street and Elm Avenue, Monroe, Mich., is considering a one-story addition to cost more than $50,000 with equipment.

Grand Trunk Railway Co., 400 East Jefferson Street, Detroit, is arranging an expansion and improvement program to cost in excess of $10,000,000. Portion of work will comprise extensions at its Pontiac shops and yards, including new engine terminal, machine shops, turntable, power house building and equipment, coaling facilities, standpipes, to cost more than $750,000 with equipment. Company will also install an electric block signal system on line between Battle Creek, Mich., and Granger, Ind., to cost close to $245,000 with equipment.

Detroit Stoker Co., General Motors Building, Detroit, has plans for a two-story addition at Monroe, Mich., to cost about $25,000. Reed M. Dunbar, Kiburtz Building, Monroe, is architect.

John R. Kerby, village clerk, Grosse Pointe Farms, Mich., is asking bids until Feb. 20 for pumping machinery with capacity of 31,650 gal. per min., with accessory equipment, for sewage system. Hubbell, Hartgering & Roth, Buhl Building, Detroit, are consulting engineers.

Michigan Electric Power Co., Bad Axe, Mich., is arranging an expansion and improvement program in Thumb district to cost about $500,000, including extensions in power plants and transmission lines. E. L. Edwards is general manager.

Bowen Products Corporation, 2760 West Warren Avenue, Detroit, manufacturer of lubricating devices, grease cups, etc., will soon begin work on a one-story and basement addition to cost $30,000, for which general contract has recently been let to M. J. Hoffman Construction Co., 7147 West Warren Avenue.

Edward Goff, Pontiac, Mich., local representative for Cadillac automobile, including Royal Oak and Birmingham districts, has secured property on West Huron Street for a service, repair and sales building, to cost $200,000 with equipment. Work will begin early in spring.

Kurth & Knapp Mfg. Co., Inc., Detroit, fabricator of steel and sheet metal, has moved into its new plant and office at Canfield Avenue and Moran Street.

Canada

TORONTO, Jan. 23.

MACHINE tool business is more active, with sales running mostly to single items which total a good volume. Inquiries are of a diversified nature and come from many sections of the Dominion. Demand from the mining fields of northern Ontario has improved considerably since the first of the year, and there is a steady inquiry for equipment for milling plants, etc. The automotive industry is the chief buyer at present with railroads running a close second, purchasing more extensively for replacement needs and for shops under construction. Improvement among manufacturing interests has been reflected in a stronger demand for small tools.

H. A. Brown, vice-president General Motors of Canada, Ltd., Oshawa, Ont., states that Walkerville plant of corporation, which has been idle four years, will be reopened early in February. Slightly more than one-half capacity will be put into operation as soon as machinery can be installed, major portion to be used for coach and truck division. A complete line of trucks, bus bodies and cabs will be made. Other space will be devoted to manufacture of front axles for Chevrolet and Pontiac cars. It is intended to remove entire manufacturing of General Motors trucks from Oshawa, Ont., to Walkerville, which will provide more room for expansion of other lines at Oshawa works.

Fraser Companies, Ltd., will start work immediately on erection of a $2,000,000 mechanical pulp mill at Edmunston, N. B., which is expected to be in operation by end of year. Enlargement of sulphite mill is already under way. Further official announcements are expected soon respecting establishment of other pulp and paper mills on Restigouche or Miramichi River in New Brunswick.

Corrugated Cattle Cake & Cotton Seed Oil Co., 66 Temperance Street, Toronto, will start work in spring on erection of a factory and mill at Huntsville, Ont., to cost $100,000. It will be two stories, 100 x 310 ft., steel and brick construction. T. Walsh, manager, is receiving bids until Feb. 10 on erection of like plant at Weston, Ont.

Western Canada

Quaker Oats Co. is planning erection of large mill at Saskatoon, Sask., on which work will start in spring.

Construction will start at once on erection of a plant at St. Boniface, Man., for Great West Paper Mills Co., to cost $300,000. Box board and building paper will be produced.

Pacific Coast

SAN FRANCISCO, Jan. 18.

CONTRACT has been let by Austin-Western Road Machinery Co., Los Angeles, to William P. Neill Co., Inc., 4814 Loma Vista Street, for one-story plant in central manufacturing district, 100 x 150 ft., to cost about $40,000 with equipment.

Municipal Power & Light Bureau, South Broadway, Los Angeles, has plans for a new power substation and distributing plant at Venice, Cal., to cost about $220,000, of which approximately $150,000 will be used for equipment. E. F. Scattergood is chief engineer.

Goodrum & Vincent, Santa Monica, Cal., local representatives for Buick automobile, have awarded general contract to H. M. Roth Construction Co., National Building, for a two-story service, repair and sales building, 150 x 150 ft., to cost $160,000 with equipment.

Utah Asphalt Corporation, Price, Utah, care of John F. Cregon, Third Street and North Grand Avenue, Pueblo, Colo., engineer, has plans for a rock asphalt mining plant, including power house, machine shop and other units, to cost $750,000 with machinery.

Washington Gas & Electric Co., Longview, Wash., has arranged for bond issue of $1,250,000, portion of proceeds to be used for extensions in power plant and transmission system.

Pacific Asbestos & Supply Co., 315 Front Street, Portland, has authorized plans for rebuilding portion of plant recently destroyed by fire, with loss reported at $50,000 including equipment.

Valley Motor Co., Salem, Ore., has work under way on a one-story service, repair and garage building, 157 x 220 ft., to cost close to $100,000 with equipment.

Smokeless Fuel Co., Salt Lake City, Utah, is completing plans for construction of first unit of new plant, to cost in excess of $200,000 with equipment. Other units will be built later, with entire cost placed at $1,000,000.

Board of Education, Glendale, Cal., will build vocational shop and power house in connection with new group of eight high school buildings to cost $1,200,000. Alfred F. Priest, Fay Building, Los Angeles, is architect.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has applied for permission to construct and operate a hydroelectric power plant on Feather River, Butte, Plumas and Sierra Counties, comprising group of eight generating stations, with gross capacity of 360,000 hp. Entire project with transmission lines will cost in excess of $15,000,000. Company has secured permission to dispose of stock issue of $6,460,000, portion of fund to be used for extensions and improvements.

Sperry Flour Co., 141 California Street, San Francisco, has awarded general contract to C. F. Dinsmore & Son, Ogden, Utah, for new factory branch at Ogden, with storage warehouse, grain tanks, etc., to cost about $250,000, including mechanical handling equipment.

Continental Can Co., with branch works in Seattle, has purchased plant of Seattle-Astoria Iron Works, Seattle. Latter company specialized in manufacture of automatic can-making and canning machinery for food and other dry products. Capital stock of Seattle-Astoria Iron Works was $500,000, and its transfer to Continental Can Co., will be made by an exchange of stock in each company. Continental Can Co. recently purchased Los Angeles Can Co., Los Angeles, G. N. Easton Can Co., San Jose, Cal., and Seattle Can Co., Seattle.

Washington Iron Works, Seattle, founder, machinist and boiler maker, is adding a forge shop to its new plant at Sixth Avenue South and Atlantic Street. It will be 48 x 150 ft. and will cost about $50,000. When completed, equipment will be removed from former forge shop and a new Mahr forging billet heating furnace installed.

Bids are being taken on a $750,000 plant at Cajon Pass for American Portland Cement Co., Story Building, Los Angeles.

Offices of Pacific Coast Steel Co., San Francisco, have been moved from Rialto Building to Hunter-Dulin Building.

United States Steel Products Co. has moved its Portland, Ore., offices to new headquarters at Thirty-third and Nicolai Streets. E. R. Eldridge is manager in this district.

Seattle branch of Allis-Chalmers Mfg. Co., Milwaukee, Rex T. Stafford, manager, has plans for new steel and concrete building, 60 x 150 ft., in which company will manufacture Texrope drive, which it is making in its present shop on leased ground. New plant is to be built on property owned by company. Equipment will include 15-ton electric crane.

Foreign

ARRANGEMENTS are being made by Westphalia United Electric Co., Berlin, Germany, for sale of bond issue of $20,000,000 in United States, under direction of Harris, Forbes & Co., 56 William Street, New York, bankers, proceeds to be used for expansion and improvements in power plants and system.

Company recently formed at Muzquiz, Coahuila, Mexico, has plans for a hydroelectric power project on San Juan River where site has been secured, and it is purposed to award contracts for construction and equipment at an early date. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Mexico No. 26500; also at American Consulate, Piedras Negras, Mexico, Oscar C. Harper, vice-consul.

Municipal Council at Prague, Czechoslovakia, has plans for construction of a brick-manufacturing plant at Jinonice where property with raw material deposits has been secured. Initial works will have annual output of 30,000,000 brick. Information at office of American Consulate, Prague; K. L. Rankin, assistant trade commissioner.

Government of Colombia, South America, is planning purchase of locomotives, rails, railroad cars, steel barges, concrete mixers, trucks, pipe and other construction equipment for building of railroads, waterways, highways, etc., with such machinery estimated to cost more than $2,500,000. Details at Colombian Government Bureau of Information, 1440 Broadway, New York.

Officials of General Electric Co., Schenectady, N. Y., and Electric Bond & Share Co., 2 Rector Street, New York, have formed Italian Superpower Corporation, an affiliated interest, to take over and develop light and power properties in Italy, including acquisition and expansion of existing hydroelectric properties and other power utilities. Plans are said to be under way for sale of bond issue approximating $30,000,000, considerable portion of proceeds to be used for power expansion and development. L. K. Thorne, president, Bonbright & Co., Inc., 25 Nassau Street, investment securities, will be chairman of board and president of new company.

NEW TRADE PUBLICATIONS

Railroad Equipment.—Worthington Pump & Machinery Corporation, 115 Broadway, New York. Bulletin No. W P-1000, dealing with railroad products. Included are pumps, air compressors, steam condensers, oil engines, water and oil meters, locomotive feed water heaters and pumps and open stationary feed water heaters.

Alloy Iron and Steel.—International Nickel Co., New York. Three pamphlets, Nos. 11, 203 and 204, have recently been issued, dealing respectively with "Notes on Machining Alloy Steel," "Effect of Nickel on Machinability of Cast Iron" and "Economic Value of Nickel in Cast Iron." The first is by Thomas H. Wickenden, the second by D. M. Houston, and the third is written by another member of the staff of the development and research department of the company. They are all well illustrated.

Pyrometers.—Pyrometer Instrument Co., 74 Reade Street, New York. An eight-page pamphlet describes the simplified pyro optical pyrometer which the company has recently developed.

Facts About Refractory Mortar.—Denver Fire Clay Co., Denver, Colo. Pamphlet discussing the essential properties of mortars for bonding fire brick in furnace and boiler settings. Describes the company's preparations which have high melting point, low changes in volume and strength at heat and good resistance to corrosive agencies.

Steel Castings.—Commercial Steel Casting Co., Marion, Ohio. Illustrated 16-page pamphlet showing various types of open-hearth castings produced and some of the equipment.

Welding and Cutting Equipment.—Torchweld Equipment Co., 224 North Carpenter Street, Chicago. Catalog, 32 pages, 4 x 9 in., illustrating interior construction of oxy-acetylene blowpipes and regulators. Full line of auxiliary equipment is listed and priced.

Design of Furnaces for Pulverized Coal.—Combustion Engineering Corporation, 200 Madison Avenue, New York. 8-page pamphlet emphasizing the necessity of turbulent mixing of fuel with preheated air in order to burn pulverized coal efficiently. Data on wall temperatures and notes on maintenance of boiler settings are also included.

Spectrographic Analysis.—Adam Hilger, Ltd., 24 Rochester Place, Camden Road, London, N. W. 1, England, 10-page pamphlet containing reports from eight different laboratories, citing their ability to detect impurities in metals of the magnitude of 0.001 per cent. Also a list of applications to commercial metallurgical analysis, and a brief description of the necessary equipment.

Worm-Gear Speed Reducers.—W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago. Catalog 35 of 56 pages is devoted to speed-reducing units involving worm gears. Many of the illustrations are from installations used in plants of wide variety. Details of the equipment are shown, together with price lists, clearance diagrams and a large amount of tabular matter indicating sizes to be used for varying conditions.

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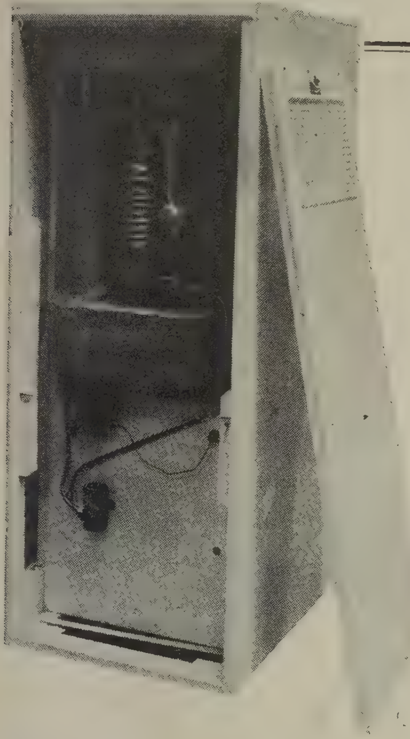

Stampings Welded Into Complex Units

Moderate Investment in Machines and Equipment Produces Compact, Efficient and Reliable Parts for Iceless Refrigeration Units

BY ALAN G. WIKOFF*

SOME notable achievements have been accomplished in recent years by firms making various kinds of domestic refrigeration units, not the least being the ability to compress in very small compass the necessary mechanical and chemical units, so built and assembled as to be entirely automatic in operation. Numerous makes are now marketed, the results of marked ingenuity by designer and constructor.

One interesting variety operates on the so-called gas-fired absorption system. The entire device is made of thin-walled tubing and sheet metal stampings, with all joints welded. In the diagram the various parts are sketched in the location and shape they assume in the completed unit, except that the condenser and the liquid heat exchanger are rectangular coils respectively at top and bottom of the boiler.

The whole system operates at about 15 atmospheres pressure, high enough so ammonia gas will liquefy at the temperature of the cooling water, which may be tepid. Therefore it is essential that the complex system of pipes and chambers be absolutely tight—a pin hole leak at any joint would speedily render the outfit inoperative. As observed at the plant of Servel, Inc., oxy-acetylene welding is used almost exclusively in the construction, because of its ability to make sound joints and to assemble complex devices from simple units.

Construction of Parts

A Servel unit consists of seven principal parts: Boiler *B*; absorber *A* and evaporator *E* (which are similar); condenser *C* and liquid heat exchanger *L* (which are pipe coils); rectifier *R*; and gas heat exchanger G.

Absorber *A* and evaporator *E* are made of sheet

Plant for Making Gas Absorption Refrigerator Units

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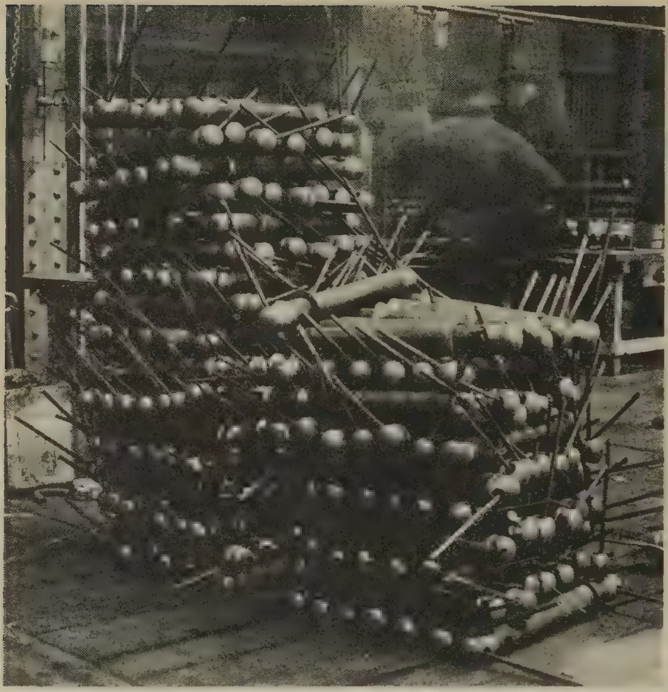
*Linde Air Products Co., 30 East Forty-Second Street, New York.



STOCK of Gas Heat Exchangers, with Pipes for Delivering Liquid Ammonia from Rectifier to Evaporator Protruding from Either End

metal stampings. A wrapper sheet, properly punched for side openings, is closed into a cylinder and a longitudinal seam made. A series of self-spacing stampings, the trays, is then slipped inside and fixed in place by spot welding. Sheet metal cups welded on top and bottom form the domed ends.

Gas heat exchanger *G* is built as follows: Several pieces of thin-walled steel tubing, about ¼ in. in diameter, cut to length, are slipped into corresponding holes in end diaphragms, and expanded enough for a tight fit. A longer tube for liquid ammonia is threaded through the last open hole, the entire nest is pushed into a longer tube about 2½ in. in diameter, where it fits snugly, and the protruding ends of the ammonia tube are bent upward. Over these ends cup-shaped stampings are slipped and welded to the outer casing forming the ends of the exchanger. A flange is also welded to the casing for attaching the refrigerator partition. Openings for the various connections are, of course, punched before the individual parts are assembled.

The rectifier *R* is made of two pieces of tubing, one short and straight, the other smaller in diameter and bent into a U after three holes for connections have been punched in the sides. Round disks are welded over one end of each of these tubes. A series of perforated stampings is then slipped over one arm of the bent tube, spot-welded top and bottom, and the outer tube is put in place. A ring welded to both tubes closes the annular space at the bottom.

First Assembly

Assembly starts with the parts that have just been described. A coil of copper pipe for cooling water is

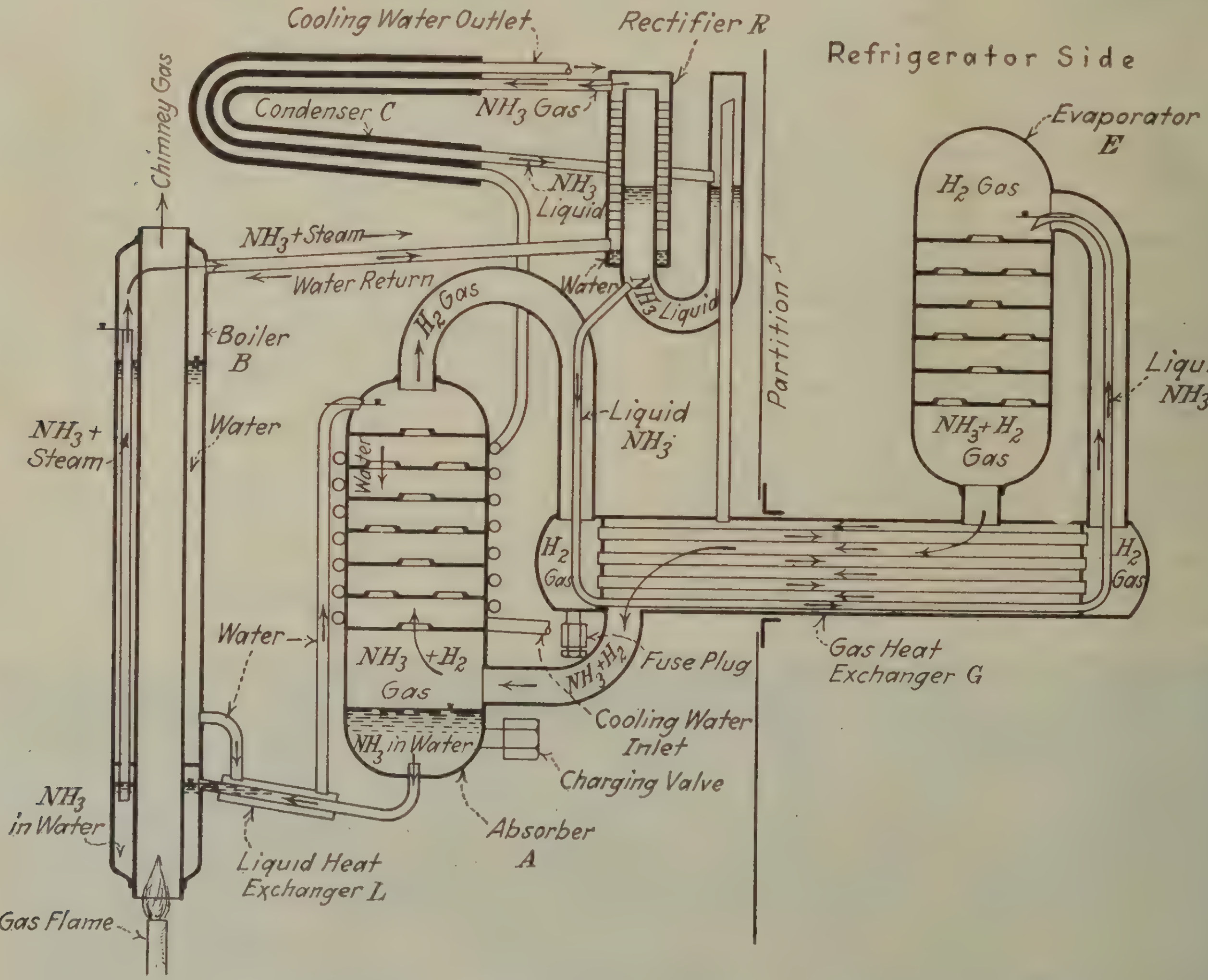

Cooling Water Outlet
Rectifier R
Refrigerator Side
Chimney Gas
Condenser C
NH3 Gas
Evaporator E
NH3 Liquid
H2 Gas
NH3+Steam
Water Return
Water
NH3 Liquid
H2 Gas
Boiler B
Partition
Liquid NH3
NH3 + Steam
Water
Water
Liquid NH3
NH3+H2 Gas
H2 Gas
H2 Gas
Water
NH3 +H2 Gas
NH3+H2
Fuse Plug
Gas Heat Exchanger G
Cooling Water Inlet
NH3 in Water
Charging Valve
NH3 in Water
Absorber A
Liquid Heat Exchanger L
Gas Flame

Diagram Showing Construction and Operation of Servel Unit

CONCENTRATED ammonia solution (NH_3 *in water) in the bottom part of the boiler B on being heated drives ammonia gas* (NH_3) *and steam up through vent pipe at side of boiler across to rectifier R, where the steam condenses on the little shelves and trickles back into the top portion of boiler. Ammonia gas passing into the condenser C is cooled and liquefied, the liquid ammonia returning to the other leg of the rectifier R. From here it is piped to evaporator E, and, dripping from tray to tray, changes from liquid to gas, absorbing heat and thus cooling the refrigerator. The mixture of ammonia and hydrogen gas* (NH_3 *and* H_2) *in the evaporator E is heavy and settles into the absorber A by way of the gas heat exchanger G. In the absorber A, ammonia gas is washed out of the gas mixture by the water condensate overflowing from the boiler and trickling from tray to tray. Hydrogen gas* (H_2) *returns to the evaporator E.*

slipped over absorber *A* and held in place by clips welded to the wall. Two curved tubes connecting absorber *A* and gas heat exchanger *G* are then welded and to this is added the evaporator *E*. An interesting work-holding fixture used for many of the assembly operations is a swivel vise mounted on a substantial pipe standard so it can be turned in any direction. With this arrangement the position of the work can be quickly changed by the operator with hardly any interruption to the welding.

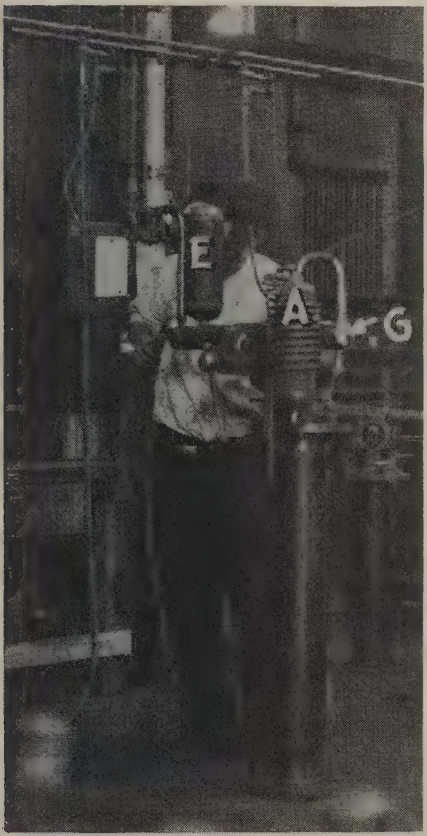
Attaching the rectifier, using a jig, completes the first assembly.

What might be called the hydrogen circuit is now completely assembled. It is tested for tightness by closing with clamps and gaskets any openings to which connections will be made later, and subjecting it to 800 lb. per sq. in. air pressure. Every joint is painted with soap solution; absence of bubbles indicates tight joints. After receiving its O. K. the unit goes to the galvanizing and tinning department, where the refrigerator side up to the partition is galvanized. A heavy coating of tin is applied to the absorber condenser coil by dipping, for the purpose of increasing the metallic contact between copper water coil and the absorber. This insures more efficient heat exchange between the cold water and the gases inside the absorber.

Coils

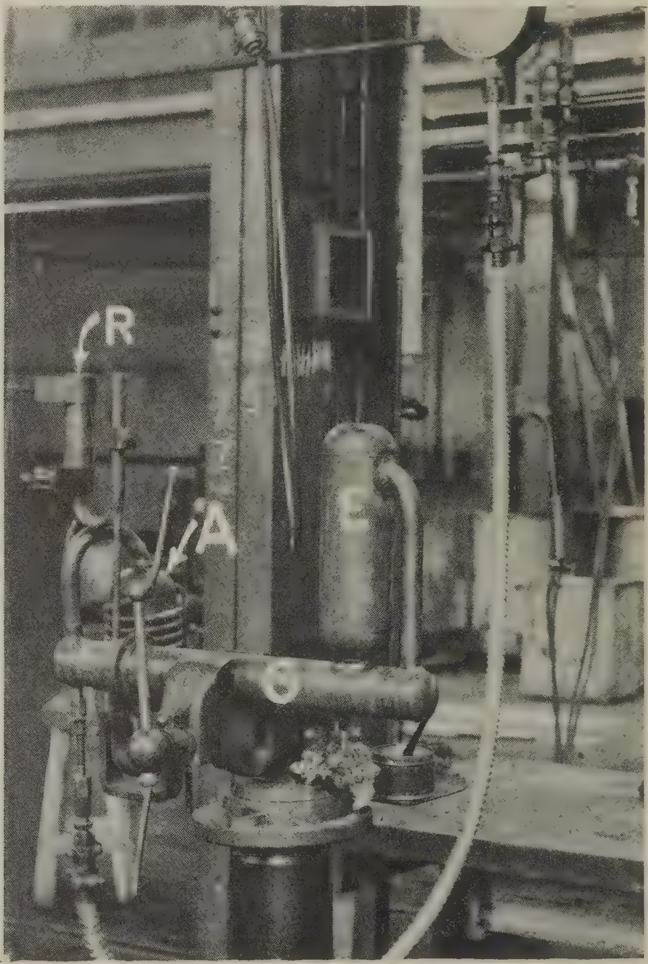
Liquid heat exchangers *L* are made simply by thrusting a small steel pipe through a larger one, welding the ends of the outer pipe to the inner, and bending them into a rectangular coil of about five turns. The condenser *C* is made as follows: A length of steel tubing to carry the ammonia and another of copper to carry cooling water are placed side by side and made into a rectangular coil of about three turns. It thus consists of alternate turns of steel and copper tubing, held together by steel clips tack-welded to the steel tubing. To increase metallic contact and thus give better heat transfer, the coil is dipped into molten tin which solders the pipes together. A strand of twisted copper wire is then placed in the space between adjacent coils and covered with soft solder applied with a welding blow-pipe.

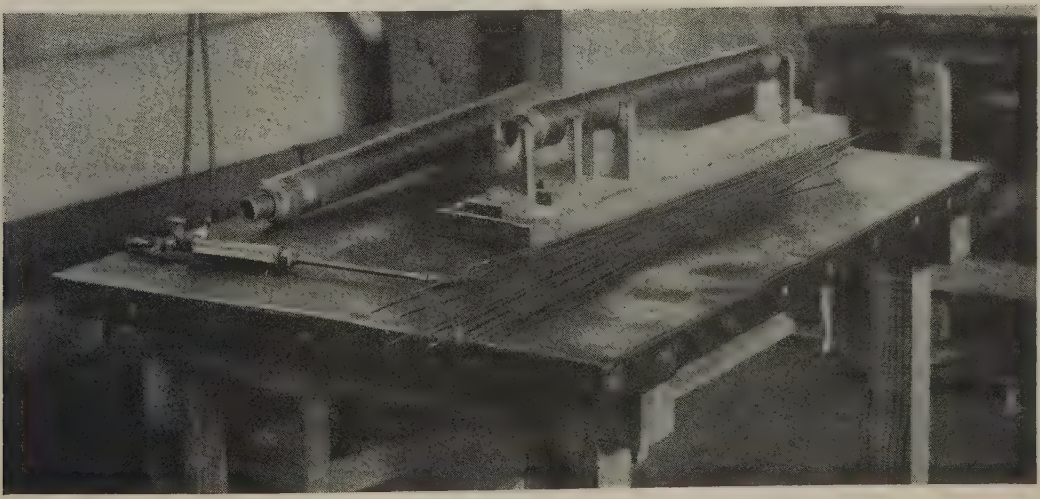
Boiler *B* is a jacketed tube. Over the inner chimney is slipped a sheet metal washer or annular diaphragm, and welded on. A small diameter tube for carrying ammonia and steam from the lower compartment is



(Above) Operator Welding Connections Between Evaporator E and Gas Heat Exchanger G

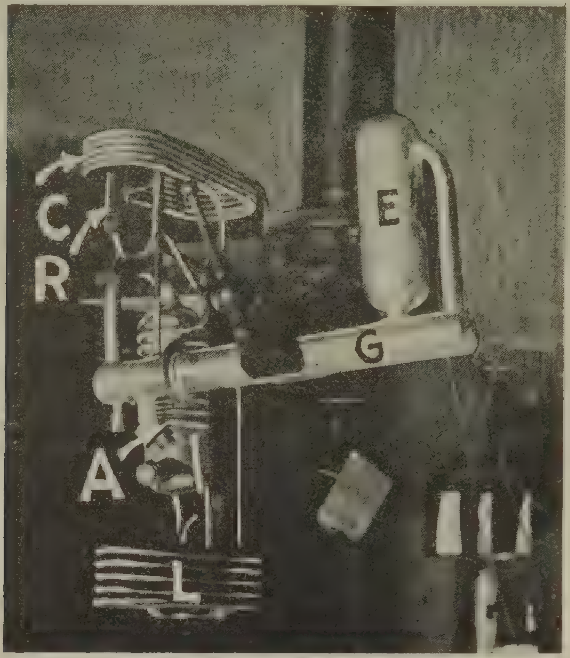
(At Right) First Assembly Under Pressure Test. Openings in rectifier R closed by clamps and gasket



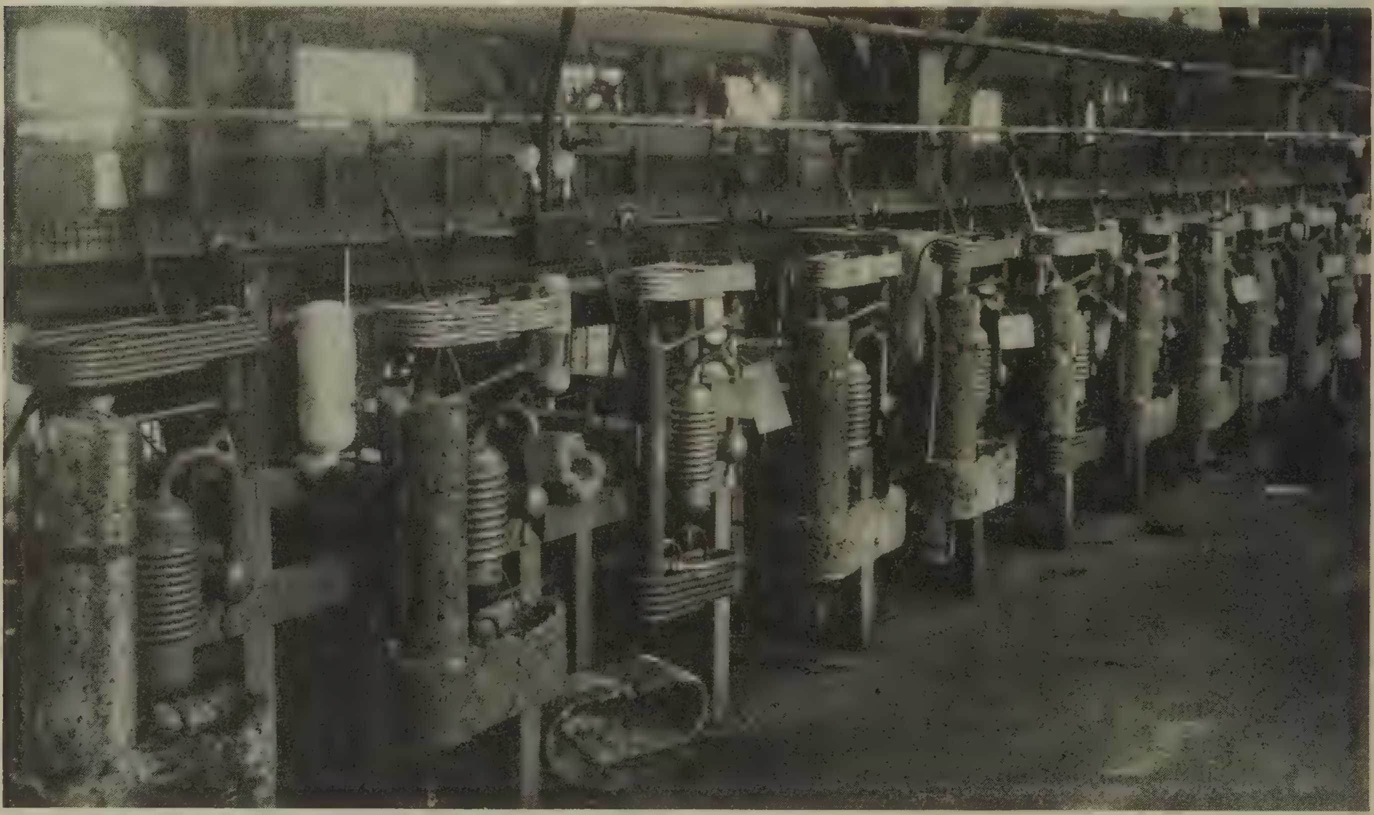


(At Left) Simple Work-Holder for Making Boiler

then thrust through a hole in the diaphragm and welded in place. Then one short and one long tube, each with one end swaged down, are slipped over the chimney until they butt against the diaphragm. One weld then makes a solid joint between diaphragm and jacket, and two others close the ends of the jacket.



Completed Unit. (This picture is printed upside down to place the various parts in working position)



Servel Units Under Operating Test Before Installation in Cabinets

Final Assembly and Test

Boiler and coils are then welded to each other and to the first assembly by short pieces of connecting tubing, when the complete unit is ready for proof test at 800 lb. air pressure. While this allows a liberal factor of safety over the normal working pressure, it does not even approach the ultimate strength of the unit, which can withstand over 3000 lb. per sq. in. hydrostatic pressure before failure. This is an indication of the uniformly high quality of material and workmanship maintained throughout this plant.

The unit is now ready to receive its charge of refrigerating agent. The air is first removed by a vacuum pump. The required volume of ammonia solution of known strength is then introduced, a three-way cock turned and enough hydrogen gas admitted to register the correct pressure on the gages. The charging valve is then closed and sealed.

After placing insulation loosely around the generator and liquid heat exchanger, the unit is placed on the cold test rack, a gas burner is inserted at the bottom of the generator, connections for circulating water are made to the condenser coil, and temperatures developed on the refrigerating side recorded.

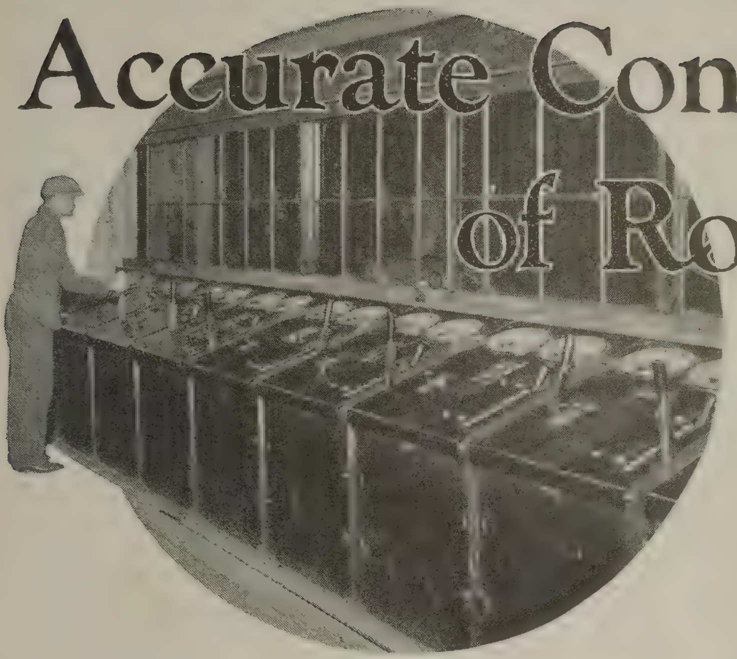
Subsequent assembly operations are of interest. The first step is to place an aluminum casting over the evaporator end of the unit. This casting forms the cooling compartment of the refrigerator and has shelves for the insertion of the trays used in making ice cubes. The unit is then mounted on an insulated board that forms the partition separating the cold part of the refrigerator from the section that contains the heating element. The generator and liquid heat exchanger are then covered with a very heavy layer of heat-insulating material. After being sprayed with a coat of paint and placed in the ice box, the gas burner, thermostat and connections for gas and water are attached. The burner is so designed that the gas will be turned off automatically should the flame be accidentally extinguished. The unit is then given a final cold test, a careful record being kept of the temperature in the cooling compartment of the refrigerator.

Purchase of United States Can Co. by Continental Approved

Stockholders of the United States Can Co., Norwood, Ohio, at a meeting on Jan. 21 voted to accept the offer of the Continental Can Co., Inc., New York, whereby the latter company will take over all of the assets, properties and goodwill of the United States company, the transaction to be effective Feb. 7.

The Continental company has also acquired the Seattle Astoria Iron Works, Seattle, Wash., manufacturer of can making and allied machinery and equipment.

Accurate Control of Rolling Speeds



Introduce Many Operating Economies in New Ten-Inch Merchant Mill Built for Bourne-Fuller Co.

UNUSUAL provision has been made in the new electrically driven 10-in. merchant bar mill at the Union Works of Bourne-Fuller Co., Cleveland, for close regulation of rolling speeds, resulting in less frequent roll changes. Furthermore, it is not necessary to keep as close watch on roll diameters as it would be with constant-speed drive, because when a roll is turned down and slightly reduced in diameter, the speed of the stand can be increased to compensate for the change. No roll changes are necessary in rolling sizes from 7/32 in. to ⅝ in. in round bars or equivalent sections in squares and flats. Mill stands have one-piece semi-steel housings. When rolls are to be changed the entire housing is lifted by crane and taken to the set-up stands. It is claimed that a one-piece housing makes a more solid mill.

With the speed of the finishing train under close control, the lengths of the loops as the steel passes from one stand to another may be so short that light sections have little chance to chill. There is also no time wasted in passing the steel through the four sets of rolls. The mill has been operated at a delivery speed of 1600 ft. per minute when rolling ½-in. rounds, but it is expected that this speed will be increased somewhat. This high speed also helps to prevent chilling of small sections.

The mill is designed for rolling both alloy and plain carbon steel bars. It produces strip, bands, angles and spring steel in straight lengths and coils. The mill will specialize on bars for cold drawing and for nut stock. It replaces two old merchant bar mills, an 8-in. and a 10-in. mill. It will roll rounds from 7/32 in. up to 1¼ in. and corresponding sizes in squares, hexagons, flats and ovals, although it is not the intention to produce sections larger than ¾ in.

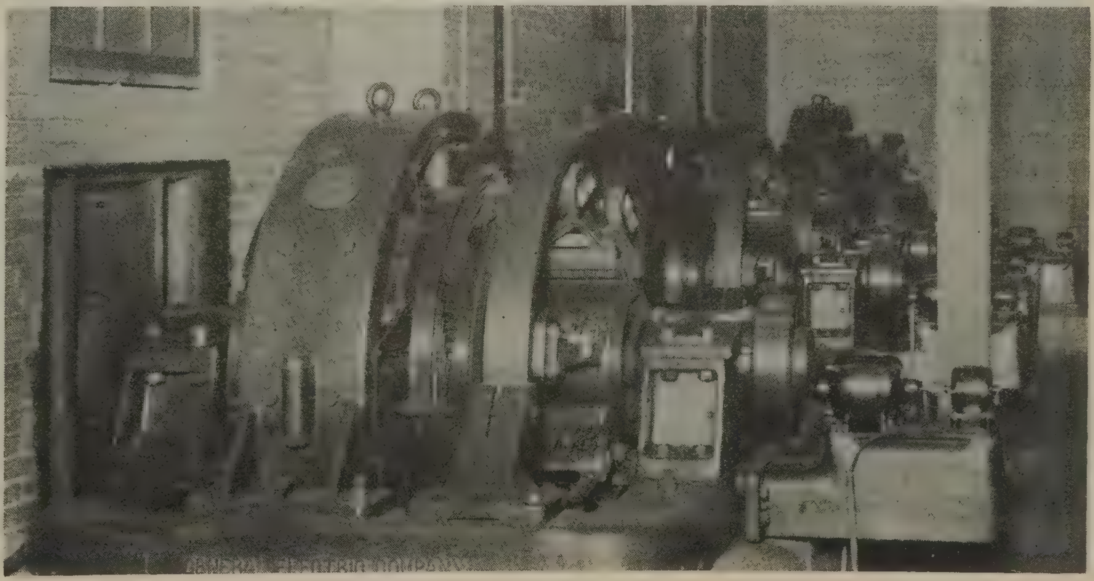
The new mill is semi-continuous, with two groups of four stands of roughing rolls arranged in tandem, and four finishing stands. The first four roughing stands are driven by a single motor. The second group of roughing stands have individual motor drives. Three motors drive the finishing rolls.

Heating Furnace Has Suspended Roof

Billets from 3½ in. down to 1½ in. square in lengths up to 30 ft. are used, and as a rule these are not cut to shorter lengths on leaving the reheating furnace. Instead, the billet is reduced in its full length in one piece, and finished bars that go to the hot bed are cut to length by a flying shear. Bars that are coiled are not cut, but coiled their full length. The new heating furnace is 32 x 32 ft. and fired with producer gas. Billets are charged endwise into the side of the furnace over a table having rollers mounted in roller bearings. Inside the furnace the rollers are water cooled and operated by motor-driven worm gears. Billets are pushed sidewise through the furnace on skids, not water cooled.

The roof is entirely supported by structural steel members located along the sides of the furnace, a construction which permits side wall repairs without dis-

INDIVIDUAL Drive Motors on Roughing Stands Nos. 5, 6, 7 and 8 Are Placed Close Together and Speed Set as Desired Is Maintained by Electrical Interlock



turbing the roof. Air, but not the fuel, is preheated by passing through regenerative chambers. Reversal of the flue gases is done at intervals by water-cooled sliding dampers and mushroom valves. Hot billets are discharged by an ejector gripped by motor-driven pinch rolls, the bottom roll being raised and lowered by an air cylinder. The furnace was designed by Oliver Luetscher, Peru, Ind., and, excepting the auxiliary equipment, was built by Bourne-Fuller Co. Small mill-type direct-current motors for this and other equipment were furnished by Westinghouse Electric & Mfg. Co.

Eight Roughing Mills in Two Sets of Four

The end of the heated billet, when pushed from the furnace, is gripped by motor-driven pinch rolls that deliver it to the first roughing stand. An up-and-down shear is located between the furnace and first roughing rolls, but, as previously stated, billets are usually rolled full length.

The roughing mill is continuous, eight stands in tandem, each with 12-in. rolls. The first four stands are driven by one 500-hp. motor with a combination bevel gear and pinion drive, thus avoiding the use of spindles. The motor drives through a gear reduction set and double flexible Fast couplings, one 15 ft. and the other 9 ft. in length, to a line shaft. Bevel gears on this shaft mesh with bevel gears on the ends of the pinion shafts. Several advantages are claimed for this arrangement: (a) floor space is saved by making the mill stand a compact unit, (b) backlash is avoided and (c) the usual lost motion in the coupling box is eliminated. The long coupling was used so the motor could clear an existing building column.

The second group of four 12-in. roughing stands are driven by individual motors (as shown in the illustration) through gear reduction sets. These mill stands are on unusually close centers for individually driven units designed to roll small sizes, but are spaced farther apart than most continuous group-driven mills for small merchant bars and rods. Stands Nos. 5, 6 and 7 are driven by 300-hp. motors. Stand No. 8 requires a 500-hp. motor, because a heavy draft is taken here when rolling spring steel, angles, flats and some special sections. All mill motors and control equipment were furnished by General Electric Co.

Three Motors Drive Four Finishing Stands

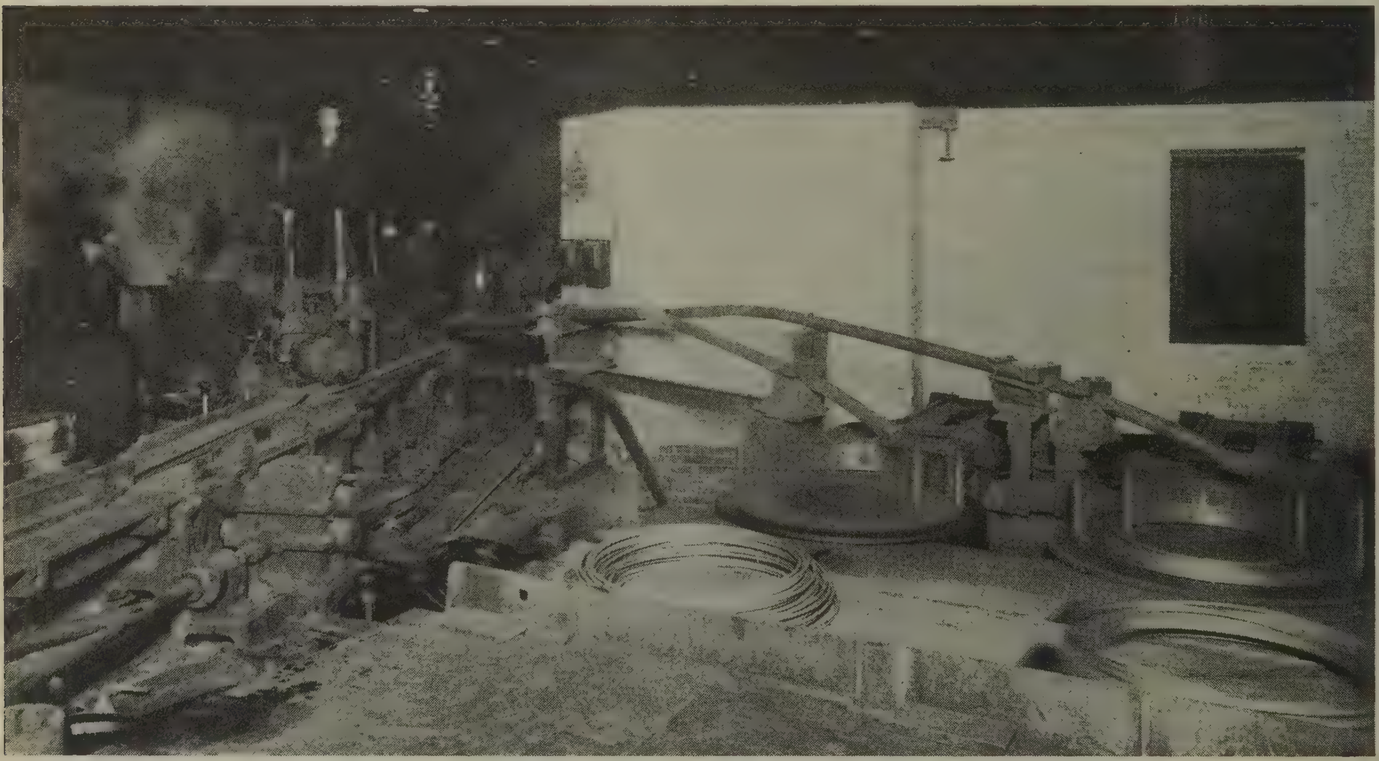
The finishing mill consists of four 10½-in. looping stands. Stands Nos. 9 and 10 are driven by one 500-hp. motor and stands Nos. 11 and 12 are individually driven by motors of the same rating. The first three stands are located side by side. Stand No. 12 is set back of the others, because sufficient space was not available for the driving motors. A repeater is usually used for delivering the steel from No. 8 to No. 9 stand and a repeater will also be placed between stands Nos. 10 and 11.

Unique Speed Control

Each mill motor has an individual magnetic control panel so any one stand can be started or stopped. A unique method is used for regulating the speeds of the four motors that drive Nos. 5, 6, 7 and 8 stands. When each of these stands is driven at the proper speed, the bar as it passes through the rolls is kept under tension but not stretched or looped. Because of the close centers, speed is controlled by a synchronous tie between the motors, which in reality takes the place of interlocking gears. It is obtained by individual balance-type vibrating speed regulators, which not only maintain a synchronous tie among the four motors, but also maintain the correct speed set for each motor within close limits. This speed-regulating equipment may be taken out of service by the operation of a transfer switch and the motors placed under hand control.

Control of the whole mill is from a house at the side, whence the operator has a good view of all the stands. This house is on the mill floor level, due to insufficient head room to permit the usual elevated pulpit. The control board, shown in the head piece of this article, is of the bench board type. There are two methods of speed regulation, one through the regular motor speed adjustment for large differences in speed, and the other through a field rheostat, which is used for making finer speed adjustments. A rheostat is located beneath each motor.

The control board is equipped with an ammeter for each motor to indicate the load carried, a tachometer to indicate the speed and a master switch for starting and stopping. Separate mill speeds are scheduled for every size of bar being rolled. Knowing the size of the section, the operator sets the controls to secure the predetermined speeds and with the field rheostat makes minor speed variations as necessary. This applies particularly to the second roughing set, in which the bar is passing through all four stands at one time and a slight variation from the proper speed of any one



Bars for Coiling Are By-passed to Right. Flying shear directly in front of operator cuts long bars in lengths which can be handled on cooling bed

Runout with Automatic Cooling Bed at Right, and Facilities for Pack-Annealing Spring Steel at Left

stand will cause the steel either to buckle or stretch.

Direct current for driving the mills and various auxiliary equipment is derived from two motor-generator sets made by General Electric Co. Each consists of a 1000-kw., 250-volt, direct-current generator driven by a 1400-kva., 2300-volt synchronous motor with 80 per cent power factor. The motor-generator sets and the motors that drive the roughing stands and Nos. 9 and 10 finishing stands are located in a motor room at the side of the mill. The individual motors that drive stands Nos. 11 and 12 are located in the control room on the opposite side of the mill. All mill motors are the same type and have a speed range of 267 to 800 r.p.m.

Automatic Control Beyond Last Finishing Pass

Movement of the bars is automatic from the time they leave the last finishing stand until they reach the bar shears. A control on the runout table kicks the bar to the flying shear, a second control delivers the bar from the runout table to the hot bed, and when it drops on the first notch of the hot bed the latter is set in motion. A control pulpit is located at the side of the hot bed, but the only duties of the attendant are to watch the movement of the steel and operate control levers should any of the automatic controls fail.

The flying shear located at the delivery end of the last finishing stand is of the Rendleman type and consists of two circular cutters rotated by two adjustable-speed motors. Another motor raises and lowers the upper cutter. Cutters are set at an angle of 45 deg. to the line of travel, the bar is moved sideways through a swinging trough until it is caught in the cutter blades, and the bar is sheared while in motion at any delivery speed. The shear has a capacity for cutting 1-in. rounds and squares, or flats up to ⅜ x 4 in.

Bars that are to be coiled are not sheared but diverted from the finishing mill runout to one or two motor-driven reels. Reels are of the pouring type, and coils are pushed off mechanically to a conveyor leading to the storage building. An overhead traveling crane then places the coils in cars or in piles on the floor. Material is usually reeled into 300-lb. coils, although the coilers have a capacity of 500 lb. Two strip coilers with motor-driven reels are also provided for coiling material rolled in strip sizes.

Straight bars from the last finishing stand are cut to length on the flying shear and carried on a double runout table to the hot bed shown in the view. This table has individually motor-driven rolls, synchronized with the finishing mill. Runout rollers and motors are equipped with roller bearings. From the runout table the steel is automatically discharged on the hot bed, 250 ft. long. It is of the double type, with 10 ft. notched bars on one side. A hand-type bed 12 ft. wide on the opposite side is provided for pack-annealing spring steel.

From the hot bed the bars are delivered to shuffle bars and run-off rollers, and thence to shears. There are three bar shears. One takes care of the hand bed. one the mechanically operated bed and the third is for shearing angles. A transfer table takes angles from the run-off rollers to a straightening machine before reaching the third shear.

The new mill was designed by N. K. Hartford, general superintendent Bourne-Fuller Co., and C. A. McDowell, superintendent of the Union Works. It was built by the United Engineering & Foundry Co., Pittsburgh, which also supplied the hot bed, tables, flying shear and other mill equipment.

Rates on brass, bronze and copper articles from Baltimore to points in Official Classification territory are not unreasonable, according to a proposed report made recently to the Interstate Commerce Commission, Washington, by Examiner E. P. Hurley. Complaint was made against the rates by the Baltimore Tube Co., Inc., Baltimore.

Freight car requirements for iron and steel products in the first quarter of 1928 will amount to 466,363 cars, according to an estimate by the car service division of the American Railway Association. Actual requirements during the first quarter of 1927 were 472,495 cars, the association's estimate being a decrease of 1.4 per cent.

New Plant Widens Scope of Output

Chicago Foundry Now Makes Greater Variety of Non-Ferrous Castings—Some Economies in Handling Materials

INCREASE in plant capacity, a broader field for its products, larger sizes of individual castings and heats from a wider range of non-ferrous metals, are the major results obtained by abandonment of an old plant and construction of a new foundry and machine shop by the Hills McCanna Co., 2349 Nelson Street, Chicago.

The property acquired for the new project is now about one-half under roof, affording space for a large expansion of output. Comparatively speaking, individual shipments from this plant will always be small in tonnage, therefore switch track facilities have not been provided, and incoming materials and products are trucked to and from the plant.

The foundry is a brick and steel structure, 66 ft. wide by 200 ft. long, with roof trusses spanning from wall to wall without intermediate columns. The furnace room is separated from the molding room by a brick wall. Eleven oil-fired furnaces are now installed and operating and space remains for the addition of five units. The furnaces are designed for 200-lb. pots. The melting time varies from 55 min. to one hour.

The foundry floor is divided down the center by a main aisle, on either side of which are the molding skids. On both sides of this aisle, near the furnace room, are the light casting floors. Equipment installed at that end of the building includes standard types of molding machines, a Pridmore stripper, two electrically operated sand riddles and a sand mixer. Small molds are made in steel flasks furnished by the Sterling Wheelbarrow Co., Milwaukee, Wis. In all there are 21 molders' stations on small work and two molders are employed at the heavy casting pit. The floor is made of concrete except where the large molds are made.

The heaviest individual casting poured to date weighed 3400 lb., but with the additional furnaces which may be installed in the future it will be possible to produce castings weighing 6000 lb. each.

On one side of the aisle is the core room and the core ovens, and directly opposite are the gate and riser cutting-off machines and the sand-blast equipment. The day core oven is designed with six drawers, each 3 ft. x 6 ft., and the night oven, which is loaded by a truck that is moved in and out of the furnace on a track, measures 8 ft. x 10 ft. inside. These ovens are oil-fired and may be operated simultaneously or separately as occasion demands. They were built by the Foundry Equipment Co., Cleveland. Two band and two hack saws constitute the gate cutting equipment. Castings are cleaned in a revolving barrel sand blast machine installed by the American Foundry Equipment Co., Mishawaka, Ind.

A duorail system for handling materials extends from the furnace room over the center aisle to the far end of the main foundry room. One 5-ton and two 1-ton hand-operated overhead cranes traverse the molding room on one side of the aisle, and a 1-ton crane of the same type operates over the molding floors on the opposite side of the aisle. The 5-ton crane is installed over the heavy-work pit. The 5-ton crane cannot travel beyond the limits of that pit, but the 1-ton cranes on that side of the aisle can be moved over the track that serves the 5-ton crane. The equipment was furnished by the Atlas-Chicago Co., Chicago. Hot metal is delivered from the furnace room to the desired location in the center aisle by the duorail system and it is then transferred to one of the hand-operated cranes.

On leaving the foundry the visitor goes through the shipping department, past the pattern storage, the assembly benches and the tool room to the machine shop, which is a well lighted and ventilated room, 66 x 200 ft. Of special note is the width of the aisles and the distance between machines. Much of the equipment was moved over from the old plant. Three new machine tools and a heavy-duty turret lathe were installed.

Castings are placed in elevated boxes in the foundry and moved by lift trucks, that were built by the Barret-Cravens Co., Chicago, to the machine shop and finally to the store room. A monorail system extends from the store room to the shipping department.

Melting furnaces, core ovens and the central heating plant are furnished with fuel oil from a central pumping station. All oil burners, pumps and auxiliary equipment were furnished by the North American Mfg. Co., Cleveland. A low-pressure boiler furnishes steam to the oil heater and the unit heaters in the shop. Each of the two oil pumps is rated at 200 gal. per hr., and the oil pipes are so arranged and by-passed that either or both pumps may draw oil from one or the other of two storage tanks. The oil pressure is maintained at 50 lb., and its temperature is raised to 100 deg. Fahr. The oil lines to the burners in the plant are so laid out that there is a constant circulation of hot oil, the return or overflow connection being made to the storage tanks. An oil-fired auxiliary hot water heater, which is connected with the oil heater, is installed for use when the low-pressure boiler is out of service. A Nash Engineering Co., South Norwalk, Conn., vacuum pump is located in the radiator return line to the boiler. The Dwyer Equipment Co., Chicago, furnished the overhead, fan-equipped unit heaters that distribute warm air throughout the various shop departments.

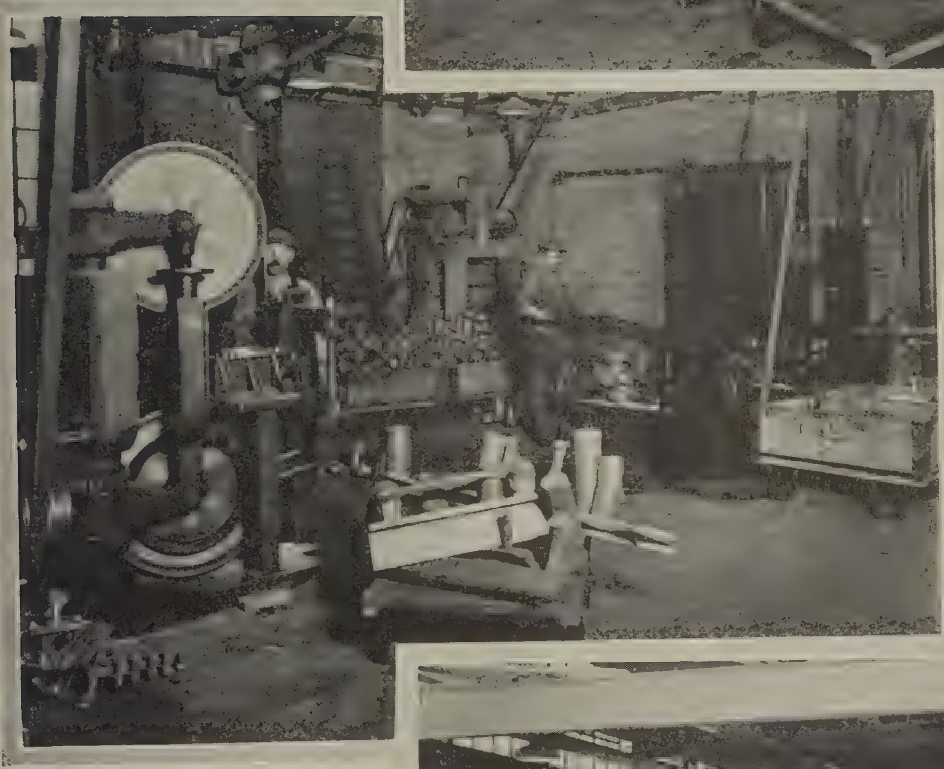
This plant is equipped to handle the more difficult non-ferrous metals, specializing particularly in aluminum-bronze; various nickel mixtures, including Monel and copper; nickel, iron and chromium alloys that find use in special fields. Complete service, from the making of patterns to the completely cast and machined part, is available. This company makes no effort to specialize in ordinary red brass jobbing work. Design and construction of this plant were supervised by Frank D. Chase, Inc., Chicago, engineers.

Why Steel Hardens

A handsomely printed brochure has been issued by the American Society for Steel Treating, Cleveland, containing the second Edward DeMille Campbell memorial lecture, by Dr. Zay Jeffries, entitled "A Contribution to the Theory of Hardening and the Constitution of Steel." The lecture was very briefly abstracted in THE IRON AGE's report of the Detroit convention of the society, contained in the issue of Sept. 29, 1927, page 867.

Departments in a New Chicago Foundry

WIDE Aisles and Liberal Passageways Between Machines Facilitate the Rapid Movement of Products by Means of Lift Trucks



SPECIAL Machinery Makes Short Work of Gate and Riser Cutting. The sand blast equipment is near at hand

MONORAIL Systems and Overhead Cranes Eliminate Much Hand Work. The shop is warmed by unit heaters located along the walls and above the workmen's heads

Prices of Steel and Other Products

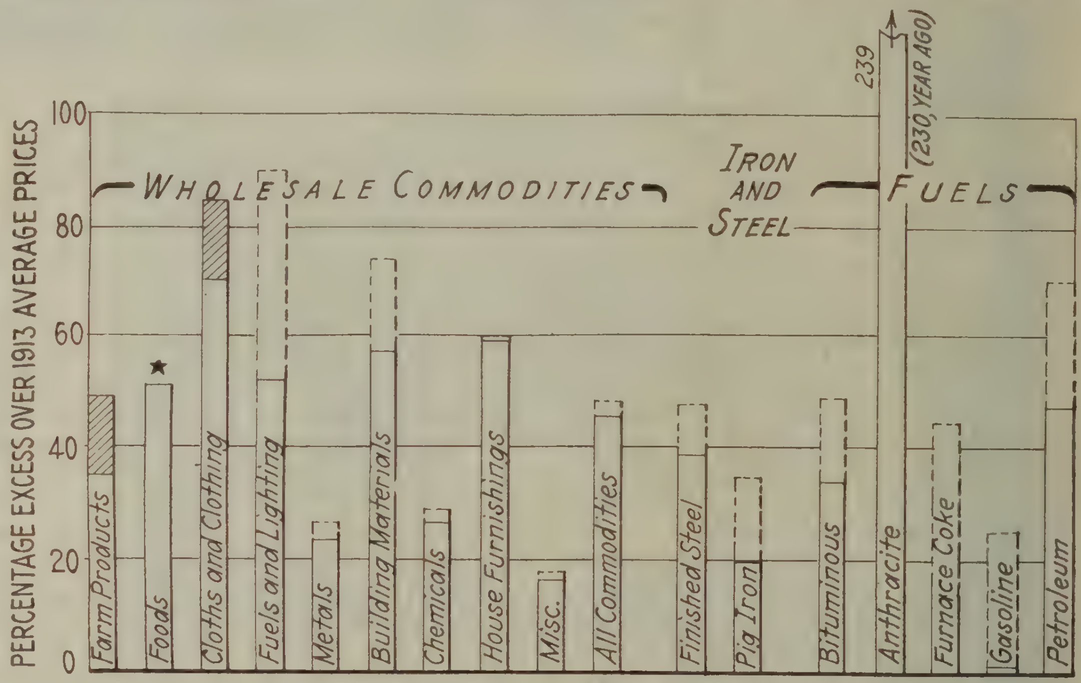
Metals Lower Than Most Other Commodities—Changes in Past Year—Probable Future Course of Prices

BY SIDNEY G. KOON*

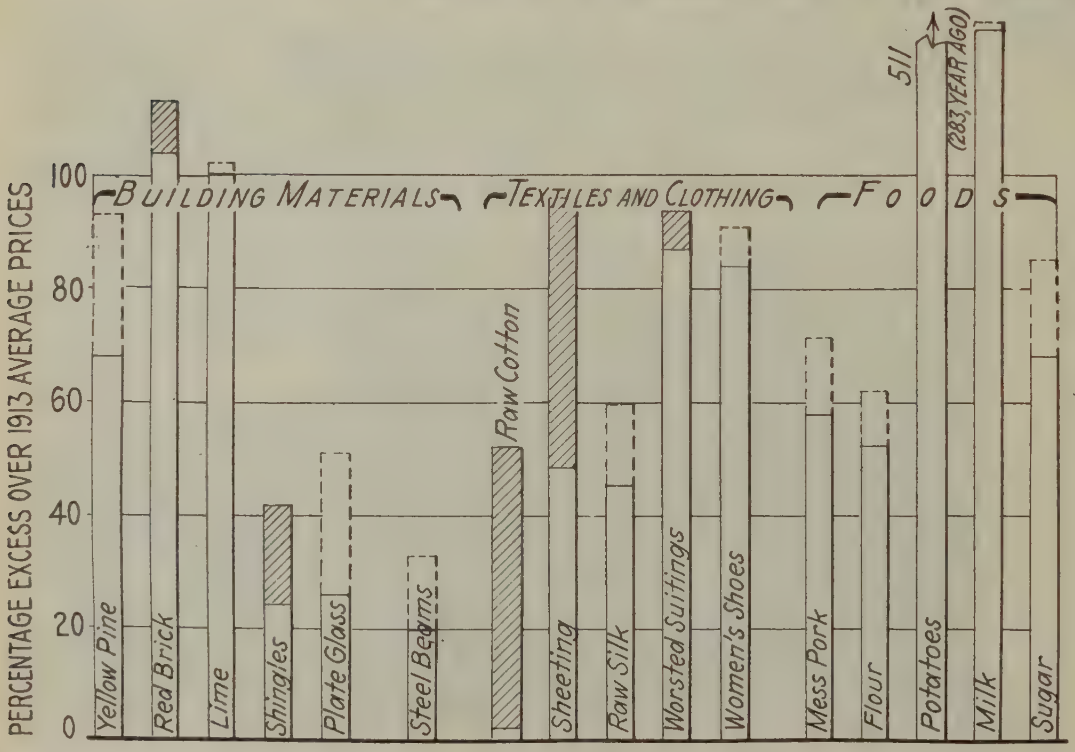
DURING the past year there was a fairly steady drop in prices of pig iron and finished steel. At the same time, there was a moderate drop in prices of commodities in general, as reported by the United States Bureau of Labor Statistics. The situation was a little mixed, however, by reason of the fact that a number of the commodity groups reported upon by the bureau showed considerable increases during the year—enough, almost, to offset the declines made in other groups.

Again, as in many cases when these studies have been published† in the past, we find the metals at a much lower level relative to pre-war than are most of the other commodities. Thus steel beams are only 20 per cent higher than in 1913, whereas building materials in general are 57 per cent higher, clothing is 85 per cent and house furnishings are 59 per cent higher, and commodities in general are 45½ per cent higher. In some instances the divergences are much greater than this. Brick is more than twice the 1913 price. Potatoes are about six times as high as they were 15 years ago. Milk, building lime, worsted suitings, cotton sheeting and women's shoes are about double the 1913 level, while anthracite is more than three times as high as it was at that time.

Without regarding 1913 as essentially correct in its



Prices of "All Commodities" Have Lowered Since a Year Ago, as Shown by the Dotted Top of the Column. Finished steel, a little lower than the general average, is below last year. Items with cross-hatching are higher than a year ago, to the extent of the hatched area. Foods show no change. Metals are among the lowest priced items of all



Steel Beams Are Only 20 Per Cent Higher Than in 1913; But All the Other Items in This Diagram (Left) Are From 42 to 511 Per Cent Higher. Brick, shingles, cotton, sheeting and suitings are now above the prices of a year ago, as shown by cross-hatching. Dotted tops of columns indicate that last year's prices were higher than now relationship of prices of various commodities, the changes which have taken place since then are shown in the diagrams and on the table. That year has formed a standard basis of comparison for a long period of time and gives us a logical relative by which we can compare prices of products differing greatly in characteristics. It is on that basis, therefore, that the present figures and those of a year ago are studied.

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*Associate editor, THE IRON AGE, New York.

†See THE IRON AGE of Jan. 13, 1927, page 142; July 2, 1925, page 8; Jan. 1, 1925, page 46; June 26, 1924, page 1870, Jan. 3, 1924, page 108, and several earlier dates.

Changes in the Past Year

DURING 1927 there was a reduction in prices of four of our five items in the fuel group and an increase in the other one. There was a reduction in prices of three items of our building material group and an increase in the other two. There was a reduction in prices of two of our textile and clothing group and increases in the other three. There was a reduction in prices of four of our food items and an increase in the other one.

Thus the trend is difficult to define, except by use of the weighted average of the Bureau of Labor Statistics. That average one year ago stood at 148.1, compared with 145.5 now, both being based on 100 as the average of 1913. Thus the decline has averaged a little under 2 per cent. Corresponding with this there has been a reduction of nearly 12 per cent in pig iron, of 10 per cent in steel beams, and of about 5½ per cent in finished steel. Both the pig iron and the finished steel figures represent THE IRON AGE composite prices.

Aside from the labor statistics price indexes, which are in index form only, all other prices in the table are quoted both in money values and in indexes based on 1913 averages. Consequently there is opportunity to relate each item to each other item, as may be desired, in studying the movement of these typical commodities. Twenty-three items are compared, in addition to the ten indexes of the bureau. These items cover several principal groups of products and each in itself is typical within its own group.

Prices quoted are drawn from a variety of sources, including market reports of trade publications and official reports from Washington. Steel beams, finished steel, pig iron and furnace coke are taken from THE IRON AGE weekly quotations. All of the prices have been translated into three diagrams, two of which show the individual items. These indicate not only the relation of present prices to those of 1913, but also their relation to those of one year ago.

These two diagrams are based on the excess of their several prices over those of 1913. A shaded area at the top of a column indicates that today's price is higher than that of a year ago. The excess is measured by the height of the area shaded. Where today's price is lower than a year ago, that fact and its extent are shown by dotted lines, above the solid lines which represent the relation of the present price to that of 1913.

Steel Prices Well Liquidated

IN the third diagram the history of prices of certain groups of commodities, together with steel beams, is traced across a period of several years. Both finished steel and steel beams are considerably lower than the all-commodity group of the bureau. They were higher for a time in 1923 and 1924, but otherwise have been continuously lower and usually considerably lower (except that the finished steel composite was just above the "all-commodities" level at the break of 1926-27). They are still further below the reported prices of building materials and clothing materials.

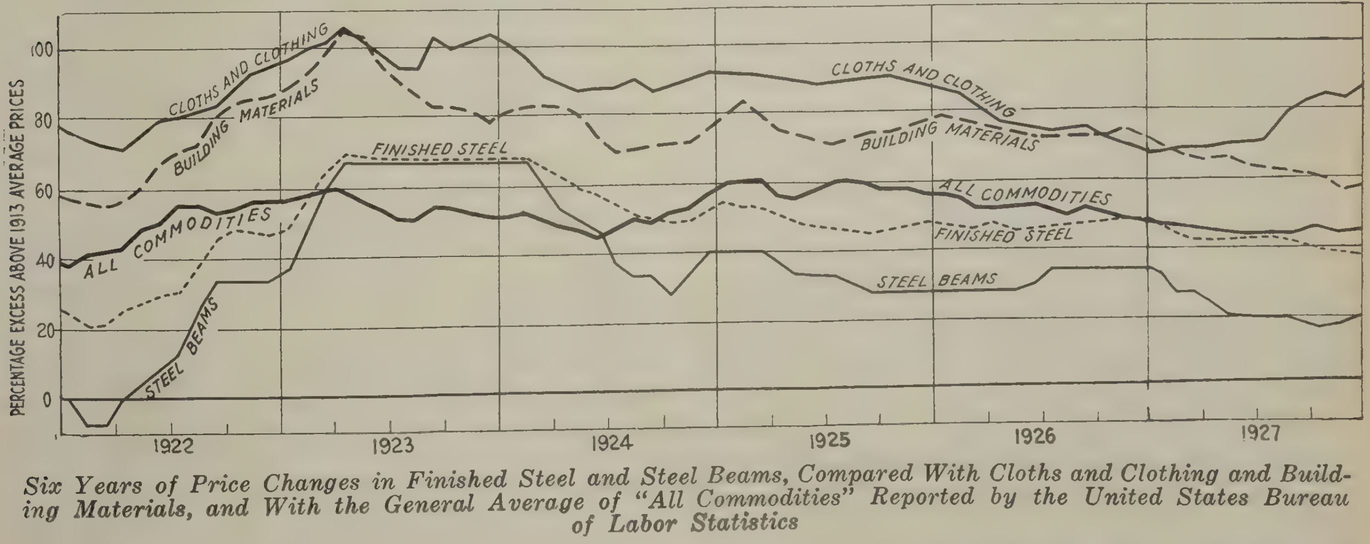
It follows that the prices of finished steel, and particularly the price of steel beams, have been more nearly liquidated than have the prices of most other commodities. They have been consistently lower than many of the materials covered in the survey, but this has been in large measure at the expense of profits.

Taking up some of the separate items, we find fuels, except for gasoline, ranging from 14 to 239 per cent above 1913. Gasoline is up only 1 per cent. Building materials are higher than pre-war by percentages varying from 26 to 113. Textiles and clothing prices exceed those of 1913 by 45 to 96 per cent. Foods are higher than in 1913 by margins varying from 52 to 511 per cent.

RELATIVE PRICES OF MANY MATERIALS

Item	Prices Quoted Average, 1913	One Year Ago	Recent Figure	Index Number (1913=100) Peak, 1920	Recent Figure
Farm products	100	134.6	....	247	148.4
Food, etc.	100	151.1	....	248	151.0
Cloths and clothing	100	169.9	....	346	184.6
Fuels and lighting	100	190.2	....	281	151.8
Metals and metal products	100	126.5	....	203	123.2
Building materials	100	174.0	....	300	157.4
Chemicals and drugs	100	128.5	....	213	126.1
House furnishings	100	159.9	....	275	159.4
Miscellaneous	100	117.7	....	208	116.6
All commodities	100	148.1	....	247	145.5
Finished Steel	1.663c.	2.453c.	2.314c.	239	139
Pig Iron (composite)	$14.70	$19.88	$17.59	325	120
Steel Beams	1.50c.	2.00c.	1.80c.	207	120
Fuels:					
Bituminous coal	$1.34	$2.00	$1.80	746	134
Anthracite	3.82	12.62	12.94	209	339
Furnace coke	2.41	3.50	2.75	735	114
Penna. petroleum	1.79	3.05	2.65	341	148
Gasoline	16.8c.	21.0c.	17.0c.	185	101
Building Materials:					
Yellow pine	$28.50	$55.00	$48.00	237	168
Red brick	6.56	13.86	13.97	333	213
Lime	4.43	8.96	8.85	268	200
Shingles, red cedar	1.97	2.43	2.79	334	142
Plate glass	31.8c.	48.0c.	40.0c.	258	126
Textiles and Clothing:					
Raw cotton	12.84c.	13.05c.	19.45c.	341	152
Sheeting	7.3c.	10.8c.	14.3c.	390	196
Raw silk	$3.65	$5.84	$5.30	445	145
Worsted suitings	1.38	2.59	2.68	392	194
Women's shoes	2.17	4.15	4.00	380	184
Foods:					
Mess pork	$20.93	$36.00	$33.00	225	158
Flour	4.62	7.50	7.00	352	152
Potatoes	61.4c.	2.35	3.75	721	611
Milk	3.5c.	7.9c.	7.87c.	243	225
Sugar	3.46c.	6.4c.	5.8c.	536	168

Little change has occurred in the level of the all-commodities figure in nearly six years. Since April, 1922, it has not once been below 144, nor above 161. During the 68 months its average level has been about 152. The latest available figure, that for November, is about 4 per cent less than the average. At no time



Six Years of Price Changes in Finished Steel and Steel Beams, Compared With Cloths and Clothing and Building Materials, and With the General Average of "All Commodities" Reported by the United States Bureau of Labor Statistics during the six years has the level departed by more than 6 per cent from its average.

Influences Affecting Future Prices

THOSE who look for a gradual subsidence of prices during the next quarter century base their opinions upon historical evidence. Such a course has been followed by prices during the years following every major upheaval of the past century and more. Well informed opinion, however, does not anticipate any steady or uninterrupted downward trend. That the trend will be downward is widely believed, but it is almost certain to be interrupted by minor humps in the curve, caused by various circumstances which are unpredictable.

Many commodities probably never will approach again the price level which obtained in 1913. Some things will reach that level or go below it. As a matter of fact, automobiles are below it today; so is rubber. Gasoline is close to it, and there have been periods since the war when steel beams have touched a figure lower than the average of 1913.

In general, however, the much enhanced labor and taxation costs following the war are expected to prevent a reduction in the prices of many commodities below levels considerably above those which formerly obtained. There is little expectation of a deflation or liquidation of labor prices. Much has been done in reducing labor costs per unit of product, but labor cost per hour of effort is likely to remain pretty close to its present level.

Costs per unit have gone down through a variety of influences. New methods of manufacturing have had their effect. New methods of management have been almost equally important. Methods of handling materials, improvement in design, improvement in characteristics of materials used, and in tools, all have been responsible for certain shares in the result. There is a definite point, however, beyond which savings of this character cannot proceed. In some respects and in some industries this point seems to be approached now. Standardization of product in other industries, however, may achieve great savings before many years have gone by.

In general, while prices of some commodities may show a slight tendency downward during the next few months, it is believed that there will be sufficient upward movement to offset, either wholly or in large part, the downward tendency of the other items. Steel prices in particular are believed to be lower with regard to other prices, and with regard to costs of production, than they should be. Whether this situation receives correction during the coming year remains to be seen. That is should be corrected, however, is easily discernible from earnings statements of companies.

Superhardening of Heat-Treated Steel

By Subjecting Them to Impact of a Cloud of Balls, Thus Producing a Work-Hardened Surface—Any Soft Spots Revealed by a Roughened Area

BY EDWARD G. HERBERT*

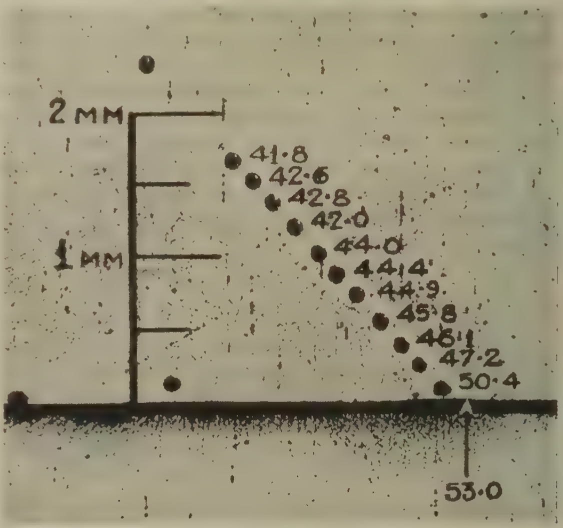
WHEN studying the work-hardened surfaces of railroad rails and locomotive tires, the author attempted to induce similar hardness under the ball of the pendulum hardness tester in the following manner: After the first test, the pendulum is tilted to the right, then to the left, then back to the vertical position, and a second hardness test is made on the same spot. Successive tests showed progressive increases in hardness up to a certain maximum, and thereafter a slow softening. A summary of results† on various articles follows:

	Original Hardness		Maximum Hardness Induced by Testing		Hardness of Surface of Worn Article	
	Herbert	Brinell	Herbert	Brinell	Herbert	Brinell
Locomotive tire	26.4	264	32.0	320	34.2	342
Rail	25.2	252	35.5	355	33.1	331
Clash gear (oil hardened) .	36.3	490	57.1	771	58.5	790
Worm gear (case hardened) ...	49.4	667	82.2	1110	49.4	667
Cam (case hardened)	60.2	815	85.2	1150	86.0	1160

†Presented in a paper before the September, 1927, meeting of the (British) Iron and Steel Institute, entitled "The Work-Hardening of Steel by Abrasion."

These figures (together with microscopic studies) indicate that a metal surface, even if hardened by heat treatment, may be superhardened by work if the conditions of abrasion are so severe as to cause some plastic flow of metal below the abraded surface. (Note that the worm gear did not have a surface hardened by use, since it was subjected to no impact when in operation.) Such plastic flow can occur in very hard steel. Consequently it was thought probable that articles of hard steel could be superhardened beforehand as a means of resisting wear, and the result of the inquiry was the invention of the "cloudburst." Its significance may be explained thus:

Physicists tell us that we are immersed in an atmosphere consisting of molecules flying about with high velocity and constantly colliding with each other and with us. I will ask you to imagine an atmosphere whose molecules consist of small, hard, steel balls, flying about with high velocity and colliding with each other and with any object immersed in it. An article placed in such an atmosphere will be subjected to a rapid succession of blows, and if a certain relationship exists between its hardness and the atmospheric pressure—that is, the momentum of the balls—its surface will be compressed uniformly without being sensibly indented.



Diamond Time Hardness Numbers Showing Surface Hardening by Cloudburst on Heat-Treated Nickel-Chrome Steel

The article, if of hard steel, will thus become incased in a thin superhardened layer. If the velocity of the balls be now slightly increased, the hardened layer will still resist indentation, and will be further increased in hardness and in thickness. By gradually increasing the velocity of the balls, a superhardened layer can be produced, intensely hard on the surface and gradually decreasing in hardness throughout its thickness, which may be about 2 mm. As there is no abrupt change of hardness there is no tendency for the layer to flake or scale off in service, a type of failure common in case-hardened articles. The actual hardness that can be thus produced depends upon the superhardening capacity of the steel, which is easily measured with the pendulum hardness tester, and the ball velocity required to produce this hardness can be determined by experience.

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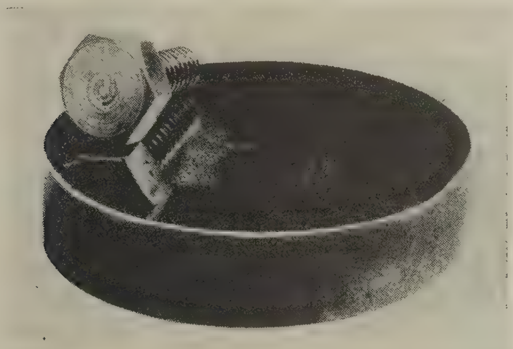
*Edward G. Herbert, Ltd., Levenshulme, Manchester, England.

Method of Superhardening by Impact

For producing the steel ball atmosphere two methods have been employed. In one, the balls are caused to fall into the chamber from a height which can be varied. Continuous circulation of balls is maintained by means of an elevator and conveyor.

In the other method, the balls roll down a slight incline and are thrown in an upward direction by the vanes of a rotor whose speed can be varied, and with it the speed of the flying balls. After entering a rubber-lined chamber in which the work is placed, the spent balls again roll down the incline, thus maintaining a continuous circulation.

Just as there is a relationship between the original hardness of the steel and the initial ball velocity which compresses the surface without indenting it, so there is a relationship between the "maximum induced hardness" of the steel, as measured with the Herbert pendulum, and the final ball velocity which is sufficient to produce maximum hardness, but is insufficient to indent the superhardened surface. Any further increase of velocity would merely roughen the surface without increasing its hardness, and the whole superhardening process must therefore take place between these two limiting velocities.



Polished Mild Steel Disk Case-Hardened (Except for H on Top) and Superhardened. Process leaves mirror surface unharmed, but pits softer areas

The process can, of course, be applied to produce a work-hardened layer on any metal, by adjusting the initial and final ball velocities to its original hardness and its "maximum induced hardness." The fact that articles of very hard steel can be superhardened by working was discovered independently by Hultgren, who turned it to practical account in the superhardening of steel balls.

Quantitative measure of the hardness and depth of superhardening is given in the figure, which is a micrograph (magnified 20 diameters) of a section cut perpendicularly to the superhardened surface of a heat-treated nickel-chrome steel. Eleven pendulum test impressions are shown in a depth of 1.7 mm., and an average surface hardness of 53 is found. (Diamond time hardness 53 equals 715 Brinell.) The original surface hardness was 38.8, equivalent to 525 Brinell.

A Method of Quantity Testing for Hardness

The atmosphere of steel balls was invented and investigated as a means of superhardening. The investigation has revealed another effect of equal importance.

The initial ball velocity is so adjusted to the hardness of the work that it is just insufficient to indent the surface.* It follows that if any part of the work is soft, its surface will be indented and roughened.

If, for example, a quantity of hardened steel articles are placed in a ball atmosphere of correct pressure, it will be found on removing them that any soft articles or any soft spots can be easily distinguished by their indented appearance.

We have here a new process, which may be called "cloudburst hardness testing," whereby large quantities of hardened articles can be tested for hardness, all at once, and all over, and without marking them, except on the soft spots. The existing cloudburst testing machine makes 200,000 hardness tests per minute. But this is only a small machine, and the number of tests can be increased indefinitely.

Where quantities are sufficient to warrant it, the work can be carried through the testing chamber on a conveyor, and when it emerges the soft pieces can be picked out like rotten cherries from a tray of ripe fruit.

As an instance of the way soft spots may be revealed (as well as the unharmed surface remaining after cloudburst superhardening) a photograph is reproduced of a piece of mild steel, case hardened, polished and superhardened. The letter H had been painted without protective compound before carburizing and was decidedly softer than the surrounding surface. The cloudburst roughened the softer surface and rendered it easily visible. The reflection of the steel screw shows the mirrorlike superhardened surface.

Reducing Tube Mill for Seamless Steel Tubing

A new reducing mill for the manufacture of seamless steel tubing, which has several unique features, has been brought out by the Wellman-Seaver-Morgan Co., Cleveland. In following established methods in the manufacture of tubing it is said to be rather difficult and expensive to make the smaller sizes, i.e., sizes smaller than 2½ in. outside diameter. In the ordinary methods of manufacturing this tubing it is the common practice to pierce and roll the blanks at approximately 3 in. outside diameter, and then to reduce the diameter in a continuous duo roll mill. In this mill each successive roll stand has its axis at 90 deg. to the preceding stand, to eliminate the rib formed at the meeting of the rolls, and also to reverse the pressure on the tube.

The newly designed mill has three rolls in the same plane in each housing. Each roll incloses 120 deg. of the circumference of the tube. The gears are mounted on roller bearings which, together with the gearing, are completely inclosed and run in oil.

The roll stands are all practically alike except that the roll assembly is shifted 180 deg. in each succeeding stand. The drive shaft always comes out in a horizontal line on the same side of the mill, and these shafts are driven through speed reducers by variable-speed motors, each stand having its individual motor. This, it is stated, permits exact regulation of speed and the handling of various gages and materials at the correct speeds. It is claimed that higher reductions per pass and higher quality of product are obtained, and that the maintenance cost is reduced. Application has been made for patents covering various features of the mill.

The Wellman company recently has been broadening its line of tube-making machinery. It has designed machinery for the production of hot-rolled seamless tubes up to 16 in. in diameter and as small as 1 in. in diameter, both by the Pilger method and the American or automatic rolling method. It is stated that the latest and most modern practice of both European and American mills has been embodied in these machines.

The first regional meeting of manufacturers and distributers of power transmission equipment, supplies and accessories will be held at 6.30 p. m., Feb. 3, at the Poor Richard Club, 1319 Locust Street, Philadelphia.

Low-Cost Pig Iron Means Highest Output per Furnace

From Larger Hearths, Better Selected Raw Material, and with More Efficient Utilization of Existing Auxiliaries and By-Products

BY W. A. HAVEN*

BLAST FURNACE men during 1927 as for several years past have concentrated on the difficult problem of keeping down costs during a period of reduced output. All items of equipment have been studied in an effort to replace labor with machinery, to eliminate delays and prevent accidents. Electrically operated devices for automatically gaging the furnace, dumping the bells and controlling the blast temperature have made their appearance. Stopping the tap hole at ten pounds blast pressure is being done regularly with steam guns of multiple cylinders. The indestructible tuyere has not yet been found, but the ultimate of continuous operation, 24 hours daily without reducing blast pressure, seems not far ahead.

Old Stacks Reconstructed with Larger Hearths

Economies have resulted from improving the quality of the raw materials, especially coke, from profitable disposition of the gas and slag by-products, and particularly from an increase in the size of the old stacks. Making more pig iron per furnace has always been a favorite procedure with American furnacemen, but harder blowing must now be strictly consistent with economy in ore and fuel. Much larger furnaces have resulted.

Recent enlargement has been chiefly by increasing the hearth diameter and straightening up the bosh. The name "large hearth" has always followed the furnaces with the largest size hearth, but the term has now come to signify furnaces having not less than 20 ft. hearth diameter. Furnaces of this size were built at South Chicago about ten years ago but their peculiar fitness for the economic production of large tonnages was not fully appreciated at that time. In 1925 and 1926 a number of furnaces were blown in having hearth diameters of from 20 ft. to 21 ft. 6 in.

In 1927 the large hearth furnaces established entirely new standards for productive capacity. Under the same conditions which got 500 tons per day from a 16-ft. furnace, or 600 tons from an 18-ft. furnace, the 21-ft. 6-in. furnaces have consistently made more than 750 tons per day; doing so with equally good furnace practice. A tendency to higher dust losses may be accounted for by the failure of stack and top dimensions to keep pace. Large hearth furnaces take a high blast temperature without difficulty and their coke rates have been as good if not better than smaller units. Blast pressures have been higher in some, but in others just as low as on the smaller furnaces. Tendencies to hang and slip have been if anything somewhat less, operating conditions generally less troublesome, and working conditions around the bosh improved.

Largest Hearth Now 24 Ft. 6 In.

Furnacemen were and still are somewhat amazed by the announcement that one company had blown in a furnace during 1927 having a hearth diameter of 24 ft. 6 in. This was done by a typical though extreme case of fitting a very large hearth to a moderate sized stack. The columns were moved out, and big jackets and mantel installed. One or more rings of new and heavier platework, sloping outward at the bottom, connect up the old shell to its new support. The top of the shell and superstructure are oftentimes undisturbed in such reconstructions.

The old and satisfactory relationship between hearth and top diameter cannot be preserved when rebuilding in this manner. One fundamental condition for proper stock distribution of fine northern ores must be preserved, namely: 2-ft. clearance between bell and furnace wall. With the large furnace in question the limitation seems to have been a 12-ft. 6-in. bell, which resulted in a top diameter of only 17 ft. A very disproportionate stack volume results, but nevertheless some record tonnages have been obtained.

With a fair quality of raw materials, a 24-ft. 6-in. furnace should easily do 850 tons per day. Since it is ordinarily feasible to increase the "normal" tonnage of any stack at least 20 per cent by physical and chemical betterment of ore and coke, it is safe to predict that this will be the forerunner if not itself the first American furnace to produce 1000 tons daily. It is no great step from a reconstructed unit of large hearth to one having other dimensions in the successful proportions found in smaller stacks. The lines of such a furnace might be somewhat as shown on the sketch.

Sintered Ore Will Increase Tonnage

It appears, however, that the distinction of operating the first 1000-ton furnace will not be for American furnacemen. The Germans are said to have furnaces making even more. It is of particular interest that it has been accomplished not by making the furnaces larger, although this is also being done, but chiefly by improving the quality of the raw materials, particularly ore. In certain cases a large portion of the ore mixture is sintered. In this way fines are almost eliminated, and a raw material exceptionally high in iron (about 68 per cent) is obtained. Large American furnaces, if supplied with rich sintered ores, would produce far more than anything yet achieved here or abroad.

Growing appreciation of these benefits may be considered a feature of the past year. Burdening northern New York furnaces with 100 per cent sintered magnetite has been accompanied with such economies in fuel and increased output, as to justify that district in the unusual procedure of sintering all the ore. These ores in their natural occurrence are extremely hard to reduce, even after crushing to a very objectionable degree of fineness, yet sintering makes a material so satisfactory for blast furnace use that sintered magnetite of a certain grade is now marketable as far west as Ohio.

Progress with Flue Dust Problem

In 1927 several plants have been added to the list of those equipped for sintering flue dust. It is gratifying that the many problems in handling this obnoxious material are steadily being solved. Its extreme dryness and fineness has been at the start of this trouble; an excellent procedure is watering the material in a dust-tight conveyor-mixer as it passes from dust catcher to car. By this means, dumping the dust catcher is practically dustless and in subsequent handling the dust is but little more troublesome than fine ore. Proper cooling and moistening before reaching the sintering plant helps in the final hydrating before the dust reaches the sintering pan.

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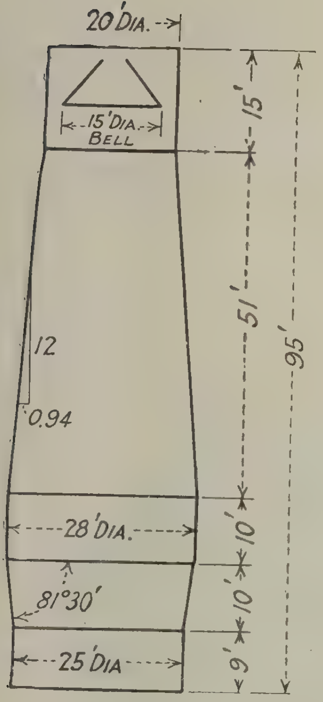
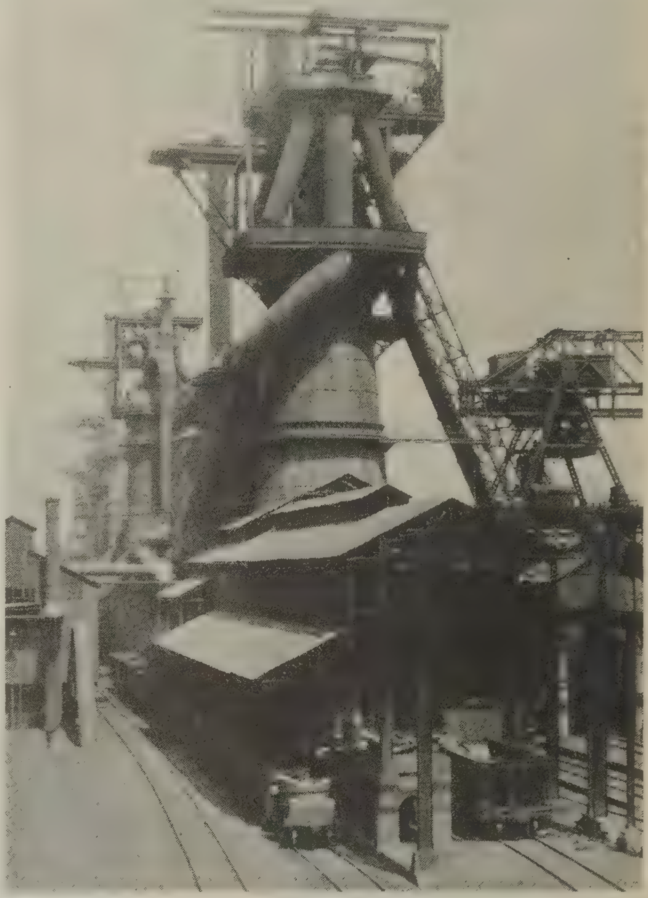
*Superintendent of Northern Furnaces, Republic Iron & Steel Co., Youngstown, Ohio.

Excessive amounts of carbon in the dust is another drawback. Good results have recently been obtained with as little as 4½ per cent, whereas something more than 6 per cent was formerly considered essential. As high carbon dust is generally due to dirty or soft coke, the betterment of blast furnace fuel will also help solve the peculiar problems of flue dust.



At Left is a Sketch Showing Proposed Lines for a Blast Furnace to Have an Average Capacity of 1000 Tons per Day



The View at the Right Shows an American Blast Furnace After Remodeling from 16 ft. Hearth Diameter to 21 ft. 6 in. By this means capacity was increased from 500 to 750 tons per day

Improved Stove and Burner Performances

Large hearth furnaces have influenced the design and construction of such equipment as stock houses, stoves, blowing engines, cast house devices, ladles and gas burners. More than one plant has found the auxiliary equipment inadequate for the increased demands of stacks rebuilt to produce fifty per cent greater tonnage.

In stove design the problem has been to heat from 50,000 to 70,000 cu. ft. per min. of wind to 1300 deg. Fahr. or higher. Nothing less than 300,000 sq. ft. of heating surface will suffice, which means at least four stoves unless very small checkers are used. As the tendency, without justification perhaps, is away from the 3½-in. checkers to a medium size of 4 or 5 in., a return to four stoves is the usual procedure.

Pressure burners have helped meet the increased load upon the blast heating equipment. Two or three times the amount of gas formerly used may now be passed through each stove. By this means three stoves meet the requirements of some very large furnaces; other plants have secured much higher blast temperatures than with burners of the old aspirating type. But overloading the stoves to the point of increasing stack temperatures is not economical, so ample checker work is no less desirable than before.

Continued efforts are being made to provide cleaner gas for heating stoves and boilers, to recover waste heat and to increase gas burning efficiency. A marked advance has been a successful apparatus to transfer heat from the stack gases into the cold wet gas from the washers. By this means heat lost in washing is partly replaced and the sludge nuisance is eliminated, as entrained moisture is converted into water vapor. Several installations of this type are in operation.

Boiler house equipment had had some of the attention it has so long deserved. Most boilers fired with furnace gas today have less than 60 per cent efficiency, and a maximum of about 115 per cent rated capacity, whereas with modern improvements these units may be driven to more than 150 per cent of rating and their efficiency brought above 70 per cent. In this way increased gas from big furnaces may be utilized without installing additional boilers.

It is a matter of regret that a by-product of such proved utility as slag should fail to net a profit to the industry, but at least the cost of slag disposal is being substantially reduced. Nearly all plants are now equipped to prepare slag for some commercial purpose, usually in the hard form for road building, concrete construction or railroad ballast. Efforts are being made to produce slag of a grade that will be a preferred material in these lines of work.

Total Practical Capacity Highest in History

In blast furnace construction the policy of conservatism has been observed. Several old plants have been scrapped and few new ones built. Such has been the success, however, of the larger furnaces, better raw materials and improved types of auxiliary equipment, that the country's potential capacity for producing pig iron remains greater than ever before.

New Automatic Chucking Machine

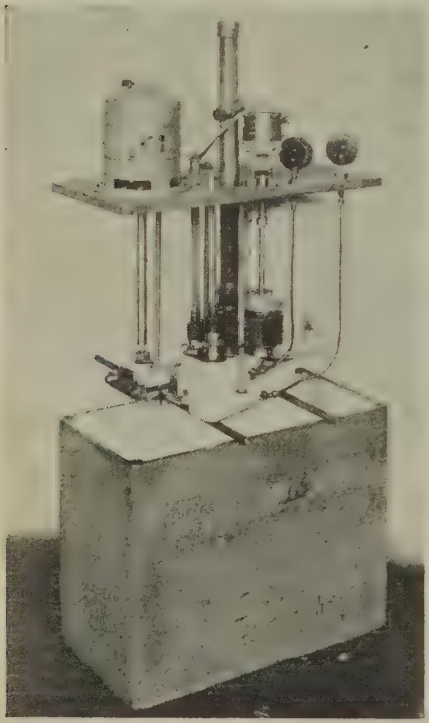
Feed of Tools is by Means of Two Tool-Carrying Bars Having Longitudinal and Semi-Rotative Movement —Hydraulic Chucking Employed

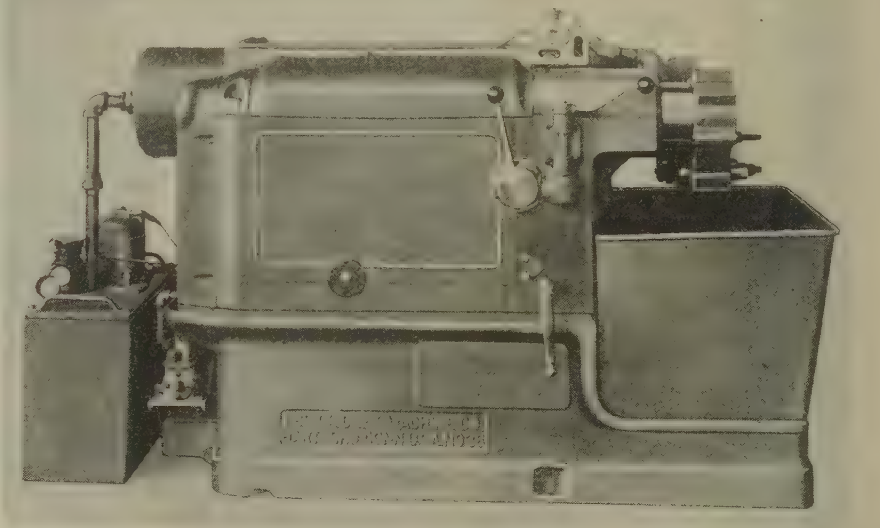
SIMPLICITY of tool set-up is a feature of a new chucking machine which has been brought out by the Gridley Machine Co., Hartford, Conn. The machine is of single-spindle work-revolving type and is designed for boring, turning, facing and forming operations on forgings such as the races of anti-friction bearings, etc. The swing is for chucks up to 10 in. in diameter and work up to 8 in. in diameter.

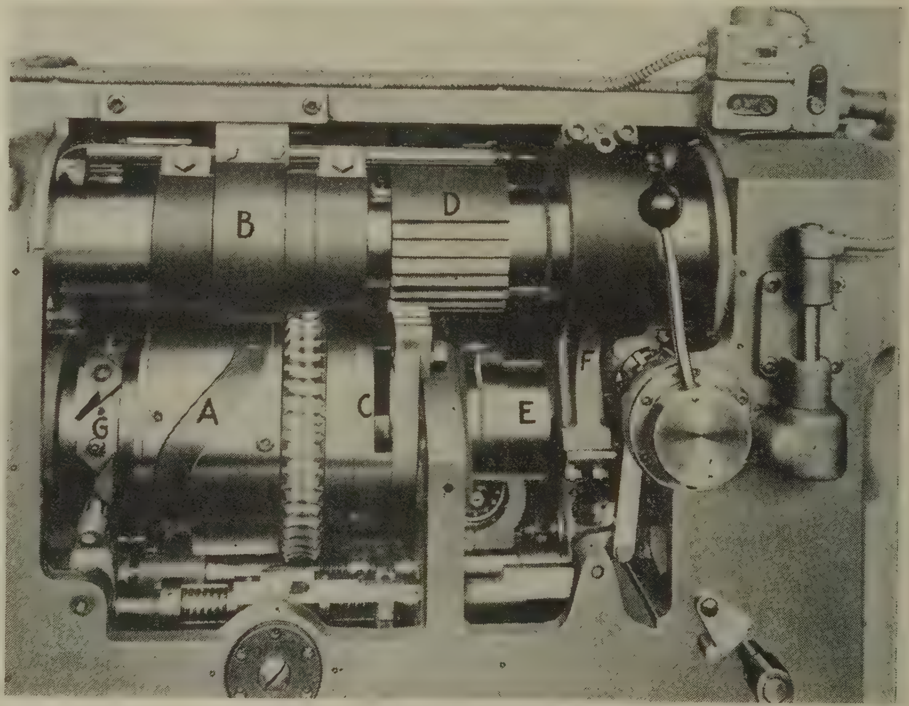
The general arrangement of the machine may be noted from the several views reproduced herewith. In this design two tool-carrying arms are mounted on the ends of tool slides or sliding bars of large diameter, one bar on each side and parallel with the work-holding spindle and chuck. No other moving parts are exposed during machining operations, the other mechanisms being inclosed within the cabinet of the machine. At the left-hand end of the machine is the hydraulic unit that actuates the work-holding chuck, and at the right-hand end, beneath the tool-carrying arms, is the chip box. The latter rests on rollers located in the front extension of the base, which rollers facilitate pulling of the chip box on to the platform of a truck, when the box is to be emptied. Observable also from the illustration of the operating-side of the machine is the central grouping of all controls.

The sliding bars or tool-operating slides are carried in split adjustable bearings at the front and the rear of the cabinet. They have independent semi-rotative and longitudinal movement, and each slide is independent of the other, being actuated by cams mounted on separate camshafts. The arrangement of the tool-operating mechanism may be seen from the close-up view herewith, which shows the mechanism as observed from the operating side of the machine when the covers have been removed. All rotating members are mounted on ball bearings and all moving parts are flood-lubricated.

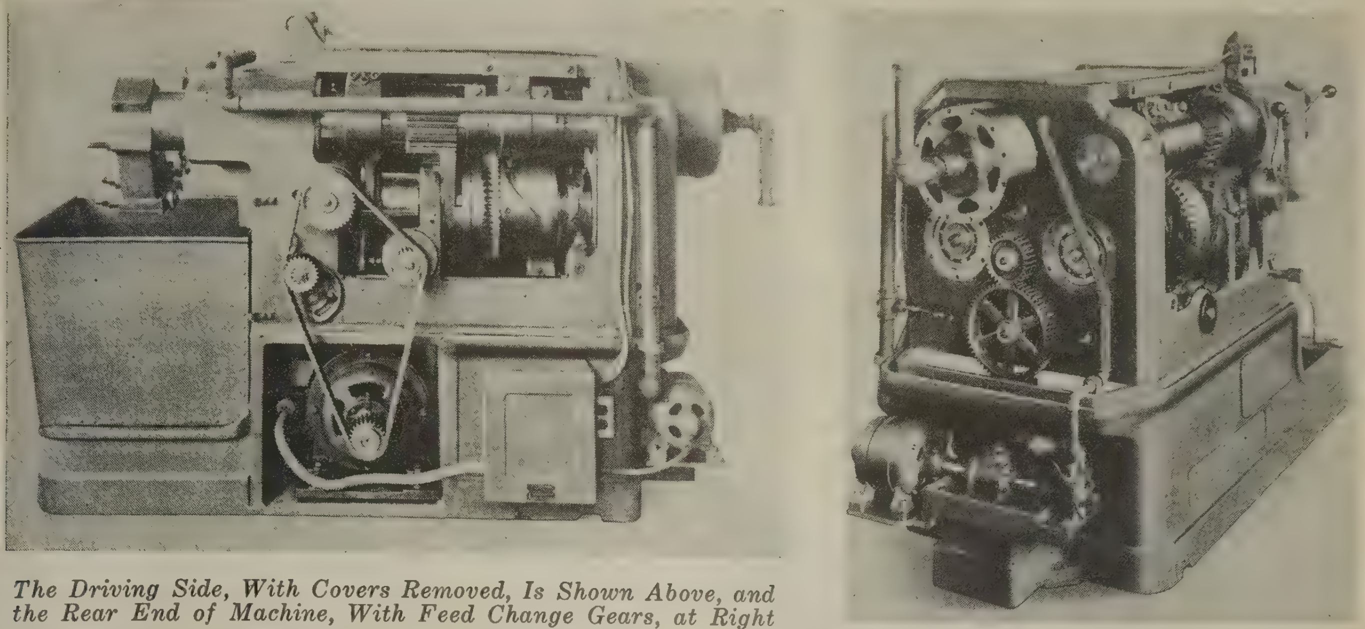
Longitudinal movement of the tool slides, parallel to the center line of the work, is by means of cam *A* and part *B*, which surrounds the tool slides, but does







THE Operating Side of the Chucking Machine, With Covers in Place, Is Shown at the Upper Right. The close-up view shows the arrangement of cams, etc., on the operating side of the machine. The components of the hydrau chucking unit may be noted from the open view above



The Driving Side, With Covers Removed, Is Shown Above, and the Rear End of Machine, With Feed Change Gears, at Right

not grip it. This has lengthwise movement along a fixed guide and is confined between two collars. By this arrangement longitudinal movement may be transmitted to the bar without restriction of the semi-rotative movement.

The semi-rotative movements of the tool slide and tool-carrying arms attached to them, by which the cutting tools are swung to and from the work, are produced by the segment gear and pinion *D* (actuated by cam *C*) and cam *E*.

The cutting tools are positioned before they start to cut by means of the segmental pinion, the gear sector and the face cam. The wide-faced pinion *D*, with teeth cut on part of its periphery, is keyed to the tool slide and is in constant mesh with the gear sector below it. This gear sector derives a periodic swinging movement from the face cam *C*.

Cam *E* imparts semi-rotative movement to the tool slide during the cutting operation, except in the case of straight turning. It is splined to the camshaft and is mounted on the end of the shaft so that the cam may be conveniently removed and replaced by others of different shape. While the tools are cutting the hardened steel bearing piece of the lower end of the arm of part *F* rests upon the periphery of cam *E*. This part, *F*, is attached to the tool slide and moves with it.

Movement of the tools on the opposite tool slide is controlled by the camshaft on the other or driving side of the machine. It is the same as that shown in the close-up view except in the shape of the cams. The cam corresponding to cam *G* serves to stop and start the work spindle and to control the supply of coolant.

The drive arrangement may be noted from the accompanying view of the driving side with covers removed. From the motor in the base, the drive is by silent chain to the upper sprocket which is on the end of the wormshaft. The latter drives the work spindle, and through the spindle and change gears, drives the camshafts when the latter are in slow motion. Upper sprockets of different diameters provide for changes of spindle speeds, compensation for variations in length of driving chain being made by adjusting the sprocket at the left. Fast motion of the camshafts is obtained by the small sprocket at the right and clutches that are actuated by cam *G*. The latter serves to change the motion from fast to slow and vice versa, as required. The ratio of the change gears, a set of which is regularly furnished, determines the rate of the slow rotation of the camshafts, which is equivalent to the rate of feed of the cutting tools. The fast motion of the camshaft returns and repositions the tools.

Before the start of the cycle of operations the positions of the cams and other parts are as shown in the close-up illustration. When the starting lever of the machine is moved, cam *C* actuates the gear sector, which rotates the bar and moves the arm *F* so that the bearing piece of the latter is in line with the periphery of cam *E*. This movement swings the tool-carrying arm and brings the cutting tool toward the work.

The whole slide is then moved toward the left by cam *A*, which advances the tool to the cutting position. The gear sector is released by cam *C*, and the bearing piece of arm *F* is allowed to rest on the periphery of cam *E* for the remainder of the cycle. The motion of the camshaft is then changed from fast to slow by means of cam *G*.

For parallel boring or turning, a cylinder is used for cam *E*, which produces no further tangential advance of the cutting tool during its traverse to the left. If the cut is taper, cam *E* will have a constant rise, and if it is to be irregular the cam will be made accordingly. If the cut is entirely one of forming, the slide will be advanced to its extreme left position by cam *A*, and held stationary while the tool is advanced tangentially to the work by the rise of cam *E*.

Coolant is pumped to the tools and lubricating oil forced to the horizontal pipe on top of the cabinet by means of two pumps which are mounted on the rotor shaft of the motor located at the end of the base of the machine. The horizontal pipe for lubricating oil is perforated and serves to spray oil continuously over the mechanism within the cabinet. The reservoir for the coolant surrounds the motor and extends into the base under the chip box. The lubricating oil reservoir is also inclosed in the cabinet.

The floor space occupied by the machine is 33 x 78 in., and the weight is approximately 6800 lb.

Hydraulic Chucking Employed

The hydraulic unit for actuating the work-holding chuck is of the company's design. It is designated as the model HU 200, and has been placed on the market recently for use on screw machines, automatic lathes and other equipment on which air-operated chucks or fixtures have been employed. The unit is self-contained and is designed to stand on the floor and connect with the machine by a single pipe, which conveys the oil. A motor lead to the source of power and the mounting of a switch at the operating position completes the installation of these units. By means of the switch the operator may open or close the chuck or fixture in a fraction of a second and can vary the constant pressure maintained to suit the holding power required for the particular work.

The unit, an open view of which is shown in a separate illustration, includes a small rotary pump which is directly driven by a ¼-hp. motor and serves to maintain constant pressure on the chuck cylinder. This pressure may be adjusted quickly up to 150 lb. per sq. in. While the work is being held in the chuck, the pump, by means of a piston by-pass valve, builds up in an accumulator, the energy to actuate the cylinder piston at high-speed when new work is placed in the chuck. The time of opening or closing the chuck is less than ½ sec.

Actuation of the chuck at will is by means of a heavy-duty tumbler or momentary contact switch controlling a solenoid piston valve. The piston valve, pump, piston by-pass valve, accumulator relief valve, accumulator and manifold are suspended from the cover plate of the tank and submerged in the lubricating oil that fills the tank. The gages on the cover plate of the tank indicate the cylinder and accumulator pressures. Any leaks that might occur in the cylinder packing are returned to the unit through a small flexible tube.

NEW ROLL GRINDER

Forced Feed Table Lubrication Among Features of 24-In. Swing Machine

FORCED feed table lubrication has been provided on the 24-in. swing self-contained plain roll grinder illustrated, which has been added to the line of Cincinnati Grinders, Inc., Cincinnati.

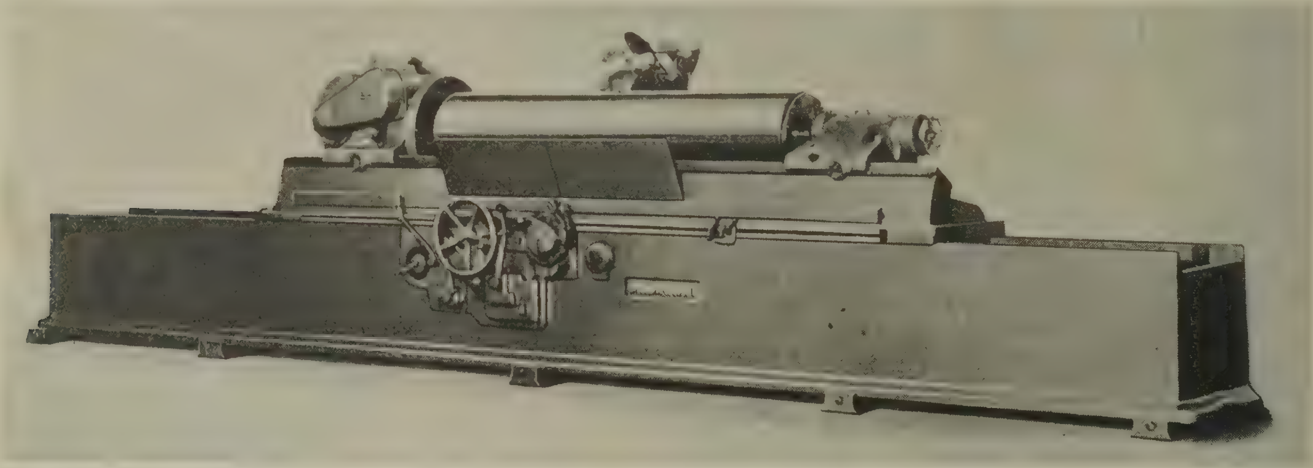
The machine is available in 13 different lengths from 48 to 336 in., each larger size being 24 in. longer than the preceding. In method of control, the new machine resembles the company's 12- and 16-in. plain grinders. The weight of the grinder illustrated is 30,000 lb. net. The distance between the center of the V-guide and the center of the flat bearing of the table is 20½ in.

The system of oiling the table guides is unusual. Instead of oil-distributing pockets with rollers in the bed, the V and flat table ways are flooded with filtered oil from a pump which is geared directly to the drive shaft. The oil is pumped from a central tank to the table guides at about 4 lb. pressure and distributed through oil grooves cut on the under side of the sliding table. These grooves extend the length of each table bearing and are open at the ends. In this way the oil pressure is constant throughout the length of the table, and regardless of how short the traverse the ways are always flooded with clean oil. In draining back to the central tank, the oil passes through a settling chamber on each end of the bed, and a Purolator which removes the grit and dirt. This system of table lubrication is incorporated under lease from the Gray Planer Co., Cincinnati. Lubrication of other parts of the machine is centralized at a few points, and requires infrequent attention.

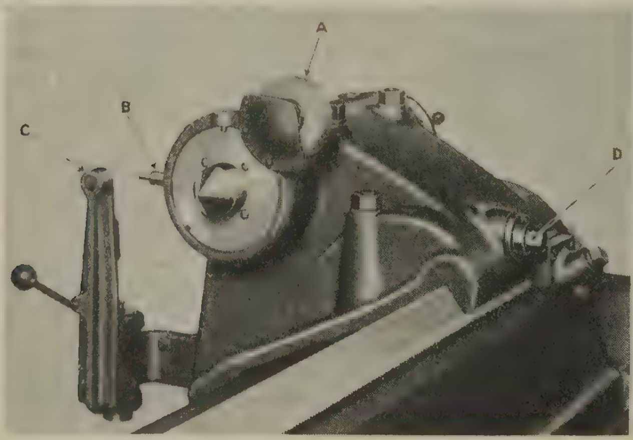
Standard machines are built with single tables, but machines up to 144 in. between centers have been designed with two tables, one an upper work table or swivel table and the other, the lower, a sliding table. The swivel table is designed with the large bearing areas to provide maximum stability, and tapers 12 ft. in length may be ground. On single-table machines a set-over construction in the footstock takes care of any misalinement between centers. Short tapers may be ground if the cutting face of the grinding wheel is dressed to the desired degree and then brought straight into the work. The table is traversed by means of steel gearing with a safety friction clutch, which comes into operation if the machine is jammed. This clutch also functions at each reversal of the table.

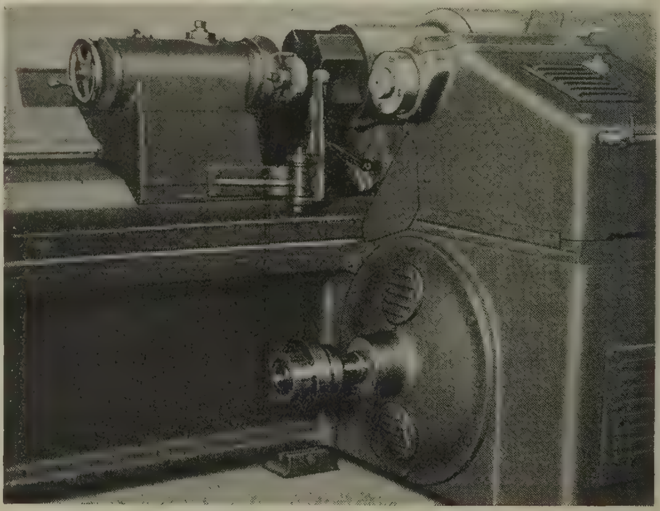
The wheel head is of heavy design, and is mounted on large V and flat bearings. A 30-hp. motor mounted on the outside of the machine is coupled to the main drive shaft by a flexible coupling. The spindle is driven from the main shaft with a multiple-strand Texrope drive which runs over idlers in order to permit of adjusting the wheel slide. Inspection of the moving parts of the drive is facilitated by openings in both the wheel head and bed.

The weight of the wheel head plus the downward pull of the Texropes is said to hold the slide on the ways even under the heaviest cuts. The wheel slide guide is a generously proportioned V bearing and the infeed



Roll Grinder With Cast Iron Sleeve in Grinding Position. On the footstock, below, A is the wheel truing fixture; B the diamond holder; C the radius truing fixture; and D the set-over screw. The flexible motor coupling is shown at lower right





screw is mounted directly on the center of the V. The wheel head is balanced with a large counterweight to assure smooth infeeding and accurate sizing.

The grinding wheel spindle is mounted in half bearings of bronze, the upper halves acting as safety caps on the spindle. The spindle is lubricated automatically by oil which is lifted out of a reservoir in the wheel slide and carried into distributing pockets in the spindle cap by means of centrifugal slingers on the spindle. The spindle is made from a chrome-nickel steel forging, heat treated, and ground to a high finish; it is designed to carry a wheel 12 in. wide if necessary. End thrust is taken up by a double-thrust ball bearing which may be adjusted while the spindle is running. It is claimed that this type of spindle mounting is free from chatter.

Table traverse speeds, 12 in number, are obtained through hardened steel sliding gears mounted on hardened shafts with integral multiple splines. The gear box is mounted on the back of the bed of the machine, and speeds are controlled by a single lever from the left front of the machine.

The grouping of all controls within easy reach of the operator, making it unnecessary for him to move from a central position, is a feature emphasized. A mirror attachment is provided to enable the operator to see the point of contact between the wheel and the work without bending over the machine. The headstock is controlled by a rheostat, located on the right front of the machine, which in turn operates through a dynamic braking panel.

Power is transmitted to the faceplate through Texrope drive, worm and large worm wheel. A 3-hp. 230-volt d.c. motor is employed and the speed of the faceplate ranges from 11 to 96 r.p.m. The work headstock is of dead center type and is held in place on the table by three clamping bolts, while the footstock has two. Where direct current is not available, a 3½-kw. 230-volt d.c. generator with rheostat is built into the machine.

In addition to the set-over screw construction provided to facilitate parallel grinding on the single table machines, the footstock is said to be unique in that it is equipped with two types of wheel truing devices. A roll type truing fixture can be mounted on the large diameter behind the work center, or a diamond can be used as wanted. The radius truing fixture bolted to the footstock shown in the close-up illustration of the footstock rounds the edge of the grinding wheel for grinding fillets on rolls. Both head and footstock are adjustable on the table by hand-operated rack and pinion. The tailstock spindle, operated by a handwheel, has a full length adjustable bearing to compensate for wear.

A power driven center grinder, driven from the headstock, for regrinding work centers is standard equipment. The coolant pump is of centrifugal type and is arranged so that its bearings do not come in contact with the water. The coolant nozzle is carried on the front of the wheel guard. Adequate water guards and wedge blocks for alining the grinder on its foundation are regularly furnished.

Steels for Ammonia Synthesis

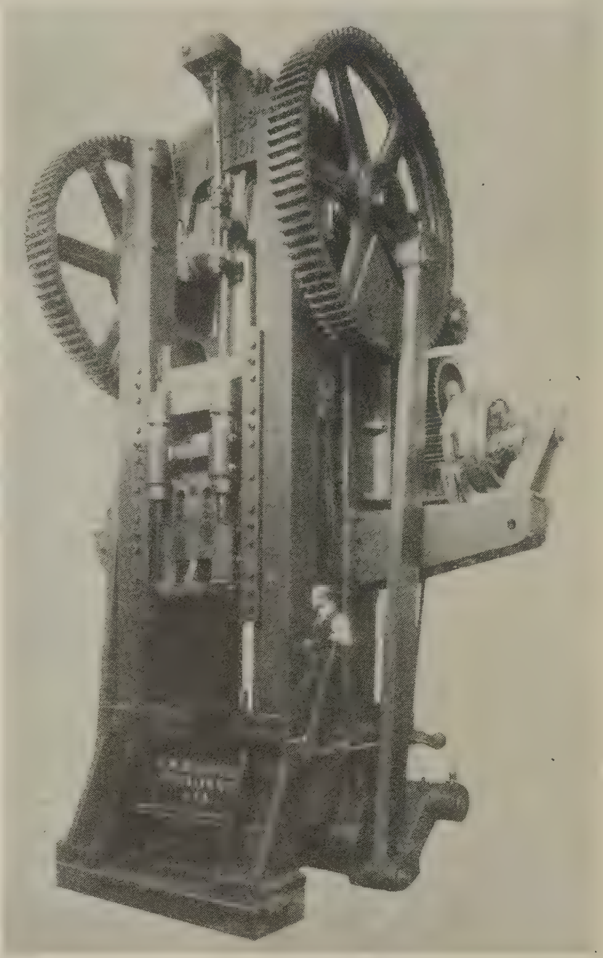
Technologic Paper No. 361 of the Bureau of Standards covers in considerable detail the material presented to THE IRON AGE readers Dec. 1, 1927, page 1518. J. G. Thompson, the author of the article noted, together with J. S. Vanick and W. W. Sveshnikoff, wrote the Bureau's publication, entitled "Deterioration of Steels in the Synthesis of Ammonia."

The Struthers-Wells Co., Warren, Pa., is now manufacturing standardized types of heat exchangers for oil refineries, chemical and process work, power, by-product and coke plants, etc. These standard heat exchangers are claimed to have high fluid and vapor velocity, well developed turbulence, removal tube bundle, a high practical heat transfer rate and full allowance for expansion and contraction. A new bulletin describing these is available on request.

Large Double-Action Press for Cutting and Drawing Heavy Metal

A special single-crank double-action power press, which, weighing approximately 400,000 lb., is the largest machine of this type ever built by the E. W. Bliss Co., Brooklyn, N. Y., is shown in the accompanying illustration. The diameter of the crankshaft is 18 in. at the bearings and 21 in. at the pins. The machine is designed to draw and lift out work up to a depth of 11 in., and is adapted for the cutting and drawing of heavy metal. It has a capacity of 1000 tons, divided as follows: 500 tons on the blank-holder and 500 tons on the plunger.

The press is of tie rod construction, the entire working strain being taken by the four large steel tie rods which tie the crown, bed and uprights together. The arrangement is such that if desired the inner and outer slides can be locked together and the press used as a single-action press for work requiring a pressure of 1000 tons. This change is made by driving two pins through the blankholder and plunger slides and removing two keys in the connecting rods, actuating the blankholder slide, which rods are made in two pieces for this purpose.



The Crankshaft Is 18 In. in Diameter at the Bearings and 21 In. at the Pins. The machine will draw and lift out work to a depth of 11 in.

When used as a double-action press the blankholder is operated by long links inside the housing which are connected to a crankshaft in the bed. The crankshaft is operated by the main gears through a toggle motion, has four crank pins, two of which are used to operate the blankholder and two to operate the positive liftout in the bed. Adjustment of the blankholder is by four large adjusting screws and plunger adjustment is made by a 15-hp. motor mounted on the crown. The machine is driven by a 125-hp. motor and it is triple geared and has twin drive.

Dimensions are as follows: Distance between housings, 60 in.; distance from the bed to blankholder, stroke down, adjustment up, 42 in.; and distance from the bed to the plunger, 48 in. The stroke and adjustment of the blankholder, respectively, is 11⅝ in. and 8 in.; of the plunger, 24 in. and 8 in.; and of the knockout, 11⅝ in. and 7 in.

42-In. Heavy Engine Lathe Has Improved Headstock and Carriage

The Niles Tool Works Co. division of the Niles-Bement-Pond Co., Hamilton, Ohio, is adding to its line a 42-in, heavy engine lathe having improved features, particularly in the headstock and carriage. The actual swing of the machine is 43 in. and the length of bed is 32 ft. The drive is by a 20-hp. variable speed motor, but may be increased to 25 hp. or more, according to the service required.

Main spindle bearing dimensions have been increased about 40 per cent and other parts correspondingly. All gears in head are now of steel. The forged faceplate gear ring, also of steel, is of the same diameter as the outside of the faceplate and is shouldered and bolted to the faceplate. The faceplate is forced on the spindle by a hydraulic press and fits against the large flange on the spindle to which it is also bolted to give additional strength and rigidity.

Four mechanical changes of speed are obtainable in the lower half of the headstock for either a. c. or d. c. motor drive, which in conjunction with the variation in motor speeds for d. c. drive, gives faceplate speeds ranging from 1.9 to 231 r.p.m. For a. c. drive the top half of box has six additional mechanical changes, making 24 changes, ranging from 1.5 to 169.5 r.p.m. The pinion for the faceplate drive is located directly under the tool line in order to assure a smoother drive. Direct drive to the spindle is made through a large gear pressed and keyed on to the spindle next to the front spindle bearing. This is the only drive gear on spindle. The use of sleeves on the spindle has been eliminated. All gears and bearings in the head are supplied with forced lubrication by a pump which is driven from the driving gears, the pump being direct connected so that when machine is started oil is forced to the gears and bearings. The pump is bolted to a combination cover and bracket and may be removed by taking out four bolts. The head is oil tight and dust proof and attention has been given to oil leakage by placing drains and covers at points where this is most likely to occur. An oil indicator is located in a prominent position so that the operator may see that the headstock oiling system is functioning properly. All gears in the headstock are close against a bearing and there are no overhung gears in the drive.

On this machine the spindle thrust bearing is carried in a separate unit outside of the headstock so that it can be made of adequate proportions to assume the load and to give ready access for inspection and adjustment. The thrust is taken on a hardened and ground block with a special bronze washer on the spindle. The thrust plates dip in an oil compartment, oil being carried by slingers over the surface of the bearing. Adjustment is made by spanner wrench on two nuts on the ends of the bolts carrying the thrust bracket.

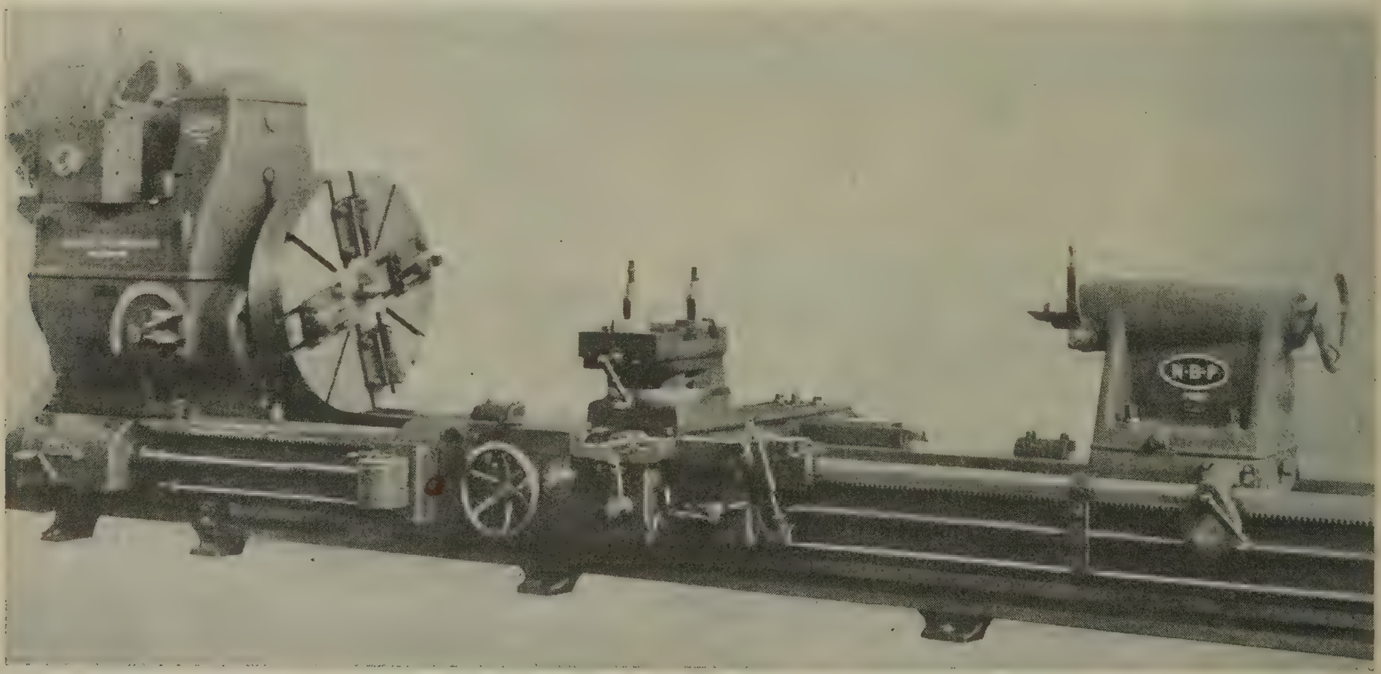
With the d. c. drive the faceplate is stopped quickly by dynamic braking. In the a. c. drive a mechanical brake incorporated in the gear box is operated from a motor control lever on carriage. Moving the lever to the "off" position automatically applies the brake. A jog button is provided on the headstock for slightly turning over the gears while shifting and for inching the faceplate in setting up or inspecting work.

The motor pinion shaft is supported between two bearings independent of the armature shaft bearings so that the motor bearings are not subject to load from the gears.

The carriage apron is of new design. The carriage is supported on the bed on V tracks, but the bridge also has a flat bearing on the inner edge of front shear, giving a solid bearing directly under the tool. The carriage is gibbed underneath the track at the front and the back and can be securely clamped in position when cross feeding. A graduated swiveling tool slide with four clamping bolts and tool straps is regularly furnished instead of the two poppet tool holders shown. Provision is made for power angular feed, which may be supplied as an additional feature, and power rapid traverse to carriage is also optional. A separate reversing motor used for the latter is mounted on a bracket on the carriage and connected by gearing with feed rack. The rack pinion may be withdrawn when cutting threads.

The apron is a one-piece casting assembled as a self-contained unit. An oil reservoir is provided in the top, the oil being led to all gears and bearings through brass piping. This reservoir is filled through holes in top of carriage. Feeds are engaged and reversed by sliding gears and positive tooth clutches. The lead screw is splined the full length and drives a double fine tooth clutch which engages either one of two bevel gears. The clutch is moved by lever at the front of the apron. This provides means of changing the direction of the feed or for stopping the feed by throwing it into neutral.

A lever for securing either cross or longitudinal feed is located at the side of apron. This lever controls a sliding gear which in one position is in engagement with the cross feed gear and when thrown in the other direction connects with the gear train to the rack for longitudinal feed. The lever for engaging the lead-screw nut is interlocked with the feed. All gears in apron are of steel and are doubly supported on large shafts. The rack pinion also has a bearing at its outer end. The feed gear box provides four changes of feed and threads by sliding gears and clutches. Change gears for additional feeds and threads are furnished.



The Actual Swing of the Lathe Is 43 In. The main spindle bearing dimensions have been markedly increased and all gears in the head are now of steel. The carriage apron is of new design

Price Cutting Threatens Prosperity

Half of American Industry Operating at a Loss—Stabilizing of Bolt and Nut Market Indicates What Can Be Done in Other Lines

BY CHARLES J. GRAHAM*

PROFITLESS prosperity had its innings in 1925 and 1926 and reached its climax in 1927 and, in so doing, brought forcibly to our attention the threat contained in its continuance by the abnormal number of business failures during that period.

The failures in dollars reached the stupendous figure of two billion in 1925, two billion two hundred million in 1926 and up to the end of August, 1927, one billion seven hundred and forty-five million. If the same average continued over the last four months of 1927, the figures for the year would show the staggering total of two billion seven hundred and sixteen million dollars.

In 1926, 41 per cent of all corporations doing business in the United States did business at a loss. In 1927, when all the returns are in, this will probably grow to close to 50 per cent.

In 1926 there was 23c. lost for every dollar earned. In 1927 this figure will, in all probability, be very materially increased, and, if such a condition were permitted to continue, it would eventually have but one answer—complete demoralization, great national suffering and another long period of readjustment.

There is no argument against the economic unsoundness of one-half of our business institutions doing business at a loss, and it goes without saying that to correct such a condition is our greatest national problem. Its solution means the one great accomplishment we must all strive for if it is our desire to keep America in her present position as a world power.

The problem *must* be solved if we are to stabilize and perpetuate present labor conditions in the United States both from the standpoint of employment and the return to labor.

We all have come to a full realization of the fact that satisfactory labor conditions and present high wages are responsible for the degree of prosperity we have had, and any underlying condition which would affect in any way our ability to keep up the present rate of employment or of wages paid would have the effect of cutting down buying power, would restrict production, and the inevitable result would be a long period of depression, of suffering and of dissatisfaction.

We have now reached the turn of the road. The best brains of American business—political, social and economic—are now face to face with this problem and undoubtedly with such intensive study it will be solved, and every business man in America has his responsibility and his place in the eventual solution of it.

How Losses Were Turned to Profits in Bolt and Nut Industry

The bolt, nut and rivet industry, which I represent, had its baptism of fire in 1924, when its losses were running into such figures that practically the entire industry was facing complete annihilation. This caused the best brains in our industry to combine in an effort to bring about a "right about face" and study its individual problems as an industry, and it has accomplished rather remarkable results.

From an industry loss of 12 million dollars in 1924, we have, by consistent cooperative effort in every way possible, converted this loss into a profit of approximately six millions of dollars per year in 1925, 1926 and 1927; a change of 18 millions of dollars per annum on an invested capital of about 150 million dollars.

Six million dollars profit on such an investment is not sufficient, but it is a move in the right direction and, by further effort along constructive lines, we hope to bring about a condition whereby we will finally make a return consistent with manufacturing necessity and be able to make not only a fair return for our stockholders, but a return sufficient to enable us to keep abreast of the times in modernization of equipment.

This has been done under the handicap of a very large overproduction; 55 per cent of our equipment will supply the present normal requirements of bolts, nuts and rivets in the United States.

The same problem that we had in 1924 is now facing many other industries, and the same result we have attained can be accomplished by all if they put the same sincere constructive effort into it that we have done.

Selfishness Greatest Evil in Competitive Lines

We made a complete scientific study of the reasons behind such a condition. We found that the greatest underlying evil we were up against was the evil that is sapping the life out of practically all competitive lines of American industry today, and that evil is selfishness.

We found that we were conducting our individual companies on a basis that had lost all semblance of decency or fairness—fairness to ourselves, our competitors, our customers or to the world at large.

We have entirely revolutionized our business methods. We have dug in deep and brought to the surface all of the evils we could find and have killed them one by one. We have developed a degree of unselfishness never before attained either in our industry or any other we know anything about.

What has been the result other than a return in dollars? We can look the world in the face today with a degree of pride, our competitors are our friends rather than our enemies and we are conducting our business on a higher ethical plane than ever before and have created the same honest conduct in our business as heretofore ruled in our social lives.

We have gone further than this. We have started a movement which we feel has solved the distribution problem in our own industry and, if the same plan is followed by all other industries, it will be the greatest automatic stabilizer of business and labor conditions of anything heretofore attempted.

Organization of Agencies of Distribution a Boon

Our distribution plan is very simple but very effective. We have been brought to realize the importance of the jobber in the proper and economical distribution of our merchandise.

During the period of ruthless competition culminating in our financial distress in 1924 we had ignored the existence of the jobber and became his chief competitor, thereby creating in him an enemy and becoming the chief aggressor in the rapid decline of our markets brought about entirely by our lack of appreciation of his importance to us.

Beginning early last year and finishing only last week, a committee of eight of the leading executives of our industry toured the entire United States. We have held meetings with the jobbers in 36 cities, representing every important jobbing center, and have now converted the jobber from an enemy to a friend and have made him a supporter of our markets rather than

(*Concluded on page* 378)

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*President Bolt, Nut and Rivet Manufacturers Association, Pittsburgh. Abstract of address before the Pennsylvania State Chamber of Commerce at Harrisburg, Pa., Jan. 25.

Youngstown-Inland Steel Merger

Combined Companies, with Ingot Capacity of 5,000,000 Tons Annually, Will Rank Third in Size in Country

THE long-discussed merger of Youngstown Sheet & Tube Co. and the Inland Steel Co. was concluded on Jan. 25 and there now remains only the working out of some minor details to complete a combination that will put under control of one management capacity capable of producing 5,000,000 tons of steel ingots annually and which has plants located in Youngstown and the Chicago district making a well-rounded line of finished products. The new company in size will rank next to the Steel Corporation and the Bethlehem Steel Co.

Directors of the Yougstown Sheet & Tube Co. and the Inland Steel Co. on Tuesday approved the merger. A special Sheet & Tube stockholders' meeting to ratify the action has been called for March 15. Inland Steel has decided to retire, effective April 1, its outstanding $10,000,000 of preferred stock, at $115 per share, making payment from its own assets. The charter under which Sheet & Tube operates as an Ohio corporation is to be amended in pursuance of the terms of merger, and the name changed to the Youngstown-Inland Steel Corporation.

The Youngstown company in Youngstown produces sheets, bars, pipe and wire products, while in its Chicago district plants it makes pipe and tin plate, having only last year started up a modern tin plate plant of 24 mills. The Inland Steel Co. capacity nicely complements the Youngstown line, with rails, structural shapes, both light and heavy, bars, rods, plates and sheets, besides capacity for spikes, bolts, nuts and rivets.

New Shares to Be Exchanged for Present Shares

The new corporation will issue 3,200,000 shares, of which 2,000,000 shares will be given to present holders of the common stock of the Youngstown company on a basis of two new shares for one old, and the other 1,200,000 shares will go to holders of Inland common stock on a basis of one new share for one old share.

"In order to adjust net assets to be contributed by the respective companies," the official announcement reads, "the Youngstown Sheet & Tube Co. will declare a dividend to the aggregate amount of $1,250,000 to be distributed to holders of its common stock and the Inland Steel Co. will declare a dividend of the aggregate amount of $6,000,000 to be distributed to holders of its common stock.

Youngstown Sheet & Tube Properties

The Youngstown Sheet & Tube Co. operates iron and steel making plants at Hubbard, East Youngstown, Struthers, Youngstown, Warren, and Zanesville, Ohio; East Chicago, Ind., and South Chicago and Evanston, Ill. The company owns under lease the Newport-Bonnie mines and the Palms-Anvil-Keweenaw group on the Gogebic Range in Michigan and the Isabella Mine on the Marquette Range in the same State. It also has partial ownership in a number of ore properties in Minnesota and Wisconsin operated by Pickands, Mather & Co., and owns and operates the Mayville mine on the Iron Ridge Range in Wisconsin.

Products Are Widely Diversified

Products of the Sheet & Tube Company include iron and zinc ores, lead and zinc concentrates, coal and limestone, coke and coke oven by-products, sulphuric acid, basic, Bessemer, malleable, foundry, forge, and high and low phosphorus pig iron, blooms, slabs, billets, sheet bars, muck bar, skelp, socket iron, merchant bars and angles, concrete reinforcing bars, agricultural implement shapes, spring steel bars and springs, black, galvanized, blue annealed, automobile, furniture, full-finished and special finished sheets, formed roofing and siding sheets, universal and sheared plates, wire rods, plain, galvanized and copper coated wire, woven-wire fence and concrete reinforcing fabric, galvanized, polished, blued and cement coated wire nails, wire staples, wire hoops, barbed wire and flexible steel armored electrical cable, black and galvanized steel pipe, oil well casing, tubing, drive and line pipe, boiler tubes, rigid steel conduit, conduit elbows, couplings and unions, and oil and water well tools and supplies.

Mills in Youngstown District

At the Hubbard, Ohio, works are two blast furnaces having an annual capacity of 325,000 tons of foundry, basic and malleable pig iron.

The Campbell works, East Youngstown, Ohio, has four blast furnaces with a capacity of 900,000 tons annually. The by-product coke plant consists of 306 Koppers ovens, by-product recovery plant and Semet-Solvay benzol plant, with an annual capacity of 1,500,000 net tons of coke and 4,000,000 gal. of light oil. The Bessemer department of the steel works contains two 12-ton Bessemer converters and five cupolas. In the open-hearth department are 12 100-ton basic open-hearth furnaces, 36 gas producers and three hot metal mixers. The plant has a capacity of 780,000 tons of Bessemer and 840,000 tons of basic open-hearth steel ingots.

In the rolling mill department are 24 double puddling furnaces, two busheling furnaces, two rotary squeezers, 16 four-hole soaking pits, nine slab heating furnaces, five continuous producing gas and coke oven gas fired heating furnaces equipped with 49 gas producers, one 40-in. and one 44-in. two-high, one-stand blooming mills, an 18-in., two-high, 10-stand continuous billet mill, an 18-in., two-high, eight-stand continuous sheet bar mill, a 10-in., two-high, 10-stand continuous skelp mill, a skelp mill with 20-in., three-high, one-stand roughing and 16-in., two-high, three-stand finishing, a skelp will with 18-in., three-high, two-stand and 18-in., two-high, one-stand, two 29-in., three-high, two-stand merchant bar mills, one 30-in. x 72-in. universal plate mill, one sheet and one pair furnace and 14 combination sheet and pair furnaces, 15 hot, black sheet mills, four cold mills, eight double-box annealing furnaces, four plunger pickling machines, six galvanizing pots, tube mill with six butt-weld furnaces, five lap-weld furnaces and four galvanizing pots. The plant has an annual capacity of 688,400 tons of hot rolled finished products including 600,000 tons of black pipe and 88,400 tons of black sheets, 800,000 tons of skelp and 50,000 tons of couplings.

At the Struthers, Ohio, works are three continuous heating furnaces; one 10-in. two-high, 16-stand wire rod mill, one 12-in., two-high, nine-stand bar mill, one 9-in., two-high, 12-stand bar mill, wire mill with 206 wire drawing blocks, 192 wire nail machines, nine straightening and cutting machines, 48 barbed wire machines, 17 wire fence machines, 13 wire hoop machines, three wire galvanizing pans and nail galvanizing equipment. In the conduit department are two electro-galvanizing units for lap-weld and butt-weld pipe. The plant has a capacity of 370,000 tons of hot rolled products, including 250,000 tons of merchant and concrete bars and 120,000 tons of wire rods.

The Brier Hill Works, Youngstown, acquired by the purchase of the Brier Hill Steel Co., March 1, 1923, has three blast furnaces, which have an annual capacity of 550,000 tons of basic pig iron. The by-product coke plant consists of 84 Koppers ovens, a by-product recovery plant and a Koppers benzol plant. The annual capacity is 370,000 net tons of coke and 1,000,000 gal. of light oil. The open-hearth department has 12 basic

JAMES A. CAMPBELL has been active in the steel business since 1891, when he became superintendent of the Warren mill of the former Trumbull Iron Co. Then followed various connections in an operating capacity until in 1901 he was made vice-president and general manager of the Youngstown Sheet & Tube Co. In 1903 he was elected president.

L. E. BLOCK has spent his entire business life in the coal and iron business. He was treasurer and director of the Inland Coal & Washing Co. from 1897 to 1905, becoming vice-president and treasurer of the Inland Steel Co. in the latter year and in 1919 he was elected chairman of the Inland board of directors.

P. D. BLOCK began his iron and steel experience with the Block-Pollak Iron Co., Chicago and Cincinnati, in 1888. In 1903 he became vice-president and treasurer of the Inland Steel Co. and in 1919 was elected its president.

open-hearth furnaces, with an annual capacity of 780,000 tons of steel ingots. In the rolling mill department are six continuous heating furnaces, three normalizing furnaces, eight four-hole soaking pits, one 40-in., two-high, one-stand blooming mill, one 24-in., two-high continuous mill, one 24-in., two-high, six-stand merchant mill, one 32 in. x 84 in. sheared plate mill with one stand two-high and one stand three-high, one 40 in. x 110 in. three-high, one-stand sheared plate mill, eight sheet and eight pair furnaces, eight hot black sheet mills, two trains of cold rolls of four stands each, 16 box annealing furnaces, and four pickling machines. The plant has a capacity of 700,000 tons of semi-finished products and 430,000 tons of finished products, including 370,000 tons of sheared and universal plates and 60,000 tons of black sheets.

At the Western Reserve Works, Warren, Ohio, acquired with the Brier Hill Steel Co., are two pair furnaces, five combination sheet and pair furnaces, two two-high jobbing mills with one roughing stand and one finishing stand each, five hot black sheet mills, eight stands of cold rolls, four box annealing furnaces, four blue annealing furnaces and one pickling machine. The plant has a capacity of 70,600 tons of black sheets.

Plants in Chicago District

The two blast furnaces at the Indiana Harbor works, East Chicago, Ind., which were acquired by the purchase of the Steel & Tube Co. of America in June, 1923, have an annual capacity of 468,000 tons. The coke plant consists of 120 Semet-Solvay coke ovens, a by-product recovery and a benzol plant, with an annual capacity of 648,000 net tons of coke and 2,880,000 gal. of light oil. The steel works has two 15-ton Bessemer converters, four 75-ton basic open-hearth furnaces, one 600-ton mixer and three cupolas. It has an annual capacity of 600,000 tons of Bessemer and 240,000 tons of basic open-hearth steel ingots. In the rolling mills are five slab reheating furnaces, one Morgan continuous heating furnace, six soaking pits, one 35-in., two-high, one-stand blooming mill, one 28-in., two-high, one-stand billet mill, one 10-in., two-high, 11-stand continuous skelp mill, one 30 in. x 88 in., two-high, one-stand sheared or universal plate mill, two butt-weld and three lap-weld furnaces, and one galvanizing pot. The plant has a capacity of 280,000 tons of slabs and 200,000 tons of billets and 370,000 tons of finished products, including 130,000 tons of plates and 240,000 tons of black pipe.

The four blast furnaces at the South Chicago Works, South Chicago, Ill., have an annual capacity of 810,000 tons.

The Evanston works, Evanston, Ill., consist of two butt-weld furnaces and one galvanizing pot. The plant has an annual capacity of 72,000 tons of black pipe. The Zanesville works, Zanesville, Ohio, consist of two lap-weld and two butt-weld furnaces and two galvanizing pots. It has an annual capacity of 120,000 tons of black pipe. Both of these plants were acquired with the Steel & Tube Co. of America.

Properties and Products of Inland Steel Co.

The Inland Steel group consists of the Indiana Harbor works, plants Nos. 1 and 2, Indiana Harbor, Ind.; a rail steel bar mill at Chicago Heights, Ill., and sheet mills at Milwaukee. The Indiana Harbor plant covers 600 acres and 800 acres of vacant property is held in Porter County, Indiana. These tracts are served by the New York Central, the Pennsylvania and the Baltimore & Ohio railroads. The company owns 8000 acres of coking coal land in Jefferson County, Illinois, and 2000 acres in Pennsylvania. Ore properties are owned and leased in the Mesabi and Cuyuna ranges of Minnesota. The company also owns an interest in the Inland Steamship Co., which operates three 10,000-ton ore boats.

The principal Inland products are basic, malleable and foundry pig iron, coke and by-products, steel ingots, slabs, blooms, billets and sheet bars, rails, heavy and light structural shapes, merchant and concrete bars, rods, universal and sheared plates, black, galvanized and blue annealed sheets, rivets and railroad track supplies.

Blast Furnace Capacity 965,000 Tons

At the Indiana Harbor works are four blast furnaces—No. 1 completed in 1907, No. 2 in 1912, No. 3 in 1917 and No. 4 in 1926. Their annual capacity is 965,000 tons. Steam is furnished by 10 boilers rated at 10,500 hp. The sintering plant has a yearly capacity of 35,000 tons, and the slag granulating plant of 650,000 tons. The by-product coke plant consists of 204 Koppers ovens with an annual capacity of 900,000 tons of coke and 3,000,000 gal. of light oils.

In the steel plant, which is completely electrified, is the following equipment: 14 100-ton and 12 60-ton basic open-hearth furnaces, a 600-ton mixer, 35 soaking pits, one 40-in., one 36-in. and one 32-in. blooming mills, a 28-in. rail and structural mill, a 24-in. billet and sheet bar mill, a 24-in. jobbing shape mill, a 24-in. Morgan continuous sheet bar and billet mill, a 24-in. Morgan continuous billet and slab mill, an 18-in. merchant mill, an 11-in. to 8-in. Morgan continuous bar mill, a 32-in. sheared plate mill, two jobbing mills, 16

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This Issue in Brief

Changes losses into profits for an entire industry by solving distribution problem. Instead of competing with distributers, the bolt, nut and rivet manufacturers cooperate with them. Antagonism has given way to support, prices have been stabilized, and the industry has been put on a profit-making basis.—Page 378.

Thin film of rust acts as a protective coating to prevent further corrosion. All metal surfaces corrode a little, says metallurgist. Rust-resisting metals owe their noncorrodibility to the fact that a protective film forms on the surface and automatically brings to an end corroding action. — Page 377.

Superhardens steel parts by subjecting them to shower of small steel balls. Tiny blows work-harden the steel and produce a thin, super-hardened layer. Soft spots in hardened articles are readily revealed, as the steel balls will clearly mark any unhardened surface.—Page 333.

America sold less steel abroad in 1927 than in 1926, but bought more. Steel exports were 1.69 million gross tons, 8 per cent below 1926. Imports were 398,385 tons, 1.5 per cent above 1926.—Page 379.

Industrial locomotive tests reveal that coal consumption is 572 lb. an hour. Under steady operation water consumption is 450 gal. an hour.—Page 380.

Iceless refrigerating units made almost wholly of welded stampings and thin-walled tubing. Welding is found to be especially suitable in making gas-tight joints.—Page 321.

Low-cost pig iron means large-hearth blast furnaces. Big furnaces have justified themselves, for they operate easily and economically, says blast furnace superintendent. Prophesies that 1000-ton per day furnace will soon be here.—Page 334.

Synchronizes motor speeds by means of electric interlock. Individual balance type vibrating speed regulators govern speed of motors on new Bourne-Fuller rolling mill, so that bars are kept under tension but are not stretched or looped between passes.—Page 326.

Can prices come down to prewar levels? Many things probably never will approach again the 1913 figures, with enhanced wages and higher taxation.—Page 332.

Millions saved in manufacturing economies have been wasted in faulty distribution methods. Reaction has set in, says trade association head, and business is beginning to devote to distribution the attention it deserves.—Page 378.

Sizable gain is made in pig iron output. Estimated daily production in January was 92,467 tons, a gain of 5507 or 6.3 per cent over December. Estimates indicate that the increase in number of furnaces in blast is 16, largest gain in two years.—Page 349.

One-half of all corporations lost money in 1927, says Bolt, Nut and Rivet Manufacturers' Association head. The problem of making industry profitable for the majority must be solved if labor conditions are to be stabilized and buying power maintained.—Page 341.

Foreign purchases of American machinery steadily increasing. We sold 435.5 million dollars' worth of machinery abroad in 1927, a gain of almost 9 per cent over 1926, and the second only to 1920, when prices were considerably higher.—Page 382.

Are prices governed by percentage of productive capacity operating? No, indicates editorial writer, for in some finished steel products one branch may operate at a higher rate than others and yet have poorer prices.—Page 346.

"Of what value is all our efficiency in production if we do not distribute efficiently, economically and effectively?" asks Eugene G. Grace. Urges engineers to study merchandising and distributing problems.—Page 372.

Ten companies now control about 82 per cent of the steel-making capacity of the United States. Recent mergers further concentrate steel production among the large producers. Five companies have more than two-thirds of the total capacity. —Page 347.

Activity in automotive industry is steadily growing. Increase in volume of steel bookings in Detroit area has been running about 4 per cent a week since early in January. Ford payroll now numbers 89,788 workers.—Page 366.

Prices of metals and metal products relatively low compared with pre-war figures. The average is only 23.2 per cent above 1913, while the average of all commodities is 45.5 per cent, or twice as high.—Page 330.

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Prices and Productive Capacity

PRODUCERS of almost any commodity are prone to regard price cutting in their selling market as fundamentally due to an excess of productive capacity. Those who assert that market troubles arise from the efforts of competitors to operate at higher rates than the state of demand permits really take the same ground. The common saying is that producers are "trying to secure an economical operation."

If a proper study could be made it probably would be found that several important influences induce price cutting or prevent prices from advancing to a level fair to the producers. Certain facts are obvious from a rapid survey. One is that the amount of price cutting or the unsatisfactoriness of prices in different commodities is not in direct relation to the apparent excess of capacity. In finished steel products one branch may operate at a higher rate than another and yet have poorer prices. Similar instances can be found among the manufacturing consumers who are customers of the steel mills.

Another case in point is the custom of measuring the steel industry's operation in terms of percentage of steel ingot capacity, even though steel ingots are the one commodity the steel industry does not sell. Its sales are of finished products and of semi-finished steel, each line having its individual market. It is common knowledge that the total rolling and finishing capacity in the United States is quite in excess of the total ingot-making capacity. If demand should mount in all lines relative to the respective finishing capacities a point would soon be reached calling for the full ingot tonnage without the finishing departments' being able to run full.

While most manufacturers would seek a higher operation to reduce unit cost, this idea should be more critically examined. It is illogical, for the simple reason that there is no critical rate of operation which brings a disproportionately sharp reduction in costs. Costs are better at 60 per cent than at 50 per cent and likewise they may be better at 90 per cent than at 80 per cent. Andrew Carnegie went further, endeavoring to sell more than assumed capacity and then driving mills to break their records. Nowadays mills seldom succeed in getting a higher operating rate at the expense of competitors. But who will say that if they did they would not be tempted to try to go further and further, courting an encounter with the impossible?

Price cutting is often blamed on especially severe competition in one or more lines. Of course there are chance differences in personnel in various industries, but these differences are commonly overestimated. Some industries do have less intelligent and more aggressive competitors than others. But human nature is much the same all around, and if the personnels were exchanged it is probable that the marketing conditions might stay much the same.

In the case of steel mill products a very important price factor is that mill customers must resell the bulk of the tonnage in their respective markets, and these markets have their individual difficulties. For this reason a group of consumers may slip into a lower market and call upon the mills for relief or, faced by a mill demand for higher prices, may feel themselves unable either to absorb the advance or to pass it along. Thus the mills have a definite stake in influencing their customers to seek better prices.

AMERICAN machinery was shipped abroad in 1927 in greater quantity than ever before. Expressed in dollar values 1920 was higher, but the margin of $28,000,000—6½ per cent—was much less than the enhancement of prices in the immediate post-war period. The total exports in the year just closed were $435,476,000. This compares with a shade under $400,000,000 in the preceding year and with $463,000,000 in 1920. Since 1922, when the total was $239,000,000, there has been a continuous and fairly uniform gain year by year. This increment has averaged $39,000,000 a year. As recently as 1916 a new high record was made at $226,500,000, which was reported as far in excess of any preceding year. That the shipments were so high in 1927 was due in part to record exports of agricultural machinery; shipments of machine tools in 1927 almost doubled the total registered in 1926.

Steel Mergers and Steel Output

NOW that the merger of the Youngstown Sheet & Tube Co. and the Inland Steel Co. is virtually assured and the purchase of the Trumbull Steel Co. by the Republic Iron & Steel Co. has been ratified by stockholders, the grouping of large units of steel production has been carried to a point where ten companies will control about 82 per cent or 47,497,000 tons, out of the 58,000,000 tons per annum of theoretical steel-making capacity in the United States. Five of these companies have total capacity of almost 41,000,000 tons, the smallest of the group being rated at nearly 2,000,000 tons, while in a secondary group are five other producers whose totals are between 1,000,000 and 1,750,000 tons each. The ingot capacities of the ten companies are:

	Tons
United States Steel Corporation	23,046,000
Bethlehem Steel Corporation	7,900,000
Youngstown-Inland Corporation	5,040,000
Jones & Laughlin Steel Corporation	3,000,000
Republic-Trumbull companies	1,950,000
American Rolling Mill Co.	1,750,000
Central Alloy Steel Corporation	1,400,000
Wheeling Steel Corporation	1,273,000
Colorado Fuel & Iron Co.	1,138,000
Corrigan, McKinney Steel Co.	1,000,000
Total	47,497,000

If the Youngstown-Inland and Republic-Trumbull properties should be brought together later under one ownership, a possible development toward which there is as yet no definite move, the total ingot capacity of the combination, amounting to 6,990,000 tons, would still be exceeded by the Bethlehem Steel Corporation's rating of 7,900,000 tons.

Of a little less than 11,000,000 tons of ingot capacity that is left to all of the steel companies not included in the ten above listed, there are thirteen whose totals range between 300,000 and 1,000,000 tons a year. These are:

	Tons
Crucible Steel Co. of America (including Pittsburgh Crucible Steel Co.)	950,000
International Harvester Co.	700,000
Lukens Steel Co.	686,500
Pittsburgh Steel Co.	600,000
Weirton Steel Co.	570,000
Donner Steel Co.	540,000
Alan Wood Iron & Steel Co.	529,000
Otis Steel Co.	421,000
Sharon Steel Hoop Co.	400,000
Interstate Iron & Steel Co.	375,000
Granite City Steel Co.	360,000
Bourne-Fuller Co.	300,000
Andrews Steel Co.	300,000
Total	6,731,5

While most of these thirteen companies make only one or two products each, instead of the diversified lines in which the larger groups are engaged, they are well distributed geographically and help to preserve a competitive situation which allays any fear of monopolistic tendencies in steel production. Recent industrial history confirms the opinion, before expressed in these columns, that large consolidations of capital and facilities have brought with them a greater degree of responsibility toward the public, including that share which purchases the products of the steel mills.

The smaller manufacturing units in the steel industry, although numerically of importance, own only 6½ per cent of the total steel-making capacity. It is in this group, however, that mergers may now be looked for, such as the one recently consummated by six Ohio sheet companies under the name of the Empire Steel Corporation. This company, while having only 185,000 tons of steel-making capacity, has upward of 400,000 tons of finished steel capacity when relying upon other companies for some of its raw product.

In the major steel products—rails, plates, shapes, bars, tubular goods, sheets and wire rods—the five leading producers under the new line-up will predominate to a degree which is well illustrated by the following table, giving in the first column the collective capacities of the five companies and in the second column the estimated capacities of all plants combined:

	COMBINED CAPACITY OF FIVE LEADING PRODUCERS, TONS	ESTIMATED CAPACITY OF ALL PRODUCERS, TONS
Rails	3,672,000	4,529,500
Plates	5,119,000	6,877,000
Shapes	3,784,000	4,434,000
Bars, hoops, bands, etc.	9,148,000	18,048,100
Tubular goods	3,646,000	5,501,500 (welded and seamless)
Sheets and tin mill black plate	3,645,000	8,710,700
Wire rods	2,886,000	4,494,800

In the Chicago district the Youngstown-Inland combine will have 240,000 tons of rail-making capacity out of a total of 1,373,000 tons; 330,000 tons in plates of a total of 1,566,000 tons; 285,000 tons in shapes of 914,000 tons; 360,000 tons in bars, hoops, bands, etc., of 3,732,000 tons; 265,000 tons in sheets and light plates of 530,500 tons; 312,000 tons in pipe of 738,000 tons. Tubular products lead in the capacity at Youngstown, with 600,000 tons.

The acquisition of the Trumbull company will give the Republic Iron & Steel Co. a total of about 650,000 tons in bars, strips, hoops and bands and 260,000 tons in sheets.

Seamless Pipe Lines Next

SUPPLANTING of welded pipe by the seamless product is progressing steadily and the manufacture of seamless pipe up to 24 in. in diameter, which means an invasion of the pipe line field hitherto controlled by the welded product, is now at hand. This development will repeat history.

Some years ago seamless steel captured the boiler tube market, and the demand for welded steel and welded iron tubes is now small by comparison with what it was a decade ago. Seamless drill pipe and casing have also been making a constantly stronger bid for use in oil and gas wells, and are now being used almost to the exclusion of welded pipe in Western fields and other producing districts where the oil lies at great depths below the surface and is reached only after piercing thick strata of rock.

Up to date none of the seamless pipe manufacturers in this country has made pipe more than 13 in. in outside diameter; 10 in. has been the more common limit. In this respect, European producers have been turning out sizes up to 20 in. in diameter by a process different from that likely to be used in this country. It is generally conceded that American manufacturers have found best success after supplanting the European method of making a large tube with what is popularly referred to as the "automatic" mill, and there is little doubt that the future development for tubes up to 24 in. in diameter will follow along this line. Two installations of this sort are now in contemplation in the Pittsburgh district which will increase the size to 24 in. in diameter. Plans are under way for even larger seamless pipe for high-pressure work, and like tubular products demanding high-class metal without welds.

Profits from Collateral Advantages

NEARLY 50 years ago it was proved that solid carbon dioxide could not compete with water ice as a refrigerant. Mathematicians skilled in thermodynamics demonstrated that, while it would absorb twice as much heat and was therefore worth twice as much, carbon dioxide ice required much more than twice as much energy to solidify it as it took to freeze water. In other words, it would cost more to make it than it could be sold for. Therefore men looking for new business ventures turned to other lines of endeavor.

But more recently some others (who perhaps were unaware of the scientific reasons why they couldn't succeed) manufactured some solid carbon dioxide and marketed it under the trade name of "dry ice." In a short time in actual use it was found that instead of replacing twice its weight of ice, as theory indicated, in certain services it replaced ten times its weight! The thermodynamical demonstration wasn't wrong, but the theoretical computer did not realize that the gas evaporating from the refrigerant was itself an excellent insulator against outside heat. Other collateral advantages, such as lower shipping weights and ability to use one-time paper containers, have warranted many consumers to pay enough for the new refrigerant to make its production a profitable business.

This is not written with the intent of advertising dry ice, but to indicate what an essential part collateral advantages play in successful marketing. If solid carbon dioxide had the same utility as water ice (as assumed by the physicists of last century) it could not compete. But unsuspected utilities, the collateral advantages of the substance, enhanced its value.

In fact, collateral advantages are the selling points which market most modern devices. Old but usable equipment is made obsolete by newer designs with collateral advantages. Possession of a washing machine and steam dryer does not mean that the laundress's wages will be less than if she worked with a wash tub, boiler and clothes line; the collateral advantage to the owner is that the housewife thereby becomes less dependent upon the laundress's whims. An oil furnace isn't particularly cheap, either to install or operate, but it is far more comfortable to set a clock and thermostat in the evening than it is to rise early in the cold morning and shake down the grates.

These homely illustrations serve to fortify the point that selling purely on a price basis is not so profitable as when the article or commodity has valuable collateral advantages which warrant a premium. Obviously various metal industries will do well to extend this principle of marketing to their own production. Not that it hasn't been done already, but the principle is worthy of wider and more intensive application, and warrants some extensive studies by many producers.

Certain instances come to mind. Malleable castings get preference when their easy and uniform machinability is properly appreciated. The copper and brass industry is marketing increasing amounts of pipe, sheets, and moldings on the basis of permanence and beautiful surface—frequently an entirely collateral advantage where the expected life of the structure is limited. Such collateral advantages of all-steel car bodies as "squeaklessness" and safety in collision warrant their adoption for automobiles no less than passenger cars and at a higher price. Broad-flanged beams, the so-called H-beams, effect such economies in the design and fabrication of structural steel work that they often get a premium over the older I-beam sections.

Prosperous is the industry that can find these collateral advantages for its product, and is astute enough to charge its customers for values received.

Why Our Capital Leaves Home

OUR large and increasing foreign loans have created various strong reactions, but one of the important phases of the movement has received slight attention. It is commonly overlooked that these loans furnish a test of our own industrial progress and show it to be less than might well be desired.

The strongest reaction to the outflow of capital has been one of criticism. It is charged that if we continue this lending the returns earned cannot come in, for in the long run, it is said, they would have to be in kinds of merchandise that we do not wish to import. Suspicions have been expressed that we have been slipping into the lending of additional sums to cover interest and that the inevitable result will be a compounding of interest, uncollectable after a period of years.

These contentions cannot be dismissed. But, whereas this criticism began several years ago, it is encouraging to note that the net total of our loans last year was greatly in excess of the interest charges and the loans made a new high record. Estimates just made of foreign loans in 1927 minus redemptions run above one and a half billion dollars, making our total foreign investments at this time about 13 billions. Investments in the United States held abroad, however, probably total in excess of three billions.

Another strong reaction to this exportation of capital, one of criticism and indeed of complaint, has been that our lending to foreigners helps them industrially and will place them in a stronger competitive position, whereby our merchandise export trade may be injured.

These two points are well worth considering, and they have been considered. Another phase has received little attention, but it is very important:

How does it come about that capital is attracted abroad—why does it not stay at home? It has always been recognized that there is "a disinclination in capital to emigrate," and economists have even attempted to estimate the "disinclination," sometimes putting it as high as a 2 per cent difference in expected return.

In addition to the bare facts as to totals, there are two late trends—one, diminished profits from our home investments last year and, second, increased foreign loans. With a diminishing supply of capital, we export more! Emphatically, there is something to be looked into.

When this country was young, capital flowed into it and the process was considered natural. Have we now grown so old industrially that the rest of the world has an average age less than ours? There are data by which we may consider the point. The last Department of Commerce *Review* estimates private American investments abroad at the end of 1926 at $11,215,000,000, divided in the following proportions:

	Per Cent
Europe	26.8
Latin America	40.1
Canada and Newfoundland	25.0
Asia, Australia, Africa, etc.	8.1
Total	100.0

The division seems natural enough. Europe is old, Latin America and Canada are new, and industrially the rest of the world is in early stages.

If there were such a thing as a collective national mind, it would be natural to ask what eventual benefits we expect to derive from the investments, i. e., what do we expect to buy for ourselves with the money? It cannot be construction at home, or we should use the capital itself for constructing. It cannot be goods, for we do not want more foreign merchandise. The natural inference is that foreign loans are increasing because of a lack of opportunities for profitable investment at home.

Sharp Gain in January Pig Iron Output

Estimates, Collected by Wire, Show Daily Rate 5507 Tons or 6.3 Per Cent More Than December—Net Gain of 16 Furnaces

PRELIMINARY estimates of the January pig iron production, gathered by wire on Tuesday, Jan. 31, indicate a sharp increase over December. With the output for the last day or two calculated by producing companies, the production of coke pig iron last month was 2,866,468 gross tons, or 92,467 tons per day. This compares with 2,695,755 tons, or 86,960 tons per day, in December, also a 31-day month. The January increase in daily rate was therefore about 6.3 per cent.

The feature of the January operations was the net gain of 16 furnaces. The incomplete returns indicate that 20 furnaces were blown in and four blown out or banked. This is the largest net increase in many months, the nearest approach having been one of 14 furnaces in December, 1925. The United States Steel Corporation is credited with 13 of the 20 furnaces blown in, seven being Carnegie Steel Co. stacks and five furnaces located in the Chicago district. Only one Steel Corporation furnace was blown out, giving that organization a net gain of 12 stacks for the month. There were six independent steel company stacks blown in and two blown out, with one merchant furnace started up and one shut down. According to the data, there were 185 furnaces operating on Jan. 31.

Actual data for the January output will be published in THE IRON AGE Feb. 9. The table gives the estimated production by districts for January and the three months preceding.

Pig Iron Production by Districts, Gross Tons

	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)
New York and Mass.	203,859	199,726	212,778	232,422
Lehigh Valley	74,575	74,316	75,748	81,829
Schuylkill Valley	43,784	44,238	53,269	64,260
Lower Susq. and Lebanon Valleys	30,528	32,289	30,150	31,828
Pittsburgh district	585,203	523,875	495,005	540,525
Shenango Valley	76,911	58,982	64,752	77,106
Western Penna.	89,226	92,774	92,000	93,010
Maryland, Virginia and Kentucky	94,087	92,981	91,300	88,991
Wheeling district	108,026	114,030	110,055	110,222
Mahoning Valley	248,445	222,572	223,617	245,625
Central and Northern Ohio	312,293	295,179	306,395	324,793
Southern Ohio	32,473	32,413	32,750	32,954
Illinois and Indiana	606,788	537,892	508,545	506,438
Mich., Minn., Mo., Wis., Colo. and Utah	130,160	140,141	126,287	121,203
Alabama	223,829	227,775	219,478	224,533
Tennessee	6,281	6,572	6,247	8,373
Total	2,866,468	2,695,755	2,648,376	2,784,112

Railroads Ordered to Revise Rate Provisions on Scrap

WASHINGTON, Jan. 31.—Railroads in Official Classification territory have been ordered by the Interstate Commerce Commission to revise present tariff provisions with respect to scrap iron and steel. The commission took this action in a decision made public last Friday in which it upheld a complaint of the Wrought Washer Mfg. Co., Milwaukee, against the assessment of rates on old material which in most instances were those applicable on manufactured iron and steel and were generally fifth-class rates. The complainant had asked application of scrap rates and sought reparation on that basis. The findings of the commission mark a victory for scrap iron dealers and consumers, who for a long period have held conferences with railroad representatives and with the commission, asking for revision of the existing provision which describes scrap iron as "scraps or pieces of iron or steel having value for remelting purposes only." The commission on numerous occasions has supported this definition.

In announcing the decision in the Wrought Washer case the commission tentatively suggested the following rule for consideration by the carriers:

> Rates apply on pieces of iron or steel, separate or combined and in their original form or otherwise, which are chiefly valuable for remelting or fagoting, which can not be damaged by breakage, and which can be transported in open cars without damage from exposure: Provided, however, that these rates will not apply on iron or steel which, although chiefly valuable for remelting purposes, is in the form of raw or unfinished material for which other rates are specifically provided.

The distinction between the present provision and the one proposed is that the latter does not limit the definition of scrap to material which is fit for remelting purposes only.

The Wrought Washer Mfg. Co. does not remelt old material, but reheats it, and after rerolling, shearing and sorting, makes washers from about 30 per cent, while the remainder is converted into washers without reheating. The commission held that the rates charged the company should not exceed the billet rate and called upon the railroads to apply the new rates beginning March 21. Reparation also was awarded.

Iron and Steel Markets

Prices, Output, Demand Increase

Advance in Wire Products Follows That on Plates, Shapes and Bars—Blast Furnace Operations Gain—Further Broadening of Consumption

A MARKED increase in blast furnace operations in January, fresh price advances and further evidences of heavier consumption reflect the growing strength of the steel market.

The rapidity of recent gains in steel mill operations is given fresh emphasis by the blast furnace statistics. A net gain of 16 active furnaces in the month, all of them steel works stacks, is indicated by telegraphic reports to THE IRON AGE on Jan. 31. The nearest approach to this increase in recent years was a gain of 14 furnaces in December, 1925.

The Steel Corporation alone blew in 13 furnaces in the month and put out one, a net gain of 12. The operations of this producer's plants now average 84 per cent, as against 82 last week and 75 three weeks ago.

Encouraged by expanding business and, no doubt, more determined to get better prices as a result of the poor showing of earnings for the last quarter of 1927, steel producers have announced fresh advances in quotations. Following the lead of the Steel Corporation subsidiary, all makers of wire nails and plain wire have marked up prices $2 a ton. Most of the leading producers of automobile body sheets have restored the former base of 4.15c., Pittsburgh, or $3 a ton above the recent ruling price, and there is more general acceptance of the $3 increase on cold-rolled strip announced by a leading mill two weeks ago.

The advance of Jan. 19 on plates, shapes and bars stimulated specifying and drove in considerable pending business. This reaction was most pronounced at Chicago, where the sales total for the week has been exceeded only twice in the past two years and the increase in specifications has pushed production up to 88 per cent of ingot capacity.

From Chicago also come more definite indications of the gradual abandonment of short-term buying. Diminishing caution on the part of consumers is reflected in longer commitments and corresponding improvement in mill scheduling.

Evidences of broadening demand are seen in the better showing in lines that have been lagging, notably pipe and tin plate. Pipe mill operations have increased to 70 per cent of capacity, as compared with 60 per cent a week ago. Three orders for line pipe in early prospect total 300,000 tons, one alone calling for 150,000 tons. An export inquiry for 15,000 tons of pipe is active, and an order has been taken by an independent producer for 4000 tons for Ontario, Canada.

In tin plate, specifications are expanding, and requirements this year, according to reports from the canners' convention in Chicago, promise to exceed those of 1927.

Wire mills are running at 70 per cent, which represents virtually a peak rate of operation in view of the surplus of producing capacity. Demand for wire products has improved materially, and some mills are booked for 30 days.

The automotive industry has reached a good rate of production, although not running at capacity. The payroll of the Ford Motor Co. numbered 90,000 as of Jan. 27, an increase of 4000 since Jan. 14.

Railroad buying remains a major market factor. A Western road has placed 14,000 tons of rails and Chicago mills are still figuring on 75,000 tons. The Central Railroad of New Jersey ordered 13,494 tons from the Bethlehem Steel Co. Track accessories booked at Chicago total 25,000 tons. The Pennsylvania Railroad has purchased 600 passenger cars, an unusually large order for such equipment, and freight cars bought by three roads number 1250. For repairs to 1000 cars the Norfolk & Western is inquiring for 8000 tons of plates and small shapes.

Out of nearly 45,000 tons of fresh structural inquiry, 27,000 tons is for railroad work. The Santa Fe alone will place 20,000 tons of bridge work. Awards of fabricated steel total 29,000 tons, including 4500 tons for a bridge at Vicksburg, Miss., and 3300 tons for New York subway work.

Pig iron shipments are increasing in some districts, reflecting better conditions among foundries, but sales, except at Cleveland, have not been conspicuously large. Lake Erie furnaces sold 24,000 tons in the week, much of it in small orders. Large stock piles on furnace yards are a deterrent to price advances. While current quotations are being fairly well maintained, there are occasional concessions on the larger tonnages, true particularly when furnaces of different districts meet in competition.

Total production of pig iron in January, according to preliminary estimates, was 2,866,468 gross tons, or 92,467 tons per day, a gain of 5507 tons or 6.3 per cent over the 86,960 tons per day in December. The net gain of 16 furnaces brought the total active at the end of the month to 185.

Exports of machinery from the United States in 1927 amounted to $435,476,591, a gain of 9 per cent over 1926, the largest total since 1920 and the second largest total ever shipped abroad. Machine tools exported from the United States in 1927 represented nearly double the value shipped in 1926, having been $12,538,313, against $7,104,277.

Finished steel, on the basis of THE IRON AGE composite price, has advanced to 2.336c. a lb., after holding at 2.314c. for six weeks. It is now higher than at any time since early last October, but is 2½ per cent below the level of a year ago. Pig iron remains for a third week at $17.67 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jan. 31, 1928	Jan. 24, 1928	Jan. 3, 1928	Feb. 1, 1927
No. 2, fdy., Philadelphia..	$20.26	$20.26	$19.76	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.50
Basic, del'd eastern Pa...	19.50	19.50	19.50	21.50
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	18.50	18.50	18.50	20.50
Malleable, Valley........	17.25	17.25	17.50	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	100.00	100.00	100.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	33.00
Light rails at mill........	36.00	36.00	36.00	36.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	34.00
Forging billets, P'gh......	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	42.00	42.00	40.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago........	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	**1.85**	1.80	1.80	1.90
Steel bars, Chicago.......	**1.95**	1.90	1.90	2.10
Steel bars, New York.....	**2.19**	2.14	2.14	2.24
Tank plates, Pittsburgh...	**1.85**	1.80	1.80	1.90
Tank plates, Chicago.....	**1.95**	1.90	1.90	2.10
Tank plates, New York...	**2.17½**	2.12½	2.12½	2.24
Beams, Pittsburgh	**1.85**	1.80	1.80	1.90
Beams, Chicago	**1.95**	1.90	1.90	2.10
Beams, New York.......	**2.14½**	2.09½	2.09½	2.24
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.25

Sheets, Nails and Wire,	Jan. 31, 1928	Jan. 24, 1928	Jan. 3, 1928	Feb. 1, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.80	2.85
Sheets, black, No. 24, Chicago dist. mill..........	3.00	3.00	2.90	3.00
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.75
Sheets, galv. No. 24, Chicago dist. mill..........	3.85	3.85	3.70	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill..........	2.20	2.20	2.15	2.35
Wire nails, Pittsburgh....	2.55	2.55	2.50	2.60
Wire nails, Chicago dist. mill	**2.60**	2.55	2.55	2.65
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.45
Plain wire, Chicago, dist. mill	2.45	2.45	2.45	2.50
Barbed wire, galv., P'gh..	3.25	3.25	3.20	3.30
Barbed wire, galv., Chicago dist. mill..............	3.25	3.25	3.25	3.35
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$14.00	$14.00	$13.50	$15.50
Carwheels, Philadelphia...	15.50	15.50	15.50	16.00
Heavy melting steel, P'gh.	*14.75*	15.00	15.50	16.50
Heavy melting steel, Phila.	13.50	13.50	13.50	15.00
Heavy melting steel, Ch'go	12.50	12.50	12.50	13.25
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.00	16.50
No. 1 RR. wrot. Phila....	15.25	15.25	15.25	17.00
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.00	12.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$2.60*	$2.65	$2.75	$3.25
Foundry coke, prompt....	3.75	3.75	3.75	4.25
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.25	13.25
Electrolytic copper, refinery	13.87½	13.87½	13.75	12.87½
Zinc, St. Louis...........	**5.67½**	5.65	5.65	6.57½
Zinc, New York..........	**6.02½**	6.00	6.00	6.92½
Lead, St. Louis..........	6.30	6.30	6.30	7.20
Lead, New York.........	6.50	6.50	6.50	7.40
Tin (Straits), New York..	*54.62½*	55.37½	57.75	66.50
Antimony (Asiatic), N. Y.	**11.25**	11.00	11.00	14.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Pittsburgh

Price Advances on Wire Products and Auto Body Sheets

PITTSBURGH, Jan. 31.—The steel trade has been engaged in consolidating its gains and in building its price line for second quarter business. Strip steel producers have stronger price ideas on the hot-rolled product and the advance announced a week ago by a large maker of cold-rolled strips has since been followed by all other manufacturers. An advance of $3 a ton has been announced on automobile body sheets to 4.15c. per lb., and this has been accompanied by a stronger effort to place the market on the basis announced several weeks ago, but which had not been attained because of the willingness of some mills to take additional orders at the prices ruling in December. Another swing in the same direction is an advance of $2 per ton in wire and wire products, applying to all except woven wire fence.

Since the mills are heavily committed for this quarter in these several products, the price changes can be interpreted as indicating that steel manufacturers are determined to place second quarter business upon a more profitable basis than that now passing through the mills. The advance of Jan. 19 on plates, shapes and bars has continued in the past week to stimulate specifications on old business and to bring in contracts from buyers who were inclined to withhold signing them in the belief that they would do as well on spot purchases. Not a mill in this district now has a price of less than 1.85c., on plates, shapes and bars, and while comparatively little business is being done at that figure, mills will go no lower on new orders and there is strong possibility that a further advance may be sought as the time comes for writing second quarter tonnages.

Business in bars, plates and shapes has improved materially as buyers have become convinced of the firm intention of manufacturers to get at least a fair profit for their steel. There has, however, been no change in the general attitude of purchasers toward the market and the fact that it is still difficult to schedule rolling mills more than a week ahead is evidence that many buyers still believe in the buying-for-consumption policy.

Specifications against old and lower-priced orders in other products continue to come in well and the trend of both steel works and rolling mill operations continues upward. For this and nearby districts, ingot production may now be placed at between 75 and 80 per cent of capacity. The Carnegie Steel Co. has added six blast furnaces to its active list since a month ago, while the Pittsburgh Crucible Steel Co. and Republic Iron & Steel Co. each has put on one furnace.

Activity still is lacking in pig iron, scrap and fuels, and while iron prices hold steady, presumably because of slightly less steel company selling, prices of the other materials are soft.

Pig Iron.—Only a small-lot business is being done in pig iron. Some fair-sized tonnages of basic iron, sold by one steel company to another, have been moved, but this business is largely non-competitive, except that the seller has had to make prices more attractive than the nominal quotation of Valley furnaces. The buyer gets the benefit of a considerable saving of freight as between the shipping furnace and those in the Valleys. In Bessemer, foundry and malleable iron, sales have been chiefly in one or two car lots and at recent prices. Agents of charcoal iron producers have written up considerable business with roll makers for shipments over the first half of the year and it is estimated that the amount is close to 10,000 tons.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Steel manufacturers seem to have largely supplied their immediate needs of ferromanganese by purchases and specifications in December to escape the price advance. Current shipping instructions embrace only moderate tonnages. Consumers in this district do not take seriously the reports that higher prices for ferromanganese are immediately ahead.

Semi-Finished Steel.—There is a fairly good movement of billets, slabs and sheet bars in keeping with the fact that the non-integrated sheet, tin plate and strip mills now are having a good operation. Little of the business in these forms, however, is subject to open market competition, buyers being satisfied to adhere to regular sources of supply. Wire rods have been advanced $2 a ton along with the advance in wire and wire products, the new quotation being $44, base Pittsburgh or Cleveland. Pipe skelp is priced at 1.85c., but there is hardly enough business to provide a test.

Bars, Plates and Shapes.—While no considerable amount of business yet has been done at the advanced price recently announced, the market does not appear quotable at less than 1.85c., since all makers in this and nearby districts now are quoting that figure, and they are strengthened in their price position by the heavy accessions to order books resulting from the advance. Bar orders have notably increased in the past week or 10 days. In plates and shapes there is also evidence that buyers take seriously the stand manufacturers lately have been taking on prices. Structural steel inquiry is fairly good, but awards are rather light. The Norfolk & Western is asking prices on approximately 8000 tons of plates and small shapes for repairs to 1000 cars.

Rails and Track Supplies.—The order book of the local standard-section rail producer was further swelled by the distribution of the Nickel Plate order. That road is yet to act on its inquiry for spikes and tie plates. In general, the demand for track supplies is a little slow, but most makers have fair-sized orders booked for late shipment. Spike prices are irregular and easy, but on tie plates and rails prices are well maintained.

Wire Products.—The American Steel & Wire Co., as of Jan. 25, advanced all wire products, except woven wire fence, $2 per ton, putting nails to $2.65, base, per keg, Pittsburgh or Cleveland, and plain wire to $2.50, base, per 100 lb., those points. Other makers have since followed suit. The effect of the advance has been to stimulate specifications on first quarter contracts carrying the former prices and to drive to cover a good many buyers who had not signed contracts for this period. Jobbers still have low-priced tonnage, notably nails, coming to them on orders placed late last year and now will have access to first quarter contract tonnage. It will take a little time for these supplies to get into consumption and the common belief is that the new prices will not be fully effective before the second quarter.

Tubular Goods.—There is a steady, although gradual, increase in the demand for standard-weight pipe, but no appreciable gain is observed in the orders for oil country goods, except possibly from California, where there is fairly extensive drilling of old fields in the expectation of tapping oil at depth. This demand helps particularly the sale of seamless casing and drill pipe. Reports from the oil industry are more cheerful, with reports of a premium being offered for the high gravity oil of the Seminole, Okla., field. An effort now is being made to extend the curtailment program in that field for another three months. No less than 2000 miles of line pipe is embraced in gas pipe line projects now under consideration. There are lines projected from Amarillo, Tex., to Omaha and to Kansas City; from Monroe, La., to St. Louis; from Wyoming to San Francisco and from the latter city to Los Angeles. Pipe prices still show some irregularity.

Sheets.—Makers generally are taking a firmer stand on prices and most of the leading producers of automobile body sheets have since a week ago restored the former base price of 4.15c., Pittsburgh, while almost all makers have taken a stand at 2.90c., base Pittsburgh, on black, 3.75c., base, on galvanized, 2.10c., base, on blue annealed under 40 in. wide, and 2.20c., base, on sheets wider than 40 in. These prices may be regarded as second quarter quotations, since the mills generally are so well obligated, and, by the same token, buyers are so well covered for this quarter that not much possibility exists for the higher prices to become effective promptly. Buyers are specifying well, but new business is light.

Tin Plate.—Reports from the canners' convention in Chicago suggest a common belief that the excess stocks of canned fruits and vegetables will be pretty well used up before the new crops come in. The natural inference is that tin plate requirements will be greater this year than last. At present there is expanding tendency in specifications on contracts and mill operations easily average 75 per cent of capacity.

Cold-Finished Steel Bars and Shafting.—Business holds up remarkably well and is being helped by the fact that a good many buyers who did not believe that the advance announced for this quarter would hold have been impressed by the recent advance in hot-rolled bars.

Hot-Rolled Flats.—Makers are growing stronger in their price ideas, and while there continues to be business at 1.85c., base, for wide material and 2.05c., for narrow, most makers now regard 1.90c. and 2.10c. as their minimum. Specifications on old orders are coming in well.

THE IRON AGE Composite Prices

Finished Steel

Jan. 31, 1928, 2.336c. a Lb.

One week ago	2.314c.
One month ago	2.314c.
One year ago	2.396c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Jan. 31, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.54
One year ago	19.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.17c.
Del'd New York	2.19c.
Del'd Cleveland	2.04c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.80c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.04c.
Del'd Philadelphia	2.10c.
F.o.b. Coatesville	2.00c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c.
Del'd Philadelphia	2.13c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
All gages, wider than 2 in., to 6 in., P'gh,	2.05c. to 2.10c.
*All gages, 6 in. and wider, P'gh	1.85c. to 1.90c.
All gages, narrower than 6 in., Chicago,	2.20c. to 2.40c.
All gages, 6 in. and wider, Chicago,	2.00c. to 2.20c.

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*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb*
Spikes, $\frac{9}{16}$ in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	9
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	50
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Cold-Rolled Strips.—All makers in this district have gone along with the advance announced a week ago by the American Steel & Wire Co. of 3.15c., base, for lots of 1 to less than 3 tons, subject to a deduction of 25c. per 100 lb. for lots of 3 tons or more. Specifications are good on old orders.

Old Material.—The market still is dull and easy. While it is doubtful that any consumer could buy heavy melting steel at less than $15, it is a fact that none will pay more and dealers have succeeded in picking up fair-sized lots for delivery at one point in the district at $14.75. The general market may be appraised at $15 for this grade, with variations either way in keeping with the destination. Blast furnace scrap is weak and $11 is about all that can be obtained. The February scrap list of the Baltmiore & Ohio contains 14,150 gross tons and that of the Norfolk & Western 4100 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.75 to $15.25
Scrap rails	14.25 to 14.75
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	14.75 to 15.25
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00
Short mixed borings and turnings	11.00
Cast iron borings	11.00
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.75 to 15.25
Industrial	14.25 to 14.75
Agricultural	13.75 to 14.25

Bolts, Nuts and Rivets.—Better demand is developing for bolts and nuts from the railroad car builders. Jobbers also are specifying with a little more freedom. Rivets still are slow. Prices are firm on all products.

Coke and Coal.—Declining production of soft coal does not bridge the gap between supply and demand and prices still are weak under the effort of producers to find a market. Lump gas coal, nominally priced at $2.10 per net ton at mines, has sold at $2 and even less in some cases. Slack coal again is plentiful and down in price. The coke market still suffers from limited demand. Light offerings of beehive oven coke do not stay the decline in prices because by-product coke still is freely obtainable. Single carloads of beehive oven furnace coke can be sold at $2.75, but on large lots $2.65 is about all that can be obtained. Foundry coke ranges from $3.75 to $4, with occasional sales of especially good brands at a little more.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Shifting Currents in Pig Iron Imports

Imports of pig iron in December, at 14,299 tons, showed a decline of less than 4 per cent from December, 1926, in spite of the fact that imports for the calendar year 1927 were less than 30 per cent of the corresponding total in 1926. December imports in 1927 were nearly one-seventh of the total for the first 11 months, whereas in 1926 the December tonnage was only one-twenty-ninth that of the 11 months.

India furnished more than half the total incoming tonnage in December, contrasted with only 203 tons last year. In December, 1926, Germany furnished more than two-thirds of the total, contrasted with none a year later. As a matter of fact, Germany's pig iron shipments reaching the United States in December, 1926, were greater than the total from Germany reaching the United States in the entire year 1927.

In the 12 months India has furnished us with just over half our total imports. Netherlands has supplied almost half the remainder and Great Britain more than half that not furnished by India and Netherlands. In contrast with this, Germany led in 1926 with more than one-third the total. Great Britain was second, India third, and Netherlands fourth.

UNITED STATES IMPORTS OF PIG IRON, BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	December		12 Months Ended December	
	1927	1926	1927	1926
United Kingdom	2,741	40	21,139	92,083
British India	8,044	203	66,627	83,311
Germany	....	10,218	9,711	157,094
Netherlands	3,451	3,699	29,383	69.054
Canada	36	48	725	4,767
France	....	....	3,000	28,449
Belgium	....	....	699	7,488
All others	27	575	1,784	3,527
Total	14,299	14,783	133,068	445,773

Truscon Steel Co. to Build $350,000 Plant in Europe

YOUNGSTOWN, Jan. 31.—To take advantage of cheaper steel costs and cheaper labor in Europe, the Truscon Steel Co. has decided to build a European fabricating plant, which will likely be located in Belgium, President Julius Kahn announced this week, on his return from a European trip. The unit will be similar to the plant built by the company in 1927 at Los Angeles at an approximate cost of $350,000. The new plant will ship to Europe, Africa, China, Australia and India. It will be built this year.

At Youngstown, the company is extending its steel window and sash departments, wire mesh fabrication and metal lath plants, by 50 per cent at an estimated cost of $400,000. This work will be finished by May 1.

President Kahn states that the earnings in 1927 will show profits of 30 per cent on the company's common stock of $10 par value, against 38½ per cent in 1926. The annual meeting, scheduled for the second Tuesday in February, will be postponed 30 days.

The Illinois Steel Co. and the Inland Steel Co. have adopted new cards on extras for assembling and handling bars and small shapes. All specifications of less than 4000 lb. each of a size are subject to the following lump sum extras which will be added to the net price of the material: Less than 4000 lb. down to and including 2000 lb. take a lump sum extra of $4; less than 2000 lb. down to and including 1000 lb. take an $8 extra, and less than 1000 lb. takes a $12 extra. The old extras were $3, $6 and $10 respectively.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c. to 1.85c.
Sheared	1.80c. to 1.85c.
Universal	1.80c. to 1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $43 to $45. Cleveland mill base, $42 to $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Large Steel Sales and Specifications—Ingot Output at 88 Per Cent

CHICAGO, Jan. 31.—Immediate effects of recent price advances in plates, shapes and bars are sales that have been exceeded only twice in the last two years within a like period. These sales and an increase in specifications have made necessary an ingot output of 88 per cent of capacity. Another blast furnace has been lighted at Gary. This is the sixth steel works furnace that has been brought in since Jan. 1 and it makes the total count of active stacks 27 out of 36 in this district. Steel deliveries average about three weeks. Confidence among users is prompting them to make known their requirements farther in advance and this affords producers an opportunity to rearrange rolling schedules to accommodate the late comers or those who suddenly find their immediate needs have not been fully covered. At the same time producers hint at discouragement of small-lot orders by the announcement of an advance in extras for assembling and handling bars and small shapes. A better credit situation throughout most of the agricultural districts is reflected in orders for wire products. Nails, a dormant commodity until a week ago, are in good demand and stocks in producers' hands are low for this time of the year. Automobile plants are again stepping up production following a check in output during the first few days of the national automobile shows.

Pig Iron.—Shipments of foundry iron continue to grow heavier and it is of interest that malleable foundries are taking a larger share of local furnace output. Chicago producers are holding rigidly to $18.50 for deliveries in and near Chicago and to the North. Firmness in prices is lacking to the West and South. A central Indiana user closed for 1000 tons with a producer east of this district at a price that eliminated Chicago competition. Current sales are in good volume and for the most part represent a growing interest in second quarter requirements. Specifications for silvery iron are unusually large.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Ferromanganese remains at $100, seaboard, though reports have been circulated that the price would be advanced $5 at once. Specifications for ferrosilicon are liberal. Spiegeleisen is bringing $32, base, Hazard, Pa., in the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—The Pennsylvania purchase of passenger cars is impressive in size, but it holds out little promise of steel tonnage for Western mills. In some quarters it is reported that about 150 of the coaches may be built in Western shops. An order for oil tanks has added 5000 tons to the books of a Western mill and definite inquiry has come out for 2000 tons of tank plates. This is the third successive week of fair specifications for car builders.

Mill prices on plates per lb.: 1.95c. to 2.05c., base, Chicago.

Structural Material.—Railroad requirements hold the center of attention in this market. The Santa Fe announces that its 1928 bridge program will require 20,000 tons of steel and the Northern Pacific will use 2000 tons. A railroad viaduct near Chicago calls for 1300 tons and a bridge for the Missouri-Kansas-Texas Lines will take 500 tons. The Garment Center Building, Chicago, taking 2400 tons, is said to have been awarded to the McClintic-Marshall Co. As a whole, the structural material market is active and gives promise of heavier shop operations before spring. Fabricators are making a stiff stand for better prices.

Mill prices on plain material per lb.: 1.95c. to 2.05c., base, Chicago.

Rails and Track Supplies.—A Western railroad has closed for 14,000 tons of standard-section rails. Fresh inquiry is developing slowly as the end of the rail buying movement is in sight. Business before Chicago mills, however, is not less than 75,000 tons. Orders for light rails are running ahead of the first month of last year, but the total business in this commodity is of small proportions. The railroads are now willing to take heavy shipments of track accessories and operations have been speeded to conform closely with rail output. Orders for track accessories totaled 25,000 tons. New inquiry is in small volume.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Bars.—Recent advances in prices appear to have had the effect sought by producers in that sales in soft steel bars are unusually heavy, comparing favorably with the best weeks in many months. The demand is widespread and well balanced, with a widened circle of users. Judged by the demand for steel, the agricultural implement industry is in full swing. In some quarters a check was reported in the manufacture of automobiles, but it has had practically no effect on Chicago mills. The automotive industry is making a close study of its March requirements. An improvement is noted in the demand for iron bars, prices on which are steady at 1.90c., Chicago. Alloy bar mills are busy and deliveries are extended. Late in getting under way, the demand for rail steel bars is hitting a fair stride. Individual specifications are small but numerous, and they are causing mills no little trouble in maintaining reasonable rolling schedules, at the same time conforming to promised delivery dates. Backlogs are small and producers have been hesitant either to advance the price above 1.80c., Chicago Heights mills, or to increase mill operations more than a nominal amount.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.05c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Sheets.—A widespread demand for sheets has necessitated an expansion in hot-mill operations, but specifications are at close range and producers can foretell operations only a week in advance. Deliveries are prompt, ranging 10 days to two weeks, depending on the product. Prices are steady under small scale buying.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cast Iron Pipe.—Fresh inquiry gives promise of an accurate check on prices in tonnage lots. Recent sales have been small at prices that range from $28 to $30, Birmingham. Springfield, Ohio, is taking bids on 4400 tons of 36-in. class B pipe, and Madison, Wis., will purchase 600 tons of 6 to 12-in. class B pipe. Other inquiry is for 400 tons by Rochester, Minn., and an unstated tonnage by Conneaut, Ohio. The American Cast Iron Pipe Co. is reported to be low bidder on 1000 tons of 6-in. to 24-in. centrifugal pipe at Minneapolis. Deliveries are a trifle easier, ranging from 20 to 30 days.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $36.20; 4-in., $38.20 to $40.20; Class A and gas pipe, $4 extra.

Wire Products.—Effective Jan. 25 the leading producer of wire and nails advanced quotations $2 a ton. Chicago delivered prices to jobbers in carload lots are now $2.70 on common nails and $2.55 on plain wire. Galvanized and cement coated nails and staples and spring, galvanized and barbed wire and plain fence wire were also advanced $2 a ton. No change was made on woven wire fencing or steel posts. It was announced that the new prices were for acceptance on contracts for specification and delivery up to and including March 31. The last two weeks was marked by rapid strengthening in this market. The spring buying movement, which often does not get in full swing until February, has already grown to considerable proportions. Mill stocks were of fair size and well balanced early in January, but as the month comes to a close producers are depending on current output to fill orders and buyers are not getting the service in deliveries that they had become accustomed to in recent months. Mill output has been advanced to 67 per cent of capacity. Demand for wire products is widespread, being particularly good in the South and in the Middle States. Shipments of nails are heavy. Reports from the Northwest are more promising. Prices for wire products are given on page 353.

Wire Rods.—Local producers announce a price advance to $45, Chicago. New buying is in small volume, but specifications are liberal.

Hot-Rolled Strip.—Competition remains keen in this commodity and lower prices are the rule rather than the exception where desirable tonnages are at stake. Minimum prices for 6 in. and narrower are 2.20c., or occasionally a shade lower, and 2c. is not uncommon on wide strips. New buying is quiet, but specifications are of fair size.

Reinforcing Bars.—Shop operations have been reduced steadily and now do not average over 50 per cent of capacity. The outlook, however, is favorable. Projects that have been active remain so and each week finds a number of new developments in the hands of estimators. The Illinois State roadway program for 1928 is unusually large and already about 200 tons of rail steel bars has been placed for construction that will be begun in the early spring. Rail steel bar mills have revised price schedules on work of that kind and are now asking 1.85c. for slab reinforcement and 1.95c. for bars that go into culverts and bridges. Recent lettings and new projects are shown on page 369.

Coke.—Demand for by-product coke for foundry use is increasing. Prices are steady at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—A feature of this market is an advance in output to 70 per cent of capacity, following liberal releases by the automotive trade, manufacturers of farm implements and car builders. Railroad buying also is active. Large rivets are quoted at $2.85, Chicago, for immediate or future delivery.

Cold-Rolled Strip.—Sales of this commodity are small and afford no real test of price advances announced a week ago. The greater portion of large users and many small buyers had placed contracts at the old quotations. Specifications are liberal.

Old Material.—The Chicago scrap market is now displaying signs of strengthening. This is not a reflection of large consumer interest, but of miscellaneous inquiry by many buyers of small tonnage. With yards operating at reduced capacity, it is not always possible for dealers to cover short sales as rapidly as is their wish. The net result of this situation is that prices being paid by brokers have held close to a dead level for the past week and indications are at hand that higher prices may be paid in the near future. Railroad shipments are a trifle heavier. Dealers and consumers continue to bid against each other on lists and the general level of prices paid to railroads is on a par with two weeks ago when the market reached its highest point of interest and large consumer buying was active. In consequence the margins on recent orders are narrow. Active bidding for cast iron borings has advanced prices paid by dealers to $11 a gross ton. Offerings of rerolling rails by the railroads are large. The Santa Fe sold 1200 tons this week and tonnage of this grade on track is fully equal to the demands of local mills. Lists offered this week include 50,000 tons by the Pennsylvania; 4500 tons by the Burlington, and a blank list by the New York Central.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.25 to 15.75
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Brake shoes	11.75 to 12.25

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	$2.90 to 3.00
Cement coated nails, base per keg	2.90 to 3.00

Foundry Equipment Orders Higher

Based on reports from 16 companies, members of the Foundry Equipment Manufacturers' Association had net orders in December amounting to 106.2 per cent of the average monthly shipments of 1922-23-24. Shipments were at 110.4 per cent and unfilled orders represented 103.5 per cent of a month's average output. Orders were the highest since June, but considerably below the average of the first six months of 1927. In December, 1926, gross orders amounted to 181 per cent, compared with 106.8 per cent in the corresponding month of 1927.

The plant of the British-American Metals Co., manufacturer of brass and copper boiler tubing, Plainfield, N. J., was destroyed by fire on Jan. 29. It will be rebuilt.

New York

Large Inquiries for Steel Pipe—Pig Iron Demand Increasing

NEW YORK, Jan. 31.—Demand for pig iron is not only increasing, but there are evidences that some melters are preparing to make speculative purchases, believing that prices are headed upward. For example, a melter who has never bought more than 1000 tons at a time offers to pay cash for several times that tonnage for delivery as needed. Several buyers who have just recently placed orders are in the market for additional iron. The Thatcher Co., for instance, is asking for quotations on 1500 tons of No. 2 plain for its Garwood, N. J., plant and 1000 tons of No. 2X for its Newark, N. J., foundry for delivery during the remainder of this quarter. The Eastern Malleable Iron Co., Naugatuck, Conn., is inquiring for 2500 to 3000 tons of malleable. W. P. Laytham of W. P. Laytham & Sons Co. and the Eagle Iron & Brass Foundry, Inc., Passaic, N. J., is asking for prices on 3000 to 5000 tons of high silicon iron. The American Tube & Stamping Co. division of the Stanley Works, Bridgeport, Conn., is reported to have closed against an inquiry for 3000 to 5000 tons of basic. Total sales in this territory during the week are estimated at 8500 tons. Ruling quotations on Buffalo foundry iron remain at $17, base furnace, while eastern Pennsylvania foundry ranges from $19 to $19.50, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Iron and Steel.—A line pipe inquiry for 150,000 tons, an inquiry for 15,000 tons of pipe for export, a sale of 4000 tons of pipe for Ontario, Canada, and a rail order of 13,494 tons are among the outstanding developments of a more active steel market. Representatives of steel companies express satisfaction with the volume of incoming business, which, though largely in the form of specifications against contracts rather than new business, is of a more urgent character, indicating that buyers are influenced not only by their own expanding requirements but also by the extension of deliveries on some products. There is a good deal of room for improvement in the tonnage received by Eastern mills for plates and shapes, but the volume is slightly larger on these products as well as on bars. Sheets and strip steel are in good position from the mill point of view, and in some instances makers of sheets are not promising shipments in less than three or four weeks. Eastern mills have generally followed the advance of $1 a ton, quotations now being 2.14½c. on shapes and 2.17¼c. per lb. on plates, delivered New York. Bars are now 2.19c., New York. The Central Railroad of New Jersey has ordered from the Bethlehem Steel Co. 10,830 tons of 130-lb. and 2664 tons of 100-lb. rails.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c.; plates, 2.17½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—The McClintic-Marshall Co. will furnish 500 tons of bars for a section of the subway in Manhattan, and Igoe Brothers will provide 250 tons for a warehouse at Garden City, N. Y. The volume of smaller jobs placed during the last week has been small. On Feb. 7 the mill price will be advanced $1 a ton to 1.95c. per lb., Pittsburgh. The Youngstown warehouse price is unchanged at 2.20c. or 2.57½c., on cars at New York. Out of New York warehouse the price is 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Warehouse Business.—Orders are smaller and less numerous than earlier in the month. Effective Jan. 25, black and galvanized sheets have been reduced to 4c. per lb., base, for black and 4.70c. per lb., base, for galvanized. New Jersey jobbers are still quoting 4.20c. per lb., base, for black and 4.95c. per lb., base, for galvanized.

Cast Iron Pipe.—Yonkers, N. Y., has purchased about 370 tons of 6 and 8-in. water pipe and some export business has been booked, including a small tonnage for a private user in Cuba and about 2000 tons for Manila, P. I. Bids on about 8000 tons of cast iron pipe for Camaguey and Santiago, Cuba, recently reported placed with the French maker, are understood to have been rejected and a new inquiry will be issued. Prices are fairly firm, but show no tendency to advance.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Coke.—Demand is small and prices are unchanged at $4 per net ton, Connellsville, for foundry grade and $2.75 to $3 per ton, Connellsville, for furnace coke. Delivered prices are: To northern New Jersey, $8.03;

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.10	$5.85
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

CARNEGIE LIBRARY OF ATLANTA

to New York or Brooklyn, $8.79; to Newark or Jersey City, $7.91. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—Prices of all grades are substantially unchanged. Business is confined to small transactions and shipments on old contracts. Some export business is in prospect if prices offered by foreign buyers are increased slightly. Japanese exporters have been purchasing old rails and are still in the market for No. 1 heavy melting steel, while agents of German mills have been inquiring for No. 1 heavy melting steel. Machine shop turnings are being purchased at $10.75 to $11 per ton, delivered eastern Pennsylvania. Stove plate is quoted at $12.50 per ton, delivered.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to	$10.85
Heavy melting steel (yard)	6.75 to	7.25
No. 1 heavy breakable cast	11.25 to	12.00
Stove plate (steel works)	8.75 to	9.00
Locomotive grate bars	8.75 to	9.00
Machine shop turnings	6.75 to	7.50
Short shoveling turnings	7.00 to	7.50
Cast borings (blast furnace or steel works)	6.75 to	7.50
Mixed borings and turnings	7.00 to	7.50
Steel car axles	16.00 to	16.50
Iron car axles	23.75 to	24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)		8.75
Forge fire	6.50 to	7.00
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought, long	9.00 to	9.50
Rails for rolling	10.50 to	11.00
Cast iron carwheels	11.25 to	11.75
Stove plate (foundry)	8.75 to	9.00
Malleable cast (railroad)	10.00 to	10.50
Cast borings (chemical)	11.00 to	11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to	$14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to	11.50

Cleveland

January Steel Business Larger Than December's for Some Mills

CLEVELAND, Jan. 31.—January has made a very good showing in the volume of finished steel business, which with some mills was larger than during December, when specifications for January shipment were heavy. The volume of business with a number of the mills during the closing week of the month did not hold up to that earlier in the month. This statement applies to sheets and strip steel as well as to the heavier forms of finished steel. Consumers specified heavily early in the month and many have not yet felt the need of issuing additional specifications.

The automotive industry is under good operation, although not going at capacity. As automobile manufacturers and parts makers generally are under contract for the first quarter, very little new business is coming from this source.

Structural inquiry has fallen off. The advance to 1.85c., Pittsburgh, on steel bars, plates and structural material is being adhered to. Few sales have been made at the advance, as most buyers covered at 1.80c., Pittsburgh. Local mills quote steel bars at 1.85c., Cleveland. A Cleveland plate mill has followed the advance to 1.85c., Pittsburgh.

The award of 57,800 tons of structural steel by the Cleveland Union Terminals Co., a New York Central Railroad interest, reported last week, for various construction work in connection with the Cleveland Union Depot project, about completes, for the present at least, the buying of structural steel for this project. However, the laying of new tracks is expected to require considerable steel for grade elimination work, but this steel may not be bought until next year. The total amount of structural steel purchased for this project, including the 57-story Terminal Tower Building, one section of which is now completed and occupied, the station proper, several viaducts, a lift bridge, a railroad bridge across the Cuyahoga River and valley and several commercial buildings, is approximately 108,000 tons. Of this, various contracts placed with the American Bridge Co. aggregate 95,800 tons. The Mount Vernon Bridge Co. has taken 10,200 tons and the McClintic-Marshall Co. 2000 tons.

Pig Iron.—Sales by Cleveland interests amounted to 24,000 tons the past week, or a gain of 5000 tons over the previous week. Furnaces took many small orders from consumers who are following a hand-to-mouth policy in buying. Not much business has been booked for the second quarter and sales for that delivery are expected to fall below those for the first quarter, as considerable fourth quarter iron was carried over to this quarter and many consumers will carry over first quarter iron to the second quarter. Most producers shipped in January as much iron as they made, but some producers still have fairly large stock piles. Some furnaces shipped more iron during January than during the corresponding month last year and others about the same amount. Shipments to the automotive industry in the Michigan territory continue heavy. Prices are unchanged. Producers are willing to take second quarter business at current prices. A Muncie, Ind., foundry placed 2000 tons of malleable iron for the second quarter, dividing it among four furnaces at a delivered price equivalent to a $17 Lake furnace price, although a Cleveland producer had to shade its price to $16.50 to overcome a 50c. freight disadvantage. For delivery in the territory adjacent to Cleveland $17 is being maintained. Furnaces are holding quite generally to $18 for foundry and malleable grades for Michigan delivery, but $17.50 has not disappeared. Sales include 500 tons of basic iron by a Lake furnace to a north central Ohio steel foundry.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—A $2 a ton price advance to $44, Cleveland, has been made on wire rods for the remainder of the first quarter. Many consumers covered at $40 before the last price advance. Sheet bars, slabs and billets are unchanged at $33, Cleveland. Specifications are good.

Sheets.—While a fair amount of new business is coming out, mills are depending largely on specifications received earlier in the month to keep them operating at close to capacity. Outside of the automotive field the demand is only moderate. A few inquiries are coming out for March shipment. While most leading manufacturers are holding to regular prices, concessions of $2 a ton from these prices have not disappeared, or 2.80c., Pittsburgh, on black sheets in common grades and 2c. on blue annealed. Galvanized sheets are unchanged at 3.65c., Pittsburgh. A Cleveland producer has advanced auto body sheets to 4.15c., but others are still on a 4c. base.

Strip Steel.—Some makers have followed the advance on cold-rolled strip steel of $3 a ton, now quoting 2.90c., Cleveland, for 3 tons or over, and 3.15c. for 1 to 3 tons, but 2.75c. and 3c. have not disappeared. Fender stock is irregular, ranging from 4.15c. to 4.20c., Cleveland. Specifications are good but there is little new business, as nearly all consumers are under contract for the quarter. Hot-rolled strip is firm at 1.85c., Cleveland, for material 6 in. to 12 in. wide, and at 2.05c. for narrower than 6 in. Most shipments on contract are being made at lower prices.

Wire Products.—A price advance of $2 a ton on nails and wire has been announced by all the leading pro-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

ducers to apply on business taken during the remainder of the first quarter. New prices are $2.65 per keg, Cleveland, for nails and $2.50 per 100 lb. for plain wire. Before the advance, buyers not fully covered for the quarter were allowed to place supplemental orders and consequently little business will be taken for the current quarter at the higher prices.

Reinforcing Bars.—Awards include 1600 tons for a factory building in Toledo. Work in connection with the Cleveland Union Terminals project will require 2000 tons in addition to 1600 tons still pending. Local warehouse prices are irregular. Rail steel bars are unchanged at 1.65c., mill.

Warehouse Business.—Sales show a fair gain. Prices are being firmly maintained and there is talk of an advance on sheets.

Coke.—Cold weather has stimulated the demand for by-product coke for domestic use. The price is unchanged at $4.50, Ohio ovens. Heating coke is moving slowly, with $2.75 the ruling price at Connellsville for early shipment. Connellsvile foundry coke is unchanged at $3.75 to $5.10, ovens.

Bolts, Nuts and Rivets.—Demand for bolts and nuts is fair, holding to the gain reported earlier in the month. Rivet specifications, which have been light, improved somewhat during the week. Little new business is coming out for either product, as buyers generally are under contract. Prices are firm.

Old Material.—Demand is limited to small-lot purchases by dealers to cover old orders. Prices are no lower except on No. 1 busheling. Plenty of scrap is coming out at ruling quotations and some of the mills are not taking material as freely as early in the month, shipments having been received faster than needed. Small-lot purchases were made by local dealers during the week at $14 and $13.50 for Nos. 1 and 2 heavy melting steel and at $10.50 for blast furnace scrap. No. 1 busheling scrap has declined to around $11, Cleveland, reflecting the weak market on this grade in Detroit.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.40c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel, squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Philadelphia

New Steel Orders Small—Eastern Mills Quoting on New Price Bases

PHILADELPHIA, Jan. 31.—Mills are receiving a steady flow of specifications against contracts for plates, shapes and bars, but purchasing at the new price levels is limited to occasional small tonnages, most consumers having covered their requirements for the present quarter. Plates and bars are firm, but there is still irregularity in shape prices because of hang-over projects. On new business all eastern Pennsylvania mills are now quoting on the advanced basis.

Pig iron is quiet and the only test of $19.50 per ton, base, on foundry iron has been in purchases of carload lots or a few hundred tons. With most mills carrying fair stocks of scrap on their yards, the old material market continues quiet. The list of the Pennsylvania Railroad, bids on which open Feb. 1, offers close to 45,000 tons of scrap.

Iron and steel warehouses in this district have adopted a list of quantity extras on iron and steel bars and small shapes.

Pig Iron.—Consumers of foundry iron are fairly well covered so that present purchasing is only of occasional carload lots, on which the price of $19.50 per ton, base, is apparently quite firm. There is some inquiry in the market for malleable iron, including a small tonnage for a Baltimore foundry. Small sales of low phosphorus iron continue. Importers of British low phosphorus report that their prices have been advanced about 50c. a ton to $23.50 to $24 per ton, duty paid, Atlantic port. No sales of basic are reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.		20.76
East. Pa. No. 1X		21.26
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Mills are maintaining the new basis of 1.85c. per lb., base, Pittsburgh, or 2.17c. per lb., Philadelphia, but activity is principally in specifications against existing contracts at the former schedule.

Shapes.—All eastern Pennsylvania mills have advanced to the new level of 1.85c. per lb., Pittsburgh, 2c. per lb., Bethlehem, 1.97½c. per lb., Pottsville, or 2.12c. to 2.13c. per lb., delivered Philadelphia. With contracts at lower prices still in existence, occasional shading still appears. An obstacle to greater firmness is the fabricated material market, bids in which have not yet reflected the upward movement in shapes. In addition to sizable bridge contracts, local fabricators have in prospect the projected Fox theater and office building for Seventeenth and Market Streets, estimated to cost $11,000,000.

Plates.—Prices are being quoted at 2c. per lb., Coatesville, or 2.10c. per lb., delivered Philadelphia, and all eastern Pennsylvania producers are now on the new basis. Specifications against contracts are liberal, but new business is limited.

Sheets.—Blue annealed sheet prices are steady at 2.10c. per lb., base, with widths greater than 40 in. taking a 10c. per 100-lb. extra. Both black and galvanized sheets, however, still exhibit occasional weakness. A motor company is reported to have obtained a concession on black sheets; galvanized sheets also have been slightly shaded.

Warehouse Business.—Demand for material from warehouse stocks is small. A list of quantity extras adopted by the warehouses selling iron and steel bars and small shapes applies the base price to orders for 2000 lb. or more. For 1500 to 1999 tons the extra is

13c. per 100 lb.; for 1000 to 1499 tons, the extra is 30c. per 100 lb. and for less than 1000 lb. the extra is 50c. per 100 lb. Iron and steel bars are being quoted at 2.40c. per lb., base, and shapes at 2.40c. to 2.60c. per lb.

Ferromanganese.—Quotations continue unchanged at $100 per ton, seaboard. Both British and domestic sellers are inclined to discount recent reports that a small advance in price was contemplated.

Imports.—In the week ended Jan. 28, a total of 696 tons of pig iron was received at this port from India. Steel arrivals included 339 tons of structural shapes and 8 tons of steel bars from Belgium; from France, 42 tons of steel billets, 24 tons of bars and 22 tons of structural shapes and 35 tons of hoops and bands; from the United Kingdom, 6 tons of hoops and bands.

Old Material.—Prices of all grades are unchanged. One eastern Pennsylvania consumer with sufficient tonnage of stove plate, machine shop turnings and yard steel is offering to make further purchases at 50c. less than was recently paid, but no transactions are reported at the lower level. The list of the Pennsylvania Railroad, bids on which open Feb. 1, offers close to 45,000 tons of iron and steel scrap.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.25 to	15.75
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast boring (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		13.00
Stove plate (for steel works)		13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)	11.00 to	11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to	13.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	12.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	15.00 to	15.50

Steel Corporation Fails to Earn Common Dividend

Fourth Quarter Earnings Lowest Since Last Quarter of 1924—Bethlehem Profits Also Show Decrease

EARNINGS of the United States Steel Corporation for the last quarter of 1927 were $31,247,529, roughly $10,000,000 less than in the preceding quarter, and the lowest since the fourth quarter of 1924, when earnings of $30,939,912 were shown. In the corresponding quarter of 1926 the corporation earned $53,502,525.

In terms of the present common stock issue of 7,116,235 shares, earnings in the past quarter, after payment of preferred stock dividend, amounted to $1.05 per share, and for the first time since the third quarter of 1924 common dividend requirements were not met. Additional common stock recently issued does not account for this fact as the deficit for the quarter ended Dec. 31, 1927, was $4,963,499, or considerably higher than the additional dividend requirements necessitated by the common stock increase.

Based upon quarterly statements for the year, the indicated surplus available for common and preferred dividends, after all other charges, is $87,845,456. This compares with $116,667,404 in 1926 and with $90,602,653 in 1925. After dividend requirements which were declared for the present quarter at the usual rate of 7 per cent yearly, balance to surplus for 1927 amounted to $12,812,134. In 1926, $25,783,238 was added to surplus after an appropriation of $30,000,000 for improvements and additions to plants and property.

The following table shows earnings in recent years by quarters:

Quarters	1927	1926	1925	1924
First	$45,584,725	$45,061,285	$39,882,992	$50,075,445
Second	46,040,460	47,814,105	40,624,220	41,381,039
Third	41,373,831	52,626,826	42,400,419	30,718,415
Fourth	31,247,529	53,502,525	42,630,840	30,939,912

Bethlehem Earnings Also Show Decrease

The Bethlehem Steel Corporation also showed a decrease in earnings for 1927, its net income amounting to $15,826,142 or $5.02 per share of common stock, as compared with $20,246,167 or $7.48 a share in 1926. In the past quarter Bethlehem profits were $2,371,371, equivalent to 37c. per share on the common stock. This compares with $2,788,053 or 61c. a share in the preceding quarter, and with $4,481,316 or $1.55 a share in the fourth quarter of 1926.

Earnings of Other Companies

The Crucible Steel Co. of America had net earnings in 1927 of $5,617,145, compared with $6,547,731 in 1926. The Gulf States Steel Co. earned $756,402 in 1927, as compared with $799,792 in the preceding year. This company's earnings in the fourth quarter of 1927 were $234,994, compared with $150,182 in the preceding quarter, and with $234,852 in the fourth quarter of 1926.

The Superior Steel Corporation reported a deficit for 1927 of $189,847, compared with net profits of $271,817 in 1926. The deficit in the fourth quarter of 1927 was $73,223, compared with $32,608 in the preceding quarter and with profits of $5,712 in the last quarter of 1926. The Virginia Iron, Coal & Coke Co. also had a deficit in 1927, which amounted to $170,291, compared with net profits of $84,022 in the preceding year.

EARNINGS FOR FOURTH QUARTER OF THE UNITED STATES STEEL CORPORATION

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
Oct., 1927	$12,526,787	$657,317	$11,869,470
Nov., 1927	10,281,777	656,845	9,624,932
Dec., 1927	10,408,428	655,301	9,753,127
	$33,216,992	$1,969,463	

Total earnings after deducting all expenses incident to operations, also estimated taxes and interest on bonds of the subsidiary companies		$31,247,529
Less, charges and allowances for depletion and depreciation, applied as follows, viz.:		
To depletion and depreciation and sinking funds on bonds of subsidiary companies	$10,623,859	
To sinking funds on United States Steel Corporation bonds	2,940,068	
		13,563,927
Net income		$17,683,602
Deduct: Interest for the quarter on United States Steel Corporation bonds outstanding	$4,115,658	
Premium on bonds redeemed	323,969	
		4,439,627
Balance		$13,243,975
Add: Net balance of sundry receipts and charges, including adjustments		550,858
Total		$13,794,833
Dividends:		
Preferred, 1¾ per cent	$6,304,920	
Common, 1¾ per cent	12,453,412	
		18,758,332
Deficit for the quarter		$4,963,499
Balance of surplus for nine months ended Sept. 30		17,775,633
Balance of surplus for the year		$12,812,134

Birmingham

New Steel Tonnage Developing at a Satisfactory Rate

BIRMINGHAM, Jan. 31.—Only a small amount of new iron tonnage is coming in. Birmingham furnaces continue to quote foundry iron on a $16 base. The Woodward Iron Co. changed its basic furnace back to foundry on Jan. 25 and is now operating these on foundry. Seventeen furnaces are in blast in Alabama, 10 on foundry, six on basic and one on recarburizing iron. It is expected that the Tennessee company will place a Bessemer furnace in blast within a short time. All but the six Ensley furnaces of the Tennessee company are now idle.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—New tonnage is developing at a satisfactory rate and the market has a firmer tone. Business lately has been encouraging and prospects for the next several months are good. The Tennessee Coal, Iron & Railroad Co. has been gradually increasing open-hearth production at its Ensley works and now is operating eight and nine. At the Fairfield works the number is unchanged at four. The Gulf States Steel Co. continues with four. Structural steel fabricators report little change in market or operations.

Cast Iron Pipe.—Tonnage is pending from two cities in Florida and one in North Carolina. Minneapolis and New York each placed around 1000 tons with Birmingham plants. All pressure pipe producers report that small business is accumulating at a steady rate. Market conditions have improved during the past 10 days.

Coke.—Moving in fairly good volume. Price remains at $5.

Old Material.—Business is somewhat improved and inquiries are increasing. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Youngstown

Sheet Makers Taking Stronger Stand on Prices

YOUNGSTOWN, Jan. 31.—Steel business has been going on as usual, despite the fact that the mergers involving companies in this district have been getting the attention of the executives and have been the principal topics of trade discussions. Steel manufacturers report a considerable improvement in sales, production and shipments as compared with the closing months of last year and they are hopeful for the future. The automotive industry, which means so much to the district on account of the preponderance of sheet-making capacity, is not yet buying freely and there is the expectation that as automobile production moves upward, steel requirements must expand very substantially. No complaint is heard as to the movement of bars and small shapes, which are firmly held at the new base of 1.85c., Pittsburgh, on new business and on which it is commonly believed still higher prices will be reached on second quarter contracts. Mills are beginning to take a stronger stand on sheet prices, and while competition and the fact that buyers were covered pretty heavily for this quarter at lower prices makes impossible getting the full first quarter prices, it seems to be the intention of makers to get 2.90c., base, Pittsburgh, 3.75c., base, and 2.10c., base, respectively, for black, galvanized and blue annealed sheets on second quarter business.

Good specifications are coming to the tin plate mills in the district, which now have orders sufficient to sustain an operation of slightly over 75 per cent of capacity. Output of this product in this district will be materially increased by changes that are to be made in the operation of the Trumbull works, where through partial use of the continuous strip mill for breaking down slabs it is planned to double the present output of the Trumbull and Liberty mills, which now have a rated annual capacity of 2,500,000 base boxes.

There is a seasonal increase in the demand for standard weight pipe, and the leading producer still has a good order book in line pipe, but the general average is kept down by the continued lack of activity in oil country goods. An effort is being made to extend the curtailment of oil production in the Seminole, Okla., field for another three months with the expiration of the present agreement on March 31. If this move is successful it probably will mean drilling operations in other fields and a demand for well pipe, but failure would mean the release of so much oil now capped that the effect would be fresh weakness in oil prices and little or no drilling elsewhere. Line pipe promises to be the backbone of pipe business next spring and summer as the lines now pending amount to no less than 2000 miles, for which 200,000 tons is probably a conservative estimate, since much of the pipe is of large outside diameter.

Semi-finished steel is not moving with much snap at present, but this is explained by the fact that sheet bars constitute most of such business and the principal buyers are the companies that have been combined in the Empire Steel Corporation. The working out of details of that merger have engaged those interested to the exclusion of other matters. Sheet bar makers still call the market $34, mill, or $34.50, delivered Youngstown district.

Pig iron is not doing much. Weakness in the Pittsburgh market has had the effect of restricting local purchases of scrap.

Steel works operations in the so-called Youngstown district are running from 70 to 75 per cent of capacity. Since the first of the month the Carnegie Steel Co. has put on three blast furnaces, two Ohio and one Farrell, while last week Republic Iron & Steel Co. started up its No. 4 furnace at Hazleton. The latter has written off its No. 1 furnace and now has only four workable stacks. Through improvement in equipment and in practice, these four furnaces are producing as much iron as formerly was obtained from five, while the No. 2 stack, rated at 600 tons a day, has been averaging more than 800 tons daily during the past three months and has on several days gone over 900 tons.

With the absorption of Trumbull Steel Co. by Republic Iron & Steel Co., the name of the former will disappear and the plant at Warren, Ohio, will be known as the Trumbull or Warren works of the Republic company. A number of Trumbull men now located at Warren will come to Youngstown. The new personnel of the combined companies will be announced within the next two weeks.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Steel Business at Greatly Improved Rate—Pig Iron Melt Increasing

ST. LOUIS, Jan. 31.—Shipments of pig iron are being well maintained, but sales are light. Of the sales by the Granite City maker, 500 tons went to a district user of malleable, 750 tons of foundry grades went to a central Illinois melter, 400 tons of foundry to a St. Louis consumer and 250 tons of this grade to a Kansas City melter. Most of the sales were for first quarter shipment.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Because of the increase in pig iron melt, there has been a better demand for metallurgical coke, and shipments are holding up well. The trade in domestic grades is slow.

Finished Iron and Steel.—The Granite City mill reports that since Jan. 1 business has been coming in better than at any time during the last five months; that its production of ingots is about 85 per cent of capacity. Its sheet and tin mills are operating at full capacity and its plate operations are at 65 per cent of capacity. Warehouse business is quiet, although there is an improvement over December sales. Structural fabricators' business is still very light.

Old Material.—Heavy offerings by railroads and country dealers which weakened the market a week or so ago have been absorbed and prices are steadier. The only change this week is a decline of 50c. a ton on railroad springs. There has been some buying of melting steel and stove plate. Railroad lists include: Pennsylvania, 40,000 tons; Chicago, Burlington & Quincy, 4500 tons; Union Pacific, 2000 tons; Big Four, 1960 tons; New Orleans & Great Northern, 230 tons; Standard Oil of Indiana, 125 tons; Missouri Pacific, 120 cars; Chicago, Milwaukee & St. Paul, 40 carloads, and Mobile & Ohio, 32 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.50 to $13.00
No. 1 locomotive tires	14.00 to 14.50
Heavy shoveling steel	12.50 to 13.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	14.50 to 15.00
Bundled sheets	9.00 to 9.50
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	10.50 to 11.00
Cast iron borings	9.25 to 9.75
Iron rails	14.00 to 14.50
Rails for rolling	15.25 to 15.75
Machine shop turnings	8.00 to 8.50
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft.	15.75 to 16.25
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	14.00 to 14.50
Stove plate	13.75 to 14.25
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Buffalo

Inquiry for 2500 Tons of Malleable—Steel Operations Increase

BUFFALO, Jan. 31.—The principal pig iron inquiry is from Eastern Malleable Co., Naugatuck, Conn., for 2500 to 3000 tons of malleable. The New York Air Brake Co. is in the market for 400 to 500 tons of malleable, following its recent purchase of 1000 tons of the same grade for its Watertown, N. Y., plant. While malleable has been held at $17.50, this price has lately been shaded on sizable business and better than $17 has been done by a buyer outside the Buffalo district. On foundry iron $17 is being shaded on eastern shipment, though holding firmly in this district. Some miscellaneous small inquiry is coming out and shipments are said to have increased. The Donner Steel Co., which banked a furnace recently, has the stack back in blast. The Hanna Furnace Co. has blown out one of its two stacks on Hamburg Street.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Good specifications are reported by sheet makers, automobile business being particularly active. Black sheets are firm, with more business being placed at 2.90c. Automobile body sheets are firm at 4c., and some business has been taken at 4.10c. Sheet mill operations are at 85 per cent. Improved mill operation is reported. The Donner Steel Co. has increased its active open-hearth furnaces to six and Bethlehem's Lackawanna plant has been operating 21 out of 24 open-hearths for some time. Demand for bars, shapes and plates is fair. Heavier buying of bolts and nuts is reported.

Old Material.—There has been some buying of heavy melting steel, including a 3000-ton transaction. A Buffalo consumer paid between $15.25 and $15.50 for this tonnage. Some inquiries have come out for low phosphorus billet and bloom ends, but no large tonnages have been sold. An offer of $10.75 is being made by a local consumer for short mixed turnings and borings; another consumer at a point taking a 63c. freight rate from Buffalo offered $11 for this material when last in the market. Short shoveling steel turnings for electric and blast furnaces have advanced to $11 to $11.50. A sale of steel rails, 3 ft. and under, at $17 to $17.25, is recorded.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades

No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.50 to 14.00
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.50 to 14.00
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.50 to 14.00
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25

Acid Open-Hearth Grades

Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	15.75 to 16.00

Electric Furnace Grades

Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50

Blast Furnace Grades

Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	9.00 to 9.50

Rolling Mill Grades

Steel car axles	16.75 to 17.25
No. 1 railroad wrought	12.50 to 13.00

Cupola Grades

No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50

Malleable Grades

Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Canada

Iron and Steel Industries Report Improved Business

TORONTO, ONT., Jan. 31.—Improvement continues to feature business in the iron and steel industries of Canada. Makers of railroad rolling stock equipment have recently closed large orders and other business of a like nature is pending. Rail mills are operating at capacity on orders closed late in 1927, and it is stated that both the Algoma Steel Corporation, Sault Ste. Marie, Ont., and the Dominion Iron & Steel Co., Sydney, N. S., have sufficient orders on hand to keep rail mills going at the present rate until about June 1.

Pig Iron.—Forward buying has fallen off because most melters are covered up to the end of March and some to the end of June. Hand-to-mouth buyers are responsible for the greater part of current demand for foundry and malleable iron. A small number have increased their daily melt. Orders for 100 to 200 tons are fairly common, and inquiries are being received for as high as 500 or 600 tons for immediate delivery. Deliveries against contract are also being speeded up. Imports of iron are holding to a high level. The Algoma Steel Corporation will soon blow in No. 4 blast furnace to take the place of one damaged recently by an explosion. Prices have become firmer and shading is gradually disappearing.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.00
No. 2 foundry, sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—The quiet state of the market has had a softening effect on some prices in Toronto and Montreal. Toronto dealers have recently purchased heavy melting steel at $8.50 per ton as against a former price of $9. A few other lines have been purchased below present market quotations. In the Montreal market dealers are now offering $20 per ton for wrought iron axles and $18 for steel axles as against former prices of $21 and $19 respectively. Other prices are unchanged. Shipments to United States buyers are running into larger tonnages than a month or six weeks ago.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

San Francisco

Southern Pacific Buys 3200 Tons of Track Spikes and Bolts

SAN FRANCISCO, Jan. 28 (*By Air Mail*).—Bookings of iron and steel products this week were mostly small lots. Considerable new work, however, is being figured on or is about to come out. The most important award of the week involved nearly 3200 tons of track spikes and bolts for the Southern Pacific Co., San Francisco.

Pig Iron.—Sales and inquiries are confined to unimportant lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

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*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Pending business calls for more than 20,000 tons. The largest inquiry involves about 5000 tons for a department store in Oakland. Prices continue firm at 2.35c., c.i.f.

Plates.—Demand for plates is practically at a standstill. No awards of importance or new inquiries have developed. Several Northwestern pipe line projects requiring over 3000 tons are expected to come up for figures in the near future. Producers are quoting 2.25c., c.i.f.

Bars.—The Pacific Fruit Express Co. has bought 475 tons of merchant bars and bands. The largest concrete bar award called for 200 tons for a dormitory at the University of California, Berkeley, and was booked by the Steel Service Co. Pending business does not involve a large total. Prices in the San Francisco district on out-of-stock material continue weak and as low as 2.25c. continues to be quoted in some instances.

Cast Iron Pipe.—Awards of cast iron pipe this week, with one exception, called for lots of less than 100 tons. R. H. Downer, San Diego, was awarded 155 tons of 4 and 6-in. class B pipe for improvement of Boundary Street, San Diego, Cal. Chowchilla, Cal., purchased standard pipe instead of 188 tons of 4 to 8-in. class B pipe. Pending business exceeds 3500 tons. Inquiries include 261 tons of 4 to 8-in. class B or centrifugal pipe for Pasadena, Cal., bids on which open Feb. 2; 137 tons of 4 to 10-in. class B pipe for Modesto, Cal., and 119 tons of 8-in. class B pipe for Eureka, Cal., bids on which go in on Feb. 7. During the past week bids were received on 264 tons of 4 to 8-in. class B pipe for the improvement of Voltaire Street, San Diego, Cal. Bert Noble was low bidder.

Track Material.—The Southern Pacific Co., San Francisco, has placed 28,000 kegs of track spikes, 2800 tons, and 3200 kegs of track bolts, 320 tons, with unnamed producers. No action has yet been taken on its inquiry for 4500 tons of tie plates. Bids were opened this week for the rehabilitation of the municipal railway system at Phoenix, Ariz., and Claude Fisher of Los Angeles submitted the only bid. This work involves 1500 tons of 70 and 75-lb. standard T rails.

Coke.—Sales and inquiries are limited to small lots. Prices continue unchanged.

Prescribes New Rates on Steel Products to Oklahoma and Texas

WASHINGTON, Jan. 31.—Rates, based on those prescribed in the Consolidated Southwestern cases, were prescribed by the Interstate Commerce Commission in a decision made public last Saturday to apply on shipments of iron and steel products, in carloads, from points in Pennsylvania, Ohio, Indiana, Illinois, Missouri, Kansas, Kentucky, Tennessee and Alabama and on shipments of iron or steel wire rope, in carloads, from Kansas City, Mo., to destinations in Oklahoma and Texas. The decision involved a number of complaints and after declaring existing rates unreasonable, provided for reparation.

Boston

Cold-Rolled Strip Prices Revised—Pig Iron Quiet—Scrap Weak

BOSTON, Jan. 31.—Pig iron sales the past week probably did not exceed 2000 tons, of which the Mystic stack took fully half. For the little business closed there was practically no competition. Furnaces east of Buffalo held to prices equivalent to $16.50 to $17 a ton, base Buffalo. Sales included 300 tons of Lake charcoal iron at $24 a ton, base furnace. A Massachusetts foundry is still negotiating for 1000 tons of No. 2 plain and No. 2X iron, and there is somewhat more inquiry for small tonnages with deliveries running into the second quarter. The most encouraging news is that the New England iron melt is increasing, particularly among the largest foundries.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.91 to	22.41
East. Penn., sil. 1.75 to 2.25		23.15
East. Penn., sil. 2.25 to 2.75		23.65
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—By-product domestic coke was in excellent demand the past week owing to low temperatures and small stocks in distributers' hands. Domestic coke is selling on a basis of $8.50 a ton on cars, Everett, Mass. Specifications against first half foundry coke contracts are increasing. Foundry coke remains at $11.50 a ton, delivered within a $3.10 freight rate zone.

Cast Iron Pipe.—Malden, Mass., has awarded 300 tons of pipe to an unnamed foundry. Lowell, Mass., closed bids on Jan. 28 for 100 tons of 6 to 12-in. pipe, and Leominster, Mass., closes this week on 300 tons of 16-in. Gardner, Mass., closed bids several days ago on 150 tons of 6 and 8-in. pipe, but no award has been made, and Stone & Webster, Inc., has yet to close on 2000 tons of gas pipe. Private business slowed up somewhat the past week, but is still of fair proportions. The market for small pipe remains firm, but concessions are still available on large dimensions. On private business 4-in. pipe is selling at $45.10 to $46.10 a ton, delivered common Boston freight rate points, and 6 to 12-in. at $41.10 to $42.10. The usual $5 differential is asked on class A and gas pipe.

Cold-Rolled Strip Steel.—New England makers of cold-rolled strip have revised their quotations to conform to the new prices recently named by mills in the Pittsburgh and Cleveland districts. Current specifications are satisfactory in volume. Most Eastern mills have a good tonnage on their books. The Worcester mill is now quoting 3.30c. per lb. for lots under 3 tons and 3.05c. for larger lots.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.35c. to 5.35c.
Squares and flats	*3.85c. to 5.85c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Warehouse Business.—Wire nails out of warehouses are no higher despite the recent mill advance of $2 a ton to $2.65 per keg, base. A large stock held by one jobber is still offered at the old prices.

Old Material.—Prices for most kinds of scrap are steady and unchanged despite a falling off in business. Railroad wrought, however, is 50c. a ton lower, and $6.26 a ton on cars is the average price for steel turnings, as against $6.50 a week ago, although some recent sales were made at $6.60. For forge flashings $6.50 a ton on cars is the average price today, but sales were made the past week at $6, $7 and $7.25. One local firm is paying $13.50 to $14 a ton for shafting for Pennsylvania delivery, but a majority of dealers are not doing better than $13 to $13.50. Shipments of chemical borings are on old orders only, and the market is 50c. a ton lower. Textile cast is in liberal supply at $14 to $14.50 a ton delivered New England points, with few takers. Some business recently was closed at slightly better prices for Pennsylvania delivery. The Boston & Albany Railroad yesterday closed bids on approximately 1000 tons of miscellaneous material, and the Boston Elevated Railroad today on 1000 tons of girder rails and two cars of small scrap.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.25
Scrap rails	8.50 to	8.75
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought	8.00 to	8.50
Machine shop turnings	6.00 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	6.00 to	6.50
Forge flashings	6.50 to	7.00
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to	8.50
Rails for rerolling	10.00 to	10.50
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate		11.00
Railroad malleable	13.00 to	13.50

Cincinnati

Sheet Mill Operations Gain—Scrap Market Weakens

CINCINNATI, Jan. 31.—While pig iron consumers are specifying at a moderate rate against first quarter contracts, fresh sales have been of small volume and the market is devoid of sizable inquiries. There has been a slight gain in foundry operations, but the current basis of production is not considered satisfactory. A local dealer has sold 500 tons of foundry iron to an Indiana melter and a like amount to another company in this district. The price structure remains unchanged, with the Lake Erie sellers quoting from $16.50 to $17, base furnace, and southern Ohio makers asking $19, base Ironton. Southern iron is firm at $16, base Birmingham. Movement of Jackson County silvery iron has been slow.

The Hamilton Coke & Iron Co., Hamilton, Ohio, will begin operation of its blast furnace and by-product coke ovens in April. By that time construction of the railroad from the site of the plant to the East Side works of the American Rolling Mill Co. at Middletown will be completed and the new furnace will begin supplying hot metal to the East Side open-hearths. When the furnace is lighted, the American Rolling Mill Co. is expected to blow out one furnace at Columbus and may continue, temporarily at least, the operation of the second Columbus furnace on foundry iron for the merchant trade.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The gradual expansion of operations among consuming industries is proving of benefit to producers of finished steel. Many contract customers are authorizing the release of first quarter tonnages, while other buyers have been forced to come into the market and pay the new prices. The lack of major building projects is being felt in structural steel. Small fabricators are taking an increasing number of awards ranging from 100 tons downward, and so far as work on hand is concerned, are in the best position in several months. Bars, structural shapes and plates are quoted at 1.85c., base Pittsburgh, for first quarter delivery. In the sheet market conditions are regarded as satisfactory, with specifications and orders in January considerably in excess of those in January, 1927. The American Rolling Mill Co. reports that bookings in the past 30 days have been substantially greater than its producing capacity and that sales have been well distributed among all classes of buyers. The demand for its specialty grades of sheets has been particularly heavy, the volume of orders having been sufficient to carry operations well through the remainder of the quarter. All of the company's plants are operating on a basis which approaches full capacity. Prices are being well maintained on black and blue annealed sheets, which are quoted at 2.90c. and 2.10c., base Pittsburgh, respectively. On galvanized sheets, however, irregularities still are reported from the South, where concessions of from $1 to $2 a ton have been given. Sellers of wire goods have announced an increase of $2 a ton in common wire nails and in plain wire. The former is now priced at $2.65 a keg, Pittsburgh or Ironton, and the latter at $2.50 per 100 lb., Pittsburgh or Ironton. Consumers with first quarter contracts are protected at the old prices.

Reinforcing Bars.—New billet bars are quoted at 1.85c., base Pittsburgh, and rail steel stock at 1.75c., base mill.

Warehouse Business.—January closes with shipments out of local warehouses running about 5 per cent ahead of those in the corresponding month of 1927. The number of orders placed recently has been large, but the tonnage in the aggregate has been unsatisfactory. Prices are firm.

Coke.—By-product foundry coke will continue during February at the present price of $7.50 per net ton, f.o.b. ovens, or $9.62, delivered Cincinnati. In domestic grades walnut size is quoted at $5, ovens; No. 2 nut at $4.50 and egg at $5.50. At Detroit there will be no change in quotations the coming month. Shipments of foundry coke to automobile foundries are well maintained, but demand from jobbing foundries has been light. Prices of New River and Wise County beehive foundry coke are firm, although sales in this territory have been small.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—There has been a reaction among dealers, who find that mills will buy material only if concessions are made from present prices. Therefore it is the opinion of the trade that quotations are likely to dip slightly. The Norfolk & Western has put out a fair-sized list.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.75 to $12.25
Scrap rails for melting	12.50 to 13.00
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.50 to 12.00
Short rails	17.00 to 17.50
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	12.25 to 12.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Detroit

Steel Requirements Increasing in Motor Industry and Other Lines

DETROIT, Jan. 31.—The demand for steel in the Detroit district continues steadily upward, and while the automotive industry is the largest factor, industrials generally are increasing steel consumption. As nearly as can be estimated, the increase in volume of bookings has been running about 4 per cent a week since early in January.

The general offices of the Ford Motor Co. were moved this week from Highland Park to the new $2,000,000 administration building at Fordson. The Ford payroll has been climbing steadily and now numbers 89,788, as of Jan. 27. The increase since the previous report, Jan. 14, is 3729, and this recruiting program is expected to continue until production has reached 2000 cars a day.

The Hudson Motor Car Co. has signed a contract for an additional two-story building, 80 x 640 ft., which will be rushed to completion. A number of divisions of the machine shops of the Hudson Motor Car Co. have recently been put on a two-shift a day basis, and a few divisions on full 24-hr. operation. A full night force is in process of organization.

The advance in bars, shapes and plates to 1.85c., Pittsburgh, is driving in a number of small orders.

An advance of 50c. per ton has been obtained on several small sales of pig iron.

The market on old material shows no further signs of weakness.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$12.00 to $12.50
Boring and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	16.00 to 17.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.75 to 11.25
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Increased Freight Rates on Steel Drums Ordered Canceled

WASHINGTON, Jan. 31.—Proposed increased freight rates on iron or steel barrels or drums in carload lots from points on and north of the Ohio River and on and east of the Mississippi River and from Memphis and Nashville, Tenn., to New Orleans and points in the Mississippi Valley territory taking the same or related rates were found by the Interstate Commerce Commission not to be justified, in a decision announced last Saturday. The suspended schedules were ordered canceled, but without prejudice to the filing of new ones naming the same proposed rates to apply on new iron or steel barrels or drums of United States Standard gage No. 19 or thicker, in minimum-weight car lots of 13,000 lb. per 36-ft. 6-in. car, subject to Rule 34 of the Consolidated Classification. The carriers were given permission to establish the proposed sixth-class rates on old iron or steel barrels or drums of any thickness.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Jan. 31	Jan. 30	Jan. 28	Jan. 27	Jan. 26	Jan. 25
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.87½	13.87½	13.87½	13.87½	13.87½	13.87½
Straits tin, spot, N. Y.	54.62½	54.87½	....	55.25	54.75	55.12½
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.30	6.30	6.30	6.30	6.30	6.30
Zinc, New York	6.02½	6.02½	6.02½	6.02½	6.02½	6.02½
Zinc, St. Louis	5.67½	5.67½	5.67½	5.67½	5.67½	5.67½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Jan. 31.—Activity is not pronounced in any of the markets. There has been very little demand for copper, but prices are firm. Sales of tin have been moderate at receding quotations. The lead market is steady. Demand for zinc is fairly good, with the market a little stiffer.

Copper.—Very little demand is reported from either domestic or foreign sources, so much so that prices are largely nominal. Electrolytic copper is firm at 14.12½c., delivered in the Connecticut Valley, with only one custom smelter reported willing to shade this price to about 14.05c. to 14.07½c. Copper Exporters, Inc., continues to maintain its official quotation at 14.50c., c.i.f. usual European ports. Lake copper is quoted unchanged at 14.25c., delivered.

Copper Averages.—The average price of Lake copper for January, based on daily quotations in THE IRON AGE, was 14.25c. The average price of electrolytic copper was 13.85c., refinery, or 14.10c., delivered in the Connecticut Valley.

Tin.—Sales for the week ended Saturday, Jan. 28, were light at about 850 tons. Dealers were the principal buyers, consumers being uninterested. Yesterday, Monday, the market was also sluggish, with only 50 tons changing hands, and today conditions have been similar. The only feature of the market is the fact that sales at Singapore continue in good volume. Official data of deliveries into consumption will not be available for a day or two, but American estimates place the total for January at 5415 tons. Prices in London today were about £3 to £4 per ton less than a week ago, with spot standard quoted at £247 7s. 6d., future standard at £247 5s., and spot Straits at £247 15s. The Singapore price today was £252 10s. Spot Straits tin was quoted today at 54.62½c., New York.

Lead.—A moderate business is reported at 6.27½c. to 6.30c., St. Louis. The market is steady and producers are not forcing the issue, but maintaining their quotations. The leading interest continues to quote 6.50c., New York, as its contract price.

Zinc.—Ore prices at Joplin advanced last week to $37, but there was not a corresponding increase in the price of prime Western zinc. The market, however, is a little stronger at 5.67½c., St. Louis, or 6.02½c., New York, but possibly this could be shaded in some cases to 5.65c. Some producers report a fair volume of business each day in the past week, but in most cases the metal has to be offered to the consumer. Sales of ore last week at close to 12,000 tons were about equal to the production, stocks still being very high but remaining in strong hands.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Consuming demand continues in fair volume. Chinese metal for spot and early future delivery is quoted at 11.25c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots, is quoted at 23.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 31.—This market is moderately active and prices, with the exception of tin, have held firm. For the most part current sales are for delivery in February. The old metal market is a trifle more active and prices are steady.

Prices, per lb., in carload lots: Lake copper, 14.25c.;

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	57.00c. to 58.00c.
Tin, bar	59.00c. to 60.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	61.00c.
Tin, bar	63.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	65.75c.
Solder, ½ and ½	36.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not been changed since Dec. 5. Zinc sheets are still being quoted at 10c., base, and lead full sheets remain at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

tin, 56.50c.; lead, 6.35c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.25c.; pewter, No. 1, 34c.; tin foil, 40c.; block tin, 50c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Pennsylvania Orders 600 Passenger and Baggage Coaches—1250 Freight Cars Purchased

Purchase of 600 passenger and baggage coaches by the Pennsylvania was the outstanding feature of the week's market. The Central of Georgia and the Chesapeake & Ohio have each placed orders for 500 freight cars and the Norfolk & Western will build 250 gondolas in its own shops. Details of the week's business follow:

Long Island Railroad has ordered 10 baggage cars from American Car & Foundry Co.

St. Louis Southwestern has placed six caboose car underframes with Virginia Bridge & Iron Co.

Fruit Growers Express has purchased 240 refrigerator car underframes from Pressed Steel Car Co.

Pennsylvania Railroad has placed orders for 613 passenger and baggage coaches, distributed as follows: 50 passenger coaches, with Pressed Steel Car Co.; 150 passenger coaches, with Standard Steel Car Co., 88 passenger coaches, with Bethlehem Steel Co.; 125 baggage cars, with American Car & Foundry Co.; 85 baggage cars, with St. Louis Car Co.; seven gas-electric cars, with J. G. Brill Co.; six gas-electric cars, with Pullman Car & Mfg. Corporation, and 20 passenger and baggage, 12 passenger coaches, 45 baggage-scenery and 25 horse-express cars, with its own shops.

Lehigh & New England has placed orders with American Car & Foundry Co. for repairs to 200 50-ton hopper cars.

H. C. Frick Coke Co. has ordered repairs to 641 70-ton hopper cars, distributed as follows: 137, with American Car & Foundry Co.; 274, with Greenville Steel Car Co.; 137, with Standard Steel Car Co., and 89, with an unnamed builder.

Central of Georgia has ordered 500 gondola cars from Tennessee Coal, Iron & Railroad Co.

Illinois Central has ordered two air dump cars from Differential Car Co.

Chesapeake & Ohio has ordered 200 70-ton steel hopper-bottom gondola cars from American Car & Foundry Co. and 300 similar units from Richmond Car Works.

Norfolk & Western will build 250 gondola cars and 30 locomotive tenders at its Roanoke, Va., shops; this railroad is also taking bids on rebuilding 1000 57½-ton hopper cars.

Chicago Great Western has ordered 50 stock car and five caboose car underframes from Bradford Corporation.

New England Fuel & Transportation Co. has purchased 50 mine cars from Bethlehem Steel Co.

Texas & Pacific has ordered two all-steel private cars from American Car & Foundry Co.

Nashville, Chattanooga & St. Louis has ordered two 70-ton combination passenger-baggage cars and two 70-ton baggage cars from American Car & Foundry Co.

St. Louis-San Francisco has purchased 15 steel baggage and mail and five steel baggage cars from American Car & Foundry Co.

Union Pacific will buy six gas-electric cars and eight trailers.

Great Northern has ordered five combination baggage and mail gas-electric cars from J. G. Brill Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	9.75c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

REINFORCING STEEL

New Projects Include 2000 Tons for Cleveland Bridge—Awards of Only 5600 Tons

New projects totaling more than 3000 tons were larger than in the previous week, but less than in other weeks since the first of the year. The largest inquiry was 2000 tons for the Cuyahoga bridge in Cleveland. Awards of 5600 tons included 1600 tons for the Willys-Overland Co. factory building in Toledo, Ohio, and 500 tons for the Nassau-Broad Street subway in New York. Awards follow:

East Boston, 475 tons, Border Street outlet, to Concrete Steel Co.

New York, 500 tons, section of Nassau-Broad Street subway; from Marcus Contracting Co., general contractor, to McClintic-Marshall Co.

Garden City, N. Y., 250 tons, warehouse for Great Atlantic & Pacific Tea Co., to Igoe Brothers.

Chicago, 300 tons of rail steel bars, apartment building at 222 Chestnut Street, to Inland Steel Co.

Chicago, 400 tons of rail steel bars, apartment building at Kenmore and Lawrence Avenues, to Inland Steel Co.

Chicago, 200 tons of rail steel bars, Lawyers Building, to Inland Steel Co.

Toledo, 1600 tons, Willys-Overland Co. building, to Building Products Co., local.

Chicago, 310 tons of rail steel bars, apartment building at 5346 Cornell Avenue, to Inland Steel Co.

State of Illinois, 500 tons of rail steel bars, State road work, to Olney J. Dean & Co.

St. Louis, 600 tons (380 tons rails, 120 tons billets), Arsenal Street viaduct, to Laclede Steel Co.

San Francisco, 475 tons merchant bars and angles for Pacific Fruit Express, to unnamed company.

Oakland, Cal., 100 tons, Women's Athletic Club, to San Francisco jobber.

Berkeley, Cal., 200 tons, girls' dormitory, University of California, to Steel Service Co.

Orland, Cal., 331 tons, Stony Gorge Dam, 286 tons to Laclede Steel Co. and 45 tons to Pacific Coast Steel Co., instead of 286 tons and 45 tons respectively to Pacific Coast and Laclede companies as reported last week.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Chicago, 200 tons, Stop & Shop Building.

Chicago, 200 tons, apartment building at 5421 Cornell Avenue; William Reichert, architect.

Chicago, 200 tons, laboratory for University of Chicago.

Chicago, 300 tons, garage; Fox & Fox, architects.

Chicago, 130 tons, Edgewater Hospital; Dwight D. Wallace, architect.

Jefferson City, Mo., 130 tons, office building for Missouri Highway Commission.

Cleveland, 2000 tons, deck structure for Cuyahoga River bridge.

The Youngstown Sheet & Tube Co., Youngstown, has purchased the entire capital stock of the Associated Supply Co., 724 Pacific Electric Building, Los Angeles, pipe distributer, but will continue to operate the company under its own name. Bernard Dunn, vice-president of the company, will be manager.

FABRICATED STRUCTURAL STEEL

Santa Fe Bridge Requirements 20,000 Tons—Awards Total 29,000 Tons

With the inquiry of the Atchison, Topeka & Santa Fe Railroad for 20,000 tons for 1928 bridge work, new business developed in the last week amounted to 44,750 tons. The week's awards of 29,000 tons included 4500 tons for a bridge at Vicksburg, Miss., and 3300 tons for subway work in New York. Awards follow:

Detroit, 1700 tons, building for city water board, to Mahon Structural Steel Co.

Philadelphia, 300 tons, Northeastern Title & Trust Co. building, to Bethlehem Fabricators.

Providence, R. I., 1100 tons, Court House, to Lehigh Structural Steel Co.

Cambridge, Mass., 605 tons for Lever Brothers; warehouse, 475 tons, to New England Structural Co., and plant alterations, 130 tons, to Boston Bridge Works, Inc.

Boston, 150 tons, McMillan stores on Newbury Street, to Lehigh Structural Steel Co.

Leominster, Mass., 100 tons, theater, to James H. Tower Iron Works, Providence.

Springfield, Mass., 400 tons, hotel, to Levering & Garrigues.

Rutland, Vt., 150 tons, bridge, to American Bridge Co.

Scarsdale, N. Y., 200 tons, school, to American Bridge Co.

New York, 3300 tons, section of Nassau-Broad Street subway, to McClintic-Marshall Co.

New York, 2200 tons, addition to Savoy Plaza Hotel, Fifth Avenue and Fifty-ninth Street, to American Bridge Co.

New York, 1200 tons, loft building on West Thirty-sixth Street, to Harris Structural Steel Co.

New York, 700 tons, apartment building on East Fifty-ninth Street, to Paterson Bridge Co.

New York, 600 tons, overhead drive on Park Avenue at Grand Central Station, to Taylor-Fichter Steel Construction Co.

New York, 300 tons, Woolworth Building at Vesey and Church Streets, to Harris Structural Steel Co.

Croton, N. Y., 400 tons, highway bridge, to unnamed local fabricator.

East Orange, N. J., 800 tons, apartment building, to McClintic-Marshall Co.

East Orange, 900 tons, apartment building, to Hedden Iron Construction Co.

Lancaster, Pa., 400 tons, passenger station for Pennsylvania Railroad, to McClintic-Marshall Co.

Washington, 1200 tons, telephone building, to Lehigh Structural Steel Co.

Hopewell, Va., 1000 tons for Atmospheric Nitrogen Corporation, to Lackawanna Steel Construction Corporation, Buffalo.

Cincinnati, 250 tons, building for Meyer Packing Co., to L. Schreiber & Sons Co.

Vicksburg, Miss., 4500 tons, bridge for Vicksburg Bridge & Terminal Co., to Virginia Bridge & Iron Co., Birmingham.

Chicago, 2400 tons, garment center building, reported to have been taken by McClintic-Marshall Co.

Chicago, 350 tons, Naylor Spiral Pipe Co., to Midland Structural Steel Co., local.

Chicago, 340 tons, Wieland Dairy Co., to A. Bolter's Sons, local.

Starved Rock, Ill., 1700 tons, lock gates on Illinois River, to Independent Bridge Co., Pittsburgh.

Milwaukee, 300 tons, rebuilding Wells Street viaduct for Milwaukee Electric Railway & Light Co., to Milwaukee Structural Steel Co.

Toronto, Ont., 1300 tons, *Toronto Star* Building, to Dominion Iron & Steel Co.

San Francisco, 180 tons, plain material for Pacific Fruit Express Co., to unnamed interest.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Philadelphia, 520 tons, Uptown Theater for Stanley Co. of America; general contract to Cramp & Co.

Newark, N. J., 2000 tons, station at Journal Square, bid in.

Boston, 270 tons, bridge over Boston & Albany Railroad.

Middletown, Conn., 200 tons, savings bank.

New York, 1000 tons, apartment building on Fifth Avenue.

New York, 1200 tons, tanks for the Pan-American Co.

Jamaica, N. Y., 1000 tons, theater.

Jamaica, 500 tons, public library.

New York Central Lines, 3350 tons, four steel car floats; Dravo Contracting Co., Pittsburgh, low bidder. New bids to be asked on 10 steel derrick lighters and five steel deck scows.

Pittsburgh, 5500 tons, Thirty-first Street bridge, bids opened Feb. 2.

Atchison, Topeka & Santa Fe, 20,000 tons for 1928 bridge work.

Northern Pacific Railroad, 2000 tons, bridges.

Bogalusa, La., 200 tons, building for Bogalusa Paper Co.

Corpus Christi, Tex., 400 tons, dock shed.

Missouri-Kansas-Texas, 500 tons, bridges.

Chicago, 1800 tons, Sheridan Towers apartment hotel; Holabird & Roche, architects.

Chicago, 900 tons, apartment building at 1325 Astor Street.

Schiller Park, Ill., 1300 tons, viaduct for Minneapolis, St. Paul & Sault Ste. Marie.

Des Moines, Iowa, 1400 tons, building for Bell Telephone Co.

Burlington, Iowa, 325 tons, steel wharf boat for Burlington Dock Board; St. Louis Steel Construction Co., low bidder.

Boise, Idaho, 233 tons, bridge over Clark Fork River, Sanders County; bids opened.

San Francisco, 800 tons sheet piling, Coyote Point bridge; bids being taken.

Oakland, Cal., 100 tons, warehouse on Peralta Street; bids received.

Youngstown-Inland Steel Merger

(Concluded from page 343)

hot black sheet mills, eight stands of cold rolls, 19 box annealing furnaces, and six galvanizing pots.

Ingot Capacity of 1,800,000 Tons

The plant has an annual capacity of 1,800,000 tons of steel ingots, 1,416,000 tons of semi-finished products, 240,000 tons of rails, 150,000 tons of heavy structural shapes, 132,000 tons of light structural shapes, 40,000 tons of universal plates, 160,000 tons of sheared plates, 300,000 tons of merchant and concrete reinforcing bars, 50,000 tons of blue annealed sheets, 140,000 tons of black sheets, 75,000 tons of galvanized sheets and 30,000 gross tons of rivets and track bolts, nuts and spikes.

At Chicago Heights the company operates a 14-in. rail slitting bar mill with an annual capacity of 60,000 tons of rail steel bars. At Milwaukee the company has 10 hot black sheet mills, five stands of cold rolls, four double-box annealing furnaces and five galvanizing pots. The yearly capacity of this plant is 60,000 tons of sheets.

Republic-Trumbull Consolidation Approved

THE absorption of the Trumbull Steel Co. by the Republic Iron & Steel Co. also has been approved by the stockholders of those companies and on the basis of exchange announced when the controlling interests in these companies reached an agreement several weeks ago. Common stockholders of the Trumbull company are to receive one share of Republic common stock for six shares of Trumbull common stock and the basis of the preferred stock exchange of the companies is one share of Republic common for one and six-tenths of Trumbull preferred. This involves the issuance of 300,000 additional common shares of Republic common stock.

The work of putting the two companies together now is in progress and details as to personnel of the combined companies will be announced in the next week or ten days. The name of the new company will be the Republic Iron & Steel Co. and the name of the Trumbull Steel Co. will be dropped. The Trumbull plant will be devoted to the production of strip and tin plate, the plan being to double its capacity for tin plate production. Many of the men now at Warren, Ohio, the location of the Trumbull plant, will be transferred to Youngstown, which will be the location of the general offices.

PERSONAL

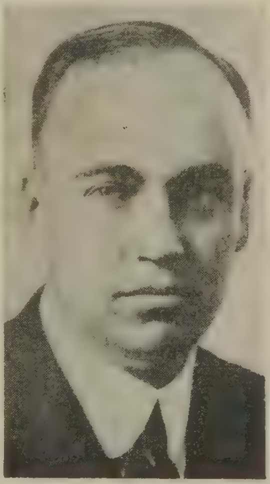
New Link-Belt Vice-Presidents

George P. Torrence, George L. Morehead, Frank B. Caldwell and W. C. Carter, whose appointments as vice-presidents of the Link-Belt Co., Chicago, were announced in THE IRON AGE of Dec. 29, all have been associated with the company for a number of years.

G. P. TORRENCE

G. L. MOREHEAD

Mr. Torrence, who will have charge of the company's operation and sales at Indianapolis, with headquarters in that city, is a graduate of Purdue University. Before joining the Link-Belt Co. in 1911 as a draftsman at its Indianapolis works, he was identified with the Marion Malleable Iron Co., Marion, Ind.; the Air Lord Tie Co., Little Rock, Ark., and the Westinghouse Air Brake Co., Pittsburgh. In 1915 he was transferred to the general sales department at the Link-Belt Chicago office, and was made manager of the department in 1918. He became sales manager at Chicago in 1919, and the following year was transferred to Indianapolis. He was made general manager of the Indianapolis plant in 1925.


F. B. CALDWELL

W. C. CARTER

Mr. Morehead will have charge of Eastern operations and sales, with headquarters at Philadelphia. He was graduated from the University of Missouri in 1902 and joined the Link-Belt organization in 1906. He was successively maintenance engineer, superintendent of construction and chief engineer at the Chicago plant, and in 1919 became assistant manager of the Ewart plant, Indianapolis. In 1920 he became general manager of that plant and five years later was transferred to Philadelphia as manager of the plant in that city.

Mr. Caldwell, who will be in charge of the Chicago plant and of sales offices in that territory, was graduated from Cornell University in 1912 and was associated for a number of years with the H. W. Caldwell & Son Co. He was vice-president of that company prior to its merger with the Link-Belt Co. He was later assistant to the chairman of the latter company and sales manager for the Chicago plant products. He became general manager of that plant in 1927.

W. C. Carter will have general charge of production at all plants, with headquarters at Chicago. He became identified with the company immediately after his graduation from the University of Illinois and until 1909 was supervisor of the drafting and engineering department at Chicago. Later he became construction engineer, and in 1911, superintendent of the Chicago plant, holding that position until 1926, when he became assistant general manager. He was appointed production manager of the company and its subsidiaries in October, 1927.

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Guy Hubbard has resigned as associate editor of *Mechanical Engineering*, New York, to become advertising manager of the National Acme Co., machine tool builder, Cleveland. Mr. Hubbard received his technical training at the University of New Hampshire, and began his active association with the machine tool business in 1915 in the shop and drafting room of the Windsor Machine Co., Windsor, Vt. During the war he served in the Ordnance Department of the Army. As a member of the headquarters staff of the American Society of Mechanical Engineers, Mr. Hubbard has been concerned primarily with matters related to machine tools and production. He is a director of the Machine Tool Congress of the National Machine Tool Builders' Association.

GUY HUBBARD

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James A. Henry has been named general manager of sales, strip steel sheet department, Weirton Steel Co., Weirton, W. Va., succeeding Joseph F. Savage, who recently resigned. Mr. Henry had been assistant general manager of sales since about the middle of last year and previously had been Detroit district sales manager for the Columbia Steel Co. and the Wheeling Steel Corporation. His headquarters will be in Weirton, but he will continue to spend much time in Detroit.

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H. W. Seymour has been elected a director of Crane Co., Chicago, to succeed L. P. Ordway, resigned. L. B. Peeples has been made a vice-president. Other directors and officers have been reelected.

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Henry D. Sharpe, Brown & Sharpe Mfg. Co., Providence, R. I., has been reelected president of the Community Fund of Providence.

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Leonard F. Cowell has been appointed Chicago district manager for the Lamson & Sessions Co., bolt and nut manufacturers, Cleveland, and William M. Olsen has been appointed to fill a similar position in the Detroit territory, the company having opened new district offices in both cities. The Chicago office is at 1016 Straus Building and the Detroit office at 4-228 General Motors Building. Mr. Cowell for 15 years was connected with the sales organization of Kirk-Latty Co., Cleveland, which was absorbed some time ago by the Lamson & Sessions Co. Mr. Olsen was with the Kirk-Latty Co. for 17 years.

E. A. Bayton, who has been in charge of the Detroit sales office of the Lees-Bradner Co., Cleveland, manufacturer of gear-cutting and grinding machinery, has been appointed sales manager of that company.

Roy H. Smith has been elected president and treasurer of the Kent Machine Co., Cuyahoga Falls, Ohio, manufacturer of bolt-threading and other machinery.

Charles H. Longfield, sales manager of the Lamson & Sessions Co., Cleveland, has been elected a director of that company.

Fred J. MacMackin, secretary-treasurer of the Andrews Iron & Steel Corporation, Utica, N. Y., has been made general manager of the company. George W. Andrews continues as president.

W. H. Lewis was reelected president of the Pennsylvania Engineering Works, New Castle, Pa., at the annual meeting held recently. Other officers elected are W. S. Wheeler, vice-president and treasurer; S. B. Cleal, secretary, and Lee E. Allen, chief engineer.

Roy Cosbey, for four years comptroller of the Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has been elected secretary and a director of the company, succeeding the late Richard J. Dibowski. Before becoming associated with the Wadsworth company, Mr. Cosbey was identified with the Joslin-Schmidt Co., the Cincinnati Milling Machine Co., the Modern Foundry Co., and Ernst & Ernst, all of Cincinnati.

M. B. Mathley, for many years representative in the Chicago territory for the Roller-Smith Co., 233 Broadway, New York, has been appointed exclusive sales agent in that territory, succeeding M. Frankel. W. J. Schuhmann, who has been connected with the company's New York office, has been transferred to the works at Bethlehem, Pa. Albert Milmow, Latonia Building, Charlotte, N. C., has been appointed agent for the Roller-Smith Co. in North and South Carolina. S. H. King has been added to the sales force in New York.

Harold Ingram has been appointed superintendent of roll shops, Homestead works, Carnegie Steel Co., succeeding W. C. Oberg, recently promoted to superintendent of all roll departments of the company. Mr. Ingram was Mr. Oberg's assistant for several years.

Capt. Alby O. Ackard, superintendent of river transportation for the Carnegie Steel Co., Pittsburgh, was appointed commodore of the Carnegie fleet at the annual dinner of the company by James A. Farrell, president of the Steel Corporation, who was the principal guest at the dinner. Captain Ackard was born in Pittsburgh in 1866 and has been with the Carnegie company since 1917, first as captain of the steamer Duquesne and, since 1919, as general superintendent of river transportation.

A. M. MacFarland has been added to the staff of the Lincoln Electric Co., Cleveland, as general sales and development engineer. During the early years of the war he was engaged in consulting engineering practice, and later was assigned by the Navy Department to supervise the construction of marine propelling machinery for naval units. After the war he became interested in the design and development of percussive and automatic arc-welding equipment, and during the last seven years obtained about 30 patents in the welding field.

John T. Seaver, formerly a partner in the firm of Ridenour, Seaver & Kendig, Cleveland and Pittsburgh, consulting engineers, has formed J. T. Seaver, Inc., Fairmount-Cedar Building, Cleveland, to act as sales agent in the sale of material-handling and other heavy machinery.

Henry H. Peck has been appointed district sales manager in New York for the Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa., maker of carbon and alloy steel castings. He will have offices at 114 Liberty Street.

William A. Rockenfield, recently general manager of the Baldwin Chain & Mfg. Co., Worcester, Mass., and identified with other manufacturing projects in a consulting capacity, has been appointed vice-president of the High-Speed Hammer Co., Inc., Rochester, N. Y., and will devote his time to engineering and sales.

J. F. Naylor was elected president of the Keystone Forging Co., Northumberland, Pa., at a recent meeting of the board. He succeeds J. J. Axilrod, who severed his connection with the company last April. Mr. Naylor has been works manager for the Keystone company for three years and previously was associated with the J. H. Williams Co., at Brooklyn, for 20 years.

F. O. Schramm has been appointed assistant general sales manager of the Eastern division of the Pressed Steel Car Co., with headquarters in New York, and F. L. Johnson has been made assistant general sales manager of the Western division, with headquarters in Chicago.

C. H. Heist has been appointed general manager of the Mayville Iron Co.'s plant, Mayville, Wis., succeeding J. H. Means, resigned.

John H. Watson, Jr., President of Corrigan, McKinney Steel Co.

John H. Watson, Jr., was elected president of the Corrigan, McKinney Steel Co., Cleveland, at a meeting of the directors Jan. 30 to fill the vacancy caused by the death of J. W. Corrigan. Mr. Watson, an attorney and close friend of Mr. Corrigan, had been secretary of the company. J. E. Ferris, vice-president in charge of finances and treasurer, was elected secretary.

Mr. Watson issued an announcement that the company would continue to be operated as an independent, that the policies of Mr. Corrigan will be followed and that the management of the business and properties will be conducted by the present organization. The announcement stated that the elections were made unanimously by the board on which every stock interest of the company is represented. Mr. Corrigan owned a majority of the stock.

Mr. Watson was named in Mr. Corrigan's will as one of the two trustees of his estate, the other being the Union Trust Co., Cleveland. The trustees are given full control of Mr. Corrigan's interests in the steel company and all associated companies. The only restriction is a provision in the will that none of Mr. Corrigan's stock in the steel company is to be sold during his widow's lifetime without her consent.

The death of Mr. Corrigan was followed by rumors that the company would be merged or purchased by another interest. Cleveland banks are largely interested in the Corrigan, McKinney steel plant by their ownership of preferred stock of the McKinney Steel Holding Co., which is secured by Mr. Corrigan's stock ownership in the original McKinney Steel Co.

Obituary

William N. Bancroft, organizer of the Dibert, Bancroft & Ross Co., Ltd., New Orleans, electric steel foundry, died on his farm near Los Angeles, on Jan. 24. He was 57 years of age.

Edwin M. Drummond, since 1910 president of the Drummond Mfg. Co., 1214 West Main Street, Louisville, Ky., died suddenly on Jan. 22, aged 60 years. He was graduated from the Stevens Institute of Technology, Hoboken, N. J., and immediately became associated with his father in the Drummond company. He was a member of the American Society of Mechanical Engineers and of the Engineers and Architects Club of Louisville.

URGES STUDY OF SELLING

Eugene G. Grace Says Distribution Problem Is Present-Day Challenge to Engineers

THE steel industry of Pittsburgh paid a great compliment to Eugene G. Grace, president Bethlehem Steel Corporation, in heavy representation at the forty-seventh annual banquet of the Engineers Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Jan. 30, at which Mr. Grace was the principal speaker. The attendance reached a total of fully 1400 and the presence of men prominent in the steel industry gave the gathering a character similar to that of meetings of the American Iron and Steel Institute. None of the steel companies of the district was unrepresented.

Taylor Allderdice, president National Tube Co., was toastmaster, and William G. Clyde, president Carnegie Steel Co., was at the speakers' table, while T. M. Girdler, president Jones & Laughlin Steel Corporation, also was in the assemblage.

Mr. Grace, taking as examples the late Gen. George W. Goethals, W. W. Atterbury, Herbert Hoover, John Hays Hammond and Charles M. Schwab, drew an interesting picture of the characteristics of these men that had made them leaders of industry as well as of the engineering profession with which they were affiliated. His remarks were in part as follows:

> In the careers of the men to whom I have referred we find typified the development of the chief problems of engineering. The first is to shape and direct the forces of nature and thus to bring the world's resources to add to the comfort and welfare of mankind. That, in a word, is the problem of production. Engineers have made a supreme contribution to the solution of that problem. But I feel that we have two somewhat newer branches of engineering which must command more and more of our attention. Those are what might be termed commercial and human engineering. Of what value is all our efficiency in production if we do not distribute efficiently, economically and effectively? And of what value is any of it unless we can add to the happiness and deeper satisfaction of those engaged in industry, as well as those who enjoy its products?
>
> I predict that the outstanding advances in business over the next 10 years will be in improved merchandising and distributing methods. Herein lies a wide field of opportunity for the engineer.

E. H. H. Simmons, president of the New York Stock Exchange, told of the machinery of that organization and the part it had played in the upbuilding of industry in affording a means whereby the shares and bonds of American companies could be sold to the investing public. He defended speculation and the speculative investor, saying that when the securities of a new industry appeared there was only the speculative investor to take them, since the permanent investor was timid and not disposed to tie up funds in securities about which there was any doubt as to dividends. He paid a tribute to the frank publicity policy of the Steel Corporation in matters of corporate information and especially its quarterly report of the number of shares held by banks and brokerage firms and those in the names of individuals. In 20 years holdings of Steel Corporation common stock have changed from one-third in the hands of the public and two-thirds in banking and brokerage names to 80 per cent in individual names and the remainder in speculative accounts.

Wright Company Gets Large Government Order

WASHINGTON, Jan. 31.—The Navy Department has awarded a contract for the construction of 100 nine-cylinder air-cooled aircraft engines, with spare parts, to the Wright Aeronautical Corporation, Paterson, N. J. The engines will be installed in 25 new coast patrol planes being built by the Douglas Co., Santa Monica, Cal. Each plane will carry two engines and the remainder of the order will be used as spares.

Grinding Machinery Makers Consolidate

The Wilmarth & Morman Co., Grand Rapids, Mich., manufacturer of grinding machinery, has consolidated with the Covel-Hanchett Co., Big Rapids, Mich., maker of grinding and saw and knife-fitting machinery. Prior to Jan. 1, the latter company was known as the Machinery Co. of America. It operates plants at Big Rapids and Benton Harbor, Mich. The Grand Rapids office of the Wilmarth & Morman Co. will be discontinued and the company will operate as a division of the Covel-Hanchett Co.

Russian Railroad Delegation Places Orders for Equipment

Purchases of railroad-building equipment are being made in the United States by a delegation of railroad men from Soviet Russia, according to an announcement by S. M. Ivanoff, chairman of the delegation, at the office of the Amtorg Trading Corporation, 165 Broadway, New York. Its first purchases consisted of steam shovels, gas locomotives, drilling supplies and a number of automobiles. Equipment is being bought for the new Turkestan-Siberian Railroad, which, Mr. Ivanoff announced, will cost about $110,000,000 to build, including rolling stock. The road, about 900 miles long, will extend from the sub-tropical region of Soviet Turkestan to southern Siberia and will shorten by two-thirds the distance between Tashkent, the center of Turkestan, to Novosibirsk, the capital of Siberia. Considerable additional equipment will be bought after the delegation has visited plants in this country making such equipment. The delegation will also make a study of the New York Central, Baltimore & Ohio and Northern Pacific railroads.

Pacific Coast Fabricating Plants Are Merged

The steel fabricating, crane and bolt and rivet departments of the Judson Mfg. Co., Emeryville, Cal., and the Pacific Rolling Mill Co., San Francisco, steel fabricator, have merged and will be operated under the name of the Judson-Pacific Co. The Judson Mfg. Co. was organized in 1882 and for many years has operated open-hearth furnaces, rolling mills and a fabricating plant and will continue to operate the steel-making departments. The Pacific Rolling Mill Co. was organized in 1868 and at first rolled bars from pile scrap. It was the first company on the Pacific Coast to install an open-hearth furnace. In 1897 it began operating as a fabricating plant only.

The Judson-Pacific Co. has been incorporated in Nevada with physical assets of $1,500,000. Officers are: Carlos J. Maas, president; E. B. Noble, vice-president and treasurer; A. E. Wilkens, vice-president and general manager; Paul F. Gillespie, vice-president in charge of sales. The combined capacity of the fabricating plants at San Francisco and Emeryville is 25,000 tons a year.

McClintic-Marshall Co. Buys Steel Fabricating Plant on Pacific Coast

The McClintic-Marshall Co. has purchased the Central Iron Works, San Francisco, and will operate the plant under the name of the McClintic-Marshall Co. Central Works. The Central Iron Works was organized by A. A. Devoto in 1900 and is one of the important steel fabricating plants on the Pacific Coast. Mr. Devoto will be general manager; A. B. Charlton, manager of works, and Harry Mortenson, formerly of the Mortenson Construction Co., San Francisco, secretary. This gives the McClintic-Marshall Co. two plants on the Coast, one in Los Angeles.

Higher Prices in European Markets

Particularly on Continent, Stiffer Prices Accompany Swedish Strike—Tin Plate Weakness Expected

(By Cable)

LONDON, ENGLAND, Jan. 30.

THERE has been improved demand for Cleveland pig iron since consumers have realized that makers are unlikely to reduce prices in view of the stiffening of Continental quotations. Considerable activity was noticeable last week including the covering of requirements on contracts up to June.

Export business is still quiet. East coast hematite is dull and as stocks are large makers are keen sellers. The North Lonsdale Iron & Steel Co. has blown out its remaining Ulverston blast furnace. Durham coke prices have stiffened as a result of increased export sales. Foreign ore is quiet.

A strike at Swedish iron ore mines may affect the market by forcing German consumers to purchase North African and French ores. Finished iron and steel are quiet generally and plate mills are seeking orders. Several more shipbuilding contracts have been placed and domestic mills are seeking the orders for the steel material involved.

Tin plate is quiet. Although inquiry is moderate, consumers are expecting lower prices. Most works, however, are still due to complete their compulsory three weeks suspension and the association has agreed to prolong the plan and will require the closing of works for an additional three weeks during the period beginning March 1.

Galvanized sheets are moderately active. Bombay has bought some fair tonnages and Calcutta is inquiring. Prices are firm. There is a good demand from Japan for No. 28 gage black sheets and there have been some small sales of thin gage sheets. No. 24 gage black sheets are generally quiet and makers are accepting lower prices.

The Continental market is strong as a result of improved export business, establishment of French sales offices for semi-finished material and beams and the strike in the Swedish ore fields. The North British Locomotive Co. has secured a contract for 29 locomotives for South Africa and the same railroad has awarded 10 locomotives to Italian makers.

FRENCH PRICES IRREGULAR

Domestic Buyers Evidently Well Stocked—Export Trade Quiet—British Pig Iron Competitive

PARIS, FRANCE, Jan. 13.—Despite the good prospects for increased business at the beginning of the year, the market has been steadily growing quieter and there is a tendency toward weakness in prices. Revival of the comptoir for heavy rolled products is expected to bring about more firmness, but until there is a genuine reduction of stocks held by consumers and the franc is legally stabilized a lasting revival of business is not anticipated. Another unfavorable factor in the situation is the high cost of production, caused in part by the heavy taxes borne by industry, the prospect of increased freight rates and the probability of revised laws on workers' insurance. Export trade is quiet, and prices have developed a slight downward tendency.

Pig Iron.—Purchasing of phosphoric foundry iron by domestic users has been declining since the first of the month. Nevertheless producers have increased the tonnage available for domestic consumption in January from 30,000 to 33,000 tons. Hematite is moving in moderate tonnages as negotiations for the formation of an international syndicate continue. An advance in foundry iron prices is expected in some quarters, but there are also reports that coke may decline, which would justify a reduction in pig iron prices. Competition for foreign trade is keen, particularly from British furnaces, which are still quoting low prices on foundry and hematite iron.

Semi-Finished Material.—Export business is limited to a few small tonnages of billets and blooms, but demand for sheet bars has shown slight improvement. Blooms are quoted at £3 17s. 6d. to £4 2s. ($18.88 to $19.97) per ton. Billets are nominally £4 3s. 6d. to £4 7s. 6d. ($20.33 to $21.31) per ton, f.o.b. Antwerp.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	17½s.	to	£0	17¾s.	$4.27	to	$4.33
Bilbao Rubio ore*	1	0½	to	1	1	4.99	to	5.11
Cleveland No. 1 fdy.	3	7½				16.44		
Cleveland No. 3 fdy.	3	5				15.83		
Cleveland No. 4 fdy.	3	4				15.59		
Cleveland No. 4 forge	3	3½				15.46		
Cleveland basic (nom.)	3	15	to	3	15½	18.27	to	18.39
East Coast mixed	3	8	to	3	10	16.56	to	17.05
East Coast hematite	3	8½	to	3	10½	16.68	to	17.17
Rails, 60 lb. and up.	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	10				65.75		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to	5	15	26.18	to	28.01
Tin plate, base box.	0	18	to	0	18¼	4.39	to	4.45
Black sheets, Japanese specifications.	13	5	to	13	10	64.53	to	65.75
							C. per Lb.	
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	10	10	to	11	0	2.28	to	2.39
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	9	15	to	10	0	2.12	to	2.17
Galv. sheets, 24 gage	13	0	to	13	5	2.82	to	2.88
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	2s.				$15.10		
France	3	2				15.10		
Luxemburg	3	2				15.10		
Basic pig iron (nom.):								
Belgium	2	19				14.38		
France	2	19				14.38		
Luxemburg	2	19				14.38		
Coke	0	18				4.39		
Billets:								
Belgium	4	7	to	£4	9s.	21.19	to	$21.68
France	4	7	to	4	9	21.19	to	21.68
Merchant bars:							C. per Lb.	
Belgium	5	0				1.10		
France	5	0				1.10		
Luxemburg	5	0				1.10		
Joists (beams):								
Belgium	4	8	to	4	10	0.97	to	0.99
France	4	8	to	4	10	0.97	to	0.99
Luxemburg	4	8	to	4	10	0.97	to	0.99
Angles:								
Belgium	4	17½				1.08		
⅛-in. plates:								
Belgium (a)	6	4	to	6	5	1.37	to	1.38
Germany (a)	6	4	to	6	5	1.37	to	1.38
3/16-in. ship plates:								
Belgium	5	19	to	6	0	1.32	to	1.33
Luxemburg	5	19	to	6	0	1.32	to	1.33
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

Sheet bars are quoted at £4 7s. to £4 8s. 6d. ($21.19 to $21.55) per ton, f.o.b. Antwerp.

Finished Material.—Reports that negotiations for the formation of a comptoir controlling heavy rolled products had been successful immediately affected the market. Prices began to advance and soon afterward demand declined, as consumers evidently had sufficient stocks. In consequence, prices have become irregular, although mills are not seeking tonnage for prolonged delivery, expecting a reaction upward when the comptoir is actually formed. Beams are quiet at £4 7s. to £4 7s. 6d. (0.96c. to 0.97c. per lb.), and quotations on merchant bars are easier at £4 16s. 6d. to £4 17s. 6d. per ton (1.06c. to 1.07c. per lb.), f.o.b. Antwerp. Demand for wire rods is good, and an advance in prices by the Wire Rod Syndicate has been expected but has not yet developed. Mills producing hot-rolled hoops are heavily engaged with tonnage booked in the past few weeks. First quarter prices on rails have not yet been established. The export statistics of the Government on rails are being studied by the rail comptoir, which points out that fully 40 per cent of total exports was made up of relaying rails sold by the railroads and scrap rails exported by dealers in old material and so classified to avoid coming under the scrap export quota. Prices of light and heavy gage sheets are unsteady, but medium gages still show a slight tendency to advance in the domestic market. For export, sheet prices are unchanged.

GERMAN PRICES ADVANCED

Added Cost of 8-Hr. Day Brings Increase—Unemployment Insurance a Burden—Mills Busy

Berlin, Germany, Jan. 13.—The expected advance in domestic steel prices was made effective Jan. 12. It is the first general revision of domestic prices since the formation of the Ingot Steel Syndicate in 1925. The reason for the advance was a reduction by Governmental order of the working day from 10 to 8 hr. without an accompanying reduction in wages. The increase in prices is much smaller than had been expected, advances of from 10 to 20 per cent having been predicted in some quarters. The conservative character of the price revision was probably due to current evidence that business is beginning to decline. Railroad car loadings have been considerably smaller recently, and the latest report on unemployment shows a total of 1,046,000 out of work, compared with 450,000 in October, 1927. The total, however, was smaller than in the corresponding week in 1927, which showed 1,748,000 unemployed.

Actual advances are limited to certain products. Steel bars and shapes are up 3 m. (72c.) per ton. Price rebates granted by mills in Westphalia to consumers in southern Germany to offset higher freight rates have been reduced from 6 m. ($1.43) to 4 m. (95c.) per metric ton. Thus, structural shapes of Thomas steel are now 134 m. ($31.92) per ton, f.o.b. Oberhausen, instead of 131 m. ($31.20) per ton, and steel bars are 137 m. ($32.63) per ton, f.o.b. Oberhausen, instead of 134 m. ($31.92) per metric ton.

Prices Still Low

These advances in prices are not expected to afford much aid to French and Belgian exporters to Germany, and no objections are looked for from German manufacturers producing chiefly for export. The increased difference between German domestic and world market prices has been adjusted, as in the past, by advances in the rebates paid by the steel syndicate to exporting manufacturers.

In announcing the revision of prices, producers have pointed out that, although steel prices based on an index of 100 in 1914 are only 124.4, the general price index in Germany is about 140. The index for production machinery is 133.9, and for coal, 130.7.

The threat of a strike in the steel industry or suspension of the mills as a result of the 8-hr. day controversy has finally passed. But steel mills, as well as manufacturers in other branches of industry, complain that the new system of unemployment insurance is unsatisfactory. Pay for unemployment is based on the average wages earned in the three months preceding unemployment. As a result, it is claimed, men who have been drawing high wages and are unemployed because their work is seasonal prefer drawing unemployment pay to accepting work in some other branch of industry at a lower wage. It is also contended that contributions to the insurance funds are a heavy burden on industry.

Steel Mills Well Booked

Conditions are still good throughout the steel industry, and, according to the ministry of trade, there had been no appreciable reduction in the prosperity of the country on the first of the current month. Producers of various products have orders booked ahead for about the following periods: producers of pig iron, three months; producers of steel ingots, two and a half months, and of semi-finished products, three months; rail mills, one to one and a half months; structural mills, one and a half months; bar mills, three months, and sheet mills, one to two months. Orders are still being booked in satisfactory volume.

Ship yards are not so well engaged as they were last summer. The total capacity of all yards is about 1,000,000 tons of shipping. Current contracts are for something less than 500,000 tons, compared with the summer total of close to 700,000 tons.

Mills in the Ruhr are preparing to negotiate with Russian oil monopolies for the delivery of line pipe and other oil field materials, as well as the aid of German technical men.

German Mills to Offer Special Products Here

Hamburg, Germany, Jan. 14.—Following the decision of the United States Treasury Department that German steel is not being dumped in the United States, mills here have been endeavoring to regain some of the trade with American consumers that was lost to French, Belgian and Luxemburg mills while the dumping question was under investigation.

German mills are evidently inclined to abandon the business in structural shapes and bars to the French and Belgian mills, as competition is extremely severe. Their activity is, therefore, directed toward increasing sales of seamless tubes, sheets, hoops and other high-grade products.

Swedish Ore Interest Controls French and African Mines

Stockholm, Sweden, Jan. 12.—Formation of the Aktiebolag Hematit Stockholm, a new iron ore company, has attracted considerable attention. It is a subsidiary of the Grangesberg Oxelosung Aktiebolag, the largest producer of ore in Sweden. The new company has purchased Dutch and British interests in certain North African iron ore mines and more recently bought a majority interest in leading French iron ore companies.

German Decision Extends Time on Machinery Claims

Hamburg, Germany, Jan. 14.—A recent decision of the Supreme Court on claims in the machinery trade is of considerable importance to foreign sellers of machinery to German users. The decision of the court was that claims as to the quality of a machine should be made within one week of putting the machine in operation and not, as has been the practice in the past, two weeks after receipt of the machine. This leaves the time when a claim may be presented indeterminate, as a machine may not be placed in actual operation for some time after it is received.

LEAD AND ZINC IN 1927

Output of Zinc Decreased While That of Lead Increased Slightly

THE output of primary domestic desilverized lead in 1927 was about 375,000 tons; of soft lead about 240,000 tons, and of desilverized soft lead about 61,000 tons, making a total output from domestic ores of about 676,000 tons of refined lead, according to statistics compiled by the United States Bureau of Mines. Corresponding figures in 1926 were 366,413 tons of desilverized lead, 258,565 tons of soft lead, and 55,707 tons of desilverized soft lead, making a total of 680,685 tons. The output of lead smelted and refined from foreign ore and bullion was about 131,000 tons, as compared with 118,256 tons in 1926.

The total primary lead smelted or refined in the United States in 1927 was thus about 807,000 tons, as compared with a total of 798,941 tons in 1926—a gain of about 1 per cent. The output of antimonial lead in 1927 was about 16,000 tons, as compared with 22,524 tons in 1926.

Imports of refined pig lead for 11 months amounted to 2442 tons, of which 1764 tons came from Mexico. Exports of lead of foreign origin amounted to 111,835 tons, as compared with 67,660 tons exported in the entire year 1926. Exports of lead of domestic origin amounted to 2233 tons, as compared with 4276 tons exported in 1926. Exclusive of stocks of lead at smelters and refineries, and estimating the amount of lead exported with benefit of drawback, for which figures are not available, it is calculated that the new supply of lead made available for consumption in 1927 was about 685,000 tons, as compared with 717,653 tons in 1926.

Less Zinc Last Year

Output of primary metallic zinc from domestic ores in 1927 was about 575,000 tons and that from foreign ores was about 13,000 tons, a total of 588,000 tons, as compared with 611,991 tons from domestic ores and 6431 tons from foreign ores, a total of 618,422 tons in 1926. In addition to the output of primary zinc, there was an output of about 45,000 tons of redistilled secondary zinc, as compared with 40,799 tons in 1926, making a total supply of distilled and electrolytic zinc in 1927 of about 633,000 tons, composed of 192,000 tons of high-grade and intermediate, 71,000 tons of select and brass special, and 370,000 tons of prime Western zinc.

Imports of slab zinc for 11 months amounted to only 24 tons. The exports of slab zinc made from domestic and foreign ores amounted to 48,273 tons, including 3625 tons of rolled zinc. The apparent consumption of primary zinc in 1927 was about 522,000 tons, as compared with 557,026 tons in 1926.

The total number of retorts at the 24 zinc smelters that operated during all or a part of the year was about 120,000. Of that number about 73,000 were reported in operation at the end of November and about 73,000 were expected to be in operation at the end of the year. At the end of 1926 there were 89,496 retorts in operation at these 24 plants.

MANGANESE ORES IN 1927

Domestic High-Grade Ore Output Declines Again—Larger Manganiferous Ore Shipments

DOMESTIC shipments of manganese ore containing 35 per cent and more of metallic manganese totaled in 1927 approximately 43,600 gross tons, valued at $1,142,000, according to preliminary figures compiled by the United States Bureau of Mines. This is a decrease of 6 per cent from the 1926 shipments of 46,258 tons. A decrease in average value per ton of all ore shipped in 1927 is due in part to the decreased world's price of metallurgical ore and also to the decreased shipments of chemical ore in comparison with those of metallurgical ore. The shipments of metallurgical ore amounted to 26,000 tons, valued at $416,000, while those of 1926 were 26,530 tons, valued at $379,893. The shipments of chemical ore in 1927 amounted to 17,600 tons, valued at $726,000, while those of 1926, were 19,728 tons, valued at $848,770.

The quoted price of high-grade manganese ore in 1927 decreased materially in the latter part of the year. Quotations for foreign ore, crude, have been approximately 33c. per unit, whereas the average price of 1926, Atlantic seaboard, was 39c. per unit.

Ore Imports Declined

Figures furnished by the Bureau of Foreign and Domestic Commerce show that during the first 11 months of 1927 the metallic content of imported ore was 276,823 tons. The gross tonnage of ore was 554,382 tons. This includes importation from Cuba. Assuming that the imports for December were at the same rate as during the first 11 months, the total ore importation was approximately 605,000 tons as compared with the total imports of 738,000 tons in 1926. The decrease in imports is attributed in the main to the decreased manufacture of steel during the year, and possibly to the draft on stocks in the hands of consumers.

Manganiferous Iron Ore Shipments Large

Shipments of domestic ore containing from 10 to 35 per cent of manganese (ferruginous manganese ore) in 1927 were 134,000 tons, valued at approximately $609,000, as compared with 364,312 tons, valued at $1,179,429, in 1926. The domestic shipments of ore containing from 5 to 10 per cent of manganese (manganiferous iron ore) in 1927 were 1,317,000 tons, valued at $3,306,000, as compared with 835,412 tons, valued at $1,934,381, in 1926. The changes indicated are largely explained by the fact that much of the output in Michigan and Minnesota averages about 10 per cent, being classified in some years as ferruginous manganese ore, in other years as manganiferous iron ore. A large quantity of manganiferous iron ore produced in Wisconsin in 1927 containing slightly more than 5 per cent manganese is included in the above figures, whereas the corresponding output in 1926 fell below this grade and has not been included because classed as iron ore.

The apparent outstanding features of the year have been the increase in the domestic manufacture of spiegeleisen and the increased production and consumption, relative to the production of steel, of ores having a low metallic manganese content. While the combined production of ferruginous manganese and manganiferous iron ores in 1927 differs but slightly from the production of 1926, the gross tonnage of steel produced decreased.

Canadian Pig Iron Output Showed Seven Per Cent Loss in 1927

"Tonnage of pig iron produced in Canada during 1927, amounting to 709,697 gross tons, was 7 per cent lower than in the previous year, but the output of steel showed considerable improvement at 907,638 tons, compared with 776,888 tons in 1926," says the report of the Dominion Bureau of Statistics.

"The gain in steel production was due mainly to the increase in tonnage required for rails and other railroad equipment, and to a better demand from the construction, machinery and agricultural implement industries. The decline in pig iron production must have been accompanied by a depletion of stocks on hand at the various works, since the bulk of the pig iron made in Canada goes into the manufacture of steel, and the aggregate output of steel was up 17 per cent. Imports of pig iron showed an increase to 45,833 net tons (40,922 gross tons) from 29,246 net tons (26,112 gross tons)."

For the month of December the production of pig iron in Canada amounted to 63,197 gross tons, an increase of 66 per cent over the 37,989 tons of November and 17 per cent over the 53,971 tons made in December of a year ago.

SHIPBUILDING SHOWS GAIN

Increase of Nearly 39 Per Cent in 1927—England Far in the Lead

WORLD production of merchant vessels increased sharply during 1927, launchings for the year aggregating over 600,000 gross tons more than for 1926, according to Lloyd's Register of Shipping. Last year's total of 2,285,000 gross tons was the largest recorded since 1922. But the figure is still over a million tons less than that for the last pre-war year, 1913; and is nearly 5,000,000 tons below the peak year of 1919.

While launchings in the United States showed a gain of about 20 per cent last year, as compared with 1926, the increase for Great Britain and Ireland during the same period was over 90 per cent. On the other hand, the 1927 total for all other maritime countries combined showed a slight decline from the 1926 figure. The relative position of these groups is shown in the table, giving the gross tonnage of ships launched:

	1927	1926
United States	179,218	150,613
Great Britain and Ireland	1,225,873	639,568
Other countries	880,588	884,796
World total	2,285,679	1,674,977

Economic Survey, Sponsored by Secretary Hoover, to Be Made

WASHINGTON, Jan. 31.—Far-reaching inquiry into the changes in economic currents is to be instituted by Secretary of Commerce Herbert Hoover, who has appointed a committee of leading business men and economists to supervise the work. Their names will be announced late. Private individuals have subscribed money to pay the expenses of the Bureau of Economic Research of New York in making the fact-finding background. The cooperation of the Department of Commerce will be given. It is proposed to determine the facts with regard to such questions as the shifts in employment, changes in methods of production and distribution, in industry and agriculture, shifts in relative price levels and profits, movements in the business cycle and other allied subjects which bear upon the general business situation. It is expected that the inquiry will take several months. Five years ago a similar survey was made under similar auspices.

Commodity Price Movements Present Confused Picture of Future

Business trends as reflected in wholesale commodity and retail price movements, volume of employment and wage earnings at the present moment present a confused picture and do not indicate what may be expected in the immediate future in way of business recovery, according to the National Industrial Conference Board, 247 Park Avenue, New York.

While underlying conditions are appraised as sound by the Conference Board, it is pointed out that living costs based on retail prices of the necessities of life, which in the past have tended to follow the trend of wholesale commodity prices with a lag of only a few months, as yet have shown no signs of rising; wholesale prices have shown an upward trend since April, 1927. In the view of the board, inasmuch as final consumption determines the permanence of production, the failure of retail prices thus far to reflect a stiffening of demand for goods leaves it at the present an uncertainty whether or not the upward turn of wholesale commodity prices during the past eight months is of a permanent character and actually reflects an increased demand for materials such as would foreshadow increasing industrial activity.

The volume of employment in industry has been definitely on the downward trend since July, 1920, and at the close of 1927 was approximately 20 per cent less than at the peak in 1920. Most of this decline, however, took place during a period of increasing industrial production and is known to have been due largely to increased mechanization of industry. There are no statistics available indicating to what extent the thus created labor reserve has found employment in other occupations, or to what extent it has been offset by immigration restriction. But it is significant, the board points out, that despite the decline in the volume of employment wage earnings of those employed in industry have shown marked stability at a high level which, during 1925, 1926 and 1927, averaged 116 per cent higher than in July, 1914. This, the board concludes, does not reflect pressure by an increasing labor reserve on the employment market.

Simplified Practice Results in Large Saving to Industry

WASHINGTON, Jan. 31.—Growth of simplified practice in industry is shown in a report issued by Ray M. Hudson, assistant director Bureau of Standards, in reviewing the 1927 activities of the commercial standards group of the bureau. There were completed during the year 18 new simplified practice recommendations, bringing the total projects completed to 80.

That simplification yields benefits sufficient to attract manufacturers, distributers and consumers alike, says Mr. Hudson, is demonstrated in the high degree of adherence shown by recent reviews of 15 of the simplified practice recommendations already promulgated. The report shows that accepters representing an average of 82.61 per cent of the total volume of the industry affected are following the simplified practice schedules. Further evidence that simplification is proving of great value to manufacturers and purchasers, it is pointed out, is found in the increased number of associations accepting the completed recommendations. The list of association indorsers grew from 686 to 868 during the year, the individual concerns from 2775 to 6676.

Among other experiences cited in connection with this form of waste elimination are those pertaining to a metal lath manufacturer, who reported a reduction of $140,000 in his inventory, and a manufacturer of eaves trough and conductor pipe, who reported a $30,000 reduction in his inventory. A manufacturer of die head chasers reported a 20 per cent reduction in his inventory, while another reported a reduction of 65 per cent.

Mr. Hudson reports that in eight of the 80 simplifications savings are estimated by leaders of the affected industries to be around $300,000,000 annually, of which $250,000,000 is said to be saved in the softwood lumber industry. Among the estimates are the following:

	Reductions		Estimated
	From	To	Annual Saving
Die head chasers	*100	*25	500,000
Die head chasers	*100	*25	500,000
Sheet steel	1819	263	2,400,000
Reinforcing bars	40	11	4,500,000
Range boilers	130	13	5,500,000

*Per cent.

Russian Iron and Steel Output in November

HAMBURG, GERMANY, Jan. 14.—Production of iron and steel by the Union of Soviet Socialist Republics in November, 1927, was 251,944 metric tons of pig iron and 331,400 tons of steel ingots. There were 57 blast furnaces in operation and 169 open-hearth furnaces. The output of finished products totaled 253,941 metric tons. Iron ore production in November was 308,432 tons, and manganese ore output, 63,554 tons.

Classified listing of Canadian automotive, electrical, hardware, radio, machinery, iron and steel, and other manufacturers is contained in the tenth annual edition of Fraser's Metal Products Directory, published recently by the Fraser Publishing Co., Montreal. Included are statistics on manufactured products in Canada, showing their 1927 value to have been $3,000,000,000. Iron and steel products accounted for $500,000,000.

RUST CHECKS RUSTING

Corrosion-Resisting Metals Develop Impervious Protective Coating Automatically

At a meeting of the Compressed Gas Association, held in New York, Jan. 23, C. E. MacQuigg, of Union Carbide and Carbon Research Laboratories, Long Island City, N. Y., exhibited a unique model showing clearly the mechanism of corrosion according to the electrolytic theory. It consisted of a bank of about 250 flashlight globes, each located immediately behind a small hole in a cardboard screen. These globes were of different colors and properly wired to a four-step flashing mechanism and lead storage battery so that, when in operation, a shower of green sparks, representing hydrogen ions, fell out of a portion of the screen, corresponding to the solution, toward the bottom, representing a piece of iron. Here they met another shower of white sparks indicating electrons flowing along the iron bar, and were mutually extinguished. Similarly, streams of other colored sparks denoted the flow of hydroxyl ions from the solution, iron atoms from the bar, oxygen from the air, and the precipitation of iron hydrate.

Extracts from Mr. MacQuigg's paper, "Notes on the Corrosion of Metal," follow:

We are apt to think of metals as being insoluble, and so they are, relatively. Generally speaking, we should think of them more properly as being quite ready to go into solution—sometimes very rapidly, as when in a strong acid—at other times very slowly, as when in pure water. When the rate of solution is so gradual that a long time is required for its effect to be noticed and the products remain on the metal, then we speak of corrosion as having taken place.

The rate of solution may differ with the same metal in different solutions, and it is also different for the various metals with the same solution. This latter tendency is called the "electro-potential" of the metal for a given solution. It is a measure of the relative strength of the force which tends to send electrically charged atoms (the so-called ions) of the metal into the solution. The greatest such tendency would exist for manganese, and in a lessening scale others would appear in the following order: zinc, ferrous iron, nickel, lead, tin, ferric iron, copper, silver, platinum, gold. Gold is the lowest and therefore would tend to go into solution (i. e., "corrode") the least of all these metals in this particular environment.

Protective Films

There is, however, another factor which tends to prevent corrosion in some metals: a condition developed at the surface which arrests all further corrosion. In other words, a protective film is formed on the surface of such metals, and this automatically brings to an end the corroding action when it is continuous and self-renewing. Examples of such are found in aluminum and the stainless steels or rustless irons which contain chromium, nickel, cobalt or silicon. These metals actually do have a marked tendency to go into solution (witness their positions in the electro-potential lists), but in a great many environments the products of the chemical action are deposited on the surface of the metal and are so amazingly effective in sealing off further action that a bright metal surface will remain so indefinitely.

A large number of factors come into the complex reactions of corrosion which are so simplified in the electrolytic theory. Some of these are not clearly understood as yet, and others, while clearly recognized, cannot be evaluated in any given instance because of lack of sufficient information. For instance, it is known that most metals, even in the worked condition, are somewhat porous, that is, they have numerous minute or even submicroscopic pores which go from the surface down into the interior of the metal. These pores will generally act to hasten or stimulate corrosion because they tend to give rise to so-called concentration cells, or local pockets in the corroding medium where the chemical concentration is sufficiently different from that over the general surface of the metal to give rise to a most marked speeding up in corrosion. Such pitting may result in perforations looking as though the metal had been drilled by a tool. This teaches us to avoid laminations or crevices where corrosion may be stimulated.

Protecting Films Must Be Insoluble in Corroding Medium

Protecting films do not always protect. For instance, dilute alkalies do not attack iron, but concentrated alkalies do, since the latter have the power of dissolving the protective coating of oxide which tends to form. Similarly, the protective coating formed by the action of an oxidizing agent on chromium alloys is lacking when the corroding medium is hydrochloric acid; the metal is then rapidly attacked.

With the generally accepted theory of corrosion in mind it is of interest to know what has and can be done to combat corrosion.

There is, first of all, the time-honored method of surface protection; a good example would be the covering of steel by concrete. Coating metal by metal is widely used; sometimes merely by a dipping process, as in galvanizing and tinning. Other protective coatings are put on by means of electroplating, examples being nickel, chromium, silver and cadmium. Instances of the protective value of an oxide coating are found in Parkerizing, calorizing, bluing, Sherardizing, browning and the manufacturing of so-called Russia iron.

The second method of protection has been developed in quite recent years through the use of the chromium and chromium-nickel alloys, which has been growing in a remarkable way. These automatically develop a resistance against any given medium of attack through changes which take place on the surface of the metal itself—a corrodible metal becomes rustless by the very act of rusting. This method is of such importance that, contrary to the assumptions made a few years ago, that extreme purity of metal must be found in order to minimize corrosion, we shall probably swing to the other extreme and develop a very specialized technique in which corrosion resistance will be obtained through alloying.

Dunbar No. 1 Furnace Being Scrapped; Iron Making Site for 138 Years

The Dunbar Corporation, Dunbar, Pa., formerly the American Manganese Mfg. Co., which dismantled its No. 2 furnace late last year, has started to tear down the remaining, or No. 1, furnace. This is the seventh merchant furnace in western Pennsylvania to be scrapped in the past five years. At the beginning of 1923 there were 24 merchant furnaces in western Pennsylvania and the Mahoning and Shenango valleys. In that year the Shenango Furnace Co., Sharpsville, Pa., dismantled its No. 4 furnace, and since then the following stacks have been scrapped: Rebecca furnace, Kittanning Iron & Steel Mfg. Co., Kittanning, Pa.; Alice furnace, Valley Mould & Iron Corporation, Sharpsville, Pa.; Ella furnace, Reliance Coke & Furnace Co., West Middlesex, Pa.; No. 2 furnace, Dunbar Corporation, Dunbar, Pa.; Clinton furnace, Clinton Iron & Steel Co., Pittsburgh, and now No. 1 Dunbar furnace. Of the 17 furnaces still standing only four are in operation.

The passing of No. 1 Dunbar furnace brings to an end an enterprise that was started 138 years ago, as this furnace was the direct successor, and occupied the site, of the second blast furnace built west of the Alleghanies, a stone furnace built in 1790. This stack, known as the Union furnace, was built by Col. Isaac Meason, and was first operated in March 1791. The first furnace, several times rebuilt of stone, gave way in 1870 to an iron-shelled furnace. The furnace now being dismantled was built in 1920.

The American Railway Tool Foreman's Association has changed the dates of its 1928 convention to Sept. 12, 13 and 14. Meetings will be held at the Hotel Sherman, Chicago. F. A. Armstrong, of the Pratt & Whitney Co., 564 West Monroe Street, Chicago, is secretary.

Price Cutting Threatens Prosperity

(Concluded from page 341)

an antagonist, and have pointed out to him the importance to the jobbing industry of a stabilized market not only in our line, but in all other lines he handles.

This plan has been responsible for the creation of the greatest piece of machinery ever put together in the history of the jobbing industry—a piece of machinery which is now in operation in our line and ready and willing to be effective in all other lines of trade which sell either part or all of their product through the hardware jobbing channels.

We have caused to be created 32 jobbers' committees, each headed by an important executive as chairman, each committee covering a particular section and each committee representing all of the jobbing interests of its particular section; therefore, we have 32 committees with 32 chairmen representing the entire jobbing industry of the country as a whole.

This gives an opportunity for cooperative effort in the jobbing industry never before possible and represents collectively a buying power of approximately a billion dollars per year, and such buying power used on a proper basis in an endeavor to stabilize purchases has untold possibilities.

They have had the fact presented to them in as forcible a manner as possible that the radical price cutter in any line is their greatest enemy, and they will do more to stamp out this evil than any other piece of machinery ever created.

They realize the radical price cutter is an enemy not only to themselves in creating liabilities for them where a stabilized prize creates assets, but he is also an enemy to their community, to their source of supply and to the country as a whole.

They realize he is the arch enemy to decent wages, decent living and decent profits. He converts all assets into liabilities, surpluses into deficits and satisfactory tax returns into higher taxes. He is the outstanding evil in everything constructive, and his operations only lead to destruction for himself as well as to others.

We are all interested in lower taxes. The greatest thing to bring about lower taxes is for all industry to make a fair profit, thereby creating for the Government a tremendous increase in tax returns, and a marked increase in buying power will also be created, thereby further increasing our prosperity and, with it, greater returns to our Government in the form of taxes.

Better Distribution Means Sharp Reduction in Costs

The brains of industrial America in the past have been devoted to the upbuilding of industry from a manufacturing standpoint. Untold millions have been expended annually on improved machinery and manufacturing methods to create low-cost production, and we have succeeded beyond our fondest expectations.

During all these years we have neglected a proportionate expenditure of brain power and money in proper methods of selling and distribution, as a result of which we have wasted millions in selling that we have saved in manufacturing, with the result as indicated in my opening remarks, that almost half of our business corporations are now operating at a loss.

Now the reaction has set in, and the same brains that created our manufacturing success are now confining a great deal of their attention to the subject of how to sell and distribute, so that the era of profitless prosperity will be eliminated, and we will go forward on a basis so that all men engaged in business activities—labor, employees of all kinds, executives and stockholders—will receive a satisfactory return for their endeavor.

It seems strange that in all these years our business executives in their struggle for cost reduction have overlooked the greatest single factor in this very important line of any ever undertaken.

Take our industry again as an example, this recent move of ours, in creating the proper channels of distribution of our products, is the greatest we have ever made in cost reduction.

It will mean a marked reduction in our sales expense, and will also go completely through the organization, beginning where actual manufacturing stops—shipping expense, packing expense, clerk hire, accounting, stationery and office supplies—and such savings will eventually react to the benefit of the ultimate consumer.

Steel Shipped 236 Miles by Airplane

STEEL has been shipped by airplane, possibly for the first time. Joseph T. Ryerson & Son, Inc., report that they have just forwarded a rush shipment from Chicago to Iowa City, Iowa. The Iowa City Iron Works telegraphed to the Ryerson warehouse in Chicago for a small quantity of rivets. It was late afternoon and the rivets were needed at once. The order was made up immediately and rushed to the American Railway Express, arriving at the air station in time to catch the 7.50 p. m. airplane express. One hour and 50 min. later the airplane landed in Iowa City, 236 miles away. The rivets were dropped and were in use that night.

Year's Exports Highest Since 1921

Slight Gain Over 1926, Due to Heavy Pig Iron and Scrap Shipments—Finished Steel Exports Lower—Imports Fall Off

WASHINGTON, Jan. 28.—While exports of iron and steel products in 1927 increased only 13,756 gross tons over those for 1926, going to 2,180,969 tons from 2,167,213 tons, imports in 1927 dropped 359,582 tons, or a little more than 34 per cent, declining to 750,467 tons as against 1,110,049. Exports in December, 1927, totaled 168,428 tons, against 177,928 in November, and imports were 64,188 tons and 61,882 tons respectively.

Results of our international trade in iron and steel in 1927 are looked upon as showing that the European Steel Entente and the numerous cartels, instead of making headway in gaining a foothold in the American market, or preventing domestic steel manufacturers from maintaining their foreign markets, lost in both directions in the aggregate.

While the sharpest decline in the import movement was in pig iron, with a total of 133,068 tons in 1927 compared with 445,773 tons in 1926, there were important decreases also in the importation of a number of important finished lines, including steel bars (decline of 12,000 tons), iron bars (1400 tons), rails (46,600 tons), and wire products other than barbed (3250 tons). The decline in imports of rails in 1927 was due largely to a single factor, the 1926 movement, amounting to 62,776 tons as against 16,145 tons in 1927, being made up to an important degree of imports from Germany for the Boston & Maine Railroad.

There were, however, some substantial increases in imports of semi-finished and finished lines in 1927, when compared with 1926. These included wire rods (8000 tons increase), hoops and bands (5300 tons), sheets (5100 tons), structural shapes (40,000 tons) and seamless tubes (all wrought pipe, increased 19,000 tons). The greatest gain was in structural shapes, which increased to 161,848 tons in 1927 as against 121,099 tons in 1926, with the bulk of the tonnage coming from Belgium.

The greatest export movement in 1927 was in tin plate, with 254,131 tons as compared with 250,782 tons the preceding year, and wrought pipe (258,476 tons, against 287,822 tons in 1926). Scrap made the most important gain, going to 238,303 tons from 104,738 tons. Slight increases were made in plates, plain wire and barbed wire and woven wire fencing. Substantial losses were shown in steel bars, galvanized sheets, black sheets, hoops and bands, plain and fabricated structural material, steel rails and welded pipe.

Of the steel exports in December, 61,256 tons went

Exports of Iron and Steel from the United States

(In Gross Tons)

	December		12 Months Ended December	
	1927	1926	1927	1926
Pig iron	3,079	2,651	50,992	25,208
Ferromanganese	75	50	1,641	793
Scrap	22,668	7,711	238,303	104,738
Pig iron, ferroalloys and scrap	*25,822*	*10,412*	*290,936*	*130,739*
Ingots, blooms, billets, sheet bar, skelp	2,610	5,918	98,613	100,956
Wire rods	1,448	2,795	16,128	19,646
Semi-finished steel	*4,058*	*8,713*	*114,741*	*120,602*
Steel bars	7,983	10,952	111,121	137,770
Alloy steel bars	700	341	6,149	4,946
Iron bars	94	374	3,872	5,171
Plates, iron and steel	15,444	8,806	139,632	138,258
Sheets, galvanized	9,574	17,163	152,175	178,636
Sheets, black steel	8,181	19,545	152,497	175,740
Sheets, black iron	2,506	2,790	17,163	19,252
Hoops, bands, strip steel	2,751	3,135	43,160	46,912
Tin plate; terne plate	15,856	31,735	254,131	250,782
Structural shapes, plain material	14,310	10,617	148,069	157,121
Structural material, fabricated	4,811	6,843	68,637	77,853
Steel rails	15,717	19,445	175,539	187,557
Rail fastenings, switches, frogs, etc.	4,383	2,853	35,806	41,771
Boiler tubes, welded pipe and fittings	18,982	32,106	258,476	287,822
Plain wire	2,891	1,878	35,482	31,311
Barbed wire and woven wire fencing	4,128	1,591	52,393	50,718
Wire cloth and screening	167	176	2,268	1,989
Wire rope	398	333	4,569	4,779
Wire nails	1,369	628	9,993	11,743
Other nails and tacks	874	530	8,453	7,924
Horseshoes	54	34	563	661
Bolts, nuts, rivets and washers, except track	1,196	925	12,218	13,220
Rolled and finished steel	*132,369*	*172,800*	*1,692,366*	*1,831,936*
Cast iron pipe and fittings	1,612	3,201	27,964	34,111
Car wheels and axles	827	675	16,661	16,679
Iron castings	1,525	406	11,727	8,838
Steel castings	572	555	7,004	7,566
Forgings	351	144	4,868	2,644
Castings and forgings	*4,887*	*4,981*	*68,224*	*69,838*
All other	1,292	1,283	14,702	14,098
Total	168,428	198,189	2,180,969	2,167,213

Imports of Iron and Steel into the United States

(In Gross Tons)

	December		12 Months Ended December	
	1927	1926	1927	1926
Pig iron	14,299	14,783	133,068	445,773
Ferromanganese*	8,334	7,411	34,023	43,932
Ferrosilicon‡	788	1,341	7,753	13,125
Ferrochrome§	....	....	435	525
Scrap	3,462	6,407	60,203	86,725
Pig iron, ferroalloys and scrap	*26,883*	*29,942*	*235,482*	*590,080*
Steel ingots, blooms, billets and slabs	1,917	1,675	13,702	30,825
Iron blooms, slabs, etc.	....	25	91	348
Wire rods	1,075	868	17,990	10,074
Semi-finished steel	*2,992*	*2,568*	*31,783*	*41,247*
Rails and splice bars	641	982	16,145	62,776
Structural shapes	14,529	10,454	161,848	121,099
Boiler and other plates	544	795	4,035	4,946
Sheets and saw plates	1,338	1,615	15,804	10,671
Steel bars	8,117	6,324	91,497	103,473
Bar iron	822	590	4,220	5,623
Hoops, bands and cotton ties	2,077	2,885	33,773	28,407
Tubular products (wrought)	1,725	5,318	50,088	31,073
Nails, tacks, staples	224	456	1,064	5,354
Tin plate	10	70	5,665	2,160
Bolts, nuts, rivets and washers	26	4	356	360
Round iron and steel wire	296	506	3,962	4,330
Barbed wire	261	206	4,027	3,056
Flat wire; strip steel	144	187	2,543	3,678
Steel telegraph and telephone wire	3	3	35	1,128
Wire rope and strand	150	61	2,178	2,492
Other wire	17	114	1,145	1,485
Rolled and finished steel	*30,924*	*30,570*	*398,385*	*392,111*
Cast iron pipe	3,112	12,094	81,769	83,873
Castings and forgings	277	385	3,048	2,738
Total	64,188	75,559	750,467	1,110,049
Manganese ore*	31,771	26,971	308,594	354,223
Iron ore	131,837	205,035	2,620,717	2,555,441
Magnesite (dead burned)	4,404	911	44,976	67,596

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*Manganese content only.
‡Silicon content only.
§Chromium content only.

United States Imports of Iron and Steel Products in December, 1927

(In Gross Tons)

Austria	1,815
Belgium	16,118
Czechoslovakia	22
Denmark	21
France	6,535
Germany	8,404
Italy	4
Netherlands	3,549
Norway	3,308
Poland and Danzig	538
Sweden	2,641
Switzerland	2
United Kingdom	5,276
Canada	7,855
Cuba	53
British India	8,044
Japan	3
Total	64,188

to Canada, while that country, easily the largest consumer of American steel products, took 831,177 tons in 1927, against 833,856 tons in 1926. Japan took 27,054 tons in December and in 1927 took 278,207 tons against 260,361 tons in 1926. There were gains in exports to some South American countries in 1927 over the preceding year, Argentina taking 82,380 tons against 60,105 tons, and Brazil taking 70,635 tons against 62,542 tons. There were losses in exports to Chile and Colombia. Chile took 44,641 tons as compared with 61,642 tons, while Colombia took 59,080 tons as against 71,142 tons.

Japan led by a small margin as the destination of 1927 exports of steel rails, taking 29,474 tons as compared with 29,214 tons for Canada. Canada took 112,147 tons of the 139,632 tons of plates exported last year; 71,559 tons of the 152,175 tons of galvanized sheets exported; 121,514 tons of the 148,069 tons of plain structural material exported; 41,918 tons of the tin plate; 65,399 tons of the 111,121 tons of steel bars and 62,250 tons of the 152,497 tons of black sheets exported, Japan taking 61,849 tons. Japan led as the destination of tin plate exports, taking 54,685 tons.

Of the 14,529 tons of structural material imported in December, Belgium supplied 8664 tons; Germany, 2444 tons; France, 1876 tons; Austria, 1195 tons. Of the 8117 tons of steel bars imported that month, Belgium furnished 3824 tons; Germany, 1954 tons; Sweden, 865 tons. France supplied 2456 tons of the 3112 tons of cast iron pipe imported, while 649 tons came from Belgium. Of the 31,771 tons of manganese concentrates imported, Soviet Russia supplied 15,161 tons; Brazil, 10,160 tons; British West Africa, 2834 tons, and British India, 2691 tons. Of the 8334 tons of ferromanganese imported during the month, Canada supplied 4252 tons; Norway, 2641 tons; United Kingdom, 1441 tons. British India was the source of 8044 tons of pig iron imports; Netherlands, 3451 tons; United Kingdom, 2741 tons.

Of the total imports in December, 16,118 tons came from Belgium, 8404 tons from Germany, 8044 tons from India, 7855 tons from Canada, 6535 tons from France and 5276 tons from the United Kingdom. These six countries accounted for 81 per cent of the total incoming tonnage.

Operation of Industrial Locomotives

Coal and Water Consumption of Saddle-Back Unit Determined in Service Tests—Operated Without Cylinder Cut-Off

BY FRED M. REITER*

TO check the operation of a standard four-wheel, saddle-back, industrial locomotive, made by the H. K. Porter Co., some data were taken and calculations made. The object was to determine coal and water consumption, and note how often the locomotives should refuel and take water. The data were taken as a standard to check the actual operation of the locomotives. Time studies were made to determine the duration of runs, piston speed (obtained from r.p.m. of driving wheels), steam conditions, etc.

In determining water consumption, the cylinder conditions were as follows: Bore, 17¼ in.; stroke, 24 in.; piston rod, 3¼ in. This resulted in a piston area of 233.7 sq. in. at the head end and of 225.4 sq. in. at the crank end, the average being 229.6 sq. in. The total volume of the two cylinders, each revolution of a driving wheel, figures out at 12.8 cu. ft.

Steam at average boiler pressure of 150 lb. gage represented 360 deg. Fahr. The average cylinder pressure was throttled to 60 lb. gage, with 5 per cent moisture. The locomotive was operated with the reverse lever open wide, regulation of speed being made by the operating throttle. Thus no cut-off occurs in the cylinder, although the pressure is considerably reduced.

Consumption of Steam

Density of steam at 60 lb. gage is 0.1721 lb. per cu. ft. The moisture in it weighs 0.0130 lb., making the total weight 0.1851 lb. The average operating speed of the engine was 23 r.p.m., determined by count at the driving wheel. The weight of steam consumed each hour at 23 r.p.m. was 3268 lb. This represents a consumption of 394 gal. of water an hour, to which must be added 12 gal. for the air-brake engine.

Losses included 1 per cent for popping, 2 per cent for blow-off and 7 per cent of steam to the flues for producing draft and for leaks, etc. This makes a total of 10 per cent. Injector steam is not figured, as this is returned to the boiler with the water. Thus the apparent water consumption of 406 gal. an hour figures up to 450 gal. an hour total.

The tank capacity (saddle back) is 1650 gal. Of this amount 210 gal. in the legs of the tank cannot be taken out by the injectors. This leaves 1440 gal. net delivered by the tank. With low water in the boiler, when the locomotive is filled, an additional 610 gal. would be required, making a total of 2050 gal. put in each time the tank is filled.

Dividing this amount by 450 gal. an hour gives 4.54 hours duration of the water supply under steady continuous operation. As the locomotive is idle, between runs, about 40 per cent of all time, including the periods when steam is off and the locomotive is coasting, etc., the overall duration of water per fill is about 7.6 hr.

Heat Units Taken from Coal

Heat input into water at 200 deg. Fahr. to produce steam at 150 lb. gage pressure is 1017 B.t.u. per lb. The total heat per hour to make steam thus figures out at 3,847,311 B.t.u. an hour. About 2 per cent of the water is used for blow-off, having been heated from 200 to 360 deg. This adds 12,160 B.t.u., making the total heat absorption of the boiler 3,859,471 B.t.u. an hour. With a boiler efficiency of 50 per cent, the heat supplied by the coal must be 7,720,000 B.t.u. an hour.

Consumption of coal of 13,500 B.t.u. per lb. calorific value would thus be 572 lb. an hour. Figuring on 40 per cent idle periods, this reduces to 343 lb. The bunker capacity with the fire low before loading and maximum coal taken on was found to be 1700 lb. Thus the duration of one fill or coal supply works out at just under five hours.

Actual operation of the locomotives, when operated with reasonable care, checked these figures closely.

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*Dayton Power & Light Co., Dayton, Ohio.

Where Steel Exports Went in Nineteen Twenty-Seven

Canada Took 522,034 Tons of Nine Leading Items—Japan Retains Second Position with 158,664 Tons, Followed by Argentina with 58,618 Tons and Cuba with 51,299 Tons

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Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	December		12 Months Ended December		December		12 Months Ended December		December		12 Months Ended December	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*15,444*	*8,806*	*139,632*	*138,258*	*9,574*	*17,163*	*152,175*	*178,636*	*8,181*	*19,545*	*152,497*	*175,740*
Canada	12,028	5,786	112,147	111,295	635	1,705	71,559	42,487	2,825	5,023	62,250	65,210
Japan	943	39	2,148	529	171	328	3,625	5,378	3,296	10,214	61,849	88,796
Cuba	82	50	846	1,289	425	2,153	10,945	12,005	114	130	1,207	674
Philippine Islands	370	....	2,082	....	1,755	2,062	19,004	23,362	41	....	2,739	....
Mexico	16	102	815	1,522	531	545	8,254	9,083	68	....	1,652	....
Argentina	....	....	....	....	615	1,289	9,207	10,357	57	516	1,882	1,590
Chile	....	....	....	....	....	1,121	....	6,940	843	....	5,910	....
Colombia	....	....	....	....	767	935	8,940	7,992	34	....	595	....

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	December		12 Months Ended December		December		12 Months Ended December		December		12 Months Ended December	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*15,717*	*19,445*	*175,539*	*187,557*	*4,128*	*1,591*	*52,393*	*50,718*	*2,871*	*1,878*	*35,482*	*31,311*
Canada	1,714	627	29,214	26,343	6	17	3,580	5,297	1,038	781	14,453	11,878
Japan	914	6,143	29,474	34,378	....	....	....	....	251	111	702	1,335
Cuba	402	3,524	18,619	19,810	284	117	4,107	2,372	43	122	1,171	1,348
Philippine Islands	....	152	5,284	5,181	261	13	2,957	4,761	11	....	591	....
Mexico	1,031	332	7,744	9,670	580	282	4,407	2,347	131	269	3,701	5,564
Argentina	....	....	....	....	912	....	6,810	2,065	522	....	6,971	2,857
Chile	301	552	4,241	9,270	32	....	944	....	....	....	....	....
Colombia	....	5	....	4,964	....	355	....	6,301	....	....	....	....
Brazil	776	6,020	22,642	23,467	392	32	9,109	6,357	154	....	415	....

	Tin Plate				Plain Heavy Structural Material				Steel Bars			
	December		12 Months Ended December		December		12 Months Ended December		December		12 Months Ended December	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Total	*15,856*	*31,735*	*254,131*	*250,782*	*14,310*	*10,617*	*148,069*	*157,121*	*7,983*	*10,952*	*111,121*	*137,770*
Canada	1,827	3,639	41,918	49,902	11,730	8,281	121,514	119,590	4,453	5,131	65,399	82,741
Japan	5,743	7,446	54,685	49,062	531	66	4,584	5,380	203	67	1,597	2,173
Cuba	248	903	3,761	3,124	293	503	7,473	7.201	234	146	3,170	3,452
Mexico	894	771	12,177	9,299	....	....	....	....	....	195	....	3,412
Argentina	1,711	2,517	33,415	16,573	....	....	....	....	7	118	333	2,830
Chile	502	1,230	5,805	7,031	198	714	2,810	6,593	123	167	191	2,879
Brazil	....	1,277	....	5,868	....	....	....	....	....	....	....	....
China	....	4,764	8,949	24,178	....	....	....	....	....	....	....	....
British India	....	253	....	14,591	....	....	....	....	....	....	....	....
United Kingdom	....	....	....	....	....	....	....	....	1,380	3,423	17,952	27,396
Italy	....	183	....	10,126	....	....	....	....	....	....	....	....

Destination of All Iron and Steel Exports from the United States

(In Gross Ton)

Country of Destination	December, 1927	Calendar Year 1927	Calendar Year 1926
North and Central America and West Indies	*81,033*	*1,088,577*	*1,107,964*
Canada and Newfoundland	61,787	832,984	834,858
Cuba	5,006	92,486	94,708
Mexico	6,295	81,656	100,837
Guatemala	333	6,124	10,125
Salvador	3,452	7,140	16,277
Panama	1,186	18,881	9,015
Other Central America	1,401	13,222	14,292
British West Indies	629	12,384	10,580
Other West Indies	944	23,700	17,272
South America	*27,713*	*348,899*	*373,102*
Argentina	6,915	82,380	60,105
Brazil	3,492	70,635	62,542
Chile	4,917	44,641	61,642
Colombia	5,192	59,080	71,142
Peru	1,776	32,207	37,819
Venezuela	3,486	44,918	68,116
Other South America	1,935	15,038	11,736
Europe	*9,785*	*197,326*	*144,154*
France	173	4,586	10,393
Italy	1,763	41,832	23,486
Rumania	749	2,457	2,591
Russia	6	8,102	3,073
Turkey in Europe	77	3,711	3,032
United Kingdom	4,316	66,915	68,809
Other Europe	2,701	69,723	32,770
Far East	*47,127*	*526,268*	*523,833*
Australia	1,670	26,672	33,353
British Malaya	723	8,444	15,520
China	4,748	53,843	46,054
Dutch East Indies	1,912	35,259	41,028
India	1,792	28,215	37,097
Japan and Chosen	27,054	278,207	260,361
Kwangtung	344	18,969	20,247
Philippine Islands	6,702	63,334	57,554
Other Asia and Far East	2,182	13,325	12,619
Africa	*2,770*	*19,899*	*18,160*
British South Africa	2,442	10,403	9,393
Egypt	86	4,554	5,761
Portuguese East Africa	61	3,827	2,299
Other Africa	181	1,115	707
Total	168,428	2,180,969	2,167,213

Machinery Exports High in 1927

Second Largest Dollar Value in History—Exceed 1926 by Nearly $36,000,000—Imports Show Slight Gain

WASHINGTON, Jan. 28.—Making a gain of $35,608,101, exports of machinery in 1927 aggregated $435,476,591 as against $399,868,490 in 1926, while imports of machinery and vehicles for the two years amounted to $27,517,361 and $26,211,967 respectively. Imports of the machinery and vehicles listed in THE IRON AGE table totaled $18,603,229 in 1927 and $17,137,056 in 1926. Imports of industrial, office and printing machinery in 1927 were valued at $16,452,625 last year and $16,450,043 the preceding year.

Exports of industrial machinery in 1927 amounted to $201,473,555, against $179,556,215 in 1926, while exports of "other industrial machinery" were valued at $69,048,380 and $55,010,374, respectively. Exports of power-driven metal-working machinery last year were valued at $20,345,478, while in 1926 the value was $14,316,274. Other metal-working machinery to the value of $5,051,314 was exported in 1927 as compared with $4,551,248 in 1926.

Machinery exports listed in THE IRON AGE table reached a value of $38,169,898 in December, against $36,187,195 the month before and $32,111,380 in December, 1926. Industrial machinery to the value of $17,206,531 was exported in December, against $17,101,313 in November and $15,486,344 in December, 1926. Exports of all power-driven metal-working machinery in December were valued at $2,352,753, against $1,202,648 in December of the preceding year, while the respective values of exports of other metal-working machinery were $568,104 and $376,144. Exports of "other industrial machinery" in December, 1927, and the corresponding month of the preceding year were valued at $5,890,035 and $5,260,901, respectively. Respective imports of industrial, office and printing machinery were valued at $1,208,764 and $1,438,565.

Bilton Machine Tool Co. to Be Sold at Auction April 3

Assets of the Bilton Machine Tool Co., Bridgeport, Conn., have been ordered to be sold at public auction on April 3 by Judge Edwin S. Thomas of the United States District Court. The order was issued upon motion of counsel for the receiver of the company. In making the motion, counsel for the receiver said that an offer of $500,000 had been received for the business. The company's property consists of real estate, buildings, plant property, equipment and machinery at Bridgeport.

Machinery Exports from the United States
(By Value, in Thousands of Dollars)

	December		12 Months Ended December	
	1927	1926	1927	1926
Locomotives	$639	$276	$5,327	$5,113
Other steam engines	47	43	1,361	1,306
Boilers	117	175	1,744	1,805
Accessories and parts	78	29	668	646
Automobile engines	286	327	10,885	12,522
Other internal combustion engines	463	645	7,105	9,130
Accessories and parts	181	316	3,218	4,273
Electric locomotives	163	129	1,321	2,968
Other electric machinery and apparatus	665	666	7,462	7,423
Excavating machinery	844	392	5,392	4,505
Concrete mixers	88	43	1,131	734
Road making machinery	167	54	2,218	1,688
Elevators and elevator machinery	331	410	4,873	5,195
Mining and quarrying machinery	975	1,103	13,286	14,857
Oil well machinery	870	1,375	16,843	15,303
Pumps	438	607	6,314	6,169
Bending and power presses	159	39	1,428	1,299
Forging machinery	131	68	1,109	1,059
Machine tools*	1,324	696	12,538	7,104
Rolling machines	58	47	542	402
Other metal-working machinery and parts	568	376	5,051	4,551
Textile machinery	1,092	1,047	11,466	10,400
Sewing machines	784	737	8,964	8,683
Shoe machinery	156	126	1,718	1,353
Flour-mill and gristmill machinery	106	71	626	863
Sugar-mill machinery	370	331	5,824	4,043
Paper and pulp mill machinery	332	477	3,823	3,846
Sawmill machinery	61	66	800	966
Other woodworking machinery	166	78	1,485	1,200
Refrigerating and ice-making machinery	586	470	7,454	5,059
Air compressors	408	315	5,873	4,665
Typewriters	2,317	1,683	20,856	18,220
Power laundry machinery	91	34	1,456	1,210
Typesetting machines	412	393	4,504	3,741
Printing presses	642	520	6,251	6,232
Agricultural machinery and implements	6,246	4,966	90,098	85,667
All other machinery and parts	15,807	12,983	154,463	135,666
Total	$38,170	$32,111	$435,477	$399,868

*Principal details are shown in another table.

Imports of Machinery into the United States
(By Value)

	December		12 Months Ended December	
	1927	1926	1927	1926
Metal-working machine tools	$22,800	$101,073	$413,821	$521,554
Agricultural machinery and implements	362,542	336,122	5,406,599	5,011,804
Electrical machinery and apparatus	123,639	77,263	1,772,435	844,551
Other power-generating machinery	6,352	735	279,118	76,202
Other machinery	621,323	655,720	8,106,724	8,452,955
Vehicles, except agricultural	277,760	202,321	2,624,532	2,229,990
Total	$1,414,416	$1,373,234	$18,603,229	$17,137,056

Exports of Power-Driven Metal-Working Machinery

	December, 1927		November, 1927	
	No.	Value	No.	Value
Engine lathes	79	$187,362	136	$264,480
Turret lathes	31	89,766	39	152,569
Other lathes	39	56,443	58	110,253
Vertical boring mills and chucking machines	26	73,582	15	36,671
Thread-cutting and automatic screw machines	47	42,483	109	134,763
Knee and column type milling machines	32	76,947	22	52,409
Other milling machines	75	223,241	74	196,801
Gear-cutting machines	38	105,639	36	85,490
Vertical drilling machines	34	24,551	79	28,797
Radial drilling machines	10	27,129	6	22,539
Sensitive drilling machines	57	9,843	26	11,971
Other drilling machines	36	25,704	47	55,113
Shapers and slotters	41	47,620	28	48,612
Planers	3	10,188	..	.....
External cylindrical grinding machines	67	148,073	80	184,206
Internal grinding machines	31	51,379	148	117,304
Metal-working tool-sharpening machines	34	25,885	49	33,344
Total	680	$1,225,835	952	$1,535,322

Machinery Markets and News of the Works

JANUARY TRADE SPOTTY

Good Business Reported by Some While Others Were Disappointed

Railroad Buying in Chicago Appears More Promising—Santa Fe to Issue List of Its Requirements

SOME machine tool manufacturers report that sales in January were considerably ahead of those in December, but the improvement was not shared by all companies, and in a number of instances December volume was not equaled in January. In general the past month was not up to expectations.

Railroad buying of machine tools at Chicago promises to get under way soon. The Santa Fe is about to distribute lists of its 1928 requirements, which probably will be large. Railroad buying so far this year has not been important. In the East the only inquiry of size is that issued a few weeks ago by the Delaware, Lackawanna & Western for about 30 machines. Orders have not yet been placed.

Inquiry from the farm machinery industry is steady and sales to this class of manufacturers, which have been of help in building up volume in Chicago, are expected to continue for several months. Purchasing by automobile companies has not been large, but it is conspicuously better than in the late months of last year. A motor company in the Detroit district has ordered 17 17-in. lathes, raising to a total of 24 the lathes bought by this company in two weeks. Other orders for small lots of tools have come from the Detroit district.

New York

New York, Jan. 31.

BUSINESS continues good with a fair volume of new inquiry and purchasing of single tools. The Mergenthaler Linotype Co., Brooklyn, is still buying equipment. The General Electric Co., Schenectady, N. Y., has been purchasing against a short list of tools and is still to close on a lathe and a 12-ft. planer. The International Motor Co., Plainfield, N. J., is expected to be in the market soon.

Except for the Delaware, Lackawanna & Western Railroad list of about 30 machines, the demand from railroads is light. The New York Central has issued several inquiries for single tools, but is not expected to purchase for several weeks. The Central Railroad of New Jersey has closed on a 30-in. x 16-ft. lathe with the Niles Tool Works.

Recent purchases by industrial users of machine tools have included a 13-in. x 30-in. lathe, two 7-in. x 32-in. bench lathes and a Racine Shear Cut saw by a Chicago manufacturer; four 16 x 36-in., two 16 x 60-in. and one 20 x 48-in. lathes and a No. 2 jig boring machine by a Michigan automobile manufacturer; a 20-in. x 48-in. engine lathe and a No. 2 jig boring machine by a New York State manufacturer; a No. 2 jig boring machine by a company in Syracuse, N. Y.; rebuilt Pratt & Whitney 14-in. vertical surface grinder by a tool maker in Pennsylvania; used 7 x 32-in. Pratt & Whitney bench lathe by a company in New York City; No. 3 Pratt & Whitney die sinking machine by a Detroit manufacturer; No. 2 jig boring machine by a Vermont company; cold saw by a Massachusetts plant; No. 131 Ransom grinder by a New Jersey machinery dealer; 22-in. x 14-ft. Morris lathe by a Pittsburgh manufacturer and four-spindle, drum type milling machine by a Detroit motor company.

Anaconda Copper Mining Co., 25 Broadway, New York, has approved plans for a new electrolytic zinc plant at its properties at Anaconda, Mont., to cost in excess of $500,000.

Seal Lock Burial Vault Co., Forest Hills, L. I., has plans for a one-story plant, to cost approximately $45,000 with equipment. W. J. Boegel, 185 Madison Avenue, New York, is architect.

Harry Harvie, 15 Hillside Avenue, Rockville Centre, N. Y., architect, has completed plans for a one and two-story automobile service, repair and garage building at Rockville Centre, to cost about $200,000 with equipment.

New York Telephone Co., 140 West Street, New York, is arranging an expansion and improvement program to cost $6,444,465, including underground cable plant in Brooklyn; outside plant facilities at Nyack, N. Y., and vicinity; central stations, switchboard equipment, lines, etc., at various points on Long Island, and additional testing facilities in Manhattan.

International Power & Paper Co., operated by International Paper Co., 100 East Forty-second Street, New York, has purchased Newfoundland Power & Paper Co., St. George district, Newfoundland, including a hydroelectric generating plant with capacity of 98,000 hp., paper mill with output of 400 tons per day, and about 2800 square miles of timber and pulp lands on the north coast of Newfoundland. New owner contemplates expansion and improvements in paper mill properties.

Columbia Corrugated Co., 270 Eleventh Avenue, New York, manufacturer of corrugated boxes and containers, has purchased the former air reserve depot of Government at Long Island City, comprising six and a half acres with 12 buildings, on a bid of $963,750, and contemplates establishment of a main plant at that location. It is understood that new structures will be erected.

Avery Garage Corporation, 154 Amity Street, Flushing, L. I., has plans for a one-story service, repair and garage building, 100 x 225 ft., to cost approximately $100,000 with equipment. Daniel Campbell, Jr., address noted, is architect.

New York Dock Co., 44 Whitehall Street, New York, will soon take bids on general contract for a ten-story factory at Joralemon and Furman Streets, Brooklyn, to cost in excess of $400,000. Russell G. Cory, 30 Church Street, is architect and engineer.

American Power & Light Co., an interest of Electric Bond & Share Co., 2 Rector Street, New York, is arranging for an increase in both common and preferred stocks, a portion of proceeds to be used for purchase of Washington Water Power Co., Spokane, Wash., operating hydroelectric power plants and transmission lines in eastern Washington and northern Idaho. New owner plans increased generating capacity and transmission system.

Union Railway Co., 2396 Third Avenue, New York, has authorized plans for a two and one-half story automobile service, repair and garage building at White Plains, N. Y., for bus service, to cost more than $125,000 with equipment. E. H. Faile & Co., 441 Lexington Avenue, are architects.

American Car & Foundry Motors Co., 30 Church Street, New York, is said to be planning establishment of new factory branch at Atlanta, Ga., to be used largely for manufacture of double-decked buses operated in that city by Georgia Power Co.

E. R. Squibb & Sons, 80 Beekman Street, New York, manufacturers of chemicals, etc., have awarded a general contract to White Construction Co., 95 Madison Avenue,

The Crane Market

THERE has been but little new inquiry in the past week, either for electric overhead or locomotive cranes. Some sizable business, however, is still pending. The Public Service Production Co., Newark, N. J., is expected to close in a few days on two 120-ton and one 65-ton overhead cranes. E. L. Phillips & Co., 50 Church Street, New York, have revised inquiry for a 60-ton overhead crane and are now asking for prices on a 40-ton electric crane for the Long Island Lighting Co. There are a number of current inquiries for medium and large capacity locomotive cranes but prospective purchasers are slow to take action.

Among recent purchases are:

Dwight P. Robinson, Inc., New York, 40-ton, 4-motor overhead crane for Gulf States Steel Co., Alabama City, Ala., from Niles Crane Corporation.

Edison-Portland Cement Co., Phillipsburg, N. J., 10-ton crawl-tread locomotive crane from an unnamed builder.

Lockwood, Greene & Co., 1 Pershing Square, New York, 20-ton, 29-ft. 6-in. span, 1-motor overhead crane and 5-ton, 7-ft. 10-in hand power crane for Elizabeth City, Tenn., from Box Crane & Hoist Corporation.

Paramount Finishing Co., Brooklyn, N. Y., ½-ton electric hoist from Box Crane & Hoist Corporation.

Artistic Dyeing Co., Brooklyn, ½-ton electric hoist from Box Crane & Hoist Corporation.

Charles Mundt & Son, Jersey City, N. J., 5-ton electric Hoist from Box Crane & Hoist Corporation.

Spence Iron Foundry, Jersey City, N. J., 1-ton electric hoist from Box Crane & Hoist Corporation.

New England Public Service Co., Lewiston, Me., 35-ton overhead crane from the Whiting Corporation.

for a twelve-story factory and distributing plant, 98 x 164 ft., at 18-30 Columbia Heights, Brooklyn, to cost about $1,000,000 with equipment. Russell G. and Walter Cory, 30 Church Street, New York, are architects and engineers.

Passaic Iron Works, Inc., 119 Fourth Street, Passaic, N. J., has plans for a one-story addition, 40 x 74 ft., to cost close to $20,000 with equipment. Preiskel & Skvarla, Playhouse Building, are architects.

Armstrong Cork Co., Codwise Avenue, New Brunswick, N. J., is considering rebuilding portion of local plant destroyed by fire Jan. 21, with loss close to $50,000 with equipment. Headquarters are at Lancaster, Pa.

Ovens, power equipment, conveying and other machinery will be installed in the three-story addition of Forester Bakery, Inc., Bergenfield, N. J., to cost upward of $100,000. McCormick Co., 41 Park Row, New York, is architect and engineer.

Newark Brush & Scraper Co., 266 Fabyan Place, Newark, has leased a two-story factory forming part of plant of Jennings Silver Co., 390 Nye Avenue, and will remodel for a new plant. Present works will be removed to new location early in March and additional equipment provided. Company has abandoned plans for an addition to present factory.

Board of Education, New Milford, N. J., is considering installation of manual training equipment in new high school to cost $360,000, for which plans will be prepared by Ernest Sibley, Bluff Road, Palisade, N. J., architect.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has acquired 176 acres at West Orange, N. J., and contemplates construction of power substation and switching station on portion of site, remainder of land to be used for high tension transmission lines.

Lerner Brothers, 365 Market Street, Newark, manufacturers of handles, etc., have leased a three-story factory at 39-41 South Sixth Street for expansion and will remove to that location.

Knickerbocker, Cram & Co., Inc., 7 East Forty-second Street, New York, has been organized to succeed Knickerbocker Machine Tool Co., and will handle complete line of machine tools, many of which were formerly sold through discontinued machine tool department of Manning, Maxwell & Moore, Inc. Company's personnel will consist of former employees of that organization.

Panatone Corporation, New York, has been organized to manufacture new type of radio loud speaker and is under engineering management of Industrial Engineering & Finance Corporation, 5052 Grand Central Terminal, New York. Latter company will be in market for wire, magnets, wood-working materials and art cabinets.

Kastwell Foundry Co., Newark, has succeeded to business of Transfer Metal Casting Co., and will continue operation as general jobbing foundry.

Buffalo

BUFFALO, Jan. 30.

PLANS are maturing for a two-story vocational school for Board of Education, Genesee Building, Buffalo, to be known as Burgard Vocational School, to cost $1,000,000 with equipment, and for which bids on general contract will be asked by Ernest Crimi, address noted, architect for the board.

International Oxygen Co., 796 Frelinghuysen Avenue, Newark, N. J., manufacturer of compressed industrial gases, welding apparatus, etc., has begun construction of a new plant at Buffalo, to cost more than $75,000 with equipment. A preferred stock issue has been sold to provide in part for expansion.

Bids have been asked by J. A. Zurn Mfg. Co., Fourteenth and German Streets, Erie, Pa., manufacturer of plumbing equipment and supplies, gas burners, etc., for an addition, to cost close to $250,000 with machinery. Wilbur Watson & Associates, 1614 Prospect Avenue, Cleveland, are architects and engineers.

Niagara, Lockport & Ontario Power Co., Lafayette Building, Buffalo, will construct a steel tower transmission line at Salamanca, N. Y., and vicinity.

Board of Education, Kenmore, N. Y., plans installation of manual training equipment in a three-story addition to high school to cost $700,000, for which bids have been asked on general contract. F. J. and W. A. Kidd, 522-24 Franklin Street, Buffalo, are architects.

Chautauqua Heating Co., Inc., Salamanca, N. Y., recently formed with capital of $25,000 by Harold A. Watkins, Salamanca, and associates, is said to be planning a local factory for manufacture of radiators and other heating equipment.

Wire Wheel Corporation of America, Inc., 1700 Elmwood Avenue, Buffalo, is reported considering expansion in production, now averaging about 40,000 sets of wire wheels per month. Arrangements are being made for stock distribution to provide additional financing.

Syracuse K-U Corporation, 250 Walton Street, Syracuse, N. Y., has been organized to succeed Walker Kitchen Utilities Co. and will continue manufacture of dishwashing machinery and equipment and kitchen utensils. It is at present in market for small amount of equipment and is a buyer of sheet metal from time to time.

E. R. Caldwell & Son Co., Syracuse, N. Y., brass founder and manufacturer of brass castings, will be reorganized with view to wide production. Company went into voluntary bankruptcy last fall and settlement of 25c. on the dollar was accepted by creditors. Harold Coyne, superintendent of Reddin Iron Works, receiver, has been discharged.

Philadelphia

PHILADELPHIA, Jan. 30.

GENERAL contract has been let by Camden Rail & Harbor Terminal Corporation, Camden, N. J., to Cramp & Co., Denckla Building, Philadelphia, for a nine-story cold storage and ice-manufacturing plant, 105 x 285 ft., to cost more than $2,000,000 with equipment. Company was organized recently by Frederick Cohen, Merchantville, N. J., and J. A. Raulerson, 127 South Sixty-third Street, and has disposed of bond issue of $2,250,000, to provide for erection. Mr. Raulerson is president. Moores & Dunford, Inc., 110 East Forty-second Street, New York, is architect and engineer.

John Galbraith, 619 Commerce Street, Philadelphia, manufacturer of wooden and metal-reinforced boxes and containers, has awarded general contract to Schaeffer & Co., 1600 Arch Street, for a one-story addition, 36 x 120 ft., to cost close to $40,000 with equipment.

Norton Co., 3208 Market Street, Philadelphia, manufacturer of grinding wheels and other abrasives, with main plant at Worcester, Mass., has plans for a new local factory branch and distributing plant for which bids will soon be asked on general contract. Ballinger Co., 105 South Twelfth Street, is architect and engineer.

United Gas Improvement Co., Broad and Arch Streets, Philadelphia, is concluding purchase of traction system of

Wilmington Light & Power Co., Wilmington, Del., from American Electric Power Co., New York, latter taking over utility properties at Sioux City, Iowa, heretofore held by first noted company. Extensions and improvements will be carried out in Wilmington district, including power line construction. Properties will continue under directon of Stevens & Wood, Inc., 120 Broadway, New York, engineer, which is now preparing plans for a steam-operated electric generating station near Pennsville, N. J., for Wilmington and other utilities, to cost in excess of $7,000,000.

G. A. Drieling Co., Philadelphia, has been formed with a capital of $25,000 to take over and expand company of same name, with sheet metal works at 1914 North Fifth Street. New company will also manufacture iron and steel products, as well as machine equipment and devices.

Board of Trustees, Lafayette College, Easton, Pa., has engaged C. Z. Klauder, 1429 Walnut Street, Philadelphia, architect, to prepare plans for a new engineering building, with mechanical and testing equipment, to cost $500,000 with machinery.

Keystone Aluminum Die Casting Co., Philadelphia, has been organized by William H. Brown, 6370 Church Road, and Frank Brown, to operate a local plant for production of die-castings and kindred specialties, with capital of $50,000.

C. Edward Smith Hardware Co., 314 East Washington Street, New Castle, Pa., has plans for a three-story and basement storage and distributing plant to cost $55,000. W. J. Eckles Co., Lawrence Savings & Trust Building, is architect.

Harrisburg Gas Co., Harrisburg, Pa., is arranging for an increase in funded debt from $2,500,000 to $10,000,000, of which bonds in amount of $2,500,000 will be sold in near future, a portion of fund to be used for extensions and improvements. Initial work will comprise a budget of $350,000, for additional purification and auxiliary gas plant machinery, pipe lines, etc. L. S. Williams is president.

B. F. Shaw Co., Second and Lombard Streets, Wilmington, Del., manufacturer of pipe, steam fitters' supplies, etc., recently reorganized with W. Miller Shaw as president, has plans for expansion to cost close to $150,000 with equipment, including enlargement in pipe fabricating works.

Scranton Coal Co., Scranton, Pa., is considering rebuilding its equipment and mine supply storage and distributing plant at Dickson City, Pa., destroyed by fire Jan. 25, with loss estimated at $175,000.

L. B. Smith, White Hill, near Harrisburg, Pa., has secured six acres on Gettysburg Road, at terminus of car line, and will operate plant for rebuilding of motor trucks and motor buses.

Keystone Portland Cement Co., Bath, Pa., has work in progress on a new mill near city to cost more than $1,000,000, and will have initial unit ready for service in spring. John Buckland, Allentown, Pa., is president.

Chicago

Chicago, Jan. 30.

RAILROAD buying of machine tools promises to get under way as the Santa Fe starts distribution of inquiries for what appear to be its first large requirements for 1928. Quotations have been asked on a boiler flanging clamp, a 14-in. x 8-ft. tool-room lathe, 54-in. boring mill and a 36-in. x 16-ft. engine lathe. The Burlington is in the market for two double-end axle lathes.

Business in January was slightly better than in December, but well behind expectations of the trade. Fresh inquiry, however, lends hope to dealers that sales will be more brisk in February. Tool room equipment is active and punch presses have moved freely this week. Inquiry from farm implement manufacturers is steady and sales give promise of holding up for several months. Renewed activity is indicated by the Nash Motors Co., Kenosha, Wis.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a substation, 140 x 160 ft. to cost $200,000. H. W. Green Construction Co., 9 South Clinton Street, is contractor.

Standard Oil Co., 910 South Michigan Avenue, Chicago, will build a two-story garage, 75 x 118-ft. to cost $35,000.

Plans are being considered by Blake Specialty Co., Sixteenth Avenue and Mill Street, Rock Island, Ill., manufacturer of pipe bends, etc., for one-story addition, to cost more than $25,000 with equipment.

Streator Cold Storage Door Co., LaRue Street, Streator, Ill., contemplates one and two-story addition, to cost close to $40,000 with equipment, and will prepare plans in about 30 days.

Fisher Governor Co., 201 First Avenue, Marshalltown, Iowa, manufacturer of engine governors, etc., has awarded general contract to Lippert Brothers, Boone, Iowa, for two-story addition, 70 x 125 ft., to cost about $50,000 with equipment. H. E. Reimer, 129 East Main Street, is architect.

Rockford Drop Forge Co., Rockford, Ill., has awarded general contract to Linden & Sons, 1110 Tenth Street, for one-story sawtooth roof addition to cost $30,000.

Glacier County Light & Power Co., Cut Bank, Mont., Frank Seal, head, is planning construction of a new generating plant on Two Medicine River, near Cut Bank, with transmission lines for service in Glacier Park, Browning and vicinity, to cost in excess of $175,000.

Iowa Packing Co., Eighteenth and Maury Streets, Des Moines, Iowa, is considering erection of a boiler plant, to cost approximately $100,000 with equipment.

Great Lakes Forge Co., 1212-58 West 119th Street, Chicago, has filed plans for a one-story addition, 90 x 100 ft.

Peoples Gas Light & Coke Co., 122 South Michigan Boulevard, Chicago, is arranging for an increase in capital from $60,000,000 to $75,000,000, a portion of proceeds to be used for expansion and improvements. Company is closing negotiations for purchase of combination water-gas plant and coke oven of Chicago By-Products Coke Co., and will develop enlarged output.

Rapid Roller Co., 800 Austin Avenue, Chicago, has engaged Schmid & Ryan, 77 West Washington Street, architect, to prepare plans for a new factory to cost in excess of $50,000 with equipment.

Lehigh Briquetting Co., Lehigh, N. D., has begun superstructure for its fuel briquette plant. Work will include coal crushing unit, briquetting unit, storage building and bins, machine shop and power house, to cost in excess of $500,000 with equipment. Ralph W. Richardson, Zenith Building, St. Paul, Minn., is engineer.

Rockford Auto Co., Oxford Street, Rockford, Ill., has begun erection of five-story and basement service, repair and garage building, 65 x 156 ft., to cost $135,000 with equipment. F. A. Carpenter, Brown Building, is architect.

Swift & Co., Union Stock Yards, Chicago, meat packers, are said to be completing plans for a new cold storage and refrigerating plant at Altamont, Ill., to cost approximately $80,000 with equipment.

Federal Public Service Co., operating Yankton Light & Heating Co., Yankton, S. D., and other light and power properties, has arranged for bond issue of $1,200,000, a portion of fund to be used for extensions and improvements.

New England

Boston, Jan. 31.

MORE machine tools were sold in January than in December or November, although the market cannot be said to be even moderately active. Sales the past week were confined almost exclusively to used equipment and included a milling machine, No. 18 Bliss press, bench lathe, bench miller, two 14-in. lathes, three drill presses and miscellaneous other equipment to manufacturers in this vicinity, and one No. 20 Garvin and one No. 2 Brown & Sharpe vertical milling machines to Oakland, Cal., interests. More inquiries have been received by local dealers for one, two or three tools, both new and used. General opinion among Boston houses is that there is more active inquiry before the trade than at any period during the past five or six months, and the outlook for sales the next two months is bright.

General business is better in New England than a month ago, which adds to the optimism of the machine tool trade. Orders received by Massachusetts manufacturers in December equaled those of November, according to the Associated Industries of Massachusetts index, which was 93.7 for December. The first full year index showed a falling off of less than 1 per cent in orders for 1927. The index is compiled from reports from 250 companies representing a capitalization of more than $450,000,000 and having at least 125,000 employees. New England machine tool builders in general are busier than a month ago, despite a falling off in export orders.

Pneumatic Drop Hammer Co., Boston, recently installed a battery of pneumatic lift gravity drop hammers at a Newburyport, Mass., plant and has received orders for other hammers from Ohio, Indiana, Greenfield, Mass., Providence and Connecticut manufacturers. To care for increasing demand, company has added to its mechanical equipment.

Smith Co., Milford, Mass., automobile safety devices, is negotiating for purchase of a plant in Hartford, Conn., and expects to move into it about March 1. Company plans to manufacture other automobile accessories, all under newly incorporated name of Smithco Auto Safety Control Co., with capital of $100,000. Robert Smith is president.

Atlantic & Pacific Tea Co. has awarded general contract for a five-story, 105 x 273 ft., warehouse and bakery at Cranston, R. I., for which motors, handling equipment, etc., are required. H. L. Treeman, 1 Fitchburg Street, Somerville, Mass., is in charge.

General Electric Co., West Lynn, Mass., has purchased land on Boston Avenue., Bridgeport, Conn., on which it contemplates erection of a manufacturing plant.

Work has started on a power development for Springfield Railway Terminal Co., Springfield, Vt. Charles T. Main, Inc., 201 Devonshire Street, Boston, is engineer.

Charles H. Tenney Co., 200 Devonshire Street, Boston, engineer, is taking bids on a 35 x 50 ft. boiler plant addition to Brockton Gas Light Co., 54 Main Street, Brockton, Mass., to cost, with equipment, $130,000.

Watertown Builders' Supply Co., 418 Arsenal Street, Watertown, Mass., manufacturer of building materials, has plans under way for a three-story plant to cost close to $40,000 with equipment. H. F. Bryant, 334 Washington Street, Brookline, Mass., is architect.

E. H. Hotchkiss Co., Hoyt Street, Norwalk, Conn., manufacturer of snap fasteners and other metal specialties, is receiving bids for one-story addition, 50 x 132 ft., instead of two-story structure as originally intended, to cost upward of $40,000 with equipment. Ballinger Co., 105 South Twelfth Street, Philadelphia, is architect and engineer.

Richards & Co., Inc., 269 Ludlow Street, Stamford, Conn., manufacturer of lacquers, etc., has begun erection of additions, including two-story extractor and beater units, 30 x 60 ft. and 35 x 65 ft., respectively; boiler house, 80 x 110 ft., and other structures, to cost $85,000, for which general contract recently was let to J. W. Ferguson Co., Paterson, N. J.

New England Public Service Co., Worcester, Mass., has purchased plant and property of Franklin Light & Power Co., Franklin, N. H. Plans are under way for expansion, including transmission line construction. Company is also securing control, it is said, of Tilton Electric Co., Tilton, N. H., and will expand in that territory. Purchasing company is operated by Middle West Utilities Co., Chicago.

Southern New England Ice Co., 48 Edwards Street, Hartford, Conn., will erect one-story plant with capacity of 75 tons per day, to cost close to $100,000 with machinery.

Universal Car Co., North Attleboro, Mass., will soon begin construction of a one-story and basement service, repair and garage building, 65 x 100 ft. Machine shop and parts division will be installed.

Thames Sheet Metal Works, 14-18 Hamilton Street, New London, Conn., has been organized to operate metal fabricating plant. Principal products will be metal ovens, tanks, ducts, breechings, smoke stacks, ventilators, skylights and cornices. Company has plant in operation but will be in market for more equipment and materials.

Pittsburgh

PITTSBURGH, Jan. 30.

JANUARY has been a good month for a few machine tool dealers, but rather lean in point of sales for the majority. There has been good inquiry, but many seem to have been for getting prices on which to formulate requests for appropriations. In the past week distribution of about 10 tools for the Herron Hill High School by the Pittsburgh Board of Education has added to the business of a few firms.

In heavy machinery, inquiry continues better than actual business. Crane builders and makers of rolling mill equipment are very busy in their estimating departments. A seamless pipe mill projected for the McKeesport works, National Tube Co., will probably be installed either at Lorain, Ohio, or Gary, Ind. The hot-rolled strip mill for Sharon Steel Hoop Co., which is understood to be a 13-stand unit, is yet to be placed. A Pittsburgh builder has contract for the new wide strip mill for Wheeling Steel Corporation.

Barton E. Brooke and H. R. Dyer, Dollar Bank Building, Youngstown, Ohio, architects, are preparing plans for a three-story automobile service, repair and garage building at Sharon, Pa., to cost $150,000, for which bids will soon be asked.

Harry G. Blanck, 2716 Veteran Street, Northside, and George D. Gianakos, Monterey and North Avenues, Pittsburgh, have formed Gianakos-Blanck Co., to operate a local plant for manufacture of kitchen and confectioners' equipment, and kindred metal goods.

United States Engineers Office, Pittsburgh, will soon ask bids for turbine engines, pumping equipment and piping for gate structure at Lock No. 6, Allegheny River. Plans have been approved for a power house at this location, and operating machinery also for cover plates.

Borough Council, Springdale, Pa., is considering purchase of water-softening plant for the municipal waterworks, to cost $40,000. J. F. Pierce is borough manager.

Pennsylvania Power Co., Sharon, Pa., has applied for permission to construct a steel tower transmission line across Mahoning River, near Mahoningtown, Ohio. Stevens & Wood, Inc., 120 Broadway, New York, is engineer.

Arrangements are being made by American Window Glass Co., Farmers' Bank Building, Pittsburgh, for resumption of operations at its plant at Bellevernon, Pa., closed for several years. Remodeling is under way and improvements and replacements will be made in equipment.

Joint School Boards of Ebensburg and Cambria Township, Ebensburg, Pa., are considering installation of manual training equipment in a high school to cost $170,000. H. M. Rogers, Johnstown Trust Building, Johnstown, Pa., is associate architect.

South Atlantic States

BALTIMORE, Jan. 30.

PLANS are being completed by George A. Whiting, president Standard Wholesale Phosphate Co., and Standard Acid Works, Inc., Continental Building, Baltimore, and associates for new plant in Curtis Bay Section for production of muriatic acid, to cost in excess of $300,000 with machinery. Same interests operate Consumers Acid Works, Inc., Curtis Bay, now building plant in that district for manufacture of sulphuric acid. Peter S. Gilchrist, president, Chemical Construction Co., Charlotte, N. C., is consulting engineer for new works.

Board of Awards, office of City Register, City Hall, Baltimore, is asking bids until Feb. 8 for materials for repair shops for Department of Education. Joshua R. Jolly, is acting secretary, Board of School Commissioners.

Warwood Ring Co., 200 North Eleventh Street, Baltimore, manufacturer of piston rings, etc., affiliated with Warwood Tool Co., same address, is reported considering erection of a new plant, to cost upward of $75,000 with equipment.

Georgia Steel & Iron Co., Tallapoosa, Ga., is said to be completing plans for works for production of horse-shoes, plate steel specialties and iron products, to cost close to $100,000 with equipment. Local buildings will be remodeled.

Duke Power Co., Charlotte, N. C., is completing plans for a new power transmission line from Canton, N. C., to Greenville, S. C., and vicinity, connecting with a recently completed hydroelectric generating station on Pigeon River, N. C., to cost more than $150,000.

Carolina Rubber Co., Salisbury, N. C., recently merged with Ajax Rubber Co., Racine, Wis., has plans for enlargements to cost upward of $90,000 with equipment. C. H. Waggener has recently been elected vice-president and general manager.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Feb. 7 for one electric furnace for navy yard at Norfolk, Va., schedule 8413; also for trunnion roller bearings for Washington yard, schedule 8414; for 15,600 steel boiler tubes for Brooklyn Navy Yard, and 15,600 such tubes for Mare Island, schedule 8374, and for one bolt heading machine for Puget Sound yard, schedule 8388.

Crisp County Board of Commissioners, Cordele, Ga., has engaged J. E. Sirrine & Co., Greenville, S. C., and E. S. Killebrew, Albany, Ga., engineers, to prepare plans for a hydroelectric generating plant on Flint River, vicinity of Cordele, to cost $1,250,000 with equipment and transmission system. First noted will act as consulting engineer.

Hickory Wood Products Co., 507 East Third Street, Gastonia, N. C., is said to have leased additional property for new plant for production of tool handles and kindred turned wood products, to cost more than $20,000.

Board of Education, Durham, N. C., is considering installation of manual training equipment in an addition to junior high school to cost $200,000, for which superstructure will soon begin. Milburn, Heister & Co., First National Bank Building, are architects.

Savannah River Electric Co., Greenwood, S. C., has secured permission for a hydroelectric power development on Savannah River, near Clarks Hill, McCormick County, to cost upward of $10,000,000 with transmission system. O. G. Thurlow, Birmingham, is engineer.

P. C. Painter, city manager, Greensboro, N. C., is asking bids until Feb. 7 for ash-handling equipment at municipal pumping plant.

Alfred Carper, Buchanan, Va., is head of a project to establish plant for production of metal automobile license tags and will soon secure prices and information on equipment.

Central of Georgia Railway Co., Savannah, Ga., has plans for a one and three-story storage and distributing plant, 52 x 125 ft., and 40 x 125 ft., to cost $60,000. G. A. Belden is architect.

Virginia Public Service Co., Charlottesville, Va., is planning construction of a transmission line in Natural Bridge National Forest district, Bedford and Amherst Counties, to cost upward of $75,000.

Milwaukee

MILWAUKEE, Jan. 30.

MACHINE-TOOL manufacturers are entering February with perhaps the best prospects for new business that have been before them in several months. January business, while not of large proportions, was better in comparison with any of the preceding six months. An encouraging development was in inquiries, action upon many of which is expected by February or March, with the automotive industries in particular. Foundries and machine shops in this territory report improving demand and employment is gaining.

Rhinelander Paper Co., Rhinelander, Wis., manufacturer of news print and book paper, contemplates installation of an additional machine unit, a new finishing room and a new steam generating plant at an estimated cost of $175,000.

Chamber of Commerce, Clintonville, Wis., is sponsoring organization of a $125,000 corporation to take over plant and good will of the Topp-Stewart Tractor Co., local, and engage in manufacture of highway construction and maintenance equipment, conveyors, etc., also continuing production of tractors. A going company, identity of which is as yet not revealed, has agreed to move its operation to Clintonville as part of new organization. D. J. Rohrer, Harry E. Brooks, C. F. Folkman, Max Stieg and Fred Ruth, Clintonville manufacturers and business men, constitute executive committee.

Common Council, Hartford, Wis., William Radtke, clerk, closes bids Feb. 7 for direct-connected fan and steam engine to deliver 18,000 cu. ft. per min. of air; direct-connected steam driven 25 kw., 120 volts d.c., exciter, and rewinding two electric generator units.

Federal Asbestos & Cork Insulating Co., 931 Thirtieth Street, Milwaukee, has acquired several buildings of former Johns-Manville works at Forty-second and State Streets, and will rebuild entire area as an additional production unit at an estimated cost of $75,000. General contract has been let to the Appleton Construction Co., I.O.O.F. Building, Appleton, Wis.

Mertes Machinery Co., 246 Oregon Street, Milwaukee, manufacturer and distributer of contractors' equipment and machinery, has purchased former plant of Crucible Steel Casting Co., 612 Clinton Street, which it is remodeling for general manufacturing and storage.

Star Pointer Pump Mfg. Co., Menasha, Wis., has changed its corporate title to Twin Cities Plumbing Supply Co., and will devote most of its attention to manufacturing and distributing supplies and materials for plumbing and heating trades.

Indiana

INDIANAPOLIS, Jan. 30.

A ONE-STORY addition, 60 x 100 ft., will be erected to plant of Truck Engineering Co., East Pontiac Street, Fort Wayne, Ind., to cost close to $80,000 with equipment. Work will begin in spring. Guy Mahurin, Standard Building, is architect.

Acme Tool & Machine Co., 924 Fort Wayne Avenue, Indianapolis, has acquired property, 40 x 217 ft., as site for new plant to cost about $35,000.

Oakes-Swenson Co., Indianapolis, recently formed, will operate a metal stamping works at East Nineteenth and Sheldon Streets. Carl G. Swenson and Perry Oakes are heads.

Board of Trustees, Purdue University, Lafayette, Ind., has awarded general contract to A. E. Kemmer, Third and Brown Streets, for a three and four-story service building for mechanical and other work, to cost $75,000. Walter Scholer, Painters' & Decorators' Building, is architect.

Board of Education, Brazil, Ind., plans installation of manual training equipment in a two-story addition to junior high school, to cost $125,000. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects. Charles P. Keller is superintendent of schools.

W. A. Folger, Fort Wayne, Ind., has plans for a one-story machine and repair shop to cost about $25,000. G. Mahwin, 425 Standard Street, is architect.

J. R. Gratham Motor Sales Co., 541 Washington Street, Gary, Ind., is completing plans for a three-story and basement service, repair and garage building, 75 x 110 ft., to cost $100,000 with equipment. Joseph H. Wildermuth, 583 Broadway, is architect.

Empire Box Co., 518 West Monroe Street, Chicago, manufacturer of paper boxes and containers, has superstructure in progress on a new plant at South Bend, Ind., to cost upward of $150,000 with machinery. W. M. Elwood, Christman Building, South Bend, is architect.

Vulcan Plow Co., Evansville, Ind., has purchased interests of Earl L. Yocum and Fred H. Hand in Hayes Pump & Planter Co., Galva, Ill., acquiring controlling interest in the Hayes company. Acquired plant will be continued in operation and production increased.

Cincinnati

CINCINNATI, Jan. 30.

WITH several notable exceptions, machine tool companies report that sales in January have been light and have not come up to volume attained in December. Inquiries before the trade, however, give promise of better business during February, and builders are of the opinion that buying will increase steadily in the next 60 days.

Purchases by automobile companies continue to hold the center of attention. A maker in the Detroit district has ordered 17 17-in. lathes, this transaction raising to a total of 24 the number of machines contracted for by this company in the last two weeks. Two other Detroit manufacturers have added new machine tool equipment, including drilling machines. From Sweden has come to a local builder an order for four special lathes. Railroads are a negligible factor in the market at the moment, while sales to companies in the general industrial field have been only fair in volume. The Central Railroad of New Jersey has closed for a 30-in. x 16-ft. heavy engine lathe.

Plans are being considered by Wilmington Ice Co., Wilmington, Ohio, for rebuilding plant recently damaged by fire, with loss of more than $25,000 including equipment.

Gummed Products Co., Troy, Ohio, manufacturer of paper goods, has awarded a general contract to A. E. Brown & Son, Troy, for a one-story addition, to cost about $35,000 with equipment.

Harris-Thomas Drop Forge Co., 126 Harshman Street, Dayton, Ohio, has let general contract to Danis-Hunt Co., Dayton, for a one-story addition, to cost approximately $25,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is taking bids until Feb. 10 for quantity of tools, including micrometer calipers, hacksaw frames, expansion reamers, welding torch, dies, files, etc., circular 206; until Feb. 21 for one bomb trailer, circular 209.

American Glanzstoff Corporation, 180 Madison Avenue, New York, will build a two-story steam-operated power plant, 66 x 112 ft., and 33 x 112 ft., and one-story machine shop, at its new rayon mill at Elizabethton, Tenn.; entire project to cost in excess of $1,500,000. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers.

De Soto Paint & Varnish Mfg. Co., Memphis, Tenn., formerly De Soto Paint Mfg. Co., recently reorganized with increase in capital to $1,000,000, is arranging for expansion, including establishment of department for manufacture of lacquers. W. G. Saunders is president.

United Public Service Corporation, Chicago, has purchased Kentucky Power Co., Maysville, Ky., and affiliated interests operating in northern Kentucky, for about $6,000,000. New owner plans extensions and improvements, including transmission line construction.

Board of Trustees, Ohio State University, Columbus, is asking bids until Feb. 9, for construction of addition to power plant and completion of new chemistry building, to cost $300,000. Joseph M. Bradford, Brown Hall, Campus, is architect; William C. McCracken, Department of Public Works, State House, is engineer.

E. L. Bruce Lumber Co., Thomas Avenue, Memphis, Tenn., manufacturer of hardwood flooring, etc., has plans for a one-story mill addition, 100 x 100 ft., to cost close to $40,000 with machinery.

Newman Mfg. Co., 418 Elm Street, Cincinnati, manufacturer of ornamental bronze and other metal products, has acquired former plant of Safe Cabinet Co., Norwood, with main unit, two stories, 100 x 600 ft., and four side wings, and will remodel for early occupancy. Present business will be removed to new location.

International Aircraft Corporation, Cincinnati, has been organized under Ohio laws to acquire assets and business of International Aircraft Corporation, Long Beach, Cal., latter company having been engaged in aircraft manufacture since 1909. New company has leased plant of Industrial Nitrate Co. at Ancor, Ohio, for establishment of works.

Nash Gas & Diesel Engine Co., 913 East Third Street, Dayton, Ohio, has been formed to manufacture gas and oil engines. It has secured local plant and also has arranged to do work by contract.

Gulf States

Birmingham, Jan. 30.

CONTRACT has been let to Mackle-Shepherd Co., 615 South Twenty-seventh Street, Birmingham, for one-story factory branch and distributing plant, 60 x 220 ft., in Smith Park section for Bates Valve Bag Co., 8200 South Chicago Avenue, Chicago, manufacturer of bag-filling machinery, to cost about $35,000.

Plans have been completed by Weslaco Machine Works, Weslaco, Tex., for establishment of a plant, and equipment will soon be installed in existing building. L. L. Crosby is president.

Montgomery, Ward & Co., Chicago Avenue, Chicago, operating a mail order business, has filed plans for an eight-story factory branch and distributing plant at Fort Worth, Tex., 220 x 360 ft., to cost $1,250,000 with equipment.

Sun Oil Co., Houston, Tex., is completing plans for development of sulphur properties in vicinity of Richmond, Tex., where more than 300 acres has been secured. Initial plant will cost in excess of $1,000,000 with machinery. A housing development for employees is being arranged. Benjamin Andrews will be chief engineer, in charge.

Travis Cottonseed Products Co., 303 East Fifth Street, Austin, Tex., has acquired 10 acres in vicinity of Corpus Christi, Tex., as site for a new cottonseed oil mill, to cost more than $60,000 with equipment.

Fire, Jan. 26, destroyed wagon works at State Penitentiary, Huntsville, Tex., with loss close to $25,000 with equipment. Prison Commission, Col. H. Walker Sales, head, plans to rebuild.

Houston Lighting & Power Co., Houston, Tex., is planning erection of a new power substation to cost close to $200,000 with equipment.

Valley Electric & Ice Co., San Benito, Tex., is completing plans for a new cold storage and refrigerating plant, on 10-acre tract, at Raymondsville, Tex., recently acquired, to cost close to $100,000 with machinery.

Chamber of Commerce, Clarksdale, Miss., is head of project to establish a plant for manufacture of face brick to cost more than $40,000.

M. L. Hampton & Associates, Congress Building, Miami, Fla., architects, have filed plans for a two-story municipal automobile service, repair and garage building, 185 x 245 ft., to cost close to $100,000 with equipment.

Findlater Hardware Co., Chadbourne Street, San Angelo, Tex., has plans for a new storage and distributing plant, 76 x 180 ft., to cost approximately $50,000 with equipment. A. F. Korn and B. M. Morgan, Thomas Building, Dallas, Tex., are associated architects.

Lone Star Gas Co., 1915 Wood Street, Dallas, Tex., has awarded general contract to Austin Co., Linz Building, for a new storage and distributing plant, with meter shop, automobile service and garage department, to cost about $75.000 with equipment.

Crawford Auto Shop, Inc., 2227 First Avenue, Birmingham, has plans for a two-story service, repair and garage building, 140 x 150 ft., to cost approximately $100,000 with equipment. William L. Welton, American Trust Building, is architect.

Rapid Battery Mfg. Co., 1401 James Street, Waco, Tex., will proceed with erection of two-story plant, 70 x 112 ft., to cost about $18,000 with equipment.

Hidalgo Utilities Co., Hidalgo, Tex., has secured a franchise and plans installation of an electric light and power house, and ice-manufacturing plant. A. Y. Baker, Edinburg, Tex., is president.

Galvanizing & Plating Co. of Texas, 3205 Engelke Street, Houston, Tex., has begun operation of its plant for hot dip galvanizing of sheets, plates and structural materials. It is equipped to do commercial galvanizing in any quantity.

Climax Engineering Co., Clinton, Iowa, has appointed Equitable Equipment Co., 410 Camp Street, New Orleans, its sales and service representative in lower Louisiana and Mississippi.

Cleveland

Cleveland, Jan. 30.

SALES fell off the past week, dealers reporting very few orders and not much new inquiry. However, reports from some manufacturers are more encouraging. A local manufacturer of turret lathes continues to take a good volume of business in orders for one or two machines and states that January sales will be the largest of any month in two years. This is partly due to business brought out by the recent price advance, although many orders have been at the new prices. Reports from Detroit indicate a moderate amount of orders for single machines or small lots from the automotive industry.

Virden Co., division of Gill-Virden Co., Philadelphia, formed about a year ago by merger of Virden Co. and Gill Brass Co., is moving from Cleveland to a new plant just completed in Philadelphia. Company manufactures lighting fixtures.

Variety Machine & Stamping Co., 3406 Tate Avenue, Cleveland, is enlarging its plant by erection of an addition, 36 x 60 ft.

Plans are being completed by Steel Improvement & Forge Co., 5003 Windsor Avenue, Cleveland, for new works for drop forge production, to cost close to $100,000. It is understood that standard type units will be used and that no architect will be employed.

Ohio Valley Gas Corporation, Zanesville, Ohio, recently formed to take over and operate natural gas properties in southern Ohio and West Virginia, furnishing service to Hope Natural Gas Co., Zane Gas Co., Zanesville, and other interests, has arranged for bond issue of $1,800,000, portion of proceeds to be used for extensions and improvements, including pipe line construction.

Serugee Rubber Co., Akron, Ohio, John Hatfield, president, recently organized, is completing plans for a new factory at Atwater, Ohio, for manufacture of general rubber specialties, to cost more than $50,000 with machinery.

Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, has filed plans for a four-story and basement power substation, 55 x 125 ft., to cost approximately $100,000 with equipment.

General Tire & Rubber Co., Akron, Ohio, is disposing of a preferred stock issue of $3,500,000, a portion of fund to be used for expansion.

Ice & Fuel Co., Youngstown, Ohio, Paul Hunt, president, is completing plans for a new electrically-operated ice-manufacturing plant, to cost about $120,000 with machinery.

Henn Motor Sales Co., 1290 West 117th Street, Lakewood, Ohio, has awarded a general contract to Austin Co., Cleveland, for a one-story service, repair and garage building, 70 x 185 ft., to cost close to $100,000 with equipment.

Arcade Garage Co., Akron, Ohio, has plans for a four-story service, repair and garage building, 132 x 135 ft., to cost approximately $250,000. Starrett & Van Vleck, 8 West Fortieth Street, New York, are architects.

St. Louis

St. Louis, Jan. 30.

BIDS will be asked at once by Curtiss-Robertson Aircraft Corporation, Bridgeton, Mo., for one-story plant on local site, for manufacture of commercial airplanes and parts, to cost $100,000 with equipment. Company is affiliated with Curtiss Aeroplane & Motor Co., Buffalo, N. Y., and Robertson Aircraft Corporation, Bridgeton. McDonald & Condie, 502 North Taylor Street, St. Louis, are architects.

Ramsey Accessories Mfg. Co., 4375 Duncan Avenue, St. Louis, manufacturer of automobile equipment, has awarded general contract to Atlas Construction Co., International Life Building, for one-story top addition to present factory, 40 x 180 ft., to cost about $25,000 with equipment.

Shampaine Aseptic Furniture Co., St. Louis, operated by A. S. Aloe Co., 1819 Olive Street, has leased portion of building at 1222 Chouteau Avenue, and will establish new plant for manufacture of metal beds and metal furniture.

John F. Brewer, Mountain View, Ark., plans extensions and improvements in local steam-operated electric power house, to include installation of engine, generator and accessory equipment.

Board of Education, Kansas City, Mo., is considering construction of central power station and heating plant to cost close to $100,000 with equipment.

Board of Public Service, St. Louis, is asking bids on general contract until Feb. 14 for one cast iron surge tank, contract 2985; for zeolite water softener, contract 2986; and for one deaerating feed-water heater, vent condenser and auxiliaries, contract 2987. O. D. Tillay is secretary.

Common Council, Kennett, Mo., is considering installation of municipal electric light and power plant, to cost $25,000 with equipment.

Arkansas Cold Storage Co., Little Rock, Ark., is arranging for erection of three-story addition to ice and refrigerating plant, to cost $90,000 with equipment.

Board of Education, Dodge City, Kan., is planning installation of manual training equipment in new three-story and basement high school to cost $250,000, for which bids have been taken on general contract. Mann & Co., Rorabaugh-Wiley Building, Hutchinson, Kan., are architects.

Wilson Power & Light Co., Wilson, Ark., is disposing of bond issue of $250,000, a portion of fund to be used for expansion and improvements, including transmission line construction.

L. J. Kent Boiler & Sheet Iron Works, Springfield, Mo., will build a new one-story plant, 75 x 150 ft., to cost about $40,000 with equipment.

D. M. S. Motor Repair Co., 2615 Warwick Boulevard, Kansas City, Mo., recently organized with capital of $100,000, plans operation of a one-story machine repair and parts works.

Public Service Co. of Oklahoma, Boston Street, Tulsa, contemplates extensions and improvements in ice-manufacturing plant at Grove, Okla., recently acquired, including installation of additional equipment. Transmission line will be built from Afton to Grove.

A. P. Green Fire Brick Co., Mexico, Mo., has begun enlargements in plant to increase capacity about 30,000 fire brick daily, to cost upward of $200,000 with equipment.

Detroit

DETROIT, Jan. 30.

PLANS are being completed by Superior Foundry Corporation, Grand Rapids, Mich., for a one and two-story foundry, 75 x 175 ft., to cost close to $100,000 with equipment. Wernette & McCarthy, Houseman Building, are architects.

City Commission, Grand Rapids, Mich., plans installation of pumping and power equipment, boiler plant, etc., in connection with a sewage disposal plant. Entire project will cost $1,500,000. Financing will soon be arranged.

Douglas & Lomason, 5836 Lincoln Avenue, Detroit, manufacturer of hardware products for automobile bodies, contemplates purchases of forgings and castings, brass, aluminum, sheet steel and other raw materials during next few months.

Jackson Steel Products Co., division of General Motors Corporation, Jackson, Mich., will occupy former local plant of Kelsey-Hayes Wheel Corporation, recently acquired, for production of steel stampings.

Johnson Motor Sales Co., 711 North Saginaw Street, Flint, Mich., has plans for a two-story and basement service, repair and garage building, 70 x 125 ft., and will soon take bids on general contract. MacKenzie & Pratt, Genesee County Savings Bank, are architects.

Oakland Motor Car Co., Oakland Avenue, Pontiac, Mich., is completing plans for a four-story and basement addition, 130 x 200 ft., to cost close to $200,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

Following erection of initial building for its new plant now in progress, Michigan Fertilizer Co., Lansing, Mich., will build a second unit, one story, 27 x 85 ft. Another structure for production of acid is also under advisement.

City Council, Ann Arbor, Mich., is planning a municipal airport, including machine and repair shops, hangars, storage and distributing buildings and other structures, to cost in excess of $100,000. G. H. Sandeberg, City Hall, is city engineer.

Board of Education, Pontiac, Mich., is planning construction of a new two-story and basement industrial arts school, with central steam power plant adjoining, to cost in excess of $325,000 with equipment.

Peter Smith Heater & Mfg. Co., 6209 Hamilton Street, Detroit, recently formed to succeed Peter Smith Heater Co., plans erection of a one-story addition early in the spring, adjoining present plant at Fordson, designed for heater division, which will be removed from present works at 1230 Wilbor Street, following completion. Company is arranging to expand operations and will operate division for manufacture of pressed steel parts. Heater division will be devoted to production for steam railroads and electric cars. Zeno C. Wilkinson, formerly connected with Youngstown Pressed Steel Co., Youngstown, has recently become vice-president and director.

Quartermaster Department, Washington, plans a one-story mechanical and repair shop at Selfridge Field, Mich., and new equipment storage and distributing plant, to cost $85,000. It is understood that bids will be asked late in spring.

Canada

TORONTO, Jan. 30.

WHILE large lists are absent from the machine tool market, a steady flow of orders is being received by builders and dealers for one, two and three tools. Industrial companies in all parts of the Dominion are extending their operations and many have plant additions under way or contemplated. Some improvement is noted in sales to the automotive industry, particularly garages and repair plants. While some large orders have recently been closed from mining interests in northern Ontario and Quebec, it is understood that inquiries in dealers' hands indicate a continued strong buying movement from this source.

Horton Steel Works, Ltd., Bridgeburg, Ont., has plans for an addition, 98 x 305 ft., of reinforced concrete to cost $50,000. New equipment will be purchased. Company manufactures ore bins, boiler breechings, tanks, etc.

Machine shop at Beaverton, Ont., owned by Smith Brothers, was destroyed by fire Jan. 24, with loss to building and equipment estimated at $10,000.

Standard Steel Construction Co., 55 Main Street East, Welland, Ont., will build an addition, one and one-half stories, 30 x 50 ft.

American Cyanamid Co., Stanley Street, Niagara Falls, Ont., has started foundation work on a $200,000 addition, to include a melting plant, 60 x 125 ft., and cooling plant, 60 x 82 ft. Standard Steel Construction Co., Welland, Ont., has contract for structural steel.

J. N. Coupal, Plantagenet Springs, Ont., will start work in spring on installation of a power development plant on Nation River to cost $30,000.

Western Canada

Application has been made by Calgary Power Co., Calgary, Alta., to develop two more power sites on Bow River, between its present Horseshoe Falls plant and Calgary. G. A. Gaherty is managing director.

Northern Light & Power Co., Estevan, Sask., is contemplating power development to cost $5,000,000. Plans call for erection of a station near Estevan where power can be developed from lignite coal.

Pacific Coast

SAN FRANCISCO, Jan. 25.

PERMISSION has been granted Sacramento Pulp & Paper Co., Sacramento, Cal., H. D. Wagnon, 1038 East Tenth Street, North, Portland, president, to issue securities in amount of $500,000, proceeds to be used for new pulp and paper mill in vicinity of Sacramento.

Southern California Edison Co., Los Angeles, is planning extensions and improvements in plant and system at Tulare and vicinity, to cost $325,000. Similar work will be carried out in Santa Barbara territory, to cost about $250,000.

Pacific Fruit Express Co., 65 Market Street, San Francisco, has awarded general contract to Lynch-Cannon Co., Chapman Building, Los Angeles, for one-story ice-manufacturing plant at Fresno, Cal., to cost upward of $500,000 with machinery. Company has taken option on about 200 acres at Tucson, Ariz., as site for ice-manufacturing and cold storage plant, to cost more than $650,000 with equipment. Engineering department is in charge.

Water and Power Commission, 207 South Broadway, Los Angeles, is asking bids until Feb. 28 for electric generators, exciter generator, transformers and auxiliary electric equipment, and hydraulic machinery for municipal power department. James P. Vroman, secretary.

Illinois-Pacific Glass Co., Fifteenth and Folsom Streets, San Francisco, is completing plans for new works at Vernon, near Los Angeles, where 8-acre tract is available, to cost $700,000 with machinery. It is expected to begin work in about 60 days.

Pacific Can Co., 290 Division Street, San Francisco, has begun grading for a new one-story plant, for which superstructure will soon begin, to cost $400,000 with machinery. L. H. Nishkian, Monadnock Building, is engineer and manager of construction.

Great Western Power Co., 530 Bush Street, San Francisco, has acquired about 35 acres near city as site for a steam-operated electric generating plant, with initial capacity of 35,000 kw., to cost upward of $750,000. It will be equipped to use oil fuel. McClellan & Junkersfeld, Inc., 60 Trinity Place, New York, is engineer.

City Council, Sand Point, Idaho, is considering installation of a municipal hydroelectric generating plant on Priest River, where site has been secured, to cost $175,000. H. A. Sewell, Interstate Engineering & Construction Co., Newport, Wash., has submitted estimates of cost.

Southern Pacific Railroad, Eugene, Ore., has awarded contract to H. E. Wilder, Eugene, for a one-story machine shop, 200 x 200 ft., at its local engine terminal, to cost $250,000 with machinery. Two craneways will be built. E. L. King, Pacific Building, Portland, is division superintendent.

Bunting Iron Works, Inc., 820 Parker Street, Berkeley, Cal., is considering erection of a one-story plant, to cost more than $70,000 with equipment.

Faegol Motors Co., Oakland, Cal., manufacturer of automobiles, is arranging for a note issue of $600,000, a portion of proceeds to be used for expansion and financing.

Idaho Power Co., Boise, Idaho, is reported planning construction of a hydroelectric generating station on Snake River, near American Falls, Idaho, to cost $1,700,000 including transmission lines.

Ornamental Iron Works, 900 Republican Street, Seattle, will erect a new one-story building, 64 x 100 ft.

Everett Marine Ways, Everett, Wash., has under construction a machine shop adjoining its welding department. Harold J. Durham is president and manager of company.

Iron Fireman Mfg. Co., Portland, Ore., will soon begin construction of an addition to its plant on East Seventeenth Street.

Foreign

PLANS are being considered by National Argentine Oilfields, Enrique Mosconi, director-general, a department of Government of Argentina, Buenos Aires, for additions and improvements in its oil refinery at La Plata, to include installation of new machinery for cracking and other operations, to cost $900,000. Plant has present capacity for handling 2000 tons crude oil per day.

Synthetic Ammonia & Nitrates, Ltd., Bellingham-on-Tyne, near Newcastle-on-Tyne, England, branch of Imperial Chemical Co., Ltd., London, has plans for two new units with capacity of 50,000 tons of nitrogen per year, to cost more than $5,000,000 with machinery. Expansion is scheduled for completion early in 1930.

Municipal Council, Bydgoszoz, Pomerania, Prussia, Germany, has negotiated a loan of 3,000,000 francs (about $600,000) for extensions and improvements in its power facilities. A new plant will be built, to be equipped with two turbo-generator units of 3500 and 3000-kw. capacity respectively, and scheduled for completion by end of year. Present station will be used for reserve.

Pan-American Petroleum & Transport Co., 120 Broadway, New York, is considering construction of a new oil refinery in Venezuela, with initial capacity of about 75,000 bbl. per day, supplementing an existing refinery of Lago Oil & Transport Co., a subsidiary, near Maracaibo. Thomas Cook is general manager of manufacturing and refining.

City Administration, Riga, Latvia, has authorized plans for a new municipal electric power house and estimates of cost will soon be made. American Consulate, Riga, McCeney Welich, vice-consul, has information regarding project.

A company has been formed to take over Halda Aktb., manufacturer of Halda typewriters, with main factory at Svangsta, Sweden, with capital not less than 200,000 crowns, nor more than 600,000 crowns ($54,000 and $162,000). Plant has been closed for some time and new company contemplates early resumption of manufacture, with installation of additional equipment. American Consulate, Stockholm, Sweden, is understood to have information regarding project.

A sugar manufacturing company at London, England, has acquired property in Chichester district as site for a beet sugar refinery to cost about £400,000 (about $2,000,000). Information at Bureau of Foreign and Domestic Commerce, Washington, reference England, 35-X; also at American Consulate, London, William L. Cooper, commercial attaché.

NEW TRADE PUBLICATIONS

Preheaters.—Gradon Mfg. Co., East Tioga and Memphis Streets, Philadelphia. Folder 710 of 4 pages is devoted to preheaters in the construction of which considerable welding work is done. Standard dimensions and list prices are given for 27 sizes. The units are made both horizontal and vertical.

Ash Gates and Accessories.—Atlas Conveyor Co., 20 South Fifteenth Street, Philadelphia. Bulletin of 8 pages illustrating and describing ash gates of various types for use with furnaces fired by stokers, or otherwise. One type features ashes from pulverized fuel. An ash quencher is described, also.

Combustion Control.—Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia. Pamphlet of 8 pages reprinting an article from *Combustion*. It deals with fuel control by means of meters of the recording type.

Magnetic Brakes.—Cutler-Hammer Mfg. Co., Milwaukee. Bulletin P-38 of 20 pages. Illustrated description of magnetic brakes, with dimension and clearance drawings, together with specifications of various types suited for a wide variety of purposes. Illustrations are largely of installations, one showing a brake on a blooming mill manipulator finger, at the Inland Steel Co.

Steam Generation.—Combustion Engineering Corporation, 200 Madison Avenue, New York. An 8-page paper by Martin Frisch, dealing with aims and tendencies in steam generation and combustion engineering. Illustrations include cross sections of large generating units, diagrams of performance and illustrations of special equipment to improve performance. Higher steam pressures, higher boiler capacities and higher combustion rates are mentioned as present trends.

Cutter Grinder.—George Gorton Machine Co., Racine, Wis. Form 1090 of 4 pages illustrates and describes a cutter grinder, especially suited to the grinding of small mills, drills and engraving machine cutters. It is operated by a fractional horsepower motor, running at 5000 r.p.m. for the ⅛ hp. or 3400 r.p.m. for the ⅙ hp.

Belting.—F. Raniville Co., Grand Rapids, Mich. Belting manual, 3½ by 5½ in., 48 pages. In addition to price information and data relating to the belting, mechanical leather specialties and other products of the company, pages are devoted to practical suggestions for flat belt users. Other pages list mechanical rules, hp. transmitted, types of belt drives, etc.

Turret Lathe Tooling.—Jones & Lamson Machine Co., Springfield, Vt. Attractive booklet illustrating standard turret lathe tooling on chuck work.

Small Tools.—Gairing Tool Co., Detroit. Booklet 8½ by 11 in., 16 pages, describing and illustrating multiple-operation cutters, spot facers, counter-bores, core drills, etc., as well as the company's fixtures for grinding and salvaging counterbores and core drills.

Woodworking Machinery.—Oliver Machinery Co., Grand Rapids, Mich. Catalog No. 24, 8½ by 11 in., 31 pages, describing the company's Junior line of portable woodworking machinery. The line includes tilting arbor saw benches, band sawing machines, jointers, hollow chisel mortisers, and sanders. Electric glue pots and heaters, babbitt pots, tool grinders and vises are among several other items described.

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THE IRON AGE

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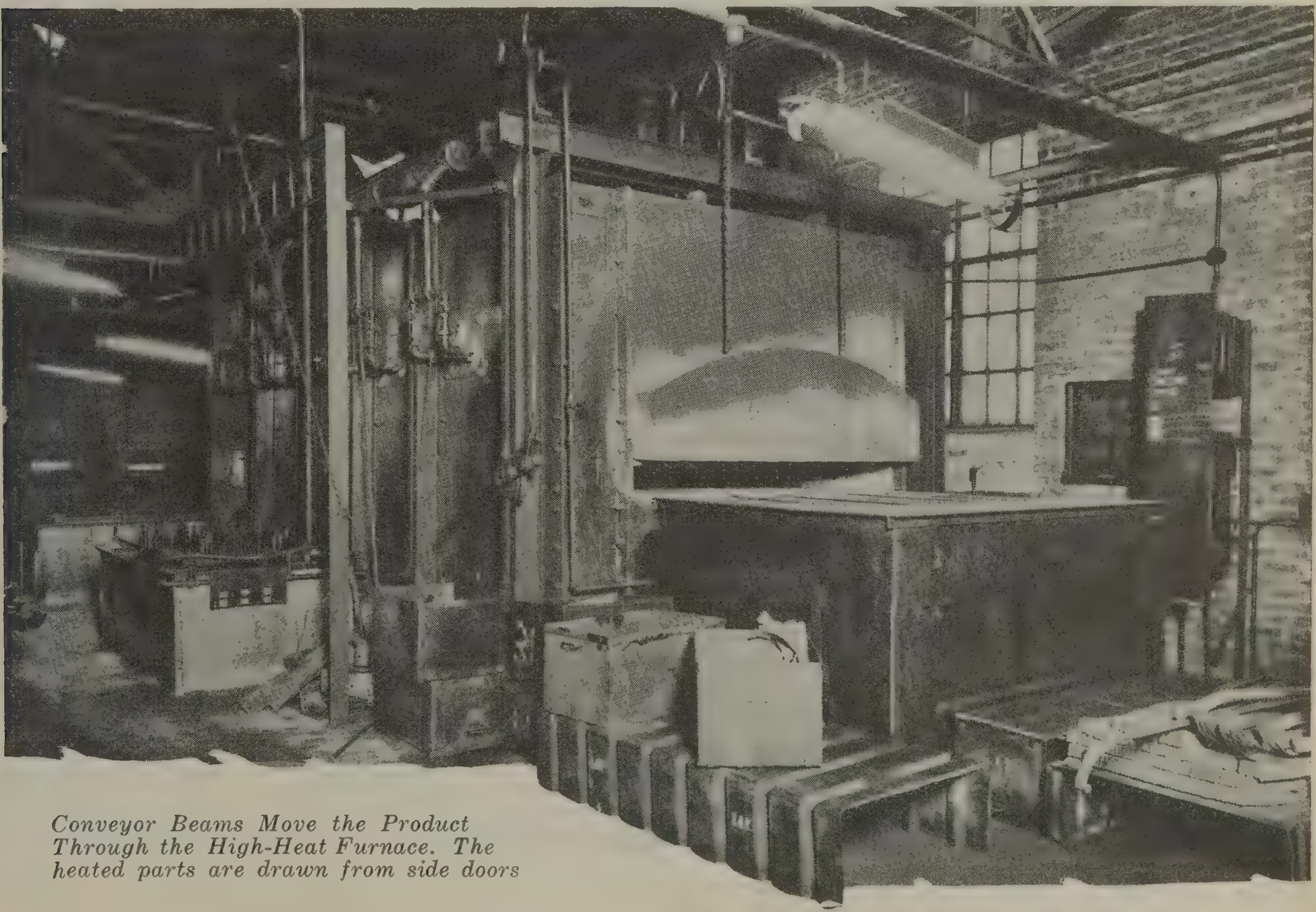
Heat Treating Three Thousand Automobile Bumpers Daily

Furnaces Fired by City Gas Mixed With Air in Central Reservoir—Special Equipment Prevents Distortion in Quenching—Close Control of Temperature a Feature of Chicago Plant

BY ROGERS A. FISKE*

ACCURATE control of furnace temperatures for hardening and close attention to the rate of heating and the time for soaking have successfully brought about marked uniformity in the heat treating of 3000 automobile bumpers a day at the plant of the Stewart-Warner Speedometer Corporation, Chicago. The equipment includes two special conveyor-type, gas-fired furnaces, one for hardening and one for drawing. In the former, temperatures are automatically controlled within limits of 10 deg. Fahr. A conveyor system sets the pace for the progress of the material, and the character of the equipment is such that a high degree of skill is not required of the furnace operators.

Simplicity of the layout is an impressive feature. The furnaces are parallel to each other so that parts that have been heated in the hardening furnace and then quenched are transported across an aisle to the



Conveyor Beams Move the Product Through the High-Heat Furnace. The heated parts are drawn from side doors entering end of the drawing furnace. The operators have ample floor space on which to perform their duties, and the aisles are wide enough to facilitate repairs to the furnaces. The flow of the product is uniform, so that it has not been necessary to provide storage on the floor of the department for parts undergoing heat treatment. The conveyor in the drawing furnace, which is of the chain grate type, extends beyond the discharge gate. As each bumper part comes into view, it is removed by hand and placed with a minimum of motion on a conveyor that delivers it to the grinding and plating departments.

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*Western Editor THE IRON AGE, Chicago.

Fuel and Air Mixed in Central Plant

City gas of 530 B.t.u. per cubic foot is used for practically all of the heat-treating operations. To assure a non-oxidizing flame, the gas is mixed with air in a central plant. The proportions are one part of gas to one and one-half parts of air. Furnace operators therefore require little or no knowledge of the principles of combustion, inasmuch as the amount of air content necessary to support combustion is regulated for them. In the gas-mixing department are several compressors, which raise the air-gas mixture to a pressure of 25 oz. per square inch for distribution throughout the plant.

Shears used for cutting stock to the proper length, together with heating furnaces and presses, are located in a room adjacent to the heat-treating department. After being pressed into form, bumper bars, springs, bracket parts and bumperettes are delivered to the operator in charge of feeding the hardening furnace. The conveyor on this furnace projects beyond the feed door, so that the operator works under favorable conditions insofar as radiant heat from the furnace is concerned.

The high-heat or hardening unit is of the conveyor-beam type, i.e., the bar stock is fed into and through the furnace by means of four beams operating through slots in the hearth of the furnace. The principal feature of the conveyor beams is that they are tile-covered; hence no metal projects into the furnace or is subjected to heat.

The motion of the beams is obtained through a cam and crank mechanism, the cams raising and lowering the beams and the transverse motion being obtained through the crank action. The mechanism is so designed that there is no forward or backward travel of the beams during the raising or lowering period. This insures a true rectilinear motion and prevents the material from dragging on the hearth of the furnace, which would tend to wear out the hearth or distort the plates carried on the beams.

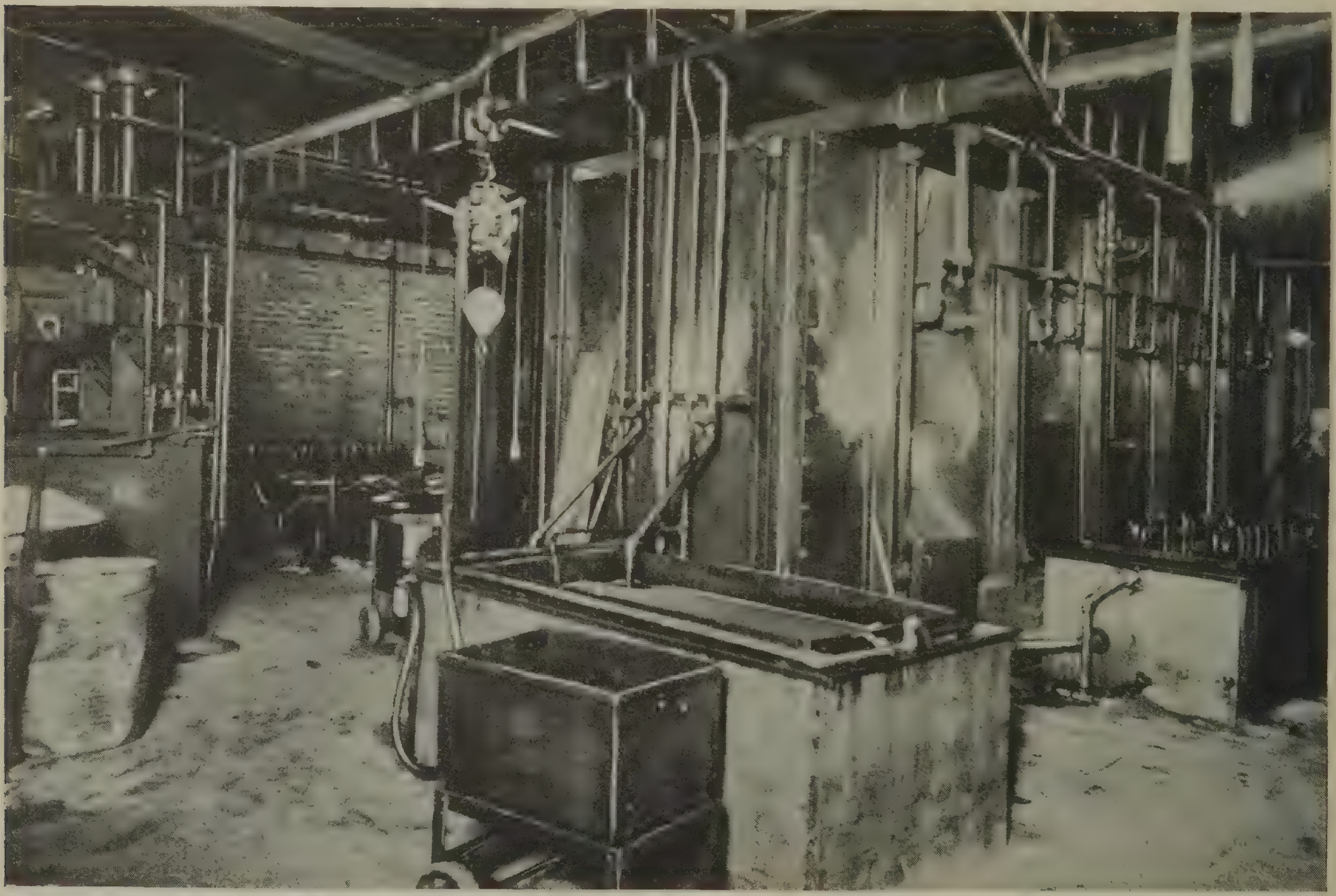
The beams are built of heavy structural shapes, on top of which are clamped the insulation and tile which project into the furnace. The beams are carried on heavy flanged rollers and rocker arms, and approximately 80 per cent of the weight of the beams themselves is counterweighted. All the operating mechanism is under the furnace, where it is accessible for oiling and for repairs.

Overhead Combustion Chamber Insures Uniform Heat

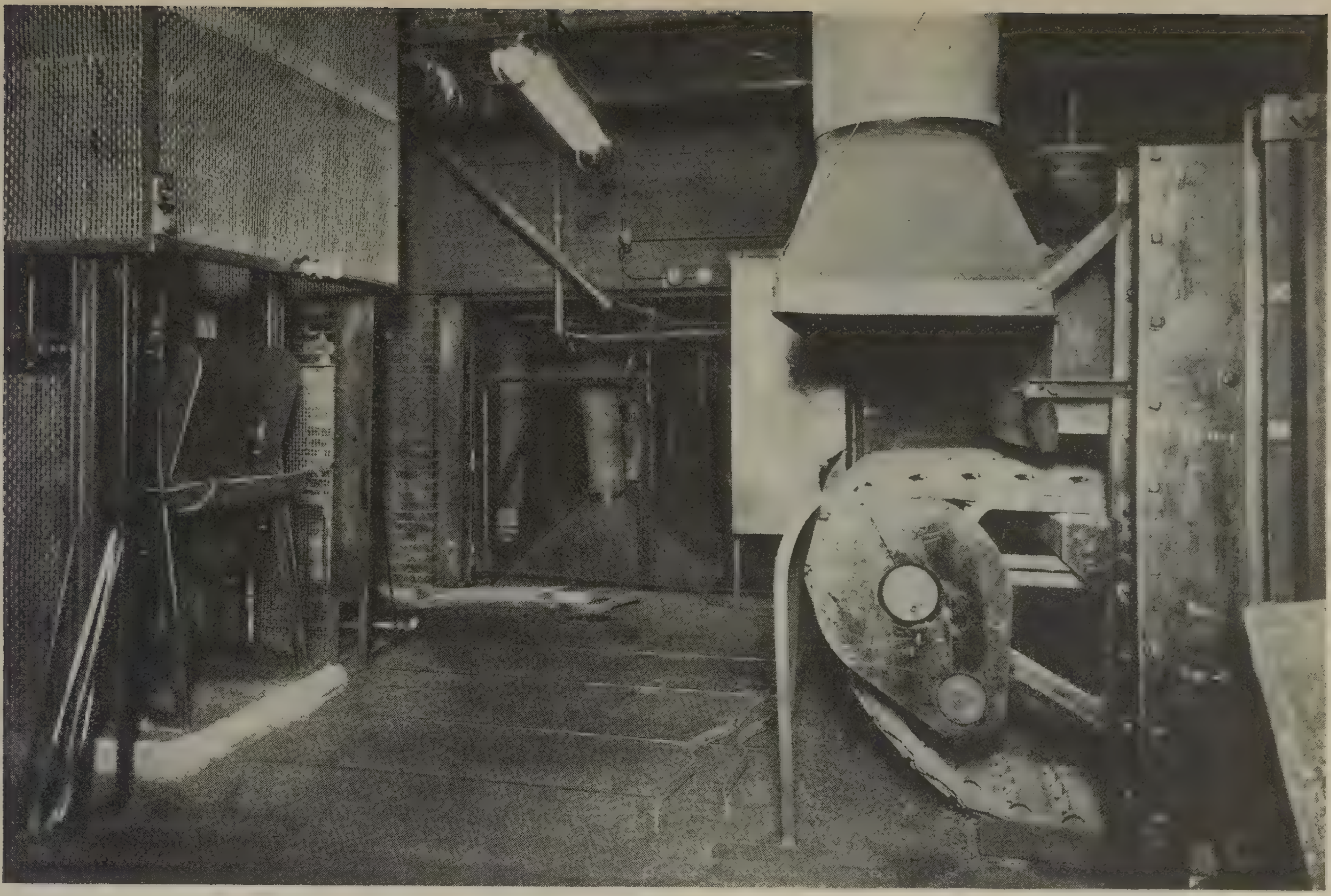
The furnace is constructed with an overhead combustion chamber, separated from the work chamber by a perforated arch, which acts as an accumulator and distributer for the heating gases. The gases are withdrawn from the furnace by means of flues in the side walls, which connect with cross flues under the hearth. This arrangement assures a thorough circulation of the heating gases under the hearth floor and around the beams.

As previously mentioned, this unit is fired with city gas, the burners being arranged in pairs. Each pair of burners is set at an angle so that the flames converge as they enter the combustion chamber. One burner on each pair is controlled by means of a Dixon valve through a Leeds & Northrup recorder controller and thermocouple located in the work chamber immediately under the burners. With this arrangement one burner of each group is running constantly while the other burner is used for control and is either on or off, as the heat condition in the furnace demands.

Parts being heat treated are brought up to 1710 deg. Fahr. during their travel through three-fourths of the length of the furnace, allowing one-fourth of



Water Jacketed Quenching Vats Are Conveniently Located. At the left is a special press the platens of which can be lowered into an oil bath



A Chain Conveyor Transports Bumper Parts Through the Drawing Furnace

the travel time for soaking. The temperature is controlled within 10 deg. Fahr. The length inside of the furnace is 22 ft., and the time of travel through the furnace is 20 min., giving a rate of slightly more than one foot a minute.

Special Press Prevents Distortion During Cooling

Not all parts are completely formed before passing through the high-heat furnace. Therefore a hydraulic press is located near the discharge end of that furnace. The heated parts are drawn through side doors at the end of the furnace, and, if they have already been formed, they are immediately quenched. If additional press work is necessary, the piece is placed, while hot, in the hydraulic press. After the dies have been closed, the platens are lowered into a vat of oil. In this way the part cools while being held by the dies, and distortion resulting from cooling is avoided.

Parts that do not require press work after heating are removed from the furnace and cooled in oil tanks, one of which is located at each side of the furnace at the discharge end. The oil is agitated by a motor-driven pump, by means of which it is delivered to a radiator-type cooler located on the roof of the building. Normally the temperature of the oil bath is held below 100 deg. Fahr. The oil tanks are water-jacketed.

A monorail air hoist is used to transfer the hardened product from the oil drain boards to the draw furnace, which is of the under-fired three-quarter muffled type. It is equipped with a continuous chain grate type of conveyor for handling the work. The conveyor consists of three strands of extra heavy malleable iron roller chain, upon which are mounted especially designed malleable iron interlocking flights. The return strand is directly underneath the furnace, where it is protected from rapid cooling action so that it returns to the furnace well up to heat. This furnace is likewise fired by gas burners, arranged in pairs and controlled as on the high-heat furnace. The drawing temperature is maintained between 900 deg. and 1000 deg. Fahr. The inside length of the furnace is 23 ft. 7½ in., and the time of travel of a single part through it is 25 min., or at a rate of slightly less than a foot a minute. Maximum temperature of the part is reached about 5 min. before it is discharged from the furnace.

Both furnaces have extra-heavy fire brick walls, and they are insulated with 4½ in. of cork insulation brick. The conveyors are driven through fully inclosed spur and worm gear speed reducers, direct-connected to motors. Both furnaces were built by the McCann-Harrison Corporation, Cleveland.

As each part is taken from the conveyor bed of the drawing furnace it is closely inspected for defects and is subjected to a hardness test. If it meets specifications, it is placed on the conveyor for delivery to the grinding room.

Novel Use of Swing Grinders

A point of interest in the grinding room is the use made of swing grinders for finishing the flat surfaces of bumper parts. Opposite each grinder is an oscillating table provided with an automatic ratchet device which gives the table a lateral motion. A number of the bumper parts are secured to the table, and the swing grinder is lowered. Power is applied to the table, which moves backward and forward in a plane at right angles to the axis of the grinding wheel. When the table reaches the end of its travel in one direction and stops momentarily, preparatory to moving in the opposite direction, it is ratcheted to one side so that the grinding wheel will not retrace the path it has just been working on.

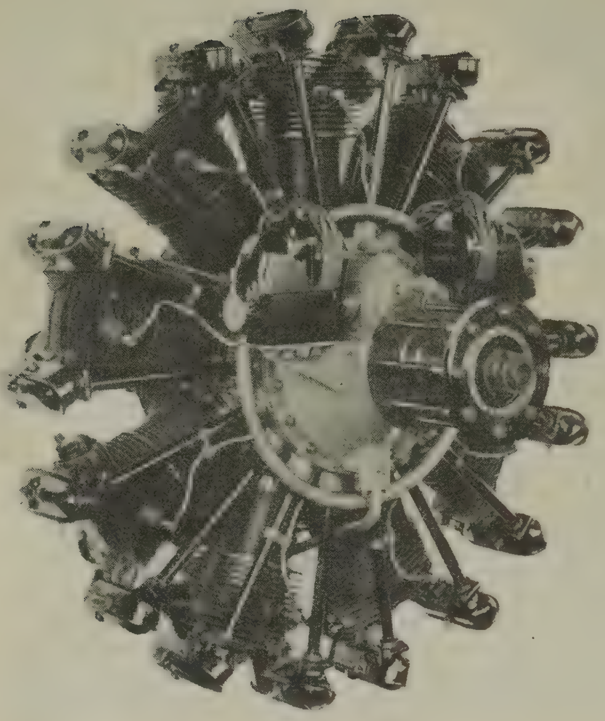
A 6500-hp. reversing blooming mill motor for the South Works, Illinois Steel Co., and a 4600-hp. reversing roughing mill motor for the Tata Iron & Steel Co., Jamshedpur, India, will be furnished by the Westinghouse Electric & Mfg. Co. Each order includes a motor-generator set and switching equipment.

The Lake Superior Mining Institute will hold its twenty-sixth annual meeting in the Oklahoma-Kansas-Missouri zinc-lead field upon invitation of the Tri-State Zinc and Lead Ore Producers Association. The tentative date is April 1 to 6.

Wright "Whirlwind" a High

Interchangeability and
Important Accomplish
Materials and

BY FAY LEONE



WHILE crossing Forty-fourth Street in New York on my way to my office to write this article I was attracted by a large crowd gathered in front of a window. Evidently there was something of great interest inside. I stopped to see what it was. By skirting the crowd which extended well out into the street, I finally gained a point of advantage from which I could see the object upon which their attention was focused. It was a Wright Whirlwind engine. Never have I seen a piece of mechanism which has aroused greater curiosity or commanded more sustained interest on the part of the observers. Truly, Colonel Lindbergh has done a wonderful thing in making America air minded. Naturally the 508 lb. of refined mechanism which created the breeze upon which he flew to Paris comes in for its share of credit and attention.

The Wright Whirlwind, the "W" part of the "We," is well worth careful examination and study. Its story is a story of the triumph of man and metal over the elements. A romance of "making metal fly" which should inspire every metal worker with a new regard for his calling and instill in the minds of the youthful apprentices a still higher regard for engineering thinking and accurate, clean execution.

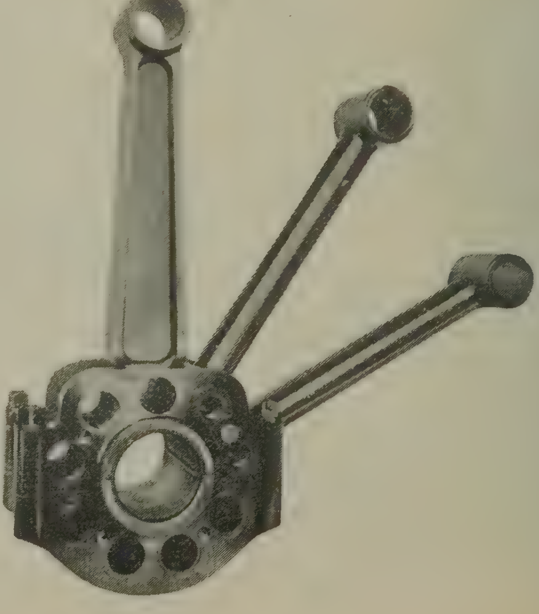
The Whirlwind engine, familiarly known in the Wright Aeronautical Corporation shop as the J-5 series, is a nine-cylinder air-cooled, static, radial type. It operates on the familiar four-stroke cycle principle. Calling the top cylinder No. 1, the firing order, indicated in a counter-clockwise direction, is 1-3-5-7-9-2-4-6-8. The cylinders have a 4½-in. bore and 5½-in. stroke. Although rated normally at 200 hp. at 1800 r.p.m., the average power developed at this speed is about 223 hp. The engine weighs, dry, 508 lb. Its length is 34 in. and the diameter over all, 45 in. The displacement is 788 cu. in. and the compression ratio, 5.2 to 1. The guaranteed fuel consumption is not more than 0.60 lb. per hp.-hr. at the rated horsepower and the guaranteed oil consumption not over 0.025 lb. per hp.-hr.

Nine Cylinders Drive Single Crankshaft

Before going further it may be interesting to know how each of the nine cylinders, which are equally spaced around the crankcase and operate in the same vertical plane, manages to transmit its power to one revolving crankshaft upon one end of which the propeller is fastened. Perhaps no question is asked oftener of the Wright engineers than "How do you get all the cylinders to work on the same crankshaft?" Well, here is the way it is done. It's very simple after all. A master connecting rod, shown in an accompanying illustration, is fastened in the usual manner at the top end to the piston pin of cylinder No. 1 and at the bottom to a comparatively large crankpin of a single-throw crankshaft which runs in bearings mounted in the crankcase. This master connecting rod carries at its lower end eight minor connecting rod bearings spaced at equal intervals around the periphery and the articulating rods, eight of them, running to the other eight cylinders operate through these minor bearings on the main crankshaft. An inspection of the illustrations will make this operation clear. So carefully has the assembly been designed that even with the very little clearance allowed the mechanism functions perfectly.

This "starfish" type of motor lends itself to many unique points of design and makes possible an interchangeability of parts which is quite remarkable. Also an accessibility which is never more appreciated than in the case of an airplane. The entire Whirlwind motor may be dismantled and inspected or overhauled without taking it out of its airplane mounting. The valve mechanism, ignition and carburetion system are open and in plain sight; they can be reached without difficulty and the equidistant spacing of the cylinders around the circle makes carburetion problems which occur in the ordinary vertical or V-type horizontal engine comparatively easy of solution in this form.

The cylinders are made of high-carbon steel forgings from which the cooling fins are integrally machined in a manner to be explained in a later article. The cylinder head with its integral cooling fins is cast from aluminum-alloy known as the "Y" alloy, composition of which is approximately: Copper, 4 per cent; nickel, 2 per cent; magnesium, 1.5 per cent; iron, 0.75 per cent, and silicon, 0.50 per cent, with the balance aluminum. This casting carries the two valve seats and two spark plug openings. The combustion chamber is hemispherical in shape, the valves are inclined to the axis of a cylinder by an angle of 35 deg. The



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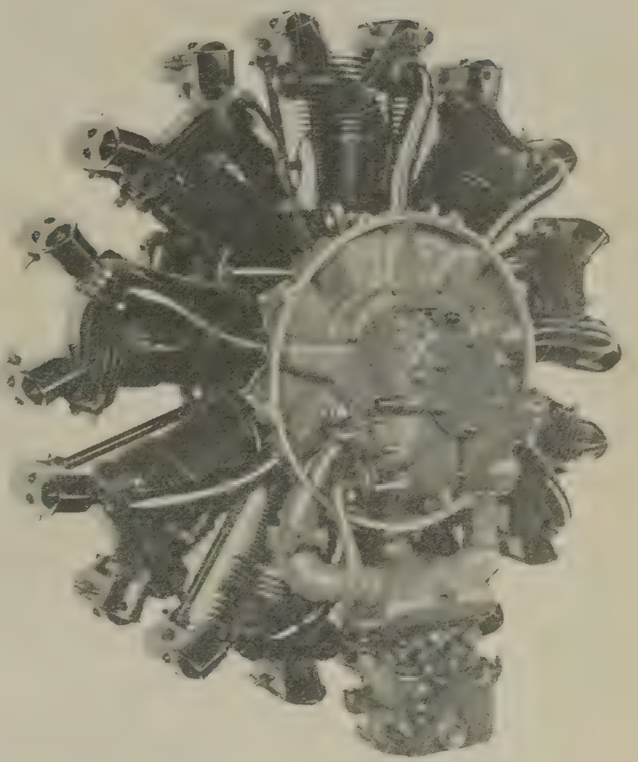
*Mechanical engineer, New York, and former editor of the *Aircraft Yearbook*. This is the first of a series of articles on the Wright Whirlwind engine; the next will describe some of the methods of manufacture.

Achievement in Engineering

Accessibility of Parts Are
nents—Some Data on
Operating Costs

FAUROTE*

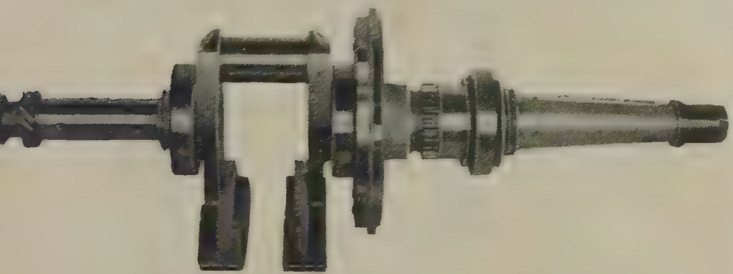


spark plugs are screwed into bronze bushings, diametrically opposite, in the sides of the combustion chamber, on an angle of 10 deg. to the crankshaft axis. The pistons are of heat-treated cast aluminum-alloy and carry four rings, the three at the top being compression rings and the one at the bottom an oil scraper. The piston pins are of hardened alloy steel (S.A.E. No. 6150 or S.A.E. 3250). They are the full-floating type with an aluminum alloy plug in the end to prevent scoring of the cylinder walls. The connecting rods, that is, the master and the eight link rods, are machined from a chrome-nickel steel forging (S.A.E. No. 3140). The master rod is provided with a steel-backed babbitt-lined bearing at the crankshaft end, and the piston pin and knuckle pin bearings of the link rods are of bronze.

Crankshaft a Chrome-Nickel Steel Forging

The crankshaft is of single-stroke counterbalanced type, and is a chrome-nickel steel forging (S.A.E. No. 3140), machined all over. It is hollow throughout its length, the channel being used to distribute oil to all parts of the engine. The counterweights are bolted to extensions of the crank-cheek. There are four bearings, a ball thrust bearing, two main ball bearings and a plain bearing in the rear crankcase section where the oil is admitted. Cam and accessory drive gears, the ball bearings, starting dog, oil slingers, and propeller-hub key are attached to the crankshaft.

The crankcase proper is made up of five aluminum alloy castings. The front section includes the thrust bearing housing, magneto bracket and the magneto and cam driving gears. The intermediate section contains the cam and valve tappet mechanism and the housing for the front crankshaft bearing. The main section which provides the pads for the attachment of the cylinders contains the flange for mounting in the airplane and the housing for the rear crankshaft bearing and intake passages. The rear section contains drives for oil pump, fuel pump, gun synchronizers and tachometers. It also provides a mounting for the engine starter and the housing for the main oil strainer. The intake manifold and oil sump section is an aluminum casting containing space for the accumulation of oil, a flange for mounting the carbureter and the intake passages.



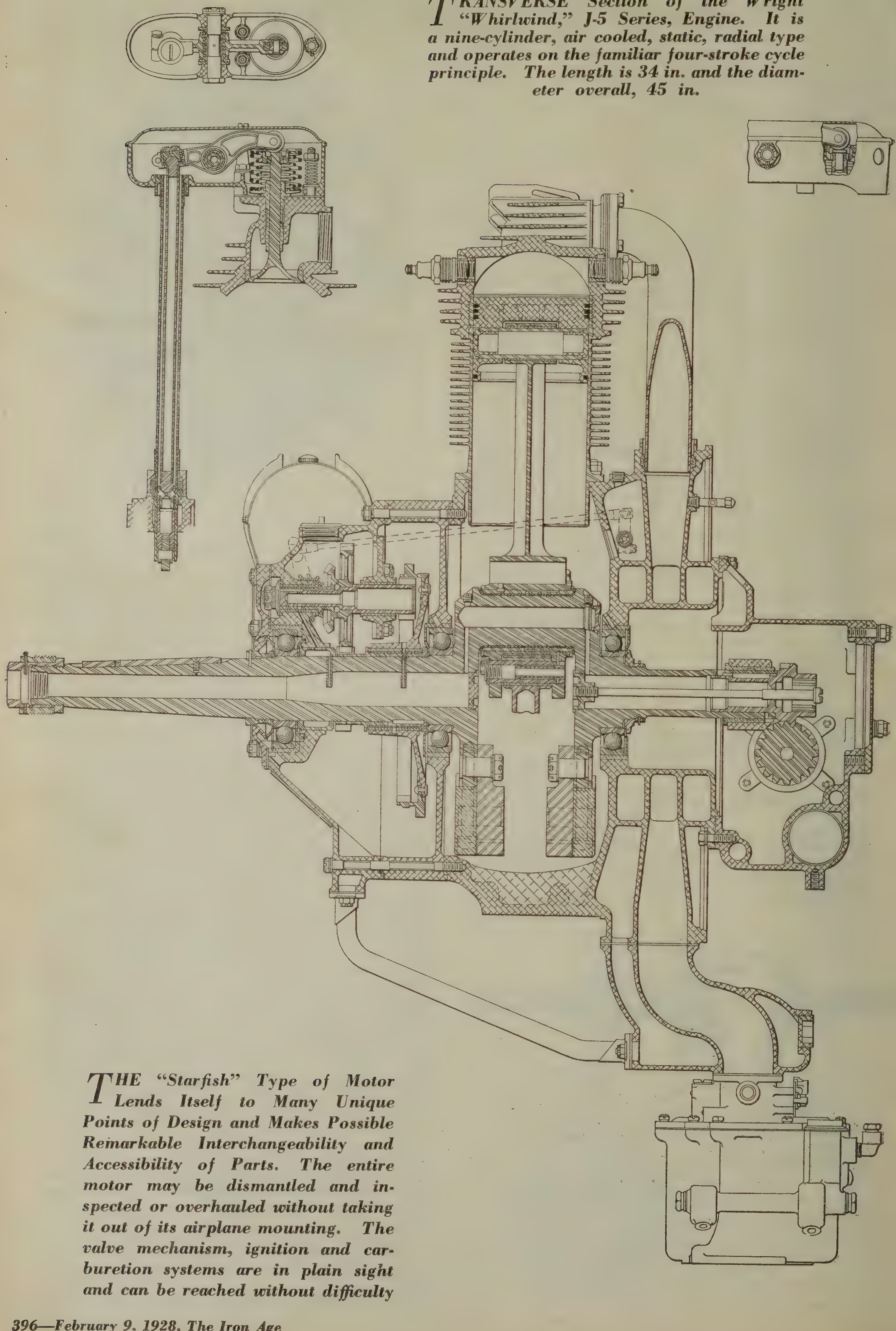
THE Master Connecting Rod and Two of the Eight Articulating Connecting Rods Are Shown at the Left. The master rod is fastened at the top to the piston pin of cylinder No. 1, and at the bottom to the crankpin of the crankshaft shown above.

The assembled engine, front and rear views, is shown at the top of these pages

Inlet and exhaust valves are set at an angle of 70 deg., their heads are flush with the combustion chamber and they rest in valve seats of aluminum bronze of rectangular cross-section. These angular rings are shrunk into a recess in the cylinder head and then rolled over at the top. The valves are of the tulip type and are machined from tungsten steel, the exhaust valve being salt cooled to prevent overheating. Each valve is held in place against its seat by three concentric helical round steel wire valve springs and is operated by a valve mechanism actuated by a cam located in the intermediate crankcase section, through cam followers of the roller type, a push rod and rocker arm; all of which are inclosed. The cam unit runs in the opposite direction from the crankshaft and at one-eighth its speed. It consists of a hardened steel ring with eight lobes on the outside and an internal gear cut on the inside. This is riveted to an aluminum hub riding on a sleeve, which is keyed to the crankshaft. The cam followers are of the roller type operating in forged steel bushings which are a push fit in the intermediate crankcase section. The upper ends of the followers contain hardened steel sockets into which the lower push-rod ball fits. The push rods are of nickel steel tubing with hardened steel balls forced into either end. The upper balls fit into hardened steel cups which are a loose fit inside the clearance adjusting screws at the outer end of the rocker arms. The valve gear is inclosed by rocker arm housings which form the support for the rocker arm pins. Pressed steel covers are used on the rocker arm housing and the push rods are inclosed by tubular steel housings. The intake valve opens 8 deg. early and closes 60 deg. late, while the exhaust opens 60 deg. early and closes 8 deg. late.

Two Scintilla magnetos mounted on the front section of the crankcase supply the ignition, through a duplicate set of heavily insulated high-tension wires inclosed in metal ignition manifold rings, from which two separate wires are taken to each cylinder, one on either side.

A special type of three-barreled Stromberg carbureter has been fitted to this engine and the crankcase has been cored with channels which serve as intake manifolds; the three sets, of three cylinders each, taking their gas from these three annular pas-



TRANSVERSE Section of the Wright "Whirlwind," J-5 Series, Engine. It is a nine-cylinder, air cooled, static, radial type and operates on the familiar four-stroke cycle principle. The length is 34 in. and the diameter overall, 45 in.

THE "Starfish" Type of Motor Lends Itself to Many Unique Points of Design and Makes Possible Remarkable Interchangeability and Accessibility of Parts. The entire motor may be dismantled and inspected or overhauled without taking it out of its airplane mounting. The valve mechanism, ignition and carburetion systems are in plain sight and can be reached without difficulty sages in the main crankcase section. The carbureter is fastened to an oil-jacketed manifold sump attached to the bottom of the crankcase main section.

Lubrication System Unique

The lubricating system is unique. There are three oil pumps of the gear type assembled as a unit located in the crankcase rear section. One of these pumps sucks oil from a tank behind the engine which carries the supply and delivers it under pressure to an annular groove around the rear crankshaft bearing. From this groove the oil enters the crankshaft and then passes through the various channels to the crankpin, knuckle pins, cam and magneto drive bearings. Oil collecting in the crankcase is returned to the oil tank by the other two pumps which clear the rear crankcase section and the main section sump. Oil collecting in the front crankcase section drains to this sump through an external pipe. Thus the lubricating system is of the pressure type except for the cylinder walls and accessory drive gears which are lubricated by splash and spray, the one exception being the rocker-arm pin which is provided with grease gun connection.

Air Heater Operated from Pilot's Cockpit

Pilots' experiences have shown that a carbureter air heater is needed at times to prevent the formation of frost and ice in the carbureter during cold weather operation. Therefore, an air heater is provided which can be operated from the pilot's cockpit by a valve allowing the adjustment of the air temperature entering the carbureter. This heater is of cast aluminum-alloy and is attached to the carbureter by means of six machine screws. There are also provisions for the attachment of a pump so that the fuel may be delivered at the carbureter at any pressure required for successful operation. Provision is also made for two tachometer drive connections and for two oil thermometers. One thermometer is located in the oil cooling sump surrounding the carbureter manifold and indicates the temperature of the oil as it leaves the engine; the other, located in the oil strainer cover, gives the temperature as it enters. Incidentally the oil temperature, under normal conditions of flight, is not allowed to exceed 180 deg. Fahr.

Various other devices, such as self-starters, starters of the geared hand type with booster magneto of the concentric inertia type, either hand or electrically driven, may be attached. These starters are equipped with torque-overload releases to prevent abnormal stresses in the mechanism should the engine backfire while starting. For machines intended for military service Nelson-type machine gun synchronizer drives are available. The company has also developed a special set of overhaul tools and a complete manual covering care and overhauling.

Direct Cost of Operation Less Than 4c. per Mile

It may be of interest to know how much it costs to operate this engine under normal flying conditions. For a cruising speed of 100 mi. per hr. the Wright corporation gives the following figures as the probable direct cost per mile:

	Per Mile
Fuel, 9-12 gal. per hr., at 25c. per gal....	2.50c.
Lubricating oil, 2 qt. per hr., at 70c. per gal.	0.35c.
Engine spare parts and overhaul for first 50,000 miles....................	1.00c.
Probable direct cost per mile..........	3.85c.

"If it is desired to figure the cost of depreciation, it is generally believed that the Wright Whirlwind may be counted on for 1500 hr. of normal service. This figure is based on proper periodic overhauls, approximately every 200-300 hr. and gives a depreciation charge of about 3c. per mile.

"The above figures are approximate, but there are many cases on record where the costs are less than estimated above. For instance, the J-5 series Whirlwind in the world's record endurance flight averaged 7½ gal. of fuel and less than a pint of lubricating oil per hour. One Whirlwind operator using nine engines averaged 10½ gal. of fuel per hour for over 3000 hr. and with a cost of replacement parts for the first overhaul (300 hr.) of only $6.30 per engine. Another operator averaged $16 per engine for replacement parts on about 300 hr. per engine."

A guide book on the design, manufacture and installation of electrical supply equipment has been issued in the shape of the National Electrical Manufacturers' Association Handbook of Supply Standards. This is a revision of previous handbooks of the same series, and is dated October, 1927. There are 231 pages, with 125 illustrations, mostly diagrammatic. The size is 6 x 9 in., and it is sold by the association (420 Lexington Avenue, New York) at $3.50. The book is indexed and contains standards indorsed by nearly 200 manufacturers of a large line of electrical apparatus.

Record Performances of the Wright "Whirlwind" Engine

ENDURANCE RECORD

APRIL 12, 1927, the Wright-Bellanca cabin monoplane, with Clarence Chamberlin and Bert Acosta as pilots, took off from Roosevelt Field, N. Y., and established a world's record endurance flight of 51 hr., 11 min. and 25 sec., exceeding the previous record by approximately 6 hr. The plane took off with a useful load of over 2900 lb., including 385 gal. of fuel.

BYRD

MAY 9, 1926, Commander Byrd and Floyd Bennett flew from King's Bay, Spitzbergen, to the North Pole and return in 15½ hr. A Fokker monoplane, equipped with three Wright Whirlwind engines, was used.

LINDBERGH

MAY 20, 1927, Capt. Charles A. Lindbergh took off alone from Roosevelt Field, N. Y., in his Ryan monoplane "The Spirit of St. Louis" and landed at Le Bourget Airport, Paris, France, 33 hr., 29 min. and 30 sec. later, having covered a distance of 3610 miles. The fuel consumed was 381 gal., and the oil, 11.8 gal.

CHAMBERLIN

JUNE 5, 1927, Clarence Chamberlin, with Charles A. Levine a passenger, completed a non-stop flight from Roosevelt Field, N. Y., to Eisleben, Germany, a distance of 3905 miles, in about 43½ hr. The Bellanca monoplane which had previously established a world's endurance record was used for this flight.

MAITLAND

JUNE 29, 1927, Lieutenants L. J. Maitland and A. F. Hegenberger completed a non-stop flight of 2400 miles from Oakland, Cal., to Oahu, Hawaii, in 25 hr., 50 min. A Fokker monoplane Army transport, equipped with three Wright Whirlwind engines, was used for this flight. The fuel consumed by all these engines was 920 gal., and the oil, 21 gal.

BYRD

JUNE 29, 1927, Commander Byrd, accompanied by Bert Acosta, G. O. Noville and Bernt Balchen, took off from Roosevelt Field, N. Y., in a Fokker monoplane with three Wright Whirlwind engines, for Paris. After arriving over France, they were unable to locate Paris due to the low-lying clouds and heavy rain. Turning back toward the coast, they landed at Ver-sur-Mer, after some 43 hr. in the air.

SMITH

JULY 13, 1927, Ernest L. Smith and Emery B. Bronte took off from Oakland, Cal., in a Whirlwind engined Travel Air Monoplane, and landed on the island of Molokai, Hawaii, 25 hr. and 36 min. later. In this non-stop flight, 2348 miles were covered.

STINSON

IN the National Air Tour, June 27 to July 12, 1927, Edward A. Stinson, in a Stinson monoplane with a Whirlwind engine, won first place with a score of 97 per cent of the possible maximum. This plane attained a high speed of 124.3 miles per hour with 1500 lb. pay load and a total of 2275 lb. useful load. This tour of over 4000 miles, covered 18 States and one Province of Canada. Twelve of the 14 planes competing were equipped with the Wright engines.

Operating Costs of Industrial Trucks

Evaluation of Elements Affecting Costs—Influence of Size of Load, Distance Covered and Surface of Floor or Ramp

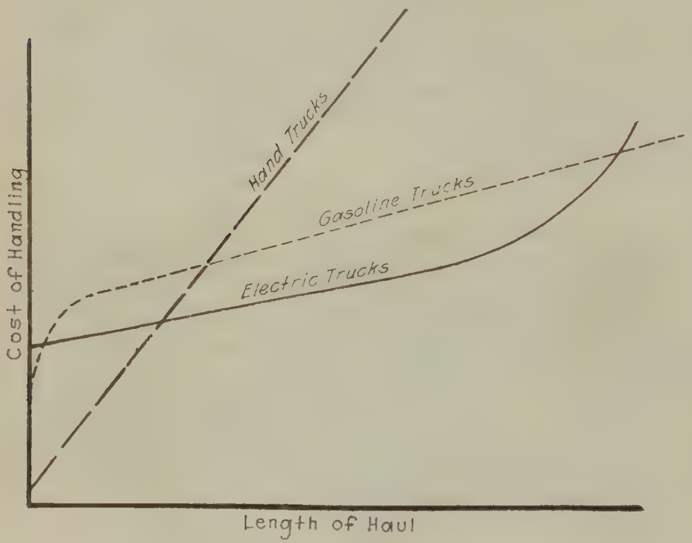
BY C. B. CROCKETT AND H. J. PAYNE*

ALL direct costs of handling materials by industrial trucks are influenced by operating conditions. Theoretical curves are presented showing the effect on the operating costs of different types of trucks resulting from variations in:

1—Length of haul,
2—Amount of material to be handled,
3—Condition of runways,
4—Number and severity of ramps.

In addition to the above, other conditions having a decided effect on the cost of operation defy analytical treatment. Experience will have to be used in determining their influence in the choice of any type of equipment. These include

5—Width of runways and available space,
6—Fragility of material handled,
7—Special requirements in handling,
8—Labor market conditions,
9—Range of uses for which equipment is employed.



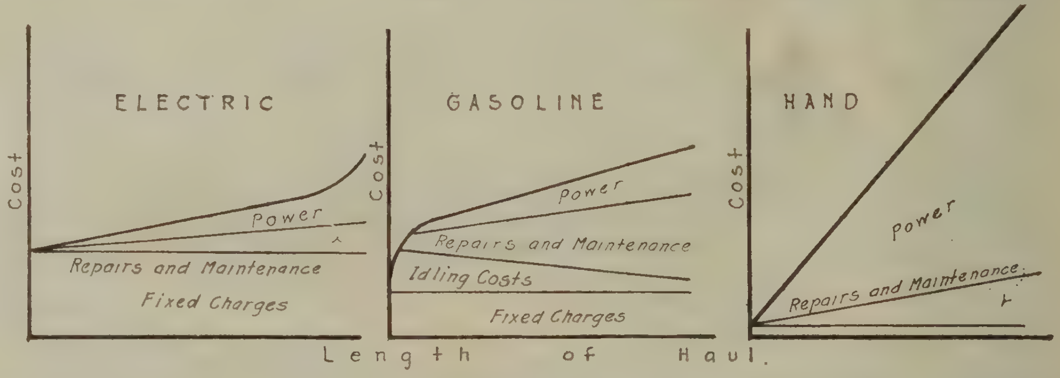


Fig. 1 (Right)—Analysis of Costs of Operation, with Relation to the Distance to Be Covered

Fig. 3 (Above)—Total Costs, with Relation to Distance to Be Covered, Arranged for Direct Comparison

Indirect savings effected by the introduction of a new system of handling or the purchase of new equipment are most readily taken care of by considering them as an indirect cost of the old system. If interest charges on the system under consideration be included in the cost, and all savings are charged as costs of the system where they are *not* realized, the difference between total costs will then be the net yearly profit accruing from the change. If interest charges are omitted, the difference in costs represents the annual savings available to meet the interest charges on the new system.

The amount of time a piece of equipment is in service has a distinct influence on the cost of operation, but not so great as many imagine. Many plant managers say that the high initial cost of electric trucks or tractors prohibits their use, because the equipment would not be in service more than a few hours a day. Suppose a gasoline or electric truck will replace four men at $3.50 a day. Assume (which is seldom true) that the men can be employed productively when not handling material. We then can draw curves to show the relation of cost to days per year or hours per day employed.

[Examination of the sets of diagrams, which are grouped in pairs (showing the building up of costs for each of the three types of operation and then comparing the total costs of the three with each other), indicates that (1) hand trucks are cheapest to operate for very short hauls, electric trucks being cheapest over an intermediate range and gasoline trucks on the longest hauls; (2) hand trucks are cheapest when the smallest amount of material is to be handled, with electric trucks cheapest for larger amounts; (3) gasoline trucks are cheapest (other things being equal) with bad runways, but electric trucks when the surface is better; (4) severity and number of ramps are of least effect on costs of operating electric trucks and greatest effect on those run by hand.]

Effect of Various Factors on Operating Costs

CURVES are presented here not as accurate results of tests made, nor are they true graphical representations of the formulas on which they are based. They are merely a suggested method of approach to the problem of selecting the most economical equipment operating under given conditions.

Cost vs. Length of Haul

The first condition to be considered is the length of haul. Letting Y = operating cost and X = length of haul, and assuming that the cost is influenced by this one condition only, the following formula is suggested:

$$Y = A + \frac{B}{X} + C\frac{X}{r}$$

There are three terms in this cost formula:

1—Fixed charges, represented by A.

2—Cost of the equipment when idling, being a constant B, which represents the hourly cost of the truck when stopping for short periods, times the time idle, which is inversely proportional to the length of haul. The second term may then be represented as B/X. For hand or electric trucks $B = 0$.

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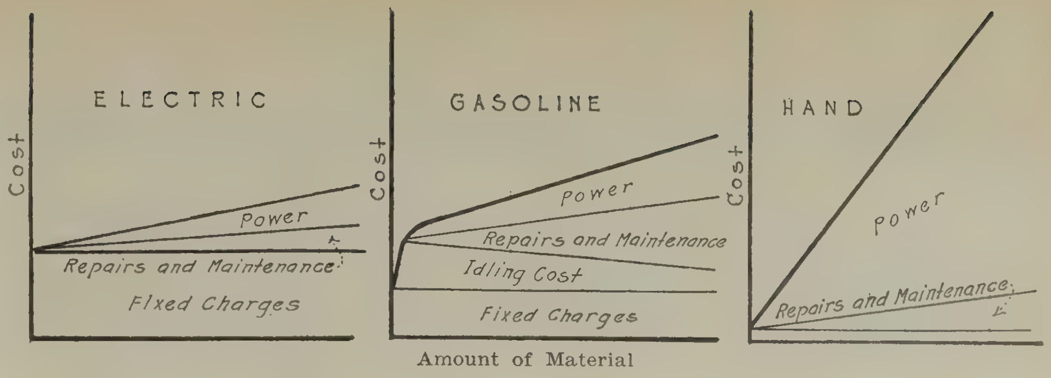
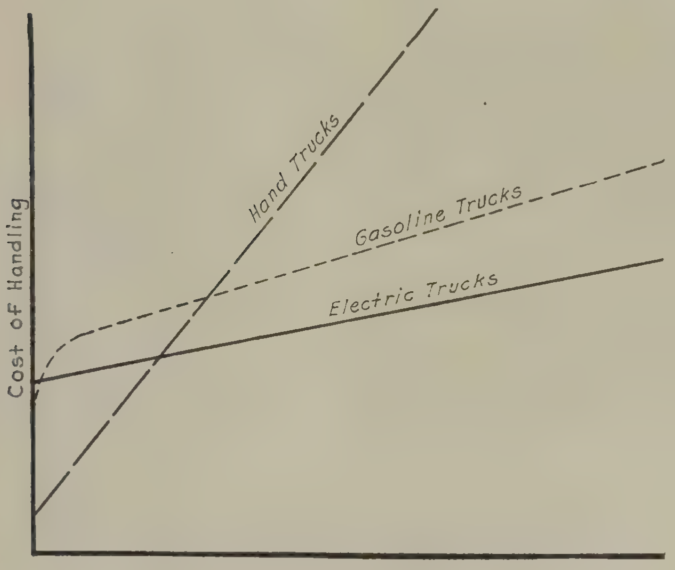
*Society for Electrical Development, Inc., New York. This is a portion of a paper read Dec. 7, at New York, before the Materials Handling Division of the American Society of Mechanical Engineers.

Fig. 2 (Right)—Analysis of Costs of Operation, as Affected by the Amount of Material to Be Handled

Fig. 4 (Below)—Total Costs, as Affected by Quantity of Material, Arranged for Comparison





Amount of Material

3—The third term is the cost of the machine when moving. This term is a constant C, representing the cost per hour when running, corrected so that the variables remaining are only the length of haul X and the speed of the truck r. The influence of speed is not seen in the cost until the hauls are of considerable cost.

Analysis of the different costs is shown in the curves of Figs. 1 and 3.

Cost vs. Amount of Material

The second condition is the amount of material handled. The formula and curves are both similar to those for the length of haul. The fixed charges are the same as before, the idling cost is proportional to the capacity of the truck and inversely proportional to the amount of material. The cost while running is proportional to the amount of material divided by the capacity of the truck. The formula is:

$$Y = A + B\frac{M}{X} + C\frac{X}{M}$$

where B = idling constant

M = capacity of truck

X = amount of material.

The curves are shown in Figs. 2 and 4.

Cost vs. Condition of Runways

The third variable influencing cost is the condition of runways. The cost here is influenced by the amount of torque necessary at the hub and varies inversely with the size of the wheel. The electric truck has to retain the small wheel for the sake of ease in handling, as the benefits therefrom generally exceed any trouble experienced on bad runways. The curves are given in Figs. 5 and 7; the formula is as follows:

$$Y = A + B + C\frac{X}{DT}$$

where D = diameter of wheel

T = torque available

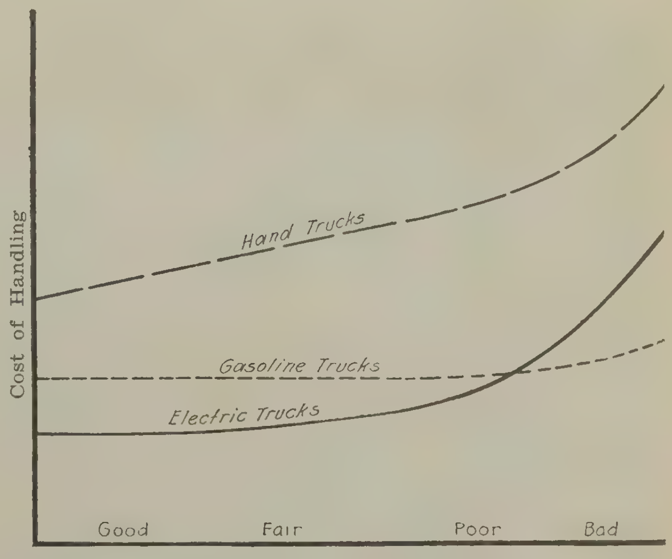
B = constant for handling on smooth runways

X = coefficient for runway.

Cost vs. Number and Severity of Ramps

The last external condition whose influence on cost is possible to analyze is the number and severity of ramps. Considering as a base the fixed charges plus operating expenses on a level floor, we may add a variable cost which is added by the ramps. This cost is principally one of power, or more exactly one of overload capacity.

As the storage battery has an overload capacity of 300 per cent or more, the operating cost of electric trucks is little influenced by this item, being merely the extra power cost. In the case of gasoline or hand trucks, however, with a definite overload limit, either units of larger capacity (or smaller loads) must be adopted, or a sharp increase in maintenance and re-



Condition of Runways

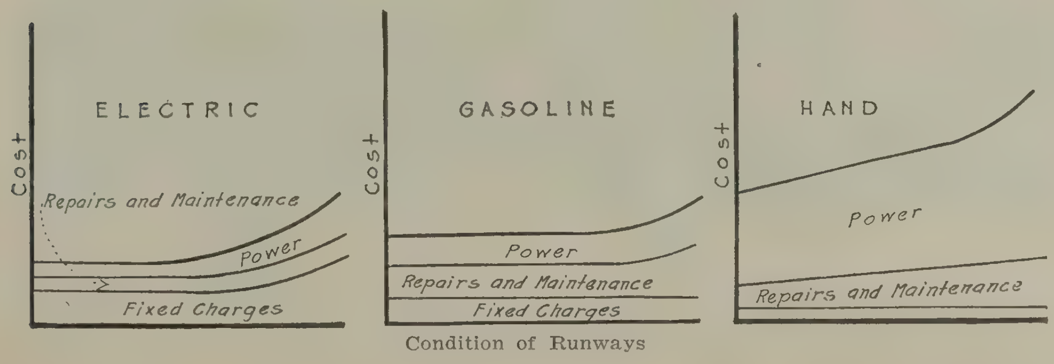


Fig. 5 (Left)—Analysis of Costs of Operation, as Affected by Condition of the Surface Covered

Fig. 7 (Above)—Total Costs, as Affected by Runway Conditions, Arranged for Comparison

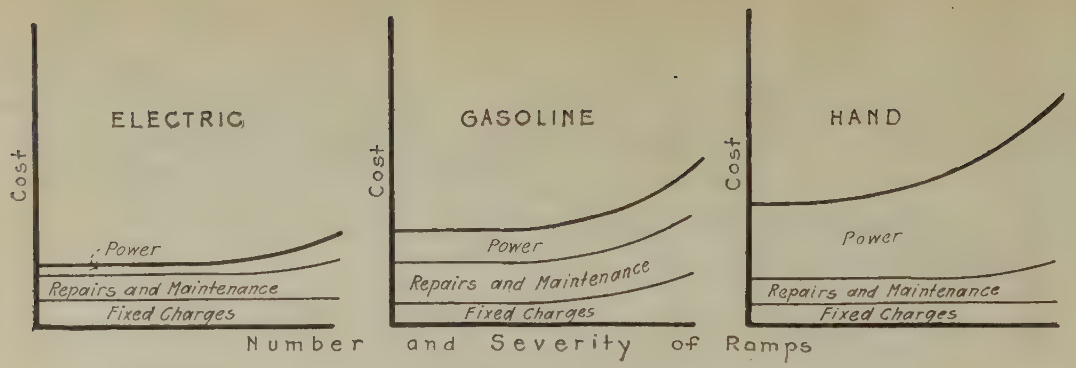


Fig. 6 (Left)—Analysis of Costs of Operation, as Affected by the Ramps to Be Negotiated

pairs and power will occur. The curves are given in Figs. 6 and 8, and the formula is as follows:

$$Y = A + B\frac{X}{M}$$

where A = fixed charges
B = cost of operation on level runways
M = capacity of truck for overload
X = coefficient for number and severity of ramps.

[In the discussion following presentation of this paper the authors disclaimed any intention of setting these figures up as final values for the costs sought. They stated that the curves were, rather, of an indicative character, and that circumstances in a particular plant might alter the relationships somewhat. They believed, however, that the curves, and the data on which they are based, are representative of what is commonly found in practice, and that, as such, they would serve as a general guide in connection with considerations of probable costs for a contemplated installation.]

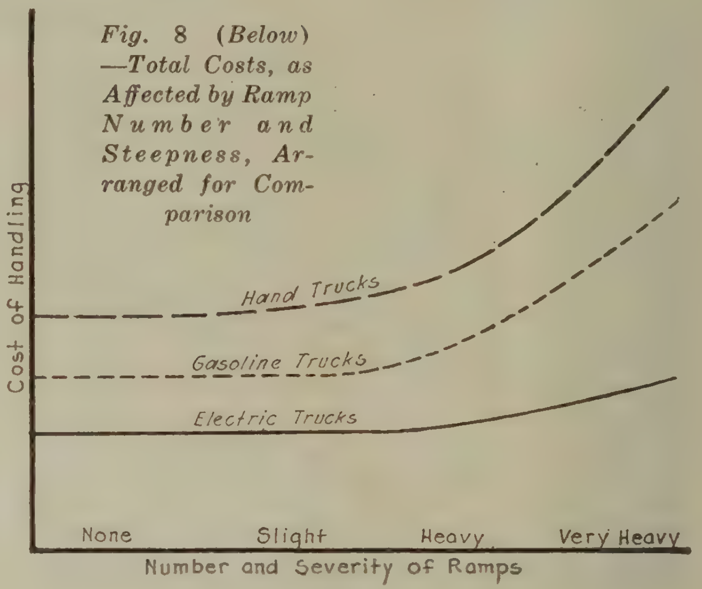


Fig. 8 (Below)—Total Costs, as Affected by Ramp Number and Steepness, Arranged for Comparison

Bridge Wire Tested After 75 Years

Developed Strength Exceeding Figure Used in Designing the Suspension Cable—Aging Thought to Improve Physical Properties of Drawn Wire

BY H. C. BOYNTON*

AT times we meet the engineer or architect who is doubtful about the permanence of our modern materials of construction. Steel and iron corrode readily, but even if a steel structure could be preserved against rust, he questions whether the high strength given to members by cold work or by heat treatment are truly permanent.

While it is impossible to cite historical data on steel treatment methods which have been in vogue only during this generation, some information is available on bridge wire which has been removed after nearly 75 years' service.

There is in the possession of the John A. Roebling's Sons Co. some wrought iron wire taken from the High Falls Bridge in New York State, which according to our records was erected in 1848 and was in service until removed, which was in August, 1921.

Inasmuch as the records of the tests of wire made in those early days are somewhat fragmentary, we do not have the original tests of the individual wires which went into the cables of this bridge, but from the late John A. Roebling's personal records is secured the fact that the wire was designed to have a tensile strength of 90,000 lb. per sq. in. That the wire is still amply strong for the intended duty is shown from tensile tests of one of these wires, made in August, 1921, which gave the following results:

Diameter	0.153 in.
Breaking strength	1,735 lb.
Ultimate strength	94,166 lb. per sq. in.
Reduction of area	25.4 per cent

This material was not galvanized or coated with any metal, yet the corrosion of this wire, while marked, was not excessive. There was relatively little pitting of the surface.

Moreover, residents living in the vicinity stated that the cables on the High Falls Bridge had not been painted for at least 10 years. This proves quite conclusively (if further proof be needed) that old wrought iron made 75 years ago is much more resistant to corrosion from ordinary weathering than our present high carbon steel made in acid open-hearth furnaces under strictest supervision.

As far as we can gather from our records the material used in this bridge was imported Swedish or Norway iron. For comparison some No. 9 Norway iron wire was recently drawn in about the same way as the old sample mentioned above, and an average of three tests from three separate bundles is as follows:

Diameter	0.147 in.
Elongation in 12 in.	3.0 per cent
Breaking strength	1,360 lb.
Ultimate strength	80,130 lb. per sq. in.
Reduction of area	28.6 per cent

This Norway iron wire tests true to form and was given three holes or passes. It is probable that the old wire mentioned above, which had a higher breaking strength in pounds per square inch, was drawn four passes, which wire-drawing, if given to the modern Norway iron wire, would bring its strength to about 90,000 or 95,000 lb. per sq. in.

From the facts above it certainly seems apparent that the cold-worked iron installed 75 years ago has not lost its valuable physical properties since the bridge was erected. In fact, the general opinion among my associates here is that cold-drawn wire gradually grows a little stronger with age. This despite the fact that the process of hardening by cold work involves the fragmentation of the metallic crystals, a large increase in what is called the amorphous phase, the introduction of great internal strains—all of which would be regarded by theoretical metallurgists as elements of structural instability. Yet such steel and iron wire has the most honorable service record of absolute dependability.

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*Metallurgist John A. Roebling's Sons Co., Trenton, N. J.

Modernizing Forging Practice

Plant Laid Out for Ease in Materials Handling and Straight-Line Production—Auxiliary Service Important

BY F. W. MANKER*

MODERN forging plants offer an interesting study in efficient synchronization in straight-line production of a multiplicity of power, heating and handling units, together with fuel, oil, air, water and steam distribution and utilization. In this scheme mass production and quality of product are the two paramount factors. Neither can in the least be sacrificed to the other. The mechanical problems of forging were solved long ago with power hammers, presses, dies, etc., but efficient and rapid heating of the raw steel is a goal more recently attained.

One of the largest and most modern forging shops has been put into full operation at the plant of Willys-Overland, Inc., Toledo, Ohio. It was built on the site of an old one, which was progressively dismantled without interfering with production.

This shop is so designed that the work progresses from one operation to another with the least amount of "float" trucking and handling. All hammers are served with individual forging furnaces and both are so arranged as to allow the greatest volume of output with the minimum of labor, fuel, power, etc.

Two main buildings, parallel, are built with steel sash sides with rolling steel shutters forming 9 x 20-ft. doors in the lower section of the side walls. This contributes to ease in handling material and parts in and out of all sections and also provides an excellent means of ventilation in the summer.

One of these buildings is 80 x 700 ft., while the second is 80 x 540 ft. All material is handled in containers by motor-driven lift trucks, according to a carefully worked out system of routing. Each building is equipped with overhead electric traveling cranes for moving and rearranging equipment, handling dies, etc.

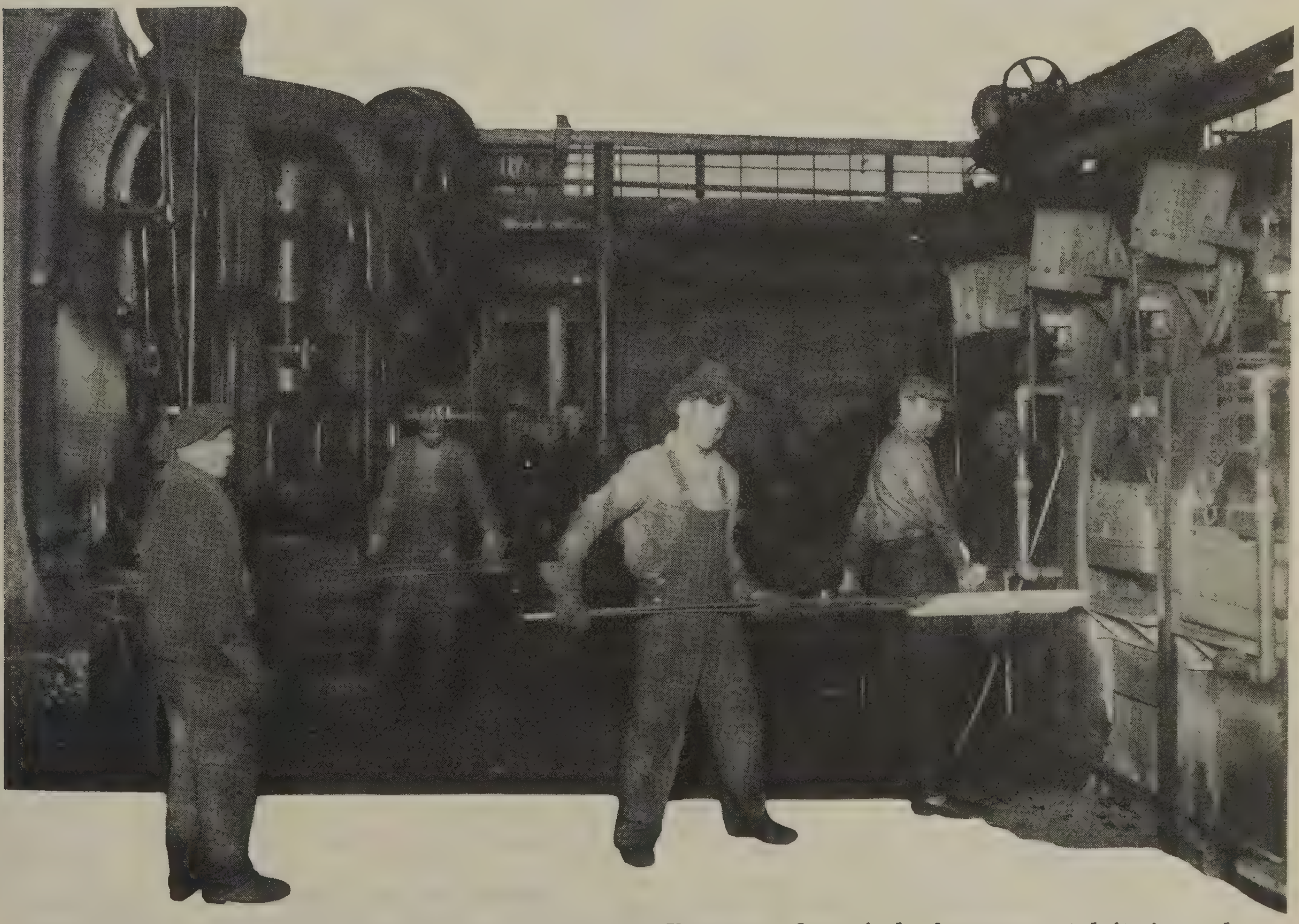
Raw material is brought in on spur tracks direct from the railroad to the steel yards, which are immediately adjacent to the forge shop buildings. These yards are commanded by overhead electric cranes of 45-ft. and 78-ft. span with lifting magnets. They serve the double purpose of unloading material from the cars and of handling the stock into the shear sheds, where it is cut to the proper length preparatory to forging.

Under a portion of the forge shop a reinforced concrete basement 12 ft. deep covers an area approximately 130 x 160 ft. This is used for compressors, oil tanks and the storage of dies, repair parts, furnace material, etc.

Separation of Heavy from Light Work

Rear axle shafts, connecting rods, cam shafts, steering worm gears and all miscellaneous parts are forged in No. 1 shop, while the heavy parts, such as crankshafts, front axles, steering knuckles, etc., are hammered out in shop No. 2. To eliminate long hauls on heavy stock, the shear sheds were placed adjacent to No. 2 shop.

In general arrangement each shop is as follows:



Removing Hot Blank from Discharge End of Forging Furnace. One of the hammers, at left, is ready to receive it

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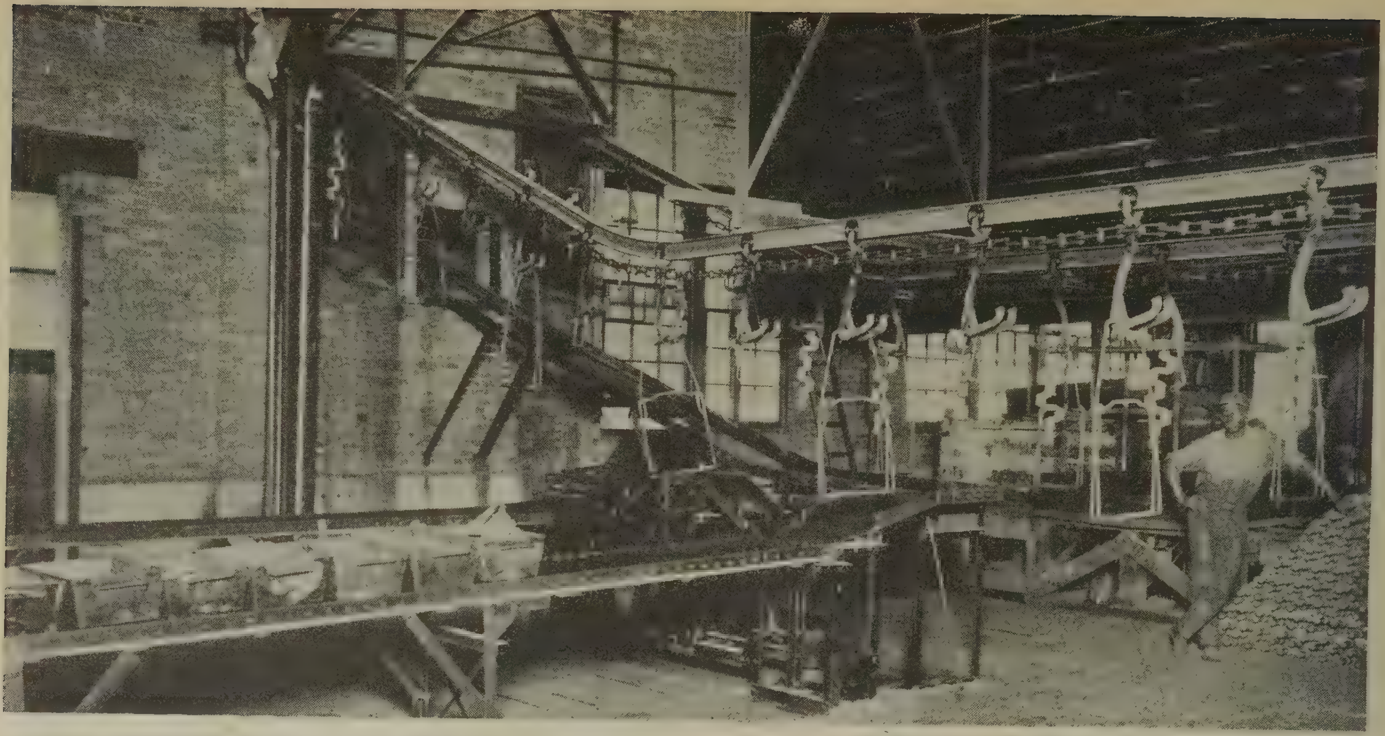
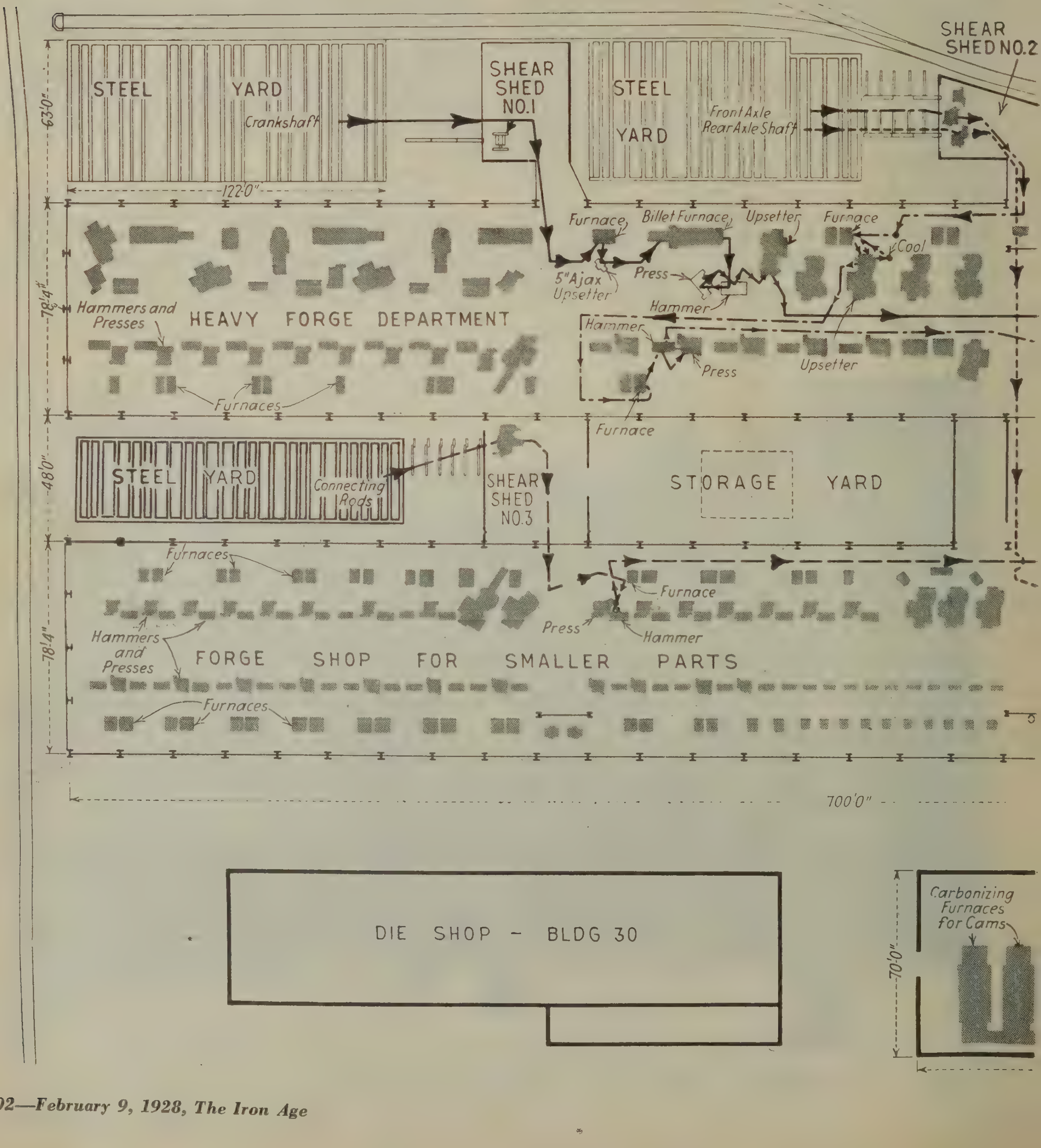
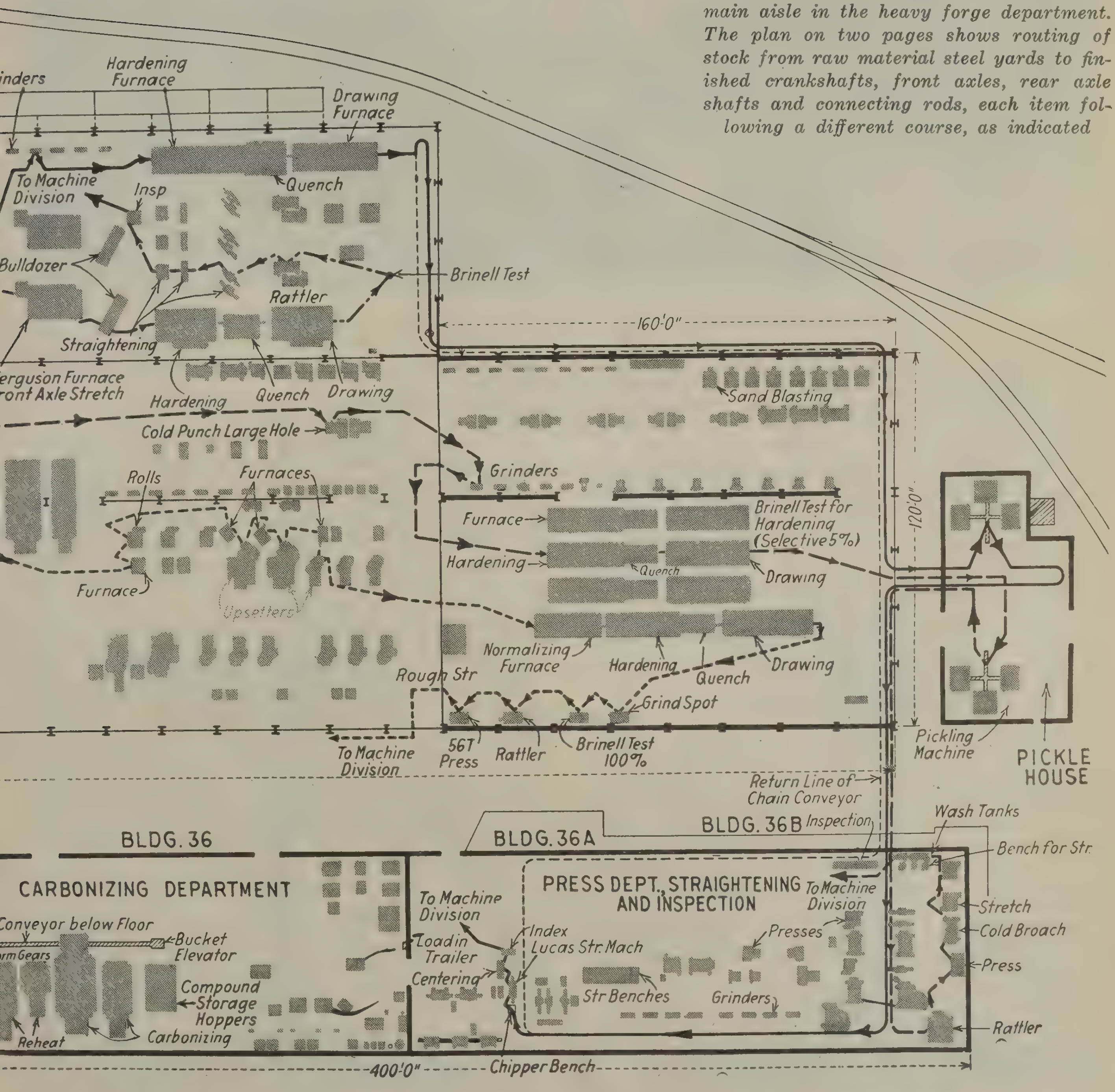
*Vice-president Surface Combustion Co., New York.




SHEAR SHED NO.2
STEEL YARD
Crankshaft
SHEAR SHED NO.1
STEEL YARD
Front Axle
Rear Axle Shaft
63'0"
122'0"
Furnace
Billet Furnace
Upsetter
Furnace
Cool
5" Ajax Upsetter
Press
Hammer
78'4"
Hammers and Presses
HEAVY FORGE DEPARTMENT
Hammer
Press
Upsetter
Furnaces
Furnace
48'0"
STEEL YARD
Connecting Rods
SHEAR SHED NO.3
STORAGE YARD
Furnaces
Furnace
Press
Hammer
78'4"
Hammers and Presses
FORGE SHOP FOR SMALLER PARTS
Furnaces
700'0"
DIE SHOP - BLDG 30
Carbonizing Furnaces for Cams
70'0"

ON Opposite Page Is Shown the Conveyor System Carrying Parts from the Forge Shop to the Pickle Room. Above is the main aisle in the heavy forge department. The plan on two pages shows routing of stock from raw material steel yards to finished crankshafts, front axles, rear axle shafts and connecting rods, each item following a different course, as indicated



inders
Hardening Furnace
Drawing Furnace
To Machine Division
Insp
Quench
Bulldozer
Brinell Test
Rattler
Straightening
erguson Furnace
ront Axle Stretch
Hardening
Quench
Drawing
160'0"
Sand Blasting
Cold Punch Large Hole
Grinders
Rolls
Furnaces
Furnace
Brinell Test for Hardening (Selective 5%)
Hardening
Quench
Drawing
120'0"
Furnace
Upsetters
Normalizing Furnace
Hardening
Quench
Drawing
Rough Str
Grind Spot
To Machine Division
56T Press
Rattler
Brinell Test 100%
Pickling Machine
PICKLE HOUSE
Return Line of Chain Conveyor
Inspection
Wash Tanks
BLDG. 36
BLDG. 36A
BLDG. 36B
Bench for Str.
CARBONIZING DEPARTMENT
PRESS DEPT., STRAIGHTENING AND INSPECTION
To Machine Division
To Machine Division
Stretch
Conveyor below Floor
Bucket Elevator
Index
Lucas Str. Mach
Presses
Cold Broach
rm Gears
Load in Trailer
Press
Compound Storage Hoppers
Centering
Str Benches
Grinders
Reheat
Carbonizing
Rattler
400'0"
Chipper Bench

along each outside wall is an 8-ft. aisle running the length of the building. Along the inner side of these aisles are placed the forge furnaces. The hammer lines are parallel to the furnace lines and so placed as to leave 16-ft. aisles between and a center aisle of 28 ft., all running the entire length of each building.

Services such as high-pressure and exhaust steam, gas, oil, water and high and low-pressure air are provided through piping located on brackets on the side and end walls directly above the outside aisles, and completely looping the shops. Ordinary city gas, supplied to the plant through a 16-in. main, is distributed to the forge furnaces and heat-treating units in a loop varying in diameter from 8 to 12 in., with branch lines at intervals.

High-pressure steam at 175 lb. gage and 100 deg. Fahr. superheat is brought to the shops by a 14-in. high-pressure main from the power house on an overhead steel bridge. It is distributed through a loop as is the gas. Exhaust steam from the hammers is returned to the power house by a 20-in. line paralleling the steam supply line. At various points in the exhaust line branch lines are taken off to different parts of the plant, where the exhaust steam is utilized in various low-pressure steam heating operations.

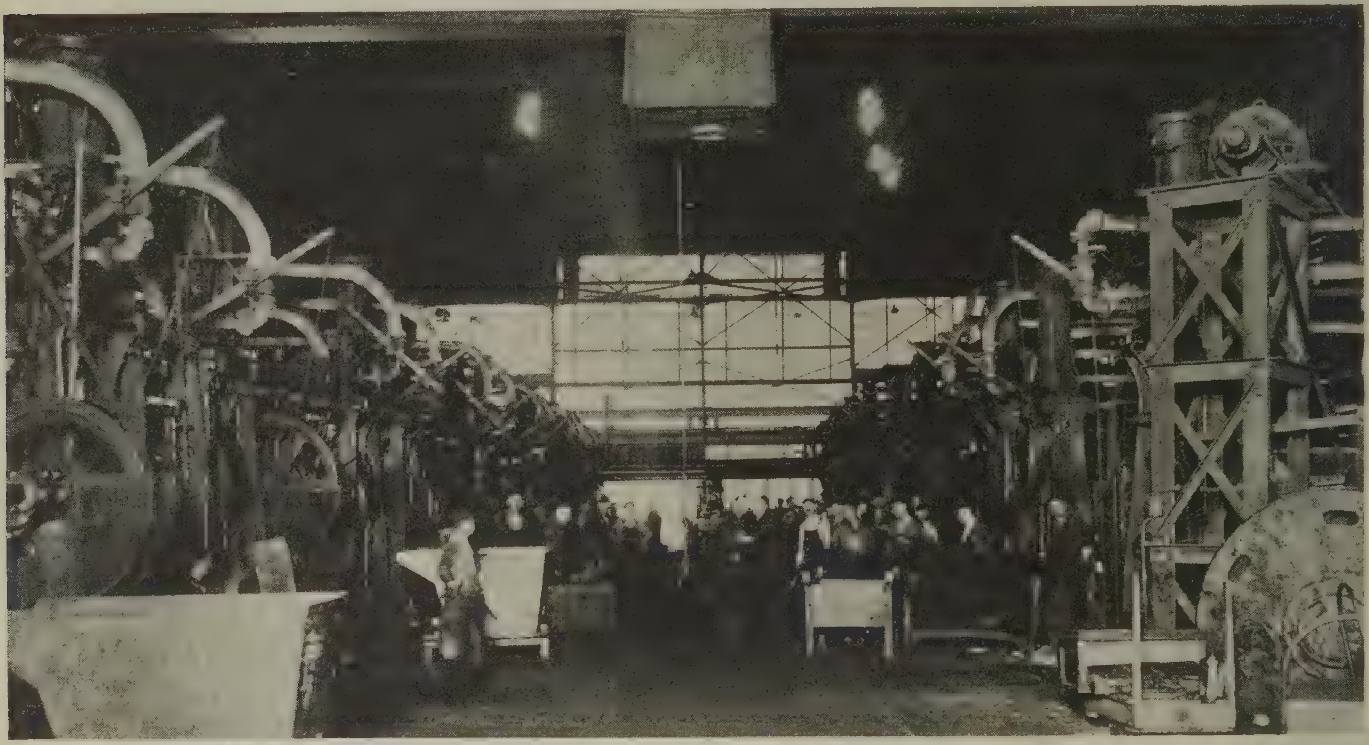
The high-pressure and exhaust steam headers are made up of Van Stone joints placed, usually, at expansion bends. These expansion bends are spaced at intervals of about 200 ft. and all the pipe joints between are welded. A steam plant of 8000 hp. capacity serves the forge shops. Overhead leads from the high-pressure steam loop supply the hammers, while the exhaust steam is returned to the exhaust header through a parallel loop.

Oil is delivered in tank cars and unloaded through gravity lines into five 10,000-gal. steel storage tanks in the basement of the forge shops. Thence motor-driven rotary pumps force it through strainers, meters and heaters into a distribution loop of 2-in. pipe. The oil is circulated continuously through this loop, which is divided into two main parts, each section having a relief valve on one end which maintains a pressure on the loop of 20 lb. at all times. Surplus oil, over and above that immediately used, passes the relief valve, is introduced into the suction manifold of the pumps and again recirculated. The six pumps have a capacity of 30 gal. per minute each.

Leads run from the oil supply line to the oil furnaces, where the oil is manifolded to the burners. From the manifold another line connects with a 2-in. oil return line which forms a loop around the shop, parallel with the others. In this way continuous circulation can be maintained right up to the burners. The oil in the return line drains by gravity into the storage tanks.

Compressors in the main power house, augmented by others in the forge shop basement, furnish high-pressure air through an 8-in. line to a loop around the shops, of from 2 to 6 in. diameter. This air at 100 lb. pressure is used on the upsetters for blowing off scale, and is employed also in pumping water. Low-pressure air for gas and oil burners is provided by eight motor-driven pressure blowers, which deliver the air at 24 oz. pressure into a 20-in. loop. Leads are taken off this air loop to each furnace burner manifold. Low-pressure air is used also for cooling dies on all the hammers, and is supplied through underground mains with an outlet to each hammer base.

The water supply consists of city, well and river water systems, forced by centrifugal pumps into lines which serve the forge shop from underground. This water is used for cooling and for some quenching operations.



Small Parts Forge Shop. Connecting rod blanks pass through some of these machines

Heating and Forging Equipment

Sixty-nine steam hammers of Chambersburg and Massillon make range in size from 1000 to 12,000 lb. Upsetters, trimming presses, bulldozers and hot saws comprise the remainder of the equipment. Each of these is served by a furnace, of which there are approximately 130. Most of these are of the box, in-and-out type and range in size from 18½ in. wide and 19 in. deep for the 1000-lb. hammers up to 57 in. wide and 33 in. deep for the 5000-lb. hammers.

While some of these furnaces are fired by oil, others, designed and installed by the Surface Combustion Co., New York, use gas as a fuel. One type, which is 6 ft. wide, 3 ft. deep and 4 ft. high, gives even heat to the material by firing along the arches with two burners on each side.

The large hammers are served with continuous, automatic temperature-controlled, gas-fired, billet heating furnaces, about 22 ft. in length, designed and installed by the Surface company. Each continuous furnace took the place of four slot-type oil-fired furnaces in the older plant.

Foreign Trade Meeting at Houston

James A. Farrell, chairman National Foreign Trade Council, has issued a call for the fifteenth meeting of the organization to be held at Houston, Tex., April 25, 26 and 27, and has invited the cooperation of chambers of commerce, boards of trade and other commercial and industrial organizations interested in the development of American commerce abroad. O. K. Davis, 1 Hanover Square, New York, is secretary of the council.

Rails Made from Bottom-Cast Ingots

Unusually Free From Segregation and Piping—Roller Straightener Used at Krupp Works an Improvement on Gag Press

BY C. W. GENNET, JR.*

IN the spring of 1926 the Boston & Maine Railroad Co. contracted with Friedrich Krupp, A.G., Essen, Germany, for 11,000 tons of 100-lb. rails of the New York, New Haven & Hartford section, and 4000 tons of 85-lb. rails of the American Society of Civil Engineers section. Basic open-hearth steel rails were to be furnished conforming to the specifications of the American Railway Engineering Association, slightly modified in the requirements for drop testing.

The rails were rolled at the Rheinhausen Works from steel made in 120-ton tilting basic-lined open-hearth furnaces. The charges, mostly all cold, consisted of about 75 per cent mill scrap and 25 per cent pig iron made from Swedish and Moroccô ore. Furnace operations were stopped when the bath showed the proper carbon content, and as ferromanganese was added to the furnace the only necessary addition to the ladle was ferrosilicon, and no additions were made to the metal in the ingot molds. It required approximately 10 hr. to make a complete heat.

The ingots were bottom-cast in groups of four. The molds, slurried with tar, stood on a cast iron base plate grooved for runner bricks connected to a central riser. The molten steel from a 1.56-in. ladle nozzle entered the central riser through a hole 3 in. in diameter and flowed thence through 1½-in. holes in the runner bricks to each of the four molds. The ingots cast were 25 in. square at the bottom and 21 in. square at the top, with 4-in. radii at the corners. The ingots were poured 88 in. high for the 100-lb. rail and 100 in. high for the 85-lb., and weighed respectively about 12,500 lb. and 13,500 lb. It required about 15 min. to bottom-pour a group of four ingots, and after approximately 50 min. the molds were taken off and the ingots charged to the pits.

Pits consisted of three groups, each of 16 holes, fired with coke oven gas. Each hole held but one ingot. After about 2 hr. in the pits, the ingots were bloomed and rolled directly into rails.

The blooming was in a two-high 43-in. mill, rolling the top end of the ingot first and reducing it in 21 passes, after six turns, to a bloom approximately 8⅜ by 7⅞ in. After a top discard of about 12 per cent and a bottom discard of 5 per cent, the blooms went without reheating into a three-high, 33½-in. roughing stand and a three-high 33½-in. finishing stand. The blooms received nine passes in the rail mill for the 100-lb. section and 11 for the 85-lb. The rails were sawed to length by a single hot saw, cutting each rail slightly long to allow for milling to 39 ft. Hot rails went to one of the four hot beds directly from the mill and hot saws, being neither spaced nor turned while cooling on the hot beds.

Table I gives the results of the rolling, inspection and testing of the rails. It wàs conducted by American inspectors and the surface inspection of the Krupp rails was in every way comparable with the practice that would be followed at American mills.

Table I—Rolling and Testing Results

		Number	Per Cent
Furnace heats made	....	149	..
Ladles cast	....	330	..
Ingots rolled	....	3,727	..
Rails rolled	....	30,903	..
Rails restraightened (following inspection)	....	459	1.5
Total short rails	....	933	3.0
Made No. 2 for flaws	1,877	....	..
Made No. 2 for other reasons	31	....	..
Total No. 2 rails	....	1,908	6.2
Rejected account surface defects	963	....	..
Rejected account other reasons	18	....	..
Total rejected (excepting for tests)	....	981	3.2
Rejected account failure at drop test:			
"A" rails	161	....	..
"B" rails	97	....	..
"C," etc., rails	346	....	..
Total rejected at drop test	....	604	1.9
Total all rejections	....	1,585	5.1
Made "X-Rayls"	....	0	..
Heats on which rails failed at drop test:	....	...	..
"A" rails	....	14	..
"B" rails	....	9	..
"C" rails	....	5	..
Total heats rejected at drop test	....	5	..

The chemical composition of the Krupp rails is in line with American practice, except perhaps that the sulphur content is low (average 0.028). The mill was able to keep the carbon content well on the high side of the specified range (0.62 to 0.77).

Table II shows the amount of each classification of rail that was shipped compared with results of Ameri-

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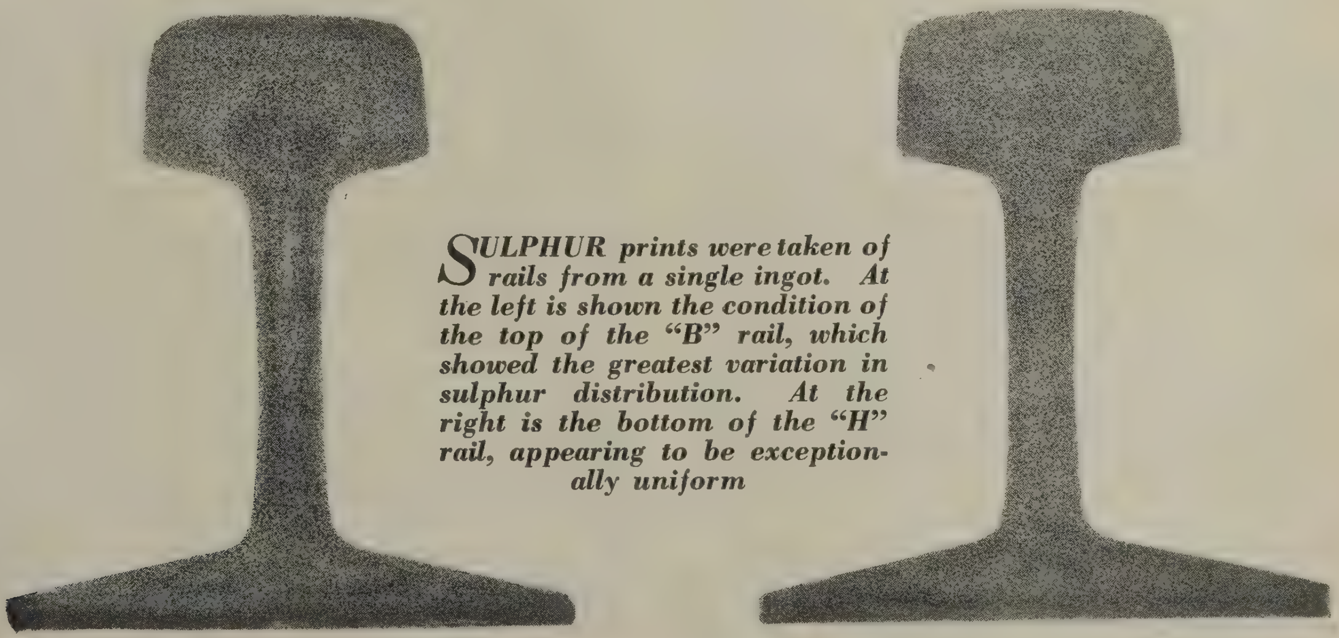
*Recently manager rail department Robert W. Hunt Co., Chicago. This article is a contracted form of a paper entitled "The Manufacture of Some Foreign Rails," to be read before the February meeting of the American Institute of Mining and Metallurgical Engineers, to be held in New York.



SULPHUR prints were taken of rails from a single ingot. At the left is shown the condition of the top of the "B" rail, which showed the greatest variation in sulphur distribution. At the right is the bottom of the "H" rail, appearing to be exceptionally uniform

can practice from carefully kept figures covering approximately 450,000 tons of rails rolled to this specification at different mills in the United States:

Table II—Comparison of Percentages of Acceptable Rails

Classification of Rail Shipped	Percentage of Total Shipments	
	Krupp	Average American Practice
No. 2 rails	6.6	5.8
"X-Rayls"	None	2.2
"A" rails	10.4	12.9
Short-length rails	4.8	4.1
High-carbon rails	39.8	30.3
All other rails	38.4	44.6

Outstanding Features of Krupp Practice

One notable departure from American practice was the bottom-casting of the ingots, and the other was straightening all the rails by passing through a roller straightening machine.

Probably the most important requisite of rails for many years has been freedom from pipe and segregation. Various ingot practices and tests have been tried whereby the presence of piping and its accompaniment could be either eliminated or restricted. An extra price is sometimes paid for an abnormal top discard, frequently as much as 25 per cent on each ingot.

The specification under which these Krupp rails were rolled requires that a classification known as "X-Rayls" be made of those whose fractured test pieces show interior defects; meaning, chiefly, piping and segregation. A large tonnage of American rails tested in the past year showed that on the average 2.2 per cent of the total shipments was "X-Rayls," but there was none among the Krupp rails. The Krupp ingots were large, (in fact heavier because taller than most American rail ingots) and the steel was poured very hot, yet there was apparently complete freedom from piping. In view of the fact that a great many observations were made of the fractures of "A" rail test pieces, this is indeed a remarkable result, for which bottom-casting must have been largely responsible.

American steel makers frequently resort to bottom-casting for special purposes, but, so far as known, ingots cast in this manner have not been rolled into rails. To ascertain the actual effect of bottom-casting, small sections were cut from the top end of the top four rails (lettered "A," "B," "C" and "D") and the bottom end of the last two rails (lettered "G" and "H"), all from the same eight-rail ingot, selected at random in the mill at the time of rolling. Sulphur prints and chemical analyses were obtained. Typical results are shown in Fig. 1 and Table III. While considerable segregation is indicated by the sulphur print in the "B" rail, the other rails appear almost free from it and also fairly sound physically.

Table III—Carbon Analyses of Rails from a Single Ingot

Rail	Location of Sample, Per Cent Top to Bottom of Ingot	Carbon at Corner of Head	Carbon at Junction of Head and Web
A	11.5	0.76	0.77
B	21.9	0.71	0.84
C	32.3	0.75	0.80
D	42.7	0.74	0.76
G	84.9	0.74	0.71
H	95.3	0.73	0.72

Other rails were analyzed. These indicate that segregation is present in the large bottom-cast ingots, possibly to about the same extent as in the shorter and stubbier top-cast American ingots. However, the number of chemical tests made is altogether too few. So far as actual piping is concerned, the Krupp practice evidently has much to commend it, and it would not be surprising to find that, with the restricted tendency to pipe, the steel would be freer from segregation.

Straightening Rails

The standard practice of straightening rails in American mills is to use a gag press having fixed supports about 60 in. apart on which the cold, or hand-warm, rail rests. Prior to this straightening process, the rails are passed through a hot cambering machine located between the hot saws and the hot beds. Its function is to put a curve in the hot rails so that they will be as near straight as practicable when cold, in spite of their unsymmetrical cross-section.

It seems quite unnecessary to comment on the probable abuse that a cold rail of high-carbon steel receives when straightening. Each blow is one well beyond the elastic limit of the metal and the gag frequently leaves an impression on the surface of the rail.

The roller straightening machine in use at the Krupp works consists of three 24-in. top rolls spaced 43 in. centers, and two bottom rolls midway between, all power driven, and somewhat grooved to take a little of the rail head and base when in the machine. Power-driven pinch rolls bearing on both sides of the web feed the rails through. All of the rolls are movable, and their position is largely dependent on the operator and his idea of the condition of the incoming rail.

There was no hot cambering machine. Consequently these rails cooled on the hot beds with a head-low sweep amounting to as much as 12 in. The feed mechanism on the entering side of the roller straightener was nevertheless adequate, and rails were fed through one after the other, requiring approximately 15 sec. for a 39-ft. rail to go through. The temperature varied about as in this country, from stone cold to slightly warm.

From the arrangement of the rolls, about 2 ft. of each end of the rail is largely unaffected. Hence, if a short bend or kink occurred near the end of the rails, it had to be eliminated after roller straightening by going to the customary gag press. From 10 to 20 per cent of the rails had to be gagged, but if a hot cambering machine had been in use, it is altogether likely that this number would have been much smaller.

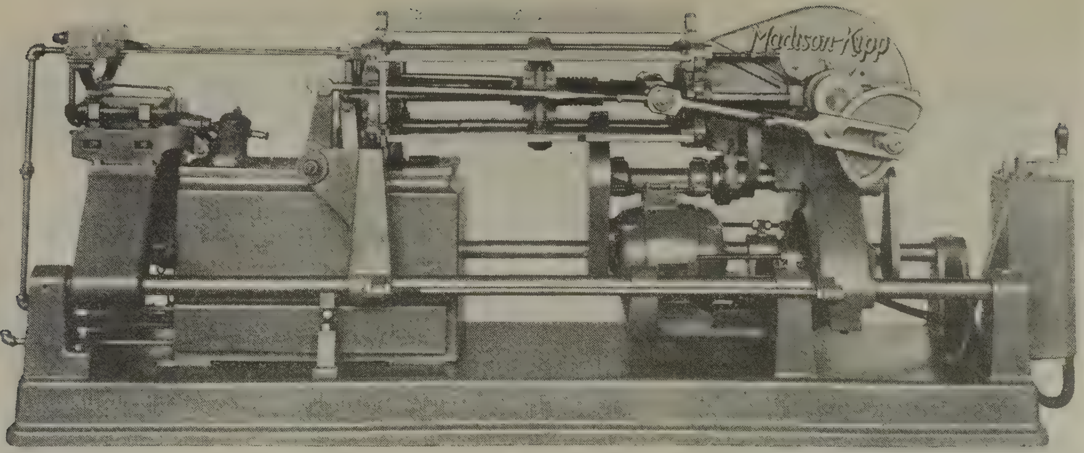
Rails straightened in this roller machine suffered considerable punishment. Of course, they had been strained well beyond the elastic limit, as was proved by the fact that they were quite free from the usual mill scale on the head and base excepting at the ends. The author, however, feels that this method of straightening is likely to be much less detrimental to rails than is the series of from 5 to 15 blows that the average rail receives in a gag press, and also is likely to result in a more accurate line and surface for the finished rail. In short, the roller straightening machine appears to be a desirable advance in the finishing of rails.

Proper Conditions for Use of Cobalt Steels for Permanent Magnets

Cobalt steels possess some important advantages for making permanent magnets, but their cost is high and in many cases may be prohibitive, says the United States Bureau of Standards in a new Scientific Paper, No. 567. However, the bureau points out that some applications of permanent magnets are possible only with the new cobalt steels, and in these cases the cost is a secondary consideration. Decrease in size and weight of the magnet are among the important advantages, but if cobalt steels are used, the magnet must be specially designed to make the best use of the peculiar properties of the alloy. The mere substitution of the more expensive material without due attention to the design is almost sure to lead to disappointing results.

Remarkable improvements have been made in magnetic materials and apparatus during recent years, and one of the greatest of these developments has taken place in steels from which permanent magnets are made. The superior qualities are brought about by adding to the steel a certain amount of cobalt. Unfortunately cobalt is, relatively, very expensive, and the new steels may cost from four to 10 times as much per pound as the ordinary kind. It was to determine the actual conditions under which the new steels should be used that the bureau took up this investigation.

The Dayton Power & Light Co., Dayton, Ohio, has bought from the Westinghouse Electric & Mfg. Co. a 33,000-sq. ft. radial flow type surface condenser, together with the necessary auxiliary equipment, to serve a 25,000-kw. turbine-generator unit. The condenser will be designed to condense 300,000 lb. of steam per hour and maintain a vacuum of 29 in. of mercury. The auxiliaries include dual-driven circulating pump, two priming ejectors, two steam jet air pumps and one turbine-driven condensate pump.



Die Castings of a Wide Range of Sizes and Forms May Be Produced

Die-Casting Equipment with Automatic Features

Operation of Dies and Die Mechanism Also Automatic In Air-Operated Gooseneck Type Machine—Die Service Offered

THE Madison-Kipp Corporation, Madison, Wis., has placed on the market the die-casting machine illustrated, one of which has been in use in the company's plant since 1920 for the production of die castings used in its own products. Toolroom facilities for designing and making dies have been developed, and complete die service is also offered by the company.

Operation is entirely automatic. A feature stressed is that in no case is more than one operator necessary, the duties of the operator being confined to manipulating the lever which engages the driving clutch, supplying new metal, and cleaning the die with an air hose. Safety features are provided and the machine can be stopped and reversed with the die in any position. Standard zinc-base and aluminum-base metals are used in the machine. The design is such that the cores can be pulled only in the proper order, and metal cannot be "shot" unless the die is closed and the gooseneck is in casting position.

The initial drive is by a 2-hp. variable-speed motor which permits the machine to be operated at 4, 6, 8 or 12 "shots" per minute. From the motor the drive is through back gears to a worm and worm-wheel which drives to a shaft upon which special dwell crank cams are attached.

The stationary half of the die is attached to the hot plate of the machine and the movable half of the die is mounted on the reciprocating carriage. The latter derives its motion from rods connected to the slotted connecting rods, eccentrically mounted on the crank cams. With the machine in the position shown, with the die open, the cam roller rides over the cam and advances the carriage by a gradually accelerated movement until the die is closed. This occurs shortly before the cam roller reaches the two-lobed section of the cam. The only object of these two lobes is to hold the die closed by exerting pressure against the heavy coiled springs behind the carriage. During this part of the cycle the crankpin moves forward and back in the slot in the connecting rod.

A charge of metal having been "shot" into the die and given sufficient time to solidify, the die is opened. In opening the die, the cam roller leaves contact with the cam and the crankpin, pulling against the rear end of the slot in the connecting rod, draws the carriage and the movable half of the die back to open position.

Molten Metal Delivered to Die by Air Pressure

It is to be noted that the accelerated movement causes the two halves of the die to come together at a speed sufficient to assure proper engagement, and conversely, it is important to have the highest speed in the cycle for breaking the die open and to start the pulling of cores. The cams provide the accelerated action in the forward movement and the decelerated action on reverse. This allows sufficient time for cleaning of the dies, putting inserts in place, etc.

The gooseneck dips into the metal pot automatically, is filled with metal, and then raised to casting position under the die. At the same time connection is made with the air chamber so that pressure may be applied to the metal for forcing the "shot" into the die. These actions are accomplished by means of push rods, connected to the slotted connecting-rod, which actuate bell cranks that raise and lower the gooseneck. When the gooseneck is raised into casting position, it makes contact with the air chamber and the die at the same time. As soon as the metal has been "shot" the gooseneck is lowered into the metal pot, thus breaking contact both at the die and the air chamber, after the air has been exhausted from the air chamber. Instead of having the gooseneck enter directly into the gate a nozzle-plate is inserted between it and the die. This is intended to prevent any tendency to spread the two halves of the die, thus eliminating production of a fin on the casting.

When the two halves of the die come together, and the gooseneck is in place, air pressure is applied behind the metal in the gooseneck, forcing a "shot" into the die. This is accomplished automatically by means of a cam on the main worm-wheel shaft, which cam makes contact with a roller on a small bell crank or trip and pushes forward the rod connected with the air valve at the rear of the machine. At the side of the machine opposite to the air pressure valve there is a similar mechanism which opens the exhaust valve, so that before the gooseneck is dropped out of engagement with the nozzle plate and die, the air in the air chamber is exhausted.

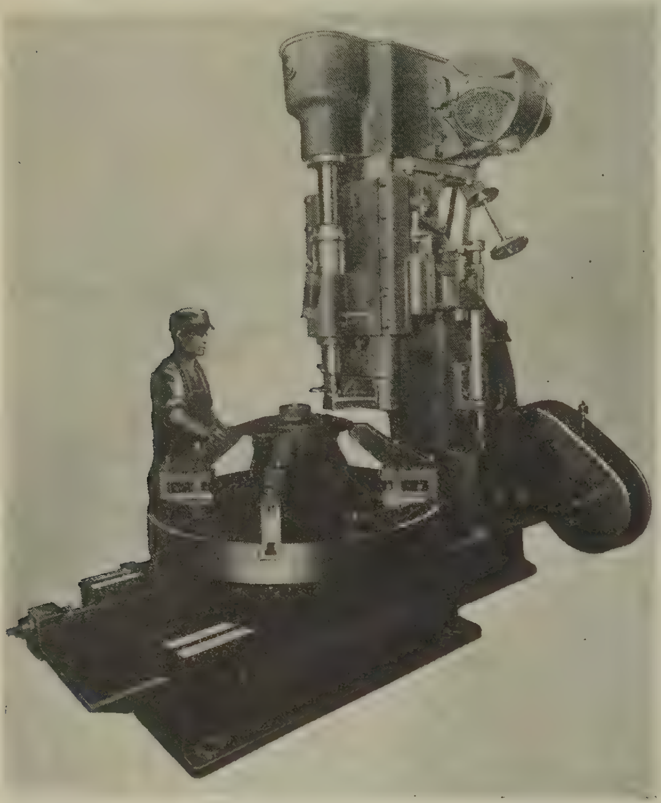
The machine is equipped with a fire brick lined cast iron furnace and a cast iron pot which can be removed from the furnace compartment. The furnace is also removable if occasion demands.

Operation of the dies and die mechanism is automatic with the operation of the machine. Advancing and withdrawing of all cores and the operation of ejector mechanisms are controlled by cams carried on members known as combination bars. Provision is made for mounting six of these bars, two on each side and two above the carriage on which the movable half of the die is mounted. It is stated that by means of these combination bars and the cams mounted on them, cores can be pulled in any direction and at any angle. Provision is also made for air and water cooling of the dies, for the mounting of splash guards and chutes for carrying away the finished castings. The machine is 10 ft. long, 34½ in. wide and 4 ft. 3 in. high. It weighs 6800 lb.

Rochester, N. Y., has been selected for the twelfth annual meeting of the American Gear Manufacturers' Association. Sessions will be held April 19, 20 and 21 at Hotel Seneca. T. W. Owen, 3608 Euclid Avenue, Cleveland, is secretary of the association.

Automatic Machine for Accurate Spacing and Drilling of Circular Pieces

For closely accurate spacing and drilling of a series of holes around circumferences of circular pieces of various diameters, the Southwark Foundry & Machine Co., Philadelphia, is offering the machine here shown, which is fully automatic excepting for mounting and removing the work. The drilled holes may be of different sizes, and the spacing or indexing mechanism may be set for eight to 36 holes. Two or three machines may be served by one operator, and a marked saving in labor is claimed for the machine in the work for which it is designed.



Automatic Spacing-Drilling Machine. The spacing or indexing mechanism may be set for eight to 36 holes, inclusive

The unit illustrated will drill holes ranging from 1 to 2 in. in diameter in steel, and is adapted for work from 1 to 3 in. in thickness. The table and chuck on this machine are special. The table is 54 in. in diameter and has a large central hole to accommodate work having long downward extensions. It is equipped with four self-centering chuck jaws which may be adjusted for gripping work ranging from 12 to 48 in. in diameter. By moving the table on the bed of the machine to a scale provided for the purpose, different diameters of drilling circles may be selected conveniently. Tables and chucks of other sizes, to suit particular requirements, may be applied to the machine.

A 10-hp. motor having speed variation of 3 to 1 is used to drive the machine, the motor being direct connected by gears and controlled by push button and magnetic contactors. The spindle, 4 in. in diameter, has three automatic drilling feeds and fast return. Downward and upward travel of the spindle is continuous while the machine is in operation, and reversal of direction of travel is automatic. Spacing of the table starts as soon as the point of the drill leaves the work on its upward stroke. The table is spaced from hole to hole, without manual setting of the work for each hole, by means of an indexing mechanism similar to that of a gear-cutting machine. This is operated by a small, independent motor and is said to afford very close accuracy of spacing. Coolant reservoir, pump and piping are regularly provided. The drilling chips drop to the open top bed, beneath the work table, and are raked out at the front end of the bed.

The Pacific Coast Steel Co.'s San Francisco office has been moved from the Rialto Building to the Hunter-Dulin Building, Sutter and Montgomery Streets.

Vertical Miller and Die Sinker for Large Castings and Dies

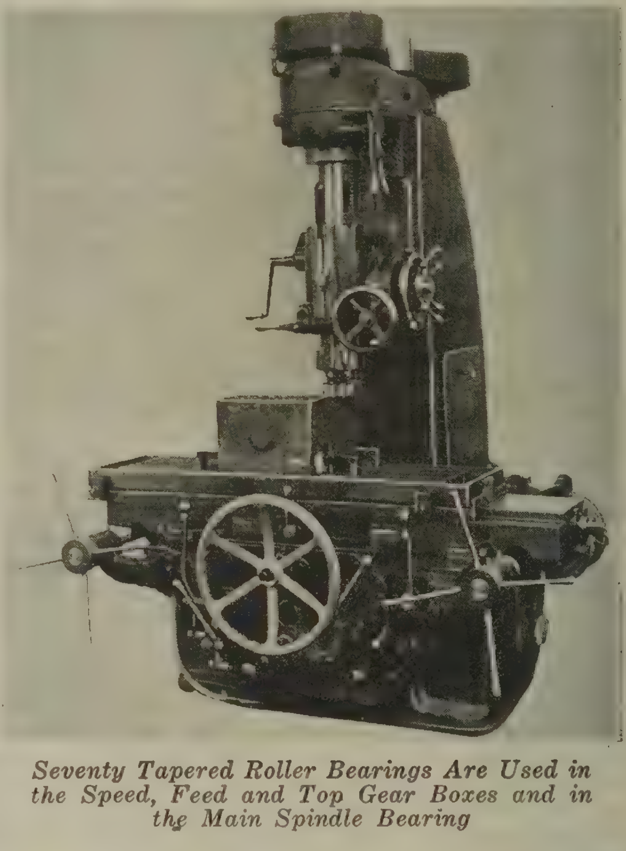
The Reed-Prentice Corporation, Worcester, Mass., is adding to its line a new No. 5 vertical milling and die sinking machine for the vertical milling of large and heavy castings and for the machining of drop forge, body and other dies.

High spindle speeds, necessary for end mills and die sinker cutters, are secured through belt drive to the spindle. Eighteen spindle speeds, ranging from 16.9 to 600 r.p.m., are obtainable and the range of feeds, which number eight for each spindle speed, is from 0.002 to 0.297 in. Power rapid traverse to the longitudinal and cross feeds in either direction is at the rate of 100 in. per min. The spindle is provided with a micrometer stop gage for accurate control of the depth of cut. It is provided with a clutch-type nose and has the taper hole adopted as standard by the National Machine Tool Builders Association.

Timken roller bearings are employed throughout, 70 such bearings being used in the speed, feed and top gear boxes, and in the main spindle bearing. The base is solid and the head and spindle quill adjustable, which construction is intended to provide maximum rigidity. The saddle extends the full length of the table and has four bearing surfaces accurately scraped to the base. Speed and feed gears are of alloy steel, heat treated, and operate in oil.

The spindle is a nickel-chromium steel forging, heat treated, and is mounted in tapered roller bearings.

Longitudinal and cross-feed screws are of heat-treated chrome-molybdenum steel of 50 Shore hardness, and the threads are finished by lapping. Nuts are of special phosphor bronze. The screws are mounted in tapered roller bearings to facilitate operation of the table and saddle.



Seventy Tapered Roller Bearings Are Used in the Speed, Feed and Top Gear Boxes and in the Main Spindle Bearing

Centralized control is a feature, speed and feed levers being located at the front of the machine for convenient operation. The main drive pulley is equipped with clutch and brake for starting and stopping the machine through one lever at the front of the machine. Large diameter handwheels can be supplied in place of the pilot wheels for longitudinal feed of the table by hand. Pilot wheels are disconnected automatically and do not rotate when power feed is engaged. Either single-pulley belt or belt-connected motor drive arrangements may be supplied. For motor drive, a 7½-hp., 1200-r.p.m. motor is recommended.

Some of the important specifications of the machines are: Working surface of the table, 62 x 16 in.; table travel, longitudinal and cross, respectively, 48 in. and 16 in.; height of table above floor, 33 in. The distance from spindle nose to table, minimum and maximum, respectively, 0 in. and 24 in.; vertical feed of spindle, 9 in.; travel of head on column, 15 in.; throat depth, 20 in.; and distance between center line of spindle to face of column, 11¼ in. The floor space occupied by the machine is 95 x 110 in. and the height is 98 in.

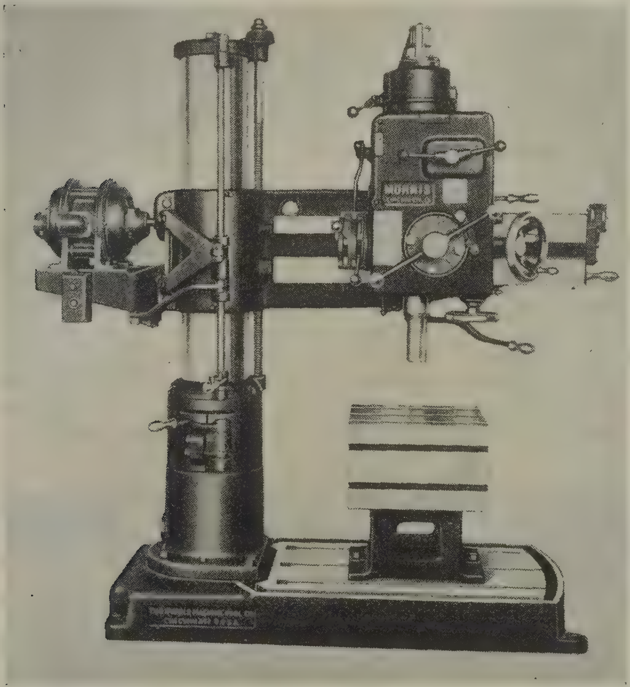
High-Speed Radial Drills with Taper Roller Bearings

The use of Timken roller bearings throughout, except for the tapping-attachment bevel gears, is a feature of a new high-speed, all-geared radial drill added recently to the line of the Morris Machine Tool Co., Cincinnati. Other features include hardened and broached gears; heat-treated multiple-splined shafts and spindle; multiple-disk clutch, and positive lubrication. The machine is available in 3- and 4-ft. sizes.

Speed and feed changes are located in the head and changes are made through sliding gears by means of convenient levers. Twelve speed changes, ranging from 125 to 1600 r.p.m., and six feeds, from 0.004 to 0.025 in. per revolution, are available. The tapping attachment reverse clutch is of multiple-disk type with the disks running in oil. The tapping-attachment bevel gears are mounted in double-row ball bearings.

The entire head and back bracket also operate in oil, which is supplied by a constant speed pump. The oil is pumped through a sight-feed oiler on top of the head, feeding by gravity through the head to the other parts.

The spindle is mounted on roller bearings in a heat-treated steel sleeve of large diameter with the rack teeth cut integral with the sleeve. Dial depth gage, automatic feed trip and safety friction feed are incorporated in the head.



Tapered Roller Bearings and Alloy Steel Gears Are Used. Twelve speeds, from 125 to 1600 r.p.m., are available

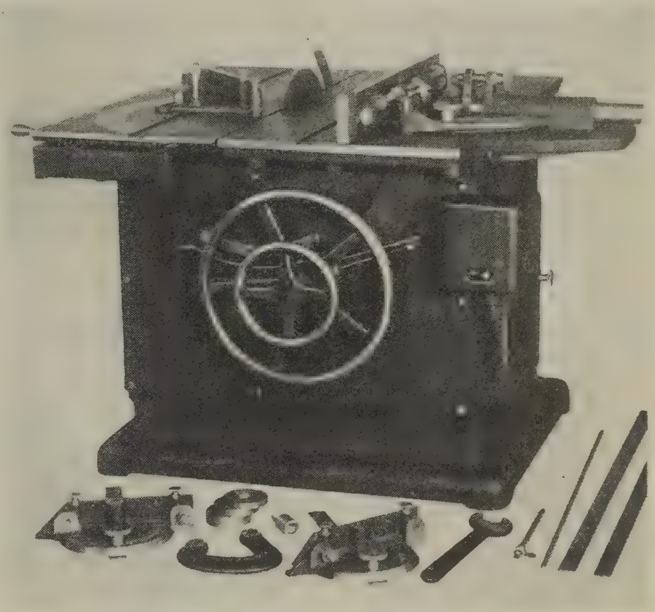
The elevating, lowering and clamping of the arm are controlled by a single lever located conveniently at the front of the machine. It is impossible to elevate or lower the arm while it is clamped, as the single lever unclamps the arm automatically before throwing in the elevating device. The elevating speed is constant and can be thrown in at any time. There is a safety friction on the elevating screw and an automatic knockout on the top and bottom of the column. All control levers are centralized. Speed and feed change, elevating and clamping levers can be reached by the operator without changing his position.

One constant-speed motor mounted on the arm and geared direct to the drive shaft is used to drive the machine, including the elevating device. The drills of 3/16-in. size may be run at 80 ft. per min., and the machine has capacity for driving 1½-in. drills.

Tilting-Arbor Saw Bench for Pattern Shop Use

A tilting-arbor miter saw adapted for use in pattern shops has been brought out by the Oliver Machinery Co., Grand Rapids, Mich. The machine is a built-in motor-driven circular sawing unit, the working top of which remains horizontal and the saw arbor tilts to any angle up to 45 deg. Saws up to 18 in. in diameter may be used, the 18-in. saw projecting through the table 4¾ in. The standard machine is designed to rip work up to 30 in. wide and do miter or dado work, either in the square or in the angular position up to 45 deg.

The base is a one-piece casting, measuring 33 x 39 in. at the floor line, and has built-in dust chute which terminates in a 6-in. round hole for connection to the blower system. A hinged door at the rear of the base provides access to all working parts of the machine, without the necessity of removing the table.



Tilting Arbor Saw Equipped with Universal Table with Rolling Section. There is also a universal tilting micrometer ripping fence and universal gages

Either a plain table, or a universal table having rolling section, can be furnished. The plain table is 44 in. long, 40 in. wide in the main portion, with 18-in. extension arranged so that it can be mounted either on the right-hand or the left-hand side of the table, giving a total of 58 in. of table width. A graduated scale on the top indicates the width of ripping up to 30 in. wide. Slots are provided on either side of the saw for the universal miter gages. The universal table has 15-in. rolling section to the left of the saw, and rolls on ball bearing ways. The rolling table may be moved 4 in. from the saw to permit use of dado saws and special heads. Cross cutting, mitering and grooving up to 36 in. wide may be done.

The motor-on-arbor consists of a 5-hp., 2 or 3-phase, 60-cycle, 220 or 440-volt, ball-bearing shaftless motor mounted directly on the saw arbor. Tilting of the saw arbor and motor unit is by means of a large handwheel directly in front of the operator through suitable gearing. The angle at which the saw is tilted is indicated by a segment and pointer. Means are provided for locking the saw at any tilted position. Push-button motor control is mounted on front of the machine.

The saw arbor is of high-carbon steel ground and is fitted with ball bearings. A dado sleeve with filling collars enables the saw arbor to carry dados up to 4 in. if desired. Safety features are provided, and convenience of operation has been given thorough attention. Ripping fences, miter cut-off gages and other equipment are furnished. The weight of the machine, designated as the No. 88, is 2200 lb., crated.

Immersion Heater for Plating Solutions

An electric immersion heater for electroplating solutions and other liquids which will not attack lead, and intended primarily for low-temperature heating, has been made available by the General Electric Co., Schenectady.

There is a steel-sheathed helicoil unit covered with a lead jacket which is swaged tight to the steel unit. The terminals are brought into a terminal box suitable for conduit connections. It is made in two sizes, both for a maximum demand of 5 kw., one for 110-volt and the other for 220-volt circuits.

Only the lower portion of the heaters dissipates heat. The upper portion, being inactive, allows the unit to be used in tanks in which the level of the solution may be as low as 10 in. from the top of the tank. The heater can be supplied in different formations.

Portability, ease of installation and non-interference with work in the tank are among advantages claimed.

Six-Foot Extension Added to Plate Rolls

The lengthening of a set of 34-ft. plate rolls to 40 ft. was successfully accomplished recently at the East Chicago, Ind., plant of the General American Tank Car Corporation. The original machine, a Ryerson-Kling bending roll installed in 1919, had capacity of 34 ft. 2 in. by ¾ in., and was equipped with an upper roll 29 in. in diameter and two lower rolls 20 in. in diameter.

In making the addition it was necessary to dismount the rolls, extend the base, and move out the rear housing. The 6-ft. extensions, made of Mayari iron, were slipped over the journals and welded along the circumference of the joints. Additional center support was furnished and placed at the joints of the lower rollers. The completed machine is shown below.

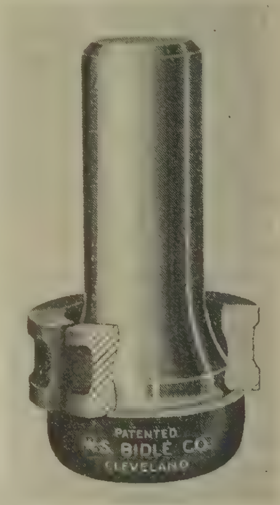
The North mill of the Alan Wood Iron & Steel Co., Conshohocken, Pa., has resumed operation. The mill, which produces blue annealed sheets, has been closed since December, when the mill drives were electrified.

Rivet Set with Tapered Shank for Standard Hammer Barrels

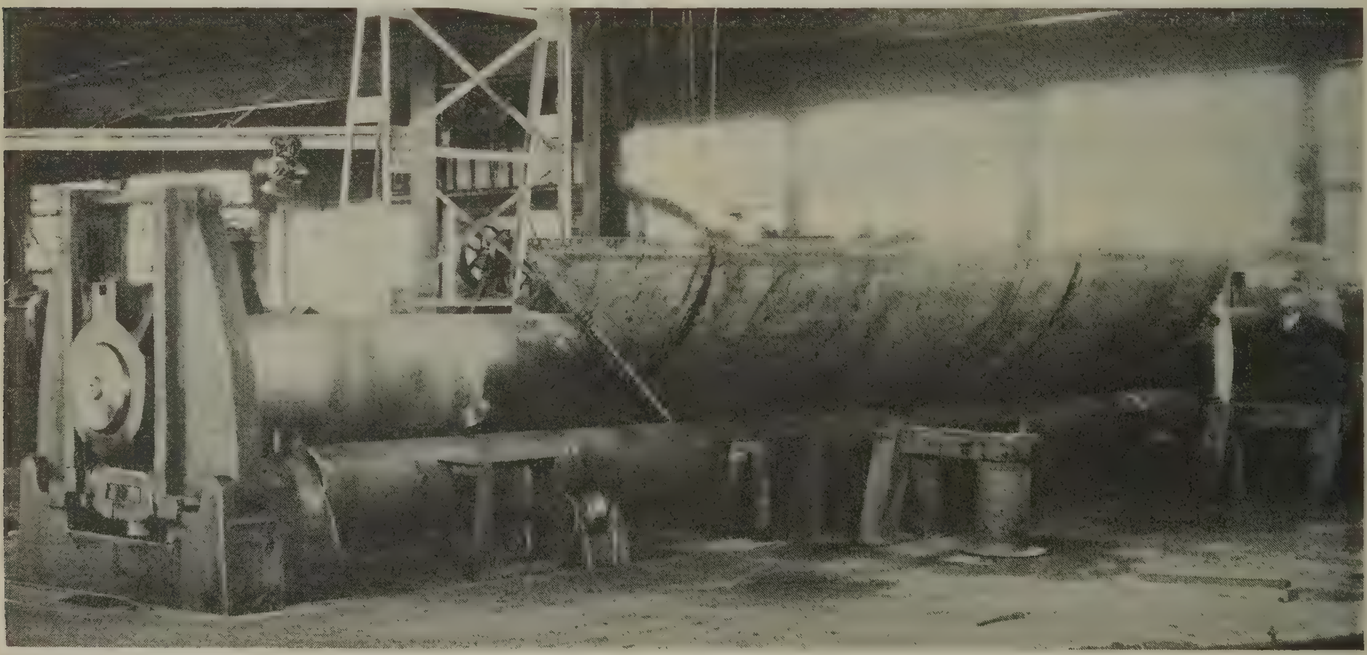
A new design of rivet set having a tapered shank and a split ring that is pressed on the shank, and permits the use of the set with any pneumatic hammer having a standard barrel, has been brought out by the W. S. Bidle Co., Cleveland. It is claimed that the design of the tool, which is designated as an anti-fatigue rivet set, eliminates breakage of the shanks under hard usage. The new set is intended to provide the advantages of a large radius between the shank and the head in a set that can be used with a standard hammer barrel.

The split ring floats, forms a separator between the barrel of the hammer of the set, and also acts as a buffer. Its weight thus becomes a part of the hammer, not of the set, so that it is stated that, size for size, the anti-fatigue sets are lighter than those of conventional design. The split ring has a spring temper, can be readily pressed on the set in a vise, and will not come off in use. When the set is worn out, the ring can be removed and applied on another set. The sets, including the split rings, are made of heat-treated chrome-vanadium steel.

Rivet Set Designed to Provide Large Radius Between Shank and Head, and Still Be Usable in Standard Pneumatic Hammers Without Any Changes



Average weekly earnings of factory workers in New York State in December are reported by the Industrial Commissioner to have been $29.57, compared with $28.75 in November. Except for last March, when an average of $29.78 was recorded, the December figure is the highest ever reported. It was equalled by that for September. Average for the year at $29.30 makes a new high record, exceeding by 1 per cent the average of $29.02 in 1926, which was the previous record.



The 6-Ft. Extensions, of Mayari Iron, Were Slipped Over the Journals and Welded Along the Circumference of the Joint. Additional center support was placed at the joints of the lower rollers

BOOK REVIEWS

Foremanship Training. By Hugo Diemer. Pages 230, 5 x 7 in. Published by McGraw-Hill Book Co., New York. 1927. Price, $2.50.

Naturally, this book is intended for the particular executive who is charged with and responsible for developing better foremanship—something that is rarely done, despite the importance of training, to say nothing of selecting the liaison officer between employer and nonclerical workers. The need for foremanship training is stressed, although that stress should really be a matter of supererogation.

The foreman's activities are defined along Taylor's machine-shop lines, which really apply to all kinds of production work. The foreman's personality is sketched from various widely different angles—works managers', trainers' and experienced foremen's. The production conference gets a chapter showing how it tends to develop foremen, but weight is laid upon the fact that participation in such conferences does not necessarily make a good foreman.

Foremen's clubs and associations are given attention; for instance, hints are thrown out as to how they should be organized, and a model constitution is reproduced. The statement is made that the international industrial committee of the Young Men's Christian Association will suggest programs and speakers; but, from personal knowledge of the way in which its foremanship course and books for side reading were turned down flat in Philadelphia, Baltimore and elsewhere, I do not concur in the author's recommendation. I am inclined to prefer that assistance be sought from the National Association of Foremen, Dayton, Ohio.

The activities of the conference as regards teaching, training, discussion, etc., are outlined. I may say that if care be not taken with such conferences the result will be, as it has been several times, that no two foremen will speak to each other. The recommendations of the Chamber of Commerce of the United States for foremanship courses are reproduced. The safety movement received, as it should, considerable attention; and there is a chapter recommending giving the foreman information about cost calculation. Industrial engineering in its relation to foremanship is considered somewhat in detail. This matter, however, is put in a manner properly addressed to and intended for the foreman, whereas the book is nominally not for him, but for the superintendent of personnel. R. G.

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Organizing the Drafting Department. By H. F. Church. Pages 133, 5½ x 8½ in. Published by Ronald Press Co., New York. Price, $3.50.

There are so many kinds of drafting departments, the requirements varying so with the industry in question, the capital invested and the production methods, as well as the amount and kind of inventive genius involved in production, that set rules for organizing the drafting department cannot be formulated to cover the entire ground, or to cover any large part thereof other than thinly and unevenly. The human element, also, comes into play. A drafting department may be organized with almost Taylor-like thoroughness, but if there is not good team-work, no disposition on the part of the head draftsman to impart his knowledge and on that of the old hands to aid the newer ones, the department will fail in spots at least, and perhaps as a whole.

The author apparently has had personal experience with a head draftsman chosen on account of "firm loyalty," but I have never heard of such a case. I do know, however, of one head draftsman whose lack of that quality led him to run a private drafting department at home and eventually to set up in business for himself in competition with the employers whose ideas, and those of his own for which his employers had paid, he stole.

One asset for a head draftsman the author omits to mention: a well-filled notebook and a set of pocket books and reference books in the line of the work in question; further, good eyesight and steady nerves, also necessary qualifications for his assistants.

Addresses of publications useful in advertising for draftsmen are given—most unnecessarily, as such lists imply that the head draftsman is not familiar with the trade periodicals in his own line; and the lists are incomplete, as they omit, for instance, the employment bulletins issued by the associated American engineering societies.

One qualification for draftsmen in machinery lines is omitted—the ability to take "mental photographs" of machines and appliances, and make detail sketches thereof afterward; also to evolve kinematical equivalents for patented mechanical movements, as for instance, a "sword-arm" for a slotted link on a locomotive, a filling cam for a cam and spring, or a petcock for an adjustable head on a printing-press buffer.

Isometric perspective, one of the most valuable means of representing three-dimensional objects in one drawing with the same scale in all three axial directions, is not even hinted at, although it is a godsend for pattern-makers and blacksmiths.

Apparently "the" drawing department to be organized is to use high-grade white paper for the master drawing; whereas modern practice is more likely to make the original on Manila paper (in lead pencil, often) and rely on tracing for the master drawing, from which any number of blueprints may be made. This permits changes to be made for successive models with but little difficulty, a new set of blueprints, properly dated, answering for repeat jobs until the new model is in the shops, and for repairs.

R. G.

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Metallographic Atlas. By Prof. H. Hanemann and Miss A. Schrader. Sections 1 and 2, consisting of 16 plates with text (125 illustrations). Published by Gebrüder Borntraeger in Berlin, Germany. Price, 14 marks.

This will eventually be a complete collection of photomicrographs, covering all metals and alloys. It bids fair to be an excellent reference collection of the structures encountered, and has accompanying explanations. These two sections (the first of the series) have to do with steel. Photographs are on photographic paper (not printed through a screen), thus preserving all the detail, and they are of fine quality.

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Metallography. (Die praktische Nutzanwendung der Prüfung des Eisens durch Atzverfahren und mit Hilfe des Mikroskopes.) By G. Berndt and M. V. Schwarz, professors in the technical high schools of Dresden and Munich respectively. Third enlarged and improved edition of E. Preuss's original work. Pages 198, 204 illustrations. Julius Springer, Berlin W.9, Germany. Price, 7.80 reichsmarks in paper; 9.20 in cloth.

A note on the title page says the book is for engineers as well as for superintendents. It might be added that it could be used to advantage by students, laboratory investigators and inspectors who have a smattering of German. Its scope is entirely confined to iron and steel, and much attention is given to those portions of the field which have not yet found their way commonly into text books. About a quarter of the space is given to macroscopy, the examination of large areas of polished and etched specimens by naked eye or under low magnifications. Included is a fine collection of 50 pictures showing segregations, flow lines, strain lines and other abnormalities discoverable by this method. Another excellent section is on the structure of welds made by all the commercial processes.

The selection and reproduction of the photographs are especially commendable. Without using a paper so highly finished that it glares, the printers have been able to reproduce fine details of structure with unusual fidelity.

Care and Operation of Machine Tools. By J. W. Barritt. Pages XIII + 290, 6 x 9 in., 160 figures. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, $2.75, net.

Written by a former supervisor of apprentices, Westinghouse Electric & Mfg. Co., Philadelphia, and used for a number of years in his own work, the volume is intended as a text and reference book for high schools, universites and trade schools, and as a part of apprentice training programs. The arrangement adapts it also for home study purposes.

Machine tools dealt with are the drill press, shaper, vertical boring mill, engine lathe, planer, horizontal boring machine and the milling machine—in the order named. More than 70 pages are devoted to the engine lathe, more than 50 to the milling machine, and more than 35 to the planer. The opening chapters deal with lubrication and the emery wheel, respectively.

The text describes the construction of the various units of the standard machine tools listed above, and explains why and how to make the necessary adjustments, which enable the beginner to operate the different mechanisms without injuring himself or the machine. Specific job operations are not considered except for the purpose of illustrating some point in the care and operation of the machine. The subject of tool grinding is treated pictorially. Tools used on each machine are grouped by classes and the shape of each tool and correct grinding are shown. The chapter devoted to milling machines includes data and illustrations of the recently adopted standardized spindle end.

The author writes clearly and gives evidence of practical contact with and appreciation of the needs of the apprentice and other students. The questions and problems listed at the end of each chapter (to the number of 139 and 30, respectively, in the chapter on lathes), add to the worth of the volume.

Plating and Coloring. (Metallniederschlage und Metallfarbungen.) By F. Michel, director of public testing laboratories, Pforzheim, Germany. Pages 179, 13 illustrations. Julius Springer, Berlin W.9, Germany. Price, 6.90 reichsmarks in paper binding.

This book contains a wealth of information on the subject matter. It is evidently written by a man well informed about the science underlying his art, but who is able to state the essential information in a manner understandable to an artisan not so well favored. Thus, while it describes the operation of a plating vat, it does so without introducing a heavy mathematical consideration of the electrical phenomena. It is unusually complete, discussing the operation of ordinary plating baths and those for the rarer metals as well. Notes on solutions which can be used for plating without the use of electricity are also included. Coloring of the various commercial metals by dipping into suitable solutions is very briefly considered in 20 pages of text. Heat tinting is not mentioned.

Mechanics of Machinery. By C. W. Ham and E. J. Crane. Pages XIII + 504, 6 x 9 in.; 385 figures. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $4.00.

The purpose of the authors has been to bring together in a condensed textbook just sufficient material to give the student a working knowledge both of "mechanism" and of "dynamics of machinery" in the time ordinarily available for this work in an engineering curriculum.

The book is divided into two parts, Part I, of 204 pages, being devoted to "Mechanism," and Part II, of 280 pages, to the "Kinematics and Dynamics of Machinery." The chapters on mechanism outline the fundamental mechanisms and the theory of the operation, while the second part of the book aims to enable the student to analyze the forces as well as the motions in the mechanisms or machines dealt with in the first part of the volume. A knowledge of analytical mechanics is presupposed in connection with study of Part II.

The authors did not set out to write a complete treatise. The statement of each topic is necessarily brief, only sufficient material having been included to bring out fundamental principles and methods. Sources of additional information are listed at the end of each chapter. Problems, also given at the end of each chapter, are intended to serve as a guide in presenting the drafting room work.

Handbook of Iron and Steel Foundry Work. (Handbuch der Eisen und Stahlgiesserei.) Vol. II.: Molding and Pouring. By C. Irresberger. Pages 584, 7½ x 10½ in.; 1702 illustrations in the text. Published by Julius Springer, Berlin, Germany. Second edition, 1927.

While we have not much to learn from Germany in the matter of iron founding, particularly core-making and setting, and perhaps in brand mixing, we can well learn from her analysis and teaching; and this work is an excellent example of infinite detail, carefully arranged and thoroughly explained. We probably excel German practice in molding machines and their use, and in core machines; and the Germans have only comparatively recently learned the use of stripping plates and drawing machines. These facts, however, and the German's infinite capacity for taking pains, go to furnish the reason why the average German foundryman is better than the average American.

Especially to be commended is the clearness of the line engravings, and the abandonment of German Schrift letters in favor of the italic line lettering of the character originated, I believe, in the Westinghouse drafting rooms.

Strangely enough, the "carrousel" machine, of which there are two in the Bavarian State foundries at Amberg, are not mentioned; neither are iron cores, so successfully used in American stove foundries and in making very wide so-called link belts. One-piece iron soil-pipe molds, for straights and elbows, find no place; although the Custer heavy two-part iron molds are given a couple of paragraphs. The Schwarz double-walled, oil-cooled molds (an American invention, which one can see in the Allyne-Ryan foundry in Cleveland) get considerable attention in connection with the mechanical appliances for their use on a large scale. This is a most important process, as castings from the same ladle show much greater tensile strength and bending capacity than those made in sand molds. Centrifugal force, as applied to driving the metal into the finest crevices of the mold, is taken up rather fully, which is necessary; as for each pipe or piston ring diameter, there is a best rotation speed of the machine, also a most practical metal temperature. The "monocast" process, used in the American Cast Iron Pipe Co. foundry in Birmingham, Ala., and another somewhat similar one, in use in Florence, N. J., have attracted the author's attention.

This book is a valuable addition to the first volume, and a worthwhile contribution to foundry literature. It is unfortunate, however, that from the very thoroughness with which it has been written and published, it is not, and cannot be, quite up to date.

R. G.

"Steel Roofing—Its Use and Application" is the title of a booklet issued recently by the Sheet Steel Trade Extension Committee, Oliver Building, Pittsburgh, which is designed to sell the idea of sheet steel roofing to the rural dweller. Of particular interest are photographs showing the effect of sheet steel roofs in preventing the spread of fire.

The International Nickel Co., 67 Wall Street, New York, has issued Nos. 203 and 204 of its series of booklets on nickel cast iron. The first, entitled the "Economic Value of Nickel in Cast Iron," outlines the various uses of nickel in foundry mixtures and deals in some detail with the results obtained. The other booklet deals briefly with the "Effect of Nickel on Machinability of Cast Iron," and presents an analysis of the difficulties in machining gray cast iron.

Electric Industrial Trucks and Tractors in Industry

A book of 96 pages and 136 illustrations has been issued by the Society for Electrical Development, 420 Lexington Avenue, New York. Cooperation with 20 manufacturers of electric industrial trucks and tractors, storage batteries and accessories was had in preparing the book, which is devoted to the profitable application of these units in industry. There is a special chapter for each of 16 major industries, of which the steel industry, foundries, machine shops and automobile plants are the four first considered. Others include railroad, marine and warehousing operations, and plants devoted to textiles, leather, rubber, paper, lumber, food products, chemicals and ceramics.

For each of the industries covered, the operating processes and the particular type of truck suited to individual jobs are described. An outline of operating costs is given, together with a tabulation of direct savings effected by employing this type of equipment. Illustrations show equipment in use in various types of service, handling various materials.

Steel Construction

A valuable addition to the engineering handbooks dealing with construction matters is a volume on steel construction, just issued by the American Institute of Steel Construction, 285 Madison Avenue, New York. Bound in limp leather, there are 384 pages full of engineering data, relating particularly to structural materials and their use. New beam and girder sections announced during the past two years by the Carnegie Steel Co. and the Jones & Laughlin Steel Corporation are included, alongside the Bethlehem special H-beams, and the standard beams furnished by all companies making structural material. Hence, the present volume contains a compendium of data regarding all of the principal structural members obtainable.

Part I covers standard specifications, the code of standard practice of the American Institute of Steel Construction and several pages devoted to the historical development of steel and iron as a construction material. Part II takes up the properties of sections, formulas for beam loading and general mathematical tables. Part III is devoted to the strength of building materials and general information related thereto. Part IV takes up the structural shapes and details—both the rolled structural shapes and the built-up sections. It explains the institute's specifications and formulas and gives dimensions, functions and allowable load tables for the various sections described, and data regarding rivets and other connecting media. Copies of the book may be obtained from the institute at $1.50 each.

Ventilation of the Holland Tunnel

Under the title "The Eighth Wonder," a well illustrated book has been put out by the B. F. Sturtevant Co., Hyde Park, Mass., describing the construction of the Holland vehicular tunnel between New York and Jersey City, and in particular featuring the elaborate ventilation arrangement. The fans, in heavy traffic, will handle 84,000 tons of air an hour, or 1400 tons a minute. The book describes the elaborate experiments which had to be undertaken before this system could be worked out and shows by illustration, both half-tone and line-cut, how the job was done.

Most of the book is taken up, however, with a graphic description of the operation of constructing the tunnel. There are 64 pages filled with information and with photographic reproductions showing many of the features of construction work, as well as line drawings giving particulars of size, relations of one part to another and many other pertinent facts.

"Getting Results with Ludlow-Saylor Screens" is the title of a catalog issued by the Ludlow-Saylor Wire Co., St. Louis. Sections of the book are devoted to the control of crusher wastes with woven screens, points to consider in choice of sizing screens, reducing costs of crushing and grinding with woven screens, special wire cloths for unusual services, and other subjects. Complete reference data on double crimped wire cloth and woven screens are furnished. Illustrations are ample. The book is handsomely printed and bound.

Recovery of waste heat from industrial processes is dealt with by J. B. Crane, engineer, boiler department of the Heine Boiler Co., New York, in the December issue of *Safety Valve*, published by that company. Particular attention is given to the recovery of waste heat in the open-hearth furnace.

Production of bituminous coal in January is estimated by the United States Bureau of Mines at 44,200,000 net tons in 25.3 working days. This is a reduction of 23 per cent from the output of January, 1927, with the same number of days; but exceeds the production of December, which was 41,277,000 tons in 26 days.

New Books Received

Standards and Specifications in the Wood-Using Industries. 1927. Pages 349, 8 x 11 in., illustrated. Published by Bureau of Standards, United States Department of Commerce, Washington. Price, $1.50.

The Economics of Installment Selling. By Edwin R. A. Seligman. Two volumes, pages 357 and 623 respectively, 6½ x 9½ in., illustrated. Published by Harper & Brothers, 49 East Thirty-third Street, New York. Price, $8.

The Road to Plenty. By William T. Foster and Waddill Catchings. Pages 231, 5½ x 8½ in. Issued by Pollak Foundation for Economic Research, Newton 58, Mass. Price, $2.

Postponing Strikes. By Ben M. Selekman. Pages 405, 5½ x 8 in. Published by Russell Sage Foundation, 130 East Twenty-second Street, New York. Price, $2.50.

Industrial Progress and Regulatory Legislation in New York State. Pages 147, 6¼ x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $2.50.

Manual of Industrial Safety. By Sidney J. Williams. Pages 197, 5¾ x 8½ in. Published by A. W. Shaw Co., Cass, Huron and Erie Streets, Chicago. Price, $2.

Cost of Government in the United States 1925-1926. Pages 294, 6¼ x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $3.50.

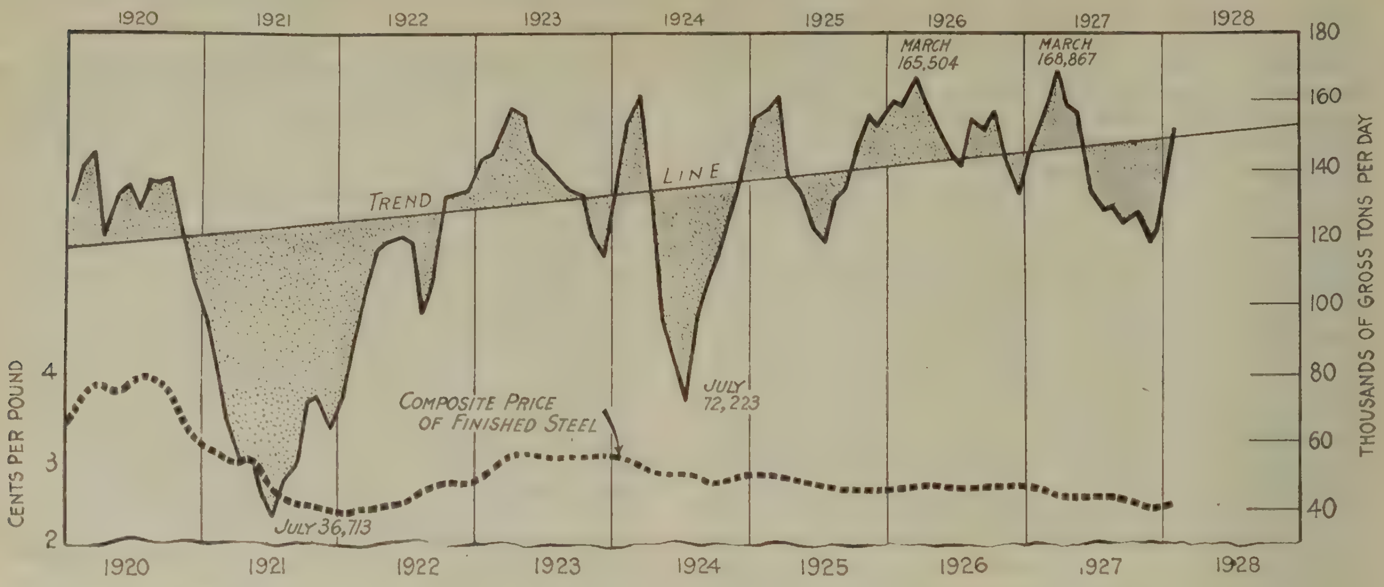
Mining Engineers' Handbook. Edited by Robert Peele. Pages 2523, 4½ x 7 in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, $10.

The Metastable Nature of Iron Carbide. Bulletin No. 83, Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa. The author is Anson Hayes, professor of physical chemistry and metallography. 52 pages.

Carbon Dioxide and Imposed Electromotive Force as Factors Affecting Rates of Corrosion of Iron in Return Mains of Steam Heating Systems. By Anson Hayes, E. Lee Henderson and Charles E. Staneart, department of chemistry, Iowa State College. Published as Bulletin No. 84 of the Iowa Engineering Experiment Station, Ames, Iowa.

Investigations of Fuels and Fuel Testing in 1925. By the Testing and Research Laboratories of the Canadian Department of Mines, Ottawa. Publication No. 671. Pages 184.

Production of Steel Ingots in January Showed an Exceptional Gain, Over 25 Per Cent, and Now Has Gone Above the Line Representing the Calculated Trend of Consumption for the First Time Since Last May



Great Increase in Ingot Production

Daily Rate of 152,304 Tons Was 25.7 Per Cent Above December and the Largest in Eight Months

PRODUCTION of steel ingots in the United States in January is calculated by the American Iron and Steel Institute at 3,959,904 gross tons. This is based on returns from companies which in 1926 produced 95.40 per cent of the total tonnage. With 26 working days, the January production was 152,304 tons a day. This compares with 121,167 tons in December and 119,299 tons in November, and with 144,611 tons a year ago.

Except for March, April and May, the January total tonnage was greater than that recorded in any month last year. With two exceptions (1926 and 1925) it was the largest January output ever made. It exceeded last year's opening month by 5.3 per cent. Most of the gain of 25.7 per cent over December was made in open-hearth steel, which advanced 28.2 per cent. Bessemer tonnage went up 11.3 per cent. Only once before was the present gain of 809,000 tons in one month matched. March, 1918, 26 working days against February's 24, advanced 1,003,000 tons. The famous "heatless days" were then over.

Estimating production in January of electric and crucible steel ingots (no longer covered in the institute's monthly figures) at 700 tons a day, the January total ingot output would appear to be about 153,000 tons a day. Details of the past two years are shown in the table.

Production of Steel Ingots

(Gross Tons)

Months	Reported by Companies Which Made 95.40 Per Cent of the Steel Ingots in 1926 Open-Hearth	Bessemer	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
1928				
Jan.	3,278,897	498,851	3,959,904*	152,304*
1927				
Jan. ...	3,041,233	545,690	3,759,877*	144,611*
Feb.	3,042,232	565,201	3,781,376*	157,557*
March ..	3,701,418	590,716	4,499,092*	166,633*
April ...	3,340,852	565,634	4,094,849*	157,494*
May	3,272,810	557,683	4,015,192*	154,430*
June ...	2,822,477	486,047	3,468,055*	133,387*
July	2,595,692	436,446	3,178,342*	127,134*
Aug.	2,805,657	505,584	3,470,903*	128,552*
Sept. ...	2,611,976	471,455	3,232,108*	124,312*
Oct.	2,641,920	495,798	3,289,013*	126,500*
Nov.	2,477,253	481,830	3,101,764*	119,299*
Dec.	2,557,130	448,299	3,150,345*	121,167*
Total..	34,910,650	6,150,383	43,040,916*	138,395*
1926				
Jan.	3,326,846	581,683	4,132,210	158,931
Feb.	3,023,829	556,031	3,785,051	157,710
March ..	3,590,791	635,680	4,468,617	165,504
April ...	3,282,435	601,037	4,105,799	157,915
May	3,201,230	516,676	3,927,979	151,076
June ...	3,036,162	498,764	3,734,153	143,621
July	2,911,375	526,500	3,634,993	139,807
Aug. ...	3,145,055	627,273	3,986,966	153,345
Sept. ...	3,089,240	612,588	3,913,383	150,515
Oct.	3,224,584	630,526	4,074,544	156,713
Nov.	2,915,558	592,239	3,705,744	142,529
Dec.	2,788,479	493,172	3,466,766	133,337
Total..	37,535,584	6,872,169	46,936,205	150,920

*Excluding crucible and electric steel ingots.

Foundrymen Appoint Members of Bureau of Standards Committee

Representatives of the American Foundrymen's Association on the ferrous metal committee advisory to the United States Bureau of Standards have been appointed for 1928 and are as follows:

John Howe Hall, metallurgical engineer Taylor-Wharton Iron & Steel Co., High Bridge, N. J., chairman of the A. F. A. group and representing the steel castings section of the A. F. A.

H. Bornstein, chief chemist Deere & Co., Moline, Ill., representing the cast iron section of the A. F. A.

J. B. Deisher, consulting engineer, 24 Roslyn Street, Rochester, N. Y., representing the malleable section of the A. F. A.

The advisory committee to the Bureau of Standards meets once a year and with its staff goes over the activities of the bureau, advising as to the projects which seem to be of greatest need to the industries, and discussing projects which should be given future consideration.

The next meeting of the committee is to take place in Washington May 11 and 12.

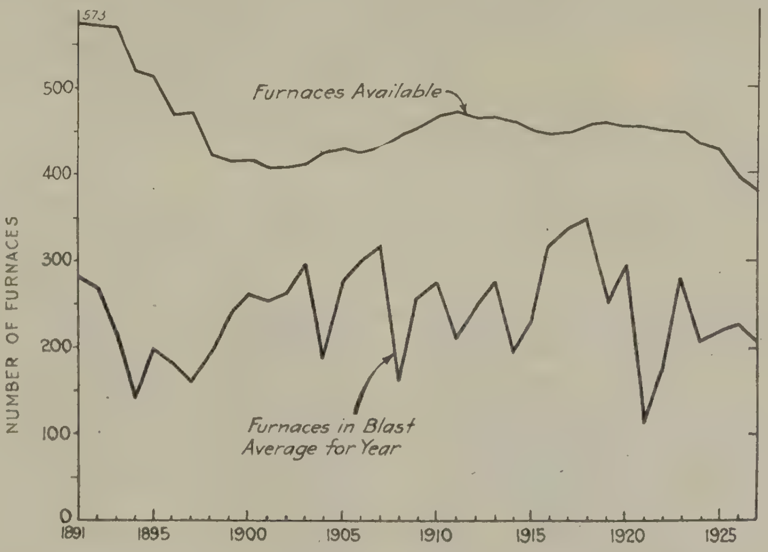
Fewer Locomotives Shipped

Railroad locomotives to the number of 47 were shipped in January, as against 72 in December, according to the Department of Commerce, Washington. Of the December shipments, 22 locomotives were steam and 23 electric for domestic use and two were steam engines for foreign use. Unfilled orders numbered 222 on Jan. 31, against 232 a month earlier. January shipments made the lowest month's total in several years.

Increasing Blast Furnace Capacity

Study of Output of Past 37 Years Covers Total Capacity of Furnaces Available, Number of Furnaces and Average Number in Blast and Tonnage Produced

AVERAGE annual production of pig iron per furnace in blast in the United States has advanced from 29,570 tons in 1891 to 176,700 tons in 1927, according to figures published in a Business Barometer of the Iron and Steel Industry, prepared by the School of Business Administration, University of Pittsburgh. Our table is based on one from an unpublished master's thesis by F. C. Smith, of the Department of Business Statistics of that university. With a few irregularities, the advance was continuous over the period. The average output first reached 100,000 tons per furnace in 1909. It has not dropped below that figure since then. It first reached 150,000 tons per furnace in 1921, and dropped below only in 1923, when, with a new high record output of pig iron for the country, many of the smaller, high-cost furnaces were brought into play by the demand for iron.



FURNACES in Blast in the United States, as an Average for the Year, for Each Year from 1891 to 1927, Both Inclusive, Together With the Total Number of Furnaces in the Country. Heavy elimination of worn-out and high-cost furnaces features the recent years

Figures for capacity were derived from annual reports of the American Iron and Steel Institute. In 1896, and again in 1924, 1926 and 1927, a slight decline in total capacity was registered. But no retrograde movement appears in the average capacity per furnace, which shows a consistent and steady rise from 62.5 tons a day in 1891 to 364.3 tons in 1926. It first passed 100 tons in 1896, then 200 tons in 1907 and 300 tons in 1920. While this change came about in large measure from the erection of large and ever larger stacks. it was accelerated by the gradual disappearance of most of the charcoal furnaces, which are small, individually, and of low output.

One diagram shows the total number of furnaces available (including those undergoing repair) on Jan. 1 of each year from 1891 to 1927. Furnaces in blast furnish a companion curve which gives a clear indication of the extent to which existing furnaces were being used. The active furnaces represent the average, during the year, of the monthly figures.

In a second diagram the steady upsweep of the average

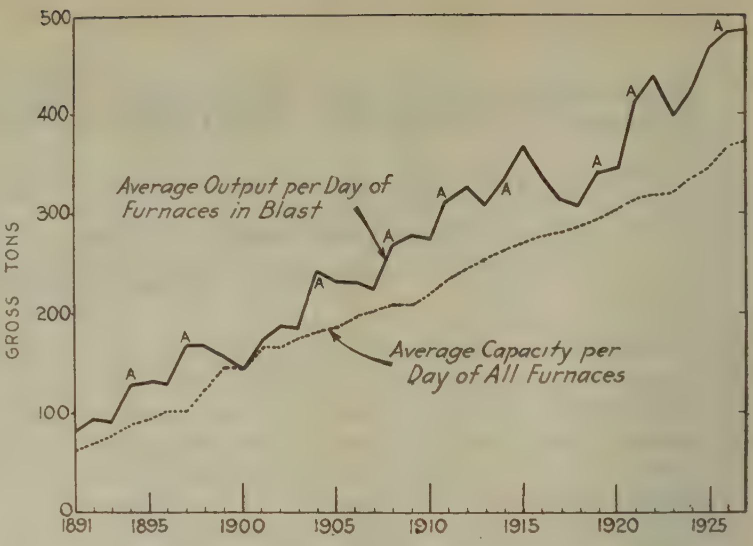
Number and Capacity of Furnaces Available and of Furnaces in Blast in the United States: 1891-1927

Year	Total Capacity (Thousands of Gross Tons)	Number of Furnaces Available Jan. 1	Average Capacity per Furnace (Gross Tons) Year	Average Capacity per Furnace (Gross Tons) Day	Annual Production (Thousands of Gross Tons)	Average Number of Furnaces in Blast	Average Production per Furnace in Blast (Gross Tons) Year	Average Production per Furnace in Blast (Gross Tons) Day
1891	13,064	573	22,800	62.5	8,280	280	29,570	81.0
1892	14,551	571	25,480	69.8	9,157	266	34,430	94.1
1893	16,188	569	28,450	77.9	7,125	215	33,140	90.8
1894	16,271	518	31,410	88.8	6,657	141	47,210	129.3
1895	17,512	511	34,270	93.9	9,446	197	47,950	131.4
1896	17,374	468	37,120	101.7	8,623	181	47,640	130.2
1897	17,446	470	37,120	101.7	9,653	158	61,100	167.4
1898	19,086	423	45,120	123.6	11,774	190	61,970	169.8
1899	21,991	414	53,120	145.5	13,621	236	57,720	158.1
1900	21,991	414	53,120	145.5	13,789	260	53,030	145.3
1901	24,812	406	61,110	167.4	15,878	251	63,260	173.3
1902	24,812	406	61,110	167.4	17,821	261	68,280	187.1
1903	26,216	412	63,630	174.3	18,009	266	67,700	185.5
1904	28,114	425	66,150	181.2	16.497	186	88,690	242.4
1905	29,154	429	67,960	186.2	22,992	271	84,840	232.4
1906	30,446	424	71,810	196.8	25,307	300	84,360	231.1
1907	31,581	429	73,620	201.7	25,781	315	81,840	224.2
1908	33,646	443	75,950	208.1	15,936	162	98,370	268.8
1909	34,834	453	76,060	208.4	25,795	255	101,160	277.2
1910	37,552	468	80,240	219.8	27,304	273	100,010	274.0
1911	40,128	473	84,840	232.4	23,650	208	113,700	311.5
1912	41,475	465	89,190	244.4	29,727	249	119,390	326.2
1913	43,257	466	92,830	254.3	30,966	275	112,600	308.5
1914	44,395	462	96,090	263.3	23,332	192	121,520	332.9
1915	44,405	451	98,460	269.8	29,916	223	134,150	367.5
1916	45,034	445	101,200	277.3	39,435	317	124,400	339.9
1917	45,865	448	102,380	280.5	38,621	337	114,610	314.0
1918	47,948	455	105,380	288.7	39,055	349	111,910	306.6
1919	49,270	459	107,340	294.1	31,015	249	124,560	341.3
1920	50,222	453	110,860	303.7	36,926	292	126,460	345.5
1921	51,741	452	114,470	313.6	16,688	111	150,340	411.9
1922	52,488	450	116,640	319.6	27,220	170	160,120	439.0
1923	52,687	449	117,340	321.5	40,361	278	145,180	397.8
1924	52,684	432	121,950	334.1	31,406	204	153,950	420.6
1925	53,435	425	125,730	344.5	36,701	216	169,910	465.5
1926	52,521	395	132,960	364.3	39,373	224	175,770	481.6
1927	51,681	379	136,362	373.6	36,400	206	176,699	484.1

capacity of all furnaces stands out prominently. At only one point (1900) does the curve showing average output per day go as low as the average capacity. Mainly it is about 25 per cent higher, due to the more intensive use of the latest, largest and lowest-cost units.

Notable in this diagram is the recurrence of nine "humps" at A, A ——— A, each appearing at a year when total production slumped, and each successive one higher than any of its predecessors. This bears out the observed fact that, when demand falls off, it is the small, high-cost furnace which first is shut down, leaving the large units to carry the load at the lowest possible total cost.

As a matter of fact, the 206 furnaces (average) in blast in 1927 produced one-sixth more iron than the 275 furnaces of 1913; more than twice as much iron as the 266 furnaces of 1903; nearly three times as much as the 236 furnaces of 1899 and four times as much as the 266 furnaces of 1892. The average furnace of 1927 made six times as much iron as the average furnace of 1891.



Average Capacity per Day of All Furnaces Available Runs Well Below the Average Output of Those in Blast, Because the Furnaces in Most Constant Use Are the Latest, Largest and Most Economical We Have. Humps in the upper curve, at A A A, show years of low total output, in which only the very best of the furnaces could be run. Each such year made a new record in average output per furnace

Weirton Steel Co.'s Ingot Capacity Now Exceeds 1,000,000 Tons

The Weirton Steel Co., Wierton, W. Va., informs THE IRON AGE that with the completion of a new open-hearth furnace, which was lighted this week, it will have a total ingot capacity of not less than 1,050,000 tons annually. The new open-hearth furnace will give the Weirton company a total of 11, the latest one having a rated capacity of 250 tons per heat. The company's finishing capacity is estimated at 960,000 tons a year, made up as follows: Tin plate, 255,000 tons; galvanized and black sheets, 85,000 tons; hot and cold rolled strip steel, 260,000 tons; wide strip sheets, full finished, hot rolled blue annealed and single pickled sheets, 360,000 tons. Its pig iron capacity is 540,000 tons. Much of the new steel capacity of the Weirton company has been added since the publication of the 1926 edition of the Iron and Steel Works Directory of the American Iron and Steel Institute, which gave its ingot rating as 570,000 tons, and this was the figure used in a table of steel company capacities published in the Feb. 2 issue of THE IRON AGE.

New High Record in Electric Power Output

Production of electric power in December, by public utility power plants in the United States, is reported by the Geological Survey at 7184 million kwhr. This is a gain of nearly 5 per cent over the November total of 6864 and about 4 per cent over the October figure of 6929. The December total was the largest ever recorded. On the daily basis, the sendouts for September, October, November and December were successively new high records. Previous to September, the record was held by December, 1926. The last December total stands at more than double the level of the average month in 1921, and nearly double the figures for 1920. Water-power provided about 38 per cent of the December sendout, against 36½ per cent in November and 34½ per cent in October.

Steel boilers ordered in December are reported by the Department of Commerce at 1054, with a total of 905,680 sq. ft. of heating surface. This is the smallest rating for any month of the year and shows a drop of approximately 20 per cent from the November total of 1,125,261 sq. ft. For the 12 months of 1927 there were 15,946 boilers ordered, aggregating 15,732,639 sq. ft.

Fewer Steel Barrels Made in December but Year Shows Small Gain

December production of steel barrels reported by 27 companies to the Department of Commerce amounted to 444,227 units. This was the smallest total for any month in more than two years. It compared with 500,909 in the preceding month and with 539,805 in December of last year. Total for the year amounted to 6,630,569 barrels, compared with 6,588,535 barrels in 1926. This represents a gain for the year of less than 1 per cent.

Shipments, at 454,638 units in December, made the smallest total for any month in more than two years. Shipments month by month have held close to the production figures. Stocks at the end of December were 52,606 units. This was a reduction of more than 10,000 during the month, but is not far from the average figure of the past 18 months. Unfilled orders at the end of the year called for 1,308,365 barrels, of which 221,897 were for delivery within 30 days. This makes the largest total of unfilled orders since the end of July.

Shipments of members of the Steel Barrel Manufacturers' Association in December are reported at 277,542. The number of barrels on unfilled orders at the end of the month was 289,392. Capacity was engaged during the month to the extent of 38 per cent.

Steel Corporation Pension Fund Paid $3,003,209 in 1927

The seventeenth annual report of United States Steel and Carnegie Pension Fund shows that last year $3,003,209.02 was distributed as pensions among retired employees of the United States Steel Corporation and its subsidiary companies. The Carnegie Steel Co. was first among the subsidiaries in the amount paid to retired employees, the amount being $783,896.90. Some of the pension disbursements of subsidiary companies were: American Steel & Wire Co., $610,068.94; American Sheet & Tin Plate Co., $401,675.22; National Tube Co., $283,019.10; H. C. Frick Coke Co., $241,216.24; Illinois Steel Co., $158,052,47; American Bridge Co., $134,753.15; Oliver Iron Mining Co., $113,330.25; Elgin, Joliet & Eastern Railway Co., $41,100.10; Tennesse Coal, Iron & Railroad Co., $40,780.05; Bessemer & Lake Erie Railroad Co., $37,656.10, and Duluth & Iron Range Railroad Co., $35,073.30. There were 1175 employees added to the pension roll during 1927 and 524 were removed from the list. At the close of the year there were 6388 on the pension roll.

Continental Steel Prices Higher

General Advances Accompany Swedish Strike—British Ore and Coke Dearer and Steel Demand Better

(*By Cable*)

LONDON, ENGLAND, Feb. 6.

CLEVELAND pig iron is active with consumers placing prompt and forward contracts and inquiring for third quarter. Export demand is still light but inquiries are increasing. Hematite iron is firmer as stocks are diminishing and export sales are increasing. Foreign ore prices are firmer as a result of the strike in the Swedish ore mines, but buyers are not desirous of committing themselves.

Finished iron and steel demand is improving, but plate orders of a substantial nature are still scarce. In general the trade is showing definite signs of improvement.

Tin plate is quiet, but there is a moderate volume of inquiry. Galvanized sheets are inactive, but the outlook is hopeful. Japan has been a moderate purchaser of light-gage black sheets.

Continental iron and steel prices are strong on increased costs and a good demand from overseas markets. Most French works and some Belgian producers have withdrawn quotations. Continental pig iron is firmer, but practically no sales have been effected with British users.

The total French production last year was 9,300,000 metric tons of pig iron and 8,275,000 tons of steel ingots. There were 142 blast furnaces operating on Jan. 1. German output last year was 13,100,000 metric tons of pig iron and 16,305,000 tons of steel ingots. Rolled steel output was 12,840,000 tons.

Luxemburg Market Quiet but Prices Are Unchanged

LUXEMBURG, Jan. 24.—The early part of January was quiet and prices were slightly irregular, but, with the inventory period over, the price situation is improved. Competition for business in South America and the Far East continues keen, but in China the political situation still hampers buying. Rail mills are well filled, some sizable tonnages having been booked in December. Buying by American consumers is small, but a revival of demand from that market is expected as the year progresses.

The entente of French, Belgian and Luxemburg producers of phosphoric foundry iron is maintaining domestic and export prices without change. It is pointed out by the association that prices of pig iron in Switzerland and Italy have reached such a low level that further reduction is impossible, but in other export markets prices will continue to fluctuate.

Semi-finished material is inactive and purchasers are seeking concessions. Beams are unchanged at £4 7s. to £4 9s. per ton (0.96c. to 0.98c. per lb.) and bars are fairly firm at £4 17s. to £4 18s. per ton (1.07c. to 1.08c. per lb.). The wire rod market is active, but prices are unchanged. Sheet purchasing has been small and concessions are beginning to develop on the lighter gages.

With 37 out of 47 furnaces in blast at the end of December, total pig iron output for the month was 228,139 metric tons. Steel ingot production reached 213,864 metric tons.

Higher Ocean Freights from Europe Aid United States

HAMBURG, GERMANY, Jan. 26.—Continental mills are viewing with dissatisfaction a further increase of ocean freight rates to Brazil, Uruguay and Argentina. Effective Feb. 1, the freight rates have been increased by 2s. 6d. to 4s. (61c. to 98c.) per ton on pipes, tubes and fittings, structural shapes, bars, plates, sheets, wire, nails, bolts and rivets, parts of railroad cars and locomotives.

These increases in freight rates are on shipments from Hamburg, Bremen, Rotterdam and Antwerp, so that German and Belgian mills are being forced to make a corresponding advance in their c.i.f. quotations. The new rate is effective until the end of March, when a further advance is in prospect. Producers point out that the rates will mean a loss of business to them and will probably react to the advantage of their American

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17¾s.		$4.33		
Bilbao Rubio ore*	1 1	to £1 1½s.	5.11	to	$5.24
Cleveland No. 1 fdy.	3 7½		16.44		
Cleveland No. 3 fdy.	3 5		15.83		
Cleveland No. 4 fdy.	3 4		15.59		
Cleveland No. 4 forge	3 3½		15.46		
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to	18.39
East Coast mixed	3 9	to 3 10	16.80	to	17.05
East Coast hematite	3 9½	to 3 10½	16.93	to	17.17
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to	38.96
Billets	6 0	to 6 10	29.22	to	31.66
Ferromanganese	13 10		65.75		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to	28.01
Tin plate, base box.	0 18	to 0 18¼	4.39	to	4.45
Black sheets, Japanese specifications.	13 5	to 13 10	64.53	to	65.75
			C. per Lb.		
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	10 10	to 11 0	2.28	to	2.39
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to	1.69
Steel hoops	10 10	to 11 0	2.28	to	2.39
Black sheets, 24 gage	9 15	to 10 0	2.12	to	2.17
Galv. sheets, 24 gage	13 0	to 13 5	2.82	to	2.88
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)					
Belgium	£3 2½s.		$15.22		
France	3 2½		15.22		
Luxemburg	3 2½		15.22		
Basic pig iron (nom.):					
Belgium	3 0		14.61		
France	3 0		14.61		
Luxemburg	3 0		14.61		
Coke	0 18		4.39		
Billets:					
Belgium	4 12		22.41		
France	4 12		22.41		
Merchant bars:			C. per Lb.		
Belgium	5 2	to £5 4s.	1.13	to	1.15
France	5 2	to 5 4	1.13	to	1.15
Luxemburg	5 2	to 5 4	1.13	to	1.15
Joists (beams):					
Belgium	4 11		1.00		
France	4 11		1.00		
Luxemburg	4 11		1.00		
Angles:					
Belgium	5 2		1.13		
⅛-in. plates:					
Belgium (a)	6 6		1.39		
Germany (a)	6 6		1.39		
3/16-in. ship plates:					
Belgium	6 1		1.34		
Luxemburg	6 1		1.34		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

competitors, especially in tubular products, sheets, barbed wire and railroad cars. In other products price differences are sufficiently great to prevent American sellers approaching the European quotations.

FAR EAST BUYS TIN PLATE

Business Confined to Small Merchant Buying—Wire Rod Orders Go to Canadian Mill

NEW YORK, Feb. 7.—Business with Far Eastern markets has been small in recent weeks. Chinese merchants are offering to purchase second hand material and plate cuttings for $24 to $26 per ton, c.i.f. Shanghai, but such prices are too low to interest American sellers. Inquiries for tin plate are confined to small lots of 500 base boxes or less. Occasional sales of tin plate waste are being made to both Chinese and Japanese merchants. With Japan entering into a political campaign, at which a larger proportion of the population will vote than ever before, not much business activity is expected until after the election in March.

Recently there were some inquiries from Japan for high-carbon wire rods, but most of this business is understood to have gone to a Canadian mill at $43.50 per ton, c.i.f. Japan, although the Canadian quotation today is about $45. Tin plate quotations are substantially unchanged at about $5.20 per base box, c.i.f. Japanese or Chinese port. There are no inquiries of consequence for light-gage black sheets, the price of which for export continues at about $77 per ton, c.i.f. Japan.

New York importers of European steel report higher Continental quotations, particularly from German mills. Current quotations range from 1.70c. to 1.75c. per lb., delivered Atlantic port, on ordinary Thomas steel bars, with shapes at about 1.60c. to 1.65c. per lb., delivered. On French and Belgian material these prices can be shaded occasionally by a few cents per 100 lb.

A decision is reported to have been rendered by the Customs Court on the classification of imports of reinforcing bars. A suit brought by Henry L. Exstein & Co., New York, importers, has been in progress for several months, the importers claiming that reinforcing bars should be classified as construction material, which takes a duty of 20c. per 100 lb., instead of the plain steel bar duty of 30c. per 100 lb.

German Furnaces Affected by Swedish Mine Strike

HAMBURG, GERMANY, Jan. 26.—Industry is beginning to feel the effect of the strike in the Swedish iron mines. Shipments of Swedish ore having ceased, German consumers have turned to the use of North African and Spanish iron ores, which, however, are of different quality. Stocks of iron ore on hand are small, and prices have already registered a slight advance.

German steel mills and blast furnaces are showing interest in iron ore and coal deposits at Kaissarie, Turkey, now being developed. Turkish Government plans to establish a blast furnace and steel mill at Kaissarie have brought out offers from German companies to construct and operate the plant. The Turkish Minister of the Interior, however, has not yet announced whether the plant will be built.

Agricultural Implement Exports Made New Record in 1927

Exports of agricultural implements from the United States established a record in 1927 amounting to $90,097,949, or $4,500,000 in excess of the previous record, made in 1926, according to George Bell, chief of the agricultural implements division, Department of Commerce, Washington. Field tractors to the number of 56,563 with a value of $33,891,332 represented the largest item. The increase in this item accounted for the gain in value of 1927 shipments over those of 1926, inasmuch as there was a decrease in most lines last year when compared with the preceding year. December exports totaled $6,246,092 as against $4,954,359 a year earlier. The principal increase was in tractor shipments, with gains made also in shipments of planters, sprayers, dusters, threshers, and windmills and parts.

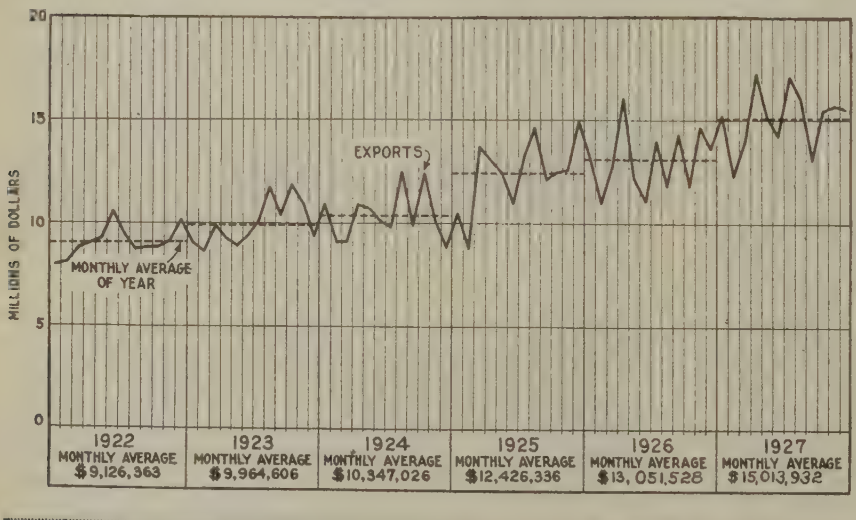
Accidents in Small Plants

More than two-thirds of the number of industrial establishments in the United States employ not more than 20 wage earners each. The total number of wage earners in such plants was given in an address by Ethelbert Stewart, commissioner of labor statistics, at 824,000. He made the significant statement that in these small establishments accidents are on the increase. Because of this fact, some insurance companies refuse to provide accident insurance in such plants, while the units are too widely scattered and too unorganized to form mutual insurance organizations.

While an enormous sum is being spent annually on safety work, it goes almost wholly into large plants. The small units lack the safety equipment which large corporations provide almost automatically. Safety organization practically does not exist in them, while the tendency to push production to the highest possible point is largely responsible for the trouble which occurs.

In a table detailing the results of a study along this line, and which is published in extenso in the January issue of *Monthly Labor Review*, the loss ratio for the smallest plants is shown to be almost double that for the largest plants. While the change in the loss ratio, as the plants become larger and larger, is not uniformly downward, it has that general tendency, and a curve would be almost uniform in its downward grade. The ratio for the smallest plants is more than 50 per cent higher than that for the average of all plants.

Exports of Industrial Machinery



EACH of the past five years has shown a consistent increase over the preceding years in United States exports of industrial machinery. The diagram shows the month-by-month movement and, in horizontal dotted lines, the average movement for each year beginning with 1922. The monthly average for 1927 was 65 per cent higher than that for 1922 and was more than 15 per cent above that of 1926. Shipments in 1927 aggregated more than $180,000,000. This steady increase was not participated in by all lines of machinery, but those which showed declines were more than offset by those which showed advances.

British Empire Steel Corporation Acquired by Bankers

Canadian Company Probably Will Be Reorganized, Though No Definite Announcement Has Been Made—President Roy M. Wolvin Resigns

TORONTO, ONT., Feb. 7.—Following a meeting of the British Empire Steel Corporation and subsidiary companies in Montreal, Que., official announcement was made of the acquisition of control of the British Empire Steel Corporation by Holt, Gundy & Co., prominent in Canadian banking. President Roy M. Wolvin announced his resignation and was succeeded as head of the corporation by C. B. McNaught of Toronto. Sir Herbert S. Holt, J. H. Gundy, George H. Montgomery, G. H. Duggan and W. E. Wilder became members of the board of directors. The new controlling interests have nothing to say as yet regarding their plans for reorganization. In fact, indications are that it will be some time before such a plan is finally drafted. The official statement was as follows:

> At the meeting of board of directors of the British Empire Steel Corporation, Ltd., Dominion Steel Corporation, Ltd., Nova Scotia Steel & Coal Co., Ltd., and their subsidiary companies, President Wolvin resigned, having succeeded in bringing into the affairs of the steel and coal industry of the Maritime Provinces new and influential financial and industrial interests. Mr. Wolvin expressed a belief that the complete severance of his connection with the affairs of these corporations might assist in ending litigation and facilitating reorganization of the finances and property of the company. He further stated that his entire holdings of securities of Dominion Steel Corporation, Ltd., and its subsidiaries had been purchased by interests associated with Holt, Gundy & Co., who had also secured 94 per cent of the currency series of consolidated mortgage bonds of Dominion Iron & Steel Co., Ltd., the guarantee of these bonds being practically the only indebtedness of Dominion Steel Corporation, Ltd. C. B. McNaught was elected president of British Empire Steel Corporation, Nova Scotia Steel & Coal Co., Ltd., and their subsidiary companies, and Sir Herbert Holt, J. H. Gundy, G. H. Duggan, W. E. Wilder and G. H. Montgomery, K. C., were added to the board of directors of the companies. To insure stability and continuity of management for Dominion Steel Corporation, Ltd., and its chief operating subsidiaries, British Empire Steel Corporation has created a voting trust for five years, the present five voting trustees being: Sir Herbert Holt, J. H. Gundy, G. H. Montgomery, K. C., C. B. McNaught and G. H. Duggan.

The British Empire Steel Corporation has two main interests, steel and coal. These are handled through an organization of 13 companies. The corporation consists in the first place of three chief companies, the Dominion Steel Corporation, the Nova Scotia Steel & Coal Co., and the Halifax Shipyards. The first two of these groups have, in turn, separate groups of lesser subsidiary companies. The Dominion Steel Corporation, for example, has 11 subsidiaries, including the Dominion Iron & Steel Co.; the Dominion Coal Co., with 16 collieries in Cape Breton, and the Sydney and Louisbourg Railway Co.; the Nova Scotia Steel & Coal Co., operating four collieries at Sydney, iron mines at Wabana, Newfoundland, limestone and dolomite properties in Cape Breton and blast furnaces and steel works at Sydney Mines; the Acadia Coal Co., Ltd., with four collieries in Pictou County, N. S.; the Halifax Shipyards, owning and operating a drydock and extensive shipbuilding and repair plants at Halifax; the Dominion Shipping Co., Ltd., with 12 cargo carrying vessels of a total tonnage of 68,000 tons; Wasis Steamship Co., Ltd., with two steel carrying ships; Cumberland Railway & Coal Co., with three collieries in Nova Scotia; Eastern Car Co., manufacturers of standard railroad cars and other rolling stock at Trenton, N. S.; the Sydney Lumber Co., at Dalhousie, and James Pender & Co., Ltd., manufacturers of wire nails and fencing.

COMMENDS BUSINESS PAPERS

J. C. McQuiston of Westinghouse Electric & Mfg. Co. Addresses Publishers at Advertising Club

FOR comprehensive knowledge of our industries, manufacturers owe a great deal to the technical publishing companies, said J. C. McQuiston, advertising manager Westinghouse Electric & Mfg. Co., East Pittsburgh, in an address to a group of business publishers at the Advertising Club, New York, on Jan. 31. His subject was "The Place of the Business Paper in the General Advertising Program."

Progressive and highly specialized publishing organizations have made exhaustive surveys of the many industries of the United States, he said, and have pointed the way for the manufacturer to talk to the specialists in all these fields.

"Stop to think how Mr. Westinghouse discovered the air brake! It was after reading something in a little publication," said Mr. McQuiston. "He picked it up one day on a train—bought it from a little girl that he thought really needed the 15c. or a quarter that she asked for it. He bought it out of kindness. He looked through it and read about using air in the switch cylinder, and the idea came to him: 'That's it, the application of air to the braking of trains.'

"Now, that is what our technical publications do. We don't know how much they do for business in spreading these new ideas of inventions and applications and all that. If a man invented something and kept it to himself it would mean nothing. But as it gets into print and goes out to other engineers who think along the same general lines, the idea is enlarged and developed, and out of it all come the big things we have today such as the automobile and the airplane.

"Along with that we have got to give credit to the business publishers for finding the way for the advertiser to use these publications. The publishers know those who subscribe, they know the character of the people who read their publications, and when they come to know the thing that the advertiser has to sell, when they come to know the problems of the advertiser, they can advise him on how to use properly the specialized media they publish.

"They now go further than that. I know because I am one of the beneficiaries of the advice of the leading technical publishers, and I want to emphasize leading technical publishers because in the technical and business publishing field, like in almost every other field of publishing, there are unfortunately a lot of very questionable publications and they weigh the thing down; papers that have no right, after all, to carry advertising. The leading and worthwhile technical publications render a real service. They study the markets, and they bring to the advertiser the service that they render—advice, counsel, plans and guidance which make the advertising effectual.

"As our plan has developed it has been largely through the research work of the leading technical papers. The research work done two years ago crystallized the plan that we have today."

Navy Asks for Bids on Plates

WASHINGTON, Feb. 7.—Bids will be opened on Feb. 14 by the Bureau of Supplies and Accounts, Navy Department, for 505 tons of medium steel plates for modernization of the battleship Oklahoma and for 250 tons of special treatment plates for construction of light cruisers Nos. 24, 28 and 29. The material for the Oklahoma is to be delivered at the Philadelphia navy yard, while the steel for the light cruisers is to be delivered at the Brooklyn yard.

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This Issue in Brief

When does it pay to replace hand trucks with power trucks? Formulas have been worked out, enabling the user to calculate accurately whether he should use hand, gasoline or electric trucks.—Page 399.

Three-quarters of a century's service fails to weaken bridge wire. Strands from bridge erected in 1848 show remarkable resistance to corrosion, testing 94,166 lb. per sq. in., and evidencing the durability of old wrought iron.—Page 400.

Heavy gain in steel ingot output. January's daily average was 152,304 gross tons, which was 25.7 per cent above the 121,167 tons per day made in December.—Page 414.

Favors Krupp methods of rail making. Bottom-cast ingots produce superior rails, engineer believes. He also recommends the Krupp method of straightening rails through rollers rather than using the American gag press method.—Page 405.

New die-casting machine requires only one operator. Machine is almost fully automatic. All the operator does is to manipulate the driving clutch lever, supply new metal, and clean the die with an air hose.—Page 407.

Should we build a fearsome navy to secure a steady flow of essential imports in emergency, or build up a reserve of the necessary materials? As far as the strategic raw materials used in steel-making are concerned, storing reserves would be the wiser policy. Executing the contemplated cruiser-building program would very likely result in competitive building by other nations.—Page 423.

Low operating costs secured in new forging plant by straight-line production layout. All hammers in the Willys-Overland forge shop have their own individual furnaces. Work progresses from one operation to another with the least amount of "float" trucking.—Page 401.

Scrap market now reacts differently to a price advance than it did in former years. Consumers are convinced that they can secure a large supply on any occasion simply by bidding a slight advance. But in the days when the steel industry had sharp peaks and deep troughs a slight rise in scrap prices tightened the supply.—Page 423.

Prevents distortion by **quenching pressed parts** in dies. Automobile bumper parts are placed in a hydraulic press as soon as they leave the hardening furnace, and after the dies are closed, the platens are lowered into a vat of oil.—Page 393.

Lower steel prices have not resulted in lower wages for steel mill workers. Wages appear to be stabilized, even though economies made possible by improved equipment have not kept pace with price reductions. —Page 422.

Swing grinders yield higher production when used in conjunction with oscillating table to hold work. The table is power driven and moves backward and forward at right angles to the axis of the grinding wheel. At the end of each travel the table is raised slightly so grinding wheel will not retrace its path. —Page 393.

"Whirlwind" airplane engine is remarkable for accessibility of its parts and the convenience with which changes can be made. It may be dismantled and inspected or overhauled without being taken out of its airplane mounting. Direct operating cost is less than 4c. per mile.—Page 394.

Number of blast furnaces has **decreased** 34 per cent in past 37 years, but capacity has quadrupled. In 1891 there were 573 furnaces available, with a capacity of 13 million gross tons. Today there are 379 furnaces, with a capacity of more than 51 million tons.—Page 415.

Hardening furnace temperature is controlled within 10 deg. Fahr. by means of overhead combustion chamber. The work chamber is separated from the combustion chamber by a perforated arch, which acts as an accumulator and distributer for the heating gases.—Page 392.

Accident rate is increasing in small plants, says commissioner of labor statistics. Small establishments, employing not more than 20 wage earners, have a loss ratio almost twice that of the large plants, and the ratio is getting larger, as practically no accident prevention work is done in small plants.—Page 418.

American steel exporters may profit by increase in ocean freight rates from continental ports to Brazil, Uruguay and Argentina. Rates were advanced from 61 to 98c. per ton on Feb. 1.—Page 417.

Structural steel fabricators will find useful data in new handbook. New beam and girder sections are included in engineering volume issued by the American Institute of Steel Construction.—Page 417.

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Steel Selling Prices and Wages

A SIDELIGHT on the present determination of steel manufacturers to obtain more profitable prices for their products was contained in the annual report of the Bethlehem Steel Corporation and apparently has escaped the attention it deserves.

Since Jan. 1, 1923, President Grace reported, the corporation has expended $150,000,000 for additions and improvements to properties and this program has been "largely responsible for a reduction of $7.27 per ton in the average cost of producing the finished steel products shipped by the corporation in 1927 as compared with the corresponding average (based upon equivalent tonnages of the same products) in 1923."

This is a cost reduction that would be gratifying to any manufacturer, but here is the rub:

"Unfortunately," continued Mr. Grace, "the economies in production have not resulted in a corresponding increase in the net income of the corporation because, during the same period, the prices of steel products have steadily declined, the average billing price per ton of all rolled steel and other finished products shipped by the corporation during 1927 having been $8.60 less than the corresponding average for 1923. The effect upon earnings of this decline in prices is apparent from the fact that Bethlehem shipped 3,971,811 tons of finished products during 1927."

It is significant that during the past four years when prices of finished steel products have steadily declined, wages not only of iron and steel workers but of all wage earners have varied but little. The National Industrial Conference Board in a recent review of wages, hours and employment in manufacturing industries points out that "for four years average hourly earnings of all wage earners covered by the Conference Board's study have varied only between 56 and 57 cents, and such uniformity must be accepted as convincing evidence of the stability of present wage scales."

Reports of wage reductions in certain industries have appeared in the press within recent months, but it can be stated on the highest authority that there is no intention on the part of the steel industry to make up for the declines in prices of its commodities by any reduction of wage scales among iron and steel workers. On the contrary, the belief that such prosperity as we now have is based largely on a high average level of wage earnings is well accepted. With labor costs undisturbed and with other operating costs brought as low as at present seems feasible, the steel industry now turns to the consumer. Price advances have been announced in almost all branches of the industry since Jan. 1, yet the protection given at former prices is so widespread that not much, if any, gain in the average shipping prices will be realized in this quarter, and the effect of the advances on second quarter business and billing prices is still to be determined. Buyers have generally accepted as an economic law that an advance in prices cannot be maintained except when supported by a demand which taxes capacity, but the profitless selling of the past year or more undoubtedly has created a new state of mind among steel selling organizations which may bring a better adherence to prices that will pay dividends.

Recent Scrap Market Phases

OF all sections of the iron and steel trade the scrap market is always one of the most interesting, because it is a market of open trading, subject to changes in the actual practices of buyers and sellers and to changes in mental attitudes. There is always the alluring chance of "beating the game," and there are more participants than there used to be. Time was when the well posted dealer could safely pursue the course of accumulating scrap in yard over periods of months, liquidating over other periods, with a large enough margin in market fluctuations to cover the extra freight, the cost of carriage, and a comfortable profit. Of late this has been impossible, for originators of scrap have endeavored to play the market by holding back scrap when prices are low and consumers have played corresponding tactics by accumulating cheap scrap and endeavoring to get through a spell of maximum consumption with a minimum of stock.

Still more recently another turn has come, as mills have adopted a policy of carrying smaller stocks, in any condition, than formerly. They have found sales competition so keen as to relieve them of their former danger, that of dealers creating further rises when they found one advance had occurred. Mills are convinced that on any occasion they can promptly get a larger supply by bidding a slight advance. Such an advance loosens the supply instead of tightening it as in the old days.

Yet some speculative tendency remains, as is indicated by the fact that both in January of this year and January of last year the scrap market weakened, whereas in each case mill operations were expanding and scrap consumption increased. Plainly the preceding rises in the market had been in anticipation, the weakening showing that the situation had been overplayed.

Dealers' yard stocks are now made up almost wholly of scrap that must pass through yard, for assorting or for manufacture. With this scrap there is naturally some speculation. The flow into yard is fairly uniform, while in determining the time to sell the dealer has opportunity to use his judgment.

A special influence helping to lessen the swings in scrap prices in recent years is that the steel industry is not called upon at times to operate at capacity or to swell its output beyond ordinary ability to produce. There used to be such occasions, and then the mills used larger percentages of scrap, relative to pig iron, than their averages. Now their practice varies but little, for they have been having neither sharp peaks nor deep troughs.

Adequate vs. Competitive Navy Building

COMMENTS both favorable and unfavorable have come to us on editorials appearing in THE IRON AGE since the abortive Geneva Conference to limit auxiliary naval craft. These editorials have opposed competitive and hence excessive navy building.

Some of the adverse criticism points out that the facts and data presented give but a partial picture of the situation. Space limitations, however, demand that the editor select those facts which bear upon the point he is making. A consideration of all the phases of the matter, while properly a preliminary to the writing, cannot be compressed within a few hundred words.

Nor is it exactly in the field of THE IRON AGE to discuss the relative parity of Great Britain's *York*, Japan's *Aoba*, and our own *Omaha* as cruisers; that is for the naval experts. Parity also is a word which means different things to different experts. But the broad question of expansion of naval armament and its repercussions on the international situation is within the field of a journal serving the steel and machinery industries—the industries essential to the maintenance of our country's defenses.

We agree with President Coolidge's words spoken last Memorial Day: "Our forces are dedicated solely to the preservation of peace."

Again: We subscribe to President Coolidge's sentiments expressed at Trenton, Dec. 29, 1926, "I do not believe that we can advance the policy of peace by returning to the policy of competitive armaments."

We believe that if the United States lays down twenty-five 10,000-ton cruisers in five years, there will be as a result much competitive building by other powers, and consequently are opposed to H. R. 7359, "A bill to provide for the increase of the naval establishment," in its present form.

We believe that the energy required to build arms and armaments on the scale contemplated by some proposals could more profitably be used for articles of peaceful commerce, more profitable both in dollars and in spiritual values.

We heartily indorse a steady and deliberate replacement program for keeping our present navy at the top of efficiency.

There is no reason for speedy building in any category of ships, because (with President Coolidge) we can see no threatening international situation, and (again agreeing with the commander-in-chief of the Navy) our present fleet is among the greatest afloat.

As to the argument often advanced that we need a fearsome navy to assure a continuous flow of essential imports, especially for the iron and steel industry, we hold that it would be wiser and better business (as far as the steel industry is concerned) to import and store a generous reserve of the strategic raw materials, manganese, chromium, tungsten, vanadium, nickel and tin, than to foment international misunderstanding, and to imperil the peace of the world, by excessive building of naval armament.

Per Ton Profits in Steel

A STUDY of the United States Steel Corporation's monthly earnings over a period of years relative to the tonnage of current shipments does not disclose, as might be fancied, a tendency of profits per ton to decrease with light operations and increase with heavy operations. The much used argument that the Steel Corporation has "other sources" of earnings is not adequate, for these outside earnings are small relative to the total.

One is prompted to question the sufficiency of the common doctrine that high operation makes for reduction in unit cost, particularly when carried to the length of claiming so large a reduction as to justify seeking a higher operating rate at the expense of prices. That there have been such practices is generally charged.

Depreciation allowances make the subject an intricate one. Does depreciation increase or decrease according to the rate at which a plant operates? If the depreciation is a fixed amount for a given time, then the per ton charge increases as output diminishes, and per ton profits decrease. Depreciation and obsolescence may be considered together, and there is an important point not always considered, that these decreases in the value of a given property are not controlled entirely by what goes on within the property. They are affected also by what occurs outside. If competitors adopt improved methods and appliances the value of the plant which does not do so is diminished.

From such considerations this becomes obvious, that a partial idleness of a plant due to trade conditions causing light general demand does not produce obsolescence as does similar idleness occasioned by owners who are not progressive or sufficiently assiduous in selling their products. A light operation shared by the whole producing trade results in less depreciation and obsolescence than occurs when trade is active. The measure is in large part what occurs in the trade as a whole, rather than what occurs in the individual plant, as to its own operating rate. The impropriety of any general policy of seeking a high operation of a steel plant for the sake of reducing depreciation is thus made apparent.

With the increasing mechanization of the steel industry these points become of greater importance year by year. The steel industry pays high wage rates, but its wage cost relative to other costs has been diminishing and the handling of charges upon investment is of increasing moment. There are times when it is as commendable that sales effort be restrained as that, under ordinary conditions, it should be aggressive. It is nearly three years now since Judge Gary said, at the Steel Corporation annual meeting, April 20, 1925: "Ever since the war the competition in the United States has been increasing—I will not say has been desperate, but I will say has been exceedingly strenuous," and since then a great deal more has occurred along the same line.

Census of Consumption

PRELIMINARY work done by the Department of Commerce in its study of a census of consumption in the United States gives rise to disturbing thoughts regarding the full utility of that census. The matter is to be prosecuted with vigor at the time of the regular decennial census of population in 1930. It is designed to supplement our vast storehouse of knowledge on conditions of production in the United States. Such a study has been in contemplation for a long time; industry wants it as a further guide and frequent requests for it have been made.

One of the chief criticisms which might be directed against the consumption census, as it has so far developed, lies in its almost complete ignoring of the distribution of producer goods. This does not connote raw materials or goods in process of manufacture; but certainly the absorption by industry of such items as machine tools is worthy of a place in any consumption census which goes beyond foods and clothing. Hand tools going into the possession of carpenters and machinists are given their place in the census, because they are sold from retail stores. Machine tools should have the same consideration, regardless of the fact that the retailer does not know them.

Doubtless many other factors might prove to be missing on a careful study of the census returns for the small area already covered. Such a glaring example as the one cited, however, would make it appear desirable to survey the entire field of the proposed endeavor, so that when it does come to fruition it may represent something that shall have been worth while.

READERS of THE IRON AGE who desire to receive a copy of the index for the last six months of 1927 may have it, with our compliments, upon request. The index, of 24 pages, has just been completed.

CORRESPONDENCE

A Naval Officer on the Pending Program

To the Editor: I wish to bring to your attention certain features connected with the position of representative naval officers on the subject of the proposed naval building program now under consideration in Congress and by the country, with particular reference to the editorial on this subject in your issue of Jan. 19, entitled "A Too Costly Navy."

The position of representative opinion in the Navy may be, I believe, summarized in the following factors:

1. We need to balance our fleet by the addition of various auxiliary units to make it an effective instrument of national defense.
2. Concerned in any question of naval power is consideration of naval bases near our outlying possessions and strategically located harbors along the approaches and near the Panama Canal and along our lines of essential communication.
3. The fighting strength of fleets lies in their modern vessels, obsolete vessels being a liability rather than asset when opposed by modern vessels of their own type.

The above are believed to concern naval strength in the abstract. Any consideration of comparison or the subject of naval competition as raised in your editorial must, it is believed, include:

4. The building programs of other Powers since the Washington Conference.
5. The total fleets of other Powers, including modern vessels built, laid down and already authorized.

On the broad subject of naval power the Navy is believed to have two general functions, indeed responsibilities:

1. To recommend to the country the types of vessels and numbers in each type necessary to make our standardized capital ship strength an efficient and effective instrument of national defense.
2. To apprise the country of the relative strength from a technical standpoint of our Navy compared with other principal powers.

This latter appears very necessary, since naval strength is known by technical people to depend greatly on naval bases and strategically located harbors along the lines of essential communication or within the probable areas of war.

As an analysis of the lessons of history (an essential part of the training of responsible naval officers) so clearly reveals that an effective defensive force is the surest insurance of a rich nation against war, we conceive it therefore the duty of the Navy to advise the country on these two points. The weight given this advice is a matter to be decided by the higher authority responsible to the nation for public policy.

Referring specifically to your editorial, it would seem that the Navy would not attempt to enter into the controversial features of what the policy of the country should be regarding this building program, but we do feel concerned with some of the statements in your article. We feel, for example, that your table is somewhat misleading, as it does not mention completed large cruisers, and that any discussion of the cruiser question should include all modern cruisers of this type, not alone the 10,000-ton class, and should not include obsolete cruiser tonnage.

By "modern" is meant the classification used during and since the Washington Conference: namely, that "light cruisers" consist of combatant vessels less than 20 years old, from 3000 to 10,000 tons, with speed of 27 knots or greater. While obviously all classes of this type will not be equal in effectiveness, mere size or total tonnage are not conclusive determining factors either, for strength in this type depends also on numbers and on base and harbor facilities that may be available to these ships for fueling, shelter and repair.

Since other Powers have been building cruisers, along with other vessels, following the Washington Conference, and since the total proposed cruiser strength for this country would not in fact exceed in tonnage or equal in numbers that already constructed or authorized by Great Britain, it is not believed fair to accuse the Navy of starting any competition in this type.

As stated before, it is considered to be the function of the Navy to recommend the numbers or tonnage of any type, not standardized by treaty, it considers necessary from a technical viewpoint. The tonnage proposals of this country at the late Geneva Conference were therefore obviously a matter for those responsible to the country for public policy to decide, after such consultation with naval advisers as they saw fit.

The British proposals at this conference that have been published do not, it is believed, contain simply an offer of cruiser parity at 400,000 tons, but, in fact, include in this a stipulation that would have limited the number of 10,000-ton cruisers to 12 for each of the two countries, and would have permitted the British to retain the most, at least, of their existing modern cruiser strength, to a total of considerably in excess of 600,000 tons. While it is believed doubtful that the British would actually prefer to limit their battle fleet cruiser strength to 12 vessels, they doubtless did, in fact, in arriving at their conclusion as to their needs, consider the number of bases and well located harbors that they possess throughout the world. It is considered equally necessary that the American Navy, in recommending to this country what it considers our needs in this type, consider also all factors involved in naval strength.

It may indeed be assumed that the Navy does consider some vessels necessary for commerce protection and for maintaining sea communication, since this country too is a maritime power and is dependent on sea communications, not only for trade but for various imports essential in war, as well as our communications with the Panama Canal and our insular possessions.

It is therefore believed to be not only the right but the duty of the Navy to state to the country the naval needs for national defense. This it considers it is doing in recommending the naval building program submitted to Congress by the Navy Department, with the authorized statement that it is not in opposition to the financial policy of the President.

In conclusion, I desire to express the appreciation I am sure the Navy must feel of the interest such a representative journal as THE IRON AGE, representative as it is of such a large factor in our country as the steel and allied industries, takes in this subject.

N. H. GOSS,
Captain, United States Navy.

New York, Feb. 3.

The Cruiser Feature of Our Naval Program

To the Editor: In the Jan. 19, 1928, issue of THE IRON AGE there appeared an editorial headed "A Too Costly Navy."

You are undoubtedly well aware of the fact that Great Britain has numerous possessions throughout the world where naval bases and supply stations are maintained. These bases are so located that it is entirely feasible for a 7500-ton British cruiser to cope with any situation that might arise and at the same time be close enough to a supply base to refuel. You also, of course, are aware that the United States does not have such bases distributed throughout the world. In so far as the Hawaiian and Philippine islands are concerned, the distance from the United States is such that a 7500-ton cruiser would be of no value at all on account of the relatively small fuel capacity of a 7500-ton cruiser as compared with a 10,000-ton cruiser.

If you would carefully read the various arguments presented by Admiral Jones and other American members to the Geneva Conference it should be quite clear to you why a 10,000-ton cruiser is essential to the United States and why it is not essential to the British. It should be quite easy to understand from the last information available why the United States would be at a very serious disadvantage if we do not have sufficient cruisers of 10,000 tons.

The Disarmament Conference of 1921 established the principle that ships were obsolete after 20 years. It is also quite well known that a cruiser having a speed of less than 25 or 27 knots is of no value as a cruiser.

In regard to your reference to the cheers that greeted the British proposal to lay down but one of the three cruisers projected in 1928, we are rather surprised that you should take such cognizance of such action, inasmuch as it is so generally known that this action was pure propaganda and was intended to influence the United States' action in regard to a new navy program that the President of the United States even referred to it in his last message to Congress. It seems axiomatic that the best way to prevent war is to be in a position to protect one's rights and commerce just as the best way to preserve law and order is to have a sufficient and well equipped police force in our modern cities.

Inasmuch as you have chosen to quote from "Brassey's Naval Annual," we believe that you would be interested in the table noted below giving a list of cruisers having effective age of 20 years or less and having a speed greater than 27 knots. (See table at bottom of page.)

From the table you will note that the effective cruiser tonnage totals:

	British Empire	Japan	United States
Building	138,000 tons	60,000 tons	80,000 tons
Built	190,810 tons	116,205 tons	75,000 tons
Total	328,810 tons	176,205 tons	155,000 tons

This table does not take any cognizance of the cruisers projected by any of the above countries. However, even with the 250,000 additional tons of cruisers now projected by Congress the United States would not be on a parity with the British Empire when the cruisers projected by the British are also considered.

We trust that you will be able to give as much publicity to the above facts as you did to the statements quoted from "Brassey's Naval Annual."

R. T. S.

New York, Jan. 31.

Makers of Sheets and Strip Steel May Combine Their Associations

A single association to embrace the activities of the National Association of Sheet and Tin Plate Manufacturers, the Cold-Rolled Strip Steel Institute and the Hot-Rolled Strip Steel Institute, is the object of a movement that has been started and has been the subject of discussion of interested manufacturers.

With the success that has attended continuous rolling of strips in sheet mill widths and the fact that a number of manufacturers of sheets have either installed or plan to install the new type of mill for mechanically producing sheets, a closer relationship of the two products has developed and with it has come a belief that trade association and sales promotion activities could be as effectively handled by one as by three separate agencies.

No information of a formal character yet has been provided, but there is admission that the plan has been discussed and the idea that there will be a merging of the three associations into one is strengthened by the fact that the presidency of the National Association of Sheet and Tin Plate Manufacturers has been vacant since the resignation of Walter C. Carroll became effective on Jan. 15, last, and no effort yet has been made to fill it.

CRUISERS BUILT AND BUILDING BY THREE POWERS

	British Empire	Japan	United States
Building	14 ships of 138,000 tons	6 ships of 60,000 tons	8 ships of 80,000 tons
Built, 5 years age or less......	7 ships of 48,340 tons	14 ships of 81,705 tons	10 ships of 75,000 tons
Built, 6 to 10 years..........	20 ships of 97,470 tons	7 ships of 34,500 tons	None
Built, 11 to 15 years..........	12 ships of 45,000 tons	None	None

January Iron Output Up Sharply

Net Gain of 16 Furnaces the Feature—Actual Data Show Daily Rate Increased 5613 Tons or 6.4 Per Cent

COMPILATION of the actual data for the pig iron production in January shows that the estimates made by wire on Jan. 31, as published in THE IRON AGE Feb. 2, were about 100 tons per day less than the real figures.

Total pig iron production in January was 2,869,761 gross tons or 92,573 tons per day for the 31 days, against 2,695,755 tons or 86,960 tons per day for the 31 days in December. The increase last month over December was 5613 tons per day or about 6.4 per cent. This is the first increase in output since April, last year, and is the largest production since August, when the daily rate was 95,073 tons. A year ago the output was 100,123 tons per day.

Net Gain of 16 Furnaces

A large gain in active furnaces was the feature. Twenty-one furnaces were blown in and five were shut down—a net gain of 16 for the month. This follows nine months of successive net losses. The nearest approach to so large a net increase was 14 in December, 1925, when 15 furnaces blew in and one was shut down.

Of the 21 furnaces blown in last month 13 belonged to the United States Steel Corporation, six to independent steel companies and two to merchant producers. The Steel Corporation shut down two furnaces, as did also merchant producers with only one independent steel company stack blown out. Thus the net gain of 16 furnaces was confined to steel companies with 11 credited to the Steel Corporation and five to independent steel companies.

Capacity Active on Feb. 1

On Feb. 1 there were 185 furnaces blowing as compared with 169 on Jan. 1. The estimated daily rate of the 185 furnaces was 96,640 tons; the 169 furnaces on Jan. 1 had an estimated operating rate of 86,835 tons per day.

Manganese Alloy Output

Production of ferromanganese in January was 22,298 tons or the largest since last July, when it was 26,394 tons. A substantial amount of spiegeleisen was made by two companies, but publication of the actual data is not now possible.

Possibly Active Furnaces Reduced

The number of possibly active furnaces in the United States has been reduced by the dismantling of

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)	Oct. (31 days)
New York and Mass.	203,715	199,726	212,778	232,422
Lehigh Valley	72,639	74,316	75,748	81,829
Schuylkill Valley	43,946	44,238	53,269	64,260
Lower Susq. and Lebanon Valleys	30,338	32,289	30,150	31,828
Pittsburgh district	582,497	523,875	495,005	540,525
Shenango Valley	77,023	58,982	64,752	77,106
Western Penna.	89,372	92,774	92,000	93,010
Maryland, Virginia and Kentucky	94,590	92,981	91,300	88,991
Wheeling district	108,188	114,030	110,055	110,222
Mahoning Valley	247,371	222,572	223,617	245,625
Central and Northern Ohio	313,697	295,179	306,395	324,793
Southern Ohio	32,480	32,413	32,750	32,954
Illinois and Indiana	608,771	537,892	508,545	506,438
Mich., Minn., Mo., Wis., Colo. and Utah	134,718	140,141	126,287	121,203
Alabama	224,132	227,775	219,478	224,533
Tennessee	6,284	6,572	6,247	8,373
Total	2,869,761	2,695,755	2,648,376	2,784,112

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	......
Mar.	111,809	114,975	111,032	112,366	......
Apr.	107,781	108,632	115,004	114,074	......
May	84,358	94,542	112,304	109,385	......
June	67,541	89,115	107,844	102,988	......
½ year	95,794	105,039	109,660	107,351	......
July	57,577	85,936	103,978	95,199	......
Aug.	60,875	87,241	103,241	95,073	......
Sept.	68,442	90,873	104,543	92,498	......
Oct.	79,907	97,528	107,553	89,810	......
Nov.	83,656	100,767	107,890	88,279	......
Dec.	95,539	104,853	99,712	86,960	......
Year	85,075	99,735	107,043	99,266	......

Coke Furnaces in Blast

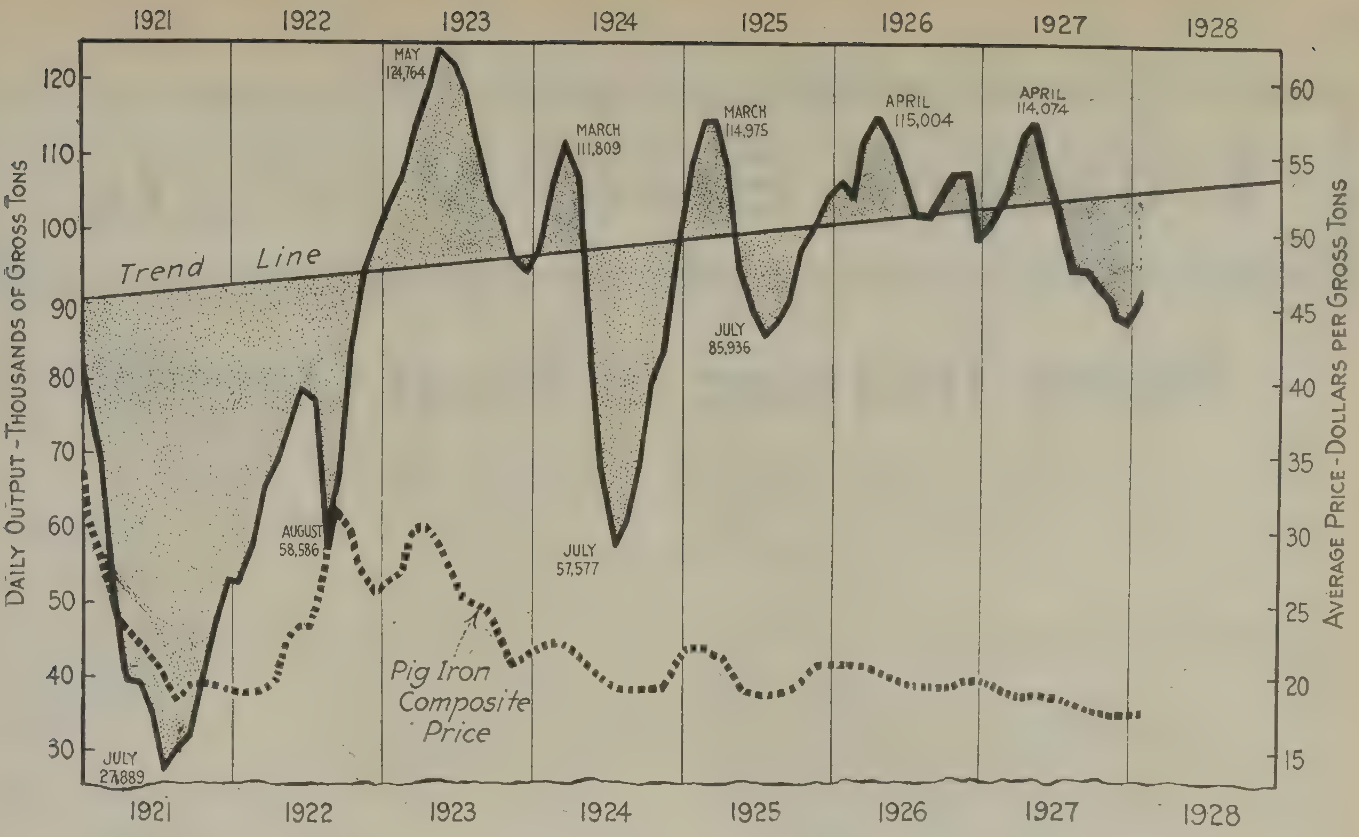
Furnaces	Feb. 1 Number in Blast	Feb. 1 Capacity per Day	Jan. 1 Number in Blast	Jan. 1 Capacity Per Day
New York:				
Buffalo	12	5,795	12	5,060
Other N. Y. and Mass.	3	1,105	2	800
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,430*	5	2,330
Schuylkill Valley	4	1,415	4	1,425
Susquehanna Valley	2	910	2	960
Ferromanganese	1	70	1	65
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	33	19,800	27	16,565
Ferro and Spiegel.	1	250	2	330
Shenango Valley	6	2,840	5	2,250
Western Pennsylvania	5	2,485	5	2,815
Ferromanganese	2	400	2	280
Maryland	5	2,470	5	2,360
Wheeling District	6	3,490	6	3,690
Ohio:				
Mahoning Valley	15	8,700	12	7,200
Central and Northern	18	10,230	17	9,800
Southern	4	1,045	4	1,065
Illinois and Indiana	33	21,200	27	17,350
Mich., Wis. and Minn.	6	2,680	7	3,040
Colo., Mo. and Utah	4	1,645*	3	1,300
The South:				
Virginia	1	215	1	220
Kentucky	1	365	1	370
Alabama	17	6,900	18	7,360
Tennessee	1	200	1	200
Total	185	96,640	169	86,835

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	....
Mar.	3,441,986	3,483,362	....
Apr.	3,450,122	3,422,226	....
May	3,481,428	3,390,940	....
June	3,235,309	3,089,651	....
½ year	19,848,461	19,430,678	....
July	3,223,338	2,951,160	....
Aug.	3,200,479	2,947,276	....
Sept.	3,136,293	2,774,949	....
Oct.	3,334,132	2,784,112	....
Nov.	3,236,707	2,648,376	....
Dec.	3,091,060	2,695,755	....
Year*	39,070,470	36,232,306	....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in January Was 6.4 Per Cent More Than in December; Composite Price Increases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

the Hokendauqua furnace of the Thomas Iron Co. in Lehigh Valley, the abandonment of the No. 1 Swede furnace of the Alan Wood Iron & Steel Co. in the Schuylkill Valley, the scrapping of the Buena Vista stack of the Alleghany Ore & Iron Corporation in Virginia, the discontinuance of the No. 1 Hazelton furnace of the Republic Iron & Steel Co. in the Mahoning Valley, the abandonment of the two Oxmoor stacks of the Tennessee Coal, Iron & Railroad Co. in Alabama and the dismantling of the Standard furnace of the Tennessee Product Corporation in Tennessee. This reduces the number of effective blast furnace units in the country from 357 to 350.

Furnaces Blown In and Out

Among the furnaces blown in during January were No. 1 Donner furnace in the Buffalo district, and No. 2 Northern furnace in New York; one furnace at the Bethlehem plant of the Bethlehem Steel Corporation in the Lehigh Valley; two Carrie, one Duquesne and two Edgar Thomson furnaces of the Carnegie Steel Co. and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; two Ohio furnaces of the Carnegie Steel Co., and one Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley; one River furnace in northern Ohio; two South Chicago furnaces, three Gary furnaces, and one Inland furnace in the Chicago district, and the furnace of the Columbia Steel Corporation in Utah.

Among the furnaces blown out or banked during January were one Buffalo furnace of the Hanna Furnace Co. in the Buffalo district; one furnace at the Bethlehem plant of the Bethlehem Steel Corporation in the Lehigh Valley; one Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; the Mayville furnace in Wisconsin, and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1927		1928	
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb. ...	2,256,651	....	24,560	7,045	....	....
Mar. ...	2,675,417	....	27,834	7,650	....	....
Apr. ...	2,637,919	....	24,735	12,907	....	....
May ...	2,619,078	....	28,734	9,788	....	....
June ...	2,343,409	....	29,232	10,535	....	....
½ year.	14,876,355	....	166,939	55,411	....	....
July ...	2,163,101	....	26,394	9,350	....	....
Aug. ...	2,213,815	....	21,279	9,104	....	....
Sept. ..	2,090,200	....	20,675	6,037	....	....
Oct. ...	2,076,722	....	17,710	6,129	....	....
Nov. ...	1,938,043	....	17,851	6,521	....	....
Dec. ...	1,987,652	....	20,992	6,816	....	....
Year..	27,345,888	....	291,840	99,368	....	....

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*Includes output of merchant furnaces.
†Data not available.

Round Table Discussions on Blast Furnace and Coke Ovens

A program of wide interest to blast furnace and coke oven operators has been arranged for the mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association to be held at the William Penn Hotel, Pittsburgh, Friday, Feb. 17. Separate round table discussions on coke plant and blast furnace matters are to be held during the morning and in the afternoon there will be a general meeting at which both coke oven and blast furnace operating subjects will be considered. In the evening, following the dinner, F. H. Willcox, vice-president Freyn Engineering Co., Chicago, will be the principal speaker and his subject will be "Blast Furnace Practice in Europe."

Complaint has been filed with the Interstate Commerce Commission by the Continental Steel Co., Kokomo, Ind., charging that rates on the transportation of scrap iron and steel from points in Ohio, Michigan, Illinois, Wisconsin, Iowa, Nebraska, Oklahoma, Texas, Missouri, Arkansas and Kentucky to Kokomo are relatively higher than the rates on old material to Chicago, St. Louis and a number of other consuming points.

Iron and Steel Markets

Sharp Increase in Ingot Output

Production Rises 26 Per Cent in January—Another Large Gain in Unfilled Orders—Further Price Advances —Heavy Pig Iron Sales

A TWENTY-SIX per cent increase in steel ingot production and another sharp gain in unfilled business in January have further emphasized the extent of market recovery. Steel output last month made the second largest gain on record, and the Steel Corporation's unfilled orders statement is expected to show an increase of more than 300,000 tons—the largest, excepting that of 518,430 tons in the previous month, since December, 1925.

Steel output has continued to gain in February. Current operations of Steel Corporation plants are placed at 88 per cent of capacity, as compared with 84 per cent last week and 60 per cent in late December. Recent increases in production have been sharpest at Chicago, where ingot output averages 92 per cent, as compared with 88 per cent last week. At Pittsburgh, operations are reported as unchanged at 75 to 80 per cent.

The trend of prices is still upward, in contrast with the situation a year ago when prices were declining. Moreover, the present rate of production is a more accurate measure of consumption than was true at that time, when there was some stocking of steel in advance of actual specifications. A marked difference also is seen in the fact that the current period was not preceded by an autumn expansion in business. Present recovery is a logical consequence of underbuying in the closing months of 1927.

Comparisons with recent years are chiefly of interest because of the recurrence of heavy production in the first quarter. Doubtless this has been due to roughly coinciding upswings in demand, but buying because of peculiarities of given seasons of the year is of diminishing importance. Such seasonal fluctuations are disappearing even in structural steel, tin plate and automobile steel, and remain a factor mainly in wire products and rails.

Price advances during the week include increases of $3 a ton on fender stock strips and $2 a ton on cold-finished bars and rail steel bars. Sheet prices are also stronger and on new business in black sheets 2.90c., Pittsburgh, has become the minimum of most makers. Higher prices on these products, as well as those recently announced on wire products, cannot become fully effective until next quarter, since most buyers are covered until April 1 at lower quotations.

These forward obligations were doubtless driven in by recent evidences of market strength, but rising prices normally result in heavier commitments. The fact that the advance in plates, shapes and bars to 1.85c., Pittsburgh, caused hesitant buyers to place pending business at 1.80c., a price at least $1 a ton above that ruling on fourth quarter specifications, indicates that one upward step in prices has become established.

Railroads are taking more steel both in the form of shipments against recent rail contracts and in material for cars. The Southern Railway and a Western road have added a total of about 30,000 tons to rail bookings, and at Chicago 50,000 tons remains to be closed. Sales of track accessories at Chicago totaled 12,000 tons. The St. Louis-San Francisco has ordered 4000 freight cars requiring more than 45,000 tons of steel.

Structural steel business in prospect has been enlarged by inquiries for nearly 54,000 tons, including 18,000 tons for a new civic opera house in Chicago and four projects in New York totaling 21,000 tons. Awards in the week of 44,500 tons included 9000 tons for a viaduct in Cleveland, 5000 tons for a bridge in Pittsburgh and 5000 tons for a New York office building. At St. Louis 3000 tons of reinforcing steel is on inquiry for a warehouse.

Pig iron sales increased sharply in the week in the East and at Chicago and Cleveland. In the territory in which New York and Philadelphia are centers, the total business was fully 75,000 tons and possibly more. This included 20,000 to 25,000 tons of basic bought by an eastern Pennsylvania steel company and about 20,000 tons for a Delaware River cast iron pipe company. At Cleveland 34,000 tons was sold, representing largely the needs of foundries which have been using up supplies ordered in the last quarter. Except in eastern Pennsylvania, where producers have advanced foundry iron to a basis of $20, furnace, prices remain unchanged, and the eastern Pennsylvania rise has not been tested.

Steel ingot production in January was 3,959,904 tons, or 152,304 tons a day, according to data compiled by the American Iron and Steel Institute. The increase over December output was 809,559 tons, or 25.7 per cent. This gain is exceeded only by that of March, 1918.

At 53.25c. per lb., spot Straits tin has sold at the lowest level since April 21, 1925, when the price was 52.62½c.

Stronger sheet prices have caused THE IRON AGE composite for finished steel to advance to 2.350c. from 2.336c. last week. It is now higher than at any time since last September and is only about 1 per cent below its level a year ago. The pig iron composite remains at $17.67 for the fourth week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 7, 1928	Jan. 31, 1928	Jan. 10, 1928	Feb. 8, 1927
No. 2, fdy., Philadelphia..	$20.26	$20.26	$19.76	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.50
Basic, del'd eastern Pa...	19.50	19.50	19.50	21.25
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	18.50	18.50	18.50	20.50
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill........	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	**1.85**	1.80	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago.......	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.80	1.90
Steel bars, Chicago.......	1.95	1.95	1.90	2.00
Steel bars, New York.....	2.19	2.19	2.14	2.24
Tank plates, Pittsburgh...	1.85	1.85	1.80	1.85
Tank plates, Chicago.....	1.95	1.95	1.90	2.00
Tank plates, New York...	2.17½	2.17½	2.12½	2.19
Beams, Pittsburgh	1.85	1.85	1.80	1.90
Beams, Chicago	1.95	1.95	1.90	2.00
Beams, New York........	2.14½	2.14½	2.09½	2.24
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.20

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Feb. 7, 1928 Cents	Jan. 31, 1928 Cents	Jan. 10, 1928 Cents	Feb. 8, 1927 Cents
Sheets, black, No. 24, P'gh	**2.90**	2.80	2.80	2.80
Sheets, black, No. 24, Chicago dist. mill.........	3.00	3.00	3.00	2.90
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.75
Sheets, galv., No. 24, Chicago dist. mill.........	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.55	2.60
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., P'gh..	3.25	3.25	3.25	3.25
Barbed wire, galv., Chicago dist. mill.........	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	**$15.00**	$14.75	$15.25	$16.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.50	13.00
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila....	15.25	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.50	11.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.75	$3.25
Foundry coke, prompt....	3.75	3.75	3.75	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.25	12.75
Electrolytic copper, refinery	13.87½	13.87½	13.87½	12.30
Zinc, St. Louis...........	*5.65*	5.67½	5.65	6.55
Zinc, New York..........	*6.00*	6.02½	6.00	6.90
Lead, St. Louis..........	*6.22½*	6.30	6.30	7.22½
Lead, New York.........	6.50	6.50	6.50	7.40
Tin (Straits), New York..	*53.25*	54.62½	56.12½	69.50
Antimony (Asiatic), N. Y.	*11.00*	11.25	11.25	15.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Price Advances Extend to Fender Stock Strips and Cold-Finished Steel Bars

PITTSBURGH, Feb. 7.—Events of the week have to do with prices rather than with changes in the character of buying or in the rate of iron and steel plant operations. Since a week ago, the $3 a ton advance to 4.15c., base Pittsburgh, on automobile body sheets has become general, and because full finished sheets and cold-rolled strips are competitive for automobile fenders, makers of fender stock strips have announced an advance of $3 a ton. An advance of $2 a ton has been announced on cold-finished steel bars and shafting. Meanwhile, sheet manufacturers are getting stronger price ideas on the common finishes and efforts continue to put strips, both hot and cold-rolled, at definitely higher levels. New quantity extras, the same as those now demanded on bars and small shapes, have been applied to hoops and bands, which means higher prices for lots of less than 2 tons of a size.

Manufacturers are well obligated for this quarter on most of the products on which advances have been announced and the higher prices therefore represent largely the ideas of the steel trade on second quarter business. While the latest advance on cold-finished steel bars is announced as applying only on business written for shipment over the remainder of this quarter, this stipulation is generally regarded as an assurance that they will not have to absorb a further advance in prices of hot-rolled bars, which it is hinted will be made before books are formally opened for second quarter.

There is a steady flow of specifications on existing commitments, and here and there is some evidence that consumers underestimated their requirements and have had to make fresh purchases, which in some cases carry the full quotations of producers. As a general rule, the requirements of consumers are not exceeding the tonnages they have on order or on which they are protected. Consumption of steel is increasing, as it usually does at this time of the year. The automobile industry made a substantial increase in output in January as compared with December, and all indications are that it will go still higher in production this month, but it is also a fact that this industry is not doing as well as it did at this time last year, nor is it taking steel as freely as many expected it would by this time.

No appreciable increase is observed in the demand for oil country pipe, as the oil industry has not yet succeeded in overcoming the evils of overproduction. Railroad demands are fair and the inquiry from that source is promising. Not much structural steel business is developing in this district, and the national picture is one of a few projects of size rather than one of many small jobs. The agricultural implement industry is busier now than it was during the last few months of last year. Railroads are now taking large deliveries of rails, which helps to explain the present volume of production. The market, however, derives some of its life from the fact that buyers take more seriously than usual the price advances that have been made and are taking out steel a little more freely than they might if there was not the possibility that delay may mean higher costs.

Steel ingot production in this and nearby districts still may be estimated at from 75 to 80 per cent of capacity. There is not the tendency of a year ago to produce in advance of actual specifications, and the present rate of production is a more accurate measure of consumption than was the slightly higher rate of a year ago, when not a few producers were operating on the basis of the probable requirements of their customers.

Pig Iron.—New business in pig iron has rarely been lighter than at present. Melters are depending very largely on contract purchases, but it is encouraging to producers that they are taking shipments with much more freedom than they did in the closing weeks of last year. There are hopes of higher prices, but they seem to rest largely on the belief that as the steel industry gets busier there will be less steel company iron on the market. There is, however, no evidence yet that the steel companies which ordinarily have iron for sale have withdrawn from the merchant market. Only small lots of the various grades are being sold and there is no occasion to change prices. Two small lots of Bessemer iron recently were sold at $18, Valley furnace, but the inquiries were not general and as a steel company was the seller it is supposed that reciprocal considerations enabled the seller to get a price above the ruling market. The Shenango Furnace Co. has put on its No. 1 furnace and for a short time will have both of its furnaces going, the starting up of the idle furnace being in preparation for blowing out its No. 3 stack.

W. P. Snyder & Co. make the average price of Bessemer iron shipped from Valley furnaces in January $17.50, and of basic iron $17, as compared with $17.57 and $17, respectively, in December.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Consumers of ferromanganese are specifying guardedly because of fairly large carryover stocks from late last year, but the movement of other commonly used ferroalloys is steady and well up to monthly quotas. Prices are unchanged.

Semi-Finished Steel.—There is little or no open market trading in billets, slabs and sheet bars, non-integrated manufacturers merely meeting increased requirements by enlarging specifications to regular sources of supply. There are no suggestions of a change in prices. Pipe skelp orders likewise are largely on a requirement basis and the few pipe makers that now buy their steel no longer seek competitive bids. The open quotation is that of plates, or 1.85c. There has been little or no test of the new base price on wire rods, because important tonnage buyers were covered for this quarter at materially lower prices, most of the tonnage now moving on first quarter contracts carrying a price of $40, with a little at $42.

Rails and Track Supplies.—The local standard-section rail mill is producing and shipping actively against an order book that will engage capacity well toward the middle of the year, provided the roads take out all the tonnage ordered. Light-section rails continue to reflect the unfavorable coal situation. Makers of spikes and other track accessories have fair-sized order books, but specifications are moderate.

Wire Products.—Makers have taken some small-lot orders at the recently advanced prices, but most buyers are protected for this quarter at lower prices and new business does not amount to much. Specifications are reported to be steady and of good volume on regular contracts for this quarter, against which specifying can be done for the next six weeks. Nails at $2.65, base, per keg, Pittsburgh, and plain wire at $2.50, base, per 100 lb., are largely a second quarter proposition except for stray tonnages beyond regular contracts.

Tubular Goods.—Steady increase is noted in the demand for standard-weight pipe, and if all the tonnage that is embraced in projected gas and oil pipe lines should be placed in the near future, a number of manufacturers would not have to worry about mill operations. Except for the demands from California in connection with deep well drilling, the call for oil country pipe is moderate. The pipe lines mentioned as being nearest a formal inquiry are one to run from Monroe, La., to St. Louis, with a spur into Memphis, Tenn., and an extension to Kansas City of the line from Amarillo, Tex., to Wichita, Kan. The former is said to have been approved by the bankers, but the actual inquiry is yet to reach any of the mills, and in view of the necessity of securing the right of way and the franchise necessary to get into the city of St. Louis, it is probably good opinion that the order will not come out in the next few months. Fairly good demand is noted for boiler tubes for locomotive construction and repair and mechanical tubing is being taken steadily by motor car builders. Tubular mill operations range from 60 to 70 per cent of capacity.

Sheets.—Heavy operations of independent sheet mills in January seem to have affected February operations, and a few mills appear to need business to keep going. Last month's operations by independent mills are estimated at 85 per cent of capacity, but shipments fell considerably below that rate and there are now supplies to meet tonnage releases yet to come in. Operations this month are more in keeping with specifications and they form most of the business, since so large a percentage of consumers secured coverage for this quarter long before it began. In spite of these conditions, however, the general tendency of prices is higher and some fair-sized lots of black sheets have been placed at the full price of 2.90c., base Pittsburgh, representing purchases by buyers who underestimated their requirements. Most mills want 2.90c., base, for black; 3.75c., base, for galvanized, and 4.15c., base, on automobile body sheets, the latter quotation having been generally adopted since a week ago, presumably for the reason that tonnage now entered would be an obligation against second quarter tonnage and the common desire is to bring up the price average for that period. Demands from the motor car and body builders still are below what it was expected they would be by this time. Car builders have somewhat modified the inspections they recently set up on sheets and again are accepting shipments on the basis of former specifications.

THE IRON AGE Composite Prices

Finished Steel
Feb. 7, 1928, 2.350c. a Lb.

One week ago	2.336c.
One month ago	2.314c.
One year ago	2.374c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron
Feb. 7, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.59
One year ago	19.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c.
.o.b. Chicago	1.95c. to 2.05c.
el'd Philadelphia	2.17c.
el'd New York	2.19c.
el'd Cleveland	2.04c.
.o.b. Cleveland	1.85c.
.o.b. Lackawanna	1.95c.
.o.b. Birmingham	2.10c.
.i.f. Pacific ports	2.35c.
.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

.o.b. Pittsburgh mills	1.90c. to 1.95c.
.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

.o.b. mills east of Chicago district	1.75c.
.o.b. Chicago Heights mill	1.80c.

Iron

ommon iron, f.o.b. Chicago	1.90c.
efined iron, f.o.b. P'gh mills	2.75c.
ommon iron, del'd Philadelphia	2.12c.
ommon iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c.
.o.b. Chicago	1.95c. to 2.05c.
.o.b. Birmingham	2.10c.
el'd Cleveland	2.04c.
el'd Philadelphia	2.10c.
.o.b. Coatesville	2.00c.
.o.b. Sparrows Point	2.00c.
.o.b. Lackawanna	1.95c.
el'd New York	2.17½c.
.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c.
.o.b. Chicago	1.95c. to 2.05c.
.o.b. Birmingham	2.10c.
.o.b. Lackawanna	1.95c.
.o.b. Bethlehem	2.00c.
el'd Cleveland	2.04c.
el'd Philadelphia	2.13c.
el'd New York	2.14½c.
.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
ll gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
ll gages, wider than 2 in., to 6 in., P'gh,	2.05c. to 2.10c.
All gages, 6 in. and wider, P'gh	1.85c. to 1.90c.
ll gages, narrower than 6 in., Chicago,	2.20c. to 2.40c.
ll gages, 6 in. and wider, Chicago,	2.00c. to 2.20c.

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*Mills follow plate or sheet prices according o gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
ars, f.o.b. Pittsburgh mills	2.20c. to 2.25c.
ars, f.o.b. Chicago	2.20c. to 2.30c.
ars, Cleveland	2.30c. to 2.35c.
hafting, ground, f.o.b. mill	*2.45c. to 2.90c.
trips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
trips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
trips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
trips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
ire nails	$2.55 to $2.65
alvanized nails	4.55 to 4.65
alvanized staples	3.25 to 3.35
olished staples	3.00 to 3.10
ement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
right plain wire, No. 9 gage	$2.40 to $2.50
nnealed fence wire	2.55 to 2.65
pring wire	3.40 to 3.50
alv'd wire, No. 9	3.00 to 3.10
arbed wire, galv'd	3.25 to 3.35
arbed wire, painted	3.00 to 3.10

Chicago district mill and delivered Chicago rices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, lass., (wire) mill $3 a ton higher on production f that plant; Duluth, Minn., mill $2 a ton igher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.05 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.05 to 3.10
Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Tin Plate.—Specifications for tin plate are sufficient to engage productive capacity to fully 80 per cent, a gain of 3 or 4 points from the average of a week ago. This is somewhat under the rate of a year ago, but can makers are not making up containers nearly as heavily in advance of orders as a year ago, and tin plate specifications are in keeping with that fact. Plans have been made for increased acreage in almost all packing crops regardless of this year's carryover, and efforts are to be made to increase consumption of canned foods through emphasis on the quality. The common expectation of tin plate manufacturers is that this year will see a production between that of 1926 and 1927, or, roughly, 37,500,000 base boxes.

Cold-Finished Steel Bars and Shafting.—Most manufacturers since a week ago have announced an advance of $2 a ton to 2.30c., base Pittsburgh or Chicago, to apply on new business for shipment between now and the end of this quarter. General coverage of buyers for this quarter at 2.20c. minimizes the possibility of much new business between now and March 31. Restriction of the new price to orders for shipment by that date is probably a safeguard against a further advance in hot-rolled bars. Specifying on first quarter contracts is steady and in good volume despite the fact that parts makers generally are not making up stocks of finished products in anticipation of orders.

Hot-Rolled Flats.—Specifications and shipments still show an expanding tendency and from that standpoint the situation is satisfactory. But the movement is against low-priced orders and consumers generally are so well covered that there is little new business. On new business mills generally want 1.90c. for wide stock and 2.10c., base, fcr material less than 6 in. wide. The Jones & Laughlin Steel Corporation has put out a new card on hoops and bands, the only change being the adoption of the quantity extras for lots of less than two tons, already in effect on bars and small shapes. For lots of less than 4000 lb., but not less than 2000 lb., there is a lump sum extra of $3; less than 2000 lb., but not less than 1000 lb., $6, and for lots of less than 1000 lb., $10.

Bars, Plates and Shapes.—Makers in this district are well satisfied with what buyers are specifying on first quarter bar contracts, which generally carried a price of 1.80c., base Pittsburgh. Business in bars, plates and shapes taken late last year at 1.75c., base, appears to be well cleaned up. On new business there is no evidence that less than 1.85c. is being done. Structural lettings are light in this area and neither in the shops nor the estimating departments are local fabricators as busy as they could be.

Cold Rolled Strips.—All makers now are quoting 3.15c., base Pittsburgh or Cleveland, subject to a deduction of 25c. per 100 lb. for lots of 3 tons or more of a size and temper for one shipment. Specifications on old and lower-priced contracts are still coming along well.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Bolts, Nuts and Rivets.—Demand for bolts and nuts is considerably better, notably from jobbers, than it was a few weeks ago, but still is no strain upon the ability of manufacturers to supply. Rivets are not yet showing much life. Prices of these products are firm.

Fluorspar.—Small lots of gravel spar for spot shipment are bringing $15 per net ton at mines, but all contracts of any consequence carry a price of $14.50 for domestic material. Foreign spar does not appear to be finding much use in this and nearby districts.

Coke and Coal.—It is impossible to report improvement in either prices or business. Furnace coke is plentiful in relation to demand and prices are largely dictated by buyers. Usable coke can be bought as low as $2.50 but pig iron producers who are exacting as to sulphur content of the coke cannot do much better than $2.60, while a little more is asked when only one or two cars are wanted. Foundry coke ranges from $3.75 to $5.10, but most of the business is nearer the lower limit. The coal market is very slow.

Old Material.—Not much change is noted in the market. A steel maker putting in a new open-hearth furnace for the first time was a buyer of a small lot of selected heavy melting steel and is reported to have paid $15.75 and $16. But dealers are seeking orders for railroad steel from other melters at $15.25, while on some short orders dealers continue to pick up fair-sized lots at $14.75 for delivery at one point. No sales of this grade into consumption are noted at under $15 and that is a fair appraisal of the consumer market. Blast furnace scrap still is easy. There is little life to the demand for any grade, but sales develop without much advance notice, since there is not the tendency of former years for consumers to buy well ahead of needs.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.75 to $15.25
Scrap rails	14.25 to 14.75
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	14.75 to 15.25
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00
Short mixed borings and turnings	11.00
Cast iron borings	11.00
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.75 to 15.25
Industrial	14.25 to 14.75
Agricultural	13.75 to 14.25

Baldwin Steel Plant in Canada Taken Over By New Interest

TORONTO, ONT., Feb. 7.—Gordon F. Perry, president National Iron Corporation, Ltd., Toronto, on behalf of himself and a syndicate of British, Canadian and United States interests, has taken up the option he held on the plant and property of the Baldwin Canadian Steel Corporation, Toronto. Mr. Perry stated that he is not yet in a position to announce plans for the development which the syndicate has in mind, but he said in a short time a thriving industry will arise on the site of the now idle plant.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c.
Sheared	1.85c.
Universal	1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $43 to $45. Cleveland mill base, $42 to $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Ingot Output at 92 Per Cent—Sales Volume is Undiminished

CHICAGO, Feb. 7.—Ingot output in the Chicago district is conservatively estimated at 92 per cent of capacity. The Illinois Steel Co. has blown in a stack at Gary and one at South Chicago, making 20 active out of 27. For the district as a whole, eight furnaces have been lighted since the first of the year.

Sales volume is undiminished since a week ago, when purchases compared favorably with any seven-day period in the last two years. Deliveries on most products have been extended.

Not less than 45,000 tons of steel will be required by Western shops for cars purchased in the week. A Mid-Western railroad is asking for prices on 36 passenger and baggage cars and it may soon enter the market for freight equipment.

Bids have been taken on the Chicago Civic Opera Building and it is probable that the 18,000 tons of steel required will be purchased at an early date. The position of fabricators is strengthening because of recent contracting and the prospect that spring construction will be heavy. Building permits in Chicago in January were 15 per cent heavier than in the first month a year ago.

Active inquiry for oil storage tanks now totals 5000 tons of steel and several new projects are rapidly taking form. Small consumers of steel are feeling the pinch of extended deliveries and the quantity extras recently placed on bars and small shapes by local mills. The effect has been a noticeable increase in the average size of purchases.

Pig Iron.—Excluding the long term contracts placed at the beginning of the year, sales for first and second quarter delivery in the first seven days of the current month are only a shade less than the total for January. As an indication that foundrymen are looking to the future, it is estimated that two-fifths of recent purchases are for delivery up to March 31 and that three-fifths of the tonnage sold is for shipment in the second quarter. Furnace operations are steady but release orders are in excess of production, thus affording sellers an opportunity to reduce furnace stocks. Higher prices at St. Louis are broadening the Chicago territory and are adding stability to local quotations. Less is heard of options at $18, delivered, against possible shipments by boat in the spring. The melt in malleable foundries continues to grow.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Ferromanganese is quoted at $100, seaboard, or $107.56, delivered Chicago. The spiegeleisen market is quiet and prices are steady.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Financial arrangements appear to be holding in check a pipe line project requiring 130,000 tons of steel, which will extend from the Southwest as far north as Omaha. Orders for tankage materials are lacking this week but inquiry is enlarged to the extent of 3000 tons. The railroad equipment market is active. The St. Louis-San Francisco has placed 4000 freight cars requiring 45,000 tons of plates, shapes and bars, and the Rock Island is asking for prices on 36 passenger and baggage cars. The Chicago & Eastern Illinois inquiry for 500 cars is promising. The St. Paul will come into the market for rolling stock, but it is understood that formal inquiry will not be issued before April. The local plate market is active as indicated by deliveries of four to five weeks on the universal mill product and two to four weeks on sheared products. Less is heard of low competitive prices on business that emanates from the Southwest, and in the local market prices are firm at 1.95c. for large lots and at 2.05c. for small lots.

Mill prices on plates per lb.: 1.95c. to 2.05c., base, Chicago.

Structural Material.—Projects that are in the making and actual inquiry before the trade total close to 100,000 tons in the immediate Chicago territory, while at Milwaukee it is estimated by the trade that an additional 40,000 tons is in prospect. Bids have been submitted on 30,000 tons of building work in Chicago. The Civic Opera building will require 18,000 tons and the Sheridan Towers 4000 tons. Railroad needs in structural shapes are heavy but the pending list is growing more rapidly than awards are being made. More activity is noted among fabricators. It is doubtful if prices named by shops are much above the level of December, but with heavier backlogs it seems probable that an advance in prices, much talked of by fabricators, may go into effect. Building promoters are being hurried into the market by the advances in mill prices. Structural mills are heavily engaged and deliveries have been extended, the best available now being four weeks, while on some sizes six weeks is the best promise. Prices are firm at 1.95c. on large tonnages and at 2.05c. for small orders.

Mill prices on plain material per lb.: 1.95c. to 2.05c., base, Chicago.

Rails and Track Supplies.—A Western railroad has purchased 15,000 tons of standard-section rails. Counting new inquiry, there remains not less than 50,000 tons of rails still to be purchased in this district. Track accessory sales total 12,000 tons, and 15,000 tons is on inquiry. Railroads are ready to take heavier shipments of track supplies and mills have been speeded. Although rail purchases have dragged as compared to a year ago, the railroads have been more prompt in completing shipping schedules and mills today have better arranged rolling schedules than in any previous late winter delivery period. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Bars.—Soft steel bar sales are on a par with last week, making the second consecutive seven-day period which compares favorably in volume of business with any like period in two years. Agricultural machinery manufacturers are fully engaged and local producers report no check in output is apparent in the automobile trade. In fact, such March schedules as now have been made up by that industry indicate that shipments in the coming month may be heavier than in January or in February. Cold drawn bar producers are forwarding heavy specifications. Prices are firm at 1.95c. to 2.05c. The iron bar market is moderatley active and prices remain at 1.90c., Chicago. Quotations on alloy steel bars are showing greater strength as sellers find their order books well filled. Rail steel bar producers have light backlogs and they hesitate to disturb the market by keeping pace with advances in the prices of mild steel bars. Quotations remain at 1.80c., Chicago Heights mills. Hard steel bar requirements for concrete reinforcement are heavy and the movement of fence posts is fully up to seasonal expectations. Deliveries of these products are prompt.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.05c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Cast Iron Pipe.—Reports are that a more strenuous effort will be made to advance prices, but in the light of recent sales market quotations can be based only on $26 to $28, Birmingham, on attractive tonnages and on $28.50 to $30 for the average run of small business. The delivery situation is clearing in that makers are now able to make prompt shipment of some small sizes and shipment in 20 days is being promised on the larger diameters. Detroit will open bids Feb. 10 on 2000 tons of 24-in. class C pipe. A number of old quotations such as the year's requirements for Conneaut, Ohio, and 100 tons for Portsmouth, Ohio, are still open. Springfield, Ill., has ordered 300 tons from the National Cast Iron Pipe Co. The Santa Fe placed two sizable orders but interest among the railroads has been lagging. Public utilities give indication that they will soon be shopping for early spring requirements.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $36.20; 4-in., $38.20 to $40.20; Class A and gas pipe, $4 extra.

Sheets.—Specifications are more liberal and mill schedules are made up for two weeks. In the last few days the flow of releases has been growing steadily. The Milwaukee mills have resumed operations. Although the improved demand for shipments is relatively widespread it is noticeable that the roofing trade and general manufacturing are more active now than other buyers. Business in the Northwest is spotty but improved. Fresh sales are in small volume at steady prices.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Steel.—Orders for billet steel reinforcing bars out of Chicago warehouses are small in the aggregate. The bulk of recent reinforcing bar awards has been taken by the hard steel bar mills. Fresh inquiry is light, but old projects are active as weather conditions become more favorable to outdoor construction. Shop operations average about 40 per cent. Asking prices for billet steel reinforcing bars range from 2.35c. to 2.75c. and rail steel is going at 1.80c. to 1.85c., Chicago Heights mills.

Cold Rolled Drawn Bars.—Chicago prices have been advanced to 2.30c. New sales have not been in large volume and a real test of the market is yet to come, but sellers say they have withdrawn old quotations and are naming only the new prices. Producers in this district are well engaged.

Wire Products.—Orders for these commodities are in good volume and mill operations are being held at 65 per cent of capacity. Specifications from the manufacturing trade are expanding. Jobbers, who in January undertook to expand stocks, are finding the rate of turnover high and are reordering to keep pace with demands. Mill stocks are growing smaller but the assortment is still good. Nail shipments are steady and woven wire fencing is moving in good volume, especially to the Southwest. Little business is coming from the railroads. All local producers have put in effect the advance in prices announced last week. Order books are of fair size. Current sales can hardly be said to be in sufficient volume to afford a test of the market. Prices for wire and wire products are shown on page 431.

Coke.—All by-product coke ovens in this district are lighted. Shipments are steady and prices are well maintained at $9, local ovens, and at $9.50, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—Demand for small rivets is sharply upward and prices are stronger. Specifications for these commodities in January were fully 30 per cent heavier than in December and this increase is well sustained in the first days of February. Production averages a shade under 70 per cent of capacity.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Old Material.—The local scrap situation is rather mixed in its tendencies. Large sales of heavy melting steel made two weeks ago stiffened the market and it was then generally believed that after a short period of inactivity prices would advance. Insofar as bids for railroad lists and trading prices among dealers are concerned this is true, but it is now disclosed that two local mills have taken upward of 18,000 tons of heavy melting steel at $12.75 to $13 a gross ton, delivered. This is a shade under the prices paid by other consumers in the near past. Rejections are high by users, who insist on having strictly No. 1 material, and dealers fear that margins of profits may be wiped out. The position of sellers is made worse by the inactivity of local yards and the fact that consumers are entering more spiritedly into bidding on railroad lists. Railroad shipments are finding placement as soon as they appear on tracks. One steel mill that does not often enter the market is picking up odd lots of 1000 to 2000 tons of heavy melting steel.

Prices delivered consumers' yards, Chicago:

Per Gross Ton		
Basic Open-Hearth Grades:		
Heavy melting steel	$12.50 to	$13.00
Shoveling steel	12.50 to	13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to	14.75
Hydraulic compressed sheets	11.00 to	11.50
Drop forge flashings	9.75 to	10.25
Forged, cast and rolled steel carwheels	15.50 to	16.00
Railroad tires, charging box size	16.25 to	16.75
Railroad leaf springs, cut apart	16.25 to	16.75
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.50 to	15.00
Coil springs	16.50 to	17.00
Electric Furnace Grades:		
Axle turnings	13.00 to	13.50
Low phosphorus punchings	14.25 to	14.75
Low phosphorus plate, 12 in. and under	13.50 to	14.00
Blast Furnace Grades:		
Axle turnings	10.75 to	11.25
Cast iron borings	10.25 to	10.75
Short shoveling turnings	10.25 to	10.75
Machine shop turnings	7.50 to	8.00
Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	15.00 to	15.50
Cupola Grades:		
Steel rails less than 3 ft.	15.25 to	15.75
Angle bars, steel	14.00 to	14.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	13.75 to	14.25
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	18.75 to	19.25
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	11.00 to	11.50
No. 1 busheling	9.25 to	9.75
No. 2 busheling	4.25 to	4.75
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	13.50 to	14.00
No. 1 agricultural cast	13.50 to	14.00
Stove plate	11.75 to	12.25
Grate bars	11.50 to	12.00
Brake shoes	11.75 to	12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Inland Steel Earnings Decline Slightly—Donner Profits Off Sharply

The Inland Steel Co., Chicago, had net profits in 1927 of $6,806,894, equivalent after all charges to $5.16 per share of common stock. This compares with $7,147,704 in 1926, equal to $5.45 a share earned on common. Decline in earnings was most pronounced in the last quarter of the past year, when the company earned $1,216,853, as compared with $2,113,185 in the corresponding quarter of 1926.

Earnings for 1927 of the Donner Steel Co., Inc., Buffalo, amounted to $372,194, compared with $736,608 in the previous year. This company's profits in the quarter just passed were slightly better than in the December quarter of the previous year, having amounted to $86,595 in 1927 and to $86,092 in 1926.

New York

Pig Iron Sales 20,000 Tons—Structural Inquiries 21,000 Tons

New York, Feb. 7.—Sales of pig iron in this territory in the past week exceeded 20,000 tons. With a few exceptions, buying is for specific needs rather than for speculative purposes. Melters have largely disposed of stocks carried over from last quarter, and in some cases are expanding operations. Moderate-sized purchases still predominate, although several large buyers have placed orders recently. The Central Foundry Co., New York, has closed for 5000 tons, of which 3000 tons is for delivery at its Dundalk, Md., plant and 2000 tons is for shipment to the Essex foundry at Newark, N. J. The Thatcher Co. has placed 2000 tons for its Garwood, N. J., plant and 1500 tons for its Newark, N. J., works. The Eastern Malleable Iron Co., Naugatuck, Conn., has placed 3000 tons of malleable, and W. P. Laytham, Passaic, N. J., has closed against his inquiry for 3000 to 5000 tons of high silicon iron. An inquiry from the Washburn Wire Co., Phillipsdale, R. I., for 5000 tons of basic is the largest pending tonnage. A considerable proportion of the iron recently bought is for delivery this quarter. Two inquiries in this territory for 2000 tons and 500 tons of foundry iron respectively call for second quarter shipment. Except for low prices made by an idle furnace in disposing of its remaining stocks, the trend is toward a firmer market. Most eastern Pennsylvania producers have advanced their quotations on foundry iron to $20, base furnace. Recent sales have been at $19.50 and less. Buffalo foundry iron is increasingly steady at $17, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—Effective today, distributers have advanced prices $1 a ton, to 1.95c., Pittsburgh mill. Youngstown and New York warehouse prices have remained unchanged, although two $1 advances have been made in the mill price. Sizable bookings have not been numerous in the last week, but some distributers have taken a fair tonnage in small jobs. Another section of the subway on which the general contract is soon to be awarded will require 300 tons of bars.

Finished Steel.—Structural steel inquiry is the most important development of the week locally, the total in four projects being 21,000 tons, of which 11,000 tons is for subway work, 4000 tons for a New York State office building to be erected in Manhattan, 3500 tons for bridge in Queens and 2500 tons for a loft building in Manhattan. The Structural Steel Board of Trade of New York reported for its members a total of about 10,000 tons in structural steel awards for the week, of which the largest was 5000 tons for the Lefcourt Building at Fifth Avenue and Forty-third Street. Builders are apparently recognizing that recent price advances are a determined step by the mills to improve their recent unsatisfactory earnings, and as a consequence tonnage involved in important undertakings is being placed or is about to be placed against options at previous prices soon to expire. Eastern shape mills report a gain in tonnage booked. In the last week of January there were fairly good specifications against the quotas for that month, and with this tonnage coming in consumers have not been specifying as freely during the past week. Mills making plates, shapes and bars are now getting fairly well into the prices which became effective on first quarter contracts, as consumers have almost reached the end of the steel due them on specifications at former prices given to the mills on or before Dec. 31. The recent advance of $1 a ton for the remainder of this quarter has so far applied only to small lots from consumers who had no contract protection. The interest of consumers in the future course of prices is evidenced by a few inquiries for second quarter plate contracts, on which mills have preferred not to quote at this time. Makers of sheets are now uniformly quoting 2.90c. on black, 2.10c. on blue annealed and 3.75c. on galvanized, Pittsburgh base, but consumers are well covered and new buying is light. The same situation applies to hot and cold-rolled strip steel and wire products, on which price advances have recently been announced.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c.; plates, 2.17½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Warehouse Business.—Effective Feb. 6, jobbers have advanced prices on cold-finished shafting and screw stock $2 per ton to 3.40c. per lb., base, for rounds and hexagons and to 3.90c. per lb., base, for flats and squares. Business is beginning to show some improvement, particularly in the movement from stock of

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

structural material. Black and galvanized sheets continue in moderate demand and prices are unchanged.

Cast Iron Pipe.—There is a fair volume of small tonnage purchasing by private companies, but municipal buying is small. The New Haven Water Co., New Haven, Conn., has closed on 2000 tons of pipe and Brockton, Mass., is reported to have closed for 225 tons of 6 and 8-in. water pipe with the United States Cast Iron Pipe & Foundry Co. The basis of $28 per ton, f.o.b. Birmingham, is being fairly well maintained by both Southern and Northern makers.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Coke.—Purchasing of both foundry and furnace grades is light, but curtailment of operations has enabled producers to maintain prices. Standard foundry is quoted for prompt shipment at $4 to $4.50 per ton, Connellsville, and standard furnace at from $2.75 to $3 per ton, Connellsville. Delivered prices are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—Prices are unchanged in an inactive market. Purchasing by consumers is confined to small tonnages. Although prices show no tendency to advance, there are apparently no large supplies of most grades. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered eastern Pennsylvania. Yard grade is being purchased by brokers at $10.75 and $11 per ton, delivered Harrisburg, Phoenixville or Pottsville, Pa., and as high at $11.25 has been paid in some instances. The list of about 45,000 tons of scrap offered by the Pennsylvania Railroad is reported to have brought out slightly lower prices than were offered on the Pennsylvania list last month.

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Cleveland

Heavier Steel Tonnages Coming from Automotive Industry

CLEVELAND, Feb. 7.—Specifications against contracts for practically all forms of finished steel are holding up in good volume. Heavy tonnages are coming from the automotive industry and other consuming industries are ordering material somewhat more freely than recently. While the output of the Ford Motor Co. is still rather limited, falling considerably short of 1000 cars per day, some of the other makers of low-priced automobiles are operating at maximum capacity.

New steel business is moderate owing to the fact that most consumers are under contract. However, quite a little new business is being placed in steel bars, plates and structural material at 1.85c., Pittsburgh, which is being firmly adhered to except by local bar mills that are using a 1.85c. Cleveland base for steel bars. Following the $3 a ton advance on cold rolled strip and auto body sheets, makers of cold rolled strip have made a similar advance on fender stock. Cold finished bars have been advanced $2 a ton to 2.35c., Cleveland. Not much change is looked for in the volume of sales before next month, when consumers will come into the market for the second quarter, and on this business mills may get the full benefit of the higher prices.

Inquiry in the building field is light. The Timken Roller Bearing Co., Canton, Ohio, has placed a contract for a factory extension, requiring 3000 tons of structural steel. The Strobel Steel Construction Co., Chicago, has taken a contract for the erection of 9000 tons of structural steel bridge work for the Cleveland Union Terminals Co. The fabricating contract for this placed recently did not include erection. Lake shipyards have an inquiry out for a small building requiring 1000 tons.

Pig Iron.—Sales increased in the past week, during which Cleveland interests took orders for 34,000 tons, a gain of 10,000 tons over the previous week. The business was well scattered and for the most part was in small lots. Sales were rather evenly divided between early shipment orders, contracts for the second quarter and contracts to carry buyers through the remainder of this and the second quarter. The latter list is made up mostly of foundries that had carried over fourth quarter iron and had not previously made any purchases for this year's delivery. Buying interest developed in the northern Ohio territory, which has been quiet for some time. February shipments are starting out well and promise to equal in volume those of January. Although heavy shipments, particularly to the automotive industry, enabled some furnaces to reduce their stocks considerably last month, others are shipping only about as much iron as they are making and still have fairly large stocks that were accumulated in the late months of last year. Jobbing foundries report a slight gain in business. Pig iron prices show no change. Lake furnaces are able to sell foundry and malleable iron at $17 in the northern Ohio territory, but local furnaces must go to $16.50 to overcome the freight disadvantage for shipment to some competitive points. For Michigan delivery there is still a range of from $17.50 to $18. Low phosphorus iron is inactive. While a Valley producer has taken considerable business at $27, furnace, this price has to be shaded 50c. a ton when competition with Eastern furnaces must be met.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—The market has a firmer tone and prices below 2.90c., Pittsburgh, on black and 2.10c. on blue annealed sheets seem to have disappeared. While new business is only moderate, as most buyers are under contract, mills are taking some fair-sized lots of finished black sheets at the full price. Galvanized sheets are still irregular, some mills going to 3.75c., Valley, or 3.65c., Pittsburgh. Mills generally have joined in the advance to 4.15c. on auto body sheets. Specifications are heavy from the automotive industry and fair from most other consumers. The steel barrel industry is slack and little business is coming from that source.

Strip Steel.—Makers of cold rolled strip have advanced fender stock $3 a ton to 4.30c., Cleveland and Pittsburgh, for the remainder of this quarter for No. 20 gage and heavier. Cold-rolled strip is being quite

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

generally quoted at a 3.15c. Cleveland base or 2.90c. for 3 tons and over. Hot-rolled strip is firm at 1.85c., Pittsburgh, for wide and at 2.05c. for narrow material. Specifications against contracts are good, but new business is light.

Reinforcing Bars.—The Cleveland Union Terminals Co. has a new inquiry out for 1000 tons for foundation work, which with 2000 tons reported last week and tunnel work still pending, makes a total of 4600 tons to be placed. Makers of rail steel bars have marked up their price $2 a ton to 1.75c., mill. Billet steel reinforcing bars are generally quoted at 1.85c., Cleveland. Good lots from warehouses are going at around 2.25c.

Warehouse Business.—Jobbers have advanced galvanized sheets $2 a ton to 4.60c. but have not changed other grades. Warehouse orders are fair, showing a gain over January and the average size of orders is larger. Prices are firm.

Iron Ore.—Consumers are as yet showing no interest in Lake Superior ore for 1928 delivery, and there has been no discussion of prices. Prices may not be named before April and it is doubted whether the ore buying movement will start before that time. There is nothing to indicate that there will be a change from the prices that have prevailed the past two years.

Semi-Finished Steel.—Specifications for sheet bars are not holding up to recent volume, as some of the sheet mills report that they do not have orders to keep them operating at the rate at which they were running last month. The leading local producer has shut down one open-hearth furnace, now operating nine out of 14. Prices are unchanged at $33, Cleveland, for sheet bars, billets and slabs.

Coke.—Foundry coke is in better demand than recently, reflecting some improvement in foundry operations. By-product foundry coke is quoted at $8, Painesville, for February shipment, or $9.01, delivered Cleveland. Connellsville quotations are $3.75 to $5.10, ovens, for foundry grades and $2.75 for heating coke. By-product coke for domestic use is moving slowly and unchanged at $4.50, Valley ovens, for egg size.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is slowly expanding. Specifications during January showed a gain over December, but were not as heavy as during January last year. The industry has increased operations and is now running at from 60 to 65 per cent of capacity. Rivet orders are rather light. Prices on these products are firm.

Old Material.—Mills are not taking as much scrap as recently, several finding it necessary to restrict shipments which were coming in faster than needed. A Warren, Ohio, mill has stopped shipments entirely. There is no new demand from consumers and dealers are buying very little scrap. The holding up of shipments is having a depressing effect on the market, although prices are no lower. Dealers are making small-lot purchases, paying $14 for No. 1 heavy melting steel and $10.50 for blast furnace scrap.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Philadelphia

Foundry Iron Advanced to $20 Per Ton; Sales in Week of 60,000 Tons

PHILADELPHIA, Feb. 7.—Purchases of several sizable tonnages of pig iron brought the total closed in this district in the week to 60,000 tons or more. Eastern Pennsylvania pig iron producers have advanced prices of foundry grades to $20 per ton, base furnace, and in some cases quotations at $19.50 were withdrawn. Included in pig iron sales were 20,000 to 25,000 tons of basic and a large tonnage of foundry iron for a cast iron pipe interest.

Sales of plates, shapes and bars are in most cases small as consumers are well covered by contracts, but the recent advances are being firmly maintained on new business. Among plate mills there is some discussion of the advisability of adopting quantity differentials. Sizable plate tonnage has been booked by eastern Pennsylvania mills from fabricators who were awarded contracts for oil tanks and stills for the Sinclair Oil Co.

Pig Iron.—Effective last week, eastern Pennsylvania furnaces advanced prices 50c. a ton on foundry grades to a basis of $20 per ton, base furnace. Prior to the advance, a large tonnage of outstanding business was closed at the former quotations. It is estimated that more than 60,000 tons of foundry and basic iron was purchased in this district during the week. Included in this total was more than 20,000 tons of foundry grades purchased by the leading cast iron pipe interest, 5000 tons of foundry iron by the Central Foundry Co. and 20,000 to 25,000 tons of basic iron by an Eastern plate manufacturer. A Delaware River pipe maker is in the market for a medium-sized tonnage of foundry iron and another eastern Pennsylvania consumer of basic iron is reported to be considering purchase of a tonnage soon. The past week's basic business is understood to have figured back to about $19, furnace. There has been some small business in low phosphorus iron, steel foundries working on orders from the railroads being particularly active. There have been some carload lots of foundry iron closed on the new basis of $20 per ton, furnace, but no substantial tonnage has been placed at this price.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.26 to $20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X	21.26 to 21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Quotations on steel billets continue unchanged at $33 per ton, Pittsburgh, for rerolling quality and $38 per ton, Pittsburgh, for forging billets.

Bars.—Current purchasing is small, but specifications against contracts are coming out freely and mills are beginning to consider the possibility of a further advance for second quarter business. The present basis of 1.85c. per lb., base, Pittsburgh, or 2.17c. per lb., delivered Philadelphia, is evidently being well maintained.

Shapes.—Prices are showing slightly less irregularity, so that 2c. per lb., Bethlehem, and 1.97½c. per lb., Pottsville, or 2.12c. to 2.13c. per lb., delivered Philadelphia, are representative of the present market. Award of contracts for barges and car floats by the Pennsylvania and New York Central railroads has been postponed. In a few instances recently, local fabricated projects have been revised to reinforced concrete. An outstanding revision is the Blum Store addition, originally 1200 tons of structural steel and now only 150 tons of column cores and girders.

Plates.—Eastern Pennsylvania mills have booked some substantial tonnage from fabricators of oil tanks and stills for the Sinclair Oil Co. A Chattanooga, Tenn., fabricator awarded about 2500 tons of plates to a Claymont, Del., mill and a Louisville, Ky., contractor has placed 1000 to 1200 tons with another eastern Pennsylvania producer. Quotations continue unchanged at 2c. per lb., Coatesville, or 2.10c. per lb., delivered Philadelphia.

Sheets.—Blue annealed sheet prices are fairly well maintained at 2.10c. per lb., base, with a 10c. per 100 lb. extra for widths greater than 40 in. Black and galvanized sheet prices, however, still show a tendency to softness with black sheets ranging from 2.70c. to 2.90c. per lb., Pittsburgh, and galvanized from 3.65c. to 3.75c. per lb., Pittsburgh.

Warehouse Business.—Purchasing from stock continues small, but prices are being fairly well maintained with only occasional concessions. Effective Feb. 6, prices on cold finished steel were advanced $2 per ton to 3.35c. per lb., base, for rounds and hexagons and 3.85c. per lb., base, for flats and squares.

Imports.—In the week ended Feb. 4, the only iron or steel shipment received at this port was 23 tons of steel billets from Sweden.

Old Material.—Prices are unchanged and the market is quiet. Dealers report all grades moving in fair volume, although there is no great surplus of scrap available. Consumers are reported to be showing less inclination to suspend shipments.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.25 to	15.75
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast boring (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		13.00
Stove plate (for steel works)		13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)	11.00 to	11.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to	13.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	12.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	15.00 to	15.50

Milwaukee Company Saves 784 Hours by Use of Air Mail

The Kearney & Trecker Corporation, Milwaukee, machine tool manufacturer, has been making a practical test of the advantages of air mail, with the result that in one week's time, a net gain of 784 hours over the regular mail was made. The test was made between Milwaukee and Detroit, Cleveland, Syracuse, N. Y., Philadelphia, New York, San Francisco and Los Angeles representatives of the company. A regular letter and an air mail letter were dispatched to each city daily and a tally was kept on the time of arrival. In only one instance, that to Cleveland, did a letter sent through regular channels beat the air mail letter. One letter to Syracuse and another to Philadelphia arrived at the same time. The investment of $3.50 in air mail postage is balanced by the 784 hr. saved, according to George L. Erwin, Jr., sales manager, who conducted the test.

Production of machinery in Canada in 1926, excluding household and office equipment, was valued at $29,563,000, an increase of 31 per cent over the output value of 1925, and close to the production record established in 1920, according to industrial census statistics recently issued by the Canadian Government, says a report of the Industrial Machinery Division, Department of Commerce. Returns were received from 156 machinery manufacturers.

Wyckoff Drawn Steel Co. Acquires Chicago Plant

The Wyckoff Drawn Steel Co., Pittsburgh, with plant at Ambridge, Pa., has substantially added to its productive capacity in the manufacture of cold-finished steel bars and shafting and also has entered the Chicago district through its acquisition of the Fitzsimons Steel & Iron Co., Chicago. The Fitzsimons company started business 25 years ago at Milwaukee, moving to Chicago about three years ago and building the plant which now becomes the Chicago works of the Wyckoff company. The latter was organized in 1919 and produced its first steel early in 1920.

E. C. Rock, recently Cleveland district manager of the Wyckoff company, has been appointed Chicago district manager in charge of both sales and the operation of the plant, while Joseph Mahan, assistant superintendent at Ambridge, goes to Chicago in a similar capacity. George A. Neesham has been appointed assistant treasurer and transferred from Pittsburgh to Chicago and Herman J. Laurent, who has been in the Pittsburgh office, has been appointed office manager of the Chicago branch.

A. A. Bialis, who has been special representative of the Wyckoff company in Pittsburgh, has been named general manager of sales. A. W. Wyckoff is president of the company; William McConway and Joseph T. Somers are vice-presidents, the latter in charge of sales; D. G. Dodds is secretary-treasurer, and they with William Metcalf, Jr., comprise the board of directors.

Bethlehem Offers Preferred Stock to Employees at $120 a Share

The Bethlehem Steel Corporation has announced its 1928 offering of preferred stock to employees under the terms of the company's employees' saving and stock ownership plan. In commenting upon the offering Eugene G. Grace, president, stated that since the plan was inaugurated four years ago 30,000 employees have invested more than $11,000,000 in the corporation's stock and $2,000,000 in dividends has been paid or credited to them. Special benefit payments amounting to $530,000 have also been made or credited to the workers.

Employees who subscribe for shares may pay for them either in cash or in monthly, semi-monthly or weekly installments extending over 27 months. During this period they will be credited with all dividends declared. In addition, special benefit payments amounting to $15 per share will be made to employee stockholders who hold their stock for a period of five years and remain in the employ of the corporation. The price this year will be $120 per share, compared with $107 in 1927.

American Sales Agents for British Ferromanganese Appointed

Sales representation in the United States for British producers of ferromanganese is now in the hands of two companies: Rogers Brown & Crocker Brothers, Inc., New York, and Frank Samuel & Co., Philadelphia.

Rogers Brown & Crocker Brothers, Inc., has become the agent of an organization recently created in England, known as the United Kingdom Ferromanganese Co. This is made up of the following companies: Darwen & Mostyn Iron Co., Ltd., Wigan Coal & Iron Co., Ltd., Dorman, Long & Co., Ltd., and the United Steel Companies, Ltd.

Frank Samuel & Co. have been made the agents of the two other principal British ferromanganese producers: The Linthorpe Dinsdale Smelting Co., Ltd., and Bolckow Vaughan & Co., Ltd.

Production of beehive coke in the United States in January is estimated by the Bureau of Mines at 373,000 net tons in 26 working days. This is about 1 per cent under December, and is less than half the output of January, 1927, which was 787,000 tons. All three months had the same number of working days.

Canada

Business Making Progress—Pig Iron Gaining Strength

TORONTO, ONT., Feb. 7.—Business as a whole is making progress. Following an order placed by the Canadian Pacific for $2,000,000 to $3,000,000 worth of rolling stock, it is now reported that the Canadian National Railways will be in the market shortly for 200 cars. Business placed by Canadian railroads for rolling stock, etc., this year is several million dollars less than orders of a year ago.

Pig Iron.—Current demand is confined almost entirely to orders for 50 to 500 tons for early delivery. Forward buying is not a feature of the market, but shipping orders against contracts have resulted in a big movement of iron to consumers. Prices are gaining strength in Toronto and Montreal districts, but no revision has been made.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.00
No. 2 foundry, sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Dealers have failed to make further revision in prices, although the market continues weak. Sales are largely confined to a few special grades.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Steel Demand Satisfactory—Southern Places 15,750 Tons of Rails

BIRMINGHAM, Feb. 7.—New pig iron tonnage is not large and the market is moving along quietly, except for daily small-lot sales. Quotations for foundry iron remain on a $16 base. Most melters have covered their requirements for February, while some have bought through March. The Sloss-Sheffield Steel & Iron Co. has blown out its city furnace No. 1 preparatory to rebuilding and enlarging. This work will duplicate city furnace No. 2, which included all of the Dovel improvements and increased production to 400 tons. Shipments of foundry iron have been growing larger since the middle of January and now are close to production. There was a considerable increase in yard stocks during January because of the small shipments in the first two weeks.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—Demand continues satisfactory and new business is developing at an even rate. No further changes have been made in prices. The Tennessee Coal, Iron & Railroad Co. is adding two new stands of finishing rolls to the Fairfield sheet mill, a continuous reheating furnace is to be built at the Fairfield structural mill and an additional row of soaking pits will be installed at the Fairfield blooming mill. The Tennessee company has received an additional order from the Southern Railway for 15,750 tons of rails. The Central of Georgia Railroad placed an order for 500 steel gondola cars and 50 flat cars. Several orders for 100 tons or more of structural steel and reinforcing bars were reported last week. The Ingalls Iron Works Co. will furnish the structural steel for the new 14-story office building of the Protective Life Insurance Co. in Birmingham, which will require about 350 tons. Open-hearth operations continue the same as for the past two weeks, the Gulf States Steel Co. operating four and the Tennessee company 12 to 13.

Cast Iron Pipe.—Small orders are coming in at a fair rate but nearly all of the larger business expected this quarter remains in abeyance. Bids were opened in Atlanta on Feb. 3 for about 700 tons but award was not made at the time. Several small awards from Mississippi towns are pending. Plant operations remain unchanged.

Coke.—Shipments are increasing and the market outlook is improving. Coke business is now between 30 and 40 per cent better than late November and December. No change has been made in the price, $5.

Old Material.—Shipments are about the same as for some time. Inquiries have increased but very little additional business is being obtained.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to	$10.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	8.00 to	8.50
Cast iron borings	8.00 to	8.50
Stove plate	13.00 to	14.00
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		15.00
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

St. Louis

Pig Iron Sales Exceed 5,000 Tons—3,000 Tons of Bars in New Project

ST. LOUIS, Feb. 7.—Sales of pig iron by the Granite City maker during the week amounted to between 5000 and 6000 tons of foundry grades and 150 tons of malleable, mostly for shipment during first quarter. A leading Southern interest sold 500 tons. The iron was sold in scattered lots to Illinois, Iowa and Missouri melters. Shipping specifications are satisfactory. An increased melt is reported by the steel mills, jobbing foundries and stove plants. The market is firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Coke.—Domestic grades are moving in fairly large volume because of favorable weather conditions. Industrial grades are being taken more freely as a result of heavier melt in the district.

Finished Iron and Steel.—Increased activity is shown in construction work. About 1000 tons was placed with structural fabricators during the week in projects of 100 tons or more, while smaller jobs are increasing in number. The largest reinforcing bar project in some time is the J. C. Penney Co. warehouse, requiring 3000 tons, the general contract for which has been let to Starrett Brothers, Inc., New York. The Granite City steel mill reports that its bookings for January were the heaviest for any month since March, 1927, and sufficient to operate the plant until the end of March. Prices in sheets are said to be firmer. Warehouse business in the St. Louis industrial district is very good, but the slump in orders from the oil fields offsets gains from other sources.

Old Material.—The market for old material continues weak, and prices are lower as the result of heavy offerings and congestion at the mills, which have bought heavily. Between 10,000 and 12,000 tons rolling mill and foundry grades were bought by mills during the week at 50c. a ton less than they paid for similar material in January. Railroad lists include: Baltimore & Ohio, 14,170 tons; Atchison, Topeka & Santa Fe, 7215 tons; Kansas City Southern, 250 tons; St. Louis-San Francisco, 29 carloads, and Standard Oil Co. (Woodriver), 3 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.00 to $12.50
No. 1 locomotive tires	13.00 to 13.50
Heavy shoveling steel	12.00 to 12.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 15.00
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	12.00 to 12.50
No. 1 busheling	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	13.50 to 14.00
Rails for rolling	14.50 to 15.00
Machine shop turnings	7.75 to 8.25
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.25 to 10.75
Steel rails, less than 3 ft.	15.75 to 16.25
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	14.00 to 14.50
Stove plate	13.75 to 14.25
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Buffalo

Pig Iron Prices Slightly Firmer—Finished Steel in Good Demand

BUFFALO, Feb. 7.—Stiffer prices are reported on New England pig iron business and the local market is firmer. The International Harvester Co. closed for 1000 tons of malleable and 1000 tons of foundry for Auburn, N. Y., and the Eastern Iron Malleable Co. is said to have placed part of the 2500 to 3000 tons of malleable it required. A Troy melter wants 500 tons of foundry. The Washburn Wire Co. and the American Tube & Stamping Co. are in the market for basic iron, the former asking for 5000 tons and the latter for 3000 to 5000 tons. The Kensington-Davis foundry of Buffalo is seeking 2000 tons of foundry iron.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—The market for all lines shows an improvement in specifications and new business. The sheet market is firm, with demand better, particularly for black and automobile body sheets. Bars, shapes and plates are firm and demand is improved. Bolt and nut business is very good. A Rochester school will require 200 to 300 tons of reinforcing bars and a Buffalo school, No. 47, 130 tons. Bethlehem's Lackawanna plant, the Donner Steel Co. and the Seneca Iron & Steel Co. are maintaining good operation.

Old Material.—Conditions are slightly better, though prices are not strong. An additional tonnage of heavy melting steel, No. 1 grade, has been sold. This included No. 1 busheling and hydraulic compressed sheets. A tonnage of knuckles and couplers was sold at $16.50 to $17, with coil and leaf springs and rolled steel wheels at the same price. There has been some inquiry for low phosphorus billet and bloom ends, but this material is scarce. Railroad malleable purchases were at $15 and $15.50 for immediate delivery.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.25 to 13.75
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	16.50 to 17.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	16.75 to 17.25
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.35c. to 5.35c.
Squares and flats	*3.85c. to 5.85c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

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*Including quantity differentials.

Boston

Pig Iron and Some Grades of Scrap Are Firmer in Price

BOSTON, Feb. 7.—Buffalo and eastern Pennsylvania steel mills, having increased their bookings of finished products, are practically out of the pig iron market. Buffalo iron at $16.50 a ton, base, has disappeared from New England, and $17 is the prevailing quotation, while eastern Pennsylvania iron is generally $20 a ton, base furnace. With the price situation clearer, more Buffalo iron is being sold, one furnace having booked approximately 3500 tons within 10 days. During the past week furnaces east of Buffalo took orders ranging from car lots to 300 tons, sales aggregating about 2000 tons, at delivered prices mostly equivalent to $17, Buffalo. Sales of Indian iron at $21.75 to $22 a ton, on dock here, duty paid, for No. 2 grade, are reported. An open inquiry for 1000 tons of No. 2 plain and No. 2X is still uncovered, and another melter is privately negotiating for 2000 tons. Otherwise prospective tonnages are small because most foundries are well covered into the second quarter.

Prices of foundry iron per gross ton; delivered to most New England points:

Buffalo, sil. 1.75 to 2.25		$21.91
Buffalo, sil. 2.25 to 2.75		22.41
East. Penn., sil. 1.75 to 2.25	$23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—Activity centers in domestic fuel on a basis of $8.50 a ton, Everett, Mass. No further gain in specifications against first half by-product foundry contracts has developed beyond that noted a week ago. By-product foundry coke is still $11.50 a ton, delivered within a $3.10 freight rate zone.

Shapes and Plates.—Representatives of mills continue to report encouragingly on shape, plate and bar business. Fabricators, however, have few jobs of size to bid on, and competition for work is keen. Several sizable jobs are hanging over the market and should close shortly. Local fabricators expect sizable business will develop in Fall River, Mass., as a result of the recent fire there.

Warehouse Business.—Most warehouses have advanced wire nails 10c. per keg to conform with new mill quotations. The general price from stock is $3.50 a keg. Car lot shipments from mills are $2.70 a keg, base, and less than car lot, $2.95. The movement of iron and steel out of warehouses is increasing, although individual purchases are small. Prices are firmer in view of the fact that most warehouses are holding to scheduled lists. Foreign material, however, is still obtainable at concessions.

Importations.—Receipts of foreign iron at this port in January consisted of 750 tons of English, 333 tons of Dutch and 295 tons of Indian, a total of 1378 tons, which compares with 643 tons of December, 1927, none in January, last year, 4061 tons in January, 1926, and 8212 tons in January, 1925. No foreign ores were imported in January, whereas in December, last year, 8850 tons was received and in January, last year, 16,052 tons.

Cold Rolled Strip Steel.—The recent adjustment in cold rolled strip steel prices has further stimulated mill sales. Much of the current buying, however, is for immediate consumption. The Worcester mill is quoting 3.30c. per lb. for 1 to 3-ton lots in one shipment, and 3.05c. for larger lots.

Old Material.—No perceptible increase in the movement of old material has occurred. Business the past week was largely confined to heavy melting steel, railroad and yard wrought, long bundled skeleton, forge scrap and flashings. These materials, with the exception of heavy melting steel, are firmer. Current sales of skeleton are generally at $7 to $7.25 a ton on cars at shipping point, whereas a week ago sales at $6 to $6.50 were reported. Forge scrap ranges from $6 to $7 a ton, with a majority of sales at $6.50 to $7. Railroad wrought is up 50c. a ton at $10.50 to $11. Heavy melting steel is $9 to $9.10 a ton, with an occasional sale at $9.25. Textile cast continues in large supply and sells at a discount from strictly No. 1 machinery cast, when usually it brings a premium.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.25
Scrap rails	8.50 to	8.75
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought	9.50 to	10.00
Machine shop turnings	6.00 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	6.50 to	7.00
Forge flashings	7.00 to	7.25
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	6.00 to	7.00
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate		11.00
Railroad malleable	13.00 to	13.50

Cincinnati

Foundry Melt Increases 20 Per Cent in 10 Days—Scrap Weak

CINCINNATI, Feb. 7.—Foundry melt in this district has increased about 20 per cent in the past 10 days, but the improvement is not reflected in pig iron. Shipments on contract are only fair and consumers are not manifesting interest in second quarter needs. Most melters have covered their requirements for the remainder of the first quarter, so that fresh orders booked by local dealers have been meager. The largest sale was 2000 tons of foundry iron for a southern Ohio company. The Buick Motor Co. is reported to have bought approximately 600 tons of 14 to 16 per cent ferrosilicon from a Buffalo furnace, shipment to be made by water. Southern Ohio producers are adhering to $19, base furnace, though this price is noncompetitive except for delivery by barge. Lake Erie makers are understood to be asking from $16.50 to $17, base furnace, and Southern interests are holding to $16, base Birmingham. One of the Columbus furnaces of the American Rolling Mill Co. will be blown out in March.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Specifications against first quarter contracts are indicative of a steady acceleration in industrial operations in this district. The number of fresh orders at the new prices has been surpris-

Warehouse Prices, f.o.b. Cincinnati

		Base per Lb.
Plates and structural shapes		3.40c.
Bars, soft steel or iron		3.30c.
Reinforcing bars		3.30c.
Hoops	4.00c. to	4.25c.
Bands		3.95c.
Cold-finished rounds and hexagons		3.85c.
Squares		4.35c.
Open-hearth spring steel	4.75c. to	5.00c.
Black sheets (No. 24)		4.05c.
Galvanized sheets (No. 24)		4.90c.
Blue annealed sheets (No. 10)		3.60c.
Structural rivets		3.85c.
Small rivets		65 per cent off list
No. 9 annealed wire, per 100 lb.		$3.00
Common wire nails, base per keg		2.95
Cement coated nails, base 100 lb. keg		2.95
Chain, per 100 lb.		7.55
		Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.		$18.00
4-in.		38.00
Seamless steel boiler tubes, 2-in.		19.00
4-in.		39.00

ingly large. One of the bright spots is the favorable attitude which buyers in general have shown toward the effort of mills to get more money for their products. The advance of $2 a ton on common wire nails and on plain wire has served as a stimulus for the better movement of material on contracts calling for delivery prior to April 1, but the actual test of the market will not come for some time. The producer at Ironton is understood to have followed the lead of Eastern makers in establishing prices on a higher basis, so that the prevailing quotation on common wire nails is now $2.65 per keg, Ironton or Pittsburgh, and on plain wire $2.50 per 100 lb., Ironton or Pittsburgh. Bookings of sheets continue at a high rate, the early days of February having kept pace with January. Mills in this district have enough orders in hand to schedule rollings about two weeks ahead. Prices are fairly steady at 2.10c., base Pittsburgh, for blue annealed, 3.75c. for galvanized and 2.90c. for black. Only in structural steel are activities lagging. The Ohio State Highway Commission is taking bids for the general contract for a highway bridge in the northeastern part of the State for which about 700 tons will be required. Bars, structural shapes and plates are firm at 1.85c., base Pittsburgh.

Reinforcing Bars.—A gradual increase in the strength of prices is noted. New billet bars are bringing from 1.85c. to 1.90c., base Pittsburgh, while rail steel is firm at 1.75c., base mill. In at least one instance the latter has been sold at 1.80c. for delivery in 60 days.

Warehouse Business.—Jobbers report a slight increase in sales, but total bookings from a tonnage standpoint are still below normal. The slackness in building activities in this district has been partially responsible for the rather unsatisfactory condition. Prices are firm and unchanged.

Coke.—A sudden influx of specifications for by-product foundry coke is reported by local dealers, who say that orders on hand are sufficient to take practically the entire month's output. As a result of this betterment, February shipments for at least two companies will be the best in five months. There also has been a buying spurt of more limited proportions in by-product domestic coke. Prices are unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Melting steel is off 25c. a ton and weakness has cropped out in other items. A steel company in this district bought a small tonnage of heavy melting steel the past week and is reported to have paid a delivered price of $14.75. Mills are taking a fair amount of material on current contracts, but are hesitant about placing orders for future delivery. The Chesapeake & Ohio has put out a list of 8000 tons, half of which is rails, and the Louisville & Nashville 7800 tons.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	12.25 to 12.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.50 to 12.00
Short rails	17.00 to 17.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.00 to 9.50
Brake shoes	10.00 to 10.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	12.25 to 12.75

By-product coke plants associated with blast furnaces made a smaller proportion of the by-product coke output in 1927 than for some years past. The United States Bureau of Mines places this ratio at 81.3 per cent, leaving 18.7 per cent for the independent ovens. The furnace figure compares with 82.6 per cent in 1926 and with ratios varying from 82.3 to 83.6 per cent in the four preceding years.

San Francisco

Southern Pacific Orders 4400 Tons of Tie Plates—Plates $1 Higher

SAN FRANCISCO, Feb. 7 (*By Telegraph*).—Demand in most lines is well sustained, with shapes and cast iron pipe the most active. Important developments include the award of 4400 tons of tie plates by the Southern Pacific Co. to Eastern makers and 1200 tons of structural shapes for a paper bag plant at Tacoma, Wash., to the Hofius Steel & Equipment Co., and 800 tons for the Alexander & Baldwin Building in Honolulu to the Honolulu Iron Works.

Pig Iron.—About 800 tons of Indian pig iron arrived and was divided between San Francisco and Los Angeles melters. The next shipment of 1400 tons is due the latter part of the month.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Plates and Shapes.—Structural shape awards for the week exceeded 2800 tons and pending business involves 24,000 tons. No plate awards of size have been made, but bids have been opened on a tanker for the Standard Oil Co., San Francisco, involving 3500 tons of plates and 1500 tons of shapes. The Newport News Shipbuilding & Dry Dock Co. was low bidder. Bids will be opened Feb. 17 on 1500 tons for a penstock at Seattle, Wash. Plate prices have been advanced $1 a ton from 2.25c. to 2.30c., c.i.f. Pacific Coast ports.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Reinforcing Steel.—The only reinforcing steel award of the week was 500 tons taken by the Pacific Coast Steel Co. for a paper bag plant at Tacoma.

Cast Iron Pipe.—Bert Noble, San Francisco, has been awarded the order for 263 tons of 2 to 6-in. pipe for improvement of Voltaire Street, San Diego. Pending business involves 4000 tons.

Coke.—About 4000 tons of British coke has arrived, most of it going to foundries in the San Francisco and Los Angeles districts. The next shipment is due about the middle of March.

Detroit Scrap Market Weak

DETROIT, Feb. 7.—Further signs of weakness were noted in the market on old material in this district during the past week because some mills have held up deliveries in the face of increasing output by the larger scrap producers.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$12.00 to $12.50
Borings and short turnings	8.75 to 9.25
Long turnings	7.75 to 8.25
No. 1 machinery cast	14.50 to 15.50
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.75 to 11.25
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Loading of revenue freight for the week ended Jan. 21 totaled 884,095 cars, according to reports of the Car Service Division, American Railway Association. This was a decrease of 22,639 cars from the preceding week.

FABRICATED STRUCTURAL STEEL

Awards of 54,000 Tons—Chicago Civic Opera House Will Take 18,000 Tons

Awards totaling close to 44,500 tons made the past week's business one of the best so far this year and new projects calling for a total of nearly 54,000 tons were larger than any week since Jan. 1. The largest single awards were 9000 tons for a viaduct in Cleveland, 5000 tons for a bridge in Pittsburgh, and 5000 tons for an office building in New York. Included in pending business is 18,000 tons for the Chicago Civic Opera House, 11,000 tons for a New York subway and 4000 tons for a State office building in New York. Awards follow:

Lynn, Mass., 580 tons, Lynn Gas & Electric Co. power house addition, to New England Structural Co.

Somerville, Mass., 100 tons, garage, to New England Structural Co.

State of New Hampshire, 1500 tons, bridges, 14 to American Bridge Co., two to Boston Bridge Works, Inc., and one to Standard Engineering Co.

New York, 11,300 tons reported to Structural Steel Board of Trade, Inc.; 9800 tons in following jobs not previously reported: Savings Bank at Sixth Avenue and Ninth Street and warehouse at 167th Street and Sedgwick Avenue, to George A. Just Co.; 15-story apartment building at 15 East Ninety-sixth Street, 37-story Lefcourt office building at 521 Fifth Avenue, 15-story apartment building at Ninety-first Street and Riverside Drive and pavilion for Clarence Mackay at Roslyn, L. I., to Paterson Bridge Co.; supports for power station installation for Brooklyn Edison Co., to McClintic-Marshall Co.; chapel and faculty building for Fordham University, to Lehigh Structural Steel Co.; alteration to Cohan Theater at Broadway and Forty-third Street, Proctor's Theater at Third Avenue and Fifty-eighth Street, 14-story office building at Madison Avenue and Seventy-sixth Street and one-story club at 115 West Seventieth Street, to Harris Structural Steel Co.

New York, 1600 tons, loft building at Eighth Avenue and Forty-sixth Street, to Harris Structural Steel Co.

New York, 1500 tons, apartment building on West Ninety-sixth Street, to Easton Structural Steel Co.

New York, 1200 tons, apartment building on Eighty-eighth Street, to Harris Structural Steel Co.

New York, 650 tons, apartment building at 105 East Twenty-first Street, to Easton Structural Steel Co.

Nyack, N. Y., 400 tons, high school, to Bethlehem Steel Co.

Perth Amboy, N. J., 500 tons, building for American Smelting & Refining Co., to Pittsburgh Bridge Co.

Greensand, N. J., 1725 tons, coal distillation plant for Combustion Engineering Corporation, to Jones & Laughlin Steel Corporation.

Waldwick, N. J., 100 tons, plate girder bridge for Erie Railroad, to Phoenix Bridge Co.

Philadelphia, 200 tons, plant building for Olney Foundry Co., to Belmont Iron Works.

Pittsburgh, 5000 tons, Thirty-first Street bridge, to Fort Pitt Bridge Works.

Ambridge, Pa., 150 tons, municipal water tanks, to Pittsburgh-Des Moines Steel Co.

Detroit, 320 tons, branch for Bank of Detroit, to local fabricator.

Corpus Christi, Tex., 370 tons, dock sheds, to local fabricator.

Schiller Park, Ill., 1300 tons, viaduct for Soo line, to Bethlehem Steel Bridge Corporation.

Cleveland, 9000 tons, Prospect Avenue viaduct, to Mount Vernon Bridge Co.

Buffalo, 250 tons, Public School No. 23, to Henesey-Mann Structural Co., local.

Canton, Ohio, 3000 tons, plant additions for Timken Roller Bearing Co., to McClintic-Marshall Co.

Downers Grove, Ill., 100 tons, theater, to Midland Structural Steel Co., Chicago.

Powerton, Ill., 156 tons, miscellaneous steel for Super-Power Co., to Vierling Steel Works, Chicago.

Cary, Ill., 300 tons, building for Cary Brick Co., to Hansell-Elcock Co., Chicago.

Burlington, Iowa, 300 tons, barge for Burlington Barge Terminals, to St. Louis Structural Steel Co.

Burlington, 130 tons, municipal dock house, to Lakeside Bridge & Steel Co.

Milwaukee, 100 tons, factory, for Federal Asbestos & Insulating Co., to Lakeside Bridge & Steel Co.

Birmingham, 350 tons, Protective Life Insurance building, to Ingalls Iron Works Co.

Lake Charles, La., 600 tons, municipal wharf sheds, to Orange Car & Steel Co., Orange, Tex.

State of Texas, 1100 tons, tanks for Pan-American Co., to Chicago Bridge & Iron Works.

Lincoln, Neb., 1500 tons, third wing of State House, to unnamed bidder.

St. Louis, 130 tons, girders in addition to Jefferson Hotel, to Mississippi Valley Structural Steel Co.

St. Louis, 450 tons, girders in Arsenal Street viaduct, to Stupp Brothers Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Middletown, Conn., 575 tons, office building.

New York, 11,000 tons, section 1, route 8, of subway in Borough of Queens; bids close March 2.

New York, 4000 tons, State office building.

New York, 3500 tons, highway bridge in Borough of Queens.

New York, 2500 tons, loft building at 228 East Forty-fifth Street.

New York, 350 tons, apartment building at 69 East Seventy-seventh Street.

New York, 125 tons, gymnasium at Amsterdam Avenue and 138th Street.

Bayonne, N. J., 300 tons, tanks for Standard Oil Co. of New Jersey.

East Orange, N. J., 600 tons, Municipal Building.

Philadelphia, 300 tons, public school.

Philadelphia, 600 tons, Uptown Theater; may be changed to reinforced concrete.

Philadelphia, 150 tons, column cores and girders for Blum Store, previously reported as 1200 tons but revised to reinforced concrete; general contract to Wark Construction Co.

Philadelphia, 2500 tons, Integrity bank and office building, Sixteenth and Walnut Streets.

Philadelphia, 2000 tons of sheet steel piling, Tacony-Palmyra bridge; general contract to Dravo Construction Co.

Philadelphia, 358 tons, Radcliffe central office building for Bell Telephone Co.; general contract to John N. Gill Construction Co.

Pontiac, Mich., 900 tons, building for J. W. Cook Corporation.

Washington, 1000 tons, power house for Stone & Webster, Inc.

Coles County, Ill., 200 tons, bridge for Illinois Highway Commission; St. Louis Structural Steel Co., low bidder.

Chicago, 18,000 tons, Civic Opera House.

Chicago, 2800 tons, approach to Robey Street bridge.

Chicago, tonnage being estimated, approach to La Salle Street bridge.

Chicago, 300 tons, building for Strauss & Schram.

West Pullman, Ill., 400 tons, building for Columbia Mills, Inc.

Milwaukee, 1500 tons, County section of Milwaukee Public Safety Building; bids close March 16; separate bids on fabrication and delivery, and on erection.

San Diego, Cal., 700 tons, power house for Byllesby Engineering & Management Corporation, Chicago.

RAILROAD EQUIPMENT

St. Louis-San Francisco Places Orders for 4000 Freight Cars

St. Louis-San Francisco has placed orders for 4000 freight cars, distributed as follows: 1000 box and 500 hopper cars with American Car & Foundry Co., 500 hopper and 500 automobile cars with Pullman Car & Mfg. Corporation, and 500 box, 500 flat and 500 hopper cars with General American Car Co.

Swift & Co. have ordered 500 underframes from Bettendorf Co.

Seaboard Air Line has made inquiry for 25 Mikado type locomotives.

Chicago, Rock Island & Pacific is inquiring for 10 baggage and six baggage-mail cars, 10 coaches and 10 suburban coaches.

Southern Pacific has withdrawn its inquiry for 300 box car underframes and 300 superstructures.

Mud Valley Logging Co., Olympia, Wash., has purchased a Mallet type locomotive from Baldwin Locomotive Works.

Mexican Railways have ordered two Pacific type locomotives from American Locomotive Co.

American Smelting & Refining Co. is inquiring for 60 gondola cars.

Bangor & Aroostook will build 100 single-sheathed box cars at its Derby, Me., shops.

Carnegie Steel Co. has ordered 15 tank cars from Petroleum Iron Works and 35 from Standard Steel Car Co.

Woodward Iron Co. has ordered 50 mine cars from American Car & Foundry Co.

Long Island Railroad has ordered two baggage-mail cars from American Car & Foundry Co.

Monon will buy one gas-electric car.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Feb. 7	Feb. 6	Feb. 4	Feb. 3	Feb. 2	Feb. 1
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.87½	13.87½	13.87½	13.87½	13.87½	13.87½
Straits tin, spot, N. Y.	53.25	53.62½	....	54.00	54.37½	54.25
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.22½	6.22½	6.25	6.25	6.25	6.25
Zinc, New York	6.00	6.00	6.00	6.00	5.97½	6.00
Zinc, St. Louis	5.65	5.65	5.65	5.65	5.62½	5.65

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Feb. 7.—None of the markets is particularly active, excepting possibly tin. Demand for copper has been moderate with prices exceedingly firm. Tin sales have been quite large at new low levels for several years. Very little change in lead has developed and both demand and prices for zinc remain about the same.

Copper.—A moderate spurt in demand from domestic producers developed last week, but the market in the last few days has been exceedingly quiet. Firmness in prices is a feature despite light demand both from domestic and foreign consumers. Practically all producers are adhering rigidly to 14.12½c., delivered in the Connecticut Valley, at which level most of the metal changed hands. Some metal has been available from custom smelters now and then at a concession, but the quantity has been small. The official quotation of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f., usual European ports. Lake copper is reported quiet but firm at 14.25c., delivered.

Tin.—Total sales for the week ended Saturday, Feb. 4, were about 1300 tons, of which 800 tons was sold up to Thursday night. Most of the latter was taken by dealers. Consumers did not enter the market until Friday, when sales were made as low as 53.75c. On that day consumers took most of the offerings and were evidently buying on the scale down. Yesterday, Monday, the market was dull with 75 tons changing hands, but today consumers bought quite liberally again with futures selling at 53c. to 53.12½c. Spot Straits tin today was quoted at 53.25c., New York, which is the lowest price since April 21, 1925, when it was 52.62½c. Two causes mentioned for the low prices are the increase in world production last year and the fact that consumers are fairly well covered for February and March, at least. London prices today fell sharply from those of yesterday and are considerably below those of a week ago, with spot standard quoted at £238 15s., future standard at £240 5s. and spot Straits at £240 10s. The Singapore price today was £245 5s. Arrivals thus far this month have been 630 tons, with 6240 tons reported afloat.

Lead.—Offerings of resale metal in the West have somewhat weakened the market there and quotations range from 6.22½c. to 6.25c., depending on the producer. The quotation of the leading interest is unchanged at 6.50c., New York, as its contract price. While no large quantities have changed hands, there is a fair demand for smaller lots.

Zinc.—Another advance in ore prices took place last week bringing the quotation to $38, Joplin. For the first time in several weeks sales exceeded production. A corresponding increase in the price of prime Western zinc has not developed and quotations during the week have ranged from 5.62½c. to 5.67½c., St. Louis, with the quotation today largely nominal at 5.65c., St. Louis, and 6c., New York. It appears possible that this price would be slightly shaded under favorable conditions. Sellers report a fair demand from day to day, but they are not anxious to force the issue, particularly for future delivery.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Demand is very light and Chinese metal for spot and early future delivery is a little easier at 11c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Feb. 7.—Prices, with the exception of tin, are firm. Sales are numerous for prompt delivery, while future business is only moderately active. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 14.25c.;

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.00c. to 57.00c.
Tin, bar	58.00c. to 59.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	36.00c. to 37.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.50c.
Tin, bar	61.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	64.50c.
Solder, ½ and ½	35.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not been changed for more than two months. Lead full sheets are still being quoted at the advance of Dec. 1, and zinc sheets have held at 10c., base, for six months.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

tin, 55c.; lead, 6.35c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.25c.; pewter, No. 1, 34c.; tin foil, 40c.; block tin, 50c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

New Projects Include 3000 Tons for St. Louis Warehouse—Awards Small

The tonnage of reinforcing bars awarded and specified in new projects registered a decline this week, with less than 3000 tons placed and about 3800 tons of new business. The largest award was 1600 tons for a building in Fort Worth, Tex., for Montgomery Ward & Co. An outstanding inquiry is 3000 tons for the J. C. Penney Co. warehouse in St. Louis. Awards follow:

CAMBRIDGE, MASS., 360 tons, Lever Brothers warehouse, to Barker Steel Co.

LYNN, MASS., 100 tons, Lynn Gas & Electric Co. power house addition, to Morrison Stevens Co.

LONG ISLAND CITY, N. Y., 200 tons, warehouse for R. H. Macy & Co., Inc., to Concrete Steel Co.

GRIFFIN, GA., 100 tons, Graham Mfg. Co. plant addition, to Connors Steel Co., Birmingham.

TAYLOR, S. C., 300 tons, plant building, to Connors Steel Co.

FORT WORTH, TEX., 1600 tons, Montgomery Ward & Co. building, to Concrete Engineering Co.

CHICAGO, 100 tons of rail steel bars, building in Humboldt Park, to Calumet Steel Co.

CHICAGO, 200 tons of rail and billet steel bars, Cornell apartment building, to Barton Spider-Web System.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 300 tons, Harlem River subway tunnel; George H. Flinn Corporation, low bidder on general contract.

ROCHESTER, N. Y., 200 to 300 tons, Benjamin Franklin school; bids taken, Feb. 20.

BUFFALO, 130 tons, school No. 47; bids taken, M. B. Parker, Cleveland, contractor.

CHICAGO, tonnage being estimated, Civic Opera House; Graham, Anderson, Probst & White, architects.

CHICAGO, 700 tons, Passavant Hospital; George A. Fuller Co., general contractor.

MILWAUKEE, 225 tons, County highway trestle; bids close Feb. 21.

ST. LOUIS, 3000 tons, warehouse for J. C. Penney Co.; Starrett Brothers, Inc., New York, general contractor.

Youngstown-Inland Merger Details Are Being Worked Out

YOUNGSTOWN, Feb. 7.—Details are being worked out for the merger of the Youngstown Sheet & Tube Co. and the Inland Steel Co., which will operate under the name of the Youngstown-Inland Steel Corporation as an Ohio corporation. A new company will not be formed, but the charter under which the Sheet & Tube company operates will be amended to provide for the changes. Special stockholders' meetings of both companies will be held March 15, when the merger plan, already approved by directors, will be ratified. President James A. Campbell of Sheet & Tube has gone to Florida for a month's vacation.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

Obituary

CAPT. JAMES MOWATT, retired head of the Chicago Ship Building Co., Chicago, died Jan. 24. He was born near Duncan's Bay in Scotland and came to America in 1863. He was manager of the Chicago Dry Dock Co. from 1880 to 1892.

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GEORGE BERGMAN, assistant secretary and export sales manager of the Cincinnati Milling Machine Co., Cincinnati, died suddenly Feb. 1. He was 44 years of age and had been associated with the company for 26 years. During a part of that time he was head of the commercial sales department and also was identified with the export department. He was recently appointed export sales manager.

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CHARLES KROESCHELL, until five years ago president of the Kroeschell Brothers Co., Chicago, manufacturer of steam boilers, died Jan. 31.

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BERTON B. BRATT, active for many years in blast furnace construction, died at his Pittsburgh home Jan. 31. For the past 14 years he had been connected with the engineering department of the Eliza furnaces, Jones & Laughlin Steel Corporation, Pittsburgh. Previously while identified with Julian Kennedy, Pittsburgh, he had supervised the reconstruction of the Isabella furnaces, Carnegie Steel Co., and the building of the furnaces of the Rogers-Brown Iron Co., Buffalo, and the American Steel & Wire Co., Cleveland. He was born at Glenfield, Pa., in 1873 and was graduated from the University of Pittsburgh in 1893.

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FRANK F. VANDERVORT, for many years Eastern sales representative for the Wheeling Mold & Foundry Co., Wheeling, W. Va., died on Feb. 3 at his home in Chestnut Hill, Philadelphia. He was 62 years of age. Mr. Vandervort was born at Pittsburgh and attended Cornell University.

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W. F. HOPKINS, metals sales manager of the Republic Metalware Co., Buffalo, died suddenly on Jan. 19 at his home in that city, aged 47 years. He had been associated with the Republic company since 1918 and was previously identified for 17 years with the Buffalo Wire Works, Buffalo.

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CHARLES F. W. FELT, chief engineer for the Atchison, Topeka & Santa Fe, died Feb. 5 at Colorado Springs, Colo., after an illness of several months. He was president of the Railway Engineers' Association in 1926.

Hickman, Williams & Co., pig iron brokers, who for years have had Eastern selling offices in New York and Boston, as well as in Philadelphia, have decided to consolidate the New York and New England territories with one office at 120 Broadway, New York. Rufus W. Page will continue to represent the firm in New England, making his headquarters at Auburndale, Mass.

PERSONAL

William Lawrence Saunders, chairman Ingersoll-Rand Co., New York; J. Vipond Davies, of Jacobs & Davies, consulting engineers, 30 Church Street, New York, and Bancroft Gherardi, vice-president American Telephone & Telegraph Co., New York, simultaneously completed notably long periods of continuous service in the United Engineering Society at the annual meeting of its board of trustees held on Jan. 26. Mr. Saunders has been a trustee for 12 years, Mr. Davies for 11½ years, and Mr. Gherardi for nearly eight years. Each has served as vice-president, as chairman of the finance committee and as president. The latter office they filled, respectively, for three, four and one years. For two terms Mr. Saunders represented the American Institute of Mining and Metallurgical Engineers, of which he is a past-president, and for two terms the American Society of Mechanical Engineers. Mr. Davies represented for two terms the American Society of Civil Engineers, of which he is a past vice-president, and for two terms the American Institute of Mining and Metallurgical Engineers. Mr. Gherardi represented continuously the American Institute of Electrical Engineers, of which he is now president.

P. J. McCarty, who for a number of years has served as sales representative in Connecticut of the Ludlum Steel Co., Watervliet, N. Y., has been appointed district sales manager of the company in New York. The New York office, which has been at 33 West Forty-second Street, will be removed to 40 Rector Street.

A. E. Starbuck, for many years identified with the Haynes interests, Kokomo, Ind., manufacturers of stellite and other alloys, has been elected president of the American Stainless Steel Co., 801 Commonwealth Building, Pittsburgh, succeeding John C. Neale, who recently resigned.

W. A. Whaley has been appointed district manager in Virginia and North Carolina for the Fitzsimons Co., Youngstown, with headquarters at Norfolk, Va. Walter F. Bray has been added to the company's sales organization at Detroit.

R. H. Minton, general superintendent General Ceramics Co., Metuchen, N. J., has resigned, following a connection of 14 years with that company. He has had supervision over all plants of the organization in the Raritan River district, devoted to the production of sanitary ware, refractories, chemical stoneware and kindred products. Mr. Minton has been specializing in refractory and high-refractory research and investigations for blast furnace and steel mill service and will engage as a consulting engineer in this line. He is a past-president of the American Ceramic Society.

H. W. Caldwell, who was recently elected president of the Cleveland Stone Co., Cleveland, has been president of the Sterling Grinding Wheel Co. since its acquisition by the Stone company in 1922. Previously he was for many years vice-president of the latter company and in direct charge of its grindstone department. The Sterling company is operated as the abrasive division of the Cleveland Stone Co.

J. W. McLeod, formerly with Hall-Will, Inc., Erie, Pa., has been appointed Erie district sales representative for the Arch Machinery Co., 1005 Park Building, Pittsburgh, and will handle sales in northern Pennsylvania, with headquarters in Erie.

John C. Neale has been elected a director of the Pittsburgh Valve Foundry & Construction Co., Pittsburgh, succeeding J. N. Anderson, Jr., resigned, and also is serving as assistant to the president. Mr. Neale for almost five years was president and general manager of the American Stainless Steel Co., Pittsburgh, and previously had been identified in executive capacities with the Midvale Steel & Ordnance Co., the Central Steel Co., Massillon, Ohio, construction of the plant of which he supervised, and the Carnegie Steel Co.

Frank A. Demms and H. S. Bradley have been elected directors of the Shenango Furnace Co., Pittsburgh, and Mr. Bradley has been made assistant to the president. Mr. Demms is treasurer of the company and has been associated with the W. P. Snyder interests for 25 years. Mr. Bradley is president of Shenango-Penn Mold Co., an affiliated Shenango Furnace Co. interest.

Herbert C. Poole, for the past three years works manager Colonial Steel Co., Pittsburgh, has been appointed assistant general sales manager in charge of the eastern district, including the Philadelphia, New York and Boston offices of the company. He will make his headquarters in New York. Mr. Poole has been identified with the company for 20 years and was New York district sales manager prior to his appointment as works manager.

W. F. Piper, of the Beardsley & Piper Co., Chicago, manufacturer of foundry equipment, is in a serious condition at Buhl Hospital, Sharon, Pa., because of injuries sustained Feb. 2, when an airplane in which he was flying from Sharpsville, Pa., to Chicago, crashed in a forced landing. Elmer L. Beardsley, also a member of the firm, pilot of the plane, was cut about the face but escaped serious injury. Mr. Beardsley and Mr. Piper flew from Chicago to Sharpsville, 410 miles, in 3 hr. 15 min. The accident occurred as they were taking off for the return trip to Chicago.

Herbert Mertz, formerly secretary and sales manager for the Orton Crane & Shovel Co., Chicago, has resigned and will establish an office in New York to sell the products of that company in New York and New England. P. A. Orton, Jr., becomes secretary and sales manager of the Orton company.

Dr. Michael Pupin, professor of electrical engineering at Columbia University, is the recipient of the 1928 Washington Award. Presentation was made Feb. 2 at a dinner given at the Palmer House, Chicago. The American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the Western Society of Engineers were hosts. The Washington Award, which has been established by the latter society, "is to be presented annually to the engineer whose work in some instance or whose services in general have been noteworthy for their merit in promoting public good."

Guy M. Peterson has been made vice-president of the Cheney-Bigelow Wire Works, Springfield, Mass. He has been engaged in the realty business.

Emil Nelson has resigned as president of the Moulders Foundry Co., North Chelmsford, Mass., and has been succeeded by John H. Davis.

H. B. Swan, superintendent of foundries for the Cadillac Motor Car Co., Detroit, addressed the foundry study group in the College of Engineering and Commerce of the University of Cincinnati on Feb. 3. His subject was "Modern Developments of Foundry Practice."

R. S. Cochrane, metallurgist of the Surface Combustion Co., Toledo, Ohio, spoke on the "General Application of Gas Heat in Industry" at the monthly meeting of the Cincinnati Chapter of the American Society for Steel Treating on Feb. 8.

Charles E. Stone, since 1924 vice-president of the Interstate Drop Forge Co., Milwaukee, has been elected president, succeeding C. R. Messinger, who is a member of the board of directors and also president of the Chain-Belt Co. Lamar S. Peregoy has been elected vice-president. C. C. Bremer, treasurer, and J. C. Merker, secretary, were re-elected. Directors are C. R. Messinger, W. C. Frye, J. W. Millspaugh, L. S. Peregoy, E. L. Wood and W. J. Nugent. Mr. Stone was purchasing agent and later assistant to the president of the Chain-Belt Co. prior to his association with the Interstate company, which is a member of a group of affiliated concerns, including the Sivyer Steel Casting Co., the Federal Malleable Co., and the Chain-Belt Co., Milwaukee, and the Nugent Steel Castings Co., Chicago.

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H. E. Sheldon, president Allegheny Steel Co., Pittsburgh, is on a Pacific Coast tour. He is accompanied by W. F. Detweiler, general manager of the company.

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V. W. Peterson is president and C. B. Mitchell is vice-president and treasurer of a new company that has purchased the plant and business of the Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, manufacturer of air chucks, air-operated arbor presses, boring bars and other air-operated devices. The business will be continued under the old name. Mr. Peterson and Mr. Mitchell also control and operate the Sherman-Manson Mfg. Co., Chicago, manufacturer of tubular steel products.

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George W. Page, associated for 30 years with the W. A. Jones Foundry & Machine Co., Chicago, and now director of purchases for that company, has been elected vice-president to succeed the late Thomas A. Jones. William F. Coleman has been appointed treasurer. He has been identified with the company for a number of years and will continue to serve also as general superintendent. Warren G. Jones continues as president and general manager and J. A. Sizer remains as secretary.

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Donald M. Ryerson has been elected chairman of the board of directors of Joseph T. Ryerson & Son, Inc., Chicago, succeeding his father, the late Edward L. Ryerson. The new chairman has been active in the management of the company, formerly having been vice-president and general manager. Joseph T. Ryerson continues as president and treasurer and Edward L. Ryerson, also a son of the late chairman, has been made general manager and will continue also in his position as vice-president. Everett D. Graff is a newly elected vice-president and G. G. Moody and E. L. Hartig remain as vice-presidents.

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A. P. Afanassieff has been appointed assistant to the president of the Shaw-Crane-Putnam Machine Co., Inc., 100 East Forty-second Street, New York, according to an announcement by F. J. Baumis, president. Henry Huss has been appointed sales manager of the Putnam division of the same company.

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P. J. Flaherty, president and general manager of the Johnson Bronze Co., New Castle, Pa., has purchased the Johnson interests in that company, and will continue with the company in his same capacity. No changes in operation or personnel are planned.

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A. B. Moyer, formerly assistant engineer for the Struthers-Wells Co., Warren, Pa., has been placed in charge of a new branch office which has been opened by the company at 332 South Michigan Avenue, Chicago.

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H. B. Miller has been appointed Pittsburgh district manager for the Truscon Steel Co., Youngstown, succeeding Charles D. Loveland, recently appointed district manager in charge of the company's office at Newark, N. J. Mr. Miller has been assistant sales manager with headquarters in Youngstown.

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H. H. Morgan, since 1904 connected with Robert W. Hunt Co., Chicago, engineer, has been appointed metallurgical engineer in charge of the rail and track fastening department, succeeding C. W. Gennet, Jr. Mr. Gennet has resigned to become associated with the Sperry Development Co. in connection with the Sperry transverse fissure detector. Mr. Morgan is a graduate mechanical engineer, and during the first 13 years of his employment with Hunt company he was directly connected with inspecting and testing work, being particularly active in the inspection and testing of rails, investigation of rail failures, and various tests of track fastenings. During the World War he was transferred to Washington to engage in inspection and testing of engineering materials and equipment for the American Expeditionary Forces. At the close of the war he was appointed district manager of the Pittsburgh district of Hunt company.

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F. A. Lawler, formerly manager of the Chicago branch of the Crucible Steel Co. of America, has been appointed executive vice-president of the Ziv Steel & Wire Co., Chicago.

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Bennett Chapple, director of publicity for the American Rolling Mill Co., Middletown, Ohio, has been elected a vice-president of the company in general charge of advertising and publicity programs and as a special representative. Other officials of the Armco organization who have been given this title during the last year include Weber Sebald, in general charge of commercial development; John B. Tytus, in charge of special construction engineering and special assistant to the general management; J. C. Miller, general representative of the company at Ashland, Ky.; D. Eppelsheimer, in charge of general engineering and construction problems and special assistant to the general management, and A. K. Lewis, who is vice-president of the Columbia Steel Co., and special representative of the company at Butler, Pa.

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George T. Johnson has been elected third vice-president of the Buckeye Steel Castings Co., Columbus, Ohio, and will be in charge of sales and engineering. He was graduated from Cornell University in 1906 and has been identified with the manufacturing, engineering and sales departments of the Buckeye company since that time.

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Frank A. Peck, vice-president of the Universal Crane Co. and the Thew Shovel Co., Cleveland, has been elected a director of the Manufacturers' Division of the American Road Builders' Association, in recognition of his work in contributing to the success of the 1926 Cleveland Road Show.

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L. J. Jones has resigned as vice-president, secretary and a director of the Eastern Rolling Mill Co., Baltimore, and will leave shortly for a Mediterranean cruise.

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J. King Hoyt, Jr., a member of A. Milne & Co., 741 Washington Street, New York, iron and steel merchants, sailed for Sweden on Feb. 4. He will visit iron and steel plants in Sweden and other countries on the Continent and at Sheffield, England.

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B. H. Hale, Albany, N. Y., and J. A. Rumer, Chicago, have been appointed Eastern and Western sales managers, respectively, for the Ferro Enamel Supply Co., Cleveland.

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E. M. Adams, first vice-president and general sales manager for the Inland Steel Co., Chicago, left Feb. 4 for a five weeks' vacation in Honolulu.

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C. R. Lewis has been made executive vice-president, in addition to his duties as general manager of sales for the Standard Forgings Co., Chicago. A. C. Stockton, formerly vice-president and comptroller, has been elected vice-president, treasurer and secretary of the company.

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E. C. Wells, president Roane Iron Co., Chattanooga, Tenn., has resigned on account of ill health, his retirement being effective immediately. He has been succeeded by Morrow Chamberlain, who has been secretary and treasurer. Charles T. Culbert, auditor of the company during the past two years, will take up the duties relinquished by Mr. Chamberlain.

Machinery Markets and News of the Works

UPTURN IN SALES VOLUME

Machine Tool Business and Inquiries Show Decided Gain

Santa Fe Railroad Issues Inquiry for 34 Items of Equipment—Large Buying by Mergenthaler Linotype Co.

MACHINE tool sales and inquiries have turned upward in the first week of February. Buying has been well apportioned among all consuming lines, although automobile companies probably have been the most active purchasers. However, the orders of the Mergenthaler Linotype Co., Brooklyn, totaling upward of $1,000,000 in the past two or three weeks, comprise one of the largest amounts placed by any one company outside the automobile field since the war. The Santa Fe Railroad has issued an inquiry for 34 items of shop equipment.

Orders booked during the past week or two have placed some machine tool manufacturers in the best position in several months. Inquiries are in good volume and lend encouragement to the prediction of some in the trade that a mounting scale of purchasing will be in evidence throughout February and March. Some machine tool companies report a heavy increase in the demand for repair parts, indicating that manufacturers generally are expanding their activities.

The automotive industry promises to yield much more business in the first half of this year than in the latter six months of 1927. Tools for which automobile companies are now inquiring total about $500,000.

Woodworking machinery is fairly active. The St. Marys Wheel & Spoke Co., St. Marys, Ohio, has bought 25 new and six rebuilt machines, and the Perfection Stove Co., Cleveland, is taking bids on 25 machines.

New York

NEW YORK, Feb. 7.

THERE is a fair volume of inquiry for machine tools, but with the exception of some further purchasing by the Mergenthaler Linotype Co., Brooklyn, only a small number of purchases is reported. The Merganthaler list of purchases has been one of the largest since the war, totaling $1,000,000 to $1,200,000. In addition to the six turret lathes reported early in the year and about 20 engine lathes, of which 17 went to the Monarch Machine Tool Co. and three or more to the Hendey Machine Co., the Merganthaler company is understood to have closed on about 230 spindles of drills with Leland-Gifford Co. and 50 to 60 more with another maker. Its orders for milling machines total about $400,000, of which $250,000 worth was bought from one maker and $125,000 worth was distributed to four others. The Intertype Corporation, Brooklyn, is preparing additional production factilities and may be in the market for a few tools soon.

Machine tool builders have comfortably filled order books and in some instances are quoting slightly extended deliveries. One maker, quoting from seven to 15 weeks' has advanced prices about 10 per cent.

Recent purchases have included a 16 x 60-in. and a 20 x 72-in. lathe and a No. 2 Brown & Sharpe surface grinder by a California machine tool builder; an 8-in. rotary surface grinder by a Philadelphia company; an automatic grinder for thread milling machines by a New York City manufacturer, and a 42-in. boring and turning mill by a machine tool manufacturer in Cincinnati.

Plans are being arranged by Decorated Metal Mfg. Co., Sackett and Henry Streets, Brooklyn, for extensions and improvements in its six-story plant to cost close to $45,000. Slee & Bryson, 160 Montgomery Street, are architects.

A. C. and A. K. Roemermann, First National Bank Building, Mount Vernon, N. Y., architect, have plans for a two-story automobile service, repair and garage building, to cost approximately $100,000 with equipment.

General Motors Truck Co. and Yellow Coach Co., both operated as divisions of General Motors Corporation, Broadway and Fifty-seventh Street, New York, have leased seven-story building being erected at 211-25 West Sixty-first Street, totaling 140,000 sq. ft. floor space, and will centralize service and repair departments, as well as sales division, at that location.

Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, is said to have plans for additions in its aircraft manufacturing plant at Farmingdale, L. I., to cost more than $50,000.

Westcott & Mapes, Inc., 233 Broadway, New York, architect and engineer, has plans for a 12-story terminal warehouse, with ice, cold storage and refrigerating departments, on block bounded by Eleventh and Thirteenth Avenues, Twenty-sixth and Twenty-seventh Streets, to cost about $7,500,000 with equipment.

General Bronze Corporation, recently formed to take over and consolidate John Polachek Bronze & Iron Co., Long Island City, and Renaissance Bronze & Iron Works, both at Long Island City, has concluded negotiations for purchase of the bronze and iron works of Tiffany Studios, Inc., Corona, L. I., with plant totaling about 2½ acres, specializing in architectural bronze and iron products, lighting fixtures, etc. New owner will maintain operations at Corona works.

Benjamin Stevens, Flatbush Avenue and Stevens Street, Brooklyn, has filed plans for a two-story automobile service, repair and garage building on Nostrand Avenue, to cost about $175,000 with equipment.

Columbia Air Liners, Inc., recently formed by Charles A. Levine, 233 Broadway, New York, is completing installation of plant at Long Island City, 100 x 100 ft., for manufacture of commercial and military airplanes, and parts.

Ossining Ice Co., South Highland Avenue, Ossining, N. Y., has work under way on a new plant to cost about $150,000 with machinery. Waldemar Mortensen, 405 Lexington Avenue, New York, is architect.

Universal Pipe & Radiator Co., 420 Lexington Avenue, New York, is arranging an expansion program, to include acquisition of other properties and manufacture of additional steel and iron products. It is purposed to increase capital from 400,000 to 3,000,000 shares of stock, no par value, at a special meeting Feb. 15, and to begin program immediately thereafter. Louis B. Ladoux is president.

Western Electric Co., 195 Broadway, New York, has awarded a general contract to Turner Construction Co., Graybar Building, for a one-story unit at its telephone apparatus and cable shops, Kearny, N. J., 97 x 348 ft., for by-products production, to cost in excess of $200,000 with equipment.

In connection with an expansion program to cost $22,000,000, Public Service Electric & Gas Co., Public Ser-

The Crane Market

INQUIRIES for both electric overhead and locomotive cranes are numerous, but purchasing is still limited. The Public Service Production Co., Newark, N. J., which has been in the market for three large capacity overhead cranes is understood to have closed. The Franklin Lumber Co., Newark, has not yet closed on its two lumber handling cranes. There are a number of inquiries current for locomotive cranes, but users are slow to place orders.

In the Pittsburgh district the Westinghouse Electric & Mfg. Co. is inquiring for a 5-ton, 25-ft. 6-in. span, 1-motor overhead crane.

Among recent purchases are:

Dixie Construction Co., High Level, Ala., 125-ton, 60-ft. 3-in. span, overhead crane with 15-ton auxiliary from Niles Crane Corporation.

Koppers Construction Co., Pittsburgh, a 5-ton, 50-ft. span electric crane for New Haven, Conn., from Niles Crane Corporation.

Otis Elevator Co., Yonkers, N. Y., 1-ton, 2-motor, single I-beam crane reported purchased from Shepard Electric Crane & Hoist Co.

Commonwealth of Massachusetts, a 6-ton, single I-beam hand power crane through a local dealer.

State Line Generating Co., Hammond, Ind., 20-ton, 33-ft. 4½-in. span; 20-ton, 28-ft. 5½-in. span and 20-ton, 26-ft. 1¾-in. span, electric overhead cranes and a 4-motor, 27-ft. 7-in. span bucket crane from Whiting Corporation.

Chicago Garbage Disposal Plant, three 2-cu. yd. bucket cranes from an unnamed builder.

New Haven Gas Co., New Haven, Conn., 5-ton, 50-ft. span crane to handle a ¾-cu. yd. bucket from Niles Crane Corporation.

Penn Metal Co., Parkersburg, W. Va., two 3-ton underhung transfer cranes and one 3-ton, 2-motor electric hoist from Northern Engineering Works.

vice Terminal, Newark, plans construction of a steel tower transmission line from a power substation and switching plant at Roseland, on which work has been started, to Bushkill, Pa., about 45 miles, where connection will be made with system of Pennsylvania Power & Light Co., Allentown, Pa.; Roseland station will occupy a 40-acre tract, and will cost close to $5,000,000 with equipment. About $3,000,000 will be expended for other transmission lines in different parts of State. Power substation at Kearny will be increased and additional equipment provided, to cost more than $400,000.

British-American Metals Co., South Second Street and Clinton Avenue, Plainfield, N. J., manufacturer of brass and copper tubing, etc., has authorized rebuilding portion of plant destroyed by fire Jan. 29, with loss in excess of $400,000 including machinery. Casting and machine shops were not damaged; tube mill was one story, 200 x 300 ft., and will be replaced in same size.

Triplex Safety Glass Co. of North America, Hoboken Terminal Building, Hoboken, N. J., has leased property at Passaic, N. J., formerly used by Passaic Cotton Mills, and will remodel for production of non-shatterable windshields.

Scandinavia Belting Co., Charlotte, N. C., manufacturer of brake bands, belting, etc., has leased one-story building to be erected at 248-50 Central Avenue, Newark, for an Eastern factory branch and distributing plant. Local office now at 226 High Street.

Bigelow & Shanley, 24 Walnut Street, Newark, architects, have plans for a new multi-story automobile service, repair and garage building, to cost $200,000 with equipment.

Guardian Fence Co., 1125 Broad Street, Newark, manufacturer of wire fencing, etc., subsidiary of Igoe Brothers, 234 Poinier Street, has leased three-story building at 32-34 Austin Street and 19 Tichenor Lane, for a new plant.

Board of Education, Union, N. J., contemplates installation of manual training department in addition to high school on Morris Avenue to cost $300,000, for which plans will be drawn by Fred Elsasser, 845 Broad Street, Newark, architect.

Ochrome Valve Co., 17-23 West Sixtieth Street, New York, has been formed to manufacture poppet valves for automobiles and Diesel engines, still plugs of special material and other items. Plant is at Bayonne, N. J.

Buffalo

BUFFALO, Feb. 6.

OFFICIALS of Savage Arms Corporation, Utica, N. Y., are organizing a company to take over electric refrigerator and affiliated branches and to carry out increased production in this line, including electric washing and ironing machines. A present subsidiary, known as J. Stevens Arms Co., with main plant at Chicopee Falls, Mass., will succeed to firearms division of parent company, with change in name to Savage-Stevens Arms Co. Production in latter line will be concentrated largely, it is said, at Chicopee Falls. Savage corporation will operate as a holding company for both interests.

Board of Education, Gowanda, N. Y., is considering installation of manual training equipment in a new high school, to cost $250,000, for which plans will be drawn by Edward Green & Sons, and Albert H. Hopkins, 1 Niagara Square, Buffalo, architects.

Lockport Light, Heat & Power Co., Lockport, N. Y., has secured permission to operate in Niagara and Olean Counties, and plans construction of new pipe lines for distribution of coke-oven gas secured from plant of Semet-Solvay Co., Tonawanda, N. Y., including line to Wrights Corner and Medina, to cost $334,000 with station equipment; and line to Olcott and vicinity to cost $136,400.

V. R. Decrow, 91 Walnut Street, Lockport, N. Y., and associates have formed Decrow Automotive Specialties, Inc., capitalized at $100,000, and contemplate establishment of local plant for manufacture of automobile equipment and devices. Earl E. Hoyt, 57 Locust Street, is also interested in organization.

Board of Education, Municipal Building, Rochester, N. Y., is asking bids on general contract until Feb. 23 for two-story Benjamin Franklin High School, to include manual training department, to cost $2,750,000. Gordon & Kaebler, Hiram Sibley Building, are architects.

Clinton Metallic Paint Co., Clinton, N. Y., has purchased mining plant and ore rights in this section formerly operated by late C. A. Borst. Negotiations have also been concluded for acquisition of deposit of hematite ores in this same district, heretofore held by Franklin Iron Mfg. Co. New owner is planning development and operation of properties for raw material supply, and will increase output of metallic paints.

Plans are now under way for rebuilding foundry of Otis-Sawyer Co., Oswego, N. Y., recently destroyed by fire, with a loss estimated at $40,000.

Fabrication of steel has been started in new plant of Leach Steel Corporation, Adele Street, Rochester. Main building is 60 x 200 ft., with shop 30 x 100 ft.

Philadelphia

PHILADELPHIA, Feb. 6.

BIDS have been asked on general contract by Norton Co., Worcester, Mass., manufacturer of grinding wheels, etc., for a two-story and basement factory branch and distributing plant, 57 x 100 ft., at Stenton and Louden Streets, Philadelphia, to cost more than $50,000 with equipment. Local headquarters are at 3208 Market Street. Ballinger Co., 105 South Twelfth Street, is architect and engineer.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, is planning construction of an automobile service, repair and garage building, with bus terminal facilities in vicinity of Broad Street and Olney Avenue, to cost $1,500,000 with equipment. A similar multi-story structure will be erected also on Locust Street. Company is arranging for sale of $5,000,000 preferred stock, fund to be used for cost of structures.

Bids will be received by Bureau of Supplies and Accounts, Navy Department, Washington, until Feb. 14, for 320 pneumatic hose clamps and 1350 pneumatic hose couplings for Philadelphia Navy Yard, schedule 8416.

Harry L. Hussman Refrigerator Co., North Broadway, St. Louis, manufacturer of domestic refrigerators, freezers, etc., has acquired plant of Keystone Screw Co., Yardley, Pa., for new Eastern works. Existing plant consists of 35,000 sq. ft. of floor space on 17 acres and will be improved for immediate occupancy of new owner.

Philadelphia Rubber Works Co., Land Title Building, Philadelphia, has awarded general contract to Robert E. Lamb Co., 849 North Nineteenth Street, for a one-story addition to its mill at Oaks, Pa., 50 x 100 ft., to cost $40,000 with equipment.

Borough Council, Clayton, N. J., plans installation of electrically-operated pumping machinery and auxiliary power equipment at municipal waterworks. Fund of $100,000, is being arranged for expansion.

Giant Mfg. Co., Council Bluffs, Iowa, manufacturer of playground equipment, has leased portion of former pottery of John Maddocks' Sons Co., Trenton, N. J., and will remodel for Eastern branch factory, to specialize in merry-go-rounds and kindred apparatus.

Board of Public Works, Camden, N. J., William D. Sayrs, Jr., director, will soon ask bids for four pumping plants for municipal waterworks, with capacity of about 5,000,000 gal. per day, to cost close to $100,000.

Bartol Research Foundation, care of Dr. Howard McClenahan, Franklin Institute, 15 South Seventeenth Street, Philadelphia, has plans for a two-story engineering and laboratory building on Swarthmore College campus, Swarthmore, Pa., to cost about $150,000. John T. Windrim, Commonwealth Building, is architect.

Harry Burgin, 4608 Salmon Street, Philadelphia, and associates have organized Bridesburg Foundry Co., with capital of $50,000, and plan operation of works in Bridesburg district for production of iron castings, dies and kindred products. George Elliott, 4817 Leiper Street, is also interested in new enterprise.

American Assembling Machine Co., Easton, Pa., is arranging for establishment of local plant for mechanical parts production and assembling.

Pennsylvania Water & Power Co., Holtwood, Pa., is disposing of bond issue of $6,000,000, portion of proceeds to be used for expansion. Company is affiliated with Consolidated Gas, Electric Light & Power Co., Baltimore, and has plans for a hydroelectric power development on Susquehanna River, south of its present station at Holtwood.

Harry A. Whartenby, Inc., Philadelphia, has been chartered under State laws, with capital of $50,000, to take over and expand structural steel and iron business of Harry A. Whartenby, Fulton Building. New company will manufacture line of ornamental iron and steel products and other metal goods.

School District of Upper Darby Township, Upper Darby, Pa., is considering installation of manual training equipment in new junior high school to cost $700,000, for which plans will be drawn by Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects.

Gannett, Seelye & Fleming, Inc., Harrisburg, Pa., engineer, operating public utility properties, has acquired plant and system of Elizabethtown & Marietta Gas Co., Elizabethtown, Pa. Plans are under advisement for expansion, including pipe line construction.

Moltrup Steel Products Co., Beaver Falls, Pa., maker of cold drawn, milled and ground specialties, has discontinued connection with Henry Stewart & Co., Drexel Building, Philadelphia, and opened a branch office at 617 Widener Building. Russell E. Crank is district sales manager.

Briscoe Mfg. Co., 725 Walnut Street, Lebanon, Pa., has been organized to manufacture patented flexible coupling and do a general machine and jobbing business. Factory is completed and company expects to be in operation soon.

Chicago

CHICAGO, Feb. 6.

AN additional inquiry for 34 tools to the list of the Santa Fe Railroad is the feature of this market. There is some doubt in regard to the report that the Studebaker Corporation, South Bend, Ind., will revive a list of experimental department tools. The Nash Motors Co., Kenosha, Wis., is purchasing tools for installation where production methods can be improved. The upward swing in sales late in January has been carried into February. Orders received, however, are scattered. New inquiry, which comes from widely diversified sources, is growing. Sales reported include a 25-in. x 20-ft. lathe, a 3½-ft. radial drill and a 14-in. tool room lathe.

Additions to Santa Fe List:

One portable crane.
One flanging clamp.
One 84-in. guide bar grinder.
Two 90-in. wheel lathes.
One 1500-lb. steam hammer.
One 8-in. cold saw.
One 24-in. upright drill.
One 14-in. x 6-ft. portable lathe.
One 30-in. x 16-ft. heavy-duty engine lathe.
One Niles, or equivalent, 90-in. locomotive truing machine.
One Hendey, or equivalent, 20-in. x 12-ft. heavy-duty engine lathe.
One Whitney, or equivalent, 20-in. x 2½-in. single wet tool grinder.
One 20-in. x 8-ft. heavy-duty engine lathe.
One 24-in. heavy-duty shaper.
Two Lucas No. 33, or equivalent, horizontal boring machines.
One Cincinnati No. 4, or equivalent, milling machine.
One 20-in. x 6-ft. brass turret lathe.
One 54-in. guard-wheel, tire-turning lathe.
One 90-in. driving wheel lathe.
Two 18-in. x 10-ft. engine lathes.
One 36-in. x 10-ft. engine lathe.
One 3½-ft. and one 4½-ft. radial drills.
One 20-in. drill press.
One Micro grinder.
One 2-in. double-head bolt cutter.
One 75-ton hydraulic press.
One 1¼-in. bolt cutter.
One 50-ton hydraulic press.
One 10-in. x 36-in. grinder.
One 39-in. crank planer.

Plans for merger of Jefferson Electric Mfg. Co., Chicago, with Chicago Fuse Mfg. Co. have been announced by John A. Bennan, president of both companies. Consolidated company will be known as Chicago-Jefferson Fuse & Electric Co. and will have an authorized capitalization of 120,000 shares of no par capital stock. Exchange of stock will be made on a share for share basis.

Hannifin Mfg. Co., 621 Kolmar Avenue, Chicago, manufacturer of machine tools, will build a two-story addition to provide 25,000 sq. ft. of floor space.

The Dominion Electric Co., Minneapolis, Minn., will build a shop addition to cost $25,000.

Mattoon Engine Works, 120 North Fourteenth Street, Mattoon, Ill., has been organized to succeed Chuse Engine & Mfg. Co. It will continue manufacture of steam engines in plant of former company and is prepared to carry out old contracts.

West Side Metal & Roofing Co., 2917 South La Salle Street, Chicago, has asked bids on general contract for a three-story addition, including improvements in present plant, to cost $150,000 with equipment. Lowenberg & Lowenberg, 111 West Monroe Street, are architects.

Rapid Roller Co., 800 Austin Avenue, Chicago, manufacturer of printers' rollers, etc., will proceed with erection of new three-story plant, 100 x 200 ft., to cost more than $250,000, instead of smaller sum. Present plant will be removed to new location. Schmid & Ryan, 77 West Washington Street, are architects.

Samuel Olsen & Co., 2418 Bloomingdale Avenue, Chicago, manufacturer of conveying machinery, etc., has asked bids on general contract for a one and two-story addition, 135 x 250 ft., to cost approximately $150,000 with equipment. Waller Co., 510 North Dearborn Street, is architect and engineer.

Great Northern Railway Co., Railroad Building, St. Paul, Minn., is considering extensions and improvements in its terminal and locomotive shops at Grand Forks, N. D., including addition to engine house, additional machine repair shops, two 100,000-gal. capacity water tanks, and other facilities, to cost in excess of $500,000. R. W. Davis is chief engineer.

City Council, Centralia, Ill., is considering installation of a municipal electric light and power plant, to cost more than $50,000 with equipment.

Davenport Cement Co., Davenport, Iowa, J. R. Lane, president, is said to be planning early construction of initial units of a cement mill at Buffalo, Iowa, to cost upward of $1,000,000 with machinery.

City Council, Great Falls, Mont., plans the installation of high duty pumping machinery to cost about $36,000, and other pumping and power equipment in connection with extensions and improvements in municipal waterworks, entire project to cost about $100,000. M. L. Morris is city engineer.

Great Northern Tool & Supply Co., Billings, Mont., J. C. O'Donell, manager, is considering plans for new factory branch for oil well equipment at Cody, Wyo., including machine shop and other structures.

William L. Hoffman, 718 West Sixty-third Street, Chicago, architect, has plans for a one-story automobile service and repair garage building, to cost $165,000 with equipment.

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, is reported planning extensions and improvements in its car and locomotive shops at Aurora, Ill., to cost $275,000 with equipment. A. W. Newton is chief engineer.

Key City Gas Co., Dubuque, Iowa, is considering construction of an addition to its artificial gas plant, to cost $200,000 with equipment; extensions will be made in pipe lines.

Beckwith Iron Works, 544 West Seventy-ninth Street, Chicago, has awarded general contract to Olson & Berg, 7957 Rhodes Avenue, for an addition, 40 x 180 ft., to cost $15,000 with equipment.

New England

BOSTON, Feb. 6.

MACHINE tool sales, which showed signs of activity the past 10 days, have slumped. With some dealers business is as quiet as at any time in December and November. While actual sales fell off inquiries increased and the trade feels confident that a good business will develop late this month or early in March. Recent sales included a new 53-in. boring mill, new 18-in. x 25-ft. engine lathe, two used milling machines, an arbor press, a 24-in. x 14-ft. lathe, 28-in. upright drill and a new band saw to Massachusetts shops; a two-spindle drill and an upright drill, used tools, to Maine users, and miscellaneous smaller equipment to plants in various sections of New England. Several pieces of equipment, each costing $5,000 to $7,000, also were sold, but because of the possibility of additional orders from these buyers, sellers are withholding details. The local trade expects that the General Electric Co., Pittsfield, Mass., will shortly close on several large machines.

Central Maine Power Co. contemplates a hydroelectric power development at Bingham, Me.

Pattern shop of Gibby Foundry Co., Condor Street, East Boston, valued at $25,000 and patterns valued at $75,000 were recently destroyed by fire. It is planned to rebuild.

Parker Wire Goods Co., Worcester, Mass., has acquired Stephen Richard Co., Inc., Southbridge, Mass., cutlery. It is planned to continue manufacture of cutlery, but to establish sales and shipping departments in Worcester.

Saco-Lowell Shops, Boston, textile machinery, will move its Lowell Machine Shop, Lowell, Mass., to its plant at Biddeford, Me. Lowell plant manufactures minor lines of cotton machinery, Bradford, worsted and spun silk machinery, while the Biddeford plant is devoted to spinning, roving and twister equipment. Kitson Machine Shop, Lowell, opening and picking machinery is not affected by this move. Company also operates a card and drawing machinery plant at Newton Upper Falls, Mass.

Mechanical Devices, Inc., with a capitalization of 700,000 shares of 7 per cent preferred stock, par $10, and 60,000 shares of common stock, par $5, has organized under Massachusetts laws to manufacture cotter pins, nuts, bolts, screws, etc., and to do engineering work. It will use part of Victory plant, Squantum, Quincy, Mass., which was operated during war by Bethlehem Shipbuilding Co., Ltd.

Contract has been let by Taunton-New Bedford Copper Co., New Bedford, Mass., to J. E. Cox Co., North Main Street, Fall River, Mass., for extensions and improvements in two-story plant, to cost more than $30,000.

Northern Rubber Co., Ballardvale, Mass., has acquired portion of local plant of Ballardvale Mills Co., consisting of two factory units on 2¾ acres, and will remodel for a new mill. It is purposed to begin production in March.

New England Public Service Co., Worcester, Mass., has purchased plant and properties of Utilities Power Co., Bristol, N. H., including a local power dam and hydroelectric power station and is planning to increase height of dam for expansion in generating capacity. Extensions will be made in transmission lines.

Public Building Department, City of Boston, City Hall Annex, has plans for a new power house at jail on Charles Street, to cost $100,000 with equipment. Bids will be asked by Desmond & Lord, 1 Beacon Street, architects. Department is also planning erection of a municipal automobile service, repair and garage building, to cost in excess of $200,000 with equipment.

Indiana Truck Corporation of Massachusetts, 54 Carleton Street, Cambridge, Mass., a subsidiary of Indiana Truck Corporation, Marion, Ind., has acquired building adjoining present factory branch, and will use for extensions.

Worcester Wire Works, Inc., 230 Ludlow Street, Worcester, Mass., has awarded a general contract to Bylund Brothers, Wallace Avenue, Auburn, Mass., for a two-story addition, 67 x 200 ft., to cost about $35,000.

Rhode Island Carboard Co., Pawtucket, R. I., has acquired through its subsidiary, Emerson Realty Corporation, plant of Home Bleach & Dye Works, Attleboro, Mass., and will remodel for new plant. Entire project, including purchase, is reported to cost more than $500,000. Lowell Emerson is president.

Coffin Valve Co., 20 Tolman Street, Boston, manufacturer of heavy gate valves, is said to be completing plans for rebuilding portion of plant recently destroyed by fire, with loss of more than $75,000 including equipment.

Kingsbury Machine Co., Keene, N. H., has changed its name to Kingsbury Machine Tool Corporation.

Pittsburgh

PITTSBURGH, Feb. 6.

MACHINE tool sales are dull, but inquiries are fairly active. A few dealers have succeeded in closing some old inquiries.

Locomotive Stoker Co., Pittsburgh, a subsidiary of Westinghouse Airbrake Co., has been sold to Standard Stoker Co., New York, which has plant at Erie, Pa., and will be known as Pittsburgh plant of Standard Stoker Co., Inc. Locomotive Stoker Co. will be dissolved after servicing of numerous stokers now in use on locomotives and coal pushers is completed.

Chromium Co. of Pittsburgh, has been incorporated under Pennsylvania laws and is engaged in chromium plating in a plant at 400 Lexington Avenue. Offices are at 1005 Park Building. Norman Allderdice is president and Dr. R. J. Piersol, vice-president and consultant.

Plans are under consideration by Baltimore & Ohio Railroad Co., Baltimore, for rebuilding engine house and adjoining machine shops at its repair works, Connellsville, Pa., destroyed by fire Feb. 2, with loss in excess of $400,000, including equipment.

United States Engineers, Huntington, W. Va., are asking bids until Feb. 15 for a quantity of iron rivets, circular 137; until Feb. 13 for riveted spiral pipe, circular 135; until Feb. 16 for 1540 lb. steel pipe lining, 1875 lb. steel swing chain, and two sprocket chains, circular 136.

W. T. Carson Battery Co., Huntington, W. Va., plans rebuilding its service, repair and garage building at 1331 Third Avenue, recently destroyed by fire, with loss close to $100,000 including equipment.

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of heavy hardware products, plan rebuilding machine shop destroyed by fire Jan. 31, with loss estimated at $21,000 including equipment.

Board of Education, Fulton Building, Pittsburgh, is arranging an early call for bids on general contract for a two-story and basement trade and vocational school, to cost $150,000 with equipment. E. B. Lee, Chamber of Commerce Building, is architect.

Philip Palmgreen, McKeesport, Pa., and associates, have formed Palmgreen Mfg. Co., to operate local plant for manufacture of tools and machinery. Ben A. Dahlin, Versailles, Pa., will be an official of new company.

South Atlantic States

BALTIMORE, Feb. 6.

BIDS will be asked soon for a one-story addition to plant of Davison Chemical Co., Garrett Building, Baltimore, manufacturer of acids, fertilizers, etc., Curtis Bay district, to cost in excess of $400,000 with machinery. A. Benzon is company engineer.

Newman Machine Co., Jackson Street, Greensboro, N. C., manufacturer of wood-working machinery and tools, has plans for a one-story addition, 60 x 135 ft., to cost about $80,000 with equipment. Extension will provide total floor space of more than 42,000 sq. ft. Later it is purposed to build a one-story foundry addition. Company recently increased capital to $500,000 for expansion.

Board of Commissioners, District Building, Washington, is asking bids until Feb. 20 for foundry and forge shop equipment for McKinley Technical High School.

Maryland Clay Products Co., Frostburg, Md., recently formed by J. Glenn Beall, Frostburg, and associates, has plans for new plant for manufacture of vitrified sewer pipe, to cost in excess of $200,000 with machinery. Site has been selected along line of Western Maryland Railway. Ervin I. Prichard, Frostburg, is also interested in organization.

Capital Granite Co., Columbia, S. C., recently organized with capital of $300,000 by Robert G. Lassiter, Oxford, N. C., and associates, has plans for a new rock-crushing plant in vicinity of Blairs, S. C., to have capacity of 3000 tons per day. D. E. Saunders, Columbia, is secretary.

Crown Cork & Seal Co., 1611 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, capping machinery, etc., will make extensions and improvements in three-story plant to cost $50,000. L. R. White, Hearst Tower Building, is architect.

J. A. Jones Construction Co., Realty Building, Charlotte, N. C., has filed plans for four-story automobile service, repair and garage building, to cost upward of $200,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Feb. 14 for six motor-generator sets and spare parts for navy yard at Anacostia, schedule 8451; for 6691 lb. rough machined forged shafts for Brooklyn Navy Yard, schedule 8463; for wire, brass, copper, bronze and steel for Eastern and Western yards, schedule 8420; for quantity of brass, copper and steel burrs, rivets and washers for Eastern and Western yards, schedule 8423; and for quantity of machine and wood screws and nuts for Philadelphia yard, schedule 8404.

Baker County Power Co., Moultrie, Ga., is reported planning installation of a local power house, using Diesel engine units. Company was recently acquired by W. B. Foshay Co., Foshay Building, Minneapolis, Minn.

Edisto Public Service Co., Denmark, S. C., will make extensions in power facilities and transmission lines in Allendale section, where electric light and water properties recently were acquired.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (closing date not stated) for refrigerating equipment for marine barracks, Mare Island, Cal., including motor-driven compressor, motor-driven brine pump, control equipment, switchboard apparatus, etc., specification 5523.

Dreamland-on-the-Bay, Inc., Love Point, Md., C. W. Elrod, general manager, is considering construction of steam-operated electric power plant, to cost more than $60,000 with equipment. Application has been made for permission to build transmission lines for service at Chester, Stevensville and vicinity.

M. H. Elder Culvert & Machinery Co., Atlanta, Ga., has been formed by merger of Southern Supply Co. and M. H. Elder Co., both of Atlanta, and will carry line of products of Galion Iron Works, Galion, Ohio, and other makers of road building and construction supplies. Warehouses have been opened at 653 Whitehall Street, Atlanta, and company will operate in Georgia, Florida, South Carolina and Alabama.

Milwaukee

MILWAUKEE, Feb. 6.

WHILE machine tool sales have not yet reached a substantial volume, conditions in the trade are becoming more satisfactory and give indications of a steady increase. Inquiry is active, with automotive industries showing greater interest than for the past six months. Due largely to the greater activity of these industries, Milwaukee employment has increased 1000 men in the past thirty days.

Allis-Chalmers Mfg. Co., Milwaukee, has placed orders amounting to $100,000 for new production machinery for its tractor division and is in market for additional miscellaneous items.

Modine Mfg. Co., Seventeenth and Racine Streets, Racine, Wis., manufacturer of radiators and cooling systems for internal combustion engines, contemplates construction of an addition costing about $100,000 complete. Bids will be taken about March 15.

MacWhyte Co., Kenosha, Wis., manufacturer of wire rope, cable, etc., has placed general contract with John Zoubek, 4042 Seventh Street, local, for erection of a mill addition to cost about $25,000.

Quality Aluminum Casting Co., Lincoln Avenue, Waukesha, Wis., has contracted with Paul Gierke, 816 Lincoln Avenue, local, for construction of a brick and steel foundry addition, 40 x 200 ft.

J. E. Fuller and associates, Rockford, Ill., have purchased former plant and property of Acme Brass & Metal Works, Waupaca, Wis., with patent rights to Jorgenson primer for gas engines, and will resume operation upon completion of alterations and replacements. A gray iron foundry unit will be established and a general line of automotive and power farm machinery specialties will be manufactured.

George S. Parker Co., 219 Court Street, Janesville, Wis., manufacturer of fountain pens and metal magazine pencils, is holding in abeyance plans by F. A. Carpenter, architect, Brown Building, Rockford, Ill., for an addition estimated to cost $150,000. Work may be undertaken later in year.

Gold Medal Camp Furniture Co., Racine, Wis., has acquired plant and equipment of R. B. Lang Mfg. Co., 1800 Holborn Avenue, Racine, at assignee's sale for $14,900, and will use it as an additional production unit for metal parts. Lang company manufactured hardware specialties and metal stampings and has been in liquidation following death of its founder and president, R. B. Lang. Some alterations will be made by Gold Metal company, with replacement of obsolete equipment.

Nekoosa Motor & Machine Co., Nekoosa, Wis., has plans by Frank J. Henry, architect, Wisconsin Rapids, Wis., for a new machine shop costing about $25,000 with equipment. Work will begin March 1.

Gedemer Tool & Machine Co., 1920 Taylor Avenue, Racine, Wis., is preparing to build a new unit at a cost of about $25,000.

Atlas Engineering Co., 3038 Galena Street, Milwaukee, which recently sold its mortar and plaster mixer department to Chain Belt Co., Milwaukee, has changed its name to Zimmermann Engineering Co. and will continue to manufacture other lines of mechanical specialties. H. W. Zimmermann is president.

Kurz-Root Co., Appleton, Wis., manufacturer of electrical appliances and specialties, sustained a loss of $15,000 by fire on Feb. 2. Plans are being made for erection and equipment of a new plant.

Armstrong Foundry Co., 1530 Junction Avenue, Racine, Wis., manufacturer of gray iron castings, has plans by J. Mandor Matson, local architect, for a brick and steel addition, 70 x 80 ft. Work will begin about March 1.

Cincinnati

CINCINNATI, Feb. 6.

SALES turned sharply upward the past week, with the result that machine tool builders are in the best position in several months, so far as orders on hand are concerned. Buying has been well apportioned among all consuming lines, although automobile companies probably have been the most active purchasers. Inquiries have been good, and manufacturers are of the opinion that bookings during February and March will be of liberal volume. The automotive industry affords promise of yielding substantial business through the first half of 1928, pending transactions indicating that expenditures in the Detroit district will approximate at least $500,000, and possibly considerably more.

Railroads are beginning to come into the market. The Santa Fe has issued a list covering its annual requirements, while the Southern has placed an order for three large shapers. The Norberg Mfg. Co., Milwaukee, has bought a 62-in. heavy boring mill and a 73-in. standard boring mill. Many machine tool companies report a heavy increase in demand for repair parts. Electrical tool manufacturers state that sales have been fairly good in the past 30 days, and prospects are favorable for active business in the first six months of the year. Purchases by companies in the automobile industry have contributed much to order books.

Plans are being considered by Armstrong-Johnston Mfg. Co., foot of West First Avenue, Columbus, Ohio, manufacturer of truck and cab bodies, for a two-story addition to cost about $40,000 with equipment.

Ohlen-Bishop Co., Columbus, Ohio, manufacturer of saws, saw frames, etc., contemplates rebuilding portion of plant destroyed by fire Jan. 29, with loss in excess of $100,000 with machinery.

I. F. Weber & Co., Commercial Building, Dayton, Ohio, engineers and contractors, have plans for a three-story automobile service, repair and garage building to cost $250,000.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Feb. 20 for 65 spinner assemblies, split hub propellers, circular 215; until Feb. 13 for inverted Liberty engine spare parts, circular 199; until Feb. 13 for 30 sets bomb rack installation parts, circular 207.

W. M. Dean Marble Co., South Garden Street, Columbia, Tenn., will begin a one-story addition, 106 x 145 ft., with installation of additional machinery. Capital has recently been increased to $75,000 for expansion.

Diamond Ice Co., Knoxville, Tenn., operated by Standard Ice Co., is considering erection of a one-story plant to cost close to $200,000 with equipment.

Tennessee Electric Power Co., Chattanooga, Tenn., will make extensions and improvements at Maryville, Tenn., and vicinity, including construction of transmission lines, additional substation equipment, etc. O. T. Huddleston is local manager.

Steel Products Engineering Co., Springfield, Ohio, plans installation of additional machinery.

Advance Bag & Paper Co., Inc., Middletown, Ohio, has arranged for a bond issue of $3,750,000, a portion of proceeds to be used for expansion. Work is under way on a new mill at Hodge, La., for manufacture of kraft paper products, containers, etc., to cost upwards of $1,500,000 with machinery.

Ovens, power equipment, conveying and other machinery will be installed in one-story and basement plant, 70 x 200 ft., to be erected by Blue Bird Baking Co., Horton Street, Dayton, Ohio, to cost about $85,000 with equipment.

Cincinnati Gas & Electric Co., Cincinnati, is concluding negotiations for a merger with Columbia Power Co. and Union Gas & Electric Corporation, under first noted name. An expansion program will be carried out, including transmission line construction.

Monroe Brass & Wire Co., Traction Building, Cincinnati, has been appointed representative in this territory for Fitzsimons Co., Youngstown, Ohio, manufacturer of cold drawn steel.

Indiana

INDIANAPOLIS, Feb. 6.

CONTRACT has been let by Bendix Brake Co., Bendix Drive, South Bend, Ind., manufacturer of automobile brakes and kindred equipment, to H. G. Christman & Co., 306 South Notre Dame Avenue, for a one-story addition, 100 x 120 ft., to cost about $30,000 with equipment.

Indiana Service Corporation, Fort Wayne, Ind., is arranging bond issue of $5,000,000, portion of fund to be used for extensions and improvements in power plants and transmission lines.

Delco-Remy Corporation, Anderson, Ind., manufacturer of automobile electric lighting and starting equipment, is completing plans for an addition to be used largely for production of storage batteries, to cost in excess of $75,000.

Interstate Public Service Corporation, Indianapolis, has applied for permission to issue bonds in amount of $12,554,000, portion of proceeds to be used for expansion and improvements in electric light and power properties, including transmission lines.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, plans early installation of machinery in new one-story plant, 125 x 300 ft., at Dayton, Ohio, on which work is under way. It is reported to cost upward of $100,000 with equipment. Charles E. Bacon, Odd Fellows Building, is architect.

City Council, Elkhart, Ind., plans early call for bids for an elevated steel water tank and tower with capacity of 500,000 gal., for municipal water department. Fred Anderson is city engineer.

Board of Education, Mishawaka, Ind., contemplates installation of manual training department in a two-story and basement junior high and grade school to cost $235,000, for which superstructure will soon begin. Hamilton, Fellows & Wilkinson, Tower Court, Chicago, are architects.

Baker Ice Machine Co., Omaha, Neb., manufacturer of ice and refrigerating machinery, has taken over building of Swartz Electric Co., West Sixteenth Street, recently acquired, and will establish new factory branch and distributing plant.

Cleveland

CLEVELAND, Feb. 6.

MACHINE tool sales and inquiries gained the past week following a slowing down during the previous week. A local manufacturer purchased eight small turret lathes from a Cleveland builder for use in making shock absorbers for automobiles. A local company purchased four 16-in. engine lathes and another two 10-ft. heavy-duty squaring shears. A Cleveland manufacturer sold five small turret lathes to an Eastern manufacturer of brass goods.

A fair volume of business is being done in the Detroit territory. Woodworking machinery is fairly active. The St. Marys Wheel & Spoke Co., St. Marys, Ohio, which is adding the manufacture of furniture to its other products, has purchased 45 new wood-working machines and six rebuilt machines. The Perfection Stove Co., Cleveland, is taking estimates on about 25 wood-working machines.

Butler Mfg. Co., 1812 East Twenty-fourth Street, Cleveland, manufacturer of street-cleaning machinery, sweepers, has leased new factory to be erected at Akron, Ohio, by Akron, Canton & Youngstown Railway Co.

National Sanitary Co., Salem, Ohio, manufacturer of sanitary ware, contemplates rebuilding portion of plant destroyed by fire Jan. 29, with loss reported in excess of $300,000 including equipment.

B. J. Long, 17712 Riverway Avenue, Cleveland, has filed plans for a one-story machine shop, 45 x 115 ft., to cost about $30,000 with equipment.

Northern Ohio Power & Light Co., Akron, Ohio, is arranging an expansion and improvement program to cost $1,600,000 for Akron district, including completion of power substation on Beach Street, cost $150,000; completion of new power substation at South Akron, $125,000; improvements in downtown heating plant and system, $248,000; extension in transmission lines, new power substations at Fairlawn, Kent, Lake Junction and vicinity and miscellaneous work.

Paterson-Leitch Co., 900 East Sixty-ninth Street, Cleveland, operating a structural steel fabricating plant, has filed plans for a one-story addition, 70 x 200 ft., to cost about $30,000. A 10-ton traveling crane and other handling equipment will be installed.

Canfield Oil Co., 3216 East Fifty-fifth Street, Cleveland, is considering extensions and improvements in its refinery, including installation of equipment for modernizing unit for handling crude oil.

Plant of Perkins Structural Steel Co., Wooster, Ohio, together with equipment, tools, machinery, etc., will be sold at public auction Feb. 14.

St. Louis

ST. LOUIS, Feb. 6.

PLANS are being considered by Central Hardware Co., 811 North Sixth Street, St. Louis, for a new multi-story storage and distributing plant, to cost $100,000 with equipment.

Alois Aufrichtag Copper & Sheet Iron Mfg. Co., 900 South Third Street, St. Louis, has begun superstructure for a new one-story plant, 80 x 240 ft., with extension, 30 x 100 ft., for tool room and boiler house, entire project to cost upward of $60,000 with equipment.

Common Council, Blackwell, Okla., is considering installation of additional equipment in municipal light and power plant to cost $30,000.

St. Joseph Lead Co., 60 Wall Street, New York, is reported planning installation of a new concentrating mill at Mine La Motte, vicinity of Bonne Terre, Mo., to cost in excess of $200,000 with equipment.

Swallow Airplane Co., Wichita, Kan., Victor Roos, manager, is planning erection of three one-story units, 50 x 100 ft, 40 x 50 ft., and 28 x 65 ft., to cost more than $40,000 with equipment.

Western Refrigeration Co., Twenty-first and Campbell Streets, Kansas City, Mo., has taken out permits for two new local ice-manufacturing plants, to cost $160,000 and $150,000, respectively, with machinery.

Harding Glass Co., Fort Smith, Ark., manufacturer of sheet glass products, has plans for extensions and improvements, with installation of additional equipment, to cost about $150,000.

Budig Machine Co., McCook, Neb., plans one-story machine shop addition, 40 x 100 ft.

Nebraska Power Co., Seventeenth and Harney Streets, Omaha, Neb., is planning an expansion and improvement program to cost about $1,500,000, including extensions in power plants and transmission lines. New 60,000-volt line will be built from Omaha to Louisville, Neb.

Hill, Hubbell & Co., Tulsa, Okla., manufacturer of paints, etc., has plans for a new four-story factory, to cost $75,000 with equipment. W. D. Blakley, Tulsa, is architect.

American Eagle Aircraft Co., Thirteenth and Chestnut Streets, Kansas City, Mo., is said to be planning immediate installation of equipment in a local building for parts production and assembling.

General Motors Corporation, Detroit, has begun erection of a new branch at 2501 McGee Road, Kansas City, Mo., 170 x 230 ft., to cost about $115,000 with equipment. It will be used for service, repairs and sales of General Motor Truck Division, Yellow Truck & Coach Division, and Hertz Drivurself Stations, Inc.

National Milling Co., 2221 Front Street, Toledo, Ohio, plans construction of a new flour mill at North Kansas City, Mo., with machinery for initial capacity of 3000 bbl. per day, to cost close to $800,000 including equipment.

Spartan Aircraft Co., 2240 St. Louis Street, Tulsa, Okla., recently formed with capital of $1,000,000 by Willis C. Brown, contemplates establishment of local plant for manufacture of airplane parts and accessories.

Detroit

DETROIT, Feb. 6.

CONTRACT has been let by Hupp Motor Car Co., 3641 East Milwaukee Street, Detroit, to Everitt-Winters, Inc., 1651 East Grand Boulevard, for a one-story addition to cost close to $30,000 with equipment.

Rich Steel Products Co., Battle Creek, Mich., has acquired 10 acres at Marshall, Mich., as site for new plant on which work will soon begin. It is reported to cost upward of $60,000 with equipment.

Oakland Motor Car Co., Oakland Avenue, Detroit, has awarded general contract to R. S. Knapp Co., Idaho and Fenkell Streets, Detroit, for a two-story addition for general engineering service, to cost $150,000 with equipment.

Consolidated Paper Co., Monroe, Mich., has awarded general contract to Owen-Ames-Kimball Co., Grand Rapids, Mich., for a four-story addition, primarily for manufacture of folding paper boxes and containers, to cost $300,000 with equipment.

Grand Rapids Gas Light Co., 47 Division Street, North, Grand Rapids, Mich., has plans for extensions and improvements in its artificial gas plant, to cost in excess of $250,000 with equipment. A booster gas pump and other machinery will be installed.

Department of Street Railways, Detroit, has taken out permit for a new automobile service, garage and repair building, to cost close to $100,000 with equipment.

Brunswick-Balke-Collender Co., 623 South Wabash Avenue, Chicago, manufacturer of talking machines, etc., has arranged for removal of its local plant to factory at Muskegon, Mich., where bulk of production will be concentrated. Muskegon plant will be extended.

Commercial Milling Co., 203 Randolph Street, Detroit, will soon take bids for an addition to its flour mill, to cost close to $85,000 with equipment. Fraser Co., 667 East Water Street, Milwaukee, is engineer.

Edwin Sterner Co., Flint, Mich., plumbing and heating equipment, has acquired former four-story plant unit of Hayes Wheel Co., totaling about 80,000 sq. ft. of floor space, and will remodel for expansion.

Hudson Motor Car Co., East Jefferson Avenue, Detroit, has filed plans for an addition, including improvements in portion of present plant, to cost $375,000 with equipment. Albert Kahn, Marquette Building, is architect and engineer.

Jaxon Steel Products Co., Jackson, Mich., division of General Motors Corporation, has begun production of stampings in portion of former plant of Kelsey-Hayes Wheel Corporation, and plans expansion in facilities and production to occupy entire works.

Detroit Boring Bar Co., 682 East Fort Street, Detroit, has been organized to manufacture boring bars, both of its own patented type and to customer specification. At present company is operating in plant of Waterman Corporation and is fully equipped.

Pontiac Sheet Metal & Roofing Co., Pontiac, Mich., has been organized to manufacture and install sheet metal building products and roofing. Plant is being erected and large part of equipment has been purchased.

Gulf States

BIRMINGHAM, Feb. 6.

PLANS have been completed by St. Petersburg Cold Storage Co., St. Petersburg, Fla., for a four-story cold storage and refrigerating plant to cost about $275,000 with machinery. C. C. Whitaker, Bona Allen Building, Atlanta, Ga., is architect and engineer.

North Alabama Utilities Co., Sheffield, Ala., recently formed with capital of $100,000 by R. T. Simpson, Sheffield, and associates, has acquired local site for artificial gas plant to cost $65,000.

Thompson Can Co., Dallas, care of Industrial Department, Chamber of Commerce, Dallas, recently chartered with capital of $70,000 by E. Rowse Thompson and associates, is planning early erection of a new plant for manufacture of tin cans, to cost $50,000 with machinery, which will be of automatic type.

Gulf, Colorado & Santa Fe Railway Co., Union Depot, Galveston, Tex., is considering establishment of a new engine house with machine shops and repair facilities at San Angelo, Tex., to cost in excess of $90,000 with equipment. F. Merritt is chief engineer.

Daniel Japhet, State National Bank Building, Houston, Tex., contractor, has filed plans for a three-story automobile service, repair and garage building, 125 x 125 ft., to cost about $150,000 with equipment.

Gulf States Utilities Co., Beaumont, Tex., is said to have plans for extensions and improvements in local power house, as well as power stations at Hull, Jasper and Port Arthur, Tex., with installation of additional equipment. Company will also improve ice-manufacturing plants at Orange and Port Arthur, with additional machinery installation. Work is in progress on extensions in electric generating plant at Lake Charles, La., with additional equipment, and permit has been secured for new power substation at Beaumont.

Consumers' Ice & Coal Co., 945 Houston Avenue, Port Arthur, Tex., is contemplating an extension to its plant, with installation of additional equipment, to cost $50,000.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has plans for a one-story locomotive repair shop, 200 x 500 ft., at Cleburne, Tex., to cost upward of $150,000 with machinery. C. F. W. Felt is chief engineer.

Chevrolet Motor Co., Flint, Mich., has awarded general contract to Hewitt Construction Co., Houston, Tex., for a new two-story assembling plant at Houston, where site, 100 x 250 ft., has been acquired, to cost close to $200,000 with equipment.

Board of Education, West Point, Miss., contemplates installation of manual training equipment in a two-story and basement high school to cost $160,000, for which bids will soon be called. George Mahan, Jr., City Savings' Bank Building, Memphis, Tenn., is architect.

Presidio Light & Ice Co., Presidio, Tex., has plans for extensions and improvements in local power house, including installation of a new turbo-generator unit and accessories, to cost $70,000 with other machinery.

Aransas Compress Co., Corpus Christi, Tex., has plans for an addition to cost more than $300,000 with machinery. A high density compress, boilers, and other equipment will be installed. Hardy & Curran, Nixon Building, are architects.

J. E. Mitchell, 600 South Sixth Street, St. Louis, is at head of a project to construct and operate a plant at Dallas, Tex., for manufacture of cotton ginning machinery and parts. Property has been secured and work on two-story factory will soon begin, to cost about $35,000 with equipment.

Roxana Petroleum Corporation, Shell Building, St. Louis, has acquired about 13 acres at Midland, Tex., and plans construction of storage and distributing plant to cost upward of $75,000.

City Council, Amarillo, Tex., is planning installation of electrically operated pumping machinery and auxiliary power equipment in connection with extensions and improvements in municipal waterworks. Entire project will cost $125,000. H. B. Jones is city engineer.

Board of Trustees, Prairie View State College, Prairie View, Tex., is planning construction of a one-story unit for a boys' trade and vocational school, to cost $150,000.

Pacific Coast

SAN FRANCISCO, Feb. 1.

PLANS are being considered by Northwestern Pacific Railroad Co., San Francisco, for new power house at its car and locomotive shops. Work will be carried out in connection with an expansion program to cost more than $100,000.

California Rubber Products Co., Redwood City, Cal., manufacturer of hard rubber goods, has leased local plant and will remodel for a new factory. A department for refining gutta percha will be installed.

Fresno-Madera Ice Co., Seventh Street and Ventura Avenue, Fresno, Cal., is planning erection of a new plant, to cost about $100,000 with machinery.

Coast Counties Gas & Electric Co., Santa Cruz, Cal., has plans for a new equipment storage and distributing plant at Hollister, Cal., to cost about $35,000 with material-handling, repair and other equipment.

Metro-Goldwyn-Mayer Studios, Inc., Culver City, Cal., has plans for a one-story machine shop at its motion picture plant, 100 x 100 ft., to cost in excess of $40,000 with equipment. J. M. Haenke, Subway Terminal Building, Los Angeles, is architect.

Southern California Edison Co., Los Angeles, is disposing of preferred stock issue to cost close to $1,000,000, portion of proceeds to be used for extensions and improvements, including transmission line construction. Company has approved plans for expansion in Tulare district to cost about $325,000.

Lewis County Concrete Products Co., Chehalis, Wash., operated by Concrete Pipe Co., 134 Nickerson Street, Seattle, is arranging early erection of initial unit of a new local plant for production of concrete pipe and kindred specialties, to cost about $40,000 with equipment. Additional units will be built later. Thomas Stoy is local manager.

Puget Sound Power & Light Co., Seattle, is arranging an expansion and improvement program to cost $4,475,000. Work will include extensions in hydroelectric power plant on Baker River, to increase output by 27,000 hp., new power transmission line from Baker generating station to Seattle, substation equipment, etc. Company is operated by Stone & Webster, Inc., Boston.

San Joaquin Light & Power Corporation, Fresno, Cal., has approved plans for first unit of new power substation at Ashland and West Avenues, including additional transmission line, to cost about $90,000. Expansion will be carried out later, with ultimate cost of $250,000.

Apple Growers' Cold Storage Co., Watsonville, Cal., recently organized, has engaged Trine Service Corporation, Central National Bank Building, Oakland, Cal., architect and engineer, to prepare plans for a one-story cold storage and refrigerating plant, 300 x 500 ft., to cost approximately $250,000 with machinery.

Brown Instrument Co., Philadelphia, manufacturer of pyrometers, thermometers and other indicating and recording instruments, has opened new branch office at 537 Holbrook Street, San Francisco.

Foreign

CONTRACT has been let by Soviet Metal Trust, Moscow, Russia, to Frank D. Chase, Inc., 720 North Michigan Boulevard, Chicago, engineer, for plans and erection supervision for a new foundry at site of former plant of Singer Mfg. Co., Podolsky, about 25 miles from Moscow. It will have capacity of 150 tons per day, approximately trebling present output, and will cost in excess of $750,000. Work is scheduled to begin this summer.

Stuart & Partners, 12 Berkeley Street, London, W. 1, general contractors, have secured award for a new beet sugar refinery at Brigg, Lincolnshire, England, for which plans were prepared by German interests. Unit is estimated to cost close to $1,000,000 with machinery. Information at the American Consulate, London, William L. Cooper, commercial attaché.

Terni-Societa per l'Industria e l'Elettricita, Rome, Italy, known as Terni, is disposing of a bond issue of $12,000,000 in the United States, portion of proceeds to be used for hydroelectric power development, including completion of plant now in course of construction to have initial output of 105,000 kw., and similar type station of Societa Elettrica dell' Alto Nera, a subsidiary, designed for capacity of 9000 kw. Extensions will be made in transmission lines and substations.

Establissements Kuhlmann, Paris, France,. manufacturer of industrial chemicals, etc., has arranged for increase in capital from 200,000,000 to 250,000,000 fr., and will soon dispose of a block of stock in United States, proceeds to be used primarily for expansion in synthetic nitrate works, including buildings and equipment.

Colombian Government Bureau of Information, 1440 Broadway, New York, has detailed information regarding equipment and materials to be purchased by Republic of Colombia, South America, for 1928 railroad, waterway and highway construction, including data on bids to be received by Senor Ministro de Obras Publicas, Bogota, Colombia. Purchases will aggregate $10,000,000, and will include steel rails, steel for bridges, locomotives, stone-crushing plants, road rollers, concrete mixers, steel wire and cable, dynamite, pipe barges, construction machinery and miscellaneous equipment. Abram Martinez is director of information bureau at New York.

American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York, has information regarding enlargement of bicycle manufacturing plant at Kharkov, Russia, for which it is proposed to secure a fund from net profits of industries of the Ukraine.

Canada

TORONTO, Feb. 6.

MACHINE tool sales are increasing, each week showing some improvement over the one preceding. Local builders and dealers are optimistic regarding the future and look for increased activity in early spring. In addition to the better domestic demand, there is general improvement in imports, especially in such lines as are not made in the Dominion, the United States benefiting considerably by this business. The automotive and mining industries are responsible for much of the current orders.

Bids are being received by F. A. Dallyn, 71 King Street West, Toronto, for following equipment required by water commissioners of Palmerston, Ont.: One direct-connected motor-driven centrifugal fire pump, capacity 850 gal. per min. with C. G. E. C. R. 7051-K1 automatic starting compensator with push button control, with no voltage and overload protection; gasoline-driven double-section centrifugal fire pump; and one deep water centrifugal multistorage pump, capacity 350-400 gal. per min., total discharge head 185 ft. Latter pump is to be installed in a setting 100 ft. below surface, price to include installation in well; all prices f.o.b. Palmerston, tax included.

Bids will be called at once by Municipal Council, Loretteville, Que., for construction of waterworks and sewage plants and systems on which work will start in spring. Estimated cost is $200,000.

Town Council, Pembroke, Ont., is in market for a 1400 gal. per min. pump for waterworks plant. E. G. R. Lewis is chairman of waterworks commission.

Bids will be called immediately by W. J. Walsh, architect, 304 Terminal Building, for a factory and office to cost $35,000, for F. T. Brooks, 28 Mary Street, Hamilton, Ont.

Dominion Truck Co., South Street, Kitchener, Ont., is having plans prepared by B. A. Jones, 14 Ontario Street South, for factory addition to cost $10,000.

Canadian Cartons, Ltd., 364 Richmond Street West, Toronto, will build a manufacturing plant at corner of Perth and Addison Avenues.

J. Robert Page, 18 Toronto Street, Toronto, has contract for erection of a two-story factory, 63 x 165 ft., to cost $50,000 for Art Craft Top & Trimming Co., 9 Bloor Street East. E. A. H. Menges, 40 Strathearn Boulevard, is architect.

Fire, Jan. 29, destroyed plant of Peterborough Lock Mfg. Co., Peterborough, Ont., with loss, including machinery, estimated at $75,000 to $100,000.

Western Canada

Baynes & Horie, 846 Howe Street, Vancouver, B. C., have contract for $6,000 addition to plant of the Tait Pipe & Foundry Co., 4100 Nanaimo Street, Vancouver.

Bids are being received by S. E. O'Brien, secretary Dominion Department of Public Works, Ottawa, Ont., until Feb. 15, for construction of drydock and plant buildings at Esquimalt, B. C.

Northern Construction Co., and J. W. Stewart, 736 Granville Street, Vancouver, B. C., have been awarded contract by Alberta Wheat Pool, Calgary Alta., for construction of superstructure of a grain elevator at foot of Rupert Street, Vancouver, to cost $2,500,000. C. D. Howe & Co., Port Arthur, Ont., are architects.

Growth of the Port of Montreal

A splendidly illustrated and printed book on the development of the only world port receiving ocean steamships located 1000 miles from the ocean, has been put out by the Harbor Commissioners of Montreal. It consists of 80 pages, mostly pictorial, but with a large amount of data covering operations of the port and, particularly, showing its rapid growth. In the seasons of 1924, 1925 and 1926 an average of more than 1000 transatlantic vessels each year arrived in the port. The annual tonnage of these ships averages a little less than 4,000,000.

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Profits By Diversifying Products

Moderate Size Plant Anticipates Disadvantage of Single Line and Extends Activities by Developing New Devices—Production Carefully Planned

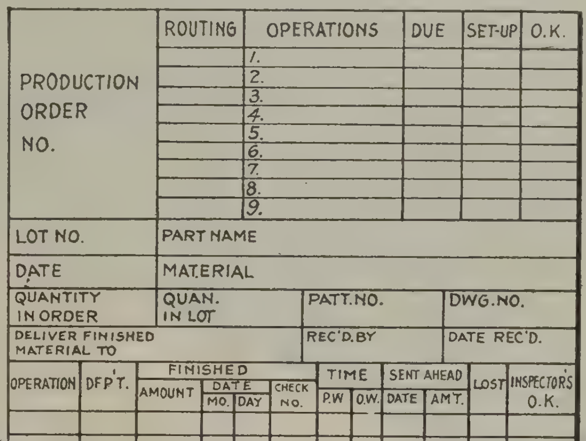
BY BURNHAM FINNEY*

EXCESS producing capacity has been put forward in the past few years as one of the chief ills affecting many industries. Some manufacturers have sought to meet this situation by diversifying their lines, and an increasing number have successfully adapted their plants for the manufacture of a multiplicity of products.

An example of a metal working plant of moderate size which has diversified its products and thereby attained volume of output without sacrificing profits is that of the Hobart Brothers Co., Troy, Ohio. To facilitate conception of the company's policy, it may be well to consider its history.

In the early days of the electrical industry, when the use of electricity for lighting was being introduced, C. C. Hobart, president of the company, saw the possibilities in electrically-driven equipment. In connection with his work in manufacturing and installing lighting plants, for instance, he saw the grocery clerk tiring himself grinding coffee by hand. An electric coffee mill was the result. After his business had grown substantially, Mr. Hobart sold his holdings and for a time left the electrical field.

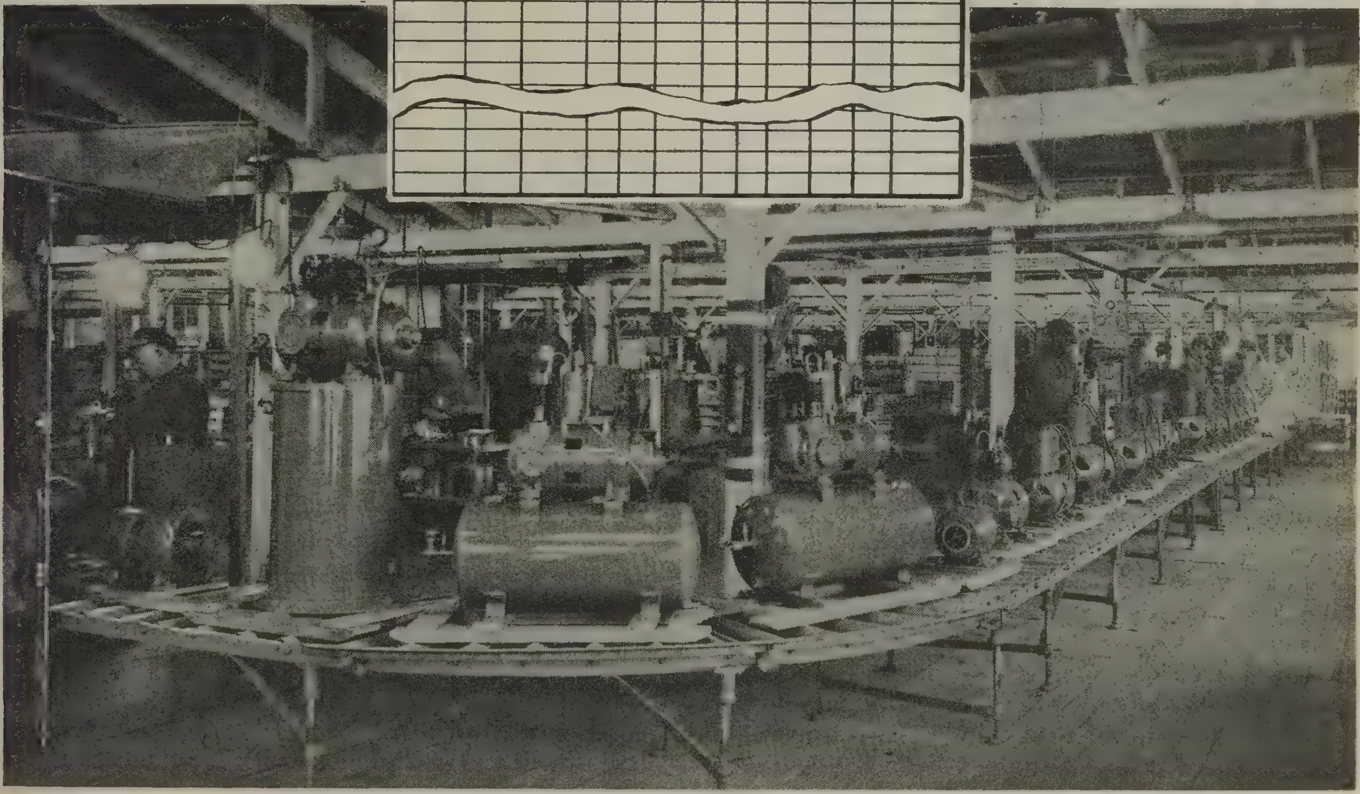
Meanwhile his two sons became enthusiastic at the prospect offered by electrically-driven devices. Soon after his graduation from college, one



PRODUCTION ORDER NO.	ROUTING	OPERATIONS	DUE	SET-UP	O.K.
		1.			
		2.			
		3.			
		4.			
		5.			
		6.			
		7.			
		8.			
		9.			

LOT NO.	PART NAME		
DATE	MATERIAL		
QUANTITY IN ORDER	QUAN. IN LOT	PATT. NO.	DWG. NO.
DELIVER FINISHED MATERIAL TO		REC'D. BY	DATE REC'D.

OPERATION	DFP'T.	FINISHED				TIME		SENT AHEAD		LOST	INSPECTOR'S O.K.
		AMOUNT	DATE MO.	DAY	CHECK NO.	P.W	O.W.	DATE	AMT.		



Material to Be Machined or Otherwise Processed Is Accompanied Through the Plant by the Card Shown. Roller Conveyors are extensively used. The view shows machines being conveyed from paint spray booths.

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*Resident editor THE IRON AGE, Cincinnati.

of the sons, Edward A. Hobart, opened an electric motor repair shop. One of his possessions was an electric automobile, and in order to charge the battery of the car he built a motor generator set to convert to direct current the alternating current provided by the municipality. With the generator working successfully, other owners of electric automobiles began to bring their cars to Mr. Hobart to have the batteries charged.

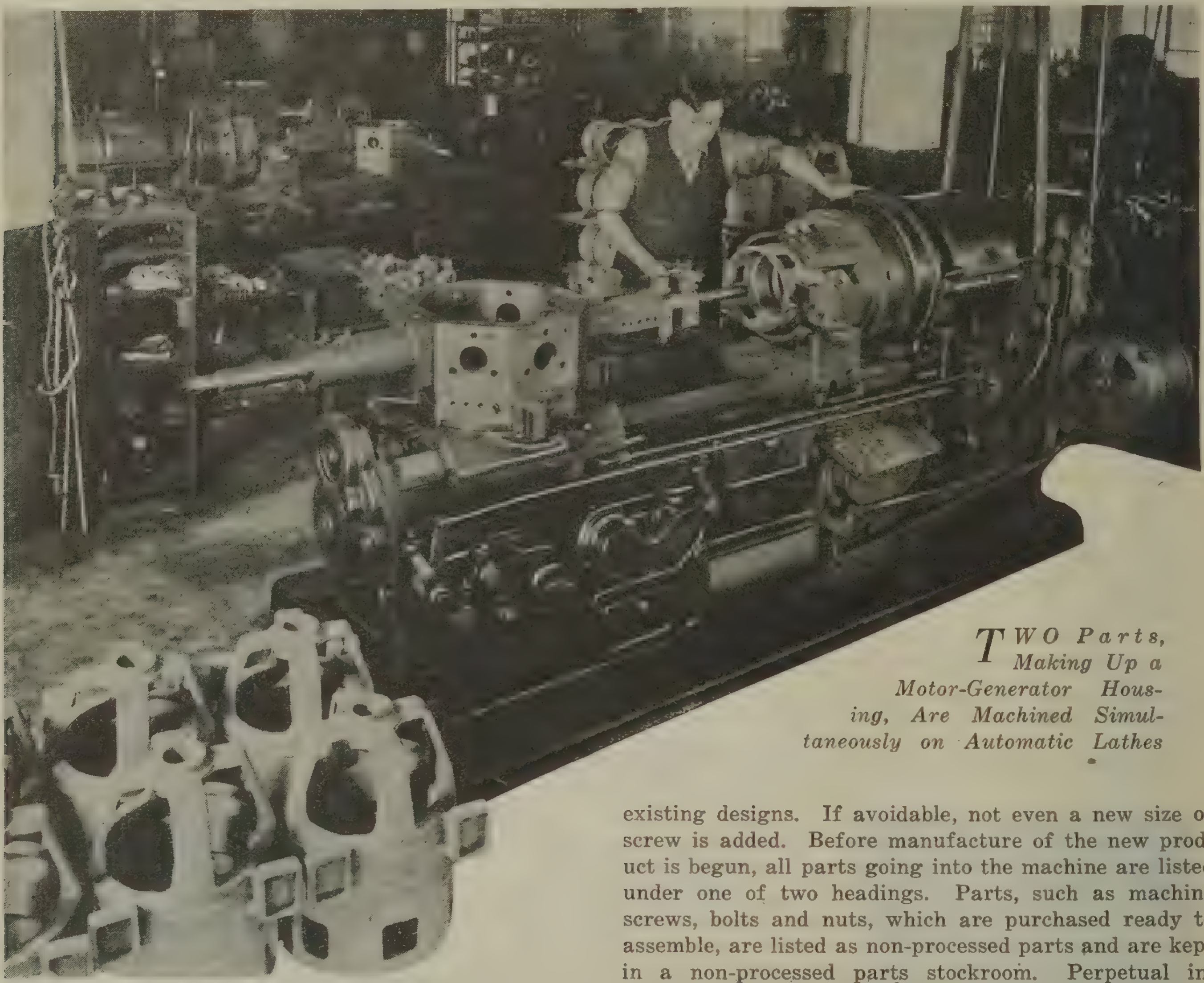
At that time the electric starter for gasoline automobiles was just coming on the market, and the owners of such cars with that device also wanted their starter batteries charged. Realizing the field that was opening up, Mr. Hobart, with his brother, William H. Hobart, began an advertising and sales campaign which caused their motor-generator manufacturing business to grow rapidly.

Foresees Danger in Dependence on Single Product

In 1916 E. A. Hobart saw danger ahead in being entirely dependent upon a single product, the use of which was limited and for which substitutes were appearing on the market. He was convinced that the automobile industry offered unusual possibilities and that the thing to do was to add another commodity which would be of service in the field in which the company had already become known. Accordingly, he began development of a small air compressor which, after four years of experimental work, was ready for the market. Being familiar with automobile construction, Mr. Hobart conceived the idea of utilizing the rear axle spiral bevel drive on an air compressor and put the idea into practice.

Having built up two different products, the company did not hesitate to add others as the needs of garages and automobile repair shops expanded. The result is that the Hobart Brothers Co. today manufactures 30 items and sizes of equipment. The principal products are: Motor generator sets for battery charging, for motion picture show arc lights and for arc welding; air compressors for tire inflating, paint spraying and for industrial applications; battery testing equipment; electrically-driven grinders; automobile starting motor and generator testing equipment; and car washers.

Control of the material and parts required to make such a variety of products has presented many problems, and close cooperation between different departments has been essential. In designing a new product, the engineering department takes into consideration the items already manufactured by the company and makes as many parts as possible interchangeable with existing designs. If avoidable, not even a new size of screw is added. Before manufacture of the new product is begun, all parts going into the machine are listed under one of two headings. Parts, such as machine screws, bolts and nuts, which are purchased ready to assemble, are listed as non-processed parts and are kept in a non-processed parts stockroom. Perpetual inventory is kept of this stock by means of a visual index filing system. Parts on which machining or any other work is required before they are ready for assembly are classed as processed parts. This material is started through the necessary operations by the production department, a production order card accompanying it. This card, reproduced herewith, specifies the routing and lists all operations. Space is provided on the lower part of the card for entering the daily production records. Upon completion of machining or other operations, the parts are sent to finished stock storage bins along the assembly line, each part being stored adjacent to the point where it will be assembled.



TWO Parts, Making Up a Motor-Generator Housing, Are Machined Simultaneously on Automatic Lathes

With approximately 2500 different items of material going into products on which about 7000 operations are performed, accurate records are essential. All records are headed with the number of the drawing, the number being so devised that an employee who has been in the factory only a short time gets a clear conception of what a particular drawing number covers. To make this clear: Suppose *A* indicates a certain bore and size of housing, in this case 8-in., and *P* is the

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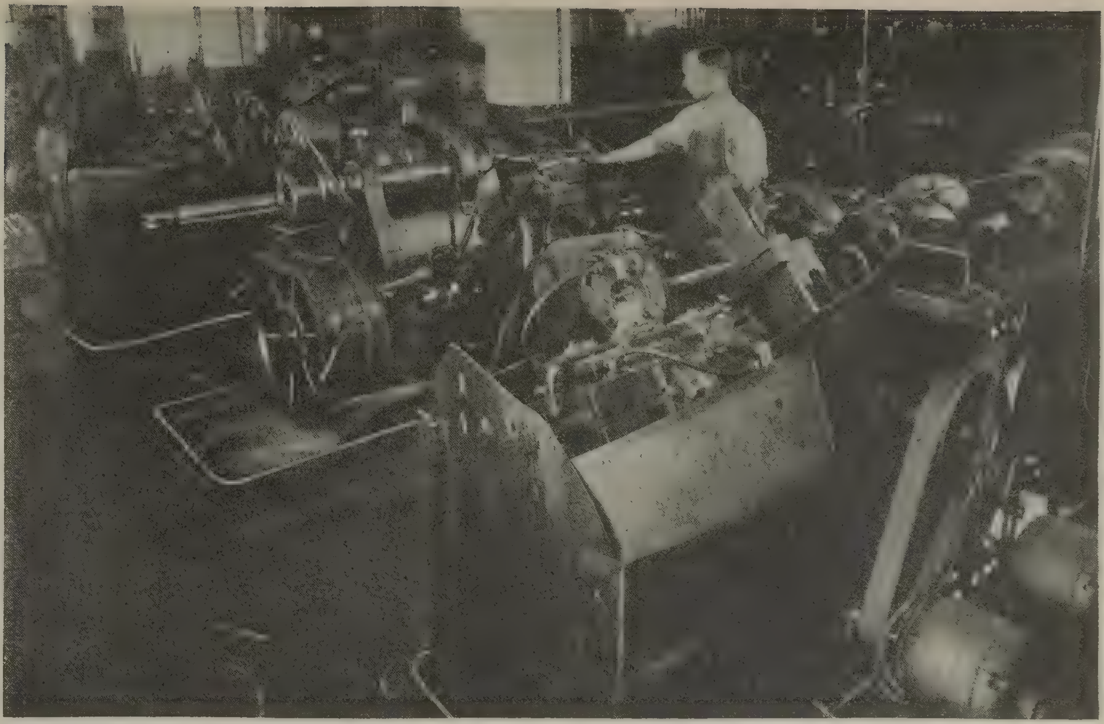


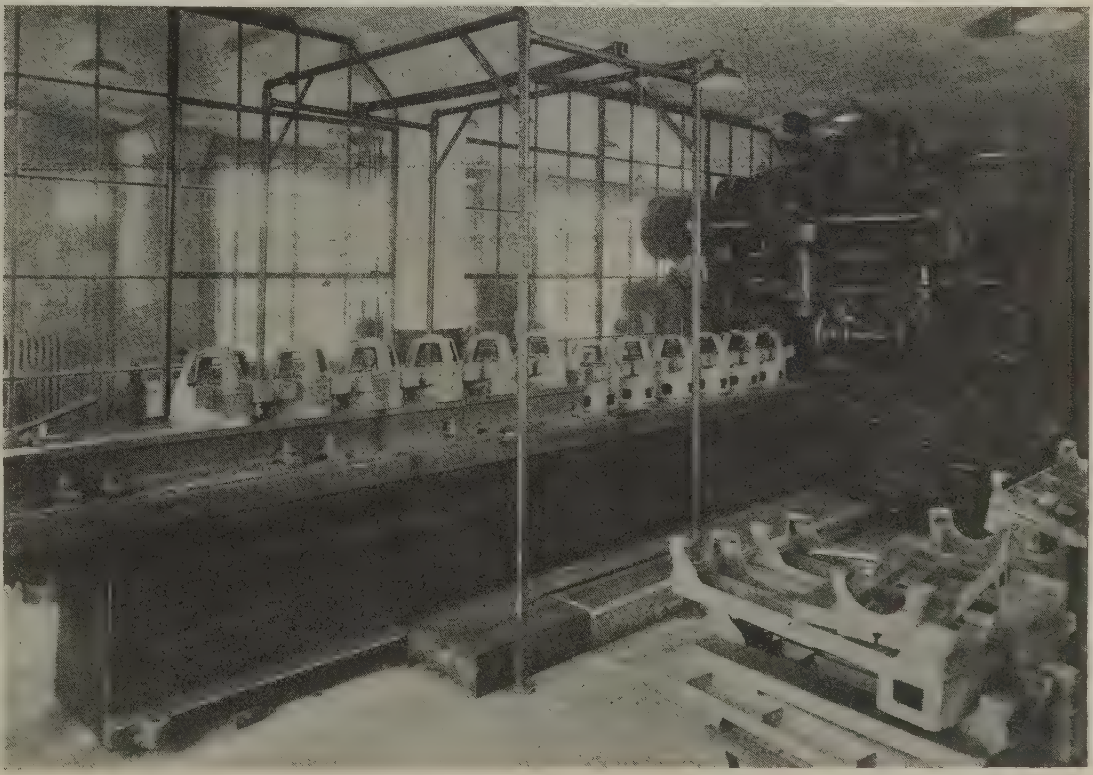
MOTOR - Generator Shafts Are Machined on Gridley Automatics. One end of the shaft is finished, ready for grinding, on the unit in the foreground, and the other end of the shaft is finished on the second machine

symbol for compressors. Therefore in seeing the symbol *AP*8, the workman knows that the subject is an 8-in. bore compressor part. The pattern number is the same as the drawing number, and all operations on the piece have the drawing number as a prefix. For example, *AP*8-1 would be the first operation on piece *AP*8. With this simple system, it is possible for many employees to know the drawing numbers of a great many parts, and consequently the numbers of patterns, jigs and operations.

With a diversity of products the problem of material handling is less easily solved than in a plant engaged in mass production of a single commodity. Mechanical conveying has been worked out successfully, despite the fact that in planning for it there arose difficulties which ordinarily do not occur. In order to bring about economies by the use of conveying equipment, it was necessary to arrange departments so that consecutive operations would fall in logical order and material move along a straight line from one operation to the next. Where roller or belt conveyors could not be utilized to advantage, lift trucks and platforms were substituted. The company has made a strict rule that nothing is to be piled on the floor, platforms or skids being used for the temporary storage of material in process. In this way material can be moved instantly.

Use of Modern Equipment an Established Policy

One of the major factors in maintaining a high standard of quality of product and in effecting manufacturing economies has been the installation of modern machine tools. Practically all machines are individually motor-driven and are specially equipped for certain work. The two parts that make up a motor-generator housing are machined simultaneously on automatic lathes, which, in addition to reducing the cost per piece, have permitted closer accuracy than previously. Air compressor crankcases are milled in one operation on an Ingersoll milling machine, equipped with three roughing cutters and two finishing cutters which work simultaneously. Similarly, five cutters are used in milling motor-generator housings in one operation. For making motor-generator shafts a number of Gridley automatics have been installed. One machine finishes one end of the shaft ready for grinding.



AIR Compressor Crankcases Are Milled in One Operation. The machine is equipped with three roughing and two finishing cutters. Similarly, five cutters are used in milling motor-generator housings

As soon as this operation is completed, the shaft is put in the second machine and the other end is finished.

Cooperation of Employees Fostered

While efficient control of production, installation of a simple system of keeping records, setting up of mechanical conveyance for transporting material and use of modern machine tools have contributed to the solution of the problems presented by the manufacture of a multiplicity of products, the most important factor has been the human element. To keep each employee interested in his work and to have him take pride in that portion of the product for which he is responsible has been the goal set by the company. To do this, different wage systems have been instituted in different departments. Varying conditions throughout the plant make undesirable a uniform wage system for all departments. Instead the management has tried to see that each man, judged by his natural ability, by his training and by his productive capacity, receives the highest pay to which he is entitled.

Foremen have been recognized as key men in maintaining contacts between management and employees. In every department hangs a sign giving the name of the department and the name of the foreman in charge. Beneath the sign is the slogan, "Quality—First and Always." The signs have a splendid psychological effect in creating in the foreman a fine sense of responsibility and in making him properly feel that he is important in the eyes of the management.

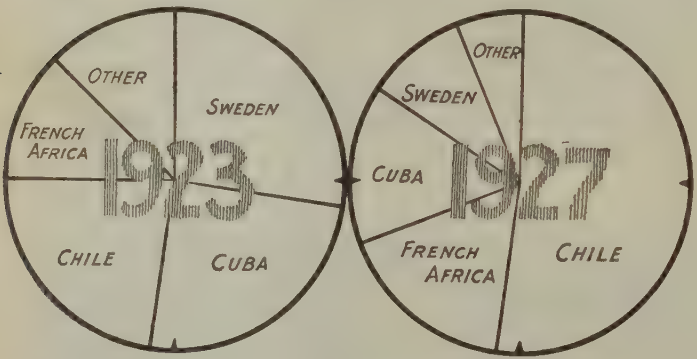
Foremen's meetings are held monthly. A few select employees other than foremen are invited to these meetings so that they may obtain first-hand knowledge of some of the problems confronting department heads. These conferences are conducted in the lunchroom of the plant and either a speaker is brought in or a round-table discussion is arranged. During the discussion each man has an opportunity of bringing before the group some of the difficulties he has encountered, and the discussions have been valuable not only in effecting cooperation but in bringing to each foreman the realization that his is not the only department, an idea which is likely to take root if such conferences are not held.

The experience of the Hobart company serves to show how a plant of moderate size, during a period of intense competition and of over-production in many industries, has been able not only to keep the position which it reached years ago, but also to extend its activities into new markets by intelligently planning its production program and by developing, within profitable bounds, new commodities the demand for which has been created by constantly changing conditions in industrial life.

IRON ORE IMPORTS GAIN

Changing Sources of Supply Notable in Last Few Years

IMPORTS of iron ore into the United States in 1927 are reported by the Department of Commerce at 2,620,717 gross tons. This represents an increase of about 2½ per cent over the 1926 total and is the largest incoming volume since 1923. With that exception, it is the largest total we have ever brought in. Imports in December, at 131,837 tons, were far below the figure of a year earlier, and far below the November total. If the December incoming movement had been in accordance with immediately preceding months, the aggregate for the year would have come close to the 1923 record.



Chile has furnished more than half of the total iron ore imports each year for the last four years. This is in contrast with Chile's position in 1923, with less than one-fourth the total, and with a smaller tonnage than came from either Sweden or Cuba. This point is brought out clearly in the diagram, which shows the proportion of the iron ore imports from the four principal supplying countries in 1927 and in 1923. Sweden, which was first in 1923, has dropped to fourth position. Cuba, which was second in 1923, is now third. Chile, which was third in 1923, has advanced to first, and French Africa, which was fourth in 1923, is now second.

It will be noted from the diagram that the supplies coming from countries other than the four mentioned have dropped off markedly. This total of all other shipments was under 169,000 tons in 1927, against 345,000 tons four years earlier. Spain in 1923 furnished about 215,000 tons, and in 1925 and 1926 sent in more than came from Sweden. Shipments from Spain have fallen to about one-eighth of the 1923 total, accounting for the major portion of the shrinkage of imports from the countries not individually shown in the diagram.

Sources of American Imports of Iron Ore

(In Gross Tons)

	December		12 Months Ended December	
	1927	1926	1927	1926
Spain	......	1,196	27,165	83,608
Sweden	20,178	14,114	244,458	53,605
Canada	6,405	556	26,079	16,984
Cuba	29,500	50,000	392,113	539,000
Chile	61,500	111,000	1,369,200	1,364,400
French Africa ...	......	15,900	446,420	321,745
Other countries ..	14,254	12,269	115,282	176,099
Total	131,837	205,035	2,620,717	2,555,441

	Total Imports	From Chile	From Cuba	From Sweden
1927..............	2,620,717	1,369,200	392,113	244,458
1926..............	2,555,441	1,364,400	539,000	53,605
1925..............	2,190,697	1,113,900	535,130	141,324
1924..............	2,047,055	1,144,775	285,288	310,436
1923..............	2,768,430	634,600	692,979	749,765
1922..............	1,135,156	......	381,746	317,539
1921..............	315,768	......	123,222	143,234

Prizes Given for Accident Prevention Work

Stanley & Patterson, Inc., 150 Varick Street, New York, manufacturer of electrical products, was the winner of the 1927 metal manufacturers' industrial accident prevention contest, conducted by the Merchants' Association of New York. At a meeting held on Feb. 7 the employees of the Stanley & Patterson organization were presented with $100 in gold as a reward. The company employs 250 persons and operated its plant for 214,416 man-hours without accident.

Of the 50 companies participating in the contest, 22 operated during the four months ended Dec. 31 without a lost-time accident and were given certificates attesting their records. The American Safety Razor Co., employing 750, operated 577,368 man-hours with but two lost-time accidents and the Sperry Gyroscope Co., with 500 employees, had only two lost-time accidents with 326,561 man-hours of operation. These companies received honorable mention.

The M. A. Hanna Co., Cleveland, has been appointed exclusive sales agent of the Bulger Block Coal Co., with coal mines at Bulger, Pa.

Cutting Costs and Avoiding Accidents

Mechanical Charging System for Cupola Saves 66 Per Cent in Operating Charges—Injury Hazard Reduced

BY G. F. TEGAN*

A MECHANICAL cupola charging system which has been in operation in the foundry of the Union Switch & Signal Co., Swissvale, Pa., since last October has reduced costs for charging from $23.50 per day to $8 per day. But it is not merely in this economy, one of several which have resulted from the change from manual to mechanical charging, that the management of the foundry finds satisfaction. The new system eliminated an accident hazard. Under the former method of charging the raw materials, the bins were located alongside a railroad spur track, directly under the loading platform. While no fatal accidents occurred, it happened fairly frequently that pig or scrap from a loaded charging box which had been improperly placed on the platform fell within a few feet of the men working in the bins. Introduction of the new system grew out of the desire of the management to wipe out that danger.

This system is unique in that the storage bins are built into instead of above the ground and, besides the mechanical charging, there is only one handling instead of two, as in most installations, of the raw materials. A spur track runs over a trestle, under which are the coke and limestone bins. Delivery of these materials in hopper cars obviates a handling and incidentally effects a very substantial saving. The coke and stone gravitate into the bins and it is no longer necessary to have the coke delivered in box cars for protection against the weather, for which there is an extra charge of 50c. a ton or $12.50 per car.

Another track on the other side of the storage house serves the pig iron and scrap bins. This track is served by an overhead electric traveling crane, used also by the forging shop of the company, lying parallel to the foundry building. It is equipped with a magnet hoist, and the pig iron and scrap are lifted from the cars and lowered into the bins. This is a much shorter lift and a simpler operation than would be the case with superposed bins.

Coke and Limestone Are Delivered in Hopper Cars, Which Go Over the Trestle Under Which Are Located the Bins. Scrap is delivered on the opposite side

Few would question the claim that it is actually a one-handling system. And it is a safe system, since by no conceivable way can any of the workmen be injured by falling loads. Proof of this is found in the fact that men who formerly either refused to work or worked unwillingly about the bins are really eager to work in the new bins, which are well removed from the radius of the charging bucket.

The system was the idea of the Union Switch & Signal Co. which made the drawings. The Webb Engineering Co., Oliver Building, Pittsburgh, was the contractor and made the detail drawings.

There are nine storage bins in all, five for pig iron

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*THE IRON AGE, Pittsburgh.

To Permit Entry of the Large Charging Bucket, the Cupola Has Been Cut Away at the Charging Door. The hoist operator, by cable from the cage, releases the charge by opening the bottom of the bucket

and one for scrap on one side of the scale car pit, and two for coke and one for limestone on the other. The bins all have sloping bottoms, to give gravity movement of the materials to within easy reach of the loaders. The iron and scrap bins are open, while those in which the coke and stone are stored are gated to control the flow more easily, which is rapid on account of the use of heavy sheet steel as a covering for the bottoms. The floors of the iron and scrap bins get additional support, as well as resistance to the abrasion of the metals, from use of imbedded 20-lb. rails inverted. The structural steel and concrete bin house is of rugged construction. It is 90 ft. long and 45 ft. 3 in. wide, and is 21 ft. deep at the level of the scale car pit, which is approximately 6 ft. below the bottom of the bin floors. The iron and scrap bin doors, which serve also as a roof, are of heavy corrugated galvanized sheet steel.

The scale car, with automatic measuring devices, was furnished by the Atlas Mfg. Co., Cleveland. On it is placed a steel bucket capable of holding 4000 lb. of pig iron and scrap, 400 lb. of coke and 65 lb. of limestone. Nothing could be simpler than the making up of this charge, with scale bell to warn the operator when the correct amount of the several materials has been let down into the bucket. The charge made up, the scale car moves to an opening at the end of the bin building. Here the bucket is lifted by a 3-ton hoist, built by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., and conveyed by monorail to the cupola, where the hoist operator, without leaving the cage, unloads the charge.

As is true in all foundries where mechanical charging has replaced manual effort, the cupola in this plant has been cut away at the charging platform to permit the entry of the larger charge. It is interesting to note that the charging platform in this foundry, formerly littered with charging boxes and reserve supplies of materials and equipment, now is as clear as the deck of a warship on inspection days. The change in the system has released considerable space for other uses. The new system is so thorough and dependable that it is not necessary to keep a supply of coke or metal at the charging opening of the cupola.

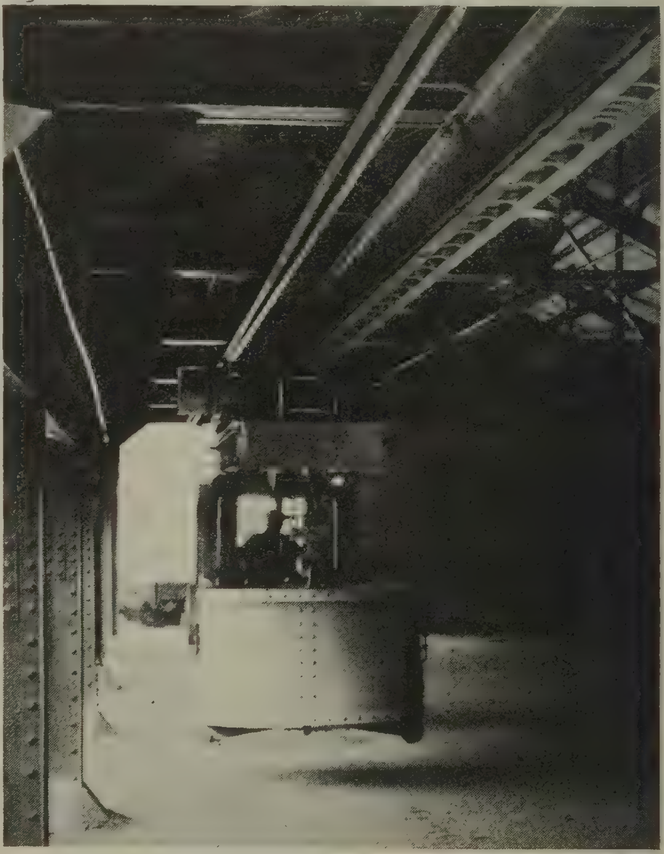
Definite Measure of the Savings

Based on 300 working days a year, the cost of handling materials to the cupola under the old system was $23.52 a day ($7,056 a year). Under the new method, it is $8 per day or $2,400 per year, which is an indicated annual saving, at 300 working days, of $4,656 a year.

The foundry consumes 65 cars of coke a year. The old cost of unloading cars on the platform was $35 a car or $2,275 a year. It now costs only $1.20 a car to perform the same operation, or $78 a year, a saving under the new system of $2,197 annually. There is in addition a saving of about 100 tons of coke a year, valued at approximately $700, which was lost in handling. And in taking coke shipments in hopper cars instead of box cars there is the saving of 50c. a ton, which on 65 cars of 25 tons each amounts to $812.50 a year.

Unloading three carloads of limestone, the usual yearly consumption of the company, formerly cost $35 a car or $105 a year. It is now being done for $1.20 a car through the use of the trestle, a saving of $102 a year. It was formerly necessary to maintain 48 boxes for handling metals, at $18 each a year, or a total charge of $864, while 25 boxes now suffice. At the same upkeep charge the annual cost is $450, a saving of $414. The foundry is charged for the use of the yard crane at $8 an hour. It was formerly used 2 hr. daily; its use has been cut to 1 hr. daily, or a saving of $2,400 a year.

A careful checkup of the results during the first three months of operation discloses that total costs for the year will run about $6,000, under the new system, against almost $16,000 under the old method. Besides this indicated saving there has been a more uniform cupola charge and consequently an improvement in the quality of the metal.



Charging Platform Now Serves as a Lane for Passage of the Hoist Conveying the Charge

Training and Paying Executives

Development of Administrators and Ways of Compensating Them Considered at American Management Association Meeting

WHILE scientific management has concerned itself exhaustively with the methods of training, supervising and compensating workmen, it has not often become introspective and stopped to consider the problem of maintaining and regulating the executive personnel. The development of executive talent, incentives for and compensation of executives, as well as methods for pensioning the men of administrative departments whose age has diminished their usefulness, were dealt with at the winter convention of the American Management Association, held at the Hotel Roosevelt, New York, Feb. 6 to 10. New points of view in the training of men on the job were also brought out, and emphasis was laid on telling how rather than what to do during the training periods.

Training Young Executives

Dependability, vigor, resourcefulness and personal leadership were suggested by Dr. W. W. Charters, professor of education, University of Chicago, as the qualities which should be developed in the training of young executives. During a well directed training period it is possible to determine whether any of these attributes are lacking in an individual. If the subject does not respond to special training along the line in which he is deficient, it is usually possible to shift him into another department of the company and into duties which are not essentially executive.

Dr. Charters' paper was based upon an investigation of the methods used for the development of executive talent by various members of the association. He found that a number of companies continue to place much stress on actual classroom instruction. In many cases this form of teaching is supplemented by considerable practical experience in various departments of the company. Other firms have derived splendid results without any formal classroom work, and develop their future administrators by a well planned building up of executive knowledge with consecutive training in the different departments. In such cases the young man is permitted to sit in on conferences devoted to policy problems and other administrative functions, and is allowed considerable personal contact with the manager in charge of the department in which he happens to be located. Special administrative problems are assigned, and careful study is made of solutions suggested by the junior. Criticism of such efforts is frequently warranted, but Dr. Charters pointed out that praise should be forthcoming when deserved, as the student has no other way of definitely knowing what progress he is making. This also leads to self confidence, which, if not developed to an extreme, is a very desirable quality in the young executive.

The speaker emphasized the fact that the advancement of an executive is always more likely if a properly trained assistant is available to step into the job. In spite of the fact that a number of men feel that training young executives is only training them out of their jobs, this seldom occurs in a progressive and expanding institution. Better positions nearly always await the man who is able to train others to attend to his own work properly.

Incentives for Executives

That incentive plans for executives may be used to advantage in industry was brought out by the experiences of a number of companies as outlined at two sessions of the meeting. Yet discussion indicated that the application of any sort of universal plan might easily nullify possible benefits.

Howard Coonley, president Walworth Co., Boston, in outlining the plan used by that organization, stated that the company had made a success of its system largely through recognition of the fact that different classes of executives respond to different kinds of incentives. The better type of executive, Mr. Coonley pointed out, cannot be handed bonuses in the way they are given to shop workers. This is true partly because the product of the executive is somewhat intangible and cannot be set down immediately in dollars and cents. Yet a well regulated incentive plan for executives will have its effects on the earnings of a company, and the speaker brought out the fact that bonus methods used by the Walworth organization are expected to result in a material increase in profits within the next few years.

In a discussion of Mr. Coonley's paper, J. P. Jordan, industrial engineer, New York, opposed limiting incentives by set rules.

Pensions Are a Business Proposition

By pointing out that the payment of pensions to superannuated employees is a direct aid to management in keeping up efficiency, reducing accident hazards and lowering manufacturing costs, E. S. Cowdrick, industrial relations counsellor, New York, was able to place his plea for adequate pension plans on a practical business basis. "For this reason," he said, "it is probable that industrial pensions will be a permanent and growing form of business administration. At the same time it is likely that, with clear thinking on the subject, better administration and more adequate financing, pensions will become increasingly valuable to employers by raising efficiency and morale and by preventing the retention of superannuated workers on active payrolls."

Pension plans, the speaker stated, have developed rather recently in American industry. In surveying 248 plants he found that only five had had pension systems prior to 1900 and that 87 per cent of these companies had began pension payments since 1910. This growth was due partly to the increase in life expectancy. The increase, however, has not been offset by a lengthening of the working period, which, on the contrary, has grown shorter. The spread of education and the decline in child labor are sending workers into industry at a much higher age than was true in the past, and there is less work for the laborer who has grown old or has even come to late middle life.

Mr. Cowdrick stated that there are several theories underlying pension payments, notably the deferred wage theory, the supposition that the pension is a charitable gratuity and the conception that it is a reward for long and faithful service. "According to the deferred wage theory," he said, "money expended for pensions comes out of funds available for the compensation of labor and is merely part of the wages which might have been paid to the worker during his productive years. If this theory were accepted there would arise at once a moral question as to the right of the employer to withhold any part of the wages due to employees and then to restore the money only to those who, by longevity and continuity of service, fulfill the pension requirements." He rejected this objection, however, because a company is not forced to pay the pensions in order to hold and secure a labor force.

The keen manager asks a stronger reason than charity for the payment of such pensions, and will not accept the theory that a reward must be paid for long service. If this were the only reason for pensions it would be cheaper to secure new employees at stated intervals. But upon realizing that paying pensions increases the morale of the worker and decreases labor turnover, thus

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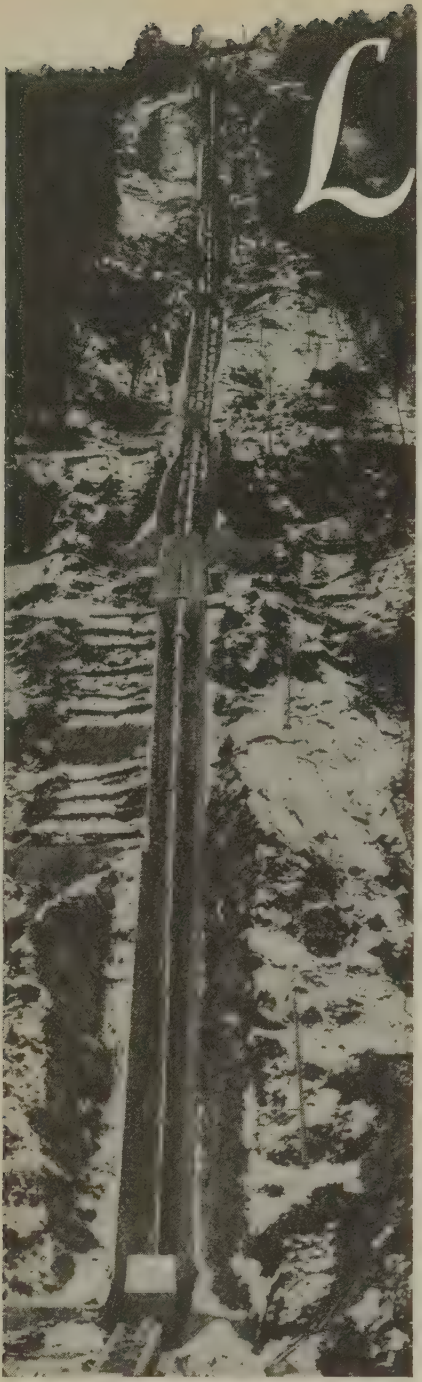

Large Pipe for High Head Made by Arc Welding

Penstock for Japanese Hydroelectric Plant Made of Bent Plates, Longitudinal Joints Welded by Hand

BY T. UJIIYE*

SINCE the end of the great war, striking progress has been made in Japan in the scientific study of electric arc welding as well as in practical applications. Its utilization is becoming more popular year by year.

Modern, highly scientific welding is exclusively employed in the construction of important strength members of pressure vessels at the three dockyards of Mitsubishi Shipbuilding Co., Ltd., located at Kobe, Nagasaki and Hikoshima.

One of the earliest applications of welding on a large scale was the construction of a 1942-ft. penstock at our Kobe works for the Azumi Electric Power Co., Ltd. This penstock was built in 1924 for their Nakafusa No. 4 power station in Nagano Prefecture; it was the first penstock built by means of electric arc welding in Japan, and its successful operation proves the soundness of the design and manufacturing methods.

The dimensions are as follows: Total length of the penstock, 1942 ft.; upper riveted portion, 796 ft. long; lower welded portion, 1146 ft. long; maximum statical head, 1031 ft. The welded portion is in two sizes with a reducer at the middle part of the line, the upper section being 625 ft. in length by 42 in. in diameter includes pipes numbers 1 to 31, and the lower highest pressure section 521 ft. in length by 39 in. in diameter.

Individual sections of pipe were made 20 ft. long; plate thicknesses ranged from ½ in. to ⅞ in., as shown in the accompanying table.

Manufacturing Procedure

Flat steel plates were cut to shape by guillotine shear, and the edges were milled to the correct bevel as shown in the figures. Then the plate was bent to the required semi-circle by means of a mast roller. Two plates formed the pipe; with a temporary band outside and an inner core at each end, it was then welded on specially designed roller saddles. Each piece has two longitudinal welds, diametrically opposite.

After having properly prepared the edges of the plate and assembled the joint, a light tack weld or initial layer weld was made at 8-in. intervals along the outside of both seams. The welder then made a complete weld between the first two tacks. He then omitted three spaces and welded between the fifth and sixth tacks, and so on, until the end of the seam was reached. This process was again repeated by starting between second and third tacks, skipping three, and so on, until the whole seam was welded. Finally, a finish or second layer weld was made on the initial light tack welds along the entire line to complete the work.

Cast steel flanges, approximately 4 in. x 3½ in. x 1¼ in. were then attached at each end by edge welds, as shown in Fig. 1. The routine of the work was about the same as just described for the longitudinal seams.

The anchor rings shown in Fig. 2 were bent from a straight bar, 0.66 in. x 4 in., and the ring was butt welded at the closure. Each was attached by a series of 3-in. corner welds alternating with 5-in. open spaces, the series on either side being staggered in position.

Pipe No. 53 has a T-branch welded on to lead to one turbine, while pipe No. 54, in addition to a similar turbine outlet, is closed by a domed end.

Each completed pipe was subjected to a hydrostatic pressure test ranging from 368 to 670 lb. per square inch depending on the thickness of the pipe wall, as shown in the table. The result was satisfactory; no welded places failed.

Electric Arc-Welded Steel Pipe for Azumi Electric Power Co., Ltd.

Pipe Number	Thickness, In.	Length, Ft.	Kind of Pipe	Max. Statical Head, Ft.	Max. Statical Pressure, Lb. per Sq. In.	Test Pressure, Lb. per Sq. In.
1 to 6	½	20	Straight	565	245	368
7	½	12	Straight	565	245	368
8	9/16	19	Bend	654	283	425
9	9/16	32	Expansion	654	283	425
10 to 15	9/16	20	Straight	654	283	425
16 to 22	⅝	20	Straight	744	322	483
23	⅝ x 11/16	32	Expansion	826	358	537
24 to 30	11/16	20	Straight	826	358	537
31	11/16	20	Straight	826	358	537
32	¾	19	Reducing	826	358	537
33	¾	40	Expansion	918	398	597
34 to 37	¾	20	Straight	918	398	597
38 to 43	13/16	20	Straight	1000	433	650
44	⅞	20	Straight	1031	447	670
45	⅞	19	Bend	1031	447	670
46	⅞	40	Expansion	1031	447	670
47 to 50	⅞	20	Straight	1031	447	670
51A	⅞	18	Bend	1031	447	670
51B	⅞	16	Bend	1031	447	670
52	⅞	5	Straight	1031	447	670
53	⅞	20	Straight	1031	447	670
54	⅞	18	Straight	1031	447	670

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*Welding engineer Mitsubishi Shipbuilding Co., Ltd., Kobe, Japan.

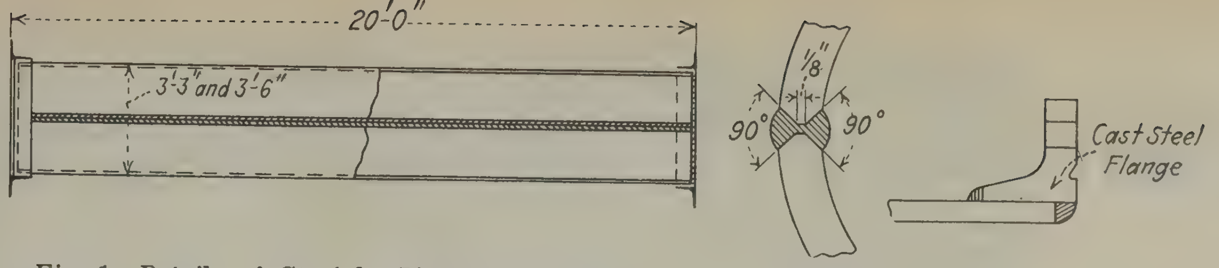


Fig. 1—Details of Straight Pipe. Each length has two longitudinal seams, double vee

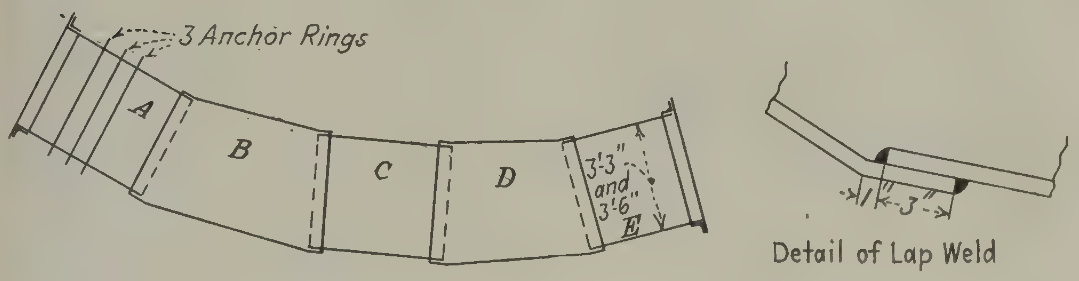
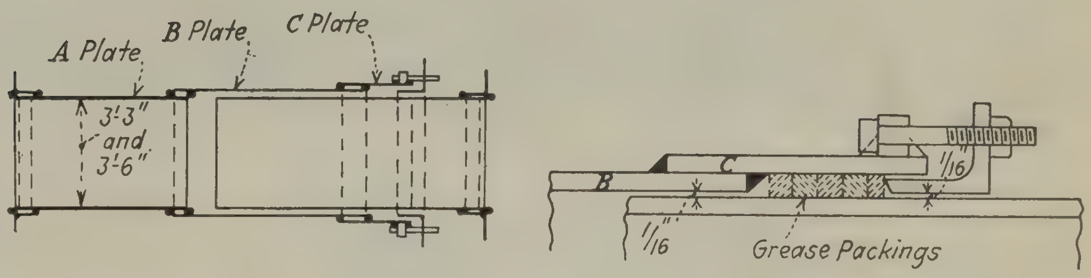


Fig. 2—Bends Are Made by Welding Straight Nipples Inside Flanged Connectors

Fig. 3—General Assembly and Details of Expansion Joint



Field joints between pipe sections were made by a series of 24 to 32 bolts, in size up to 1⅛ in. in diameter, depending upon the stress to be carried. All tests, including proof test on the completed line, were completed to the entire satisfaction of the customer; the work also passed the severe survey of the Japanese Communications Department.

Advantages of Welded Construction Listed

Experiences with this penstock indicate the following advantages of this type of construction: First, tight joints, metal solid against metal, can be obtained without punching a single hole in the pipe wall; second, the weight of the pipe can be considerably reduced below a riveted design, and the expense of punching and caulking is also eliminated; third, the diameter of the entire line was reduced by about 1½ in., because the internal friction caused by rivet heads is eliminated; fourth, continual inspection and caulking of leaks has been dispensed with; fifth, the appearance of the welded line is much better than a riveted one and lagging can be applied in a more economical way; sixth, after installing the penstock on the site, and passing water into it, no trouble or no stoppage has occurred; and seventh, in operation, the water is passed in a more satisfactory manner than ever experienced with riveted pipes.

All those who have been connected with this power project, or who have inspected this penstock, are of the opinion that it offers a positive demonstration of the advantage of electric arc welding in securing rigidity of pipe, low frictional resistance, less weight for transportation and installation, greater capacity for the turbines, smoother interior and exterior surfaces and freedom from corrosive tendencies. The Mitsubishi Shipbuilding Co. is confident that the process applied under strict supervision of technical engineers will give great economies and satisfaction.

Fig. 4—Pipe Sections in Testing Yard

Welding of Gun Metal

Hitherto it has been impossible to weld gun metal bronzes (90 per cent copper, 10 per cent tin) because the microscopic crystals of delta constituent existing in such castings cooled at a moderate rate will melt and boil out before the alpha solid solution, which forms the bulk of the alloy, reaches its melting point. The result is a concentration of tin next to the weld line, inducing brittleness, and a spongy zone just below, through which cavities rupture occurs at relatively low loads.

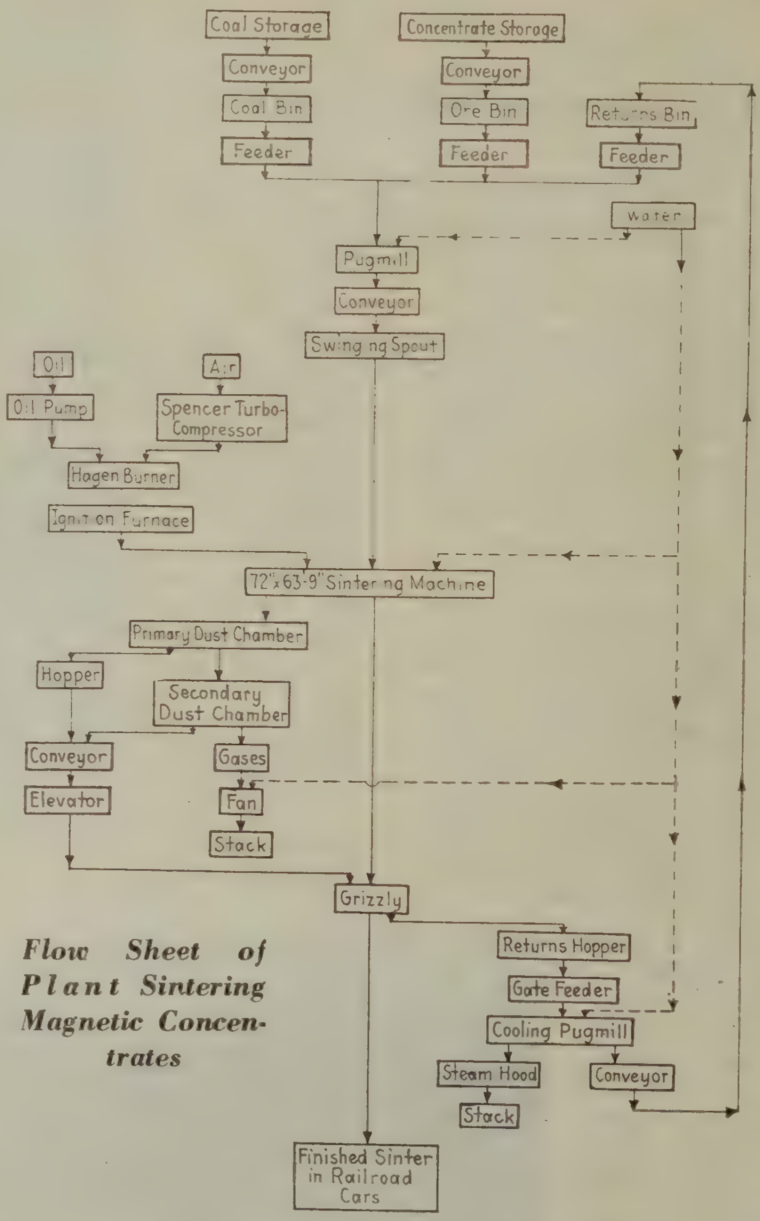
S. W. Miller, welding engineer, Union Carbide & Carbon Research Laboratories, in a paper to be read before the Montreal meeting of the American Society for Steel Treating, notes that this trouble can be avoided by heating the casting before welding to 1000 deg. Fahr., when the delta constituent changes to a higher melting, tough beta solid solution. After welding the rate of cooling should be about that of the original casting.

Sintering a Variety of Materials

Magnetic Concentrates and Iron-Bearing Ores Handled by Continuous Dwight & Lloyd Process

BY EDWARD J. TOURNIER[*]

CONTINUOUS sintering of ferrous materials was discussed, in many of its general aspects, at page 191 of THE IRON AGE for Jan. 19. The present article carries the subject forward into consideration of the possibilities of the process for two particular types of raw materials—magnetic concentrates and iron-bearing ores. The series will be concluded with a third article, to be published at an early date. A previous series of three articles, by the same author, covered intermittent sintering. They were published in THE IRON AGE of March 17, April 21 and July 14, 1927.


Coal Storage
Conveyor
Coal Bin
Feeder
Concentrate Storage
Conveyor
Ore Bin
Feeder
Returns Bin
Feeder
Water
Pugmill
Conveyor
Swinging Spout
Oil
Oil Pump
Air
Spencer Turbo-Compressor
Hagen Burner
Ignition Furnace
72"x63-9" Sintering Machine
Primary Dust Chamber
Hopper
Secondary Dust Chamber
Conveyor
Gases
Elevator
Fan
Stack
Grizzly
Returns Hopper
Gate Feeder
Cooling Pugmill
Steam Hood
Conveyor
Stack
Finished Sinter in Railroad Cars

Flow Sheet of Plant Sintering Magnetic Concentrates

Sintering Magnetic Concentrates

For a number of reasons the sintering plant of the Chateaugay Ore & Iron Co. is of considerable interest: First, it has in operation the largest continuous process machine ever built; second, it treats magnetic concentrates. The ore, which contains about 62½ per cent iron, is conveyed from a concentrator plant to a storage bin at the top of the sintering plant. Adjacent to the ore bin is a similar bin for anthracite culm, which is used for ignition. Both bins have American Ore Reclamation Co. revolving table feeders which discharge materials directly into a pug-mill, where they are mixed and moistened with water. The mixture then goes by belt conveyor to the swinging spout of the 72-in. x 64-ft. sintering machine. Sintering fuel is approximately 6½ per cent.

The sintering machine has a suction zone 6 ft. wide and 63 ft. 4 in. long, and has 84 pallets mounted on Timken roller bearing wheels. Each pallet is fitted with six grate bars. The driving mechanism consists of two sets of gears and an inclosed reducer. This arrangement brings the gears outside the machine frame, making them more accessible. It also takes them out of the path of sinter dust from the pallets. The machine has a capacity of 50 tons of sinter per hour.

Oil Is Used for Ignition

After the material has been spread on the grates by the swinging spout it passes under the ignition furnace, which is fired by oil. About 0.40 gal. of oil per ton of sinter is used. Air for combustion is furnished by a Spencer turbo-compressor. Air and oil, mixed in a Hagen burner at the side of the furnace, pass through a preheating coil directly into the combustion chamber of the furnace.

Combustion gases pass through cast iron tubes to a preliminary dust-settling chamber, where separation of the coarse particles is effected. The preliminary separator discharges into a hopper having double bell valves at the bottom. These valves are operated intermittently, the coarse dust being thus fed on to a belt conveyor, which takes it to a small belt and bucket elevator. The latter discharges the dust over a stationary bar screen on the discharge end of the sintering machine. The larger pieces are delivered to a railroad car and the fines drop into the return hopper.

The gases then pass into a centrifugal separator where the fine particles of dust are eliminated. The dust separator is connected to a center-plate fan, 100 in. in diameter, having a capacity of 60,000 cu. ft. of air a min. at 720 r.p.m. It is direct-connected to a 350-hp., 2300-volt General Electric synchronous motor.

Sintering Iron-Bearing Ores

At blast furnaces where sintering plants are operated, the depletion of the flue-dust stock piles creates a condition which necessitates the employment of other materials that can be treated profitably. Such a con-

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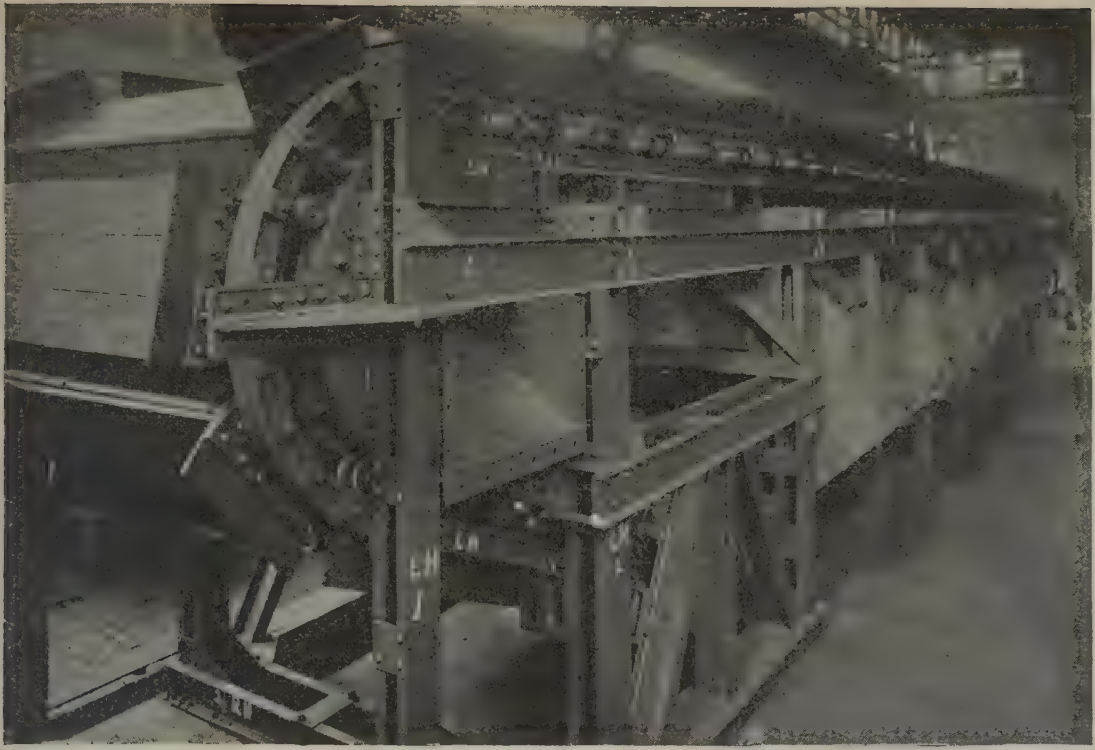
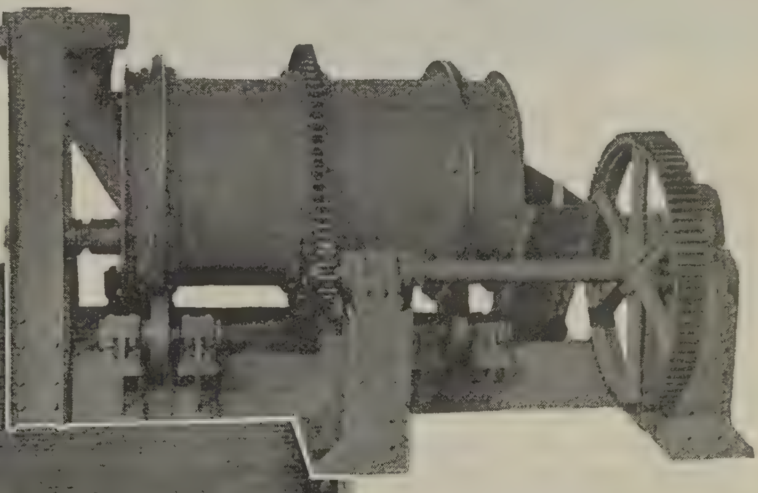
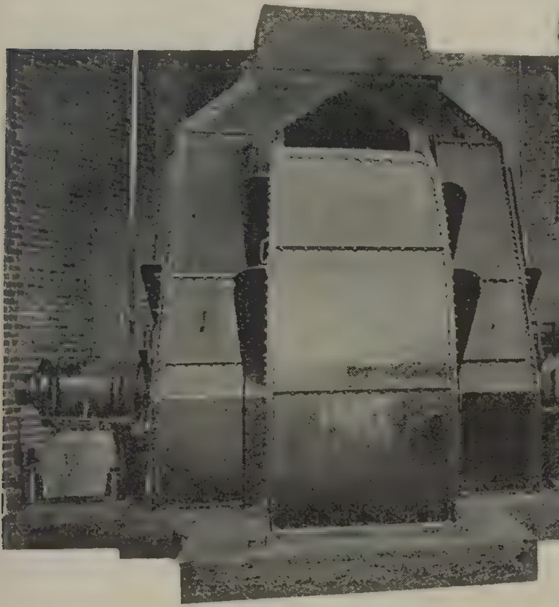
[*] Mechanical engineer, 110 Clinton Avenue, Clifton, N. J.



A NOTICEABLE Point About the Discharge End of the Sintering Machine Is the Absence of the Gap Between Pallets Existing on Older Designs. Both the top and the return sides are actuated by the sprockets at the drive end (shown at bottom of page)

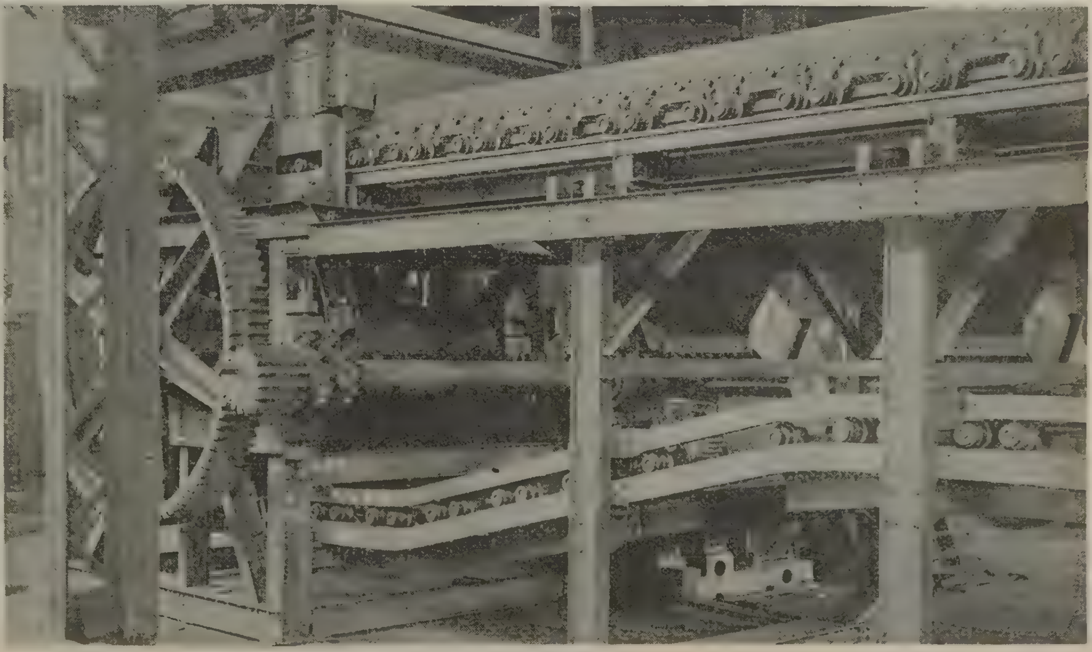
DOUBLE-INLET 100-*in. Center Plate Fan (Below) Is* 23 *Ft. from the Left-Hand Fan Bearing to End of Motor. It is* 12 *ft.* 6 *in. high*





TYPE of Pug Mill or Mixer (Above) Used for Materials Which Tend to Be Sticky. It is generally used in treating concentrates

DRIVE End (Right) of a 72-in. x 63-ft. 4-in. Sintering Machine. Note the absence of gear trains between top and bottom strands of pallets. The distance from floor to top of pallets is about 11 ft. 9 in.



Non-Deforming Steels Require Care

Heat Treatment to Prevent Cracking, Warping, Soft or Brittle Skin, and to Get Desired Hardness and Exact Size

BY W. PAUL EDDY, JR.*

THERE are two important classes of so-called non-shrinking oil-hardening tool steels. The first and older type contains usually 0.85 to 1 per cent carbon, and 1.50 to 1.75 per cent manganese; some brands also have 0.15 to 0.25 per cent vanadium. The second type is a later development of the simple manganese oil-hardening steel. It contains the same amount of carbon but about one-half per cent less of manganese than the older steel, and has approximately 0.5 per cent each of chromium and tungsten; some brands of this type also contain a small amount of vanadium. The phosphorus, sulphur and silicon in both types are kept as low as is practicable. Both steels are made in either electric or crucible furnaces, principally in the former.

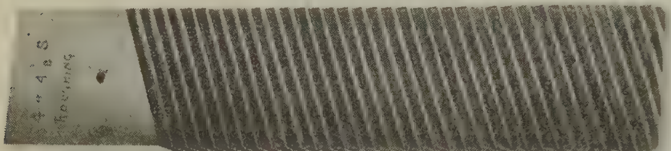


Fig. 1. Hand Broach Made of Straight Manganese Steel, with Vanadium. Hardened in salt bath at 1500 deg. Fahr. Ground on cutting edges only

It appears that the chrome-tungsten type is very slowly displacing the straight manganese. The newer alloy seems to have as small a volume change in hardening as has the older, and in addition to have somewhat better cutting qualities. It is true, nevertheless, that in a great many applications the two steels may be used interchangeably.

They are much used for gages—in plug gages they are generally conceded best among the tool steels so far as wear resistance is concerned. They are widely used for stamping and blanking dies, thread-rolling dies, hobs, taps and broaches. It perhaps goes without saying that many of the applications are for master tools or dies which, owing to complicated design or to lack of special equipment, are inconvenient or impossible to grind after hardening. Yet a successful product cannot be produced consistently without very careful handling and knowledge of the peculiarities of such steels.

Procedure to Avoid Cracking

Both these steels, and especially the early manganese type, are far from immune to cracking. To overcome this hazard, we apply the same principles used for other steels: (a) re-annealing, before hardening, any tools of very complicated design or on which much work has been done; (b) careful design, to eliminate so far as possible immediately adjoining thick and thin sections and sharp corners and angles; (c) careful inspection of the steel for defects; (d) slow, even heating of the tools, using preheats whenever possible; (e) careful quenching; (f) tempering soon after quenching; (g) annealing, whenever rehardening is necessary.

Of course, there is no steel which is absolutely non-deforming in heat treatment. The difference in volume change between these steels and most other tool steels is one of degree only. Non-deforming steels have very low volume changes after correct heat treatment.

Although these steels scale somewhat less than plain carbon steels, they show a marked tendency toward forming a soft skin during hardening. With ordinary methods it will often be found that a file easily digs into the surfaces to depths which may vary from 0.001 in. to 0.005 in., depending upon the size of the tool, the method used and the care exercised. It must be remembered that the slightest skin softness may be fatal to precision tools which probably are not to be ground.

Non-deforming steels transform with comparative sluggishness when passing through the critical range during heating. They require considerably longer times of heating than do plain carbon steels. This means that the opportunity to decarburize or to scale is increased. It is sometimes found advisable to raise the hardening temperature in order to reduce the time of heating.

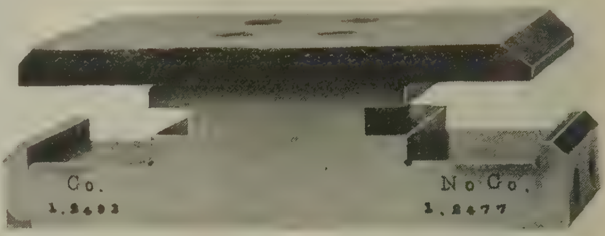


Fig. 2. Gage, Ground on All Working Surfaces. Made of same steel and hardened in same way as broach shown in Fig. 1

The real problem is to produce hard surfaces with as little distortion as possible. Since it is not to be expected that many heat-treating departments will have facilities for all methods of hardening, the results to be expected in the use of several methods will be discussed.

Open Fire and Muffle Liable to Produce Soft Skin

The open fire method, using either a gas-fired or oil-fired oven furnace, will produce fairly good results in the hands of an expert treater. Possibly the majority of tools, especially the larger ones, made of oil-hardening steels are hardened in this way. It is probable that the chemical compositions of these steels were developed largely by experimentation in this type of furnace. The rate of heating therein is about correct to produce minimum distortion of the hardened and drawn tools. With the class of tools which we are considering, however, it is imperative, as has been said before, that scaling or decarburizing be practically nil; therefore success depends upon the expertness of the hardener.

Smaller tools may be hardened with fair success by using a muffle, such as suspending the pieces by hooks or wires in an empty crucible in a pot-type furnace. An alloy or even pressed steel pot may be used, although the life of the latter is comparatively short. This method, giving about the same rate of heating as the open fire, will cause but little distortion, but a good surface is at least as difficult to retain as in the semimuffle oven furnace, and the same reservations about skill of the workman apply. For both these methods the hardening temperatures recommended by the steel manufacturers, usually between 1425 and 1475 deg. Fahr., are suitable.

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*Metallurgist Geometric Tool Co., New Haven, Conn.

Pack Hardening Requires Slightly Higher Quench

Tools such as taps and plug gages may be packed in charcoal (some prefer a mixture of three parts charcoal and one part carburizing compound) in a steel pot heated in a cylindrical pot furnace. In this practice it is advisable to heat not more than two or three tools at a time; they should be of approximately the same size, and should be arranged, with the thermocouple, at the points of an equilateral triangle or of a square, with all objects equidistant from the walls of the pot and as near the center of the pot as is practicable. The rate of heating should not be rapid, else the tools will heat unevenly. A more satisfactory method of packing, especially when a variety of shapes must be hardened, is to use ordinary carburizing boxes in an oven furnace—automatic temperature control of the furnace is very desirable—using charcoal or the above-mentioned mixture. Slightly higher temperatures, namely, 1450 to 1500 deg. Fahr., should be used with either pack method.

These methods are entirely satisfactory at these temperatures for giving a good surface. From the standpoint of distortion, however, they are not very good, except for tools whose three dimensions are about equal. Tools such as taps, owing to the slower rates of heating and longer time of holding at heat, diminish in length and increase slightly in diameter. This change can be modified by varying the hardening and drawing temperatures, but this produces undesirable metallographic structures. Although steels containing vanadium may be able to withstand some variation in hardening temperature, such changes should be made with the utmost caution. Furthermore, even charcoal carburizes slightly at higher temperatures than 1500 deg. Fahr., often resulting in the formation of brittle surfaces.

A tap one-half to one inch in diameter, for example, may contract 0.0015 in. to 0.002 in. per inch of length when pack-hardened at 1475 deg. Fahr. If the temperature be raised to 1575 deg., the shortening will be reduced to about 0.0005 in. per inch, on an average. Further raising of the hardening temperature produces little or no change in the contraction. It may be said here that temperatures of 1450 deg. and 1550 deg. Fahr. in the open fire or muffle method would usually produce expansions in length of such taps of about 0.001 in. and 0.003 in. per inch, respectively, with no decrease in diameter.

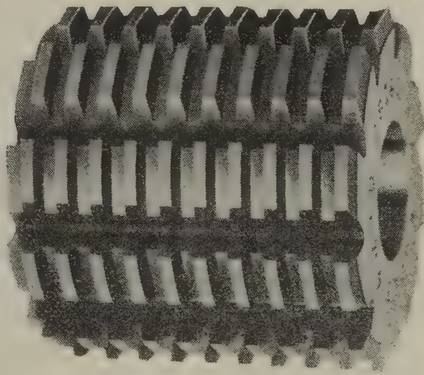


Fig. 3. Hob Mill Which Lengthened 0.0005 *In. per Inch After Heat Treatment*

Cyanide Baths May Produce Brittle Surfaces

One inevitably wonders if a bath method of hardening will prove satisfactory. A lead bath, if kept free from impurities, may give good results with very small tools, although it is not, in the writer's opinion, the most desirable for larger masses of oil-hardening steels, on account of its very rapid heating rate. Temperatures of around 1475 to 1500 deg. Fahr. should be used with a lead bath, even when hardening small pieces. Change of dimensions after lead hardening at the above range of temperatures are usually very small.

A commercial case-hardening bath using calcium cyanamid as the active agent produces good results on varied sizes of tools at about 1475 deg. Fahr., so far as distortion is concerned; the surfaces of the tools are not softer than the interiors, but if anything a trifle harder owing to absorption of nitrogen. However, the increased brittleness of the edges of a cutting tool is unquestionably undesirable. Attempts have also been made to use mixtures of commercial heat-treating salts and sodium cyanide; such mixtures have about the same characteristics as the cyanamid bath; the brittle surfaces in the hardened tools are usually even more pronounced; furthermore, it will be found very difficult to maintain a constant percentage of cyanide, and the limits for successful operations are narrow indeed.

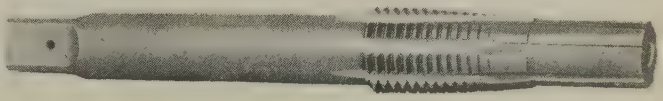


Fig. 4. Chasing Tap Which Lengthened 0.001 *In. per Inch After Heat Treatment*

Claims for Salt Mixtures Exaggerated

There are several salt mixtures on the market which are claimed to melt into baths that are perfectly inert to all steels. I have not worked with all of these baths; but upon considering only those with which I have had experience, it is my opinion that many of the claims are exaggerated. Some baths do not retain their property of neutrality for any great length of time; others never had it, at least for oil-hardening steels. Some baths require the use of rectifiers, purifiers or inhibitors, which, however, are usually only partially efficacious. These statements do not apply, of course, to all commercial salts; some apparently do what is claimed for them. All of the six or eight baths which I have tried for carbon steel hardening will, when properly used, practically eliminate scaling. The temperatures necessary for hardening tools of nondeforming steels in salt baths, to obtain the desired change in dimensions, are between 1450 and 1500 deg. Fahr. Some operators believe that a better surface can be assured by raising the temperature slightly and shortening the time of heating.

Lest the words "desired change in dimension" in the above paragraph seem foolish, the reader should remember that all tools should be tempered, and that changes of dimension may take place during the tempering operation as well as the hardening. Whatever the method of hardening, a contraction in length occurs during tempering at low temperatures. This contraction increases in amount with rising temperature until about 400 deg. Fahr. is reached, above which the rate of change decreases. Most tools of oil-hardening steels, especially cutting tools and gages, are tempered at from 275 to 375 deg. Fahr. As an example, if the hardening temperatures suggested above for salt baths and a draw of 275 or 300 deg. Fahr, for 30 to 60 min. are used, almost no dimensional change may be expected. But if, for instance, a slight expansion is desired, say 0.0005 in. per inch of length of a thread gage or tap, with the same hardness as before, the hardening temperature may be raised about 25 deg. Fahr. with reasonable hope of success. It is entirely possible to work out a schedule of temperatures and times for both hardening and tempering for the various sizes and shapes of tools treated, which, if careful control be exercised, will be surprisingly consistent in the results produced.

A final word of caution is advisable in regard to quenching: A comparatively gentle quench is sufficient to harden these steels, provided there is no surface change in carbon content during heating. A violent, swishing quench increases distortion and warping.

Recommended Heat Treatments

Fig. 3 represents a hob mill 2⅝ in. in diameter made of the later type of oil-hardening steel, containing manganese, chromium, tungsten and vanadium. This mill was not ground on the threads, but merely on the cutting edges, on the ends and the inside of the bore. This tool was packed in charcoal in an alloy carburizing box and heated to 1475 deg. Fahr. in an electric oven furnace equipped with automatic temperature control. It was withdrawn from the box by means of a wire, which had previously been attached, and quenched in oil with a slow, regular up-an-down motion parallel to the axis of the tool. It was drawn at 300 deg. Fahr. for 30 min. in an oil tempering furnace. This hob lengthened 0.0005 in. per inch.

Fig. 4 shows a chasing tap made of the same type of steel as above. This tool is a ¾ in. diameter, 12-pitch, Whitworth thread tap and was ground only on the cutting edges after hardening. It was pre-heated to about 450 deg. Fahr. and suspended vertically by a wire in a salt bath at 1525 deg. Fahr. and heated for 12 min. It was quenched in exactly the same way as was the hob mill and was drawn at 275 deg. Fahr. for 30 min. This tap expanded in length 0.001 in. per inch, which was desired.

Mining Engineers Prepare for February Meeting

Papers on the Open-Hearth, Blast Furnace and Special Steels— Fine Program for Institute of Metals

PAPERS on iron and steel will be much to the fore at the annual meeting of the American Institute of Mining and Metallurgical Engineers, Feb. 20 to 23, at the Engineers' Societies Building, 29 West Thirty-ninth Street, New York. An excellent program has been arranged.

The first session is scheduled for Monday morning, Feb. 20, at which Prof. William Campbell, Columbia University, will preside. The session will be devoted to alloys. "Critical Points in Chromium-Alloys" will be discussed by A. B. Kinzel, and he will include a description of a new type of furnace which may find a variety of applications in the future. Hugh O'Neill will present a paper on "Effect of Annealing on Cold-Worked Single Crystals of Silicon-Ferrite," and M. G. Corson will discuss "The Constitution of the Iron-Silicon Alloys," while C. R. Wohrman will present a paper on "The Heterogeneity of Iron-Manganese Alloys."

On the afternoon of the same day a session on special steels is scheduled and will be presided over by Dr. John A. Mathews. Robert Job will discuss "Types of Steel Used by Railroads, Past and Present," and C. W. Gennet, Jr., will present a paper on "The Manufacture of Some Foreign Rails." "Aircraft Steel" is the subject of a paper by E. A. Richardson, and Lloyd Jones, of the E. W. Bliss Co., Brooklyn, will discuss "Continuous Rolling of Sheets."

Sessions on Open-Hearth and Blast Furnace

A session devoted to the open-hearth furnace is scheduled for Tuesday afternoon, Feb. 21, L. F. Reinartz, chairman. "A One-Ton Acid Open-Hearth Furnace and Some Experimental Results" will be reported on by C. E. Meissner. This furnace was constructed at the Chrome Steel Works, Chrome, N. J. A. L. Feild will discuss "Rate of Carbon Elimination and Degree of Oxidation in Acid Open-Hearth Practice." The results of the study of the effect of temperature on the solubility of oxygen in iron will be presented by Dr. C. H. Herty, Jr., and J. M. Gaines, Jr. Prof. Enrique Touceda will discuss "Bailey Furnaces for Synthetic Pig Iron," and T. C. Bailey has taken as his subject "Electrically Heated Soaking Pits."

Wednesday morning, Feb. 22, will be devoted to the blast furnace, with Ralph H. Sweetser, American Rolling Mill Co., presiding. J. P. Dovel will describe what he has done to make the blast furnace a permanent structure instead of one that has to be periodically rebuilt at considerable cost in his paper, "Improvements in Blast Furnace Construction." W. R. Phibbs will describe some interesting special features in the operation of the blast furnace of the Columbia Steel Corporation at Ironton, Utah. "Gas Washing" is the title of a paper by A. J. Boynton, which he will supplement with observations based on his recent trip to Europe. "The Use of High-Alumina Slag in the Blast Furnace" will be discussed by T. L. Joseph and two associates. J. R. Campbell will give results on the cleaning of bituminous coal to reduce its ash content.

On Wednesday afternoon there will be a joint round-table conference of members of the iron and steel committee of the A. I. M. and M. E., and the American Foundrymen's Association, on the subject, "Blast Furnace Operations and the Character of Pig Iron and Castings." This will supplement the one held a year ago. Ralph H. Sweetser will be the chairman.

Howe Memorial Lecture

The annual Howe memorial lecture will be presented at 4 p. m., Monday, Feb. 20, by Henry D. Hibbard, consulting metallurgist, Plainfield, N. J., who will take as his subject "The Significance of the Simple Steel Analysis."

The annual banquet will be held Tuesday night at the Waldorf-Astoria Hotel, at which the following presentation of awards will be the feature: The Hunt gold medal to Dr. John A. Mathews, the Hunt prize to Dr. C. H. Herty, Jr., the J. E. Johnson, Jr., award to P. H. Royster, and the Saunders gold medal for achievement in mining to Herbert Hoover, Secretary of Commerce, and past-president of the Institute.

Varied Program of Institute of Metals

Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will hold several sessions, as is the custom, with the main society during the week of Feb. 20. The meetings will be held at 29 West Thirty-ninth Street, New York.

Tuesday, Feb. 21. 2 p. m. On Lead; R. S. Dean, chairman.
Wednesday, Feb. 22. 9.30 a. m. On Metallography; Zay Jeffries, chairman.
9.30 a. m. On Secondary Metals; E. R. Darby, chairman.
2 p. m. On Light Alloys; H. W. Gillett, chairman.
4 p. m. Annual Lecture.
6 p. m. Annual Dinner at the University Club.
Thursday, Feb. 23. 9.30 a. m. On Copper; W. H. Bassett, chairman.
2 p. m. On Precious Metals; G. F. Kunz, chairman.
Friday, Feb. 24. 9.30, 11 and 2; Sub-Committees of B-2, American Society for Testing Materials.

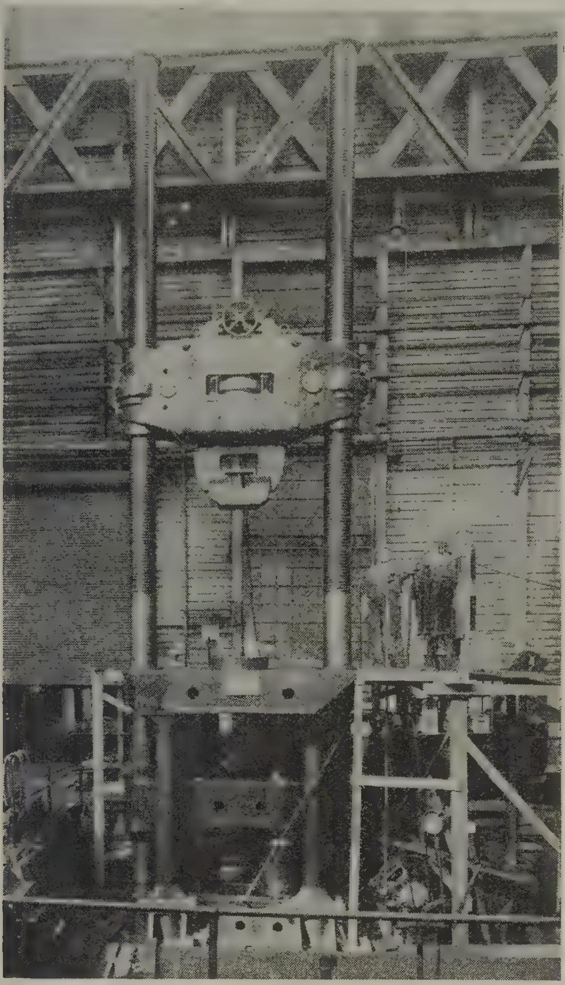
Prof. C. H. Mathewson of Yale University will deliver the annual lecture on the subject "Twinned Structure in Wrought Metals."

A feature of the annual dinner on Wednesday evening will be an intimate talk on the production of copper and copper alloys by W. H. Bassett, of the American Brass Co.

HYDRAULIC TESTING MACHINE

Universal Tests to Capacity of 1,000,000 Lb.—Designed for Car Frames

ANOTHER large testing machine of 1,000,000 lb. capacity has been completed by the Southwark Foundry & Machine Co., Philadelphia. It differs markedly from the machine of similar capacity described in THE IRON AGE of April 14. The new machine, which is from the designs of the Emery-Tatnall Co., was built for the Symington Co., Rochester, N. Y., and designed primarily for testing side frames, couplers, yokes and other parts of railroad car construction.



General View of the Machine, Showing Length of the Screws and Arrangement of Platen and Upper Crosshead

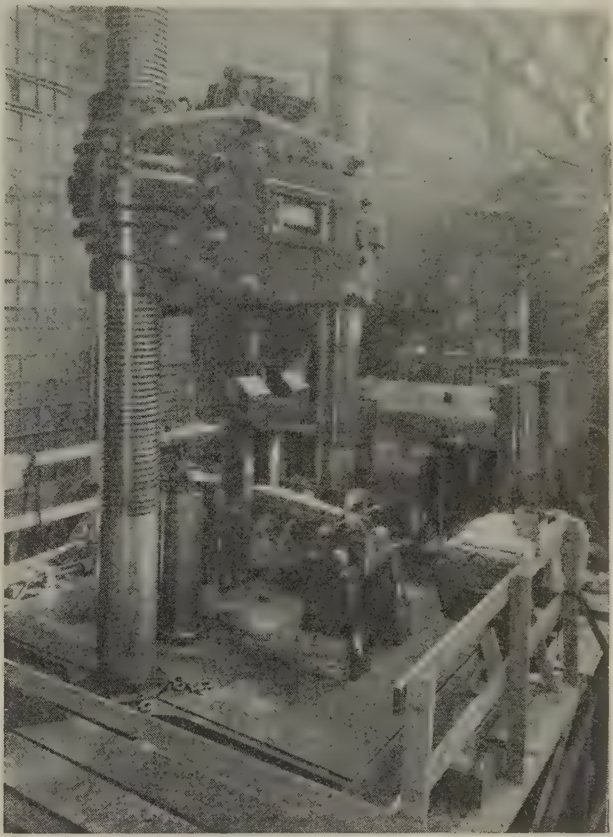
As the machine is available for both tension and compression, it is of the universal type. It has two columns in place of the four in the earlier machine, and operation is by means of four hydraulic cylinders where the earlier machine had but one. There is a clear distance between the screws of 7 ft. 1 in., the fixed bed or upper platen having a width somewhat greater than this and a length of 10 ft. Control and measuring apparatus are all on this platen, so that everything is under the hand of the operator.

One illustration taken in the erecting shop shows the machine set up with a side frame undergoing compression test. When erected in the laboratory this platen will be flush with the floor, while the lower platen, the hydraulic cylinders, etc., will all be in the basement.

Essentially this machine consists of a fixed bed carrying four hydraulic presses (18-in. plungers) and a moving yoke. This yoke consists of a crosshead between the presses, as shown in the general view. The crosshead carries the two 14-in. screw columns, which in turn carry the top cross beam containing the weighing apparatus. This beam is carried on the columns by means of two inclosed nuts which are driven by a motor and suitable gearing on the rear of the beam. This top beam, therefore, is adjustable on the columns. Its position is determined by using the motor and rotating the columns, but they are not rotated for placing stress on the test piece. Actual power for testing is given by the hydraulic presses below the table, which raise or lower the screw columns and the yokes as a unit.

These presses force the whole yoke, consisting of the two cross beams and the two columns, up or down as required. The columns slide through bushings near the bottom of the main bed. The weighting system consists of an Emery hydraulic support in the top cross beam. This support is connected with hydraulic indicators not visible in the illustration. The edge of the support is shown in the opening at the center of the massive beam.

The cast steel yoke in which the support is carried is balanced in such a manner that vertical loads in either direction on the upper platform or holder become loads of compression on the support. The view shows compression heads in place. These, however, are readily removed and spherical seated tension holders may be substituted for them. Hydraulic power is furnished with a motor-driven Hele-Shaw pump, oil being used in the hydraulic system. The reservoir holds 55 gal. of oil. As the ratio between the oil cylinder plungers and the effective pump area is about 500 to 1, the full 1,000,000-lb. capacity is obtained with an oil pressure of about 2000 lb. total, or some 1000 lb. to the square inch.



Machine Set Up for a Test. This view shows operating and recording equipment located on the table

Twentieth Annual Meeting of Institute of Metals

The twentieth annual general meeting of the Institute of Metals, which will be held in London on March 7 and 8, will include several interesting functions. The new president, Dr. W. Rosenhain, will be inducted into the chair by Sir John Dewrance, and will deliver his presidential address. Afterward 16 papers will be read and discussed. These include contributions from metallurgists in Germany, Japan and the United States, as well as Great Britain. The official program of the meeting includes a notable list of new members, 123 in all, which brings the membership close to the 2000 mark. It is striking to note what a large proportion of the new members reside abroad. Among the latest applicants for membership are André Citroën, the famous French motor car maker, and representatives of the French mint and ministry of marine.

DOUBLE-MAGNET LIFTING

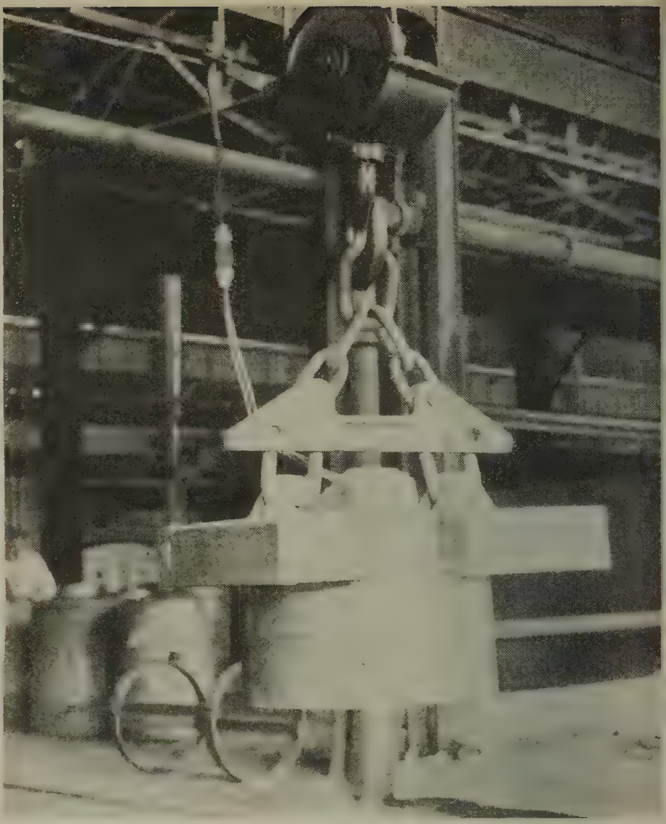
Two Magnets Obviate Expensive Binding of Strip Steel Coils

STRIP steel coils, before they leave the coiling machines at the Superior Steel Corporation plant, Carnegie, Pa., are bound with a single band around the middle of the circumference, and another across the center to hold the inside end of the strip. This is sufficient binding, as the coils are immediately piled on small trucks, and, in lots of 12, are carried to the annealing department. There they are transferred to buggies, the binding is removed and the buggies are pushed into annealing furnaces.

All of the coils, regardless of their weight, the thickness or width of the metal, are 28 in. across the outer diameter. Because of this, the center hole will vary betweeen 10 and 20 in. in diameter. The coils run from 1200 to 1800 lb. in weight, while the strip varies in width from 14 to 20 in. Every coil is bound in the same manner.

In the annealing department, two lifting magnets on a special spreader beam handle these strip steel coils. They were supplied by the Electric Controller & Mfg. Co., Cleveland. Either one of these magnets will lift the heaviest coil, if that coil is bound securely. But with the present simplified method of binding, the center turns of the coils will pull out under the pulling power of a single magnet. It was, therefore, a simple problem—two magnets versus more elaborate binding of every coil—the solution of which dictated the purchase of the two magnets.

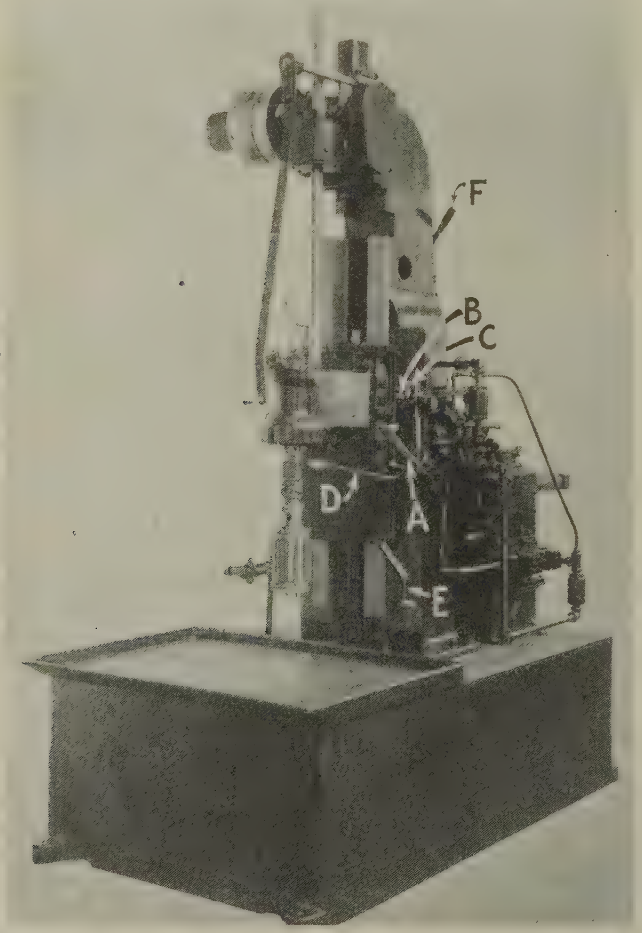
As stated before, the outer diameter of every coil is 28 in. The spreader beam designed for this job holds the two lifting magnets so that their centers are exactly that distance apart. This brings the center of pull of each magnet above the outer edge of the coil to be lifted. The major part of the lifting of a coil is done at the outer edges, so there is no tendency for the steel strip to come uncoiled. With two lifting magnets, the Superior company has done away with elaborate, expensive binding of coils on a job where, under any circumstances, the binding can be only temporary.



Lifting Coils of Strip Steel by Two Magnets, to Avoid Uncoiling Action Frequent When One Is Used

Single-Spindle Lapping Machine

For use where production requirements do not warrant the installation of a multiple-spindle lapper, and also for corrective lapping, the Moline Tool Co., Moline, Ill., is offering a single-spindle unit, designated as the No. 12.



Automatic Operation May Be Provided

The machine is available with or without the automatic feature of the company's multiple-spindle lapper, by means of which the spindle makes a predetermined number of strokes and then withdraws and stops. The accompanying illustration shows the non-automatic machine.

The base of the machine forms a reservoir and settling tank of about 2 bbl. capacity for the lapping compound. Steady flow of the compound on the lapping tool is maintained by a pump and system of piping which delivers the compound at the rate of about 30 gal. per min. The fluid drains into two drawers, which may be removed conveniently for cleaning. From the drawers it overflows into the first compartment of the base and then flows over baffle plates into successive compartments, from the last of which it is again pumped to the laps. A pan table, the working surface of which is 35 x 45 in., is bolted to the base for mounting suitable fixtures.

The drive may be either from a motor or a countershaft to the clutch pulley on the machine, from which the power is transmitted to the spindle through spiral and spur gears. The multiple disk clutch is operated by a lever which also operates a brake, stopping the rotation of spindle the instant the clutch is disengaged.

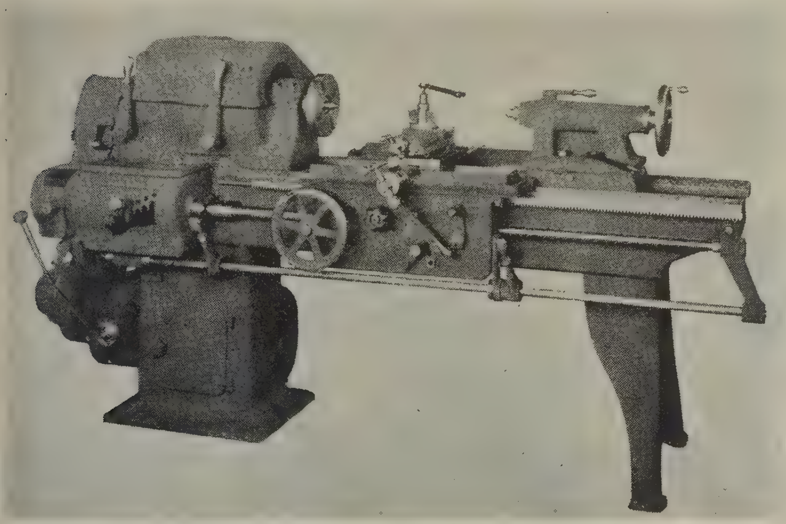
Reciprocations of the slide carrying the spindle are obtained by an Oilgear pump unit and are controlled by levers at the front of the machine. The stroke can be set for any length up to 24 in., and the rate of reciprocation can be changed by the adjustment of a valve on the pump. All reciprocating parts, such as the rail, slide and heads, are made of aluminum to minimize the weight of the reciprocating parts.

In the machine illustrated the slide is at the bottom of the stroke, but in the starting position the slide is up. To start the cycle of operations, lever *A* is pulled down, causing the slide to travel down to the position shown where pin *B* strikes knock-out *C*, reversing the direction until pin on lever D strikes knock-out C, again repeating the working cycle. To remove the lap from the work, the lever D is pulled down, the knock-out pin passes the knock-out, and the slide travels upward until pin E throws lever A into the neutral position. The machine is equipped with a One Shot centralized oiling system, which is operated by the lever F.

The slide can be set to give a maximum distance of 47 in. from the spindle nose to the table. For motor drive, a 5- to 7½-hp. 1200-r.p.m. motor is recommended. The shipping weight of the machine is approximately 6900 lb.

Multi-Speed Lathe With Four Highest Speeds from Gear Box on the Leg

The Chard Lathe Co., Newcastle, Ind., has brought out a multi-lathe, arranged so that the four highest speeds are obtained from a gear box on the leg of the machine, without use of any of the gears in the headstock. Eight additional speeds are obtainable through the headstock when heavy cutting is desired. The lathe may be driven either direct from a lineshaft or from a motor.



Eight Additional Speeds Are Obtainable Through Headstock Gears of the Multi-Speed Lathe

The four-speed gear box is cast integral with the leg of lathe and includes a bracket for mounting the motor. The drive from the motor to the gear box is by silent chain, and from the gear box to the spindle is usually by means of a wide belt. The latter may be by silent chain if desired. All gears in the gear box are hardened and all shafts are mounted in ball bearings and run in a bath of oil.

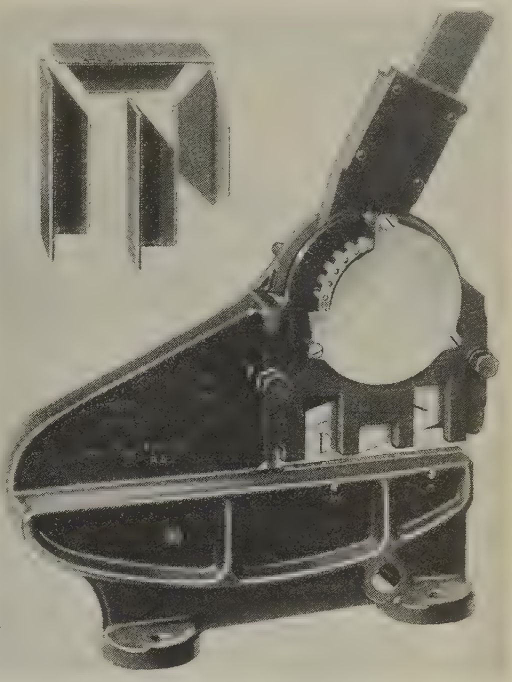
Three changes of speed are obtainable in the headstock, two through gears and one direct to the spindle, giving 12 spindle speeds that provide a finely divided range of surface speeds. Forward speeds are obtained through a friction clutch operated by levers on a rod beneath the lead screw, which levers also control a brake for stopping the spindle. All other speeds are obtained through sliding gears. All speeds are selective and all levers are within easy reach of the operator.

Power from the gear box to the spindle is transmitted to a pulley that is mounted on a sleeve on the spindle, and on which two gears are keyed. These gears transmit the power to the gears on the back shaft which have clutch teeth cut on the face of hubs. The clutches slide on keys on the backshaft to engage either of the gears on this shaft. The spindle and backshaft are made hollow to permit constant oiling of the moving parts.

Application has been made to sell the East Side plant of the Hydraulic Steel Co., Cleveland, which has been operated for several years under a receivership. It is stated that the reorganization committee, of which Walter C. Jenney, Philadelphia, is chairman, has been assured of a cash bid of $1,000,000 for the plant.

Shear for Slitting 3/16-In. Material

A hand-operated slitting shear with capacity for material 3/16 in. and less in thickness has been added to the line of the Whitney Metal Tool Co., Rockford, Ill. The machine, designated as the No. 6, is of alloy steel, drop forged, and all wearing parts are hardened.



The Eccentric Crankpin and Trunnion Bearings of the Shear Are of Roller Type

The eccentric crankpin and trunnion bearings are of roller bearing type. The shear blades are 4½ in. long and are inserted, the lower blade being adjustable to compensate for wear.

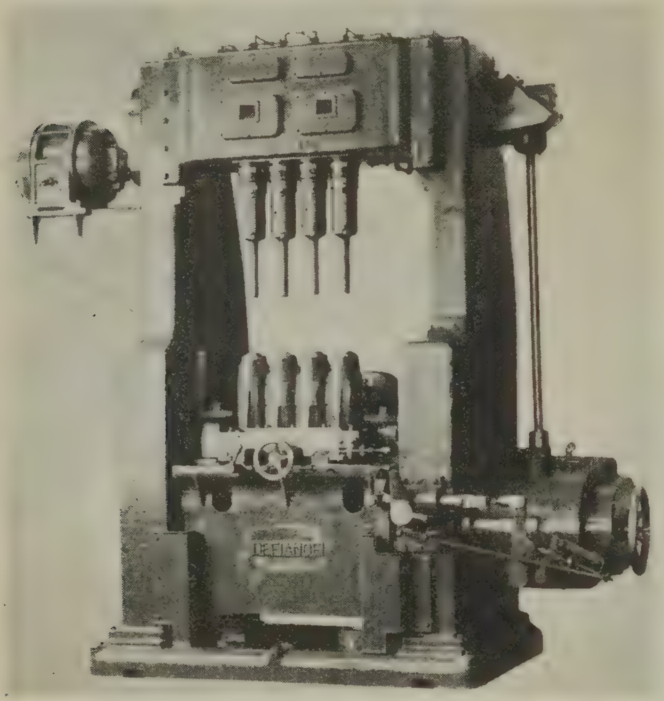
Cutting Blowpipe Designed to Prevent Backfire

One source of delay often experienced when cutting with an oxy-acetylene blowpipe is known as the "backfire" or "flash back." When the blowpipe head gets very hot, or accumulates spatterings of hot metal on the tip, or is accidentally brushed too close to the molten metal, the gas stream (a mixture of acetylene and oxygen) will start burning back in the passageways leading from the mixing chamber. When this occurs the oxygen is turned off momentarily, in order to extinguish the flame and prevent the interior of the blowpipe from being melted.

To avoid such delays, the Oxweld Acetylene Co., 30 East Forty-second Street, New York, has developed a new cutting blowpipe, known as C-14, which will not backfire, it is stated, even under the most severe operating conditions. Several improvements in minor detail are also embodied, such as the replacement of cast parts with brass forgings. Nozzles for the new C-14 are interchangeable with the older type C-2. The blowpipe can also be used with either medium-pressure or low-pressure acetylene.

Single-Purpose Fixed-Center Cylinder Boring Machine of Heavy Type

A single-purpose, four-spindle, fixed-center cylinder boring machine for the rough boring, semi-finishing or reaming of traction and gas engine cylinders having any number of bores or automobile engine cylinders cast en bloc or singly, has been brought out by the Defiance Machine Works, Defiance, Ohio. This machine, designated as the extra heavy No. 8, is a production unit with capacity for 15 to 25 cylinder blocks per hour.



Traction and Gas Engine Cylinders or Automobile Engine Cylinders, Cast en Bloc or Singly, May Be Rough Bored, Semi-Finished or Reamed on a Production Basis

Rigid construction is a feature. The frame and base castings are of heavy design, with cast ribs. The slides are broad and long and are scraped and gibbed. The feed mechanism is of unit construction, affording easy access, and is entirely inclosed. The feed gear box retains a sufficient level of oil to provide splash lubrication. All feed shaft bearings are bronze bushed and end thrusts are taken by ball bearings. Feed changes are made simply by removing a gear case cover and changing two gears. Hand adjustment for the table feed is provided, but when the machine is in operation the table automatically feeds the work to the boring tools. When the cut is finished, the table reverses automatically to fast travel, returns to the loading position and stops until engaged to bore the next cylinder. By means of double clutches in the feed box the machine can be set to feed, disengage, rapid travel up, feed again, disengage and automatically return. The drive to the spindles is either by belt from a three-step cone pulley or from a motor through a flexible coupling.

The spindles are made of hammered steel, are of large diameter, and each spindle is mounted in three bronze bearings. The nose bearing is conical in shape and has a convenient means of adjustment for taking up wear. Each spindle floats between two sets of ball bearings which receive the end thrusts. A friction brake is provided for instant stopping of the spindles. The boring tool is fitted to the spindle by a tapered shank and held in place by a long bolt extending through the spindle from the top, which eliminates the possibility of its being extracted from the spindle on the return feed.

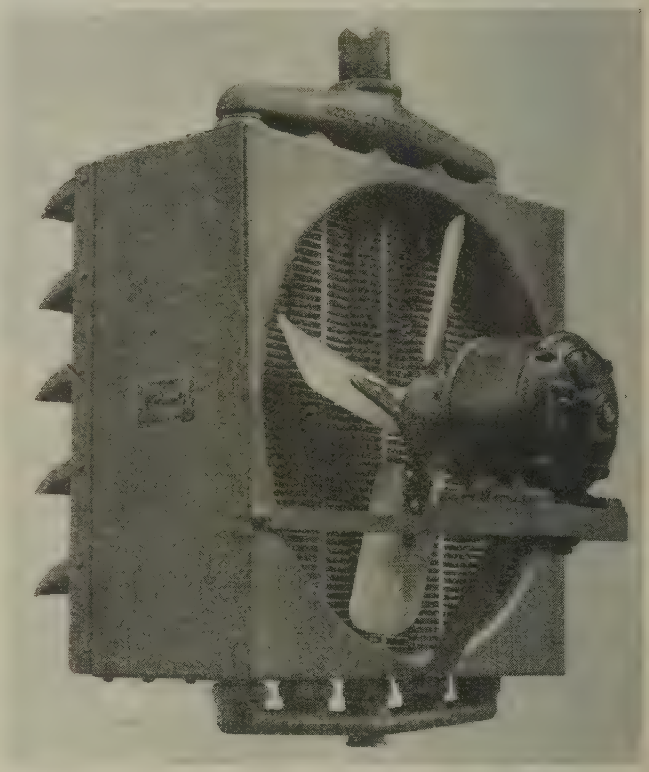
The auxiliary sliding table is operated in and out by means of screw feed driven by a separate motor mounted on the back, which actuates a right and left hand slip friction clutch. A sliding table, when used in front of the machine, permits the loading of blocks over the fixture. The latter has revolving bushings into which the pilot bars enter before the cutting takes place.

A pair of jack screws of large diameter serve to raise and lower the table. Each screw is retained in a jack and actuated by a heavy worm and worm gear through a bronze nut which is sleeved to the worm gear. Moving parts are packed in grease. A simple adjustment is provided for advancing or retarding the screws independently in order to maintain perfect alinement of the table. Thrust is taken by ball bearings. For driving the machine 15 to 25 hp. is required. Floor space occupied is 11 ft. x 6 ft. 10 in., and the net weight of the machine is 21,330 lb.

Unit Heater for Use of High-Pressure Steam

Unit heaters designed with fins and cores integrally cast and with strength in radiator sections sufficient for working pressures up to 250 lb. are being marketed by the Mechanical Mfg. Co., Pershing Road and Loomis Street, Chicago. Each radiator section, complete with fins, is cast in one piece of a special aluminum alloy. The units are tested to 800 lb. hydrostatic pressure in the shop. The cores are designed so that they offer the least possible resistance to the flow of air directed against them by the motor-operated fan, which is mounted on a bracket secured in turn to the metal casing.

Louvers, which can be adjusted independently of each other, are provided across the front of the radiator sections. The intake manifold is so proportioned that distribution of steam is uniform to all connected core or heater sections. The table shows the performance of this heater unit.



Fins and Cores Are Cast Integral, and Radiator Sections Are for Pressures Up to 250 Lb.

Steam Pressure, Lb. Gage	Air Intake, Temp., Deg. Fahr.	Equivalent Direct Radiation, Sq. Ft.	B.t.u. Output
1	60	570	137,300
10	60	662	159,000
100	60	1030	246,900

The standard model 20 "thermal unit" delivers 2600 cu. ft. a minute, with a 1/6-hp. motor operating at 1135 r.p.m.

Hungarian Pig Iron Output Higher

Production of pig iron in Hungary in 1927 totaled 215,200 tons, against 132,900 tons in 1926, according to a report received by the Iron and Steel Division, Department of Commerce, Washington, from Assistant Commercial Attaché John A. Embry, Vienna. Imports of pig iron were 30,000 tons in 1927 and 26,300 tons in 1926.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Expansion of activity in chief consuming industries is likely to be moderate.

Car and locomotive buying in January slumped badly from the high level of December.

Automobile production is clearly expanding, with the seasonal peak two or three months ahead.

Building volume continues large; residential building is the backbone; structural sales have not held up, but are now improving.

Outlook for tank plates in petroleum States should improve, as storage of oil may become a larger element.

Iron and steel exports have been much lower, December showing the smallest movement of the year.

THERE is no question but that the placing of *orders* for steel has been active, but there is some question as to whether the volume of orders represents current *requirements*. It remains to be seen whether buyers have not anticipated their requirements sufficiently to produce a lull in ordering later on. Arguments on both sides of the question may be brought forward. Perhaps the following discussion will enable the reader to draw his own conclusion.

Production Goes Above Demand Line

WE present herewith a revised chart of our composite demand line, together with the production of steel ingots. The composite demand line has been recalculated, using revised figures where necessary, and in all cases indexes of seasonal variation have been reworked. The weights used for averaging the indexes of activity in the various steel-consuming industries have been revised, also. Although we believe that the result is considerably more accurate than its predecessor, it is notable that, as often happens in such cases, the refinements introduced have made no great difference. Indeed, the sound conclusions based on the old chart were sufficient to demonstrate its substantial value.

The composite demand line, representing the average activity in the chief iron and steel-consuming industries, ceased to decline in December. In fact, it showed a slight gain in that month, which is noteworthy in view of the large decline during the three preceding months. Evidently operations in the chief consuming industries were stabilized temporarily at about the average level of the last seven years. Declines occurred in railroad traffic, building activity, mining (including petroleum), and in exports; but these declines were offset by increases in general manufacturing, machine tool orders and automobile production. The most notable increase occurred in the automobile industry.

Meanwhile steel ingot production, adjusted for seasonal variation—as are nearly all our curves—increased quite sharply. In November it had fallen below the average of the last seven years and it had been below the level of the composite demand line since last August. Its position had corrected the excesses of the preceding four months and probably resulted in the accumulation of considerable unfilled requirements. Thus, in December, steel production rose to the level of the demand curve again and in January it made the sharpest advance that has occurred since April, 1923.

This recent expansion of the ingot output seems to have been temporarily justified or even required by the increased volume of orders from railroads and automobile manufacturers. But in the case of the railroads, at least, the orders were not based on current activity; and in general it appears that a good deal of the business was driven in by advances in prices. Undoubtedly the demand line will not show any such rise

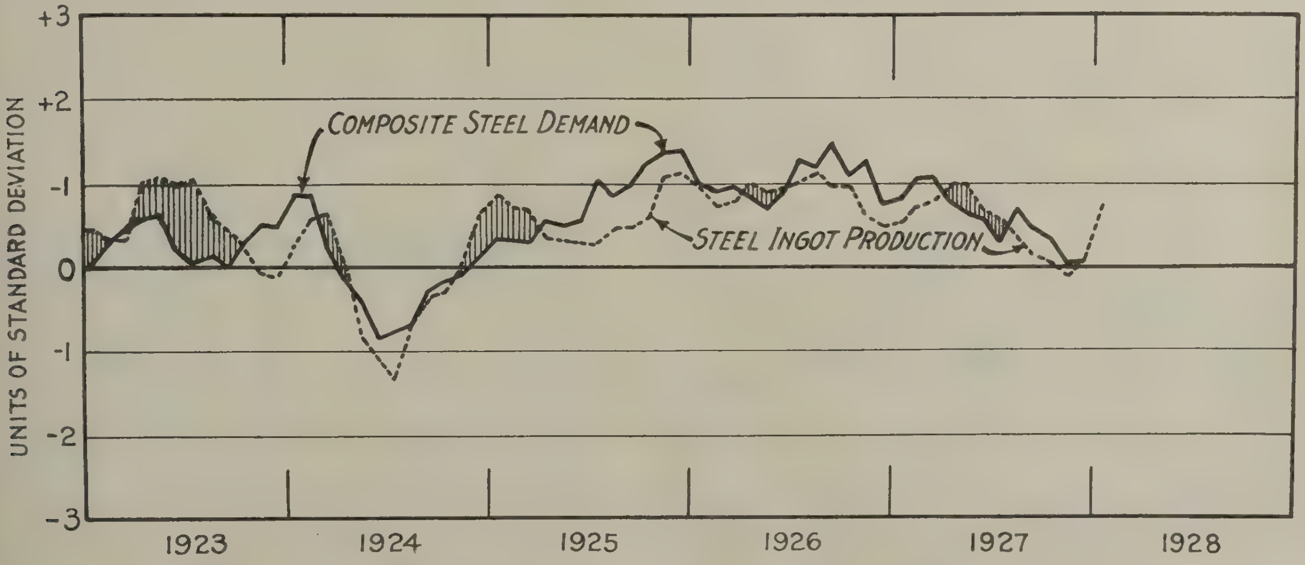


Fig. 1—Current Steel Production Made in January the Sharpest Advance in Nearly Five Years and Is Above the Curve of Composite Demand. The outlook for the immediate future is encouraging

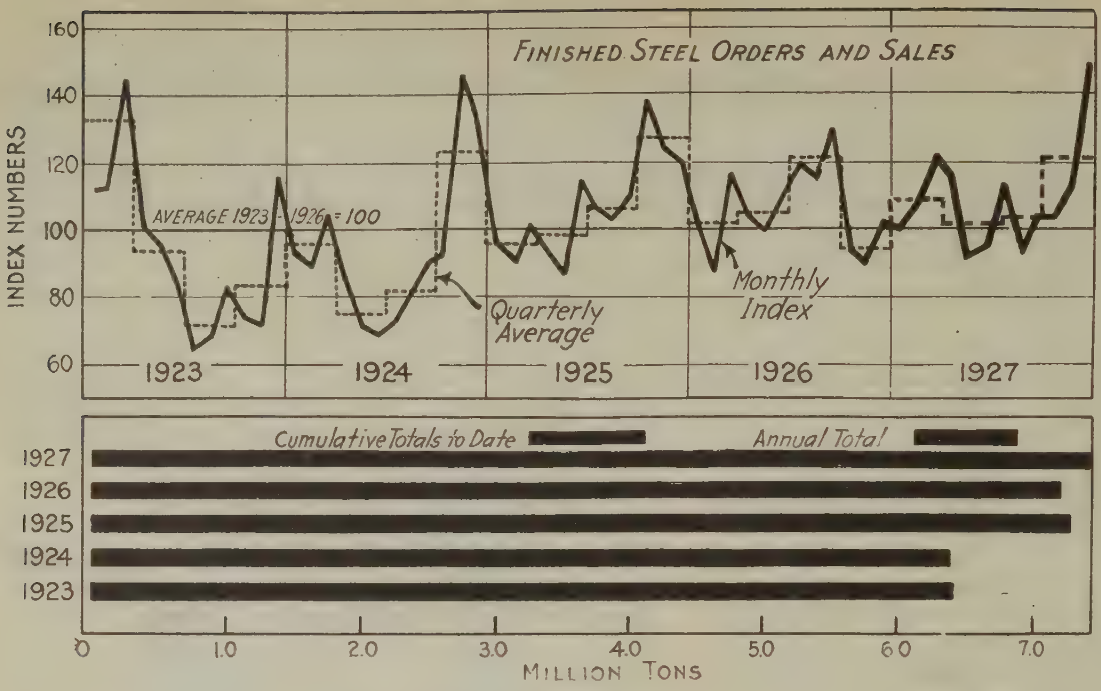


Fig. 2—Buying of Finished Steel Made a Great Spurt in December, Reflecting Accumulated Requirements. The peak of resultant production may follow in February or March

in January as occurred in the production curve, and it seems quite probable that steel production may be working into a position similar to that of early 1925, when a temporary excess developed. It is doubtful if production can hold the January pace. It should increase in February and March, which would be a normal seasonal occurrence. But in view of the sharpness of the gain in January it may be doubted if the full seasonal gain will occur during both months.

Conditions in Particular Lines

Of course, this suggestion is based partly on the doubt that February and March will show a sharp rise in the composite demand line, which brings up the outlook in the chief consuming industries. January estimates indicate that *railroad freight traffic* continued to make an unfavorable showing, though the declining trend was interrupted. Car loadings during the recent weeks indicate that the decline in loadings of miscellaneous and merchandise traffic has been checked. The recovery in general business, which we anticipate, should become apparent in increased railroad traffic before the end of February. Good buying of rails and recent reports of large equipment orders are encouraging. It must be admitted, however, that there is as yet no definite indication of any large gain in railroad requirements.

Manufacturing industries (excluding iron and steel and automobile production), after declining steadily between June and November, held about level in December. It is improbable that there will be much change in January, allowing for seasonal variation, but we look for improvement soon. Indications of an upward trend in unfilled orders and a reduction in stocks of manufactured products appeared in December. One favorable indication, too, is the fact that machine tool orders gained sharply in that month. Some let-down probably occurred in January, but seasonal developments and improvement in general business should bring gains in February and March.

The *automobile industry* is clearly expanding. Though production was small in December, it made a greater recovery than usual for the season and all indications are that the output will be steadily increased. The seasonal peak in the automobile industry does not come until April or May, and there should be some large buying of sheets, strips and other automobile material between now and that time.

The last three months of 1927 brought a larger volume of *building contracts* than did the first quarter, and January showed improvement both in building permits and in contracts awarded. A continued good volume is indicated, so that the outlook for the demand for structural steel, nails and common pipe seems good.

Mining activity, including petroleum production and drilling, is hardly satisfactory and the prospects are but fair. The outlook for the oil industry, however, is such as to indicate that improvement will occur during the year. And when such improvement does occur it is probable that oil companies will for a time be encouraged to accumulate more storage oil, which would bring a better demand for tank material. Drilling activity is at a low ebb, with no improvement in immediate prospect.

Agricultural prosperity appears to have shown no improvement during the last month or two. We note

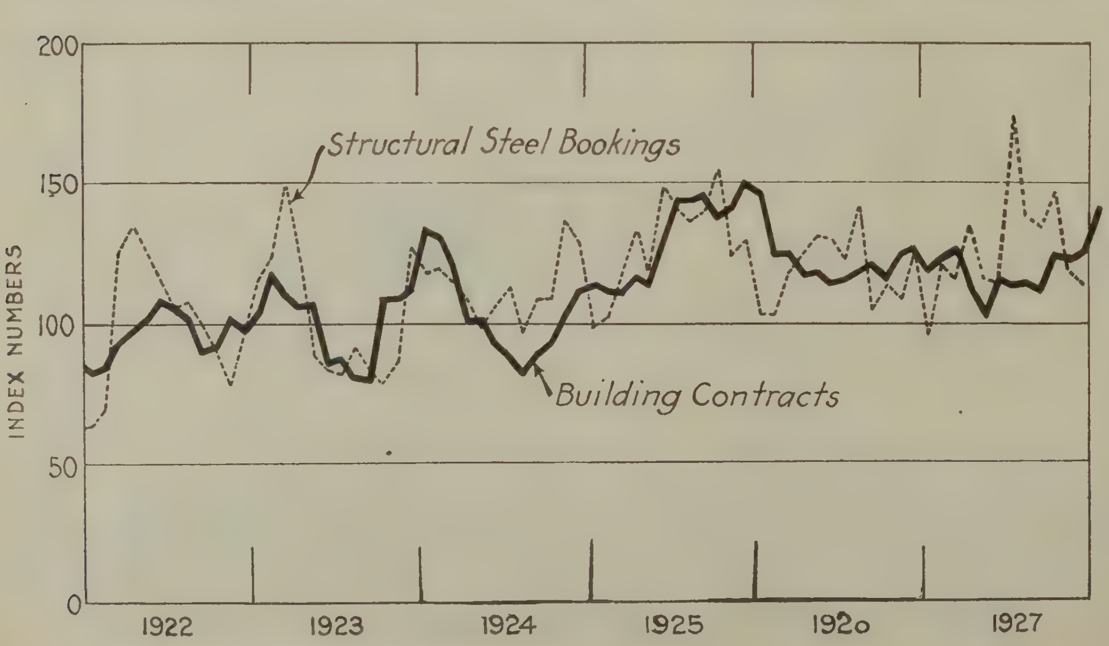


Fig. 3—Building Contracts Gained Sharply in January. Structural steel bookings dropped badly in December, but should resume a high level in the spring. January reports support this view

that in January the sales of the mail order houses fell off more than usual from December. Such sales, however, were above a year ago and trade reports continue to indicate good activity among the manufacturers of farm machinery. On the whole, the agricultural demand for steel products should be fair to good.

As to *exports*, we find that, considering the season, the foreign shipments of iron and steel fell to the lowest point of the year in December, when our adjusted index was only 4 per cent above the average of the last seven years. This compares with 10 per cent above in November and 22 per cent above a year ago.

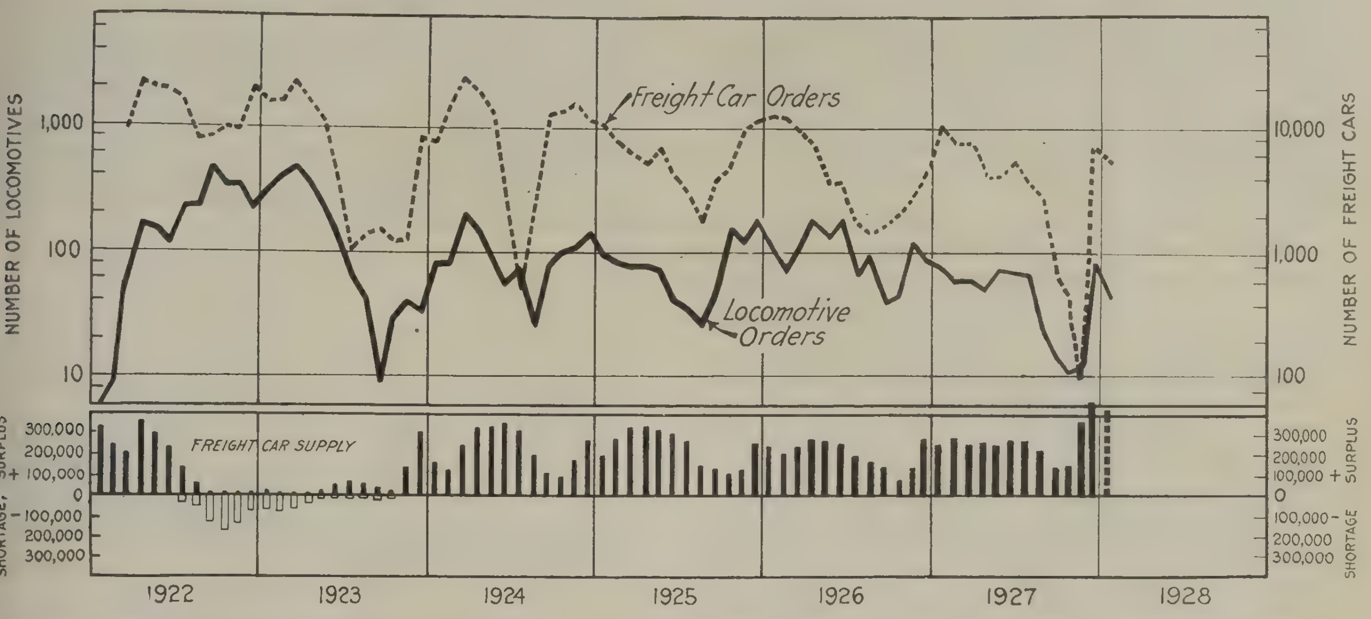


Fig. 4—Locomotive and Railroad Car Orders Dropped Sharply from December Levels. Good-sized orders in early February presage betterment in demand for certain steel products

On the whole, the prospects favor the conclusion that there will be a moderate expansion in the activity of the chief consuming industries, particularly in automobile production and in general manufacturing. Building activity promises to be well sustained and railroad freight traffic should recover within a month or two. But steel production has gone ahead so fast that there is some danger now that it will unduly anticipate requirements.

Heavy Buying Featured December

AN extraordinary wave of buying of finished steel developed in December. The total tonnage of sheets, castings, fabricated structural steel and fabricated steel plates booked in that month was higher than in any other month in recent years, if not record breaking. (Our index number represents about 50 per cent of the finished steel business, but it does not include bars, pipe, tin plate, wire or nails.)

This expansion reflects postponed buying and accumulated requirements on the part of consumers. It was due in part also to price advances, which were doubtless made with a view to driving in business. Of course, the bulk of the orders was placed at the previous low prices. Accordingly, the December buying movement may not carry through. The fact remains, however, that it brought the total sales for 1927 above those of any recent year, including 1925. It is a sad commentary on the price situation in the industry that, with such a volume of business, the profits of the manufacturers should have declined so materially in 1927.

Such an increase in buying as occurred in December, coming at a period of very low production, is bound to give a stimulus to steel making that will last for two or three months. Similar spurts occurred in March, 1923, and December, 1923, and in these cases the peak of production was not reached until three months later. Other spurts came in November, 1924, and October, 1925, and these were followed by peaks in production within two months. It, therefore, seems highly probable that the production curve will continue to rise at least through February and probably through March.

Precedent, however, casts some doubt on the succeeding months. In the past, reaction has quickly occurred following such a run-up in buying. This has, no doubt, been due in some cases to the fact that buyers have placed orders amply covering their requirements for some time ahead, and then have awaited fresh weakness in the steel markets before again making purchases. Something of this procedure is apparent in the present instance, but it seems that a considerable part of the December ordering was the result of current or nearby requirements, and if we are correct in anticipating a general improvement in business, it is reasonable to infer that there will be no such large slump in steel buying during the next half year as occurred in early 1925.

Building Contracts Hold Up Well

CONSTRUCTION activity gained sharply in January. The square feet of floor space in contracts awarded actually increased a little, being 63,717,000, although a large decline is usual in January. As a result, our adjusted index for the month is 142 per cent of the average for 1921-1925, against 126 per cent in December and 119 per cent a year ago. This represents the highest annual rate of construction activity since January, 1926, when the decline that carried down to the middle of last year began. Since May, 1927, the adjusted index of construction activity has increased 38 per cent. Moreover, building permits showed more than the usual seasonal gain in January, which proves that the residential type of building in cities and towns is contributing to the total gain in construction. This rise in permits is a strong indication that the upward trend in building will continue for a time.

Bookings of structural steel in December fell to the lowest level since June, and were below their average relation to building contracts (see Fig. 3). The sharp rise in contracts, however, forecasts a gain in structural steel bookings; this forecast is supported by current trade reports for January, which are to the effect that the average weekly awards amounted to about 50,000 tons of fabricated structural steel, against only 30,600 tons in December.

Equipment Buying Slumped After Big Gain

IN one case, at least, we already know that a December spurt in buying did not carry through into January—namely, in the case of railroad equipment. Freight car orders in January were hardly fair and locomotive orders fell to negligible proportions.

As reported by *Railway Age*, freight car orders in January numbered 2098, the great bulk coming from Southern and Southwestern roads. The figure compares with 14,114 cars in December, 17,196 cars in January, 1927, and 11,531 cars in January, 1926. Nevertheless the total for the last three months shows a fairly good level, so that a gain in February may yet save the day, as the sharp gain in December did. Some hope of this appears in current reports of large inquiries, and several good-sized orders have already been placed in early February.

We have to note that statistical indications as to the extent of freight car buying during the next month or two do not warrant any great optimism. In the first place, the volume of freight traffic in January would indicate no increased requirements; in the second place, the surplus of freight cars as last reported was the largest that has existed at any time in the last seven years. The surplus on Jan. 23 is reported at 421,393 cars, which compares with about 275,000 a year ago. There thus appears to be little reason to expect a sustained gain at this time. Moreover, several railroad executives have recently expressed a lack of optimism concerning railroad earnings during the next few months.

Only two locomotives are reported to have been ordered in January, and both of these orders came from industrial concerns. This is the smallest month's business on our record. Total shipments of locomotives, including steam and electric, fell to a new low, amounting to only 47. In spite of the decline in shipments, unfilled orders also decreased and amounted to only 222. These are the official Government figures for the entire month of January.

As shipments declined by 25 locomotives, and unfilled orders decreased by only 10 locomotives, one might infer that the total orders for the month amounted to 15 locomotives. As in the case of freight cars, the number of locomotives in storage is large. Also the percentage of bad-order locomotives is fairly low. The number in storage on Jan. 1 was 7490 against 4601 a year ago. Bad-order locomotives on Jan. 15 numbered 9140, against 9371 on the same date in 1927.

Naturally, we find that employment in railroad equipment manufacturing establishments was at a very low ebb in December.

Coke Production at Increased Rate in December

WASHINGTON, Feb. 14.—Output of by-product coke in December was 3,646,000 net tons, an increase over November of 146,000 tons, or 4.2 per cent, according to the Bureau of Mines. The average daily rate of production also increased, from 116,667 tons in November to 117,612 tons in December, a gain of 945 tons, or 0.8 per cent. Production of beehive coke in December remained practically stationary, the total being estimated at 377,000 tons. Production of all coke amounted to 4,023,000 tons, of which 90.6 per cent was contributed by the by-product ovens and 9.4 per cent by beehive ovens.

Preliminary totals for the calendar year 1927 show a production of 43,921,000 tons of by-product coke and 7,004,000 tons of beehive coke. In comparison with 1926 this is a decrease of 1 per cent in by-product coke output and of 44 per cent in beehive production.

Large Construction Activity in January

Building contracts in January in the 37 States east of the Rocky Mountains are reported by F. W. Dodge Corporation at $427,169,000. This represents the second largest January on record and is a gain of 11 per cent over January, 1927. It is a decline, however, of 11 per cent from the preceding month. Residential buildings accounted for 45 per cent of the total, continuing the lead which this type of structure has held for several years. Public works and utilities were 17 per cent, commercial buildings 16 per cent, and industrial buildings 9 per cent.

Heavier Steel Furniture Orders

New orders for steel furniture in December are reported by the Department of Commerce at $2,850,314, comparing with $2,476,230 in November. The December total was the largest since March and was somewhat larger than that of December, 1926, at $2,802,325. For the year, however, there was a falling off of 2 per cent from 1926, the total being $30,760,343, against $31,393,171 in the earlier year.

Shipments ran a little ahead of new orders in both years. In December, however, they fell below orders, being reported at $2,740,602. Unfilled orders at the end of the year are given as $1,413,880, a reduction of about 10 per cent from the figure a month earlier and about the same amount below the figure at the end of 1926.

Orders for steel shelving in December are reported at $619,276, the largest figure since last June. This compares with $574,763 in November, and with $561,979 in December, 1926. Orders for the year were $7,351,122, a slight increase over 1926. Unfilled orders at the end of the year were $605,809.

Commercial Stocks of Coal

Bituminous coal stocks in hands of commercial consumers on Jan. 1 are estimated by the United States Bureau of Mines at 55,500,000 net tons. This is almost precisely the same amount as a year earlier and is 13 per cent greater than the total of Jan. 1, 1926. It represents a shrinkage of about 10 per cent from the Oct. 1, 1927, figure of 61,900,000 tons. This shrinkage has been progressive since April 1 last, when a record tonnage of coal was on hand, estimated at 75,000,000 tons, or about double the total of a year before that.

It is estimated that the Jan. 1 total represented about 41 days' supply. This was not equally distributed among various users, however. Steel mills had a supply figured at 45 days; by-product coke plants at 38 days; other industrial plants at 44 days; coal gas plants at 79 days; electric utilities at 58 days; railroads at 41 days, and coal dealers at 27 days.

Of the steel plant total supply, 2,273,786 tons on Jan. 1, steam coal accounted for 1,296,376 tons or 42 days' supply, and gas coal, 977,410 tons, or 50 days' supply. By-product plants had 6,437,676 tons of coking coal, including 1,546,864 tons of low-volatile coal (48 days' supply) and 4,890,812 tons of high-volatile coal (40 days' supply).

The Industrial Steel & Supply Co., 26 East Jackson Boulevard, Chicago, has been organized to buy and sell industrial and railroad iron and steel scrap and industrial and railroad supplies. Officers of the new company are Lawrence C. Ryan, formerly vice-president and treasurer of the Standard Forgings Co. and the St. Louis Forgings Co., president and treasurer, and John T. McEnroe, formerly vice-president of the Benjamin Colitz Co., vice-president.

Walter Erman & Co., McCormick Building, Chicago, dealers in old materials, have changed their firm name to Erman-Howell & Co., Inc.

Schedule of the next installments of the ***Business Analysis and Forecast,*** *by* ***Dr. Lewis H. Haney,*** *Director New York University Bureau of Business Research, follows:* ***Feb. 23—*** *Position of Iron and Steel Producers;* ***March 1—*** *General Business Outlook;* ***March 15—*** *Activity in Steel Consuming Industries.*

Foundrymen Prepare Program for Philadelphia Convention

Preliminary Schedule of Technical Sessions—Many Papers Arranged For—Course in Cupola Operations a New Feature

THE program committee of the American Foundrymen's Association, in arranging for the program of meetings for the thirty-second annual convention of the association at Philadelphia, May 14 to 18, announces the following tentative schedule of technical sessions:

Monday May 14—Registration, committee meetings, and first session in cupola operation course
Tuesday, May 15—
  9.30 a. m.
    (1) Opening meeting and business session
  11 a. m.
    (2) Non-ferrous metals
    (3) Steel founding
    (4) Cast iron
  2.30 p. m.
    (5) Foundry costs and second session in cupola operation course
Wednesday, May 16—
  10 a. m.
    (6) Steel metallurgy
    (7) Cast iron
  12.30 p. m.
    (8) Round table on brass founding
  2.30 p. m.
    (9) Foundry management
    (10) Foundry coke specifications and third session in cupola operation course
Thursday, May 17—
  10 a. m.
    (11) General foundry practice
    (12) Apprentice training
  12.30 p. m.
    (13) Round table on malleable founding
  2.30 p. m.
    (14) Sand control; fourth session cupola operation course
Friday, May 18—
  10 a. m.
    (15) Materials handling
    (16) Malleable founding

The papers for these meetings, while not all the sessions have been definitely arranged, show promise of being some of the best, as a group, ever secured for an A. F. A. meeting. The interests of all the four branches of the industry have been considered, and in addition the varied interests of the metallurgists, executive, shop manager, engineer and practical shop man have been met. A partial list of the papers to be presented follows:

"Furnace Refractories for Brass Foundries," by H. M. St. John, chief metallurgist Detroit Lubricator Co., Detroit.

"Science in the Foundry," by E. F. Hess, metallurgist Ohio Injector Co., Wadsworth, Ohio.

"Risers, Their Need and Feed," by R. R. Clarke, alloy foundry, General Electric Co., Erie, Pa.

"Variables in Steel Foundry Practice," by F. A. Melmoth, Thomas Firth & Sons, Ltd., Sheffield, England; I. B. F. exchange paper.

"Economies in Oxy-Acetylene Cutting for Riser Removing," by G. O. Carter, Linde Air Products Co., 30 East Forty-second Street, New York.

"Sand Reclaiming in the Steel Foundry," by D. M. Scott, Gould Coupler Co., Depew, N. Y.

"Interdependence of Operating and Sales Departments in the Success of a Foundry," by K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa.

"Theory of Cupola Operation in Relation to Practice," by R. B. Schaal, Roberts & Manders Stove Co., Hatboro, Pa.

"Automatic Blast Gate Control for the Cupola," by H. W. Crawford, General Electric Co., Schenectady, N. Y.

"Necessity for Creating a Casting Consciousness," by A. F. Jensen, Hanna Engineering Co., Chicago.

"The Schedule Fallacy," by J. J. Ewens, George H. Smith Co., Milwaukee.

"General Characteristics of Alloy Steel Castings," by J. W. Frank, Chicago Steel Foundry Co., Chicago.

"The Research Laboratory of the American Steel Foundries," by W. C. Hamilton, research director American Steel Foundries, Indiana Harbor, Ind.

"Temperature Measurements of Molten Cast Iron," by H. T. Wensel and W. F. Roeser, United States Bureau of Standards, Washington.

"Influences of Carbon and Silicon Variations in Cast Iron," by D. G. Anderson and G. R. Bessmer, Western Electric Co., Chicago.

"Producing High-Strength Cast Iron," by John D. Miller, Cresson-Morris Co., Philadelphia.

"Basic Principles of Management in the Foundry," by J. D. Towne, Dayton, Ohio.

"Manganese Steel," by H. P. Evans, Pettibone-Mulliken Co., Chicago.

"Stabilizing Labor and Cutting Cost by Horse Sense," by A. D. Lynch, Ohio Brass Co., Mansfield, Ohio.

"What Does the Buyer Expect for His Money?" by J. A. Marks, Packard Motor Car Co., Detroit.

"A Contribution to the Training of Labor and the Personnel of a Foundry," by A. Soupart, Director of Musee, Professional de l'Etat et des Ecoles Techniques de Morlanwetz; exchange paper of the Association Technique de Fonderie de Belgique.

"Heat Losses from a 75-Ton Hot Metal Car," by W. F. Roeser, United States Bureau of Standards, Washington.

"Surface Conditions of Castings as Affected by Core Sand Mixtures," by H. L. Campbell, University of Michigan, Ann Arbor, Mich.

"Testing Molding Sands for Durability," by M. A. Blakey, International Harvester Co., Milwaukee.

"Sand Conservation and Control in a Gray Iron Jobbing Shop," by T. F. Kiley, Brown & Sharpe Mfg. Co., Providence, R. I.

"Sand Control Methods in a Light Casting Foundry," by W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J.

"Materials Handling and Its Relationship to Building Plans," by E. F. Scott, Austin Co., Cleveland.

"Reducing Scrap in the Malleable Foundry," by R. A. Greene, Ohio Brass Co., Mansfield, Ohio.

This list of papers will be supplemented by others and by reports of committees.

The technical sessions, scheduled for the mornings of the convention week, will be held in the meeting rooms of the Hotel Bellevue-Stratford and the afternoon meetings, which are all of general interest, will be held in the meeting rooms of the Commercial Museum, which will house the foundry exhibit.

The Cupola Operation Course

An innovation this year, to interest that large group of foundrymen, the practical men in cast iron foundries operating and working with cupolas, will be the four-period cupola operation discussion course. These discussion groups will be held on each of the first four days of the meeting. The leaders each day are as follows:

Monday, May 14, Dr. Richard Moldenke, "Principles Underlying Cupola Melting Processes"; Tuesday, May 15, E. J. Lowry, "Cupola Construction Details"; Wednesday, May 16, David McLain, "Cupola Charging Practice"; Thursday, May 17, H. W. Dietert, "Cupola Improvement."

Blast Furnace Practice Presented to Connecticut Foundrymen

The February meeting of the Connecticut Foundrymen's Association was held on Feb. 10 at New Britain, Conn. R. J. Linney, vice-president Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., was the chief speaker. He gave an outline of the mining and preparing of ores for the blast furnace, as well as of other operations at the company's plant. Carl H. Neumann, Union Mfg. Co., New Britain, secretary of the association, announced that Walter M. Sanders, Sanders & Franklin, engineers, Providence, R. I., will speak on "Producing, Testing and Grading Molding Sands" at the monthly meeting on March 9. The Waterbury-Farrel Foundry Co. has been made a member of the association.

PIG IRON DUTY INADEQUATE

Tariff Commission Informs Congress of Present Difficulties of Administration

WASHINGTON, Feb. 14.—Difficult problems surrounding administration of the tariff act are pointed out by the Tariff Commission in its eleventh annual report to Congress. A number of them concern means of ascertaining costs of production according to requirements of the flexible provision, by which duties may be increased or decreased 50 per cent, which, in instances, the commission has found to be inadequate. A case in point relates to pig iron. The increase of 50 per cent in the duty on pig iron, proclaimed by the President, effective March 25, 1927, permitted a maximum duty of only $1.12½, raised from 75c. per ton. "Such increased duty fails by a wide margin to equalize differences in costs of production indicated in the commission's report," it is pointed out.

It also is explained that by section 315 (flexible provision) nothing shall be construed to authorize the transfer of an article from the dutiable list to the free list or from the free list to the dutiable list, although applications have been filed with the commission requesting investigations looking toward complete removal of the duties on certain articles, or the imposition of duties on articles now on the free list. It is stated that although action by the President is limited in such cases, information obtained by the commission is available for the use of Congress.

The report directs attention to an opinion of the Attorney General that in finding the differences of costs in producing foreign and domestic articles there should be taken into account, among other things, costs of transportation, where it is shown such differences in costs, as between foreign and domestic articles, constitute an advantage or disadvantage between the foreign and American producers. Prior to this opinion the commission had presented cost comparisons both with and without transportation costs. Since the Attorney General's opinion, Feb. 2, 1926, all cost comparisons have included transportation costs.

The most important question, it is stated, concerns principal markets of the United States where imported and domestic goods meet in competition. If the principal market is a port of entry, the transportation charge for imported goods is composed of the foreign inland freight and ocean transportation. The domestic plants may be scattered over a wide area.

"Upon what basis should domestic transportation to the principal market, wherever located, be calculated?" asks the commission. "Upon the basis of the nearest group of plants, the most distant group of plants, or on the basis of an average transportation charge from all plants?

"Under existing circumstances, it may be found that a principal market for the domestic products is at one point and the principal market for imported goods is at another point. In fact, the domestic and imported goods may not actually meet in the same market. Under these conditions should transportation for both domestic and imported articles be calculated to their respective markets only? In such an event how shall the commission determine the principal market?"

The report shows also that the ascertainment of invoice prices as evidence of production costs is not free from difficulties.

Old Foundries Can Be Brought Up to Date, Says Engineer

At the February meeting of the New England Foundrymen's Association Wednesday evening, Feb. 8, in Boston, Clement A. Hardy, engineer, Chicago, gave an address on "New Foundries for Old," in which he declared there is no foundation for the assertion often made that American foundrymen are slow to adopt modern methods, because there has been more improvement and advancement in foundry practice in the United States than in the rest of the world.

Mr. Hardy stated that almost any old foundry could be made into a new foundry at moderate cost, provided there was enough head room to permit the installation of handling equipment. He cited instances of improvements in corerooms, material yards, sand handling and the various other departments of foundries. Mr. Hardy is in favor of the racked ovens and said that some 25,000 are in use in this country. He illustrated, with a blackboard, changes just completed at the Builders Iron Foundry, Providence, R. I., where charging has been increased to 25 to 30 tons per day with only three men required for two cupolas.

In changing over old foundries to new, Mr. Hardy said the handling of flasks on the molding floor and in the yard, especially if the work is medium large, is highly important. It is very often the case that foundries use valuable space for storing flasks in the foundry.

Earl T. Bennington, manager Cleveland Electric Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio, who followed with an address on "Materials and Production Handling in the Foundry," illustrated how five or six different kinds of sand are handled efficiently and economically at the Cadillac Motor Co. plant. By this system, which has been adopted by the General Motors Corporation as standard, one man delivers 500 tons of sand per day.

With lantern slides Mr. Bennington illustrated many different ways of handling materials and products in widely scattered foundries, where gray iron, malleable and brass castings are made. Stress was placed on the push-button control in pouring, with ladles holding 300 to 400 lb. of metal. Some of the slides depicted handling materials and products in other industries, including wire and rod mills. He stated that the American Steel & Wire Co., Worcester, Mass., is making the largest coils of wire in the world, weighing 400 to 450 lb., and has capacity for 600-lb. coils to be made at some future date.

Henry M. Lane, consulting engineer, Detroit, will address the New England foundrymen at the March meeting.

Screw Machine Products Association Elects Officers

David Bell, David Bell Co., Inc., Buffalo, was elected president of the Screw Machine Products Association at the fifth annual meeting of the association in Chicago. Mr. Bell succeeds H. B. Lundberg, president Michigan Screw Co., Lansing, Mich.

S. G. Eastman, Belvidere Screw & Machine Co., Belvidere, Ill., was named vice-president and the treasurer is F. H. Fischer, Fischer Special Mfg. Co., Cincinnati. Mr. Fischer was also elected to the board of directors, other new members of which are J. J. Hagen, president Western Screw Products Co., St. Louis, and J. S. Cochran, president of the Mac-It Parts Co., Lancaster, Pa. Malcolm Baird continues as field secretary of the association, with offices at 232 Delaware Avenue, Buffalo.

E. F. DuBrul, general manager of the National Machine Tool Builders' Association, was one of the speakers at the meeting, his address being on the "Dollar Delusion in Depreciation Accounts." Following luncheon, a moving picture entitled "The Age of Speed" was shown by the Norton Co., Worcester, Mass. At the second business session it was decided to adopt a monthly business barometer which would indicate the relative amount of business obtained during each month and unfilled orders.

The Eastern division of the Screw Machine Products Association, the president of which is George Briggs, Screw Machine Products Corporation, Providence, held its annual meeting at the Crescent Athletic Club, Brooklyn, Feb. 10.

Salesmen and Purchasing Agents to Hold Cooperative Exhibit at Bridgeport

Tool steel, small tools, electric equipment, plating and general factory supplies are among the products to be shown at the cooperative exhibit of the Salesmen's and Purchasing Agents' Association, which will be held at the Pyramid Mosque, Bridgeport, Conn., Feb. 24 and 25. There will be more than 80 exhibitors. It is expected that the attendance will include visitors not only from Connecticut but from contiguous territory.

The purpose of the association, made up of buyers and sellers, is to foster better understanding of each other's problems and of the goods which are the basis of their contacts. The officers are: H. J. Behn, Hunter & Havens, president; A. H. Jones, Bryant Electric Co., vice-president; W. B. Osborne, Bussman Mfg. Co., secretary; and R. T. Phipps, Bullard Machine Tool Co., treasurer, all of Bridgeport.

Companies which will participate include:

Aluminum Co. of America, New Haven; American Hardware Co., Bridgeport; American Pulley Co., Philadelphia; American Swiss File & Tool Co., Elizabeth, N. J.; Apothecaries Hall Co., Waterbury, Conn.; Atlantic Mfg. Co., Milford, Conn.

Bassick Co., Bridgeport; Bay State Tap & Die Co., Mansfield, Mass.; Badger-Adamson Co., New York; Bridgeport Airport, Inc., Bridgeport; Bridgeport Brass Co., Bridgeport; Bussman Mfg. Co., St. Louis; Bunting Brass & Bronze Co., New York; Black & Decker Mfg. Co., Towson, Md.; Brown & Sharpe Mfg. Co., Providence; Bryant Electric Co., Bridgeport; Charles Bond Co., Philadelphia.

Cann & Saul Steel Co., Philadelphia; Crane Co., Bridgeport; Chisholm-Moore Mfg. Co., Cleveland; Cutting & Woods, Bridgeport; Cornwall & Patterson Co., Bridgeport; Colts Patent Fire Arms Co., Hartford; Crouse-Hinds Co., Syracuse, N. Y.; Chromium Co. of America, Waterbury, Conn.

DeMattia Wire Works, Southport, Conn.; T. L. Dickenson, New York.

Economy Fuse Mfg. Co., New York; H. M. Ellsworth Co., Bridgeport; Erie Malleable Iron Co., Erie, Pa.; Edison Lamp Works, Harrison, N. J.

Frank H. Fargo Co., Bridgeport; J. B. Ford Co., Wyandotte, Mich.

General Electric Co., Bridgeport; Graybar Electric Co., Inc., New Haven.

Hanson-VanWinkle-Munning Co., Newark, N. J.; Hawley Hardware Co., Bridgeport; Hartford Belting Co., Hartford; Heppenstall Forge Co., Bridgeport; Hilo Varnish Co., Brooklyn, N. Y.; Hunter & Havens, Bridgeport; Hessel Hoppen Co., New Haven.

Lindquist Hardware Co., Bridgeport; Ludlum Steel Co., Watervleit, N. Y.

MacDermid, Inc., Waterbury, Conn.; Manning Abrasive Co., New York; Midvale Steel Co., New York.

Johns-Manville Corporation, New York.

Norton Co., Worcester.

Quigley Furnace Specialties Co., New York.

Ridge Tool Co., Elyria, Ohio; J. H. Richardson Oil Co., Bridgeport.

Seymour Mfg. Co., Seymour, Conn.; Skinner Chuck Co., New Britain, Conn.; Standard Oil Co., Bridgeport; F. B. Stevens, Inc., New Haven; S. K. F. Industries, Hartford.

Trumbull Electric Mfg. Co., Plainville, Conn.

Unishear Co., Inc., New York.

Vanadium-Alloys Steel Co., New York.

Warren Belt Co., Worcester; Wellington Kincaid Co., Bridgeport, Conn.; Westinghouse Electric & Mfg. Co., Bridgeport; J. H. Williams & Co., New York.

Yale & Towne Mfg. Co., Stamford, Conn.

Zapon Co., Stamford, Conn.

Steel Treaters to Hold Semi-Annual Convention in California in 1929

The board of directors of the American Society for Steel Treating has decided to hold a convention in California. According to present arrangements the second semi-annual meeting will be held in Los Angeles the week of Jan. 14, 1929. Twelve other national societies will cooperate in arranging a five-day program and the event will be known as the Western Metal Congress. There will be held concurrently under the auspices of the society what is designated as the "Western States Metal and Machine Tool Exposition." The success of this is announced as already assured, over 100 Eastern companies having signified their intention to exhibit. This exposition in California will not take the place of the regular National Metal Exposition to be held in 1929. This will be held as usual during national metal week, the place and date to be announced later. Information as to special trains leaving Chicago about Jan. 8, 1929, for Los Angeles will be published later.

Shipments of Sheet Metalware

December shipments of enameled sheet metalware are reported by the Department of Commerce at 307,280 dozens, valued at $1,085,762, compared with 287,115 dozens in November, valued at $1,147,108. The December value was the smallest since July and the third smallest of the year. For the 12 months, shipments have aggregated 3,916,930 dozens, valued at $14,321,892.

Galvanized sheet metalware shipped in December amounted to 107,267 dozens, valued at $398,199. This was a sharp reduction from the November total of 138,853 dozens, valued at $544,301. In December, a year earlier, shipments were 123,381 dozens, valued at $479,876. For the 12 months in 1927 shipments were 2,109,323 dozens, valued at $8,041,226. This is a small gain from the 1926 total of 1,945,164 dozens, valued at $7,950,683.

Production of galvanized sheet metalware, which held close to shipments in each year, amounted in 1927 to 2,093,805 dozens. This is a gain of 6½ per cent over the 1926 total of 1,966,012 dozens. The gain in pails and tubs was more than this, for the total went up from 1,429,909 dozens to 1,668,725 dozens. There was a reduction of more than 20 per cent in other ware produced, which declined from 536,103 dozens to 425,080 dozens.

Steel Corporation's Unfilled Orders Increase 303,073 Tons as of Jan. 31

A large increase in the unfilled orders of the United States Steel Corporation was registered in January. The total on Jan. 31 was 4,275,947 tons, which is an increase of 303,073 tons over the 3,972,874 tons on Dec. 31. The gain in January over December was 518,430 tons. In November also there was an increase of 113,404 tons. The unfilled orders on Jan. 31 were the largest since March, 1926, when the total was 4,379,935 tons. A year ago the total was 3,800,177 tons. Thus the unfilled orders at the end of January, this year, were 475,770 tons in excess of those 12 months previous. The following table gives the unfilled tonnage by months, commencing with January, 1925:

	1928	1927	1926
Jan. 31.......	4,275,947	3,800,177	4,882,739
Feb. 28.......	....	3,597,119	4,616,822
Mar. 31.......	....	3,553,140	4,379,935
April 30.......	....	3,456,132	3,867,976
May 31.......	....	3,050,941	3,649,250
June 30.......	....	3,053,246	3,478,642
July 31.......	....	3,142,014	3,602,522
Aug. 31.......	....	3,196,037	3,542,335
Sept. 30.......	....	3,148,113	3,593,509
Oct. 31.......	....	3,341,040	3,683,661
Nov. 30.......	....	3,454,444	3,807,447
Dec. 31.......	....	3,972,874	3,960,969

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

Further Reduction in Trackwork Shipments

Shipments of trackwork in the last quarter of 1927 are reported by the American Iron and Steel Institute, in revised figures, at 28,759 net tons. This is the smallest quarter for several years. Each of the three months of the quarter showed successively smaller totals than any months of the preceding two years. A slight gain was made in January, however, when the shipments totaled 9332 tons, against 9139 tons in December.

The Otis Steel Co., Cleveland, announces that it will erect an additional 125-ton open-hearth furnace at its Riverside works this year. This company completed its fifth open-hearth furnace at this plant last year.

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This Issue in Brief

Stabilizes sales by diversifying output. Even in periods of intense competition and overproduction, electrical equipment manufacturer has been able to increase his business steadily by extending activities into new markets.—Page 460.

Pensions are not charity, but a business proposition. Payment of pensions to superannuated employees is a direct aid to management in keeping up efficiency, reducing accident hazards, and lowering manufacturing costs, says industrial relations counsellor.—Page 463.

Discovers way to weld gun metal. Heat the casting, before welding, to 1000 deg. Fahr., says welding engineer. After welding the rate of cooling should be about that of the original casting.—Page 465.

Muckraking era gives way to "cover it up" practice. Gross obstructions of justice are resulting from recent tendency to treat scandals with absolute silence.—Page 485.

Is there a better business barometer than pig iron production? Some statisticians regard steel ingot output as a more reliable gage. Others look upon electric power consumption with favor. But this new indicator will have to be handled with caution, as the lighting load element introduces a considerable seasonal factor.—Page 436.

Increases industrial efficiency by placing a sign bearing the foreman's name over each department. Electrical equipment manufacturer finds that this inculcates in the department head a deeper sense of responsibility.—Page 460.

Foundry saves $10,000 a year by new mechanical-handling system. Cupola charging system alone makes a saving of close to $5,000 a year, and in addition eliminates accident hazard.—Page 458.

What is the best way to train young executives? Some firms use the classroom method. Others find it best to give consecutive training in different departments, permitting the new man to sit in on conferences devoted to policy problems.—Page 463.

Makes large pipe out of bent plate by arc-welding. A lighter, smaller pipe can be used than in the case of riveting, declares Japanese manufacturer, as internal friction caused by rivet heads is eliminated.—Page 465.

In pack-hardening small tools such as taps and plug gages it is advisable not to heat more than two or three tools at a time, says metallurgist. The tools should be about the same size, and the rate of heating should not be rapid, else the tools will heat unevenly.—Page 469.

Can the steel industry maintain the January pace? Doubtful, says Dr. Haney, stating it appears that a good deal of business was drawn in by price advances. Steel production has gone ahead so fast that there is some danger now that it will unduly anticipate requirements, he declares.—Page 477.

Old foundries can be modernized at moderate cost, says engineer, provided there is enough head room to permit the installation of handling equipment. Some plants use valuable space for the storing of flasks in the foundry.—Page 480.

Pig iron duty is inadequate, says Tariff Commission. Finds that present duty of $1.12½ per ton fails to equalize differences in production costs.—Page 480.

To avoid distortion during quenching of small tools, quench the pieces gently. A violent, swishing quench increases distortion and warping.—Page 470.

Accident prevention work cuts insurance rate 70 per cent. Ohio steel foundries' rate was $2.40 per $100 of payroll a few years ago. Now it is 70 cents.—Page 485.

If the coal industry is excused from the provisions of the Sherman law, what about the other industries? If the recommendation made by Secretary of Labor Davis is heeded by Congress, other industries suffering from too much competition may be expected to request permission to form trade agreements.—Page 485.

If you are thinking of taking on a new product, give careful consideration to standardizing it as far as possible with your present products. Important economies can be gained by making parts interchangeable, and keeping to as low a point as possible the new items to be bought, made, and stocked.—Page 458.

Shortening of small tools during pack-hardening may be reduced by raising the temperature. A tap one-half inch in diameter may contract 0.0015 in. to 0.002 in. per inch of length when pack-hardened at 1475 deg. Fahr. If the temperature be raised to 1575 deg. the shortening will be reduced to about 0.0005 in. per inch on an average.—Page 469.

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Steel Tonnage Prospect for 1928

JANUARY is a month of unusual importance in supplying an indication of the course of steel production. Some of the other months of the year may have important swings in the trend just ahead of them. The American Iron and Steel Institute report of Bessemer and open-hearth ingot production in January was reproduced on page 414 of last week's IRON AGE, indicating, with an estimate of electric and crucible production, a rate of 153,000 tons of all ingots per working day.

The past four years have been years of unusual steadiness in steel and their record as to monthly variations is therefore worthy of careful study at this time, since there is no fundamental reason for expecting 1928 to depart radically from the precedent thus set up. These four years had certain similarities and certain differences. They all had increasing production in the first three months and decreasing production in the next four months, while the last five months showed divergences.

A noteworthy point was that, while March was the high month of production in each of the four years, the respective March figures showed astonishingly little variation. The March average was 164,309 tons of ingots per working day, and the average divergence, either up or down, was only 1.67 per cent. The four Decembers preceding March, on the other hand, had average variations of 7.8 per cent from their average, which was 134,519 tons of ingots per working day. Accordingly when there was a low December there was a large percentage increase in the next three months, and vice versa. Production got to the same point in the end.

January has been showing less variation than December, but more than March. In 1924, January production was light, while in the next three years it was rather heavy. The January average in the past three years was 153,470 tons a day, conforming closely to the 153,000 tons just reported for last month. It is plain, then, that steel production is now in such a swing as to indicate that next month will do as well as March has done so uniformly in the past four years. The four-year average for March, as noted above, was 164,309 tons a day, while the March average in the past two years was 167,000 tons a day, and that rate seems the more natural. It would represent 9 per cent increase over last month's production, and a 90 per cent engagement of capacity according to the institute's present capacity rating.

The four increases the Steel Corporation has had in unfilled obligations, October to January inclusive, lend substantial support to such an expectation. The four-month increase was 1,127,834 tons, while the same months a year ago had a much smaller increase.

A downward turn after March has occurred in each of the past four years, but it promises to be less extensive this year, if it comes. Apparently the automobile industry will reach its high operating rate later than usual, and freight car buying is coming somewhat later than it did last winter. It now seems likely that only a very indifferent performance in the second half will keep this year from exceeding the steel output of 1927.

Lower Accident Rate in Foundries

A GOOD gage of what is being accomplished in some metal-working industries in the reduction of accidents is found in the sliding down of workmen's compensation insurance rates. Lower rates, at least in some States, cut the overhead down to the extent that the premium is reduced, although the gain from reduction in the number of employees absent because of injuries cannot be measured in dollars and cents. The steel foundries of Ohio are a conspicuous example of an industry that has done much to eliminate accidents and cut the cost of workmen's compensation insurance. The State insurance rate in this branch of the foundry industry a few years ago was $2.40 per $100 of payroll. This was reduced in the last half of 1927 to 70 cents per $100 of payroll. The State insurance rate for gray iron foundries in Ohio, formerly $1.35 per $100 of payroll, is now $1.20. Accident hazards are generally regarded as greater in steel foundries than in other branches of the foundry industry. Steel manufacturers have been especially forward in safety work, both in an educational way and in the installation of safety appliances, and this has been reflected to a large degree in the steel foundries.

While many gray iron foundries, particularly larger plants, have kept pace with the steel foundries in accident prevention work, there is the difference that many of the gray iron foundries are quite small and apparently have not given so much attention to accident prevention as have the larger plants. Because of this, foundry accidents in Ohio are more numerous in gray iron foundries, thus necessitating higher compensation rates than the steel foundries have to pay. At the same time the reduction in the insurance rate for gray iron foundries indicates that these, too, are making some progress in accident prevention.

The Recent Vogue of "Cover It Up"

A GENERATION ago the muckraker flourished, and "pitiless publicity" was the rule. Of more recent years, there has been a swing to the opposite extreme. Absolute silence is the best policy. If there is a disturbing situation existing—say nothing about it, maybe it will blow over. If there is a scandal, hush it up— people soon forget. It is a reversion to the Victorian style of "cover it up."

One plan is no better than the other. A particularly discouraging development of the gumshoe policy is the increasing use of the legal dodge: "I decline to answer on the ground that it might tend to incriminate me," or "on advice of counsel, I refuse to answer," as well as the ability of important parties to pending court proceedings to discover pressing business in South America, or that their health requires a year in Florida, or an opportunity to consummate a life-long desire to spend their declining years among the capitals of Europe.

At times one suspects an organized conspiracy of silence. When any witness (or his lawyer) can judge whether or no his information reflects upon his character, and then hide behind a legal barrier, what is the function of court? More than once such a policy has resulted in gross obstruction of justice by concealing the criminal until too late to punish him.

In such circumstances it is heartening to read the recent letter of John D. Rockefeller, Jr., to Col. Robert W. Stewart, chairman of the board of directors of Standard Oil Co. of Indiana, wanted in Washington on the odoriferous oil case, but happening to be in Havana, on his way to Mexico. The letter said: "No desire, however praiseworthy, to protect those who may have been guilty of wrongdoing justifies the withholding of any slightest fact that will help to clear up the situation."

It remains to be seen whether Mr. Rockefeller's personal influence will be sufficient to enlist the unreserved adherence of the Standard Oil Co. of Indiana to the cause of prompt justice. The fact that this plan will clear that company's name does not detract from the fundamental truth behind Mr. Rockefeller's sentiments. Neither does the enunciation of it by him add to the essential soundness of the policy of frankness and honesty. The pronouncement is notable chiefly for the prominent attention it will draw to a principle of sound business ethics, obscured by much gum-shoeing tactics. It is worthy of repetition:

"No desire, however praiseworthy, to protect those who may have been guilty of wrong-doing justifies the withholding of any slightest fact that will help clear up the situation."

Amending the Sherman Law

THERE has been less comment than might have been expected on the proposal of Secretary of Labor Davis that the Sherman Law be amended in favor of the coal industry, so that coal operators could go before the Federal Trade Commission or the Attorney-General to secure a permit to consolidate and form trade agreements. Mr. Davis advocated such modification of the anti-trust act at a meeting in Syria Mosque, Pittsburgh, Jan. 28, and presumably his remarks were given sufficient publicity to provoke response if there were genuine interest in the subject.

Perhaps, however, the public was so artless as to take it that such a procedure in favor of the coal industry would have no sequel; that since no other industry is in as poor shape as the coal industry no other would seek the pleasant relief that might thereupon be obtainable with adequate effort. Perhaps, indeed, and not improbably, Mr. Davis did not consider fully the consequences, believing that coal is in a unique position because a labor union of large membership is involved.

When the proposition is put forth by a member of the Cabinet we are entitled to weigh it carefully. Mr. Davis is quoted as having said that, while two years ago there were 260,000 miners too many, now there are 300,000 too many. One can hardly take it that he would expect the combinations he advocates would tend to increase the consumption of coal and bring about the employment of more men. Rather there would be provided more funds for the mechanization of mines. The benefit then would be largely to the coal operators, suffering at present from too much competition.

Where, then, would the line be drawn? The courts having decided long ago that the Sherman Law should be viewed in the light of reason, it is fair to take it that in any industry there should be a reasonable amount of competition and in none should there be an unreasonable amount. Few are the industries today in which the members do not feel that there is an unreasonable amount of competition.

One can hardly go so far in fancy as to believe that Congress would draw its Sherman Law amendment in form referring specifically to coal or that if it did so the courts would approve the act as constitutional. The amendment would have to be general in character, referring to the degree of competition from which relief could be sought. The interesting question then would be which other industry would first arrive in Washington. The copper producers, who have accomplished more of late than formerly in curbing their competitive spirit, would doubtless be prompt in seeking entrance into a broader field of effort in reducing their competition to reasonable proportions. The steel industry would well be entitled to seek relief.

Some very simple consolidations in steel have resulted in protracted investigations by the trade commission. One may even imagine that in course of time even the automobile industry would go to Washington.

At any rate it must be put on record that in one case at least there has been such competition as to move a Cabinet member to propose that the United States Government reduce its restrictions. If there are not other cases in the same category at present there may be in future, or the idea of how bad the competition should be before relief is justified may be modified so as to include other cases. Here is evidence that some progress is being made in our thinking on the Sherman Law.

Minimum Wage Laws Waning

MINIMUM wage legislation in the United States has lost much ground. Of the 16 jurisdictions, represented by 15 States and the District of Columbia, which have experimented with minimum wage laws for women, eight have had the legislation held unconstitutional, repealed or otherwise nullified through legal procedure, according to a survey made by the National Industrial Conference Board. In 1923 the United States Supreme Court declared minimum wage laws unconstitutional in relation to adult women, so far as their mandatory provisions were concerned.

The Conference Board points to Massachusetts as the only strictly industrial State having a minimum wage act, and this law is non-mandatory. The only penalty that the State wage board may impose is the publication of names of companies that ignore decrees recommending minimum rates for women and boys. As a consequence, the difficulties of administering the Massachusetts law have proved so great that after 12 years of operation wage decrees have been issued for only 21 occupations, in which not more than 87,000 out of an approximate total of 500,000 women wage earners in the State are employed. At the present time, says the report, the Massachusetts law is the only type of minimum wage legislation likely to be a factor in the future.

The board calls attention to the fact that mandatory minimum wage acts are operating in California, Oregon and Washington, but that they "are to be considered as enforceable only so long as there is no opposition serious enough to result in a court test, in view of the Supreme Court's repeated findings unfavorable to the mandatory type of law. Specific local conditions, such as the lack of competition from other States for the industries prevailing in these Pacific Coast States, are believed principally responsible for such absence of opposition to the law."

The Industrial Welfare Commission of California, which has jurisdiction over 130,000 women workers, recently published a report on the operation of the minimum wage law of that State. According to this survey, certain arguments that have been raised against minimum wage laws have been satisfactorily answered by California experience. Instead of the minimum wage becoming the maximum wage, more and more women workers are receiving above the minimum, now set at $16 a week. Moreover, the number of women receiving considerably higher pay is increasing. For example, in 1919, with a minimum wage of $10, only 446 women received more than $30 a week. In 1925, under a $16 minimum, the number had increased to 6084. The sub-standard workers have not suffered loss of employment, the commission finds, since the employer may apply for permits for such women and legitimate requests are granted. As for the contention that apprentices and unskilled workers would be dropped when they reached the minimum wage and their places taken by cheaper help, experience has proved, as it has elsewhere in industry, that men and women, following training, are soon absorbed in the ranks of skilled workers.

Whatever the experience has been on the Coast, the fact remains that in Massachusetts the minimum wage law has had little effect on what are generally thought of as the manufacturing industries, as distinguished from such establishments as laundries and bakeries. On the contrary, the wages of women in manufacturing industries have gone up with other wages, following economic laws. The aim of owners has not been to lower wages, but to increase volume of production per labor hour. This has been effected to an extent by better equipment and methods and, taking the average run of labor, perhaps still more by adoption of piece-work rates, which stimulate the efforts of the unwilling and the lazy. Under such conditions a minimum wage law is not needed.

Barometers of Industry

PIG iron production is still regarded in many quarters as the most reliable single business indicator we have. Its vogue appears to be on the wane, however, and efforts have been made to find a satisfactory substitute. Some statisticians have regarded steel ingot production as a more reliable gage than pig iron, partly because changing metallurgical factors have made pig iron less important in steel making and partly because of some substitution of other forms of metals for castings.

Electric power consumption is one of the new indicators. Its use in this way was discussed at a recent New York conference of economists and statisticians. The point was made that, over the period during which these figures have been available, the curve (when modified as suggested below) has been practically parallel with that of pig iron. Obviously such a measure will have to be handled with a great deal of caution. It has a large element of seasonal activity, hence the lighting load should be eliminated before attempting to use the figure. There is a rapid change under way in the electrification of industry. This must be evaluated if we are to depend on the indications of the electric power factor.

It was the consensus of opinion at the meeting referred to above, which was under the auspices of the National Industrial Conference Board, that a single indicator, whether it be one of those mentioned above, or in itself a composite of a number of items, is exceedingly helpful to industry as a gage of conditions. Sharp distinction was drawn between industrial activity on the one hand, which connotes volume only, and business conditions on the other, which involve also considerations of profits and general business welfare. It was generally agreed, however, that each line of business is subject to influences independent of the general situation and hence must have its own index, expressed or implied, as well as the general index, if courses are to be charted with satisfactory assurance.

The fact that the pig iron and steel production figures are available earlier than those of any other index we now have, and with virtually 100 per cent of completeness in them, suggests that after all they, or one of them, should continue to be the first reliance of those attempting to pilot business. Representing raw materials, and entering virtually every industry in some degree, they carry a large element of prophecy, as their history has amply proved.

NEW STEEL ASSOCIATION

Merger of Sheet and Strip Organizations Approved—G. H. Charls to Be President

DEVELOPMENTS have come rapidly since the announcement in THE IRON AGE of Feb. 9 that a merging of the National Association of Sheet and Tin Plate Manufacturers, the Hot-Rolled Strip Steel Institute and the Cold-Rolled Strip Institute into a single organization was in the making. Meetings of the three associations were held in Pittsburgh last week and reports of committees that had been appointed to investigate the proposal were presented and approved. Details of organization since have been getting the attention of the committees of the three organizations, which have delegated to G. H. Charls, commissioner of the Hot-Rolled Strip Steel Institute, and E. T. Sproull, head of the Cold-Rolled Strip Steel Institute, full authority to draw up the constitution and by-laws of the new association, which may be known as the National Association of Flat Rolled Steel Manufacturers.

E. THEODORE SPROULL GEORGE H. CHARLS

It will take a little time to work out the various details in connection with the new organization, its purposes and the scope of its activities, but Mr. Charls says that in a general way it will be patterned after the National Association of Sheet and Tin Plate Manufacturers in the matter of statistics, costs and labor bureaus, in sales promotion, production and consumption investigations, and will undertake other legal activities that not only the manufacturers but the general public may walk in the light of accurate information.

"Any agreement, understanding, combination or arrangement or any form of concerted action to curtail production, increase prices, suppress competition or otherwise restrain trade or commerce or to monopolize or attempt to monopolize any part of the trade or commerce of the country," said Mr. Charls, "is expressly excluded from the purpose or object of the association and contrary to its purposes."

All developments to date have been tentative, but the plans as they have so far crystallized, mean an organization along the lines of any business corporation, with a president and other executives with definite responsibilities. Mr. Charls will be president and he will have to assist him two vice-presidents, E. T. Sproull, who will continue his present work in connection with cold-rolled strip steel, and A. N. Flora, who has been vice-president in charge of sales of the Trumbull Steel Co., Warren, Ohio, who is to supervise the new organization's activities relating to sheets and hot-rolled strips. It is probable that Cleveland will be the location of the headquarters of the new association.

The men who are to be responsible for the direction of the new body have long been identified with the manufacture and sale of the products embraced in its activities. Mr. Charls was for many years associated with the American Rolling Mill Co. and subsequently was with the United Alloy Steel Corporation, of which he was president when it was merged with the Central Alloy Steel Co. into what is now the Central Alloy Steel Corporation. Mr. Sproull, who assumed the commissionership of the Cold-Rolled Strip Steel Institute last May, was previously for 20 years active in sales and executive capacities in the steel industry, having been with the American Sheet & Tin Plate Co. in Pittsburgh, and the Jones & Laughlin Steel Corporation before going with the Trumbull Steel Co., of which he was general manager of sales for several years; he was assistant to the president when he left that company to become general manager of sales of the Oliver Iron & Steel Corporation, Pittsburgh. Mr. Flora has been active in the affairs of the Trumbull Steel Co. and besides being vice-president in charge of sales gave much time to matters pertaining to labor and wage scales, in which he is regarded as an expert.

Otis Steel Co. to Add Three Open-Hearth Furnaces

Directors of the Otis Steel Co., Cleveland, have authorized the construction of building space and complete overhead equipment for three additional open-hearth furnaces at its Riverside plant. One furnace of 125-ton capacity will be built this year. This furnace and building extensions will involve an expenditure of approximately $550,000. At present with five open-hearth furnaces the company's ingot capacity is insufficient to meet its requirements. President E. J. Kulas, in announcing the extensions, said that, with the increased steel-making capacity, important operating savings will result which should be reflected in earnings. This was demonstrated in January when the company was able to operate on an inventory of ingots, slabs and sheet bars accumulated in the dull period late last year. This, he stated, resulted in a marked gain in earnings and prompted the directors to decide to increase the steel-making capacity.

American Rolling Mill Co. Sells Natural Gas Rights in Kentucky

Financial interests in Cincinnati, Pittsburgh and New York identified with the Hope Engineering & Supply Co., a West Virginia corporation with plants at Mount Vernon, Ohio, and with the Inland Gas Corporation, which is engaged in producing and selling natural gas in eastern Kentucky, have purchased from the American Rolling Mill Co. the natural gas rights on Armco property near its continuous sheet mill at Ashland, Ky., and also on land which the American Rolling Mill Co. had leased for natural gas development. The consideration was $3,000,000 cash.

Iron and Steel Markets

Steel Output at Sustained Rate

Slight Gain in Production of Heavy Finished Products Offset by Lower Sheet Mill Operations—Large Awards of Structural Steel—Hot-Rolled Strip Prices Advanced

STEEL production is approaching a state of equilibrium, and current market activity is limited mainly to specifying against past commitments.

A retarded rate of buying is not surprising in view of heavy purchases occasioned by an advancing market and the obvious advantage to consumers of taking full shipments against orders placed at lower prices. This development has raised the question whether buyers are not anticipating some of their second quarter needs in present specifications. The extent of such speculative activity, if there be any, cannot be measured at this time. Certainly no such motives will influence specifying against contracts for rails or releases against tonnages for specific work, such as railroad car construction or the fabrication of building and bridges.

Incidentally, much of the recent increase in mill bookings has been due to railroad purchases and construction activity. Moreover, producers making the heavier rolled products used in those avenues of consumption have experienced the sharpest gains in both bookings and output. The Steel Corporation, for example, has increased its operations to 90 per cent of capacity, as compared with 88 per cent a week ago. On the other hand, plants in the Youngstown district, a leading center of sheet production, have been forced to curtail output slightly.

Sheets are in marked contrast with the heavier rolled products. January production by independent sheet manufacturers was 99 per cent of capacity, while shipments were at the rate of only 78 per cent. The explanation for this excess in output seems to lie in lagging specifications, particularly from the automobile industry. Motor car production continues to gain, but more slowly than was anticipated. In fact, the gradual character of the increase is regarded as one of the best promises of sustained demand for steel.

Maintenance of a high rate of ingot production is assured for a month or more despite divergent situations in different finished products. The large volume of specifications against such products as bars, plates, shapes and rails is enough to make this result reasonably certain. And in a market still lacking in entirely uniform tendencies, it is well to note that at Chicago, where demand for heavier rolled products has been heavy, new business in plates, shapes and bars continues to balance output, leaving mill backlogs undiminished in size. Production at Chicago remains at 92 per cent of capacity, while the average for Pittsburgh and nearby districts is between 75 and 80 per cent.

Part of the activity of Chicago mills is accounted for by construction work. In the Chicago district alone structural steel orders for the week exceed 50,000 tons, including 19,000 tons for a Chicago civic opera building. The total for the country is close to 68,000 tons, making the week the second largest in point of tonnage so far this year. Other large awards were 11,000 tons for a bridge at Vicksburg, Miss., and 8000 tons for a viaduct in Milwaukee. Pending projects were enlarged by inquiries for upward of 29,000 tons. Two drainage improvement jobs in Los Angeles will take 6400 tons of reinforcing bars, and 4500 tons has been awarded for the Cleveland Union Terminals.

Railroad purchases include 15,000 tons of structural steel for bridges placed by the Santa Fe and 1000 steel hopper car bodies ordered by the Norfolk & Western. Except for the latter, the railroad equipment market is devoid of important awards or inquiries. The Canadian National Railways have divided nearly 30,000 tons of rails among Canadian and American mills, the latter getting 11,550 tons. The Wabash is inquiring for 4800 tons of tie plates.

The upward trend of steel prices this week extends to hot-rolled strips, on which a new price schedule for the remainder of this quarter, and for second quarter not only puts quotations $1 to $2 a ton higher, but establishes four groups of widths, each taking its own base price. Sheet manufacturers have announced the opening of books for second quarter at 2.90c., Pittsburgh, for black, 2.10c. for blue annealed, 3.75c. for galvanized and 4.15c. for automobile body sheets, Pittsburgh. Except on the latter, these were the prices announced last year for first quarter, but which did not become fully effective because of heavy sales at lower figures.

Pig iron business has been fairly brisk in some districts but almost stagnant in others, notably in Pittsburgh and the Valleys. Sales were 25,000 to 30,000 tons at Buffalo, 25,000 tons at Cleveland, 10,000 tons at New York and at Boston. At St. Louis there are inquiries for 10,000 tons. A radiator manufacturer has bought 30,000 tons for various plants for second quarter at slightly higher prices than ruled on its first quarter tonnage. A Delaware River cast iron pipe manufacturer bought 10,000 tons from the Everett, Mass., furnace. Pig iron shipments are unusually heavy at Chicago. The new base price of $20 on eastern Pennsylvania iron has become established by small-lot sales, but in New England prices are again unsettled. In some other districts prices are firmer but no higher.

Both of THE IRON AGE composite prices have advanced. Higher prices on wire products have raised the finished steel composite to 2.364c., from 2.350c. last week. It is now at the highest point since mid-September. Pig iron has gone to $17.75 from $17.67 last week, because of an advance in eastern Pennsylvania foundry iron.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 14, 1928	Feb. 7, 1928	Jan. 17, 1928	Feb. 15, 1927
No. 2 fdy., Philadelphia..	**$20.76**	$20.26	$20.26	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*...	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa....	19.50	19.50	19.50	21.00
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*......	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh....	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago....	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$43.00	$43.00	$43.00	$43.00
Light rails at mill........	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh..	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	34.00
Forging billets, P'gh......	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh....	1.85	1.85	1.80	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.12	2.12	2.12	2.12
Iron bars, Chicago........	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh.....	1.85	1.85	1.80	1.90
Steel bars, Chicago.......	1.95	1.95	1.90	2.00
Steel bars, New York.....	2.19	2.19	2.14	2.24
Tank plates, Pittsburgh...	1.85	1.85	1.80	1.85
Tank plates, Chicago......	1.95	1.95	1.90	2.00
Tank plates, New York....	2.17½	2.17½	2.12½	2.19
Beams, Pittsburgh........	1.85	1.85	1.80	1.90
Beams, Chicago	1.95	1.95	1.90	2.00
Beams, New York........	2.14½	2.14½	2.09½	2.24
Steel hoops, Pittsburgh....	2.20	2.20	2.20	2.20

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Feb. 14, 1928 Cents	Feb. 7, 1928 Cents	Jan. 17, 1928 Cents	Feb. 15, 1927 Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.80	2.80
Sheets, black, No. 24, Chicago dist. mill..........	3.00	3.00	3.00	2.90
Sheets, galv., No. 24, P'gh.	3.65	3.65	3.65	3.70
Sheets, galv. No. 24, Chicago dist. mill..........	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill..........	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh....	**2.65**	2.55	2.55	2.55
Wire nails, Chicago dist. mill	**2.70**	2.60	2.55	2.60
Plain wire, Pittsburgh....	**2.50**	2.40	2.40	2.40
Plain wire, Chicago dist. mill	**2.55**	2.45	2.45	2.45
Barbed wire, galv., P'gh..	**3.35**	3.25	3.25	3.25
Barbed wire, galv., Chicago dist. mill	**3.40**	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh'	$15.00	$15.00	$15.00	$16.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.50	13.00
Carwheels, Chicago.......	14.00	14.00	14.00	15.00
Carwheels, Philadelphia...	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia...	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot, Phila....	*15.00*	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.00	11.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	**$2.75**	$2.60	$2.75	$3.50
Foundry coke, prompt....	3.75	3.75	3.75	4.25
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.25	13.00
Electrolytic copper, refinery	13.87½	13.87½	13.87½	12.75
Zinc, St. Louis..........	*5.60*	5.65	5.62½	6.67½
Zinc, New York.........	*5.95*	6.00	5.97½	7.02½
Lead, St. Louis..........	*6.12½*	6.22½	6.30	7.30
Lead, New York.........	*6.35*	6.50	6.50	7.40
Tin (Straits), New York..	*51.87½*	53.25	54.25	68.75
Antimony (Asiatic), N. Y.	11.00	11.00	11.00	14.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Mill Operations at 75 to 80 Per Cent But New Business is Light

PITTSBURGH, Feb. 14.—Steel consumers still are specifying very steadily against old orders but seemingly are meeting the great bulk of their requirements from these releases, since new business is of very moderate proportions. This is not an altogether unexpected situation, because prices have been advancing pretty steadily since the opening of the year and it was natural that buyers should take every step to defer as long as possible paying the higher prices, and this they are doing by taking full shipments against their older and lower-priced commitments.

Comparatively light new engagements do not appear to be diminishing steel works and rolling mill operations, except possibly in the Youngstown district, where in some lines output was speeded up to a greater extent than was called for by shipping instructions. With a reduction in backlog business, notably in sheets, there has been a halting in the upward tendency in production.

Pittsburgh and nearby districts are producing ingots at between 75 and 80 per cent of capacity, an even higher operation by the leading producer making the average closer to 80 than to 75 per cent. A good order book in the various steel products at the opening of the year has been further augmented by the business driven in by the price advances, and the maintenance of steel plant activities for the next 30 days is not entirely dependent upon new business. Taking out of their purchases by buyers will be sufficient.

The second quarter promises to be an interesting one in the steel market, for most of the price advances that have been announced over the past three or four weeks have been related to that period on account of the heavy obligations that existed for this quarter's production. There is not much disposition on the part of consumers to question the claim of manufacturers that they are entitled to prices that permit a fair return, but a more interesting phase that will be determined in the quarter beginning April 1 is whether consumers are not anticipating some of their needs for the next quarter in their current specifications. Steel ingot production rose rapidly in January and is holding well to the higher rate this month. Since very little urgency has been observed in the specifications, there naturally is some concern as to whether actual consumption of steel has increased as much as production.

Makers of hot-rolled strip steel in the past week have come out with definitely higher prices, the advance averaging $2 per ton. Informally opening their books for second quarter business, sheet makers have reaffirmed the nominal first quarter prices of the common finishes and have advanced automobile body sheets $3 per ton. The prices on the common finishes represent advances of from $1 to as much as $4 a ton over those at which much of the current shipments are invoiced.

The Pittsburgh and Valley pig iron market still is dull and markedly so by comparison with other markets. There is little activity in the scrap market, although one fair-sized sale of heavy melting steel at $15 is noted. A temporary shortage of beehive oven furnace coke was created by some extra purchases by a Valley iron maker and a rise of 15c. per ton in the price does not promise to hold out the week.

Pig Iron.—This market continues to run behind others in point of activity and in developing strength in prices. The Westinghouse Electric & Mfg. Co. has put out an inquiry for its second quarter requirements of foundry iron, but does not name a specific tonnage. No other second quarter inquiries of importance are before producers and current demand still runs to small lots. Consumers are taking out iron on old orders very steadily, but the fact that so little second quarter demand yet has developed makes it apparent that the coverage given buyers in the latter part of last year was extensive. Pig iron producers still say there is no profit in present selling prices and would like to see them advance, but that is proving difficult in face of liberal stocks on furnace yards and the fact that demand is so limited. The Shenango Furnace Co., which recently blew in its No. 1 furnace, late last week put out its No. 3 furnace for relining.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Bars, Plates and Shapes.—Buyers are specifying well on old orders carrying lower prices than now prevail, the movement of bars being particularly good, but evidently consumers are meeting the great bulk of their requirements from steel ordered late last year and in January, as strictly new buying is of moderate proportions. Prices on new business are firm at 1.85c., base Pittsburgh, on all three products, and there is still a suggestion that with the opening of books for second quarter a higher price will be sought. Structural steel lettings are light in this district, but fabricators now find inquiry to be running a little heavier in small projects than was true recently.

Rails and Track Supplies.—Steady movement of standard-section rails against 1928 contracts is reported, but as yet not much activity has developed in spikes and other track supplies. There is nothing new as to prices.

Sheets.—Several of the independent companies late last week announced the opening of books for second quarter at 2.90c., base Pittsburgh, for black sheets; 3.75c., base, for galvanized; 2.10c., base for narrow and 2.20c., base, for wide blue annealed sheets, and 4.15c., base, for automobile body sheets. These prices, which are a reaffirmation of the formal first quarter prices, have since been announced by the American Sheet & Tin Plate Co. There continues to be free, but hardly urgent, specifying on old orders, but new business is in moderate volume. The prices just announced are being applied on new business for the remainder of first quarter, as well as on second quarter contracts, by makers representing a large part of the country's capacity, but the competition for orders for early rolling still produces some shading.

Tin Plate.—New business is very light, since all of the important consumers are under contract for their requirements for the first half of this year. Specifications on contracts are flowing in steadily enough to provide an average mill operation of approximately 80 per cent. In connection with the weakness of pig tin, tin plate makers say that it was largely discounted in the reduction made in tin plate prices last November.

Hot-Rolled Flats.—One large Pittsburgh district producer has announced the following price schedule, effective at once and applying on new business for shipment during the remainder of this quarter and on second quarter contracts: Widths under 3 in., 2.20c. to 2.40c., base Pittsburgh; 3 in. to but not including 6 in., 2.10c. to 2.20c., base; 6 in. to but not including 12 in., 1.90c. to 2c. The Chicago base prices are $2 per ton over the Pittsburgh bases. On strips from 12 in. to 24 in. wide, 16-gage and heavier, prices are to be based on plates at 1.85c., base Pittsburgh, and blue annealed at 2.20c., base Pittsburgh. It is expected that other makers will adopt this price schedule. Specifications on old orders are good, but new business is light.

Ferroalloys.—Liberal shipping instructions against contracts for spiegeleisen are reported, but takings of ferromanganese still are moderate and there has been a slight letdown in ferrosilicon. New business does not amount to much. Prices are unchanged.

Semi-Finished Steel.—There continues to be a fairly heavy movement of billets, slabs and sheet bars in keeping with good operating rates of non-integrated makers of strips, sheets and tin plate, but open market activity is limited. Forging quality billets and blooms reflect in demand the upward trend of automobile production. The pipe market is not active enough to produce much specifying of skelp. Wire rods are moving well against contracts for this quarter, but new business amounts to little, since users generally are well covered. The present price of $44, base Pittsburgh or Cleveland, is not being paid frequently or on much tonnage.

Wire Products.—Good movement is noted of these products against first quarter contracts, carrying lower prices than now are generally quoted, but it is a little early for much second quarter business and because of full coverage of buyers for this quarter, there are few new demands. There is no evidence that producers are going below $2.65 per keg, base Pittsburgh, for nails and $2.50 per 100 lb., base, on plain wire, but getting these prices on any considerable amount of tonnage necessarily waits on the spring movement into consumption and the incident reduction of jobbers' stocks. Stocks of nails in second hands are believed to be heavy enough to cause some slackness in second quarter ordering.

Tubular Goods.—Inquiry has reached some producers for approximately 400 miles of 20-in., 22-in. and 24-in. pipe for a gas line to run from Amarillo, Tex., to Kansas City, but the formal inquiry for the pipe for the gas line to run from Monroe, La., to St. Louis is yet to reach the mills, although it is understood that banking interests have expressed willingness to finance the project. While there continues to be a steady expansion in the demand for standard-weight pipe, there has

THE IRON AGE Composite Prices

Finished Steel

Feb. 14, 1928, 2.364c. a Lb.

One week ago	2.350c.
One month ago	2.314c.
One year ago	2.374c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Feb. 14, 1928, $17.75 a Gross Ton

One week ago	$17.67
One month ago	17.67
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
.b. Pittsburgh mills	1.85c.
.b. Chicago	1.95c. to 2.05c.
'd Philadelphia	2.17c.
'd New York	2.19c.
'd Cleveland	2.04c.
.b. Cleveland	1.85c.
.b. Lackawanna	1.95c.
.b. Birmingham	2.10c.
.f. Pacific ports	2.35c.
.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

.b. Pittsburgh mills	1.90c. to 1.95c.
.b. Birmingham	2.05c. to 2.15c.

Rail Steel

.b. mills east of Chicago district	1.75c.
.b. Chicago Heights mill	1.80c.

Iron

mmon iron, f.o.b. Chicago	1.90c.
fined iron, f.o.b. P'gh mills	2.75c.
mmon iron, del'd Philadelphia	2.12c.
mmon iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
.b. Pittsburgh mills	1.85c.
.b. Chicago	1.95c. to 2.05c.
.b. Birmingham	2.10c.
'd Cleveland	2.04c.
'd Philadelphia	2.10c.
.b. Coatesville	2.00c.
.b. Sparrows Point	2.00c.
.b. Lackawanna	1.95c.
'd New York	2.17½c.
.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
.b. Pittsburgh mills	1.85c.
.b. Chicago	1.95c. to 2.05c.
.b. Birmingham	2.10c.
.b. Lackawanna	1.95c.
.b. Bethlehem	2.00c.
'd Cleveland	2.04c.
'd Philadelphia	2.13c.
'd New York	2.14½c.
.f. Pacific ports	2.35c.

ot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
gages, 2 in. and narrower, P'gh,	2.10c. to 2.20c.
gages, wider than 2 in., to 6 in., P'gh,	2.05c. to 2.10c.
ll gages, 6 in. and wider, P'gh	1.85c. to 1.90c.
gages, narrower than 6 in., Chicago,	2.20c. to 2.40c.
gages, 6 in. and wider, Chicago,	2.00c. to 2.20c.

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*Mills follow plate or sheet prices according gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
rs, f.o.b. Pittsburgh mills	2.20c. to 2.25c.
rs, f.o.b. Chicago	2.20c. to 2.30c.
rs, Cleveland	2.30c. to 2.35c.
afting, ground, f.o.b. mill	*2.45c. to 2.90c.
rips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
rips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
rips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
rips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

o jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
ire nails	$2.65
alvanized nails	4.65
alvanized staples	3.35
olished staples	3.10
ement coated nails	2.65

	Base Per 100 *Lb.*
right plain wire, No. 9 gage	$2.50
nnealed fence wire	2.65
pring wire	3.50
alv'd wire, No. 9	3.10
arbed wire, galv'd	3.35
arbed wire, painted	3.10

Chicago district mill and delivered Chicago ices are $1 per ton above the foregoing. Biringham mill prices $3 a ton higher; Worcester, ass., (wire) mill $3 a ton higher on production that plant; Duluth, Minn., mill $2 a ton gher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32⅛	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

been no appreciable gain in the call for oil well pipe, except from California, where drilling is fairly active, and unless there is a decided change in the oil situation, pipe makers will have to place considerable dependence this year on line pipe business. Most of the oil well pipe going to California is seamless. In keeping with the upward tendency in steel prices in general, some talk is heard of a possible stiffening in pipe prices. This originates with jobbers, who, on account of uncertainty in prices, are said not to have made much money and they would welcome a step by manufacturers which would stabilize the market. On standard-weight pipe the makers are quoting the card discount plus 1, 5 and 2½ per cent beyond on carloads, but since the latter part of last year that quotation has not been strictly observed.

Cold-Finished Steel Bars and Shafting.—Buyers still are specifying in good fashion against first quarter contracts, but it is early for second quarter business and not much new spot business is developing in view of the fact that consumers are well covered for this quarter. On new business makers want 2.30c., base Pittsburgh or Chicago, but current shipments are mostly priced at $2 a ton less. Takings for parts for a low-priced motor car are moderate and some producers have not had orders for almost two weeks.

Cold-Rolled Strips.—Makers generally have opened books for second quarter business at 3.15c., base Pittsburgh or Cleveland, for lots of 1 up to 3 tons, or 2.90c. for lots of 3 tons or more. Current specifications on first quarter contracts, carrying prices $3 per ton below the new quotations, are sufficient to provide an operation of approximately 85 per cent of capacity. On second quarter business, fender stock strips are quoted at 4.30c. for No. 20 gage and at 4.35c. for No. 22 gage.

Bolts, Nuts and Rivets.—Demand for bolts and nuts is steady but it imposes no strain upon productive capacity. Rivets are not showing much life. Prices of these products are firm.

Coke and Coal.—Spot beehive oven coke is quotable at $2.75 per net ton at ovens, but the causes which led to this price, representing an advance of 15c. a ton, have disappeared and there is doubt that this price will hold to the end of the week. The putting in of a second furnace by a Valley pig iron producer occasioned the extra demands that shortened the supply over the latter part of last week, but this producer since has taken off a furnace and now needs no extra supplies. Foundry coke prices are the same as a week ago. The coal situation presents nothing new except in the effort of the miners' union to give life to a strike that practically has long ceased to exist. There is to be a Senatorial inquiry into the situation.

Old Material.—The market is stronger on machine shop turnings, which have sold at $11.50, and also is higher on blast furnace material because of the fact that Ohio melters are again taking shipments. Heavy melting steel has been sold for delivery at one point in the district at $15. This grade still is quotable from $14.75 to $15.25, as dealers are paying the latter price on short orders at one destination and are getting supplies at $14.75 for delivery on short sales at another. Compressed and bundled sheet scrap commands a little more money than recently. Other grades show no particular change, and the market as a whole does not show the activity it did in former years when there was as sharp an increase in steel works operations as there has been in the past six weeks.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.75 to $15.25
Scrap rails	14.25 to 14.75
Compressed sheet steel	14.25 to 14.75
Bundled sheets, sides and ends	13.25 to 13.75
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	14.75 to 15.25
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.75 to 15.25
Industrial	14.25 to 14.75
Agricultural	13.75 to 14.25

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Ironton Iron and Steel Companies May Be Merged

Eastern interests are reported to be conducting negotiations looking toward the consolidation of iron and steel companies in the Ironton, Ohio, district. Options have been obtained on the properties of the Marting Iron & Steel Co., the Belfont Steel & Wire Co., the Norton Iron Works Co., excluding the Norton blast furnace, and the Ashland Steel Co. If the options are exercised the companies will be taken over and operated under one management and by-product coke ovens will be erected on the river front near the Marting and Belfont furnaces.

It is said that the plan, if carried out, will result in cutting down considerably the cost of producing pig iron at Ironton and will enable that district to regain some of the merchant iron business it has lost in recent months.

Such consolidation would include the blast furnaces of the Marting and Belfont companies, the nail and wire mill of Belfont, the wire cloth plant of Norton and the Bessemer steel mill of the Ashland Steel Co. The Norton furnace would be retained by the present owners to supply hot metal to the open-hearth furnaces of the Ashland plant of the American Rolling Mill Co. This furnace is now being modernized by the addition of new equipment.

The Belfont furnace of the Belfont Steel & Wire Co. was blown out on Feb. 2.

Rates on brass ingots and on copper scrap and brass scrap in carloads, from Newark, N. J., to points in New England territory are not unreasonable, according to a recent decision by the Interstate Commerce Commission in dismissing complaints by the Federated Metals Corporation.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
olling, 4-in. and over	$33.00
olling, under 4-in. to and in-uding 1¾ in.	$33.50 to 34.00
ging, ordinary	38.00 to 39.00
ging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
n-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c.
Sheared	1.85c.
Universal	1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $42 to $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
range Bessemer, 51.50% iron	$4.55
range non-Bessemer, 51.50% iron	4.40
abi Bessemer, 51.50% iron	4.40
abi non-Bessemer, 51.50% iron	4.25
h phosphorus, 51.50% iron	4.15

eign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
ore, low phos., copper free, 55 to 58% on in dry Spanish or Algeria	10.00c.
ore, Swedish, average 66% iron,	9.25c. to 9.50c.
ganese ore, washed, 52% manganese, om the Caucasus	39c.
ganese ore, Brazilian, African or Indian, sis 50%	38c. to 39c.
gsten ore, high grade, per unit, in 60% ncentrates	$10.25 to $10.75

	Per Gross Ton
ome ore, 45 to 50% Cr_2O_3, crude, c.i.f. tlantic seaboard	$22.00 to $24.00

	Per Lb.
ybdenum ore, 85% concentrates of oS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
rnace, f.o.b. Connellsville rompt	$2.75
undry, f.o.b. Connellsville rompt	3.75 to 4.50
ndry, by-products, Ch'go ovens	9.00
ndry, by-product, New England, del'd	11.50
ndry, by-product, Newark or ersey City, delivered	9.45 to 9.85
ndry, Birmingham	5.00
ndry, by-product, St. Louis	9.75

Coal

	Per Net Ton
e run steam coal, f.o.b. W. Pa. ines	$1.40 to $1.80
e run coking coal, f.o.b. W. Pa. ines	1.50 to 1.75
coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
e run gas coal, f.o.b. Pa. mines	1.75 to 1.90
m slack, f.o.b. W. Pa. mines	1.00 to 1.10
slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
chine bolts	70
rriage bolts	70
bolts	70
v bolts, Nos. 1, 2, 3 and 7 heads	70
-pressed nuts, blank or tapped, square	70
-pressed nuts, blank or tapped, hexagons	70
c. and t. square or hex. nuts, blank or pped	70
hers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

Bolts with rolled threads up to and including n. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Structural Steel Contracts 50,000 Tons—Ingot Output Steady at 92 Per Cent

CHICAGO, Feb. 14.—This is another heavy week in structural and bridge awards, the total reaching well up to 50,000 tons. Foremost among new contracts is 19,000 tons for the Chicago Civic Opera Building. The Santa Fe has awarded 15,000 tons of 1928 bridge work to the American Bridge Co., which will also furnish 11,000 tons for the main spans of a bridge across the Mississippi River.

The railroad equipment market can be gaged only by the size of specifications from car builders. The largest single inquiry in the Chicago market is for 500 cars. The trade believes that three or four large lots are still to come, but the railroads from which the inquiries are expected are marking time.

Specifications for finished steel products exceed production by a fair margin. Output holds steady at 92 per cent of ingot capacity. Wire mill engagement at 75 per cent clearly indicates the return of credit in farm communities. Orders for sheets have expanded and hot mills have been speeded at least 10 points in the week. The price structure in all steel commodities is more firmly established and Chicago producers are finding a wide field and less competition as natural territories become more clearly defined by freight differentials from producing points. New buying in plates, shapes and bars balances well with output so that steel mill order books are not diminished in size, notwithstanding heavy production.

Pig Iron.—Shipments of Northern foundry iron over the first half of February are a shade heavier than in the last two weeks in January, when local sellers shipped a larger tonnage of pig iron than in any like period since the fourth quarter of 1926. Shipping orders exceed output and producers are drawing heavily on stocks at the furnaces. The melt in malleable foundries is growing. While sales are not so heavy as last week, they are in good volume when it is considered that the first quarter is half over and second quarter buying would not normally get under way for several weeks. A user located north of Chicago is in the market for 2000 tons of foundry iron. Charcoal iron is moving in carloads at $27.04, delivered.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—New buying in these commodities is dull. Prices for ferromanganese are steady at $100, seaboard. Car lots of 19 to 21 per cent spiegeleisen bring $32, Hazard, Pa. Release orders on ferrosilicon are in good volume.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Deliveries on plates have advanced to a range of four to six weeks following heavy specifications from car builders and structural shops. Rolling schedules are well rounded out on universal mills, the more extended shipping dates applying particularly to that commodity. Considering the large capacity available there is an uncommonly good run of orders for wide sheared plates. Inquiry for tank plates now stands at 6000 tons, the increase over last week representing the requirements of several small users. Bids will go in this week on 2000 refrigerator cars for the Pacific Fruit Express. The Rock Island has come into the market for eleven 72-ft. gas-electric cars in addition to the 36 passenger cars inquired for a week ago. Engineers for the Chicago & Eastern Illinois are considering changes in design on the freight equipment that railroad will buy and it may be a week or 10 days before orders are placed. Prices are firm at 1.95c. to 2.05c., Chicago, for delivery until April 1. Producers are noncommital as to price policies for steel to be delivered in the second quarter.

Mill prices on plates per lb.: 1.95c. to 2.05c., base, Chicago.

Structural Material.—Of primary interest in the local market is the announcement that the McClintic-Marshall Co. will fabricate the 19,000 tons of structural steel required for the Chicago Civic Opera Building. This award, coupled with reports that two other building projects requiring a total of 30,000 tons of steel are near the closing point, makes this a most unusual week in structural business. Fabrication has been awarded at Milwaukee on 8000 tons required for the Sixteenth Street viaduct. Fresh among the large bridge requirements of the railroads is the announcement that the Missouri Pacific will take 4000 tons for a span at Little Rock, Ark. Deliveries on shapes now range from two weeks to six weeks and contracts recently placed indicate that shipments will soon be further extended. Fabricators are enjoying a substantial volume of business, but shops are not yet filled to the point where prices can be put above the levels of recent months.

Mill prices on plain material per lb.: 1.95c. to 2.05c., base, Chicago.

Rails and Track Supplies.—In new business this week is dull. Orders for standard section rails are small and bookings of track accessories were not over 6000 tons. Rail mills in the Chicago district are engaged at nearly full capacity. Track supply production stands close to the normal capacity of the trade supplied from mid-Western mills. Open weather of the past few weeks is favorable to track work and railroads are calling for rail deliveries in full accord with the shipping schedules arranged earlier in the year. Demand for light rails is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Bars.—New buying in mild steel bars continues to run ahead of shipments, while current specifications are keeping pace with deliveries from mills. Shipping orders from cold drawn manufacturers indicate that that industry is operating close to capacity. Road machinery plants are busy and farm machinery makers are holding to full schedules. Specifications for iron bars are light and backlogs are small. The situation is such that producers hesitate to ask higher prices and quotations remain at 1.90c., Chicago. One local producer of alloy steel bars is operating at capacity. Prices are firm. Demand for rail steel bars is swinging in line with that for other finished steel products. Specifications for the week exceed production by a comfortable margin for the first time since last fall. Deliveries are still prompt, but producers have been quick to take advantage of the easier arrangement of rolling schedules and they are not willing to give the "overnight" service which has been characteristic of this market for many months. Mill books have also grown, but not to the point where much consideration is being given to quotations above 1.80c., Chicago Heights mills, which is now the ruling price. Bed makers and barn equipment manufacturers are busy.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.05c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Cast Iron Pipe.—So far as public lettings and open inquiry are concerned, this market is about as dull as at any time in the past year. The only business of size in the market is 2000 tons of pipe on which Detroit has taken figures. It is reported that French makers entered the low bid. Several American foundries quoted figures close to $30, Birmingham. The freight rate from that point to Detroit is $7.92. Several orders this week from contractors total a fair tonnage, and based on actual inquiry a substantial amount of business is looked for from public utility operators. Sellers still talk of advances in prices, but nothing definite will be known until quotations made in Detroit are disclosed.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.20 to $36.20; 4-in., $38.20 to $40.20; Class A and gas pipe, $4 extra.

Sheets.—Present prices on sheets will no doubt be reaffirmed for second quarter. Some producers already have opened books for that period. Chicago delivered prices are 3.05c. for black sheets, 3.90c. for galvanized and 2.25c. to 2.35c. for the blue annealed product. Indications given a week ago that users' requirements would expand are well borne out, and production, following greatly increased specifications, has been increased to 88 per cent of hot mill capacity. Rolling schedules are now more than a week in advance for the first time in several months. It is evident that stocks in the hands of users are low because the bulk of release orders specify delivery at the earliest convenience of mills. New sales in all grades of sheets are quiet. Competition in the Southwest is keen and prices quoted are below the general level of the market.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Billets.—Shipments of billets are in fair volume. Rerolling billets 4-in. and over are quoted at $33 a gross ton.

Hot Rolled Strip.—Shipments of this commodity are steady, but new sales are in small volume. Prices still show the effects of keen competition.

Wire Rods.—Local producers are now quoting the one price of $45, Chicago. This commodity is moderately active.

Reinforcing Bars.—Sales are light but shipments from warehouses have been comparatively large because of the open winter. Shop backlogs continue to dwindle and output is only a shade above 40 per cent of capacity. There still remains a sizable tonnage of road reinforcement to be placed. Prices are steady at 2.30c. to 2.75c. for billet steel reinforcing bars out of warehouses and 1.80c. to 1.85c., Chicago Heights mills, for rail steel. Recent awards and new inquiries are shown on page 506.

Bolts, Nuts and Rivets.—Producers announce a revision in price schedules on small rivets. Carloads are being quoted at 70 per cent off list by some makers, while others are giving 70 and 10 per cent. Specifications for bolts and nuts are steady and a fair business in spot sales is reported.

Wire Products.—Demand for wire and wire products continues to expand and Chicago producers are now using close to 75 per cent of plant capacity. Less than a year ago it was variously estimated that 65 per cent of wire mill capacity represented the requirements of this country. Specifications from the manufacturing trade are in good volume and jobbers, finding turnover more rapid than had been anticipated, are forwarding liberal orders. Several sizable railroad purchases have been made and, judging from specifications already issued, the bulk of this tonnage will be taken out at an early date. The demand is diversified both as to source and commodity, and it has left mill stocks in a well-balanced condition.

Coke.—Foundry consumers of by-product coke are more insistent on prompt delivery and shipments against first half contracts are heavy. Quotations on spot business are $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—Mixed tendencies of a week ago are now more apparent in the Chicago scrap market. Users of the large tonnage grades give indication that they have placed orders for more scrap than they can conveniently handle, particularly at the rate at which sellers are anxious to ship. Some buyers have tightened inspections. Outcoming scrap is more than adequate to meet present shipping instructions. Dealer trading is less active and those sellers who have materials coming out on track are pressing sales, thus giving buyers the impression that prices may sag. As a general rule, dealers are paying $12.75 for heavy melting steel, but $13 has been paid when exacting inspection was in prospect. Cast iron borings and busheling are more plentiful. A purchaser has refused cast iron borings at $10.75 a gross ton, delivered, and a buyer of steel angle bars has made an offer of 25c. below recent market quotations. The Rock Island is offering 9000 tons and the Wabash will sell 2000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.25 to 15.75
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	14.25 to 14.75
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.25 to 19.75
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.50 to 14.00
Stove plate	11.25 to 11.75
Grate bars	11.50 to 12.00
Brake shoes	11.75 to 12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

To Tell of Sparrows Point Development

"Recent Developments at the Sparrows Point Plant of the Bethlehem Steel Co." is the title of a paper to be read March 3 before the Philadelphia district section of the Association of Iron and Steel Electrical Engineers. The author is F. O. Schnure, electrical superintendent of the Sparrows Point plant. The meeting will be held at 7.30 p. m. at the Engineers' Club, 1317 Spruce Street. Plans are in the making for a visit on May 5 to the Conowingo, Md., hydroelectric plant.

New York

Pig Iron Sales of 10,000 Tons—Sheet Prices on Firmer Basis

New York, Feb. 14.—Pig iron sales by local brokers aggregated fully 10,000 tons for the week. This total is above the average, although only half as large as that for the previous week. The Washburn Wire Co., Phillipsdale, R. I., has closed against its inquiry for 5000 tons of basic iron. This tonnage, however, was not included among the sales of New York brokers. There is a good run of small-lot purchases, and indications of increasing melt are seen in repeat orders and in the hastening of shipments against contracts. More interest is being shown in second quarter requirements. The American Radiator Co., New York, has purchased about 30,000 tons, representing second quarter requirements of plants not regularly supplied by its subsidiary, the Tonawanda Iron Corporation. This company is still in the market for 2000 tons of foundry iron for second quarter delivery at Gloucester, N. J. Another second quarter inquiry from a melter in this district calls for 1500 tons. While current prices are slightly higher than those which ruled on much of the first quarter tonnage booked, the recent advance to $20, base furnace, on eastern Pennsylvania foundry iron is still largely untested. Quotations on Buffalo foundry iron are not entirely free from irregularities, although concessions below $17, base furnace, are less frequent than some weeks ago. Efforts of an idle furnace to liquidate remaining yard stocks, now estimated at 5000 tons, have proved a disturbing market factor.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—Neither the agents of British producers, nor the importers of Norwegian and Canadian alloy report any new business. Specifications on contracts are moderate, and it is probable that a large number of consumers were well stocked with the alloy through purchases made at the end of the year. In spiegeleisen there has been a fair amount of carload business the past week or so. Prices of both alloys are unchanged.

Reinforcing Bars.—Tonnage placed thus far in February has been in considerably less volume than was the case in the preceding month, but local offices have been kept rather busy figuring work which will be placed in the early spring. On the small orders which have made up the bulk of the tonnage placed recently prices have been firm.

Finished Steel.—During the last week the volume of orders has been checked somewhat, and it seems that the buying movement which began early in the new year has reached a peak, temporarily at least. Yet there has been nothing to indicate the beginning of a recession, and the tendency toward firmer prices is still serving to supply the mills with heavy specifications on old contracts. Continued improvement in the volume of business in plates and shapes is being reflected in a firmer price structure, and the minimum prices of 2.14½c., at New York, for shapes and 2.17½c. for plates are representative of the market. Talk of further price advances is also bringing out negotiations for a number of projects which might have remained dormant until later in the year. Fabricated prices, however, are barely reflecting the increased cost of plain material, and fabricators seem more interested in securing backlogs than in obtaining a better margin of profit. Several large jobs placed recently in New York have reflected this tendency. Awards of fabricated structural steel in the metropolitan territory during January, as reported to the Structural Steel Board of Trade, amounted to 30,000 tons, the figure not including bridges, subways, etc. This compares with 36,900 tons in December and with 38,000 tons in January, 1927. Practically all the mills represented in this district have adopted the new sheet prices, namely 2.90c., Pittsburgh, for black, 3.75c. for galvanized, and 2.10c. to 2.20c. for blue annealed. A number of sales of carload lots and less have been made at these figures. An advance in hot-rolled strip has also been announced. While mills seem to be adhering to 2.65c., Pittsburgh, for nails and 2.50c. for plain wire, most consumers are fairly well covered for this quarter and there has been little opportunity to test these quotations.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c.; plates, 2.17½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Warehouse Business.—Purchasing has been slightly larger than in the early part of last month. The wide range in black and galvanized sheet prices continues,

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3 in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

jobbers in local New Jersey quoting on a basis of 4.20c. per lb. for black and 4.95c. per lb. for galvanized, while New York warehouses offer black sheets at 4c. per lb., base, and galvanized at 4.70c. per lb. Cold rolled strip steel prices have been revised, effective Feb. 12, to a range of 5.15c. to 5.40c. per lb.

Cast Iron Pipe.—There has been a little activity during the past week, with some purchases by private companies and a few scattered lettings of small tonnages by municipalities. A number of large projects are said to be under consideration for early spring negotiation. Prices are firmer with some suggestions of advances. Both Northern and Southern makers are adhering to the present quotation of $28 per ton, Birmingham base.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Coke.—Slightly better foundry operations in this territory are giving some strength to the prices for foundry coke, but no improvement in spot demand is noted. The market for the furnace grade is very quiet. Standard foundry is quoted for prompt shipment at $4 to $4.50 per ton, Connellsville, and standard furnace at from $2.75 to $3 per ton, Connellsville. Delivered prices are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—Consumers are less inclined to delay shipments of scrap, but there has been no buying of consequence, so that business is largely confined to filling old contracts. No. 1 heavy melting steel is being bought at $13.50 per ton, delivered eastern Pennsylvania, and yard grade at $10.50 to $11 per ton, delivered. Most brokers are paying $11 per ton, but in a few cases only $10.50 is paid on shipments of yard steel to a Phoenixville, Pa., mill. A local foundry consumer of stove plate recently purchased a small tonnage at $11 per ton, delivered, and brokers are offering $8.50 per ton, New York, for foundry grade, with the offering price for steel mill grade $8.75 per ton, New York. Representatives of German steel mills are still seeking to purchase heavy melting steel for export to Germany. A sale of about 15,000 tons for export to Europe is reported.

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

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*Net base, including boxing and cutting to length.

Cleveland

Bars and Shapes in Good Demand—Hot-Rolled Strip Prices Advanced

CLEVELAND, Feb. 14.—Demand for steel bars and structural material in specifications against contracts continues fairly heavy. Consumers are taking out material at a rate that indicates that they will order about all the steel covered by first quarter contracts. Plates are not active but are moving better than a few weeks ago. Some car lot business is coming out in steel bars, plates and structural material at the new 1.85c. price, which is holding. New demand for sheets in this territory is rather slow, but the automotive industry is taking heavy shipments of sheets, strip steel and alloy steel.

Hot-rolled strip steel has been advanced $1 to $2 a ton and mills have opened their books for the second quarter at the advance. Some of the sheet mills have also opened their books for the second quarter at the present regular quotations. An increase in production schedules is planned by some of the automobile companies for next month. The bulk of the steel business in this territory is coming directly or indirectly from the automotive industry, but orders from this source are hardly up to expectations. Some of the parts makers have only a moderate amount of business. This is evidently due, partly at least, to the fact that the Ford Motor Co. is still operating at a very limited rate.

In the structural field, not only has inquiry improved, but the outlook for building work in this territory is more promising than for some time.

Pig Iron.—The market continues active, with sales of 25,000 tons in foundry and malleable grades by Cleveland interests during the week, which was somewhat less than during the previous week. While many foundries are buying for the second quarter, others are inclined to purchase only for their early needs, so that they can more closely balance purchases with their requirements. These see no incentive to cover far ahead as long as there are no indications of higher prices and they can secure good deliveries on current orders. The Lake furnace price is holding to $17 in this territory, but producers are still absorbing freight by going to $16.50 for shipment to some competitive points. In Michigan, where the price has strengthened recently, the market is now established at $18. Shipments are running ahead of those in January, largely because of the liberal amount of iron that is being taken by the automotive industry. Shipping orders from radiator, heating furnace and stove manufacturers show a gain, but northern Ohio foundries are taking only moderate shipments.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Shipments of Lake Superior ore from Lake Erie ports are rather light, amounting to 320,432 tons in January as compared with 449,361 tons in the same month last year. Shipments for the season until Feb. 1 were 26,707,158 tons, as compared with 31,050,208 tons during the previous year. The dock balance is slightly less than that of a year ago, being 6,288,000 as of Feb. 1, compared with 6,692,124 tons on the same date a year ago.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a fair volume of well distributed orders from jobbers, the automotive industry, railroads and other consumers. Recent price advances on steel bars, wire and wire rods have a tendency to make the tone of the market firmer. The industry is operating at approximately 60 per cent. The demand for rivets is not active.

Sheets.—Several of the mills have opened their books for the second quarter at the present regular quotations of 2.90c., Pittsburgh, for black, 2.10c. for blue annealed, 3.75c. for galvanized and 4.15c. for auto body sheets. New business is rather light but specifications from the automotive industry in Michigan continue good and permit the mills to maintain heavy operations. Efforts to make a higher price basis effective have not yet succeeded on galvanized sheets, on which there is a shading of around $3 a ton. The price on blue annealed sheets appears to be well maintained and black sheets are firm at 2.90c.

Strip Steel.—Makers of hot-rolled strip have issued new price schedules under which prices are from $1 to $2 a ton above those that have been prevailing. In the new schedules the dividing line between very narrow material and the next classification is 3-in. strip instead of 2-in., as at present. The new prices are 2.20c., Pittsburgh, for under 3 in. wide, 2.10c. for 3-in. to 6-in., inclusive, and 1.90c. for 6 to 12-in., inclusive. Strip over 12 in. wide will carry the blue annealed sheet or plate base, as at present. The new prices apply to hoops and bands, but cut hoop is unchanged at 2.30c. The new prices apply to desirable orders, and for small lots mills are asking $4 a ton above the round lot price for 3 in. and narrower material and $2 a ton on other widths. The new prices will apply on second quarter contracts, for which mills have opened their books. Cold-rolled strip is firm at 3.15c., base Cleveland, or 2.90c. for 3 tons and over, and mills have also opened their books for the second quarter for cold-rolled strip at the present price, and for fender stock at the recently advanced price of 4.30c., Cleveland.

Semi-Finished Steel.—There is some activity in forging billets in car lots. Sheet bar specifications are holding up well, but there is very little new business.

Nails and Wire.—A $2.55 price on nails has not disappeared in some sections, but this is evidently quoted by some small makers and is not being met by the larger producers. Specifications are coming out in good volume.

Reinforcing Bars.—Awards include 750 tons for grade elimination work in Cleveland. Small-lot inquiry has improved. Rail steel bars are now generally quoted at 1.75c., mill.

Warehouse Business.—Sales show a slight gain over last month. Prices are firm. The recent advance in mill prices has not been followed by any change in warehouse prices except on galvanized sheets.

Coke.—Furnace coke is weak. Foundry grades are dull. Quotations are unchanged at $8, Painesville, for by-product foundry coke, or $9.01, delivered Cleveland, and $3.75 to $5.10, ovens, for Connellsville foundry coke and $2.75 for heating coke.

Old Material.—The only activity reported is the purchase by a Cleveland consumer of 3000 to 5000 tons of blast furnace scrap at $11. Scrap is being produced faster than it is being consumed and some of the mills have become badly congested with material, necessitating further restrictions. This is having a weakening effect on the market. Blast furnace scrap is being freely offered at $10.50. Quotations on other grades are unchanged.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50
Mixed borings and short turnings	10.50
No. 2 busheling	10.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Philadelphia

Steel Specifications Slow—Tonnage of Heavy Melting Steel Bought

PHILADELPHIA, Feb. 14.—Purchasing of both pig iron and steel has been light, but prices are generally steady. Specifications against contracts on bars and shapes are reported to be coming through rather slowly, consumers' requirements evidently being somewhat smaller than had been expected earlier in the quarter. As a result, some carry over of present contracts into the next quarter would not be surprising, although heavier specifications may develop as spring activity begins.

Black and galvanized sheet prices are slightly firmer, but concessions are still reported on desirable business. Some shading of both strip steel and blue annealed sheets has appeared, but most makers are not inclined to meet the lower quotations.

Despite general quietness in pig iron, furnaces are evidently maintaining the new price basis of $20. A Delaware River pipe maker is reported to have closed on a sizable tonnage with a New England furnace.

Pig Iron.—About the only inquiry of consequence for second quarter delivery is about 2000 tons of foundry iron for the Gloucester, N. J., plant of the American Radiator Co. A cast iron pipe maker on the Delaware River is understood to have closed on about 10,000 tons of foundry iron with a New England furnace. Current purchasing of foundry iron is limited to occasional orders for one or two carloads, but consumers with contracts are in most cases accepting shipments without delay. The new basis of $20 per ton, furnace, seems to be fairly well established, although there have been no large tonnages bought since the price became effective.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Consumers are slower in providing mills with specifications on their contracts. The current quotation of 1.85c. per lb., base, Pittsburgh, is being maintained on new business.

Shapes.—There is evidently a fair volume of tonnage involved in projects for the immediate future, but fabricators are specifying moderately against contracts. On current business, mills are quoting 2c. per lb., Bethlehem; 1.97½c. per lb., Pottsville, or 2.12c. to 2.13c. per lb., delivered Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.40c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Plates.—Mills report a good volume of shipments against contracts, but new business is limited for the most part to small lots. Prices are being maintained at 2c. per lb., Coatesville, or 2.10c. per lb., delivered Philadelphia.

Sheets.—On both black and galvanized sheets there is slightly less tendency to offer the concessions from the market price that were obtainable a few weeks ago. Some shading of 2.90c. per lb., Pittsburgh, on black and 3.75c. per lb., Pittsburgh, on galvanized, however, is still in evidence. Recently a seller of strip steel sheets is reported to have quoted lower than 2.10c. per lb., base, but most makers are not inclined to meet this lower quotation.

Ferromanganese.—Selling of lots of 100 tons or less continues and prices are unchanged at $100 per ton, seaboard.

Warehouse Business.—Prices are unaltered, although the present volume of purchasing from stock is small. The recently adopted quantity differentials on steel bars and small shapes are evidently being maintained by jobbers.

Imports.—In the week ended Feb. 11, 353 gross tons of pig iron from the Netherlands was received at this port. Ore imports were confined to 600 tons of chrome ore from Cyprus. Other imports were 50 tons of steel bars from Belgium and 35 tons from France, 189 tons of structural shapes from Belgium and four tons of steel scrap from the United Kingdom.

Old Material.—A mill at Coatesville, Pa., has closed on 15,000 to 20,000 tons of No. 1 heavy melting steel in the past week. Except for this purchase the scrap market continues quiet. A Phoenixville consumer, evidently receiving a sufficient tonnage of stove plate at $13 per ton on present contracts, is now offering $12.50 per ton, delivered, and will pay $11 per ton, delivered, for machine shop turnings. A Lebanon, Pa., user of specification pipe is temporarily delaying shipments on contracts.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.00 to	15.50
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast boring (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		13.00
Stove plate (for steel works)		13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to	13.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	12.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Busbar Supports Designed for Flexibility in Arrangement

A new line of busbar supports, known as the modified hollow square type, is being offered by the Westinghouse Electric & Mfg. Co. The supports consist of heat-treated aluminum alloy clamps which are insulated from the standard 1¼ in. pipe of the mounting support by means of high-grade micarta tubes. The bus support is designed for 4 in. x ¼-in. busbars and for a maximum of 4000 volts. It may be adjusted to carry one or 12 bars. This feature allows the bus to be tapered as feeders are tapped off, or allows the easy installation of additional bus copper to provide for an increasing load. The hollow square arrangement of bars minimizes the influence of both skin effect and proximity effect, and will allow the copper to be used at its maximum efficiency. These supports are particularly adapted to heavy low-voltage bus construction.

Canadian Imports and Exports of Iron and Steel for 1927

TORONTO, ONT., Feb. 14.—Figures on Canada's imports and exports of iron and steel for 1927 are announced as follows:

Iron and Steel Imports into Canada

	1927	1926
Iron ore	$2,875,624	$2,853,549
Pigs, ingots, etc.	1,889,729	1,569,929
Rolling mill products	44,112,343	47,710,207
Tubes, pipes and fittings	3,727,361	3,834,837
Wire	3,334,551	3,129,673
Engines and boilers	16,920,299	13,907,730
Machinery	46,237,754	38,683,540
Tools	2,489,459	2,336,648

Iron and Steel Exports from Canada

	1927	1926
Iron (total)	$67,831,274	$75,602,162
Pigs, ingots, etc.	2,868,356	1,569,390
Scrap	782,407	646,644
Rolled products	1,929,139	2,685,979
Bars and rods	657,880	1,004,810
Rails	963,383	516,983
Machinery	5,591,523	4,451,443

Iron and Steel Production of Saar Increases Above Pre-War

WASHINGTON, Feb. 14.—Production of pig iron in the Saar in 1927 aggregated approximately 1,780,000 metric tons, against 1,638,051 tons in 1926 and 1,374,514 tons in 1913. The output of crude steel last year was 1,900,000 tons, compared with 1,734,161 tons in 1926 and 1,718,540 tons in 1913, according to the Iron and Steel Division, Department of Commerce. The Saar industries are members of the Continental Steel Entente and also are affiliated with a number of comptoirs. The report says that the several plants have made every effort to modernize and develop their installations.

James A. Farrell and M. C. Taylor Inspect Alabama Plant

BIRMINGHAM, Feb. 14.—James A. Farrell, president and chief executive officer, and Myron C. Taylor, chairman of the finance committee, of the United States Steel Corporation, arrived in Birmingham on Feb. 8, inspected properties of the Tennessee Coal, Iron & Railroad Co., and departed on Feb. 10. The visit of these two officials brought out a number of reports relative to proposed new developments, one specifying a new tube mill. At the office of the Tennessee company it was stated that these reports were without foundation at this time.

Louvain Memorial to Be Dedicated By Engineers This Year

The Louvain Library, destroyed by the Germans during the World War, and restored by American benefactions, will be dedicated on July 4 of this year, according to present plans, says a statement by the Engineering Foundation, 29 West Thirty-ninth Street, New York. The Belgian ambassador and Whitney Warren of New York, the architect, have both assented to this date, the foundation announced, and the sanction of the Louvain authorities is expected.

The foundation is arranging for the presence of a delegation of American engineers at the dedicatory ceremonies. Under the auspices of the foundation, a clock and carillon will be placed in the tower of the new library building at a cost of $80,000, to be subscribed by members of the engineering profession in this country. Up to Jan. 25, $32,300 had been contributed by 1880 engineers. The clock and carillon, the gift of 56,000 American engineers, will be installed "in memory of the engineers of the United States of America who gave their lives in the service of their country and its allies in the Great War, 1914-1918." Dr. Edward Dean Adams will head the United States engineering contingent at Louvain.

Boston

Pig Iron Prices Unsettled Again—Sales Totaled About 10,000 Tons

BOSTON, Feb. 14.—The show of firmness in pig iron from furnaces in Buffalo and east of Buffalo has not been maintained. Buffalo steel mills, out of the pig iron market a week or 10 days ago, have re-entered and taken No. 2X tonnages at $16.50 a ton base, furnace, and No. 1X at $17. Not all Buffalo stacks have met these prices, but furnaces east of Buffalo are competing. Current buying is for first and second quarter, mostly for deliveries straddling these periods. Sales the past week approximated 10,000 tons, and included 1000 tons No. 2 plain and No. 2X split three ways, stacks east of Buffalo taking 700 tons. Another sale was 2000 tons of No. 2X and No. 1X, divided between Buffalo and other Eastern furnaces, and still another was 1000 tons of two grades. Smaller sales ranged from 500 tons down to car lots, with eastern and western Pennsylvania, Virginia and Alabama irons cutting very little figure.

Prices of foundry iron per gross ton; delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Cold-Rolled Strip.—Cold-rolled strip steel continues in good demand, but buying is of a hand-to-mouth character. Competition from Middle Western mills has practically disappeared, but it is keen among Atlantic seaboard mills. The Worcester, Mass., mill is holding to 3.30c. per lb. base, on lots of 1 to 3 tons and at 3.05c. on larger lots.

Sand.—Because of the comparatively low melt of iron in New England this winter, indications are that the spring molding sand buying movement will be slow in getting under way. Sand is $2.75 a ton, that price having been in effect since December, last, when it was $2. A meeting will shortly be held in New York in the interest of lower freight rates on sand.

Bars.—Mill representatives report some forward buying of steel bars, but most of the business placed so far this year has been for immediate consumption. Current prices are 1.85c. to 1.90c. per lb., base Pittsburgh. Reinforcing bars from stock, are 2.70c. to 2.75c. per lb. base, mostly 2.70c. For mill shipment, 1.90c. per lb., base, Pittsburgh, is the prevailing price, or 2.26½c. delivered in New England.

Warehouse Business.—Warehouse prices on cold-finished steel bars have been advanced 10c. per 100 lb. to 3.45c. per lb. base, for rounds and hexagons. Quantity differentials have been changed.

Coke.—Business in by-product foundry coke is not improved. Foundry coke remains at $11.50 a ton, delivered within a $3.10 freight rate zone. Business in domestic fuel is holding up well, but little impression has been made on stock piles at ovens. The general asking price is $8.50 a ton on cars Everett, Mass., but concessions have been given on specified sizes.

Old Material.—Unfavorable weather and continued low prices have combined to curtail the movement of old material in the past week. Most producers of scrap are willing to sell only when stocks become burdensome. This is especially true of heavy melting steel. Pennsylvania steel mills are drawing lightly upon New England scrap dealers, and the foundry melt does not permit expansion in textile and machinery cast sales. Prices remain unchanged.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.25
Scrap rails	8.50 to	8,75
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought	9.50 to	10.00
Machine shop turnings	6.00 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	6.50 to	7.00
Forge flashings	7.00 to	7.25
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	6.00 to	7.00
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate		11.00
Railroad malleable	13.00 to	13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

St. Louis

Pig Iron Inquiries for 10,000 Tons—Wabash to Buy 4800 Tons of Tie Plates

ST. LOUIS, Feb. 14.—Sales of pig iron during the last week totaled about 3000 tons—2500 tons by the Granite City maker and 250 tons by a leading Southern interest, but inquiries exceed 10,000 tons. The melt is increasing and prices are firmer. Stove foundries are operating five days a week, and the jobbing foundries report an increased melt. The principal inquiry is for 4000 tons for a radiator manufacturer. A railroad car

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

builder wants 1000 tons, and local and nearby melters are inquiring for 5000 tons in scattered lots.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Movement of domestic grades is fair because of cold weather, but buying is less than production and stock piles are increasing at by-product ovens. Industrial grades are moving freely.

Finished Iron and Steel.—The principal inquiry before the market is for 4800 tons of tie plates for the Wabash Railroad. Buying of plates, shapes, bars and sheets is showing improvement, and prices are said to be holding well on all of these items. Warehouse business continues light in the territory as a whole, but is more active in the city of St. Louis. Structural fabricators report a quiet week.

Old Material.—Active items in the old material list showed a decline of 25c. a ton, and the market is still suffering from the effects of heavier shipments to this district than can be assimilated by its industries, although they are very busy. Railroad lists include: Rock Island, 10,000 tons; Chesapeake & Ohio, 7929 tons; Wabash, 1870 tons; Ann Arbor, 70 tons; Great Northern, 46 carloads; Nickel Plate, 24 carloads; Chicago, Milwaukee & St. Paul, 21 carloads; Kansas City, Mexico & Orient, 3 carloads; Standard Oil of Indiana, 3 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.75 to $12.25
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.75 to 12.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 15.00
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	13.50 to 14.00
Rails for rolling	14.25 to 14.75
Machine shop turnings	7.75 to 8.25
Steel car axles	20.00 to 20.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.25 to 10.75
Steel rails, less than 3 ft.	15.75 to 16.25
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	12.00 to 12.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.75 to 14.25
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Youngstown

Valley Steel Producers Averaging Slightly Under 75 Per Cent Operation

YOUNGSTOWN, Feb. 14.—Total specifications, orders and shipments of leading local steel makers for the first half of this month are approximately the same as in the same period last month. January, however, was a month of heavy shipments because of the large December specifications. The increase in plant operations to take care of the enlarged January movement seems to have been sufficient to supply all demands that have developed since the opening of the year. Instead of a further increase in the output of steel, some companies have found it necessary to ease down a little to escape getting ahead of their order books. Taking in the Steel Corporation units in the Mahoning and Shenango Valleys, which as in other districts appear to be doing better than independent company plants, the district is producing ingots at an average somewhat under 75 per cent of capacity, but that rate is above performance of some of the independent companies.

While some gain is noted in the demand for buttweld pipe, there has been no improvement in the call for drill and drive pipe and casing and orders for line pipe appear to have been materially reduced. Heavy shipments of nails in January and of other wire products, following the recent advance in prices, have been succeeded by something of a lull in new business in these items. The district appears to have produced sheets a little more rapidly than they were being specified and there has been a moderate letdown in mill operations to bring about balance between output and demand. The report about steel bar business is uniformly favorable and there is practically full operation of the bar mills in this area.

An increase in the movement of sheet bars is noted. In pig iron there is lifelessness in marked contrast with the activity reported from other producing centers. Steel makers here are not buying much scrap and their takings of ferroalloys and other raw materials have been lighter this month than last.

The bright feature of the situation is that prices are showing firmness. Manufacturers do not expect to be obliged to take any business in bars for second quarter shipment at less than today's price of 1.85c., base Pittsburgh, and there are predictions that the price for that period will be 1.90c. Sheet makers feel that 2.90c., base Pittsburgh, for black sheets on second quarter business is as low as they should go, while for galvanized 3.75c., base, and for blue annealed 2.10c., base, on sizes up to 40 in. wide, with 2.20c. for sheets wider than 40 in. are uniformly the second quarter ideas of producers.

Buffalo

Pig Iron Sales Exceed 25,000 Tons—Steel Business Improves

BUFFALO, Feb. 14.—Pig iron prices are firmer and sales over the past week or 10 days have probably reached 25,000 to 30,000 tons. The Massey-Harris Harvester Co. has closed for at least part of its inquiry for 2000 to 4000 tons of foundry and malleable. A 1000-ton malleable lot was closed, as well as two lots totaling 1500 tons of foundry. A Pennsylvania consumer placed 1000 tons of foundry and another inquiry from Pennsylvania was for 1000 tons of foundry. The American Tube & Stamping Co., Bridgeport, Conn., is said to have placed 3000 to 5000 tons of basic. A current inquiry is for 1500 tons of malleable and included in prospective business are a dozen lots ranging from 200 to 500 tons of foundry and malleable. Producers hear that the melt is increasing considerably and there is talk of higher prices on pig iron. Prices quoted are firmer.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Business continues to improve and prices are firm. Bar and shape mill operation is around 85 per cent. The 1.95c. Buffalo price is steady. Sheet mill operation is 85 per cent and prices are firm at 2.90c. for black; 3.75c. for galvanized, and 4.15c. for automobile body sheets. Price cutting has disappeared. Most of the sheet business is for prompt shipment, with a steady demand from the automobile industry. Specifications for bolts and nuts are sufficiently better to maintain operations at 60 to 65 per cent, and quotations are firm.

Old Material.—Increasing mill operation is making for a better demand, with evidences of a shortage of

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

strictly No. 1 heavy melting steel. Most of the yard stocks are low and mill stocks are not heavy. Sales of knuckles and couplers have been made, and there has been some selling of railroad malleable at $15.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.75 to	$15.25
No. 2 heavy melting steel	13.25 to	13.75
Scrap rails	13.75 to	14.25
Hydraulic compressed sheets	13.25 to	13.75
Hand bundled sheets	9.00 to	9.50
Drop forge flashings	11.50 to	12.00
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.75 to	13.25
Machine shop turnings	9.00 to	9.25
Acid Open-Hearth Grades		
Railroad knuckles and couplers		16.50
Railroad coil and leaf springs		16.50
Rolled steel wheels		16.50
Low phosphorus billet and bloom ends	17.00 to	17.50
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	11.00 to	11.50
Blast Furnace Grades		
Short shoveling steel turnings	10.75 to	11.00
Short mixed borings and turnings	10.50 to	11.00
Cast iron borings	10.50 to	11.00
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades		
Steel car axles	17.00 to	17.50
No. 1 railroad wrought	12.50 to	13.00
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.00 to	13.25
Locomotive grate bars	11.00 to	11.50
Steel rails, 3 ft. and under	17.00 to	17.25
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Railroad		15.50
Agricultural		15.50
Industrial		15.50

San Francisco

Price Advances on Steel Products Extend to Pacific Coast Trade

SAN FRANCISCO, Feb. 11.—(*By Air Mail*).—Advances in the c.i.f. prices on several domestic iron and steel products, following recent announcement of higher levels in the Eastern markets, were announced this week. Shape mill representatives and fabricators are encouraged by the number of new and pending projects up for figures. The largest award of the week involved 2400 tons of structural shapes for the Northern Life Insurance Building, Seattle, secured by the Wallace Bridge & Structural Steel Co. and the Hofius Steel & Equipment Co. of Seattle.

Pig Iron.—A tabulation of imports for November shows a total brought in at Pacific Coast ports of 1794 tons, compared with 811 tons for the previous month. Los Angeles took 650 tons and San Francisco 595, the remainder going to Portland and Seattle. Most of this material came from India. Demand is by no means heavy, most foundries having sufficient stock on hand to take care of their requirements for two months. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to	$26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to	26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to	25.00
**German foundry, sil. 2.75 to 3.25		24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Awards for the week exceeded 3600 tons and, in addition to the 2400 tons mentioned above, the Stubbs Co., St. Louis, took 600 tons for a building for the Government at Cristobal. Pending business calls for 27,000 tons. An inquiry for 800 tons of sheet steel piling for the Coyote Point bridge across San Francisco bay has been withdrawn as other material will be used. Structural material imported in November totaled 4961 tons as compared with 2041 tons for the preceding month. Of this total, San Francisco fabricators took 2983 tons and Los Angeles interests 1331 tons. More than half of this tonnage came from Belgian mills. Domestic prices are firm at 2.35c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Plates.—The only plate award of importance was booked by the Worth Steel Co. and involved 250 tons for the Mare Island Navy Yard. No action has been taken on 5000 tons of plates and shapes for a Standard Oil tanker. Inquiries include 170 tons of universal plates for 800 box cars for the Western Pacific Railroad and approximately 400 tons for three months' requirements for the Standard Oil Co., San Francisco. Plate prices have been advanced $1 a ton, from 2.25c. to 2.30c., c.i.f.

Bars.—Several important reinforcing bar tonnages will be up for figures in the near future. Two of these projects involve over 6500 tons for two drainage district improvement jobs in Los Angeles. Bids are being taken for 600 tons for the Big Dalton Dam at Los Angeles. In November 2843 tons of foreign merchant and reinforcing bars entered Pacific ports. San Francisco took 1645 tons and Portland and Los Angeles about 600 tons each. Close to 1000 tons of this total came from French mills.

Cast Iron Pipe.—Lettings this week included 154 tons of 4 to 8-in. class B pipe for Chehalis, Wash., booked by the Pacific States Cast Iron Pipe Co.; 369 tons of 4 to 8-in. class B for the improvement of streets in Paradise Hills, San Diego, taken by the United Concrete Pipe & Construction Co. of San Diego; 217 tons of 6 to 10-in. class B for the improvement of Long Beach Boulevard, Lynwood, Cal.; 153 tons of 6 to 10-in. class B for the improvement of Main Street, San Diego, awarded to the Butterfield Construction Co. of San Diego, and 119 tons of 8-in. class B for Eureka, Cal., taken by B. Nicoll & Co. Bids have been opened on 1244 tons of 6 to 12-in. class C and D pipe for Vancouver, B. C., and on 156 tons of 4 and 8-in. class B for the improvement of Pacific Street, Oceanside, Cal. Bids will be opened soon on 222 tons of 4 to 8-in. class B for Armona, Cal., and on Feb. 21 for 3095 tons of 4 to 12-in. class B for Southgate, Cal. Importations during November totaled 1782 tons as compared with 2043 tons for the previous month. Nearly 1500 tons was shipped by French foundries.

Steel Pipe.—Some improvement in demand is reported. The Grinnell Co. was low bidder on two lots of welded steel pipe for Los Angeles. One specification called for 100,000 ft. of 6-in. involving 950 tons, and the other for 30,000 ft., or 285 tons.

Cold-Rolled Material.—Prices have advanced $2 a ton in this market and current business, such as it is, is being quoted on at 2.30c., base Pittsburgh, or equivalent.

Wire Products.—Wire nail prices have been advanced by from $3 to $4 a ton and practically all producers are now holding to the new level of $3.10 per keg, c.i.f. Coast ports.

Sheets.—Sheet prices have been advanced $3 to $4 a ton and the new prices appear to be firm at 2.75c., 3.60c. and 4.40c., c.i.f. Coast ports, on blue annealed, black and galvanized sheets, respectively. The Southern Pacific Co. has an inquiry out covering three months' requirements.

Warehouse Business.—Out-of-stock prices on nails have been advanced from 3.25c. to 3.40c., and black sheets, 24 gage, from 4.80c. to 4.95c. Galvanized sheets, 24 gage, have advanced from 5.35c. to 5.50c. and blue annealed, 10 gage, from 3.75c. to 3.90c.

Revenue freight loaded in the week ended Jan. 28 is reported by the American Railway Association at 902,832 cars, a gain of more than 2 per cent from the 884,095 cars of the preceding week. The total has been consistently below the corresponding figures of the two preceding years, the most recent comparison being with 943,879 cars in the corresponding week of 1927 and 925,696 in 1926.

Cincinnati

Pig Iron Dull—Scrap Weak—Steel Shipments Continue at Good Rate

CINCINNATI, Feb. 14.—Dullness pervades the southern Ohio pig iron market. Sales and inquiries have been so few that dealers have had to go back many years to find a parallel condition. The situation at Ironton is far from satisfactory, the shutting down of the Belfont furnace having brought to a temporary halt at least all production of merchant pig iron at that point. The Belfont company has considerable iron on its yards over and above the tonnage required to fill current contracts. The Marting Iron & Steel Co., on the other hand, has reduced its stocks substantially in the last few months, but still does not find prices sufficiently high to justify blowing in either of its furnaces. Southern Ohio foundry iron continues on a basis of $19, furnace. Lake Erie makers are reported to be quoting $17, base Cleveland, and whether they will go under that figure to obtain orders at points where they are at a freight disadvantage is uncertain. Alabama and Tennessee irons are firm at $16, base Birmingham, in the South, but sales north of the Ohio River have been of little consequence. The demand for Jackson County silvery iron is fair and prices are steady.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Makers of bars, shapes and plates report that specifications and orders have declined slightly in the past week. Nevertheless, operations of industrial consumers in this district show no diminution, and shipments from mills are going forward on a gradually expanding scale. The seasonal lull in structural steel is holding back activities in that line. Small fabricators are increasing production as a result of obtaining numerous small jobs, but the larger companies report a dearth of important projects. Quotations on bars, structural shapes and plates remain firm at 1.85c., base Pittsburgh. Conditions in the sheet market are considered favorable. The American Rolling Mill Co. has followed the lead of other companies by announcing the following prices for second quarter: 2.10c., base Pittsburgh, for blue annealed, 2.90c. for black, 3.75c. for galvanized and 4.15c. for automobile body sheets. The company's operations at its four plants have been increased to full capacity, and recent bookings have been fully equal to the volume of production. Orders have been well balanced among all consuming lines, specifications from automobile manufacturers having been particularly good. The wire goods market has been more active than usual, the demand for nails having been brisk. Specifications against old contracts have been sizable. Common wire nails are quoted at $2.65 per keg, Pittsburgh or Ironton, and plain wire at $2.50 per 100 lb., Pittsburgh or Ironton. Sales of cold-rolled bars and of cold-rolled strip steel have turned upward in the past two weeks.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Reinforcing Bars.—Bids on a new building for Christ Hospital, Cincinnati, are being taken by Tietig & Lee, architects, Cincinnati. The bar requirements probably will total 250 tons. Prices of new billet bars range from 1.85c. to 1.95c., base Pittsburgh. Producers of rail steel stock have advanced quotations $1 a ton to 1.80c., base mill, but will go to 1.75c. to secure attractive orders.

Warehouse Business.—The basis upon which reinforcing bars are being quoted for delivery out of local jobbers' warehouses has been changed so as to set up a differential of $3 a ton between new billet and rail steel bars. The new schedule calls for 3c. on rail steel bars and 3.15c. on new billet stock for delivery in the metropolitan Cincinnati district. For shipment to other points, new billet bars are priced at 3.05c. Readjustments also have been made on a number of products for delivery to Southern cities so that the delivered price is equalized with that from other markets which have a freight advantage over Cincinnati. However, this has in nowise affected the general list of quotations applying in the metropolitan Cincinnati area. Sales have been moderate in volume.

Coke.—Specifications for by-product foundry coke are at a fairly good rate and promise to continue on the present basis through February. Movement of beehive foundry coke from the Wise County and New River districts has been sluggish, but prices have remained firm in the face of a somewhat stagnant market.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—A further recession in sales has occurred in the past week with the result that quotations on a few items have been adversely affected. Mills in this district are buying small quantities of material to meet current requirements, but are paying far less for their scrap than dealers predicted a month ago. Without exception foundry grades are quiet.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to	$12.00
Scrap rails for melting	12.25 to	12.75
Loose sheet clippings	9.00 to	9.50
Bundled sheets	9.50 to	10.00
Cast iron borings	8.00 to	8.50
Machine shop turnings	8.50 to	9.00
No. 1 busheling	10.50 to	11.00
No. 2 busheling	7.50 to	8.00
Rails for rolling	13.00 to	13.50
No. 1 locomotive tires	13.50 to	14.00
No. 1 railroad wrought	11.50 to	12.00
Short rails	16.50 to	17.00
Cast iron carwheels	12.75 to	13.25
No. 1 machinery cast	16.00 to	17.00
No. 1 railroad cast	13.50 to	14.00
Burnt cast	8.00 to	8.50
Stove plate	9.00 to	9.50
Brake shoes	10.00 to	10.75
Railroad malleable	12.75 to	13.25
Agricultural malleable	12.25 to	12.75

Birmingham

Pig Iron Firmer—Steady Demand for Steel Continues

BIRMINGTON, Feb. 14.—The pig iron market is said to be somewhat firmer. Sales last week were slightly larger than in the one preceding, but new business continues mostly in small lots. Several sizable orders are pending. These will be booked for first quarter, with a carry-over into second quarter allowed. Second quarter inquiries are developing but furnaces are not booking or quoting at this time. Foundry iron quotations remain on a $16 base. The Tennessee company has blown in Bessemer No. 2 and it is now on basic. This offsets the blowing out of the Sloss-Sheffield No. 1 city furnace, which is to be rebuilt and enlarged. Seventeen furnaces are in blast in the district.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—A fairly steady demand upon the mills continues, in line with market conditions of the past several weeks, but structural steel and plate fabricators report only a nominal amount of new business. The Tennessee company has put on another open-hearth furnace at the Fairfield Works, now operating five. At Ensley eight and nine are producing. The Gulf States Steel Co. continues with four.

Cast Iron Pipe.—A good volume of business is developing in small tonnage orders. Several jobs are coming up in Georgia, Mississippi and Florida. Plant operations have slightly increased. Base price, for immediate delivery, is now $28.50 and $29.

Coke.—There is very little spot demand at the present time as most of the first quarter requirements have been booked. Shipments are going forward at a steady rate. Quotations for both spot and contract remain at $5.

Old Material.—Demand for steel rails is better, but business in other lines shows but little improvement.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Detroit

Motor Car Companies Increasing Production Schedules Over 1927

DETROIT, Feb. 14.—The volume of steel bookings in the Detroit district is still on the increase, with about 5 per cent gain during the past week. This is largely accounted for in the rapidly mounting production schedules of the principal automobile companies.

For instance, the Graham-Paige Motors Corporation turned out 1497 cars last month, as compared with 1374 for the same month a year ago, and 1021 for December, 1927. The Chevrolet Motor Co. produced 91,681 cars and trucks in January, as against 73,676 in January, 1927. The schedule for this month has been set at 110,000 cars and trucks.

The Packard Motor Car Co. brought out 4150 cars in January of this year, as compared with 3857 in December and 2300 in January a year ago. The schedule for this month will surpass the January figure.

The Oakland Motor Car Co. turned out 3095 cars in January of this year, as against 2217 for the same month a year ago. The corresponding figures for Pontiac are 16,178 for January of this year, and 5824 for the same month a year ago. The schedule for the present month of Oakland and Pontiac combined is set at 22,268.

The Hupp Motor Car Corporation produced 3610 cars last month, 3763 during the month previous to that, and 2749 in January a year ago.

The Hudson-Essex January, 1928, production ran to 25,390, as against 12,000 in January a year ago. The objective at the Hudson-Essex plant is 1460 cars per day, which will be reached in the near future.

Dodge Brothers' production of cars and trucks is mounting steadily, and will reach a figure of 1650 units per day about March 1.

The Ford Motor Co. is still behind its schedule, the present rate being approximately 1200 cars per day, but 2000 cars per day may be reached by March 1, which would be 30 days behind the original estimate.

The Buick Motor Co.'s production for January of 17,042 is a big advance over the previous month, which showed only 12,900, but the January figure is below that for the same month a year ago of 18,260.

The Reo Motor Car Co. turned out 2384 cars in January, as against 2322 a year ago. February production will show a substantial increase over January.

Prices on automobile steel generally are firm. There have been no large orders in structural shapes, bars and plates during the last week. However, there has been a satisfactory increase in small-lot structural orders.

With no sales involving large tonnage during the past week in this district, market conditions on old material are about the same as a week ago. A decline of 25c. per ton was recorded on hydraulic compressed scrap and flashings. The general feeling seems to be that the present prices are about at the bottom.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$12.00 to $12.50
Borings and short turnings	8.75 to 9.25
Long turnings	7.75 to 8.25
No. 1 machinery cast	14.50 to 15.50
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.50 to 11.00
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	9.75 to 10.25

Canada

Railroad Orders Placed With Canadian and American Mills

TORONTO, ONT., Feb. 14.—The past week has been active in the iron and steel industry of Canada. New business has been in larger volume than for some time and many lines of industry have benefitted. The Algoma Steel Corporation, Sault Ste. Marie, Ont., the British Empire Steel Corporation, and a number of other Canadian companies shared in the orders placed by the Canadian National Railways, which included the following: For Canadian lines, 10,115 tons of 100-lb. rails, 7881 tons of 85-lb. rails, 647 gross tons splice bars, 141 gross tons of bolts, 208 gross tons spikes, 1121 gross tons plates, 49 gross tons shimming spikes and 56,020 rail anchors. Orders placed by the Canadian National Railways with United States firms for American lines include 11,550 gross tons of 100-lb. rails, 33 gross tons of bolts, 71 gross tons of splice bars, 74,788 rail anchors, 19 gross tons of spikes and 195 gross tons of tie plates.

The mills at Sault Ste. Marie, Ont., Hamilton, Ont., and at Sydney, N. S., are running almost at capacity.

Pig Iron.—Pig iron sales are showing slow but steady improvement, though most melters are covered by contract to the end of March. A good demand is reported for prompt shipment and orders for from 100 to 500 tons are appearing. Six furnaces in Canada are now in blast. While there has been no change in pig iron prices in the Toronto market, producers are asking slightly higher prices in Montreal.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Considerable tonnages of old material have been thrown on the market lately and this has had a softening effect on prices. Recent purchases of heavy melting steel by dealers have ranged from $8 to $9 per gross ton, Toronto.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Feb. 14	Feb. 11	Feb. 10	Feb. 9	Feb. 8
Lake copper, New York	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.87½	13.82½	13.82½	13.82½	13.82½
Straits tin, spot, N. Y.	51.87½	....	52.87½	53.12½	53.05
Lead, New York	6.35	6.35	6.35	6.45	6.45
Lead, St. Louis	6.12½	6.12½	6.12½	6.22½	6.22½
Zinc, New York	5.95	5.97½	5.97½	5.97½	5.97½
Zinc, St. Louis	5.60	5.62½	5.62½	5.62½	5.62½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Feb. 14.—All the markets are quiet, with the price tendency downward in some. Copper has generally held its own despite some shading. Tin has gone to new low levels on this movement, with buying quite heavy. Lead prices have been reduced for the first time in some weeks. Zinc is a little weaker, with demand very light.

Copper.—Demand both from foreign and domestic consumers has been very light the past week. The few sales of electrolytic copper that have been made have, in most cases, been done at around 14.07½c., delivered in the Connecticut Valley, but a quotation of 14.12½c. is still maintained by practically all large producers. The shading has been done in most cases by one or two custom smelters. The statistics for January which appeared early this week, were considered favorable to sellers. They showed a reduction in mining of ore in January of about 200 tons a day, and a decrease in stocks of metal in both the blister and refined condition of about 9000 tons. It is stated that consumers, both here and abroad, particularly the latter, still have considerable metal to purchase for delivery this month and in March. Because of this and the statistical condition of the industry, some producers are optimistic and expect a buying movement in the near future. The Lake copper market is quiet, but firm, at 14.25c. delivered.

Tin.—New low prices, accompanied by large sales, have been the feature of the week. Not less than 1700 tons changed hands and possibly the total ran as high as 2000 tons. Consumers bought freely, but the market continued to decline. The weakness is ascribed partly to the anxiety to make sales and to the attitude of consumers who have been buying on a scale downward and not on reactions. Yesterday, when the market was closed here because of the holiday, the London market broke over £5 per ton, but rebounded today about £3 per ton. The local market has not been very active today, with moderate sales of futures reported at 51.75c. to 51.87½c. and with spot Straits tin quoted nominal at 51.87½c. New York. In London today spot standard tin was quoted at £231 5s., future standard at £233 15s. and spot Straits also at £233 15s., all quotations about £7 per ton less than a week ago. Arrivals thus far this month have been 2110 tons, with 5070 tons reported afloat.

Lead.—For the first time in many weeks the American Smelting & Refining Co. reduced its contract price from 6.50c. to 6.35c., New York. The fact that the outside market had practically reached this level was the cause of the reduction. In St. Louis quotations range from 6.10c. to 6.15c. The market is generally quiet, with demand moderate.

Zinc.—Prime Western zinc has hovered around 5.62½c., St. Louis, for the past week and today is a little lower at 5.60c., St. Louis, or 5.95c., New York. Demand is reported as only moderate, and the market is generally very quiet. Ore prices at Joplin fell $2 per ton last week to $36. Sales were only 7000 tons, with production at about 12,500 tons. Statistics for the month of January show stocks of refined metal to have been reduced about 1200 tons.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—This market is very quiet, with Chinese metal for spot delivery quoted at 11c. and futures at 11.12½c. New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots, is quoted at 23.90c. per lb. delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Feb. 14.—This week is characterized by a steady flow of orders, many of which are for more extended delivery. Prices for tin and lead are lower. The

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c. to 55.50c.
Tin, bar	56.50c. to 57.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	35.50c. to 36.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.50c.
Tin, bar	61.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	64.50c.
Solder, ½ and ½	35.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Bronze, brass and copper products at mill are unchanged in price, and no revisions are reported in quotations on lead full sheets and zinc sheets.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

old metal market is moderately active and prices are steady.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 54c.; lead, 6.30c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.25c.; pewter, No. 1, 34c.; tin foil, 40c.; block tin, 50c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Los Angeles Drainage Improvement Will Take 6400 Tons—4500 Tons in Cleveland Terminals

TWO drainage improvement jobs in Los Angeles, requiring 6400 tons, brought the week's new inquiries to a total of 8150 tons. Awards of 8200 tons included 4500 tons for the Cleveland Union Terminals. Awards follow:

PHILADELPHIA, 225 tons, school at Seventeenth and Tasker Streets, to American Steel Engineering Co.

CAMDEN, N. J., 900 tons of rail steel bars, building for Camden Cold Storage Co., to unnamed bidder.

MAYVIEW, PA., 250 tons, Pittsburgh Municipal Hospital, to Carlem Engineering Co.

CHICAGO, 110 tons of rail steel bars for road work, to Concrete Engineering Co.

EVANSTON, ILL., 400 tons of rail steel bars for Boltwood public school, to Calumet Steel Co.

TACOMA, WASH., 500 tons, Union Bag Co. plant, to Pacific Coast Steel Co.

SEATTLE, 350 tons, Northern Life Building, divided between Pacific Coast Steel Co. and Northwest Rolling Mills.

SEATTLE, 250 tons, garage, to Pacific Coast Steel Co.

CLEVELAND, 750 tons, Whitehouse Crossing grade elimination, to Bourne-Fuller Co.

CLEVELAND, 4500 tons, work for Cleveland Union Terminals Co., to Bourne-Fuller Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 250 tons, pier for Erie Railroad.

CHICAGO, tonnage being estimated, cooperative apartment building at 1325 Astor Street.

CHICAGO, tonnage being estimated, Drake Tower; B. H. Marshall, architect.

CHICAGO, 300 tons, apartment building at 14 West Elm Street; William Bernhard, architect.

ST. LOUIS, 380 tons; building for Lindell Trust Co. at Grand and St. Louis Avenues, 150 tons; southern approach to Municipal bridge across Mississippi River, 130 tons, and garage at Thirteenth and St. Charles Streets, 100 tons.

LITTLE ROCK, ARK., 100 tons, bridge over Arkansas River for Missouri Pacific Railroad; E. A. Hadley, St. Louis, chief engineer.

LOS ANGELES, 5200 tons, Drainage District Improvement No. 23; bids about March 12.

LOS ANGELES, 1220 tons, Drainage District Improvement No. 22; bids taken.

LOS ANGELES, 600 tons, Big Dalton Dam; bids Feb. 20.

SAN DIEGO, CAL., 100 tons, pier foot of E Street for United States Navy; bids March 3.

The Concrete Reinforcing Steel Institute will hold its fourth annual meeting at the Edgewater Gulf Hotel, Biloxi, Miss., March 19-21. M. A. Beeman, Tribune Tower, Chicago, is secretary.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

RAILROAD EQUIPMENT

Norfolk & Western Orders 1000 Hopper Bodies—New York Central Inquires for Ten Locomotives

FALLING somewhat below the average of recent weeks, railroad buying included few large orders. Purchase of 1000 hopper car bodies by the Norfolk & Western was the outstanding transaction. A South American road has made inquiry for a list of miscellaneous cars. The New York Central will buy 10 locomotives for service on the Boston & Albany. Details of the week's business follow:

Norfolk & Western has ordered 1000 hopper car bodies from Ralston Steel Car Co.

Delaware & Hudson has ordered three mail and baggage cars from American Car & Foundry Co.

State Railways of Uruguay have made inquiry for the following items: Three first class passenger coaches, one Pullman coach, two dining cars, two baggage cars, 10 box cars, 32 stock cars and one auxiliary crane.

Anglo-Chile Nitrate Co. has ordered 50 flat cars from American Car & Foundry Co.

Tennessee Copper Co. has ordered one six-wheel switching locomotive from American Locomotive Co.

Sinclair Refining Co. has ordered one six-wheel switching locomotive from Baldwin Locomotive Works.

Amtorg Trading Corporation has placed an order for 200 dump cars with American Car & Foundry Co.

Chicago & Alton has ordered seven baggage and mail and two postal cars from Pullman Car & Mfg. Corporation.

New York Central is inquiring for 10 locomotives for service on Boston & Albany.

Northern Pacific has ordered one articulated-type locomotive from American Locomotive Co.

Chicago, Rock Island & Pacific will buy 11 70-ft. passenger, baggage and mail service gas-electric cars.

Toronto, Hamilton & Buffalo has ordered two locomotives from Montreal Locomotive Works.

New York Metal Merchants Hold Dinner

The Metal Merchants' Credit Association, New York, held its fourth annual dinner at the Waldorf-Astoria Hotel, Feb. 9. The dinner was followed by an entertainment. Guests of the association included representatives of the Bethlehem Steel Co., Youngstown Sheet & Tube Co., Central Alloy Steel Co., Apollo Steel Co., American Rolling Mill Co., Weirton Steel Co., Superior Sheet Steel Co., Republic Iron & Steel Co., Eastern Rolling Mill Co. and the Newton Steel Co. Officers of the association for 1928 are: J. George Fuchs of Hoffman & Scofield-Bruce & Cook, Inc., New York, executive secretary, and Richard H. Lippincott, Jr., of Dickerson, Van Dusen & Co., New York, vice-chairman.

One outstanding feature of United States shipments of agricultural implements in 1927 was the large total which went to Canada, amounting to $29,791,472. This was 33 per cent of the total shipped to all countries and exceeded the shipments to all of Europe by more than $8,000,000, according to the Agricultural Implements Division, Department of Commerce.

FABRICATED STRUCTURAL STEEL

Awards of 67,900 Tons—19,000 for Chicago Building and 15,000 in Santa Fe Bridge Work

WITH 19,000 tons for the Chicago Civic Opera Building, 15,000 tons in bridge requirements for the Santa Fe railroad, 11,000 tons for a bridge at Vicksburg, Miss., and 8000 tons for a viaduct at Milwaukee, structural awards during the last week amounted to 67,900 tons. This total has been exceeded but once in the present year. New projects added to pending work totaled 29,300 tons, the largest of which was an oil tanker for the Standard Oil Co. Awards follow:

New York, 900 tons, building for Empire Mortgage Co. on Fifth Avenue, to Hay Foundry & Iron Works.

Philadelphia, 400 tons, building for Bell Telephone Co., to Shoemaker Bridge Co.

Taylor, S. C., 400 tons, foundry building, to Southern Engineering Co.

State of Michigan, 170 tons, bridge work for State Highway Commission, to Massillon Bridge & Structural Co.

Newark, N. J., 850 tons, Journal Square station and office building, to American Bridge Co.

Philadelphia, 950 tons, Ninth Bank & Trust Co. Building, to Bethlehem Fabricators, Inc.

Philadelphia, 150 tons, addition to West Philadelphia Title & Trust Co., to Robinson Iron & Steel Co.

Washington, 1000 tons, addition to Bennings power plant, Potomac Electric Power Co., to Jones & Laughlin Steel Corporation.

Zanesville, Ohio, 180 tons, two sand barges for Muskingum River Sand & Gravel Co., to Jones & Laughlin Steel Corporation.

Vicksburg, Miss., 16,000 tons, railroad and highway bridge; 11,000 tons for superstructure, to American Bridge Co., and 5000 tons in approaches, to Virginia Bridge & Iron Co., the latter previously reported.

Bogalusa, La., 200 tons, building for Bogalusa Paper Co., to the Virginia Bridge & Iron Co.

Ann Arbor, Mich., 550 tons, First National Bank Building, to Whitehead & Kales.

Detroit, 320 tons, Bank of Detroit, to Guibert Steel Co., Pittsburgh, previously reported awarded to a local fabricator.

Bloomington, Ind., 700 tons, building for University of Indiana, to an unnamed bidder.

Chicago, 19,000 tons, Civic Opera House, to McClintic-Marshall Co.

Chicago, 300 tons, Harlam Avenue bridge, to American Bridge Co.

Chicago, 1400 tons, Sheridan Towers apartment building, to Hansell-Elcock Co.

Chicago, 300 tons, building for Straus & Schram, to Butler Street Foundry & Iron Co., local.

Atchison, Topeka & Santa Fe, 15,000 tons for 1928 bridge work, to American Bridge Co.

Milwaukee, 8000 tons, Sixteenth Street viaduct, to Julius C. Theilacker, 5924 Washington Boulevard, Milwaukee, for fabrication only; separate bids being taken on erection.

Tacoma, Wash., 1250 tons, buildings for Union Bag & Paper Co.; 500 tons to Hofius Steel & Equipment Co., 250 tons to Lidgerwood Pacific Co., and 500 tons to Star Iron & Steel Co.

Seattle, 2300 tons, Northern Life Building, equally divided between Wallace Bridge & Structural Steel Co. and Hofius Steel & Equipment Co.

Cristobal, Canal Zone, 600 tons, Government building, to Stubbs Co., St. Louis.

Mare Island, Cal., 250 tons of plates for Navy Yard, to Worth Steel Co.

San Francisco, 263 tons, apartment building at Pacific and Laguna Streets, to McClintic-Marshall Co.

San Francisco, 130 tons, apartment building at Gough and Fern Streets, to Golden Gate Iron Works.

San Francisco, 120 tons, theater on Geneva Street, to Mortenson Construction Co.

Fresno, Cal., 500 tons, ice plant for Pacific Fruit Express Co., to Minneapolis Steel & Machinery Co.

Los Angeles, 200 tons, power house, Fifty-eighth and Figueroa Streets, to McClintic-Marshall Co.

Honolulu, 800 tons, office building for Alexander & Baldwin, to Honolulu Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Vermont, 500 tons, highway bridges for flood rehabilitation.

New York, 900 tons, pier for Erie Railroad.

Rochester, N. Y., 2200 tons, high school; bids taken Feb. 23.

Philadelphia, 600 tons, building for Temple University.

Pennsylvania Railroad, 500 tons, bridge work.

Washington, 1500 tons, building for Department of Agriculture.

Winston-Salem, N. C., 3000 tons, manufacturing building for Reynolds Tobacco Co.

Cleveland, 2100 tons, addition to open-hearth plant of Otis Steel Co.

Rittman, Ohio, 400 tons, building for Ohio Box Board Co.

Cleveland, 130 tons, conveyor house for Kelly Island Line & Transport Co. at Marblehead, Ohio.

Philadelphia, 1800 tons, building for Integrity Trust Co. at Sixteenth and Walnut Streets, to be let by Peyton Realty Co., 300 Madison Avenue, New York.

Indianapolis, Ind., 2500 tons, department store.

Kenosha, Wis., 500 tons, hotel and theater.

Chicago, 900 tons, approach to LaSalle Street Bridge.

Chicago, 600 tons, garage at 112 West Lake Street.

Chicago, 400 tons, produce market at Eighty-ninth Street.

Little Rock, Ark., 3000 tons, bridge over Arkansas River, for Missouri Pacific Railroad; E. A. Hadley, St. Louis, chief engineer.

Oakland, Cal., 300 tons, telephone building, Forty-fifth Street and Telegraph Avenue; bids being taken.

San Francisco, 800 tons sheet piling for Coyote Point bridge across San Francisco Bay; inquiry withdrawn.

San Francisco, 125 tons, hall for Native Daughters of Golden West; bids opened.

San Francisco, 5000 tons plates and shapes, oil tanker for Standard Oil Co.; Newport News Shipbuilding & Dry Dock Co., low bidder.

Seattle, Wash., 1500 tons plates, 78-in. penstock for Cedar River project for city; bids Feb. 17.

Olympia, Wash., 235 tons, Wind River bridge; bids opened.

Los Angeles, 600 tons, plates and shapes for two 80,000-bbl. tanks for Pan-American Petroleum Co.; bids taken soon.

Forming an American Pressed Metal Association

On Feb. 28 those interested in forming an association of pressed metal manufacturers will meet at the Cleveland Athletic Club, Cleveland, at 9.30 a. m., to discuss the report of the organization committee and adopt a permanent form of organization. This is the result of the meeting of a group of stamping manufacturers held in Cleveland Jan. 20.

Republic Earnings Less—Sharon Steel Hoop Profits Decrease

The Republic Iron & Steel Co., New York, had net profits in 1927 of $3,018,282, equivalent after preferred dividend payments to $4.22 per share of common stock. This compared with $5,065,022 or $11.05 a share in 1926. Profits of the company during the last half of 1927 were less than $1,000,000, while the company earned over $2,600,000 in the corresponding period of 1926. Unfilled orders of finished and semi-finished steel amounted to 140,809 tons on Dec. 31, 1927, as compared with 88,383 tons on Sept. 30 and with 157,250 tons at the end of 1926.

Earnings of the Sharon Steel Hoop Co., Sharon, Pa., were $555,519 in 1927, after all charges, comparing with $1,295,542 in 1926.

British Iron and Steel Output Light in January

London, England, Feb. 14 (*By Cable*).—Pig iron production in January was 560,600 gross tons, while that of steel ingots, including castings, was 626,200 tons. The corresponding production in December was 559,100 tons of pig iron and 604,900 tons of steel.

A comparison of the January production with the monthly rate for previous years is shown in the following table in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly	855,000	638,600
1920—Average monthly	669,500	755,600
1922—Average monthly	408,500	490,100
1923—Average monthly	620,000	706,800
1924—Average monthly	609,900	685,100
1925—Average monthly	519,700	616,400
1926—Average monthly	203,500	296,700
1927—Average monthly	607,800	758,200
1928—January	560,600	626,200

PERSONAL

C. W. Heppenstall, president Heppenstall Forge & Knife Co., Pittsburgh, observed the thirty-fifth anniversary of his connection with that company by entertaining its officers and veteran employees at a banquet in the main office on Feb. 11. He began his career as an office boy for the Trethewey Mfg. Co., now the Heppenstall Forge & Knife Co., in 1893. Following the dinner a moving picture showing all the operations of the different departments of the works was presented. After the moving picture B. B. Weinberg, general manager of sales, presided, and a number of officers and employees made talks on their experiences during employment with the company. A. P. Naylor, the oldest employee in service, on behalf of the employees of the Heppenstall Forge & Knife Co. and the Heppenstall Forge Co., a subsidiary company at Bridgeport, Conn., presented Mr. Heppenstall with a hand engraved bronze tablet. Mr. Heppenstall talked on the history of the Heppenstall family and company and the growth of the plant.

C. W. HEPPENSTALL

Arthur Dufty has been appointed manager of the Bantam Ball Bearing Co., Bantam, Conn., relieving W. S. Rogers, president, of all details of direct management. Mr. Dufty was graduated from Purdue University, Lafayette, Ind., in 1899, and was for 16 years superintendent of buildings and purchasing agent at Purdue. Later he was for three years business manager at Oberlin College, Oberlin, Ohio, before going into commercial lines for himself at Cleveland.

Ledyard Heckscher, who some months ago resigned as president of the Alan Wood Iron & Steel Co., Philadelphia, has resigned as president and director of the Rainey-Wood Coke Co., 52 Vanderbilt Avenue, New York. Alan D. Wood has been elected to succeed him as a director of the coke company and has also been made assistant treasurer.

W. S. Isherwood, general sales manager of the AC Spark Plug Co., Flint, Mich., has been appointed a member of the board of governors of the Automotive Equipment Association.

Frank J. Wachter, vice-president and sales manager of the cutlery division, Landers, Frary & Clark, New Britain, Conn., has resigned. He had been associated with the company for 15 years.

Charles L. Newcomb, general manager Dean Pump Works, Worthington Pump & Machinery Corporation, Holyoke, Mass., has resigned, and is at St. Petersburg, Fla., for the winter. He has been succeeded by Hugh Benet, formerly with Bartlett Hayward Co., Baltimore.

T. M. Manley, who has served in various capacities for the Morse Chain Co., Ithaca, N. Y., for about 20 years, has recently been appointed manager of the district including the Mohawk Valley, northern New York, Vermont, western Massachusetts and northeastern Pennsylvania, with headquarters at the company's main office.

Roy F. Druschky, recently in the St. Louis sales department of the Wagner Electric Corporation, St. Louis, has been placed in charge of a branch office opened by the company at 475 West Peachtree Street, Northeast, Atlanta, Ga. His territory will include Georgia, Alabama and Florida.

J. C. Ward, president of the Edgar Allen Steel Co., Inc., 194 Front Street, New York, sailed for England on Feb. 3, after a visit of several months in the United States and Canada.

LeRoy J. Zorn, executive vice-president of the J. H. Channon Corporation, Chicago, has been elected president of the company.

R. T. Stafford, for some years manager of the Northwest branch of the Allis-Chalmers Mfg. Co., Seattle, has been made assistant manager of the electrical department of the Pittsburgh Transformer Co., Pittsburgh. He has been succeeded by John Alberts, who has been connected with the company as representative in Europe and also in Portland, Ore., and San Francisco.

W. A. Carmer, traffic manager for the Bass Foundry & Machine Co., Fort Wayne, Ind., has been elected president of the Fort Wayne Transportation Club.

Arthur Maulding has been appointed general foreman of the steel plant of the Mount Vernon Car Mfg. Co., Mount Vernon, Ill. Robert Elliott has been made assistant superintendent.

T. B. Cram, for 19 years closely identified with the furnace industry, is now associated with Holcroft & Co., Detroit, contracting engineers, as special representative.

W. S. Hovey, president Fairbanks, Morse & Co., Chicago, will address the Mid-West Power Conference at a luncheon meeting to be held at the Hotel Stevens, Chicago, on Feb. 17. His subject will be "The Engineer's Part in Business."

Arthur E. Vail, for the past nine years superintendent of the Upper Level plant of Aluminum Co. of America, Massena, N. Y., has resigned. He has been connected with the Aluminum company at its various plants for 13 years.

W. J. Longmore has been appointed consulting supervisor of purchases Westinghouse Electric & Mfg. Co., East Pittsburgh; E. R. Norris, general works manager of all manufacturing operations; A. W. Bass, assistant to the vice-president; S. E. Marks, director of traffic, and C. G. Taylor, general purchasing agent. Mr. Longmore has been with the company since 1881 and since 1891 has headed the purchasing department. Mr. Norris, who for several years has been director of works equipment, began his connection with the company in 1892 as a general mechanic at the Newark works. He has been located at the East Pittsburgh plant since 1894. Mr. Bass started with the company in 1912 in charge of graphic statistics, and in 1921 was made director of works records. Mr. Marks entered the employ of the company in 1891 in the purchasing department, and since 1923 has been director of traffic and shipping. Mr. Taylor became assistant purchasing agent in 1895, purchasing agent in 1917, and a few years ago was made director of purchases.

C. S. Slack has been elected general manager of the Wise Industries, 1033 Mount Elliott Street, Detroit, manufacturer of cap nuts and stampings. He succeeds M. M. Wise, who has resigned.

D. F. Miner has been appointed manager of the material and process engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh. He has been with the company since 1919. He was graduated from Clark College, Worcester, Mass., in 1912, and did post-graduate work at Worcester Polytechnic Institute which brought him degrees in arts, science and electrical engineering.

W. R. G. Baker has been appointed managing engineer of the radio department of the General Electric Co., Schenectady, N. Y. He succeeds Adam Stein, Jr., who has joined the executive staff of Acoustics Products Co., a holding company recently organized to take over a number of radio phonograph companies. Mr. Baker has been connected with radio development of the General Electric Co. since it became active in this field.

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George J. Klein, of the Novelty Lighting Corporation, Cleveland, was elected president of the Artistic Lighting Equipment Association, 711 Graybar Building, New York, at the association's annual convention held recently in Cleveland.

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Edgar B. Thomas, for the past 15 years engaged in general engineering practice and building construction, has been added to the contract department staff of the H. K. Ferguson Co., Cleveland, engineer and builder. Mr. Thomas is chairman of the Cleveland Chamber of Commerce rivers and harbors committee, vice-president of the National Rivers and Harbors Congress and vice-president of the Great Lakes Harbors Association. He is a past president of the Cleveland Engineering Society.

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R. F. Arndt, sales representative of Poole & McGonigle, Portland, Ore., structural steel fabricators, has been made a director of the Builders Exchange of Portland, representing interests of the steel industry.

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J. B. Green, president of the Fusion Welding Corporation, Chicago, is spending the month of February on a lecture tour, his subject being the flow of welding metal in oxy-acetylene and metallic arc welding. The lectures are based on research work done by the engineering department of the Fusion Welding Corporation, and are being given at welding conferences held under the auspices of a number of State universities. Mr. Green will also speak at the annual meeting of the American Institute of Electrical Engineers in New York.

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M. W. McArdle, vice-president and general manager of the Chicago Flexible Shaft Co., Chicago, has been elected president of the company. He has been associated with the organization for 20 years.

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Dana Summers has been oppointed general superintendent of the Chicago Steel & Wire Co., Chicago. He has been identified with wire manufacturing plants for 15 years.

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E. J. Shuler, for the last eight years in charge of welding operations for the New Orleans Public Service Corporation, New Orleans, has joined the engineering staff of the Fusion Welding Corporation, Chicago.

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Julius A. Pfeiffer, recently vice-president of the Northwestern Expanded Metal Co., Chicago, has been made director of sales of the fireproof materials division, Milwaukee Corrugating Co., Milwaukee.

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E. T. Weir, president Weirton Steel Co., Weirton, W. Va., is in Nassau, British West Indies, for a stay of about six weeks.

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T. M. Girdler, recently elected president of the Jones & Laughlin Steel Corporation, was the guest of honor at a dinner at the Duquesne Club, Pittsburgh, on Feb. 10, given by members of the Lehigh Alumni Association of Pittsburgh. Mr. Girdler was graduated from Lehigh University in 1901. The affair was sponsored and directed by Taylor Allderdice, president National Tube Co.; Frank Bell, president Edgewater Steel Co.; T. J. Bray, president Republic Iron & Steel Co.; F. R. Dravo and R. M. Dravo, Dravo Contracting Co.; C. D. Marshall and H. H. McClintic, McClintic-Marshall Co.; H. D. Williams, president Pittsburgh Steel Co.; F. A. Merrick, vice-president Westinghouse Electric & Mfg. Co., and R. T. Morrow, assistant to vice-president Pennsylvania Railroad.

E. S. Chamberlain has joined the Triplex Machine Tool Co., New York, as machine tool salesman. In the past he has been connected with the National Tool Co. and the Kearney & Trecker Corporation, representing both companies in the New York territory.

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J. Ramsey Speer, president Mackintosh-Hemphill Co., Pittsburgh, will address the Pittsburgh Foundrymen's Association at its regular monthly meeting and dinner at the Fort Pitt Hotel, Pittsburgh, Monday evening, Feb. 20. His subject will be "Where Does the Foundryman Find His Profit?"

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H. M. Davison, who has been with the Hayward Co., 50 Church Street, New York, for a number of years, the last seven as general manager of sales, has resigned.

Foundry Equipment Manufacturers Elect Officers

At the annual meeting of the Foundry Equipment Manufacturers Association, in Cleveland, Feb. 7, the following officers were elected for the ensuing year: President, S. C. Vessy, W. W. Sly Mfg. Co., Cleveland; vice-president, Henry W. Standart, Northern Engineering Works, Detroit. H. Cole Estep, Penton Building, Cleveland, was re-elected secretary-treasurer. Mr. Standart was also elected a director for the term ending February, 1931, together with A. F. Jensen, Hanna Engineering Works, Chicago. Mr. Vessy was re-elected a director. In addition to the foregoing the board now includes T. W. Pangborn, Pangborn Corporation, Hagerstown, Md., past president, and E. O. Beardsley, Beardsley & Piper Co., Chicago.

The report of the secretary-treasurer showed that the association has reached a high point in number of members and in financial resources. The reports on business conditions showed that somewhat better conditions have prevailed since the first of the year. It was agreed to take steps to enlarge and amplify the statistical work of the association.

The members were addressed by Whiting Williams, Cleveland, on the subject, "What is Industry Doing to Us?" and by E. F. DuBrul, manager National Machine Tool Builders Association, who discussed the possibility of common action between trade associations to invoke those provisions of the Clayton Act relating to unfair practices with respect to unethical buying methods.

Obituary

John J. Treat, assistant superintendent Yale & Towne Mfg. Co., Stamford, Conn., and a former mayor of Stamford, died at the Stamford Hospital Feb. 7. He was born at New Haven, Conn., in 1873.

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Edward R. Wiggins, advertising manager for French & Hecht Mfg. Co., Davenport, Iowa, died Jan. 31, after a brief illness, aged 41 years. He had been associate editor and contributor to various technical journals until a few years ago when he entered the advertising field.

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Fred J. La Motte, superintendent of the Tonawanda Iron Corporation, the pig iron producing subsidiary of the American Radiator Co., died at Tonawanda, N. Y., on Feb. 11, of pneumonia. He had been in charge of the Tonawanda furnace for four years, having come there from the Chicago district.

The Bureau of Supplies and Accounts, Navy Department, will open bids next Tuesday for 250 tons of black medium steel plates for use in construction of light cruisers Nos. 28 and 29, one-half of the tonnage to be delivered at the Mare Island and the other at the Puget Sound navy yards. Bids will also be opened at the same time for 80 tons of black medium steel rivet rods for use in constructing cruiser No. 29, building at Mare Island.

Training and Paying Executives

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leading to better organization and managerial efficiency, most companies have become interested in pensions.

In favoring the non-contributory pension plan, in which the company sets aside a certain amount each year for future payments, Mr. Cowdrick mentioned several weaknesses of the contributory plan. In the contributory plan the employer is really dealing with money which is not his own and must become involved in cumbersome records and bookkeeping. He must also adjust the payments of those who leave the service of the company before the pension time. The contributory plan likewise forces all employees to take part, and compulsion in such matters is not popular among workers.

Non-Contributory Plan Really a Savings System

Expressing opposition to the contributory pension plan, J. M. Larkin, assistant to the president, Bethlehem Steel Corporation, stated that as this system is really a means of encouraging saving among workers, he would prefer some sort of a thrift or investment plan which did not conceal its real motive under another name. Mr. Larkin stressed the fact that a pension plan is an investment and not a form of benevolence. With this fact in mind, the speaker urged the study of possible pension plans with emphasis on their social benefits rather than their cost.

Dr. Irving Clark, Norton Co., Worcester, Mass., stated that a great many workers who are retired on pension might have been kept at work much longer if adequate medical supervision had been provided in the plant. These men, who are often forced to retire because of some chronic disease contracted in late middle life, might, with proper medical care, have stayed on the job and remained of considerable value to their company both in producing power and in maintaining morale among their fellows. At the same time a worker is much more contented at work than retired on pension.

Training Men on the Job

A plea for the keeping of a detailed record of successful methods for training men on the job was voiced by H. G. Kenagy, Life Insurance Sales Research Bureau, Hartford, Conn. He deplored the lack of any definite technique for the training of workers. He characterized job analysis or the determining of what must be taught as the first step in training. The instructor should then arrange duties in the order of their difficulty and, after demonstrating proper methods, let the student try things for himself and become adequately efficient at one task before assuming new duties. Particularly important, Mr. Kenagy stated, is the measurement of a man's ability to learn and the assignment of his new work accordingly. Throughout the training period the men in charge should retain an experimental attitude and in that way build up a knowledge of the subject for future use.

Mid-Winter Safety Conference

Safety measures in steel and allied plants will feature a meeting of the Chicago district section of the Association of Iron and Steel Electrical Engineers, to be held on the evening of Feb. 21. Three papers will be presented and discussed. John P. Eib, safety director Illinois Steel Co., Joliet, Ill., will read a paper on "Education as a Means in Accident Prevention," featuring 5,028,640 man-hours in his plant without a lost-time accident. "Electrical Safety Circuits, Their Uses and Construction," by W. M. Runyon, engineer Crouse-Hinds Co., Syracuse, N. Y., and "Codes for Use in High-Tension Practices," by C. L. Baker, Bethlehem Steel Co., Johnstown, Pa., are the two other papers. The meeting will follow a dinner, and will be held at the Electric Power Club, 30 North Dearborn Street, Chicago.

Sintering a Variety of Materials

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dition arose at the plant of the E. & G. Brooke Iron Co., Birdsboro, Pa.

Since the process simultaneously desulphurizes and sinters materials efficiently, the treatment of French Creek ore had been anticipated as a possibility from the start of the sintering plant. The French Creek mines produce ore that may be desulphurized to 0.1 per cent when crushed to ¼-in. size and sintered with about 3.5 per cent carbon. Fine crushing permits obtaining a uniform mixture, thus eliminating the variation that existed in run-of-mine lump ore.

Results obtained in improved furnace operation, from sintering tests of this material, were so satisfactory that it was decided to build a crushing plant to operate in conjunction with the sintering plant. The latter, built by the American Ore Reclamation Co. in 1911, and continued in operation until April, 1919, produced over 200,000 gross tons of sinter. A second plant, with an American Ore Reclamation Co. machine 42 in. x 57 ft. 4 in., was placed in operation in February, 1919. Plant No. 2, adjacent to the old installation, was housed in a timber building. In May, 1920, the new sintering plant, as well as the crusher installation, were totally destroyed by fire, after having produced about 100,000 tons of sinter. Notwithstanding the heavy loss, the Brooke company decided to build a larger and more modern plant immediately. This included a new crushing plant.

(To be concluded)

Sheet Steel Orders in January Ran 28,800 Tons Ahead of Shipments

January sales of the independent sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers ran almost 28,800 tons in excess of the shipments for that month, but instead of an increase of that amount in the unfilled orders at the end of January that item was lower, as compared with one month before, by more than 51,000 tons. This is partly explained by an increase in the month in unshipped orders. Observations made during the month that production was high in relation to shipments are confirmed by the actual figures, which show that shipments were 77.6 per cent of capacity, while the production was 89.6 per cent. The statement for January, with comparisons, follows:

	January	December	November
Total number of mills	720	719	718
Capacity per month	486,550	472,064	485,350
Per cent reporting	72.6	72.6	72.6
Sales	302,921	530,197	344,519
Production	316,541	260,130	232,041
Shipments	274,126	221,689	224,789
Unfilled orders	694,197	745,393	437,306
Unshipped orders	110,945	97,630	92,678
Unsold stocks	59,508	53,474	52,966
Percentages to Capacity			
Sales	85.7	154.7	97.8
Production	89.6	75.9	65.9
Shipments	77.6	64.7	63.8
Unfilled orders	196.5	217.5	124.2
Unshipped orders	31.4	28.5	26.3
Unsold stocks	16.8	15.3	15.0

New Strip Mill for Steel & Tubes, Inc.

Steel & Tubes, Inc., Cleveland, will build a new continuous hot-strip mill at its Elyria, Ohio, plant. This will have a capacity for rolling strip up to 14 in. wide. Construction is planned to start in about six months.

Prices Still Higher on Continent

Advances in Both Pig Iron and Finished Steel—British Boiler Plates Lower—Germany Gets Railroad Order

(By Cable)

LONDON, ENGLAND, Feb. 13.

HOME demand for Cleveland pig iron continues to improve, but export sales are still small. Imports of ontinental iron are diminishing, last month's arrivals f pig iron totaling only 15,000 tons. The total of iron nd steel imports was 284,000 tons. Cleveland iron akers have not yet recaptured the Scottish market, ut sales are increasing.

Hematite is steadier as a result of some sales to taly and Germany of special analysis iron and imroved domestic demand for mixed numbers. Foreign re continues quiet, but prices are firm as a result of he Swedish strike.

Finished steel is generally quiet for export, but doestic demand is steady. Steel plate and shape makrs are endeavoring to form a central selling agency or export, but they are meeting with opposition and rospects of success are not considered hopeful.

January exports were 20,670 gross tons of pig iron, f which 200 tons went to the United States. Total exports of iron and steel were 332,185 gross tons.

Tin plate is active, the increasing cost of foreign steel bringing consumers into the market in anticipation of an early advance in the tin plate minimum price. Works are well sold ahead and if all the present inquiry matures will be booked for many months, as output is still restricted. Some makers have booked orders for December shipment.

Galvanized sheets are active and some good tonnages have been placed with makers, enabling them to advance prices. Black sheets are moderately active.

Continental markets continue to advance with demand good and some shortage of supplies. British users of semi-finished have paid £4 14s. ($22.90) per ton, f.o.b. for sheet bars and £4 13s. ($22.65) per ton, f.o.b. for 2-in. billets. Merchant bars have sold for export at £5 5s. per ton (1.16c. per lb.) f.o.b. There has been some heavy business in beams at as much as £4 14s. per ton (1.04c. per lb.), f.o.b. The German output for January is reported at 1,400,000 metric tons of pig iron and 1,600,000 tons of steel ingots.

FRENCH PRICES ADVANCING

Formation of Sales Offices for Semi-Finished Steel and Beams Stabilizes Market

PARIS, FRANCE, Jan. 29.—While there is a fair volme of purchasing for current needs, business is deeloping largely from a desire on the part of consumrs to increase their stocks at present prices in expecation of advances when the proposed national compoirs for semi-finished material, bars and beams are esablished, Feb. 15. Money is easier than for some time, ut costs of production and distribution will probably e increased soon by an advance in freight rates.

Prices are generally firm and in some markets there s a decided tendency to advance, but improvement is lmost exclusive with iron and steel producers. Manufacturing industries generally have but little work on their books. There is increased unemployment in certain regions.

Pig Iron.—Producers of phosphoric foundry iron at a recent meeting decided to advance domestic prices 10 fr. (40c.) per ton for February. The new basis for No. 3 foundry is 435 fr. ($17.05) per metric ton, f.o.b. furnace. Deductions for quantity purchases have been reduced. On purchases of 100 to 199 metric tons the reduction is 2 fr. (8c.) instead of 3 fr. (12c.) per ton; on 200 to 499 tons the reduction is 4 fr. (16c.) instead of 5 fr. (20c.) per ton; on 500 to 999 tons the reduction is 6 fr. (24c.) instead of 10 fr. (40c.) per ton and for more than 1000 tons the reduction is 8 fr. (32c.) instead of 12 fr. (48c.) per ton. Medium phosphorus foundry iron has been advanced 10 fr. (40c.) per ton. The expected decrease in prices of coke has not been

British and Continental European prices per gross ton, except where otherwise stated, f. o. b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.			$4.39		
Bilbao Rubio ore*	1 1½			5.24		
Cleveland No. 1 fdy.	3 7½			16.44		
Cleveland No. 3 fdy.	3 5			15.83		
Cleveland No. 4 fdy.	3 4			15.59		
Cleveland No. 4 forge	3 3½			15.46		
Cleveland basic (nom.)	3 15	to	3 15½	18.27	to	18.39
East Coast mixed	3 9	to	3 10	16.80	to	17.05
East Coast hematite	3 9½	to	3 10½	16.93	to	17.17
Rails, 60 lb. and up	7 15	to	8 0	37.75	to	38.96
Billets	6 0	to	6 10	29.22	to	31.66
Ferromanganese	13 10			65.75		
Ferromanganese (export)	13 0	to	13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5 7½	to	5 15	26.18	to	28.01
Tin plate, base box	0 18	to	0 18¼	4.39	to	4.45
Black sheets, Japanese specifications	13 5	to	13 10	64.53	to	65.75
				C. per Lb.		
Ship plates	7 12½	to	8 2½	1.66	to	1.77
Boiler plates	9 2½	to	9 12½	1.98	to	2.09
Tees	8 2½	to	8 12½	1.77	to	1.99
Channels	7 7½	to	7 17½	1.60	to	1.71
Beams	7 2½	to	7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to	7 15	1.58	to	1.69
Steel hoops	10 10	to	11 0	2.28	to	2.39
Black sheets, 24 gage	9 15	to	10 0	2.12	to	2.17
Galv. sheets, 24 gage	13 2½			2.85		
Cold rolled steel strip, 20 gage, nom.	14 0	to	14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)						
Belgium	£3 2½s.	to	£3 4s.	$15.22	to	$15.59
France	3 2½	to	3 4	15.22	to	15.59
Luxemburg	3 2½	to	3 4	15.22	to	15.59
Basic pig iron (nom.):						
Belgium	3 0			14.61		
France	3 0			14.61		
Luxemburg	3 0			14.61		
Coke	0 18			4.39		
Billets:						
Belgium	4 13			22.65		
France	4 13			22.65		
Merchant bars:				C. per Lb.		
Belgium	5 5	to	5 7½	1.16	to	1.18
France	5 5	to	5 7½	1.16	to	1.18
Luxemburg	5 5	to	5 7½	1.16	to	1.18
Joists (beams):						
Belgium	4 14			1.04		
France	4 14			1.04		
Luxemburg	4 14			1.04		
Angles:						
Belgium	5 5			1.16		
⅛-in. plates:						
Belgium (a)	6 8			1.41		
Germany (a)	6 8			1.41		
3/16-in. ship plates:						
Belgium	6 3			1.36		
Luxemburg	6 3			1.36		
Sheets, heavy:						
Belgium	6 1			1.34		
Germany	6 1			1.34		

(a) Nominal.

large. Furnace grades have declined 5 fr. (20c.) per ton and foundry grades 8 fr. (32c.). There is a question whether these reductions will be applied to existing contracts. At a recent meeting of the entente of French, Belgian and Luxemburg producers of pig iron, it was decided that export prices be maintained for Switzerland and Italy and in other foreign markets the conditions of competition will be followed.

Ferroalloys.—As a result of the agreement between British and Norwegian ferromanganese producers prices are becoming stable. Other producers of ferromanganese are following the price set by the British and Norwegian furnaces.

Semi-Finished Material.—The new selling organization for semi-finished products and beams is to take over sales Feb. 15. Meanwhile producers entering into the agreement have decided to maintain prices until the new organization begins to function. Most mills are well booked with business and deliveries vary from five to 12 weeks. Export business is improving and prices are beginning to advance, although total purchasing is still small. Blooms are quoted at £3 19s. to £4 3s. ($19.25 to $20.21) per ton and billets at £4 5s. to £4 8s. 6d. ($20.70 to $21.55) per ton, f.o.b. Antwerp.

Finished Material.—The market on beams is strong as a result of the formation of the selling organization. Steel bars have advanced to about £5 per ton (1.10c. per lb.). Demand for wire rods is good and prices are strong but unchanged. Sheet prices are being maintained while negotiations are carried on for formation of a selling organization to control the sheet market. Even in the export market, sheet prices, affected by these negotiations, show a tendency to advance.

New German Tube Company Bought by United Steel Works

Hamburg, Germany, Jan. 30.—The Niederrheinische Stahlwerke A. G., the newest German steel corporation is now entirely controlled by the Vereinigte Stahlwerke A. G. (United Steel Works). The controlling company purchased a majority of the shares through the German Tube Syndicate. It is announced that there will be no interruption in construction of the new tube plants for the Niederrheinische interests and the first tubes by a new process, the Sack-Gasse-Verfahren, will be produced about September of this year.

Public Arbitrator in Germany Handles Many Cases

Hamburg, Germany, Jan. 30.—Recent statistics given out by the public arbitrator for Germany show that during 1925 a total of 4087 labor disputes were settled by the arbitrator, in 1926 a total of 5043 were settled and in 1927, with December estimated, 5907 cases were arbitrated. Of all wage disputes in Germany, 55 per cent were settled by the public arbitrator in 1926 and 59 per cent in 1927.

Despite the apparently satisfactory showing by the public arbitrator, neither employers nor employees are satisfied. It has been pointed out that both the employer and the workmen present exaggerated demands to the arbitrator, who is forced to assume full responsibility in making a decision that is fair to both sides in the controversy.

Large Railroad Order Goes to Germany on Reparations

Hamburg, Germany, Jan. 30.—The French Government has placed a large railroad material order for the French West African colonies with the United Steel Works, Klockner Works and other German manufacturers. The contract, which will be delivered on reparations account during the next 14 months, includes 640 miles of track, 30 freight cars, 11 locomotives, 70 passenger cars and station equipment and cranes.

HIGHER MARKET IN BELGIUM

Reduced Competition from France Aids Price Advance—Buyers Offer Bonuses

Antwerp, Belgium, Jan. 30.—Reflecting the decide increase in purchasing that has developed recently prices are beginning to advance. Much of the presen demand for iron and steel seems to be of a speculativ nature, but producers maintain that prices are still to low and continued increases seem to be expected. I some quarters, however, it is pointed out that the advance in prices has been too rapid to present a health condition and some reaction may develop. On the othe hand, export trade is showing decided improvemen with French mills filling their books with domestic orders. Belgian rail mills have taken some importan tonnages from the state railroads.

Pig Iron.—Buying has been in good volume an prices are firm. No. 3 phosphoric foundry iron is unchanged for export at £3 2s. to £3 3s. ($15.10 to $15.34) per ton, f.o.b. Antwerp. Bessemer iron is quoted at £ 18s. to £3 ($14.13 to $14.61) per ton, f.o.b. Antwerp.

Semi-Finished Material.—Although the volume o transactions is still small prices are firm. Buyers ar seeking concessions, but mills show no inclination t shade their original quotations. Blooms range from £ to £4 3s. ($19.48 to $20.21) per ton and billets from £ 6s. to £4 8s. 6d. ($20.94 to $21.55) per ton, f.o.b Antwerp. There is a good demand for sheet bars an some scarcity for prompt shipment is appearing. Current prices are about £4 10s. ($21.92) per ton, f.o.b Antwerp.

Finished Material.—Mills in most cases are not seeking additional business. Buyers are offering to pa slight advances. Prices for steel bars continue to advance and it is only on a large tonnage that less tha £5 per ton (1.10c. per lb.) is obtainable. Beams hav moved upward with competition from French mill temporarily reduced by a heavier home demand and current quotations range from £4 9s. to £4 10s. per to (0.98c. to 0.99c. per lb.). Corrugated bars are quoted a £5 5s. per ton (1.16c. per lb.), f.o.b. Antwerp. Ho rolled hoops are on a basis of £6 per ton (1.32c. per lb. f.o.b. Antwerp, and wire rods continue firm at £5 10s per ton (1.21c. per lb.).

Finds Reinforcing Bars Are Construction Material; Take Lower Tariff

A decision favorable to importers has been rendered on deformed steel bars by Justice I. F. Fische of the United States Customs Court, Second Division Galveston, Tex. The court finds that the plaintiff i justified in claiming that deformed steel bars are properly dutiable under paragraph 312 of the Tariff Act, which applies to construction materials, dutiable at 1/5 of one cent per lb. instead of under paragraph 304, which applies to semi-finished material, and plain steel bars, dutiable at 3/10 of one cent per lb. when the value is not more than 1.50c. per lb.

The decision of Judge Fischer concludes:

"We are of the opinion that within all the prevailing decisions on the subject these deformed bars are structural shapes, since that is their chief if not exclusive use. Certain it is that they are *ejusdem generis* with the beams, girders, joists, angles, channels, and other structurals shapes enumerated in paragraph 312. We therefore sustain the claim alleged in the protest under the latter paragraph and reverse the decision of the collector in each instance as to this merchandise."

The Government has 60 days in which to appeal this decision to a higher customs court and action along this line seems to be expected by importers. Meanwhile entries of deformed bars will be paid for by the importer at the higher rate under protest so that should the decision be sustained the excess duty will be refunded. Bars may be brought in at the lower rate if a bond is posted by the importer covering the amount of the excess duty.

Machinery Markets and News of the Works

AILROAD LIST OF 21 TOOLS

t. Louis-San Francisco Will Take Bids Up to Feb. 20 on Inquiry

usiness So Far This Year Ahead of Like Period in 1927—Automobile Companies Buying but Not Heavily

RAILROAD inquiry for machine tools has been enlarged by a list of 21 items on which the St. Louis- an Francisco will take bids up to Feb. 20. The Santa e is expected to place orders this month against re- nt inquiries. Railroad buying so far this year has een relatively light.

The principal activity in the Detroit and Cleveland arkets is brought about by expanding production of itomobile companies. The Packard Motor Car Co. is placed an order for a fair-sized lot of multiple bindle drilling machines, and the Ford Motor Co. continues to buy for production of its model, but on a moderate scale. Taken altogether, the business coming from the automotive industry is not as heavy as in some recent years at this time.

Machine tool sales during the first six weeks of 1928 are reported by some companies to be 20 per cent larger than in the corresponding period of 1927, but the improvement has not been evenly distributed and the result is a variation in the rate at which machine tool plants are operating. A large volume of business is pending, however, and should conditions industrially continue to improve it is expected that the present margin over the first quarter of last year will be maintained.

The National Acme Co., Cleveland, was one of the larger buyers during the week, ordering a considerable amount of equipment for the manufacture of shock absorbers for automobiles. Inquiries from the General Electric Co. at Schenectady, N. Y., has increased its recent inquiries to cover about 12 tools.

New York

NEW YORK, Feb. 14.

A GOOD volume of machine tool inquiry is accumulating but purchasing is light. The railroads continue inactive but industrial users of tools are in the market for single pieces of equipment. The General Electric Co. has issued further inquiries the past week bringing the total to about 12 tools. The New York Central Railroad has several outstanding inquiries, but has not yet announced that it is ready to place business.

Among recent purchases are a 62-in. heavy-duty and a -in. standard boring mill by a Milwaukee company; 18 x -in. used Norton grinder by a company in Wheeling, W. a.; 8-in. rotary surface grinder and No. 1 jig boring ma- ine by a clock manufacturer in Middle West; two 5-in. itomatic milling machines by a New Jersey company; 13 x -in. lathe by a Massachusetts manufacturer and one also a company in Cleveland; No. 2 jig boring machine by a ol and die maker in Detroit; 21-in. Aurora drill by a man- acturer and a 13 x 30-in. lathe by a water company in alifornia.

Bids will soon be asked by Otis Elevator Co., Wells Ave- ie, Yonkers, N. Y., for a two-story addition, to cost in ex- ss of $50,000 with equipment. Engineering department at mpany headquarters, Eleventh Avenue and Twenty-sixth reet, New York, in charge.

Safe-T Stat Co., Inc., 79 Bridge Street, Brooklyn, manu- cturer of electrical equipment, has arranged merger with . G. Nagel Electric Co., Toledo, Ohio, and will consolidate oduction at latter plant.

Artcraft Auto Lamp Co., 141 West Fifty-fourth Street, ew York, manufacturer of automobile headlights, etc., has ased space at 9-11 Franklin Street for expansion.

Fur Merchants' Cold Storage Co., 248-50 West Twenty- ghth Street, New York, will soon take bids for a ten-story ldition to cold storage and refrigerating plant, to cost in cess of $250,000 with equipment. Brutus Gundlack, 110 ast Forty-second Street, is architect; Ophuls & Hill, Inc., 2-14 West Forty-second Street, is architect.

International Power & Paper Co. of Newfoundland, Ltd., erated by International Paper Co., 100 East Forty-second reet, New York, is disposing of a bond issue of $4,866,000, rtion of fund to be used for expansion, including property rchase of newsprint mill and hydroelectric generating plant west coast of Newfoundland. A. R. Graustein is president both companies.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated fiber containers, corrugated boards, etc., has succeeded to plant and business of Thompson & Norris Co., 212 Concord Street, Brooklyn, manufacturer of kindred products, and will continue as a division of its organization.

William Shary, 41 Union Square, West, New York, architect, will soon begin construction of a two-story automobile service, repair and garage building to cost about $100,000 with equipment.

National Carbon Co., 30 East Forty-second Street, New York, is planning expansion at its plant at Fremont, Ohio, with facilities for output of 120,000 dry cell batteries per day. Plant at 580 Henderson Street, Jersey City, N. J., heretofore given over to this manufacture, will be transferred to Fremont, as well as plant at East St. Louis, Ill. Jersey City unit will be converted for Eastern storage and distributing service.

Fire recently damaged portion of works of American Name Plate Mfg. Co., 117 Imlay Street, Brooklyn, manufacturer of metal name plates.

Lancia Motors of America, Inc., 140 West Fifty-seventh Street, New York, lately organized to assemble Lancia automobiles, with parts imported from Italy, is arranging for installation of equipment at former plant of Fiat Co., Poughkeepsie, N. Y. Anthony G. Fokker, head of Atlantic Aircraft Corporation, 110 East Forty-second Street, has been elected president.

Godfrey M. Ricci, 224 Smith Street, Perth Amboy, N. J., architect, has revised plans for a new ice-manufacturing plant to cost close to $35,000.

Huff Airplanes, Inc., Perth Amboy, N. J., has begun superstructure for initial units for its aircraft assembling plant, and will have buildings ready for equipment in March. Entire project will cost in excess of $75,000.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has plans for a two-story power substation at Rahway, N. J., to cost more than $50,000 with equipment. Plans are also under way for similar station at Princeton, N. J., to cost close to like sum. Company has arranged for bond issue of $43,689,000, portion of proceeds to be used for expansion.

Elizabethtown Water Co., 64 Broad Street, Elizabeth, N. J., is reported planning installation of pumping plant at Bound Brook, N. J., with filtration unit.

Richards Chemical Co., 198 Warren Street, Jersey City, N. J., has work under way on a new one and two-story plant, to cost approximately $100,000 with equipment. Edward M. Paterson, 76 Montgomery Street, is architect.

American Electric Switch Corporation, Minerva, Ohio, has acquired Nyelec Switchboard Co., 422 East Fifty-third Street, New York. Nyelec company will retain New York office factory and personnel and will be operated as Nyelec division of American corporation. Both companies manufacture safety switches, fuse panels, panelboards, switchboards and other electrical equipment.

Safety Cable Co., division of General Cable Corporation, formerly at 114 Liberty Street, New York, is now located at 420 Lexington Avenue.

Leeds, Tozzer & Co., Inc., 75 West Street, New York, has been appointed special representative in Eastern states for Thew Shovel Co., Lorain, Ohio, and Universal Crane Co., Elyria, Ohio.

New England

BOSTON, Feb. 13.

LOCAL machinery dealers again report a falling off in business the past week and the market is nearer a standstill than at any time this year. Sales included a No. 3 Lapointe broaching machine, hydraulic lifting equipment, a small amount of sheet metal-working equipment for a local school, a 14-in. lathe, three or four small drills, one press and miscellaneous used equipment.

New England machinery manufacturers are doing much better than dealers, several reporting good sales. A Connecticut manufacturer the past week sold 21 tools, some for domestic and some for foreign use. Many small New England shops that have inquired for equipment apparently have abandoned purchases, temporarily at least, as anticipated work has not developed. A western Massachusetts plant is expected to close on several tools this week, and some large New England users indicate they will buy equipment shortly.

Small tools are fairly active, sales the past week being the largest for any similar period this year. Expensive gages also are included in this business.

All metal-working and other equipment of Worthington Pump & Machinery Co., East Cambridge, Mass., to be retained has been moved to other subsidiary plants. Cambridge plant is disposing of equipment not needed, and is seeking purchasers for its foundry and main plant.

Work has started on a one-story, 32 x 52 ft., work shop by Providence Granite Co., 210 Kinsley Avenue, Providence. Pneumatic equipment is required.

A manufacturing plant to replace one in North Woburn, Mass., recently destroyed by fire, is contemplated by Merrimac Chemical Co., 148 State Street, Boston. J. B. Rutter, company's engineer, has plans.

York Ice Machinery Corporation, 200 Causeway Street, Boston, engineer, is preparing plans for a one-story, 80 x 150 ft., ice manufacturing plant for Brockton Ice & Coal Co., 426 Main Street, Brockton, Mass.

Smith & Walker, 80 Boylston Street, Boston, architects, have closed bids on a one-story, 34 x 44 ft., pumping station at Beverly, Mass., for South Essex Sewage Commission, of which B. F. Snow is chairman.

Commercial Bodies, Inc., of New Jersey has leased space at 128 Brookline Street, Cambridge, Mass., for repair and manufacture of motor vehicles and automobile bodies.

Schein & Levine, 44 Broadway, Chelsea, Mass., have plans for a one-story 90 x 100 ft., press room for Panco Rubber Co., 31 Highland Street, Chelsea.

Strand & Sweet Mfg. Co., Winsted, Conn., enameled wire, will shortly start construction of a wire coil manufacturing plant unit.

Plans are in progress for a one-story, 40 x 60 ft., substation for Brockton Edison Electric Illuminating Co., Brockton, Mass. Stone & Webster, Inc., Boston, is engineer.

Bids for construction of the Hartford, Conn., trade school will be requested early in March.

Independent Lock Co., 78 Winter Street, Fitchburg, Mass., will shortly start erection on a two-story, 40 x 154 ft. addition. Morris Falk, president, will supervise work. Plans are private.

General Motors Corporation has under consideration erection of an assembly plant at Stoughton, Mass., on property with frontage of 1600 ft. on New York, New Haven & Hartford Railroad.

Plans are nearing completion for a manufacturing plant at Webster, Mass., for Waterhouse Co., Tracy, Conn., boats and automobile bodies. Plans are private.

Bids have been asked on general contract by E. Ingraham Co., 392 Main Street, Bristol, Conn., manufacturer of clocks and mechanisms, for a one-story addition, 25 x 161 ft., to be used primarily as a press department. Max J. Unkelbach, Bristol, is architect.

H. C. Hearne, 1389 Main Street, Springfield, Mass., arc tect, has completed plans for a three-story automobile s vice, repair and garage building, 110 x 140 ft., to cost excess of $100,000 with equipment.

E. H. Hotchkiss Co., Hoyt Street, Norwalk, Conn., man facturer of snap fasteners and kindred metal goods, h awarded general contract to Hewlett Co., Main Stre Bridgeport, Conn., for a one-story addition, 50 x 132 ft., cost close to $40,000 with equipment. Ballinger Co., 1 South Twelfth Street, Philadelphia, is architect and engine

Cadillac Automobile Co. of Rhode Island, 9 Federal Stre Providence, has awarded general contract to C. I. Bign Construction Co., 184 Washington Street, for a one-sto service, repair and sales building, to cost approximate $115,000 with equipment.

Back Bay Hotels Garage, Inc., Boston, care of Geor Nelson Meserve, 260 Tremont Street, architect, has beg erection of three-story and basement service, repair a garage building, to cost in excess of $500,000 with equipme

Brockton Gas Light Co., 54 Main Street, Brockton, Mas is said to have plans under way for a one-story automob service, repair and garage building, 125 x 125 ft., for co pany motor trucks and cars, to cost upward of $80,000 wi equipment. C. H. Tenney Co., 200 Devonshire Street, Bosto is architect and engineer.

C. A. Cook Co., 18 Osborn Street, Cambridge, Mass., ma ufacturer of typewriter chairs and kindred equipment, h acquired a factory at Ashland, Mass., and plans early moval for increased output.

St. Louis

ST. LOUIS, Feb. 13.

BIDS are being asked by Board of Public Service, Louis, O. D. Tillay, secretary, until Feb. 21, for thr forced draft fans, with turbine drives, air ducts, etc.; al for two boiler feed pumps and one house pump.

D. M. S. Motor Repair Co., 2615 Warwick Bouleva Kansas City, Mo., recently organized, has engaged J. Hogg, Walsix Building, architect, to prepare plans for two-story machine repair and parts plant, to cost close $40,000 with equipment.

Sapulpa Refining Co., Sapulpa, Okla., is considering building portion of oil refinery recently destroyed by fi with loss in excess of $125,000 including equipment.

North Arkansas Power Co., Mountain Home, Ark., considering construction of new electric light and pow plant, and ice-manufacturing plant at Salem, Ark., whe franchise has been secured, to cost in excess of $75,0 with machinery. Wyatt Wolf is head.

H. D. Lee Flour Mills Co., Salina, Kan., has plans a new mill and elevator to cost about $140,000 with m chinery. I. L. Zerbe, 139 South Santa Fe Avenue, architect in charge.

Curtiss-Robertson Airplane Mfg. Co., St. Louis Flyi Field, Bridgeton, Mo., has revised plans for a local pla one-story and part basement, 60 x 250 ft. and 40 x 60 and one-story operating unit, 32 x 40 ft., to cost in exce of $75,000 with equipment. McDonald & Condie, 502 Nor Taylor Avenue, St. Louis are architects.

Western Power, Light & Telephone Co., Salina, Ka operating public utility properties in Kansas, Missouri a Oklahoma, is disposing of a bond issue of $2,750,000, portion of proceeds to be used for extensions and improv ments, including transmission line construction, and acqu sition of ice-manufacturing plants and other utilitie Nathan L. Jones is president.

Board of Education, University City, Mo., is consideri installation of manual training equipment in new seni high school to cost $500,000. Ferrand & Fitch, 6188 Delm Boulevard, St. Louis, are architects.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., h plans for extensions and improvements in steam-operat electric power house on Noble Street, including installati of boilers, turbine equipment and auxiliary apparatus, cost in excess of $200,000. Byllesby Engineering Co., 2 South La Salle Street, Chicago, is engineer.

Champlin Refining Co., Enid, Okla., is said to be pla ning construction of a new 6-in. pipe line from its prope ties at Seminole to Watchorn, about 100 miles.

Board of Education, Holbrook, Neb., plans installation manual training equipment in a new two-story and bas ment high and grade school, to cost about $110,000, f which superstructure will soon begin. Arthur D. Bake Clinic Building, Grand Island, Neb., is architect.

Oklahoma Natural Gas Corporation, Oklahoma Cit Okla., has arranged for bond isuse of $14,000,000, a porti of proceeds to be used for expansion and improvement including acquisition of other properties, pipe line and st tion construction.

Cleveland

Cleveland, Feb. 13.

Machine tool sales and inquiries dropped off somewhat the past week. The National Acme Co., Cleveland, has made additional purchase of considerable equipment including multiple spindle drilling machines, milling machines and broaching machines for manufacturing automobile shock absorbers. In the Detroit territory, the Packard Motor Car Co. placed a round lot of multiple-spindle drilling machines and another automobile manufacturer purchased two large turret lathes. The Ford Motor Co. continues to buy equipment, mostly in single machines. There is little activity outside the automotive field. No business is in prospect in the near future from railroads in this territory.

Cleveland Heater Co., 1900 West 112th Street, Cleveland, having plans drawn for a one-story addition to cost close $40,000 with equipment. George S. Rider Co., Century uilding, is architect and engineer. Leo Friedman is presi- nt.

Board of Education, Northfield, Ohio, is considering in- allation of manual training department in one and two- ory high school to cost $150,000, for which plans will soon completed by T. R. Ridley, 109 North Union Street, Akron, nio, architect.

Ohio Power Co., Canton, Ohio, has arranged for a bond sue of $10,018,000, a portion of proceeds to be used for pansion and improvements, including transmission line nstruction.

International Harvester Co., 2905 Chester Avenue, Cleve- nd, headquarters at Chicago, is considering erection of a ie-story factory branch, service and repair works on East fty-fifth Street to cost about $100,000 with equipment.

Board of Education, Cleveland, is said to have plans for addition to the city trade school for foundry work, to st approximately $40,000.

Upson-Walton Co., Cleveland, informs The Iron Age that recent news item listed this company as a manufacturer wire rope, cables, etc., whereas its wire rope mill was ld some years ago to American Cable Co. Upson-Walton . now specializes in ship chandlery and allied articles.

Glen L. Martin Co., Cleveland, manufacturer of airplanes, ll move its plant to Baltimore, Md., where new works will placed in operation early next year. Cleveland plant will ntinue in operation until June, 1929. Entire output at esent is being taken by United States Navy Department d removal is due to fact that this department insisted on cation of plant at some point on Eastern coast.

Statement in these columns Feb. 2 that Variety Machine Stamping Co., 3404 Tate Avenue, Cleveland, is building ant was in error; it will be built in spring. Company has rchased No. 7 Bliss press with tonnage blow of 245 tons ich will take 54-in. stampings.

Gulf States

Birmingham, Feb. 13.

BOUT 15 acres has been leased by Alabama, Tennessee & Northern Railroad Co., Mobile, Ala., for a local terminal rd, locomotive shop, freight buildings, etc., to cost about 00,000. Project will include an engine house, with repair cilities, turntable, coal-loading and handling equipment. . Troxey is chief engineer.

Seaboard Coal Mining Co., 25 Broad Street, New York, s plans for a coal terminal on site of former plant of abama Drydock & Shipbuilding Co., Mobile, Ala., with ading, conveying and other mechanical handling equipment, cost $150,000.

Southern Ice & Utilities Co., Odessa, Tex., will soon begin nstruction of a one-story ice-manufacturing plant, to cost 0,000 with equipment.

Peden Iron & Steel Co., Houston, Tex., has foundations der way for a one-story unit, 125 x 130 ft., for production column spirals, bar-bending and kindred steel and iron rvice, to cost more than $85,000 with equipment. Travel- crane, hoists, bar-bending and other equipment will be stalled.

West Texas Utilities Co., Dallas, Tex., is considering re- ilding portion of its power house and ice-manufacturing ant at Memphis, Tex., recently destroyed by fire, with loss $40,000 with equipment.

Alabama Water Service Co., Birmingham, is planning rchase of two 200-kva. electric generators with auxiliary uipment, for power station of Dallas Electric Co., Dallas, ., a subsidiary.

Corpus Christi Boiler, Welding & Machine Works, Inc., Carrizo Street, Corpus Christi, Tex., has awarded general contract to E. L. Darby Construction Co., Chaddick Building, for one-story plant, 55 x 150 ft., to cost about $30,000 with equipment. A 5-ton traveling crane will be installed.

Atlas Mfg. Co., Orlando, Fla., is considering installation of equipment for manufacture of tin cans, and is desirous of securing information regarding cost, etc.

Transcontinental Oil Co., Waggoner Building, Fort Worth, Tex., is reported planning construction of an oil refinery at Port Arthur, Tex., to cost upward of $175,000 with equipment.

Rice Mfg. & Distributing Co., Gulfport, Miss., R. L. Rice, president, has leased a building on Windham Avenue, Laurel, Miss., and will remodel for manufacture of safety automobile lighting equipment, control apparatus, etc.

Planters' & Shippers' Compress Co., Corpus Christi, Tex., has acquired about 80 acres on waterfront and plans construction of one-story cotton compress, with total floor space of about 400,000 sq. ft. Installation will include two high density compress units, monorail conveyor system and other mechanical equipment. Entire project will cost more than $900,000 with machinery. E. A. Parry is industrial engineer, in charge.

Cree & Co., Cross Plains, Tex., operating a mechanical works, are considering erection of a one-story machine and forge shop at Coleman, Tex., to cost about $18,000.

Philadelphia

Philadelphia, Feb. 13.

Plans have been filed by Sterling Motor Truck Co., Forty-eighth and Chestnut Streets, Philadelphia, for a one-story service, repair and sales branch, 182 x 220 ft., to cost in excess of $85,000 with equipment. Clarence E. Wunder, 1520 Locust Street, is architect.

Francis J. MacDonald, president Philadelphia Ship Repair Co., Mifflin Street Wharf, Philadelphia, has concluded arrangements for purchase of ship repair yard and drydocks of William Cramp & Sons Ship & Engine Building Co., in Kensington district. Last noted company discontinued operations there several months ago. Sale does not include machine shops and foundries, this group having been taken over by Cramp-Morris Industrials, Inc., recently organized to manufacture hydraulic and electric power equipment, etc.

Pennsylvania Salt Mfg. Co., Widener Building, Philadelphia, has filed plans for a power house addition, to cost approximately $50,000 with equipment.

Pennsylvania Water & Power Co., Holtwood, Pa., will soon ask bids for construction of a new hydroelectric generating plant on the Susquehanna River, about nine miles from present station, to cost in excess of $20,000,000 with transmission lines. Company is affiliated with Consolidated Gas, Electric Light & Power Co., Baltimore, which will use bulk of new capacity.

Locust Construction Co., Sixth and Locust Streets, Philadelphia, is considering erection of a three-story automobile service, repair and garage building, to cost approximately $150,000 with equipment.

Riley Milk & Ice Co., Pitman, N. J., plans for addition to its cold storage and refrigerating plant, to cost $100,000 with machinery.

Crescent Insulated Wire Co., Trenton, N. J., has awarded general contract to Karno-Smith Co., Inc., Broad Street Bank Building, for one-story addition, estimated to cost $15,000.

Bids will be received by Bureau of Supplies and Accounts, Navy Department, Washington, until Feb. 21 for metal propeller blades, propeller hubs and propeller hub sleeves for Philadelphia Navy Yard, and for yards at Lakehurst, N. J.; San Diego, Santa Monica and Mare Island, Cal., schedule 8458; until Feb. 28 for lighting and power cable for Philadelphia Yard, schedule 8487.

American Gas & Electric Co., 30 Church Street, New York, has secured property near Pennsville, N. J., as site for steam-operated electric generating plant to be built and operated by its subsidiary, American Electric Power Co., same address. Initial station will have a capacity of 100,000 kw. Steel tower transmission lines will be built. Entire project is reported to cost more than $7,000,000. Stevens & Wood, Inc., 120 Broadway, New York, is engineer.

Board of Education, Lawrenceville, N. J., plans installation of manual training equipment in two-story junior high school, to cost $300,000, for which plans will be drawn by P. L. Fowler Co., 224 East Hanover Street, Trenton, N. J., architect.

Lehigh Portland Cement Co., Allentown, Pa., has arranged for preferred stock issue to total close to $1,000,000, a portion of fund to be used for expansion.

C. H. Bonner, Crafton, Pa., and associates, have organized Latrobe Paperboard Co., to operate a mill at Latrobe, Pa., for manufacture of paperboard, corrugated paper products, etc. Mr. Bonner will be treasurer; N. J. Wallace, Oakdale, Pa., will be an official.

Hamilton Watch Co., Lancaster, Pa., is disposing of a preferred stock issue of $4,800,000, a portion of proceeds to be used for expansion, including acquisition of plant and business of Illinois Watch Co., Springfield, Ill. Both plants will be continued in service.

Bureau of Water, Department of Public Works, City Hall, Philadelphia, is asking bids until Feb. 21 for a sand-washing machine, contract 913; also for pig lead, contract 910; and for furnishing and installing chlorinators, contract 912. Alexander Murdock is director.

Pittsburgh

PITTSBURGH, Feb. 13.

THE machine-tool market is showing a good degree of activity and while individual sales, in most cases, are for single tools, they are numerous enough to make a very satisfactory total. Most of the orders are against inquiries that have been up for some time, but there is a fair sprinkling of awards against recent requests for prices. New inquiry is moderate, but dealers are uncovering some requirements by personal solicitation.

Officials of Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, and duPont Viscoloid Co., 330 Fifth Avenue, New York, have formed Pittsburgh Safety Glass Co., capitalized at $1,000,000, to manufacture laminated shatterproof glass under trade name Duplate. Plans are under way for new plant at Creighton, Pa., near site of present works of Pittsburgh Plate Glass Co., to cost more than $1,000,000 with machinery. B. P. Davis, Jr., of duPont Viscoloid Co., which is a subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del., will be chairman of board of new organization; H. S. Wherrett, vice-president of Pittsburgh Plate Glass Co., will be president.

Dravo Contracting Co., Neville Island, Pittsburgh, operating a boat-building and repair yard for steel barges, etc., has completed plans for a one-story addition, 125 x 200 ft., to cost in excess of $85,000 with equipment.

Linde Air Products Co., 30 East Forty-second Street, New York, is said to have plans for a one-story works, 80 x 120 ft., at Erie, Pa., to cost in excess of $125,000 with equipment.

Fostoria Glass Co., Moundsville, W. Va., has awarded general contract to R. R. Kitchen Co., 37 Nineteenth Street, Wheeling, W. Va., for a two and three-story addition, 75 x 260 ft., for furnace division, lehrs and other equipment to cost in excess of $100,000 with machinery.

Erie Foundry Co., Erie, Pa., maker of forge shop equipment, has removed its Detroit office to 335 Curtiss Building, West Grand Boulevard and Hamilton Avenue. R. B. McDonald is in charge.

Packard Motor Car Co. of Pittsburgh, 4709 Baum Boulevard, has filed plans for a one-story service, repair and parts building at 4710 Maripoe Street, estimated to cost $75,000.

Detroit

DETROIT, Feb. 13.

BIDS are being asked by Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, until Feb. 27, for a one-story addition on Bellevue Avenue, to be equipped for metal stamping service, reported to cost in excess of $100,000, with machinery. Albert Kahn, Inc., Marquette Building, is architect and engineer.

National Gas & Electric Corporation, Battle Creek, Mich., has concluded negotiations for purchase of electric light and power properties of Central States Utilities Co., at Monroe, Grand Haven and Coldwater, Mich., and will consolidate with its other properties in the State. Plans are under way for extensions and betterments, including transmission line construction.

Consumers' Power Co., Jackson, Mich., is planning the early installation of a meter repair and reconditioning shop at its local gas-generating plant, reported to cost in excess of $40,000 with equipment; a new addition will be constructed for mechanical fan boosters and governor equipment. Plans are under way for expansion in other districts of the State, including large outdoor electric power substation at Alma, to cost more than $100,000; new transmission line from Belding to Orleans, Mich.; and extensions and betterments of plant and system of Gardiner Light Co., Stanton and Langston, Mich., recently acquired, including transmission line construction.

Advance Pattern & Production Co., 3024 West Fort Stree Detroit, manufacturer of metal patterns and mechanica equipment, has plans under way for a one-story addition o Temple Street, to cost approximately $25,000, with equipmen O'Dell & Diehl, Donovan Building, are architects. E. Ritter is secretary and treasurer.

Superior Foundry Corporation, Grand Rapids, Mich., ha awarded general contract to I. K. Parsons & Son, Gran Rapids, for a one and two-story foundry, 75 x 175 ft., t cost approximately $100,000 with equipment. Wernette McCarthy, Houseman Building, are architects.

Universal Magnesite Products Co., Escanaba, Mich., considering a new one-story addition to cost close to $20,00 with equipment. Work will begin in the spring.

St. Joseph Paper & Board Co., St. Joseph, Mich., plan rebuilding portion of its mill recently destroyed by fir with loss reported more than $200,000 with equipment.

C. S. Klein, Detroit Saving Bank Building, Detroit, arch tect, has plans under way for a one-story ice-manufacturin plant, 50 x 175 ft., for company whose name is temporaril withheld, to cost about $100,000 with machinery.

South Atlantic States

BALTIMORE, Feb. 13.

BIDS will be asked on general contract before close month by C. Hoffberger & Co., 530-40 East Monumen Street, Baltimore, operating ice and cold storage plant for an 11-story cold storage and refrigerating plant add tion to cost approximately $900,000 with machinery. Joh H. Wickersham, Appel Building, Lancaster, Pa., is enginee

Board of Commissioners, District Building, Washingto is asking bids until Feb. 23 for four air compressors, pavin breakers and accessory mechanical equipment for highwa department; on Feb. 24 for four concrete mixers for high way department; and until Feb. 28 for one horizonta centrifugal motor-driven air compressor complete, for pow plant in District Building.

Blue Ridge Talc Co., Henry, Va., is considering rebuildin portion of plant destroyed by fire Feb. 6, with loss in exce of $80,000 with machinery. Same fire also destroyed work of Community Electric Co., on neighboring site, with los approximating $75,000. This plant, also, will be rebuilt.

Claude Neon Lights of Maryland, Inc., Baltimore, ca of Industrial Management Corporation, 12 Clay Street, en gineer, has plans for establishment of a local plant fo production of sheet metal signs, equipped with special Neo lighting devices.

Chesapeake Paper Board Co., Key Highway and line Baltimore & Ohio Railroad, Baltimore, will take bids in abou 30 days for one-story addition, including improvements present mill, to cost about $80,000 with machinery.

George A. Mahone, 7 St. Paul Street, Baltimore, is head of project to construct an automobile service, repair ar garage building on site of Preston Gardens, remodelin portion of existing structures, to cost in excess of $500,00

Industrial Electric & Machine Co., 507 East Russell Stree High Point, N. C., has awarded general contract to R. Cottam, Perry Street, for a one-story addition, 30 x 132 f to cost about $45,000 with equipment. Traveling crane wi be installed.

Mill Devices Co., Gastonia, N. C., A. B. Carter, hea manufacturer of textile mill equipment, plans constructio of a new factory for manufacture of gears, nuts, bolts an kindred products, to cost more than $80,000 with machiner

Bureau of Supplies and Accounts, Navy Departmen Washington, is asking bids until Feb. 21 for wire cloth fo Eastern and Western navy yards, schedule 8445; also fo pumping machinery and spare parts for Norfolk, Washingto and Philadelphia yards, schedule 8460; until Feb. 28 for on turret lathe for San Diego yard, schedule 8469; until Fe 28 for one pipe and nipple-threading machine, one flexib hand-block belt sander and one rotary slitting shear fo Mare Island yard, schedule 8473; until Feb. 21 for tw Diesel engines, two oil pumps, one windlass, one bilge pum one air compressor and one air tank for Charleston Nav Yard, schedule 8497.

Stanley Milling Co., Stanley, Va., is considering rebuild ing portion of plant recently destroyed by fire, with loss excess of $100,000 with machinery.

Ferguson Gear Works, Inc., Gastonia, N. C., is said to contemplating a new one-story plant to cost more tha $25,000 with equipment.

Enfield-Norfleet Co., Charlotte, N. C., automobile deale has plans for a two-story service, repair and garage build ing, totaling about 25,000 sq. ft. of floor space, to cost mor than $100,000 with equipment. Lockwood, Greene & Co Charlotte, are architects and engineers.

The Crane Market

GOOD inquiry for cranes is developing in the New York, New England and Pittsburgh districts, but purchasers are low in placing orders. In addition to a good volume of nquiry for single locomotive cranes, the Amtorg Trading orporation, 165 Broadway, New York, is reported to be sking prices on nine 40-ton locomotive cranes for the nieper River electric project in Russia. As the buyer is nterested in securing kerosene motor driven cranes, it is elieved that European competition for the business will be evere. In the field of overhead cranes F. L. Smidth & Co., 0 Church Street, New York, are inquiring for a 25-ton, 22-ft. pan crane, either hand operated or one motor, 80-ft. lift. he Western Electric Co., New York, has not yet closed on 25-ton locomotive crane. The Gulf Refining Co., Bayonne, . J., is inquiring for a ½-ton, 18-ft. span, underhung hand ower crane.

In the Pittsburgh district it is expected that the Wheeling teel Corporation will soon close for several mill type cranes or Steubenville, Ohio. Cranes will be required in plant hanges, the Carnegie Steel Co. is planning for its Homestead orks and in the open-hearth project at its Mingo, Ohio orks. The Pittsburgh Safety Glass Co., which will build plant at Creighton, Pa., for the manufacture of non-shattering glass, is expected to be in the market for overhead cranes.

Among recent purchases are:

Union Bag & Paper Corporation, 233 Broadway, New York, 25-ton locomotive crane for Tacoma, Wash., from Industrial-Brownhoist Corporation.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, 10-ton crawl-tread locomotive crane from unnamed builder.

American Smelting & Refining Co., 120 Broadway, New York, 2-cu. yd. 97-ft. span bucket crane from Western builder.

Vermont Foundry Co., Windsor, Vt., used 5-ton overhead traveling crane from unnamed seller.

Stahleker Steel Corporation, Boston, 2-ton electric traveling crane for its Cambridge plant, from unnamed builder.

New England Public Service Co., Augusta, Me., 40-ton, 28-ft. span hand power crane with two 20-ton trolleys from Whiting Corporation.

United Electric Railway Co., Providence, R. I., two 1½-ton electric hoists from Chisholm-Moore Mfg. Co. and two 4-ton electric hoists from Shepard Electric Crane & Hoist Co.

Buffalo

BUFFALO, Feb. 13.

ARRANGEMENTS have been made by Metalace Corporation, 373 Seventh Street, Buffalo, recently organized, for referred stock issue of $250,000, majority of proceeds to be sed for expansion and development. Company will speciale in a line of enameled metal products and proposes to add list of products.

Ewart C. Hugh, head of Hugh Co., 190 Elk Street, Buffalo, anufacturer of sheet metal goods, is at head of a project construct and operate a local plant for manufacture of etal alloy boats, with base of aluminum. Company will be rmed to be known as Metal Alloy Boat Co., and initial lant unit will be erected on site adjoining works of Hugh o. Others interested in new company include H. L. Chisolm, Jr., W. P. Wells and J. T. Snyder.

H. J. Heinz Co., 1062 Progress Street, Northside, Pittsurgh, canned food products, has filed plans for a new facry branch and distributing plant at 145 Marion Street, uffalo, to cost $50,000.

Rochester Gas & Electric Corporation, Rochester, N. Y., as applied for permission to extend its transmission lines Monroe and Ontario Counties, including power substation cilities. Company will also make extensions in gas system, cluding pipe line construction.

Board of Education, Gloversville, N. Y., contemplates inallation of manual training equipment in addition to high hool to cost $350,000. W. Brown Van Dreser, 31 West ulton Street, is architect.

Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, as taken out a permit for a one-story addition to cost close $20,000.

Indiana

INDIANAPOLIS, Feb. 13.

CONTRACT has been let by Bishop, Knowlton & Carson, 312 North Meridian Street, Indianapolis, architects, to rown-Mack, Inc., 226 East Michigan Avenue, for a threeory and basement automobile service, repair and garage ilding, 100 x 165 ft., at 1452 North Pennsylvania Street, ported to cost close to $200,000 with equipment.

Standard Plating Works, Goshen, Ind., has broken ground r a one-story addition, reported to cost in excess of $16,000 ith equipment.

McCord Radiator & Mfg. Co., Plymouth, Ind., headarters at Chicago, manufacturer of automobile radiators d radiator cores, gaskets, etc., has arranged for a bond sue of $2,500,000, a portion to be used for expansion in ants and facilities. A. C. McCord is president.

Board of Education, Evansville, Ind., contemplates the stallation of manual training equipment in proposed twoory and basement grade and high school at Lincoln and cCormack Avenues, estimated to cost $300,000, for which ds have been asked on general contract. Fowler & Karges, urniture Building, are architects.

Craftsman Tool Co., Marion, Ind., has plans for a new e-story plant, estimated to cost close to $45,000 with uipment.

Pierce Governor Co., Anderson, Ind., manufacturer of speed control equipment for internal combustion engines, is arranging for the sale of a stock issue of 60,000 shares, a portion to be used for expansion in manufacture.

Chicago

CHICAGO, Feb. 13.

ALTHOUGH this market is showing a fair degree of activity, the lack of large lists and the effort necessary to follow up small business is keenly felt. Sales the past week were smaller in volume, but inquiry enlarged by the Santa Fe list is promising. The St. Paul is in the market for a 16-in. x 8-ft. lathe. A pipe manufacturer at Milwaukee is erecting an addition and may require some new machinery in the spring. Deliveries are satisfactory. There has been a fair movement in used machinery. It is reported that price advances are being considered on several lines of machine tools.

Crowe Name Plate & Mfg. Co., 1749 Grace Street, Chicago, manufacturer of metal name plates, etc., is said to be planning a one-story addition to cost more than $23,000 with equipment.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of solid fiber containers, corrugated board specialties, etc., has arranged for stock issue to total $3,330,000, a portion of proceeds to be used for expansion.

Great Northern Utilities Co., Shelby, Mont., is completing plans for a new power house with gas engine units using natural gas, generators, and auxiliary equipment, to cost in excess of $250,000 including transmission line construction. A. H. Sikes is manager.

Dayton Co., Eighth Street and Nicollet Avenue, Minneapolis, Minn., has plans for a four-story, basement and subbasement addition to its automobile service, repair and garage building, to cost more than $300,000. Long & Thorshov, Andrus Building, are architects.

Eagle Furniture Co., 1828 South Fourth Street, Rockford, Ill., has work under way on a three-story and basement factory addition, 60 x 60 ft., to cost upward of $85,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

Joseph W. McCarthy, 139 North Clark Street, Chicago, architect, has been selected by Holy Name Trade School, care of William Hoffman, 721 Cass Street, to prepare plans for a boys' trade and vocational school at Lockport, Ill., to cost in excess of $100,000 with equipment.

Minnesota Power & Light Co., West Superior Street, Duluth, Minn., has taken over former plant of Deetz Sheet Metal Works, 104 Garfield Avenue, and will remodel for a new equipment storage and distributing plant to cost $110,000. Charles C. Olsen is engineer.

Carney Co., Mankato, Minn., has begun rebuilding portion of its local cement mill, recently destroyed by fire, to cost $125,000 with equipment. George Pass & Son, Eckle Building, are architects.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated fiber containers, corrugated paper goods, etc., has plans for a one-story unit at Sullivan, Ill., to cost more than $90,000 with machinery.

City Council, Emmetsburg, Iowa, is considering installation of a municipal electric light and power plant to cost upward of $30,000 with equipment.

Board of Education, Storm Lake, Iowa, is considering installation of manual training equipment in two-story high school to cost $175,000, for which plans are being prepared by Keffer & Jones, Masonic Building, Des Moines, Iowa, architects.

M. A. Erickson, head of Rugby Light & Power Co., Rugby, N. D., is planning construction of a new steam-operated electric power house at Kenmare, N. D., to cost about $75,000 with equipment.

Iowa Railway & Light Co., Cedar Rapids, Iowa, will make extensions in its power plant at Nevada, Iowa, including installation of additional equipment, to cost $35,000.

Cedar Rapids Engineering Co., Cedar Rapids, Iowa, will build a shop addition, 60 x 100 ft. O. F. Paulson Construction Co. is general contractor.

Hutchins Co., Inc., 410 Phoenix Building, Minneapolis, has been organized to manufacture D. K. pressure lubricator, patented device with meter for dispensing grease in transmissions and differentials of automobiles. Company has assembly plant, but is in market for tanks, fittings, etc.

Cincinnati

CINCINNATI, Feb. 13.

DESPITE a falling off of fresh orders for machine tools the past week, sales the first six weeks of 1928 show an increase of approximately 20 per cent over the corresponding period last year. The amount of pending business which should be placed in the next 60 days is the basis for the prediction that this margin over 1927 will be maintained throughout the first quarter. The improvement, however, has by no means been well distributed among machine tool companies. Some builders have profited recently by an impressive volume of orders, while others have obtained only a meager supply. This condition has resulted in spottiness, so far as operations of local plants are concerned.

The St. Louis-San Francisco Railway Co. is inquiring for 21 tools, bids for which close on Feb. 20. Action on the Santa Fe list is expected this month. Automobile companies are making a fair number of purchases and will be heavy buyers in the near future. A local builder has sold eight 18-in. engine lathes for shipment to the Pacific Coast.

St. Louis-San Francisco Tool List

The following motor-driven tools are for 440-volt, 3 phase, 60 cycle current. Bids will be received by B. T. Wood, vice-president and chief purchasing officer, St. Louis, until Feb. 20.

One traverse gaining machine.
One model F. G. Micro internal grinder with two sets of grinding wheels.
One Niles combination journal turning and axle lathe.
One No. 2 Williams crusher and pulverizer.
One 90-in. Putnam heavy duty driving wheel lathe.
One No. 220 Jarecki pipe threading machine.
One metal band saw with six extra blades.
One Niles 96-in. 600-ton driving wheel press.
One Warner & Swasey No. 4-A hollow hexagon turret lathe with 25-in. swing.
Two wood-boring motors, similar to Independent Pneumatic Tool Co.'s No. 62.
One Pels punch and shear with 30-in. throat.

The following equipment also will be purchased:

One 100-ton spring testing machine.
Three Cyclone 5-ton high-speed chain hoists.
One 24-in. heavy-pattern American crank shaper.
One Leeds-Northrup recording pyrometer and temperature control for 6-ft. x 40-ft. car type heat treating and annealing furnace.
Two Model 5021-A automatic temperature controllers of thermocouple type.
One 3000-lb. Baker electric truck.

Plans are under consideration by Peters Cartridge Co., First National Bank Building, Cincinnati, for a new three-story plant at Kings Mills, Ohio, to cost more than $60,000 with equipment. Van Leyen, Schilling, Keough & Reynolds, 3440 Cass Avenue, Detroit, architects.

Tennessee Box Co., Johnson City, Tenn., manufacturer of wooden boxes and containers, has acquired former plant of Von Cannon Lumber Co., and will remodel to double capacity of present mill.

Shelby Electric Co., 392 South Main Street, Memphis, Tenn., manufacturer of electrical specialties, has awarded general contract to F. J. Ozanne & Co., Empire Building, for new one-story plant, to cost close to $45,000 with equipment. E. L. Harrison, Fidelity Bank Building, is architect.

P. J. Bradshaw, International Life Building, St. Louis, architect, has plans for a four-story motor bus service, repair and terminal building, 200 x 300 ft., at Louisville, to cost $350,000 with equipment. J. Graham Brown, Fourth Street and Broadway, Louisville, is head of project.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Feb. 24 for 100 wheel assemblies, circular 221; until Feb. 23 for 20,000 ft. high tension ignition cable, circular 222; until Feb. 23 for 50 pilot director assemblies, circular 223; and until Feb. 27 for 30,305 lb. sheet iron and 41,500 lb. cold rolled steel, circular 226.

United States Foil Co., Thirtieth Street and Grand Avenue, Louisville, is having plans prepared for three-story brick and steel office, manufacturing and warehouse buildings at Hale and Grand Avenues. Ossian P. Ward, Louisville, is architect.

J. F. Kurfees Paint Co., 201 East Market Street, Louisville, has completed plans for four-story addition, of concrete slab construction with brick curtain walls. Joseph & Joseph, Louisville, are architects.

F. J. Ozanne & Co., Memphis, Tenn., have been awarded contract for erection of factory and sales building for Shelby Electric Co., at Iowa and Main Streets, Memphis. It will be of saw tooth design and will be completed within three months.

Pacific Coast

SAN FRANCISCO, Feb. 8.

PLANS are being arranged by Pacific Coast Steel Co., Rialto Building, San Francisco, for a new unit at its plant at South San Francisco, to be equipped for the manufacture of bolts, nuts, rivets, etc. Appropriation of $500,000 has been approved.

Department of Water and Power, 207 South Broadway, Los Angeles, has filed plans for a two-story and basement power substation, 75 x 103 ft., at 5736 South Figueroa Street, reported to cost $110,000, with machinery. E. F. Scattergood is chief engineer.

Coast Machinery Co., Los Angeles, has leased a one-story factory to be constructed by Austin Co. of California, 777 East Washington Street, on Merrill Avenue, estimated to cost $100,000. Present works will be removed to new location and capacity increased.

Benbow Power Co., Benbow, Cal., recently organized, has made application for permission to construct and operate a hydroelectric power plant on the South Fork of Eel River, to be used for mining and other service, reported to cost in excess of $200,000, with transmission lines.

Pacific Gas & Electric Co., San Francisco, is disposing of a bond issue of $20,000,000, a portion of fund to be used for expansion and improvements, including transmission line and other construction.

Pacific Fruit Express Co., 65 Market Street, San Francisco, is reported planning a car repair and reconditioning works at Tucson, Ariz., where site was recently acquired, for refrigerator car service, to cost more than $200,000, with equipment. Company is a subsidiary of Southern Pacific Co.

Northwest Power & Light Co., Port Angeles, Wash., has made application for permission to use water from Elwha River for a proposed hydroelectric power development, with initial plant to have capacity of 22,000 hp., reported to cost in excess of $1,000,000, with transmission lines.

Armijo High School District, Fairfield (Solano County), Cal., has plans under way for a one-story machine shop and manual training unit at its group school, reported to cost about $35,000, with equipment.

Mullenbach Electrical Mfg. Co., 116 East Sixteenth Street, Los Angeles, has been organized to manufacture switchboards, panel boards, cabinets and electrical control distribution apparatus. Plant is completed and in operation.

Work has been started on construction of large machine shops for Southern Pacific Railroad at Eugene, Ore., estimated cost $250,000. H. E. Wilder, contractor, Eugene, has the contract.

Montgomery Mfg. Co., is building new plant on West Spokane Street, Seattle, for manufacture of disk wheels for automobiles.

Winner Tool Co., Puyallup, Wash., has increased capital stock from $50,000 to $100,000, and will make some additions to plant.

Ballard Drop Forge Co., Seattle, has taken over agency for State of Washington for Williams form and column clamp, made by Hawley Mfg. Co., Chicago.

Foreign

PLANS are being arranged by Government Wood Chemical Trust, Soviet Russian Government, Moscow, for a new turpentine and resin plant at Barnaoul, Siberia, reported to cost in excess of $400,000. During next 36 months same interests propose to build five similar plants at various points in Siberia. American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York, has information regarding the project.

A canning company at Goteborg, Sweden, has plans under way for construction of a new five-story factory. Machinery to be purchased will include separating equipment, refrigerating machinery, sterilizing and exhausting equipment, can-making machinery, etc. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Sweden No. 267053; also at American Consulate, Goteborg, H. C. von Struve, consul.

Nippon Electric Power Co., Ltd., Tokyo, Japan, has arranged for sale of $9,000,000 bond issue in United States, portion of proceeds to be used for extensions and improvements, including power plant and transmission line construction. Company has work under way on a steam-turbo electric generating plant with a capacity of 40,000 kw. Yoshizo Ikeo is vice-president.

A company at Perth, Australia, has plans for a new local plant for production of fending and barbed wire. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Australia No. 60014; also at American Consulate, Sydney, Australia, Charles F. Baldwin, assistant trade commissioner.

London & North Eastern Railway Co., London, England, is arranging early construction of a freight classification yard at Cambridgeshire, including sorting classification facilities for more than 3600 cars, hydraulic retarders, repair and reconditioning facilities, etc. Entire project is estimated to cost close to $1,500,000. Information at office of American Consulate, London, William L. Cooper, commercial attaché.

Bwana M'Kubwa Copper Mining Co., Ltd., Capetown, South Africa, operated by Anglo-American Corporation of South Africa, Ltd., same address, has arranged for increase in capital to £3,500,000. A new bond issue of £1,000,000 (about $4,800,000) is being arranged, portion of proceeds to be used for installation of an additional plant at Bwana M'Kubwa mining properties.

H. C. Atkins Mfg. Co., 2318 Randolph Street, St. Louis, has appointed following agents: H. Romeyn Smith, Inc., 12 Lispenard Street, New York, in metropolitan New York; Leon Commerford, Washington, in Middle Atlantic States; Southern States Sales Co., Albany, Ga., in Southeastern States, and Brown & Brady, San Francisco and Los Angeles, on Pacific Coast.

Canada

TORONTO, Feb. 13.

MACHINE tool sales the past week were augmented by several lists from Canadian industrial companies which are building additions to plants or have new works under construction. The Canadian National Railways have closed on a machine for polishing and finishing tubes; 14-ft. radius jib crane; emery wheel stand; 48-in. Bertram carwheel borer, with Davis carwheel boring tool; several air compressors; 8½-in. Westinghouse compressor and an automatic valve grinder. Other lists are appearing and a volume of business is pending.

While Canadian dealers and builders are securing a large portion of the machine tool business, a considerable number of current orders is also going to the United States. During the month of November Canadian industrial companies imported from the United States tools and machinery valued at more than $520,000. It is understood that the bulk of this demand is for equipment that is not produced here, and must of necessity go to the United States.

Alan Campbell and associates have purchased building, machinery, stock, etc., of Canadian Radiant Electric Co., Grimsby, Ont., and will remove equipment to Bowmanville, Ont., where it will be installed in plant of Bowmanville Foundry Co. Company will operate under name of Canadian Radiant Co. Officers include Alan Campbell, president; C. E. Rehder, vice-president; directors, Peter Campbell, P. A. Thompson, Montreal, and Arthur Campbell, Montreal.

Armstrong, Siddeley Motors, Ltd., operating in association with Ottawa Car Mfg. Co., Ottawa, Ont., has completed arrangements for manufacture of aero engines.

Modern Tool & Die Works, Essex, Ont., contemplates erection of an addition.

London Airports, Ltd., London, Ont., will call for bids about March 1 for construction of two steel hangars, 40 x 40 ft. Machine shops will be erected later.

Ratepayers of Collingwood, Ont., carried a by-law authorizing construction of a grain elevator to cost $800,000, by Collingwood Elevator Co. Building will be of reinforced concrete and have capacity of 2,000,000 bu. C. D. Howe & Co., 704 Whalen Building, Port Arthur, Ont., are engineers.

Crown Cork & Seal Co., Ltd., 87 Parliament Street, Toronto, has secured new site and will erect a one-story factory, 120 x 200 ft., to cost $100,000. Wells & Gray, Confederation Life Building, Toronto, have been awarded general contract.

I.T.S. Rubber Co. of Canada, Ltd., 30 Alpine Avenue, Toronto, has had plans prepared for erection of a $30,000 addition.

Only One Blast Furnace in Africa

AFRICA has only one blast furnace, but even with this monopoly it has rather hard sledding because the market for the product is so small that the output of the furnace is not fully absorbed. The furnace is at Newcastle, Natal, South Africa, on the main line between Durban and Johannesburg. It furnishes basic pig iron for the Union Steel Corporation of South Africa, Ltd., by which it is owned, and foundry iron is supplied to foundries throughout South Africa. Last year the furnace produced 37,850 tons in the nine months ended Sept. 30, when it was blown out because of overproduction, and it will not be relighted until about the middle of this year. Coke is produced from South African coal, and the ore used is mined in South Africa and runs 40 per cent iron, 6 per cent silicon and 5 per cent carbon. J. K. Eaton is resident director of the furnace property.

E. Thibault, St. Therese, Que., has been awarded contract for erection of a factory, 80 x 150 ft., at Joliette, Que., for C. Muir Rubber Co., Ltd., 437 Bourget Street, Montreal. C. A. Reeves, 83 Craig Street West, Montreal, is architect.

Western Canada

C. D. Howe & Co., Whalen Building, Port Arthur, Ont., and Vancouver, are preparing plans for erection of a grain elevator at foot of St. Andrews Avenue, Vancouver, B. C., to cost $1,000,000 for Randall, Gee & Mitchell, Winnipeg and Vancouver.

Stuart, Cameron & Co., Ltd., Vancouver, B. C., has been awarded contract for construction of a 1,000,000 bu. grain elevator at New Westminster, B. C., for the New Westminster Harbor Commissioners.

NEW TRADE PUBLICATIONS

Automatic Feeds for Punch Presses.—F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago. Catalog No. 27, 6 by 8½ in., 48 pages. Several roll feeds and roll feed combinations are described, as well as dial, magazine hopper, pusher, and chute and slider feeds. Pages are also devoted to stock reels and special machines. The feeds are designed for stock ranging in thickness from 0.001 to 1.40 in., and up to 7½ in. wide.

Grinding Wheel Chuck.—Norton Co., Worcester, Mass. Booklet describing the features of the company's chuck for segmental grinding wheels.

Hot Pressing of Brass Parts.—Zeh & Hahnemann Co., 182 Vanderpool Street, Newark, N. J. Four-page bulletin outlining the advantages and method of producing hot pressed brass parts. Information is given on the metals, dies, and machines employed.

Adding Nickel to Cast Iron.—International Nickel Co., 67 Wall Street, New York. Instruction card, showing methods whereby nickel may be alloyed with foundry iron, either in the cupola or in the ladle, and notes on proper mixtures for particular services. A 4-page pamphlet entitled "High Duty Requirements" describes the general effect of nickel in cast iron.

Nitralloy and the Nitriding Process.—Ludlum Steel Co., Watervliet, N. Y. 24-page pamphlet describing properties of aluminum-chromium steels, and the means whereby they may be given an intensely hard, corrosion resisting surface by heating at 875 deg. Fahr. for from 2 to 90 hr. in an atmosphere of ammonia, followed by a slow cooling.

Large Metallographic Equipment.—Bausch & Lomb Optical Co., Rochester, N. Y. Describes metallurgical microscope and camera with permanently aligned optical system. Fine focusing adjustment carries only 4 oz. weight, enabling heaviest specimens to be kept permanently in focus. Shock absorbers also eliminate vibration. Accessories are available for photographing at all magnifications from several thousand down to full size.

Gate Hoists.—D. J. Murray Mfg. Co., Wausau, Wis. Booklet devoted to facilities of company for manufacture of gate hoists for power reservoir and irrigation dams.

Rails and Accessories.—Sweet's Steel Co., Williamsport, Pa. General catalog listing and describing the company's products, which include light steel rails, special plain splice bar sections, heavy steel rails and special rail sections, track bolts and spikes, fabricated portable track, steel mine room ties, light steel angles and miscellaneous products.

Bolts, Nuts, Rivets and Screws.—Pheoll Mfg. Co., 5700 Roosevelt Road, Chicago. General catalog presenting company's standard lines. Included are special machine screws and bolts, cap and set screws, stove bolts and rods, special rivets, machine screw nuts, stove bolt and cap nuts, semi-finished steel and brass nuts, wing nuts, threaded rods, wire and studs, brass washers and metal stampings.

Time Recorders.—Esterline-Angus Co., Indianapolis. Bulletin 1127 containing description and specifications of company's new time recorder.

Ventilating Equipment.—American Blower Corporation, Detroit. Bulletin 3504 devoted to company's type SE steel plate blower. Full specifications are provided.

Low-Temperature Carbonization of Coal.—International Coal Carbonizing Co., 200 Madison Avenue, New York. Catalog KSG-2 of 12 pages is devoted to the KSG process, developed in Germany. Description of the process is given, with a diagram showing the flow of materials and gases through the system. Many elements of the plant are illustrated, while the description covers the pertinent facts.

Unit Heaters.—Buffalo Forge Co., Buffalo. Four-page folder with illustrations, describing a floor-type high-pressure unit designed to recirculate the air in heating a factory building.

Handling Equipment.—Revolvator Co., 336 Garfield Avenue, Jersey City. Bulletin 81 of four pages illustrates many types of handling and loading equipment for warehouses and manufacturing plants. The illustrations show the equipment in use.

Floor Crane.—Manley Mfg. Co., York, Pa. Bulletin of two pages illustrating and describing portable floor cranes of one and two-ton capacity. These are both the gantry and the jib type and are operated by chain block or other manual means.

Aerovane Blowers.—Bayley Blower Co., Milwaukee. Catalog 32 of 34 pages illustrates and describes blowers for forced draft and other purposes, made on the aerovane model. Most of the volume is taken up with dimension and clearance diagrams, and tabular matter related to the capacities of the different sizes of blower included.

Steel Racks.—Lewis-Shepard Co., Watertown, Mass. Folder of four pages devoted to arc-welded steel storage racks, designed to store any size or shape of material. Layouts may be made to suit any requirements.

Lift Trucks.—Lewis-Shepard Co., Watertown, Mass. Folder devoted to a "complete family" of lift trucks, portable elevators, and lift truck platforms. The arc-welded platform is arranged for entrance of the lift truck on all four sides. A power-operated stacker, a jack-lift, and a single stroke lift truck complete the list.

Notes on Machining Alloy Steel.—International Nickel Co., 67 Wall Street, New York. Compares machineability of various alloy steels, as reported from recent investigations. Recommends profile and angle of tool, and cutting speed and feeds best for steels of various tensile strengths.

Electrical Supplies.—Westinghouse Electric & Mfg. Co,. East Pittsburgh. The 1928-1930 catalog, 1200 pages, presents the electrical and mechanical features and application information for all supply apparatus and appliances manufactured by the company. In addition, it describes and illustrates a representative list of large motor and generating apparatus. All equipment obtainable through district offices or agent-jobbers is completely described and illustrated.

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Calendar.—Committee on Public Relations of Eastern Railroads, New York. Following the style of calendar used for several years, the various days through 1928 are given colors, representing respectively the number of days' revenue necessary to pay for certain of the major expense items of the railroads. The first 151 days are required to pay the year's wages, then 24 days' pay for locomotive fuel, 69 days for materials and supplies, 24 days for all other operating expenses, 22 days for taxes and 40 days for interest and rents. There remain 23 days to pay for dividends and only 13 days to make improvements out of earnings or to make up losses of leaner years.

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THE IRON AGE

New York, February 23, 1928

ESTABLISHED 1855

VOL. 121, No. 8

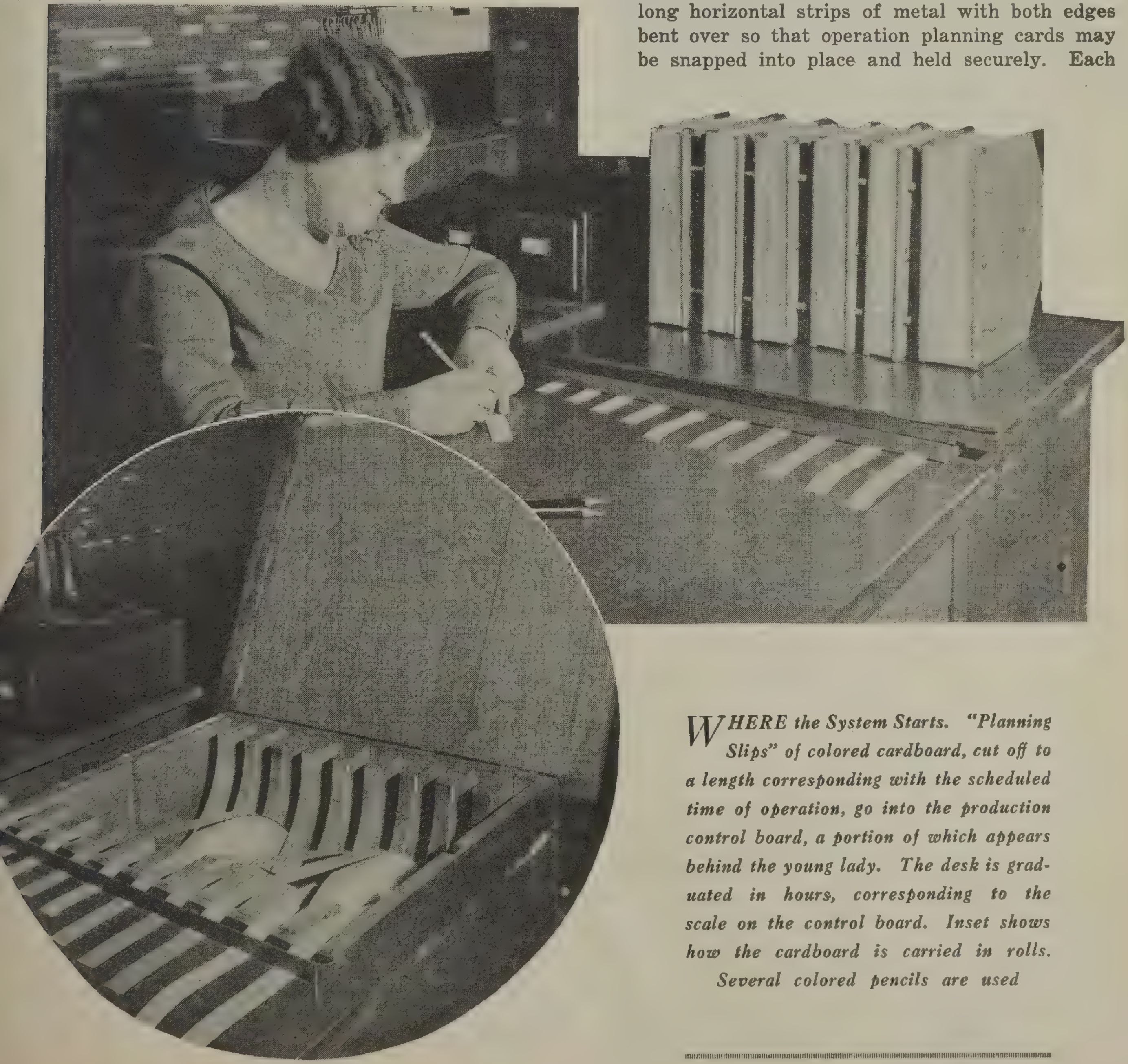
Production Control in Pump Plant

Interlocking System Relieves Foremen of Much Routine "Paper Work"—A Long Look Ahead —Employee Morale Considered

BY SIDNEY G. KOON

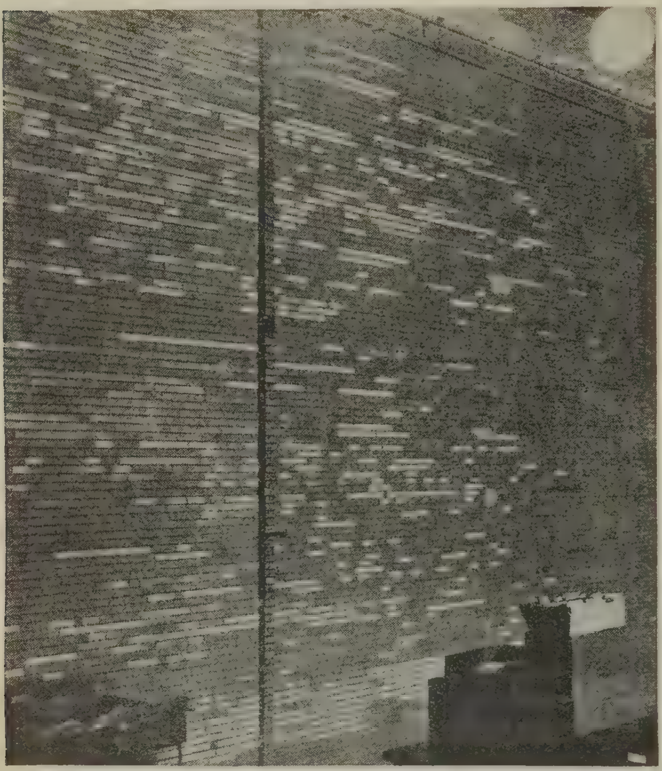
CONTROL of production in the manufacture of a considerable line of pumps of various descriptions is handled by the Nash Engineering Co., South Norwalk, Conn., in a very effective manner. For the most part all production machines in the plant are scheduled for some time in advance, some of the schedules running as far ahead as two months. A visual control board occupies the entire side of a good-sized room and from floor to ceiling. Access to the upper portion is provided by a sliding ladder.

Essentially this board consists of about 110 long horizontal strips of metal with both edges bent over so that operation planning cards may be snapped into place and held securely. Each



WHERE the System Starts. "Planning Slips" of colored cardboard, cut off to a length corresponding with the scheduled time of operation, go into the production control board, a portion of which appears behind the young lady. The desk is graduated in hours, corresponding to the scale on the control board. Inset shows how the cardboard is carried in rolls. Several colored pencils are used strip is about 1¼ in. wide and runs the whole length of the room. A vertical bar of wood, running on rails top and bottom, may be moved from left to right along this board. This forms the synchronizing element, based on the dates carried across at the top of the board. The bar carries on its face the designation of the various machines, one represented by each strip. This same designation or number appears at the end of the board.

Each operation card or *Planning Slip* on the board indicates by its color the type of pump to which it applies. The one shown is canary yellow. The card indicates by its length the estimated total time required for performing the particular operation involved, on the number of pieces designated. It carries on its face the drawing number (D-4141), the lot number (7658L2), the number of pieces to be produced (100), the standard time for each piece (0.06 hr.), the scheduled machine (No. 67), the character of the operation (A-1, meaning ream and cut off), the set-up (15,948) of tools to perform the A-1 operation, and occasionally other information. *B*, in lower right corner, indicates the next destination of the piece, for the next subsequent operation.



AT Left Is a Section of the Production Control Board, Which Fills the Whole Side of the Room. The vertical bar is the synchronizing measure, as explained in the text

As the card designates the total time estimated for the operation, its length corresponds with the product of the number of pieces (100) multiplied by the standard time (0.06 hr.) for each piece. Each card remains on the board until the particular operation it represents is finished, when it is at once removed.

Tool Room an Element in Control

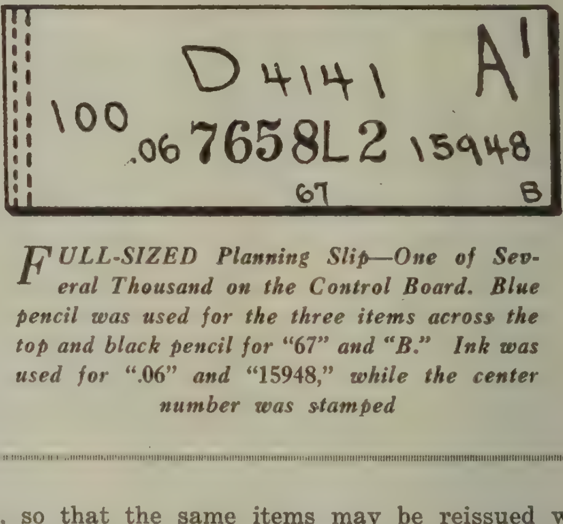
As a part of the system, a control card or *Home Set-Up* in the tool room designates all the operations —facing, drilling, counterboring, etc.—which may be required on a given piece, at a given machine. It lists the tools, jigs and other equipment necessary to perform each operation and gives the drawing number.

Associated with this is the *Set-Up Requisition* card shown, which again designates the number of the set-up, blueprint number, machine number and operation, and tells the day and hour when the set-up will be needed at the machine. In the case shown, the hour is given as 11 a. m., and the card calling for this set-up will normally be sent to the tool room, by the foreman, about 8 a. m.

In the tool room the complete outfit of all the tools, jigs and other tool room equipment required to perform the operation is put together in a metal basket, in advance of the time it is required at the machine. This basket contains also a leather envelope with transparent celluloid face, in which are placed the blueprint governing the operation, a card giving detailed instructions as to what is to be done to the piece on that machine, and a slip designating the operator who is to perform the work.

Scheduling usually takes such a form that this assembly of tools in the metal basket may be made several hours in advance of the stipulated time of use. Sometimes this is the day before but almost always it is at least an hour ahead of use, except in emergency cases. On delivering the set-up to the operator, the tool clerk obtains a check or receipt for it.

When the job is finished the returned basket of tools is inspected. Such tools as require it are sharpened, and then put back into place, ready for the next job. Jigs and other fixtures are put into shape, if such action is necessary, and otherwise the equipment is placed in condition for reissue when called for. The original envelope, containing the blueprint and instructions as to the work, comes back with the tools, so that the same items may be reissued when the next lot of the same piece is to be machined.



D 4141 A1
100 .06 7658L2 15948
67 B

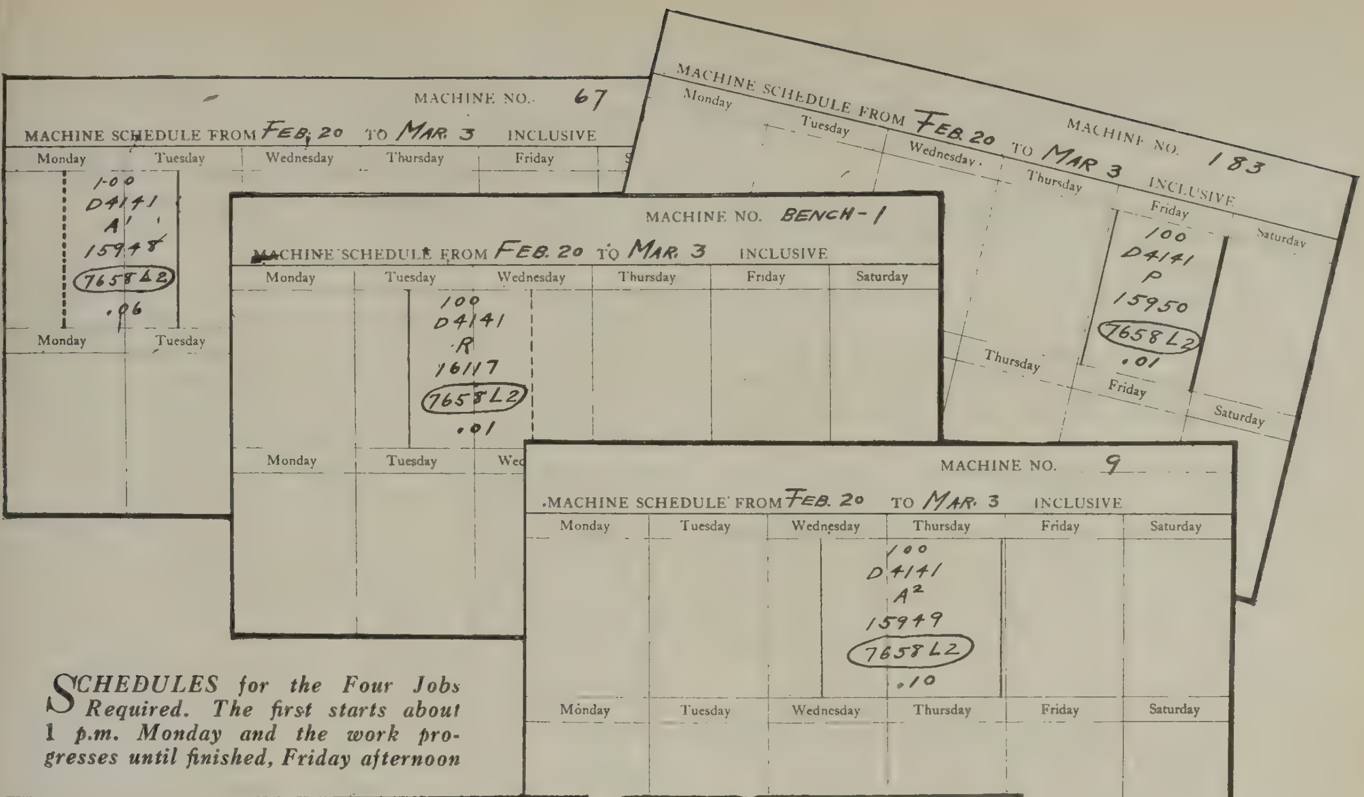
FULL-SIZED Planning Slip—One of Several Thousand on the Control Board. Blue pencil was used for the three items across the top and black pencil for "67" and "B." Ink was used for ".06" and "15948," while the center number was stamped

Check Cards Keep Foremen Posted

Each foreman's office has a set of *Machine Schedule* cards, showing for each machine in his department the schedule for two weeks. Each day is represented by a rectangular space on the card, in which are entered the pertinent facts regarding what is to be done on that machine during that day. These data are the same as were used on the operation planning cards (planning slips) of the production control board, and the symbols are the same as there.

A vertical blue line (here shown about 1 p. m. on Monday) designates the scheduled beginning of a sequence of operations. The scheduled end of the sequence is shown by a vertical red line, here indicated at the close of work on Friday. When each such item is started on the machine a red line is drawn diagonally across the rectangle. When the job has been completed a blue line is drawn on the other diagonal, thus cancelling the rectangle.

Each day a clerk from the production control office checks up on these cards. If he finds a shortage or a failure to live up to schedule he follows this up, determines the cause, and sees that it is corrected or



MACHINE NO. 67

MACHINE SCHEDULE FROM FEB. 20 TO MAR. 3 INCLUSIVE

Monday	Tuesday	Wednesday	Thursday	Friday
1-00 D4141 A¹ 15948 7658L2 .06				

Monday Tuesday

MACHINE NO. BENCH-1

MACHINE SCHEDULE FROM FEB. 20 TO MAR. 3 INCLUSIVE

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	100 D4141 R 16117 7658L2 .01				

Monday Tuesday We

MACHINE SCHEDULE FROM FEB. 20 TO MAR 3 INCLUSIVE

MACHINE NO. 183

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				100 D4141 P 15950 7658L2 .01	

Thursday Friday Saturday

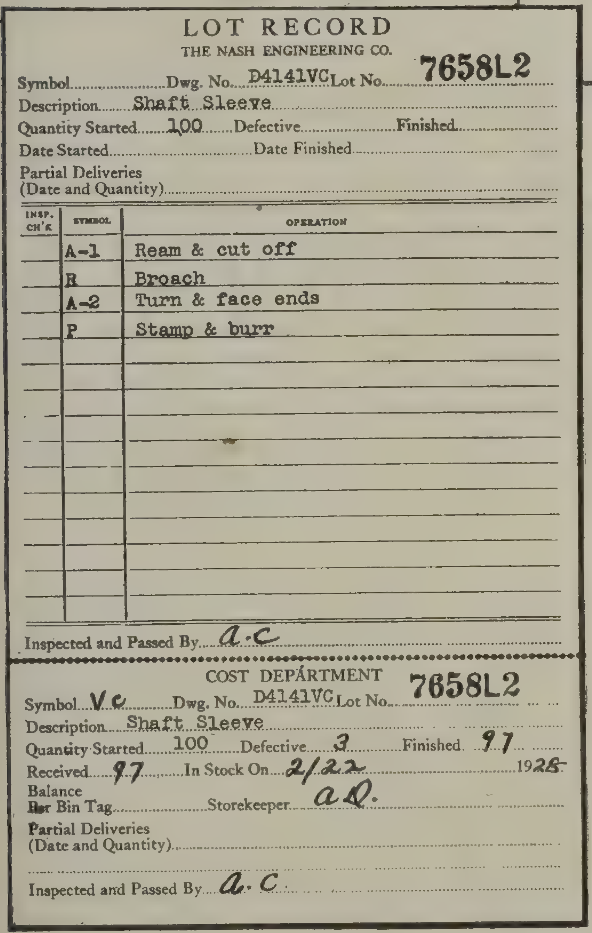
MACHINE NO. 9

MACHINE SCHEDULE FROM FEB. 20 TO MAR. 3 INCLUSIVE

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			100 D4141 A² 15949 7658L2 .10		

Monday Tuesday Wednesday Thursday Friday Saturday

SCHEDULES for the Four Jobs Required. The first starts about 1 p.m. Monday and the work progresses until finished, Friday afternoon



LOT RECORD

THE NASH ENGINEERING CO.

Symbol........ Dwg. No. D4141VC Lot No. 7658L2

Description Shaft Sleeve

Quantity Started 100 Defective .... Finished ....

Date Started .... Date Finished ....

Partial Deliveries (Date and Quantity) ....

INSP. CH'K	SYMBOL	OPERATION
	A-1	Ream & cut off
	R	Broach
	A-2	Turn & face ends
	P	Stamp & burr

Inspected and Passed By a.c

COST DEPARTMENT

Symbol V.C Dwg. No. D4141VC Lot No. 7658L2

Description Shaft Sleeve

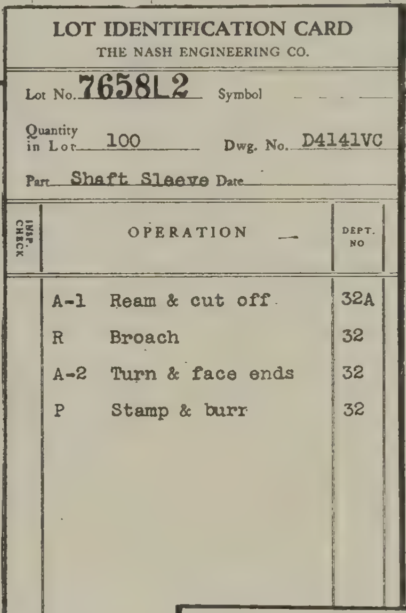
Quantity Started 100 Defective 3 Finished 97

Received 97 In Stock On 2/22 1928

Balance ~~Per~~ Bin Tag .... Storekeeper a.Q.

Partial Deliveries (Date and Quantity) ....

Inspected and Passed By a.c



LOT IDENTIFICATION CARD

THE NASH ENGINEERING CO.

Lot No. 7658L2 Symbol ....

Quantity in Lot 100 Dwg. No. D4141VC

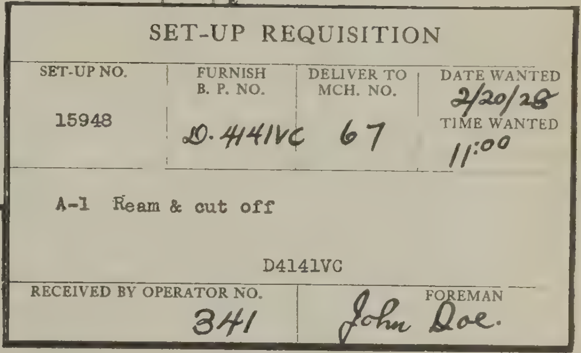
Part Shaft Sleeve Date ....

INSP. CHECK	OPERATION		DEPT. NO
	A-1	Ream & cut off	32A
	R	Broach	32
	A-2	Turn & face ends	32
	P	Stamp & burr	32

LOT Identification Card, at Left, Guides the Truckload of Pieces from Machine to Machine Until Finished

—

SET-UP Requisition, Below, Is One of the Four for the Lot. It tells tool room clerk when the tools and jigs are wanted and where



SET-UP REQUISITION

SET-UP NO.	FURNISH B. P. NO.	DELIVER TO MCH. NO.	DATE WANTED
15948	D.4141VC	67	2/20/28 TIME WANTED 11:00

A-1 Ream & cut off

D4141VC

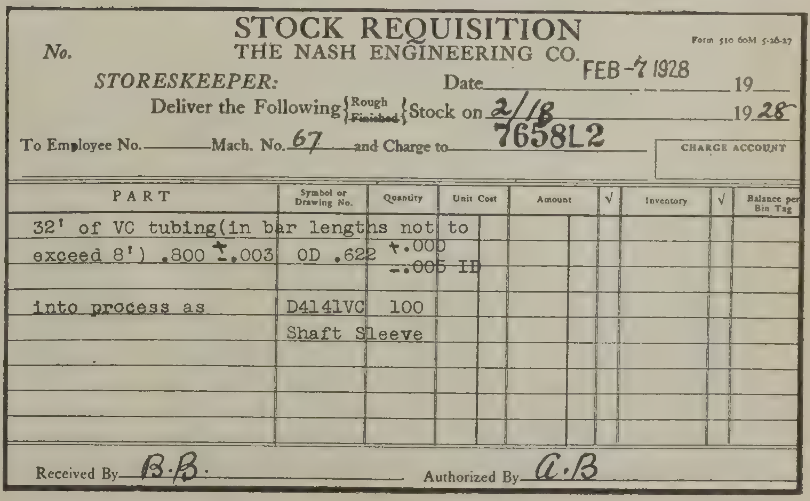
RECEIVED BY OPERATOR NO. 341

FOREMAN John Doe.

LOT Record, Above, Is the Inspection Department's Basis for Inspecting the Work When It Comes in. Then the lower part is detached and sent to the cost department for "costing"

—

AT Right Is the Stock Requisition Card, on Which the Storekeeper Makes Delivery of the Necessary Stock at the Specified Machine and at the Required Time



STOCK REQUISITION

No.

THE NASH ENGINEERING CO.

Form 510 60M 5-26-27

STORESKEEPER: Date FEB -7 1928 19

Deliver the Following {Rough ~~Finished~~} Stock on 2/18 1928

To Employee No. .... Mach. No. 67 and Charge to 7658L2

CHARGE ACCOUNT

PART	Symbol or Drawing No.	Quantity	Unit Cost	Amount	√	Inventory	√	Balance per Bin Tag
32' of VC tubing(in bar lengths not to								
exceed 8') .800 ±.003	OD .622	+.000 -.005 ID						
into process as	D4141VC	100						
	Shaft Sleeve							

Received By B.B. Authorized By A.B

properly reported. This relieves the foreman of the necessity to spend his time in following up such details. It leaves him free to exercise his proper functions of supervising the operation of his department, assisting any operator who needs it and generally exercising control over the work.

Each lot of castings or other parts going through in process, except where the pieces are so large that they are handled separately, is contained in a box on a transfer skid. These skids are moved mainly by means of hand-elevating trucks, with capacity of about 5000 lb. A *Lot Identification* card is put in each box, showing the sequence of operations to be performed on the parts in the box.

There may be two or three operations at one machine before the parts are transferred to the next machine. The card shown has the four operations called for by the other cards used here as illustrations of how the system is carried out. As soon, however, as one man has finished his work on such a lot of castings, he signals for a truck man to remove the boxload to the machine where the next operation is to be performed.

Usually six or eight large pumps go through on a single schedule or lot order. Smaller units go in lots of 25 to 50, while the parts which are used to the extent of several in a single pump, or which are interchangeable, or which are in large use through repeated reorders for pumps, go through in lots of 100 to 200 or more.

Two more cards complete the system. The *Stock Requisition* card is practically self-explanatory. It shows the amount of stock required to machine 100 pieces of D-4141 and tells the stock clerk when the material is wanted. The *Lot Record* card is kept in the inspection department until the work is delivered to stock. Then the lower portion of the card is removed and sent to the cost department, properly filled in. It carries data needed in figuring costs. The cost department, by this time, has received the job card, showing the time put in by the operator on this lot.

Examples of Special Work

While routine work is carried through as above, special machines have been purchased from time to time to do specific tasks. About two years ago a Cincinnati duplex miller was put in to mill both faces of a casting at one set-up. This was a new piece of work which previously had not been required.

One two-unit gang drill was set up for drilling both sides of a cast iron tank. The two sides required separate set-ups of drills. Each spindle of the machine is equipped with a multiple-spindle drilling head. Two tanks are drilled at once, one under each head. One tank has its left side drilled, while the other is being drilled on the right side. As soon as this job is completed, the two pieces are interchanged in position so that the opposite sides can be drilled. One man and a helper operate this machine, which has capacity for using 42 drills at once.

One example of work is a bronze shaft or spindle about 18 in. long, turned from a solid, rough bar, with several different diameters at intervals along its length. One man, an expert in non-ferrous work, turns these shafts at the rate of about one an hour. He was reported to have made over 20,000 of them with only one shaft spoiled. Several go-no-go gages are used in checking the different diameters, as all of these shafts have to pass a rigid inspection.

Materials handling in the plant is very simple. It is almost entirely by means of hand-operated elevating trucks, some of which run as high as 7000 lb. in capacity, but most of them are of 5000 lb. A few electric trucks are used, one of which is fitted with a davit-type crane. There is some fairly heavy work handled in the plant, although, for the most part, the pumps are of relatively small size. Some base plates over 5 ft. square were in process of machining. These are fitted to carry the pump, the motor and a compression tank.

New developments, experimental work, repairs, emergency work of all kinds, so far as possible, are sent through a separate department. The object of this is to avoid disturbing the production schedule on machines engaged in regular routine work. This independent department is equipped with a variety of machines capable of doing practically all the work which may be turned out in the regular departments. For the most part, however, it cannot do the work so economically as it can be done in the special-purpose machines used in regular production. It does, however, furnish a desirable auxiliary and, particularly for developing new lines, it is especially useful.

Employee Morale Important

It frequently happens that a certain machine is not scheduled for work for a day, or perhaps two or three days. This does not mean that the regular operator of that machine is without work. He is transferred to another machine, or even on occasion to another department. This keeps him continually employed, helps morale and incidentally results in the company's having a better trained personnel than would be possible with men each capable of doing a single job only.

Labor turnover is reported to be very small. The policy expressed in the preceding paragraph is partly responsible for this. The men are asked for suggestions, even on jobs which have been studied out and definitely scheduled as a result of several years of experience. Men who have been in the plant for five years or more receive full pay on a two weeks' vacation each summer. Those who have been employed for a shorter period receive proportionate portions of their pay, but all have the regular vacation period.

About 500 men are employed, practically all on day rates. There has been very small change in the total number of employees in the past five years, practically all of the terminations of employment having been made good by new employees almost at once.

National Meeting of Materials Handling Division

Preliminary announcement has been made of a meeting April 23 and 24 at the Hotel Benjamin Franklin, Philadelphia, of the materials handling division of the American Society of Mechanical Engineers. This is the first nation-wide meeting which this division has held. More than 2000 engineers, members of the society, are enrolled in the division, which fact indicates the active interest in this subject.

The tentative program includes a foundry session the first morning, at which will be presented two unusual systems of handling installed in foundries—one steel and the other cast iron. Monday afternoon will be devoted to inspection of various plants in Philadelphia, featuring efficient handling systems. An informal dinner Monday evening will be addressed by speakers of national prominence, covering certain aspects of materials handling.

Tuesday morning a session will be devoted to external handling and transport. Papers will be presented on handling of materials at railroad terminals and marine terminals and on door-to-door distribution. In the afternoon indoor and bulk handling will be considered, including papers on production control as tied up with handling methods. In the evening the session will be devoted to mechanization of coal mines, being a joint session with the National Coal Association and the Philadelphia section of the American Institute of Mining and Metallurgical Engineers.

Mechanical Handling of a Variety of Products Cuts Costs 25 Per Cent

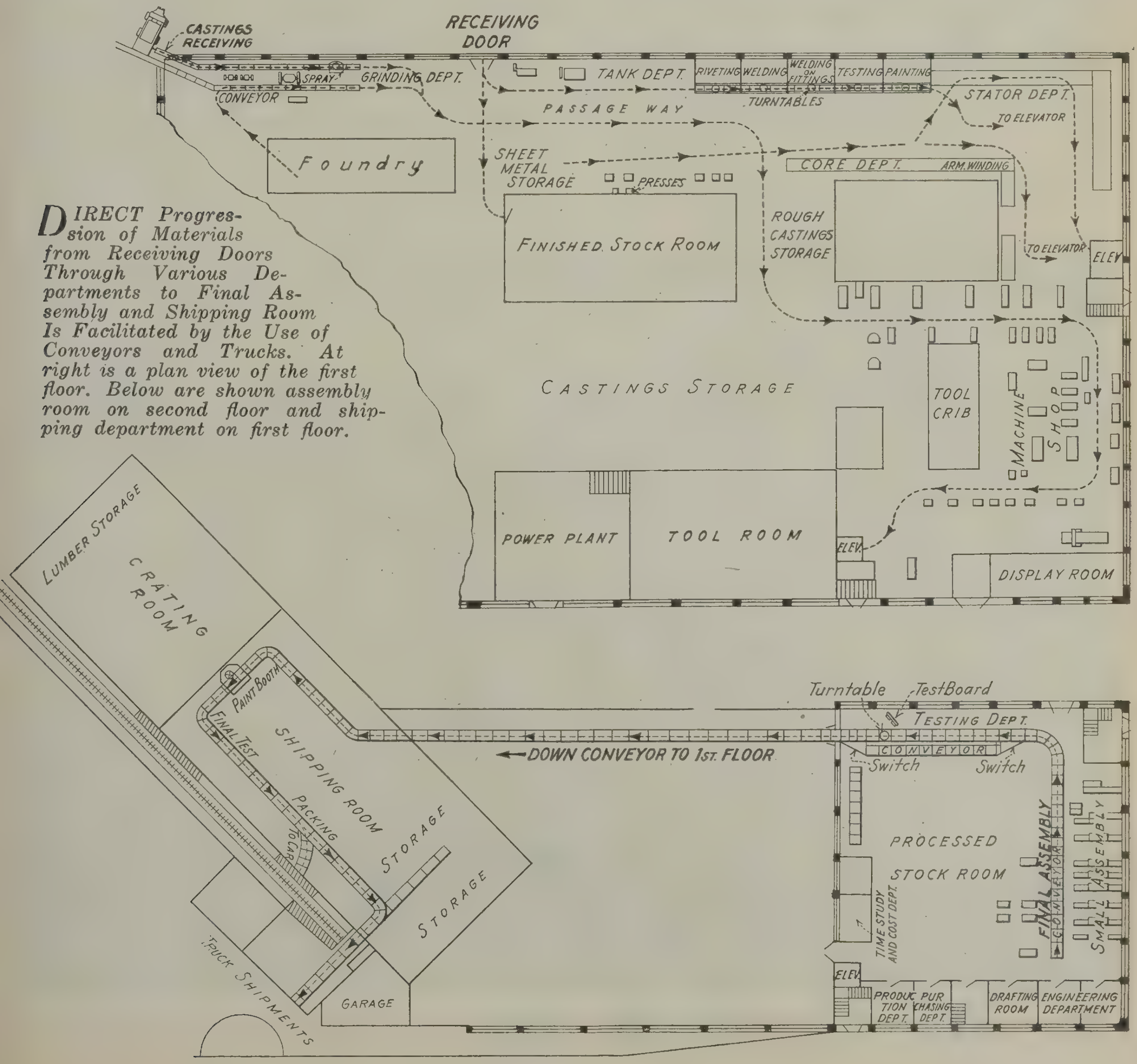
BY BURNHAM FINNEY*

THAT materials handling methods widely adopted by companies concentrating on mass production of a single article, such as an automobile, can be successfully applied by smaller metal-working plants is the experience of Hobart Brothers Co., Troy, Ohio. Even though the company's transportation problem was made intricate by the variety of products manufactured, it has recently introduced a roller and belt conveying system, supplemented by the use of hand-lift trucks, which has cut down costs approximately 25 per cent. Furthermore, it is now possible to turn out considerably more material without adding to the floor space previously occupied.

The fact that the company's activities are spread over six different lines of products, some of which bear a close relationship to others, but each of which differs in construction from the other five, has not interfered with the practical working out of a successful materials handling scheme. Through careful planning it has been possible to arrange departments in consecutive order so that the material in process follows a continuously progressive route from the beginning of assembling operations until the finished machine is placed in freight cars for shipment to customers. Conveyors also have been installed for handling material when it is received.

Conveyor System Expedites Final Assembling

Arrangement of the final assembly department is such that parts are ready at the point of assembly. On one side of the conveyor track are stored the parts which have been processed in the machine shop and which require no sub-assembly work. On the opposite side, running at right angles to the conveyor, are metal cabinets containing small parts, this portion of the plant being known as the small assembly department. It is here that sub-assemblies are made so that parts


CASTINGS RECEIVING
RECEIVING DOOR
CONVEYOR
SPRAY
GRINDING DEPT.
TANK DEPT.
RIVETING
WELDING
WELDING ON FITTINGS
TESTING
PAINTING
TURNTABLES
STATOR DEPT.
TO ELEVATOR
PASSAGE WAY
Foundry
SHEET METAL STORAGE
PRESSES
CORE DEPT.
ARM. WINDING
FINISHED STOCK ROOM
ROUGH CASTINGS STORAGE
TO ELEVATOR
ELEV.
CASTINGS STORAGE
TOOL CRIB
MACHINE SHOP
POWER PLANT
TOOL ROOM
ELEV.
DISPLAY ROOM
LUMBER STORAGE
CRATING ROOM
PAINT BOOTH
FINAL TEST
SHIPPING ROOM
PACKING
TO CAR
STORAGE
STORAGE
TRUCK SHIPMENTS
GARAGE
DOWN CONVEYOR TO 1st. FLOOR
Turntable
TestBoard
TESTING DEPT.
CONVEYOR
Switch
Switch
PROCESSED STOCK ROOM
FINAL ASSEMBLY
CONVEYOR
SMALL ASSEMBLY
TIME STUDY AND COST DEPT.
ELEV.
PRODUCTION DEPT.
PURCHASING DEPT.
DRAFTING ROOM
ENGINEERING DEPARTMENT

DIRECT Progression of Materials from Receiving Doors Through Various Departments to Final Assembly and Shipping Room Is Facilitated by the Use of Conveyors and Trucks. At right is a plan view of the first floor. Below are shown assembly room on second floor and shipping department on first floor.

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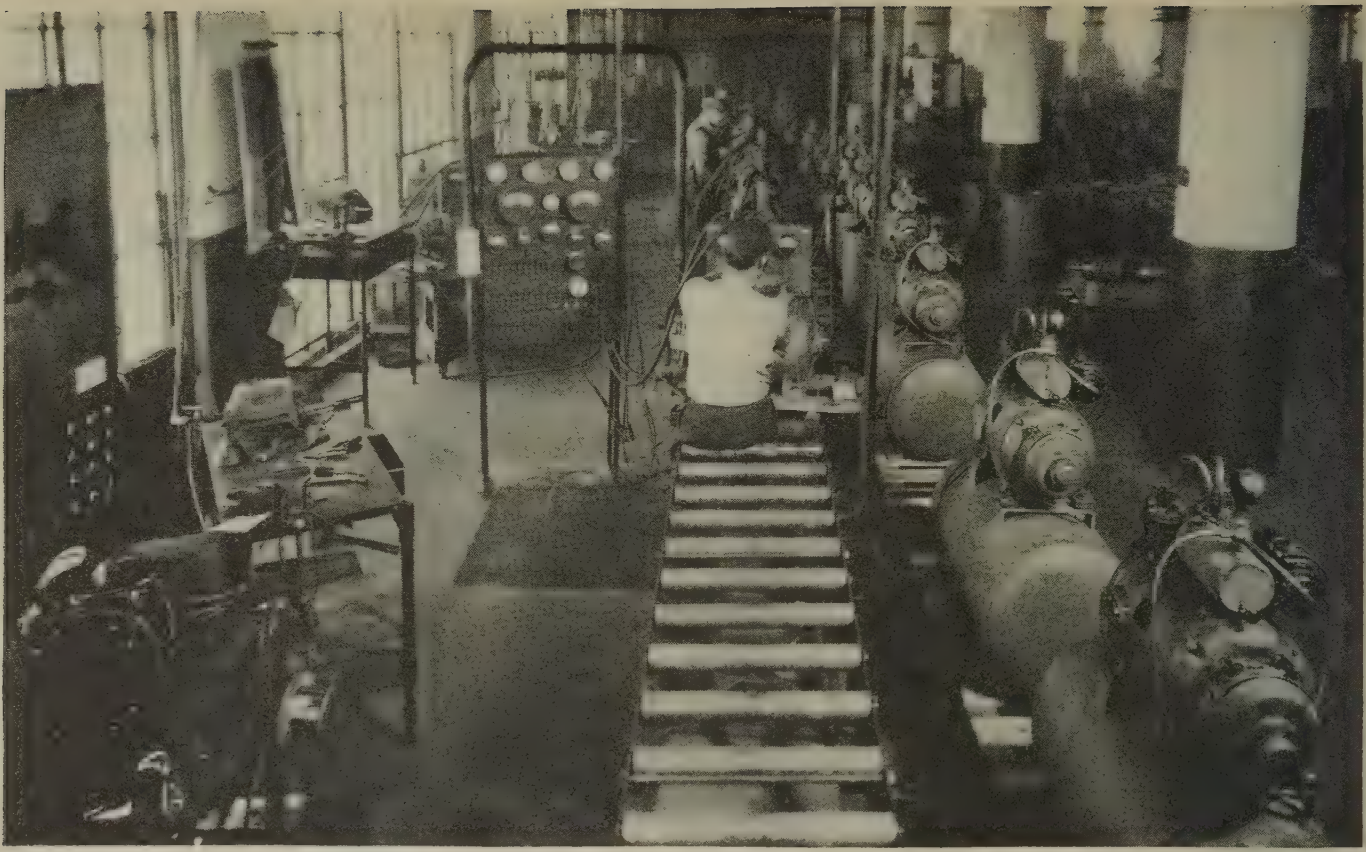
*Resident editor THE IRON AGE, Cincinnati.



Separate Conveyors of Different Heights Are Used in the Testing Department. The lower conveyor is used to handle air compressors, as shown. The switchboard (at left) is located so that all instruments are in full view of the tester making final adjustments

are at the proper place for the final assembly operation.

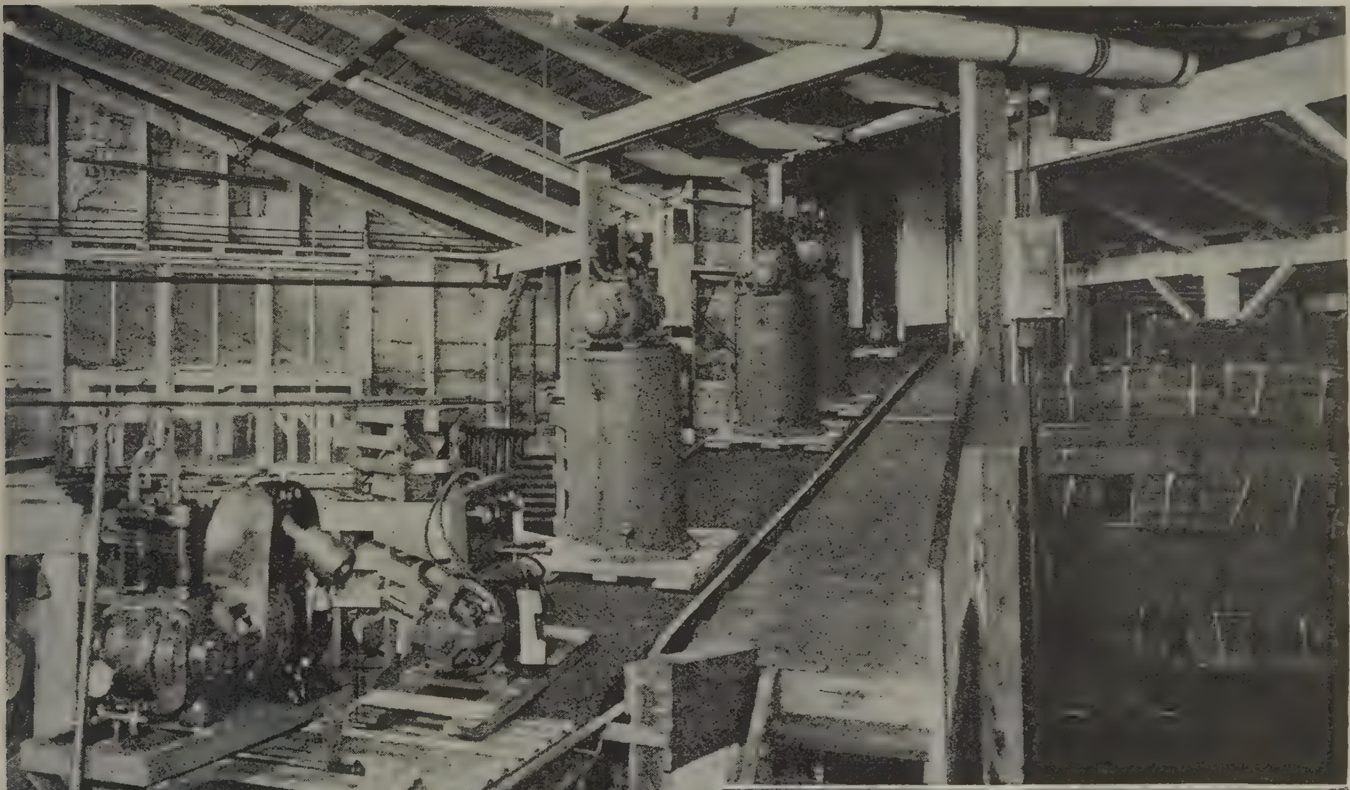
After the conveyor leaves the assembly department, it branches into two tracks paralleling each other for passage through the testing department. This plan was deemed advisable because of the difference in height of the constant potential battery chargers and of the air compressors manufactured by the company. The former go through the testing department on a roller conveyor track 24 in. high; the latter pass along on a track only 8 in. high. For the final test a switchboard is so located that all instruments can be seen by the operator who is making adjustments.

Assembled Machines Conveyed to First Floor for Painting

From the testing department the machines are carried on an electrically-driven belt conveyor through a

Conveyor in Final Assembly Department. To the right is the small assembly department in which sub-assemblies are made from parts stored in the metal cabinets. To the left of the conveyor are stored parts requiring no sub-assembly work passageway on the roof of a portion of the plant and thence down into the paint department on the first floor. At the end of the passageway the belt conveyor goes down a slight incline at the bottom of which the machines pass on to a roller conveyor. They are moved a short distance to a point where they are sanded previous to passing through the paint spray booth to receive their final coat of paint.

After painting, all machines continue on the roller conveyor to the final test operator who subjects them to a rigid examination. The machines then are packed for shipment by the progressive method. Those to be sent out immediately are taken on the conveyor through a door nearby on to the loading platform; others, which temporarily are to be placed in stock, are diverted by means of a switch in the conveyor track to a siding where they remain until shipped.



As Assembled Products Leave the Testing Department They Are Carried on a Motor-Driven Belt Conveyor through a Covered Passageway Over the Roof of Part of the Plant to the Paint Department

(At Right) Assembled Machines Enter the Paint Department on a Motor-Driven Belt Conveyor, Which Delivers Them to a Roller Conveyor

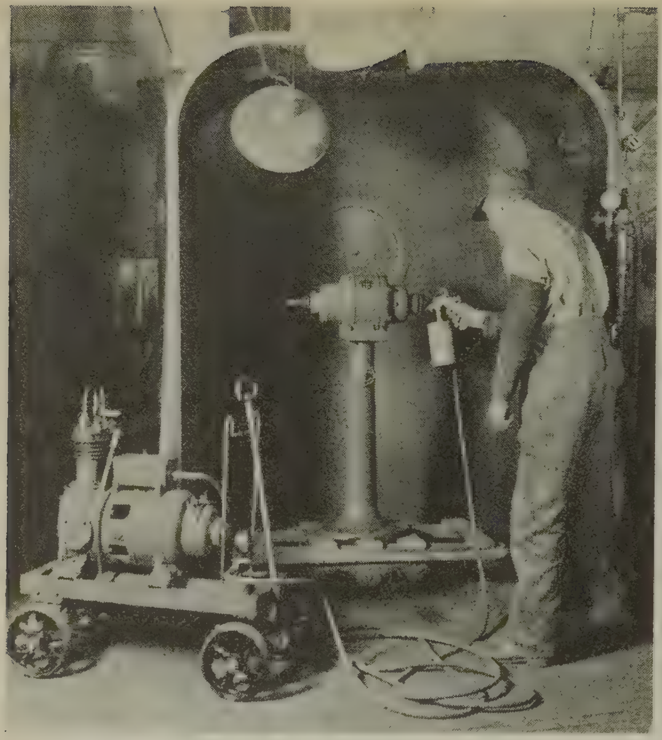
So far as possible, machines of one type are assembled, painted and packed for shipment in groups. For example, 20 air compressors may go down the assembly line in consecutive order, occupying the attention of workmen for 2 hr., before the assembly of a battery charger is begun. When a change is made, 10 battery chargers may be put through. This policy, however, cannot be followed rigidly because it is sometimes desirable to assemble several different kinds of machines simultaneously.

Rush orders are given special handling, the conveyor system giving way in favor of small hand trucks, which can be moved about easily and quickly as necessity demands.

Conveyors and Trucks Used to Handle Raw Materials

Rough castings are received at the door of the factory from automobile trucks and are transferred to a gravity roller conveyor which takes them to the grinding department. From that point they move in electric lift trucks to the machine shop, where all of the machining operations are performed. The trucks are placed alongside the operator, so that the time expended by him in handling the castings is minimized. After being machined, the castings are again put into electric lift trucks and are taken by elevator to the processed stock department on the second floor adjacent to the assembly conveyor track.

Stock other than castings is brought into the plant through a second entrance. Steel sheets are stored at one side of a passageway which runs the length of



Rush Orders Are Given Special Handling on Small Hand Trucks

the building. As they are needed they are trucked on a specially designed electric lift truck to the punch presses nearby and thence to the core and the armature-winding departments. Then they go by elevator to the assembly department on the second floor. Some of the sheets are moved by truck to the stator department instead of to the armature-winding department before being transported to the assembly floor.

Compressor Tanks Moved to Assembly Department by Electric Truck

Tanks for air compressors take a course which deviates somewhat from that of other material. In the tank department steel plate stock is sheared to the proper length and is formed into the desired shape. Then the tanks pass successively through the operations of riveting and welding, including the welding of fittings, testing and painting. All welding is done by means of the company's own HB portable electric arc welder. When the tanks are completed, they are transported by electric lift truck to the assembly department.

An intermediate step between machining and assembling castings is filling, sanding and painting. Castings are taken from the machine shop to the filling and painting room where they are filled and put on a roller conveyor for overnight storage. The next morning they are dry enough to have the plain, curved and straight surfaces sanded by a sanding machine located at the end of the conveyor. After this operation, the castings travel again by conveyor to the finish sanders, which are situated in a separate room specially protected against dust. From this room the castings go by conveyor to a spray booth where they are painted ready for use by the assembly department.

Recently the company has established its own brass foundry, and plans now are being prepared for erecting a gray iron foundry, in which practically all of the castings going into the company's products will be made. In keeping with the general policy followed elsewhere in the plant, the foundry will be equipped with the latest mechanical handling conveniences to effect savings in transportation costs.

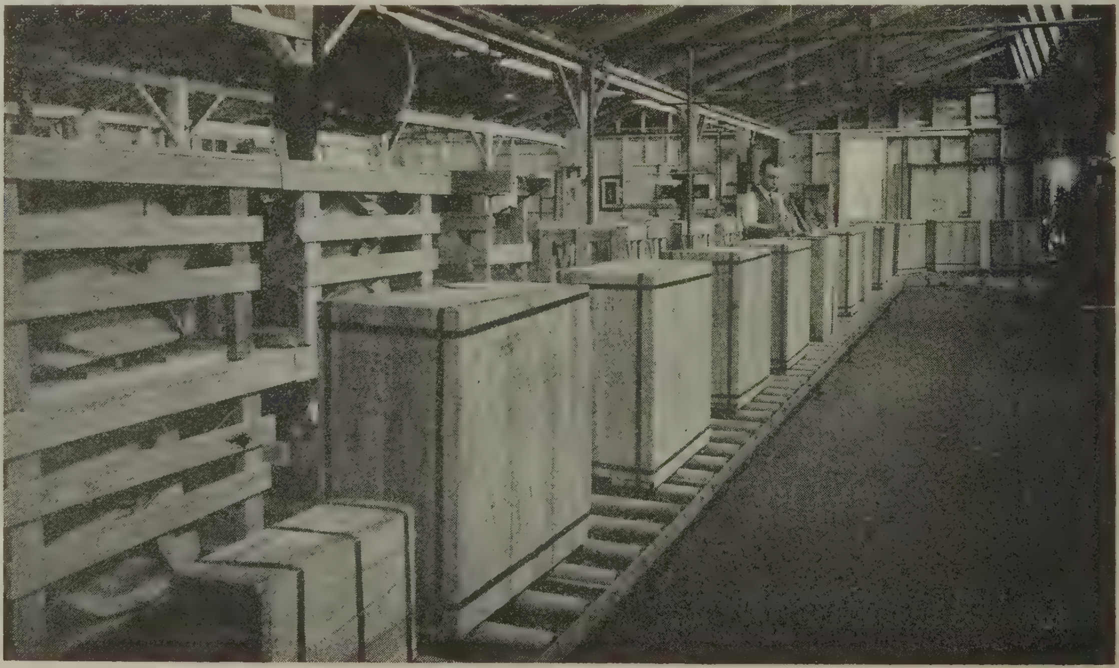
Handling Equipment Permits Production of a Complete Machine Every 20 Min.

Since the installation of the conveying system, the company is able to produce a complete machine every 20 min., whereas the output previously had been considerably below this record. In addition, the efficiency of the workmen has been increased, because they have at hand almost without effort on their part the product on which they are working, the conveyors having been built so that the material would be at the most advantageous working level. Moreover, the manufacture of numerous products, totaling 30 sizes and items, has not rendered impractical or costly the operation of roller and belt conveyors operated on much the same principle as those in plants featuring quantity production of a single product.

A mining institute, open to all men interested in any branch of the mining industry will be held at the College of Mines, University of Washington, Seattle, during the week beginning March 5. Prospectors, miners, mine owners, persons interested in metallurgy, investors in mining enterprises, and the public generally are invited to attend. This institute will take the place of the winter mining session which originated at Seattle in 1897 and continued for 28 years.

From the proceeds of an issue of $11,000,000 6 per cent debenture bonds just made the Pittsburgh Steel Co., $5,000,000 is to be reserved for the construction of a by-product coke plant. The remainder is to be used to refund outstanding bonds of the company, and the payment of bank loans contracted during the course of extending the properties.

Products Crated for Shipment Are Moved by Roller Conveyor to the Loading Platform. Machines assembled for stock are held in storage



Synchronous Motors for Rolling Mills

Steel Mill Units of Constant Speed—Welded Construction in Vogue—High Efficiency Is Combined with a Starting Torque Adequate for Most Mills

BY W. T. BERKSHIRE* AND H. A. WINNE*

DRIVING main rolls is universally recognized as very heavy duty. The loads are high and are applied and relieved suddenly. A motor driving a single stand will run between passes with only 5 to 10 per cent load, due simply to mill friction. As the metal strikes the rolls the load jumps almost instantly to possibly 100 or 150 per cent of normal and is as suddenly reduced when the metal leaves. This happens several times a minute.

If such a drive has been properly selected, several passes on each bloom or billet may require 150 to 175 per cent normal load on the motor. As the load is so intermittent in character, the motor is selected with the idea of permitting some of the passes to come up to these limits, so long as the root-mean-square value of the load is within the normal rating of the motor. If the heavier passes are of not more than 3 or 4 sec. duration, a flywheel may be utilized to reduce the peak loads on the motor and power system.

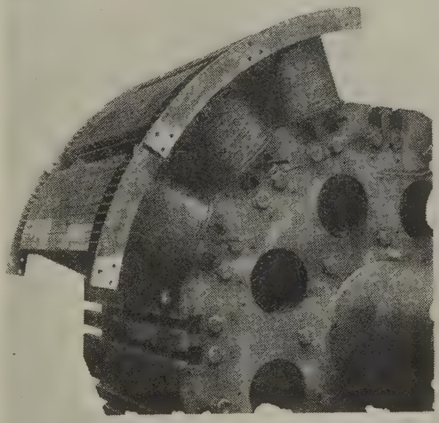
Practically the only reason synchronous motors have not been widely used on mill drives in the past is because their starting characteristics are not so desirable as those of the wound-rotor induction motor. For 100 per cent kva. input the induction motor develops approximately 100 per cent rated torque at starting; whereas the synchronous motor will give from 30 to 60 per cent starting torque, with the same kva. input, at a much lower power factor. However, the torque obtainable from a synchronous motor is ample to start most types of mills and its other advantages make it the logical choice in many cases.

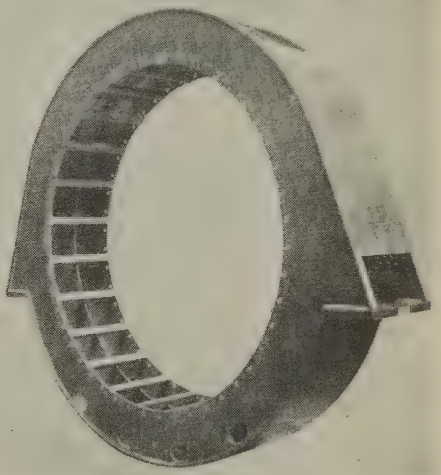
A synchronous motor can be designed for fully as high maximum or pull-out torque as an induction motor. For steel mill service this pull-out torque varies from 225 to 300 per cent of normal full-load running torque. The synchronous motor has the advantage that, for any reduction in applied line voltage, the pull-out torque decreases only in direct ratio to the voltage, whereas the torque of an induction motor decreases as the square of the voltage.

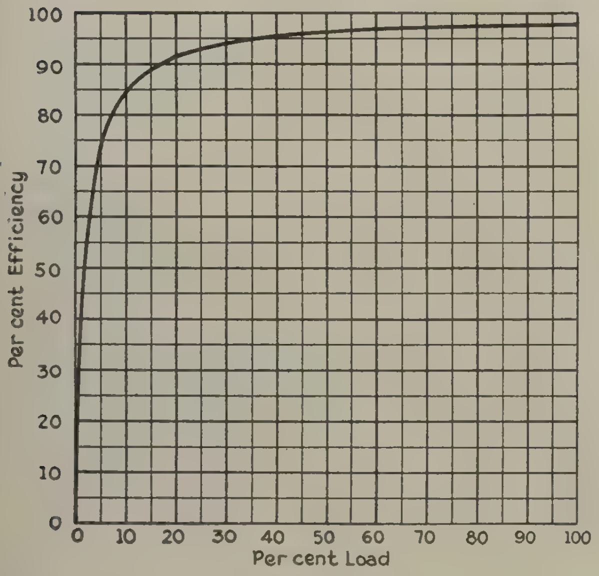
ROTOR Assembly (Right) of 6500-Hp. Synchronous Mill Motor for 6600 Volts

Fabricated Stator Frame (Extreme Right) of 16-Pole 4500-Hp. Motor for Bethlehem Steel Co.

Efficiency Characteristic Curve (Below) from a Large 25-Cycle Synchronous Motor







Efficiency

One curve shown illustrates the high efficiency obtained from large synchronous motors of 25 cycles. The 60-cycle units show about the same characteristics. The fact that approximately 75 per cent efficiency is obtained at 5 per cent of normal load is noteworthy.

The full load efficiency of synchronous motors for steel mill service varies from 0.5 to 2 per cent more than that of corresponding induction motors. This better efficiency, of course, means some saving in power cost.

Construction

The stator frames of the earlier motors of this type are of cast iron. Those built within the past year and a half, however, are fabricated of steel plates securely welded together, and braced to form an exceedingly strong and rigid structure. To the inner periphery of the frame are welded steel dovetailed keys. The core laminations are held on these keys and clamped between heavy welded steel finger flanges. Air ducts are provided in the core and complete ventilation is further accomplished by the use of air slide wedges.

Because of their size and weight, the stator coils in these large motors are insulated carefully to protect them from mechanical injury. After their assembly in the stator, the end projections are securely laced to insulated steel bracing rings supported from the stator frame. The larger machines are supplied with resistance temperature detectors. The stator coils are liberally designed to take care safely of sudden overloads, or the condition where the motor may be required to develop its maximum torque as an induction motor.

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*General Electric Co., Schenectady, N. Y. This is a brief abstract of a paper read Nov. 29 at a regional meeting, in Chicago, of the American Institute of Electrical Engineers.

The rotor spiders of the machines of small diameter are built up of laminations punched from heavy steel plates. Those of larger diameter are of cast steel. The laminated pole pieces are either dovetailed into the punched rotor or secured to the cast rotor by means of bolts screwed into steel keys imbedded in the pole pieces.

RELATIVE BASE DIMENSIONS OF THE TWO TYPES OF MOTORS, FOR SEVERAL DIFFERENT RATINGS

Rating			Floor Space in Sq. Ft.	
Hp.	R.p.m.	Cycles	Synchronous Motor	Induction Motor
9,000	107	25	445 (a)	515 (g)
6,500	187	25	272 (b)	319 (h)
5,000	100	60	288 (c)	398 (j)
5,000	240	60	195 (d)	224 (k)
5,000	83	25	282 (e)	300 (l)
1,500	300	25	123 (f)	143 (m)

(a) 18 ft. x 24 ft. 8 in. (b) 17 ft. 5 in. x 15 ft. 7 in. (c) 13 ft. 2 in. x 21 ft. 11 in. (d) 13 ft. 8 in. x 14 ft. 2 in. (e) 14 ft. 3 in. x 19 ft. 9 in. (f) 10 ft. 10 in. x 11 ft. 8 in. (g) 20 ft. 7 in. x 25 ft. (h) 16 ft. 7 in. x 19 ft. 3 in. (j) 16 ft. 8 in. x 23 ft. 11 in. (k) 14 ft. x 16 ft. (l) 15 ft. x 20 ft. (m) 12 ft. 3 in. x 11 ft. 9 in.

Field windings are usually of edgewise-wound copper strip. Here again great care is given to the insulation between the turns of the winding, and of the coils as a whole, from the pole pieces and rotor spider. A recent improvement in design consists in the addition of fins to the ends of the field coils, which are made by simply projecting every second or third turn during winding. These fins provide an increased area of radiating surface on the ends of the coils and have proved very effective in reducing the field temperature.

Field of Application

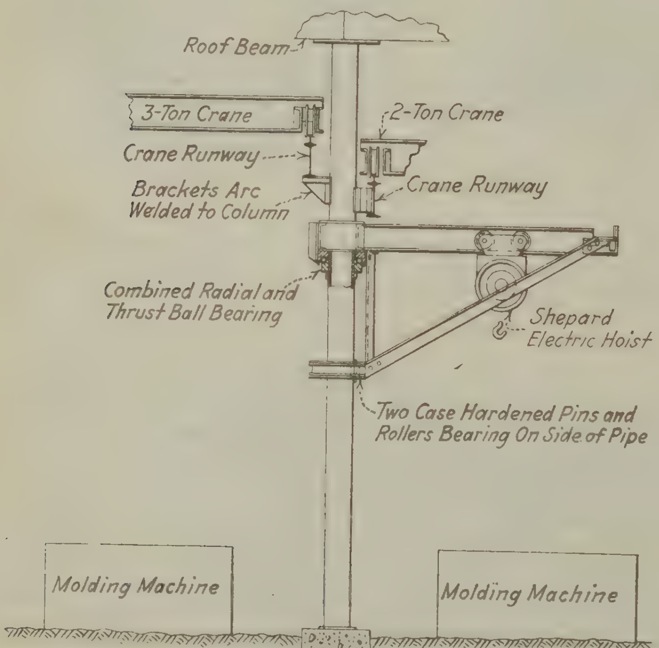
The field of application of the synchronous motor in main roll service is limited to strictly constant speed drives. This eliminates it from consideration on reversing mills, mills requiring flywheels and mills needing adjustable speed.

It is not as a rule advisable to attempt to apply it to any type of mill which may have to be started with metal in the rolls, such as a cold strip mill, nor to cold sheet mills, which have excessively high friction. Such mills may require at starting considerably more torque than is needed to carry their full load at full speed. Unless the motor is sufficiently small in comparison to the power system so that it can be started at full voltage, difficulty may be experienced in getting started and synchronized.

Foundry Jib Crane of Great Flexibility

Design Fitted for Work in Limited Space—Unusual Ball Bearing Arrangement—Electric Welding Employed in Attaching Crane Supports

HANDLING molds mechanically in a limited space is a problem which has been solved by the Fox Furnace Co. (division of American Radiator Co.), Elyria, Ohio, by the erection of a specially designed jib crane which takes the place formerly occupied by a wooden building column. This column was replaced by a length of 8-in. double-strong pipe, on which the crane is mounted. The crane swings a complete circle, covering one-half of two bays. It handles molds for heating furnace castings from two molding machines, transferring them from one machine to the other, and also placing them on the foundry floor for pouring.


Roof Beam
3-Ton Crane
2-Ton Crane
Crane Runway
Crane Runway
Brackets Arc Welded to Column
Combined Radial and Thrust Ball Bearing
Shepard Electric Hoist
Two Case Hardened Pins and Rollers Bearing On Side of Pipe
Molding Machine
Molding Machine

Jib Crane with 360-Deg. Swing for Handling Loads to and from Molding Machines

A feature of the crane, as shown by the drawing, is that the load is taken partly by a combined radial and thrust ball bearing on the column, and directly under the boom, and partly by two roller bearings at the lowest point on the supporting bracket. In the radial and thrust ball bearing sixty ½-in, balls are used. The housing is a steel forging. The rollers and pins of the bracket bearing are case-hardened steel. The crane is equipped with a 1-ton Shepard electric hoist and carries a boom load of 2500 lb. It is so designed that, if there should be an overload of the boom, the bracket supporting the boom will fail before the column shows any tendency to buckle.

In addition to the roof load, the crane column supports two overhead crane runways which cover adjacent bays, one carrying a 3-ton traveling crane and the other a 2-ton crane. Brackets supporting the two crane runways are electrically welded to the crane column.

As the bearings assure a smooth action of the crane, little effort is required to move the load. The crane was designed and built by H. A. Jahraus, consulting contracting engineer, 1878 Haldane Road, Cleveland.

Simplified Practice on Forged Tools

As a result of meetings held early in 1924 representatives of the Forged Tool Society and other interested firms in the trade recommended that 300 of the 665 then existing varieties of forged tools be eliminated. Included in this classification are picks, mattocks, hoes, bars, wedges, sledges, and anvil and blacksmith's tools. Last year an effort was made to simplify the eye sizes, and the United States Bureau of Standards has now issued Simplified Practice Recommendation No. 17 giving the details of the sizes and shapes proposed, 10 in number (as compared with approximately 120 in use in the past).

This pamphlet is issued in advance of formal approval by all factors in the industry, and comments or criticisms will be welcomed by the Bureau of Standards.

The Koppers Co., Pittsburgh, will occupy 11 floors of the new 32-story Koppers Building, which is now being erected at Grant Street and Seventh Avenue, that city. Graham, Anderson, Probst & White are architects and E. P. Mellon is consulting architect. Completion is set for Jan. 1, 1929.

Era of Individualism Passing

Iron and Steel Industries of California Are Told That Cooperation and Understanding Between Buyers and Sellers Are Necessary to Prosperity

"PRICE-CUTTING is the most vicious practice ever introduced into business," said Charles F. Abbott, executive director American Institute of Steel Construction, in an address on "Wasted Profits" at the fourth annual meeting of the Iron, Steel and Allied Industries of California at Del Monte, Cal., on Feb. 18. "Wherever price-cutting exists," he added, "profits are thrown away. It is purely a case of out-guessing competition, with the price trend always downward. Failure to maintain a one-price policy leads to a deep pit, the bottom of which no organization has ever reached alive.

"Furthermore, the practice is directly contrary to the interests of the buyer. While the law of supply and demand operates it is economically sound for the buyer to try to get the best possible price, but to drive a bargain below the line of a fair profit, good quality and proper service is poor business in the long run. Substitutions, inferior quality and inadequate service logically follow. The buyer suffers and pays in the end a price much greater than one based upon cost plus a fair profit.

"The era of narrow, selfish individualism is passing. We are entering upon a new era of cooperation and cordial understanding between buyer and seller, producer and distributer, and the individual units of our industries. Cooperation between all the elements of an industry is becoming the price of survival."

Steel Industry Needs Intelligent Cooperation

He added that the steel industry is in need of intelligent, aggressive cooperation of a wider scope than is represented by any of its trade organizations now in existence. He advocated work along lines of standardization and simplification, better business methods, better competitive conditions within the industry, protection of the industry against encroachments of competing industries, and broader markets and better profits for all steel products.

Attacking the enormous waste which goes on in the United States, Mr. Abbott said that it is in the field of distribution that the greatest waste prevails. He said that the American Institute of Steel Construction is now working to eliminate some of the wastes that come within the scope of its own field.

Research a Means to Eliminate Waste

"Research has proved one of the most effective means," said Mr. Abbott, "of reducing the tangible causes back of the wholesale squandering of our opportunities for more profitable business. Profits depend largely upon continuous research. Reduced costs, improvement in quality and new uses are among the possibilities.

"The market for steel, like the market for all other products, must be nourished and developed. A survey of the market for steel would unquestionably reveal missed opportunities for the sale of many millions of tons. Neglect of such possibilities adds millions to the wasted profit account.

"Research furnished an essential part of the data required for the standard specification for structural steel for buildings, and the standard specification for fireproofing structural steel buildings, formulated by committees appointed by the American Institute of Steel Construction. The first specification is effecting a saving of about 10 per cent of the amount of steel required for any steel frame building in those cities in which its use has been authorized. The fireproofing specification reduces costs by eliminating the unnecessary dead loads demanded by obsolete fireproofing methods.

"The institute is now cooperating with the manufacturers of electric and gas welding devices in a program of research regarding the use of welding in the erection of structural steel. Tests are being conducted in the laboratories of the University of Toronto, and there is reason to believe that it may be possible to bring the costs of steel construction still lower through the use of the welding process.

"It is, of course, scarcely necessary to point out that all research resulting in a reduction of costs tends to promote the wider use of the product, since it places it in a more favorable position in the struggle with competitive materials for the buyer's favor. Lower costs have much the same effect as improvements in quality, or better adaptation to the consumer's preferences.

Steel Being Displaced for Bridges

"Steel is suffering a serious displacement in the field of highway bridge construction. The public is being educated to believe that steel bridges are unsightly, expensive, and lacking in durability. In Pennsylvania it is next to impossible to erect a steel highway bridge, because those in control hold that there are two conditions under which steel is justified: When the span and height are such as to make concrete impracticable, and where there is no way to get the additional funds required for concrete.

"It is strange that such a situation should exist in the State that is the home of the steel industry. Other States enforce restrictions favoring competition, and the number of such States is increasing.

"If the public wants artistic steel bridges, why not build them? The shortest route to a sale is to overcome resistance by meeting the buyer's desires. Why should steel always be painted black or some other unattractive color? Why shouldn't the steel industry initiate research designed to provide the data for the construction of beautiful steel bridges?

Potential Markets for Steel Not Scratched

"As to the development of new uses for steel, steel roadbeds, steel railroad ties and steel for residences provide promising fields for expansion. Steel-frame residences have already passed out of the experimental stage, but we have not yet even scratched the surface of the potential market.

"The yearly increase in the country's population amounts to 2,242,875, or 6145 persons a day. The average number of persons in a family is 4.33; so it is necessary to provide 1419 new homes every 24 hr. This means that 517,935 new homes are needed each year to take care of the increase in population alone. By no means all families live in individual dwellings, but granting the exceptions, think what the proper cultivation of the residence market offers the steel industry in the shape of a new and steady demand for its product!

"An encouraging indication that the steel industry is awakening to the necessity of studying the market is given by the recent organization of a commercial research department by the Colorado Fuel & Iron Co. The future sales activities of this company will be based upon accurate information as to customers, prospective customers, market possibilities, buying influences and economic trends.

Solution of Business Problems Lies in Group Action

"When one stops to consider that the volume of business is as great as, or greater than, the volume in previous years, the absurdity of the present demoralization and lack of profits becomes apparent. The rem-

(*Concluded on page* 576)

Why Some Drill Rod Steels Fail

Typical Failures Cited—A Particular Case Critically Analyzed—Good and Poor Structures —Stresses Involved

BY OSCAR E. HARDER*

DURING the past few years much attention has been paid to the failure of metals by fatigue, or probably the better term is "progressive fatigue." Outstanding examples of such researches are those conducted under the direction of Prof. H. F. Moore, reported in Bulletins 124, 143 and 156, of the engineering experiment station of the University of Illinois, and those by Dr. D. J. McAdam, Jr., of the United States Naval Engineering Experiment Station, Annapolis, Md.

An excellent piece of work, particularly with reference to the mechanism of the progressive fatigue failure, is that by Francis F. Lucas, of the Bell Telephone Laboratories, New York, published in the *Transactions* of the American Society for Steel Treating, Vol. XI, page 531 (1926). Professor Moore and Mr. Lucas have paid special attention to the progressive failure through the metal and have given us considerable information with reference to how the failure takes place.

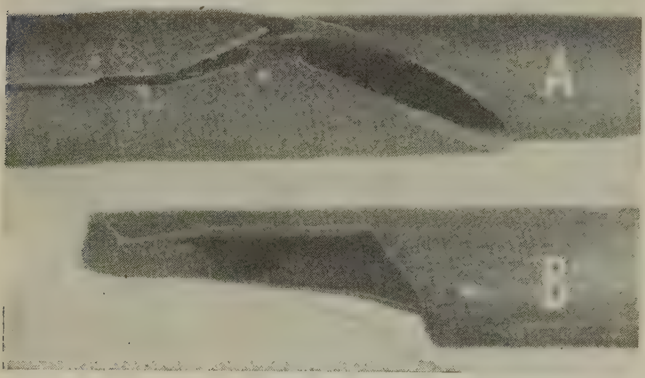


Fig. 1—One of the Most Common Types of Failures in Diamond Drill Rods

Doctor McAdam, in the *Proceedings* of the American Society for Testing Materials (1926) and R. R. Moore of the engineering division, United States Air Service, at McCook Field, Dayton, Ohio, in the same volume, have paid special attention to the influence of combined corrosion and fatigue stressing.

There are numerous other publications on fatigue of metals, but it is not considered necessary in this brief paper to review all the literature on the subject.

So far as the writer is aware, fatigue failure in diamond drill rod has not been reported in the literature. In the study of the failure of ordinary drill rod by the United States Bureau of Mines, some types of failure were reported which may have been due to progressive fatigue. Recently the writer was called upon to examine and report on a failure in a piece of 1¼-in. outside diameter diamond drill rod. This rod had failed while drilling a hole about 2600 ft. deep, and a microscopic examination of the rod indicated that the failure was of the progressive fatigue type.

Typical Failures of Diamond Drill Rod

What is believed to be the most common type of failure in diamond drill rods is shown in Fig. 1, which is about one-half actual size. If the stresses to which the rod is subjected are analyzed, there are three important ones:

(1) Torsion due to the rotation during the drilling operation. This stress is repeated but not a repeated reversed stress. The magnitude of the stress may be calculated from ordinary formulas.

(2) Repeated reversed bending, a stress which is encountered in the case of crooked drill holes which are not uncommon.

(3) Stress due to pressure of the cooling water as it is forced through the pipe. This hydrostatic pressure produces two kinds of stresses: Radial stress, which is always a compressive stress, and tangential stress, which is always a tensile stress and is a maximum at the inner surface of the cylinder. As the radius increases this stress approaches the internal pressure, but the maximum stress is always greater than the internal pressure.

The failure under examination was a longitudinal split in the pipe which started near one of the couplings and progressed a distance of some 12 in. A macrograph of a section of the rod at a magnification of 2½ diameters is shown in Fig. 2.

Casual examination revealed little that was unusual, but more careful study showed that, in addition to the one fracture which caused failure, there were four others starting from the inside of the tube and progressing outward in the positions indicated by the numbers in Fig. 2. These cracks were barely visible with the unaided eye, but became very interesting when studied at higher magnifications, as will be discussed later.

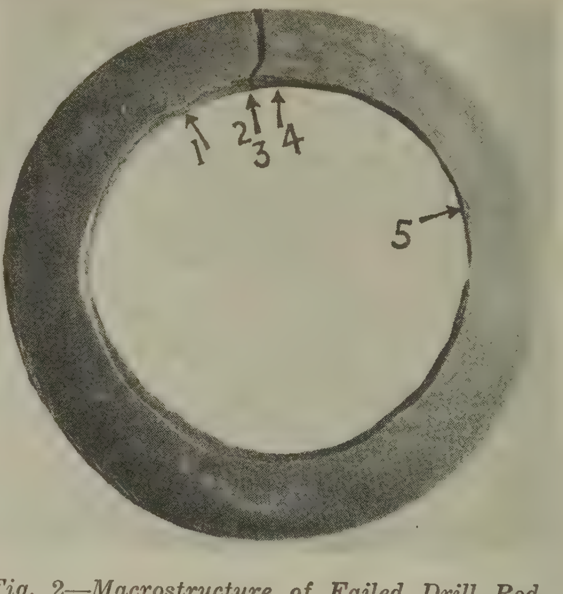


Fig. 2—Macrostructure of Failed Drill Rod, Showing Positions of Fractures. Half original size

The chemical analysis of the drill rod gave the following results:

	Per Cent		Per Cent
C	0.24	S	0.051
Mn	0.48	Si	0.004
P	0.009		

It represents a material of unsatisfactory composition in two particulars. The carbon is only 0.24 per cent, whereas it should have been perhaps 0.35 to 0.40

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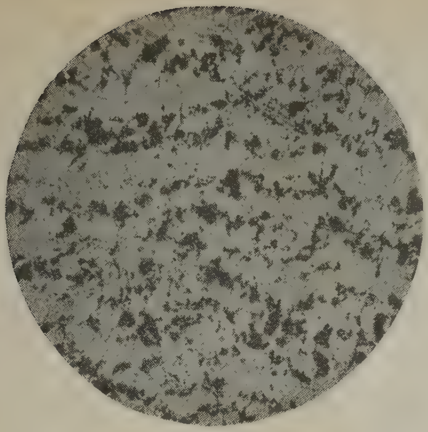


Fig. 3

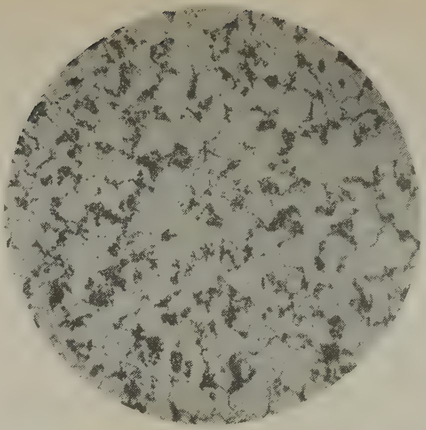


Fig. 4

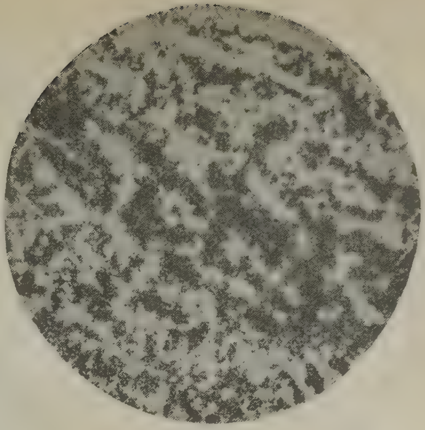


Fig. 5

Fig. 3—*Reveals Pronounced Banding of the Structure.* *Figs.* 4 *and* 5 *show uneven distribution of the carbon*

per cent. Second, the sulphur is quite high and suggests the possibility of sulphide segregations.

The microscopic examination of the rod indicated two objectionable structures. First, there is pronounced banding of the structure; that is, long bands of ferrite, as illustrated by the light areas in Fig. 3, and these are separated by more or less banded areas of pearlite, shown dark in the figure. Second, there is an uneven distribution of the carbon, as shown in Figs. 4 and 5. Fig. 4 would indicate that this particular part of the drill rod was decarburized to a considerable extent, and Fig. 5 indicates a concentration of the carbide and probably concentration of sonims, or non-metallic inclusions. A concentration of sonims might be attributed to the fact that the steel was not clean, while a decarburized zone such as shown in Fig. 4 might be due to ingotism, or more likely it was due to burning out of the carbon in upsetting the drill rod at the end.

An attempt was made to determine the amount of the segregation by making use of the sulphur print, which indicated that there was considerable segregation of sulphides.

How the Fatigue Fracture Progressed

The various fractures were examined microscopically but before discussing these in detail, it seems to the point to quote from the summary in Mr. Lucas' article previously referred to:

> 1.—Non-metallic inclusions in ingot iron are a potential source of weakness when such metal is subjected to reversed cycles of stress.
>
> 2.—Iron carbide when occurring as inclusions in ingot iron is not a source of weakness.
>
> 3.—Non-metallic inclusions seem to be insecurely seated in the metal, and the boundary between the inclusion and the metal is the path often followed by the fatigue crack.
>
> 4.—The non-metallic inclusions act as "stepping-stones" for the fatigue crack.
>
> 5.—Grain boundaries do not appear to be a potential source of weakness.

From a study of the photomicrographs of the fractures it appears that the direction of the progress of the fracture has been determined largely by non-metallic inclusions. The observations here would seem to be in complete agreement with the findings of Mr. Lucas. In one case the progress of the fracture was particularly interesting. First there was a large slag inclusion which came to the surface of the metal and, undoubtedly, constituted the notch effect as regards fatigue resistance. The failure then progressed into the metal and, near the end of the fracture, passed through one of the very badly segregated areas.

Causes of the Failure

Referring to the three stresses encountered in the service of diamond drill rod, it is evident that the maximum stresses due to rotation and bending are at the outside surface of the tube. While one of the stresses, due to the hydrostatic pressure, produces a maximum tensile stress at the inner surface of the tube, it is not believed that this stress is sufficient under operating conditions to cause failure. The failure in this particular rod, however, has apparently started from the inside.

There are two seemingly plausible explanations for this phenomenon. If, in the manufacture of the drill rod, the inside was left rough and striated in a longitudinal direction, the notch effect may have been sufficient to cause the failure to start on the inside of the drill rod even though the stresses were lower than on the outside. Second, it is obvious that the tube is badly corroded inside and the failure may have been the result of a combination of the notch effect and corrosion fatigue such as had been reported by Doctor McAdam and R. R. Moore.

The low carbon content of this drill rod, and therefore its lower physical properties, would undoubtedly lower its endurance limits, and it might be expected to fail at lower fiber stress than drill rod of higher carbon content. As previously pointed out, the structure is banded and furthermore there is segregation and a considerable amount of non-metallic inclusions. It should also be pointed out that the wall thickness is non-uniform, being about 0.050 to 0.060 in. thinner at the point where the failure occurred than on the other side.

Structure of Satisfactory Material

It should be said, by way of explanation, that this particular drill rod represents stock which had been on hand for a long period of time, stock which was probably purchased about the close of the war when various industries were buying the steel they could get

Figs. 6 *and* 7—*Photomicrographs of Drill Rod Steels Which Are Considered Satisfactory Material at the Present Time*

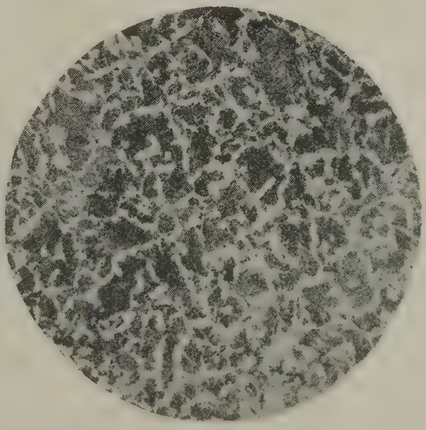


Fig. 6

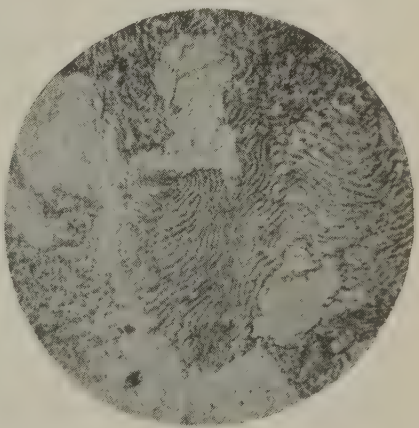


Fig. 7

regardless of the fact that it did not completely satisfy their specifications.

Photomicrographs of drill rod samples which are considered satisfactory material at the present time are shown in Figs. 6 and 7. These represent steel containing about 0.40 per cent carbon, and a macroetch, as well as these photomicrographs, showed a homogeneous structure and general freedom from sonims.

Summary and Conclusions

1.—What appears to be a typical progressive fatigue failure in diamond drill rod has been noted.

2.—The cracks have been observed to start from the inside of the pipe and to progress outward, contrary to what would be expected from the intensities of the fiber stresses.

3.—A combination of notch effect and corrosion has been suggested as the cause of the position of the cracks.

4.—It has been indicated that the quality of the steel as revealed by the microstructure has an important bearing in progressive fatigue failures.

5.—The importance of care in handling stocks of raw materials and inspection has been indicated.

Magnetic Alloys Named and Defined

Several Important Brands in Common Use Described in Terms of Properties and Composition

It has lately become the custom to christen newly developed alloys with names chosen with the idea of indicating something of the nature of the material. Many of these names have already become familiar, but in the field of magnetic materials there seems yet to be some confusion in many cases as to the real meaning. For example, there is uncertainty on the part of some with regard to the alloy which has been called "permalloy." Is it good material for permanent magnets or not? With this situation in mind the following brief description of some of the more recently produced alloys may be of interest and value.

Permalloy.—So named because of its high permeability, this alloy, which is 78 per cent nickel and 22 per cent iron, has a maximum permeability, when properly heat treated, more than 50 times as great as that of pure iron. This remarkably high permeability is exhibited under the influence of very weak magnetizing forces and consequently the material is exceedingly valuable in the construction of the magnetic cores of apparati which operate with feeble electric currents. On account of its relatively low saturation value (about one-half that of pure iron), its usefulness is restricted to applications where the magnetizing forces are very small, as they are in most types of communication apparatus. One of the most interesting applications is its use in the loading of submarine cables. Permalloy has very little magnetic hysteresis and consequently is not suitable for permanent magnets.

Hipernick.—This "high-permeability-nickel" alloy has equal amounts of nickel and iron. It does not give as high permeability as permalloy but has an initial permeability, under suitable heat treatment, more than ten times that of pure iron with a maximum permeability upward of 50,000, which is roughly 25 times that of pure iron. Its principal advantage lies in its less sensitiveness to the effect of mechanical strain and its response to the ordinary method of heat treatment by slow cooling. It has found its main use in the cores of audio frequency transformers and current transformers.

Copernick.—This does not contain copper as the name might seem to imply, but has the same chemical composition as hipernick. By means of a different heat treatment, however, somewhat different magnetic properties are obtained. The principal characteristic is a considerable range of flux density in which the permeability has little variation, hence its name "constant-permeability-nickel." This condition is obtained at some sacrifice of initial and maximum permeability, but both are considerably higher than for the best silicon transformer steel, being of the order of 1200 and 15,000 respectively according to the heat treatment.

"A" Metal.—This is a high-frequency induction furnace product consisting of iron, nickel, and copper. The copper content is 6 to 8 per cent. It was developed primarily for use in the cores of audio frequency transformers and similar applications. It has a range of inductions in the neighborhood of 4000 gausses in which there is little variation in permeability and so gives very little distortion, due to the direct current component usually present in audio frequency transformers.

Thermalloy.—A temperature-sensitive alloy of approximately 66.5 per cent nickel, 30 per cent copper, and 2 per cent iron. The permeability falls off with increase in temperature in a nearly linear manner. By varying the composition and heat treatment, almost any desired characteristics can be obtained. The material has been successfully used for magnetic shunts in watthour meters for the compensation of errors due to variations in temperature.

K. S. Magnetic Steel.—This permanent magnet steel was developed by the Japanese metallurgist Kotaro Honda and named by him in honor of Baron S. Sumitomo whose financial support made possible the investigation leading to its discovery. By means of the addition of a substantial percentage of cobalt to magnet steel of the ordinary composition, a steel was produced having remarkable magnetic properties. Without sacrifice of residual induction, this alloy gives a coercive force more than three times as great as that of the best practical magnet steels previously produced. With proper attention to design, it is possible to reduce the amount of steel required for a given purpose to about one-third of that required for the older types of magnet steel. It is also possible to make stable magnets of forms not practicable with the steels previously available. On account of the high cost of cobalt and somewhat more expensive methods of production, K.S. magnetic steel is not generally an economical material, however, and its use is justified only where considerations of weight or space are of paramount importance.

Cobaltcrom.—As the name implies, the distinguishing ingredients of this permanent magnet steel are cobalt and chromium. The percentage of cobalt is generally lower than in the K.S. magnetic steel and the chromium content is higher. These steels are produced in England and come in two grades "Special" and "Double Special." The residual induction is somewhat lower than for the ordinary magnet steels, but the coercive force values compare favorably with the K.S. magnetic steel described above. A rather complicated heat treatment is specified for these steels, but with care very good results can be obtained.

Permanite.—This is a permanent magnet steel having properties intermediate between those of cobaltcrom and the ordinary magnet steels in common use. It might be called a cobalt-chrome-tungsten alloy. The coercive force is about 50 per cent higher than ordinary tungsten or chromium magnet steels and the residual induction is about the same. The same statements with regard to design and cost that apply to the other types of cobalt magnet steels are applicable to permanite.

Nomag.—As its name would indicate, this material is hardly a magnetic alloy. It is a practically non-magnetic cast iron which owes its non-magnetic characteristic to the presence of about 6 per cent of manganese. Machinability is obtained by the addition of about 9 per cent of nickel. It has a high electrical resistivity and is useful where the ordinary mechanical properties of cast iron are desired but where a magnetic material would be objectionable.

American Steel Treaters in Canada

Winter Sports and Technical Programs Divide Attention of Members

Uses of Alloy Steels and Heat-Treatment Problems Considered

TECHNICAL programs held by the American Society for Steel Treating in Montreal last week (Feb. 16 and 17) warranted a better attendance from both Canada and the States. For quality of original papers and vivacity of discussion the meetings were the equal of any held by the society at its general meetings.

About 100 members from New England, the North Atlantic and Central States were entertained by the local chapter with a full program of sleigh riding, tobogganing, ski jumping and professional hockey. These winter sports, as well as visits to various resorts, made the occasion one long to be remembered by those from milder and dryer climates.

Four manufacturing plants held open house. Canadian Steel Foundries, Canadian Vickers, Dominion Engineering Works and Dominion Bridge Co. all seemed to be working near capacity. The general impression a casual visitor retains of these operations is that much more attention to small details is given by both management and workmen, the sum of which undoubtedly contributes to high quality in the output. Really notable machinery and structures are being constructed in these modern plants.

Chromium and Nickel Steels

MOST of the papers had to do with alloy steels and the adaptability of various alloys for practical purposes. Space prevents a full abstract of all those presented. Several had to do with chromium and nickel analyses.

Cast Chrome Irons

V. T. Malcolm, metallurgical engineer Chapman Valve Mfg. Co., Indian Orchard, Mass., presented a paper on "Cast Chrome-Irons" which mentioned the foundry difficulties and the requirements of the finished castings. He said that cast chrome-irons are really corrosion-resisting mild steels, and are essentially different from stainless steels by having lower carbon. (In discussion it was mentioned that castings also carry considerably more silicon; a successful analysis is 0.15 per cent carbon, 17 per cent chromium. E. C. Bain said that he would judge that carbon would have to be less than 0.45 per cent carbon if the chromium was 18 per cent, to insure that the material would resist corrosion.) Such castings, after annealing at about 1550 deg. Fahr., are soft and malleable, and machine without great difficulty. Physical properties are given in the accompanying table.

Ultimate strength	100,000 lb. per sq. in.
Yield point	75,000 lb. per sq. in.
Maximum allowable working stress at 1000 deg. Fahr.......	12,000 lb. per sq. in.
Melting point	2,750 deg. Fahr.
Scaling point (maximum temperature for continuous operation)	1,600 deg. Fahr.

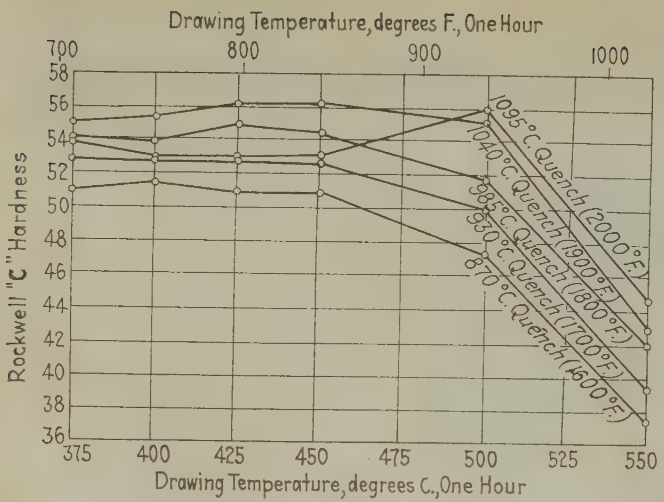
In melting, extreme care is necessary to avoid oxide inclusions. Good clean scrap, reducing conditions during melting, thorough refining and degasifying are all necessary. Highest skill in molding and temperature control during pouring are required. Operations must be adjusted so that the alloy will not burn or cut into the sand, so that it will shrink no more than a controllable amount, clean easily and solidify into a dense fine-grained metal with carbides uniformly and finely dispersed. In order to remove iron-rich scale or adhering dirt it is customary to pickle castings in hydrochloric acid, wash them, and then immerse in concentrated nitric acid. This produces a surface film which is passive to atmospheric corrosion.

During the discussion it was brought out that English metallurgists are more successful in making high-temperature erosion and corrosion-resisting castings than are the Americans. Nickel is added to some analyses when making castings up to 1000 lb. in weight, and in order to reduce the necessity of heat treating parts of non-uniform cross-section. If carbon can be kept low enough so that the chrome-iron casting is exclusively a solid solution of ferrite plus chromium plus carbon, then the only things which heat treatment can do, other than relieve internal strain, is to cause grain growth (which is especially active when silicon is up) or reduce coring.

N. L. Mochel of the Westinghouse Electric & Mfg. Co., Philadelphia, said that at present not all the commercial requirements can be met simultaneously by chromium or chromium-nickel castings. High-pressure steam fittings especially give trouble; nearly all machined castings are comparatively porous. Complexity of form seems also to increase enormously the foundry difficulties. Some striking successes have been accomplished, however. He mentioned particularly the fact that his organization has a large tank made of a chrome-iron casting which has held concentrated nitric acid for three years without damage.

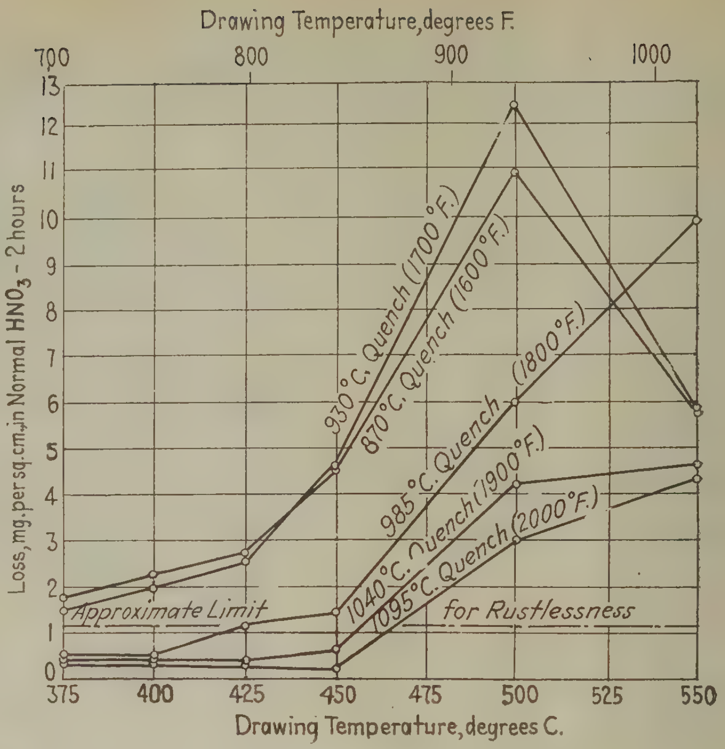
Reasons Why Stainless Steel Resists Rust

Edgar C. Bain of the Union Carbide and Carbon Research Laboratories presented a paper entitled "X-Rays and the Constituents of Stainless Steel." A detailed study was made of a thin commercial sheet analyzing as follows: Cr 17.4, C 0.77, Mn 0.43, Si 0.25 and Ni 0.24 per cent. A series of test pieces, systematically quenched and drawn, gave hardness and corrosion tests as shown in the diagrams. (Loss of weight



Hardness of Quenched Stainless Steel Is Not Much Affected Until Drawn Above 500 Deg. C.

High Temperature Quench and Low Temperature Draw Give Maximum Resistance to Corrosion (At Right)



in circulating weak nitric acid is an evaluation of atmospheric corrosion). A distinct secondary hardness developed by drawing a 1095 deg. C. quench to 500 deg. C. indicates that some austenite is retained after this high quench. If this steel is to have good rust resistance it must have a high quench and a relatively low draw.

Systematic X-ray investigations were also made. The paper shows clearly how to interpret these diffraction patterns. In all instances, ferrite "doublets" appeared at the 550 deg. C. draw, which Mr. Bain interpreted to indicate the sudden disappearance of martensite and internal strain. Patterns of residual carbide were distinctly shown in all specimens quenched from 1040 deg. C. and lower, which did not change in appearance after the various draws, this indicating that they did not materially increase in number or effective size. The steel quenched from 1040 deg. C. had faint austenitic lines; the one quenched from 1095 deg. C. had the austenite pattern as well marked as the ferrite pattern.

After a brief account of the constitution of the rustless irons, stainless steels and chrome irons, Mr. Bain advanced the following considerations to account for the observed phenomena:

1. That 12.5 atomic per cent chromium in solid solution in either alpha iron or gamma iron (whether as ferrite, austenite or some intermediate phase) is sufficient to resist oxidation by atmosphere or acid exposure.
2. That in annealed or excessively drawn steels practically all the carbon is held in complex carbides, containing a higher Cr: Fe ratio than the surrounding ferrite.
3. That this may cause the ferrite immediately adjacent to have a chromium content less than 12.5 atomic per cent, and readily rust, despite the fact that the chemical analysis of the entire sample may be correct.
4. Heating and quenching dissolves and disperses these carbides, but care must be taken to heat hot enough and long enough, and to avoid high temperings (which reforms the carbide particles).
5. If chromium is high enough by a safe margin, the steel or iron is rustless in all conditions.

Toughness of Chromium-Nickel Steel

In order to determine whether an S.A.E. 3265 steel is better than the more usual 3250, B. F. Shepherd, assistant metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., made some tests on the following steels:

	S.A.E. No. 3250 *Per Cent*	Low-Nickel *Per Cent*	High-Carbon *Per Cent*
Carbon	0.50	0.51	0.63
Manganese	0.40	0.51	0.47
Nickel	2.35	1.75	1.85
Chromium	0.95	0.95	1.00

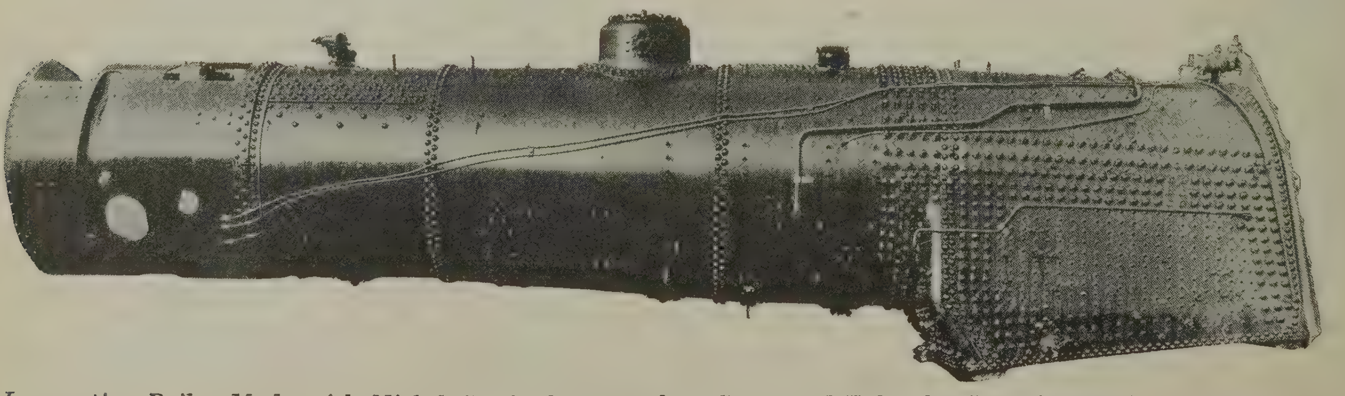
Silicon in these steels was 0.25, sulphur 0.013 and phosphorus 0.01 per cent.

Izod, tensile and hardness tests are contained in his paper entitled "A Note on the Hardness and Impact Resistance of Chromium-Nickel Steel," and are summarized in the table. Annealed bars were rough ground to 0.015 in. of size, hardened and finish ground to shape. Izod bars were then notched by grinding with a 45-deg. notch, 1/64 in. deep, 0.01-in. radius at the bottom. Results were consistent, the average spread in the groups of three being three units, or 13 per cent of the impact value.

Oil quenching was done from lead baths. Tempering was done in an electric furnace for 2.5 hr. Bars either quenched, or quenched and drawn, at 300 deg. Fahr. broke under the head, thus illustrating the fact that "hard" parts fail by concentrated local stresses. The unyielding character of the steel prevents that slight local distortion and plastic flow which would uniformly distribute the load. When quenched from 1450 deg. and drawn at 550 the following results were obtained:

	S.A.E. 3250	Low-Nickel	High-Carbon
Proportional limit..	233,750	over 200,000	228,750
Ultimate strength..	264,500	275,000	273,500
Elongation in 2 in.	8.0	7.5	6.0
Reduction in area..	22.5	24.0	17.0

It can be seen that the standard S.A.E. 3250 is not improved by increasing the carbon. Hardness and



Locomotive Boiler Made with Nickel Steel Shell, Firebox, Stays and Tubes by Canadian Pacific Railway Co.

strength are no better; ductility and impact are much inferior.

Impact and Hardness Tests on Chromium-Nickel Steels

Heat Treatment	S.A.E. 3250		Low-Nickel		High-Carbon	
	Izod	Rockwell	Izod	Rockwell	Izod	Rockwell
Q. 1450	15.3	56	10.0	57	7.5	59
Q. 1450 ; D. 300	29.0	56	17.3	56	12.7	57
Q. 1450 ; D. 550 .	29.0	50	21.3	50	16.3	50
Q. 1500	14.3	56	7.3	58	8.7	59
Q. 1500 ; D. 300	28.3	56	20.7	56	6.3	58
Q. 1500 ; D. 550	26.3	50	16.0	50	16.0	52

Nickel Steel in Boiler Construction

"Alloy Steel for Boiler Construction" was discussed by Charles McKnight of International Nickel Co., New York. While nickel steel boilers were installed in the United States cruiser Chicago, built many years ago, and in one locomotive built by the Baldwin Locomotive Works in 1904, the Canadian Pacific Railway Co. may be regarded as pioneering when in 1926 it built 44 locomotives with nickel steel boilers and fireboxes. By this means the steam pressure was increased 25 per cent (from 200 to 250 lb.) without increasing the thickness of the plate. Characteristics of the 3 per cent nickel steel used are shown in the table. Cold bend tests show it to have about the same ductility as carbon steel.

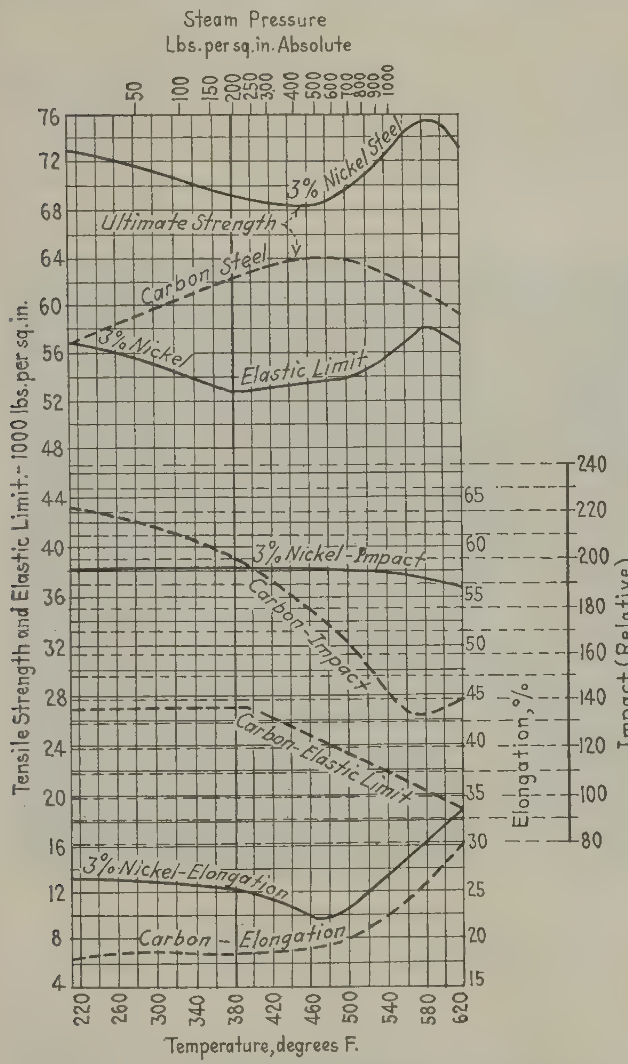
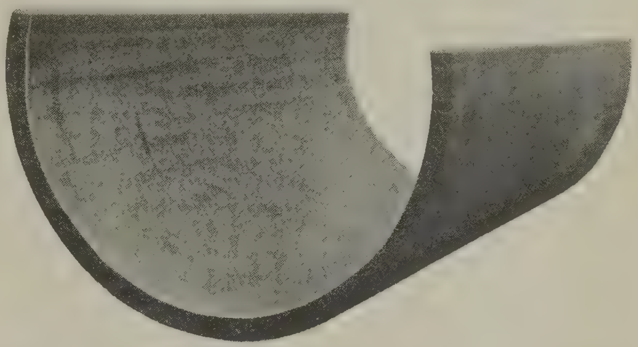


Fig. 1—Comparison of Physical Properties of Carbon and Nickel Steel at High Temperatures

Fig. 1 gives physical properties at elevated temperatures, as determined by P. Goerens.* While this investigation is reliable the results are not comparable with others by investigators using different test pieces, and steels with different histories. It is especially necessary for boiler steel to cool slowly after rolling—the usual passes through leveling rolls are in effect a quenching.

Manufacturing procedure is as follows: A well killed steel is cast in big end-up molds with hot tops. Crop 40 per cent to avoid pipe. Chip all surface defects. Heat slowly, and conduct rolling so as to insure best possible surface, and finish at a good red heat. Pile hot plates promptly, one on top of another, and cover pile with sand. Plates should require 8 hr. to come to black heat.

In the boiler shop no special difficulties are met. Either carbon steel or nickel steel rivets can be used. Welding by either gas or arc process is perfectly feasible when using nickel steel welding rod. Mr. McKnight also feels that the increased resistance to corrosion conferred by the nickel content, and the high elastic limit of the material, will minimize corrosion cracking so troublesome in the highly stressed regions between staybolt holes.



Two-Inch Nickel Steel Plate for Babcock & Wilcox High Pressure Boiler

Nickel steel staybolts were described in THE IRON AGE, Dec. 29, 1927, page 1785. Low-carbon tubes with about 2 per cent nickel have been in extensive naval use for 25 years, and outlast carbon tubes many times. They are also successful for stationary boilers, whereever water conditions are bad. This analysis has the property of developing a glossy surface to which scale does not adhere.

Properties of Nickel Steel and Carbon Steel Boiler Plate

	Nickel Steel		Carbon Steel
	Specified	Average of 523 Tests	Average of 385 Tests
Analysis:			
Carbon	0.20% max.	0.163%	0.193%
Manganese	0.40 to 0.80%	0.557%	0.401%
Phosphorus	0.045% max.	0.021%	0.022%
Sulphur	0.045% max.	0.029%	0.033%
Silicon	......	0.203%	......
Nickel	2.75 to 3.25%	2.960%	......
Physical Properties:			
Ultimate	70,000 lb. per sq. in. min.	77,880 lb. per sq. in.	59,200 lb. per sq. in.
Yield point	0.5 ultimate	47,550 lb. per sq. in.	36,200 lb. per sq. in.
Elong. in 8 in.	20% min.	26.33	28.64
Reduction	50%	54.15%	......
Izod impact	......	63.4	......

Heat Treatment and Tool Steel

ANOTHER group of papers considered methods of heat treatment, microscopic examination and the effect of impurities on high speed tool steel.

Putting Internal Stresses to Work

Internal stresses are usually the designer's bugaboo, but W. J. Merten of Westinghouse Electric & Mfg. Co., East Pittsburgh, proposes to put them to good use. Langenberg's methods of increasing the strength of gun tubes by expanding them hydraulically rest upon the same principle. G. M. Eaton† also has shown that coiled springs may be much improved by quenching in an internal spray.

In high-speed turbine shafts and disks the centrifugal forces induce large stresses in tension. If such pieces are quenched so that the periphery cools first, the resulting internal stresses are in tension, which obviously reduces the factor of safety in the design. Mr. Merten calls attention to the fact that compressive stresses of from 5000 to 15,000 lb. per sq. in. may be placed in hollow forged or bored disks as follows: Mount the disk before heating on a mandrel, and when ready to quench place the mandrel on suitable rollers and spin the disk rapidly, meanwhile spraying pressure water on the center of the disk. Subsequent tempering

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*Paper entitled "Die Kesselbaustoffe," in *Zeitschrift des Vereines Deutscher Ingenieure,* Jan. 19, 1924.

†*Transactions,* American Society for Steel Treating, November, 1927.

relieves these quenching stresses somewhat, but never entirely, as evidenced by slight changes in dimension after machining. At any rate, those that are left are in such a disposition as to increase the margin of safety during operation, rather than the opposite.

In presenting his paper, Mr. Merten pointed out that the great difficulty in heat-treating such a forging as a complete rotor for a big turbo generator led them to manufacture it of a series of disks, placed side by side and held together by bolts extending from one bearing boss to the other. These disks are about 20 in. thick, 56 in. in diameter, have an 8-in. bore, and weigh 7500 lb. each. By means of the quenching described, and this method of sectional construction, the slots cut in the assembled rotor could be deepened so much that the extra coils thus provided for increased the electrical rating of the machine from 50 to 75 per cent. A. B. Kinzel also said that this same principle was utilized by saw smiths, who were in the habit of quenching the rim of high-speed circular saws, then smithing the center to put compression on the circumference. Studies showed that these induced stresses amounted to 18,000 lb. per square inch; machines have also been developed to perform this work under close control.

Case Hardening with Ammonia

Vanadium steel case hardens excellently in ammonia at 950 deg. Fahr., according to results reported by A. B. Kinzel, of Union Carbide and Carbon Research Laboratories, Long Island City, N. Y. Aluminum alloy steels for this purpose have already been developed by Fry, in Germany,[*] and the process of low-temperature nitrification without scaling or distortion is commercially attractive.

Ordinary calorized steel will not harden usefully in ammonia, because the aluminum concentration at the surface is too high; a long, high-temperature anneal after calorizing will diffuse aluminum inward to the necessary degree, but the double process is undesirable; it also scales the surface.

A short, low-temperature calorizing treatment on carbon steel or chromium steel at 1020 deg. Fahr. for 2 hr. gave a good case after nitrification. No embrittling resulted; the bar before treatment had Izod impact of 80, and 78 afterward.

Chromium, silicon, manganese, tungsten and titanium steels are not so good as aluminum for the process. Zirconium steels appear erratic.

A series of 0.06 per cent carbon steels alloyed with vanadium were tried. With vanadium above 0.5 per cent a nitrogen case with maximum hardness (67 Rockwell "C") was secured. More vanadium is required as the carbon increases; it seems that the ferrite must contain at least 0.4 per cent vanadium. Vanadium may be economized by adding chromium, manganese or silicon, or combinations of these, to the higher carbon steels, which alloys replace some vanadium in the complex carbide. One per cent plain carbon steels may be successfully treated after packing in powdered ferrovanadium and heating as follows:

Stage	Gas Atmosphere	Temperature	Time
Decarbonize	Hydrogen	1290 deg. Fahr.	30 min.
Vanadiumize	Nitrogen	1690 deg. Fahr.	2 hr.
Nitrogenize	Ammonia	950 deg. Fahr.	15 hr.

If the high-carbon steel originally contained 0.5 per cent vanadium, the middle stage can be omitted.

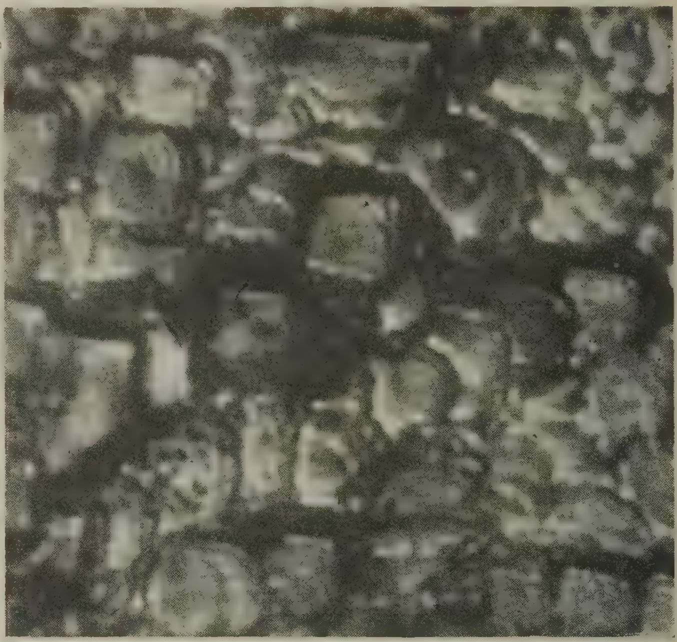
H. A. De Fries, metallurgist Ludlum Steel Co., Watervliet, N. Y., described recent developments in aluminum steels for nitride case hardening. Straight aluminum, or chromium-aluminum steels, with or without nickel, will produce very hard surfaces, but all of them are subject to "Krupp Krankheit" or brittleness after heating at moderate temperatures. For instance, a steel with original impact value of 15 would test only 2.5 after heat treatment. One quarter per cent molybdenum corrects this defect. The impact loss is only two units, regardless of whether the core is tested, or the test piece case hardened before testing. Present practice is to use aluminum from 0.25 to 1 per cent, molybdenum 0.15 to 0.60 per cent, and low chromium. Ten to 15 hr. in ammonia at 875 to 950 deg. Fahr. is sufficient to give a case, comparable in Herbert pendulum hardness to cases developed on plain aluminum steels in a much longer time. Such parts installed in high-speed automobile engines are giving superior resistance to abrasion.

P. C. Osterman, American Gas Furnace Co., Elizabeth, N. J., confirmed the statement that molybdenum-aluminum steels give the hardest cases in ammonia, and the quickest penetration. Eight hours is all that is necessary for some commercial parts. Nitrification of ordinary carbon steels will probably be much used to induce a superior degree of corrosion resistance. Alloy steels, covered with mill scale, may be given a hard and useful case by nitrogen; a soft friable shell is produced, easily removable, and under this a hard surface is found.

When questioned regarding the use of these materials for gages, Mr. Kinzel said that aluminum steel changed 0.0003 in. per inch after nitrification; vanadium steel changed less than half as much.

Crystals Within Metallic Grains

Results of a new method of preparing metal samples for microscopic examination were shown by R. G. Guthrie, Peoples' Gas Light & Coke Co., Chicago, and J. Fletcher Harper, Allis-Chalmers Mfg. Co., Milwaukee, in a paper entitled "Crystal Micrography." Work has thus far been confined to pure metals or solid solutions, which, in the authors' opinion, appear much alike because conventional polishing methods produce a film of cold-worked metal which is only in special instances removed by the etching solutions. By methods which were not divulged an optically plane surface is produced by them, which after short pickling develops what would ordinarily be called etching pits, but which Messrs. Guthrie and Harper believe to be the real crystallographical constitution of the metallic grains. From the preliminary studies, certain ideas were advanced, tentatively, on the nature of martensite, and slip bands and the effect of plastic deformation. No evidence is found in high-power micros of the presence of amorphous material at the grain boundaries.



Hot Forged Armco Ingot Iron, Slowly Cooled but not Heat-Treated. Etched with hot concentrated hydrochloric acid. Magnified 2500 diameters

In the discussion the warning was sounded that the appearances developed may be more apparent than real. E. C. Bain, of Union Carbide & Carbon Research Laboratories, reminded those present that plastic flow and ruptured surfaces may give large single crystals the appearance of being made of a number of different blocklets, whereas thousands of X-ray spectograms failed to show any mixed orientation in such a single crystal. R. S. Archer, of Aluminum Co. of America, also warned against hasty conclusions, recalling the pronouncement that duralumin, which would season crack, is coarse grained (under the X-ray analysis) whereas fine grained material is permanent, and some ingenious speculations are based thereon. This pronouncement was made after a limited number of examinations, and has recently been shown to have no basis in fact.

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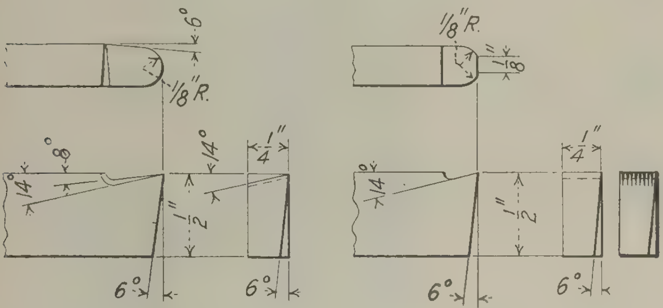
[*] See The Iron Age, Aug. 5, 1926, page 340, and Sept. 30, 1926, page 916.

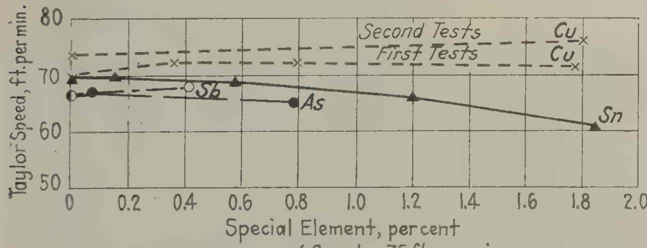
Impurities in Tool Steel

Some tool steel of the low-tungsten, high-vanadium type was melted in the electric furnace at the United States Bureau of Standards, poured into a ladle containing measured amounts of the impurity, cast into 55-lb. ingots, cooled, annealed, surfaced, reheated, and forged or rolled into 1½-in. square bars. Antimony up to 0.4 per cent, arsenic to 0.8 per cent, copper to 1.8 per cent and tin to 1.8 per cent were added. Cutting tests were then made, and results were reported by H. J. French and T. G. Digges in a paper entitled "Effects of Antimony, Arsenic, Copper and Tin in High-Speed Tool Steel."

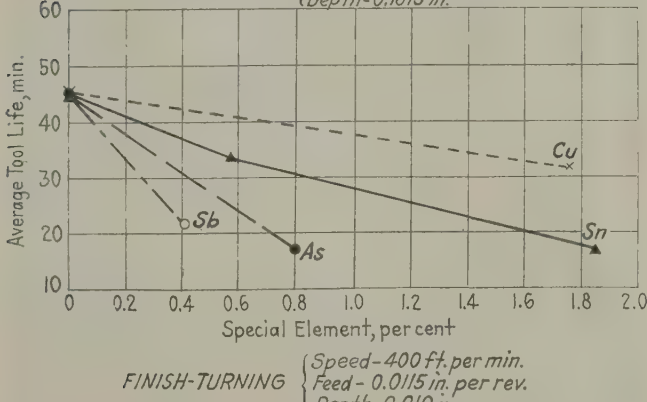


Lathe Tools Used in Tests. Roughing tool at left, finishing tool at right. After breakdown, finishing tool has corrugations on nose

Test tools of the shape illustrated were made and compared with a commercial steel known to represent the capabilities of the type chosen. In the rough-turning tests, figured back to the Taylor speed, the effect of the added metals is not great—copper in fact seems to improve the tool, a fact verified by a second test. Finish-turning tests have not yet been standardized, but in this instance were done by setting two tools in one holder for equal depth of cut. The "trailer" tool will then do no cutting as long as the "leader" shows no wear. Experience shows that when the leader has worn about 0.002 in. the trailer begins to cut, and this time marks the life of the leading tool. As compared with the standard tool, all four added metals show marked detriment to a finishing tool. The authors conclude, therefore, that these elements should be excluded from the melt by careful selection of scrap and alloys if the best high-speed steel is to be made.



ROUGH-TURNING {Speed – 75 ft. per min. Feed - 0.028 in. per rev. Depth - 0.1875 in.



FINISH-TURNING {Speed - 400 ft. per min. Feed - 0.0115 in. per rev. Depth - 0.010 in.

Copper, Tin, Antimony and Arsenic Affect Durability of Finish Turning Tools More Than Rough Turning Tools. All tests run without coolant

The steels with 1.7 per cent antimony and 1.8 per cent tin were very hot short, and could not be forged. The others forged; some developed surface cracks which were later machined out. The tin-bearing steels smoked during forging like molybdenum steels. None of the added elements caused any material change in hardness (either as quenched or after drawing at various temperatures) from that of the standard tool after equivalent heat treatment, with the exception of the tin-bearing steels which had about the same hardness after quenching at 2200, 2400 or 2500 deg. Fahr., and at all draws up to 900 deg. Microscopic examination revealed no abnormalities in any of the steels.

Finishing tools have a curious appearance after breakdown. As shown on the sketch they are ground with a blunt nose. After failure the end is corrugated with little ridges, extending down from the cutting edge about ⅛ in. and spaced according to the feed given the tool.

A steel manufacturer in commenting upon the difference between added impurities and residual impurities existing in the original ores or metals, said that the total of arsenic, antimony and tin must be less than 0.1 per cent in order to avoid trouble in rolling high-speed steel, especially on the thin edges. Chemical analyses of such elements in slight amounts is very difficult, however, and the user of impure ferrotungsten is never sure of just what he is getting.

Gray Iron Research Committee Meeting Changed to Pittsburgh

The meeting to consider a proposed organization for research work in gray iron foundry practice, which is being organized by the Philadelphia Foundrymen's Association and which was called to meet in Philadelphia on March 13, as published in THE IRON AGE, Jan. 26, page 309, has been changed to Pittsburgh for the same date. This is the result of a conference between the Philadelphia committee and representatives of the Western committee, held in Philadelphia on Feb. 7.

According to a tentative agenda, the summary of the Western viewpoint will be given by Walter Seelbach. with that of Philadelphia opinion presented by Walter Wood. This will be followed by an address by some prominent manager of a non-competing association and by general discussion.

Definition of Term for Special Annealing Wanted

The committee on heat treatment of ferrous castings of the American Foundrymen's Association calls the attention of steel foundrymen to tentative standard A-119-27-T of the American Society for Testing Materials, entitled, "Tentative Definitions of Terms Relating to Heat Treatment Operations." Under this heading the term "annealing" is defined as "a heating and cooling operation of a material in the solid state." This definition is necessarily broad in order to cover all types of annealing practice now in use. A full discussion of the subject appeared in the issue of the *Bulletin* of the American Foundrymen's Association for December, 1927.

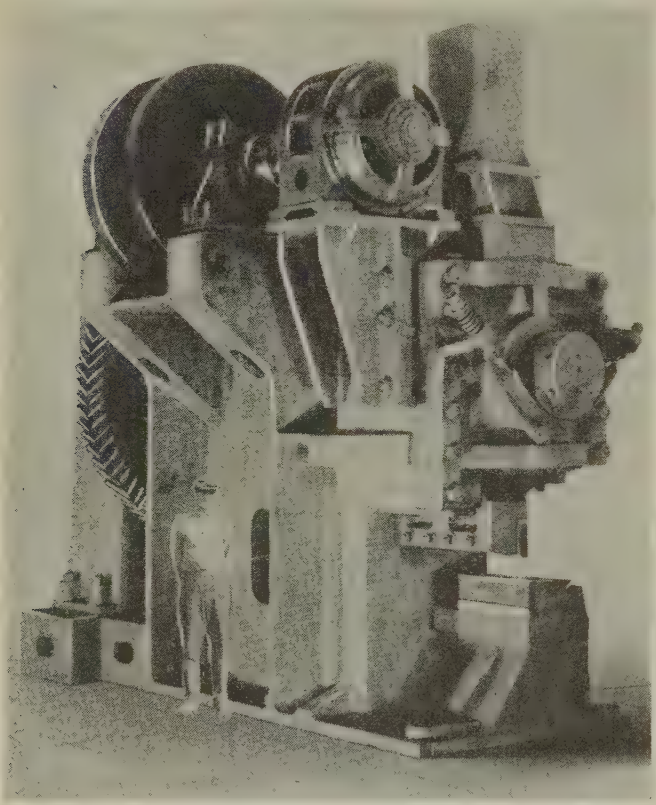
It has been suggested that a specific term be proposed for steel foundry slow-cool annealing practice in which castings are heated above the critical, followed by furnace cooling. Those interested in the question are invited to send their comments and criticisms to A. W. Lorenz, chairman of the committee, care of the Bucyrus-Erie Co., South Milwaukee, Wis.

Total apparent consumption of babbitt metal in January, based on reports received by the Department of Commerce from 31 firms, was 4,928,517 lb., compared with 4,465,787 lb. in December, and 5,439,689 lb. in January, 1927.

Large Shear Cuts Cold Alloy Steel Bars 5 In. and Less in Diameter

A new open-throat shear of large capacity and having improvements which facilitate operation and reduce maintenance has been brought out by the Mackintosh-Hemphill Co., Pittsburgh. The capacity is for cutting 4½-in. square or 5-in. round cold alloy steel. The stroke of the shear is 6½ in. and cuts are made at the rate of about 15 per min.

The massiveness of the machine may be noted from the illustration. The height is approximately 16 ft. and the weight is about 225,000 lb., 80,000 lb. of which is in the shear frame alone. The pressure at the knife is 1,400,000 lb. A 125-hp. motor, mounted on top of the frame, is employed to drive the machine. Drive gears are also mounted on top of the shear, which arrangement is intended to provide increased floor space around the machine and place the motor drive where it is less exposed to injury.


Alloy Steel May Be Sheared at the Rate of Approximately 15 Cuts Per Min. The weight of the machine is 112 1-2 tons

All gears, including master gear and pinion, have herringbone cut teeth with a solid apex. The motor pinion and motor gear shaft are provided with ring oil bearings having babbitt lined shells fitted in steel bearing bases which are rigidly keyed and bolted to the shear frame. Symmetrically spaced on the pinion shaft are two 63-in. flywheels which serve to equalize the load on the motor shaft bearings. The flywheels, as well as all gears, are inclosed in oil-tight covers.

The eccentric shaft has a square end on which the loose clutch slides. It is supported in two bearings on the frame of the shear and by an outboard bearing at the clutch end, as well as by one in the face plate. The eccentric is provided with a solid bronze slide which is mounted on the top ram. Bronze liners are also placed between the ram and the shear frame, and the front side of the ram is equipped with an adjustable wedge for taking up wear. An air-operated jaw clutch is also mounted on top of the frame.

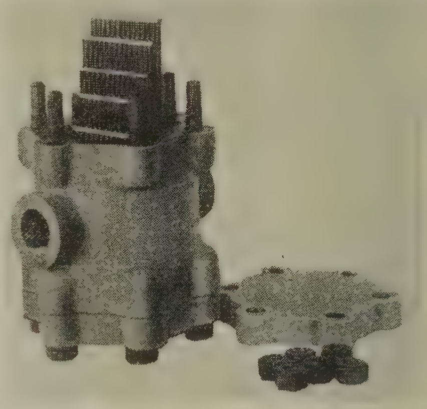
The top knife block is balanced by means of a double spring at the top of the shear which is easily accessible for adjustment or replacement. To insure the stopping of the top knife block in the upper position, a band brake is provided at the end of the eccentric shaft. This comes into action automatically as the ram reaches the top of its stroke and goes out of action when the material is being cut. Lubrication of this machine has been given thorough attention.

Purifier For Use in Connection with Air, Steam and Gas Lines

The Andrews-Bradshaw Co., division of the Blaw-Knox Co., Pittsburgh, has brought out a "pipe line Tracyfier" for use in connection with air, steam or gas lines up to 3 in. The device is similar in principle to the company's larger purifying device known as the Tracyfier.

In saturated steam lines the device is said to remove all moisture, delivering standard specification steam that is free from solids, both soluble and insoluble. It may also be used in gas-producer steam lines to maintain more uniform hydrogen content in the gas and in the steam lines leading to the tar burners on open-hearth furnaces. In the latter application the dried steam is said to produce a shorter, hotter and more uniform flame, save approximately a gallon of tar per ton of steel, and keep the checker chambers cleaner. In connection with air lines, one "pipe line Tracyfier" may be used for drying and cleaning the air for several tools, and it is claimed that in lowering the out-of-service time the output of each pneumatic tool is increased. The device may be used also for removing, either for recovery or elimination, of drops of liquid carried by gases.

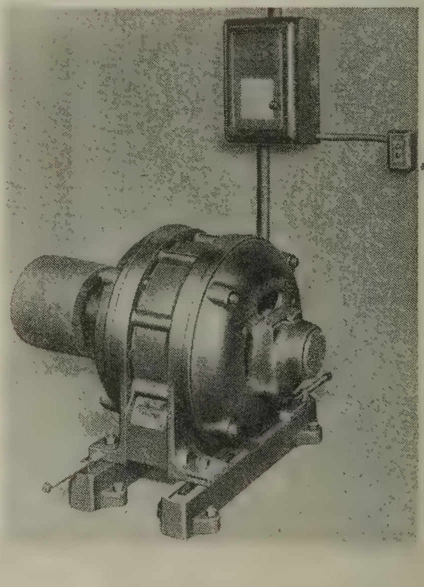
In Air Lines, One Purifying Unit Will Dry and Clean the Air for Several Tools



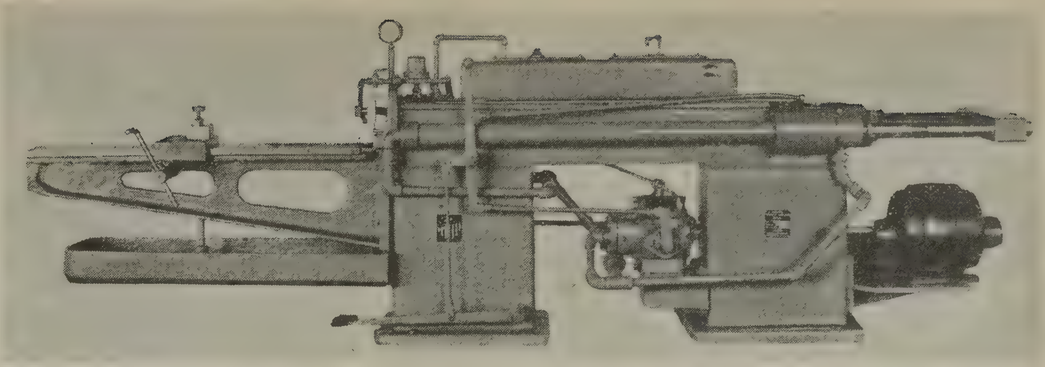
Induction Motors Designed for Starting on Full Line Voltage

Line Start squirrel-cage induction motors designed for starting on full line voltage have been placed on the market by Allis-Chalmers Mfg. Co., Milwaukee.

Starting Equipment Consists of Magnetic Switch With Push-Button Control



These motors are normal torque, high reactance machines and will not, it is stated, draw starting current in excess of the limits recommended by the electrical apparatus committee of the National Electric Light Association. They are available in ratings from 7½ to 30-hp., 600 to 3600 r.p.m., low voltage, and with either sleeve or roller bearings. Magnetic switch with push-button control is the only starting equipment required.



Broaches Up to 50 in. Long May Be Used. Cutting speeds range from 0 to 28 ft. per min.

Broaching Machine With Variable Cutting and Return Speeds

Variable speed hydraulic cutting and return strokes and twin-cylinder construction are features of a new No. 2 hydraulic broaching machine which has been added to the line of the American Broach & Machine Co., Ann Arbor, Mich.

The range of cutting speed is from 0 to 28 ft. per min. and the return speeds up to 60 ft. per min. are obtainable. The stroke is sufficient to permit use of broaches 50 in. long. The machine is fitted with hand and foot lever controls and a direct-reading gage that indicates the amount of pressure applied. The front of the machine has a finished face which extends to within a few inches of the floor and to which support tables or fixtures may be attached. The unit illustrated is equipped with the support table, carriage and oil pan.

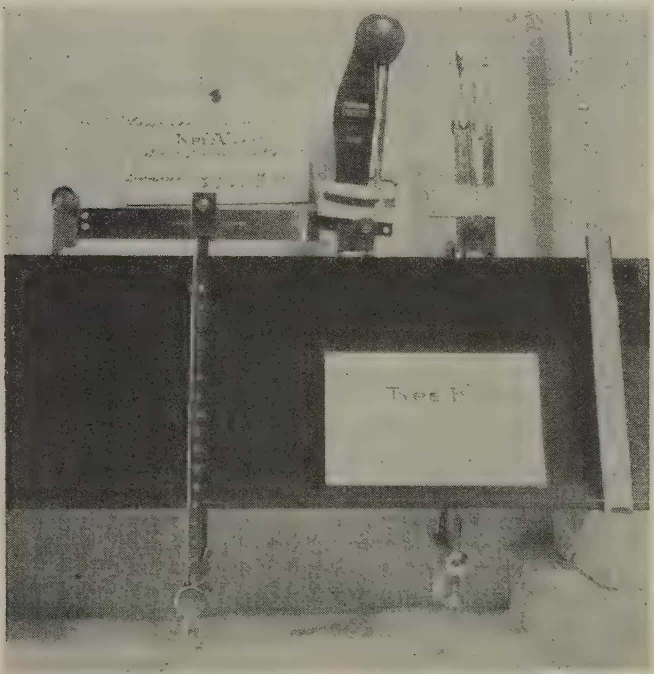
Twin-cylinder construction, used in other horizontal hydraulic broaching machines built by the company, is emphasized as giving the advantage of applying pressure on the full area of the piston and avoiding high pressure against the packing glands. The bore in the cylinder is 2¼ in. The machine is fitted with three rams, 2½ in. in diameter, one in each cylinder and one for operating the sliding head, all three being connected by means of a cross head and all moving simultaneously. Cylinders are of steel, machined and honed to assure high finish, and are fitted with pistons having two conventional type piston rings and leather cups. The oil tank has capacity of approximately 15 gal. The pump operates under pressure of 1000 lb.

The bore in the face of the machine is 5 in. in diameter. The pulling head is tapped 2 in., 8 pitch. Vertical adjustment of 1½ in. above center, and 1 in. below center is provided. The sliding head is fitted with hardened steel shoes which operate in box-shaped ways. The speed of the pump is 900 r.p.m. A 5-hp., 900 r.p.m. constant-speed motor is recommended. The weight of the machine is 4000 lb.

Tensometer or Strain Gage

To measure accurately the extension of a material under test in a tensile testing machine, the Southwark Foundry & Machine Co., Philadelphia, is putting out the Huggenberger tensometer, of which an illustration is given. This is manufactured in Zurich, Switzerland, and avoids the use of the dial indicator. It is based on the lever principle and is made in several types for varying uses.

That shown at the left of the illustration is type A, with a tilting knife edge at the lower right extremity of the working section. This is essentially a laboratory instrument, possessing the requisite precision and sensitivity. The lever multiplication is about 1200 to 1, which makes it possible to measure a change in the length of a specimen when this change is as much as 0.00001 in.



Two Forms of the Tensometer Are Here Shown. That at left is the high-precision type for laboratory use; at right is the outdoor type, which may be used regardless of exposure to rain, snow or dust

Type B, shown at the right of the illustration, is of more rugged construction and is designed for use in the field. The lever muiltiplication is about 1000 to 1, giving about the same sensitiveness in measurement. This instrument can be used even under exposure to dust, rain, and snow, as all moving parts are outside the frame, where they may be readily cleaned and inspected.

Spang, Chalfant Reorganization Completed

Henry Chalfant, who was chairman of the board of Spang, Chalfant & Co., Inc., Pittsburgh, prior to the merging with that company of the Standard Seamless Tube Co., continues as chairman in the new and enlarged company, while W. C. Fownes, Jr., who was treasurer and general manager Standard Seamless Tube Co., becomes chairman of the executive committee. Gordon Fisher continues as president, Charles F. Cruciger as vice-president and treasurer, and C. R. Barton, who was general superintendent Standard Seamless Tube Co., and W. J. Hampton, who has had charge of operations, for Spang, Chalfant & Co., are vice-presidents of the new company. These men and J. H. Hillman, Jr., W. S. Mitchell, A. B. Sheets, I. C. Chalfant and C. F. Beachler comprise the board of directors.

The capital structure of the new company consists of 150,000 shares 6 per cent cumulative preferred stock of $100 par value, and 1,000,000 shares of common stock of no par value, of which 117,500 shares of the preferred and 750,000 shares of the common have been issued. Of $12,000,000 first mortage 5 per cent sinking fund bonds authorized, $10,000,000 is to be issued, the proceeds to be used for the acquisition of the business and assets of the Standard Seamless Tube Co. The company has acquired 100,000 shares of 375,625 shares of common stock outstanding of the Oil Well Supply Co., having a present market value of approximately $3,500,000. The old Spang, Chalfant & Co. was capitalized at $7,000,000 and the Standard Seamless Tube Co. at $2,000,000.

Germany Imports More Machinery

Buys More Special Machinery but Fewer Machine Tools—Trade with United States Strongly Favorable to This Country—German Output Recovers

BEFORE the war, machine tools formed a large share of the German machinery imports, particularly those coming from the United States, according to a report by Theodore Pilger, American trade commissioner, Berlin, Germany. Since the war this trade in machine tools has never returned to the pre-war levels, but a part of the loss has been replaced by the sale of much special industrial machinery. This is of a widely varied type, such as road-building equipment; conserving, canning and packing machinery; printing and paper-working machinery, and special-purpose equipment for all industries which are now being modernized.

The amount of machinery imports in 1927 was 62 per cent of the amount imported in 1913, and the value of imports in 1927 was 130 per cent of 1913. The price per pound of machinery imported into Germany rose from 11c. in 1913 to 24c. in 1924, and was 23c. in 1927. In the past year German machinery imports exceeded 1926 imports by nearly 50 per cent, in both value and tonnage. The United States has been furnishing a considerable part of these increased imports, and German industrialists are looking here for the latest and most modern equipment in every field.

German Machinery Exports 87 Per Cent of Pre-War Volume

Exports in 1925 and in 1926 averaged about 35 per cent of the total German machinery production, but because of the increased domestic demand, 1927 exports were probably not over 30 per cent of total production. In 1927, 458,000 tons of machinery was exported with a value of 870,000,000 marks, about 87 per cent of the pre-war value, when corrected for the higher price level. The price per pound on machinery exported has also shown a steady rise in recent years, in 1911 to 1913 averaging 12c.; in 1924, 18c.; in 1926, 19c., and in 1927, 20c. The gain may be largely attributed to the use of less metal of a better quality than was used in pre-war years. Furthermore, German machinery manufacturers are now using better cost accounting systems than before, their quotations on foreign business are beginning to rise somewhat.

It also appears that considerable progress has been made in improved design, based principally upon the better raw material now obtainable. Germany is now using higher grade iron ores imported from Sweden, Spain and Morocco, instead of the low-grade "spath" ore from the Siegerland and the "minette" ore from Lorraine. Furthermore, Siemens-Martin furnaces are being used in the manufacture of steel to a much greater extent than heretofore.

Textile machinery is the most prominent group of German exports, followed by metal-working and power-generating machinery and agricultural implements.

Trade with United States Almost Balanced in Tonnage

In 1926, 70 per cent of Germany's total machinery exports were sold to other parts of Europe; 11.6 per cent to Latin America; 7 per cent to Asia; 4.7 per cent to the United States and Canada, and 1.5 per cent to Africa.

Official statistics recently issued by the German Government for 1927 show that German machinery exports to the United States (13,528 metric tons) were only 99 metric tons greater than the German machinery imports from the United States. Despite the virtual balance in weight, by value the balance is strongly favorable to the United States, as the pound price of the United States exports is much over the pound price of German exports.

In 1913 the United States was in thirteenth place as a buyer of German machinery. In 1924 it was fourteenth; in 1925 fifteenth, but in 1926 it rose to sixth place as a German machinery customer. In 1925 the United States bought 8153 metric tons of German machinery, valued at 18,990,000 marks; in 1926, 17,839 tons, valued at 34,639,000 marks, and in 1927, 13,528 metric tons (value not yet made public). Although 1926 was, therefore, an extraordinary year, it does appear that the United States is steadily increasing its purchases of German machinery.

Factors Contributing to Recovery of German Machinery Industry

Much of the recovery made by the German machinery industry since the beginning of 1924, according to Mr. Pilger's report, may be attributed to corporate consolidations, cartels, foreign loans made to Germany during the period, Government support of engineering industries, and good labor at low wages. Although exports by tonnage have not quite reached the high mark of 1913, it is believed that 1927 was one of the greatest production years in the country's history.

Financial Structure and Loans

German machinery builders, in line with all other German manufacturers, have found it advisable to report fixed capital as low as possible, and in spite of great enlargements made during the war, statements of fixed capital are almost the same now as in 1913. Legal and other reserves, as well as long term obligations, have practically disappeared from balance sheets. Although the average profit on invested capital in 1925 was only 1.4 per cent, earnings were much better in 1927. Concentration of industry has also been actively forced, first as a result of inflation and later because of competition. This consolidation movement has been much more evident in the basic raw material field than in the finished manufacturing lines.

This stabilizing corporate activity would not have been possible, in view of the shortage of working capital, had it not been for generous loans made to Germany by foreign countries. The last two years have also shown marked progress in the negotiation of foreign trade treaties in which the machinery industry has taken a large part. It has also declared itself in favor of a gradual reduction in the German tariff on machinery in order to encourage corresponding reductions by other countries. An increasing amount

Comparison of Machinery Industries in Germany and the United States in 1925

	Germany	United States
Number of factories engaged in machinery building	15,965	8,154
Total annual machinery producing capacity, 1925, German estimate	$1,200,000,000	$4,050,000,000
Total number of employees	612,165	481,212
Average number of employees per factory	38	59
Percentage of salaried employees to total employees	17.2	18.5
Total horsepower in use	635,000	1,424,259
Horsepower per employee	1.04	3.38
Value of production	$690,000,000	$2,232,985,974
Value of production per employee	$1,090	$4,640
Value exported in 1925	$175,000.000	$149,379.000
Value exported in 1927	$207,000,000	$180,167,000
Percentage of production going to export	39	6.7

of German machinery is also coming into the world's markets as "satisfaction for war indemnity."

Government Support

Government support to the German machinery industry embraces: Reduction of 50 per cent in inland freight rates covering export shipments, Government export credit insurance, a Government guarantee of export credits granted to various purchasers, Government ownership or controlling interest in a number of machinery factories, furnishing special banks with funds at rates below the regular market which are made available to finance export shipments, support of standardization and simplification programs, countenancing of cartels, trusts and other price-regulating organizations and permitting sales abroad at lower prices than in the protected domestic market.

Stable Labor Conditions and Low Wages

Labor conditions, the fourth factor in the recovery of the German machinery industry, seem to have become stable. Although the trend is upward, it is not believed that any rapid increase in wages is likely. Efficiency and output are rapidly increasing by the use of greater power and the adoption of American production methods. Although the legal working day is now 8 hr. in Germany there is no difficulty in obtaining workmen for overtime at the regular hourly wage. The matter of "hours" in Germany is less a matter of law than of unfilled orders in the shops.

Germany's Share in World Production

According to a monograph on the world's engineering industries published at the International Economic Conference at Geneva in 1927, Germany claims to have built about 21 per cent of the total world output of machinery in 1913, compared on a basis of value, while Great Britain built 12 per cent; and the United States, 50 per cent. Reducing 1925 values to pre-war levels, Germany claims that in that year she built only about 13 per cent of the world's output of machinery, with Great Britain and the United States building 14 and 58 per cent respectively.

Germany claimed in 1925 to have manufacturing capacity sufficient to turn out $1,200,000,000 worth of machinery annually and that its factories were about 70 per cent active. These German statistics gave the United States capacity at $4,000,000,000 and set Great Britain at $825,000,000 annually, with the capacity of the entire world at $7,000,000,000. Of the world's exports of machinery in 1913 Germany supplied 29 per cent, Great Britain 28 per cent and the United States 27 per cent, according to the monograph. Based on pre-war values, the United States supplied 34 per cent, Great Britain, 24 per cent, and Germany, 21 per cent of the total world exports in 1925.

German and American Industries Compared

As shown in the accompanying table, Germany employs 21 per cent more persons in its machinery factories than does the United States, but each man has only 1.04 hp. furnished to him, as compared with 3.38 hp. per employee in the United States. Largely for this reason, the American workman produces $4,640 worth of machinery per year, or over four times that of his German colleague.

The relative importance of export markets to the United States and to Germany is shown by the fact that foreign shipments represented only 6.7 per cent of American production as compared with 39 per cent for Germany. The machinery trade from and to Germany in 1926 gave an excess of exports over imports amounting to 706,000,000 marks, which is one-eighth of the total excess exports of that year for all important manufactured commodities which showed an export surplus. Furthermore, it is one-eighth of the total net importation of foodstuffs and raw materials which Germany brought in.

Power Transmission Association Holds First Regional Meeting

The first of a series of regional meetings of the Power Transmission Association was held at the Poor Richard Club, Philadelphia, Feb. 3. The attendance was in excess of 100 and included manufacturers, distributers, engineers and salesmen of mechanical power transmission equipment.

W. H. Fisher, vice-president of the T. B. Woods Sons Co., Chambersburg, Pa., and president of the association, presided at the meeting. The general object of these regional conferences, the next of which will be held in Chicago, is to acquaint members of the industry with the purposes and scope of the association, which aims to promote the most efficient and economical distribution of power. It is planned to collect and disseminate data that will be helpful to representatives of the industry in cooperating with the users of power transmission equipment in selecting the most efficient method of drive. It was explained that the association is committed to "the right drive in the right place."

T. E. Hazell, vice-president of the William H. Taylor Co., Allentown, Pa., and member of the association's dealer relations committee, in an address following that of Mr. Wood, pointed out that the association would fill a long-felt want in providing the necessary supplementary consulting engineering and technical service for distributers and dealers. The association would provide a place to which salesmen could refer special problems and secure the experience of users and the recommendations of engineers, he said.

At the annual meeting of the association in New York, Dec. 7, an advertising program to acquaint the users of power equipment with the purposes of the association was suggested, the advertising space to be appropriated for the association from the member's schedules. Roy C. Moore, Charles A. Schieren Co., New York, chairman of the advertising committee, explained the progress made and predicted that the program adopted would prove to be an outstanding example of coordinated and cooperative advertising, of high value to the association and to each member company contributing use of its space.

Charles E. Carpenter, E. F. Houghton & Co., Philadelphia, emphasized the value of the opportunity afforded by the association in showing the place of the products of its members in the equipment of programs of plants throughout the country. Other speakers included L. H. Shingle, Shingle-Gibb Leather Co., Philadelphia; W. A. Staniar, engineer of the Du Pont companies, Wilmington, Del., and chairman of the association's board of advisory engineers, and W. S. Hays, executive secretary of the association.

At a meeting of the executive committee nine regional chairmen or team captains were named to head an "every member get a member" drive. Edward H. Ball, president, Chicago Belting Co., Chicago, is general chairman. The regional chairmen are: H. E. Whiting, Whiting Leather & Belting Co., Long Island City, N. Y.; Charles M. Murray, Transmission Ball Bearing Co., Buffalo; Stiles C. Smith, Smith Power Transmission Co., Cleveland; D. I. Wheeler, Whitney Mfg. Co., Hartford; F. H. Willard, Graton & Knight Co., Worcester; A. G. Snider, Hide Leather & Belting Co., Indianapolis; H. J. Heasley, G. W. Sadler Belting Co., Montreal, Canada; J. E. Henry, Medart Co., St. Louis, and H. P. Degen, H. P. Degen Belting Co., San Francisco.

Employment Off During January in Illinois—Improvement Looked For

Employment in Illinois dropped 2.1 per cent during January and reached the lowest level since the war, according to a report recently issued by the State Department of Labor. Immediate prospects in metal and wood industries, as well as in other industries, notably iron foundries and printing trades, indicate a general industrial improvement in February, according to the report. Automobile establishments reported a gain of 2.6 per cent. In sheet-metal and electrical products establishments the course of employment was downward during January.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output (adjusted) increased with unusual sharpness in January and probably will continue upward for a time.

Unfilled orders showed a smaller increase than in December, and less than the gain in ingot production.

Pig iron production advanced to normal, making a smaller gain than ingot output and early price recovery may be expected.

Finished steel prices, still too low for a proper relation with their raw materials, advanced during the month to a better position.

IN general, the impression to be gained from an examination of the steel statistics this month is that of the "scared bull." The trend is favorable, as we had anticipated it would be at this time. But conditions are not altogether conducive to a sustained improvement in the industry. Production appears to be well up with requirements, and is large enough to arouse doubts as to any large advance in prices. The question is being asked, are the consumers not taking more steel than they actually require?

This is at least a reasonable question, in view of the fact that ingot production is in excess of theoretical normal requirements and the further fact that prices have been suspiciously slow in advancing when compared with the sharp gains in unfilled orders and in the volume of production. It may well be asked why prices are so low. And the answer must be that either the supply, including stocks, is large, or the demand is small, or both conditions are true. Consumers have thus far merely shown a willingness to take a large quantity—at a low price.

Ingot Output Jumps Above Normal

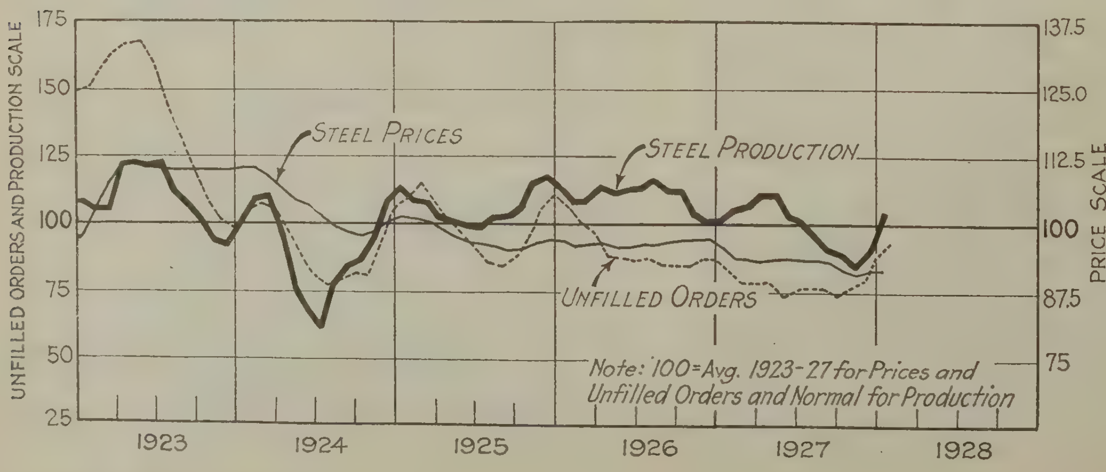
STEEL ingot production was sharply upward in January. Not only did it rise more than usual for the season, but enough to carry the average daily production from 10 per cent below normal to nearly 5 per cent above normal. The only comparable gains in recent years have been in August, 1924, and April, 1923. Nothing approaching it has appeared in January.

Our adjusted index of ingot production, allowing for normal growth and for seasonal variation, is 104.7 per cent of normal, against 89.8 per cent in December and 101.5 per cent in January, 1927. It is thus not only higher than a year ago, but represents the highest annual rate of ingot production that has existed since last May. Such expansion rarely occurs except under one or two circumstances: (1) at the beginning of a period of sustained recovery (as in 1922 and 1924), or (2) near the end of a recovery (as in April, 1923, December, 1924, and November, 1925).

It is significant as to the present case that the expansion starts from a sub-normal point, as to both steel production and activity in most of the chief consuming industries, notably in the automobile, railroad and mining branches. Naturally, this suggests that the recovery is not a mere final spasm at the peak of a business boom. On the other hand, it carries production in one leap above normal and, as shown last week in this department, above the indicated level of the potential requirements of the chief consuming industries. Accordingly, some doubt may well exist as to the continuance of the upward movement for any prolonged period.

Some light on the question might be expected from the condition of unfilled orders. If unfilled orders were large and continually rising, production might easily continue to expand. Unfilled orders are rising (or have been rising), but they are not yet large, and the January increase was less than that which occurred in December. The production curve gained on the unfilled orders curve. Thus we are left in doubt.

The price situation is the result of demand and supply conditions, and as we know something about supply we may infer something about demand. The price trend is slightly upward. At this writing THE IRON AGE index of finished steel prices is 2.364c. The average for January was 2.32c., which compares with 2.31c. in December and 2.30c. in November. The January average is 91.6 per cent of the average for the five years 1923-1927. This appears to be but a halting response to the rise in the unfilled orders. Moreover,



Note: 100=Avg. 1923-27 for Prices and Unfilled Orders and Normal for Production

Fig. 1—Steel Production Increased More Sharply in January Than in Some Years. Prices, after sagging for months, have turned upward. Unfilled orders have made two substantial monthly gains

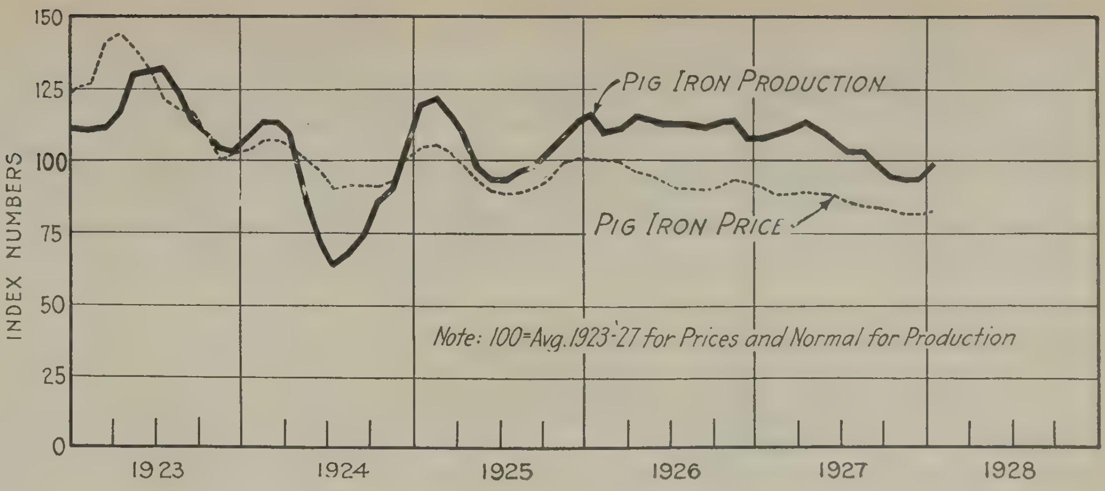


Fig. 2—Good Recovery in Output of Pig Iron May Presage an Approaching Advancement in Prices. But weakness in fuel and scrap may retard the recovery

it shows that producers are willing to expand production in spite of a low price level. There is no indication of much gain in the intensity of demand. Again we are left in doubt.

Normal Output of Pig Iron

PIG iron production increased approximately to the normal level last month. After falling to 93.2 per cent of normal in November, it rose to 99.7 per cent in January. These figures allow for both seasonal variation and a conservatively determined factor of normal growth. Thus it may be noted that, in spite of a considerable recession in industry, the pig iron output was reduced only to 7 per cent below estimated normal, and continued below normal only four months.

As usual, the price of pig iron has rather closely followed the direction of the production curve. At this writing, THE IRON AGE composite is $17.75. The average for January was $17.65, which compares with $17.54 in December, the low month. The January average was 82.5 per cent of the average for the five years 1923-1927. It will be remembered that finished steel prices were 91.6 per cent of the five-year average. (Also, steel production was more sharply curtailed than was the pig iron output, and it fell further below normal.)

Thus it can be said that pig iron has suffered more over-production and greater price weakness than has steel. But it can also be said that pig iron production expanded less rapidly than steel production in January. In fact, the ratio of pig iron production to steel production fell with unusual sharpness in that month. Considering the trend of the steel markets, this circumstance is favorable to higher pig iron prices. And it seems likely that, in spite of some unfavorable conditions, prices will move higher during the next month or two. The advance, however, will certainly be moderated by the weakness in fuel and in steel scrap.

One might *guess* that the average daily production of pig iron may run up to about 105,000 tons in February, and possibly to around 111,000 tons in March, attended by moderately stronger prices, but it would be too daring to try to look beyond that point.

Finished Steel Prices Slightly Higher

THE outstanding change in the iron and steel price structure during January was the higher level of finished steel. Sheets, nails and bars were all higher, as appears in the third chart. The fact appears to be that prevailing prices at the end of 1927 were much too low, and that they have been marked up a little on this account rather than through the urgency of demand. They are still by no means high and are probably not high enough to give an adequate profit to the average manufacturer.

Almost equally notable are the continued stability in the price of semi-finished steel, the inability of scrap to make progress on the upside, and the weakness of fuel.

A third fact is the existence of some independent strength in the pig iron market, which is advancing much as we had forecast. The gain here is apparently due chiefly to the relatively great expansion in steelmaking requirements, which obviously tends to reduce the supply in the merchant markets. Several large melters, including a leading radiator company, have

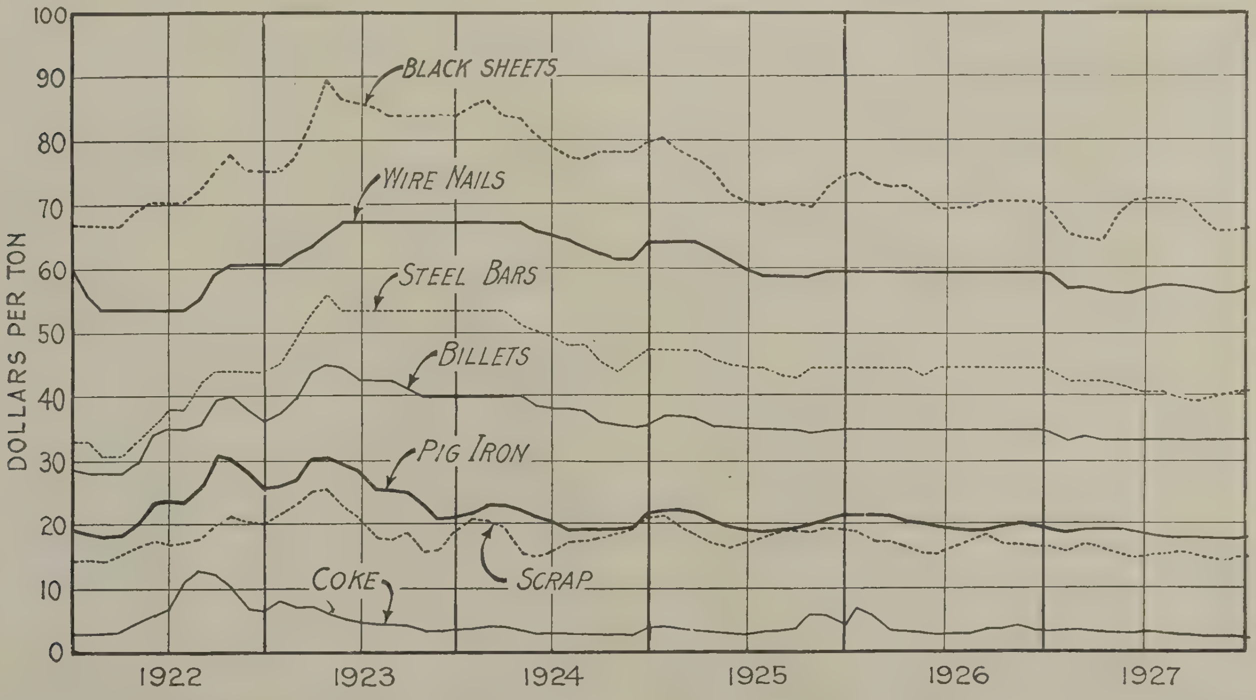


Fig. 3—Finished Steel Prices (in Particular, Sheets, Nails and Bars) Made an Advance, Putting Them into Better Position with Regard to Semi-Finished and Raw Materials. Readjustment of the price structure may be sustained if it stands the test of second-quarter buying

therefore covered their requirements for the second quarter. This at least shows that there is fair activity in the radiator, pipe and foundry business.

Our general impressions are that there is a certain lack of spontaneity in the prices of finished steel. Ingot production has been rapidly expanded and is above normal, while the price of steel shows no particular strength. Fuel is abundant and cheap. The same may be said of steel scrap. In recognition of the fact that pig iron prices could be forced no lower, and that no declines were to be expected in the first quarter, the pig iron markets have shown some strength.

It seems that finished steel prices have been pushed up from beneath, as the result of low margins of profit and some reduction in the resistance by consumers. Not until finished steel prices stand the test of second-quarter buying, however, can we be sure that a sustained recovery is in process. We find unusual difficulty in arriving at any conclusion, aside from the opinion that pig iron will probably show further advances.

ATTACKS CARTEL IDEA

Assistant to Attorney General Commends Anti-Trust Laws—Cites Existing Check on Foreign Competition

WASHINGTON, Feb. 20.—The policy of American law as it relates to industrial combinations is based upon the principle of competition, including equal opportunity, maintenance of individual initiative, freedom from Government regulations and absence of power to control prices or allot territory or customers, and differs sharply from the Continental European theory, Col. William J. Donovan, assistant to the attorney general, told the American Chemical Industry conference here on Thursday of last week. Speaking on "Foreign Cartels and American Industry," Colonel Donovan entirely discouraged the idea of those who, he said, have been urging amendment of the anti-trust laws so that American combinations similar to European combinations may be developed in order to meet more effectively threatened competition from abroad.

"It would seem that those who urge such amendments to our laws—amendments permitting combinations in industry resulting in monopoly—forget the historical, inevitable result of such a tendency," it was declared. "It would mean that the people of this country would not permit monopolistic power to go unregulated. If your industry is permitted to attain that extent of combination which results in elimination of competition, the people of the country, for their own protection, would insist that there should be greater Governmental supervision and control. So that those among you who, because of fear of foreign competition, grow panicky and urge what is in effect a surrender to the Continental principle of trade ought to pause and consider whether or not there is not greater opportunity for more effective and unhampered development of your industry under our existing laws."

Colonel Donovan then explained the means this Government has to protect American industry against a foreign monopoly which comes into this country and by collusion with citizens of the United States enters into agreements for the restraint of trade and enhancement of prices. The basis for his contention is found in the anti-trust provisions of the Wilson tariff act of 1894, which was never invoked until two years ago and was not passed on by the Supreme Court until last year, he said. The act provides that every contract between two or more persons or corporations, either of whom is engaged in importing, is illegal and void if it is intended to operate in restraint of trade or designed to increase the market prices in the United States of any article imported or intended to be imported. This act was held by Colonel Donovan to constitute a measure of protection against the illegal activities of foreign trusts in American jurisdiction.

Legalization of Combinations to Buy Foreign Raw Materials Proposed

Touching on affirmative measures to foster American foreign trade, he mentioned the Webb-Pomerene act permitting consolidations of domestic interests for exportation of their products and he also mentioned the proposed amendment to that act which would permit similar combinations for purposes of importing raw materials. He declared that it is quite clear that Congress contemplates the enactment of constructive legislation, not only to protect American industry from unwarranted attacks from abroad, but to enable American industry to have a fair opportunity of meeting foreign competition in neutral markets.

"But all statutes and all the aid that Governmental departments may give are of no avail unless there is an intelligent conduct of business itself," said Colonel Donovan. "There are those who believe that the principle of competition means that a premium is placed on drastic and destructive competition; but the law itself has recognized that destructive competition is of no benefit, even to the consumer. Cooperation in industry is not forbidden. It has been pointed out by the Supreme Court that the Sherman law did not intend to place a penalty upon intelligence in business. A manufacturer is entitled to exercise the business virtues which are based upon a knowledge of actual conditions."

Scope of Trade Association Activity Defined

Pointing out that the true course of conduct for trade associations has been laid down by certain decisions of the Supreme Court, Colonel Donovan explained that it is clear under those decisions that associations of competitors in any particular line of commerce which have solely for their purpose the collection and dissemination of statistical information as to the exact existing conditions and past transactions do not violate the anti-trust laws.

"It is only where the collection and dissemination of information and its subsequent discussion leads to agreements as to prices, customers or allocation of territory that the entire combination falls within the provisions of the Sherman law," it was declared, "and such conduct is forbidden for the very reason that persons and concerns agreeing to the imposition of arbitrary conditions must always submit themselves to the will of others."

Better Distribution Essential to Prosperity—Dr. Julius Klein

In speaking on "Factors in Profitable Prosperity," Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, declared that two factors essential to prosperity are the most rigorous scrutiny of the costs and wastes of distribution and the fullest exploitation of foreign markets. The matter of better distribution, he stated, in spite of the increasing publicity that has been given to the problem, is still evidently in need of much further analysis and exploitation.

He cited different examples showing progress made in waste elimination and production and pointed out that the value of American manufactured products increased from 1923 to 1925 by not less than $2,500,000,000 and that meanwhile there was a decrease of some 400,000 employees. He said this fact has created some alarm lest there would be a great amount of unemployment, but explained that those leaving the manufacturing lines as the result of greater output per man due to improved machinery, increased efficiency, etc., have gone into non-manufacturing pursuits. He said that the net increase of employment and servicing functions, which, after all, are the direct and immediate outcome of greater production, has more than taken up the slack created by any curtailment in manufacturing payrolls.

One means of eliminating waste in distribution urged by Doctor Klein was a better understanding of markets with a view to concentrating upon them rather than trying to spread out to sparse markets, with high costs of delivery and other obstacles to efficiency and profits in industry.

Blast Furnace Practice in Europe

Outstanding Paper Before Furnace and Coke Association—Round Table Discussions on Other Topics Bring Out Sharp Differences

MEETINGS of the Eastern States Blast Furnace and Coke Oven Association usually are productive of interesting discussions of matters pertaining to blast furnace and coke oven operations, and it rarely happens that something of outstanding interest fails to get before these assemblages. At the fall meeting of the association, held at the Shannopin Country Club, Ben Avon, Pa., it was an intimate picture of a blast furnace capable of producing 1000 tons daily and which, in a run of 45 days, actually averaged 903 tons daily.

At the mid-winter meeting held Feb. 17 at the William Penn Hotel, Pittsburgh, it was a paper on "Blast Furnace Practice in Europe," by F. H. Willcox, vice-president Freyn Engineering Co., Chicago. In detailing his personal observations, on an extended tour of blast furnaces and steel works in Germany, France and Luxemburg, Mr. Willcox touched upon a subject that has been freely discussed when blast furnace men have met. For several months word has been coming from Germany of the wonderful production records of blast furnaces there. It has been said that, in furnaces of what would be called small hearth diameters on this side of the water, there have been daily outputs of 800 to 900 tons, while in 16-ft. hearth furnaces as much as 1100 and 1200 tons daily has been made.

How the Germans Obtain High Output

Mr. Willcox, whose paper will be published later, gave the details of the ore mixtures and other reasons making these performances possible. The German iron makers are favored by being able to draw upon a wide variety of ores. By sintering fine ores and carefully charging coarse and fine ores in layers, they obtain an open burden which is easily reduced without recourse to high blast pressure or excessive use of coke. He said that there is a close similarity between the ore practice of German furnaces and those in the eastern part of the United States. Coke is not so carefully prepared as on this side of the water, and is not of such good quality, as Ruhr coal does not make a good coke, but it is strong in structure and does not break up. Scrap is not heavily used.

Touching on construction of the furnaces and the bin systems, Mr. Willcox noted that in many respects the German furnaces are heavier than American stacks, but lighter in others, while on account of the distance from receiving ports, the bins are large enough to carry stocks sufficient for several months. The bins are used for storage purposes, there being a complete absence of ore storage yards served by ore bridges. Charging is done by three or four men and there usually are four or five scale-car tracks. There has been considerable grief in the use of two stoves for the hot blast, although the stoves have considerably larger heating surfaces than American stoves.

He said that German success cannot be ascribed to any single cause, but rather is traceable to a combination of causes. He argued that American furnace men, doing their own thinking and not being too greatly influenced by German practices, can accomplish as great success in getting out tonnage as has been achieved abroad. Mr. Willcox said that in England the effect of the coal strike of a year ago has not worn off and that, accordingly, blast furnace and industrial progress is less marked there than on the Continent.

Round-Table Discussions Animated

Following out the plan inaugurated at the fall meeting, the program for the mid-winter meeting was divided into separate round-table discussions of blast furnace and coke oven subjects during the morning, with a joint meeting in the afternoon. For scope of discussions, the meeting set new high standards. Haakon A. Berg, vice-president A. G. McKee Co., Cleveland, presided at the blast furnace meeting, and H. P. Zeller, vice-president Donner-Hanna Coke Corporation, Buffalo, was chairman of the coke oven meeting. E. T. McCleary, vice-president Youngstown Sheet & Tube Co., Youngstown, was in charge of the afternoon session. C. R. Meissner, superintendent coke plant, Weirton Steel Co., Weirton, W. Va., and president of the association, presided at the dinner in the evening. There was a registration of 175.

Recent developments in gas cleaning; use of high blast temperature; relation between size of large bell and stock line diameter and its bearing on flue dust losses and what there was in pig iron, not revealed by present methods of analysis, that causes trouble in steel plants were freely discussed at the blast furnace meeting. At the joint session in the afternoon, which proved an exceedingly interesting one, coal, coke and refractories came in for a major part of the discussion. Whether zinc in refractories is a cause of their disintegration was the occasion of a real debate, with William A. Haven, superintendent northern furnaces, Republic Iron & Steel Co., taking the affirmative, and Dr. John S. Unger, Carnegie Steel Co., Pittsburgh, the negative.

Dry Cleaning of Gas Desirable

There was much discussion at the blast furnace round table of the vortex eliminator and dust catcher, which was said to be capable of taking 90 per cent of the dust out of gas running 26 grains per cubic foot of raw gas. H. S. Braman, Youngstown Sheet & Tube Co., Youngstown, gave the figures on gas cleaning at two furnaces at the Campbell works, using Kennedy whirlers as the activating units. On one furnace, 65.23 per cent of the dust was caught in the catcher, 26.11 per cent in the whirlers and 8.64 per cent in the washer and delivered to the sump. In the second furnace, on a month's observation, 70.1 per cent was caught in the catchers, 28.5 per cent in the whirlers and 1.3 per cent taken out by the washer. Dry cleaning of gas was generally admitted as desirable, because the higher percentage of dust removed dry made the washer correspondingly more efficient.

Discussion of high blast temperature brought out some difference of opinion. While several reported success with present day burdens at 1400, 1500 and 1600 deg. Fahr., it was also indicated that best success would come only when the burdens could be opened up. Eastern furnace men indicated particular success with high blasts through the use of sintered magnetic ores.

Speakers held that the small bell was too extensively blamed for some of the troubles of other years, and that now the trend is back to the small bell and to an enlarging of the stock line. A bell with a 2-ft. clearance, and the keeping of the fine ores against the brickwork, are now considered standard.

Coal and Refractory Topics

Dry cleaning of coal was described and compared with wet washing, by Mr. Affelder, Hillman Coal & Coke Co., at the joint afternoon meeting. Discussion of the melting point of coke brought out that the best coke usually results from coals of closely similar melting points. The question of the qualities of coke required for foundry and mill iron was pretty well answered by Mr. Affelder, who said that it would have to be a coke which would offset the impurities of the furnace lining, correct the ores and fluxes, offset the weather and climatic conditions, which would be flexible in cell structure and porosity and would produce a ton of pig iron on a smaller amount than, it is alleged, is being used.

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This Issue in Brief

Production control board tells at a glance the amount of work before every production machine for months in advance. Length of colored planning card indicates the number of hours the job will take.—Page 521.

Cuts costs 25 per cent by handling materials on roller and belt conveyors. Moderate-sized plant discovers it can utilize to excellent advantage mechanical handling methods employed by large mass production shops.—Page 525.

Foundry solves problem of handling molds in limited space by mounting a swinging jib crane on a pipe column erected in place of a wooden building column. The crane swings in a complete circle, serving one-half of two bays and handling molds from two machines.—Page 530.

Production delays due to tardiness in making tool set-ups are avoided by having department foreman furnish tool room, at least three hours ahead of time, with a control card showing just what set-up will be required. Tools are delivered to the department in a metal basket at least one hour before needed.—Page 522.

You can have too many shop rules. Attempting to govern the conduct of workmen in petty and inconsequential matters has an effect opposite to that desired. It is well to avoid unnecessary limitations on the freedom or initiative of the employee.—Page 552.

Pig iron price advance during the next month or two seems likely, says Dr. Haney. However, the advance will certainly be moderated by the weakness in fuel and steel scrap, he indicates.—Page 545.

Foremen are kept on important supervisory work by being relieved of the necessity of following up jobs going through department. Each foreman has a set of machine schedule cards showing just what is scheduled for each machine for two weeks in advance. These cards are checked by a clerk from the production control office, who reports delays and investigates their cause.—Page 524.

Departure from one-price policy inevitably leads to failure, says association head. Price-cutting is contrary to the interest of the buyer, for the ultimate result is inferior quality and inadequate service.—Page 531.

Fatigue failure of metals is promoted by non-metallic inclusions. Boundary between the inclusion and the metal is the path often followed by the fatigue crack, metallurgist declares.—Page 533.

Magnet steel can be reduced two-thirds in weight, without reducing the coercive force, by using a steel containing cobalt. But the high cost of this steel restricts its use to special applications.—Page 534.

High skill is required in molding chrome iron castings. Operations must be adjusted so that the alloy will not burn or cut into the sand.—Page 535.

Germans obtain high iron output from relatively moderate-size blast furnaces. As much as 1100 to 1200 tons daily is produced from a 16-ft. hearth furnace. Ability to draw upon a wide variety of ores is partly the reason.—Page 547.

Predicts wide use of nitrification to provide a superior degree of corrosion resistance to ordinary carbon steels. Metallurgist also declares that alloy steels, covered with mill scale, may be given a hard and useful case by nitrogen.—Page 538.

Cut your selling costs by confining your efforts to profitable markets. Spreading out into sparse territory promotes waste in distribution, says Dr. Klein. —Page 546.

Discourages idea of American cartels to meet threatened foreign competition. Monopoly would only result in greater Government supervision and control, says assistant to Attorney General.—Page 546.

Ammonia-hardening produces a superior case in aluminum steel containing about one-quarter per cent molybdenum, and low chromium. Brittleness at moderate temperatures is avoided, and the steel shows high resistance to abrasion.—Page 538.

Trade associations will not fall afoul of the Sherman law if they confine themselves to collecting and disseminating statistical information as to "exact existing conditions and past transactions," says Government official. They violate the law only when discussion leads to agreements as to prices, customers or allocation of territory.—Page 546.

Is instalment buying contributing heavily to the high cost of distribution? With the common citizen paying 27 per cent for money borrowed from a finance corporation, the present system of instalment buying seems wasteful.—Page 550.

ESTABLISHED 1855

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Cost of Instalment Selling

PROF. EDWIN R. A. SELIGMAN of Columbia University has written a pair of persuasive books on instalment selling, and in common phrase "gives it a clean bill of health." That is, except for a few minor and correctable abuses. On the whole, he feels that the instalment buyer gets value received for the premium he pays over the cash price, while the credit extended, both in nature and in volume, does not constitute a menace to our present banking and business system.

One hesitates to dispute so eminent an authority, but there is one aspect of instalment selling which seems so distinctly uneconomic that it is worthy of more detailed consideration. We refer to the great spread in cost of money to the commercial bank and to the instalment buyer. When John, Jerry or Henry deposits his money, the bank pays him 3 to 4 per cent for it. When John, Jerry or Henry borrows money from a finance corporation, which borrows it from a bank, he pays 27 per cent for it. In other words, the common citizen pays 24 per cent for the privilege of using his own money!

This statement may be thought to require a deal of qualification, but is it not essentially sound? The finance corporation which advances the money covering the unpaid balance on a purchase, which in turn enables the dealer to pay for his cars or refrigerators or oil burners or radios promptly, and thereby enables the maker to manufacture some more for a new wave of instalment purchases—that finance company must get the money somewhere. It has some capital stock paid in, and can get direct loans from banks on its own credit to about five times that sum, but this is nowhere near enough. It replenishes its coffers by discounting its receivables (that is, the promises to pay future instalments signed by John, Jerry and Henry) with friendly banks direct, or with a bank through some middleman, such as a larger finance company, a broker or a bonding company. When this does not procure all the money required, or the cost mounts too high, the finance company turns over its receivables (promises to pay signed by John, Jerry and Henry) to a trust, and the trust sells short time notes, based on a constantly recurring supply of such receivables, to a bank or to the public at margins varying from 1 to 20 per cent.

This outline of the financial story emphasizes one thing: that in general the only assets which a finance company can pledge are the notes signed by the purchaser on instalments—that is, by citizens generally. The only way the finance company can get money for these assets is to sell them back to the public, either direct or through the banks (which are the depositories of that self-same public's funds and credit).

In other words, a highly complex and expensive organization has been set up to enable the common citizen to borrow his own money, and to insure him against his own recklessness either in buying or using a modish luxury, convenience or necessity.

To the extent that such an expensive intermediary may be replaced by a simpler and more direct method of financing consumers' goods, the present system of instalment buying is wasteful. The suspicion will not down that this waste, this expensive step in distribution, is taking too great a share, or relieving the citizen (for a price) of common responsibility and caution in his spending or using.

Automobile vs. Steel Profits

COMPARISONS of the large profits of some of the automobile companies with the relatively small earnings of the steel companies have been commonly made during the past year. Now comes the annual report for 1927 of the General Motors Corporation, showing profits of $235,104,826 available for dividends as against $87,845,456 made last year by the United States Steel Corporation, whose capital structure is comparable in size with that of General Motors.

It has often been said that many of the steel companies have given away profits in the form of price concessions on purchases of steel by automobile companies, but this in no wise explains the enormous profits of the General Motors Corporation. Last year the automobile industry as a whole is credited with consuming nearly three and a half million tons of finished steel. If we assume that the General Motors Corporation not only paid an average of $5 a ton more for its steel than it actually paid (which perhaps would have been a profitable level for the steel companies) and an additional sum equal to $5 a ton for every ton of steel bought by other automobile companies, the total to be deducted from its profits would have been less than $17,500,000. Thus more than $200,000,000 of its profits would still have to be accounted for in other ways.

Of course, the above statement does not adequately measure the cost to the steel industry of its concessions on automobile steel, if it be assumed that a low general level of selling prices on steel is brought about in many instances by the pressure that automobile companies are able to exert by reason of their large requirements.

Fluctuating Commodity Prices

THE Bureau of Labor's index number of commodity prices at wholesale is announced at 96.3 for January, against 96.8 for December and 96.2 for January, 1927. The outstanding feature of the showing is not the steadiness in prices, which will be loosely referred to in many quarters, but the serious dangers lurking in averages. From January, 1927, to January, 1928, there is a decrease of only three-tenths of one per cent in the "average." This is an index carefully weighted according to production shown by the last census, and it is quite up to date, as all figures have been recomputed with 1926 prices as base or 100, the old system, with 1913 as base, having been abandoned after August, 1927. There is no doubt that when the general index number is unchanged the general purchasing power of the dollar is not materially changed, and that for a given volume of commodity turnover the dollar turnover is not materially changed.

But various producers have good reason to ask: "What do we get out of that?" Among such producers are those whose products are listed below, with the percentage decrease that occurred from one January to the next, computed from the Bureau of Labor's own figures:

	Per Cent Decrease
Bituminous coal	6.7
Coke	11.8
Petroleum products	29.4
Iron and steel	5.3
Non-ferrous metals	3.3
Building materials	6.9

It is the reverse of comfort to these producers to learn that others are securing higher prices for their goods. They cannot nourish any hope that because other things cost more the public will buy more of their goods now that they are cheaper.

An unevenly divided prosperity does few people much good, perhaps none in the long run. Certainly it is vastly inferior to a uniformly distributed prosperity. There has been much talk about sustained buying power. The total buying power is the thing and if it is impaired in big spots something is not right.

This showing furnishes food for thought. We must not be deluded by averages. The laborer is worthy of his hire and conditions should be sought which will assist all producers to secure decent prices.

Group Progress and the Business Press

INDIVIDUALISM in industry is steadily giving way to group effort. Time was when every manufacturer regarded competitors with suspicion and jealously guarded his secrets from prying eyes. In his self esteem he did not credit others with the ability to develop equally good ideas. Today the same self-confidence helps to explain a radical change in attitude. A keen foreign observer recently quoted an American foundryman as follows: "Why shouldn't I let a competitor visit my plant? If I do not learn more from him than he gets from me, I am to blame."

The old saying that "two heads are better than one" finally is being taken seriously. There is a constant pooling of ideas both in informal conferences and in the meetings of organized associations. It is realized that there are mutual advantages in a policy of give and take; it is clearly seen that progress is expedited if many minds work collectively for the solution of business problems. Yet it is only beginning to dawn on some that the group mind of an industry functions most effectively in the business paper.

Such a publication is not merely a newspaper. It collects the diverse ideas of many individuals, and sifts, assembles and organizes them, returning them to industry in the most usable form.

There may be journals that lead an industry and others that follow it, but the trade publication is of greatest value as the best available means for collective expression. An industry serves the common welfare and thus justifies its existence only as it learns more, and makes practical use of what it learns, about its technical and economic problems. The business paper, in both its advertising and editorial pages, is a stimulus to all to contribute to, as well as to partake of, the latest, best conceived and most useful ideas of their industry.

The Short-Term Buying Regime

MARKET factors now appear to be at work that are leading away from the extremely close-range buying which for so long has been the policy of manufacturing consumers of steel. For the most part the change may be attributed to the advancing tendency of the market, due to the emphasis the producers are putting upon the folly of cutting prices to increase operation.

There have also been some efforts to discourage small-lot business by increasing quantity extras, as on hot-rolled and cold-finished bars, or by establishing separate higher base prices for smaller lots, as in the case of cold-rolled strip steel. But, as a general thing, mills have adjusted their operative organizations to a regime of many small orders and specifications and they are not releasing their hold on a business gained and held through special efforts to give the service demanded. Although order books are well filled and specifications entered at some mills indicate delivery periods running into weeks, the small-tonnage buyer obtains and can still expect deliveries from mills that compare favorably with those of six months or a year ago.

If, in the early days of close-range buying, railroads were charged with failure in the matter of delivery, it was due in large measure to two factors: lack of cooperation among carriers entering competitive territory, and the slowness and uncertainty of package freight delivery due to the desire to concentrate on carload shipments, which net the largest return in revenue. It remained for agencies outside of buyer, seller or railroads to bring about cooperation so that package freight, and for that matter consignments by express, move to the principal centers of distribution with few transfers and with a minimum of delay.

This work has been undertaken by commerce associations in many of the large production centers. As an example, there are now moving daily out of Chicago 3000 merchandise freight cars, sealed and routed to 1800 points of distribution. The associations offer assistance to shippers in routing consignments and they invite the cooperation of railroads in competitive territory by distributing merchandise cars to the several carriers entering a given center.

Service rendered is the keynote of the situation. Railroad transportation facilities and methods are vastly improved. Hard roads have extended movement by trucks. Small orders, on which unusual dispatch is required, are now forwarded by air transport. In fact, all agencies interested have made such a thorough job of meeting market conditions as they have existed in the last few years that it would take a prolonged upward movement in prices to cause any considerable departure from the policy of short-time buying.

Coal Stocks and Consumption

A CURIOUS outcome of the failure of the bituminous coal strike of last April is that stocks at the beginning of this year were unusually large. Coal in the open market was so cheap during the months expected to constitute the strike period that holders of stocks were loath to draw upon them, feeling that they had best take advantage of the bargains continually offered.

The Bureau of Mines in a report dated Feb. 9 gives the stocks at the beginning of this year, with the usual comparisons. For a total of forty-eight dates in the past thirteen years the figures represent the stocks, either ascertained or estimated, in the hands of commercial consumers. Stocks on Jan. 1 for each recent year except 1925, are as follows:

Jan. 1	Stocks of Bituminous Coal, Net Tons
1922	48,000,000
1923	36,000,000
1924	62,000,000
1926	49,000,000
1927	55,000,000
1928	55,500,000

Even three months before the strike of April 1, 1922, there were rather large stocks and these increased to 63,000,000 tons, as a minimum estimate, on the strike date. Although resumption came late in August the stocks at the end of the year were down by 27,000,000 tons to 36,000,000 tons.

Preparation for the 1927 strike came earlier, there being 7,000,000 tons more stock on Jan. 1, 1927, than on Jan. 1, 1922, and only the accumulation of the first three months of 1927 was liquidated during the remainder of the year. The bare figures show a half-million ton increase in the year as a whole. The April 1, 1927, stocks are given at 75,000,000 tons.

The Bureau of Mines estimate of consumption during the last three months of last year is remarkably low. The estimates are based upon production, with allowances for imports, exports and changes in stocks. Apparent consumption is given as follows:

Weekly Consumption, Last Three Months of Year, Net Tons

1923	10,080,000
1926	11,200,000
1927	9,912,000

Thus consumption in the last quarter is made 11½ per cent less than in the quarter a year previous and even a trifle under consumption in the last quarter of 1923. In a four-year interval one may count upon increasing efficiency in using coal to cover an increase in trade activity without more coal being needed, but some may doubt the decrease shown from 1926 to 1927.

Production of coal since the first of this year has been well under that in the same period of any recent year. Clearly there is no chance of demand being such as to relieve the coal industry from its present deplorable condition. The proposed Senate investigation will meet a very big subject.

How to Get Zest in Work

THE intangibles in industrial relations are frequently overlooked. This is not surprising in view of what has been accomplished through the mechanization of industry and the adoption of mechanistic systems of management. Good results are obviously obtainable from various applications of the principles of scientific management, but there is too little recognition of the human phase of the plant operation. The human side of industrial relations, however, does not mean maudlin expressions of good will toward employees or excessive outlays for "welfare" work. It implies, rather, a knowledge of human nature and the possibilities of capitalizing that knowledge.

A certain amount of discipline is essential in every plant. Improved ways of performing different operations, as disclosed by time and motion studies, are cheerfully accepted by workmen when tactfully approached. Even highly specialized tasks are regarded as unavoidable in shops engaged in mass production. But the average employee resents unnecessary limitations on his freedom or initiative.

In plants where rules govern the conduct of workmen even in petty and inconsequential matters, and where the management takes the view that eternal vigilance and constant driving are the price of satisfactory production, there can be no zest or spirit in workmanship and no pride of accomplishment. "When zest departs," said Owen D. Young in a Harvard address last year, "labor becomes drudgery. . . . Zest is partly a matter of physical condition, but it is also largely influenced by mental reactions."

Zest in workmanship is primarily dependent on the general atmosphere in a given plant. While it may be encouraged by better foremanship, it depends mainly on the attitude of the managing heads of the organization. A slave driver gets the production of slaves. Management that recognizes the psychology of freedom-loving men and women reaps its reward in the intelligence and zest with which they perform their tasks.

To Organize Pressed Metal Association According to Group Interests

Preliminary steps toward the organization of an association of pressed metal manufacturers were taken at a recent meeting at Cleveland. A meeting to consider the adoption of a permanent form of organization will be held at the Cleveland Athletic Club, Cleveland, on Feb. 28, as reported in THE IRON AGE of Feb. 16. Those who were present at the preliminary conference were:

F. H. Seither, treasurer Defiance Pressed Steel Co., Defiance, Ohio.
G. F. Conway, vice-president and treasurer Lansing Stamping Co., Lansing, Mich.
J. Bingham, president, and W. H. Schomburg, vice-president Bingham Stamping Co., Toledo, Ohio.
H. C. Nelson, Globe Machine & Stamping Co., Cleveland.
F. J. Flach, president Metal Specialty Co., Cincinnati.
E. R. Wagner, E. R. Wagner Mfg. Co., North Milwaukee, Wis.
Robert C. Yates, Transue & Williams S. F. Corporation, Alliance, Ohio.
H. F. Millman, Geuder, Paeschke & Frey Co., Milwaukee.
H. S. Johnson and R. R. Braggins, Bossert Corporation, Utica, N. Y.
E. I. Dail, Dail Steel Products Co., Lansing, Mich.
George W. Schreck, Kales Stamping Co., Detroit.
George F. Sparks, Truscon Steel Co., Youngstown.
Lee O. Benner, Motor Wheel Corporation, Lansing, Mich.
H. B. Ranney, Bettcher Stamping & Mfg. Co., Cleveland.
W. W. Galbreath, president Youngstown Pressed Steel Co., Warren, Ohio.
E. W. Hamlin, Akron-Selle Co., Akron, Ohio.

At the preliminary meeting W. W. Galbreath, president Youngstown Pressed Steel Co., was elected temporary chairman. There was a discussion of the general condition of the industry, of the problems which face it and of the possibility of solving some of these problems through cooperative effort and discussion. Every person present took part in the discussion. The sentiment in favor of the organization of a pressed metal association was unanimous.

The general opinion seemed to be that much could be accomplished if it were possible to group the different plants, so that those having common interest could meet at regular intervals where most convenient. The organization committee (Messrs. Baird, Benner, Bingham, Flach, Galbreath and Johnson) was appointed to work in the problem of the proper grouping of the different plants, so that an association could be formed built up on these groups, rather than on a general association, which naturally could discuss only general problems.

In view of the large number of stamping manufacturers in the United States, and their great variety of products, it is obviously impossible to reach all in the short time before the organization meeting. Many have been reached, but the organization committee extends a cordial invitation to any pressed metal manufacturer to attend the Feb. 28 meeting in Cleveland. Malcomb Baird, 232 Delaware Avenue, Buffalo, is serving as secretary.

The Columbia Steel Corporation recently started a new battery of 23 Koppers-Becker by-products coke ovens at Provo, Utah. The work was completed in exactly 29 weeks from the day of the arrival on the job of the superintendent of construction. An addition to the by-product recovery plant also was made. The new battery gives the company a total of 56 ovens, capable of producing 400,000 tons of metallurgical coke annually.

Industry's Problems to Be Discussed at Conference in Cincinnati

Vital economic problems affecting American industry will be discussed at a round table conference in Cincinnati March 1 and 2 under the joint auspices of the Cincinnati branch of the National Metal Trades Association and the National Industrial Conference Board. The relation between wages and prices, the agricultural problem and an approach to its solution, and public expenditures and their bearing upon taxation are among the subjects to be discussed. The conference will be conducted by Magnus W. Alexander, president of the National Industrial Conference Board. Speakers will include Virgil Jordan, chief economist of the board; William J. Shultz, financial economist; Charles Nagel of St. Louis, J. A. Morford, industrial relations expert of the board, and Mr. Alexander. The conference will open with a luncheon meeting, and the Cincinnati branch of the National Metal Trades Association will hold its annual business session and election of officers at 5 p. m. A dinner will follow at which E. A. Muller, president King Machine Tool Co. and president of the Cincinnati branch, will preside.

Purchasing Agent's Committee on Iron and Steel Appointed

The National Association of Purchasing Agents has appointed an enlarged iron and steel committee representing five regions, of which Canada is one, which shall have the following for its objects: To further the use of standard specifications in the buying and selling of iron and steel scrap and to work with scrap dealers and producers to perfect these specifications; to urge producers and distributers of pig iron in perfecting and endorsing the pig iron contract, and to cooperate with the Department of Commerce and trade associations in improving conditions in the iron and steel field. The personnel of the new committee is as follows:

National chairman—C. R. Ramage, Diamond Chain & Mfg. Co., Indianapolis.

Pacific Coast Region—Malcolm McPhee, Pacific Coast Coal Co., Seattle (chairman); H. W. Christensen, Llewellyn Iron Works, Los Angeles; J. S. Gabriel, Denver & Rio Grande Western R.R., Salt Lake City; R. H. Petillon, Western Pipe & Steel Co., San Francisco.

Southern Region—E. B. Corbett, Harrisburg Pipe & Pipe Bending Co., Houston, Tex. (chairman); P. J. Oliver, Mexican Gulf Oil Co., Tampico, Mex.; Charles T. Doerr, Alabama Power Co., Birmingham.

North Central Region—A. J. Copeland, Industrial Brownhoist Corporation, Bay City, Mich. (chairman); Walter Wenzel, Vilter Mfg. Co., Milwaukee; L. E. Jones, Heywood-Wakefield Co., Chicago; E. H. Cordes, Stacey Mfg. Co., Cincinnati; H. C. Wickline, Union Steel Casting Co., Pittsburgh; J. A. Dwyer, C. G. Spring & Bumper Co., Detroit.

Eastern Region—B. C. Sawyer, Bethlehem Fabricators, Inc., Bethlehem, Pa. (chairman); F. M. Roos, Consolidated Car Heating Co., Albany, N. Y.; A. P. Hickcox, Scovill Mfg. Co., Waterbury, Conn.; M. G. L. Harris, Standard Gas Equipment Corp., Jersey City, N. J.

Canadian Region—T. G. Elliott, Babcock-Wilcox & Goldie McCulloch, Galt., Ontario (chairman); J. R. Hoyle, Canadian Vickers, Ltd., Montreal; M. K. McGuffie, Sheet Metal Products Co., Toronto.

Western Malleables, Inc., 332 South Michigan Avenue, Chicago, has been incorporated and has purchased all the properties, good-will and equipment of the Western Malleables Co., whose plant is at Beaver Dam, Wis. The foundry has a daily capacity of 75 tons of finished castings. The property covers 16 acres and buildings provide 300,000 sq. ft. of floor space. Officers are: A. D. Johnson, president; C. A. Starkweather, vice-president; H. L. Kirsh, vice-president and general manager, and R. J. Klatts, secretary and treasurer.

Iron and Steel Markets

Specifications Balance Output

Mill Bookings Gain Little Except at Chicago—Prices Await Test of Second Quarter Buying—Pig Iron More Active—Mixed Situation in Scrap

STEEL production is holding its recent gains and is perhaps a shade higher than a week ago. In most districts output and shipping orders are virtually on a parity, so that mill backlogs have ceased to expand. Operating schedules of Steel Corporation plants are unchanged at about 90 per cent of capacity, but some of the independent mills, notably at Youngstown, have increased production. Operations in the Pittsburgh-Youngstown area now average fully 80 per cent, as compared with 75 per cent at the close of January.

Consumers are specifying liberally against contracts placed at prices below those now quoted. There continues to be some concern lest buyers take shipments in excess of consumption and carry stocks of material well into the second quarter. At Cleveland, however, pressure for prompt deliveries indicates that specifications are in close step with current needs, and that supplies are not being accumulated. At Chicago there is not only a good volume of specifications against past obligations, but also considerable fresh buying, sales during the week having been exceeded only twice since Jan. 1. A further growth of mill backlogs there is reflected by extending deliveries.

From Chicago also come the first signs of interest in second quarter requirements, particularly in sheets, contracts for which have been placed at prevailing prices. In other markets present mill quotations remain largely untested. Some of the motor car builders have tried to obtain concessions from the recently advanced price on automobile body sheets, and one large company, failing to get a better quotation on its second quarter requirements, bought for the month of April only. On the other hand, irregular prices on galvanized sheets for early shipment are reported from Cleveland and the South. Prices on plates, shapes and bars are firm at 1.85c., Pittsburgh, on such new business as is being placed, and buyers are confident that they will be given an opportunity to cover their second quarter needs before any further advance is made.

Automobile consumption of steel continues to increase, but at a gradual rate. Motor car manufacturers have taken heavy orders from dealers, but it will be some time before the extent of demand from car users will be disclosed.

Fresh demand for structural steel is large, but recent bookings were not well distributed, fabricators in some districts being short of sizable work while others with large contracts, notably in the Chicago district, lack small tonnages to round out their schedules. New inquiries call for 44,000 tons. In addition, three large buildings to be erected in New York, taking a total of 50,000 tons, will soon be in the market. At Pittsburgh, 10,000 tons of plates and shapes will be needed for 66 barges. Projects closed in the week totaled 20,000 tons.

Rail mills have enough tonnage booked to keep them engaged for several months. There is still fair demand for track accessories, purchases from Chicago mills amounting to 6000 tons.

Railroad equipment buying has not developed to the extent that the steel trade had looked for. The week's principal orders were 2000 box car bodies for the Baltimore & Ohio and 500 flat cars for the Union Pacific. Bids have gone in on 2000 refrigerator cars for the Pacific Fruit Express.

Overproduction of oil is adversely affecting business in drill and drive pipe, but a fair tonnage of plates for storage tanks continues to be bought for Southwestern fields. An inquiry for 100,000 tons of pipe for a gas line from Amarillo, Tex., to Kansas City, Mo., is now before the mills.

Tin plate demand has been enlivened by inquiries for 100,000 boxes from a domestic oil producer and for 60,000 boxes from a Japanese oil company.

Pig iron business is active in Chicago, Cleveland, St. Louis and the South, but is exceedingly quiet at Pittsburgh, in the Valleys and in eastern Pennsylvania. Cleveland sales were 53,000 tons, 11,000 tons was taken by a St. Louis district producer, and one interest in Alabama has booked 25,000 tons. Two New England consumers of basic iron have taken a total of about 15,000 tons. Shipments of iron by Chicago merchant furnaces are in excess of production and yard stocks are being reduced. A Cleveland producer has advanced its price 50c. a ton, but in other districts there is no upward movement.

Steel mill grades of scrap are 50c. a ton higher at Chicago on sales of 15,000 tons, but in general the scrap market has not reflected the recent increase in steel production.

Orders for fabricated structural steel in January are computed at 213,750 tons, or 57 per cent of capacity, representing a sharp drop from 258,750 tons (69 per cent) in December and making the smallest month since January, 1927. Total orders for the year 1927 are placed at 3,060,000 tons, the largest for any year on record.

Both of THE IRON AGE composite prices are unchanged this week, that for pig iron remaining for a second week at $17.75 a ton and that for finished steel for a second week at 2.364c. a lb. The finished steel composite is almost precisely the same as the 2.367c. of one year ago, but pig iron is $1.21 below the $18.96 of a year ago.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 21, 1928	Feb. 14, 1928	Jan. 24, 1928	Feb. 21, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.26	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	21.00
Basic, Valley furnace	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Feb. 21, 1928	Feb. 14, 1928	Jan. 24, 1928	Feb. 21, 1927
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh	**44.00**	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.80	1.90
Steel bars, Chicago	1.95	1.95	1.90	2.00
Steel bars, New York	2.19	2.19	2.14	2.24
Tank plates, Pittsburgh	1.85	1.85	1.80	1.85
Tank plates, Chicago	1.95	1.95	1.90	2.00
Tank plates, New York	2.17½	2.17½	2.12½	2.19
Beams, Pittsburgh	1.85	1.85	1.80	1.90
Beams, Chicago	1.95	1.95	1.90	2.00
Beams, New York	2.14½	2.14½	2.09½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.20

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Feb. 21, 1928	Feb. 14, 1928	Jan. 24, 1928	Feb. 21, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.80	2.75
Sheets black, No. 24 Chicago dist. mill	3.00	3.00	3.00	2.90
Sheets galv. No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	2.65	2.65	2.55	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.55	2.60
Plain wire, Pittsburgh	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.45	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.25	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:	Feb. 21, 1928	Feb. 14, 1928	Jan. 24, 1928	Feb. 21, 1927
Heavy melting steel, P'gh	$15.00	$15.00	$15.00	$16.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	**13.00**	12.50	12.50	12.75
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot, Phila	15.00	15.00	15.25	17.00
No. 1 RR. wrot. Ch'go (net)	**11.50**	11.00	11.00	12.00

Coke, Connellsville, Per Net Ton at Oven:	Feb. 21, 1928	Feb. 14, 1928	Jan. 24, 1928	Feb. 21, 1927
Furnace coke, prompt	$2.75	$2.75	$2.65	$3.50
Foundry coke, prompt	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.25	13.12½
Electrolytic copper, refinery	*13.82½*	13.87½	13.87½	12.75
Zinc, St. Louis	*5.47½*	5.60	5.65	6.85
Zinc, New York	*5.82½*	5.95	6.00	7.20
Lead, St. Louis	*6.07½*	6.12½	6.30	7.30
Lead, New York	*6.32½*	6.35	6.50	7.40
Tin (Straits), New York	*51.50*	51.87½	55.37½	70.25
Antimony (Asiatic), N. Y.	*10.87½*	11.00	11.00	14.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Buyers Taking Shipments Freely—Ingot Output Averages 80 Per Cent

PITTSBURGH, Feb. 20.—From the standpoint of steel works and rolling mill operations and demand as typified by specifications against contracts, the steel situation leaves little to be desired. As a result of some increase in the operations of the Youngstown district, the general average of the Greater Pittsburgh district in steel ingot production is now easily 80 per cent of capacity. The freedom with which consumers are taking shipments against their orders suggests no immediate recession from that rate, especially as invoice prices on present shipments are generally below those manufacturers are now quoting. The unfavorable feature of the situation at the moment is that consumers are placing most of their dependence upon the steel they have on order and are not yet showing much interest in second quarter requirements. Views as to prospects are more moderate in some quarters than they were in January.

With the possible exception of pipe, steel makers have good-sized order books in all products. Evidence is still lacking that outside of the motor car industry there has been as much of a gain in consumption among the industries drawing on Pittsburgh for their steel as was indicated in some of the forecasts made in December and in the early weeks of this year.

Railroad car builders in this territory do not appear to have fared as well as those in the Central West. Structural steel business also has been better for mills outside rather than in the Pittsburgh district. The oil industry, a recovery in which would mean much to Pittsburgh in pipe business, is yet to make real headway in correcting the over-supply situation. Conditions generally are much more favorable in the Chicago district, but, on the other hand, the East, according to local advices, is not doing so well as Pittsburgh.

Automobile companies have been trying to get concessions from the recently announced price on body sheets, but do not seem to have had success, although it is rather significant that one large company, which failed to get a lower price on its entire requirements for the second quarter, decided to order only for April.

Primary materials are very dull, with steel works scrap showing some tendency toward weakness. Coke and coal are quotable at unchanged prices, but are weaker.

Pig Iron.—Merchant pig iron producers have little reason to feel cheerful about the market. While consumers are taking shipments against old orders fairly freely, their fresh requirements are few and small. The trade has before it the inquiry of the Westinghouse Electric & Mfg. Co., which may reach fair-sized proportions, though no specific tonnage is mentioned. Otherwise, inquiries are entirely for carloads. The Edgewater Steel Co. was a recent buyer of about 5000 tons of basic iron at a price below what it would have had to pay if the iron had come from a Valley furnace. The iron was sold by a steel works having a much lower freight rate. The Carnegie Steel Co. recently added a blast furnace at Mingo, Ohio, and one at New Castle, Pa., to its active list, making a total of 10 stacks this company has put on since Jan. 1, and giving it

32 in production of a total of 51. The Stewart Furnace Co., Sharon, Pa., is about to blow out its furnace.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Ferromanganese is moving a little more freely on contracts. Consumers appear to have pretty well reduced their stocks and the increased rate of steel production means a larger consumption. Spiegeleisen continues to move well on old orders, but new business amounts to little. Consumers are specifying well for high-grade ferrosilicon, although tonnages moving to the Youngstown district show some recession as compared with those of January. Prices are unchanged.

Semi-Finished Steel.—Chicago interests recently were seeking prices on 10,000 tons each of 4-in. and 1¾-in. billets for shipment to the Chicago district, but prices quoted here were too high to take the business away from Chicago district producers. Otherwise open market activity in semi-finished steel has been limited, but there continues to be a fairly good movement on specifications to sheet, tin plate and strip makers from their regular sources of supply. The Chicago inquiry developed a waiver of the size extra on small billets by some makers, but in general prices are holding well, and on wire rods all local producers now are quoting $44, base Pittsburgh or Cleveland. Sales at that price are few and small, because there was such extensive covering of consumers for this quarter at prices $2 to $4 a ton less.

Bars, Plates and Shapes.—Approximately 5000 tons of structural steel is pending in Pittsburgh district building projects and 10,000 tons of plates and small shapes will be needed in 66 barges now before fabricators for bids. Fabricated steel lettings of the past week show some increase in number, but tonnages run small, and complaint again is heard of sharp price competition. There continues to be steady specifying against old orders for plates and shapes, but strictly new business is not yet of sizable proportions. The mills are firm at 1.85c., base, for shapes and plates, and small lot sales are fairly numerous at that price. Specifications for bars continue to flow in steadily and in good volume. On new bar orders makers are holding firmly to 1.85c., base. Reinforcing bars wait on open weather for activity.

Rails and Track Supplies.—Standard-section rail bookings are sufficient to keep the mills busy for several months, provided the roads do not revise original estimates of their requirements. Light-section rails are not doing much on account of the curtailment of coal mining operations. Only a fair demand is noted for spikes and other track accessories. Prices are unchanged.

Wire Products.—All makers are quoting nails at $2.65 per keg, base Pittsburgh, plain wire at $2.50 per 100 lb., base, and other wire products at the higher prices announced on Jan. 25 last, and on such new business there is, no deviation from that schedule is observed. There is not much new business, however, since buyers were covered pretty fully for this quarter prior to the advance; they are specifying so steadily against those coverages that there is some concern that mill shipments are in excess of actual consumption and that stocks in second hands may be sufficient to lighten orders for the second quarter. Jobbers are known to have pretty heavy stocks of nails.

Tubular Goods.—Pipe makers are well satisfied with the movement of buttwelded pipe, but still report a slow movement of lapwelded, which does not appear to be sharing in the demand for drill and drive pipe and casing from California, where oil well drilling is more active at present than in any of the other producing fields. The oil situation is not improving rapidly enough to encourage hopefulness over the prospect for well pipe. The line pipe outlook, however, still is promising. All makers having mills large enough now have the inquiry for the gas line to run from Amarillo, Tex., to Kansas City, Mo. There are 400 miles of main line calling for 20-in., 22-in. and 24-in. pipe, and approximately 300 miles of smaller sizes for feeder and distributing lines, and the steel will amount to about 100,000 tons. Formal inquiry for the Monroe, La.-St. Louis gas line is yet to be made. Pipe prices continue to show some irregularity despite efforts to stabilize them. Fairly good demand is noted for locomotive tubes. Mechanical tubing is going out very steadily.

Tin Plate.—Container manufacturers, most of whom have contracted for their requirements for the first half of the year, are specifying steadily and mill operations continue at around 80 per cent of capacity. There is little business outside of contract obligations.

Cold-Finished Steel Bars and Shafting.—Consumers continue to take shipments against first quarter contracts, but demands otherwise are few and small, and no second quarter tonnages yet are under negotiation. Most of the shipments carry a price of 2.20c., base, Pittsburgh or Chicago, with occasional small lots going at 2.30c., which makers probably will name on second quarter contracts.

Hot-Rolled Flats.—There has been almost general adoption of the price schedule announced a week ago, but not much business is being done at the new prices, which, while effective immediately, were primarily intended to rule on second quarter business. Consumers generally are covered against their needs for this quarter and are taking shipments very steadily.

Cold-Rolled Strips.—Good movement against contracts for this quarter still is noted. The higher base price announced Jan. 25 has not yet had a serious test, as buyers were previously well covered for this quarter and they are not yet showing much interest in their needs for the second quarter.

THE IRON AGE Composite Prices

Finished Steel

Feb. 20, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.314c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Feb. 20, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.67
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b, Chicago	1.95c. to 2.05c.
Del'd Philadelphia	2.17c.
Del'd New York	2.19c.
Del'd Cleveland	2.04c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b. Chicago	1.95c. to 2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.04c.
Del'd Philadelphia	2.10c.
F.o.b. Coatesville	2.00c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c.
F.o.b. Chicago	1.95c. to 2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c.
Del'd Philadelphia	2.13c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Gages narrower than 3 in., P'gh	2.20c. to 2.40c.
Gages wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
Gages 6 in. and wider, P'gh	1.90c. to 2.00c.
All gages, narrower than 6 in., Chicago,	2.30c. to 2.50c.
All gages, 6 in. and wider, Chicago,	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.20c. to 2.30c.
Bars, Cleveland	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrom Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.05 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.05 to 3.10
Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Old Material.—Business is very slow and such changes as there have been in prices have not been uniform. Heavy melting steel now is quotable at $14.50 to $15; there have been no sales to consumers at less than the higher figure, but dealers are able to buy against short sales at one point in the district at $14.50, and $15 is as high as they will go on purchases for other points where there are uncovered sales at higher prices. On the other hand, No. 2 wrought, which ordinarily sells at the same level as heavy melting steel, now is at a premium because of bids by dealers who are short against sales made a few weeks ago. Dealers are keeping up the market on scrap rails by purchases against short sales. Cast iron wheels are stronger and heavy breakable cast scrap has been sold at a slight advance over recent prices. Machine shop turnings have been sold into consumption at $11.25. The recent advance in compressed and bundled sheets has not held.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.50
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.50 to 14.00
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.25
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Sheets.—Business conditions still vary. Reports from the Central West indicate a good movement against first quarter contracts and also a willingness to sign up for second quarter, but there does not seem to be the same anxiety for supplies on the part of consumers in other sections of the country. While there is interest in second quarter tonnages on the part of automobile builders and some business in body sheets has been written at the new price of 4.15c., base Pittsburgh, others are resisting that price, which is an advance of $3 a ton over the current invoice price. One large user has bought only for April. Prices indicate a stronger tendency on the part of producers to get prices that will yield a fair profit in preference to full order books at unprofitable prices. It is said that current demands do not warrant more than an 80 per cent operation of the mills, and the general average of mill engagement is at about that rate.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4,39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Bolts, Nuts and Rivets.—Not much change is noted in the character or volume of business. Buyers still are ordering steadily, but not very far ahead of their requirements. Prices are firm.

Coal and Coke.—Standard furnace coke still is held at $2.75 per net ton at ovens, but the market is not overly strong, and sales of some coke of that grade, released through the suspension of shipments by a Valley furnace, have been made at $2.50. This was really a distress sale and the coke went for heating purposes, but it is probable that if there was a demand from furnaces, less than $2.75 could be done. Foundry coke is just about steady. Coal prices though unchanged are weaker as there is too much offered to be readily or easily absorbed.

Detroit Scrap Market Weak

DETROIT, Feb. 20.—Some declines were registered in the scrap market in this district during the past week, notably on heavy melting and shoveling steel and long turnings.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.50 to $12.00
Borings and short turnings	8.75 to 9.25
Long turnings	7.50 to 8.00
No. 1 machinery cast	14.50 to 15.50
Automobile cast	18.50 to 20.00
Hydraulic compressed sheets	10.50 to 11.00
Stove plate	11.50 to 12.50
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	9.75 to 10.25

Shipment of Steel Barrels Better in January, but Still Low

WASHINGTON, Feb. 18.—Steel barrels to the number of 475,906 were manufactured in January, against 444,227 in December, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Except for December, the January total was the smallest for any month in two years. Unfilled orders at the end of January for delivery within 30 days totaled 241,145 barrels, and 1,110,652 more for later delivery. Stocks at the end of the month were 54,353 barrels.

Members of the Steel Barrel Manufacturers Institute shipped 298,480 barrels in January and had on hand orders for 354,552 on Feb. 1. The business reported in January was $927,752. Capacity was engaged to the extent of 45 per cent, being 21 per cent for I.C.C. barrels and 51 per cent for light barrels.

The American Welding Society will hold its annual meeting April 25, 26 and 27 at the Engineering Societies Building, New York. One technical session will be devoted to procedure standardization in welding, including qualifications of welders, inspection and supervision. Discussion of the subject will include procedure standardization relating to structural steel, pressure vessel and pipe welding.

The Lapham-Hickey Co., 518 Buhl Building, Detroit, and 1625 West Pershing Road, Chicago, has been appointed exclusive distributer in Illinois, Indiana, Michigan and Ohio for the Athenia Steel Co., Athenia, N. J., manufacturer of tempered and annealed clock spring steel. A complete stock will be carried at Chicago.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c.
Sheared	1.85c.
Universal	1.85c.

Wire Rods

	Per Gross Ton
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$14.50 to $15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Sales Continue at High Rate—Pig Iron Market Active

CHICAGO, Feb. 20.—Consumers of finished steel continue to enter this market at a lively rate and sales for the week are the third largest of any similar period so far this year. Although it may reasonably be assumed that specifications made earlier in the year were in some measure to balance stocks that had run low during the inventory period, it is now rather generally believed that current specifications closely represent consumptive demand. Deliveries are being extended.

The Union Pacific has ordered 500 flat and 25 passenger cars, all of which will be constructed in Central Western shops. Noteworthy among structural awards this week is 4000 tons for the Drake Tower, Chicago, taken by the American Bridge Co. It is probable that a Chicago shop will fabricate the 8000 tons required for a viaduct at Milwaukee.

Sales of billets have been heavy, not less than 20,000 tons having been taken by a producer with mills at Chicago and east of this district.

Evidence is at hand that prices for cast iron pipe are seeking higher levels. Fresh inquiry for that commodity is active.

Heavy melting steel has sold at 50c. a ton higher and other steel mill grades of scrap are correspondingly strong, but foundry specialties and blast furnace grades are weak.

Pig Iron.—Business continues active, particularly for second quarter delivery. Four merchant stacks are in blast but this output added to the foundry iron sold by local steel producers totals less than current shipments, affording a further reduction in stocks at Chicago furnaces. Prices for Northern iron are firm at $18.50 and full differentials are being obtained. Quotations by furnaces to the south are steady and local producers are meeting with little difficulty in maintaining the full Chicago schedule in intermediate territory where freight differentials are in favor of the Northern furnaces. Reports that iron to come in by boat from Lake Erie furnaces is being offered are not quieted in spite of the fact that several options against water shipments at the opening of navigation have been cancelled.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys. — Specifications for ferrosilicon are heavy and carload sales for immediate delivery are at $83.50. Ferromanganese is quiet at $100, seaboard. Spiegeleisen is being offered at $38.76 to $39.76, delivered.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Two orders for tank plates for delivery in the Southwest total 4000 tons, about half of which will be rolled in Chicago district mills. This tonnage is for shipment at the earliest convenience of producers. The Chicago Bridge & Iron Works has taken 1000 tons for refinery work for the Standard Oil Co. at El Paso, Tex. The railroad equipment market is almost devoid of fresh inquiries. The Union Pacific has ordered 500 flat cars and bids have been submitted on the 2000 refrigerators to be purchased by the Pacific Fruit Express. It is understood here that about one-fourth of those cars may be built on the Pacific Coast. The Chicago & Eastern Illinois has taken new bids on 500 freight cars. The trade is looking daily for orders from the Burlington for 150 ballast cars. Shipping schedules are being arranged on 45,000 tons of steel required for 4000 cars recently ordered by the St. Louis-San Francisco. Demand for plates from the building industry is active but rolling schedules are easily arranged because of delay between awards to fabricators and the actual beginning of erection. Prices are firm at 1.95c., Chicago, for lots of 100 tons or more.

Mill prices on plates per lb.: 1.95c. to 2.05c., base, Chicago.

Structural Material.—New business in structural material is active but in smaller volume, following heavy lettings of the past three weeks. The Drake Tower, requiring 4000 tons, has been awarded. Local shops are well supplied with heavy tonnage orders but are finding schedules difficult to arrange because of the lack of small fill-in contracts. This condition keeps competition at high pitch and no improvement is noted in prices obtained by fabricators. The Great Lakes Dredge & Dock Co. has been awarded the general contract for the Robey Street viaduct, Chicago. Chicago producers are holding rigidly to 1.95c. for 100 tons or more in a single order and at 2.05c. for smaller lots.

Mill prices on plain material per lb.: 1.95c. to 2.05c., base, Chicago.

Bars.—Sales of mild steel bars for the week are ahead of shipments. Deliveries range four to six weeks, which brings local mill bookings close to the end of the first quarter. Producers say that sales made now are for delivery in the first three months only and that no tonnage will be carried into April. Announcement of second quarter prices may be near at hand. Quotations in Chicago are firm at 1.95c. for lots of 100 tons or more. The iron bar market is quiet both in inquiries and sales. Orders for alloy steel bars are keeping Chicago mills engaged at 85 per cent of capacity. Demand for rail steel bars continues to grow and specifications are heavier than shipments. Barn equipment manufacturers and bed makers are enjoying a better volume of business. Prices are steady at 1.80c., Chicago Heights mills.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.05c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago Heights mill.

Cast Iron Pipe.—Taking fresh inquiry as a gage, the cast iron pipe market has shown a marked improvement in the week. New buying is sluggish and is confined to car lot purchases except for several orders, aggregating 2500 tons, from public utility operators. Bids opened at Detroit on 2000 tons of 24-in., class C pipe, disclose that French pipe was priced at $27, Birmingham, while three American foundries, whose bids cover the full requirements of Detroit, were all within a few cents of $30, Birmingham. It appears that delivery is an important factor in the placing of this business and therefore it is not unlikely that the tonnage will be distributed among the American Cast Iron Pipe Co., the National Cast Iron Pipe Co. and James B. Clow & Sons. Chicago will open bids Feb. 29 on 1600 tons of 8 and 12-in. class B pipe, and Akron, Ohio, will receive tenders up to Feb. 21 on 1500 tons of 4 to 16-in. pipe and 100 tons of fittings. Saginaw, Mich., will buy 475 tons of 6 to 24-in. pipe and 30 tons of fittings, and Grosse Point Farms, Mich., has need of 150 tons of 8 and 12-in. pipe. Bids at Detroit and prices quoted locally to contractors show that quotations on 6-in. and larger pipe are at $29.50 to $30.00, Birmingham, or $37.70 to $38.20, delivered Chicago.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $37.70 to $38.20; 4-in., $41.70 to $42.20; Class A and gas pipe, $4 extra.

Wire Products.—The jobbing trade continues to find business brisk and orders to mills are about equal to output, which is a shade above 75 per cent of capacity. Some production departments are fully engaged while others are operating at about 50 per cent, indicating a less balanced condition than prevailed at the beginning of the month. Business in the Middle West and in the South is good, while some improvement is noted in the near Northwest. Specifications from the manufacturing trade are growing slowly. Demand

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from warehouses is not keeping pace with that from other sources. Plain bright wire is steady at $2.55 per 100 lb., Chicago. Sellers plan to announce second quarter prices on March 1. Prices of wire and wire products are given on page 557.

Rails and Track Supplies.—Chicago district rail mills are operating at capacity and with shipping schedules well arranged there is little complaint on deliveries. New buying is quiet. Several railroads have purchased a total of 6000 tons of track accessories and fresh inquiry has raised the pending list to 15,000 tons. Light rail orders are confined to miscellaneous carlots.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—Following the announcement that present prices will be quoted for second quarter, sales of sheets have grown heavier. First quarter requirements have been well covered. Specifications have expanded and deliveries have been pushed ahead to an average of three weeks. The call for shipments is widespread both as to consuming industries and territory served.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—Interest in this market centers chiefly around business which will come from recently announced office building construction. Fresh inquiry is not large. Sales consist largely of individual orders of less than 100 tons each. The downward trend in bending shop operations is checked at 40 per cent of capacity but order books are small and the outlook is not reassuring. Recent awards have not served to test billet steel reinforcing bar prices. The hard steel commodity is quotable 1.80c. to 1.95c., Chicago Heights mills.

Bolts, Nuts and Rivets.—Fresh buying of small rivets is sluggish at the new discounts and a test of the market has not been made. Bolt and nut users are taking larger quantities. Large rivets are steady at $2.85 per 100 lb., f.o.b. Chicago.

Hot Rolled Strip.—Demand from automobile frame makers is heavy and March schedules of shipments to that industry indicate that the rate will be sustained. Producers here find that new uses for this commodity are rapidly coming to light and that the general demand is broadening. Prices in the Chicago market are unchanged, though quotations to the east of here are reported to have been advanced.

Coke.—Shipments are steady and prices for by-product foundry coke are unchanged at $9, f.o.b. local ovens, and at $9.50, delivered in the Chicago switching district.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Old Material.—A Chicago mill has purchased close to 15,000 tons of heavy melting steel at $13.50 a gross ton, delivered. This is 50c. a ton higher than prevailed on recent heavy sales. Dealers, pressed to cover on No. 1 heavy melting steel contracts, are offering $13.25. Steel mill operation is placing a heavy drain on the local market especially for the better grades of melting steel. Specialties, mainly the cast grades, are weak and the price of cast iron borings is sagging under pressure of a more than adequate supply and the refusal of many large users to make purchases at prices asked. It is reported that one large buyer is holding out for a delivered price of $10. Malleable foundries are not anxious to take deliveries against recent purchases and are not interested in current offerings. A number of gray iron foundries are declining to take deliveries pending the reduction of stocks on hand.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.25 to 15.75
Railroad tires, charging box size	16.50 to 17.00
Railroad leaf springs, cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.25 to 15.75
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.25 to 19.75
Iron car axles	21.50 to 22.00
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.75 to 10.25
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	13.00 to 13.50
Stove plate	11.25 to 11.75
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The Lally Co., Union Trust Building, Pittsburgh, dealer in tubular steel products, has been succeeded by Lally-McKelvy, Inc., which retains the present offices and will maintain its predecessor's connections and represent the Delaware Seamless Tube Co., Auburn, Pa., on sales in western Pennsylvania, western New York and West Virginia.

Changes in business methods necessary to meet new conditions will be the theme of the second annual conference of the Society for the Interchange of Merchandising Ideas which will be held at Nela Park, Cleveland, Feb. 27 and 28. F. J. Nichols, president of the F. J. Nichols Co., Dayton, Ohio, marketing counselor, is adviser to the executive committee of the society, members of which include Bennett Chapple, publicity director, American Rolling Mill Co., Middletown, Ohio.

New York

Pig Iron Sales 10,000 Tons—Three Buildings Will Take 50,000 Tons of Steel

NEW YORK, Feb. 20.—Pig iron buying is at a sustained rate, sales at 10,000 tons being on a par with the total of last week, and inquiry is heavier. Fully 15,000 tons is under negotiation, and it is regarded as significant that several melters who recently bought good-sized tonnages are in the market for additional iron. The largest new inquiry is from the National Radiator Corporation, Johnstown, Pa., and calls for 5000 tons. Abendroth Brothers, Port Chester, N. Y., are in the market for 1000 tons each of No. 2 plain and No. 2X for April and May delivery, and the General Fire Extinguisher Co., Providence, R. I., is inquiring for 1800 tons. Another New England buyer is negotiating for 1500 tons. The only inquiry calling for deliveries beyond the second quarter is from the A. P. Smith Mfg. Co., East Orange, N. J., calling for 600 tons of No. 2 plain and No. 2X for shipment from April through July. Prices show little change except that recent concessions on sizable tonnages have had the effect of making $16.50, base Buffalo, a more open quotation on attractive business. On smaller lots, however, $17 is still being obtained. The recent advance to $20, base furnace, on eastern Pennsylvania foundry iron is still largely untested in this territory.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Specifications on old contracts are coming in at about the same rate as during the last two weeks, but buyers are so well covered on needs for the present quarter that it will probably be three or four weeks before recently established prices on a number of finished products may be adequately tested. Reflecting the activity of the building industry in this territory, the outlook for shapes seems unusually bright. Three large buildings in New York for which plans are being prepared will probably require a total of 50,000 tons, and engineers and architects are rushing plans for further work in view of an advancing market. On new business shape mills seem to be adhering to 2.14½c., New York. A feature of the market is the reported placing of 2000 box car bodies with a Baltimore car builder by the Baltimore & Ohio. Activity in bars is not pronounced, but specifications are coming in at a fair rate. A large independent oil company is inquiring for 100,000 boxes of tin plate and a Japanese oil company for 60,000 boxes. There is also a growing interest in steel pipe for oil company use, and several municipalities and private corporations are inquiring for fair-sized tonnages of casing and line pipe. Sheet prices have been somewhat weaker in the last few days, and one or two companies apparently have not yet advanced their prices to the recently announced levels. However, small sales are being made at 2.90c., Pittsburgh, for black, 3.75c. for galvanized and 2.10c. and 2.20c. for blue annealed, according to width. There has been some opportunity to test the 2.50c. price for wire, but most consumers are well covered for the quarter. This condition is more pronounced in nails and buying at 2.65c., the new price, is almost entirely lacking.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c.; plates, 2.17½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Warehouse Business.—Purchasing from stock has been rather light in the past week, but there is very little tendency to shade the present schedule of prices. The market on black and galvanized sheets in New York and in local New Jersey still shows a considerable difference with black sheets at 4c. per lb., base, in New York and 4.20c. per lb. in New Jersey and galvanized at 4.70c. in New York and 4.95c. per lb. in New Jersey.

Cast Iron Pipe.—A large Southern maker has advanced the base price on pipe to $29.50 per ton, Birmingham, the increase to apply on all small routine inquiries. This move, however, is not generally reflected in the market, as competition is still keen enough to bring out prices below $28, Birmingham, on comparatively small jobs. Newark, N. J., has placed 1000 tons of 6 to 16-in. cast pipe with the United States Cast Iron Pipe & Foundry Co. and this maker has also closed on 800 tons of 48-in. pipe for New Bedford, Mass. The New Haven Water Co., New Haven, Conn., has placed 2000 tons, presumably with the same foundry.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Reinforcing Bars.—Inquiry has come out for two large industrial buildings in Manhattan, one of which will require 1000 tons of bars and the other 500 tons. Otherwise the market is without feature, awards having been mostly small tonnages. The mill price is unchanged at 1.95c. per lb., Pittsburgh. Distributers are quoting 2.20c., Youngstown warehouse, or 2.57½c., on cars at New York, and out of New York warehouse the general quotation is 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Coke.—Furnace coke is somewhat easier, but specifications for the foundry grade are coming in at a satisfactory rate. There is very little spot demand. Standard foundry is quoted for prompt shipment at $4 to $4.50 per ton, Connellsville, and standard furnace at from $2.75 to $3 per ton, Connellsville. Delivered prices are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—Except for some sizable purchases of No. 1 heavy melting steel by eastern Pennsylvania consumers, the scrap market has continued rather inactive. A Coatesville, Pa., mill recently closed on about 18,000 tons and a Bethlehem, Pa., consumer purchased a sizable tonnage of No. 1 steel. Yard grade of heavy melting steel is quiet but a fair tonnage is moving to Harrisburg and Pottsville, Pa., mills, for which brokers are paying $11 per ton, delivered. On yard steel shipments to Phoenixville, Pa., only $10.75 per ton, delivered, is being offered by most dealers. Efforts of a Phoenixville consumer of stove plate and machine shop turnings to purchase stove plate at $12.50 and turnings at less than $11 have apparently been unsuccessful thus far, as brokers claim that it is necessary to pay these prices to obtain sufficient tonnage.

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50
Prices per gross ton, delivered local foundries:	
No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Of 53 independent open-hearth furnaces in the Mahoning Valley, 41 are melting this week, against 39 the preceding week, while 108 of 127 sheet mills are under power. Some rolling mill companies, such as the Newton Steel Co. and the Trumbull Steel Co. are operating Sundays to meet demands on certain departments.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Demand for Steel Keeping Up—Pig Iron Sales of 53,000 Tons

CLEVELAND, Feb. 20.—Orders for finished steel against contracts are keeping up to the recent good volume, but it is not expected that February business will be quite equal to that in January. While some small-lot business in steel bars, plates and structural material is being taken at present prices, most orders are against lower-priced contracts that extend through the quarter. On new business, 1.85c., Pittsburgh, is being maintained on steel bars, plates and structural material and mills in some cases are able to get 1.95c. for small miscellaneous lots of steel bars. Local mills quote steel bars at 1.85c., Cleveland.

With increased mill operations, the steel output is about on a parity with orders, so that with a few exceptions, mills are not accumulating backlogs. On the other hand, consumers do not appear to be ordering in excess of current needs and are not accumulating stock, this being indicated by requests for prompt shipments. Specifications from the automotive industry continue heavy, but this industry, as well as other consumers, is covered for the present quarter. Some of the automobile manufacturers will increase slightly their output in March. Motor car manufacturers have taken heavy orders from dealers, but it will be some time before the extent of purchases by car users this spring will be known. However, a large amount of business in low-priced cars was held back late last year as buyers were waiting for the appearance of the Ford model and it seems certain that this year's sales of cars of this class will be heavy.

Consumers of steel bars, plates, and structural material are beginning to show an interest in second quarter contracts. The belief is rather general that present prices will prevail for that delivery and that if there is another advance it will not be made until buyers have an opportunity to cover at present quotations. The opening of books for second quarter contracts for sheets and hot and cold-rolled strip steel has not yet brought out any business for that delivery.

The American Steel & Wire Co. will blow in an additional blast furnace in Cleveland about March 1. It is now operating two of its four stacks.

Strip Steel.—Specifications are liberal against contracts for hot and cold-rolled strip taken at lower prices than those now prevailing, but there is very little new business, as most consumers are covered for the quarter. While mills have opened their books for the second quarter at the recently revised prices on hot strip and the current prices on cold strip, no buying has as yet developed for that delivery.

Iron Ore.—The consumption of Lake Superior ore during January amounted to 4,303,132 tons, an increase of 311,033 tons over December. During January last year 4,523,863 tons was consumed. Furnace stocks Feb. 1 amounted to 27,061,994 tons. Ore on hand at furnaces and Lake Erie docks Feb. 1 totaled 33,349,994 tons, as compared with 33,971,030 tons on the same date a year ago. Central district furnaces consumed 2,063,871 tons of ore in January, an increase of 157,530 tons over the previous month. Lake front furnaces consumed 2,060,464 tons, a gain of 177,917 tons; Eastern furnaces used 44,442 tons, a decrease of 19,978 tons, and all rail furnaces consumed 134,355 tons, a decrease of 4436 tons. On Jan. 31 there were 156 furnaces in blast using Lake ore, a gain of 12 for the month.

Pig Iron.—Sales showed a sharp gain the past week, during which Cleveland interests sold 53,000 tons of foundry and malleable iron for delivery through the second quarter. The increase is due in part to the booking of considerable iron in the East to be shipped from Buffalo furnaces. Considerable business was also taken in the Michigan territory. Sales in Ohio were moderate. One producer has advanced its Lake furnace price 50c. a ton to $17.50 for foundry and malleable iron, but others are still quoting $17, which is the ruling price in the Cleveland territory. However, efforts to establish the Lake furnace market at $17 have not been wholly successful as $16.50 has not disappeared as a price for shipment to competitive points. Full silicon differentials are not always being maintained. In Michigan $18 is the ruling price, the market there holding to the recent 50c. advance. Shipping orders continue heavy from the automotive industry and are fair from other sources. However, shipping orders indicate that many consumers overbought late last year and will carry considerable first quarter iron over into the second quarter. Business has improved with radiator manufacturers and some plants in this industry will increase operations.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Reinforcing Bars.—Some shading is reported on round-lot business and warehouse prices are irregular. Rail steel bars are unchanged at 1.75c., mill, but cannot compete in Cleveland at this price with billet steel bars.

Warehouse Business.—Jobbers' sales show a gain and the volume of business is quite satisfactory. The adoption of lump sum extras by mills on hot-rolled steel bars has diverted some business from mills to warehouses. Hardware jobbers have not followed the recent advance on galvanized sheets.

Sheets.—Consumers are showing no interest in second quarter contracts, although mills have opened their books for that delivery. Specifications continue good from the automotive industry and are fair from other consumers, but there is very little current buying. Regular quotations are being well maintained on black and blue annealed sheets, but galvanized sheets, for which the demand is not very brisk, are irregular with concessions reported of as much as $4 a ton from 3.75c., Pittsburgh base. Jobbers placed contracts a few weeks ago at prices that enable them to sell at a profit at lower than present mill prices and they are responsible for some of the present price shading.

Coke.—New demand for foundry coke is limited to car lots. Prices are unchanged at $8, Painesville, for by-product foundry coke, or $9.01, delivered Cleveland; $3.75 to $5.10, ovens, for Connellsville foundry coke and $2.75 for heating coke.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is slow, although it shows a little gain. Rivets continue dull. Practically all orders are specifications against contracts.

Old Material.—Mills are still holding down shipments to very limited quantities and the market is inactive. There is no buying by the mills, and dealers and producers are making little effort to make sales, as there is not much incentive to dispose of material they cannot ship. Dealers having old orders are covered and out of the market. Blast furnace scrap is being rather freely offered at $10.25, a reduction of 25 cents a ton. Other grades are unchanged.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.25 to 10.50
Mixed borings and short turnings	10.25 to 10.50
No. 2 busheling	10.25 to 10.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.40c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.25c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Philadelphia

Further Advance Expected on Plates, Shapes and Bars

PHILADELPHIA, Feb. 20.—Consumers of steel apparently specified sufficient tonnage during January and early February to cover nearby requirements. Consequently, shipments against first quarter contracts have been lighter and new business is extremely limited. It is expected that there will be a further price advance on plates, shapes and bars for second quarter delivery, but consumers will in all probability be given an opportunity to cover at the present level.

Pig Iron.—The market is decidedly inactive and purchasing is confined almost exclusively to occasional carload lots by the larger foundry consumers, who apparently underestimated their requirements when contracting for the present quarter. On the other hand, the smaller jobbing foundries are evidently well supplied with iron and in some instances are inclined to ask for delays in shipments on their contracts. It is estimated that current inquiry in this district is not much more than 1000 tons of foundry iron. Furnaces are maintaining the new price of $20, base, on foundry grades, despite the small volume of present business. Of the three principal basic buyers in eastern Pennsylvania, one has recently bought a tonnage, another is reported to be supplied for the next month to six weeks, and the third is still receiving shipments on an old contract. Business in low phosphorus iron is confined to occasional carload lots.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Business is restricted to small lots for prompt shipment, and prices are unchanged at $33 per ton, Pittsburgh, for rerolling billets and at $38 per ton for forging grade. The plate market being quiet, an eastern Pennsylvania plate mill is seeking business in forging billets.

Bars.—Current specifications against contracts are small and there is very little purchasing at the present level of quotations. Sellers seem confident that prices for second quarter will be advanced. The price for prompt shipment is 1.85c. per lb., Pittsburgh.

Shapes.—Fabricated steel projects are not numerous and most of the present business involves small tonnages. Competition among fabricators is keen. While the market on shapes has advanced twice in a comparatively short period, bids on structural projects are still at about the same level as before the advances. Shapes are quoted at 2c. per lb., Bethlehem, 1.975c. per lb., Pottsville, or 2.12c. to 2.13c. per lb., delivered Philadelphia.

Plates.—New business is slow in developing and specifications against contracts are light. Recent locomotive purchases by the railroads, however, are expected to provide some plate business. Prices continue at 2c. per lb., Coatesville, Pa., or 2.10c. per lb., delivered Philadelphia.

Sheets.—Although shading of prices on both black and galvanized sheets is still frequent, concessions are becoming smaller and the tendency of the market is apparently toward greater strength. Black sheets range from 2.75c. to 2.90c. per lb., base Pittsburgh, and galvanized from 3.65c. to 3.75c. per lb., base Pittsburgh. A firmer attitude is evident in blue annealed and strip steel sheets, which show little or no deviation from the basis of 2.10c. per lb., Pittsburgh.

Warehouse Business.—The recently applied quantity differentials on bars and small shapes are being maintained on most business in this district and the territory in which the differentials are quoted has been extended beyond the immediate Philadelphia district. Some jobbers expect that February will prove to be a better month than January.

Imports.—In the week ended Feb. 18, ore imports totaled 3736 gross tons, of which 3180 tons was Cuban chrome ore, 551 tons Portuguese African chrome ore and 5 tons South African manganese ore. Pig iron imports totaled 300 tons of Indian iron. Arrivals of steel consisted of 107 tons of bars from Belgium and 97 tons from France, 164 tons of shapes from Belgium, 44 tons of hoops from Belgium and 9 tons of strip steel from Great Britain. There was also 43 tons of steel scrap from Germany and 11 tons from Great Britain.

Old Material.—Except for some recent purchasing by a large eastern Pennsylvania consumer for several plants, the market is inactive. The total of these purchases was about 60,000 tons of No. 1 heavy melting steel, of which about 25,000 tons was for Sparrows Point, Md., and the remainder for Bethlehem, Steelton and Coatesville, Pa. Prices ranged from $13.50 to $14 per ton, delivered. The same consumer has purchased about 5000 tons of blast furnace scrap at $10.50 per ton, delivered Bethlehem, Pa., and $11 per ton, delivered Sparrows Point, Md.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.00 to	15.50
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast boring (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		13.00
Stove plate (for steel works)		13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to	13.00
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	12.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

MORE STEEL IN RIVER CRAFT

Last Year 506 Hulls Were Launched, Taking 79,200 Tons of Steel—63,776 Tons in Preceding Year

USE of steel in inland waterway barges, boats and other river craft, as measured by the launchings of 1927, registered a substantial increase as compared with 1926. Last year 506 hulls were launched, in the construction of which 79,215 tons of steel was used. This compares with 366 hulls, taking 63,776 tons of steel in 1926 and with 269 hulls, taking 53,710 tons of steel, in 1925.

The steady rise in construction of steel river craft not only reflects the replacement of wood barges and boats by those of steel, but also the increasing use of the inland rivers for the movement of freight. In another year, the canalization of the Ohio River from its source to its junction with the Mississippi at Cairo, Ill., will be completed and this development is expected to be followed by a considerable swelling of the waterborne movement of the products of the Pittsburgh, Wheeling and Cincinnati districts.

Inland points, such as Youngstown, are seeking the assistance that even partial use of the rivers will afford steel manufacturers through lower freight charges. A movement now is under way to get the railroads to grant a proportional rate to some point on the Ohio River, where the Youngstown products can be transferred to river barges and carried to destinations. This is not possible under present conditions, which on any such movement would mean that the railroads would exact the local tariff to the point of river transfer.

The record of 1927 launchings is as follows:

Builder	Location	Number of Hulls	Tonnage of Steel
American Bridge Co.	Ambridge, Pa.	132	19,662
Dravo Contracting Co.	Pittsburgh	113	22,600
Riter-Conley Co.	Leetsdale, Pa.	60	9,000
Midland Barge Co.	Midland, Pa.	42	7,650
Marietta Mfg. Co.	Point Pleasant, W. Va.	49	5,310
Jones & Laughlin Steel Corporation	Pittsburgh	29	4,956
Nashville Bridge Co.	Nashville, Tenn.	25	3,650
Howard Shipyards & Dock Co.	Jeffersonville, Ind.	37	3,580
Charles Ward Engineering Works	Charleston, W. Va.	12	1,835
Alabama Drydock & Shipbuilding Co.	Mobile, Ala.	7	1,014
Total 1927 launchings		506	79,257
Total 1926 launchings		366	63,776
Total 1925 launchings		269	53,710

American Rolling Mill Co. to Redeem 6 Per Cent Gold Notes

The American Rolling Mill Co. has informed holders of its 15-year sinking fund 6 per cent gold notes, due Jan. 1, 1938, that it will redeem on July 1 next the entire outstanding issue at 104½ and accrued interest. Pursuant to this notice, the company has authorized the Guaranty Trust Co. of New York to purchase any of these notes at the redemption price, with accrued interest to July 1, discounted on a 4½ per cent true discount basis figured to the redemption date. The calling of these notes is a part of the purpose of the refinancing plan approved by the company on Dec. 31, when the right to subscribe to one additional share of common stock for each six shares held was given to each stockholder and a $25,000,000 issue of 5 per cent sinking fund gold debentures, callable as a whole or in part at 104 and interest, was marketed.

Orders for 1025 steel boilers in January, with 851,811 sq. ft. of heating surface, were reported to the Department of Commerce by 72 manufacturers. This compares with 1054 boilers and 905,680 sq. ft. in December. Of the January orders 1010 were stationary boilers, with 833,314 sq. ft., and 15 were marine boilers, with 18,497 sq. ft.

Boston

Sizable Tonnage of Basic Iron Sold in New England

BOSTON, Feb. 20.—It is understood a sizable tonnage has been placed by the two largest basic pig iron users in New England, with a larger portion presumably going to a Bridgeport, Conn., consumer. Details are lacking, but it is understood the tonnage runs well into five figures. A slump in foundry iron buying in the past week is reported. Sales did not exceed 3000 tons, of which Buffalo furnaces and furnaces east of Buffalo took practically all. Buffalo iron, silicon 1.75 to 2.25 per cent, is still offered at $16.50 a ton, furnace, but on higher grades full differentials are generally maintained not only by Buffalo furnaces but by those east of Buffalo. Current iron sales are for deliveries straddling first and second quarters or for second quarter only. There are but two sizable inquiries in the market, one for 1000 tons of No. 2 plain and 1000 tons of No. 2X, and the other for 1000 tons of No. 2X and No. 1X.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Steel Grit.—New England foundries took quite a little steel grit the past week on a basis of $120 a ton for small lots and $100 a ton for large lots.

Bars.—Consumers' takings of steel bars are holding up well, but the average individual specification as well as current new order is small. Reinforcing bar business has fallen rather flat, daily average individual orders being less than 10 tons, with no easing in prices, however. Steel bars are 1.85c. to 1.90c. per lb., base Pittsburgh, generally 1.90c. Reinforcing bars from stock are 2.70c. to 2.75c., base, mostly 2.70c., with mill shipments 1.90c. per lb., base Pittsburgh, or 2.26½c., delivered in New England.

Cold-Rolled Strip.—Mill bookings of cold-rolled strip steel orders in the past week fell off somewhat. Most producers are well sold up into next month. Competition among Atlantic seaboard mills is keen. The Worcester, Mass., mill is holding to 3.30c. per lb., base, on lots of 1 to 3 tons and at 3.05c. on larger lots.

Shapes and Plates.—So far this month there has been a marked falling off in prospective fabricating jobs. At the moment, 123 tons of steel for a Weymouth, Mass., town office building is the largest job up for figures. Even small jobs are lacking. Recent lettings of bridge work in Vermont disclosed keen competition among fabricators for the work, the low bidder being $12 under the second lowest. Plate business is fairly good, but much less than it was a month ago. Standard shapes and plates are firm at 1.85c. per lb., base Pittsburgh.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Coke.—Demand for by-product foundry coke is still spotty owing to the low melt of iron. The price remains at $11.50 a ton, delivered within a $3.10 freight rate zone, and there is no indication of a change on March 1. Average weekly shipments by by-product ovens so far this year are a shade better than last year.

Old Material.—Brokers report it is easier to sell scrap, but more difficult to buy it because of the low prices offered by consumers. Purchases against an order for 3500 tons of steel scrap for shipment to Poland is helping the local market. There is practically no market for yard wrought and shippers are mixing it with steel. The market for steel axles is nominal. Long bundled skeleton sells mostly at $6 a ton on cars, and short bundled skeleton at $6.50. The general price on steel mill borings is $6 a ton for blast furnace use. A Norwood, Mass., foundry is buying stove plate at $10.50 a ton, delivered, and the Mystic Iron Works has also taken some on that basis. For shipment to Pennsylvania points, $8 a ton on cars is the general price. New England foundries are buying textile and No. 1 machinery cast a little more freely, but show no interest in No. 2 machinery cast. Some No. 2 is going to Pennsylvania steel mills at $10.50 to $11 a ton, on cars shipping point.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.10
Scrap T rails	8.75 to	9.00
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought	8.50 to	9.00
Machine shop turnings	6.00 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	6.00 to	6.50
Forge flashings	6.50 to	7.00
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	10.00 to	10.50

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate	10.50 to	11.00
Railroad malleable	13.50 to	14.00

St. Louis

Pig Iron Sales 11,000 Tons—Steel Mill Operations at a High Rate

ST. LOUIS, Feb. 20.—With sales of 11,000 tons, the Granite City maker of pig iron enjoyed its best week of the year. Several thousand tons went to radiator manufacturers in the district, a wheel maker took 1000

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

tons, and jobbing foundries bought about 1200 tons. The sales were for shipment during first quarter and into second quarter, the local maker not having made any change in prices. Shipping specifications are holding up well. The melt in the district is increasing, and the situation generally is promising.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The Granite City mill has announced sheet prices for second quarter in line with those recently named by other mills. Prices on plates, shapes and bars for second quarter have not been announced, although they are being freely inquired for. Specifications against contracts have been liberal. The Granite City interest is operating its sheet and tin plate mills at full capacity and the plate mill at above 75 per cent. Warehouse business continues good in St. Louis because of the demand for structural material, but very light in the surrounding territory.

Coke.—The market for coke remains steady. The demand for domestic grades has been rather light on account of milder weather, while industrial grades are moving more freely because of the increased melt in the district.

Old Material.—The market for old material continues soft, with a few items 25c. to 50c. a ton lower. Consumers in the district have heavy backlogs of orders, but they are well supplied with old material for the present. Shipments in this market have been very heavy and the mills are congested. Railroad lists include: Southern, 7300 tons; Texas & Pacific, 1600 tons; Chicago & Alton, 1400 tons; New Orleans Public Belt, 1100 tons; Louisville, Henderson & St. Louis, 10 miles of 80-lb. relaying rails; Frisco Lines, 25 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.75 to $12.25
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.75 to 12.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	10.00 to 10.50
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	14.25 to 14.75
Machine shop turnings	7.50 to 8.00
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.75 to 16.25
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	12.00 to 12.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.50 to 14.00
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Birmingham

Second Quarter Pig Iron Inquiry Developing—Steel Buying Steady

BIRMINGHAM, Feb. 20.—Inquiries for second quarter pig iron, including some of large size, are more numerous and some business is being booked. The spot and March sales of the past week were at about the same level as the preceding several weeks. Shipments continue close to production. The base price of $16 is being maintained on foundry iron. There has been no change in furnace operations, 17 being in blast.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—Demand continues to improve and there is a steady accumulation of new tonnage.

Cast Iron Pipe.—There is a fair amount of new pressure pipe business in small lots and several large orders are expected in the near future. The market is somewhat firmer and the base price on spot business is now $28 to $30.

Coke.—Spot demand for foundry coke continues quiet. Shipments are in satisfactory volume. Price remains at $5.

Old Material.—There is no noticeable change in tonnage or inquiries, both continuing at about the same rate as in recent weeks. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Buffalo

Pig Iron Inquiry Still Pending Totals 20,000 Tons

BUFFALO, Feb. 20.—About 20,000 tons of all grades of pig iron, principally foundry iron, remains unclosed. There are several inquiries for foundry grades ranging from 500 to 3000 tons and a couple of foundry inquiries ranging between 3000 and 5000 tons. Most of the pending business is for delivery over the remainder of first half. The Kensington-Davis foundry of Buffalo has not yet closed against its 2000-ton inquiry and the General Electric Co. inquiry for 500 tons of high silicon iron for Pittsburgh is still pending. Prices remain firm at quoted levels in this district, though some of the Buffalo furnaces are shading the silicon differentials on New England business.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation is better and more open-hearth steel capacity is being used. The Donner Steel Co. is now maintaining an 80 per cent rate on open-hearth operation. The Bethlehem Steel Co.'s plant at Lackawanna is running 80 per cent or better, and the Seneca Iron & Steel Co. is operating 80 per cent. Demand for bars and shapes is sustained at 1.95c., Buffalo. Sheet demand is very good. Bolt and nut makers report heavy specifying by the automobile companies. Three Batavia schools, plans on which are just out, will require around 200 tons of reinforcing bars.

Old Material.—A few sales are reported of heavy melting steel, hydraulic compressed and No. 1 busheling. The heavy melting steel sold was strictly No. 1 selected and not less than $15.25 is said to have been obtained. The busheling and hydraulic compressed brought around $14. Some sales of drop forge flashings are reported and there has been some strengtening of this grade. A selected small tonnage of billet and bloom crop ends brought $18, but the market is

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

more nearly represented by the $17 to $17.50 quotation. There is a strong demand for iron axles at $22 to $23.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.25 to 13.75
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.50
Agricultural	15.50
Industrial	15.50

Canada

Mills Operating at a Higher Rate—Pig Iron Business Improving

TORONTO, ONT., Feb. 20.—The improvement that has featured the Canadian iron and steel industry during the past two months is reflected in higher production among the leading mills. Companies equipped to produce rails have large tonnage orders on their books and have their rail mills running practically to capacity. The Dominion Iron & Steel Co., Sydney, N. S., which has been rolling rails for the Canadian National Railways, has started its rail mill on an order of 12,600 tons of 127-lb. rails for the Michigan Central. These are the heaviest ever turned out in a Canadian rail mill.

Pig Iron.—Inquiries for second quarter delivery are making their appearance and a number of melters appear anxious to cover up to the end of June. The demand for spot iron is strong. Indications are that first quarter spot sales will stand out above those of the first three months of 1927. Melters are entering the market for lots ranging from 50 to 200 tons and occasional orders are appearing for 500 tons. Pig iron production in Canada is increasing and with six blast furnaces blowing figures for this month will surpass those of January. It is understood that the new owners of the British Empire Steel Corporation propose changes in its blast furnaces. Some of those that are now considered more or less obsolete are to be replaced with modern stacks. Pig iron prices are firm in both Toronto and Montreal markets.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—The general trend of business in this market is on the up-grade, but so far improvement has not been sufficient to warrant the advancing of prices. Consumers are buying sparingly and prefer to hold their purchases to correspond with immediate needs. Prices are unchanged, although a little stronger.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

San Francisco

Structural Steel Awards 8800 Tons Plate—Jobs Pending Total 9000 Tons

SAN FRANCISCO, Feb. 16 (*By Air Mail*).—Outstanding among a total of 8800 tons of structural shape awards was 6500 tons for the Physicians' Building in San Francisco which went to the McClintic-Marshall Co. Central Works. Other awards included 700 tons for transmission towers for the Southern California Edison Co., Los Angeles, and 850 tons for a church in the same city, the latter project going to McClintic-Marshall Co. and the former to the Pacific Coast Steel Co. Pending business involves over 20,000 tons. Plain material continues firm at 2.35c., c.i.f. Coast ports.

Pig Iron.—Movement of pig iron this week was limited to small lots and little of importance transpired. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Plates.—Awards of plate material this week were confined to lots of less than 100 tons. However, a number of pending projects involve over 9000 tons. Bids will be opened this week in Seattle for a 2000-ton penstock and bids will be taken next week on 650 tons for a pipe line and penstock at Milton, Ore. The Southern California Edison Co. has taken bids on a 1300-ton penstock. Prices are now firm at 2.30c. c.i.f.

Bars.—In the reinforcing bar market the largest award was 210 tons for apartments in Los Angeles placed with an unnamed interest. The majority of the awards lately have been confined to lots ranging from 20 to 30 tons. In the San Francisco district considerable foreign material has been used of late and this has resulted in weak out-of-stock prices, as low as 2.25c. being named.

Cast Iron Pipe.—The only award of over 100 tons this week involved 19 tons of 4 to 8-in. class 150 pipe for Pasadena, Cal., and was secured by the American Cast Iron Pipe Co. Charles Raasche, Los Angeles, was low bidder on 156 tons of 4 to 8-in. class B pipe for the improvement of Pacific Street, Oceanside, Cal. James Young, Sacramento, was low bidder on 145 tons of 4 and 6-in. class B pipe for the State Fair Grounds at Sacramento, Cal. Bids were opened this week on 128 tons of 48-in. class A pipe for the North Oufall sewer

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ³⁄₁₆-in. and over	3.15c.
Small angles, under ³⁄₁₆-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

in Los Angeles. Bids were also opened on 222 tons of 4 to 8-in. class B pipe for Armona, Cal. B. Nicoll & Co. were low bidders on 1964 tons of 6 and 8-in. class 350 pipe for Los Angeles. George C. DeGolyer, Oakland, was low bidder on 526 tons of 4 to 8-in. class B pipe for the East Palo Alto Waterworks District at Redwood City, Cal. Bids will be opened on Feb. 20 for 426 tons of 4 to 12-in. pipe for the improvement of Saturn Avenue, Huntington Park, Cal., and on Feb. 21 for 136 tons of 18-in. pipe for San Diego, Cal.

Standard Pipe.—The Grinnell Co. of the Pacific was awarded 950 tons of 6-in. welded pipe and 285 tons of 6-in. wrought iron pipe for Los Angeles. E. W. Redman, Fresno, Cal., was low bidder on 150 tons of 2 to 8-in. Matheson joint pipe for the East Palo Alto Waterworks District at Redwood City, Cal. No action has yet been taken on the inquiry of the Petroleum Securities Co. for 650 tons of 3½-in. to 16-in. plain-end line pipe for its new Richmond, Cal., plant.

Cincinnati

Pig Iron Shipments Increase—Steel Specifications Lagging

CINCINNATI, Feb. 20.—There has been a further increase in the foundry melt in this district, with the result that pig iron shipments are going forward at a better rate. In many cases, however, specifications for first quarter deliveries are lagging and it will be well into the second quarter before buyers have taken all of the tonnages called for on current contracts. Sales are inconsequential in the aggregate and inquiries are scarce. The Favorite Stove & Range Co., Piqua, Ohio, has bought 600 tons of foundry iron from a Lake Erie furnace, while another company in this territory has purchased 1000 tons of malleable. Prices are unchanged with Ironton makers asking $19 at the furnace and northern Ohio producers quoting from $16.50 to $17, base Cleveland. In the South, Alabama and Tennessee sellers are firm at $16, base Birmingham. The Marting Iron & Steel Co. is reported to be preparing to blow in one of its Ironton furnaces late in March. At present none of the merchant stacks in the Ironton district is operating.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—There has been a perceptible decline in specifications against first quarter contracts for bars, structural shapes and plates. The decrease is partly attributed to the fact that contract customers in recent weeks have taken out substantial tonnages and therefore are not in immediate need of material in large quantities. Many buyers are awaiting developments on prices before authorizing releases beyond the amounts needed for current requirements. In structural steel an inquiry for 6000 tons for a highway bridge spanning the Ohio River at Maysville, Ky., has been put out, and bids are being submitted on 1700 tons for the new buildings of the L. S. Ayers Co. at Indianapolis. Aside from these two projects, however, pending work in this district is light and fabricators have found it necessary to curtail operations. Demand for wire goods has been fairly well sustained, but deviation from the recently established prices is noted. Common wire nails and plain wire are reported to have been sold at concessions of $2 from the regular schedule of $2.65 per keg and $2.50 per 100 lb., base Ironton or Pittsburgh, respectively. Sheet producers declare that a limited volume of buying for the second quarter has been done, although major activities still center on the tonnages to be shipped in February and March. All consuming lines are contributing substantially to the well-filled order books of sheet manufacturers, who are holding to a production program calling for full capacity output. Prices are firmly maintained on a basis of 2.10c., Pittsburgh, for blue annealed, 2.90c. for black and 4.15c. for automobile body stock. Only in galvanized sheets for roofing purposes is there any shading of quotations, and on this grade cuts of from $1 to $3 a ton have been made in the South.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Reinforcing Bars.—Bids are being taken on 100 tons of bars for a warehouse of the Union Gas & Electric Co., this city, and on 150 tons for a building at Dayton, Ohio, for the Young Women's Christian Association. New billet bars are selling at 1.85c., base Pittsburgh, for sizable tonnages and at 1.95c. for small lots. Makers of rail steel bars continue to quote 1.80c., base mill, and only on especially desirable jobs will they go below that figure. Reports are current that producers will try to get from $1 to $2 a ton above present prices for second quarter orders, although no business for delivery beyond March 31 has been booked by district mills.

Warehouse Business.—While there has been a slight upward trend in the volume of sales and February tonnage will be better than that in January, business of local jobbers is running approximately 10 per cent behind that of 1927. Prices in all commodities are firm and unchanged.

Coke.—The betterment in foundry production is reflected in an increase of approximately 20 per cent in the shipments of by-product foundry coke in the first 20 days of February, as compared with January. By-product domestic grades, on the other hand, are about on a par in shipments with those of last month. The Portsmouth By-Product Coke Co. has announced that beginning March 1, it will permanently double its output of foundry coke, setting aside for this purpose a number of ovens which have been used recently in making furnace coke.

Old Material.—Steel plants in this district are authorizing the release of a fair amount of material on current contracts, and foundry grades are the most active in many weeks. However, the demand from consumers has not increased to the extent that dealers had anticipated and consequently prices have failed to advance; in fact, in certain grades a downward trend is perceived.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to	$12.00
Scrap rails for melting	12.25 to	12.75
Loose sheet clippings	9.00 to	9.50
Bundled sheets	9.50 to	10.00
Cast iron borings	8.50 to	9.00
Machine shop turnings	8.00 to	8.50
No. 1 busheling	10.50 to	11.00
No. 2 busheling	7.50 to	8.00
Rails for rolling	13.00 to	13.50
No. 1 locomotive tires	13.50 to	14.00
No. 1 railroad wrought	11.00 to	11.50
Short rails	16.50 to	17.00
Cast iron carwheels	12.75 to	13.25
No. 1 machinery cast	16.00 to	17.00
No. 1 railroad cast	13.50 to	14.00
Burnt cast	8.00 to	8.50
Stove plate	9.00 to	9.50
Brake shoes	10.00 to	10.75
Railroad malleable	12.75 to	13.25
Agricultural malleable	12.25 to	12.75

EMPLOYEE STOCK PLAN

Purchases, Under Careful Safeguarding of Interests, May Be on Monthly Payments

An interesting example of the tendency of manufacturers to encourage habits of thrift and systematic saving among their employees is shown in a stock subscription plan originated by the Mueller Brass Co., Port Huron, Mich. Principal among the provisions of the plan are:

1. All employees who had been in the service of the company one year, at the time the plan went into effect, receive as a gift one share of 7 per cent cumulative preferred stock.
2. The company will offer each employee who qualifies as to service the right to buy additional stock in amounts not to exceed 10 per cent of his annual earnings, exclusive of bonus payments.
3. Such stock may be purchased by the employee outright, or on monthly payments to be deducted from his pay.
4. The company will deposit each year, from 1929 to 1933, a percentage of its profits in the form of a trust fund, which will be distributed pro rata in January, 1933, to all employee stockholders who have remained in continuous employ of the company, and who at the date of the disbursement still own their stock.
5. The company agrees to repurchase at par value, upon 10 days' notice, any stock thus sold previous to the division of the participating trust fund
6. Suitable provision will be made to protect employees' stock investment in the event of temporary unemployment, sickness or death.

The stock that is being sold under this plan is preferred and cumulative, having preference over all other classes of the company's stock with respect to assets and dividends. Paid up stock, deposited with the company, will entitle any employee to a company loan not to exceed 90 per cent of the par value. All dividends on gift and purchased shares are payable quarterly at the rate of 1¾ per cent each quarter.

Subscriptions may be canceled at any time through filing a written request with the secretary of the company. Within 10 days from the date of notification an employee making such a request will be paid the full amount he has paid in, plus all dividends due, less any amounts due the company. Such withdrawal automatically cancels that employee's rights to participation in the trust fund distribution.

Any purchaser who is laid off because of the temporary closing of the company's plant, or a reduction in its operating schedule, and who subsequently resumes his service, will not be deprived of any of the benefits of the plan, even though he may have found it necessary to find employment elsewhere during such suspension. The benefits of the plan are extended to all employees of the company and its subsidiaries, with the exception of company officers, and sales representatives or agents operating exclusively on a commission basis.

Sheet & Tube Stockholders to Meet March 15 to Ratify Merger

The Youngstown Sheet & Tube Co., Youngstown, has issued a call for a special stockholders' meeting March 15 at Youngstown to ratify the proposed merger with the Inland Steel Co., Chicago. A letter accompanying the official call, signed by President James A. Campbell, indicates that the transaction represents actual purchase of Inland by the Sheet & Tube company rather than a consolidation of interests. In this connection, it reads: "The officers and diretors of this company believe this purchase will greatly strengthen the position of this company by the addition of the valuable good-will and resources of the Inland Steel Co., and by further diversifying its products, and that the terms of the contract are fair and for the best interests of the company. They recommend that the contract be approved by the stockholders.

"The products of the two companies are largely different and their plants are so located in different districts that there is no substantial competition between them. The plants fit together well and can be operated together to much better advantage than apart. To preserve the valuable good-will of Inland Steel Co., it is recommended that the name of the company be changed to the Youngstown-Inland Steel Co. It is also necessary that the code of regulations of the company be changed and new directors added."

It is proposed to change the Sheet & Tube company's capital structure by changing the present authorized 1,000,000 shares to 2,000,000 shares, so that the holders thereof shall be entitled to two shares in place of every one as now authorized, and authorizing an additional amount of 1,200,000 shares.

Ohio Foundry Operations Unchanged in January

January employment reports from 64 Ohio foundries and machine shops show no change from the low level maintained since November, the index of the number of wage earners, based on an average month in 1923 as 100, standing at 82. This represents a drop of 13 per cent from January, 1927. Cincinnati, with an increase of 14 per cent, was the only city which did not show a decline. Ten steel works and rolling mills reported an improvement in employment in January for the first time since May, 1927. While the number of workmen was 7 per cent greater than in December, there was a loss of 11 per cent compared with January last year.

Statistics from 24 automobile and automobile parts manufacturers in Ohio showed that employment in January was 5 per cent ahead of December and 2 per cent better than in the corresponding month of 1927. In fact, January was the first month in the past 12 in which the number of wage earners exceeded those in the same month of the preceding year. In the Ohio construction industry, employment in January was 12 per cent less than in December and 13 per cent below January, 1927. The reports are gathered monthly by the bureau of business research of Ohio State University for publication in its bulletin.

Small Decrease in Wholesale Prices in January

Wholesale prices in January were slightly lower than in December and correspondingly lower than in January, 1927, according to the United States Bureau of Labor Statistics. The index (based on 1926) was 96.3 last month, against 96.8 in the preceding month and 96.6 in January, 1927. Changes during the month included increases in prices of farm products, hides and leather, and building materials, and decreases in prices of foods, textiles, fuel and lighting, metals and metal products, chemicals and drugs and house-furnishing goods.

Metals are listed at 98.1, compared with 98.4 in the preceding month and with 98.8 in January, 1927. This group is made up of five principal subdivisions, which are respectively iron and steel, non-ferrous metals, agricultural implements, automobiles, other metal products. There was in January a slight rise in iron and steel, from 93.7 to 93.9, compared with 99.2 a year earlier.

Fewer Mechanical Stokers Sold

Mechanical stokers sold in January are reported by the Department of Commerce at 75 units, aggregating 26,572 hp. This compares with 32,202 hp. in December and with 40,467 hp. in January, 1927. With two exceptions, the latest report shows the smallest rating for any month in more than two years.

Recommendation for the adoption of intermediate grade as the single standard for new billet reinforcing steel is contained in Commercial Standard No. 1, a bulletin recently issued by the Department of Commerce. Results of a number of conferences held by the Department in an effort to establish this standard are contained.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Feb. 20	Feb. 18	Feb. 17	Feb. 16	Feb. 15
Lake copper, New York	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	13.82½	13.82½	13.82½	13.82½	13.82½
Straits tin, spot, N. Y.	51.50	....	52.00	51.62½	51.25
Lead, New York	6.32½	6.32½	6.32½	6.35	6.35
Lead, St. Louis	6.07½	6.07½	6.07½	6.12½	6.12½
Zinc, New York	5.82½	5.85	5.85	5.90	5.95
Zinc, St. Louis	5.47½	5.50	5.50	5.55	5.60

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Feb. 20.—Further weakness in tin and zinc has developed, prices the lowest in over five years having been reached in the latter. Extreme dullness still persists in copper, with a little shading here and there. The lead market is somewhat easier.

Copper.—Featureless and sluggish is the characterization of this market in all quarters. There has been almost no buying of electrolytic copper by either domestic or foreign consumers in the past week. The small purchases which American melters have made have been at a concession from the 14.12½c. price maintained by all large producers—as low as 14c., delivered in the Connecticut Valley, in one or two instances. There has been hardly enough business to establish a market, but the metal has been available at concessions anywhere from 14c. to 14.07½c. Copper Exporters, Inc., continues its official quotation at 14.50c., c.i.f. usual European ports, with almost no business done. The dullness is explained by some as due to an expectation by consumers of lower prices based on weakness in other metals. Lake copper is firm but quiet at 14.25c. delivered.

Tin.—Prices of tin continue to hover around the levels which were established in April, 1925, and the value of tin at present is the lowest since that period. Sales continue fairly liberal, the total for last week having been about 1050 tons. There are plenty of sellers, and buyers are able to buy all they want. Friday, Feb. 17, the situation in spot tin became acute, with sales at 51.62½c. and 52.25c. bid. This was due to the temporary shortage in supplies. Saturday the acuteness softened and the situation was still more relieved today. The spread between spot and futures has again reached the normal of about ¼c. Today the market has been very dull, with spot Straits tin quoted at 51.50c. Prices in London today were again a little lower than a week ago, with spot standard quoted at £230, future standard at £233 and spot Straits also at £233. The Singapore price today was £237 5s. Arrivals thus far this month have been 3015 tons, with 6280 tons reported afloat.

Lead.—Declines in the London market have caused the market here to be somewhat easier. It is stated that the metal can be bought at New York about 5 points under the contract quotation of the leading interest, which is 6.35c., New York. In the West, it is reported that some metal sold last week as low as 6c., St. Louis, but the prevailing quotation averaged about 6.07½c. A fair amount of business in small lots for prompt shipment is reported.

Zinc.—New low prices for prime Western zinc have been established. The metal reached 5.47½c., St. Louis, today, which is the lowest price since July 6, 1922. The market is extremely weak and it is stated that 5.45c., St. Louis, was possible today. On the rather rapid decline in the last week there has been a fairly large amount of forward buying, but the spot situation is not so easy as to supplies. Prime Western today is quoted at 5.47½c., St. Louis, or 5.82½c., New York, for nearby delivery. Ore at Joplin was again easier last week with some sales at $35 per ton, as against $36 a week ago. The production was again around 3000 to 4000 tons in excess of sales.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The market is a little easier, but quiet, with Chinese metal for spot delivery quoted at 10.87½c., and futures at 11c. New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb. delivered.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.00c. to 55.00c.
Tin, bar	56.00c. to 57.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	35.00c. to 36.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.00c.
Tin, bar	61.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.75c.
Lead, American pig	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	64.00c.
Solder, ½ and ½	35.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since early December, and there have been no revisions in the quotations on zinc sheets and lead full sheets.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Non-Ferrous Metals at Chicago

FEB. 20.—There is practically no change in this market from a week ago. Prices are fairly steady and new buying is in moderate volume. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 54c.; lead, 6.30c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.25c.; pewter, No. 1, 34c.; tin foil, 40c.; block tin, 50c.; aluminum, 12.50c.; all being dealers' prices for less-than-carload lots.

NICKEL-CHROME STEEL RIVETS

Develop High Strengths and Impact Resistance When Driven in Cold Plates and Cooled Normally

LIGHT armor has been attached to tanks, gun carriages, and aircraft with ordinary rivets and bolts, which on occasion have been broken and penetrated by opposing bullets. Consequently an effort has been made to find a rivet which will drive readily, harden on slow cooling, and remain tight when cold, yet not so tight as to cause the heads to pop off when hit by a small-caliber armor-piercing bullet. Results of these studies are contained in Technologic Paper of the Bureau of Standards, No. 358, by Harry K. Herschman, entitled "Air-Hardening Rivet Steels."

Satisfactory armor has a Rockwell diamond cone hardness of 40 to 45 (Brinell 375 to 450), and a group of steels which on air cooling develop this hardness was studied. It was found that the microstructure should be fully martensitic; correct hardness could be had by steels which had more or less troostite or austenite in addition to the martensite, but the relative amount of each constituent varied widely with normal variations in cooling rates, and with corresponding wide variations in the physical properties when cold. Furthermore, it was discovered that some rivets which were driven tight when hot were loose when cold. These all had low Ar" transformation points where austenite in the hot rivet changed into the martensite of the cold rivet. This transformation causes the rivet shank to elongate, and if it occurs at too low a temperature, subsequent normal contraction on cooling will not retighten the grip. This consideration fixed a moderate limit on the carbon content. Low carbon also gave good ductility, resistance to impact, and shear strength.

Best results were had in a steel containing 0.23 per cent carbon, 0.33 manganese, 1.5 chromium and 3.75 nickel. It is somewhat cheaper than a similar steel with nickel up to 4.5 per cent, which is second choice. When driven as ½-in. rivets, joining ½-in. armor, they cooled to 415 Brinell hardness. They passed the standard hot flattening and hot bending tests satisfactorily, drove readily and remained tight when cold. Microstructure in this condition was entirely angular needle form, looking like martensite (although the authors call it "pseudo-martensite" and think that it is a mixture of true martensite and ferrite). Tensile tests on air-hardened 0.505-in. bars gave the following results:

Steel	Tensile Strength	Yield Point	Elongation in 2 In.	Reduction
3.75 Ni-Cr	200,000	170,000	10	15
4.5 Ni-Cr	170,000	170,000	0	0

One-half-in. rivets, driven in a testing fixture and cooled more rapidly by contact with the cold metal, developed higher ultimate strengths. In double shear, ½ and ¾-in. rivets failed at about 170,000 lb. per square inch stress. Only a small piece would be torn off the head of a rivet driven in armor plate, when hit directly by 0.30 caliber armor-piercing bullets flying at almost 2650 ft. per sec.

Other less extensive tests indicate that lower nickel and chromium will give satisfactory results if the action is intensified by adding a little tungsten or molybdenum.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.75c.	14.50c.

REINFORCING STEEL

Awards of About 5000 Tons and New Projects Amount to About 2700 Tons

TOTAL awards of reinforcing bars were a little more than 5000 tons. The largest was 2000 tons for a power plant at Penns Grove, N. J. Inquiries totaling about 2700 tons included 1000 tons for a loft building in New York.

BOSTON, 500 tons, Post Office garage, to Concrete Steel Co.

SCARSDALE, N. Y., 100 tons, school, to Republic Fireproofing Co.

NEW ROCHELLE, N. Y., 100 tons, bridge between Glen Island and New Rochelle for Westchester County Park Commission, to Concrete Steel Co.

PENNS GROVE, N. J., 2000 tons, power house, to Concrete Steel Co.

GREENSBORO, N. C., 180 tons, Presbyterian Church, to Truscon Steel Co.

CLEVELAND, 200 tons, Marine Hospital, to Truscon Steel Co.

DETROIT, 900 tons, building for Sears, Roebuck & Co., to Gabriel Steel Co.

CHICAGO, 220 tons of rail steel bars, apartment building at Wilson Avenue and Beacon Street, to Concrete Engineering Co.

CHICAGO, 110 tons, Women's Athletic Club, to Jones & Laughlin Steel Corporation.

CHICAGO, 700 tons, Passavant Hospital, to unnamed bidder.

LOS ANGELES, 210 tons, office building, Seventh Street and Wilshire Boulevard, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1000 tons, loft building for V. Green Co. at Canal and Hudson Streets; Turner Construction Co., general contractor.

NEW YORK, 500 tons, building for Eleto Co.; Waite Construction Co., general contractor.

CINCINNATI, 100 tons, warehouse for Union Gas & Electric Co.

DAYTON, OHIO, 150 tons, building for Young Women's Christian Association.

CHICAGO, 200 tons, Sheridan Towers apartment building.

CHICAGO, 500 tons, Civic Opera Building; Graham, Anderson, Probst & White, architects.

ST. LOUIS, 300 tons, warehouse for Atlantic & Pacific Stores Co., Fourteenth and Poplar Streets; Austin Brothers, Chicago, general contractors.

FABRICATED STRUCTURAL STEEL

New Business Good With 44,000 Tons Pending —Awards Only 20,000 Tons

AWARDS of less than 20,000 tons registered the lowest level for a week's business since the first of the year. This total, however, consisted of a large number of small tonnage projects, the only purchases of more than 1000 tons being 6500 tons for the Physicians' Building in San Francisco and 4000 tons for the Drake Tower in Chicago. Pending business was enlarged by inquiries for about 44,000 tons. Outstanding was 6000 tons for a bridge at Maysville, Ky., 5900 tons for Mississippi River barges and 4000 tons for a hotel in New York.

East Barnet-Passumpsic, Vt., 139 tons, two bridges, to Berlin Construction Co.

Brookline-Newfane, Vt., 105 tons, bridge, to Berlin Construction Co.

North Royalton, Vt., 100 tons, bridge, to Albany Bridge Construction Co.

Johnson, Vt., 100 tons, bridge, to Ring Construction Co.

Westchester County, N. Y., 400 tons, bridge connecting Glen Island and New Rochelle, to Bethlehem Steel Co.

New York, 250 tons, shoring beams and splice plates for subway work for Arthur A. Johnson Corporation, to Bethlehem Steel Co.

Little Neck, N. Y., 375 tons, Lakeville School, to an unnamed fabricator.

Ithaca, N. Y., 700 tons, residential buildings for women, to an unnamed fabricator.

Philadelphia, 250 tons, Uptown Theater and office building, to Bethlehem Fabricators, Inc.

Philadelphia, 150 tons, bank and office building at Sixteenth and Locust Streets, to Bethlehem Fabricators, Inc.

Pittsburgh, 515 tons, building for National Biscuit Co., to Fort Pitt Bridge Works.

Philadelphia, 200 tons, substation for Philadelphia Electric Co., to Belmont Iron Works.

Philadelphia, 125 tons, bridge over Carpenter Street, to McClintic-Marshall Co.

Philadelphia, 265 tons, George W. Childs Public School, to McClintic-Marshall Co.

Connellsville, Pa., 100 tons, Capstan Glass Co. addition, to Pittsburgh Bridge & Iron Co.

Pittsburgh, 200 tons, Kuhn recreation building, to Guibert Steel Co., Pittsburgh.

Pittsburgh, 500 tons, Ambassador Apartments, to McClintic-Marshall Co.

Mayview, Pa., 510 tons, Pittsburgh Municipal Hospital, 300 tons of standard sections to John Eichleay, Jr. Co. and 210 Junior beams to Jones & Laughlin Steel Corporation.

Toronto, Ont., 200 tons, Junior beams for 28-story tower, *Toronto Star*, to Jones & Laughlin Steel Corporation.

Cleveland, 100 tons, laboratory for American Gas Association, to Wellman-Seaver-Morgan Co.

Chicago, 100 tons, transformer station for Commonwealth Edison Co., to Vierling Steel Works, local.

Chicago, 100 tons, railroad bridge and turn-table repairs, to Vierling Steel Works.

Chicago, 600 tons, building for Campbell Soup Co., to Hansell-Elcock Co., local.

Chicago, 4000 tons, Drake Tower, to American Bridge Co.

El Paso, Tex., 1000 tons, refinery for Standard Oil Co., to Chicago Bridge & Iron Co.

St. Louis, 100 tons, repairs to Famous & Barr Co. store, to Mississippi Valley Structural Steel Co.

Los Angeles, 700 tons, transmission line, Southern California Edison Co., to Pacific Coast Steel Co.

Los Angeles, 850 tons, synagogue, Wilshire and Hobart Boulevards, to McClintic-Marshall Co.

San Francisco, 6500 tons, Physicians Building on Sutter Street, to McClintic-Marshall Co.

San Francisco, 130 tons, apartment building, Sixteenth Avenue and Lincoln Way, to Judson-Pacific Co.

Oakland, Cal., 300 tons, telephone building, Forty-fifth Street and Telegraph Avenue to Judson-Pacific Co.

Oakland, 100 tons, warehouse, Twenty-fourth and Peralta Streets, to Pacific Coast Engineering Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Weymouth, Mass., 123 tons, town office building.

Burlington, Vt., 500 tons, bridge over Winooski River; bids March 1.

New York, 4000 tons, Governor Clinton Hotel at Seventh Avenue and Thirty-first Street.

Brooklyn, 900 tons, theater for Allied Owners' Corporation.

Philadelphia, 1800 tons, building for Integrity Trust Co., Sixteenth and Walnut Streets; Levgar Structural Co., New York, reported low bidder.

Delaware, Lackawanna & Western Railroad, 900 tons, bridge work.

Pennsylvania Railroad, 800 tons, bridges.

Cumberland, Md., 3000 tons, building for Celanese Corporation of America.

Wheeling, W. Va., 2400 tons, six covered and 10 coal barges for Wheeling Steel Corporation.

Creighton, Pa., 1000 tons, plant for Pittsburgh Safety Glass Co.

Pittsburgh, 3000 tons, C. B. Connelley Trade School.

Pittsburgh, 750 tons, Stanley-Clark theater.

Pittsburgh, 1600 tons, nine cargo barges for Union Barge Line Corporation.

Memphis, Tenn., 5900 tons, 39 barges for Mississippi River Commission; bids to be opened March 3.

Maysville, Ky., 6000 tons, highway bridge across Ohio River; bids close March 24.

Vicksburg, Miss., 300 tons, two barges for United States Engineers.

Indianapolis, 1700 tons, building for L. S. Ayers Co.

Columbus, Ohio, 350 tons, power house at Ohio State University.

Pekin, Ill., 300 tons, bridge for Chicago & Illinois Midland.

Petersburg, Ill., 300 tons, bridge for Chicago & Illinois Midland.

Chicago, 825 tons, north approach to the LaSalle Street bridge; R. H. Simpson, low bidder.

Chicago, 3000 tons, Robey Street viaduct and approach, Great Lakes Dredge & Dock Co. general contractors.

Shreveport, La., 450 tons, viaduct.

Amarillo, Tex., 1800 tons, office building for Atchison, Topeka & Santa Fe Railroad.

Corpus Christi, Tex., 1200 tons, warehouse for Planters & Shippers Compress Co.

St. Louis, 100 tons, warehouse for J. C. Penney Co.

San Francisco, 100 tons, bridge over Colorado River, Grand Canyon National Park; bids Feb. 20 by United States Bureau of Public Roads.

Milton, Ore., 650 tons plates, 48 in. penstock; bids in.

Redwood City, Cal., 100 tons, pipe line for East Palo Alto Waterworks District; bids opened.

Seattle, Wash., 2000 tons plates, penstock for city; bids opened.

Olympia, Wash., 235 tons, Wind River bridge; general contract to Gilpin Construction Co., Portland, Ore.

RAILROAD EQUIPMENT

Only 650 Cars Ordered and 200 Under Inquiry —31 Locomotives Bought

CAR awards included 500 flat cars by the Union Pacific and 150 ballast cars by the Chicago, Burlington & Quincy. The Minneapolis, St. Paul & Saulte Ste. Marie is in the market for 200 box cars and the Berwind-White Coal Mining Co. is inquiring for 1200 mine cars. Locomotive purchases included 30 industrial engines by the Russian Railway Commission.

Union Pacific has ordered 500 flat cars from Bettendorf Co.

Baltimore & Ohio is reported to have placed 2000 steel box car bodies with Standard Steel Car Co.

Chicago, Burlington & Quincy has ordered 150 ballast cars from Rodger Ballast Car Co.

Minneapolis, St. Paul & Sault Ste. Marie has placed eight baggage and smoking cars with Pullman Car & Mfg. Corporation and is inquiring for 200 box cars.

Berwind-White Coal Mining Co. has made inquiry for 1200 mine cars.

Central Railway of Brazil has purchased 12 passenger cars from American Car & Foundry Co.

Nashville, Chattanooga & St. Louis has ordered 500 center constructions from Tennessee Coal, Iron & Railroad Co.

Sinclair Refining Co. is inquiring for five coke cars.

Russian Railway Commission has ordered 30 industrial locomotives from George D. Whitcomb Co., Rochelle, Ill.

Union Pacific has ordered 15 passenger and 10 dining cars from Pullman Car & Mfg. Corporation.

Alabama Stock Dock has ordered one locomotive from American Locomotive Co.

PERSONAL

Louis Wiard has been elected president of the Wiard Plow Co., Batavia, N. Y., returning to the organization after an absence of 13 years. He first became associated with the company in 1898, and 10 years later became superintendent of the plant. He left the company in 1915 to become State industrial commissioner of New York, retaining, however, his interest in the company and retaining the title of vice-president. Mr. Wiard succeeds Arthur G. Hough, who has been president of the company since 1914 and treasurer since 1902. He became interested in the plow company at the same time as Mr. Wiard, and will continue as a director and vice-president.

R. L. Balzer, for 11 years general manager of the Clyde Equipment Co., Portland, Ore., has organized the Balzer Machinery Co., with offices at 267½ Oak Street, Portland, and will represent several lines of contractors' and loggers' machinery, including that of the Ohio Locomotive Crane Co., Bucyrus, Ohio. His territory will include Oregon and southwestern Washington.

Paul S. Seck, formerly in the Chicago branch of the Columbia Tool Steel Co., Chicago Heights, Ill., has resigned to become associated with the Ziv Steel & Wire Co., 2945 West Harrison Street, Chicago.

W. B. Arbuckle has been placed in charge of a new sales office which has been opened at 1006 Washington Avenue, Houston, Tex., by the Wagner Electric Corporation, St. Louis. He has been associated with the company for 12 years, most recently as manager of the Kansas City, Mo., service station. Previously he served in a similar capacity at Omaha, Neb., and before that was employed in the production, ignition test, research and engineering departments of the corporation at its factory.

Earl R. Nichols, formerly with the Service Steel Co., Detroit, has joined the Peter Smith Heater & Mfg. Co., Fordson, Mich., and will devote his time to developing pressed steel stamping business for that company.

Francis O. Carfer has been appointed metal sales manager of the Republic Metalware Co., Buffalo, succeeding the late W. F. Hopkins. He entered the sheet metal business 17 years ago as representative in Ohio, Indiana and Michigan for the Tiffin Art Metal Co., Tiffin, Ohio. Later he served as sales manager for the Kanneberg Roofing & Ceiling Co., Canton, Ohio, going from that company to the J. M. & L. A. Osborn Co., Cleveland, for which he later served as Buffalo branch manager. He joined the Republic company last year.

O. C. Ferens and R. C. Nelson have been appointed managers of the New York and Chicago offices, respectively, of the Keasbey & Mattison Co., Ambler, Pa., manufacturer of insulating materials.

R. B. Vessey, for several years general superintendent of the tool room and automatic department of the AC Spark Plug Co., Flint, Mich., has been made assistant to the management of the company. Before going with the AC organization he was engaged in the development of experimental machines for the Buick Motor Co. Louis B. Berge, who has been associated with the AC company for 12 years, most recently as general superintendent of plants Nos. 1, 2 and 3, has been appointed manager of manufacturing. George Mann., Jr., recently assistant comptroller, has been advanced to assistant secretary-treasurer and has been succeeded by Walter J. Langdon, formerly supervisor of the tabulating and payroll department.

Myron A. Wick, who has been vice-president of Steel & Tubes, Inc., Cleveland, has been elected president of that company, succeeding his brother, Hugh B. Wick, who has been made chairman of the board. The new president has been associated for 14 years with the company and its predecessor, the Elyria Iron & Steel Co. J. L. Sussman has been elected first vice-president in charge of the Brooklyn plant. Lyman Bartlett has succeeded Harris Sussman as a director.

Earle F. Heffley has been appointed sales manager of the Morse-Rogers Steel Co., Cleveland, steel jobber. A. J. Decker has been named assistant sales manager. Mr. Heffley had been connected for some time with the Betz-Pierce Co., Cleveland.

J. W. Collins, superintendent of the Detroit foundry of the Aluminum Co. of America, addressed the Quad-City Foundrymen's Association on Feb. 20 at the Leclaire Hotel, Moline, Ill.

John E. Frederick, general manager of the Kokomo Steel & Wire Co., Kokomo, Ind., has announced his candidacy for the governorship of Indiana.

Ralph E. Frey and J. E. Ledeboer have been elected vice-presidents of the Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa. Mr. Frey, who has been secretary and sales manager, will continue in charge of the company's products. H. R. Weaver has been elected secretary.

James H. McGraw, president McGraw-Hill Publishing Co., New York, was awarded the Harvard Gold Medal for distinguished service to advertising at a dinner held Feb. 17 at the Faculty Club, Boston. The medal is one of the 10 awards established in 1923 by Edward Bok.

O. D. Fries has been placed in charge of consumer motor sales in the Detroit territory for the Lincoln Electric Co., Cleveland. He is a graduate of the Glasgow Royal Technical College and Glasgow University, Glasgow, Scotland, and has had varied experience in practical and theoretical engineering and sales work.

J. H. Mull has retired as president of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, and has been succeeded by H. Birchard Taylor, who is also president of the Cramp-Morris Industrials, Inc., which was formed to take over some of the departments and subsidiary properties of the Cramp company when liquidation was undertaken about a year ago.

E. C. Brandt, recently works manager at the Homewood works of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and F. J. Shiring, who has been superintendent of motor apparatus, have been appointed assistant works managers of the company. J. E. Webster, formerly engineer of works for the Westinghouse organization, has been made chief plant engineer. A. E. Kaiser, who has been assistant works manager, East Pittsburgh works, has been made director of production for all works, and S. C. Hoey, since 1926 superintendent of the manufacturing engineering department, has become works manager of the Homewood renewal parts works.

George F. Davie, vice-president and treasurer of the Interstate Iron & Steel Co., Chicago, left this week for a vacation trip through northern Africa, Greece, Italy and France.

Oscar Egan, an assistant engineer with the Minneapolis Steel & Machinery Co., Minneapolis, has resigned to become chief engineer for the Hart-Parr Co., Charles City, Iowa.

W. S. Peddie has been appointed treasurer of the Minneapolis Steel & Machinery Co., Minneapolis. He will also continue as comptroller and succeeds as treasurer E. A. Merrill, who has retired after 25 years of service with the company.

H. C. Camp has been appointed receiver of the H. D. Smith Co., Southington, Conn., maker of drop forgings, by the United States District Court, Hartford, Conn.

George P. Aborn, formerly manager Blake & Knowles Works, Worthington Pump & Machinery Corporation, Cambridge, Mass., has become associated with the industrial department of the Harvard Trust Co., Cambridge

George W. Thurston, vice-president American Screw Co., Providence, R. I., has been made general manager of the company. Paul C. Nickerson, a director, has been made a vice-president.

George J. Green, of the Pittsburgh Welding Corporation, Pittsburgh, is to be the speaker at the regular monthly meeting of the Pittsburgh section, American Welding Society, at the William Penn Hotel on Wednesday evening, Feb. 29. His subject is to be "Miscellaneous Welding and Repair Work."

G. Burki, formerly salesman with the E. L. Essley Machinery Co., Chicago, has joined the Chicago sales force of Manning, Maxwell & Moore, Inc., 27 North Jefferson Street, machinery dealer.

Dr. Colin G. Fink, professor of electrochemistry Columbia University, New York, lectured recently to the graduate students of Yale University on "Corrosion, Its Cause and Prevention." He emphasized in particular the modern electrolytic method for the prevention of corrosion of boilers, which method likewise does away with the formation of boiler scale. He also referred to the new development in electroplating of chromium on steel, a process for which Doctor Fink's laboratory has been responsible.

Alexander Dow, head of the Detroit Edison Co. and president of the American Society of Mechanical Engineers, was the guest of honor at the monthly dinner meeting of the Engineers' Society of Milwaukee on Feb. 15 and spoke on "Detroit Edison Power Plant Problems." The session was under the auspices of the Milwaukee section of the American Society of Mechanical Engineers. Mr. Dow was a guest of Gen. Otto H. Falk, president Allis-Chalmers Mfg. Co., during his stay in Milwaukee.

H. A. Sedgwick, superintendent of the Cutler-Hammer Mfg. Co., Milwaukee, manufacturer of electrical controlling devices, has been made manager of operations, A. E. Rauch has been appointed assistant superintendent.

C. I. Auten, M. T. Clark and C. D. Loveland have been made vice-presidents of the Truscon Steel Co., Youngstown, Ohio. Mr. Auten has been with the company 17 years and will be in charge of the standard building division. Mr. Clark, with the company nine years, was formerly an architect in California; he will supervise the steel window department. Mr. Loveland has been in charge of sales for the company in the Pittsburgh district and in his new capacity will have charge of sales in New Jersey, with headquarters in Newark.

Pacific Northwest Iron and Steel Leaders to Hold Conference

Expansion of Pacific Northwest business, development of markets and correction of trade abuses are to be considered at a conference of iron and steel industry leaders in the Pacific Northwest at the Winthrop Hotel, Tacoma, Wash., Feb. 27. The conference will be the first of its kind in that territory and is expected to result in the formation of the Northwest Iron and Steel Conference. Problems common to the manufacturer, the fabricator, the foundry operator and the distributer of steel products will be considered as a whole and will be followed by trade group meetings for considering individual problems relating to each division of the industry.

The Gartshore, Thompson Pipe & Foundry Co., Hamilton, Ont., is completing erection of a new plant for manufacture of cast iron pipe by the centrifugal process.

Benjamin Talbot New President of Iron and Steel Institute

BENJAMIN TALBOT

The annual meeting of the Iron and Steel Institute will be held Thursday and Friday, May 3 and 4, at the House of the Institution of Civil Engineers, Great George Street, London, England. At this meeting Benjamin Talbot will assume office as the president for the year 1928-1929, and the meeting will take place under his presidency. Mr. Talbot is the inventor of the continuous process for making steel which bears his name. Born in 1864, he went to the United States in 1890. His first work here was the management of a steel works at Chattanooga, Tenn. In 1893 he went to what is now the Pencoyd Works of the American Bridge Co. at Philadelphia, as manager. Returning to England in 1900 he introduced the continuous process which he had meanwhile invented. He also originated a mechanical gas producer and is credited with several improvements in open-hearth and reheating furnaces.

The autumn meeting of the institute is announced as scheduled to be held in Bilbao, Spain, and the neighboring mining districts, Sept. 24 to Oct. 2.

Philadelphia Steel Club Holds Its Tenth Annual Dinner

The Steel Club of Philadelphia, an organization of steel company sales managers, held its tenth annual dinner at the Manufacturers' Club, Philadelphia, Friday evening, Feb. 17. It was attended by more than a hundred purchasing officials of Eastern companies as guests of the 35 members of the club. The dinner was followed by an elaborate vaudeville entertainment which had been arranged by the club's entertainment committee consisting of W. H. Dickson, chairman; R. H. McCracken and W. W. Deal. Officers of the club are: J. B. De Wolf, Trumbull Steel Co., president; W. S. Haring, Alan Wood Iron & Steel Co., vice-president; F. J. Krouse, Bethlehem Steel Co., secretary and treasurer.

Foundrymen Nominate New Officers

At a meeting of the nominating committee of the American Foundrymen's Association, in Cleveland, Feb. 6, the following were nominated as officers and directors of the association:

For president to serve for one year:
    S. T. Johnston, vice-president and general manager, S. Obermayer Co., Chicago.
For vice-president to serve for one year:
    Fred Erb, president Erb-Joyce Foundry Co., Detroit.
For directors to serve three-year terms each:
    S. W. Utley, vice-president, Detroit Steel Casting Co., Detroit.
    L. W. Olson, works manager, Ohio Brass Co., Mansfield, Ohio.
    B. H. Johnson, works manager, Cresson-Morris Co., Philadelphia.
    Peter J. Krentz, vice-president and works manager, Buffalo Foundry & Machine Co., Buffalo.
    C. E. Hoyt, executive secretary, Chicago.

Massey-Harris Co., Ltd., Toronto, has purchased the J. I. Case Plow Works, Racine, Wis. The Massey-Harris Co., large manufacturer of farming implements exercised an option dated Feb. 14, 1924, it is said, and purchased all of the plow company's assets and good will.

OBITUARY

Thomas DeVenny, manager of lines of the Portsmouth By-Product Coke Co., Portsmouth, Ohio, died Feb. 13, following an operation at University Hospital, Philadelphia. He was well known in the eastern Kentucky coal fields, having made his home at Freeburn, Ky. In addition to his duties with the Portsmouth company, he was president of the Williamson Coal Co., Edgarton, W. Va. He was 39 years of age.

James W. Nelson, for many years manager of Richard Dudgeon, Inc., New York, and actively engaged in that time in designing and developing hydrostatic apparatus, died Feb. 16 at Altadena, Cal., where he had gone a few years ago for his health. He was born in Cambridge, Ohio, 60 years ago, and received his early education in Lawrence, Kan. He was a member of the Sons of the Revolution, the American Society of Mechanical Engineers, the American Society of Civil Engineers and the Brooklyn Engineers' Club, serving as president of the last named organization.

Charles W. Hessler, manager of the Gloucester, N. J., plant of the American Radiator Co., died on Feb. 14 at his home in Haddonfield, N. J., aged 38 years. Before going with the radiator company he was identified with the Buffalo plant of the Austin-Arcola Co. and previously had been associated with his brother, the late George Hessler, in the Hessler Foundry & Mfg. Co., Oswego, N. Y.

Joseph Farris, for many years identified with the Farris Furnace Co., Springfield, Ill., died on Feb. 7.

Fay B. Zopf, vice-president of the Youngstown Boiler & Tank Co., Youngstown, Ohio, died Feb. 15 at his home in Youngstown, aged 47 years. He had been connected with the Youngstown company for four years, and for 23 years previously had been associated with the Riter-Conley Co., Pittsburgh, for a number of years as sales manager.

Albert Claude Ludlum, president New York Engineering Co., New York, died on Feb. 15 at the Fifth Avenue Hospital in that city. He was born in Brooklyn in 1867 and in 1889 went to Denver, where he entered the employ of the Kennedy & Pierce Mfg. Co., maker of mining machinery. He returned to New York in 1895 to become sales engineer and manager of James Beggs & Co., machinery dealers. He left that company in 1906 to organize the New York Engineering Co., with plant at Yonkers, N. Y., to manufacture mining and dredging machinery and equipment. He was a member of many engineering societies and clubs.

M. Cochrane Armour, for many years a partner in Rogers, Brown & Co., now Rogers Brown & Crocker Brothers, Inc., died Feb. 15 at his home in Pasadena, Cal. He was born at Auburn, N. Y., and went to Chicago in 1895, managing the local office of Rogers, Brown & Co. from that date until 1916. He was a director of the Chicago Short Line Railway, vice-president of the Rogers Iron Mining Co., president of the Iroquois Iron Co. and a director of the Rogers-Brown Ore Co. and the Lake Superior Iron & Chemical Co.

Robert Livingston Ireland, formerly a member of the firm of M. A. Hanna & Co., Cleveland, died in his apartment at the Hotel Seymour in New York, Feb. 17, aged 60 years. He was born in Stratford, Conn., and after graduation from Yale University in 1890 he located in Cleveland, where he was employed by the Cleveland Hardware Co. In 1899 he took an active part in consolidating some of the shipbuilding interests of the Great Lakes into the American Shipbuilding Co., of which he was vice-president until 1903. He became a member of M. A. Hanna & Co. in 1904, having previously married a daughter of the late H. M. Hanna. He was very active in all the affairs of that firm, although he devoted particular attention to its finances. He retired from the Hanna firm in 1918 and since then has made his home in New York. During his active business career he was associated with two Cleveland banks and with several Eastern corporations.

Era of Individualism Passing

(*Concluded from page* 531)

edy is equally obvious. Owen B. Young, chairman of the board of the General Electric Co., has said that the solution of business problems lies in group action. Charles M. Schwab has made the statement that cordial cooperation among the various elements of the steel industry would be worth more than a billion dollars.

"James A. Farrell, president of the United States Steel Corporation, has always advocated a general adoption of the principle of cooperation in the place of ruinous competition, as a means of bringing about more stable conditions and better profits in the steel industry. Close and mutually helpful relations between the producing mills and their intermediate industries constitute an essential step in achieving such cooperation.

"The mills have a well defined responsibility in the movement of their products to the ultimate consumer. Intermediate industries, otherwise designated as distributers, are in most instances essential to efficient distribution. Public interest demands service based upon the most economical system of distribution, and responsibility for such service rests equally upon producer and distributer. It continues until the public's requirements have been adequately met.

"Structural steel, steel pipe, tanks, boilers and other steel products have suffered a drastic shrinkage in their markets, due largely to lack of cooperation in the past between the producing mills and the distributing industries. I believe, however, that this state of affairs is destined to show marked improvement in the not distant future.

Volume Should Not Be the Chief Aim

"In a number of our key industries there is actually severe trade depression due largely to methods that have obliterated all semblance of salesmanship. If the tendency in this direction continues at its present rate it threatens to develop into trade prostration of the worst kind. In my opinion, the best hope of checking this trend lies in convincing our executives that volume is not the sole aim of business.

"We must learn that fair volume coupled with fair profit is far more desirable than maximum volume coupled with minimum profit or no profit at all. We must learn that a million times nothing is still nothing.

"Price-cutting is a direct result of unreasonable greed for business, and rancorous, cut-throat competition is a direct result of price-cutting."

Republic-Trumbull Merger to Become Effective May 1

Merger of the Trumbull Steel Co. and the Republic Iron & Steel Co., approved last week by about 94 per cent of the outstanding preferred and common stock of the Trumbull company, following a previous approval by Republic shareholders, is expected to become effective as of May 1. Headquarters will be in Youngstown, and the Trumbull properties will be known as the Trumbull division of the Republic company.

The Interstate Commerce Commission has suspended until Sept. 15 proposed increased rates on railroad car material in carloads between points in Illinois Classification Territory. The schedules would increase from 17.5c. to 22c. per 100 lb. the rates from Chicago to Mount Vernon, Ill., and East St. Louis, Ill.; 15½c. to 17c. to Moline, Ill., from Mount Vernon and Chicago and from 9½c. to 12c. from Mount Vernon to Belleville, Ill.

BOOK REVIEWS

Economics of Instalment Selling. By Prof. Edwin R. A. Seligman, Columbia University. A Study in Consumers' Credit, With Special Reference to the Automobile. Vol. I, 357 pages; Vol. II, 623 pages; with numerous charts and tables in the text. Harper & Brothers, New York. Price, $8.00.

These books contain the results of a year's investigation, undertaken for General Motors Corporation, in which the author had the help of several colleagues and assistants. Volume I contains a brief statement of the facts which are known about instalment selling, and an outline of the course of reasoning pursued to reach the general conclusion that instalment selling of durable goods to responsible consumers is a healthy development in modern trade. Volume II contains a series of appendices, giving in considerable detail the results of special studies undertaken to get the more essential facts, which were missing.

These volumes are to be heartily commended for several reasons. They contain an orderly analysis of a distinctly modern problem by a leading economist. They are very readable. The appendices will prove a mine of information on such things as the amount and variety of goods now being bought on instalments, the selling methods, the financing of motor car retailers, the used car problem and the defaults which occurred during the anthracite strike in 1926.

It is reported that the study was undertaken to give one of the leading automobile producers an answer to the very practical question, "Is it good public policy to encourage purchasing on the instalment plan?" Professor Seligman states that in 1925, out of an estimated total retail sales of all commodities of 38 billion dollars, no less than 5 billion dollars was negotiated on instalments, and the average amount of instalment paper outstanding was 2.2 billion dollars. Toward the end of the discussion, the author reaches the view that this paper is essentially the same as any other credit since it rests on the character of the borrower, that it does not involve utilization before payment (because the utilities of the motor car, piano or other purchase last much longer than the payment period), that it is just as liquid as the more conventional producers' credit, and that the total volume of instalment credit, even though growing, is inconsiderable in relation to the total credit of all kinds. Consequently he holds that instalment selling contains no special hazard to the banking system. Furthermore, in times of business depression, when producer's credit is overexpanded, instalment paper can be sharply curtailed, and therefore would not intensify industrial stagnation. On the contrary, Professor Seligman says it may even be distinctly beneficial in the recovery period, by starting the flow of commerce from producer to consumer more quickly than if the consumer had to wait until all his losses were repaired and his savings reestablished to the point where he could purchase the more expensive articles.

Professor Seligman attacks the distinction ordinarily made between production and consumption, and by a process of reasoning which to the reviewer does not seem entirely convincing comes almost to the conclusion that consumption is production. It goes something like this: Production is defined as the creation of wealth and of the productive efficiency which renders future wealth more easy of attainment. Consumption is defined as the utilization of wealth for the satisfaction of the personal wants of the user. Wise consumption increases the ability of the consumer to produce wealth. If you follow thus far, you then agree that "utilization of wealth that we call production is from one point of view not to be distinguished from utilization of wealth that we call consumption." These mental exercises are apparently necessary in order to remove the economic stigma which seems to attach to consumers and consumption (from which production is free), and apparently growing out of the economists' premise that the greatest good is reached where the greatest surplus of wealth is being produced. In passing, it may be remarked that this premise may be doubted, indeed has been doubted among others by a Philosopher who was brought up at Nazareth and whose teachings are still widely respected.

Considerable space is given to the question whether instalment selling increases wasteful luxury. It is concluded that the automobile is not a reprehensible luxury because its consumption is neither wasteful nor destructive of material wealth nor of economic welfare; in fact, in all but a small percentage of instances, it creates a surplus of material or psychical utilities, or at least is neutral—neither creative nor wasteful. Few people would condemn the automobile unreservedly; the balance of good it has brought far outweighs the preventable abuses and misuses.

All, however, is not rosy. Attention is called to serious abuses which have appeared in the method of selling and the surcharge for the convenience. It has been said by critics of instalment selling that it changes the buyer into a virtual slave of the usurer, and involves a long train of baleful influences. If the added price of instalment buying is figured as interest on money payments deferred, it will work out to 27 per cent per annum, or more, but it is pointed out that the "finance charge" must cover more than mere interest on the deferred payments; it includes such items as credit analysis, collections, losses by occasional default, insurance, and readiness to serve. Whether this costs more than it is worth can only be determined by asking the consumer, a thing which has yet been done only once. In the State of Oregon a questionnaire was answered by 2105 people who had bought various articles on the instalment plan. About 60 per cent believed that the method was not of advantage to them. Professor Seligman dismisses this, the only real information on the point, rather cavalierly with the observation that the conclusions "are partial and fragmentary . . . of relatively minor importance." While it is not so stated, the reader gathers that the author believes that the large growth of instalment selling is evidence enough that the buyer does not object—that he feels he is getting his money's worth. Yet growth of instalment selling could as well result from intensive salesmanship, or from an overextension of instalment purchases, to the point where a great number of consumers never are out of debt.

That these alternative suggestions are of some bearing may be concluded from what appears to be the creed of the General Motors Acceptance Corporation: "Largest possible down payment; shortest time for balance." Such a plan reduces the risk and increases the profit of the finance corporation, and simultaneously cures many of the admitted evils growing out of reckless use of other people's property by irresponsible persons. Such a policy, combined with careful analysis of the credit of prospective purchasers, has enabled the General Motors Acceptance Corporation to keep its percentage of losses in 1926 from delinquencies to 0.035 per cent of the volume of total retail paper purchased. Compare this with 1.75 per cent, an average for many other finance companies in 1925; or with 0.10 per cent losses of the Morris Plan banks; or with 0.20 per cent losses on producers' credit advanced by commercial banks; or 25 per cent when selling furniture on instalments in poorer districts.

With all these considerations in view, Professor Seligman's conclusion is obvious: that when instalment selling is good, it is very good. When instalment selling is bad (that is, not restricted to what loan brokers call "prime names," or utilized for other than durable goods, or extended in large amounts and for long times), it is bad from abuses which may be corrected, and in part are self-correcting. E. E. T.

Bounties and Rebates Feature Markets

British and German Schemes to Augment Exports Are Active—Price Trends Uneven

(By Cablegram)

LONDON, ENGLAND, Feb. 20.

CLEVELAND pig iron is active and producers are well sold, but they complain that prices are insufficiently remunerative, as costs are increasing. Export demand is improving, but so far actual sales are still meager. Hematite prices are easy.

Foreign ore is strong, due to the Swedish strike, but British consumers already have bought most of their needs.

Finished steel, generally, is quiet as regards export, but the domestic demand is improving. The Steelmakers' Association has advanced its prices of plates, angles and sections, to domestic users, by 5s. ($1.22) a ton, increasing by a similar amount the rebate to users who are participating in the rebate scheme. It is hoped thereby to attract other users.

Tin plate inquiry is good, but business is irregular, as buyers are hoping to secure their supplies at the schedule price. Some mills are accepting this figure, but most of them are holding out for 18s. ($4.39) or upward, basis, IC, f.o.b. works port, as their order books are filled for some months in advance.

Galvanized sheets are active and makers of the heavy gages are now well placed. There is moderate demand for black sheets to Japanese specifications, both thick and thin gages.

On the Continent of Europe

Continental iron and steel markets are strong, based on good demand and a reluctance on the part of the works to accept offered orders, especially on semi-finished steel and joists (beams). British sheet rollers have paid 96s. ($23.39) a ton f.o.b., for sheet bars.

German pig iron production in January is now placed at 1,180,000 (metric) tons.

GERMAN PRICE RISE OPPOSED

Consumers Protest That They Cannot Pass on Higher Cost and Ask Investigation

BERLIN, GERMANY, Feb. 1.—The recent advance in prices by the Ingot Steel Syndicate has brought protests from consuming industries. The new level of steel prices has forced manufacturers, such as the machinery builders, to make slight advances in their prices and the machinery industry points out that even a small increase gives an advantage to importers of foreign machines, particularly American. As a result of the rise in prices, the export bounties have been correspondingly increased, but German manufacturers complain that while they will lose nothing in their export trade by the price revision, German consumers will not accept higher domestic prices.

The bounties being offered to exporting manufacturers at present are: Steel ingots and blooms, 24m. ($5.72) per ton; slabs, 27m. ($6.44); structural shapes, 35m. ($8.35); steel bars, 36m. ($8.59); wire rods, 21.50c. ($6.13); heavy gage sheets, 24m. ($5.72); and boiler tubes, 80m. ($19.08).

Consumers are protesting to the Government against the revision of prices, pointing out that since the foundation of the International Steel Cartel the difference between the domestic and world market prices has been increased, although the cartel was expected to bring about higher export prices. Consumers believe that members of the steel syndicate are exploiting their home market, and there is a demand for anti-syndicate legislation, similar to American anti-trust laws. Although supporters of the steel syndicate in the Reichstag argue that the Government has not sufficient cause for applying existing legislation regulating cartels, the Minister of Industry, Dr. Curtius, has acted under the section of the law which requires producing cartels to

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.	to £0 18¼s.	$4.39	to $4.45
Bilbao Rubio ore*	1 1½		5.24	
Cleveland No. 1 fdy.	3 7½		16.44	
Cleveland No. 3 fdy.	3 5		15.83	
Cleveland No. 4 fdy.	3 4		15.59	
Cleveland No. 4 forge	3 3½		15.46	
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to 18.39
East Coast mixed	3 9	to 3 10	16.80	to 17.05
East Coast hematite	3 9½	to 3 10½	16.93	to 17.17
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 17¾	to 0 18¼	4.33	to 4.45
Black sheets, Japanese specifications	13 5	to 13 10	64.53	to 65.75
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1,99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	9 15	to 10 0	2.12	to 2.17
Galv. sheets, 24 gage	13 7½		2.96	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)				
Belgium	£3 2½s.	to £3 4s.	$15.22	to $15.59
France	3 2½	to 3 4	15.22	to 15.59
Luxemburg	3 2½	to 3 4	15.22	to 15.59
Basic pig iron (nom.):				
Belgium	3 0		14.61	
France	3 0		14.61	
Luxemburg	3 0		14.61	
Coke	0 18		4.39	
Billets:				
Belgium	4 13½		22.77	
France	4 13½		22.77	
Merchant bars:			C. per Lb.	
Belgium	5 4		1.13	
France	5 4		1.13	
Luxemburg	5 4		1.13	
Joists (beams):				
Belgium	4 15		1.03	
France	4 15		1.03	
Luxemburg	4 15		1.03	
Angles:				
Belgium	5 5		1.16	
⅛-in. plates:				
Belgium (a)	6 8		1,41	
Germany (a)	6 8		1.41	
$\frac{3}{16}$-in. ship plates:				
Belgium	6 3		1.36	
Luxemburg	6 3		1.36	
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

submit to him all decisions and agreements on prices before they become effective. In addition, the entire price situation is to be investigated by the Government.

Since the price advance on many products by the syndicate, finished materials have advanced. Apparently, as a result of the agitation caused by these increases, the syndicate has abstained from further advances. The Pig Iron Syndicate has announced unchanged pig iron prices for February. Although unemployment continues to increase, demand for iron and steel continues heavy.

Annual reports of such large companies as the Central German Steel Works, the United Steel Works, the General Electricity Co. and the Linke-Hofmann Corporation all reflected prosperity in 1927. The electrical industry did particularly well and expects some large orders if the French Government carries out its reported plan of accepting reparations payments in electrification of French railroads, ports, canals and colonial projects.

German Steel Mill Reports on Its Operations

HAMBURG, GERMANY, Feb. 4.—The United Steel Works has begun publishing quarterly reports of production and unfilled tonnage. The first of these statistics, covering the final quarter of last year, shows an output of 1,750,000 metric tons of pig iron, compared with 1,660,000 tons in the last quarter of 1926; 1,830,000 tons of steel ingots, compared with 1,780,000 tons in 1926; 6,670,000 tons of coal, compared with 6,550,000 tons in 1926; and 2,300,000 tons of coke, compared with 2,140,000 tons in 1926.

The total number of employees in the last quarter of 1927 was 183,179, of which 5173 were in the coal mines and the rest in the iron and steel departments. The number of employees was about 1.25 per cent greater than in the same quarter of 1926. By the end of January, 1928, the total of unfilled orders was 1,490,000 metric tons of steel, about 34 per cent more than in January, 1927, and about 99 per cent greater than in January, 1926.

Italian Company Books Foreign Locomotive Order

HAMBURG, GERMANY, Feb. 4.—Considerable interest has been aroused among German locomotive builders by the report that an Italian company, the Societa Italiana Ernesto Bredo at Milan, had received an order for 10 of a total of 39 locomotives purchased by the South African railroads. This is said to be the first export order taken by an Italian locomotive builder since the war. The remaining 29 locomotives on the list went to the North British Locomotive Co. German builders expect that Italy will continue as a competitor for overseas business in locomotives.

Germany Increases Imports of Tin Plate

HAMBURG, GERMANY, Feb. 4.—There was an increase of about 300 per cent in Germany's imports of tin plate in 1927 compared with 1926. German tin plate production is only about 100,000 tons a year, while consumption is about 150,000 tons annually. Of the total imports last year Welsh mills supplied 26,212 tons, compared with only about 5838 tons in 1926. The remaining tonnage came from Belgium and France, with a few small lots from the United States. German consumers evidently like the quality of American tin plate, and increased sales might be possible if the market were properly cultivated.

Exports of copper from the United States in 1927 are reported by the Bureau of Foreign and Domestic Commerce at 538,403 net tons, with a value of $150,163,302. This value is double the figure given for steel mill manufactures, which aggregated $73,871,825. It is within 6½ per cent of the total of finished and semifinished iron and steel, which was $160,631,441.

French Iron and Steel Output and Exports in 1927

PARIS, FRANCE, Feb. 2.—The total production of steel in France in 1927 was 8,275,000 metric tons, compared with 8,386,000 tons in 1926. Of this total, 5,858,000 tons was basic Bessemer, 2,251,000 tons open-hearth, 91,900 tons electric furnace steel, 59,900 tons acid Bessemer and 11,200 tons crucible steel.

The total pig iron output for 1927 was 9,293,000 tons, compared with 9,393,000 tons in 1926. Of this total, 7,162,000 metric tons was basic, 1,200,000 tons foundry, 38,000 tons phosphoric forge iron, 373,000 tons foundry grade hematite and 304,000 tons hematite, foundry and Bessemer iron.

Iron and steel imports totaled 97,194 metric tons, compared with 129,640 metric tons in 1926. Exports totaled 4,715,142 metric tons, compared with 3,471,258 tons in 1926. Of the total exports of 835,703 metric tons of pig iron in 1927, the United States received 3484 tons. This compares with 23,977 metric tons of pig iron shipped to the United States in 1926 out of total exports of 702,537 tons. The United States received 43,200 tons of blooms, billets, beams, bars and similar material, compared with 36,051 tons in 1926, and 41,537 tons of castings, compared with 38,592 tons in 1926. Exports of rails totaled 388,048 tons, compared with 322,217 tons in 1926. Of the 1927 total, Germany received the largest amount, taking 72,502 tons compared with 44,647 tons in 1926. Japan received 31,376 tons of rails, compared with 12,282 tons in 1926. The United States took 2694 tons in 1927 and 3768 tons in 1926.

British Iron and Steel Exports Lower; Imports Higher

WASHINGTON, Feb. 20.—Imports of iron and steel products into the United Kingdom increased to 283,921 gross tons in January from 280,520 tons in December, while exports declined to 332,185 tons from 351,795 tons, despite the tendency toward increased output, particularly of raw steel, according to a radiogram received by the Department of Commerce from Commercial Attaché William L. Cooper, London.

Production of pig iron in January was 560,500 tons, compared with 559,100 tons in December, while steel production totaled 626,200 tons and 604,900 tons, respectively. At the end of January there were 148 blast furnaces and 272 open-hearth furnaces in operation.

The principal gains in imports in January were in structural steel and plates and sheets. The most marked declines in exports in January were made in pig iron and ferroalloys, galvanized sheets and rails, while there were gains in such lines as structural steel and tin plate and in railroad material other than rails.

Structural Steel Orders Lower in January; 1927 Was Record Year

WASHINGTON, Feb. 20.—Orders for structural steel in January totaled 165,017 tons, representing 57 per cent of capacity, according to reports received by the Department of Commerce from 195 firms with a monthly capacity of 291,290 tons. Computed bookings amounted to 213,750 tons. Shipments were computed at 210,000 tons. Orders in December, reported by 221 firms with a capacity of 302,195 tons, were 209,429 tons or 69 per cent of capacity. Computed bookings amounted to 258,750 tons and computed shipments were 240,000 tons.

Orders for structural steel in 1927, computed at 3,060,000 tons, representing 68 per cent of capacity, were the highest in the history of the industry, though the greatest rate of operation, 72 per cent, was made in 1925, when computed orders were 2,998,080 tons. The lowest year since 1913, both in orders and rate of production, was 1921, when orders were computed at 1,188,600 tons and output rated at 35 per cent of capacity.

Monthly capacity reached its highest point in 1927, with 363,770 tons, as reported by 435 firms, and the total is estimated at 375,000 tons. There has been a continuous increase in capacity since 1913, when the 435 firms reported 214,200 tons.

Machinery Markets and News of the Works

BUYING IS LESS ACTIVE

February Machine Tool Business May Not Equal That of Last Month

Considerable Inquiry Is Pending but Prospective Buyers Are Somewhat Slower in Placing Orders

MACHINE tool buying has been moderately active in some of the principal buying centers during the past week, but sales are not in keeping with the promise held out by the fairly large inquiry of the past several weeks, and indications are that February business may not equal that of January. A considerable volume of business on which quotations went in last month is still pending, and the disposition to defer purchases is more apparent among various classes of buyers. The railroads in particular are doing little while the demands from the automobile industry have subsided now that 1928 production schedules are well under way.

Operations of machine tool plants are poorly balanced for the reason that some companies have a fair amount of unfilled business on their books, while others have comparatively little. Builders of high production tools have been getting the bulk of recent orders.

In the Cleveland and Detroit districts manufacturers of automobile parts are among the most active buyers. The chief inquiry from an automobile company is for 20 to 30 centrifugal grinding machines for the Ford plant. The Chicago trade is awaiting the placing of orders against the recent large inquiry of the Santa Fe Railroad. In the East the principal buyers are the General Electric Co. and the Wright Aeronautical Corporation.

The United States Navy will shortly purchase 18 lathes for scout cruisers.

New York

NEW YORK, Feb. 20.

INDUSTRIAL users of machine tools continue moderately active in purchasing, but no business is being closed with the railroads in this district. The General Electric Co., Schenectady, has closed against a number of tools on a list of 12 to 15 pieces of equipment, but still has some large machines to buy. The Wright Aeronautical Corporation, Paterson, N. J., has ordered a number of tools in the past 10 days including several milling machines, two turret lathes and some radial drills.

The New York Central Railroad has a number of outstanding inquiries but has not yet taken any action toward making purchases. The list of the Delaware, Lackawanna & Western Railroad is still open. The other railroads which buy in this district continue inactive.

Recent purchases of tools have included nine 5-in. production hand milling machines by a Detroit motor company, a 16 x 36-in. lathe by a Massachusetts construction company, a No. 1 Sigourney drill by a New Jersey manufacturer, a 13 x 48-in. lathe by a Milwaukee manufacturer, a 20-in. x 12-ft. Boye & Emmes lathe by an Indiana company, a 22-in. x 14-ft. Morris lathe by a Pittsburgh manufacturer, a 13 x 48-in. lathe by a Milwaukee company, a 6-in. vertical shaper by a Chicago machinery company, a 13 x 30-in. lathe by a Connecticut manufacturer, two No. 13 profiling machines by a typewriter maker, a 12-in. vertical shaper by a Cincinnati machine tool builder. A manufacturer in Pennsylvania has closed on the following used machine tools: A 26-in. x 17-ft. Pond lathe and a 30 x 30-in. x 12-ft. Pond planer, a 15-in. Bement slotter and a 2 x 26-in. Pratt & Whitney turret lathe.

Contract has been let by Ward Leonard Electric Co., South Street, Mount Vernon, N. Y., manufacturer of controllers and other electrical apparatus, to John W. Ferguson Co., Paterson, N. J., for a one-story addition, 115 x 116 ft., to cost upward of $75,000 with equipment.

E. M. Adelsohn, 26 Court Street, Brooklyn, architect, is preparing plans for a three-story automobile service, repair and garage building to cost $125,000 with equipment.

Mansfield Iron Works, 878 East Forty-third Street, Brooklyn, has acquired property on East Mill Basin, Jamaica Bay section, for establishment of a new plant.

Tillary Chemical & Perfume Laboratories, Inc., 16 Tillary Street, Brooklyn, manufacturer of chemicals and chemical by-products, is reported planning to rebuild four-story factory recently destroyed by fire, with loss estimated at more than $50,000 with equipment.

Franz Wolfgang, 535 East Tremont Avenue, New York, architect, has plans for a two-story automobile service, repair and garage building on White Plains Avenue, to cost close to $100,000 with equipment.

Department of Docks, Municipal Building, New York, will soon begin work on a municipal airport in Mill Basin-Barren Island district, Jamaica Bay, to cost $500,000, in which amount funds have been approved. Four hangars, each 120 x 140 ft., will be built, with capacity of 50 airplanes; repair and reconditioning shops, fuel storage and distributing plant, and other structures will also be built. Facilities will be provided on Jamaica Bay for seaplanes. It is expected to complete project in the fall. T. F. Keller is chief engineer.

Sanitary Postage Service Corporation, 285 Madison Avenue, New York, manufacturer of stamp vending machines, is disposing of preferred stock issue of $252,000, portion of proceeds to be used for expansion.

Joseph L. Steinman, 46 West Forty-sixth Street, New York, architect, has filed plans for a six-story automobile service, repair and garage building, 75 x 75 ft., to cost about $225,000 with equipment.

Board of Education, Great Neck, L. I., contemplates installation of manual training equipment in a proposed high school to cost about $800,000. Guilbert & Betelle, 24 Branford Place, Newark, are architects.

R. H. Macy, Inc., New York, has awarded general contract to Barney-Ahlers Construction Co., Metropolitan Avenue, Brooklyn, for a seven-story storage and distributing plant, 140 x 200 ft., at Long Island City. Installation will include elevating, conveying and other material-handling equipment. Project is estimated to cost $650,000.

Wright Aeronautical Corporation, Paterson, N. J., has work under way on a one-story assembling plant, 70 x 100 ft., for which general contract recently was let to John W. Ferguson Co., to cost about $65,000 with equipment.

Mapes & Sprowl Steel Co., 227 High Street, Newark, manufacturer of metal sheets and kindred products, has leased portion of a new one-story building on Empire Street, totaling about 15,000 sq. ft. of floor space, and will remove to that location.

G. W. Carnrick Co., 421 Canal Street, New York, manufacturer of chemicals, has awarded general contract to Enstice Corporation, 111 Academy Street, Newark, for a three-story factory at Newark, to cost more than $70,000 with equipment. Russell G. Cory, 30 Church Street, New York, is architect and engineer.

Laskey Body Co., 337 Halsey Street, Newark, recently formed to succeed to plant and business of J. B. Laskey, manufacturer of automobile bodies, has leased building at 243-45 Central Avenue and will remodel for a branch plant, to include departments for production of automobile tops and frames, body repair work, etc.

Kennedy-Van Saun Mfg. & Engineering Corporation, recently at 50 Church Street, New York, is now located at 2 Park Avenue.

Stronach Corporation, 2850 Grand Central Terminal, New York, recently formed to own manufacturing rights of Stronach non-splitting nails, has sold rights to manufacture under existing patents to Stronach Nail Co., Pittsburgh.

Petty & Wherry, Inc., 50 Church Street, New York, distributer of factory, garage, mill and contractors' equipment, has taken over distribution in New York territory of products of Dodge Mfg. Corporation, Mishawaka, Ind.

Kneuer Tail Board Co., Inc., 126 Van Buren Street, Newark, has been organized to manufacture patented spaceless tail board for commercial automobile trucks. Company is interested in purchasing iron-working machinery, such as heavy power brakes, shears, millers, power hack saws and power punches, and will also purchase iron and steel pipe 1 to 2 in. in diameter, 3/16-in. plates, 13 to 16 in. wide in lengths up to 8 ft., and 3/16-in. steel bands, 2 in. wide in lengths up to 20 ft.

Philadelphia

PHILADELPHIA, Feb. 20.

PLANS have been filed by Quaker City Iron Works, Ontario Street and Aramingo Avenue, Philadelphia, for a one-story addition, 140 x 150 ft., to cost about $40,000 with equipment.

Edward H. Reuss, Jr., Thirtieth and Race Streets, Philadelphia, manufacturer of pipe, heating equipment, etc., is having plans drawn for a one-story pipe-bending and fabricating plant, to cost in excess of $150,000 with equipment. Philip H. Johnson, Widener Building, is architect.

Philadelphia Suburban-Counties Gas & Electric Co., 712 Locust Street, Philadelphia, is arranging an expansion and improvement program for 1928 to cost more than $6,000,000, of which amount $3,954,000 will be used for electric division, and $2,355,000 for gas department. Work will include an addition to power plant on Barbadoes Island in Schuylkill River, with installation of additional equipment, new transmission lines, substations and miscellaneous construction; extensions will be made in gas properties in Newtown Square and West Manayunk, including installation of compressing equipment, pumping machinery, purifying and other apparatus, with pipe lines. H. H. Ganser is vice-president and general manager.

Silverman & Levy, 313 South Smedley Street, Philadelphia, architects, have plans ready for bids on a four-story automobile service, repair and garage building, 94 x 110 ft., with extension, 20 x 65 ft., to cost close to $150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Feb. 28 for a quantity of gages and reamers for Philadelphia Navy Yard, schedule 8533; also for quantity of tool steel, schedule 8521.

LeRoy B. Rothschild, Heymann Building, Philadelphia, architect, is preparing plans for a two-story motor bus service, repair and terminal building at Thirteenth and Filbert Streets, for Association of Motorbus Owners of Philadelphia and Vicinity, and Del-Bridge Bus Association, both represented by Harold S. Shertz, Liberty Building, attorney, to cost close to $1,000,000 with equipment.

Brown Instrument Co., Roberts and Wayne Avenues, Philadelphia, manufacturer of pyrometers and other measuring instruments, has plans for a two-story addition, with foundations to provide for an additional floor later, to cost close to $45,000. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has concluded arrangements for purchase of property at 1420-26 Locust Street, through its affiliated company, Motor Real Estate Co., and will have plans drawn for a multi-story motor bus service, repair and terminal building, to cost close to $1,000,000 with equipment.

John A. Roebling's Sons Co., Roebling, Trenton, N. J., manufacturer of wire and cables, etc., has plans for a one-story rod mill to cost close to $700,000 with equipment.

Allentown, Pa., M. W. Gross, mayor, is asking bids until March 13 for electrical distribution and control equipment for Kline's Island sewage disposal plant, contract 3, as per plans at office of city engineer.

Bellanca Aircraft Corporation, Arlington, Staten Island, N. Y., will soon ask bids on general contract for initial units of its new plant near New Castle, Del., to cost close to $100,000 with equipment. Price & Price, Wilmington, engineers, will make surveys.

A steam power house, 24 x 44 ft., will be built by Phoenixville Hosiery Co., Phoenixville, Pa., in connection with a new mill unit, entire project to cost more than $60,000 with equipment. Clarence Wunder, 1520 Locust Street, Philadelphia, is architect.

Audubon Wire Cloth Co., Audubon, N. J., has asked bids on general contract for a two-story addition, 55 x 94 ft., to cost close to $20,000 with equipment. Robert Korb is president.

Bridesburg Foundry Co., Bridesburg, Philadelphia, manufacturer of brass, bronze and aluminum castings, has been reincorporated under Pennsylvania laws, but plans no change in management or operations. Statement appearing in these pages on Feb. 9 that company would manufacture iron castings, dies and kindred products was incorrect.

Chicago

CHICAGO, Feb. 21.

THE volume of sales has reacted only slightly from the dip of last week. In the absence of large lists, the Santa Fe inquiry being an exception, dealers are forced to concentrate on small and widely scattered business. Fresh requests for prices are more numerous, but sluggish, and give no indications of closing. The Santa Fe has added a driving wheel lathe, two grinders, a 24-in. lathe and a cold saw to its list. A Milwaukee road machinery manufacturer will soon come into the market and other plants making similar equipment are showing more interest. The International Harvester Co. continues to issue requisitions for miscellaneous items. Production equipment is being sought by the Nash Motors Co. for its Kenosha, Racine and Milwaukee plants.

Interstate Rivet Co., 7850 South Chicago Avenue, Chicago, has been organized to take over small rivet business of Interstate Iron & Steel Co., Chicago. New company will operate under lease small rivet department of Grand Crossing works of Interstate company.

Sangamo Electric Co., Springfield, Ill., will build an addition, 75 x 200 ft., to cost $75,000.

American Ventilating Co., 228 North LaSalle Street, Chicago, will build an addition, 70 x 103 ft., to cost $30,000.

Johnson Sheet Metal & Furnace Works, 712 West Seventy-ninth Street, Chicago, will build a one-story shop, 37 x 121 ft. to cost $12,000.

Elgin Stove & Oven Co., Elgin, Ill., has plans for an addition, 50 x 135 ft., to be completed this spring. Company manufactures complete steel kitchen units, wall cabinets, stoves and refrigerators, and has recently added metal clothes hangers and metal furniture to its lines.

Richardson Rod & Reel Co., 536 Lake Shore Drive, Chicago, manufacturer of steel fishing rods, tackle, etc., has awarded general contract to G. A. Schillinger Construction Co., 2339 North Hoyne Avenue, for a two-story and basement plant, 62 x 120 ft., to cost about $50,000 with equipment. Van Gunten & Van Gunten, 26 East Huron Street, are architects.

Reliance Die & Stamping Co., 501 North La Salle Street, Chicago, will soon begin erection of three-story plant to cost close to $125,000 with machinery. A. A. Wickland, 5 South Wabash Avenue, is architect.

H. J. Mapp, 6739 South Western Avenue, Chicago, is considering erection of one-story machine shop, 50 x 100 ft.

Power Engineering Co., Metropolitan Life Building, Minneapolis, Minn., engineer, will take bids in spring for extensions and improvements in municipal power plant at Stoughton, Wis., to include installation of generator, exciter, switchboard, transformers and other equipment.

West End Scrap Iron & Metal Co., 1920 West Michigan Street, Duluth, Minn., is having plans drawn for new works to cost $20,000 with equipment. Thomas J. Shefchik, Glencoe Building, is architect.

Interstate Power Co., Decorah, Iowa, has plans for new hydroelectric power station, including improvements in power dam and extensions to transmission line, to cost upward of $200,000. Management & Engineering Corporation, 327 South La Salle Street, Chicago, is engineer.

Denver, Rio Grande & Western Railroad Co., Denver, Colo., is planning extensions and improvements in its locomotive shops at Salida, Colo., including installation of additional equipment.

Produce Terminal Cold Storage Co., Chicago, care of Henschin & McLaren, 1637 Prairie Avenue, architects, will take bids for an eleven-story cold storage warehouse and produce terminal at Fifteenth Place and Throop Street, to cost close to $1,000,000 with equipment.

Bellefourche Implement Co., Bellefourche, S. D., manufacturer of agricultural implements, etc., is considering erection of a new plant, to cost about $20,000 with equipment. John Boland, Rapid City, S. D., heads company.

Ford Motor Co., Detroit, is reported planning new assembling works at Pueblo, Colo., to cost in excess of $150,000 with equipment.

C. W. Olson Mfg. Co., 1300 Quincy Street, N. E., St. Paul, Minn., operating an ornamental iron and steel plant, will rebuild portion of works destroyed by fire Feb. 12, with loss reported at $30,000 including equipment.

Chicago, Rock Island & Pacific Railroad Co., 179 West Jackson Boulevard, Chicago, is arranging an appropriation of $1,651,000 for new construction and repair shops, and engine facilities, and $1,085,000 for new yard facilities.

Pittsburgh

PITTSBURGH, Feb. 20.

THERE is a steady flow of single orders for machine tools and most dealers appear fairly satisfied with the amount of business done for the year to date. New inquiries are quite numerous and dealers also are uncovering other needs on visits among buyers. In the heavier equipment there is a good amount of prospective business in cranes. A local builder recently took an order for several mills for the Timken Roller Bearing Co.

Arrangements have been made by Duquesne Steel Foundry Co., Union Bank Building, Pittsburgh, for purchase of complete foundry and steel roll equipment of Tioga Steel & Iron Co., Philadelphia, for removal to its Pittsburgh works, which will be extended for increased capacity. Purchase concludes liquidation of equipment of Tioga plant, which will be closed, company concentrating production at its plants at Easton, Pa., and High Bridge, N. J.

J. F. Bontempo, 423 Franklin Avenue, Woodlawn, Pa., architect, has plans for a two-story automobile service, repair and garage building, to cost about $90,000 with equipment, and will ask bids before close of month on general contract.

Kennilworth Tile Co., Newell, W. Va., has approved an expansion and betterment program to cost about $75,000, including installation of tunnel kiln and equipment to double present capacity.

Bailey-Farrell Mfg. Co., Twentieth and Sidney Streets, Pittsburgh, manufacturer of plumbing equipment and supplies, is considering rebuilding portion of its branch plant at Second Avenue and Ninth Street, Huntington, W. Va., recently destroyed by fire, with loss close to $70,000 including equipment.

United States Engineer, Keenan Building, Pittsburgh, is asking bids until Feb. 28 for one duplex plunger type valve pot pump, circular 285, and until March 9 for two hydraulic turbines, circular 274.

Appalachian Electric Power Co., Bluefield, W. Va., is planning construction of a power substation at Madison, W. Va., and extensions and improvements in transmission line from Yolyn and Lundale, W. Va., to cost more than $60,000.

United States Engineer, Huntington, W. Va., is asking bids until Feb. 29, for one portable vertical capstan, with gasoline engine and necessary clutch, gears, housing, frame, etc., circular 148.

School District of Altoona, Pa., has engaged H. O. Swoboda, Inc., engineer, 3400 Forbes Street, Pittsburgh, for increasing capacity of its central light, heat and power plant, made necessary by an addition to senior high school now under construction.

W. H. Nicholson & Co., Wilkes-Barre, Pa., manufacturer of expanding mandrels, arbor presses, flexible and compression couplings and steam specialties, have opened sales office at 1669 Montpelier Street, Dormont, Pittsburgh, to serve western Pennsylvania, eastern Ohio and West Virginia. Ralph A. Comstock is in charge.

Fawell Engineering Co., First National Bank Building, Pittsburgh, has been appointed exclusive representative in Pittsburgh district for Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., designer and builder of rolling mills, rolling mill machinery, hydraulic equipment and special machinery.

Buffalo

BUFFALO, Feb. 20.

PLANS are being arranged by American Radiator Co., Buffalo, for early operation of its new plant at Gloucester, N. J., for production of iron castings for radiators and assembling.

H. R. Emerick, 28 Telegraph Street, Binghamton, N. Y., is planning installation of equipment for marble and slate production, including electrically-operated machinery for drilling slabs.

Edward A. Stone, 42 Canfield Place, Rochester, N. Y., and associates have formed E. A. Stone Cutlery Co., capitalized at $100,000, and plan early operation of a local factory to manufacture cutlery. George T. Stone, 310 West Ninety-seventh Street, New York, is interested in new organization.

Malone Light & Power Co., Malone, N. Y., is disposing of a block of preferred stock, portion of proceeds to be used for expansion in plant and system, including transmission line construction.

Board of Education, Malone, N. Y., plans installation of manual equipment in a new high school to cost $600,000, for which plans will be drawn by Fuller & Robinson, 95 State Street, Albany, N. Y., architects.

Pierce, Butler, Pierce Mfg. Co., Syracuse, N. Y., manufacturer of heaters, boilers, etc., is said to have plans for a one-story addition to be equipped as a core department.

Houde Engineering Co., 237 Winchester Avenue, Buffalo, manufacturer of automobile shock absorbers, etc., will soon begin work on a two-story addition, 210 x 225 ft., to cost close to $200,000 with equipment. G. Morton Wolfe, 1377 Main Street, is architect.

Cincinnati

CINCINNATI, Feb. 20.

WHILE machine tool buyers are somewhat hesitant about placing orders for equipment, and a large volume of pending business is being temporarily held in abeyance, bookings this month are expected to be considerably better than in February, 1927, although not equal to the record set in January. The bulk of sales made recently has been outside the automotive industry, this development being significant of a healthier condition in the general industrial field.

Operations continue to be poorly balanced among machine tool builders and it is those with high production tools which are getting most of the business. A local manufacturer has sold six engine lathes to an Eastern company. The United States Government probably in the next 10 days will purchase 18 engine lathes for naval scout cruisers. Aside from a transaction calling for the shipment of seven special automatic lathes to Germany, foreign orders have been negligible.

Plans are being arranged by Cincinnati-Oakland Motor Co., 1026 Gilbert Avenue, Cincinnati, representative for Oakland automobile, for a one and two-story service, repair and sales building to cost $125,000 with equipment.

Gosite Air Machine Co., 413 West Fifth Street, Dayton, Ohio, has plans for one-story factory to cost about $50,000 with equipment. Building on site is being razed and new superstructure will soon begin.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is taking bids until Feb. 28 for 26 electric trigger solenoid control assemblies and 26 gun camera mount assemblies, circular 230; also for 1400 tow target assemblies, circular 232; until March 1 for a quantity of aluminum alloy tubing and aluminum sheets, circular 235, and until Feb. 29, for 28,000 lb. sheet iron, schedule 236.

Union Battery Co., 2717 South Troy Street, Memphis, Tenn., has leased property at 305 Trigg Street, for establishment of new plant for manufacture and distribution of automobile batteries.

Peter Fox Sons' Co., Fulton Market, Chicago, food products, is reported planning construction of an ice-manufacturing and cold storage plant on First Avenue, Nashville, Tenn., to cost more than $250,000 with equipment.

Newport Finance Corporation, Newport National Bank Building, Newport, Ky., Lorimer Scott, secretary, is head of a project to construct a four-story automobile service, repair and garage building at Cincinnati, to cost $200,000 with equipment.

Chaney Mfg. Co., Pleasant Street, Springfield, Ohio, manufacturer of thermometers and kindred instruments, contemplates an addition and improvements in present factory.

Meehanite Metal Engineering Corporation, 907 Chamber of Commerce Building, Cincinnati, has been organized to manufacture Meehanite metal, a pearlitic iron made in cupola or air furnaces which is said to combine qualities of cast iron and cast steel. At present company is licensing manufacturers to use Meehanite in their own products and is prepared to supply companies which cannot make product in their own foundries.

St. Louis

ST. LOUIS, Feb. 20.

PLANS are being completed by B. F. Mahoney & Co., San Diego, manufacturer of airplanes and parts, care of McDonald & Condie, 502 North Taylor Avenue, St. Louis, architects, for a new plant at Anglum, near St. Louis, consisting of four one-story units, 75 x 260 ft., 30 x 40 ft., 40 x 60 ft., and power house, 18 x 35 ft., to cost about $75,000 with equipment.

General Brake Service Corporation, 2727 Locust Street, St. Louis, manufacturer of automobile brakes, has plans for expansion to double present capacity.

Western Products Corporation, Kansas City, Mo., care of Henry E. Dean, Kansas City, Kan., attorney, recently formed with a capital of $100,000, will operate a new plant in Fairfax industrial district for manufacture of special hard rubber goods, including flooring, paving expansion joints, etc. Company is headed by Charles Ora and W. W. Rose.

United Motor Service Co., Twenty-seventh and Warwick Streets, Kansas City, Mo., has leased a two-story and basement building, 100 x 120 ft., to be erected by Scarritt Estate, to cost $100,000, with equipment. R. H. Sanneman, Lee Building, is architect.

Central Arkansas Public Service Corporation, Hot Springs, Ark., is disposing of a bond issue of $2,700,000, a portion of fund to be used for extensions and improvements, including transmission lines.

Board of Education, Stillwater, Okla., is arranging fund for a new manual training school, for which plans will be drawn by Philip A. Wilber, Oklahoma Agricultural and Mechanical College, Stillwater, architect.

Paxton-Mitchell Co., 2614 Martha Street, Omaha, Neb., manufacturer of iron castings, has plans for a one and two-story foundry to cost more than $100,000 with equipment. Austin Co., Euclid Avenue, Cleveland, is engineer.

Schneider Red Granite Co., 1224 Central National Bank Building, St. Louis, is arranging bond issue of $200,000, a portion of fund to be used for expansion and improvements at plant at Graniteville, Mo., including additional equipment.

Waters Auto Parts Co., 1711 Joplin Street, Joplin, Mo., has plans for a one-story addition, 25 x 35 ft., for which foundations will soon be laid.

Price Box & Basket Co., Neosho, Mo., has work under way on a new one-story mill and plans early purchase of equipment, including crane for unloading and handling logs, shingle machinery, basket machines and auxiliary equipment.

South Atlantic States

BALTIMORE, Feb. 20.

PLANS for second unit of expansion program of Bethlehem Shipbuilding Corporation, Baltimore, are nearing completion and bids will soon be asked on general contract. Structures will be one and two-stories, and with first unit will cost approximately $1,000,000 including equipment. H. B. Bisbee, Fore River plant, Quincy, Mass., is architect and engineer. J. M. Willis is local manager.

Board of Commissioners, District Building, Washington, is asking bids until March 5 for metal cabinets.

Art Furniture Mfg. Co., Macon, Ga., care of Frank R. Happ, Fourth National Bank Building, architect, recently formed with a capital of $40,000, has plans for a new one and two-story factory, 50 x 200 ft. and 50 x 165 ft., to cost about $35,000 with equipment.

Columbus Iron Works Co., Columbus, Ga., manufacturer of stoves and parts, plans installation of grinding machines and other equipment. Company will also purchase stove trimmings from outside plants. C. D. Cabaniss is vice-president.

Chesapeake Mfg. Co., Sharp and Barre Streets, Baltimore, manufacturer of furniture, will soon take bids for a two-story addition to cost about $35,000 with equipment. David Harrison, 1322 North Central Avenue, is architect.

General Supply Committee, United States Government and District of Columbia, Washington, is asking bids until March 2 for annual supplies for executive departments, including tools, dies, trucks, wire, abrasives, iron, steel, lead, babbitt metal, brass, surveying instruments, castings, electrical equipment and supplies, etc.

Motor Storage Corporation, Charlotte, N. C., has filed plans for a five-story service, repair and garage building to cost $175,000 with equipment.

Potomac Electric Power Co., Washington, has approved plans for enlargement of its steam-operated electric power house at Bennings to increase capacity by 30,000 kw. Extensions will be made in transmission lines. Entire project will cost upward of $750,000.

Georgia Portland Cement Corporation, Augusta, Ga., J. L. Hankinson, president, is reported completing plans for construction of first unit of new mill at Sandersville, Ga., to cost close to $1,000,000 with machinery. Another mill is also being projected on Savannah River, near Augusta.

Central Chevrolet Co., 1233 Hampton Avenue, Columbia, S. C., local representative for Chevrolet automobile, has plans for a three-story and basement service, repair and sales building, 65 x 210 ft., to cost close to $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Feb. 28 for two ball bearing testing machines for Annapolis Navy Yard, schedule 8496; also for starting motors, generators, distributors, magnetos and spares for motor boat gasoline engines for Hampton Roads Yard, schedule 8508; bench lathes and grinders for Newport Navy Yard, schedule 8523; three fluid pressure scales for same yard, schedule 8524; die castings for Washington Yard, schedule 8532, and until March 6 for steel bars for Eastern and Western yards, schedule 8507.

Savannah River Electric Co., operated by Southeastern Power Co., Birmingham, has secured a Federal permit for a hydroelectric power development on Savannah River, near Greenwood, S. C., entire project to cost in excess of $20,000,000 with transmission lines.

Detroit

DETROIT, Feb. 20.

A THREE-STORY addition, a portion to be used for storage and distributing service, will be erected by Lieberman & Gittlen Metal Co., 322 Front Street, S. W., Grand Rapids, Mich., to cost more than $30,000. D. R. McEachron, Associates of Commerce Building, is architect and engineer.

National Utilities Co., Grand Haven, Mich., will dispose of bonds in amount of $812,500, and 1000 shares of stock, no par value, portion of fund to be used for expansion and betterments, including transmission line construction.

Detroit Edison Co., 2000 Second Avenue, Detroit, is arranging a construction and improvement program to cost $30,000,000, including increase in capacity at Trenton Channel power plant of 50,000 kw., construction of Delray plant No. 3 and expansion in generating station at Marysville; construction of 120,000-volt steel tower transmission line from Trenton Channel station to Detroit, and similar single steel tower line from Marysville power plant to Northeast substation, Detroit, and other power lines; construction of four new power substations and additions to present substations, and miscellaneous work.

Chevrolet Motor Co., Flint, Mich., is reported to be contemplating a new assembling plant for Southwestern district in vicinity of Dallas, Tex., to cost in excess of $500,000 with equipment.

Board of Education, Battle Creek, Mich., is considering installation of manual training equipment in high school in east side district to cost $500,000, for which plans will be drawn by William B. Ittner, 911 Locust Street, St. Louis, architect.

Koestlin Tool & Die Co., 3601 Humboldt Avenue, Detroit, is said to be planning early purchase of a traveling crane and other equipment for installation in a shop addition.

Chrysler Motor Car Co., Highland Park, Detroit, is completing plans for an addition to cost close to $100,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

United States Radiator Corporation, 133 East Grand River Boulevard, Detroit, is concluding arrangements for purchase of Pacific Steel Boiler Co., Waukegan, Ill., manufacturer of electrically-welded steel heating boilers, and will operate as a division.

Board of Education, Pontiac, Mich., is having plans completed for a one-story manual arts building at high school, to cost $100,000 with equipment. Childs & Smith, 720 North Michigan Avenue, Chicago, are architects.

Niles Aircraft Corporation, Niles, Mich., has been organized to manufacture special type of monoplane. Demonstration plane has been constructed and company expects to go into mass production shortly. James R. Williams, designer of plane, is president.

Rich Steel Products Co., Battle Creek, Mich., has awarded a contract to Reniger Construction Co., Lansing, Mich., for a branch plant at Marshall, Mich., to cost $120,000.

The Crane Market

THERE has been a better volume of inquiry for overhead and locomotive cranes during the past week or ten days, but purchasing has been light. The inquiry of the Amtorg Trading Corporation, 165 Broadway, New York, previously reported as calling for 40-ton locomotive cranes for export to Russia, is for five 15-ton, kerosene operated crawl-tread cranes, one 15-ton and one 25-ton standard locomotive cranes. The Phoenix Utility Co., 71 Broadway, New York, is about to close on a 60-ton electric crane. The Reading Railroad, Reading, Pa., has not yet closed on two 250-ton, double trolley overhead cranes.

Among recent purchases are:

Humble Oil Refining Co., Austin, Tex., 10-ton, 40-ft. span and 3-ton, 25-ft. span electric cranes for Pyote, Tex., from Box Crane & Hoist Corporation.

California Edison Co., Los Angeles, two 5-ton, 31-ft. span, 3-motor, overhead cranes from Box Crane & Hoist Corporation.

Fagan Iron Works, Jersey City, N. J., one used 10-ton, 75-ft. span and two used 5-ton, 30-ft. span overhead cranes from McCabe Equipment Co., Philadelphia.

Wallingford Steel Co., Wallingford, Conn., 5-ton, 50-ft. span, 3-motor, overhead crane from Niles Crane Corporation.

Tidewater Structural Material Co., 271 Madison Avenue, New York, 1-ton hand power crane with electric hoist from Reading Chain & Block Corporation.

Otis Elevator Co., Yonkers, N. Y., a 2-ton electric hoist from unnamed maker.

Griscom-Russell Co., Massillon, Ohio, three 2-ton, 20-ft. span, 3-motor overhead cranes and one 2-ton, 2-motor, monorail hoist, reported purchased.

International Harvester Co., Chicago, 3-ton, 45-ft. span hand power crane through Page Sales Service, from H. D. Conkey & Co.

B. B. Buffaloe & Co., Monroe, La., 3-ton, 36-ft. span hand power crane from H. D. Conkey & Co.

J. J. Normoyle Co., Moline, Ill., 1-ton, 16-ft. span push crane from H. D. Conkey & Co.

Clinton Bridge Works, Clinton, Iowa, ten 2-ton push cranes from H. D. Conkey & Co.

Northern Pacific Railroad, Brainerd, Minn., mast type jib crane from H. D. Conkey & Co.

Mundie Mfg. Co., Peru, Ill., 8-ton, under-brace, jib crane from H. D. Conkey & Co.

Uxbridge Worsted Co., Uxbridge, Mass., 1-ton, 38-ft. span, 3-motor crane from H. D. Conkey & Co.

Indiana

INDIANAPOLIS, Feb. 20.

PLANS have been approved by Auburn Automobile Co., Auburn, Ind., for a five-story factory branch at Los Angeles, for service, repair and sales, to cost more than $250,000, with equipment. E. L. Cord is president.

Interstate Public Service Co., Indianapolis, has applied for permission to acquire plant and system of Dillsboro Electric Co., Dillsboro, Ind., with transmission line from that place to Aurora, Ind., and plans expansion, including transmission line extensions.

Bishop-Knowlton-Carson Co., 312 North Meridian Street, Indianapolis, architect, will soon begin construction of a three-story automobile service, repair and garage building, 100 x 165 ft., to cost $180,000 with equipment.

Duesenberg Motors Co., 1511 West Washington Street, Indianapolis, is making improvements and alterations in its plant for increased production of custom automobiles, including machinery replacements, installation of equipment, etc.

Cleveland

CLEVELAND, Feb. 20.

THE lull reported in the machine tool market a week ago is still in evidence and applies both to sales and inquiries. There is no demand for round lots of machines for equipping new plants or for extensions and few orders are being taken for more than single machines. Business at present is coming largely from manufacturers of automobile parts. Automatic screw machinery is moving fairly well in orders for one or two machines. Following the placing of some good orders by Michigan automobile companies, buying appears to have subsided in the Detroit territory. The Ford Motor Co. is still buying equipment and is figuring at present on 20 to 30 centrifugal grinding machines.

Plans are being completed by Willys-Overland Co., Toledo, Ohio, manufacturer of Overland and Willys-Knight motor cars, for new plant units to cost more than $500,000 with machinery.

Car-Van Steel Products Co., Fifth Street, S. W., Canton, Ohio, manufacturer of punches, reamers, wrenches and other tools, contemplates a one, two and three-story addition, to cost more than $50,000 with equipment.

Liberty Paper Board Co., Steubenville, Ohio, is completing extensions and improvements in former mill of Hartje Paper Co., and will provide equipment for large increase in output.

Serugo Rubber Co., 172 Cole Avenue, Akron, Ohio, is reported planning new mill at Atwater, Ohio, to cost more than $60,000 with machinery. John Hadfield is president.

Toledo Edison Co., Toledo, Ohio, is arranging an expansion and improvement program to cost about $2,000,000, of which approximately one-half will be used for an addition to steam-operated electric power plant, with installation of fourth turbo-generating unit and accessories. Transmission line will be built from Toledo to Sandusky, Ohio. C. L. Proctor is vice-president and general manager.

Packard Motor Car Co., Detroit, has awarded a general contract to Sam W. Emerson Co., 1836 Euclid Avenue, Cleveland, for a two-story service, repair and sales building at Carnegie Avenue and East Ninety-third Street.

Gulf States

BIRMINGHAM, Feb. 20.

PLANS are being completed by John E. Mitchell Co., 600 South Sixth Street, St. Louis, manufacturer of cotton ginning and flour mill machinery, for a new plant at East Dallas, Tex., primarily for manufacture of parts for ginning machines, to cost $90,000.

Board of Education, Beaumont, Tex., plans installation of manual training equipment in a new senior high school to cost $1,000,000. A special election has been called in April to approve a bond issue. An architect is being selected to prepare plans.

Long-Lewis Hardware Co., 2014 Second Avenue, Bessemer, Ala., will take bids early in March for a two-story storage and distributing plant in Smith Park section, Birmingham, to cost close to $40,000. Denham, Van Keuren & Denham, Comer Building, Birmingham, are architects.

Alabama Power Co., Birmingham, is disposing of a preferred stock issue to total about $1,950,000, a portion of proceeds to be used for expansion, including hydroelectric power plant and transmission line construction.

Mason Brown Ice & Coal Co., Huntsville, Ala., has purchased property at Decatur, Ala., and plans erection of one-story electrically-operated ice-manufacturing plant, to cost $65,000 with equipment.

Port Compress Co., Laredo Street, Corpus Christi, Tex., plans extensions and improvements in cotton compress plant, including installation of high-density press, boilers, and other equipment, material-handling and conveying machinery, to cost more than $250,000.

S. R. Morgan & Co., Rector Building, Little Rock, Ark., has acquired property at Aberdeen, Miss., as site for new ice-manufacturing plant to cost about $90,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in a new plant at East Dallas, Tex., to be erected by Mrs. Baird's Bread Co., Fort Worth, Tex., two-stories and basement, to cost $200,000 with equipment.

Amarillo Producers' & Refiners' Corporation, Amarillo, Tex., is planning the early rebuilding of portion of oil refining plant, recently destroyed by fire with loss reported in excess of $50,000, including equipment. New structure will have a capacity of 1500 bbl. per day. W. S. Roberts is secretary.

Dixie Gas & Utilities Co., Port Arthur, Tex., is disposing of bond issue of $3,000,000 and note issue of $1,500,000, portion of proceeds to be used for extensions and improvements in natural gas properties, including pipe line construction.

Florida Babbitt Corporation, 42 North Twenty-first Street, Miami, Fla., will erect one-story plant for manufacture of recently patented babbitting machine and parts, to cost close to $40,000.

Wagner Electric Corporation, St. Louis, has opened sales office at 1006 Washington Avenue, Houston, Tex. Warehouse stocks are now carried by company at both Houston and San Antonio, Tex.

New England

BOSTON, Feb. 20.

SALES of machine tools in this territory the past week increased perceptibly. The Pittsfield plant of the General Electric Co. is reported to have purchased at least a dozen tools valued approximately at $30,000, including two special purpose radial drills; the Lynn plant also has purchased several pieces of equipment. The Maine Central Railroad is reported to have bought a medium sized lathe, a planer, slotter, drill grinder and a plate machine; a Cambridge, Mass., shop has taken a large compressor; a Worcester shop has bought a 16-in. lathe. A Worcester dealer has sold radial drills, lathes and about 14 miscellaneous tools, all of the foregoing new equipment.

For a new trade school the city of Boston has closed bids on two 14-in. Hendey lathes, five 12-in. tool-room lathes, one 20-in. shaper, one single-spindle sensitive drill and one two-spindle drill, 14-in. American geared head lathe, a Monarch 14-in. cone head lathe, No. 2A Brown & Sharpe milling machine, and No. 13B Brown & Sharpe tool grinder, 23 sheet metal-working tools, and a number of wood-working tools. In used tools, two 8-in. lathes, a duplex milling machine, two upright drills, and a shaper went outside of Boston. Other used tools sold included a power press to a Boston shop, about eight miscellaneous drills, a cutting-off machine and about eight items of grinding equipment. It was by far the best week this year.

New England industrial conditions are improving. It is anticipated that Ford Motor Co. will reopen its Somerville, Mass., assembling plant about March 5. Material has been started there from Detroit. National Acme Co. and Cone Automatic Machine Co., Windsor, Vt., are operating night and day shifts. English & Mersick Co., New Haven, Conn., automobile equipment, is operating at better than 60 per cent with only a moderate stock of goods on hand. Foster Merriam Co., Meriden, Conn., iron and brass castings, is operating at 80 per cent of capacity with finished and raw stocks low. Millers Falls Co., Millers Falls, Mass., tools, is running at 65 to 70 per cent of capacity. William L. Gilbert Clock Co., Winsted, Conn., is operating at capacity; Atlas Tack Co., Fairhaven, Mass., at slightly better than 70 per cent of capacity, and Geometric Tool Co., New Haven, Conn., is doing better than in the closing days of 1927.

Pratt & Whitney Aircraft Co., Hartford, Conn., has received additional Government orders for 96 Hornet and 50 Wasp engines to cost $1,510,000, bringing the value of orders on books to approximately $6,000,000.

Bantam Ball Bearing Co., Bantam, Conn., has authorized construction of a new plant at South Bend, Ind., and upon completion company will move from Connecticut. W. S. Rogers is president and W. W. Gager, vice-president.

C. Hammond & Son, 179 North Water Street, New Bedford, Mass., have completed plans for several vocational school units at that city, including a machine shop, electrical shop and other improvements.

Gardner Airport, Inc., Gardner, Mass., is erecting a hangar and one-story, 60 x 150 ft., office and machine shop on Brock farm, between Gardner and Templeton, Mass. Charles H. Hartshorn, 562 Main Street, Gardner, is president.

Worcester Gas Light Co., subsidiary of New England Gas & Electric Association, is preparing plans for either a coal gas or a water gas plant to cost from $1,500,000 to $2,000,000. F. H. Golding is manager of New England properties.

Machine shop and the pipe shop of Beacon Oil Co., Everett, Mass., were recently totally destroyed by an explosion and fire. Plans are under way for new and larger shops.

Bids are being received by Royal Typewriter Co., Hartford, Conn., for one-story addition, 35 x 120 ft., to cost about $50,000 with equipment. Greenwood & Noerr, 847 Main Street, are architects and engineers. Headquarters of company are at 316 Broadway, New York.

Electric Boat Co., 11 Pine Street, New York, manufacturer of submarines, motor boats, etc., with plants at Groton, Conn., and Bayonne, N. J., is completing arrangements for merger with New London Ship & Engine Co., New London, Conn., in which it has heretofore held a substantial interest. New London shipyard will be continued in service.

Charles Street Garage Corporation, Boston, is having plans drawn for a one and two-story addition to its service, repair and garage building at 252 Cambridge Street, to cost close to $100,000 with equipment. Lockwood, Greene & Co., 24 Federal Street, are architects and engineers.

Cleveland Burial Case Co., 2274 St. Clair Avenue, Cleveland, has acquired the six-story building at 867 Boylston Street, Boston, heretofore held by B. F. Goodrich Co., and will occupy for a new factory branch and distributing plant.

Western Electric Co., 80 John Street, New Haven, Conn., has plans for a two-story factory branch and distributing plant at West Haven, Conn., totaling about 38,000 sq. ft. of floor space, to cost about $70,000. Engineering department at company headquarters, 195 Broadway, New York, is in charge.

Public Service Co. of New Hampshire, Manchester, has purchased Utilities Power Co., with hydroelectric power station on the Pennigawassett River, vicinity of Laconia, N. H., and will consolidate with its organization. Company has also acquired Ossipee Electric Co., Center Ossipee, N. H., with properties near Conway Electric Co., recently purchased by Public Service Co. Extensions will be made in transmission lines and substation facilities.

Brockton Ice & Coal Co., Lawrence Street, Brockton, Mass., has begun excavations for a one-story ice-manufacturing plant, 100 x 150 ft., to cost about $100,000 with machinery.

Essex Tire & Supply Co., 118 Central Avenue, Lynn, Mass., has asked bids on general contract for a new two-story and basement works, 60 x 100 ft., to cost about $50,000 with equipment. G. A. Cornet, 10 Central Avenue, is architect.

Mechanical Devices, Inc., 260 Tremont Street, Boston, has purchased Strathmore mill in Concord, formerly occupied by American Woolen Co., and expects to begin manufacture of cotter pins, nuts, screws, etc., within a few weeks. It was recently stated company would use part of Victory plant at Squantum, Quincy, but owing to limitation of lease that plan was abandoned and mill at Concord was purchased. Watson Hartley is president and general manager.

Milwaukee

MILWAUKEE, Feb. 20.

ORDERS for machine-tools continue at a relatively satisfactory rate, and the volume of business so far this month is generally reported at a higher level than a year ago. There still is, however, a hesitancy on the part of prospective buyers to take action on inquiries, but in comparison with recent months activity is measureably improved. Prospects are excellent and a speeding up of buying is believed to be at hand. Automotive industries are regarded as of best promise, judging by the character and source of current inquiry.

Aluminum Goods Mfg. Co., general offices, Manitowoc, Wis., is deferring for about six months construction of a $450,000 addition to its branch stamping and drawing plant at Two Rivers, Wis., designed by Lockwood, Greene & Co., consulting engineers, Chicago.

Chicago, Milwaukee & Pacific Railway Co., Chicago, has placed general contract with Henry Danischefsky, 1484 Humboldt Avenue, Milwaukee, for construction of a new freight depot at Milwaukee to cost $500,000. C. F. Loweth is chief engineer.

Combination Door Mfg. Co., Fifty-seventh Avenue and Mitchell Street, West Allis, Milwaukee, has started work on erection of a one-story addition, 64 x 100 ft., and is in market for miscellaneous wood and metal-working equipment.

Wisconsin Veneer Co., Rhinelander, Wis., has started work on a new mill and plywood factory providing 45,000 sq. ft., and replacing the plant wrecked by fire several months ago. New equipment will be installed throughout. F. A. Marshall is secretary and general manager.

Kurz-Root Co., Appleton, Wis., manufacturer of electrical equipment, is preparing to reestablish its plant recently wrecked by fire, with loss estimated at $25,000.

J. E. Burke, Fond du Lac, Wis., manufacturer of metal weather strip and other metal building specialties, has incorporated as J. E. Burke Co., capital stock $250,000. A new plant is about to be established in Milwaukee, but present plant in Fond du Lac will be retained also as a production unit.

Standard Sheet Metal Works, 1411 Thirtieth Street, Milwaukee, is preparing to enlarge its plant and has increased its capitalization from $30,000 to $50,000 to accommodate expansion of output and business.

Stanley F. Parker, 963 Mitchell Street, Milwaukee, has taken over factory of former Loewenbach Shoe Co., Cedarburg, Wis., and will equip it for manufacture of a sugar beet harvesting machine and other agricultural machinery. A corporation is in process of organization to carry on operation.

Board of Education, South Milwaukee, Wis., is taking bids until March 8 for construction of a new junior high school and vocational training institute, 152 x 178 ft., part three stories and basement, and estimated to cost $250,000. Architects are Parkinson & Dockendorff, LaCrosse, Wis. H. Daehling is secretary of board.

The Atlas Engineering Co., Milwaukee, which recently sold its plaster and mortar mixer business to Chain Belt Co., Milwaukee, has acquired Topp-Stewart Tractor Co., Clintonville, Wis., and will take over plant March 1. Atlas company will continue manufacture of Topp-Stewart four-wheel drive tractor and its own lines of conveyors, loaders and unloaders. Milwaukee plant at Thirty-first and Galena Streets will be retained as a branch office and warehouse. H. W. Zimmermann is president and general manager.

Board of Education, Neenah, Wis., is preparing to take bids on revised plans for new $400,000 senior high school which also will accommodate present vocational training institute. John D. Chubb, Chicago, is architect. H. V. Zemlock is secretary of board.

Pacific Coast

San Francisco, Feb. 15.

APPLICATION has been made by Red River Lumber Co., Westwood, Cal., for permission to construct and operate a hydroelectric power plant on Ash Creek, a tributary of Pit River, to cost $250,000 with transmission line.

Chain Belt Co., 82 Natoma Street, San Francisco, has leased a one-story factory to be erected at Fifth and Harrison Streets, for a factory branch and distributing plant. Headquarters are at Milwaukee.

United Verde Copper Co., Clarkdale, Ariz., has plans for a one-story foundry, 80 x 120 ft., for production of electric steel castings, to cost more than $80,000. Headquarters are at 111 Broadway, New York.

Doheny-Stone Drill Corporation, Los Angeles, manufacturer of oil drilling equipment, tools, etc., has awarded general contract to C. L. Peck, H. W. Hellman Building, for a one-story unit, 60 x 90 ft., at its new plant to be located at Torrance. It will be equipped as a change building. Entire plant will cost about $225,000. Hamm, Grant & Bruner, Ferguson Building, are architects.

Southern California Edison Co., Los Angeles, is planning construction of a steel tower transmission line from Saticoy to Castaic, Cal., about 44 miles, to cost $400,000.

Keenan Machine Works, 2925-29 First Avenue South, Seattle, has awarded contract to H. D. Stewart, 2702 First Avenue South, for a one-story machine shop addition, 60 x 75 ft., to cost about $20,000 with equipment.

Queen City Improvement Co., Seattle, has filed plans for a six-story automobile service, repair and garage building, 90 x 110 ft., to cost about $160,000 with equipment.

Signal Gas Co., Long Beach, Cal., is planning to rebuild portion of its oil refinery absorption plant destroyed by fire Feb. 10, with loss close to $90,000 with equipment.

Snow Mountain Water & Power Corporation, San Francisco, has secured permission to use waters from South Eel River, Lake County, for a hydroelectric power development with initial capacity of 21,680 hp., to cost $3,200,000, including power transmission lines and power dam.

Orange County Refining Co., Newport Beach, Cal., is planning to rebuild portion of oil refinery recently destroyed by fire, with loss reported more than $100,000 including equipment.

Whitehouse & Price, Hutton Building, Spokane, Wash., architects, have plans for a five-story and basement automobile service, repair and garage building, to cost $450,000 with equipment.

Zellerbach Paper Corporation, Sacramento, Cal., is said to have plans for new pulp and paper mill in Tongass National Forest district, Alaska, to cost in excess of $7,000,000 with equipment.

Associated Supply Co., 724 Pacific Electric Building, Los Angeles, has organized purchasing department under direction of S. A. Joseph, and is receiving all quotations, contracts, discount rates and catalogs at that address. Company was recently purchased by Youngstown Sheet & Tube Co., Youngstown, Ohio, and engages in distribution of oil field equipment.

Royal-Rochester, Inc., has been organized as a service company in California for Robeson-Rochester Corporation, Rochester, N. Y., manufacturer of hardware specialties and cutlery. New company will have office in Los Angeles and will be equipped to replace parts and make repairs on all appliances made by Rochester company.

Isler Metal Works, 109 East Twelfth Street, North, Portland, Ore., is installing new power press for forming sheet metal up to No. 10 gage.

Rose City Ironcraft Shop, Portland, Ore., has moved from 1431 Macadam Road to 1400 Macadam Road. New motors and acetylene welding outfit have been added and company expects to begin manufacture of hand-wrought ornamental iron.

Portland Machinery & Supply Co., Portland, Ore., has moved to 229 Front Street, where warehouse and showrooms have been remodeled.

Canada

Toronto, Feb. 20.

WHILE large lists were absent from the market the past week, machine tool sales maintained the high level of previous weeks this year. A number of companies are increasing their operations and many whose plants had not been fully equipped are now installing new machines. The demand is diversified and comes from practically all parts of the Dominion.

W. Beatty, general manager Beatty Brothers, Ltd., Fergus, Ont., is in market for equipment to manufacture electric washers and other specialties, for installation in a proposed addition.

City Council, Toronto, has purchased site on Queen Street West, for erection of a booster pumping station to cost $200,000, in connection with proposed $14,000,000 duplicate waterworks system.

International Pulp & Paper Co., Ltd., Gatineau, Que., is having plans prepared for erection of a box factory to cost $20,000.

East St. John Dry Dock Co., East St. John, N. B., will build addition to its plant to cost $20,000.

Western Canada

Western Dominion Collieries, Ltd., 305 Trust & Loan Building, Winnipeg, will start work immediately on construction of an addition to its briquetting plant at Taylorton, Sask., to cost $200,000.

Pacific Coast Terminals, Ltd., Vancouver and New Westminster, B. C., contemplates erection of a cold storage plant at New Westminster, of reinforced concrete construction, and to cost $900,000.

Dominion Department of Public Works, Ottawa, Ont., has awarded contract to Parfitt Brothers, Ltd., 1303 Gladstone Avenue, Victoria, B. C., for erection of drydock buildings and Esquimalt, B. C., to cost more than $15,000.

Foreign

A COMPANY at London, England, has plans for a new low-temperature carbonization plant at Askern, near Doncaster, for handling 3000 tons of coal weekly, to cost close to $1,000,000 with machinery. American Consulate, London, William L. Copper, commercial attaché, has information regarding project; also at office of Bureau of Foreign and Domestic Commerce, Washington, reference England No. 2/13/28.

Plans are under way for construction of a flour mill at Dniepropetrovsk, Russia, under Government direction, to use American machinery. Information at office of American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Rotterdam-Amsterdam Railroad, Amsterdam, The Netherlands, has plans under way for electrification of its line from Amsterdam to Rotterdam, and other branches; project will be carried out under Government direction. Information at office of American Consulate, Rotterdam, Edward A. Dow, consul.

A company in New South Wales, Australia, is planning construction of a plant to manufacture linseed oil, linseed cake and kindred products. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Australia No. 60714; also at American Consulate, Sydney, Australia, Charles F. Baldwin, assistant trade commissioner.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date announced) for a steel-covered structural steel frame hangar, 160 x 330 ft., with lean-tos on both sides, 120 ft. long, 20-40 ft. wide, for Coco Solo, C. Z., specification 5569.

Buenos Aires Great Southern Railway Co., Buenos Aires, Argentina, has begun construction of a new grain elevator at Ingeniero White, near Bahia, Blanca, to cost in excess of $4,500,000. It will have a capacity of 3,000,000 bu. All machinery will be electrically-operated. Construction will be carried out under direction of Henry Simon, Ltd., London, England. Information at American Consulate, Buenos Aires, Dana C. Sycks, consul.

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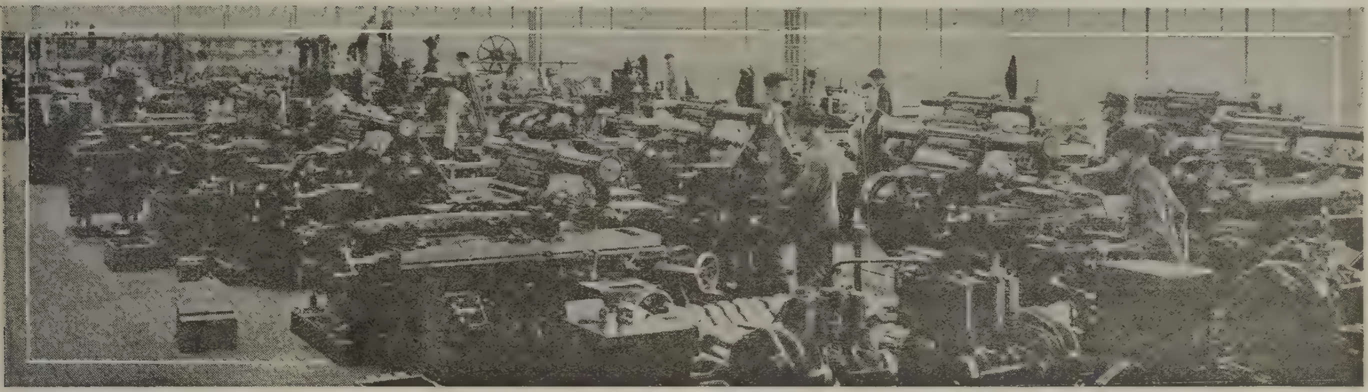

"Educational Orders" for Munitions

Plan to Rotate Contracts for War Material Among Private Plants Essential to Industrial Preparedness

BY LIEUT.-COL. TOWNSEND WHELAN*

EXTREMELY unlikely it is that a democratic nation will engage in a war with which the mass of the people is not in sympathy. In any war in which the United States may engage hereafter there will probably be no difficulty in getting all the man-power needed, either by voluntary enlistment or draft. But more than man-power is needed. Material—weapons, ammunition, transportation, clothing, food, supplies—is required also. This material is needed in the shortest time possible because the waging of a successful war is a matter of speed almost as much as of numbers and power. The army which gets there *first* with an equal or greater number of *well armed* men usually wins. The man-power of the United States is unequaled by that of any other nation, and in all probability there will be no difficulty in obtaining it in the amount and at the rate necessary. But when we examine the probability of obtaining the necessary materials of war in the amounts and on the dates required to supply this man-power, the picture is not so encouraging.

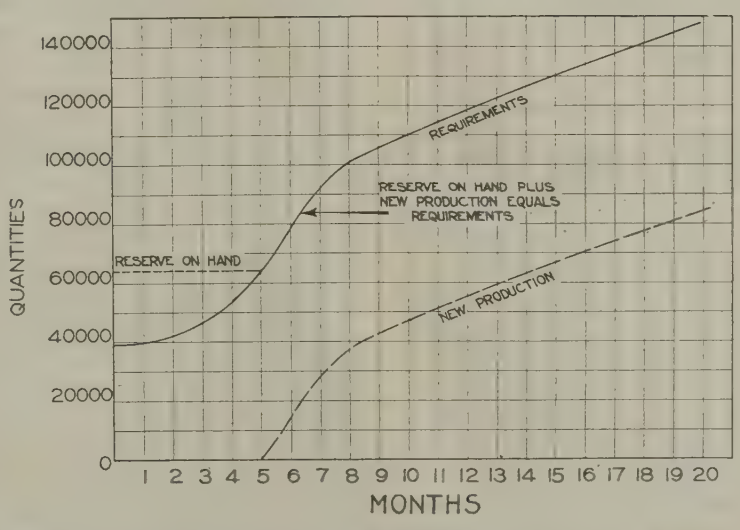

Fig. 1. Curve Showing How War Materials Held in Reserve Supply the Requirements of Mobilization Until New Production Gets Under Way

Reasons for Maintaining Reserves of War Material

No nation can afford to keep on hand a reserve of arms, ammunition and supplies necessary to wage a complete war. The cost of such a reserve and the interest on the investment would be prohibitive. Instead, each modern nation endeavors to maintain a reserve of war material which will last its man-power until such a time as its arsenals and its industrial establishments can take up the burden of manufacture and supply. If our arsenals and our commercial plants can get into small production on a certain type of ammunition five months after declaration of war, and can produce that ammunition in ample quantity after eight months, then the reserve of that ammunition maintained in peace should be that required by all the troops under arms for the first five months and part for the remaining three months.

Fig. 1 shows such an ideal supply curve. But Fig. 2 shows a curve such as this country finds itself confronted with in the case of a number of very vital items of equipment and supplies. Constant study and effort is being made by all concerned with national preparedness to eliminate the shortages illustrated hypothetically by Fig. 2. Such shortage may be eliminated either by increasing the reserve or by expediting production. To increase the reserve is extremely expensive, and of course necessitates the appropriation of funds by Congress. In some cases it must be done—there being no alternative. The reserves of certain essential articles are so small as to be a constant matter of anxiety to the War Department. But the military student endeavors first to see if he cannot eliminate most of the shortage by measures taken to hasten production, as the pre-war cost is very much less. The measures taken to hasten production have been termed "industrial preparedness."

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*Ordnance department United States Army.

Briefly, industrial preparedness for war in the United States consists in a calculation of all requirements in advance, based on the rate of mobilization of the man-power, the allocating of these requirements to the Government arsenals and to suitable selected industrial plants, and of planning in advance in the matters of power, labor, raw materials and transportation.

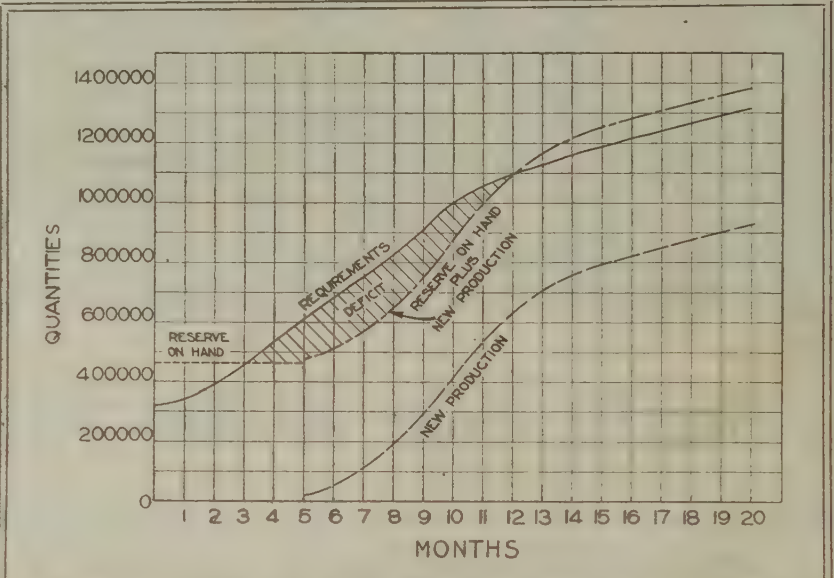


Fig. 2. A Deficit Will Exist Whenever Reserve Is Too Small or New Production Is Tardy

The industrial plant to which a war order for the manufacture of supplies is allocated is provided with detailed specifications and manufacturing information covering the article, and is asked to indicate how soon it can get into production on the article, and how soon it can reach the desired peak of production. It is also asked to draw up a war plan covering new equipment needed, bills of material, route sheets, labor, power, transportation, sub-contracts and any other essential step. When these measures are taken, the getting into production on that article is very greatly facilitated. We now know what is wanted and who will make it. The contractor knows what he is to make, and he has laid many of his plans in advance. We have already reached this stage in our plans.

Munitions Manufacture Now Exclusively in Arsenals

But there is still one weak point in the system, for, in too many cases, particularly as regards rifles, cannon, ammunition, tanks and airplanes, the manufacturer does not know *how* to make the article, nor is his plant more than generally suited in its equipment for that particular class of article. He does not understand the art of manufacture, and he is not equipped with the special machinery needed. Practically all of our manufacturers who made munitions during the World War have made no such articles since then; they have lost the art of manufacture, and the special machinery has been scrapped. A very large amount of time will be necessary to learn the art of manufacture and to design and procure the special machine tools, dies, jigs, fixtures and gages needed before production can be started. Conversely, if we can devise a plan which will teach our manufacturers the art of manufacture in time of peace very much time will be gained, the serious shortages will be greatly or entirely eliminated and very large sums of money will be saved the taxpayer.

The art of manufacture is now kept alive in our Government arsenals, which are equipped to manufacture most of the technical articles needed by our army, and which do manufacture a small amount of such material each year to meet the current needs of the army, and to replace deterioration in our reserves. It is very necessary to keep these arsenals alive to the extent that will preserve the art of manufacture, and retain a nucleus of officers, foremen and workmen familiar with the art. Further maintenance of these arsenals is not necessary, but the preparation and training of the commercial plants is vital, for on them will fall the bulk of production in war, as the arsenals have only sufficient capacity to manufacture from 1 to 5 per cent of the material needed, depending upon the particular article.

Obviously, therefore, the proper procedure would be to allocate only such portion of our peacetime manufacture to our arsenals as will be necessary to maintain the art of manufacture at these plants, and to allocate the balance of it in the form of "educational orders" to those plants which have been selected to make the particular article in event of an emergency. For example, suppose during the next five years it is necessary to manufacture 500,000 rounds of ammunition for the 75-mm. field gun for target practice and to replace deterioration in the war reserve of such ammunition. During the next five years we would then allocate say 250,000 rounds to our arsenals, and each year we would allocate 50,000 rounds to some one selected commercial plant. Thus within five years five commercial plants will have experience in manufacture, and each five years or so each plant will renew its experience. Or it may be possible to place orders annually with each selected manufacturer.

This is an entirely hypothetical example, but if some such plan could be put into effect it would result in a small line of machinery being installed in each plant for the manufacture of the article (which line could be easily duplicated in war), in a nucleus of foremen and workmen familiar with all manufacturing operations, in a perfection of plans for reaching mass production in war, including really practical plans for the necessary raw material, power, facilities, labor and transportation. Such education of our selected munitions plants, and such perfection of their war plans might easily result in advancing the date of mass production by one to three months. This would result in some cases in entirely eliminating shortages, in others of making it unnecessary to maintain such large reserves. The money gain to the taxpayer will be enormous, for it has been estimated that a month saved in getting into production will result in a reduction of the value of the reserve required to be maintained by approximately $150,000,000.

It is undeniable that it will cost more to manufacture supplies by the medium of educational orders placed with commercial plants than if these same supplies were made at a Government arsenal. The Government arsenal has complete facilities and is familiar with the work. The commercial plant will have to tool up for its initial educational order, and the planning cost will be high. Also, taking the above hypothetical case, a commercial plant cannot produce 50,000 of a certain article annually at the same unit cost as an arsenal could produce 100,000 in the same time.

Our selected commercial plants have been consulted relative to this plan for educational orders. They are a unit in stating that, more than anything else, it will result in a perfection of their war plans and in their getting into production in an emergency at a very much earlier date than would be possible without such educational orders. Moreover, they have quite generally indicated in a patriotic manner that they would be willing to undertake such orders on a cost basis. The plants which the ordnance department has selected for its war manufacture are almost all such large industrial concerns that such educational orders as would be placed with them would be a mere fraction of their regular annual commercial production.

The increased cost of educational orders over arsenal orders is a price we should pay for an exceedingly cheap form of insurance against shortages in war and will be money well spent. It should also be understood that the placing of educational orders does not necessarily mean a large increase of the amount of money appropriated annually for munitions supplies. It is in general merely contemplated that the money now appropriated annually for the procurement of current supplies shall be utilized to procure those supplies in a little different manner which, in the end, may be slightly more expensive, but which will add very greatly to our state of preparedness against war.

Present Legal Obstacles

Most unfortunately the law does not now permit the placing of such educational orders with commercial plants. The second paragraph of Section 5a of the National Defense Act now reads:

> * * * He (the Secretary of War) shall cause to be manufactured or produced at the Government arsenals or Government-owned factories of the United States all such supplies or articles needed by the War Department as said arsenals or Government-owned factories are capable of manufacturing or producing upon an economical basis.

As our Government arsenals can produce the vast majority of ordnance material and supplies needed in time of peace upon an economical basis, it follows that it is impossible to place even a small proportion of these orders with commercial plants.

There are also other existing laws which hamper the War Department in this connection, such as Section 3709 R. S., which provides that all contracts shall be made by advertising and in effect awarded to the lowest responsible bidder. Such procedure would defeat the purpose for which orders for ordnance would be placed with commercial plants, for awards in all probability could seldom be made to those well equipped and responsible manufacturers with whom the War Department has allocated orders for the manufacture of supplies in war, and whom it is desired to train in peace for such manufacture. Instead it is very likely that, under the present laws, such contracts would have to be awarded to some manufacturer who was the lowest bidder, because of his desire for work which would carry his overhead over a lean period, or for some other reason, and who might not be equipped or organized in a way that would permit of his producing quickly and in enormous quantities in war. It would be of little benefit from the standpoint of preparedness to have educational orders placed with such firms. They should be distributed among all the plants to whom war orders have been allocated in conformity with the well formulated plans for industrial mobilization.

In order to permit educational orders to be placed in the manner which will best secure the results desired, the War Department recommended introduction of a bill in the last Congress and reintroduction in the present Congress (H R 450, H R 5662 and S 1824), which provides that:

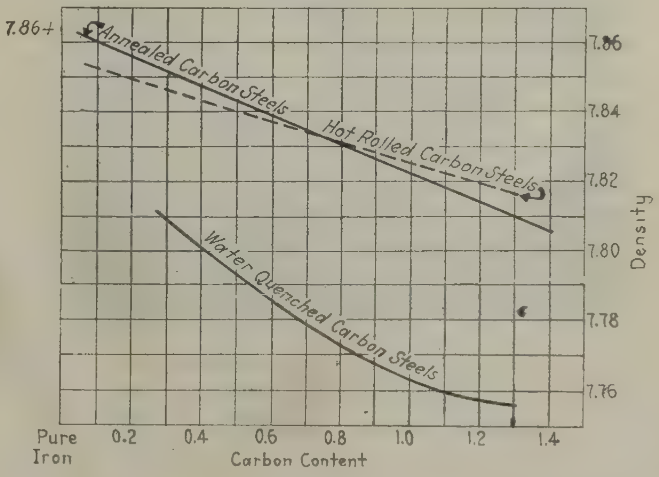
> The Secretary of War may authorize the placing of educational orders for equipment, munitions and accessories needed in the military service with commercial concerns to the degree that is considered by him as being necessary to familiarize commercial factories with munitions manufacture and to advance the industrial war plans of the War Department, and in placing these educational orders the competitive bids which in his opinion best secure these results may be accepted; and he shall make statement of his action under this provision in his annual report.

It is believed that this bill should be enacted into law as soon as practicable. It will place the nation in a far better state of preparedness as to its munitions supply for possible war than it now is. Should it become a law, the resultant training of our commercial plants in the art of manufacturing munitions, together with the other well formulated plans and measures of the War Department looking to industrial mobilization in war, will go a very long way toward insurance against war. What we are interested in is achieving a state of industrial preparedness which will match our unrivaled man-power with adequate munitions-power, so that our country will be secure from attack by any power or combination of powers. We are planning for peace, continued peace, and we think we have hit on a logical way to insure it, not by the mere expression of a pious wish, but by commanding it.

Density of Plain Carbon Steels, As Rolled, and After Heat Treatment

H. C. CROSS and E. E. Hill have studied the "Density of Hot-Rolled and Heat-Treated Carbon Steels," and their results are published in Scientific Paper No. 562 of the Bureau of Standards.

Four samples of the purest commercial and electrolytic irons available closely approximated the average density (7.864 gm. per cu. cm.) despite large difference in previous history. Density of hot rolled commercial steels decrease slightly with increasing carbon content. Annealed steels vary a trifle from these figures. In samples chosen of such size that the structure would be martensitic after water quenching from above Ac_3, the density decreased considerably. Tempering to various increasing temperatures restored the density gradually to the figures for annealed specimens. Principal data are summarized in the diagram shown at the right, adapted from Messrs. Cross and Hill's work.



Whirlwind Engine Parts Receive Careful Handling

Thorough Inspection Made at Every Stage of Manufacture—Cylinders and Cylinder Heads Machined on Production Basis

BY FAY LEONE FAUROTE*

ALMOST within a year, namely, from May 9, 1926, when Commander Byrd and Floyd Bennett flew from King's Bay, Spitzbergen, to the North Pole and return in 15½ hours in a Fokker monoplane equipped with three Wright Whirlwind engines, to July 12, 1927, when Edward A. Stinson in a Stinson Whirlwind-engined monoplane covered more than 4000 miles in the National Air Tour, eight major records, the greatest in aviation history, were made. Six of these were made over oceans and included the splendid flight of Lindbergh, that of Chamberlin and Levine, that of Lieuts. Maitland and Hegenberger across the Pacific, that of Commander Byrd and his three associates, and the flight across the Pacific by Ernest L. Smith and Emory B. Bronte.

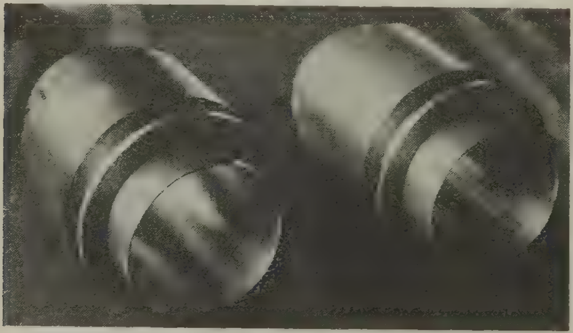
To these spectacular accomplishments has been added the good-will tour of Col. Charles A. Lindbergh in his Ryan monoplane, the Spirit of St. Louis. This tour through Mexico, Central America, a portion of South America, the islands of the West Indies and Cuba, began on Dec. 13, 1927, with a non-stop flight from Washington to Mexico City, the distance covered in this leg of the flight being 2000 miles and the flying time, 27 hours. At the finish of the tour, at St. Louis on Feb. 13, Colonel Lindbergh had spent more than 116 hours in the air and had traveled more than 9000 miles. When such records are remembered, it is hardly to be wondered that the world generally and metal workers in particular are interested in knowing something of how the Wright Whirlwind engine is built.

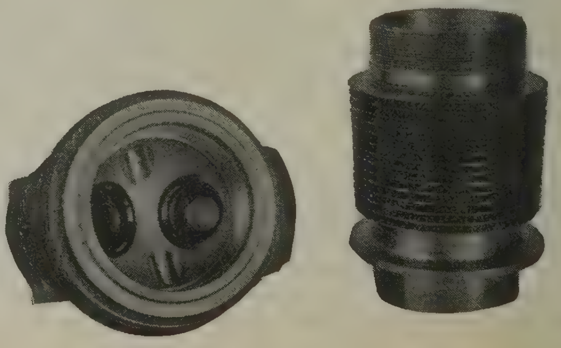
It is the purpose of this and the succeeding article to describe some of the operations performed upon the cylinder, cylinder head, pistons, connecting rod, crankcase and other parts of this famous power plant, as well as to show how some of the major parts are assembled.

At the outset, it should be said that no piece of commercial mechanism that I have seen assembled gets greater care and more careful handling at all stages. I was very much impressed by the manner in which all the parts are protected between operations, the care taken to make sure that the castings are thoroughly cleaned, and parts of metal that might afterward cause failure eliminated, the attention paid to weight, and the sincere seeking after fine workmanship. In general, one had the feeling of being in a tool room rather than in a manufacturing shop. Nor is it to be wondered at when one considers the great responsibility which is actually carried by the workmen themselves in the manufacture of this engine. Only when its motor is in operation is an airplane an airplane; failure of its engine is disastrous—you cannot tow it home. It falls to the earth or sea, a broken thing, a lifeless piece of junk; that is, unless one is within gliding distance of a field. This, of course, usually happens in flight over land but not always over water. There to fall is to perish.

Workmen Realize Their Responsibility

A very intelligent class of men is employed in the Wright shops. Their obvious seriousness and realization of their responsibility, their great willingness to do everything within their power to insure the lives of the daring pilots who will afterward use these power plants, are evidenced throughout. Since operations at the Wright Aeronautical plant are on a quality manufacturing basis, all parts are governed by carefully prepared drawings, operation and instruction sheets and routed through the shops according to a definite schedule. The usual special tools, such as jigs and fixtures which must be used in large





AFTER Annealing, the Cylinder Barrel Is Rough Machined All Over and Put Through a Series of Heat Treatments. The finished cylinder head and barrel are shown at the right

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*Mechanical engineer, New York, and former editor of the *Aircraft Yearbook*. This is the second of a series of articles on the Wright Whirlwind engine, the first having appeared in THE IRON AGE of Feb. 9, pages 394 to 397.

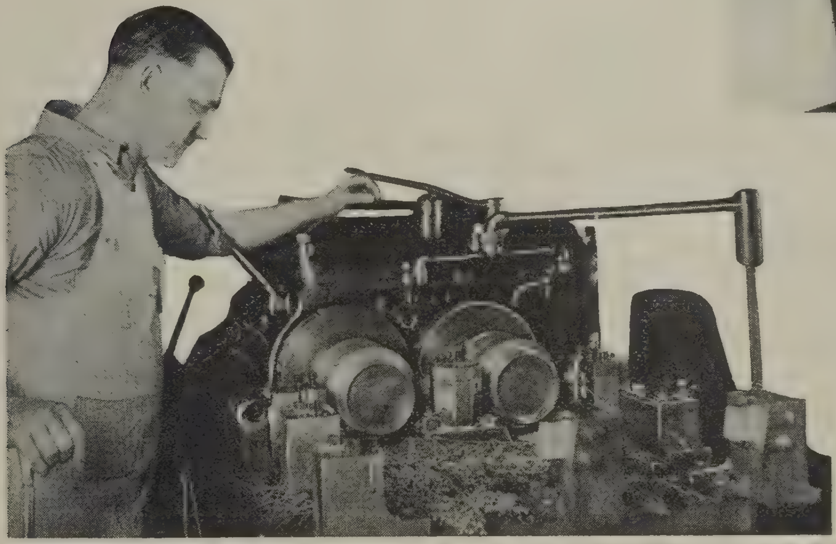
production to assure interchangeability of parts, a point vitally necessary in the manufacture of this power plant, are to be found throughout. Although standard machines are used for most operations, considerable ingenuity has been shown in the manner in which some of these standard tools have been adapted to the work at hand. The output, of course, has not yet reached the point where mass production is possible or desirable. There are no conveyor systems, no overhead trolleys or monorails, no slide ways or rollways. There are a number of assembly jigs mounted on casters, and in general it may be said that for the purposes for which they are used these are ample at the present stage of manufacture.

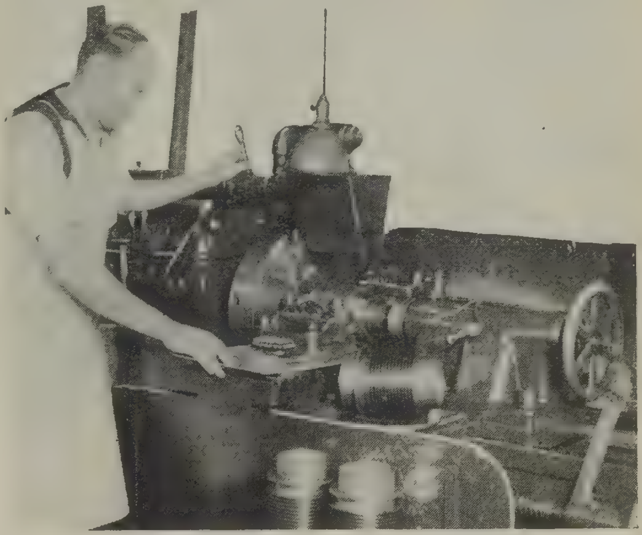
While the company makes its own aluminum-alloy and bronze castings, its steels are bought from outside vendors in rough-finished form according to rigid chemical and physical specifications.

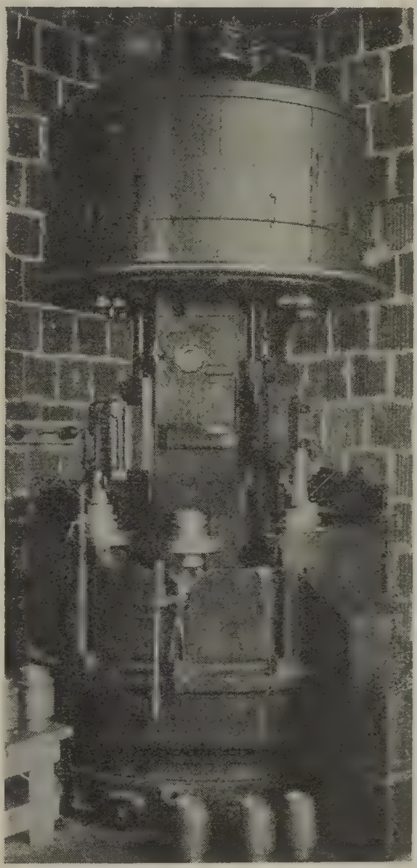
Machining and Assembling of Cylinder Unique

The manner in which the cylinder is machined and assembled is interesting. The resulting product is unique. The cylinder barrel, shown in an accompanying illustration, comes into the shop as a forging of special steel. After being annealed it is rough-machined all over and put through a series of heat treatments. A Brinell hardness tester is used for checking the hardness. The cylinder barrels are then put two at a time on a double-spindle turret lathe where they are bored and faced. The outside diameter is also turned up on a similar lathe, the work being held on an expansion arbor. Following these operations the barrels are placed in a heavy-duty automatic lathe where 14 fins, approximately 13/16-in. deep and 1/64-in. thick at the top, are cut from the solid barrel. The fins are tapered with a separate tool fastened to the top of one of the tool blocks of the same lathe, the taper being from 0.030 to 0.060 in. Two sets of tools, one on each side, operate simultaneously on the work. I was informed that an extra set of tool blocks was being put into condition while the other set was in operation on the work. Operation is continuous, the machine being stopped only when the tools become dull or the work is changed.

A thread miller then cuts the threads on the upper end of the barrels which are cut 0.013 in. oversize to take care of the shrink fit in the cylinder head. Minor operations on this part are the facing of the end to a close dimension from the flange, and the forming of the back of the flange.



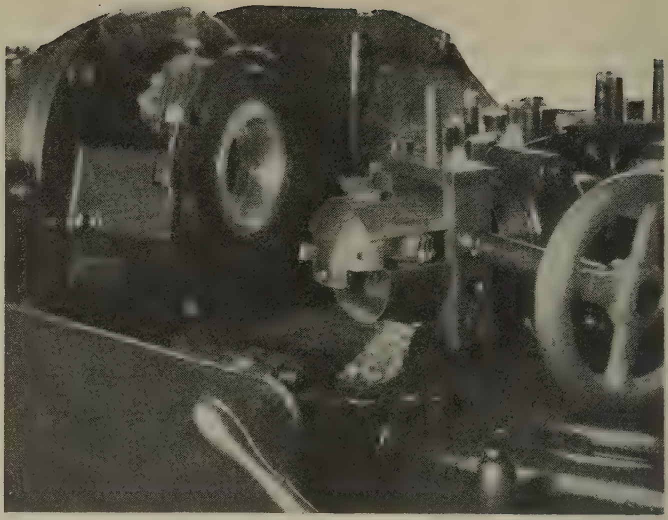




CYLINDER Barrels Are Turned on the Double-Spindle Turret Lathe Above, and Cooling Fins Are Formed on the Machine at Upper Right. The Mult-Au-Matic, at lower right, is set up for machining cylinder barrels, and will also be used for cylinder heads

Cylinder Head a Machine-Molded Aluminum-Alloy Casting

The aluminum-alloy casting for the cylinder head is produced in the Wright foundry where molding machines and special chilled cores make rapid production of good quality possible. In this department one is impressed with the liberal-sized sprues used and the excess metal which is included to secure sound castings that will not reveal internal defects after machining is partially done. The aluminum for the cylinder heads and pistons is the Y alloy, the composition of which is approximately as follows: Copper, 4 per cent; nickel, 2 per cent; magnesium, 1.5 per cent; iron, 0.75 per cent; silicon, 0.50 per cent, and aluminum, 91.25 per cent. Each of these castings is thoroughly cleaned and sandblasted, and then subjected to a 70-lb. air pressure test for defects, after which it is heat treated to normalize the interior. The part is then chucked on the inside diameter of the open end and the first fin is turned to a close-dimension diameter. A ⅜-in. hole is then drilled in the dome



MOLDS for Cylinder Head Casting Are Made on Machine at Left. Boring, facing, forming the dome and threading of the head are done on turret lathe above

end of the cylinder head, the object of this small bottom hole being to provide a stop for the boring fixture used on the next machining operation. It also determines the wall thickness and assures a uniform compression chamber in the cylinder. Rough-facing the open end and rough-forming of the dome are now performed on a heavy upright drill using combination tools. Finishing is done on a turret lathe. This operation includes boring and threading of cylinder bore. A Bullard Mult-Au-Matic is now being installed to handle this work, as well as a sequence of operations on the cylinder barrel.

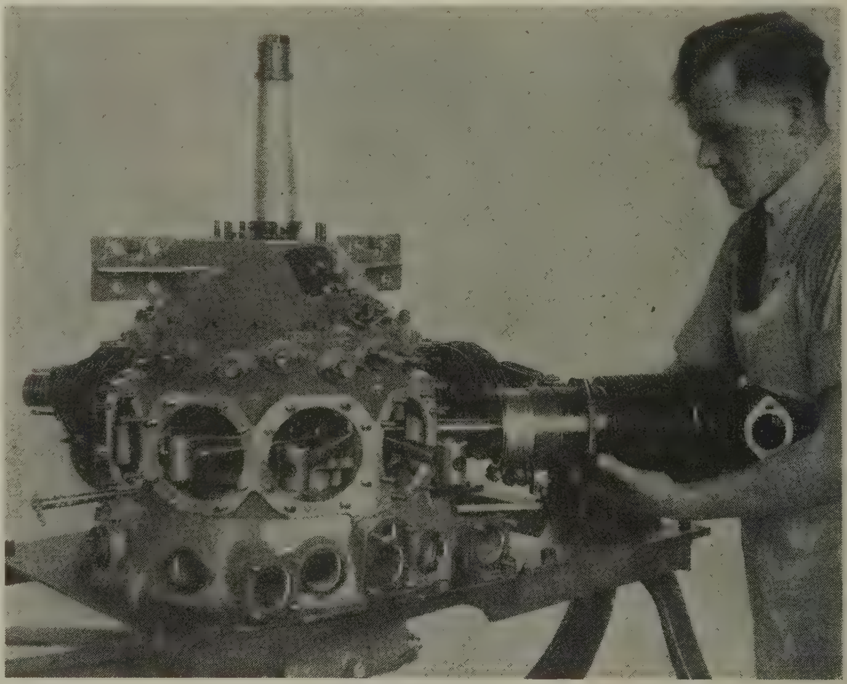
Before any further machine work is done, the cylinder head is subjected to a severe water test. All openings are plugged and water is forced into the cavity by pump until a pressure of 600 lb. per sq. in. is reached. If there is any evidence of leakage, the cylinder head is rejected.

Rough and finish facing and boring of the exhaust port, used as a locating point on future operations, is next in process. An upright drill press fitted with special fixtures and combination boring and facing tools takes care of these operations. Similar boring and facing and tapping operations are then performed on the intake port side, these also being done by an upright drill press. Then comes the drilling and tapping of the two spark-plug insert holes, one on each side of the cylinder. They are counterbored on the inside with special back-facing counterbores. The rocker-box pads are next milled on a vertical milling machine having a special index fixture. Then comes the boring of the valve guide holes and the seats for the valve seat inserts.

The cylinder heads are then placed in a furnace and heated to 650 deg. Fahr. so that the valve seat holes are expanded sufficiently to permit insertion of the bronze valve seats. As soon as this operation is completed and the cylinder heads are cool they are placed in a fixture and the lower part of the valve seat is spun into its anchorage. They are formed to a gage to insure uniform seats. The drilling and tapping of the small holes is done on sensitive drill presses. The part is then carefully inspected and if pronounced fit, is ready for assembly with the cylinder barrel. Before this operation can take place, however, the cylinder head is again heated in a gas furnace to 650 deg. Fahr., after which it is placed on an assembly stand and the cylinder barrel quickly screwed in place. The intake pipe flange is assembled at the same time. The whole job is put through a final pressure test of 600 lb. per sq. in.

Eight holes are drilled in the cylinder barrel flange on a multiple-spindle drill press. The flanges are milled with slotting saws in a gang set-up. The spark plug inserts are screwed and anchored in place and the valve guides pressed into position, after which the whole assembly is spray-enamelled all over and baked in a standard oven.

Internal grinders are used for the next operation which is the grinding of the entire cylinder assembly. A perfect, polished bearing surface is secured by a honing operation which follows the grinding. At this point all cylinders are checked carefully and the percentage of bearing is calculated. All studs are screwed in place, great care being taken that none of them is subjected to torsional stress. Indeed, to make sure



ASSEMBLY of the Cylinder in the Engine Is Preceded by Painstaking Inspection that there is no such stress a straight line is scribed the entire length of the unthreaded portion. If the thread is, therefore, twisted in the least it can be readily detected. As the job is now ready for the engine assembly, it is again painstakingly inspected and placed in individual compartment trays to be forwarded to the assembly section. An inspection of the accompanying illustration of the assembly of the cylinder in the engine will show what a clean workmanlike job this is.

Precautions for Hammer Operators

Simple Safety First Measures Adopted by Drop Forging Institute—Data on Manufacture of Satisfactory Keys

BULLETIN 451 of the United States Bureau of Labor Statistics contains the "Safety Code for Forging and Hot Metal Stamping" recently adopted by the American Drop Forging Institute, National Safety Council and American Engineering Standards Committee. It recommends that the following operating rules be posted prominently and strictly enforced:

Operating Rules

Changing Dies and Repairing.—Always block the hammer, shear or punch substantially, using steel blocks on hydraulic presses. Make sure operating mechanism is closed, locked and protected against accidental opening.

Board Drop Hammers.—When replacing board, keep hands away from ram. When adjusting mechanism, keep hands from under roll-releasing devices or from over the knock-off.

Keys must not project.

Idle equipment at noon and at night should be left with hammer resting on anvil.

Mushroomed tools must be repaired immediately.

Tongs or *forks* must be used in handling metal. Cold metal parts must be handled with tongs or picks long enough to prevent hands from getting between dies.

Quenched forgings for quick inspection should be reheated to draw temper and prevent accidents in further operation.

Goggles must be used by hammer men, heaters, helpers and cold-trim press operators.

Clothing.—Leather or asbestos aprons, gloves with asbestos or leather palms, congress shoes and leggings must be used by men handling hot metal. Wear hand leathers in moving rough cold stock.

Furnaces should be lighted by oily waste placed in front of burners. Open all doors, use long tongs and stand aside to avoid explosion or flare back. Turn on air slowly.

Handling Dies.—Threaded countersunk holes in all dies should be provided at convenient places so rods, screwed in, can be used for handling and adjusting. Minimum sizes follow:

Weight of Dies	Number of Holes	Depth	Diameter
200 to 500 lb.	2	2 in.	¾ in.
500 to 1000 lb.	2	2 in.	⅞ in.
1000 lb. or more....	4	3 in.	1 in.

Transfer Boards Prohibited.—To move dies from bench to machine use transfer truck and chain block.

Other Safety Precautions

The code recommends that aisles should be at least 4 ft. 6 in. wide, properly marked, kept clear of everything except moving traffic. Machines should be so arranged that operators stand between them, clear of the aisles.

Many items of safety equipment are noted, such as gear guards, valve locks and fan screens. Steam hammers should have springs to prevent piston (not piston rod) striking upper cylinder head. Hot steam pipes should be guarded. In mechanical hammers, where the work is so small it can be held in a one-hand tong, the machine should be operated by hand lever, rather than foot treadle. If the work is placed in the lower die and not held by hand, a guard should descend before the hammer falls, or else the operation should depend on two hand levers. Substantial pulley keepers should be installed to prevent pulley or flywheel from falling should the shaft break. Board hammers should have inclosures so that a broken board will not topple down on the operator; railed platforms should be provided for adjusting the overhead mechanisms.

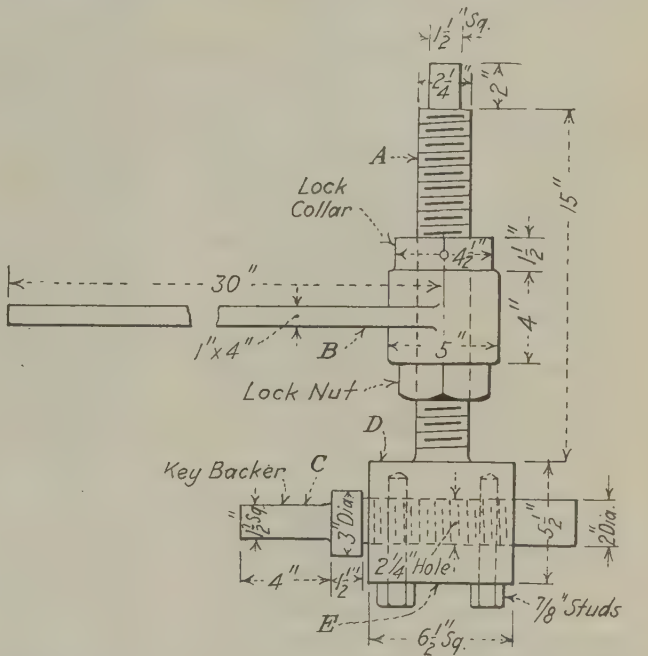
Shears should have their maximum capacity in temper and size prominently placarded, thus: "Limit, 0.30 to 0.40 per cent carbon, 3½ in. square, 4 in. round, 1½ by 8 in. flat."

Manufacture of Keys

Loose fitting, bruised or protruding keys have been the cause of so many accidents that the code gives these definite recommendations on key manufacture:

Hammer die keys shall be of material that will not crack or splinter or fly off, and shall not project so as to endanger workmen.

Note.—It is suggested that hammer die keys be made of open-hearth material (manganese, 0.40 to 0.50 per cent; carbon, 0.50 to 0.60 per cent); that they be machined accurately to fit notches, and that the ends be tempered to prevent spreading, upsetting, or breaking. The ends of keys should be redressed when necessary. For backing out keys a "key backer" held by a fixture is recommended, such as the one illustrated.



Holder for Key Backer. Part "A" is a threaded round bar enlarged to a square end "D." This end has a cap "E" with a round hole in which part "C" moves freely. Part "B" is a flat piece that screws up and down on bar "A." To operate it, part "B" is placed on the lower die and so adjusted that the left-hand end of part "C" is opposite the die key. The hammer is then lowered on top of part "B" to hold it firmly between the upper and lower dies, and part "C" is struck with a ram to drive out the key

Another method which has been found satisfactory is to use softer keys (carbon, 0.37 to 0.50 per cent), heat treated by quenching in oil until black and then cooling in the air. These keys upset before they split. This necessitates frequent dressing but is reported to be much better than using hard keys. If the small end of the key upsets before it starts out of the die, the key is driven up as far as possible, then the end is burned off with an acetylene torch and the key driven out.

Wheelock, Lovejoy & Co., Inc., distributer of alloy and tool steels, has removed its Chicago office from 5 North LaSalle Street to the Pure Oil Building, 35 East Wacker Drive.

Blast Furnace and Open-Hearth Topics Feature Technical Meetings

Mining and Metallurgical Engineers Hold Large Convention—Railroad and Other Steels Discussed —Secretary Hoover Signally Honored

SOME excellent papers on blast furnace, open-hearth and other steel problems and an ovation to Secretary Hoover were features of the 136th general meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 20 to 24. With an attendance of about 2000 members and guests, the convention was one of the largest ever held by the institute.

The tribute to Herbert Hoover, a past-president of the institute, was made when the Saunders medal was conferred on him at the largest banquet in the organization's history. Other prominent metallurgists were also honored. The chief features of the technical papers, delivered at five sessions, are reviewed in the following columns.

Modern Blast Furnace Problems Reviewed

SEVERAL valuable papers were presented at the session on blast furnaces, but unfortunately the attendance was very small. The character of the papers was such that a larger attendance and a broader discussion were merited. George P. Hansen, American Rolling Mill Co., Ashland, Ky., acted as chairman in place of Ralph H. Sweetser, who was confined to his home because of illness.

Blast Furnace Life Prolonged

Some important new developments in blast furnace construction were offered by J. P. Dovel, vice-president Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., in a paper entitled "Improvements in Blast Furnace Construction," pointing out that the expense of replacement and relining of a blast furnace may consume all the profits made while it is in operation. The author described various steps taken in altering the construction so as to make it permanent. It has been possible to install a permanent hearth in one of his company's furnaces by making it of heavy cast iron sections with machined and lap joints, bound together with wrought iron bands which can be repaired from the outside without blowing out. The whole bosh is incased in metal and does not depend upon its brick work to any extent. The author reports that the oldest structure of this type has been in service 11 years and as it is still in perfect condition a longer service will be needed to establish its permanency.

Frequent and early failures in the inwall section above the mantel were dealt with by inserting a series of rows of bronze cooling plates from the outside, attached to and supported by the shell, which after five years' service is still in good condition. Permanency of the top has been accomplished by discarding the brick in the top section and substituting a heavy cast steel jacket lined with cast iron blocks which withstand the wear and make a permanent stock-line. Flue dust production is claimed to be reduced, as well as coke consumption, at the same time increasing the capacity of the furnace.

Discussion

C. A. Meissner, United States Steel Corporation, New York, in commenting on the paper, said that Mr. Dovel has blazed the way in making it possible to increase the stock-line and other parts of the furnaces, at the same time reducing flue dust production. Conditions, however, in the South are much different from those in the North in blast furnace operation. In the North flue dust production is very heavy, involving a large loss of ore already paid for. This flue dust runs as high as 49 to 50 per cent iron, while in the South the dust contains not more than 30 to 35 per cent of iron. The adoption of Mr. Dovel's devices in the North depends a good deal on the extent to which they will reduce flue dust production, said Mr. Meissner.

Studies Metallurgy of Lime and Dolomite

A valuable contribution to the metallurgical problems involved in the use of limestone and dolomite

GEORGE OTIS SMITH

Institute's New President Is Mr. Smith, Director of the United States Geological Survey. Mr. Hibbard was the Howe Memorial Lecturer for 1928

HENRY D. HIBBARD

was offered by Oliver Bowles, supervising engineer Non-Metallic Minerals Experiment Station, United States Bureau of Mines, New Brunswick, N. J., in a paper entitled "Utilization Problems of Metallurgical Limestone and Dolomite." Mr. Bowles points out that relatively little study has been given to the nearly 24,000,000 tons of limestone and dolomite used each year metallurgically. His paper is based on an extensive review of metallurgical literature, and consists of an exposition of some of the facts based thereon. He discusses blast furnace flux, its action in the furnace, the effect of impurities on fluxing stone and offers a formula for calculating the relative values of different grades of flux. The slagging effect of magnesia and its function as a remover of sulphur, as well as its effect on slag viscosity, are gone into. The size of stone for blast furnace flux is also reviewed, as well as the use of impure fluxing material. Basic open-hearth flux is discussed along similar lines, concluding with an analysis of the problems in the use of dolomite as a furnace lining.

Discussion

In the discussion George C. Stone, chief metallurgist New Jersey Zinc Co., said that, in making spiegeleisen, magnesia is much more effective than calcium, and J. T. McKenzie, chief chemist American Cast Iron Pipe Co., Birmingham, Ala., described the use of dolomite for slagging in the cupola. He had found that less dolomite than limestone was necessary and that better results were obtained by using ½-in. to 1-in. stone instead of larger sizes. The question of the use of limestone or burnt lime in open-hearth practice was touched on by L. F. Reinartz, American Rolling Mill Co., Middletown, Ohio, who said that burnt lime gives faster heat, but limestone, because of the larger boil, produces cleaner metal.

Coal Cleaning Methods Reviewed

A paper that was considered valuable to blast furnace men in general was one entitled "Cleaning Bituminous Coal," by J. R. Campbell, American Rheolaveur Corporation, Scottdale, Pa. The author discusses various methods of cleaning coal, both wet and dry. Curves were thrown on the screen, illustrating results in ash and sulphur removal by the use of various methods on different grades of coal. In general the author emphasized the following fundamentals in the mechanical cleaning of bituminous coal: Necessity of washability studies, type of plant adaptable to the coal studied, plant control in performance, and all factors in the cost of washing.

SECRETARY HOOVER
Awarded Saunders Medal

Discussion

The wisdom of putting this paper in a blast furnace session was commended by C. A. Meissner, who said that clean coal means clean coke, a very important consideration in making good pig iron. Commending the paper for its thoroughness, Mr. Meissner said he prefers the dry method of cleaning, and stated that we need more coal cleaned. While the quality of coke has been improved, a uniform pig iron is insured by the use of uniform coke, which can be made more certain by proper cleaning of the coal.

Gas Washing Methods Contrasted

A comparison of American and German methods of washing blast furnace gas was contributed in a paper by Arthur J. Boynton, vice-president H. A. Brassert & Co., Chicago, entitled "Gas Washing." The author states that the logical order in the use of blast furnace gas is as follows: In hot blast stoves, in gas engines where such engines exist, in open-hearth and mill heating, in coke oven underfiring, and under boilers. After discussing the wet cleaning method and its various phases, Mr. Boynton goes into some detail discussing the Halberger-Beth system in Germany, and then devotes some space to the newest method of gas purification and one which is exciting considerable interest on the part of all German iron and steel men, the electrical precipitation system. Some of the results obtained from this in the United States and Germany, as well as the costs of various systems, are dwelt upon. "The reduction in the cost of steel possible through the proper application of washed blast furnace gas remains the most important single unrealized means of reducing the cost of American steel." In the meantime, says the author, wet cleaning by the disintegrator method remains the simplest, cheapest and most flexible of the thoroughly tried systems developed by Continental experiments.

Other Papers

The subject of high alumina slags in blast furnace operation was covered in a paper entitled "Production of High Alumina Slags in the Blast Furnace," by T. L. Joseph, S. P. Kinney and C. E. Wood of the Bureau of Mines. A paper on the program which was not presented was entitled "Operation of the Blast Furnace Plant, Columbia Steel Corporation, Ironton, Utah," by W. R. Phibbs, general superintendent Columbia Steel Corporation, Provo, Utah.

Open-Hearth Session Features Metallurgical Topics

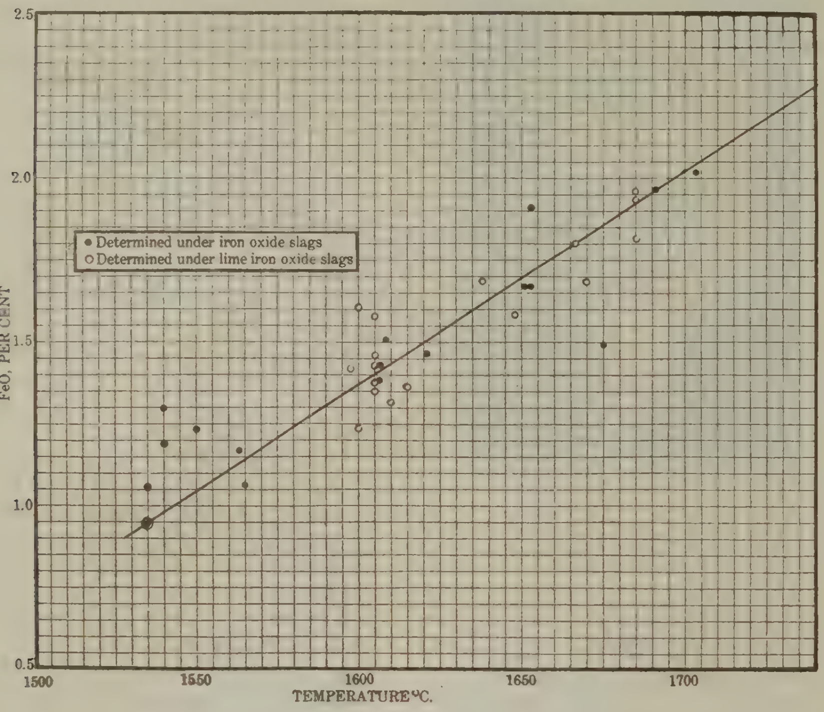
FIVE papers were scheduled for the session of the open-hearth committee, Tuesday afternoon. Leo F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio, presided. Brief abstracts of two of the papers, which were summarized by their authors, are given in the following paragraphs, together with the main features of the discussions which followed each paper. A third paper, describing a 1-ton open-hearth furnace and telling of results of its operation, will be published, in abstract, separately. The two other papers were not heard, as the authors were not present and the papers had not been preprinted.

Elimination of Carbon

Rate of elimination of carbon largely controls the time required to make a heat of steel by the basic open-hearth process and to an important degree determines the cost of refining, according to Alexander L. Feild, metallurgist Union Carbide and Carbon Research Laboratories, Inc., Long Island City, N. Y., in a paper entitled "Rate of Carbon Elimination and Degree of Oxidation of the Metal Bath in Basic Open-Hearth Practice." Practical experience has led to the generally accepted belief that the use of slags relatively high in iron oxide, such as are required to bring about rapid refining, leads to a certain sacrifice of quality in the product. As a consequence, a compromise must be made between the exceedingly slow rate of carbon drop which would correspond to the ideal case and the rapid rate which would best satisfy the condition of minimum cost.

An increase in rate of refining necessarily implies an increase in the concentration of iron oxide dissolved in the metal. However, even for the infinitely slow rate that corresponds to slag-metal equilibrium, the metal would contain a certain definite concentration of dissolved iron oxide. It is a matter of great practical importance, therefore, to determine the quantitative relation between the minimum or equilibrium concentration of iron oxide in the metal and the higher concentrations which must actually obtain in practice.

The slag comprises the immediate oxidizing agent. It is, for practical purposes, insoluble in molten iron and actual removal of the oxidizable elements from the latter must be accomplished by diffusion or transfer of iron oxide from the slag to the metal across the slag-metal interface. Since FeO is soluble in molten iron and since Fe_2O_3 is converted into FeO upon coming into contact with molten iron, the above-mentioned transfer from slag to metal is a transfer of FeO alone.



Effect of Temperature on Solubility of FeO in Iron

Oxidation of carbon proceeds by virtue of the reaction

$$C + FeO = CO + Fe.$$

The dissolved CO, a product of the above reaction, saturates the metal and thereafter escapes as gaseous CO at a pressure equal to the mean or effective hydrostatic pressure. Unless outward diffusion of CO is considered to be too slow to be of practical importance, there can be no such thing as equilibrium between carbon and FeO in the metal bath, excepting the hypothetical equilibrium at extremely low CO pressures, where dissolved CO would by thermal dissociation be in equilibrium with the oxygen pressure of dissociated FeO at the slag-metal interface.

When carbon elimination ceases measurably to progress, the carbon and FeO dissolved in the metal are substantially in equilibrium with CO at a pressure of 1 atmosphere. Hence, for any given temperature, the product of carbon and FeO is equal to a constant—the equilibrium constant for the above-mentioned reaction.

Diffusion Equations Developed

Equations which express the relation between rate of carbon drop, FeO content of the metal, and various other factors have been developed.

Assuming that the data used in the calculation are accurate enough for practical purposes, it becomes possible to calculate how the FeO content of the metal varies with rate of carbon drop for the particular operating temperature. The proportional increase in FeO due to rate of carbon drop, over and above the equilibrium value, is an inverse measure of the degree to which furnace practice approaches the ideal.

The first conclusion is that there is no conflict between theory and practice, and that the commonly accepted beliefs and ideas, so far as they go, contain the germ of truth, in most cases at least. However, the next conclusion, which inevitably follows from a careful consideration of the complexity of the physico-chemical process which comprises basic open-hearth refining, is that it can be only through the application of a perfectly elaborated theory of the process, confirmed by and based upon accurate experimental measurements, that the metallurgical and economic factors involved will be brought within intelligent understanding. The ability of a science to predict quantitatively is a measure of its degree of perfection, and prediction requires an adequate theory and the necessary fundamental data.

Solubility of Iron Oxide

Iron oxide (FeO) plays an extremely important part in the manufacture of steel, according to C. H. Herty, Jr., and J. M. Gaines, Jr., physical chemist and assistant physical chemist, respectively, Pittsburgh Experiment Station, United States Bureau of Mines, in a paper entitled "Effect of Temperature on the Solubility of Iron Oxide in Iron." In the open-hearth furnace and the Bessemer converter it is the chemically predominant compound and controls to a large extent both the operation of the furnaces and the composition and quality of their products. Almost all of the refining action is carried out through the medium of FeO, which oxidizes carbon, manganese, silicon and phosphorus.

At the end of any open-hearth or Bessemer heat the steel contains dissolved iron oxide, which must be wholly or partly eliminated. The type of deoxidation product depends on the amount of dissolved iron oxide and on the deoxidizer used. After the heat has been deoxidized and while it is being teemed, iron oxide diffuses from the ladle slag into the metal, causing losses of deoxidizer and increase in iron oxide content of the steel.

It is generally believed that non-metallic inclusions are responsible for a great many failures of steel in service and for decreased yield of steel during rolling. The basis of most non-metallic inclusions is dissolved iron oxide. This investigation was undertaken to determine the amount of iron oxide that will dissolve in iron under various conditions. Steel-making slags are complex and it has been thought best to determine solubility under simple slags as a first step. The study is being continued under slags whose compositions approach those of operating slags.

Experimental Method

In making determinations on the solubility of iron oxide in iron, a 50-kw. Ajax-Northrup furnace was used. This was equipped with a magnesia-lined graphite crucible in which 50 lb. of electrolytic iron was melted and held at the required temperature. When the metal was melted, the desired slag—either iron oxide or a mixture of lime and iron oxide—was added in sufficient quantity to give a liquid ring on the surface of the metal. Temperature readings were taken at frequent intervals and when the temperature had been constant for 15 min., samples of slag and metal were taken. The slag was analyzed by the usual laboratory methods for FeO, Fe_2O_3, SiO_2, MgO and CaO. One or two samples of metal from each heat were analyzed for the usual constituents, carbon, manganese, phosphorus, etc., and all samples were run by the modified Ledebur method for oxygen content.

The fact that increasing amounts of oxygen are found in the metal with increasing temperature indicates that oxygen dissolved in the metal is present as a compound and not as a gas. Gas dissolved in liquids shows decreasing solubility with increasing temperature.

Solubility of FeO in Iron Under Operating Slags

The exact amount of FeO in the metal in equilibrium with a finishing open-hearth or Bessemer slag cannot be predicted until data are obtained on the compounds present in such slags. The initial steps toward a knowledge of solubility of FeO in iron under commercial slags are determinations of solubility under slags consisting of FeO and SiO_2, and FeO, CaO and SiO_2.

Furthermore, in open-hearth operation, equilibrium between slag and metal is seldom reached, because carbon elimination is proceeding at all times, preventing the metal from taking up iron oxide to its equilibrium value. Under open-hearth conditions the amount of dissolved iron oxide depends on the carbon content of the metal and the temperature, unless, of course, deoxidation with some other metalloid has taken place.

The rate at which carbon is eliminated is controlled primarily by the rate of diffusion of iron oxide from the slag into the metal and this to a large extent depends on the saturation value of FeO in the metal under the slag in question.

Discussion

Running discussion followed the presentation of the three papers on open-hearth subjects. Among the principal points brought out were the following:

Slag analyses to determine FeO are available to the practical open-hearth man and can be reported by the laboratory sooner than the carbon determination comes back. If these samples are taken an hour before tapping they will be a great help in controlling the ore additions and finishing the heat.

Dissolved FeO in the bath affects the rate of carbon drop. In contrast, however, inclusions of iron silicates have no effect upon the rate of carbon drop.

A suggestion was made for obtaining the temperature of the bath of metal by means other than those depending largely upon the consideration of the temperature of the slag. This involves the use of a definite weight of platinum, which would be immersed in the bath in a refractory receptable and held there long enough to acquire the bath temperature. It then would be put into a mercury calorimeter and an accurate determination of the bath temperature would thus become available. It was hinted that a thermocouple for this purpose is now in process of experimentation in a prominent laboratory, and that announcement may be expected shortly as to its characteristics and utility.

Deep baths require a higher percentage of FeO in the slag than do shallow baths, to give an equivalent removal of carbon from the bath by the ordinary reaction $FeO + C = CO + Fe$. This is due to the fact that, with equal FeO in the slag, the rate of removal is about proportional to the area of the contact plane between slag and bath. With a deep bath (and more tons of it) there is a larger amount of carbon to be removed from the bath than with a shallow bath of equal plane.

Some Steels Used by Railroads

MEETINGS considering the properties of various steels were held on Monday, Feb. 20. The morning was given over to the more scientific aspects of alloy systems and results of laboratory study. During the afternoon several papers on the utility of steels were read, and the Howe Memorial Lecture was delivered by Henry D. Hibbard.

Rail Steel Made in Germany

More discussion was accorded C. W. Gennet's paper on "The Manufacture of Some Foreign Rails" than any other. This has already been printed in full abstract in THE IRON AGE, Feb. 9, page 405.

C. B. Bronson of the New York Central Lines dwelt chiefly on the comparative value of the roller straightener and the gag press. He said there were six debatable points, of which the first is most important: (1) Does the roller straightener, in severely kneading the entire rail end to end, do less damage than a few separate blows by the gag press? (2) Will the more costly roller straightener do the work cheaper? On this point he recognized that the tendency toward longer and heavier rails (two-thirds of them now weigh more than 100 lb. per yard) is making the straightener's and helper's job very exhausting. (3) Will it require expensive changes in layout at the finishing end of the rail mill? (4) Can it handle satisfactorily all reasonable variations in line and surface in the rails from the hot bed? (5) Can a second handling at a gag press to remove kinks at the very end be avoided? (6) Does roller straightening iron out and cover up surface defects?

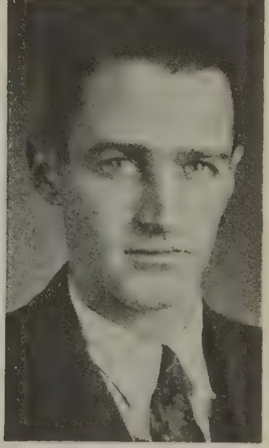
George F. Comstock, consulting metallurgical engineer, Niagara Falls, N. Y., was of the opinion that the reduced piping observed in the Krupp rails was due to the slow rate of pouring a group of ingots rather than the fact that they were bottom cast. Segregation is a more important defect than piping, and unfortunately the available data are insufficient to determine whether the foreign rails are any better in this respect than American rails. He suggested that the method of making the drop test may not have revealed the true story as to segregation.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., described the mechanism whereby slow bottom pour reduced the pipe even

THREE Metallurgists on Whom Awards Were Bestowed at the Banquet. Mr. Blaylock, the James Douglas medal; Doctor Mathews, the Hunt medal and Doctor Herty, the Hunt prize

S. G. BLAYLOCK

DR. J. A. MATHEWS



C. H. HERTY, JR.

though the mold were small end up. The metal, being in the bottom of the mold for a much longer time, chills a thick wall. At the end of the pour this chill is progressively thinner toward the top, thus inclosing a liquid core which has a greater cross section at the top than lower down—in effect a big-end-up condition.

George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., emphasized the fact that the raw material used for these rails was very carefully selected low-phosphorus scrap and pig, thus enabling carbon to be caught on the way down. He inspected the rails on delivery and found them to be remarkably straight. After 18 months in the track, they appear to be in as good shape as the average American rails after similar service.

Railroad Steels Are Meeting More Severe Duty

Robert Job, vice-president Milton Hershey Co., Ltd., Montreal, Canada, discussed "Types of Steel Used by Railroads, Past and Present." His general remarks on the development of axles and forgings were on ground already covered by E. J. Edwards in "Steels for Locomotive Forgings," printed in The Iron Age, Jan. 26, page 255. Discussing boilers, he noted the abandonment of wrought iron for carbon steels, and more lately a mis-named "silicon steel," and nickel steels. The relative advantages of these stronger steels is a matter which only extended experience in service can determine. Typical analyses are given in the table.

Properties of Boiler Steels

	Carbon Steel	"Silicon Steel"	Annealed Nickel Steel(a)
Chemical Analysis:			
Carbon, per cent	0.20	0.28(b)	0.16
Manganese, per cent	0.40	0.80(b)	0.56
Silicon, per cent	0.20	0.21	0.20
Phosphorus, per cent	0.02	0.03	0.02
Sulphur, per cent	0.03	0.03	0.03
Nickel, per cent	...	...	3.0
Physical Properties:			
Ultimate strength, lb. per sq. in.	60,000	80,000	78,000
Yield point, lb. per sq. in.	35,000	48,500	47,500
Elongation in 8 in., per cent	29.0	26.0	26.0
Reduction in area, per cent	...	49.0	54.0

(a) Average of 385 tests. See The Iron Age, Feb. 23, p. 537.

(b) Obviously the enhanced properties are due not to silicon but to increased carbon and manganese.

Locomotive frames have been discussed by W. A. Newman and C. F. Pascoe in The Iron Age, March 10, 1927, and alloy steel staybolts on Dec. 29, 1927, page 1785. Steel staybolts are practically standard for Canadian railroads. Locomotive tires have also been improved; the following are indicative of the requirements of Canadian roads: ultimate strength 150,000; minimum yield point 85,000 lb. per sq. in.; elongation 2 in., 10 per cent, reduction in area, 20 per cent, Brinell hardness 245 minimum. In order to get such physicals in a plain steel having both carbon and manganese between 0.67 to 0.77, heat treatment at the discretion of the manufacturer is necessary. Competition of forged steel wheels, and cast wheels with steel tires, has forced the makers of chilled iron wheels to study and improve their product. As a result a much better average wheel is now in use. The principal defect of the forged steel wheel is that when the hardened surface of the rim is worn through, further wear is rapid. Deeper hardening is difficult on account of the mass of the tread.

Blast Furnace Practice and Quality of Iron Castings

ONE afternoon session was devoted to a joint round-table conference on blast furnace operations and the character of pig iron and castings. Those partaking in the conference, which was held under the auspices of the iron and steel committee of the institute, were representatives of the American Foundrymen's Association, the American Pig Iron Association, the American Society for Testing Materials, the United States Bureau of Mines, the United States Bureau of Standards and various large pig iron consumers.

The conference last week was really a continuation of two previous conferences of a similar nature held a year ago by the mining engineers and reported in The Iron Age, Feb. 24, 1927, and another one under the auspices of the American Foundrymen's Association held in Chicago last June and reviewed in The Iron Age, June 16, 1927. At the latter conference a resolution was passed to the effect that a cooperative study of the effects of varying blast furnace operations on the character of pig iron made under changing blast furnace conditions and on the castings made therefrom be conducted under the supervision of the Department of Commerce, with an advisory committee consisting of representatives of the national technical associations.

The object of the conference this year was further to consider the situation and the conditions surrounding such a possible investigation and to come to some conclusion, if possible. In the absence of R. H. Sweetser, who was chairman of the Chicago conference and who was to have been chairman of the meeting last week but was unable to be present because of illness, Dr. Richard Moldenke conducted the meeting. Among those who took part in the general discussion of the subject, including the chairman, were Hyman Bornstein, Deere & Co., Moline, Ill., representing the committee on gray iron of the foundrymen's association; J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., representing the American Society for Testing Materials; Dr. C. H. Herty, Jr., United States Bureau of Mines, Pittsburgh; Dr. H. W. Gillett of the United States Bureau of Standards; J. A. Capp, engineer of tests General Electric Co., Schenectady, N. Y.; J. W. Bolton, chief metallurgist Lunkenheimer Co., Cincinnati; A. L. Feild, Union Carbide and Carbon Research Department, New York; and R. E. Kennedy, technical secretary of the foundrymen's association.

It was evident from the general discussion that there is no agreement as to just what constitutes bad castings, nor as to just what the real cause is of the various troubles which have been complained of. It was the general opinion that no progress can be made in an investigation, nor can any investigation be justified, until facts are established as to just what constitutes bad iron. One commentator was convinced that the proper way to approach the subject was from the foundry end and not from the blast furnace end, and another stated that until we try to establish the really useful, as well as the bad, properties, and then have some means of measuring them, we cannot get very far.

The committee on gray iron of the American Foundrymen's Association held a meeting previous to the round-table conference, and after a thorough discussion of the whole subject adopted the following statement, which was presented by R. E. Kennedy, technical secretary of the association, as an expression of the committee's opinion:

> The gray iron foundry industry is confronted with many difficulties owing to the complexity of its products. Not the least of these difficulties is the lack of definition of the difficulties themselves. The A. F. A. committee, having come to the realization of the necessity for definition of the various elements of the problem, has reached the conclusion that progress may be expected only after these definitions have been arrived at. Therefore, the committee proposes to attempt the formulation of a series of specific problems, the answers to which will at least assist in the establish-

ment of means of measuring qualities which determine the usefulness of the product, cast iron. When these means of measuring qualities have been determined, there is the immediate opportunity to determine the influence of variables in raw material and practice upon the output. We have every confidence that when the problem has been thus defined there will be found the active sympathetic cooperation among the interests involved in the prosecution of the research.

The round-table discussion was brought to a close by the adoption of a motion that the matter be referred to the committee on gray iron of the A. F. A. and that Dr. C. H. Herty, Jr., of the Bureau of Mines, Dr. H. W. Gillett of the Bureau of Standards, and Ralph H. Sweetser of the mining engineers cooperate and work with this committee to formulate some definite suggestions as to the advisability and scope of research in this field.

Secretary Hoover Signally Honored—Other Awards

HIGH tribute to Secretary Hoover was the feature of the annual banquet, which was held Tuesday evening. The dinner was the largest one ever held by the institute, and the 1100 guests taxed the capacity of the Waldorf-Astoria banquet hall.

To Herbert Hoover, Secretary of Commerce and a past-president of the institute, the second award of the Saunders medal for achievement in mining was the occasion of a demonstration which will long be remembered by the recipient and by those present. The formal speech of presentation was made by Cornelius F. Kelley, president Anaconda Copper Mining Co., New York. Referring to Mr. Hoover's work for refugees in the World War as "the greatest self-imposed task undertaken in the history of mankind and successfully accomplished," Mr. Kelley declared that both in war and in peace "the name of Hoover has become a synonym of helpful, intelligent, instructive, unselfish service."

Mr. Hoover's brief speech of acceptance was a review of the great advance in the engineering profession during the last 40 years, and a tribute to the work of American engineers, past, present and future. "The exchange of engineering experience and scientific discovery between nations," said Mr. Hoover, "is one form of internationalism that is beyond any reservation. More and more engineers are administrators of great industries, instead of being responsible solely for the application of their technology. A greater America for our children will in large degree depend upon the engineering profession."

For achievement in non-ferrous metallurgy the James Douglas medal is awarded each year and the occasion this year was the seventh presentation. The recipient was Selwyn G. Blaylock, general manager Consolidated Mining & Smelting Co. of Canada, Trail, B. C., Canada. The medal was presented by Scott Turner, director of the United States Bureau of Mines, who emphasized many points in Mr. Blaylock's career, particularly his acquisition of the Sullivan mine for his company and the development of the large refining plant at Trail.

For achievement in ferrous metallurgy the Robert W. Hunt medal this year was conferred upon Dr. John A. Mathews, vice-president Crucible Steel Co. of America. The award was presented by J. V. W. Reynders, a past-president of the institute, and was in recognition of Dr. Mathews' Howe lecture on "Austenitic Steels" last year.

For distinguished work in ferrous metallurgy the Hunt prize was awarded to Dr. C. H. Herty, Jr., of the United States Bureau of Mines, and for distinguished work on blast furnace problems the J. E. Johnson, Jr. award was made to P. H. Royster of the Fixed Nitrogen Research Laboratory, Washington. The award to Doctor Herty was based on his papers on the physical chemistry of steel making.

The post-prandial program was brought to a close by the introduction of the new president, George Otis Smith, director United States Geological Survey, who graciously presented his greetings to the members in assuming his new office.

Iron and Steel Committee's New Officers

The iron and steel committee of the institute, at its usual luncheon, adopted a resolution recommending to the board of directors of the institute that the iron and steel activities of the organization be recognized by establishing an iron and steel division similar to that of the institute of metals division instead of the present arrangement confined to the work of a single committee.

New officers for the coming year were elected as follows: Ralph A. Sweetser, American Rolling Mill Co., Columbus, Ohio, was made chairman. Dr. F. C. Langenberg, vice-president Climax Molybdenum Co., New York, and W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, were named as vice-chairmen. Mr. Sweetser had been a vice-chairman for some time and has been very active in the work of the committee in the last few years.

New Officers

AT the annual meeting of the institute, George Otis Smith, director United States Geological Survey, Washington, was elected president. Two vice-presidents were elected, namely, George D. Barron, consulting engineer, New York, and William H. Basset, American Brass Co., Waterbury, Conn. As new directors, Herman C. Bellinger, vice-president Chile Exploration Co., New York; H. G. Moulton, consulting mining engineer, New York, and Robert E. Tally, general manager United Verde Copper Co., Jerome, Ariz., were named.

As president of the women's auxiliary of the institute, Mrs. Herbert Hoover was unanimously elected.

Merger with the Rocky Mountain Club

An important decision was reached in the consummation of the merger of the Rocky Mountain Club of New York with the institute. This club, which was started in 1907 and which at one time was an active and prominent organization, with John Hayes Hammond as its president, during the war accumulated a fund of about $115,000 with which to build a club house. This project was never brought to a head. Those interested both in the club and in the institute were convinced that, if a merger of the two could be achieved, mutual benefit would result. A way was found by which this could be consummated and the final steps in the proceeding were taken last week. Members of the Rocky Mountain Club, who are not members of the institute, will automatically become members and the fund accumulated by the club will add decidedly to the resources of mining engineers.

Other Events

An abstract of the Howe memorial lecture and an account of the meetings of the Institute of Metals division will be published next week.

Henry D. Hibbard, who delivered the memorial lecture, is a consulting engineer, Plainfield, N. J., who has written frequently for THE IRON AGE. His subject was "Significance of the Simple Steel Analysis."

The Institute of Metals Division of the institute held a very successful series of technical sessions. The annual lecture was delivered by Dr. C. H. Mathewson, professor of metallurgy, Yale University, New Haven, Conn., on the subject "Significance of the Twinned Structure in Wrought Metals." The attendance at the sessions and the lecture was large. The usual dinner was held at the University Club on Wednesday.

Powdered Coal for Malleable Iron

Advantages Reported Are Numerous—Better Control, Lower Costs, More Uniform Operation and Quality, Quicker Heat and Hotter Metal

ALL five plants of the Eastern Malleable Iron Co. were changed over from hand-fired operation within a period of 12 months to the use of powdered coal as a fuel for air furnaces. Previously raw coal was used, shoveled in by hand labor and accompanied with the usual amount of smudge and noxious gases. The first pulverized coal unit was placed in operation on Oct. 19, 1925, in the plant at Naugatuck, Conn., and the last unit was in a year later.

Briefly stated, the advantages which are reported include getting away from the fumes and smoke previously encountered, a more uniform heating operation resulting in some quickening of the heat, a saving in furnace labor costs, a slight saving in refractory costs not yet completely evaluated and ability to run heats on a more definite schedule. The gain in refractories comes mainly from the fact that the furnace fire box and front bridge wall are now no longer needed. Whether there is an accompanying gain in increased life of refractories along the side walls and bungs is not yet definitely determined. There is less cutting along the slag line. Taken altogether, these advantages record considerable improvement over what was previously possible.

An incidental gain comes from the character of the coal used. This now consists of what is known as ¾-in. slack gas coal, which is cheaper than the ¾-in. lump gas coal previously employed. The coal handling is done mechanically, coal being brought in from storage in buckets holding 1 cu. yd. and carried on trailers hauled by a tractor. These buckets are dumped into a 6-ton hopper above the pulverizer by use of a crane.

First to Dispense With a Drier

The first unit installed at Naugatuck is said to be the second case of unit pulverizing of coal for this purpose, and the first successful case where the operation dispenses with the use of a drier for the coal. Coal is stored both indoors and outdoors, the outdoor storage having no roof. In a stretch of dry weather coal is taken from the outdoor storage and put through the process without any treatment whatever. In wet weather, or when there is snow, coal from the indoor storage is used.

Coal is fed through the bottom of the hopper by means of an adjustable gate upon a short horizontal belt which operates at a predetermined speed. This belt runs over a magnetized pulley, which gets rid of most of the "tramp iron" which may come in with the coal. From the belt the coal drops through a short diagonal chute to a rapidly revolving plate in the pulverizer proper.

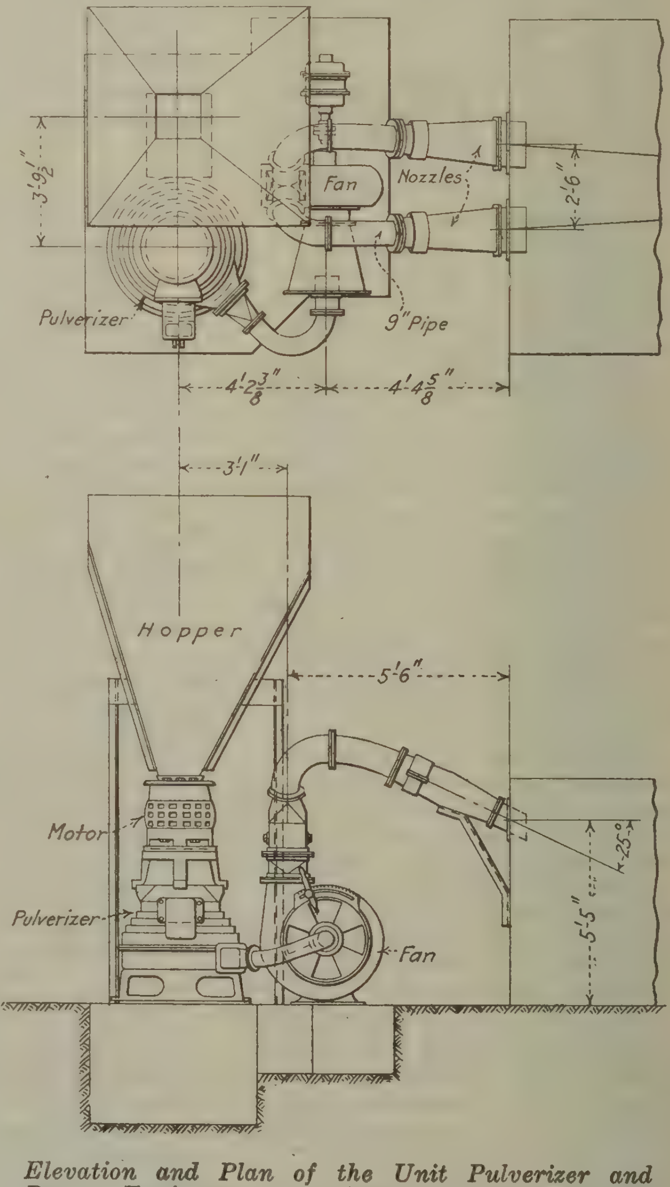
Centrifugal force throws the coal to the periphery of the plate, whence it is cascaded down through a series of pulverizing elements consisting of beaters or hammers fastened on sets of plates. These crush the coal against an inner corrugated lining of the pulverizer housing. Successive lower stages, there being five steps, are of greater diameter as the coal drops lower and gets finer. As high as 75 per cent of the coal thus pulverized will pass through a 200-mesh sieve.

Putting the Coal Into the Furnace

This coal, forced under the pressure of a fan through two burners opening into the furnace, takes the place of the former raw coal, burned on a grate with a form of stoker arrangement for spreading the coal over the grate. One man operates the furnace, having a helper only at time of tapping, in place of the previous two to three men, working much harder and engaged mainly in shoveling coal.

The two jets of flame from the burners are so directed that their center lines converge about 15 ft. inside the furnace. They are directed downward, however, so that the flame actually hits the bath at about half this distance. This bath measures 32 ft. in length in this furnace rated at 25 tons, while the width is from 6½ to 7 ft. The depth of bath when fully melted is about 9 in. at the lower tap hole (nearest the burners) and 3 in. at the farther end.

Charges of sprue, runners and risers (50 to 60 per cent) and pig iron, malleable and steel scrap (40 to 50 per cent) fill the furnace to the roof. One advantage of having the flame directed downward into the charge



Elevation and Plan of the Unit Pulverizer and Burner Equipment. The feeding gate from hopper to pulverizer is adjustable. The air supply to the fan is adjustable, also, and is worked on a definite schedule throughout the period of a heat, as determined by experiment and experience lies in the fact that this forces the flame through the charge and thoroughly heats it before melting begins. The upper parts then gradually sink into the molten pool below. Thus, molten metal does not run down over relatively cold material and partially solidify again.

Coal is blown into the furnace by a fan operated by a 15-hp. motor. This fan provides suction from the pulverizer and at the same time forced draft for the furnace. The motor operating the pulverizer proper is of 40 hp. All of the equipment, from hopper to burner, is from the designs of the Grindle Fuel Equipment Co. (subsidiary of Whiting Corporation), Harvey, Ill. Except for the hopper, beaters, motors, fan and magnetic separator, all this equipment was made by the Grindle company.

As much of the work of this plant consists of small castings, many no larger than a man's finger, it is necessary to pour the iron at a high temperature. It is almost always above 2800 deg. Fahr. This requirement of high temperature makes it inexpedient to use a bull ladle. Hence all the iron is drawn off in hand ladles and carried quickly to the pouring floors. These floors are located on both sides of the furnace.

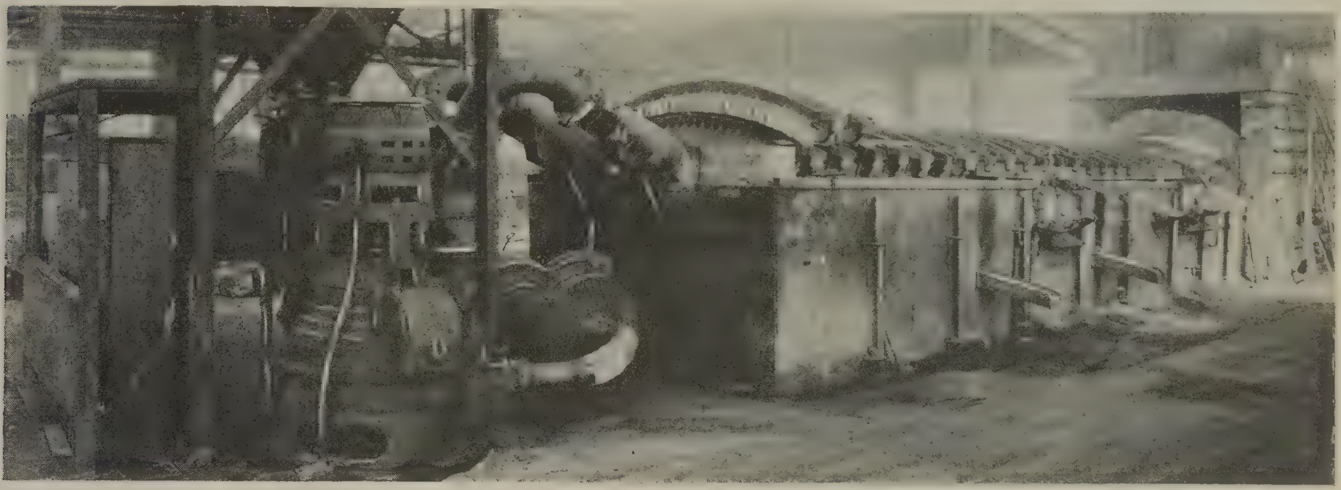
Incidental Advantages Noted

Safety is reported as an important feature of the system. If either motor stops, the interconnecting electric equipment stops the other. This means that there is no storage whatever of pulverized coal anywhere in the system. As pulverized coal is naturally explosive, the importance of this factor will be realized. When closing down the furnace, the operator shuts off the coal first. The blast of air continues for a few minutes longer, thus cleaning out of the system any coal particles which may have lodged in it. When the air goes off, the pipes are entirely empty.

Maintenance is reported as not a serious problem thus far. This covers both the coal preparation plant and the furnace. The beater sections are arranged so that they can be operated in one direction one week and in the opposite direction the next week, thus equalizing wear. Extra corrugated liners, beaters and the plates over which the coal passes are carried in stock. Thus it is easy to handle any repair or adjustment which may be necessary during the time the furnace is not operating. There is only one heat taken each day, and the repair gang can get into the furnace if necessary in the morning, before the heat is started. Or it can work on the pulverizer after a heat is out.

In construction the furnace rests on a concrete slab which supports the furnace walls and sand bottom. The top layer of sand, to a depth of 8 or 10 in., is a highly refractory variety. The surface of the bottom after the first heat is so hard that it will withstand the ordinary bumping it receives when the charge is dumped upon it. Fire clay brick of the highest quality is required for the side walls and bungs. Silica brick would not do, because of its tendency to spall under the alternate heating and cooling of the furnace.

What the new operating method means in lowered unit cost of castings was not disclosed. Many of the items of savings are not readily measurable—the more definite operating schedule and the elimination of sooty smoke, for example. But the effect upon morale is not the least of the benefits which have been noted. Working conditions have been improved not only for those having charge of the furnace but for the much larger number of molders in its vicinity. And the direct savings, which can be measured, have no uncertain bearing upon the high utility of the methods employed.



General View of the Whole Installation, from Coal Hopper (Bottom Shown) to Stack. The adjustable coal feeding gate appears at bottom of hopper; adjustable air inlet below where the two burners enter the furnace. Pulverizer is in left foreground and blower or fan just back of air inlet

To Install Foundry Handling Equipment without Shut-Down

Stephens-Adamson Mfg. Co., Aurora, Ill., is designing and furnishing a new installation of conveying and sand-handling equipment for the Melrose Park plant of the American Brake Shoe & Foundry Co., Chicago. The equipment will include a long roller conveyor, upon which continuous molding, pouring, cooling and shaking out will take place. The installation will include also apron and belt conveyors to sand-preparing machinery, screens, mixers, aerator, bucket elevator, distributing conveyor to overhead storage bins and feeders to molding machines. The new machinery is to be installed without interfering with regular foundry production.

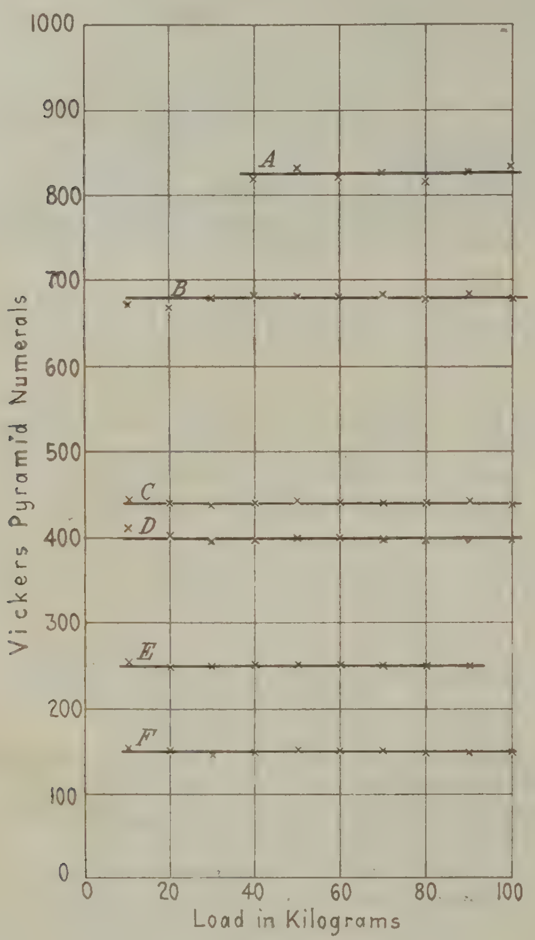
The Federal Compress & Warehouse Co., Memphis, Tenn., has filed a motion with the Interstate Commerce Commission asking the inclusion of castings and forgings and parts of compresses, each piece weighing 2000 lb. or over, in the iron and steel list in the Consolidated Southwestern Cases. The motion points out that the railroads propose to give castings and forgings Class A rating instead of a commodity rating, and that the effect would be to increase rates on these products from 46 to 64 per cent.

Loading of revenue freight for the week ended Feb. 4 totaled 926,204 cars, according to reports by the Car Service Division, American Railway Association. This was an increase of 23,372 cars over the preceding week, but a decrease of 39,460 cars under the same week in 1927.

An Improved Hardness Tester

Accurate and Proportional Brinell Numerals Claimed for British Machine—Diamond Pyramid Used as the Indenter

A NOVEL testing machine, developed by Vickers, Ltd., Erith, England, was exhibited at the Detroit exposition of the American Society for Steel Treating. It utilizes the Brinell principle, but with a diamond indenter pressed into the work under low load and at an automatically controlled rate. Thus it is said to be superior for metals of great hardness, and to be applicable to finished work and very thin sheets.



Hardness Tests on Various Metals Using Different Loads on Pyramid

A: 0.6 per cent carbon steel, water hardened
B: High-speed steel, hardened 1280 deg. C., tempered 630 deg. C.
C: 0.6 per cent carbon steel, oil hardened, tempered 450 deg. C.
D: Hadfield's manganese steel
E: 0.6 per cent carbon steel, oil hardened, tempered 650 deg. C.
F: 0.25 per cent carbon steel, oil hardened, tempered 700 deg. C.

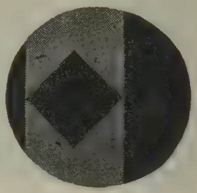
The indenter is a diamond accurately cut and polished to the form of a square-based pyramid. The impressions are therefore square. The load is light, varying from 10 to 50 kg., according to requirements; the hardness numerals obtained by the new apparatus are corrected Brinell numerals, which are strictly proportional whether the material tested is lead or the hardest steel.

The diamond pyramid was adopted in preference to the steel ball or steel cone for the following reasons:

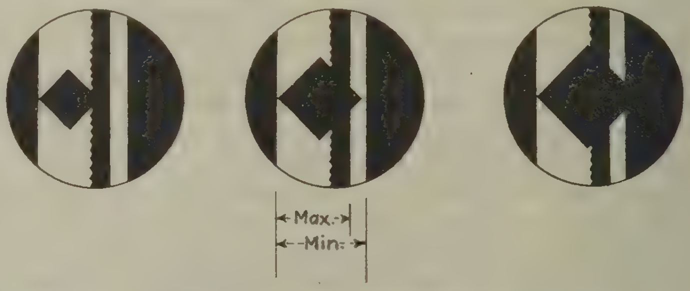
1. The square surface impression is well defined and can be measured with accuracy across the diagonal corners.
2. The impressions are always geometrically similar, irrespective of size.
3. The deformation of the indenter is practically zero, owing to its enormous hardness, even when compared with the hardest of steels.

The diagram shows how the hardness numerals obtained with a diamond pyramid at various loads on several different homogeneous materials are unaffected by variation in load. In full appreciation of the popularity of the Brinell test, the angularity of the Vickers pyramid is based on that of a ball impression of the ideal size, i.e. 0.375 times the diameter of the ball. This angle is 136 deg. It has been found, from a very large number of tests, that the numerals obtained are identical to those resulting from the ball test when the load on the Brinell machine has been adjusted to produce an impression which is 0.375 times the diameter of the ball. This similarity in hardness numerals obtains, however, only in the lower regions of hardness—that is, where the steel ball does not undergo any appreciable deformation. Between 500 and 600 Brinell hardness this deformation begins to make itself manifest by yielding slightly lower readings than the diamond pyramid, and this tendency, of course, increases with increasing hardness, until it becomes very pronounced. It should also be noted that unavoidable differences in the hardness of different steel balls will affect the numerals obtained, particularly in the higher regions.

View of Indentation as It Appears Through Measuring Microscope, Illustrating Precision with Which Knife Edges Can Gage the Size



The machine designed for use with this indenter is illustrated in the drawing and photograph. A main frame *A* of U section, carries the stage *B* and a simple lever *C* of 20 to 1 ratio, which applies the load through a thrust rod *D* to a tube *E*, which is free to reciprocate vertically and carries the indenter *F* at its lower end.



Setting of Knife Edges in Micrometer Eyepiece for Checking Maximum and Minimum Hardness. Left is impression on material which is too hard, right on too soft, and center on material which falls within the specification

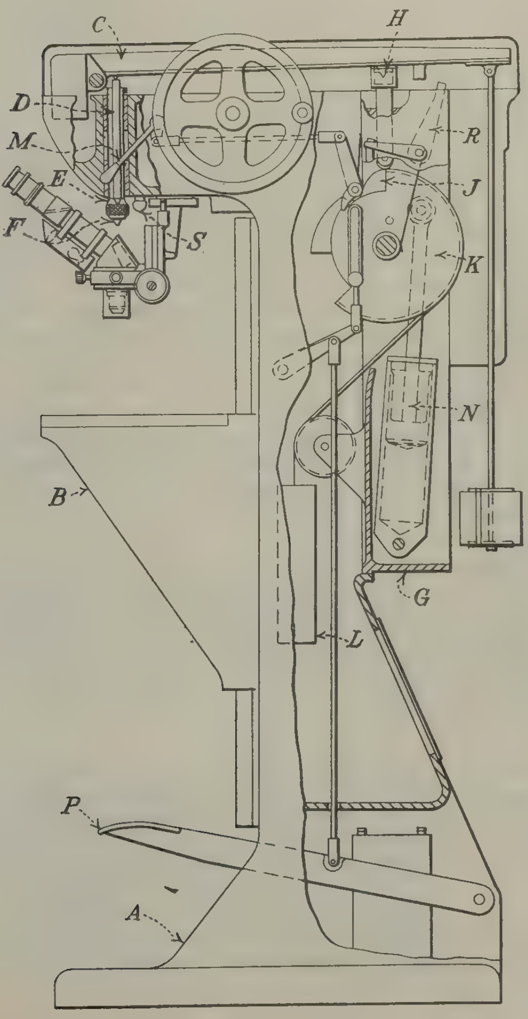
Attached to the main frame is a smaller frame *G*, which contains all the control mechanism. The plunger *H* reciprocates vertically under the influence of a rotating cam *J*, its purpose being to apply and remove the test load. The cam is mounted on drum *K* and the whole is rotated by a weight *L* attached to a flexible wire, after the starting handle *M* has been depressed. The speed of rotation is controlled by an oil dash pot *N* and is regulated by an adjustable control valve. The plunger *H* carries a rubber pad at its upper end, which engages with a cone mounted in the beam, thereby insuring a very slow and diminishing rate of application of the last part of the load. Since the cam both lowers and raises the plunger in the course of its movement, it will be seen that uniformity of loading and duration of load is attained, errors due to inertia or premature removal of the load being eliminated.

Depression of the foot pedal *P* returns cam, drum and weight to their original positions. A tripping piece *R* supports the beam during this latter operation, and drops out as soon as the plunger *H* returns to its top position.

The measuring microscope is capable of measuring to 0.001 mm. As shown in the photograph, it is mounted on a hinged bracket, arranged so it may be swung to a position immediately over the impression. It follows, therefore, that it is only necessary to lower the main stage *B* by the handwheel (upon which rests the operator's hand) and swing the microscope around. The operator leans slightly forward and makes the observation. A considerable saving of time is thereby effected. The impression is illuminated by a vertical beam of light obtained from a lamp, condenser and vertical illuminator, all of which are mounted on the microscope. The light is switched off automatically in swinging the microscope out of position.

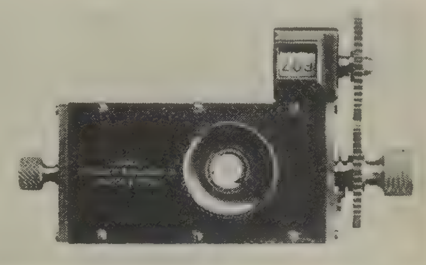
Instead of the usual scale or eye-piece micrometer, a specially designed micrometer ocular is provided. The impressions are read to knife edges, thus avoiding eyestrain, and readings are taken from a digit counter, mounted on the side of the ocular.

In order to make a test, the foot pedal is first depressed and the microscope swung out of position. The area to be tested should be smooth and clean. The work having been placed on the stage, the latter is raised until the surface to be tested just clears the point of the diamond. The small lamp *S* may be switched on if necessary to facilitate this adjustment. The starting handle *M* is then pressed to release the mechanism, when the test proceeds automatically and terminates with a click. If, for any reason, the work has not been elevated to clear the diamond within reasonable limits, the test cannot proceed satisfactorily, and in order to warn the operator of these conditions a small buzzer comes into operation.



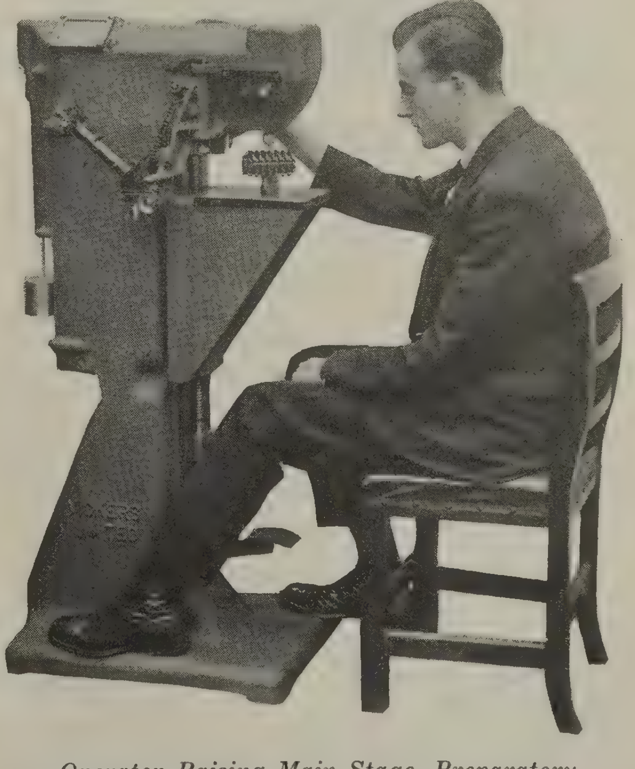
After the test has been properly completed the stage is lowered and the microscope swung over. In focussing the impression, coarse adjustment is obtained by movement of the stage, the fine adjustment being provided on the microscope itself. The measurements are made across the diagonal corners of the square impression. One of the knife edges in the eyepiece is fixed and is set by means of centering screws at the left hand corner of the impression, as it appears through the microscope. A second knife edge controlled by a micrometer screw and geared to the digit indicator is then adjusted to correspond with the right-hand corner of the impression. The reading is taken from the digit indicator at the side of the eyepiece and converted, by means of a table for the particular load impressed, direct to Brinell hardness numerals.

Digit Indicator on Eyepiece to Give Measured Distance Across Impression



Where the work has to fall within specified maximum and minimum limits of hardness, a third knife edge is brought into use. This third knife edge is set to correspond with the smaller dimension, i.e., the maximum limit of hardness, the micrometer knife edge then being adjusted to correspond with the larger dimension, i.e., the minimum limit of hardness. It is only necessary when reading to set the fixed knife edge to the left-hand corner of the impression in the ordinary way, and the right-hand corner must fall within the open strip representing the tolerance.

The time taken in the application and duration of the load can be adjusted by the oil control valve of the dashpot within wide limits. For purposes of research work it is generally desirable to set the valve so that this period is 30 sec., but for most practical purposes a 10-sec. setting will be found satisfactory. It is said that accurate tests have been made at a speed of 200 per hour.



Operator Raising Main Stage, Preparatory to Testing Hardness of Hob; Measuring Microscope Swung Aside

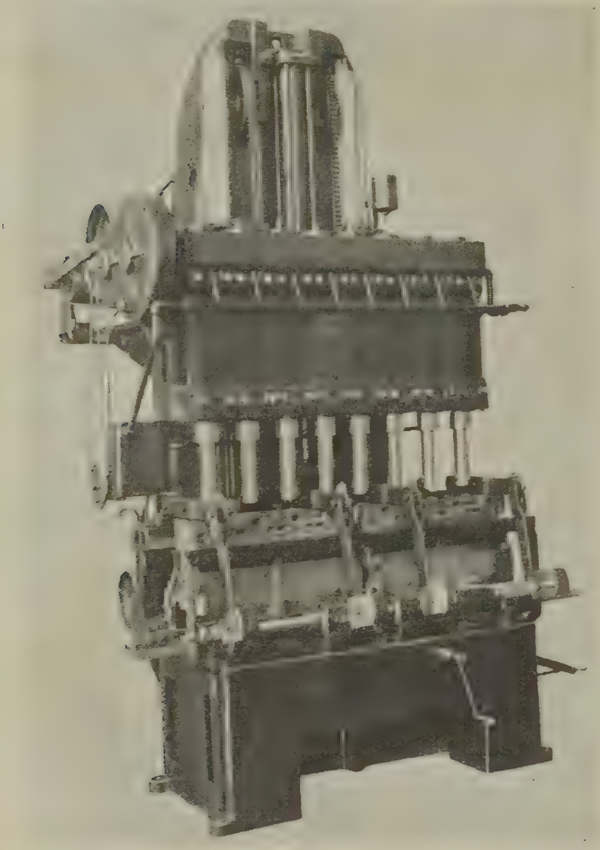
(At Left) Sectional Diagram of Mechanism

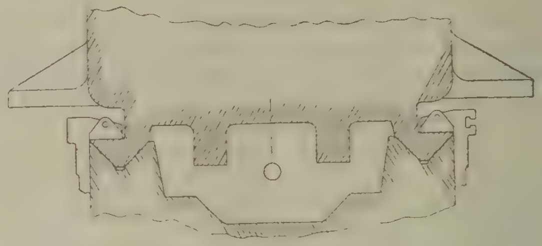
CYLINDER BORING MACHINES

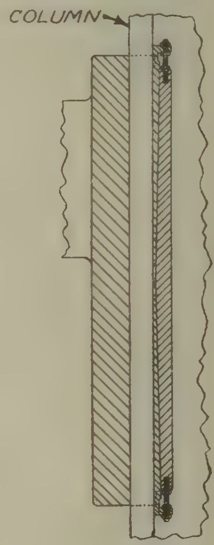
Hydraulic Feed and Double-V Guides Are Features of Redesigned Line of Equipment

THE Moline Tool Co., Moline, Ill., has redesigned its line of multiple-spindle cylinder boring machines, two sizes of which are designated as the No. 13 and No. 10-D respectively.

Both machines have hydraulic feed, using Oilgear equipment, and employ double-V guides, the arrangement of the latter being shown in the accompanying illustrations. Mounting of the hydraulic feed cylinder, between the two guides, is emphasized as eliminating the possibility of weaving of the slide during a heavy cut. The slide is held securely against the V-guides by four taper gibs, as shown in the second sectional view. The latter feature, which is claimed to be new in machine tool construction, is emphasized as facilitating adjustment. Anti-friction bearings are used on all drive shafts.







CYLINDER Borer With Hydraulic Feed, Roller Bearing Heads, and Fixture for Boring an Eight-Cylinder Motor. The cross section view above shows the type of column and slide used. The view at right is a section through the slide and gib

The machine illustrated, the No. 13, is recommended for heavy roughing operations. The rigidity of the construction is said to make it unnecessary to pilot the boring bars either at the top or bottom, although this can be done if desired. The column or housing is of box section and extends down to the floor, the base being bolted to the face of the column. Counterbalancing weights are on the inside of the column. The main drive may be either direct by motor or from a countershaft. From the main drive shaft the power is transmitted to a shaft with hardened spiral gears and through hardened spur gears.

The sides of the spindle housings or heads are accurately scraped and furnished with the necessary spacers so that all the heads can be bolted together to the desired spacing. Spindles are mounted in Timken tapered roller bearings which may be adjusted for wear simply by adjusting the nut on the end of the spindle. Special bronze spiral gears mounted on the spindles mesh with the main driving spiral gear, and by means of force feed lubricating system the entire assembly is flooded with oil. Provision is made against oil leakage around the spindles.

Spindle drive is from the same motor that drives the Oilgear pump. The cylinder is 3⅞ in. in diameter, 36-in. stroke. The entire control of the feed cycle is automatic. Upon moving the starting lever, the rail on which the spindles are mounted is brought down rapidly to the cutting position, whereupon the lever shifts to the slow feed. Upon completion of the boring operation the lever again shifts automatically to the reverse position, giving a rapid return to the rail unit. When the cycle has been completed the feed is thrown out until the operator again engages it. The rate of feed is changed by adjusting a conveniently located valve on the pump unit. If desired the oil circuit can be arranged to give two slow feeds forward.

The machine here illustrated is tooled up for an eight-cylinder motor. The fixture clears the face of the column and is bolted to the wings at the side of the column. Adjacent spindles bore alternate holes in the block, this being necessary because the spacing of the cylinder bores is too close to permit use of a construction having roller bearings. One cylinder is completed at each cycle of the machine. The castings are brought to the machine on a conveyor and pulled into the fixture by means of the latch mounted on a rack, which is operated by a crank at the front of machine. Each time a new block is pulled into the fixture the completed block is forced out at the right-hand side of the machine. The blocks are brought to their approximate location in this manner, and then permanently located by dropping the lever at the right-hand side of base, which raises the locating pins into the locating holes in the pan rail. Then by means of another lever the weights are dropped, clamping the two castings securely.

The smaller machine, the 10-D, is similar except that spindle units having tapered bronze bearings are used in place of roller bearings, permitting closer center distances to be used. This machine is recommended where the boring bars are piloted at the top and bottom of the fixture.

Specifications of the No. 13 and 10-D cylinder borers are respectively: Center distance between the two V-guides, 27½ in. and 21½ in.; floor space required, 7 ft. 8 in. by 6 ft. 4 in. and 7 ft. 2 in. by 5 ft. 4 in.; and approximate shipping weight, with fixtures, 22,925 lb. and 16,500 lb.

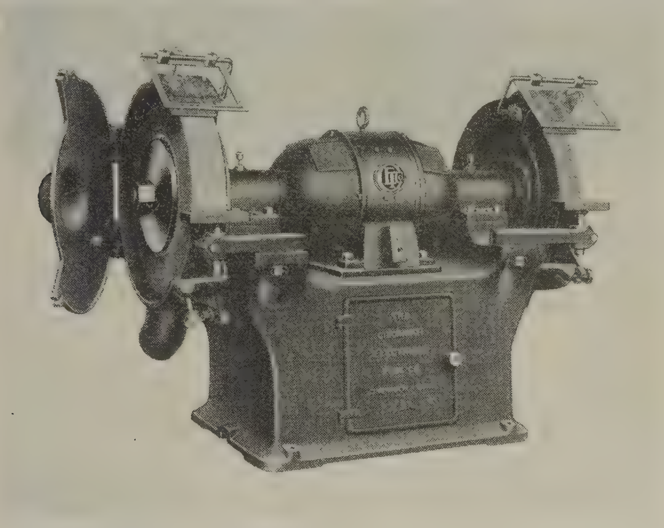
Wood pattern shop No. 2 of the Commonwealth Steel Co., Granite City, Ill., on Feb. 2 completed a safety record of 1000 days without a lost-time accident. About 100 men are employed in the department.

Interstate Iron & Steel Co., Chicago, had net profit of $409,784 in the year ended Dec. 31, 1927. This compares with $900,278 in the previous year.

Heavy-Duty Grinders for Foundry and Steel Mill Service

For heavy-duty work in foundries, steel mills, forge and other shops, the Cincinnati Electrical Tool Co., a subsidiary of the R. K. Le Blond Machine Tool Co., Cincinnati, is offering a new line of 5-, 7½- and 10-hp. floor grinders.

Motors are fully inclosed and the spindle is mounted on four Timken tapered roller bearings, which run in oil. Provision has been made for excluding grit and dust from the bearings and wear between the cup and the cone of the bearings can be taken up conveniently by means of an adjusting nut. Wheel guards are of cast steel. They are equipped with exhaust connections and have a 4-in. adjustment for wear of the wheels. Hinged covers entirely inclose the sides of the wheels, flanges and nuts. Non-breakable adjustable eye shields as well as chip breakers are provided over each grinding wheel. The grinding rests are adjustable and can be removed entirely.



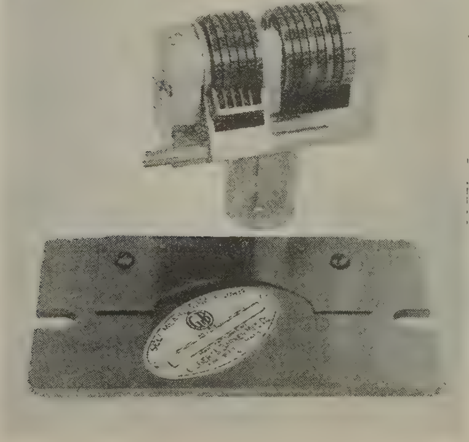
The Spindle Is Mounted on Four Tapered Roller Bearings Which Run in Oil

The spindle is of nickel alloy steel, of one piece, and is turned and accurately ground to size. Wheel flanges and nuts are machined to be in balance with the spindle, thus minimizing vibration. The grinding wheels have a 12-in. bore, which is emphasized as permitting a saving in the initial cost of the wheels and as minimizing the discarded wheel losses. The starter is of the safety type, fully inclosed, with both overload and under voltage protection, and is mounted in the base. Push-button control station is mounted on the motor frame. The machines can be equipped for alternating current, 220-440 or 550 volts, 2 or 3 phase, and for direct current of 115 or 230 volts.

Special Double Numbering Head

A special double numbering head, designed to reduce the cost of marking name-plates shown in the accompanying illustration, has been furnished recently by the Noble & Westbrook Mfg. Co., Hartford, Conn.

There are two groups of wheels. The six wheels at the left operate automatically for serial numbering, while the wheels at the right mark such information as catalog number, model number, date, etc. The latter are changed by hand as required. Between the two groups of wheels there is a star design segment stamp which is inserted directly into the support. The center support serves to strengthen the entire device.

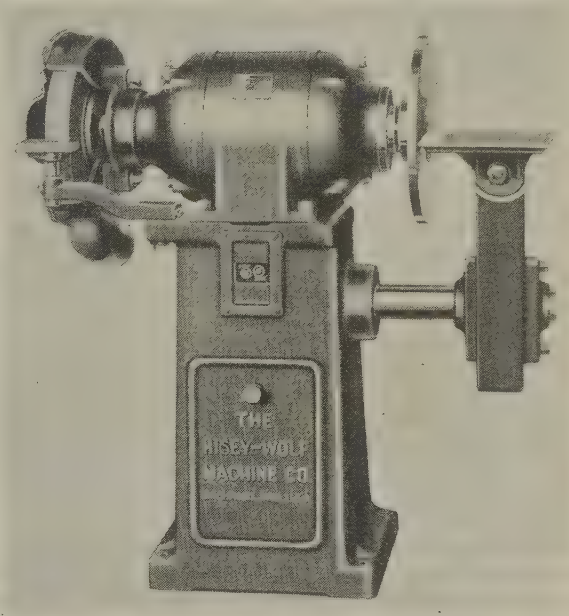


The Six Wheels at the Left Operate Automatically for Serial Numbering

Combination Disk and Floor Stand Grinder

The Hisey-Wolf Machine Co., Cincinnati, has placed on the market the 3½-hp. combination disk and floor stand grinder here illustrated. The spindle of the machine is of steel and of heavy construction to assure permanent concentricity of the disk. It is mounted on two annular ball bearings which take the radial load, end thrust being taken on a double-acting, self-alining thrust bearing. A plain work-table measuring 8¼ x 9½ in. is standard equipment, but a universal lever feed table 6½ x 13 in. is available as an extra. Other standard equipment includes a 15-in. diameter steel disk, a full safety combination wheel guard, and automatic safety motor starter. The grinding wheel, 14 in. in diameter and 2½-in. face, is furnished to order only.

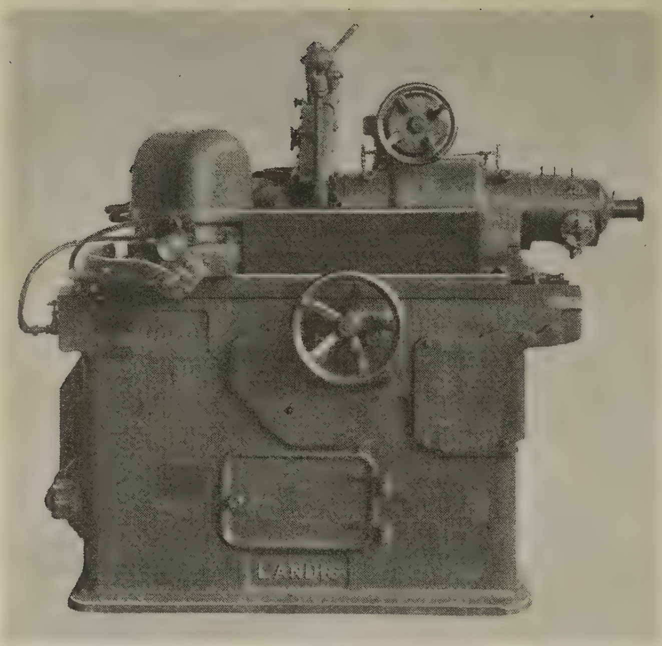
The machine is driven by a 60-cycle, 220- or 440-volt, 3-phase, 1725-r.p.m. alternating current motor, or a 115- or 230-volt, 1725-r.p.m. direct current motor. The grinders may be furnished special for 2 phase, also for 50 cycle at 1425 r.p.m.; 40 cycles at 1125 r.p.m., and 25 cycles at 1425 r.p.m. They can also be equipped for special voltage from 110 to 550 volts and for single phase service with improved repulsion-induction motors. The d.c. machines can be supplied for special voltages up to 250 volts.

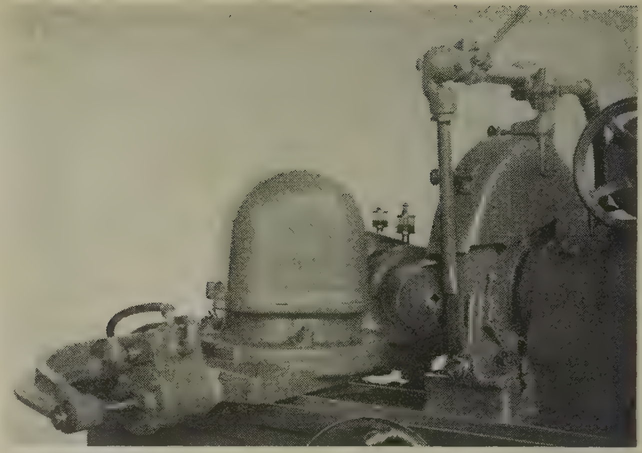


A 14-In. Grinding Wheel Is Employed. The steel disk is 15 in. in diameter

River shipments of iron and steel products in January were 330 net tons on the Allegheny, 78,069 tons on the Monongahela, and 69,750 tons on the Ohio River, according to the Pittsburgh office of the United States Engineers. In December the tonnages were 900, 65,922 and 68,472 tons, respectively. In January, 1927, there were no shipments on the Allegheny, 27,900 tons on the Monongahela and 26,409 tons on the Ohio.

The annual banquet of the Traffic Club of Pittsburgh, which includes most of the traffic officials of the iron and steel companies of the Pittsburgh district, is to be held at the William Penn Hotel, Pittsburgh, Thursday evening, March 8. Former Governor E. P. Morrow of Kentucky is to be the principal speaker. There is also to be a demonstration of the televocal system by R. J. Wensley, Westinghouse Electric & Mfg. Co.





CHANGE From One Type or Size of Valve Involves Only Change of Work-Holding Fixture. Arrangement of the work-head, wheel-head and diamond holder may be noted from view above

Semi-Automatic Hydraulic Machine for Grinding of Valve Faces

ALTHOUGH designed primarily for the grinding of similar parts in large quantities, the semi-automatic hydraulic valve face grinder here illustrated is adapted for the grinding of valves of various types and sizes. Change from one type or size to another merely involves changing to a suitable work-holding fixture.

The machine is a recent addition to the line of the Landis Tool Co., Waynesboro, Pa. It incorporates the bed, wheel-base, rear drive, oil and water service units of the company's 6-in. plain hydraulic grinder, but the work carriage, work-head and cross-slide have been designed particularly for valve face grinding operations.

The work-head is mounted at an angle of 45 deg. on a cross-slide which moves at right angles to the axis of the grinding wheel spindle. Hydraulic power, operating through a piston at the rear of the head, moves the cross-slide to and from the wheel. A ½-hp. constant-speed motor mounted on the head drives the work-spindle through silent chain and sprockets. Movement of the head automatically regulates the rotation of the spindle, a limit switch on the underside of the slide making the electrical contact. A single lever at the front of the slide controls this movement through a reversing valve.

Positive and accurate holding of the work is a feature emphasized. The work-holding fixture, which is air-operated from a cylinder at the rear of the work-spindle, consists of a clamping block on which the valve stem is placed; a clamping arm which carries the clamping shoe; and a locator which positions the valve so that the face will be properly presented to the wheel. Movement of the work-head automatically regulates the clamping and releasing of the clamping shoe.

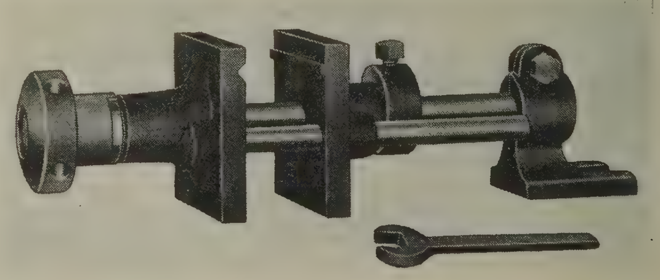
When the work-head is in the back position, the work-clamping shoe is released and rotation is stopped. In this position a valve is placed in the work holder. When the control lever is moved, the work-head moves toward the grinding wheel, the work is clamped, electrical contact is made and the work starts to rotate. The work-head continues to move rapidly toward the grinding wheel until contact is made between the wheel and the work, when it slows down automatically to a predetermined grinding feed and continues to move in until it comes against a positive sizing stop. After the work has made several revolutions, to allow the wheel to cut out, the control lever is reversed, which causes the work-head to move back rapidly. As the head approaches the extreme back position, the electrical connection is broken and the work stops rotating; at the same time the work clamping shoe is released automatically.

The grinding wheel head is massive and is equipped with an alloy steel spindle, which runs in bronze cap bearings lubricated under pressure. A 24 x 1 x 8-in. wheel is used. A reciprocating-type wheel spindle is furnished, and on this particular work the lateral movement is ½ in. Except to compensate for wheel wear or when the wheel is dressed, the grinding wheel-head is not moved. The company's standard plain hand feed is provided. The wheel-truing fixture is clamped to a pad on the top of the special work carriage, and because of its position need not be removed when not in use.

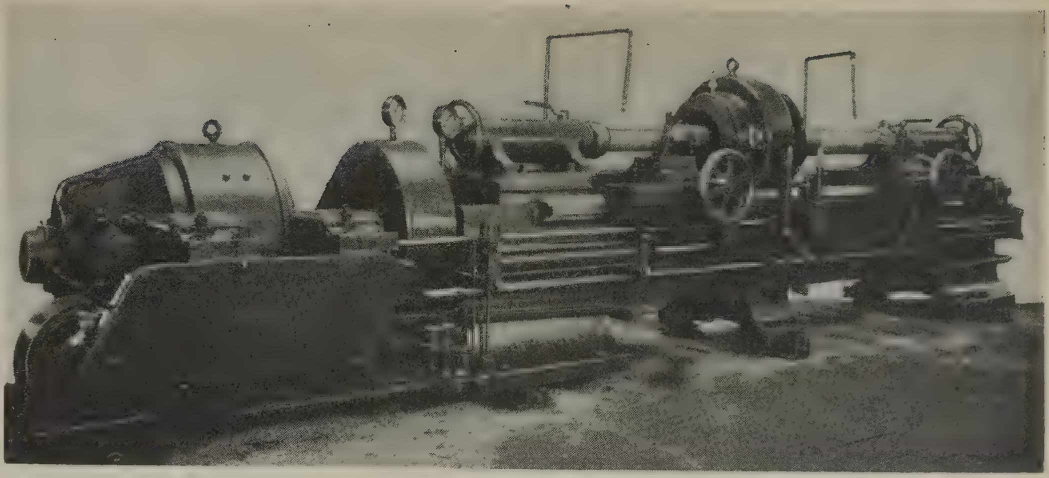
Power for the work-head feed is furnished by a geared oil pump driven from the rear drive shaft, a portion of the base of the machine being utilized as a container for the oil. The work carriage is traversed by hand, a back gear arrangement giving a slow speed for truing the grinding wheel. The machine may be arranged either for lineshaft or direct motor drive, but in either case an electrical work drive motor is required. A 5-hp. 1150-r.p.m. main drive motor is employed.

Offers New Drill Press Vise

MILLER & CROWNINGSHIELD, Greenfield, Mass., are marketing the vise illustrated, which is designed for use on drilling machines. The jaws of the device measure 3½ x 3½ in., and open 6 in. They are square on all sides so that the entire vise may be turned any side up. Round, square or hexagon rods can be held in the jaws and drilled either in the end or on the side. By loosening the clamp screw in the collar the rear jaw may be quickly slid to any position and clamped. The small shoulder on the rear jaw is intended to provide a convenient stop or rest for locating small pieces to be drilled. The work is held by tightening the clamp knob on the front jaw. The guide bars form a base on which to rest the work while drilling. The angular casting at the rear can be bolted to the drill press table to prevent turning of the vise if the drill should catch in the work. The weight of the device, which is designated as the No. 1 drill press vise, is 10 lb.



Feeding Pressure Is Applied to Each Tool by Oil Cylinders Attached to the Under Side of Each Carriage. Feeds from 0 to ½ in. per revolution are instantly available



Center-Drive Axle Lathe Equipped with Hydraulic Carriage Feed

HEAVY-DUTY center-driven axle lathes with hydraulically actuated carriages, using Oilgear equipment, have been brought out by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. The use of this type of feed mechanism eliminates the usual feed gearing, and in addition to reducing manual effort on the part of the operator, is said to speed up production.

Positive feeding pressure is applied to each tool by means of oil cylinders attached to the under side of each carriage at front and back of the machine. This application of feed pressure directly under the tool and held rigidly in balance is emphasized as permitting heavier cuts and feeds than usual. Each carriage is provided with adjustable automatic stops, and the control levers for setting the rate of feed and for power traversing the carriages are located at the center of machine within easy reach of the operator. Any feed from 0 to ½ in. per revolution is immediately available; power traverse is at the rate of 6 ft. per min.

The main drive may be by adjustable-speed motor through a single train of gears or by constant-speed motor through a three-speed gear box. The center driving head is equipped with Sykes herringbone gears. The two Oilgear pumps are driven by one 3-hp. constant-speed motor. The machine illustrated is equipped with 35-hp. adjustable-speed motor for especially heavy duty, but usually a 25-hp. motor is employed.

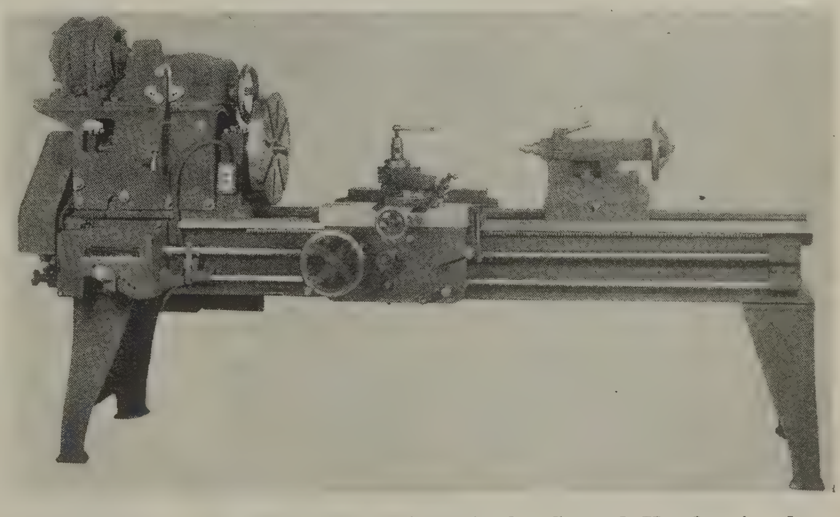
New Line of Engine Lathes

ENGINE lathes designated as the LN series, and available in three-step cone, double back geared, and all-geared head models, 16- and 18-in. sizes, have been added to the line of the Rahn-Larmon Co., 2935 Spring Grove Avenue, Cincinnati.

The bed is heavy and of hard, close-grained iron that will not, it is said, wear hollow. The spindle is of forged steel and has a hole 1 5/16 in. in diameter. The front spindle bearing is 2⅝ in. in diameter and 5 in. long, and the rear bearing 1⅞ in. in diameter, 3½ in. long. These bearings are oil grooved and supplied with oil from a reservoir.

Both carriage and apron are large and heavy, the carriage being carefully scraped and having a 24-in. bearing on the bed. Feed reverse and interlocking device, to prevent engagement of the feed rod and lead screw at the same time are provided. The back of the carriage is arranged for the application of a taper attachment. The quick-change gear box, of new design, is arranged to cut from 2 to 40, including 11½, threads per inch. Thirty-six feeds ranging from 0.0116 to 0.232 are obtainable. The tailstock is graduated for set-over work. The diameter of the tailstock spindle is 1 15/16 in. and the traverse 7½ in. The compound rest has wide bearing surface and is gibbed throughout; dial swivel and cross-feed dial are accurately graduated. The countershaft, supplied as regular equipment, is of double friction type, with self-oiling journals.

The swing of the 16-in. and 18-in. lathes, respectively, is: Over the Vees, 17 in. and 19 in.; over the carriage, 11 in. and 13 in.; and over the compound rest, 10 in. and 11½ in. The machines are available with beds 6 ft. 6 in. in length and up, in even 2-ft. lengths. The weight of the 18-in. x 10-ft. three-step cone, double back geared lathe with quick-change gears is 2050 lb. The machine illustrated is an 18 in. x 10 ft., geared-head unit with nine speeds and 2-hp. motor drive.



Nine Speeds Are Obtainable Through the Geared Head. A 2-hp. motor is employed

Forecasts End of Overproduction

GENERAL distribution of employment and conservation of production will be accepted within 10 years as the only true measure of prosperity, according to an article by James J. Davis, Secretary of Labor, in the February number of the *Monthly Labor Review*, Washington. He is of the opinion that the real object to be sought in the future is the manufacture of just enough to satisfy the national demand and foreign orders.

"Then we shall see at last some real conservation," he points out. "Economics will then live up to its name. We shall have real economy in the conservation of our natural resources, our raw materials, our national energies and, above all, a saving in our man power. We shall not wear out our workers, but rather lengthen their lives and usefulness at the same time that we lighten their labors." The economy of time that will result is held to be most important of all. Every ounce of production above capacity to consume is declared to be only a waste."

May Form Western Steel Institute

Conference at Del Monte, Cal., Decides to Consider Plan to Group Eleven Pacific and Mountain States — Minimizing of Foreign Steel Competition One Object—F. J. Koster Reelected Chairman

A PLAN to form a Western States Iron and Steel Institute, taking in 11 Pacific Coast and Rocky Mountain States, received consideration at the fourth annual conference of the Iron, Steel and Allied Industries of California at Del Monte on Feb. 17 and 18. A resolution was adopted referring the matter to a committee, which will submit a report at the next meeting of the association's executive committee.

About 200 steel men, representing Eastern and Western mills, structural steel fabricators, merchant steel and reinforcing steel jobbers and manufacturers who use steel in various forms, were present at the conference, perhaps the largest convention of its kind ever held on the Pacific Coast.

Among the speakers were Ray M. Hudson, assistant director of commercial standards, Department of Commerce, Washington; Charles J. Graham, president Bolt, Nut and Rivet Manufacturers' Association, Pittsburgh, and Charles F. Abbott, executive director American Institute of Steel Construction, New York.

Frederick J. Koster, president California Barrel Co., San Francisco, was reelected chairman of the conference.

The following objectives for the coming year were adopted by resolution: Centralized leadership, standard specifications and practices, uniform building code, support of California payrolls, extension of marketing territory in Western States, and publicity.

Before the opening of the conference, special group and committee meetings, representing foundries, general manufacturers, steel mills, merchant and reinforcing steel jobbers and fabricators, were held on Feb. 16 to discuss trade practices and general problems pertinent to each of the groups.

Reinforcing Steel Institute Elects Officers

The annual election of officers of the California Reinforcing Steel Institute was held on that day and resulted as follows: J. E. Heber, Pacific Coast manager Truscon Steel Co., Los Angeles, president; Charles M. Gunn, president Gunn, Carl & Co., San Francisco, vice-president; N. E. Dawson, Soule Steel Co., Los Angeles, treasurer. The following directors were elected: E. L. Soule, president Soule Steel Co., Los Angeles and San Francisco; W. S. Wetenhall, president W. S. Wetenhall Co., San Francisco; R. G. Falk, vice-president Badt-Falk Co., San Francisco and Los Angeles, and T. M. Davidson, Badt-Falk Co., Los Angeles.

Among the prominent visitors at the conference were William G. Clyde, president Carnegie Steel Co., Pittsburgh; G. Kahn, vice-president Truscon Steel Co., Youngstown; E. O. Shreve, manager industrial department General Electric Co., Schenectady, N. Y., and A. T. DeForest, vice-president United States Steel Products Co., San Francisco.

The general session of the conference was opened by Frederick J. Koster, who outlined what had been accomplished during the past year, saying that among the outstanding achievements were those of extending the market territory for California producers, the establishing of better purchasing policies and the putting into effect of standard practices. He also pointed out that much had already been done toward establishing a standard analysis for castings which ultimately would result in more uniform castings and in effecting savings for the foundryman and the user of castings as well as for the producer of pig iron.

M. A. Beeman, secretary Concrete Reinforcing Steel Institute, Chicago, emphasized the importance of cooperative effort as against individual effort. Mr. Beeman recounted what the institute he represents had achieved in a relatively brief time to secure for its members larger markets, better prices and more satisfactory methods of doing business in the face of domestic and foreign mill competition and low prices.

In speaking on the subject of standardization, he said: "Working in conjunction with the Department of Commerce, the steel mills and other interested parties, the reinforcing steel industry has succeeded in reducing the number of cross-sectional areas of steel reinforcing bars from 40 to 11 sizes. The result has been a tremendous saving to the steel producer and to our member jobbers through the elimination of heavy charges that were formerly necessary by virtue of carrying in stock many sizes seldom called for, and by increasing the facilities for handling steel."

Advantages Derived from Simplification

Ray M. Hudson, of the Department of Commerce, in his address on "Standardization and Its Relation to the Iron and Steel Industry on the Pacific Coast," said that thousands of American business men have come to recognize simplification and standardization as fundamental forces in modern business.

He said: "When the Hoover committee made its survey of waste in industry, it found wastes ranging from 29 per cent in the metal trades to 64 per cent in the manufacture of men's ready-made clothing. Fifty per cent of the responsibility for this waste was found to be chargeable to management and 25 per cent to labor; the remainder to conditions beyond the control of either labor or management.

"The Department of Commerce has helped to bring about simplification in many lines, and a few of the completed simplifications of interest to the iron and steel industry have resulted in the reducing of solid section steel windows from 42,877 sizes to 2244 sizes, and sheet steel (jobbers' sheets) from 1819 to 263 sizes. In the latter instance the sheet steel committee estimates that this simplification has saved the industry about $4 a ton or $2,400,000 annually.

"Pacific Coast manufacturers will find it to their advantage to concentrate their production and sales efforts on these simplified lines, for they are always in demand and will therefore move out to the trade in due season. Distributers will find these simplified lines easy to buy and sell, thus giving them a quicker turnover."

Mr. Hudson said, in speaking of foreign competition: "The greatest bulwark against invasion of our domestic iron and steel markets by foreign producers is American inventive genius and American executive capacity for organization. The bogey of foreign competition is bound to recede as we mobilize our resources and our collective energies for the best interests of our industries and the public whom they serve. Simplification, standardization and research are three formidable allies in any industry."

Radical Changes Necessary to Insure Prosperity

Charles J. Graham spoke on "Cooperation, the Essential Factor in American Prosperity." He said that close students of business conditions realize that some very radical changes are necessary if a condition is to be brought about which will assure a continuance of the prosperity enjoyed during the past three years and "to take the word profitless out of the picture."

Mr. Graham said: "There is no argument against the uneconomic unsoundness of one-half of our business institutions doing business at a loss, as no doubt will be shown when all returns are in for 1927. The correction of this condition is our greatest national problem and must be solved if we are to stabilize and perpetuate present labor conditions, as satisfactory labor conditions and present high wages are responsible for the degree of prosperity we have had. Any underlying condition which would affect in any way our ability to keep up the present rate of employment or of wages paid would have the effect of cutting down buying power, and the inevitable result would be a long period of depression.

"The subject of paramount importance to the Pacific Coast," he said, "is that of the rapidly growing importation of foreign materials, such as steel, window glass and various other materials. Ways should be found immediately to correct this situation which, if permitted to continue at its present rate of increase, will eventually react and do more to break down what you are endeavoring to build up than any other single factor or group of factors you are in contact with."

Another series of group meetings was held on the afternoon of Feb. 17, and the chairmen of the various groups reported in a general way at the closing session on the following morning, more detailed reports to be submitted to the executive committee at a later date.

Those who addressed the closing meeting were John B. Leonard, structural engineer, San Francisco, who spoke on "The New Uniform Building Code and Its Relation to the Iron and Steel Industry of California"; Frank C. Mortimer, vice-president Citizens National Bank, Los Angeles, and Charles F. Abbott, American Institute of Steel Construction, whose address was given in part in THE IRON AGE of Feb. 23, page 531.

Steel Trade Should Become "Profit-Minded"

Executives in control of policies of steel companies should become "profit-minded" with a view to putting their net income in line with less important businesses, was the advice given by Mr. Mortimer, banker. "There is no law against making good profits," Mr. Mortimer said. "Understandings among those engaged in specific lines of business which help to make fair profits should not be looked upon as reprehensible."

Mr. Mortimer said that if he were asked to write a prescription for the steel business he would make the following suggestions:

- Continue research and educational work. Find new uses for steel and inform the public how to apply them.
- Watch costs more carefully. Reduce overhead and distribution expense where possible.
- Manufacture or contract in quantities sufficient to supply the requirements of regular customers and such additional quantities as can be sold at a good profit. Tighten up on execution and enforcement of contracts.
- Consolidate some plants, if economical to do so. Disregard excess plant capacity, and discontinue unprofitable volume.
- Maintain sales volume in proper relation to demand.
- Put a price on products that will permit a continuance of good wages to employees and good returns to stockholders.
- Take or follow the lead in further and more effective moves for closer cooperation and better understandings in the industry.
- Earnestly and sincerely adhere to your present code of ethics, or to such revised practices as may be decided upon for the betterment of conditions.

Officers and Group Committees Named

Frederick J. Koster was unanimously reelected chairman of the executive committee. Walter Taylor, vice-president Llewellyn Iron Works, Los Angeles, vice-chairman from Los Angeles, and E. L. Soule, Soule Steel Co., San Francisco, vice-chairman from San Francisco.

The following group committee men were announced:

MANUFACTURERS OF SOUTHERN CALIFORNIA: George J. Kuhrts, Jr., Standard Boiler & Steel Works, Los Angeles, chairman; H. Riggs, Baasch-Ross Tool Co., Los Angeles; W. Wardman, Alloy Steel & Metal Co., Los Angeles; A. J. Morse, Alloy Steel & Metal Co., Los Angeles; George Koehler, Federal Tank & Steel Works, Los Angeles.

MANUFACTURERS OF NORTHERN CALIFORNIA: H. W. Force, California Corrugated Culvert Co., Berkeley, chairman; R. M. Alvord, General Electric Co., San Francisco; G. A. Bahler, Caterpillar Tractor Co., San Leandro; R. A. Folsom, W. R. Ames Co., San Francisco; H. P. Phillips, Link-Belt, Meese & Gottfried Co., San Francisco.

STRUCTURAL FABRICATORS, SOUTHERN CALIFORNIA: E. H. Gohle, McClintic-Marshall Co., Los Angeles, chairman; Guy C. Boyton, Baker Iron Works, Los Angeles; R. T. Miller, Union Iron Works, Los Angeles; C. Fred Brombacher, Brombacher Iron Works, Los Angeles; G. W. Suarett, Llewellyn Iron Works, Los Angeles.

STRUCTURAL FABRICATORS, NORTHERN CALIFORNIA: H. Mortenson, McClintic-Marshall Co. Central Works, San Francisco, chairman; Paul F. Gillespie, Judson-Pacific Co., San Francisco; S. S. Herrick, Herrick Iron Works, Oakland; Charles E. Spencer, California Steel Co., Oakland; H. Morris, Western Iron Works, San Francisco.

MERCHANT STEEL JOBBERS, SOUTHERN CALIFORNIA: Shannon Crandall, California Hardware Co., Los Angeles, chairman; C. A. Ducommun, Ducommun Corporation, Los Angeles; D. P. N. Little, A. M. Castle Co., Los Angeles; E. Jungquist, Percival Steel & Supply Co., Los Angeles.

MERCHANT STEEL JOBBERS, NORTHERN CALIFORNIA: F. J. Bruzzone, Baker, Hamilton & Pacific Co., San Francisco, chairman; H. D. Simon, Foucar, Ray & Simon, San Francisco; Roy L. Sanford, A. M. Castle Co., San Francisco; C. H. Merrill, Holbrook, Merrill & Stetson, San Francisco; F. F. Thomson, Thomson-Diggs Co., Sacramento.

STEEL MILLS, SOUTHERN CALIFORNIA: Harvey Hewitt, Southern California Iron & Steel Co., Huntington Park, chairman.

STEEL MILLS, NORTHERN CALIFORNIA: S. S. Lawrence, Columbia Steel Co., San Francisco, chairman; E. S. Houdlette, Pacific Coast Steel Co., San Francisco.

REINFORCING STEEL JOBBERS, LOS ANGELES: J. E. Heber, Truscon Steel Co., Los Angeles, chairman; N. E. Dawson, Soule Steel Co., Los Angeles; E. L. Hansen, Blue Diamond Co., Los Angeles; D. N. Folling, Pacific Coast Steel Co., Los Angeles; George Parker, Fenton-Parker Material Co., San Diego.

FOUNDRIES, SOUTHERN CALIFORNIA: Martin Madsen, Madsen Iron Works, Los Angeles, chairman; G. A. Axleson, Axelson Machine Works, Los Angeles; Carroll A. Stilson, Metal Trades Manufacturers Association, Los Angeles; Lloyd D. Kay, Kay-Brunner Steel Casting Co., Los Angeles; Frank M. Burger, Llewellyn Iron Works, Los Angeles.

FOUNDRIES, NORTHERN CALIFORNIA: George A. Gunn, Best Steel Casting Co., San Francisco, chairman; C. E. Williams, Columbia Steel Corporation, San Francisco; D. Guild, Phoenix Iron Works, Oakland; C. M. Henderson, McAulay Foundry Co., Berkeley; A. D. Scoville, Pacific Coast Foundrymen's Association, San Francisco.

The following resolutions were adopted by the conference:

Centralized Leadership. The development of a greater centralized leadership in the iron and steel industry by a more energetic continuation of the coordination work of the Iron, Steel and Allied Industries of California through the annual Del Monte conference and the continuation of the group meetings throughout the year.

Standard Specifications and Practices. Coordination of technical groups of architects, contractors and engineers in connection with standard specifications affecting the iron and steel industry of California.

Uniform Building Code. The active cooperation of the iron and steel industry in the adoption of a uniform building code and its general acceptance and application by the municipalities of California.

Support of California Payrolls. Continuation on a more energetic basis of the work of the Iron, Steel and Allied Industries of California to develop a statewide attitude of appreciation of the value of industrial payrolls in California, for the purpose of reducing foreign importations to the minimum, where such importations seriously interfere with the proper development of iron and steel industries in California.

Extension of Marketing Territory in Western States. Continuation of the traffic program in obtaining rate adjustments that will make it possible for California industries to serve new territories in the Western States that are logically a part of the trade area of California industries.

Publicity. Conduct an active program of publicity through the press and trade magazines of the State for the purpose of expanding existing industries and encouraging new payrolls in the iron and steel industry of California with due regard and protection for existing industries.

Western States Iron and Steel Institute. That a special committee of three be appointed by the executive committee to investigate the problem of formulating a Western States Iron and Steel Institute to comprise the 11 Western States; further, that this committee be requested to attend the Northwestern Iron and Steel Conference at Tacoma, Wash., Feb. 27, and submit a report on it at the next meeting of the executive committee for consideration.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. The continued rise of the P-V line indicates further improvement in the relation between demand and supply.

2. The trend of building activity was upward in January.

3. The automobile industry is expanding.

4. Unfilled orders show an upward trend.

5. Money is easy.

6. Factory employment and payrolls declined less than usual in January.

Unfavorable Factors

1. Retail trade declined sharply in January.
2. Considerable unemployment exists.
3. Purchasing power of farmers has declined again.
4. Profit margins are low in many industries; failures numerous; new enterprises established few.
5. Severe competition and price cutting in the automobile field.
6. Bank credit over-extended for security market operations; brokers' loans excessive.
7. A reaction in the stock market.
8. Unfavorable political situation.

OBVIOUSLY there are several rather heavy drags on the trend toward prosperity, notably political uncertainty, reduced purchasing power of factory laborers and farmers, and the necessity for correcting inflation in the stock market. But the more barometric basic indexes such as the P-V line, building activity and unfilled steel orders still point upward. Even the trend of employment became more favorable in January. Political uncertainty is about offset by prospects of continued easy money. In general it may be said that the unfavorable indications are mostly indexes of the existing semi-depressed condition growing out of past developments, and may well be taken as promises of recovery later on. The favorable factors forecast early improvement.

Continued Expansion Indicated

THERE is no need this month for much discussion of the P-V line (ratio of commodity prices to physical volume of trade) and its relation to ingot production. Briefly stated, the facts are that a continued rise occurred in the P-V line, together with an unusually sharp upturn in ingot production. About the usual time has elapsed between the upturn in the P-V line and that in steel production. In 1921 some seven months intervened between the rise in the barometer line and the upturn in steel. Exactly seven months intervened between the two occurrences last year, the P-V line having risen in May and the ingot curve (adjusted for seasonal variation) moving up in December.

Perhaps there is some interest in speculating as to the future. In our chart the P-V line has been on the up-grade for eight months; steel production has risen during but two months. It might, therefore, be hoped that a further rise in steel production will occur and one might even go so far as to hope that the expansion will last for six months following January, or until July. It could hardly be hoped that the rise would go forward steadily without interruption, but, allowing for seasonal conditions, one might expect the trend to be mostly upward.

Two facts, however, must be noted as moderating such hopes: (1) The rise of the P-V line, after being quite sharp for four months, has been rounding off; (2) steel production spurted so sharply in January that it ran well above normal. Also there are signs indicating that the P-V line may possibly decline in the near future. These facts suggest the possibility that the supply of steel may gain on demand so rapidly that the rise in steel production may not carry through. It must be admitted that the expansion in the steel industry would now be more likely to show a sustained movement had production not been stepped up so rapidly.

All this is highly speculative, and is probably over-

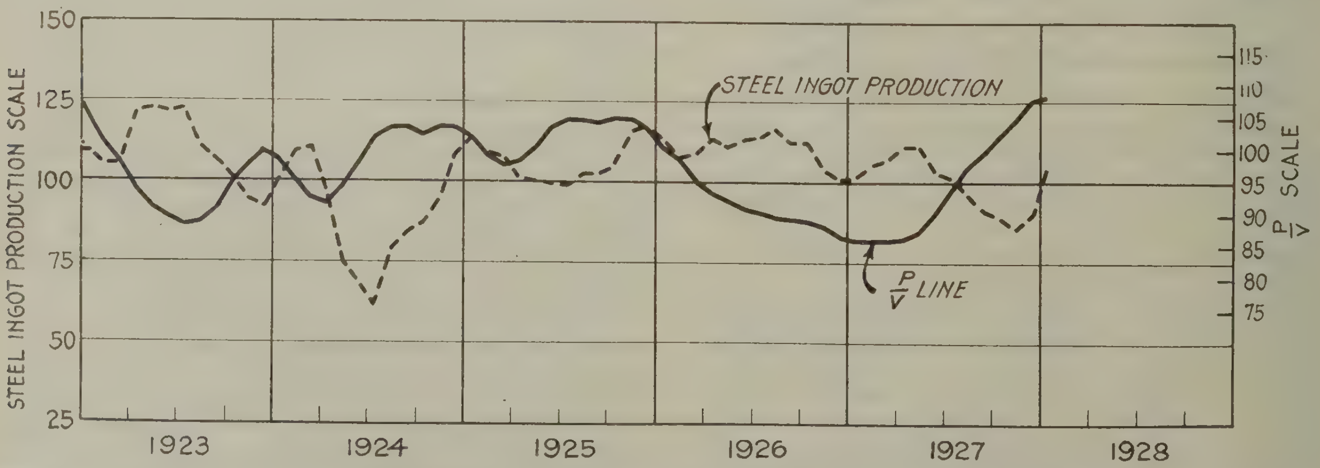
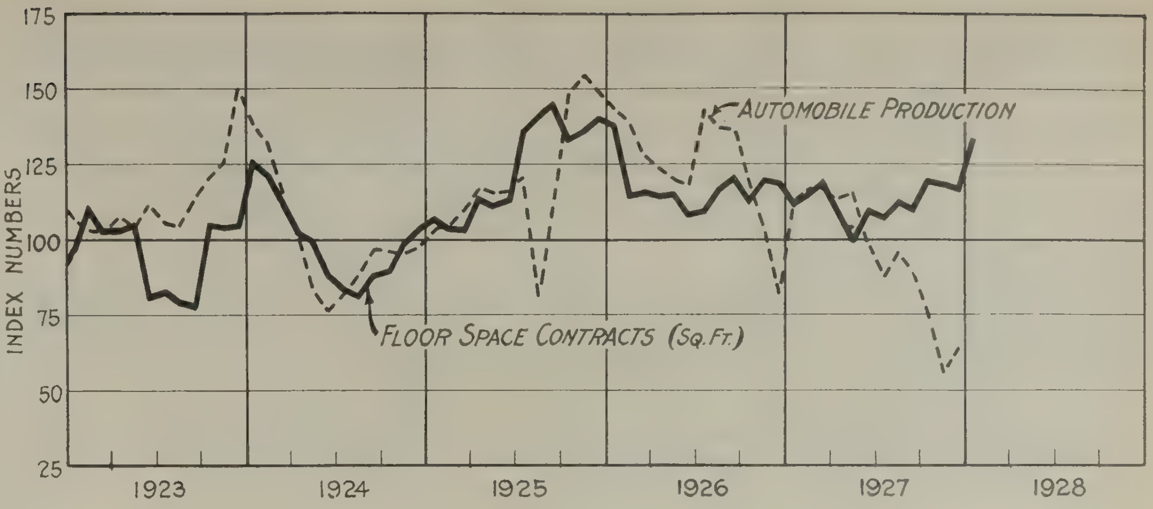


Fig. 1—Upward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Has Continued for Nine Months. Steel production responded sharply in January and heavy tonnages, with better prices, may be expected for several months

Fig. 2 — Potential Demand for Steel from Construction Activity Has Been Well Sustained. Improvement in the automobile demand for steel is thought to be at hand



working the idea that any general business barometer can be expected to forecast steel production with mechanical accuracy. It can be said, however, that *the prospects for business in general are sufficiently favorable to warrant the anticipation that the steel industry will find support at an above-normal rate of production during a period lasting from four to six months.* For example, the building program is considerable and the automobile industry will not reach the peak of its production much before May.

Buildings and Automobiles Move Upward Together

THE chief reason and justification for the recent expansion in the steel industry is apparent in the second chart. Incidentally, too, there appear some of the reasons for anticipating an early recovery in general business. In January, after making all due allowance for seasonal conditions, the trend of both building activity and automobile production was sharply upward. This is the first time that such a statement could be made since January, 1925.

Floor space in construction contracts awarded, as reported by F. W. Dodge Corporation, actually increased a little in January, in spite of the fact that a decline would have been normal for the month. The adjusted index is 133.6 per cent of the average for 1921-1927, against 117 per cent in December and 111.7 per cent a year ago. This increase is the more impressive in that building permits showed a similar trend. It continues to seem reasonably certain that building activity will hold somewhat above normal, to the great benefit of steel and many other industries, including rail and truck transportation.

Total production of motor cars and trucks in the United States and Canada jumped from 136,600 in December to 233,500 in January, an increase of over 77 per cent in the average daily output. Allowing for seasonal variation, our adjusted index is 103.3 per cent of the average of the last seven years, and compares with 63.6 per cent in December, and with 112.5 per cent in January, 1927. While automobile production is still below a year ago, the trend is sharply upward and at least the usual seasonal gains are probable in February and March. Ford has been slow to get into production, and the total sales of automobiles have not yet shown so great a gain as had been hoped for. But such leading companies as General Motors and Studebaker show large increases in new business. This trend should help steel, glass, non-ferrous metals, textiles and rubber—some of which badly need help.

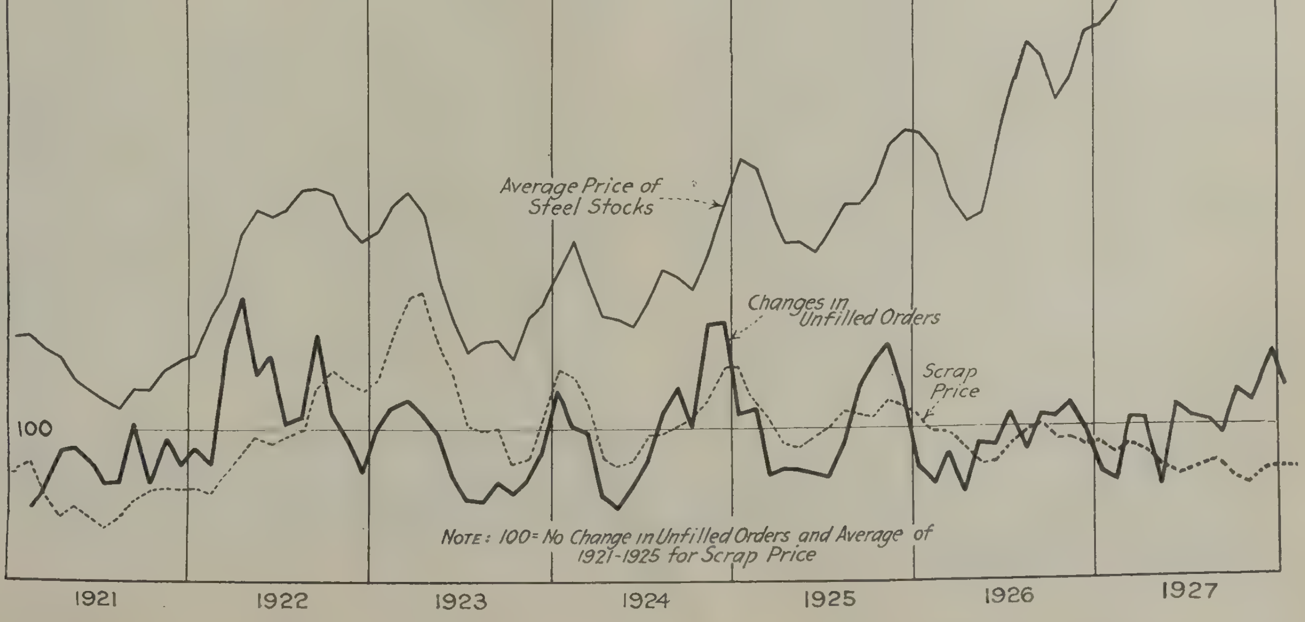
Building activity is an excellent indicator of the business trend. It is, therefore, significant to note that contracts awarded have taken a general upward course since last May.

Some Barometers Point Downward

IN our third chart, however, none of the indexes point upward. The unfilled orders barometer is down; the common stocks of steel companies are down; scrap prices are barely steady. In view of the expansion in the steel industry since January, and the somewhat stronger markets for finished steel, this showing seems paradoxical.

The decline in the unfilled orders barometer is not so bad as it might seem. As long as the curve is

Fig. 3—None of the Three Indexes Points to Higher Operating Conditions. The gain in unfilled orders was less than in December; stock prices are lower and scrap prices weak



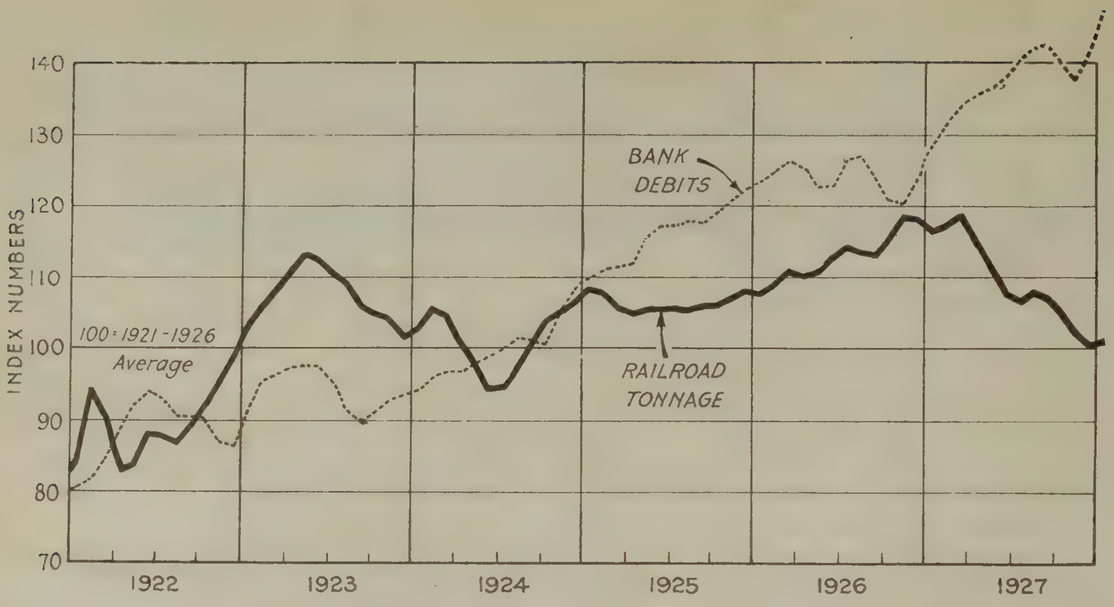


Fig. 4—Freight Traffic Has Reached What May Prove to Be the Low Point. It is nearly 25 per cent below November, 1926. Bank debits, on the other hand, have made the highest record ever known, but it is largely speculative

above the base line in the chart, some increase in unfilled orders is indicated. The decline in the curve in January simply means that the increase in unfilled orders in that month was less than the increase in the preceding month. The same situation existed in January, 1925. The barometer line was headed downward in January, 1926, and January, 1927, but in those months it fell below the base line, indicating an actual decrease in unfilled orders. It must be admitted, however, that the rate of change in unfilled orders is a very sensitive barometer. Usually its decline means a decrease in new orders.

Usually, too, a decline in the unfilled orders barometer has anticipated weakness in steel stocks, one of the very few exceptions having occurred during the inflationary movement at the beginning of 1927. Certainly the present is no exception to the general rule. Already, in February, the average price of nine steel stocks during the first three weeks is as low as the low average of last November. During the period between last September and the present time, the decline which has occurred in steel stocks is the sharpest since the spring break in 1926. It begins to look as if the September peak in the price of steel stocks had fully discounted the present expansion in the industry.

In spite of the increase in steel production, the market for steel scrap shows no strength and the decline in the unfilled orders barometer would indicate further weakness. At the least, the trend of scrap prices leads to no optimistic conclusion.

Freight Tonnage Perhaps at Low Point

THAT business cycles exist, but that they differ widely in nature, is again illustrated by the fourth chart. Railroad freight traffic, after rising in November, 1926, to a point more than 20 per cent above the average for the six years 1921-1926, fell in December, 1927, to a point nearly 2 per cent below that average. These percentages are stated without making any allowance for long-time trend or normal growth in the country's requirements. But the figures, being based on the average for a series of recent years, are probably much the same as they would be if the percentages were calculated with reference to an estimated "normal." This represents a decline of nearly 25 per cent.

It is interesting to note that the decline in freight tonnage that occurred between the peak in May, 1923, and the low point in June, 1924, was only a little less, amounting in that case to about 21 per cent. Freight traffic figures give a very comprehensive picture of industrial activity, and, aside from strike influences, rather faithfully represent the course of the business cycle insofar as this can be done without considering prices and profits. *It is, therefore, of interest to note that we have already had a somewhat greater recession than occurred in the preceding business cycle.*

One difference between the last two cycles lies in the relatively prolonged gradual rise in industrial activity that went on during 1925 and 1926. Instead of rising sharply to a peak, as was the case in 1922-1923, industrial activity held irregularly to a moderately high level, acting almost as though it were being held in restraint by the relative weakness of commodity markets. But the decline during 1927 was similar in degree and in magnitude to that in 1923-1924.

Bank Debits and Securities Speculation

Another difference is found in the performance of bank debits. As shown in the fourth chart, the curve of bank debits was relatively low during the years 1921-1924 and relatively high in the years 1925-1927. This is true, even when allowance is made for a more sharply upward long-time trend in the bank debits. Average weekly bank debits made a new record in December, 1927, when the volume of freight traffic was at the lowest point since 1924. This rise in bank debits was not due to higher commodity prices and payrolls, for the broad trend of commodity prices was about level during the whole period from 1923 through 1927, and payrolls actually declined during 1927.

As we have pointed out before, the largest factor affecting bank debits must be speculation, and notably speculations in securities. In short, *the bank debits curve reflects the inflation in the stock market and gives some idea of the extent to which, after a brief period of liquidation in 1926, that inflation has been carried in* 1927. The wide spread between railroad tonnage and bank debits represents the effect of a lower basis of capitalization, "easy money," large corporate reserves (insuring dividends in spite of a decline in business), and hopefulness as to the future (leading to a willingness to buy and hold securities over a cyclical decline).

One thing is clear: Bank debits and bank clearings do not show the true trend of industrial activity. And, by the same token, the stock market is also not showing the same alinement with business conditions, in the ordinary sense of that term, as it has generally done in the past. This may represent in part a transition to a permanently higher level of security prices and of bank debits. But we are inclined to think that to some extent it represents a maladjustment and that, as the industrial volume expands and carries railroad tonnage higher, the basis of capitalization and money rates will be advanced for a while and stock prices and bank debits will ultimately decline to meet the rising tonnage curve.

Schedule of the next installments of the ***Business Analysis and Forecast,*** *by* ***Dr. Lewis H. Haney,*** *Director New York University Bureau of Business Research, follows:* ***March 15—Activity in Steel Consuming Industries; March 22—Position of Iron and Steel Producers; March 29—General Business Outlook.***

Defines Engineering Trends in Steel

Recent Developments Reviewed by American Metallurgist—Expansion and Effect of Alloy Steels—Suggests Biological Concept of Metallurgy of Steel

A COMPREHENSIVE and valuable lecture on "The Trend of Engineering Developments in Steel" was delivered Friday evening, Feb. 17, by Dr. B. D. Saklatwalla, vice-president Vanadium Corporation of America, before a large assemblage of metallurgists and chemists in the main auditorium of the Chemists' Club, New York. The meeting was held under the auspices of the American section of the Society of Chemical Industry.

Growth of Alloy Steel Industry

Only a few of the outstanding features of Doctor Saklatwalla's broad treatment of this important subject can be touched on here. Phenomenal as the growth of general steel tonnage may seem, said the speaker in the early part of his address, the growth of alloy steels within the last few years has been still more surprising. The statement has been made, based on statistics, that the alloy steel industry has progressed 18 times as rapidly as the general steel industry in the last 15 years. Alloy steels have entered fields where their application could hardly have been prophesied. This development of alloy steel is undoubtedly responsible for our present-day engineering advancement. It is undoubtedly recognized that the advances of modern engineering are closely associated with the wonderful properties of the materials employed. But it may not be generally apparent that these properties are brought about by the effects of heat treatment carried to a high degree in the presence of alloys.

"It has been suggested in the past that the civilization of a nation is measured by the amount of sulphuric acid consumed by it, and again latterly it was suggested that the amount of steel scrap produced by it should be a truer measure," said Doctor Saklatwalla. "It would not be amiss here to set up another criterion, namely, that the civilization of a nation is proportional to the tonnage of metal heat treated by it."

Biological Concept of Steel Metallurgy

A large part of Doctor Saklatwalla's address was taken up with a discussion of the formation and structure of alloy steels, based upon an outline in diagrammatic form, representing the equilibrium changes during the process of solidifying and cooling where the composition in percentages of carbon and temperatures are coordinated. In connection with this outline, Doctor Saklatwalla drew the unique analogy that such an outline might be termed the biological concept of steel metallurgy. He insisted that the analogy is not merely a fantastic one, but a very real one. One area in the diagram he designated as the "prenatal" and another as the "area of adolescence." As in biology so in steel metallurgy, he contended, these prenatal influences have been found to be of tremendous importance. "As in biology, the care and nurture lavished on the steel at these periods is reflected in the ultimate engineering qualities which eventually emerge. Experience bears this out, since defective soaking pit practice or improper period of heating, reheating and quenching, after fabrication, are reflected in weakness and failure during the adult engineering life of the steel."

Effect of Alloys on Steels

Alloying elements in general, with special reference to certain ones in particular, were then fully discussed by the speaker. He emphasized the difference between ordinary scavenging and "molecular scavenging," as illustrated in the use of vanadium in particular, which is an example of the latter. Grain growth was discussed to some extent, as well as the alloying of cast iron. High percentage alloy steels were reviewed quite extensively, with particular emphasis on the important part they will play in the future of engineering, both from a standpoint of resisting corrosion and oxidation at ordinary and high temperatures. Attention was also called to an intermediate grade of steels containing alloy elements in higher percentages than those found in structural alloy steels, though not as high as those found in non-corrosive steels of the stainless type. Some of the developments already made in this field were presented.

Present Status of Testing

The lecturer devoted considerable attention to the question of the value of testing steel, and stated that our ideas as to testing and the values of tests and their correlation to service are becoming greatly modified. The engineering profession has been accustomed to evaluate steel on the basis of standardized physical tests made on regulation test bars. While there could be no argument as to the value of physical test results for certain purposes, especially for comparison between various lots on the same type of steel, they become irrational in comparing divergent and separate types of steel. "The alloy steel industry is now some 20 years old, and if the results of testing and service experience gathered in that time be plotted on probability curves, we would gain a fairly clear picture of the respective merits of the various types of steel for a given service."

Proper Trend in Steel Research

In conclusion, Doctor Saklatwalla said that considerable interest has been aroused recently in the subject of research in steel metallurgy. It is well to bear in mind, he said, that we are concerned with steel more from the engineering standpoint than the mere treatment of steel as a chemical product. "There is a distinct differentiation between the science of metals and the science of applied metallurgy, and the work of the last 20 years or so has been directed mainly to the science of metals. Progress should be directed in the development of correlation of test and service. We have not yet developed a rational abrasion or wire test. Our knowledge of properties of steel at high temperatures is still very limited. We lack a visual representation of how steel actually fails under certain conditions and how failure progresses. The engineer and designer are limited by the materials furnished them by the metallurgist, and consequently the progress of civilization is in no mean measure dependent on him. Our progress should lie along qualitative rather than quantitative lines. As an example of new methods may be cited the development of X-ray analysis. We are not able to study as yet the high temperature changes occurring in steel by means of the hot microscope. We devote too much effort and attention to microscopic and too little to macroscopic investigation. It would certainly pay to investigate trodden fields before exploring new ones.

DISCUSSION

Dr. Ancel St. John, consulting physicist, New York, was the first of those present to discuss Doctor Saklatwalla's lecture. He called attention to the fact that some 10 years ago he had advised the use of X-rays for studying metallurgical problems, and had suggested the possibility of X-ray diffraction analysis. Since that time the methods used in attacking these metallurgical problems have been improved, and it has been demonstrated that valuable information can be obtained by means of the X-ray without changing the metal in any respect. This method of analysis, Doctor St. John claimed, was far ahead of the microscope in the broad scope of the information obtainable. He stated that he had been examining recently sheet, brass, copper and iron up to ⅛ in. in thickness with the X-ray, in the rolled, annealed and strained condition. It had been possible, he said, to investigate practically the same area in each case, and he was glad to report that he felt that he had found out what is going on inside the metal during these various operations. Alluding to the lecturer's suggestion of the "prenatal period" in steel formation, Doctor St. John testified that he considered this very important.

The allusion of the lecturer to the prenatal, the adolescent and other periods in the development of steel was impressive, said Dr. F. N. Becket, vice-president Electro Metallurgical Co., New York. He said that it reminded him of the old saying, "Spare the rod and spoil the child," and he alluded to the possibility that, if steel is "spanked" in the prenatal, in the adolescent and in the later periods of its formation or development, it may be greatly improved. He desired to take issue with one commentator of the evening as to the impossibility of rolling high chromium products. At present, high chromium steels are being rolled down to plates and even sheets.

Complimenting Doctor Saklatwalla on the generous and broad statement which he had presented in his lecture, Dr. Paul D. Merica, director of research, International Nickel Co., New York, in alluding to the question of testing, said that our chief concern should be to give the engineer accurate information, rather than to devote too much time to the development of new products. He referred to the important progress that has been made in our knowledge of the properties of metals at high temperatures and in certain other fields of engineering steel development discussed by the lecturer.

Railroad Proposed to Link Youngstown Mills with Ohio River

Pittsburgh, Lisbon & Western, Owned by Pittsburgh Coal Co., Would Build 40-Mile Track Affording Savings on Coal and Steel Shipments

PITTSBURGH, Feb. 28.—More than ordinary interest is taken by steel manufacturers here and in Youngstown in the filing with the Interstate Commerce Commission by the Pittsburgh, Lisbon & Western Railroad of an application for permission to build 40 miles of trackage and thus provide a direct rail connection between Youngstown and the Ohio River. The Pittsburgh, Lisbon & Western Railroad is owned by the Pittsburgh Coal Co., and while the primary purpose of the proposed addition to the system is to enable the coal company to haul coal partly by water toward Youngstown and adjacent territory and effect a reduction in delivered coal costs through lower freight charges, it could be used for bringing the steel products of the Youngstown district to the river terminal and permit producers to share some of the advantages of river shipments now enjoyed by mills in Pittsburgh, Wheeling and southern Ohio.

The present line of the railroad runs from New Galilee, Pa., about 40 miles northeast of Pittsburgh, west to Lisbon, Ohio. In the construction of the new line, only four miles of the present line would be utilized, the plan calling for a 13-mile section to run from Smith's Ferry, near East Liverpool, Ohio, and Chester, W. Va., to Negley on the present line, thence west to Mill Rock, where the new line would start north 27 miles to a fork, with one branch into Struthers, Ohio, and another to a junction with the Erie Railroad at Austintown, just outside of Youngstown.

There is little doubt that Youngstown district steel companies would welcome this or some similar project that would enable them to reduce their coal costs and put them on more nearly even footing with Pittsburgh district companies able to draw their coal supplies by river. The latter are almost all within the zone where the river rate on coal is 15c. per ton from mine to plant. The present rail freight rate from Pittsburgh to Youngstown is $1.34 per ton and from the Connellsville district it is $1.42 a ton. It is believed that a combination rail and river rate of not more than $1 a ton would be possible through the building of this new line or in the working out of an arrangement whereby the existing railroads would take the coal at some point along the Ohio River and grant a proportional of the Pittsburgh through rate from that point to destination. Operated separately, with the railroad charging the local rate from the river terminal to destination, there would be little or no saving over the all rail rate.

The idea of building a road that would connect Youngstown with the Ohio River is not a new one. Several years ago an attempt was made by Youngstown steel interests to secure a traction line running in a roundabout way from Youngstown to East Liverpool, and converting it into a steam railroad with an idea of partial use of the Ohio River in the inward movement of coal and the outward movement of steel products, but nothing definite ever developed. One of the Youngstown steel companies since has been working on plans for a road that would be more direct from Youngstown to the river and in the past year there have been discussions between Youngstown steel companies and Pittsburgh coal companies having mines on or adjacent to the rivers of a plan which involved the building of a river terminal near Beaver, Pa., to which coal would be conveyed by water and then transferred to the railroads, and which might also be used as a transfer from cars to barges of down river movements of steel products from Youngstown. This plan to be successful would necessitate the cooperation of the railroads through the granting of a rate to and from Youngstown that would be a proportional part of the through rate, instead of the local rate, relatively high because of the short haul.

Shipping Board to Buy Oil Engines for Auxiliary Uses

WASHINGTON, Feb. 28.—The Shipping Board has authorized Commissioner W. S. Benson to negotiate contracts for the purchase from the Nordberg Mfg. Co., Milwaukee, of 12 two-cycle, three-cylinder, 500-bhp., air injection, internal combustion auxiliary engines at a cost not greater than $426,840. Commissioner Benson also has been authorized to negotiate for the purchase of four three-cylinder, four-cycle, 280-bhp., air injection, internal combustion auxiliary engines from the Fulton Iron Works, St. Louis, at a cost not greater than $107,232. These engines are for auxiliary equipment in the eight additional vessels the conversion of which was authorized by a Shipping Board resolution.

Exporters to Hold Convention

The eighth annual convention and dinner of the Export Managers' Club of New York, Inc., will be held March 20 at the Hotel Pennsylvania. Among the topics scheduled for discussion are new export methods, the use of aviation in expanding foreign trade, cables, radio and international telephone communication, budgetary control of export business, export sales quotas and the use of motion pictures in promoting foreign business.

The Export Managers' Club has a membership of more than 400 and the annual convention is open upon registration to anyone interested in foreign trade. The attendance at the convention last year exceeded 750.

Commercial Steel Castings Bookings and Production High in January

Orders for commercial steel castings in January totaled 90,863 tons, or 62 per cent of capacity, against 76,953 tons, or 53 per cent of capacity in December, according to reports received by the Department of Commerce from 129 concerns with a monthly capacity of 145,600 tons. Of the orders in January, 41,276 tons were for railroad specialties, representing 61 per cent of that class of capacity, compared with 39,112 tons, or 59 per cent in December. Orders for miscellaneous castings in January totaled 49,587 tons, or 63 per cent of that class of capacity, comparing with 37,841 tons, or 49 per cent, in December.

Total orders received in January made the largest tonnage since last June.

Production in January amounted to 73,886 tons, or 51 per cent of capacity, against 58,220 tons, or 40 per cent of capacity, in December. Castings for railroad specialties produced in January totaled 28,714 tons, or 43 per cent of that class of capacity, against 19,358 tons, or 29 per cent, in December. Production of miscellaneous castings in January totaled 45,172 tons, or 58 per cent of that class of capacity, as compared with 38,862 tons, or 50 per cent, in December. Total production in January was the highest for any month since last August.

By-Product Coke in January Equals Previous High Record

Production of by-product coke in January totaled 3,880,000 net tons, an increase of 234,000 tons, or 6.4 per cent, over the output in December, according to the Bureau of Mines. With the exception of March, 1927, when the reported production was the same, the January output was the highest on record. Production of beehive coke in January remained practically stationary, the total being estimated at 376,000 tons.

Automobile Production in January Gained 68½ Per Cent Over December

Production of motor vehicles in the United States increased to 225,039 in January, against 133,547 in December, according to reports received by the Department of Commerce from 161 manufacturers, 49 of whom make passenger cars and 130 make trucks, with 18 making both. Of the January output, 199,032 units were passenger cars and 26,007 were trucks, comparing with 106,079 passenger cars and 27,468 trucks in December.

Despite the gain of 68½ per cent from December, the January output was the smallest for any January since 1922. It compares with 238,926 last year, 309,544 in 1926, 240,592 in 1925, 318,526 in 1924 and 244,302 in 1923. Only five months of the preceding five years made lower figures.

Production in Canada in January was 8463 vehicles, of which 6705 were passenger cars and 1758 were trucks. This compares with a total of 3435 vehicles in December, of which 2277 were passenger cars and 1158 were trucks.

Increased Shipments of Malleable Castings

Shipments of malleable castings in January are reported by the Department of Commerce at 47,691 tons. This compares with 42,694 tons in December and 37,986 tons in November. It is, however, substantially below the shipments of January, 1927, at 49,342 tons. Figures are for 133 identical plants, of which five were idle in January.

Production of these same plants in January is given as 54,818 tons. This is the highest monthly figure since last June. It compares with 47,866 tons in December and with 51,492 tons in January, 1927.

Operation in January was at 59.6 per cent of capacity, compared with 47.6 per cent in December and with an average of 50.4 per cent for the 12 months of 1927. Capacity is on a new basis. The formula used is the "average monthly production for the best six consecutive months since Jan. 1, 1919." This places the figure at 92,015 tons, against more than 100,000 tons in each month of 1927. Hence the percentage ratios are no longer comparable.

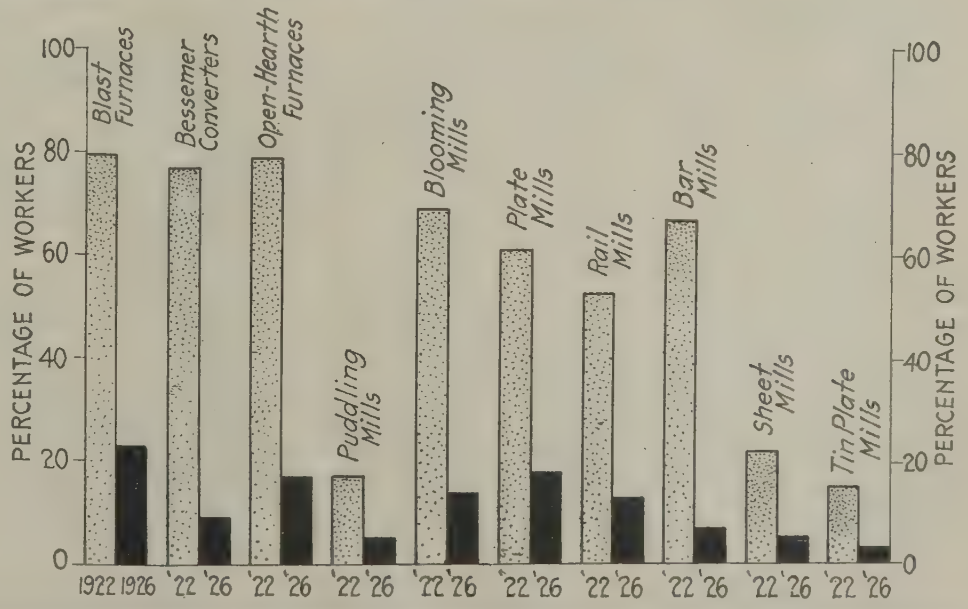
Fabricated Steel Plate Orders Lower

New orders in January for fabricated steel plate are reported by the United States Department of Commerce at 32,810 tons. This represents a drop of 8 per cent from the December figure of 35,648 tons and about the same from the figure for January, 1927, at 35,854 tons. It represented 41.1 per cent of capacity of the 51 firms reporting.

Oil storage tanks accounted in January for 8758 tons, refinery materials and equipment for 2575 tons, tank cars for 2412 tons, gas holders for 2062 tons, blast furnaces for 1225 tons and stacks and miscellaneous uses for 15,778 tons. The latter was the highest figure since last May. Blast furnace requirements made the highest total in more than a year.

Striking Reduction in Long Week in Steel Mills

CHANGES in work-week are shown in the diagram alongside. The solid black areas represent the proportion of the men, in each group designated, whose regular week in 1926 was of more than 60 hr. Contrasted with this is the dotted portion, showing the 1922 proportion on the same basis. It will be noted that there has been a sharp reduction in the long-time week for every group of iron and steel workers represented. Blast furnace operatives working more than 60 hr. have been reduced from 79 to 24 per cent, and others in similar or even greater proportions. Of the tin mill workers only 2 per cent, roughly, were working over 60 hr. in 1926. Figures are from the United States Bureau of Labor Statistics.



European Markets in Better Shape

Higher Prices and Larger Demand, Both Local and for Export —Scrap Prices Weak

(By Cablegram)

LONDON, ENGLAND, Feb. 27.

CLEVELAND pig iron position has been improved as a result of increasing prices of Continental iron. British iron makers are now securing better export orders. Domestic consumers have placed contracts up to June and stocks of iron are decreasing. There is talk of relighting some of the 50 Cleveland blast furnaces now idle. Hematite competition is still strong and, as stocks are still large, there is a possibility of one works closing at the end of this month.

Foreign ore deliveries are good, in spite of the Swedish strike. Hence the ironmasters are not engaging in fresh contracts.

Finished steel demand has improved in the domestic market, but export demand generally is still slow, especially in the plate department. The Admiralty has placed orders for seven destroyers with Scottish and North-East Coast yards. More locomotives have been ordered for use on British railroads.

Tin plate markets are moderately active, with inquiry in excess of actual business. Makers are well sold, on their restricted output, and prices are firm.

Galvanized sheets are active and firm. Japan has bought some parcels of black sheets—thin specifications. Other gages are in less demand and the market is quiet, but prices are higher because of the increasing cost of foreign steel.

On the Continent of Europe

Continental markets are strong. Semi-finished material is almost impossible to secure from the makers. There is good export demand for finished steel, which is being met direct by Continental makers. Hence very little important business is passing through traders' hands in London.

There is to be a meeting in Paris on March 5 of the European Rail Cartel, when, it is expected, prices will be advanced. The Raw Steel Cartel will hold a meeting shortly afterward.

BELGIAN PRICES HIGH

Mills Not Seeking Business—Slight Reaction Expected in Some Quarters

ANTWERP, BELGIUM, Feb. 11.—Recent rapid advances in the iron and steel market have developed a speculative tendency, so that, while it is generally admitted that many mills are well booked with tonnage and able to adopt an independent attitude, some reaction to the present strength would not be unexpected. Such a reaction may be only temporary, as sellers seem to be in a secure position, many either quoting prohibitive prices or refusing to consider further business at present. Since the strike in the Swedish iron mines will probably be settled shortly, this may exercise a slight depressing tendency on prices. With quotations covering a wide range depending upon the tonnage each mill has on its books, determination of the actual market is difficult.

Pig Iron.—Purchases of foundry iron have been large, and prices are very firm. Available supplies at the furnaces are small. Export prices have been advanced to £3 3s. ($15.34) per ton, f.o.b. Antwerp, for foundry grade, and basic iron is quoted at £2 19s. to £3 ($14.38 to $14.61) per ton, f.o.b. Antwerp. Bessemer hematite is quiet at 670 fr. ($18.90) per ton for domestic delivery.

Semi-Finished Material.—Prices have been advanced considerably, and less business is being transacted. Buyers are not inclined to pay the latest quotations of mills, but makers have only small supplies available and are in a position to be independent. Blooms are nominally £4 3s. 6d. to £4 6s. 6d. ($20.33 to $21.07) per ton, f.o.b. Antwerp. Billets are in good demand, but makers are not seeking business. As a result, prices

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	18s.	to	£0	18¼s.	$4.39	to	$4.45
Bilbao Rubio ore*	1	1½				5.24		
Cleveland No. 1 fdy.	3	7½				16.44		
Cleveland No. 3 fdy.	3	5				15.83		
Cleveland No. 4 fdy.	3	4				15.59		
Cleveland No. 4 forge	3	3½				15.46		
Cleveland basic (nom.)	3	15	to	3	15½	18.27	to	18.39
East Coast mixed	3	9	to	3	10	16.80	to	17.05
East Coast hematite	3	9½	to	3	10½	16.93	to	17.17
Rails, 60 lb. and up.	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	10				65.75		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to	5	15	26.18	to	28.01
Tin plate, base box.	0	17¾	to	0	18¼	4.33	to	4.45
Black sheets, Japanese specifications	13	5	to	13	10	64.53	to	65.75
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	9	2½	to	9	12½	1.98	to	2.09
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15.	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	10	0	to	10	5	2.17	to	2.23
Galv. sheets, 24 gage	13	7½	to	13	10	2.91	to	2.94
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	4s.	to	£3	5s.	$15.58	to	$15.83
France	3	4	to	3	5	15.58	to	15.83
Luxemburg	3	4	to	3	5	15.58	to	15.83
Basic pig iron (nom.):								
Belgium	3	0	to	3	1	14.61	to	14.85
France	3	0	to	3	1	14.61	to	14.85
Luxemburg	3	0	to	3	1	14.61	to	14.85
Coke	0	18				4.39		
Billets:								
Belgium	4	13½				22.77		
France	4	13½				22.77		
Merchant bars:						C. per Lb.		
Belgium	5	7				1.18		
France	5	7				1.18		
Luxemburg	5	7				1.18		
Joists (beams):								
Belgium	4	15				1.03		
France	4	15				1.03		
Luxemburg	4	15				1.03		
Angles:								
Belgium	5	5				1.16		
⅛-in. plates:								
Belgium (a)	6	10				1.44		
Germany (a)	6	10				1.44		
3/16-in. ship plates:								
Belgium	6	5				1.39		
Luxemburg	6	5				1.39		
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

are nominally £4 8s. to £4 11s. ($21.43 to $22.16) per ton. Makers of sheet bars are well booked with business, and, with demand large, prices are firm at about £4 12s. 6d. ($22.53) per ton, f.o.b. Antwerp.

Finished Material.—Prices show no further advance, but are decidedly strong. Buyers are unwilling to pay the present level of quotations, and mills seem to have developed an exaggerated idea of values. Steel bars are quoted at £5 5s. to £5 7s. 6d. per ton (1.16c. to 1.18c. per lb.), but some business has been closed at £5 2s. to £5 3s. 6d. per ton (1.13c. to 1.15c. per lb.), f.o.b. Antwerp. Hoops are quoted at about £6 2s. 6d. per ton (1.35c. per lb.), f.o.b. Antwerp.

JAPAN BUYS TIN PLATE

Nippon Oil Co. Places Order Here—British Export Sheet Prices Reduced

New York, Feb. 28.—Export trade continues light, and prices quoted by American mills are not particularly strong. While tin plate for export to Japan and China is quoted at about $5.20 per base box, c.i.f. Japanese or Chinese port, exporters seem to believe that with a sizable tonnage to place some concession could be obtained. The quarterly requirements of the Nippon Oil Co. in Japan, about 63,500 base boxes of oil can tin plate, have been placed with exporters in the United States. The Kioto Oil Co. in Japan is expected to enter the market shortly for 20,000 to 25,000 boxes of tin plate. Both Chinese and Japanese consumers are interested in the purchase of tin plate waste and tin plate waste waste, but are unwilling to pay the prices quoted by sellers. In some instances exporters to the Far East have been seeking to locate scrap tin plate cut from old tin cans and similar material of large size, believing that it might be used by some Far Eastern consumers and could be sold at a price within their means.

The light-gage sheet market is quiet, with American mill prices for export at $77 to $78 per ton, c.i.f. Japan or China. Recently British sellers have reduced their export prices on these specifications to £14 18s. ($72.57) per ton, c.i.f. Japan. This is only 6d. (12c.) per ton more than the recent German price of £14 17s. 6d. ($72.45). It is expected that the German quotation may be lowered to about 5s. per ton less than the British market.

Some rail business has been placed by Japanese companies. The South Manchuria Railway Co. has awarded 250 tons of splice bars to an exporter in New York for execution by an American mill and 975 tons of tie plates to a Japanese exporter for execution by a Belgian mill.

Mannesmann Works Makes Stainless Steel Tubes

Hamburg, Germany, Feb. 11.—Sole license for the manufacture of seamless drawn tubes from Nirosta stainless steel, the patents on which are owned by the Friedrich Krupp A. G., has been purchased by the Mannesmann Tube Co. About 150 tons a month has been produced by the Mannesmann company for several months, but output is being greatly increased. Export orders for these tubes are reported numerous, principally from chemical plants, as long guarantees are given by the makers.

British Iron Ore Imports Increased in 1927

Washington, Feb. 27.—Imports of iron ore and manganiferous ore into the British Isles in 1927 totaled 5,091,101 gross tons, compared with 2,058,036 tons in 1926 and 4,289,988 tons in 1925, according to a report received by the iron and steel division, Department of Commerce. Of the imports last year, 74,020 tons was manganiferous ore. Increases in imports were general, except for a decline in shipments from India. The most conspicuous increases were in receipts from Spain and Algeria, the former registering an advance to 2,416,000 tons from 956,000 tons in 1926.

FRENCH MARKET STRONGER

Consumers Replenishing Stocks and Mills Are Well Booked for Two Months or More

Paris, France, Feb. 10.—There is apparently a steady increase of confidence on the part of consumers, who are replenishing stocks in the belief that prices may show a sustained upward trend. An improvement has been evident in foreign trade also, with frequent purchases from abroad and tonnages slightly larger than for several months. An added factor of confidence is the improved market conditions in other European countries and in Great Britain. Producers are optimistic but are endeavoring to exercise moderation in advancing prices, fearing a reaction if the market increases too rapidly.

The new comptoir for the control of semi-finished material and beams seems to be thoroughly organized and prepared to function on Feb. 15. According to reports, the quotations of this new selling syndicate will not vary much from the present market level. Its relation to producers' warehouses will be similar to its position with general iron and steel merchants. Some rebates are expected to be given to warehouses, since they must carry larger stocks than contractors and other consumers.

Pig Iron.—Despite price increases on phosphoric foundry iron, improvement in business continues. Consumers are evidently using much of the iron which they are receiving, and production is increasing, largely in basic iron, as the output of foundry iron is considered sufficient to meet present requirements. On the 33,000 tons of foundry iron made available for domestic users for March, the price has been advanced 10 fr. (40c.) per ton. The General Syndicate of Northern and Northeastern Foundrymen has informed its members that, as a result of freight rate increases, prices on No. 3 phosphoric foundry will be 498 fr. ($19.57) f.o.b. Maubeuge, to 513.65 fr. ($20.10), f.o.b. Dunkirk, while it can supply them with Cleveland No. 3 foundry at 490 fr. ($19.25) per ton, delivered in the Northern region. Hematite iron is unchanged for March. Negotiations are still being carried on for the establishment of a hematite iron comptoir, and some progress is reported. For export, pig iron prices are firmer.

Semi-Finished Material.—Sellers are showing less desire for tonnage, and demand is more active. Blooms are still quiet at £4 3s. to £4 6s. 6d. ($20.21 to $21.07) per ton, f.o.b. Antwerp. Billets are moderately active at £4 7s. 6d. to £4 11s. ($21.19 to $22.16) per ton, and limited quantities of sheet bars are available at £4 11s. 6d. to £4 12s. 6d. ($22.29 to $22.53) per ton, f.o.b. Antwerp.

Finished Material.—Most mills have sufficient orders on their books to maintain a good rate of operation for two to three months, so that there is practically no inclination to shade prices, even on exceptionally desirable business. Beams are firm at £4 11s. to £4 12s. 6d. per ton (0.97c. to 0.99c. per lb.), and bars have advanced to £5 2s. 6d. to £5 3s. 6d. per ton (1.13c. to 1.15c. per lb.), f.o.b. Antwerp. The trend of sheet prices is upward.

German Steel Scrap Prices Show Weakness

Hamburg, Germany, Feb. 11.—Prices of iron and steel scrap have declined somewhat, so that shipments from the United States and Great Britain may not prove so profitable as in the latter part of last year. In the closing months of 1927 9170 tons of scrap from the United States arrived in Germany. At present, however, consumers have almost entirely ceased purchasing, and the scrap dealers, who were formerly in a single association, have divided into two organizations, which are competing for business. As consignments are often shipped to Germany from the United States and Britain for sale at the market price on arrival, this downward movement in prices may cause some losses to sellers.

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This Issue in Brief

Greatest bulwark against foreign competition is American inventive genius and capacity for organization, says Department of Commerce executive. The bogie will fade as we mobilize our resources and collective energies for the best interests of our industries.—Page 608.

Manufacturers may soon receive "educational orders" for munitions. A bill before Congress provides for authority to be given War Department to place orders with manufacturers selected as being best qualified to furnish supplies during emergency.—Page 587.

Safety code for forge hammer operators has been issued by Department of Labor. Trade associations have approved the code and recommended that it be posted in every plant operating forging and hot-metal stamping hammers.—Page 593.

Costly repairs avoided by installing a permanent hearth in blast furnace. Hearth made of heavy cast iron sections, bound together with wrought iron bands, has been in use 11 years and is still in perfect condition.—Page 594.

Reduction in the cost of producing steel is promised by the proper application of washed blast furnace gas, says engineer. This is the most important single unrealized means, he declares, adding that the present simplest and cheapest of the thoroughly tried Continental systems is wet cleaning by the disintegrator method. — Page 595.

New hardness tester employs a pyramid diamond indenter, which is pressed into the specimen under a low load. For hard metals it is said to be superior, and is applicable to finished work and to very thin sheets. Two hundred accurate tests an hour are claimed for it. —Page 602.

Early improvement in business is forecast by favorable barometers, says Dr. Haney. Trend of employment took on a more promising aspect in January; money is easy, and the P-V Line is ascending.—Page 610.

What qualities determine the usefulness of gray iron castings? A. F. A. committee proposes to answer this question by formulating a series of specific problems, and employing the solutions to help remove the difficulties confronting the gray iron industry.—Page 598.

Foresees at least four to six months of above-normal business for steel industry. Prospects are sufficiently favorable to warrant anticipation of good business at least until July, Dr. Haney indicates.—Page 611.

You will gain by concentrating your production and sales efforts on simplified lines, i. e., items in most demand, says Department of Commerce official. The "simplified" lines are more economical to make and easier to sell.—Page 608.

Cuts cost of making malleable castings by installing powdered coal equipment. Quicker heat and hotter metal are obtained. Furnace labor costs are reduced, and refractory costs are lowered slightly.—Page 600.

Though automobile output gained 68 per cent in January over December, it was still the smallest first month since 1922. The number of vehicles produced was 225,039, as against 133,547 in December. — Page 615.

Failures of steel in service may be reduced by investigation to determine the amount of iron oxide that will dissolve in iron under various conditions. Failures in a great many cases are due to non-metallic inclusions, the basis of most of which is dissolved iron oxide.—Page 596.

Heat treatment a measure of a nation's civilization, says metallurgist. At one time it was said that the amount of sulphuric acid consumed was the yardstick. Later steel scrap production was suggested as a truer criterion. Now a new measure, the tonnage of metal heat treated, may be set up.—Page 613.

Limestone produces cleaner steel, says open-hearth man. Burnt lime gives faster heat but, because of the larger boil, limestone gives cleaner metal.—Page 595.

Is "profitless prosperity" due to scientific methods of production vs. unscientific methods of selling? Industry is turning out a continually increasing volume of goods at a gradually decreasing manufacturing cost. But the selling departments of the industries apparently are blind to the fact that there is a limit to the amount of staple commodities the country can absorb, and that consumption will be stimulated little by price cutting.—Page 620.

"Tool room" precision and carefulness are employed in airplane engine manufacture. Parts are checked and tested after each operation in the making of Wright "Whirlwind" motors.—Page 590.

Don't neglect the present metals in the desire to develop new products, engineer tells metallurgists. There is a great deal to be discovered about the metals we now have, and the use made of those metals by engineers is limited to the information about them which metallurgists provide. — Page 614.

Sharp gain in pig iron output is indicated by telegraphed returns. Estimated daily production for February was 99,640 tons, a gain of 7067 tons per day, or 7.6 per cent, over January.—Page 623.

ESTABLISHED 1855

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Overproduction, a Waiting Game

REPRESENTATIVES of three industries, one, (zinc) on the road to depression, another (coal) in the very slough of despond, and a third (copper), which is finding the way out, met during the Mining Engineers' convention in New York last week to discuss the problem of overproduction in industry. The resulting picture reflected many aspects of general industrial conditions throughout the United States.

"Profitless prosperity" has been blamed upon many things. Speaking in general terms we believe it is mainly due to widespread adoption of scientific methods of production, unaccompanied by any systematic improvement in the matter of distribution and selling. It results that present plants and labor forces are turning out a continually increasing volume of finished goods at a gradually decreasing manufacturing cost. However, the selling departments of the industries generally have not yet awakened to the fact that there is a limit to the amount of staple commodities which can be absorbed by the population of this country; that such a large cut in the selling price as to wipe out all profit will not stimulate consumption to any great extent, or contrariwise that the concerted maintenance of selling price on a profitable basis will not cause any material reduction in the amount purchased. Saturation is being approached in many raw materials, semi-finished manufactures and labor-saving equipment.

These general propositions, if accepted, contain within them some indications of the corrective steps to be taken. Great expansion in productive capacity must be accepted as a fact. Even further expansion is in prospect. Harrington Emerson calculates that, when all available human effort is placed at supervising machinery, the hours of labor could be cut 30 per cent; yet production would be twice as much as today. Regardless of the precision of this estimate, the long view ahead would discern increasing mechanization and shorter work days.

Shorter work days mean more time for the ultimate consumer to utilize and enjoy the various products which will be devised and which he will make. Such has been the trend of the last 20 years. The making of automobiles, highways and electrical devices (telephones, radio, home conveniences) has absorbed most of the additional productivity our population has achieved during those years. The using of these things has been general because during the same years the scale of living and the amount of leisure has increased to the extent that citizens generally can enjoy the new luxuries and conveniences.

Thus, while research in the past has largely been confined to the problem of making things more easily, and to making new things, research in the future must pay more attention to finding new uses for the old things, to finding new and useful things to make, to devising ways and means so the ordinary citizen can acquire and enjoy more of these new things. Thus, general expansion of consumptive capacity must match the general increase in productive efficiency.

Zinc reflects some of these general considerations. A small proportion of by-product metal, acquired at low cost, dominates the market. It is a sudden source of production. It has placed the industry in the position of being able to produce far more than it can sell. Without building any more smelters, the industry suddenly has all the earmarks of overexpansion. What is to be done? The highest cost producers will have to quit. The rest will have to realize that it is a waiting game until new things can be devised to absorb the available zinc. Meanwhile "live and let live." It will do nobody much good, and the whole industry much harm, to grab a lion's share of the available business by price concessions. They will not increase actual consumption enough to warrant them.

Coal never has learned these lessons. Whereas the consumption used to increase 10 per cent a year, it has dropped to 2 per cent, not because the country's demand for power has lagged, but because more power is coming from other sources—oil, gas or electricity. Meanwhile coal has become over-expanded to where it will take 50 years to catch up. As it has been plaintively expressed, to correct the situation a number of mines and miners must die for the good of the cause; that is, accept their losses and turn their efforts to other things. The quicker the better; 50 years is too long to wait. Meanwhile, the industry must learn that it can sell no coal below cost, nor ship coal until it is sold.

Copper proves these general propositions. It was greatly over-expanded in 1920, both by enlarged plant and improved metallurgical extraction. With the war demand cut off, the future seemed almost as black as the coal situation. But a general and adequate curtailment of operations enabled all but the weakest operations to survive until the consumptive demand increased. More and more electric equipment required copper. Concerted and vigorous publicity and sales promotion regained a lost market in the building industry. A general improvement in living conditions enabled the ultimate consumer to buy more brass and copper fixtures, hardware and utensils. In short, copper found the way out by its sales managers' realizing that price slashing wouldn't expand the market. On the other hand, they united in a constructive effort to find new outlets, and waited for the expanding market, which is only a matter of time.

Cold Facts About Coal

A SENATORIAL investigation of the soft coal strike in western Pennsylvania, West Virginia and Ohio is under way. Since any correction of the conditions prompting the investigation will come through public opinion, rather than senatorial pronouncements, it is highly important that the record shall run to fact rather than sentiment.

The sympathy of the public no doubt will be aroused by testimony as to the suffering of idle miners and their families; but the public will need to know the facts to decide who is responsible for the suffering. For the past thirty years, or since the mine owners in Pennsylvania, Ohio, Indiana and Illinois, known as the central competitive field, made the mistake of granting the union check-off, the union has not been obliged to solicit membership. The hope was that with the funds so collected the union would be able to organize the Southern fields and thus establish a common wage scale for all districts. A man taking employment in a union mine automatically became a union miner, since his first pay envelope was tapped for initiation and dues by the company, the money being turned over to the union. The union leaders lost sight of the man, his living and the education of his children in the sole endeavor to unionize the mines, not those who work in them. Mine owners have been equally out of touch with the individual miner, it being such a simple matter, when men were wanted, to ask the union to furnish them.

The committee will not have to prod witnesses to get testimony to the ruthlessness of operators in this latest struggle, but it is to be hoped the reasons why the union has not performed the chief of its covenanted functions—the care of the men while out on strike—will be fully developed. There are supposed to be 400,000 union miners subject to dues, fines and assessments when at work. It would help the formation of just opinion of the situation if it could be shown what the union receipts have been and how they have been disbursed. The proper handling of the money, it would appear, should have made unnecessary an appeal to the public for help. Working miners are reported to have paid an average of $40 annually in dues, assessments and fines in recent years. Thus assuming only 50 per cent employment in the period of the Jacksonville wage scale from April 1, 1924, to April 1, 1927, there is an indicated income for the union of $24,000,000. The harshness of winter evictions from coal company houses cannot be gainsaid. On the other hand there will be testimony to the ignoring of repeated orders to leave, given in seasons of pleasant weather.

There are few so sanguine as to believe the hearing will produce valuable results. Pittsburgh district coal operators are definitely through with the union, particularly the steel companies which have ceased making contracts that were subject to suspension when any disagreement arose between owners of commercial mines and the union.

Such steel companies produce coal for their own use and not for sale, and the coal mine has its definite place as a steel-making factor. Moreover, it is a matter of calculation that the cost of stocking coal in preparation for possible shortages due to strikes has added a dollar a ton to the cost of making ingots. This extra cost comes in handling charges, interest on money tied up, and the care that must be taken to prevent the piles from burning through spontaneous combustion. That is a burden which the steel industry least of all can carry, with its well known limitations of prices and profits.

Steel Tonnage Prospects

THERE has been a tendency to overrate the importance of recent changes in steel tonnage prospects, which after all have been slight. Shortly before and after the first of the year there were notions that steel demand in 1928 would be exceptionally heavy. On the other hand, the trend toward conservatism in the past few weeks has produced a batch of less favorable expectations.

Such magnifying of small things distorts the picture, the important feature of which is really the steadiness of steel demand. There have been five years of high production of steel, with a uniformity of rate never even closely approached in the past for more than three years, and then only once, from late in 1904 to late in 1907. Gaged by steel ingot production, the slightly "off" year 1924 was 16 per cent under the five-year average, and every other year was just a trifle above, except 1926, which was 7 per cent above.

The idea used to prevail rather generally that good years in steel were naturally and necessarily to be followed by poor years. That idea must be abandoned or held very far in abeyance, for if it were to be applied it should have been applied at least two years ago, and there have since been two heavy years to indicate its errancy.

It is logical and practical to assume that after a reasonable time a continuance of a given volume of steel demand furnishes increased guarantee for its continuance. As the country grows it is easier to maintain a given rate.

In specific detail there has been no important steel consuming line that promised materially more or materially less steel consumption this year than last, with the exception of the automobile industry.

Detailed reports by steel producers for the annual presentation by The Iron Age of where steel went have assigned 13 per cent of the steel to the automotive trade in 1925, 14½ per cent in 1926 and 14 per cent in 1927. Thus a change of one-third in automotive production represents less than 5 per cent of the total steel production. Recently revised reports of the Department of Commerce of fabricated structural steel lettings in the past three years show the lowest year of the three, 1926, to have been only 3 per cent below the three-year average, and the highest year, 1927, only 2.5 per cent above the average. Last year oil and gas field consumption of steel was regarded as being very much "off," but our reports indicated a very fair consumption, and the more rational view is that it was rather 1926 that was "off," in the other direction.

Prices secured by mills for their output of steel this year will be determined by the attitude of the sellers rather than by the tonnage, which is altogether unlikely to show any material decrease, or such an increase as would of itself affect prices. In the first quarter of last year production of steel ingots represented 85 per cent of capacity, while the year's average was 75 per cent. The present quarter promises no material divergence from the corresponding quarter of 1927. There is more leeway in individual finished steel lines than in ingot production, because the total finishing capacity exceeds the ingot capacity. Two or three finishing lines may run above the general average and yet be under no strain.

CORRESPONDENCE

Equipment and Competition

To the Editor: Inferences might be drawn from the advertisements and articles appearing in your columns that there would be no difficulty in meeting the existing horrible competition with modern equipment.

We have always experienced instances of price-cutting, but never to the present extent, which borders on desperation. No one is exempt from the effects. A neighboring company, which is the largest of its kind in the country, is suffering from this cut-throat practice. Some of its best lines have been copied by smaller companies of no reputation, and the price of its stock has dropped from above 90 to between 50 and 60. On an inquiry from a dealer we recently quoted 30c. a set on one of its articles, weighing 1¼ lb., which was made of gray iron, machined, japanned and polished, and found that it was being bought for 15c.

We lately figured on some screw machine parts, and the mill made us a special price on the material. The order was placed at just the cost of the stock, with no allowance for machine work or overhead, to say nothing of profit. It would require a more modern machine than has yet been created to make it possible to meet these conditions.

I. S. Spencer's Sons, Inc.

Guilford, Conn.

Art of Competition Calls for Study

To the Editor: Magnus W. Alexander stated a good many of the problems of present-day competition in his Detroit speech, as reported in The Iron Age of Jan. 26. He pointed the way to a solution, with perhaps no intention of indicating just how the solution is to be carried out. Holding up the "deficiteer" to scorn, with the implication that he ought to be eliminated, seems to be the thought which is uppermost in Mr. Alexander's mind.

However, the best way we know at present of beating competition is to get orders instead of having the competition get them. And there is a lot to be learned out in the highways and byways of trade about that simple art.

On a recent investigation of competitive conditions in a number of competitive organizations, the writer learned some very interesting facts. They are tabulated herewith:

1. Few competitive organizations have very definite ideas about what business they really want to get.
2. In eight organizations out of 11 there was no precise information on where such business as it was claimed was wanted could be found.
3. In seven organizations out of 11 there was no clean-cut plan of getting the business which it was claimed was wanted, in spite of the competition.
4. In only one organization out of 11 had the competitive force been built on a careful study of what the prospective customer wanted. Ten out of 11 were trying to sell what they could conveniently make rather than what the prospective customer wanted.

The investigation covered tank and boiler shops, equipment and machinery builders. It must not be inferred that the information acquired in the case of these 11 organizations is applicable to any organizations other than these particular 11 which were visited. Such conditions *might* be true in a good many industries. It is entirely too easy to generalize from a few facts.

Suppose everyone who is really in a severely competitive market were to make a study of the art of competition. It is actually one of the oldest forms of human activity. Let everyone so afflicted find out all there is to be known about how competitive struggles are won, how to conduct such a struggle, what the chances are for success, etc. It is the writer's belief that a great deal of the futile competitive effort would be eliminated, not by some outside agency, but by the very perpetrators of such activity. The general theory back of the suggestion is the same as the theory which would lead us to conclude that, if an ordinary business man of violent temper would make a study of prize fighting, he would not climb into the ring with the well known Mr. Tunney. Mr. Tunney is not only physically able to fight, *but he knows how to fight.*

Robert E. Kinkead,
Consulting Engineer.

Cleveland, Feb. 2.

Tool Steels, Small Tools and Other Supplies Exhibited at Bridgeport

A cooperative exhibit held under the auspices of the Salesmen's and Purchasing Agent's Association at the Pyramid Mosque, Bridgeport, Conn., was well attended. There were more than 80 exhibitors, and the displays included representative lines of small tools, tool and die steels, non-ferrous products, plating equipment, electrical apparatus, belting and other factory supplies. The attendance was from a comparatively wide area.

Cooperating organizations included the Manufacturers Association of Bridgeport and the Chamber of Commerce. Officers of the Salesmen's and Purchasing Agent's Association are: H. J. Behn, Hunter & Havens, president; A. H. Jones, Bryant Electric Co., vice-president; W. B. Osborne, Bussman Mfg. Co., secretary; and R. T. Phipps, Bullard Machine Tool Co., treasurer, all of Bridgeport.

Articles of Agreement for Flat Rolled Steel Association Completed

Pittsburgh, Feb. 27.—G. H. Charls, E. T. Sproull and A. N. Flora, who are to be active executives of the National Association of Flat Rolled Steel Manufacturers have completed the articles of agreement whereby the National Association of Sheet and Tin Plate Manufacturers, the Hot-Rolled Strip Steel Institute and the Cold-Rolled Strip Steel Institute become one organization, and there now remains merely the ratification of the plan by the three organizations to make the merger effective.

February Iron Output Gains Decidedly

Estimates, Collected by Wire, Make Daily Rate 7067 Tons or 7.6 Per Cent More Than January—Net Gain of One Furnace

ESTIMATES of the February pig iron production, gathered by wire on Tuesday, Feb. 28, reveal a decided increase over January. Producing companies estimated the output for the last two or three days and calculations for only two companies were made in this office. The production of coke pig iron last month was approximately 2,889,500 gross tons or 99,640 tons per day for the 29 days. This compares with an actual production of 2,869,761 tons or 92,573 tons per day in January. The February increase therefore is 7067 tons per day or 7.6 per cent.

These preliminary returns indicate that there was a net gain for the month of only one furnace—six were blown in and five were shut down—making the number operating at the end of the month 186. The gain was all in steel-making furnaces. The Steel Corporation blew in six and blew out one furnace. Two independent steel companies and two merchant stacks were shut down. Thus the net gain was three furnaces for the steel-making companies, six blown in and three blown out.

Actual data for the February output will be published in THE IRON AGE, March 8. The table gives the estimated production by districts for February and the actual output for the three preceding months.

Pig Iron Production by Districts, Gross Tons

	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)
New York and Mass.	203.800	203.715	199,726	212,778
Lehigh Valley	75,700	72,639	74,316	75,748
Schuylkill Valley....	43,900	43,946	44,238	53,269
Lower Susq. and Lebanon Valleys..	29,000	30,338	32,289	30,150
Pittsburgh district...	598,100	582,497	523,875	495,005
Shenango Valley....	87,900	77,023	58,982	64,752
Western Penna.	86,800	89,372	92,774	92,000
Maryland, Virginia and Kentucky.....	89,300	94,590	92,981	91,300
Wheeling district....	118.200	108,188	114,030	110,055
Mahoning Valley....	260,500	247,371	222,572	223,617
Central and Northern Ohio..........	294,100	313,697	295,179	306,395
Southern Ohio......	25,300	32,480	32,413	32,750
Illinois and Indiana..	637,800	608,771	537,892	508,545
Mich., Minn., Mo., Wis., Colo. and Utah	131,500	134,718	140,141	126,287
Alabama	202,800	224,132	227,775	219,478
Tennessee	4,800	6,284	6,572	6,247
Total	2,889,500	2,869,761	2,695,755	2,648,376

EMPIRE OFFICERS NAMED

New Sheet Company, Formed by Merger of Six Ohio Mills Completes Organization

W. H. DAVEY

The Empire Steel Corporation, Mansfield, Ohio, completed its organization the past week and unified control of the six Ohio sheet mill plants that have been merged will become effective March 1. The companies merged include the Mansfield Sheet & Tin Plate Co., Mansfield; the Ashtabula Steel Sheet Co., Ashtabula; the Empire Steel Co., Cleveland; the Falcon Steel Co., Waddell Steel Co. and the Thomas Sheet Steel Co., Niles.

The selection of W. H. Davey, president of the Mansfield company, as president of the new company, was previously announced. Other officers have been chosen as follows: Vice-president, J. D. Waddell, president Waddell company; treasurer, W. R. Jenkins, secretary Mansfield company; secretary and director of purchases, A. I. Davey, vice-president Mansfield company; general manager, Samuel Davey, second vice-president and general manager Mansfield company. The executive committee consists of H. S. Pickands, Pickands, Mather & Co., Cleveland; W. A. Thomas, one of the owners of the Thomas Sheet Steel Co., and Mr. Waddell, Mr. Jenkins, W. H. Davey and A. I. Davey. Finances will be in charge of a special committee consisting of W. H. and Samuel Davey, C. S. Thomas, former chairman of the board of the Thomas company; A. H. Wheatley, president Empire Steel Co., and Paul Wick, vice-president Falcon company. The executive and sales headquarters will be at Mansfield. Branch sales offices will be located in Detroit, Cleveland, New York, Philadelphia and Chicago.

The Empire company will have at its Mansfield plant open-hearth capacity for about one-half of its sheet bar requirements and will purchase the remainder, about 200,000 tons a year, in the open market. The products of the six mills will include all grades of sheets except galvanized. However, it is planned to convert one of its buildings into a plant for manufacturing galvanized sheets.

W. H. Davey, president of the new company, who took a leading part in bringing about the merger, has been prominently identified with the sheet steel industry for many years. He was vice-president and general manager of the Massillon Rolling Mill Co., Massillon, for some time, and was one of the organizers in 1914 of the Central Steel Co., Massillon, the two companies later being combined. In that year he went with the National Rolling Mill Co. at Mansfield as president, and reorganized it as the Mansfield Sheet & Tin Plate Co. He continued as president and treasurer of this company. Mr. Davey gained his first experience in the steel industry in Gloucester, England, with the Hawkwell Tin Plate Works, where he became a heater. Coming to this country, he was employed by the United States Iron & Tin Plate Mfg. Co., McKeesport, Pa., now the McKeesport Tin Plate Co., and became mill superintendent of the latter company. Later he was general superintendent of the McClure Tin Plate Co., Washington, Pa., now the Washington Tin Plate Co., Before going to Massillon he was superintendent of the Carnaham Tin Plate Co., Canton. Mr. Davey has had five brothers associated with him in the operation of the Mansfield plant, two of whom are officers in the new company.

C. H. Stamm has been appointed general sales manager and manager of service of the Empire Steel Corporation. He had been in charge of service for the Mansfield Sheet & Tin Plate Co., having been connected with that company since its organization in 1915. Previously he was with the Carnahan Tin Plate

(*Concluded on page* 642)

Iron and Steel Markets

Sharp Increase in Pig Iron Output

Month, However, Shows Net Gain of Only One Active Furnace—Advance in Plates, Shapes and Bars Drives in Business at Previous Price—Automobile Production Expands

A GAIN of 7.6 per cent in pig iron production in February, as indicated by estimates telegraphed to THE IRON AGE, compares with an increase of 6.4 per cent reported in the previous month. Analysis of the returns, however, shows that there was only one more furnace in blast at the close of the month than on Feb. 1, as against a gain of 16 furnaces in January.

There was an actual decline in the number of merchant furnaces and in independent steel company stacks, the Steel Corporation alone accounting for the increase. That company blew in six furnaces in February and shut down one, while the four other stacks put out were evenly divided between independent steel makers and producers of merchant iron. Although the daily rate of pig iron production for the month, at 99,640 tons, is the largest since June, 1927, it is the smallest for any February since 1922.

The blast furnace returns give fresh emphasis to the uneven character of the recent improvement in business. Increased pig iron requirements have been preponderantly for steel-making purposes, and the gain in steel works operations has been heavier in Steel Corporation than in independent plants.

Territorially, also, conflicting tendencies in the steel market are becoming more sharply defined. Activity is most pronounced in the Chicago district, where specifications still exceed shipments and production has been pushed up from 93 to 95 per cent of capacity. In Ohio, where the bulk of current tonnage is coming from the automotive industry, shipping orders are also in good volume, although total specifications for the month were slightly smaller than in January. The market situation is less favorable at points east of Cleveland, being quietest on the Eastern seaboard, where specifications against first quarter contracts continue to lag and little new business has appeared.

From the standpoint of commodities likewise a uniform market trend is lacking. The recent gain in mill operations is to a large extent attributable to bookings in the heavier rolled products. The second advance since Jan. 1 in plates, shapes and bars, announced last week by the Steel Corporation—putting prices up $1 a ton to 1.90c., Pittsburgh, and proportionately higher levels at other basing points—has been followed by most mills. The principal immediate effect of this price increase was to cause buyers to cover their forward needs, in some cases well through the second quarter, at the previous price, or 1.85c., Pittsburgh. This figure, however, represents a $2 a ton advance over the price at which consumers specified so heavily in December. Cold-rolled strip is also showing signs of strength, with mills booking sizable tonnages for second quarter at an advance of $3 a ton above prices ruling on first quarter shipments.

For other products higher prices are still largely untested. Some business in automobile body sheets has been taken for April shipment at 4.15c., but there has been little second quarter contracting. Current orders for galvanized and black sheets, notably at Cleveland and Philadelphia, have brought out concessions of $2 or more per ton. Even on sheet contracts that have been closed for next quarter the firmness of prices will not be disclosed until the time comes for specifying.

One cause for concern in sheets, as well as in wire nails and some other commodities, is the heavy commitments made at lower prices. It is pointed out that jobbers in sheets and nails who covered at low figures are now in a position to meet or even underquote current mill prices. To what extent the generous purchases that preceded price advances anticipated forward requirements is still an unanswered question. It is believed, however, that unfilled orders of leading steel companies, as of March 1, will show little increase, and possibly a decline.

Steel production, as a whole, continues to hold its recent gains, and the operations of Steel Corporation plants are unchanged at 90 per cent of capacity for the third consecutive week. The chief hope for a further expansion in demand lies with the automobile industry. Makers of cheaper motor cars, with the exception of the Ford Motor Co., are operating at a high rate. The March schedule of the Chevrolet Motor Co. calls for 127,000 units, as compared with 72,000 in November. Employment in Detroit shows a gain of 13,500 as compared with a year ago.

Structural work is enlarged by inquiries for 24,000 tons, including 8000 tons for a garage in Chicago, and awards in the week were about 22,000 tons.

The Chicago, Milwaukee, St. Paul & Pacific Railroad has inquired for 4650 freight cars, the Pacific Fruit Express has ordered 2000 refrigerator cars and the Fruit Growers Express will buy 1200 steel underframes for cars. The Union Pacific has bought 23 locomotives.

The 1928 Lake Superior iron ore season has opened with an inquiry from the Ford Motor Co. for 443,000 tons, about 10 per cent more than this company bought last year.

Buying of pig iron, principally for second quarter, continues fairly active at Cleveland, where sales were 37,000 tons, and at Chicago, where the total was 35,000 tons. In Eastern markets there is less activity, but 15,000 tons was sold in the New York district.

Exports of iron and steel products in January were 205,766 gross tons, the highest total since January, 1927. Imports declined to 58,635 tons from 64,188 tons in December.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 28, 1928	Feb. 20, 1928	Jan. 31, 1928	Mar. 1, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.26	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	21.00
Basic, Valley furnace	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, Seaboard	100.00	100.00	100.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh	44.00	44.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.80	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	1.95	1.95	1.95	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	1.95	1.95	1.95	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	1.95	1.95	1.95	2.00
Beams, New York	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Feb. 28, 1928 Cents	Feb. 20, 1928 Cents	Jan. 31, 1928 Cents	Mar. 1, 1927 Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.80	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	2.65	2.65	2.55	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.60	2.60
Plain wire, Pittsburgh	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.45	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.25	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$14.75*	$15.00	$14.75	$16.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	*12.75*	13.00	12.50	12.75
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila	15.00	15.00	15.25	17.00
No. 1 RR. wrot. Ch'go (net)	*11.00*	11.50	11.00	12.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.60*	$2.75	$2.60	$3.50
Foundry coke, prompt	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*14.20*	14.25	14.25	13.50
Electrolytic copper, refinery	*13.75*	13.82½	13.87½	13.12½
Zinc, St. Louis	*5.45*	5.47½	5.67½	6.82½
Zinc, New York	*5.80*	5.82½	6.02½	7.17½
Lead, St. Louis	*5.90*	6.07½	6.30	7.32½
Lead, New York	*6.15*	6.32½	6.50	7.40
Tin (Straits), New York	**51.75**	51.50	54.62½	69.62½
Antimony (Asiatic), N. Y.	*10.25*	10.87½	11.25	13.50

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Production and Shipments of Steel Holding Up—$1 Advance on Heavy Tonnage Products

PITTSBURGH, Feb. 28.—The production and movement of steel are holding up to the recent rate, with the automotive industry showing particular urgency in getting supplies and a high rate of activity is noted among those serving that industry. The steel requirements for building and construction and for standard-section rails also are contributing in an important way to the maintenance of an 80 per cent operation of steel-making capacity and to some extent the agricultural implement industry is helping the production of this and nearby districts. Other major consuming sources are below the average, this being particularly true of pipe for the oil industry. The situation would be rounded out with a better distribution of the production, but the essential thing is that the industry is making a satisfactory showing as to volume. Some of the extreme cheerfulness of the early weeks of the year has passed, as the trade reviews the experiences of the first two months and takes cognizance of the fact that general business is not measuring up to some expectations.

The advance on bars, plates and shapes of $1 per ton last week by the leading producer, and since adopted by others, is being watched very closely by manufacturers for its reaction among the consumers. In view of the fact that tonnage buyers were given opportunity to add to their commitments and as they were already covered to the end of this quarter, it is obvious that a good deal of second quarter tonnage will be shipped at not over 1.85c. While steel manufacturers are desirous of getting more profitable prices, they are not overlooking the possibility that too stiff an advance might bring price resistance. Something has been accomplished by last week's advance, however, seeing that manufacturers have definitely established the second quarter price at 1.85c., as against 1.80c., the ruling contract price for this quarter.

Some contracts for second quarter in sheets and strips are being written at the higher prices recently announced, but the proof of the firmness of makers will hardly be demonstrated until the time comes for specifications on these contracts. There was, as has been pointed out from time to time, so much coverage for this quarter at lower prices that the advances could not become immediately effective. Jobber competition with mills on nails and sheets has been made possible through the fact that jobbers covered at low prices and now can resell profitably at current mill quotations or less.

Primary materials still are very dull. Interest has rarely been lower in pig iron. Scrap dealers point out that their sales are smaller with the steel industry producing ingots at 80 per cent of capacity than they were when the steel output was lower. The fuel situation is as depressed as ever, because even the production formerly rated as light is more than ample for requirements.

Pig Iron.—Business still drags and there is nothing to encourage ideas of early improvement because of the fact that important melters quite generally have stocks or protection against their requirements for the next month or two, and some for an even longer period.

Shipments are steady and in good volume and, since consumers are not stocking to any great extent, the natural conclusion is that the melt is increasing. Steel foundries in the district are having a better operation than they had over the latter part of last year, but are not so busy that they could not take on more business. Gray iron foundries still are operating at a rather low rate, but the sanitary ware and radiator companies appear to be doing well. Current sales of all grades run largely to single carloads at unchanged prices. The Westinghouse Electric & Mfg. Co. inquiry is still open; there is an impression that the business will be awarded upon a reciprocity basis.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Sustained operations of steel works is responsible for a steady flow of specifications for the commonly-used ferroalloys. New business amounts to little, since so few consumers failed to contract for supplies. Prices are unchanged.

Semi-Finished Steel.—There is a good movement of billets, slabs and sheet bars, but no activity in the market apart from the specifications of non-integrated makers of sheets, tin plate and strips. Makers of wire rods are all quoting $44, base Pittsburgh or Cleveland, but sales at that price are few and small.

Bars, Plates and Shapes.—The advance of $1 a ton announced last week by the Carnegie Steel Co., putting these products to 1.90c., base Pittsburgh, since has been adopted by other producers, but in most cases it seems to have been preceded by a good deal of covering of buyers through the second quarter at the old price and not much business has been written at the higher figure. The makers of these products are desirous of getting prices to a profitable basis, but at the same time are aiming to create a minimum of price resistance. An interesting feature of the latest announcement by the Carnegie Steel Co. is the reference to the fact that for small lots there is an extra of $2 a ton. The last previous announcement, Jan. 19, last, contained no reference to small-lot prices. A good deal of plate business is in sight in river barges, but structural steel fabricators are not figuring on as much business as they could handle. Activity in cold-finished steel bars is reflected in the specifications for hot-rolled bars.

Rails and Track Supplies.—Business still is slow in track accessories, railroads apparently waiting on weather sufficiently open for rail-laying before ordering spikes, tie plates, etc. The local maker of standard-section rails is well supplied with business and is producing actively against its orders. Light-section rails are slow.

Wire Products.—Suggestions that the second-quarter price for nails would be $2.85, base per keg, Pittsburgh, and that on plain wire $2.70, base, per 100 lb., or $4 per ton advance over present prices are not taken seriously by manufacturers or jobbers. Manufacturers are somewhat concerned over the situation in nails, which are not moving into consumption in nearly as heavy volume as they are going from the mills, and it is a question whether further advances could be sustained in view of the large stocks and the protection given to jobbers. There is also the consideration that jobbers can sell profitably at lower than today's mill prices, plus the new card of extras, while retailers seem to be in no hurry to stock against later demands. The flow of orders for wire products, chiefly specifications against contracts, is steady and is sustaining a mill operation of between 65 and 75 per cent of capacity.

Tubular Goods.—Pipe mills still are getting more business in standard-weight or buttwelded pipe than in lapwelded goods, and shipments of former so far this year are running some 4 or 5 per cent smaller than in the same period last year. Production of oil is running lighter, but stocks above ground still are too bulky for the market to strengthen sufficiently to encourage drilling operations. California still is the most active field in drilling. Pipe line projects are numerous and involve large tonnage, but only a few have reached the mills for bids. Fair demand is noted for locomotive boiler tubes, and mechanical tubing is doing well. Prices of all kinds of tubular goods still are a little irregular.

Sheets.—Buyers still are specifying freely against old orders for sheets and there is a fair amount of contracting for second quarter tonnages, more particularly, however, on the part of automobile builders, who are preparing for an active second quarter in production and do not want to be caught short. Resistance to paying 4.15c., base, for body sheets, which compares with 4c. on first quarter tonnages, appears to be subsiding, and local mills do not find buyers unwilling to go along with the higher prices. Business continues better in the Central West than here or in the East.

Tin Plate.—Specifications against contracts are good and quotas for April shipment, which have been coming in since Feb. 15, are well up to expectations. New business is small. The Texas Co.'s inquiry for 100,000 boxes of oil can sizes and the Japanese inquiry for 60,000 boxes have not been closed, but the former is expected to go to the two companies which have had that company's business in recent years.

Hot-Rolled Flats.—Some second quarter business has been written at the higher prices announced earlier in the month and all makers appear to be holding to these prices. Meanwhile, buyers are specifying well against contracts for this quarter carrying lower prices and makers have obligations sufficient to provide a fairly high operation of mills.

Cold-Rolled Strips.—Makers are shipping freely on old and lower-priced obligations and meanwhile are writing a goodly amount of second quarter business at an advance of $3 a ton. Apparently they have encountered no serious resistance from buyers.

The Iron Age Composite Prices

Finished Steel

Feb. 28, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.336c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Feb. 28, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.67
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrom Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Old Material.—There is almost no consumer interest in scrap. Dealers, not being pressed for deliveries, are not giving the market much support by purchases against short sales. Heavy melting steel still is quoted at from $14.50 to $15, but it is so hard to find buyers at the higher figure that dealers have weakened to $14.75 for delivery at one point in the district. The situation in the steel works grades is very puzzling to dealers, who find consumers no more interested in supplies with steel production at 80 per cent of capacity than they were when operations were much lower. Heavy breakable cast is not overly strong at current quotations, as one important user has held up shipments. Steel foundries have paid $17.25 for railroad specialties. The March Baltimore & Ohio list is small, containing only 9870 gross tons, or little more than half of the previous list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$14.50 to	$15.00
Scrap rails		14.50
Compressed sheet steel	14.00 to	14.25
Bundled sheets, sides and ends	13.00 to	13.25
Cast iron carwheels	14.50 to	15.00
Sheet bar crops, ordinary	15.00 to	15.50
Heavy breakable cast	13.50 to	14.00
No. 2 railroad wrought	15.00 to	15.50
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings		11.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	16.75 to	17.25
Railroad coil and leaf springs	16.75 to	17.25
Rolled steel wheels	16.75 to	17.25
Low phosphorus billet and bloom ends	18.50 to	19.00
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings		11.00
Short mixed borings and turnings		11.00
Cast iron borings		11.00
No. 2 busheling	10.00 to	10.25
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	15.00 to	15.25
Malleable Grades:		
Railroad	14.50 to	15.00
Industrial	14.00 to	14.50
Agricultural	13.50 to	14.00

Cold-finished Steel Bars and Shafting.—Makers as yet have taken no action in connection with second quarter prices. Buyers are not showing interest in supplies that far ahead and there is probably some delay to see how well the latest advance in hot-rolled bars is maintained. Specifications on contracts for this quarter are coming in freely and in a good many cases there is much urgency about shipments. Most of the shipments carry 2.20c. base Pittsburgh, but on new business all makers are quoting $2 a ton more.

Alloy Steel Bars.—In view of the fact that hot-rolled bars have become established at an advance of $2 a ton over the prices of late last year and that in the meantime there has been no change in alloy bars, some makers of the latter are considering making an effort to get higher prices on second quarter business.

Bolts, Nuts and Rivets.—Business in bolts and nuts is not showing the expansion that was expected by this time. Not much railroad car business has been taken by Pittsburgh district builders and car work is one of the chief dependencies of local producers. Jobbers are taking small lots steadily. Rivet business still leaves something to be desired. Makers generally are asking more money for small rivets and the common quotation now is 70 and 10 per cent off list.

Coke and Coal.—Spot furnace coke has weakened again in the past week and, while there is still a quotation of $2.75 net at ovens, buyers do not have to shop much to find supplies at 10c. to 15c. a ton less. Indeed, most of the recent business has been at $2.60 to $2.70. Spot foundry coke holds at the recent range of prices, with supplies quite ample. The coal market shows neither life nor strength.

Warehouse Prices f.o.b. Pittsburgh

	Base per Lb
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Two Shop Meetings Planned

Announcement has been made of two meetings devoted to machine shop practice topics—one at Chicago, March 14, and the other at Newark, N. J., March 28.

The Chicago meeting, under the auspices of the Chicago section of the American Society of Mechanical Engineers, will be held at the Morrison Hotel. Papers include: "Development of Fully-Inclosed Gear Drives for Industrial Speed Reduction," by J. A. Marland, engineer W. A. Jones Foundry & Machine Co., Chicago; "Special Machinery for Mass Production," by H. L. Blood, chief of machine design division, Western Electric Co., Chicago; "Production of Pressed Steel Frames by Automatic Machinery," by John P. Kelly, sales manager A. O. Smith Corporation, Milwaukee; and "Stopping Production Leaks Through a Simplified Production Control," by K. R. Wood, works manager Bell & Howell Co., Chicago. "The Relation of Chromium Plating to Industries and the Truth About Its Value and Application" is the title of a paper to be presented by Dr. J. Becker, chief research chemist Vacuum Can Co., Chicago.

The Newark, N. J., meeting, sponsored by the machine shop practice division of the A. S. M E., will be devoted to the design and building of jigs and fixtures. It will be held at the Y. M. C. A. building, 107 Halsey Street, and will be preceded by a dinner. F. P. Hutchinson, chief of tool design Western Electric Co., Kearny, N. J., and Harry Pound, assistant chief tool designer International Motor Co., Plainfield, N. J., will be speakers. W. F. Dixon, works manager Singer Mfg. Co., Elizabethport, N. J., will preside.

American Rolling Mill Co. Earnings Off

The American Rolling Mill Co., Middletown, Ohio, and its subsidiaries, exclusive of the Columbia Steel Co. and the Norton Iron Works, Inc., for the year ending Dec. 31, 1927, had net income after all charges of $3,748,654. This compares with net income of $4,065,050 in 1926. Total surplus as of Dec. 31, 1927, was $12,789,160, comparing with $12,432,390 at the close of 1926.

George M. Verity, president, in his annual report, declared that the volume of business during the first half of 1927 was satisfactory, but in the last half there was a distinct falling off. This is emphasized by the fact that the net earnings for the first six months were $3,001,209, as compared with $2,329,038 for the same months of 1926.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Western Mills Advance Plates, Shapes and Bars to 2c., Mill

CHICAGO, Feb. 28.—Events of the week in the Chicago steel market center mainly around the price situation. Plates, shapes and soft steel bars have been advanced $1 a ton to 2c., Chicago. Acceptance by the trade of the new quotations is still somewhat in doubt, especially on plates and shapes, while on bars new sales appear to have established the advance. Many consumers are still specifying against 1.90c. steel and, not having had occasion to take advantage of the 1.95c. price, are raising objection to the more recent 2c. quotation. Producers are apparently firm in their intention to hold current purchases and second quarter business at the new levels.

A general average of ingot production strikes only a shade under 95 per cent of capacity, an advance of two points in the week, and specifications still continue to exceed output. If rails and track accessories are included, new buying is on a par with shipments; however, taking into account only the heavy tonnage finished steel products, new purchases show a decline from a week ago. There are no direct indications that consumptive demand has dropped off to any marked degree. Second quarter contracts are few.

Pig Iron.—Purchases in the week for second quarter and prompt delivery are in excess of 35,000 tons, and fresh inquiry indicates that the buying of iron for future delivery will be well sustained. A user north of Chicago has taken 5000 tons and two buyers, one in Wisconsin and one in Michigan, have placed orders for 2500 tons each. Prices for Northern foundry iron are steady at $18.50, local furnaces. Some unsteadiness is apparent in the charcoal iron market. Sales of Southern iron are small. Several spot inquiries for silvery are noted and carload sales made during the week indicate that the present price schedule is being maintained. Gains in shipments are most noteworthy in the case of malleable foundries.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for ferrosilicon are heavy. A consumer has made inquiry for 100 tons for early delivery, but to date has refused to accept the spot quotation of $87.50, delivered. Several orders have been placed for spiegeleisen. Fifty tons or less brings $32, Hazard, Pa., but a purchase of 100 tons of the 19 to 21 per cent grade was taken at less than $31.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Producers in the Chicago district have followed the leading interest in advancing plate prices to 2c. for lots of 100 tons or more and to 2.10c. for smaller tonnages. These prices are effective on all current business and they mark the opening of books for the second quarter. Plate mill backlogs are steady as incoming business balances shipments. Deliveries range from four to six weeks. The Pacific Fruit Express has placed orders for 2000 refrigerator cars, half to be built by the Pacific Car & Foundry Co. and half by the Pullman Car & Mfg. Corporation. This business will require close to 20,000 tons of steel, of which 10,000 tons will be furnished by Chicago mills. Over 50,000 tons of plates, shapes and bars will be needed for the 4650 cars now being inquired for by the Chicago, Milwaukee, St. Paul & Pacific. The Roxana Petroleum Corporation has bought 1500 tons of plates for four 80,000 bbl. oil storage tanks. Fresh inquiry from oil producers totals close to 7000 tons of tankage material. The plate market in this district is in a healthy condition, though it may be several weeks before a real test of the new prices will come.

Mill prices on plates per lb.: 1.95c., base Chicago.

Structural Material.—This market remains active. The American Bridge Co. has taken 6000 tons and the Milwaukee Bridge Co. 1400 tons for the Sixteenth Street viaduct, Milwaukee. A local fabricator has taken 600 tons for an apartment building. The Central States Bridge Co. is low bidder on 3000 tons for a department store at Indianapolis. New projects total over 8000 tons, including 3500 tons for the Austin, Ill., high school and 1500 tons for an industrial building at Ottawa, Ill. Fabricators look for the early award of the 4000 tons required for the Steuben Club, Chicago. All local producers have announced the opening of second quarter books on structural material at prices that range from 2c. to 2.10c., the latter applying on orders for less than 100 tons. These prices take effect immediately but in the four or five days in which they have been quoted sales have not been large and it is generally admitted that further tests are needed to establish the market at the new levels.

Mill prices on plain material per lb.: 1.95c. to 2.10c., base, Chicago.

Bars.—A feature of this market is the unusual demand for soft steel bars by automobile plants and manufacturers of accessories. The Chevrolet schedule for March is said to be 127,000 cars. Farm machinery manufacturers are heavily engaged, especially in tillage equipment. Road machinery builders are rounding out an active winter season and give promise of sustained activities as they enter their heavy selling period. New prices for soft steel bars, 2c. to 2.10c., Chicago, appear to be established. Deliveries are steady at four to six weeks. Prices for alloy steel bars are firm and it is reported that advances are being considered by producers. Local alloy bar mills are engaged at close to capacity. Specifications exceed shipments and deliveries are being extended. Iron bars have been advanced to 2c., Chicago, not because of the favorable position of producers but rather to bring prices for this commodity in line with the new quotation on soft steel bars. Bar iron order books are light and current shipments are small. Rail steel bar rollers have opened books at 1.85c., Chicago Heights mills, for second quarter delivery. Meanwhile orders will be accepted for delivery up to March 31 at 1.80c. Order books in hard steel bars are the best in several months and specifications are running ahead of shipments. Both rail steel bar mills are operating double turn.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.10c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Cast Iron Pipe.—Detroit has closed for 2000 tons of 24-in. pipe at prices that were within a few cents of $30, Birmingham. James B. Clow & Sons took 600 tons, the National Cast Iron Pipe Co. 400 tons, and the American Cast Iron Pipe Co. 1000 tons. The only new inquiry of note this week comes from Rockford, Ill., where prices are being asked on 500 tons of 6-in. to 24-in. pipe and 35 tons of fittings. C. J. Ryan has been awarded a general contract by Elmhurst, Ill. Although pipe business now before the trade is not large, it is generally understood that a number of municipalities are shaping their requirements and that as spring opens this market will show satisfactory activity. Deliveries average 30 days and prices are steady at $29.50 to $30, Birmingham, for 6-in. and larger diameters.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $37.70 to $38.20; 4-in., $41.70 to $42.20; Class A and gas pipe, $4 extra.

Rails and Track Supplies.—Six Western railroads have placed orders for a total of 35,000 tons of standard-section rails. Although local mills look forward to additional orders for rails, the amount cannot be large for the reason that the major buying movement for delivery in the spring and early summer is practically completed. Rails purchased in the buying movement now closing are reported at close to 2,000,000 tons for the entire country. This is about equal to the tonnage placed during the corresponding period a year ago. Several railroads have ordered a total of 15,000 tons of track accessories and definite inquiry is before the trade for an additional 15,000 tons. Output of accessories is proportionate to rail production, which now stands at 90 per cent of mill capacity. The light rail market is dull.

Wire Products.—Little change is noted in this market. Irregularities in quotations still occur here and there, but they are not of sufficient importance to disturb the general price structure. Wire mill operations are variously estimated at between 72 and 75 per cent of capacity. Specifications and new orders are heavier than shipments and deliveries of some wire products are lengthening. Orders from jobbers in the South are particularly good. The trade in the Northwest is marking time, but producers are hopeful that business in that territory will improve with the end of winter weather. Demand from the manufacturing trade is steady. Current requirements for fencing by the railroads are not large.

Sheets.—Local hot mills are heavily engaged and, with specifications running well ahead of shipments, deliveries have been extended to four to six weeks. A fair volume of second quarter business has been added to producers' books. Current prices are firm at 3.90c., Chicago, for galvanized, 2.35c. for blue annealed sheets 40 in. and wider and 2.25c. for narrower, and 3.05c. for black sheets. A few orders have been received this week from the Northwest, a territory that has been very dull since early last fall. Car builders are ordering out roofing sheets and a good tonnage is being taken for oil tank roofs. Distribution of sheets by warehouses is small.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications have shown further improvement, especially from the railroads and manufacturers of railroad equipment. Local sellers are expecting the contracting period for second quarter to open in the next week or 10 days. Prices on practically all of these commodities are strong, this being true especially of stove bolts.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Reinforcing Bars.—New projects continue to come out faster than awards are made, and while estimators are kept busy shop operations are at less than 50 per cent of capacity. The State hard road program is shaping rapidly and several general contracts have been placed. It is reported that only a small tonnage of reinforcing steel will be required for the Chicago Daily News Building. Quotations on billet steel reinforcing bars out of Chicago warehouses range from 2.35c. to 2.75c. On the ordinary run of business in rail steel bars 1.80c. is asked and on bridge and culvert work 1.95c., Chicago Heights mills, is quoted. Recent awards and new projects are shown on page 641.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Coke.—Shipments of by-product foundry coke so far in February are in excess of the total for January. As this commodity is not stocked by users but is ordered out as required, it gives an accurate reflection of foundry melt. Prices are firm at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—A consumer has taken 10,000 tons of heavy melting steel at $13 a gross ton, delivered. Dealers, who are having some difficulty in covering old orders, are paying $12.50 to $13, depending on the grade sought and the destination. Malleable and cast grades are accumulating and they are not only difficult to sell but hold-up orders are of common occurrence. Low phosphorus grades are coming out faster than consumption demands and cast iron borings are still slow. Prices for the latter grade are sagging. Included among railroad lists are 7800 tons by the St. Paul, and 5000 tons each by the Burlington, Illinois Central and the Missouri Pacific.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to 14.75
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.25 to 15.75
Railroad tires, charging box size	16.50 to 17.00
Railroad leaf springs, cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	15.50 to 16.00
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	13.00 to 13.50
Stove plate	11.25 to 11.75
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Puddlers' Wage Rate Unchanged

Puddlers in Mid-Western mills operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel & Tin Workers, will receive for March and April $11.05 per ton for boiling iron, unchanged from the rate paid in January and February. Finishing hands will be paid the same rates as the first two months. At the bi-monthly examination of sales sheets last week, the average selling price of bar iron shipped the 60 days ending Feb. 20 was disclosed as $1.85 per 100 lb., or unchanged from the average of two previous months.

Cleveland

Steel Bookings for February Decline—Ford Inquires for 443,000 Tons of Ore

CLEVELAND, Feb. 28.—Independent mills have followed the Carnegie Steel Co. in advancing steel bars, plates and shapes $1 a ton to 1.90c., Pittsburgh, and Cleveland bar mills have made a similar advance on steel bars to 1.90c., Cleveland. A few contracts have been taken at the new price. While steel specifications continue in good volume, February bookings will fall slightly below those of January.

Orders for steel bars, plates and shapes are now nearly all against 1.80c. contracts, as buyers generally covered before the advance to 1.85c. Several of the Michigan automobile and parts makers are inquiring for steel bars, sheets and strip steel for deliveries into or through the second quarter. Some business is reported to have come from that source in sheets and strip steel at the new prices. The Ford Motor Co., which expects to get on a daily production schedule of 1250 cars in March, has inquiries out for steel in various forms for early requirements.

Business in the structural field is coming out in satisfactory volume, but in spite of the recent improvement competition is unusually keen and some of the prices that have been named recently for fabricated work are said to be the lowest in several years. An inquiry is pending for 1500 tons of sheet steel piling for the Union Terminals project for work awarded to the Bates & Rogers Construction Co. The Wheeling & Lake Erie Railroad is inquiring for 12,000 tie plates.

Some business in auto body sheets has been taken for April shipment at the regular 4.15c. price, but little business has so far been done in second quarter contracts. Black and blue annealed sheets continue to move well in specifications against contracts, but there is not much tonnage in current orders. The demand for galvanized sheets continues slow and these show no tendency to strengthen. Concessions of $2 or more a ton from 3.75c., Pittsburgh, appear rather common.

Pig Iron.—The market continued active during the week with sales aggregating 37,000 tons by Cleveland interests, compared with 53,000 tons during the previous week. Of the total, approximately 10,000 tons was for shipment to the Eastern territory. The remaining activity was largely centered in Michigan, although there was some buying in Cleveland and other parts of the northern Ohio territory. Sales generally were for second quarter. Inquiry is less active. The market has a fairly firm tone and one Lake furnace producer, which recently advanced its price on foundry and malleable iron to $17.50 has been able to take some business on that basis, though $17 is the more common quotations and that is still being shaded to $16.75 for shipment to some competitive points. In Michigan the market is holding at $18. February shipments will be about the same as in January, being heavy to the automotive industry and fair to other consumers.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Fluorspar.—The gravel fluorspar market has a firmer tone and a leading producer has advanced this grade 50c. a ton to $15, at which it sold 3000 tons to a Pittsburgh district consumer. Another sale of 1000 tons was made to a Cleveland mill.

Iron Ore.—An inquiry for 443,000 tons of iron ore has been sent out by the Ford Motor Co., which is 10 per cent more than this company purchased last year. Its inquiry includes 286,000 tons of basic ore, 66,000 tons each of manganiferous and high phosphorus and 25,000 tons of silicious ore. The Ford company is the largest open market ore buyer and several times the season's prices have been established by this company's purchases. It may be several weeks before ore firms submit bids to the Ford company. Other consumers are showing little interest in the market and producers have not given prices serious consideration. Indications point to the reestablishment of the 1927 prices, which also prevailed during the two previous years.

Strip Steel.—Not much new business in hot-rolled strip is coming out, but specifications against low-priced contracts are holding up well. While mills are quoting the recently named higher prices, there has been no real test of these prices on round-lot business. Cold-rolled strip is moving in good volume and mills are running close to capacity. Sizable lots are reported to have been taken in the Detroit territory for the second quarter at the new price.

Reinforcing Bars.—Two local awards aggregating 1050 tons were made during the week. Small-lot inquiry is fair. Rail steel bars are unchanged at 1.75c., mill.

Coke.—The price of by-product foundry coke for March is announced at $8, Painesville, or $9.01, delivered Cleveland, the same as prevailed this month.

Semi-Finished Steel.—Specifications which recently fell off somewhat have increased as consumers are sending in orders for their March requirements and the leading local producer is now operating 10 of 14 open-hearth furnaces. As practically all consumers are under contract, there is very little new business. Quotations are unchanged at $33, Cleveland, for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—The demand for bolts and nuts, while fair, has not increased. February orders are larger than January, but not up to February, last year. Automobile companies are specifying quite freely. Rivets are moving slowly. Prices on these products are firm.

Old Material.—The market continues dull, as there is no new consumer demand and mills are still restricting shipments. Consequently dealers are buying little scrap to fill outstanding orders. Production is in excess of the demand, especially of blast furnace scrap. This is due in part to the fact that some of the blast furnaces that were using considerable scrap a few months ago are now using very little. Short shoveling turnings are a drug on the market. Blast furnace scrap has declined 25c. a ton and is now rather freely offered at $10. This is the second reduction in two weeks.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Philadelphia

Plates, Shapes and Bars Advanced $1—Outstanding Quotations Not Withdrawn

PHILADELPHIA, Feb. 28.—Mills have generally followed the recent advance of $1 per ton on plates, shapes and bars, but outstanding quotations at the former prices have not been withdrawn, and one producer of shapes in eastern Pennsylvania is still quoting on the old basis. Specifications against first quarter contracts still lag and but little new business has appeared. February tonnage has been light, but as many consumers evidently overestimated their requirements in January and have been using up this slight excess during the past month, sellers believe that March will see specifications coming in more freely. Meanwhile, another $1 a ton increase in prices on the heavy tonnage products seems to be expected by sellers about the beginning of the second quarter.

Pig Iron.—Current purchasing is principally of foundry grades in small lots and on this business $20 per ton, base furnace, is quite firm. Some inquiry for second quarter delivery has appeared, but as yet there is not a great deal of interest in such contracts, as there will undoubtedly be some tonnage carried over from this quarter. A recent sale of about 100 tons of No. 2X Indian foundry iron is reported to have been made at about 50c. per ton below the eastern Pennsylvania market. The Eastern Foundry Co., Boyertown, Pa., is about to close on 300 to 500 tons of foundry iron. The inquiry of the American Radiator Co. for 2000 tons of foundry iron for Gloucester, N. J., has not been closed. No sales of basic are reported and only occasional carload lots of low phosphorus have been closed lately.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Transactions are largely in specifications against first quarter contracts. Although consumers are slow in taking shipments, they are in most cases promising full specifications against contracts before the end of the quarter and with the new price level of 1.90c. per lb., Pittsburgh, not much tonnage on current contracts is expected to carry over.

Shapes.—Mills are prepared to quote the new price level of 2.05c. per lb., Bethlehem, on new business, but this price is untested. Not all eastern Pennsylvania mills have advanced to the new level, so that the market is quotable today at 2.12c. to 2.18c. per lb., delivered Philadelphia. Specifications are coming in rather slowly and some carry-over of shipments against present contracts into the next quarter seems probable, unless considerable activity develops in the coming month. Not much fabricated business is being awarded, but some sizable projects are in prospect.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.50c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.40c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.25c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Plates.—Eastern Pennsylvania mills have adopted the new price of 2.05c. per lb., Coatesville, or 2.15c. per lb., delivered Philadelphia, but outstanding quotations of 2c. per lb., Coatesville, have not been withdrawn. Consumers are slow in specifying against contracts. Mills seem confident that the second quarter will begin with another $1 per ton increase in prices. The Cruse-Kemper Co., Philadelphia, which was awarded a contract for a 3,000,000-cu. ft. gas holder by the United Gas Improvement Co., has placed about 1600 tons of plates with an eastern Pennsylvania mill.

Sheets.—There is a moderate volume of activity in blue annealed and galvanized sheets and prices continue to show more firmness. Blue annealed sheets continue at 2.10c. per lb., Pittsburgh, with 10c. per 100 lb. extra for wider than 40 in. Black sheets are quoted at 2.75c. to 2.90c. per lb., and galvanized at 3.65c. to 3.75c. per lb., Pittsburgh.

Warehouse Business.—Although February was a short month, its total business compared favorably with January. There is a moderate demand for small lots of structural material from stock and galvanized sheets are fairly active. Business in other products continues light.

Imports.—In the week ended Feb. 25 imports of pig iron at Philadelphia were larger than for several weeks. A total of 1650 tons of pig iron arrived, of which 1559 tons was Indian and 51 tons Dutch iron. Thirteen tons of tungsten ore was received from the United Kingdom. Steel imports consisted of 86 tons of structural shapes and 67 tons of bars from France.

Old Material.—No sizable purchases of scrap are reported to have been made in the past week and prices are substantially unchanged. An eastern Pennsylvania steel company which has been offering $12.50 per ton, delivered, for stove plate and less than $11 per ton for machine shop turnings, has been unable to purchase at these prices, but has not yet paid more. Most grades are rather inactive except for shipments on old contracts, but prices show no downward tendency.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast boring (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	13.00
Stove plate (for steel works)	13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 12.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

Wheeling Steel Corporation Licensed to Use Continuous Sheet Process

Announcement has been made by the American Rolling Mill Co. that the Wheeling Steel Corporation has been granted a license for the full use of all patents owned or controlled by the former covering the continuous rolling of sheets. This is the second company which has availed itself of the license rights, the Weirton Steel Co. having been the first.

New York

Steel Price Advance Not Yet General—Pig Iron Active

NEW YORK, Feb. 28.—Pig iron buying continues in good volume, as evidenced by sales during the week of about 15,000 tons in this district, besides a number of large tonnages placed in New England. The American Tube & Stamping Co. division of the Stanley Works, Bridgeport, Conn., is reported to have closed for 10,000 tons of basic iron, and the Washburn Wire Co., Phillipsdale, R. I., for 5000 tons. The National Radiator Corporation, Johnstown, Pa., which was in the market for 5000 tons of foundry iron, has bought both for its Johnstown and its Trenton, N. J., plants, having placed 1000 tons for the latter. The A. P. Smith Mfg. Co., East Orange, N. J., has closed for 600 tons of foundry for delivery from April through July. The Crane Co., Bridgeport, Conn., has not yet bought against its inquiry for 1500 tons of foundry and malleable. Several other sizable inquiries are still open, and the amount of business pending exceeds 10,000 tons. The approach of the opening of navigation has made competition keener, particularly in territory where Buffalo and eastern Pennsylvania irons are competitive. A round tonnage of Buffalo foundry iron was recently sold in eastern Pennsylvania at $20.89 per ton, delivered. The combination water and rail rate from Buffalo is reported to have been $4.39, made up of $2.50 for barge shipment to Jersey City, N. J., 25c. for handling to freight cars and a railroad freight rate of $1.64 to destination. As low as $19.25, delivered, is understood to have been done on water shipments from outside furnaces to Delaware River points. This competition is making it difficult for eastern Pennsylvania producers to establish their recent advance to $20, base furnace. Prices on Buffalo foundry iron for shipment to this district have generally subsided to $16.50, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—The only new business in ferromanganese and spiegeleisen is the sale now and then of a few carloads for early delivery. Specifications on contract for both ferroalloys, as well as for ferrosilicon or ferrochromium, are reported as quite satisfactory.

Finished Steel.—Not all mills have followed the advance of $1 a ton on plates, shapes and bars announced last week by the Carnegie Steel Co. Some are watching developments, but it seems certain that the advance will become general before the end of this week. Meanwhile, mills are giving preferred customers an opportunity to protect themselves for second quarter on the basis of the former prices. The new level will make New York delivered prices as follows: Steel bars, 2.24c.; shapes, 2.19½c.; plates, 2.22½c. Some of the Eastern plate mills have named 2.05c., Coatesville, although the Bethlehem Steel Co. at this writing has made no announcement of an upward revision of its base prices. In volume of new business the local steel trade is quiet, but specifications against contracts are coming along in a fair way. Some contract customers have not specified in full, which gives ground for the assumption that they were covered on their maximum requirements, which in numerous instances have not been consumed. Except for the coverage on plates, shapes and bars at the prices in effect prior to the Carnegie advance, consumers have taken little interest in second quarter contracts. Sheet buyers are holding off, probably because the market in the East has not taken on the strength reported from the Middle West. Railroad business is disappointedly small both as to railroad companies' own repair and maintenance work and freight car buying.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Quotations on bell and spigot pipe continue to show variation. Birmingham foundries are quoting from $28 to $29 per ton, base Birmingham, but Northern makers are considerably below this level, although on a higher basis f.o.b. their plants because of lower freight rates. Only a small tonnage is pending. Recent purchases have included slightly less than 1000 tons of water pipe by Newark, N. J., from the Warren Foundry & Pipe Co. and about 500 tons of centrifugal pipe by Hartford, Conn., from the National Cast Iron Pipe Co. At the opening of bids Feb. 27, by New York City on about 2000 tons of water pipe, R. D. Wood & Co. were low with the following delivered prices: On 410 tons of 20-in., $36.75; on 510 tons of 12-in. and 890 tons of 8-in., $35.75; on 210 tons of 6-in., $36.75, and on seven tons of 4-in., $39.75 per ton. On 265½ tons of fittings, the Stewart Steel Products Co., New York, was low on 155 tons, Terminal Supply Co., New York, on 60 tons, R. D. Wood & Co. on 37 tons, United States Cast Iron Pipe & Foundry Co. on 11 tons and the Warren Foundry & Pipe Co. on 2½ tons.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Purchasing from stock is beginning to increase. With structural and plate fabricating shops slightly more active on spring projects, continued improvement is expected. Although February was a short month, its total business was larger than that of January. Black and galvanized sheets are less active than a few weeks ago, but prices continue firm.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will furnish 1000 tons of bars for a warehouse in Manhattan. A number of fair size jobs have been let, but the market could hardly be called active. Some distributers have already advanced the mill price $1 a ton to 2c. per lb., Pittsburgh, and others expect to follow this increase before the end of the week. New York and Youngstown warehouse prices are unchanged.

Coke.—Standard foundry coke continues at $4 to $4.50 per ton, Connellsville. Delivered prices are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City, from a local producer and $9.21 to $9.41 per net ton, delivered from a West Virginia operation.

Old Material.—Buying prices of all grades are unchanged with the exception of yard grade of heavy melting steel, which is being generally purchased at $11 per ton, delivered to consumers at Phoenixville, Harrisburg and Pottsville, Pa. Shipments of specification pipe to a Lebanon, Pa., consumer are being delayed, but brokers are still offering $12.50 per ton delivered. No. 1 heavy melting steel is moving to Bethlehem, Steelton, Coatesville and Conshohocken, Pa., and Claymont, Del., at $13.50 per ton, delivered.

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.25 to 7.50
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Birmingham

Southern Mills Follow Advance of $1 on Plates, Shapes and Bars

BIRMINGHAM, Feb. 28.—The pig iron market continues rather quiet. Second quarter inquiries are trickling in, but the movement has not developed to any size. A few sales are reported, but mostly small-lot tonnage. Shipments continue on the same level as the past few weeks and are close to production. Quotations on foundry iron continue on a $16 base. Seventeen furnaces are in blast, nine being on foundry, seven on basic and one on recarburizing iron. Operations have not changed in several weeks.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—Another advance of $1 per ton on plates, bars and structural shapes has been made in line with increases in other markets. It is the third since mid-November. Tonnage is coming in regularly and the market has a firm tone and favorable outlook. Open-hearth operations have not changed within the past several weeks. The Tennessee Coal, Iron & Railroad Co. is operating 13 and 14 of its 19 open-hearths and the Gulf States Steel Co. has four of its six in operation.

Cast Iron Pipe.—Small-tonnage pressure pipe business is coming in at a fair rate. The market appears stronger and a good volume of tonnage is in prospect. Prices are slightly stronger and base quotations are now $29 to $30. Plant operations are about the same as in the past month.

Coke.—A few inquiries have been received for second quarter, but interest is still slight. Only a small tonnage has been booked to date. Shipments on old contracts are going forward at an even rate. Quotations for spot, March and second quarter coke are all at $5.

Old Material.—Some of the standard items are moving a little better, but the market as a whole is not active. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Canada

Steel and Pig Iron Business Continues to Gain—Scrap Quiet

TORONTO, ONT., Feb. 28.—New business continues in such volume that the iron and steel industry of Canada is in a much better position with regard to unfilled orders and orders in prospect than it has been for several years. Buyers are extending the scope of their purchases and many lines of steel are featured in recent orders and contracts.

Production of pig iron in Canada in January amounted to 65,006 gross tons, marking a slight increase over the 63,197 tons reported for December, 1927. Production in January, 1927, amounted to 51,717 tons and in January, 1926, to 56,644 tons. Production of steel ingots and castings in January amounted to 84,295 tons, which was 15 per cent below the 96,248 tons produced in December, but 44 per cent greater than the 58,551 tons of January, 1927.

Pig Iron.—With the betterment that features many lines of the iron and steel industry of this country, pig iron sales tend to expand. While the greater part of current demand is for spot delivery, tonnages involved in orders are larger than those recently placed, and local blast furnace representatives are much more optimistic in their statements regarding both current and future business. Inquiries are appearing for second quarter iron, and a few melters have covered for that

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

period. The improvement in operations in the automotive industry has given impetus to foundry activities. Prices continue firm.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Business in scrap has not improved as rapidly or to as great an extent as in other iron and steel lines, but dealers report more interest on the part of buyers. Export demand continues to grow, but a larger volume of old material is entering Canada from the United States than is going over the international boundary from this country. Prices are gaining in strength but are unchanged.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

St. Louis

Steel Demand Continues in Good Volume—Pig Iron Quieter

ST. LOUIS, Feb. 28.—Buying of pig iron was light during the week, a natural result of recent heavy buying by melters. The Granite City maker sold about 2500 tons, including 1000 tons to a car builder in the district and 500 tons to a glass factory for use in making molds. The leading Southern maker sold about 300 tons and Chicago interests sold about 400 tons. The malleable foundries are especially busy. Some of the stove plants are well engaged, while with others business is only fair. The pig iron market is firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Coke.—Continued cold weather is helping dealers to reduce their piles of domestic coke. The demand for industrial grades is fairly good. Prices are unchanged.

Finished Iron and Steel.—New business and specifications against contracts are reaching the Granite City steel mill in ample volume to warrant the operation of the plate, sheet and tin plate mills to full capacity. Prices are reported to be firm. Jobbers report a slight improvement in business in the Oklahoma oil fields, with the volume from other sections only fair. Texas jobbers, it is learned, are complaining of dull business, although they expect an improvement within the next 60 days. Business is slow with the fabricators of structural steel.

Old Material.—Steel grades in the list of old materials are steady and unchanged. Foundry grades, however, are weak and lower from 25c. to $1 a ton because of heavy shipments and a lack of interest among consumers, who seem to be well supplied. Railroad lists include: Union Pacific, 13,529 tons; Chicago, Burlington & Quincy, 5044 tons; Big Four, 700 tons and 14 carloads; Chicago, Milwaukee & St. Paul, 141 carloads; Mobile & Ohio, 35 carloads; Pullman Co., St. Louis, 21 carloads; Nickel Plate, 21 carloads; Standard Oil Co., (Woodriver) 4 carloads scrap and 11,500 pounds of metals.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.75 to $12.25
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.75 to 12.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	14.25 to 14.75
Machine shop turnings	7.50 to 8.00
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.75 to 16.25
Steel angle bars	12.50 to 13.00
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Detroit

Automobile Production Increases—Steel Business Reflects Improvement

DETROIT, Feb. 28.—Industrial production volume continues upward and steel bookings reflect the increase. The automobile industry continues to lead in progress, as typified for instance by the manner in which Chevrolet production schedule for January had to be stepped up on six different occasions from Nov. 17, when 72,058 units were planned, until the latter part of January, when better than 91,000 units were ordered. This company's projected schedule for March is 127,000 units, which, if realized, will be the peak month in the company's history.

A third assembly line has just been put into commission by the new Pontiac plant of the General Motors Corporation, which will increase its capacity 50 per cent. Willys-Overland's projected March schedule is announced as 40,000 units, with 80,000 cars of all types to be turned out during the first quarter. February production for Graham-Paige will amount to 37,000 units, which is an increase of about 76 per cent over last month.

Ford production is still increasing, as evidenced by consistent building up of the payroll, the weekly increase being about 700 employees. Ford has suspended the manufacture of Fordson tractors temporarily, but will continue the manufacture of parts to service the 600,000 tractors now in use. A considerable number of tractors had been completed during the interval when production was suspended on the passenger cars.

Employment generally in Detroit is still increasing at about 2000 a week. As compared with this same period a year ago, employment now shows an increase of about 13,500.

Steel prices remain firm. Structural bookings have shown a slight increase in the last 10 days, mostly in small-lot bookings.

The market on old material in this district has registered further declines during the past week, in most cases 50c. per ton. One of the main weakening factors is the announcement by one of the largest users of blast furnace material that it is discontinuing the use of scrap.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.25 to $11.75
Borings and short turnings	7.75 to 8.25
Long turnings	7.00 to 7.50
No. 1 machinery cast	14.50 to 15.50
Automobile cast	19.00 to 20.50
Hydraulic compressed sheets	10.25 to 10.75
Stove plate	11.50 to 12.50
No. 1 busheling	9.00 to 9.50
Sheet clippings	7.00 to 7.50
Flashings	9.50 to 10.00

San Francisco

Business in Structural Steel and Cast Iron Pipe Fairly Active

SAN FRANCISCO, Feb. 25 (*By Air Mail*).—Business during the past week was interrupted to some extent by the Iron and Steel Conference at Del Monte on Feb. 17 and 18 and the Washington's Birthday holiday. However, a fair volume of tonnage was reported placed, structural shapes being the most active. General conditions on the Pacific Coast are considered good for this season and a large amount of work which will require round specifications of steel is in sight.

Pig Iron.—Some improvement is reported in the rate of foundry operations, but as most melters have sufficient stocks on hand to carry them over the next six weeks, buying of iron continues limited. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—The largest structural award of the week called for 280 tons for a hotel in San Francisco. Awards exceeded 1000 tons, the majority of them being confined to lots around 150 tons. Inquiries include 480 tons for an addition to the Heinz plant in Berkeley. An award is expected next week on 4000 tons for underframes for 2000 refrigerator cars for the Pacific Fruit Express. Pending business calls for over 17,000 tons. Prices remain firm at 2.35c., c.i.f. Coast ports.

Plates.—Some fair-sized lots are up for figure. The only sizable award this week involved 170 tons of universal plates for the Western Pacific at San Francisco, placed with unnamed Eastern producers. The Standard Oil Co., San Francisco, rejected all bids on its inquiry for an oil tanker requiring 3500 tons of plates and 1500 tons of shapes. New specifications are to be prepared. Bids were returned unopened on the 2000 ton penstock at Seattle and new specifications are also to be prepared. Pending business exceeds 4000 tons. Prices are firm at 2.30c., c.i.f.

Bars.—Reinforcing steel bar awards totaled more than 1700 tons. The largest involved 700 tons for an apartment in Los Angeles. Los Angeles will open bids March 12 for the construction of Drainage District No. 23, involving 5000 tons of bars.

Cast Iron Pipe.—Some improvement is noted in the demand for cast iron pipe and awards were more numerous. The largest letting was to the American Cast Iron Pipe Co. by Los Angeles and called for 1055 tons of 8-in. class 350 pipe. The Pacific States Cast Iron Pipe Co. took 909 tons of 6-in. class 350 for the same city. The Miracle Construction Co., San Diego, secured 156 tons of 4 to 8-in. class B pipe for the improvement of Pacific Street, Oceanside, Cal. Bids were opened this week on 137 tons of 4 to 10-in. class 150 for Modesto, Cal. James Young, Oakland, Cal., took 145 tons of 4 and 6-in. class B for the State Fair Grounds at Sacramento. The United States Cast Iron Pipe & Foundry Co. was low bidder on 128 tons of 48-in. class A for the north outfall sewer at Los Angeles. Bids have been opened on 3095 tons of 4 to 12-in. class B for Southgate, Cal., and on 222 tons of 4 to 8-in. class B for Armona, Cal. Santa Barbara, Cal., will open bids March 1 for 663 tons of 6 to 12-in. classes B and C pipe. Tacoma, Wash., opened bids Feb. 27 for 188 tons of 20-in class C. Bids were returned unopened on 426 tons of 4 to 12-in. for the improvement of Saturn Avenue, Huntington Park, Cal. Bids were opened on 15[illegible] tons of 18-in. class C for San Diego.

Coke.—Demand reflects the quiet condition in the pig iron market. Sales and inquiries were limited to small lots.

Buffalo

Pig Iron Inquiry Fairly Active—Steel Mill Operation High

BUFFALO, Feb. 28.—Pig iron inquiry this week includes 2000 tons of foundry iron for Port Chester, N. Y., and 1500 tons of foundry for the Crane Co., Bridgeport, Conn. The Kensington-Davis foundry of Buffalo has purchased 2000 tons of foundry iron. An inquiry from New England is for 1000 tons of foundry. Considerable iron remains to be bought for the second quarter. The price situation appears to be growing firmer, and there is talk of higher quotations. No. 2 plain remains at $17, furnace, in the district and at $16.50, furnace, for shipment to points outside the immediate Buffalo territory.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation continues high, though one of the largest interests has temporarily cut its open-hearth activity from 21 to 18 furnaces to make repairs. The Bethlehem price on bars, shapes and plates may be advanced to 2c., Lackawanna. Sheet business, particularly automobile body sheet, is continuing in volume with this quotation firm at 4.15c., Pittsburgh. A 700-ton reinforcing bar job for a Marcy, N. Y., hospital has been let to a local producer. Seven more Erie County bridges will require 100 tons of reinforcing bars and a new building for the Trico Products

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Co., requiring 200 tons, is up for bids. Bolt and nut business is fair, with operation of mills unchanged.

Old Material.—No new sales are reported, but one of the largest consumers is expected to enter the market within a few days, though this concern is said to have a stockpile of about 65,000 tons. New York Central, Erie, Pennsylvania and Michigan Central railroad lists are due to close this week. Machine shop turnings and cast iron borings are off slightly.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.50
Agricultural	15.50
Industrial	15.50

Boston

Pig Iron Slightly Firmer in Price—Scrap Prices Tend Downward

BOSTON, Feb. 28.—Pig iron sales in the past week approximated 4500 tons made up of small tonnages. While the general price situation is firmer, any advance is checked by one Buffalo furnace, which continues to accept business at 50c. to $1 a ton under the $17 base established by other Buffalo stacks. Open inquiries, which probably will be closed this week, include 800 tons of No. 2 plain and 1000 tons of No. 2X for a Providence, R. I., foundry; 1000 tons of No. 2X and 500 tons of No. 1X wanted by a Connecticut plant; and 2000 tons required by a Port Chester, N. Y., foundry, a total of 5300 tons. It is reported that much of the iron placed in New England so far this year was bought in advance of actual needs, and that on the present basis of melt large consumers have sufficient iron to last through the second quarter. February will be the largest month in sales for the Mystic Iron Works since it began operations.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag scraws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

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*Including quantity differentials.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Importations.—Receipts of foreign pig iron at this port during the first half of February were 696 tons of Indian and 290 tons of Dutch, a total of 986 tons, compared with 1282 tons in the first half of January and 12,350 tons in the first half of February, 1927. Imports of ore were 5893 tons from Algiers and 4365 tons from Tunis, a total of 10,258 tons.

Shapes and Plates.—There is little prospective fabricating work in New England. Seven bridges for Vermont will be figured during the next week, but the tonnage of steel involved is small. Most of the current jobs call for less than 100 tons each. Shapes and plates are now 1.90c. to 2.05c., base, depending on point of shipment, or 2.26½c. to 2.41½c., per 100 lb., base, delivered New England.

Cold-Rolled Strip.—Business in cold-rolled strip steel is not as active as it was a month ago, but is fairly good. The Worcester, Mass., mill is quoting 3.30c. per lb., base, on lots of 1 to 3 tons, and 3.05c. on larger lots.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. announce that the price of by-product foundry coke on March 1 will remain at $11.50 a ton, delivered within a $3.10 freight rate zone. The movement of foundry coke from ovens is greater than it was a month ago, but only slightly so. Competition between by-product ovens and gas companies for domestic coke business continues keen, and prices on large tonnages are elastic.

Old Material.—Prices on old material tend downward. Actual reductions are noted on steel turnings, mixed borings and turnings, pipe and chemical borings, while inside prices are paid more often than outside prices on all material except heavy melting steel. Efforts to buy No. 1 heavy melting steel at less than $9 a ton on cars, shipping point, have been unsuccessful, and $9 to $9.10 is the usual range. Indications are that 5000 tons of steel scrap for Poland, mentioned last week, will be shipped March 1. It will include automobile steel and cost $9 a ton delivered at dock. Shipments of textile and No. 1 machinery cast to eastern Pennsylvania continue on a fairly large scale, but New England consumers took comparatively little the past week. The Boston & Maine Railroad closed bids Feb. 25 on 65 cars of miscellaneous material and the Boston Elevated Railroad has closed bids on 1500 tons of rails.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.10
Scrap T rails	8.75 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	5.75 to 6.25
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	6.00 to 6.50
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.75 to 8.25
Rails for rolling	10.00 to 10.50
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Railroad malleable	13.50 to 14.00

Cincinnati

Pig Iron Demand Increasing—Sheet Mills Operating at High Rate

CINCINNATI, Feb. 28.—Increasing demand from consumers for foundry iron for current needs is lending strength to the market in this district, despite the fact that buying for second quarter has been practically at a standstill. Sales of 300 tons of Southern iron to a Louisville, Ky., melter and of a like amount of silvery iron to a Michigan consumer were the largest transactions of the week, while an inquiry from the State Reformatory at Pendleton, Ind., for 200 tons of foundry iron is the only pending business calling for more than a single carload. Prices have not been altered. Southern Ohio foundry iron remains at $19, base Ironton, and Tennessee and Alabama iron at $16, base Birmingham. Sellers in northern Ohio are quoting from $16.50 to $17, base Cleveland. On March 1 the American Rolling Mill Co. will blow out one of its furnaces at Columbus. This will leave in operation in southern Ohio three steel plant furnaces producing basic iron, one each at Columbus, Ashland and Portsmouth, and two silvery furnaces at Jackson.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....		$20.89
So. Ohio malleable..............	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25...		19.69
Alabama fdy., sil. 2.25 to 2.75...		20.19
Tennessee fdy., sil. 1.75 to 2.25..		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Announcement by producers of bars, shapes and plates that prices have been advanced $1 a ton to a basis of 1.90c., Pittsburgh, has been followed by active solicitation of second quarter business at that figure. Some mills, however, are making contracts through the first half of the year with large buyers at 1.85c., and others have joined in this practice under pressure exerted by old customers. Sellers admit that consumers are likely to take full advantage of their present lower-priced contracts by specifying all of the tonnage called for. Aside from 1700 tons of structural steel which the Central States Bridge Co., Indianapolis, will supply for a new building of the L. S. Ayres Co., that city, lettings have been of minor importance. However, indications are that much new work will come out in the next 30 days. Meanwhile, most fabricating shops in this district are operating on curtailed schedules. In the sheet market, specifications have been of substantial proportions and buyers are paying the present scale of prices for material to be delivered in the second quarter. No deviation from the scale of 2.10c., base Pittsburgh, for blue annealed, 2.90c. for black, 3.75c. for galvanized and 4.15c. for automobile body stock, has been noted. Demand for electrical sheets is the best in many weeks.

Reinforcing Bars.—Prices continue to show an upward trend, and makers of new billet bars are now asking from 1.90c. to 2c., base Pittsburgh, an increase of from $1 to $2 a ton. Rail steel stock is being sold at 1.80c., base mill, although concessions of $1 a ton are being made on large tonnages.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes....	3.40c.
Bars, soft steel or iron..........	3.30c.
New billet reinforcing bars.....	3.15c.
Rail steel reinforcing bars.......	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)..........	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10)...	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb...........	$3.00
Common wire nails, base per keg.........	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb..........................	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.......	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in..........	19.00
4-in.	39.00

Coke.—During March by-product foundry coke will remain unchanged at $7.50 per net ton, f.o.b. ovens, or $9.52 delivered here. The schedule for domestic grades also will be continued on the present basis, egg size selling at $5.50, ovens, walnut at $5 and No. 2 nut at $4.50. In Michigan the present price structure will not be disturbed, quotations at Detroit ovens holding over for another 30 days on both foundry and domestic by-product coke.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The market for steel mill grades of material has been rather listless in view of the better situation from a production standpoint at nearby mills. On the other hand, foundry items are slightly stronger, but prices are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel............	$11.50 to $12.00
Scrap rails for melting.........	12.25 to 12.75
Loose sheet clippings..........	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings..............	8.50 to 9.00
Machine shop turnings.........	8.00 to 8.50
No. 1 busheling................	10.50 to 11.00
No. 2 busheling................	7.50 to 8.00
Rails for rolling................	13.00 to 13.50
No. 1 locomotive tires..........	13.50 to 14.00
No. 1 railroad wrought.........	11.00 to 11.50
Short rails	16.50 to 17.00
Cast iron carwheels............	12.75 to 13.25
No. 1 machinery cast...........	16.00 to 17.00
No. 1 railroad cast.............	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.00 to 9.50
Brake shoes	10.00 to 10.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	12.25 to 12.75

Pacific Northwest

Prices Higher on Several Steel Products Outlook Encouraging

SEATTLE, Feb. 25 (*By Air Mail*).—Local sales agents for Eastern steel mills and jobbers report they are figuring on a large amount of new work and seem much encouraged by the outlook. Prices are firmer than for some time, and 2.30c., Seattle, on plates is said to be minimum, while reinforcing bars have gone up $2 per ton, and are now reported firm at 2.20c., Seattle, for large lots, and up to 3c. for small lots. Local building permits for February will exceed $4,000,000, a record for any month.

Pig Iron.—Sales of small lots of foundry iron, some from Utah and some Indian iron, represent all that is doing in the local market. Utah basic and No. 2 foundry are quoted at $24 to $25 per gross ton, delivered Seattle.

Shapes.—Awards in the past two weeks have been small, the largest job having been about 1200 tons for the Stimson Building in Seattle, taken by the Wallace Bridge & Structural Steel Co. The Northern Pacific Railroad is inquiring for 550 tons for two bridges. Plain material is firm at 2.35c., Seattle.

Plates.—Bids are to open on Feb. 27 on 1000 tons for a water line at Tacoma, Wash. Another pipe line involving about 1000 tons will be in the market shortly. Plates are firm at 2.30c., Seattle.

Cold-Finished Steel Bars.—Local sales representatives of Eastern mills and jobbers have advanced prices $2 per ton, and now quote at 2.90c. to 3c., base, Seattle.

Sheets.—Prices on all grades of sheets have been advanced in the local market from $2 to $3 per ton, and the market is firm at the higher prices.

Wire Products.—Prices on wire and wire nails have been advanced about $3 per ton, but demand is quiet. Wire nails are now quoted at $3 to $3.10 per 100-lb. keg, delivered Seattle.

Old Material.—Sales are only for very small lots, the leading local consumer being filled up on its scrap needs for some months. Heavy melting scrap is $10.50 to $11 per gross ton; country scrap, $8 per net ton; cast iron scrap, $13 per net ton, and borings about $5 per gross ton, delivered Seattle.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Feb. 28	Feb. 27	Feb. 25	Feb. 24	Feb. 23	Feb. 21
Lake copper, New York	14.20	14.20	14.20	14.20	14.20	14.25
Electrolytic copper, N. Y.*	13.75	13.75	13.75	13.75	13.75	13.75
Straits tin, spot, N. Y.	51.75	52.37½	....	51.87½	51.50	51.37½
Lead, New York	6.15	6.15	6.25	6.25	6.25	6.25
Lead, St. Louis	5.90	5.90	6.00	6.00	6.00	6.00
Zinc, New York	5.80	5.80	5.77½	5.77½	5.77½	5.80
Zinc, St. Louis	5.45	5.45	5.42½	5.42½	5.42½	5.45

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Feb. 28.—Unusual inactivity is reported by sellers in all markets. Prices have declined in several. Copper is nominally unchanged and tin is a little higher. Both lead and zinc have fallen to new low levels for some years.

Copper.—"Near stagnation" is a fair description of the market. Very little inquiry for domestic or foreign consumption is reported. What little buying has been done has been satisfied at 14c., delivered in the Connecticut Valley, which is a concession by one or two sellers from the quotation of 14.12½c., maintained firmly by all large producers. There has been no change in the quotation of Copper Exporters, Inc., which still stands at 14.50c., c.i.f. usual European ports. An encouraging feature is the fact that prices hold firm in the face of weakness in other metals. Lake copper is very quiet at 14.20c., delivered.

Tin.—In spite of a holiday in the middle of the week, sales for the week ended Saturday, Feb. 25, were fairly good at about 900 tons. Dealers did most of the buying, but it is believed consumers still have considerable metal to purchase for April-May. Buying has not been aggressive and the market for the most part has been heavy and sluggish. Yesterday in a quiet market less than 100 tons changed hands and today there has been very little business. Spot Straits tin was quoted today at 51.75c. New York, and prices in London were slightly higher than a week ago, with spot standard quoted at £231 5s., future standard at £233 17s. 6d., and spot Straits at £235 5s. per ton. The Singapore price today was £238 2s. 6d. Arrivals thus far this month have been 4520 tons, with 7995 tons reported afloat.

Lead.—Two changes in the quotation of the leading interest have been made in the last week—from 6.35c. to 6.25c. on Feb. 21 and then to 6.15c. yesterday, Monday, Feb. 27. Quotations in the West are nominal at 5.90c. St. Louis. Buying is only moderate with the bulk for early shipment. Inquiry is a little better in some quarters.

Zinc.—Prime Western zinc sold the past week as low as 5.40c. St. Louis, or 5.75c., New York, which is the lowest since July 1, 1922. This was for spot delivery. The market today, after sagging during the week as low at 5.42½c., St. Louis, for early delivery, is quoted at 5.45c., St. Louis, or 5.80c., New York. The slight firmness is due probably to the knowledge that production has definitely declined. A satisfactory quantity of metal is moving to consumers and sales are moderate. February metal in weak hands has been pretty well absorbed. Ore is still $35, Joplin, with production last week about 12,500 tons and sales about 9200 tons. Stocks are close to 54,000 tons.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—Weakness in other metals, particularly lead, has affected this market and Chinese metal for spot delivery is quoted lower at 10.25c. and futures at 10.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb. delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Feb. 28.—Prices are weak following unloading of resale materials. Sales in old metals are unusually small and many prices are lower.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 53.50c.; lead, 6.05c.; zinc, 5.55c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.;

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.50c. to 54.50c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.00c.
Tin, bar	60.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Zinc sheets were reduced ½c. per lb. on Feb. 27 after having been quoted at 10c since Aug. 5. Lead full sheets are now being quoted at 9.75c. to 10c., a ¼c. reduction having been made effective Feb. 21. There have been no changes in the mill prices on bronze, brass and copper products since Dec. 5.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 7200 Tons—1500 to 2000 Tons Pending for Illinois Road Work

THE week's awards amounted to 7200 tons, the largest of which was 1000 tons for a warehouse in New York. Inquiries totaled 3150 tons, 1500 to 2000 tons of which will be required for road work in Illinois. Awards follow:

CRANSTON, R. I., 450 tons, sewage disposal, to Barker Steel Co.

CAMBRIDGE, MASS., 250 tons, apartment building, to Concrete Steel Co.

BOSTON, 100 tons, stores on Newbury Street, to Barker Steel Co.

NEW YORK, 1000 tons, Green building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, building for American Women's Realty Co., to Fireproof Products Co.

BROOKLYN, 150 tons, warehouse for United Grocers Co., to Igoe Brothers.

FAR ROCKAWAY, N. Y., 100 tons, additional work on bathing pavilion, to Igoe Brothers.

NEWARK, 150 tons, Hoffman Beverage warehouse, to Faitoute Iron & Steel Co.

CLEVELAND, 125 tons, pathological laboratory for Western Reserve University, to Bourne-Fuller Co.

CLEVELAND, 450 tons, sales building for Cleveland Packard Co., to Bourne-Fuller Co.

CLEVELAND, 600 tons, factory extension for Richman Brothers Co., to Bourne-Fuller Co.

STATE OF ILLINOIS, 720 tons of rail steel bars for road work; 500 tons to Truscon Steel Co., and 220 tons to Inland Steel Co.

CHICAGO, 750 tons, building for Commonwealth Edison Co., to an unnamed bidder.

CHICAGO, 100 tons, Sherman shops, to American System of Reinforcing.

CHICAGO, 150 tons, apartment building at 1320 Astor Place, to American System of Reinforcing.

CHICAGO, 170 tons of rail steel bars, two apartment buildings, to Olney J. Dean & Co.

ST. LOUIS, 150 tons, office building for Lindell Trust Co., to Missouri Rolling Mills Corporation.

CEDAR RAPIDS, IOWA, 650 tons, addition to plant of Quaker Oats Co., to Laclede Steel Co.

LOS ANGELES, 700 tons, apartment building, Argyle and Franklin Streets, to unnamed interest.

OAKLAND, CAL., 275 tons, warehouse, Ninth and Castro Streets, to Badt-Falk Co.

SEATTLE, 100 tons, market building on Broadway, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 150 tons for North Station.

CHICAGO, 350 tons, Steuben Club.

OAK PARK, ILL., 650 tons for Nicholas stores.

SPRINGFIELD, ILL., 1500 to 2000 tons, road work for Illinois Highway Commission; bids opened Feb. 28.

Stockholders of the Stanley Works, New Britain, Conn., have authorized the sale of the company's plant at Bridgewater Junction, Mass. There is no prospective purchaser, the authorization being a formality. The principal part of the Massachusetts plant's business was moved to Bridgeport, Conn., about a year ago.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.50c.	4.00c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.50c.

RAILROAD EQUIPMENT

St. Paul Road Inquires for 4650 Freight Cars—2000 Refrigerator Cars Ordered

OUTSTANDING in the developments of the week is the inquiry for 4650 freight cars by the Chicago, Milwaukee, St. Paul & Pacific. The Pacific Fruit Express has purchased 2000 refrigerator cars and the Fruit Growers Express will buy 1200 underframes. The only locomotive order of size is that of the Union Pacific for 23. Details of the week's business follow:

Illinois Central will buy 10 motor and 10 trailer cars.

Chicago, Milwaukee, St. Paul & Pacific will accept bids on March 8 for 4650 freight and 10 baggage cars. Freight cars will be of the following types: 2500 50-ton box, 1000 70-ton hopper, 650 40-ton stock, 300 automobile and 200 ore cars.

Fruit Growers Express has made inquiry for 1200 underframes.

Pacific Fruit Express has placed orders for 2000 refrigerator cars, 1000 with Pullman Car & Mfg. Corporation and 1000 with Pacific Car & Foundry Co.

Booth & Flinn, Pittsburgh, have purchased 30 to 32 garbage cars for use in Detroit from Bethlehem Steel Co.

Union Pacific has ordered 23 4-12-2 type locomotives and 15 additional tenders from American Locomotive Co.

Standard Oil Co. of New Jersey is inquiring for 10 tank cars for export.

Wheeling Steel Corporation has ordered 16 air dump cars from Koppel Industrial Car & Equipment Co.

Paulista Railway of Brazil is inquiring for seven sleeping cars.

New York, Chicago & St. Louis has ordered one private car from Pullman Car & Mfg. Corporation.

South Manchurian Railway is inquiring for 20 air dump cars of 45 cu. yd. capacity.

Conley Tank Car Co. has ordered 50 40-ton tank cars from American Car & Foundry Co.

St. Louis-San Francisco will buy 250 underframes.

North American Car Corporation is in the market for 200 poultry cars.

St. Louis Coal & Coke Corporation Announces Changes

ST. LOUIS, Feb. 28.—The general sales offices of the St. Louis Gas & Coke Corporation have been removed from 208 South LaSalle Street, Chicago, to 1502 Telephone Building, St. Louis, it was announced here today by M. D. Curran, president, who also made public the resignation of Walter H. Underwood as general sales manager and the appointment of J. C. Gore as the latter's successor. Mr. Underwood has been general sales manager of the present company and its predecessors since 1921, having been previously with Domhoff & Joyce, Cincinnati. Mr. Gore was with the latter company for 12 years before joining the St. Louis concern as general sales agent at Chicago in 1922. For five years he has been assistant sales manager, first at Chicago and since July 1, 1927, at St. Louis.

FABRICATED STRUCTURAL STEEL

Chicago Garage Will Take 8000 Tons—Awards and Inquiries in Low Volume

AWARDS of slightly more than 21,800 tons, although somewhat above last week's total, were considerably less than the weekly average of the last two months. Inquiries totaling 25,400 tons were a little over half of last week's figure and included 8000 tons for a garage at Chicago. Awards follow:

Worcester, Mass., 250 tons, Nurses' Home, to unnamed fabricator.

Weymouth, Mass., 123 tons, town office building to Palmer Steel Co.

Boston, 270 tons, Columbus Avenue bridge for Boston & Albany Railroad, to Boston Bridge Works, Inc.

New York, 2300 tons, loft building at 228-36 East Forty-fifth Street, to McClintic-Marshall Co.

New York, 1600 tons, loft building at Thirty-fifth Street and Eighth Avenue, to Harris Structural Steel Co.

New York, 800 tons in the following awards as reported to the Structural Steel Board of Trade: National City Bank at 85 Main Street, Flushing, and alteration and addition for Best & Co., to Hay Foundry & Iron Works; apartment building at 69-73 East Seventy-seventh Street, to George A. Just Co.

Lakeville, N. Y., 400 tons, school, to an unnamed local fabricator.

Jersey City, 300 tons, tanks for Standard Oil Co. of New Jersey, to an unnamed fabricator.

Philadelphia, 3000 tons, Integrity Trust Co. building, to McClintic-Marshall Co.

Camden, N. J., 200 tons, Camden Rail & Harbor warehouse, to Bethlehem fabricators.

Camden, 600 tons, bank building, to American Bridge Co.

Chesapeake & Ohio Railway, 150 tons, bridges, to American Bridge Co.

Pennsylvania Railroad, 125 tons, bridge, to McClintic-Marshall Co.

Belle, W. Va., 700 tons, plant building for E. I. duPont de Nemours & Co., to McClintic-Marshall Co.

Pittsburgh, 115 tons, gates for Lock No. 6, Allegheny River, to Independent Bridge Co., Pittsburgh.

Rittman, Ohio, 400 tons, factory building for Ohio Box Board Co., to Forest City Structural Steel Co.

Cleveland, 125 tons, sales building for Cleveland Packard Co., to T. H. Brooks Co.

Cleveland, 2100 tons, extension to open-hearth plant of Otis Steel Co., to Wellman-Seaver-Morgan Co.

Cleveland, 720 tons, Whitehouse grade crossing elimination work, awarded by Ohio Highway Commission to McClintic-Marshall Co.

Cleveland, 135 tons, conveyor house for Kelly Island Lime & Transport Co. at Marblehead, Ohio, to Reliance Structural Steel Co.

Cleveland, 200 tons, new plant for Steel Improvement & Forge Co., to Truscon Steel Co.

Indianapolis, 1700 tons, building for L. S. Ayres Co., to Central States Bridge Co., Indianapolis.

Milwaukee, 7400 tons, Sixteenth Street viaduct; previously reported taken by Julius C. Theilacker, who has placed 6000 tons with American Bridge Co. and 1400 tons with Milwaukee Bridge Co.

Chicago, 600 tons, apartment building at 1320 Astor Street, to Midcity Foundry Corporation, local.

Joliet, Ill., 110 tons, building for Gerlach-Barklow Co., to American Bridge Co.

Amarillo, Tex., 1800 tons, office building for Santa Fe railroad, to an unnamed bidder.

Flint, Mich., 700 tons, building for Chevrolet Motor Co., to Mahon Structural Steel Co.

St. Louis, 200 tons; 100 tons for pumping station in connection with City Sanitarium, and 100 tons for gymnasium for metropolitan police, to Mississippi Valley Structural Steel Co.

San Francisco, 170 tons, apartment building at Laguna and Sacramento Streets, to McClintic-Marshall Co. Central Works.

San Francisco, 100 tons, apartment building at Lombard and Polk Streets, to McClintic-Marshall Co. Central Works.

San Francisco, 280 tons, hotel at Eddy and Jones Streets, to Judson-Pacific Co.

San Francisco, 115 tons, theater at Chestnut and Steiner Streets, to Pacific Structural Iron Works.

San Francisco, 125 tons, Native Daughters of Golden West hall, to McClintic-Marshall Co. Central Works.

Berkeley, Cal., 500 tons, factory building for H. J. Heinz Co., to Austin Co.

Daly City, Cal., 127 tons, theater, to Dyer Brothers.

San Diego, 700 tons, power house for Byllesby Engineering & Management Corporation, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York, 500 tons, building for New York Geneological Society.

State of New Jersey, 200 tons, highway bridge over Passaic River.

East Liberty, Pa., 1200 tons, theater.

Covington Township, Pa., 167 tons, County bridge over Tioga River, bids opened Feb. 29.

Kingston, Pa., 500 tons, Wyoming Seminary building, previous bids rejected and new bids asked.

Kingston, 715 tons, armory for Sixty-ninth Field Artillery; Chase Construction Co., Allentown, low bidder for general contract.

Philadelphia, 600 tons, Terminal Title & Trust Co. building, Sixty-ninth and Market Streets, bids opened Feb. 29.

Tioga, Pa., 160 tons, highway bridge.

Hampton Roads, Va., 500 hangars for United States Air Service.

Washington, 500 tons of plates for Mare Island and Puget Sound Navy Yards, schedule 8499; bids Feb. 28.

Chicago, 4000 tons, office building on Michigan Avenue, owner's name not given.

Columbus, Ohio, 100 tons, chemistry building at Ohio State University.

Clinton, Iowa, 300 tons, plant building for United Gas Improvement Co.

Chicago, 8000 tons, garage; Graven & Meager, architects.

Shawano, Wis., 700 tons, highway bridge.

Ottawa, Ill., 1500 tons, building for National Plate Glass Co.

Austin, Ill., 3500 tons, high school.

Springfield, Ill., 1124 tons, superstructure for 11 highway bridges for Illinois Highway Commission; bids opened Feb. 28.

San Francisco, 5000 tons shapes and plates for Deisel oil tanker, for Standard Oil Co.; bids rejected and new specifications being prepared.

Oakland, Cal., 100 tons, hangar No. 37; bids soon.

Los Angeles, 110 tons, science building, University of Southern California; general contract to Scofield-Twiats Co.

Seattle, Wash., 2000 tons for penstock; bids returned unopened and new specifications will be prepared.

Tacoma, Wash., 900 tons, pipe line; bids Feb. 27.

Empire Officers Named

(Concluded from page 623)

Co., Canton, the Massillon Rolling Mill Co. and the Zanesville, Ohio, plant of the American Rolling Mill Co.

F. W. Beach, who has been general sales manager of the Mansfield company, has been appointed Western sales manager of the Empire corporation, with headquarters in Chicago. He was formerly located in that city and has a wide acquaintance in the Chicago territory.

F. F. Huber, Cleveland district sales manager of the Mansfield company, will be promoted to an executive position in the home sales office.

Harold Davey, Detroit district sales manager, will have two assistants, Lawrence Cross, who has been in the sales department of the Empire Steel Co., Cleveland, and Edward Duncan, formerly with the Eastern Rolling Mill Co.

William L. Hoffman, formerly with the Brier Hill Steel Co., who has been Philadelphia district sales manager of the Mansfield company for three years, will remain in the Philadelphia territory as district sales manager of the new company.

Glenn D. East, manager of sales of the Empire Steel Co., Cleveland, and several other men who have been connected with the sales departments of the affiliated companies, will also be given places in the new organization.

Class I railroads on Feb. 8 had 369,469 surplus freight cars in good repair and immediately available for service, according to the Car Service Division, American Railway Association. This was a decrease of 34,323 cars compared with the previous week.

PERSONAL

Dr. Richard Moldenke sailed Saturday, Feb. 25, on the Arabic for Europe. He will visit Germany and other countries on business and will present an exchange paper for the American Foundrymen's Association before the International Foundry Congress, to be held in Barcelona, Spain, April 10 to 14. The congress is confined this year to the foundry associations of Europe.

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C. Naas, with the Packard Motor Car Co., Detroit, for about 20 years, has joined the Sterling Grinding Wheel Co., Tiffin, Ohio, and has been assigned to the Detroit district in a sales capacity.

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C. H. Kathe, purchasing agent and traffic manager of the Hill Clutch Machine & Foundry Co., Cleveland, has resigned. He has been associated with the company 19 years, 16 years in the above-mentioned capacity.

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Lorimer Dunlevy has resigned as sales manager of the Climax Engineering Co., Clinton, Iowa, and on March 15 becomes general sales manager of the O. E. Szekely Co., Holland, Mich., maker of commercial airplane engines and other products.

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Albert M. Ross, who has been supervisor of production and inventory in the plants of Remington-Rand, Inc., has been made assistant manager of the Remington Typewriter Works, Ilion, N. Y. He succeeds Frank Lewis, who has been transferred to the cabinet and printing division of the Rand-Kardex plant at Tonawanda, N. Y.

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J. C. Bradley, chief metallurgist American Brass Co., New York, will speak on "Manufacture of and Properties of Brass and Nickel Silver," before the Providence Engineering Society at the society rooms in Providence, Thursday evening, March 1.

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W. F. Glaser has been appointed Cleveland district sales manager for the Louis Allis Co., Milwaukee, manufacturer of electric motors. The Cleveland office, a new one, is at 409 Union Building, 1836 Euclid Avenue.

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David L. Sacks has been elected president and treasurer of Louis Sacks, Inc., 357 Wilson Avenue, Newark, N. J., and its affiliated companies, the Louis Sacks Iron Foundry and the Newark Malleable Iron Works. Other officers are David MacIntosh, first vice-president; James O. MacIntosh, second vice-president; Otto H. Mayer, secretary, and Louis E. Adams, assistant treasurer.

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Marcus Peck has been appointed assistant to the president of the United States Chain & Forging Co., Pittsburgh, and will be in charge of sales. He has been associated with the Standard Oil Co. of California and assumes the duties of Frank L. Campbell, who recently resigned as general sales manager.

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John Howe Hall, metallurgical engineer Taylor-Wharton Iron & Steel Co., High Bridge, N. J., will speak on "Manganese Steel" before the Cincinnati Chapter of the American Society for Steel Treating, Thursday evening, March 1. Slides and a reel of motion pictures will illustrate the lecture.

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W. L. Niekamp, since 1913 president Beck & Corbitt Iron Co., St. Louis jobber, resigned on Feb. 21 and has been succeeded temporarily by Henry Luedinghaus, who has been a director of the company for 15 years. Mr. Luedinghaus also is president of the St. Louis Malleable Casting Co. and the Luedinghaus-Espenscheid Wagon Co., manufacturer of farm wagons and motor trucks. Louis H. Josties, private secretary to Mr. Luedinghaus, has been made vice-president and general manager of the Beck & Corbitt company, succeeding George Niekamp, a brother of the former president.

R. C. Bastress, formerly with the Fort Wayne Iron Store Co., Fort Wayne, Ind., has joined the sales organization of the Black & Decker Mfg. Co., Towson, Md., assigned to Indiana and southern Michigan. L. W. Beuhausen, recently with Slocum & Kilburn, New Bedford, Mass., will handle Black & Decker products in western Massachusetts. G. N. McCarthy will represent the company in the Buffalo territory, taking the place of H. B. Austin, who has been transferred to the Chicago district.

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E. O. Johnstone, district sales manager at San Francisco for the American Chain Co., Inc., has been appointed Pacific Coast distributer of Ford chain hoists, manufactured by the Ford Chain & Block Mfg. Co., Philadelphia.

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George R. Bennett has resigned as vice-president and general manager of the Edgar Allen Steel Co., Inc., New York, and will be succeeded on March 1 by V. A. Greene.

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W. E. Mueller has been elected first vice-president of the Mueller Co., Decatur, Ill., succeeding the late Philip Mueller. Robert E. Mueller, chief engineer of the company, has been elected to the board of directors. Phillip Cruikshank has also been elected a director, taking the place of his father, Frank Cruikshank, who will spend several months of this year in foreign travel.

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A. F. Hanly has been appointed manager of Western sales for A. Milne & Co., steel merchants and importers, and will have headquarters at 580 Market Street, San Francisco.

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George H. Atwood has been elected president-treasurer of the Twin City Forge & Foundry Co., Stillwater, Minn. Other officers are J. L. Record, vice-president, and E. A. Merrill, secretary.

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W. A. Burns, for many years representative at Portland, Ore., for the Atlas Diesel Engine Co., Oakland, Cal., has been transferred to the company's home office.

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George L. Edwards has been made superintendent of the Brazil Machine & Foundry Co., Brazil, Ind.

James A. Farrell, president of the United States Steel Corporation, and Myron C. Taylor, chairman of the corporation's finance committee, recently made their first inspection of the steel plants in the Chicago area since the death of Judge Gary. The inspection was under the direction of Eugene J. Buffington, president Illinois Steel Co., and G. G. Thorp, vice-president.

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E. A. Lerner has been made president of the Kensington Steel Co., Chicago, manufacturer of manganese steel castings. He has been associated with the Kensington company for 10 years.

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Joseph Page, for several years associated with the New England Coal & Coke Co., Boston, has been made New England representative of Waldo, Egbert & Maltby, Inc., Buffalo.

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N. T. Jones, vice-president Superior Screw & Bolt Mfg. Co., Cleveland, has been elected president of that company, succeeding B. G. Tremaine, Jr., who has become chairman of the board. Mr. Jones is one of the pioneers in the bolt business in Cleveland, with which he has been affiliated for 30 years, and was one of the founders of the Superior company. H. D. Simpkins, secretary, has been made vice-president and has been succeeded as secretary by C. L. Wedow, who will continue his former duties as director of sales. R. H. Flues, Detroit sales representative, has been made a vice-president.

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W. H. Wills, metallurgist Atlas Steel Corporation, Dunkirk, N. Y., was the speaker at the monthly meeting of the Indianapolis chapter of the American Society for Steel Treating on Feb. 13, his subject being the "Nature and Uses of the Principal Types of Tool Steels."

J. M. Manley, secretary Cincinnati branch of the National Metal Trades Association, and E. F. DuBrul, general manager National Machine Tool Builders Association, were the principal speakers at a meeting of the Cincinnati chapter of the National Association of Cost Accountants on Feb. 23. Mr. Manley talked on the "Accountants' Interest in Legislation," while Mr. DuBrul discussed "Unintentional Falsification of Accounts."

Robert Dodd and Thomas Arnold, representatives of a Montreal banking syndicate, have been elected directors of the Algoma Steel Corporation, Sault Ste. Marie, Ont. They have also been elected to the board of the Lake Superior Corporation, of which the Algoma company is a subsidiary, and in which their banking syndicate has recently acquired large stock holdings.

D. S. Robinson, president Western Foundry & Furnace Co., Tacoma, Wash., has been elected president of the Northwest Furnace Builders' Association. Other officers are W. H. Carston, Majestic Furnace & Mfg. Co., Seattle, vice-president, and Floyd Oles, Manufacturers' Association of Washington, secretary-treasurer.

J. T. Whitehead, president Whitehead & Kales Co., Detroit, and Clyde MacCornack, general manager and chief engineer for the Phoenix Bridge Co., Phoenixville, Pa., have been elected to the board of directors of the American Institute of Steel Construction. Their terms will expire in the fall of 1928.

J. A. Lodwick, formerly general manager industrial department of the American Arch Co., Inc., has been appointed assistant to the president of the Kennedy-Van Saun Mfg. & Engineering Corporation, 2 Park Avenue, New York.

D. A. Currie, vice-president and general manager Erie Foundry Co., Erie, Pa., has acquired the entire stock holdings of the A. N. Bates estate and thereby has become the dominant interest in the company. Mr. Currie has been identified with the company for almost 22 years, starting as a timekeeper in 1906, advancing to secretary in 1914 and becoming vice-president and general manager in 1923. The company makes forge shop equipment and sheet mill machinery.

C. A. Collins, president Hanna Furnace Co., Buffalo, and vice-president of the M. A. Hanna Co., Cleveland, sailed recently on a Mediterranean cruise.

Curtis M. Yohe, for several years in charge of purchases for the Pittsburgh & Lake Erie Railroad, has been appointed assistant to the president of the New York Central Lines, with headquarters in Pittsburgh. Mr. Yohe's appointment means that the Pittsburgh district will now have direct representation of the New York Central Lines.

James E. Wallis, Jr., who formerly represented the Sullivan Machinery Co., Chicago, in Japan and later in Russia, has been made trade commissioner, at Berlin, Germany, for the Department of Commerce.

Charles G. Burton, general manager of the National Sanitary Co., Salem, Ohio, has been elected president of that company, succeeding J. E. Finefrock, who has been made vice-president. Mr. Burton will continue as general manager.

The annual meeting of the American Refractories Institute will be held May 16 and 17 at White Sulphur Springs, W. Va.

OBITUARY

A. L. HERKENHOFF

Anthony L. Herkenhoff, general manager Minster Machine Co., Minster, Ohio, and for 30 years prominent in the machinery industry, died suddenly on Feb. 21 at Sidney, Ohio, while on a business mission. He was born at Minster in 1872 and attended the Minster public schools and later the St. Mary's Institute, Dayton, Ohio, now the Dayton University. After being employed by the Atlas Engine Co., Indianapolis, for a period of years, he was instrumental in the organization of the Minster Machine Co. in 1898, serving as its general manager from that time until his death. In 1916 he helped to organize the St. Marys Foundry Co., St. Marys, Ohio, and had served as vice-president and manager since its inception. In 1918 the Streine Tool & Mfg. Co., New Bremen, Ohio, was similarly organized, and he served as the president of that company since its organization.

William Crouse, vice-president Crouse & Pope Foundry Corporation, Auburn, N. Y., died at his home in that city on Feb. 25. He was born at Union Springs, N. Y., and was associated for a time with D. W. Osborne & Co., later the Auburn Works, International Harvester Co. He organized the Crouse & Pope corporation in 1919, with plant and offices at Weedsport, N. Y. The business was continued there until 1923, when the plant was destroyed by fire. The company was reorganized and plant built at Auburn.

Samuel N. Craig, president of the Treadwell Construction Co. and the Midland Barge Co., Midland, Pa., was killed in an airplane accident at Aurora, Neb., Feb. 26. He was on his way to Los Angeles, and missing a train connection, he chartered the airplane to avoid loss of time. He was 42 years of age and was identified with the Riter-Conley Co. before organizing his own companies.

O. M. Stow, treasurer of the Union Malleable Iron Co., Moline, Ill., before it was taken over by Deere & Co., and later treasurer of the Sechler Implement & Carriage Co., died Feb. 16 in Cleveland, where he had lived for the last 10 years.

Simon H. Stupakoff, president Stupakoff Laboratories, Inc., Pittsburgh, died at his home in that city Feb. 18. He was born in Germany 73 years ago, and was well known in the iron and steel industry as a maker of precision instruments, notably for heat and electrical recording.

James B. Baker, president and general manager of the Safety Grinding Wheel & Machine Co., Springfield, Ohio, died suddenly on Feb. 26. He was 75 years of age.

Henry Phelps Howland, blast furnace superintendent for the Wisconsin Steel Co., South Chicago, Ill., died Feb. 23.

Herbert L. Hart, manager of the bolt and rivet department of the Inland Steel Co., Chicago, died Feb. 27. He was born in Chicago in 1866, and became affiliated with the Inland company in 1910.

Export Tonnage Highest for a Year

Imports of Iron and Steel Fall Off 9 Per Cent—Rails, Pipe, Tin Plate and Sheets Were Largest Finished Items Exported

WASHINGTON, Feb. 25.—Aggregating 205,766 gross tons, exports of iron and steel products from the United States in January were the highest for any month since January, 1927, when they totaled 215,235 tons. At the same time imports in January, amounting to 58,635 tons, were the lowest since last September's total of 58,464 tons. Exports in January exceeded by 37,338 those of December, 1927, while imports in January were 5553 tons less than those of December. For the seven months ended with January exports totaled 1,255,134 tons, a decrease of 106,393 tons from those for the corresponding period one year ago. Imports for the seven months ended with January, 1928, amounting to 425,170 tons, were 152,315 tons less than those for the corresponding period last year.

Gains made in exports in January when compared with December were reflected in a number of products, including scrap, ingots and semi-finished steel, steel bars, galvanized sheets, black steel sheets, hoops and bands, tin plate, steel rails, steel tubes and pipe and cast iron pipe. Losses were made in a number of items also, including plates, black iron sheets, structural material and iron castings. For the seven months ended with January, as against the corresponding period of one year ago, gains were made in scrap, increasing to 163,626 tons from 46,167 tons; pig iron, plain wire, barbed wire and woven wire fencing, wire nails, cast iron pipe, iron castings and forgings. Losses were made in a wide range of other products, such as semi-finished material, steel bars, galvanized sheets, black steel and black iron sheets, tin plate, structural steel, steel rails, steel pipe and tubes and car wheels and axles.

Decreases in imports in January when compared with February were made in pig iron, ferromanganese, structural shapes, steel bars, cast iron pipe and a number of other items, with no notable gains. By far the heaviest decline during the seven months ended with January, when compared with the corresponding period one year ago, was made in incoming shipments of pig iron, amounting to 83,376 tons and 136,768 tons respectively. The largest gain made was in imports of structural shapes, totaling 97,592 tons, against 84,641 tons.

Canada took 11,535 tons of the 29,376 tons of scrap exported in January, while Japan took 16,933 tons. Of the 8093 tons of steel bars exported during the month, Canada took 4703 tons and the United Kingdom 1310 tons. Canada was the destination of 7933 tons of the 8947 tons of plates exported. Japan led as the destination for black steel sheets, taking 10,844 tons of the 17,552 tons exported, while Canada took 3759 tons. Japan also was the principal consumer of tin plate exports in January, taking 8908 tons of the 19,668 tons exported;

Exports of Iron and Steel from the United States

(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Pig iron	4,403	3,734	32,856	19,826
Ferromanganese	1	55	1,349	468
Scrap	29,376	3,735	163,626	46,167
Pig iron, ferroalloys and scrap	*33,780*	*7,524*	*197,831*	*66,461*
Ingots, blooms, billets, sheet bar, skelp	5,674	3,212	64,952	74,993
Wire rods	3,970	2,319	11,486	12,223
Semi-finished steel	*9,644*	*5,531*	*76,438*	*87,216*
Steel bars	8,093	12,337	62,638	82,041
Alloy steel bars	521	490	3,641	2,861
Iron bars	395	432	1,743	3,455
Plates, iron and steel	10,009	10,470	79,289	80,476
Sheets, galvanized	11,097	19,474	77,504	109,767
Sheets, black steel	17,552	15,506	79,848	104,430
Sheets, black iron	1,036	1,570	9,306	9,935
Hoops, bands, strip steel	3,319	4,037	21,110	25,150
Tin plate; terne plate	19,668	41,874	121,033	194,310
Structural shapes, plain material	9,812	9,048	91,766	90,250
Structural material, fabricated	6,560	4,985	42,778	39,192
Steel rails	23,174	23,387	100,709	139,956
Rail fastenings, switches, frogs, etc.	9,370	3,164	27,112	24,762
Boiler tubes, welded pipe and fittings	21,787	42,300	132,414	199,773
Plain wire	3,786	2,271	23,362	14,140
Barbed wire and woven wire fencing	5,314	2,222	34,458	22,122
Wire cloth and screening	182	239	1,320	1,215
Wire rope	485	472	2,623	2,633
Wire nails	1,477	770	7,898	6,325
Other nails and tacks	736	647	5,190	3,772
Horseshoes	55	37	371	370
Bolts, nuts, rivets and washers, except track	867	1,002	7,332	7,151
Rolled and finished steel	*155,295*	*196,734*	*933,445*	*1,164,086*
Cast iron pipe and fittings	2,863	1,773	17,707	16,885
Car wheels and axles	932	1,115	7,988	9,227
Iron castings	1,065	770	6,993	5,130
Steel castings	707	421	3,523	3,327
Forgings	394	211	2,533	1,346
Castings and forgings	*5,961*	*4,290*	*38,744*	*35,915*
All other	1,086	1,156	8,676	7,849
Total	205,766	215,235	1,255,134	1,361,527

Imports of Iron and Steel into the United States

(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Pig iron	11,127	9,326	83,376	136,768
Ferromanganese*	5,184	1,201	26,779	21,894
Ferrosilicon	405	957	2,495	8,790
Ferrochrome	31	359	84	552
Scrap	4,674	5,920	30,955	60,719
Pig iron, ferroalloys and scrap	*21,421*	*17,763*	*143,689*	*228,723*
Steel ingots, blooms, billets and slabs	1,319	944	8,475	12,721
Iron blooms, slabs, etc.	.....	.....	91	306
Wire rods	1,079	1,512	12,470	6,697
Semi-finished steel	*2,398*	*2,456*	*21,036*	*19,724*
Rails and splice bars	3,150	2,744	9,181	29,027
Structural shapes	11,080	11,363	97,592	84,641
Boiler and other plates	58	452	1,553	2,321
Sheets and saw plates	4,292	1,646	12,577	9,004
Steel bars	7,876	6,560	48,549	55,601
Bar iron	149	632	1,987	3,114
Hoops, bands and cotton ties	1,683	2,946	20,764	20,469
Tubular products (wrought)	2,046	5,146	19,690	24,694
Nails, tacks, staples	181	526	2,672	3,964
Tin plate	39	23	211	241
Bolts, nuts, rivets and washers	25	21	244	142
Round iron and steel wire	294	185	1,905	2,536
Barbed wire	350	459	1,531	1,367
Flat wire; strip steel	135	344	1,257	2,277
Steel telegraph and telephone wire	46	23	51	1,069
Wire rope and strand	94	117	909	1,423
Other wire	41	21	931	458
Wire cloth and screening	.....	48	.....	272
Rolled and finished steel	*31,539*	*33,256*	*221,604*	*242,620*
Cast iron pipe	2,778	9,534	36,997	64,606
Castings and forgings	499	443	1,844	1,812
Total	58,635	63,452	425,170	557,485
Manganese ore*	9,376	50,605	170,015	204,323
Iron ore	251,178	295,480	1,591,139	1,600,937
Magnesite (dead burned)	2,990	.....	29,235	20,459

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*Manganese content only.

United States Imports of Iron and Steel Products During January, 1928

(In Gross Tons)

Belgium	15,322	Canada	4,997
Czechoslovakia	125	Panama	381
France	6,022	Mexico	29
Germany	10,211	Jamaica	628
Netherlands	1,720	British India	5,634
Norway	1,209	Hong Kong	2
Poland and Danzig	2,539	Japan	27
Sweden	1,228		
United Kingdom	8,561	Total	58,635

Canada took 2226 tons; Argentina, 1684 tons, and China, 1536 tons. Neither Canada nor Japan took any American rails in January. China was the greatest purchaser of this product, taking 8833 tons of the 23,174 tons exported. Brazil took 4213 tons; Guatemala, 2088 tons; Chile, 1477 tons; Argentina, 1356 tons.

Of the 11,127 tons of pig iron imported in January, British India supplied 5634 tons; the United Kingdom, 3750 tons, and the Netherlands, 1446 tons. Only 40 tons were received from Germany. The United Kingdom was the source of 2487 tons of the 5184 tons of ferromanganese imported during the month. Canada supplied 1459 tons and Norway 1204 tons. Belgium was the source of 5200 tons of the 7876 tons of steel bars imported in January; Germany, 1067 tons, and France, 1050 tons. Of the 11,080 tons of shapes imported during the month, 6758 tons came from Belgium; 2498 tons from Germany and 1567 tons from France. France also supplied 2443 tons of the 2498 tons of cast iron pipe imported during January.

Indiana and Michigan Wire Fence Manufacturers to Merge

Plans are being formulated for a merger of the Dwiggins Wire Fence Co., Anderson, Ind., and the Crawfordsville Wire & Nail Co., Crawfordsville, Ind., with the Adrian Fence Co., Adrian, Mich. The consolidated company will be known as the Mid-States Steel & Wire Co., with headquarters at Crawfordsville. Stockholders of the two Indiana companies have already approved the merger. J. E. Vandeventer, former secretary and treasurer of the Dwiggins company, will be chairman of the new company, and John Sommer, president of the Crawfordsville company, will be president. Consolidation will be effected through an exchange of stock, according to Floyd A. Deahl & Associates, Cleveland, who are handling the merger.

American Rolling Mill Co. Operating Sheet Mills Full

CINCINNATI, Feb. 28.—The American Rolling Mill Co. is operating all of its sheet mills at its various plants at 100 per cent of capacity and orders in hand are sufficient to carry through March. A number of contracts for second quarter have been made. Releases of tonnages on current contracts by automobile manufacturers have attained a substantial volume, while demand from other sources, notably from distributers, has been heavy. The company has just put into operation at its East Side works at Middletown, Ohio, a third long terne pot.

Carnegie Steel Co. Abandons Plan to Scrap Isabella Furnaces

The Carnegie Steel Co. has abandoned plans to dispose of the site of the Isabella furnaces, Etna, Pa., just outside the city limits of Pittsburgh on the Allegheny River, and the company soon will start the construction of a conveying system that will make it possible to serve these furnaces with river-shipped coke. These furnaces are located well back from the river and coke could be brought to them only by railroad, making the delivered cost high whether the coke came from the Connellsville district or by water from the Carnegie byproduct coke plant at Clairton, Pa. Because coke could be brought to the Lucy furnaces, located in Pittsburgh on the Allegheny River, they have been operated and the Isabella furnaces, which are larger and more modern and also are outside the high taxes of the city of Pittsburgh, have been idle. A short time ago it was thought likely the Isabella furnaces would be dismantled and the site sold to the Baltimore & Ohio Railroad for extension of its freight terminal facilities. The Lucy and Isabella furnaces are used principally in the production of ferromanganese.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

	December, 1927	January, 1928	January, 1927
North and Central America and West Indies	*81,033*	*78,478*	*78,606*
Canada and Newfoundland	61,787	61,647	56,213
Cuba	5,006	3,892	6,918
Mexico	6,295	4,874	7,976
Guatemala	333	3,284	531
Salvador	3,452	217	425
Panama	1,186	448	1,022
British West Indies	629	541	1,717
Other West Indies	944	2,619	2,227
Other Central America	1,401	956	1,577
South America	*27,713*	*39,035*	*56,007*
Argentina	6,915	10,063	11,540
Brazil	3,492	9,018	13,168
Chile	4,917	5,810	1,935
Colombia	5,192	4,656	12,713
Peru	1,776	1,261	974
Venezuela	3,486	7,345	13,505
Other South America	1,935	882	2,172
Europe	*9,785*	*9,347*	*17,293*
France	173	237	459
Italy	1,763	848	1,039
Rumania	749	385	593
Turkey	77	21	560
United Kingdom	4,316	4,705	10,358
Other Europe	2,707	3,151	4,284
Far East	*47,127*	*77,861*	*61,045*
Australia	1,670	2,559	3,963
British Malaya	723	504	2,745
China	4,748	14,857	8,786
Dutch East Indies	1,912	2,190	6,744
India	1,792	1,191	4,363
Japan	27,054	47,320	26,651
Kwangtung	344	1,435	311
Philippine Islands	6,702	7,390	4,367
Other Asia and Far East	2,182	415	3,115
Africa	*2,770*	*1,045*	*2,332*
British South Africa	2,442	752	769
Egypt	86	66	398
Portuguese East Africa	61	46	881
Other Africa	181	181	284
Total	168,428	205,766	215,235

Standard Steel Car Co. Acquires Illinois Car & Mfg. Co.

The Standard Steel Car Co., Hammond, Ind., has taken over the Illinois Car & Mfg. Co., with plants at Hammond and Richmond, Ind., and Chicago Heights, Ill. Patrick H. Joyce, president of the Illinois company, will become one of the vice-presidents of the Standard Steel Car Co.

Suspend Proposed Rate Increases on Waster Plates and Sheets

WASHINGTON, Feb. 28.—The Interstate Commerce Commission has suspended until Oct. 1 tariffs which propose to increase the rates on waster plates or sheets, in carloads, between points in Central Freight Association territory. Illustrative of the schedules is the proposal to increase the rate from Middletown, Ohio, to Detroit from $3.65 to $5.94 per 100 lb.

Foundry Equipment Orders

Net orders for foundry equipment received by 18 members of the Foundry Equipment Manufacturers' Association in January amounted to 128.5 per cent of the average monthly shipments during 1922, 1923 and 1924. Shipments during the month were 116.4 per cent, and unfilled orders at the end of the month, 120.6 per cent. The three-month average of gross orders is given as 110.7 per cent.

Machinery Markets and News of the Works

FEBRUARY BUSINESS OFF

Machine Tool Orders in the Month Fall Below Those of January

Orders for the First Two Months, However, Ran Ahead of Bookings in Same Period Last Year

MACHINE tool sales in February did not equal those of January, some estimates being that the average decline in orders was about 10 to 15 per cent. Sales for the first two months of this year, however, exceeded those for the corresponding period in 1927. Demand for high-production tools kept up fairly well during the last month and some companies which specialize in that field report that their February sales did not suffer as compared with January, but most lines of standard tools were affected.

The large volume of outstanding quotations on recent inquiries gives promise of a fairly substantial business in March, but the situation is difficult to appraise because of the unevenness of industrial operations. Business in the Detroit automobile manufacturing district is not up to expectations.

The Apex Electric Mfg. Co., Cleveland, is inquiring for a number of tools for the manufacture of washing machines. The Ashtabula Bow Socket Co., Ashtabula, Ohio, has bought a few tools. The T. L. Smith Co., Milwaukee, is in the market for about $40,000 worth of shop equipment.

Several Western railroads are preparing to enter the market for their 1928 tool requirements. No action has been taken by the Atchison, Topeka & Santa Fe and the Delaware, Lackawanna & Western on pending lists.

New York

NEW YORK, Feb. 28.

THERE is a fair volume of machine tool purchasing and inquiries from industrial users continue to accumulate. The General Electric Co. has been making purchases of tools for its refrigerator and motor departments and still has a list of about 10 tools to close. The Wright Aeronautical Corporation has made further purchases and still has several machines to buy. Additional inquiries have been issued by the New York Central Railroad, but while this purchaser has a sizable total of machine tools under inquiry, it has not closed any business for some time. No action has been taken as yet by the Delaware, Lackawanna & Western Railroad, which has a list of 30 tools under consideration.

Included in recent industrial purchases of machine tools were two Pratt & Whitney jig boring machines by an electric manufacturer, duplex hand centering machine by a gear maker in the Middle West, Pratt & Whitney No. 3 die sinker by a socket manufacturing company, 20 x 72-in. lathe by a Michigan company, 6-in. vertical shaper by an electric company in New Jersey, 12-in. vertical shaper by a tube company in Pennsylvania, Brown & Sharpe No. 2 G. automatic screw machine by a California company, Espen-Lucas No. 285 semi-automatic billet sawing machine by a Connecticut company.

Purchases of used tools have included an 18-in. Gleason bevel gear testing machine by a Connecticut machinery manufacturer, Wilson electric welding machine and Bement No. 2 horizontal cotter drill by a Pittsburgh company.

Bids are being asked by Knickerbocker Ice Co., 41 East Forty-second Street, New York, for a one-story addition to ice-manufacturing plant, 155 x 160 ft., at Flushing, L. I., to cost more than $70,000 with equipment. C. Leslie Weir is company architect, address noted.

American Zinc, Lead & Smelting Co., 331 Madison Avenue, New York, has plans for additions to plant at East St. Louis, Ill., to cost close to $500,000 with equipment. Lockwood, Greene & Co., 1 Pershing Square, New York, and Wilson Building, Charlotte, N. C., are architects and engineers.

Wood Newspaper Machinery Corporation, 501 Fifth Avenue, New York, manufacturer of printing presses, etc., with plant at Plainfield, N. J., has arranged for a stock issue of $717,500, portion of proceeds to be used for expansion in production, particularly for a new printing press unit.

Signal Corps Procurement District, Governors Island, N. Y., will receive bids until March 8, for motor alternators in lots of 25 to 200, circular 111; also for quantity of electrical instruments, circular 112; until March 13 for outpost wire in lots of 1200 to 2100 millimeters, circular 109.

Eleto Co., 153 East Twenty-fourth Street, New York, subsidiary of Lord & Taylor and James McCreery & Co., 5 West Thirty-fourth Street, department stores, operating for storage and distribution of both interests, has awarded general contract to White Construction Co., 95 Madison Avenue, for a ten-story, basement and sub-basement plant, including cold storage plant of 150,000 cu. ft. capacity; automobile service and repair department and garage on third floor, and divisions for manufacture of furniture. Distributing and sorting departments, first and second floor, will be equipped with belt conveyors, chutes and other mechanical handling equipment. Entire project will cost $2,500,000 with equipment.

Chupurdy Auto Coach Works, Inc., 444 West Forty-fifth Street, New York, manufacturer of automobile bodies, with repair division, has leased entire building 50 x 100 ft., at 213-15 West Sixty-fourth Street, for a new plant and will remove to new location. Additional equipment will be installed.

Department of Public Works, Division of Highways, Albany, N. Y., has plans for two two-story additions to repair and equipment maintenance shop at Poughkeepsie, N. Y., to cost approximately $75,000 with equipment. A. W. Brandt is commissioner.

Roberts-Boice Paper Co., Poughkeepsie, N. Y., will rebuild portion of the storage and distributing plant recently destroyed by fire, with loss estimated at $150,000 including equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 6 for 42 galvanized steel towers for Brooklyn Navy Yard, schedule 8528; also for 5 motor generators, control panels and spares, schedule 8525, and for spare parts for turbo-generator sets, schedule 8585.

Bayonne Steel Ceiling Co., 223 West Nineteenth Street, New York, will soon take bids on revised plans for a two-story plant at Long Island City, to cost about $75,000 with equipment. William Higginson, 101 Park Avenue, is architect and engineer.

New Rochelle Water Co., 514 Main Street, New Rochelle, N. Y., will take bids for a two-story equipment repair, service and distributing building, with automobile service and garage, 45 x 120 ft., to cost more than $80,000 with equipment. H. B. Peare, 11 North Avenue, is architect.

H. J. Nurick, 44 Court Street, Brooklyn, architect, has plans for a new automobile service, repair and garage building, 75 x 235 ft., to cost close to $100,000 with equipment.

Board of Education, Rensselaer, N. Y., is considering installation of manual training equipment in its two-story junior high and grade school, to cost about $200,000. C. H. Gardinier, 75 State Street, Albany, N. Y., is architect.

Borough Council, Spring Lake, N. J., is considering installation of a municipal electric light and power plant, and will soon secure estimates of cost.

Rubberstone Corporation, 1 Madison Avenue, New York, manufacturer of flooring, etc., has acquired property, 100 x 300 ft., at Hillside, N. J., improved with a one-story factory, for a new plant.

Consolidated Safety Pin Co., 46 Farrand Street, Bloomfield, N. J., will proceed with superstructure for a three-story addition, 34 x 75 ft., for which general contract has been let to John B. Roberts, 949 Broadway, New York, to cost upward of $70,000 with equipment.

Transogram Co., 148 Thirty-ninth Street, Brooklyn, manufacturer of toys, games, etc., has plans for a one-story plant, 90 x 400 ft. at Haskell, N. J., to cost about $50,000 with equipment, and will remove to new location. Additional machinery will be installed. Oscar Goldschlag, Inc., 1482 Broadway, New York, is architect and engineer.

Ovens, power equipment and other machinery will be installed in the three-story plant to be erected by Forester Bakery, Inc., Bergenfield, N. J., to cost $100,000 with equipment. McCormick Co., 41 Park Row, New York, is architect and engineer.

Armstrong Cork Co., Codwise Avenue, New Brunswick, N. J., has awarded general contract to George B. Rule, Inc., 71 John Street, for rebuilding of portion of local finishing mill and distributing building, recently destroyed by fire, to be one story, 115 x 175 ft., to cost more than $60,000 with equipment. Henry Boettcher, Lancaster, Pa., is architect. Company headquarters are at last noted place.

Colony Paper Box & Novelty Co., Jersey City, N. J., has leased with option to purchase the three-story factory at Guttenberg, N. J., including one-story factory adjoining, for a new plant for manufacture of paper boxes, corrugated containers, etc.

Board of Education, City Hall, Newark, will install a manuel training department in an addition to West Side high school to cost $200,000, for which superstructure will be placed under way at once.

Airport Construction Corporation, 21 East Fortieth Street, New York, has been organized to construct airports, airplane hangars, mooring towers and kindred structures. Clarence D. Chamberlin, transAtlantic flyer, will be associated with company in consulting capacity.

Excelsior Plimptruck Co., Stamford, Conn., has been organized to manufacture trucks formerly made by Plimpton Lift Truck Corporation. Operations have not yet begun.

Central Metering Corporation, Grand Central Terminal, New York, has been organized to engage in sub-metering, and will be in market for new and used meters.

Hamilton-Diuguid, Inc., 1111-13 Bedford Avenue, Brooklyn, has been organized to succeed H. A. Diuguid Co. and will do motor rebuilding and general machine work.

Standard Sales & Mfg. Corporation, 103 Park Avenue, New York, has been organized to manufacture steel mail boxes for apartment and office buildings. It will also make stamped steel milk bottle receivers, fire place dampers, ashpit dumps, clean out doors and medicine cabinets. Products are at present being manufactured under contract, but company expects to have its own plant equipped in May and will then be in market for raw materials.

Leeds, Tozzer & Co., 75 West Street, New York, has been appointed special representative for Eastern railroads for Universal Crane Co., Cleveland. Recent statement in these columns that the New York company would represent Universal organization on all products is incorrect, as remainder of trade will continue to be handled by company's other office in New York.

St. Louis

St. Louis, Feb. 27.

PLANS are being considered by Pagne Mfg. Co., Twenty-ninth Street and Southwest Boulevard, Kansas City, Mo., manufacturer of tin cans and other containers, for a one-story factory to cost about $35,000 with equipment.

Gill & Jackson, Buder Building, St. Louis, architects, have asked bids on a six-story automobile service, repair and garage building, 102 x 145 ft., to cost $350,000 with equipment.

Oklahoma Natural Gas Corporation, Oklahoma City, Okla., is disposing of a preferred stock issue to total $7,500,000, portion of fund to be used for expansion, including pipe line construction. Company recently sold a bond issue of $14,000,000 for similar work.

C. L. Monnot, Magnolia Building, Oklahoma City, Okla., architect, has superstructure in progress for a two-story automobile service, repair and garage building, 140 x 160 ft., to cost close to $100,000 with equipment.

City Council, Trenton, Mo., has engaged Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer, to prepare plans for a municipal electric light and power plant, to cost in excess of $60,000 with equipment.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., is said to have plans for four new power houses at Healdton, Lexington, Meeker and near Wynnewood, Okla., to cost upward of $200,000 with equipment. Stations will be used in connection with pipe line project of Shell Pipe Line Co., now in progress.

Joslyn Mfg. & Supply Co., North Kansas City, Mo., manufacturer of tubes, knobs and other equipment, has filed plans for a one-story factory, 55 x 165 ft., to cost $35,000. It will replace plant recently destroyed by fire. Headquarters are at 133 West Washington Street, Chicago.

City Council, Hannibal, Mo., is planning extensions and improvements in municipal electric light and power plant, to cost approximately $150,000 with equipment. Arnold Engineering Co., 565 West Washington Street, Chicago, is engineer.

Board of Education, Kearney, Neb., has plans for a one-story addition to manual training school, to cost about $40,000 with equipment. H. M. McClure, Kearney, is architect.

Western Ice & Cold Storage Co., Shawnee, Okla., operating Shawnee Ice Co., is planning extensions and improvements in ice-manufacturing and cold storage plant to double present capacity, to cost upward of $50,000.

L. J. Kent Boiler & Sheet Iron Works, 700 East Brower Street, Springfield, Mo., is planning installation of a milling machine, shaper and other tools in connection with a one-story addition to cost approximately $40,000.

Roxanna Petroleum Co., Mayo Building, Tulsa, Okla., has plans for a new gasoline refinery near Marshall, Okla., with initial capacity of about 60,000 gal. per day, to cost close to $100,000 with equipment.

R. H. Sanneman, Lee Building, Kansas City, Mo., architect, will soon begin superstructure for a one-story automobile service, repair and garage building, 170 x 240 ft., to cost approximately $150,000 with equipment.

East Arkansas Compress Co., Forrest City, Ark., A. G. Davidson, head, is contemplating a one-story cotton compressing plant, to cost about $85,000 with equipment.

Cutter Machine Co., 3723 Commonwealth Avenue, St. Louis, has taken over manufacture of grinding and polishing machinery formerly conducted by St. Louis Machine Tool Co., latter company having ceased manufacturing activities.

Union Pacific Railroad Co., Omaha, Neb., is reported planning a rock quarry for development of limestone property near Granite Canyon, Wyo., to cost about $150,000 with machinery.

Cleveland

Cleveland, Feb. 27.

MACHINE tool sales continue rather moderate although a little improvement was reported the past week. Orders are coming from scattered sources and consist mostly of single machines. The Apex Electric Mfg. Co., of Cleveland, is planning expansion of its manufacturing facilities for making washing machines and is inquiring for a number of tools, including drilling machines. The Ashtabula Bow Socket Co., Ashtabula, Ohio, purchased several tools the past week; Steel & Tubes, Inc., Cleveland, bought a 96-in. shear for its Elyria plant and the Central Alloy Steel Corporation, Massillon, purchased a vertical shaper for its Berger plant. Makers of turret lathes report a gain in single tool orders.

Plans are being considered by Massillon Steel Casting Co., Massillon, Ohio, for a one-story foundry to cost close to $35,000 with equipment.

Police Fire Alarm Mfg. Co., Akron, Ohio, care of Philip E. Hart, 418 Merriman Road, recently formed by Mr. Hart and associates, is arranging for early contruction of a one-story plant, to cost about $25,000 with equipment.

General Tire & Rubber Co., Akron, has acquired property at Kansas City, Mo., and plans construction of new three-story factory branch and distributing plant to cost approximately $175,000 with equipment.

Board of Education, Fairview Village, Ohio, plans installation of manual training equipment in a two-story senior and junior high eschool to cost $230,000, for which bids will be taken at once on general contract. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, are architects.

National Milling Co., Front Street, Toledo, Ohio, has awarded general contract to Gettins-Kopitke Co., Wabash Avenue and Fifteenth Street, for a new flour mill unit, with packing and distributing facilities, to cost approximately $500,000 with machinery.

Mullins Body Co., Salem, Ohio, manufacturer of automobile bodies, is considering a one-story addition, 50 x 290 ft., to cost about $75,000 with machinery.

Oil Products Co., East Toledo, Ohio, is planning to rebuild portion of plant destroyed by fire Feb. 13, with loss more than $50,000 including equipment.

City Council, Akron, has approved a bond issue of $900,000 for purchase of 600 acres of land in southeastern part of city and establishment of municipal airport, with hangars, shops and other structures. Negotiations are in progress with Goodyear Tire & Rubber Co., for construction of its plant for production of Goodyear-Zeppelin dirigibles on portion of tract. Latter project is estimated to cost upward of $1,500,000.

New England

BOSTON, Feb. 27.

FEBRUARY closes with mixed reports from machine tool dealers. Those who did little business in January report a marked increase in this month's sales, while a majority of dealers just about broke even in both months. The net result represents a fair gain for the trade, as a whole, in February. Machine tool builders generally will do better than in January, but business is quite spotty. Some Connecticut tool manufacturers are getting good export as well as domestic business. Local machinery trade again fell off the past week, particularly in the used tool field. The most important sales included two thread millers to a Rhode Island shop, a 20 ft. x 48-in. lathe to a Worcester plant, three tool room lathes to as many Boston plants, a used pipe machine to a greater Boston shop, a used steam hammer to a Rhode Island firm, and a 14-in. used lathe and milling machine to a Vermont company.

The city of Boston has not yet awarded the tools required for a continuation school. Bids closed Feb. 23 for miscellaneous wood-working tools for another Boston school, and will close March 1 on miscellaneous millwright equipment for still another school. Bids close tomorrow on lathes and grinding machines for the Government at Newport, R. I.

Small tools continue in fair demand, but February sales will fall short of those in January.

Stanley S. Porter, 462 Main Street, Melrose, Mass., has started work on a one-story automobile repair shop. Plans are private.

New England Metal Culvert Co., Palmer, Mass., has purchased 19,238 ft. of land with railroad siding, and has let contract for a plant at 10 Alger Street, Boston. It will be ready to operate May 1.

J. Trainor, architect, has plans in progress for a two-story, 40 x 280 ft. molding compounds plant unit for General Electric Co., Pittsfield, Mass. C. C. Chesney is general manager.

Walworth Co., Boston, pipe fittings, etc., has leased space in Statler office building, Park Square district.

Donlan Foundry Co. has taken over plant and business of G. E. Hoglund Foundry Co., Gardner, Mass.

Northern Connecticut Light & Power Co., Thompsonville, Conn., has engaged J. G. White Engineering Corporation, 43 Exchange Place, New York, engineer, to prepare plans for a hydroelectric generating plant on Connecticut River, near Windsor Locks. It will have initial capacity of 50,000 hp., and will cost more than $1,500,000 with transmission lines.

Chickering & Sons, 791 Tremont Street, Boston, manufacturers of pianos, piano mechanisms, etc., are arranging for early removal of their local factory to a new plant now in course of construction at Roxbury Crossing, to cost more than $100,000.

E. Ingraham Co., North Main Street, Bristol, manufacturer of clocks, clock movements, etc., has awarded general contract to Charles Smith & Sons, Derby, Conn., for a one-story addition to its press department, 25 x 160 ft., to cost about $40,000.

New England Water, Light & Power Co., Providence, R. I., is being organized by Arthur B. Lisle, Providence, formerly vice-president and general manager Narragansett Electric Lighting Co., and associates, with capital of $4,000,000, to take over and operate electric light and power companies in New England, to include power plant development and transmission line construction.

Jewell Belting Co., Hartford, Conn., manufacturer of mechanical belting, has arranged for sale of its local plant and machinery and will discontinue operations here.

Robert Gair Co., Montville, Conn., manufacturer of corrugated boxes and containers, has plans for a power house to cost about $45,000 with equipment. Headquarters are at 420 Lexington Avenue, New York.

Locke-Stevens Corporation, 94 Warrenton Street, Boston, manufacturer of plumbing equipment and supplies, has filed plans for extensions and improvements to cost close to $20,000.

New England Public Service Co., Augusta, Me., operating Central Maine Power Co., Public Service Co. of New Hampshire and other light and power utilities, is disposing of a preferred stock issue of $2,425,000, a portion of proceeds to be used for expansion, including acquisition of additional properties, and extensions in generating and transmission line facilities. Walter S. Wyman is president.

Arrow Knitting Needle Co., Manchester, N. H., is carrying out an expansion program, including installation of additional equipment.

Gulf States

BIRMINGHAM, Feb. 27.

PLANS are being completed by Central Power & Light Co., San Antonio, Tex., for an addition to its power house at Victoria, Tex., including installation of 6000 kw. turbo-generator and auxiliary equipment. An extension will also be built to local ice-manufacturing plant, with machinery to increase capacity to 120 tons per day.

Chamber of Commerce, Slattery Building, Shreveport, La., H. F. Porter, secretary, has plans for a one-story machine shop in connection with a hangar to be built at Steere aviation field.

Birmingham Electric Co., Birmingham, is disposing of a bond issue of $9,200,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

Hidalgo Utilities Co., Hidalgo, Tex., is planning a new one-story ice-manufacturing plant, to cost approximately $50,000 with equipment.

Mason Foundry Co., Laurel, Miss., has approved plans for a one-story machine shop and foundry addition, to cost close to $40,000 with equipment.

St. Louis & Southwestern Railway Co., Tyler, Tex., is said to be planning extensions and improvements in car and locomotive shops, to cost $95,000 with equipment. W. S. Hanley is chief engineer.

In connection with an appropriation of about $4,500,000 for line extensions and improvements in 1928, Missouri-Kansas-Texas Railroad Co., Dallas, Tex., will expend $227,393 for new shop machinery and tools for repair works in Texas area.

E-Z Opener Bag Co., Decatur, Ill., has plans for a new paper mill and bag manufacturing plant at Tuscaloosa Ala., including power house, machine shop and other units, entire project to cost more than $4,000,000 with machinery.

Dry-Kold Products Co., Dallas, Tex., is planning early construction of a one-story plant for production of dry ice, a special compressed carbonic gas, to cost $40,000 with equipment.

Texas Utilities Co., Mineral Wells, Tex., operated by Community Power & Light Co., is planning construction of one-story ice-manufacturing plant, to cost close to $80,000 with machinery.

Moody-Seagreaves Corporation, Esperson Building, Houston, Tex., operating pipe lines for oil transmission, is said to be planning a new line for natural gas from Richland Parish field to a point near St. Louis, to cost more than $12,000,000 with compressor stations, etc.

Atchison, Topeka & Santa Fe Railway Co., Amarillo, Tex., has asked bids for a one-story machine repair shop, 200 x 500 ft., at its local works, to cost in excess of $100,000 with equipment. M. C. Blanchard is chief engineer of Western lines.

Phillips Petroleum Co., Bartlesville, Okla., is reported planning construction of carbon black plants in Carson and Hutchinson Counties, Tex., to include machine shops, pipe lines, tramway system and other mechanical equipment, to cost about $175,000 each.

Alabama Power Co., Birmingham, is said to be arranging for early construction of a steel water tower at Florence, Ala., 150,000 gal. capacity, to cost about $40,000.

Tropical Furniture Co., Miami, Fla., has been formed by officials of General Industrial Corporation, Miami, to take over and operate factory of Roman Mfg. Co., N. W. Seventh and Thirteenth Streets, manufacturer of furniture. Purchasing company will remodel plant and install additional machinery. C. W. Heller is president of General Industrial organization.

Cotton Concentration Co., Twelfth and A Streets, Galveston, Tex., is contemplating an addition to its plant on Broadway for cotton compressing, to cost about $75,000 with machinery.

Eternit, Inc., Fifteenth and Locust Streets, Philadelphia, manufacturer of asbestos shingles, etc., has leased property at Houston, Tex., for a new factory branch and distributing plant, to cost more than $50,000.

Western Public Service Co., Alvin, Tex., is planning early purchase of an electrically-operated pumping unit, 500 gal. per min., in connection with extensions and betterments in waterworks. A quantity of cast iron pipe will be purchased. Carlton Ely is local superintendent.

City Council, Monroe, La., is asking bids until March 14 for two 4200-gal. per min., one 3100-gal. per min. and one 10,000-gal. per min. centrifugal pumping units, with accessories, for municipal waterworks, including eight-panel switchboard, motors for pumps and auxiliary equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Southern Ice & Utilities Co., Santa Fe Building, Dallas, Tex., has plans for a one-story ice-manufacturing plant at Big Spring, Tex., for initial capacity of 100 tons per day.

Philadelphia

PHILADELPHIA, Feb. 27.

FOLLOWING recent purchase of shipyard of William Cramp & Sons Ship & Engine Building Co., Philadelphia, by Francis J. McDonald, head of Philadelphia Ship Repair Co., a new organization, Kensington Shipyard & Dry Dock Co., has been formed to take over and operate plant. Plans are under way for expansion and improvements to cost about $500,000. Mr. McDonald is president of new company; Francis J. McDonald, Jr., secretary, and John E. Worthington, treasurer.

Nice Ball Bearing Co., Thirtieth Street and Nicetown Avenue, Philadelphia, will soon take bids for an addition, to cost more than $40,000 with equipment.

Norton Co., Worcester, Mass., has awarded general contract to Harry McGill, Jr., Philadelphia, for a two-story and basement factory branch and distributing plant, 57 x 100 ft., at Philadelphia, to cost about $50,000. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Charles Kahn, Morris Building, Philadelphia, has acquired property, 119 x 151 ft., at Fifty-seventh and Walnut Streets, and plans construction of a multi-story automobile service, repair and garage building, to cost in excess of $100,000 with equipment.

Pennsylvania Railroad Co., Philadelphia, plans expansion in its car and locomotive repair shops at Todd's Cut, Wilmington, Del., to provide for work on district lines heretofore carried out at West Philadelphia shops, centralizing operations at Wilmington; a new main shop unit is proposed, reported to cost more than $75,000 with equipment. Plans have been completed for an electrical repair shop at Todd's Cut plant, in connection with electrification of Philadelphia-Wilmington lines, now under way.

E. I. duPont deNemours & Co., duPont Building, Wilmington, Del., is arranging for immediate erection of a new plant at Gibbstown, N. J., for production of ammonia under a new process, to cost more than $400,000 with equipment.

Board of Education, Camden, N. J., plans installation of manual training equipment in a high school to be erected at East Camden, to cost in excess of $400,000 with equipment.

Board of Trustees, Drexel Institute, Thirty-second and Chestnut Streets, Philadelphia, will soon take bids on general contract for a new mechanical engineering building, 192 x 470 ft., to cost in excess of $500,000. Simon & Simon, 249 South Juniper Street, are architects.

duPont Powder Co., duPont Building, Wilmington, Del., is arranging an expansion and improvement program at its Barksdale, Wis., plant for increased production of nitric acid, to cost $400,000 with equipment.

Milton Canning Co., Milton, Del., will rebuild portion of plant destroyed by fire Feb. 18, with loss reported in excess of $200,000, including machinery.

Ovens, power equipment, conveying and other machinery will be installed in one and two-story plant to be erected by Heimbach Baking Co., Allentown, Pa., to cost $225,000. Jacoby & Evertt, Commonwealth Building, are architects.

Fire, Feb. 23, destroyed a portion of building at Second and Erie Streets, Camden, N. J., occupied by Philadelphia Metal Stamping Co., Allied Metal Stamping Co., William McIntosh Metal Stamping Co., and James A. MacMillan Chemical Co., with total loss, divided among companies noted, estimated at $200,000.

South Chester Tube Works, Inc., Front and Thurlow Streets, Chester, Pa., manufacturer of steel tubing, pipes, etc., is planning a one-story addition, to cost in excess of $45,000 with equipment.

Board of Freeholders, Camden, N. J., has work in progress on a new County vocational school, to cost $950,000 with equipment.

Bethlehem Steel Co., Bethlehem, Pa., has authorized an expansion and improvement program at its limestone quarries at Naginey, Pa., including installation of electrically-operated crushing machinery, breakers, screens, cranes, cars and other equipment. Entire project will cost about $200,000.

Shirley B. Watts, Harrisburg, Pa., has acquired automobile service, repair and garage building on Herr Street and plans enlargements with installation of additional equipment to cost approximately $100,000. Mr. Watts was formerly local manager for Bell Telephone Co. and will operate garage property as a new enterprise.

National Metal Edge Box Co., Callowhill at Thirteenth Street, Philadelphia, manufacturer of paper box machinery, paper box corner stays and kindred products, has moved into a new and larger factory and expanded scope of consulting engineering department.

South Atlantic States

BALTIMORE, Feb. 27.

PERMISSION has been asked by Suburban Light & Power Co., Munsey Building, Baltimore, for installation of transmission lines, power stations, etc., in St. Mary's, Calvert, Charles and Prince George Counties; also authority to issue preferred stock in amount of $775,000, to be used in part for project. Company was organized recently by George W. Woolford, president of Eastern Shore Trust Co., and associates, who will be president. Ezra B. Whitman, 18 East Lexington Street, will be engineer in charge of construction.

Rogers Air Lines, Inc., Baltimore, care of Gerald A. Lee, 16 West Saratoga Street, has negotiations under way for site at proposed municipal airport for new plant to manufacture commercial airplanes, including seaplanes. Initial works are reported to cost close to $40,000, and will be used largely for assembling.

Chief of Engineers, Washington, is asking bids until March 27 for one 200-kw. Diesel engine-generating set, complete with auxiliaries, and one station switchboard complete, with spare parts, circular 15.

American Tobacco Co., Reidsville, N. C., is reported planning construction of new plant, including department for redrying and conditioning, and steam power plant, to cost close to $800,000 with equipment. Headquarters are at 111 Fifth Avenue, New York.

National Public Service Corporation, operating Eastern Shore Public Service Co., Salisbury, Md., and other utilities, affiliated with Middle West Utilities Co., 72 West Adams Street, Chicago, is disposing of bond issue of $20,000,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction. Harry Reid is president.

Industrial Fibre Co., West Ninety-eighth Street and Walford Avenue, Cleveland, is said to have engaged J. E. Sirrine & Co., Greenville, S. C., architects and engineers, to prepare plans for a rayon mill, with power plant, machine shop and other mechanical buildings, on site in that vicinity, to cost $750,000 with machinery.

Blue Ridge Talc Co., Henry, Va., is rebuilding portion of its plant recently destroyed by fire, with new one-story unit, 45 x 107 ft. Installation will include pulverizing equipment, blenders, elevators, hoppers, bins, scales, etc., to cost about $65,000.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 13 for electric portable drills and grinders for Eastern and Western yards, schedule 8549; until March 6 for centrifugal pumping unit, capacity 400 gal. per min., for Mare Island yard, schedule 8567; until March 13 for band saws and spare parts, Eastern and Western yards, schedule 8552; until March 6 for three motor-generator sets and spare parts for Washington yard, schedule 8511.

Hooker-Bassett Furniture Co., Martinsville, Va., is considering new plant unit to double present capacity. Arrangements are being made for sale of stock totaling $300,000, considerable portion of fund to be used for expansion.

Board of Education, Charlotte, N. C., is considering installation of manual training equipment in addition to Alexander Graham Junior High School, to cost $150,000, for which plans will soon be drawn.

The Crane Market

THERE is a moderate volume of inquiry, but prospective purchasers are slow to close business. In addition to a number of inquiries for overhead cranes that have been pending for several weeks, Fox Brothers International Corporation, New York, is asking for bids on two lists of cranes for export. These include a 25-ton, 55-ft. span, 5-ton, 25-ft. span and two 3-ton, 25-ft. span, 40 and 50-ft. lift, overhead cranes for the Turkish Government and a list of eight cranes for the Colombian Government, a 25-ton, 20-ton, 15-ton and 10-ton, 65-ft. spans, a 3-ton, 15-ft. span, 8-ton, 35-ft. span and two 2-ton, 18-ft. span overhead cranes. Thomas E. Murray, consulting engineer, 55 Duane Street, New York, is inquiring for a 100-ton overhead crane for the New York Edison Co. In the field of locomotive cranes, the Frederick Snare Corporation, New York, which has a large breakwater contract at Lima, Peru, is reported taking bids on a 25-ton locomotive crane.

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, 150-ton power plant crane from Cleveland Crane & Engineering Co.

Standard Oil Co. of New Jersey, 20-ton, 50-ft. span hand power crane from Box Crane & Hoist Corporation.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., two used 10-ton, 34-ft. span, 3-motor Niles overhead cranes from Niles Crane Corporation.

New York Central Railroad, New York, used 25-ton locomotive crane from the Conowingo project, through unnamed seller.

F. L. Smidth & Co., New York, a 10-ton, 74-ft. span bucket crane for Monolith-Portland Cement Co., Los Angeles, Cal., from Western builder.

George J. Atwell Co., 1 Park Avenue, New York, 7½-ton truck crane from Browning Crane Co.

Carnegie Steel Co., Pittsburgh, 25-ton, 70-ft. 6-in. span overhead crane with 10-ton auxiliary for its Duquesne works from Alliance Machine Co.

Stone & Webster, Inc., 49 Federal Street, Boston, engineer, will be in charge of installation of steam-operated electric power plant of Potomac Electric Power Co., Washington, at Bennings. Project will cost close to $2,000,000 instead of smaller amount recently noted.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until March 21, for a hangar and mechanical shop, 203 x 228 ft., at Hampton Roads, Va., specification 5568.

Automotive Corporation of America, Inc., North Fallsway, Baltimore, V. P. Williams, vice-president, has concluded arrangements for purchase of plant and business of George W. Davis Motor Car Co., Richmond, Ind., and will continue production of automobiles with special devices and equipment. Company proposes to use either this plant or to build a factory for special automobile manufacture.

Globe Iron & Metal Co., 1620 Gough Street, Baltimore, has been incorporated by sons of its late president, Moses Schein, and will continue to deal in ferrous and nonferrous old materials.

Pittsburgh

PITTSBURGH, Feb. 27.

MACHINE tool business is making a favorable showing in comparison with this time last year, losses reported by some dealers being offset by gains in others. Sales of more than single tools are unusual. There is some disappointment that purchases against the quarterly list of the Westinghouse Electric & Mfg. Co. have been fewer than expected.

Bids will be asked by United States Engineer, Keenan Building, Pittsburgh, for a power plant at Lock 6, Alleghany River, Kelly Station, near Clinton, Pa.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has approved plans for extensions and improvements at its sheet glass mill at Ford City, Pa., to cost upward of $400,000, including installation of continuous grinding and polishing system and other equipment. Company is said to be contemplating construction of a new Pacific Coast plant, vicinity of Richmond, Cal., to cost close to $5,000,000 with machinery.

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of heavy hardware, have plans for a one-story addition, 150 x 225 ft., to be used primarily for assembling. A portion will be reserved for storage and distributing service. It will cost more than $100,000 with equipment.

Evans-Wallower Lead Co., Charleston, W. Va., has been formed with a capital of $1,250,000 and 500,000 shares of common stock, no par value, to take over and consolidate Evans Lead Co., Charleston, and Golden Rod Mining & Smelting Co., operating lead properties at Joplin, Mo. New company has plans for expansion. Edgar Z. Wallower, heretofore president of Golden Rod company, will head new organization; Ray M. Evans will be first vice-president.

Carson Battery & Brake Co., 1331 Third Avenue, Huntington, W. Va., has awarded general contract to R. Mankin & Co., Huntington, for a one-story works, 50 x 160 ft., to replace a structure recently destroyed by fire.

Following recent purchase of plant and business of United States Three-Way Dump & Hoist Co., Pittsburgh, manufacturer of motor truck bodies and hoists, etc., by Commercial Shearing & Stamping Co., Youngstown, Ohio, last noted company has arranged for concentration of production at Youngstown plant, where expansion will be carried out, including division body and hoist manufacture.

Fokker Aircraft Corporation of America, Glendale, W. Va., will proceed with superstructure for a local plant for assembling and other service, to cost in excess of $100,000 with equipment. Contract for building has been let to R. R. Kitchen Co., Wheeling W. Va.

Chicago

CHICAGO, Feb. 27.

SALES of machine tools this month are well ahead of the corresponding period in 1927, but not quite so large as in January of this year. Both inquiry and orders are widely scattered and usually specify one or two tools. Bids against the Santa Fe list are being submitted, but the trade looks for no action for at least four weeks. A double dry grinder has been added to its list. The T. L. Smith Co., Milwaukee, is in the market for $40,000 worth of tools. Several Western railroads are preparing lists and three junior high schools are under construction in Chicago. Deere & Co., Moline, Ill., have closed for a number of used machines, and a can company in Chicago has purchased a 24-in. shaper.

Roth Brothers & Co., 1400 West Adams Street, Chicago, manufacturers of electrical machines, have purchased property in Cicero, Ill., for erection of factory buildings.

Plans are being considered by Ahlberg Bearing Co., 321 East Twenty-ninth Street, Chicago, manufacturer of ball bearings, for a one-story addition, to cost close to $40,000 with equipment.

Board of Education, Park Ridge, Ill., plans installation of manual training equipment in a new three-story high school to cost $475,000, for which bids will be asked on general contract early in April. Zack & McCaughey, 222 West Adams Street, Chicago, are architects.

Reflector & Hardware Specialty Mfg. Co., 2235 South Western Avenue, Chicago, will begin foundations for new two-story and basement plant, 92 x 135 ft., to cost $70,000, for which general contract has been let to Christopher Rasmussen, 77 West Washington Street.

City Council, Detroit Lakes, Minn., is asking bids until March 5 for a complete steam engine generating unit for municipal electric power plant, with alternate proposals on units of 500 kva. and 625 kva., respectively; also for a one-ton electrically operated ash hoist. L. P. Wolff, St. Paul, Minn., is consulting engineer.

Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn., is negotiating for purchase of municipal light and power plant at Lakefield, Minn., and proposes extensions and improvements, with transmission line construction, to cost about $100,000.

Rath Packing Co., Waterloo, Iowa, has authorized plans for a steam power house at its plant to cost $30,000. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects.

Chicago Motor Ramp, Inc., 38 South Dearborn Street, Chicago, has awarded general contract to B. W. Construction Co., 720 Cass Street, for a ten-story automobile service, repair and garage building, to cost about $750,000 with equipment. George C. Nimmons, 122 South Michigan Avenue, is architect.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, is reported planning a new steel frame coaling station at Streator, Ill., to cost about $70,000 with equipment.

City Council, Audubon, Iowa, is planning installation of a water purification plant for municipal water system, to cost about $40,000. Bonds will be voted March 28.

Otter Tail Power Co., Fergus Falls, Minn., will make extensions and improvements in steam-operated electric power plant at Langdon, N. D., including installation of new equipment.

Minerallas Electric Co., 1045 Washington Boulevard, Chicago, manufacturer of electrical equipment, has filed plans for a new two-story plant, 75 x 115 ft., to cost approximately $40,000 with equipment.

L. H. Marston, 432 Lincoln Highway, DeKalb, Ill., architect and engineer, has plans for a new one-story factory for manufacture of metal doors, sash, etc., company name temporarily withheld, to cost more than $100,000 with equipment.

Allied Industrial Products Co., 120 North May Street, Chicago, manufacturer of grinding wheels, buffing equipment, etc., will soon take bids on general contract for a new three-story and basement plant, 40 x 105 ft., to cost $80,000 with equipment. Meyer & Cook, 820 Tower Court, are architects.

Cudahy Packing Co., Newport, Minn., meat packer, has plans for a five-story and basement cold storage and refrigerating plant, 114 x 132 ft., to cost in excess of $100,000 with equipment.

Excelsior Stove & Mfg. Co., Quincy, Ill., has begun construction on its six-story warehouse, 70 x 170 ft. A foundry, 110 x 235 ft., will be erected adjacent to the new unit and a cupola room, 70 x 150 ft. Buildings will replace portion of plant destroyed by fire several months ago.

Traction Truc-tor Co., Des Moines, Iowa, has been organized to manufacture gas-electric four-wheel-drive Tructors, designed for buses, trucks or tractors and embodying features of portable universal power plant. Company is preparing for production and will purchase electric generators and motors, steering gears, springs, radiators and other accessories. General construction and assembly will be carried on in plant of Baker Machinery Co., Des Moines.

Goetz Brass Co., 630 North Franklin Street, Chicago, manufacturer of bath, shower and lavatory fixtures and special brass products, has changed its corporate name to H. E. Robertson Co.

Detroit

DETROIT, Feb. 27.

EXTENSIONS and improvements in power house are being planned by Board of Trustees, University of Michigan, Ann Arbor, to cost $100,000 with equipment. An appropriation is being arranged.

Frost Gear & Forge Co., Horton Street, Jackson, Mich., has awarded general contract to H. K. Ferguson Co., Cleveland, for a two-story addition 50 x 100 ft., to cost about $60,000 with equipment.

St. Joseph Steel Castings Co., St. Joseph, Mich., recently organized with capital of $200,000, contemplates operation of a local plant. New company is headed by James P. McKeon, formerly assistant general manager of West Michigan Steel Foundry Co., Muskegon, Mich., and A. R. Walker, formerly president of Walker Candy Co., of same place.

Plant and business of Sauzedde Corporation, Mount Clemens, Mich., manufacturer of airplane wheels, brakes, etc., has been acquired by new interests and present company will be dissolved. A new corporation will be chartered under New Jersey laws to take over property and arrangements are being made for early removal to Bound Brook, N. J., where additional equipment will be provided.

Michigan Public Service Co., Ludington, Mich., plans extensions and improvements in local power station and system, to cost about $75,000 with new equipment. Work will start in spring.

Superior Seal & Stamp Co., 151 East Jefferson Avenue, Detroit, manufacturer of steel seals, dies, etc., is having plans drawn for a one and two-story factory, 70 x 155 ft., to cost $70,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Mahon Structural Steel Co., 8650 Mount Elliott Avenue, Detroit, has work under way on an addition totalling 100,000 sq. ft. floor space, for storage and distributing service. It will be provided with five craneways and other material-handling and conveying equipment, with total cost close to $125,000.

Houghton Electric Co., Houghton, Mich., plans extensions and improvements in local power house and system with installation of additional equipment. Transmission lines will be extended to L'Anse and vicinity.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has awarded general contract to Everett Winters Co., Detroit, for a one-story addition, 145 x 420 ft., for metal stampings, to cost in excess of $100,000 with machinery. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Winchell-Tuebner Co., Jackson, Mich., is planning construction of works for manufacture of brick at Battle Creek, Mich., including steam power house, machine shop and other buildings, and will remove headquarters to new location. It will cost more than $75,000.

Indiana

INDIANAPOLIS, Feb. 27.

PLANS are being arranged by Indian Refining Co., Lawrenceville, Ill., for a two-story oil storage and distributing plant at Fort Wayne, Ind., to cost about $60,000 with equipment. Bids will be asked late in March. Similar plant will be built at Terre Haute, Ind., to cost a like amount, for which it is expected to ask bids late in May.

Earl Little, 5 Eastern Avenue, Indianapolis, has awarded general contract to Lloyd Thompson, Indianapolis, for a one-story machine shop, 55 x 150 ft., to cost close to $20,000 with equipment.

V. M. Nussbaum & Co., Fort Wayne, Ind., are planning to purchase a 300-kw. and 200-kw. engine-generator set, each 3-phase, 60-cycle, 340-volts, with accessories.

Graham-Paige Co., West Warren Street and Detroit Terminal Railroad, Detroit, manufacturer of automobiles, has acquired former plant of Karges Wagon Co., Evansville, Ind., occupying two city blocks, and will remodel for manufacture of automobile bodies.

Metal Door & Trim Co., Laporte, Ind., is arranging to rebuild portion of plant destroyed by fire Feb. 20, with loss of $110,000 including equipment.

Pierce Governor Co., Anderson, Ind., manufacturer of speel control equipment, has increased recent financing with sale of a block of 30,000 shares of common stock, to total $540,000, a portion of fund to be used for expansion.

Mid-States Steel & Wire Co., Crawfordsville, Ind., is being organized with capital of $3,100,000 to take over and consolidate Crawfordsville Wire & Nail Co.; Dwiggins Wire Fence Co., Anderson, Ind., and Adrian Wire Fence Co., Adrian, Mich. Consolidated company will have assets of $2,000,000 in plants and equipment. J. E. Vandeventer will be chairman of board of new company, and John Sommer, president. Headquarters will be maintained at Crawfordsville.

Lanahan & Dunphy, Vincennes, Ind., have plans for a one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Board of Education, Mount Vernon, Ind., is considering installation of manual training equipment in a new two-story and basement high school, to cost $175,000, for which bids will be received on general contract March 29. N. S. Spencer & Son, 180 North Michigan Avenue, Chicago, are architects.

S. G. Taylor Chain Co., Hammond, Ind., has awarded contract to Chicago Industrial Construction Co., for a two-story addition.

Buffalo

BUFFALO, Feb. 27.

ARRANGEMENTS are being concluded for a merger of Brockway Motor Truck Corporation, Cortland, N. Y., and Indiana Truck Co., Marion, Ind., under first noted name. New organization will have combined assets totaling $9,000,000. Both plants will be continued for manufacture of motor trucks and parts, as well as 38 direct factory branches. Consolidated company plans expansion betterments, to include facilities for larger output and operations in foreign countries. Capital stock will be increased from $1,500,000 to $3,000,000, and common stock from 150,000 to 500,000 shares, no par value. George A. Brockway is president.

Board of Education, Watertown, N. Y., is considering installation of manual training equipment in a two-story junior high school to cost in excess of $250,000. Lansing & Green, Sherman Trust Building, are architects.

Rochester Gas & Electric Corporation, Rochester, N. Y., is disposing of bond issue of $6,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction.

Evan E. Jones, 31 North Ryan Street, Buffalo, and Clarence D. Fulton, 20 Hubbell Avenue, have organized Jones-Fulton Corporation, to establish and operate a local plant for manufacture of metal products. It is purposed to begin operations soon.

General Drop Forge Co., 1728 Elmwood Avenue, Buffalo, has taken bids on general contract for a one-story addition, to be used largely as a machine shop and to cost close to $100,000 with machinery. Ernest McGeorge, 3030 Euclid Avenue, Cleveland, is architect and engineer.

Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, is arranging for increase in capital from 218,000 to 300,000 shares of stock, a portion of fund to be used for expansion. An associated company, recently formed by Glenn Curtiss and others, is completing plans for erection of a new plant in vicinity of St. Louis, for manufacture of commercial airplanes and parts.

Board of Education, Liverpool, N. Y., plans installation of manual training equipment in a two-story junior and senior high school to cost about $300,000, for which bids will soon be asked on general contract. Prof. Earl Hollenbeck, Joseph Slocum College, Syracuse, N. Y., is architect.

Vacuum Oil Co., Rochester, N. Y., with branch oil refinery at Olean, N. Y., is arranging increase in capital from $70,000,000 to $175,000,000, portion of fund to be used for expansion in production, including operations in foreign countries, particularly England, where storage and distributing plants are planned. George P. Whaley is president.

Hart & Crouse Co., Utica, N. Y., has been made national distributer of Zephyr washed air system for warm air furnaces, and a part of new device will be manufactured at its Utica plant. Change will require a doubling of Hart & Crouse furnace casting production.

Lincoln Aluminum Health Co., Rochester, N. Y., will establish a plant at Port Leyden, N. Y. An existing building has been obtained and machinery will be installed immediately.

Liberty Dining Car Corporation, Buffalo, has been organized to manufacture lunch wagons. It has taken over plant of Buffalo Truck Corporation at Clarence, N. Y., which is already equipped for manufacturing.

Principal business offices of Coplan Steel Corporation will be moved from Oswegatchie, St. Lawrence County, N. Y., to New York City.

Cincinnati

CINCINNATI, Feb. 27.

WITH the majority of machine tool companies February has failed to come up to expectations, sales having been below those in either December or January. There is a small number of builders, however, who report that fresh bookings this month have exceeded those in January, so that the average decline in orders in the local market should not be more than 10 to 15 per cent. Despite the recession in the past 30 days, business in the first two months of 1928 has been from 15 to 20 per cent better than in the same period of 1927. The amount of outstanding quotations is large and a liberal percentage should close before the end of the first quarter. Buying has been well apportioned among consuming industries.

Purchases in the Detroit district have slumped sharply, although one or two companies making special high production tools report considerable pending business in the automobile field. An increase in the price of at least one type of machine which was not affected by the recent upward revision is anticipated in the near future. The Los Angeles Gas & Electric Corporation, Los Angeles, has bought a 36-in. x 28-ft. heavy-duty engine lathe.

Covington Industrial Club, Covington, Ky., is interested in a project for establishment and operation of a foundry in a building at Fifteenth Street and line of Louisville & Nashville Railroad. A group of interests formerly identified with Gates Foundry Co., Cincinnati, headed by C. W. Gates, W. H. Haven and J. C. Clifton, all of Cincinnati, are organizing New Insurance Foundry Co., to carry out project. Structure will be remodeled and equipment installed at early date.

Gray-Elliott Furniture Mfg. Co., Greenfield, Ohio, is planning to rebuild portion of three-story plant destroyed by fire Feb. 13, with loss reported at more than $70,000 including equipment.

Tietig & Lee, Merchants Building, Cincinnati, architects, have plans for an eight-story automobile service, repair and garage building, to cost $850,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids March 7 for saw blades, drills, drill grinding gages, saw frames and other tools, circular 243; also for bushings, pipe couplings, nipples, tees, etc., circular 250; until March 5 for 50 propeller disks, and 10 propeller club assemblies, circular 241.

United States Foil Co., Thirtieth Street and Grand Avenue, Louisville, will soon take bids for a three-story plant unit, 112 x 200 ft., and one-story warehouse and distributing plant on adjoining site, 100 x 200 ft., to cost $400,000 with equipment. Ossian P. Ward, Lincoln Bank Building, is architect.

General Aeronautical Corporation, 3336 Trimble Avenue, Cincinnati, has asked bids on general contract for a one-story airplane manufacturing plant in the Luken airport district, to cost about $50,000 with equipment. C. G. Dietz is head.

Ferro Concrete Construction Co., Cincinnati, has secured contract for a multi-story automobile service, repair and garage building to cost $200,000 with equipment.

Henry Vogt Machine Co., Tenth and Ormsby Streets, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded general contract to H. A. Doll, Louisville, for a two-story addition, 80 x 240 ft., to be equipped as a steel fitting shop, to cost $75,000 with machinery. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

Sterling Plumbing Supply Co., Inc., Louisville, has been organized to engage in wholesale jobbing of plumbers' and steam fitters' supplies. It will not do any manufacturing.

Pacific Coast

SAN FRANCISCO, Feb. 23.

AN appropriation of $22,500,000 is being arranged by Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, for expansion and improvements, to include construction of two hydroelectric generating plants on Mokolumne River in Jackson and Amador Counties, with steel tower transmission line to a point near San Francisco; and new 50,000-h.p. capacity steam-operated electric power plant at Oakland.

Club Aluminum Co., 1250 Fullerton Avenue, Chicago, manufacturer of aluminum cooking utensils, is reported planning purchase of site in vicinity of San Francisco for a Pacific Coast branch plant. Branch offices are at 981 Mission Street, San Francisco.

Brunswick-Balke-Collender Co., 845 South Los Angeles Street, Los Angeles, manufacturer of talking machines, billiard tables, etc., will erect one-story plant, 177 x 320 ft., in Union Pacific industrial tract, to cost about $100,000 with equipment. An 80-hp. boiler plant will be installed. Bids will soon be asked on general contract. John P. Krempel and Walter E. Erkes, Bank of Italy Building, are architects. Headquarters are at 623 South Wabash Avenue, Chicago.

Union High School District, Redwood City, Cal., has authorized plans for an addition to local high school, including a vocational training department. Bond issue of $250,000 has been approved.

A. M. Gilstrap, 3002 Logan Street, Oakland, Cal., and associates are planning construction of a fruit canning plant at Yuba City, Cal., including cold storage and refrigerating plant. Entire project is reported to cost in excess of $350,000 with machinery.

Arizona Wax Paper Co., Benson, Ariz., Charles Goetz, head, is considering erection of two-story mill, 45 x 100 ft., at Salinas, Cal., to cost close to $50,000 with equipment.

Federated Metals Corporation, 163 East Water Street, Portland, has awarded general contract to Reiners & Jolivette, Railway Exchange Building, for a one-story plant, 50 x 100 ft., to cost $55,000 with equipment.

Columbia Valley Lumber Co., foot of Cornwall Avenue, Bellingham, Wash., is considering erection of new mill with electrically-operated machinery, to cost about $90,000.

American Laundry Machinery Co., Norwood Station, Cincinnati, has acquired property on Elliott Avenue, Seattle, and contemplates erection of a factory branch and distributing plant.

E. C. Anthony, 2111 Webster Street, Oakland, Cal., has completed plans for a three-story and basement automobile service, repair and garage building, to cost about $150,000 with equipment.

Sacramento Pulp & Paper Co., 3245 Tenth Street, Sacramento, Cal., has plans for a new pulp and paper mill near Sacramento, using grape vine cuttings as raw pulp material, to cost upward of $400,000 with machinery. C. A. Kieren, Portland, is engineer.

San Joaquin Light & Power Corporation, Fresno, Cal., is arranging an expansion and improvement program to cost about $9,100,000, of which more than $1,500,000 will be used for construction of steel tower transmission lines. Other work will include generating plant additions, substations, etc.

Pure Iron Culvert Mfg. Co., Portland, Ore., branch of American Rolling Mill Co., will build factory at Gladstone Avenue, to cost $50,000. It is scheduled for completion within 60 days.

Federated Metals Corporation, 163 East Water Street, Portland, Ore., branch of Great Western Smelting & Refining Co., will erect new building at Fifteenth and Irving Streets, costing about $50,000.

Portland Wire & Iron Works, Portland, Ore., has moved from Second and Columbia Streets, to new building at 944 East Seventeenth Street.

John A. Lambie, formerly of West Coast Pipe & Steel Co., Los Angeles, has organized Superior Culvert & Flume Co. and has purchased property on Union Street, Oakland, for erection of a factory.

Bellco Machine Co., Portland, Ore., has been formed to succeed former Bell Ice Machine & Mfg. Co., East Thirty-fifth and Alder Streets. A general machine shop will be operated and expansion is planned. Baby Bliss concrete brick machines will also be manufactured.

Foreign

A COMPANY at San Salvador, Salvador, has secured a concession from Ministry of Finance for construction and operation of a local plant for production of industrial alcohol and will soon begin work. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference San Salvador No. 265099; also at American Consulate, San Salvador, LeRoy F. Beers, vice-consul.

Russian Timber Trust, Petrograd, Russia, is planning an expansion and improvement program in 1928 to cost $5,150,000, including completion of new saw and lumber mills at Mezensk, Dubrovsk, Volininsk, and Ustludjsk, and veneer mills at Vitebsk and Povoldsjk, with erection of similar plants at other location. A considerable portion of fund will be used for machinery. Information at American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Imperial Chemicals, Ltd., associated with Synthetic Ammonia & Nitrates, Ltd., London, England, will carry out an expansion and betterment program at its plant on Tees River, to cost close to $5,000,000. Contract for extension to pulverized fuel division has been let to International Combustion, Ltd., London.

Government of Palestine, Jerusalem, has arranged fund of close to $6,000,000 for public works construction and improvement. Of this amount, about $4,800,000 will be used for harbor and dock construction at Haifa, approximately $500,000 for port improvements at Jaffa, both projects to include installation of material-handling and conveying machinery, loading equipment, etc.; about $175,000 for expansion and improvements in railroad mechanical and maintenance shops, with additional tools and equipment; and close to $750,000 for construction and equipment of Government offices, etc. American Consulate, Jerusalem, Oscar S. Heizer, consul, has information regarding projects.

Pirelli, Ltd., Rome, Italy, manufacturer of automobile tires and other rubber goods, is contemplating construction of a new plant at Eastleigh, Hampshire, England, to cost in excess of $250,000 with machinery. It is proposed to have unit ready for service early next fall.

Canada

TORONTO, Feb. 27.

MACHINE tool sales show steady improvement. The automotive industry is responsible for the greater part of the current demand, some good-sized lists from this source having been closed and others are being figured on. There is also an active demand for equipment from northern Ontario mining fields, and some large orders have been placed for shipment to the Flin Flon district of northern Ontario. It is expected that for the next six months at least demand for mining machinery and power development equipment will be strong.

Although no lists are out from the railroads, there is a steady flow of orders for one to a half-dozen tools. Leading iron and steel mills are planning extensions which will involve the purchase of several million dollars worth of equipment this year.

Gordon Collins, Hamilton, Ont., has concluded arrangements to take over a building at Bronte, Ont., to operate under name of Bronte Chaplet & Mfg. Company, Ltd. Products will include tin chaplets, stamping goods, etc.

Knight Mfg. & Lumber Co., Ltd., Meaford, Ont., is asking for prices on woodworking and lumber machinery.

W. G. Lee, Markdale, Ont., is asking for a lath machine and other woodworking equipment.

Alexander J. Grant, engineer in charge of Welland Ship Canal, states that a 600-ft. drydock will be built at Port Weller, Ont. Tenders for construction will be awarded immediately and it is expected that work will start early in spring.

Dominion Envelope & Carton Co., Toronto, has taken out permit for erection of a paper mill and engine room to cost $195,000.

Quebec Power Co., Quebec, has plans for a new power house on Queen Street, which will be fed by branch transmission line from terminal at Limoilou, and installation of 3500 ft. of new line at a cost of $400,000. Company also proposes to build a new power plant in Lower Town, St. Malo and Limoilou. Construction of Quebec plant will start in March.

Town Council, Leamington, Ont., plans installation of two centrifugal waterworks pumps with 115-ft. head each, to be driven by independent motors.

Beatty Brothers, Fergus, Ont., manufacturers of electric washing machines, hydrants, machinery, etc., have let contract to G. H. Thomas & Sons, 45 Dickson Street, Galt, Ont., for a one-story plant in four sections, 192 x 192 ft., 96 x 96 ft., 96 x 72 ft., and 48 x 76 ft. Construction will start in about two weeks.

T. C. Ephgrave, 310 London Street, Peterborough, Ont., has contract for erection of a three-story $15,000 addition, 30 x 34 ft., to plant of Peterborough Lock Mfg. Co., Ltd., 198 Simcoe Street, and rebuilding of portion recently destroyed by fire.

Western Canada

It is reported from Winnipeg, Man., that Callinan Flin Flon Mines, Ltd., will spend $1,000,000 this year on erection of buildings and installation of machinery. William Forbes will be in charge.

Canadian Pacific Railway, head office Montreal, plans construction of locomotive and freight car shops at Winnipeg. It will also remodel power plant at Brandon, Man.

British Columbia Electric Railway Co., Vancouver, B. C., contemplates erection of addition to power plant on Jordan River near Victoria, B. C.

NEW TRADE PUBLICATIONS

Dry Quenching of Coke.—Dry Quenching Equipment Corporation, 200 Madison Avenue, New York. Catalog DQ-2 of 30 pages describes in detail, with many illustrations, the quenching of coke by the dry process in accordance with the Sulzer system. This is the method which was described in some detail in THE IRON AGE of Feb. 10, 1927, at page 425. Most of the plants in operation are in Europe. The one mentioned above and somewhat featured in the catalog is at Rochester, N. Y. Recovery of the heat in the coke and a number of collateral advantages are pointed out as following the use of this system.

Small-Sized Temperature Recorder. — Bristol Co., Waterbury, Conn. Four-page folder describing Model 144 recording thermometer, with 4-in. chart giving record for three days. It is entirely self-contained in a neat clock-like case and is suitable for greenhouses, residences, refrigerators and cold rooms.

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THE IRON AGE

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X-Rays: A New Tool in the Foundry

Examination Before Machining Reveals Hidden Defects and Reduces Foundry Costs—Two Cases Cited

ONE of the greatest problems of the foundryman is the reduction of costs by the elimination of faulty castings. A great deal of progress has undoubtedly been made along this line in the past, especially in the case of the larger foundries which have found it feasible to conduct extensive research.

The employment of trained scientists and metallurgists, however, is not always practicable for the smaller organizations and, even by the best metallurgical practice, it has not been possible generally to prove the existence of a great many defects in castings until the specimen has been actually worked up.

Quite early in the history of X-rays, their use was indicated as a possible help in examining objects other than the human body but, until recent years, such work was not applicable to metallurgy on a very large scale, because of the fact that the production of X-ray equipment was not along lines most adaptable for such study. In recent years, though, because of the production of equipment capable of delivering X-rays of considerable penetration at a reasonable cost, there has been a more detailed study of their possibilities in industrial work.

During the war this method was utilized to some extent in the examination of munitions and equipment.

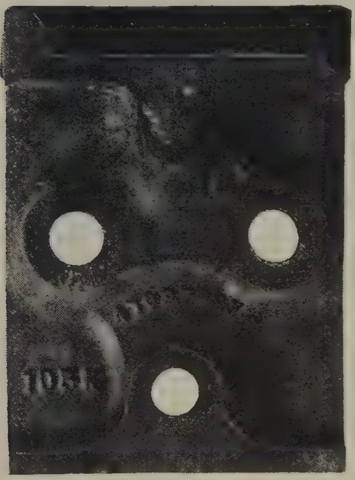
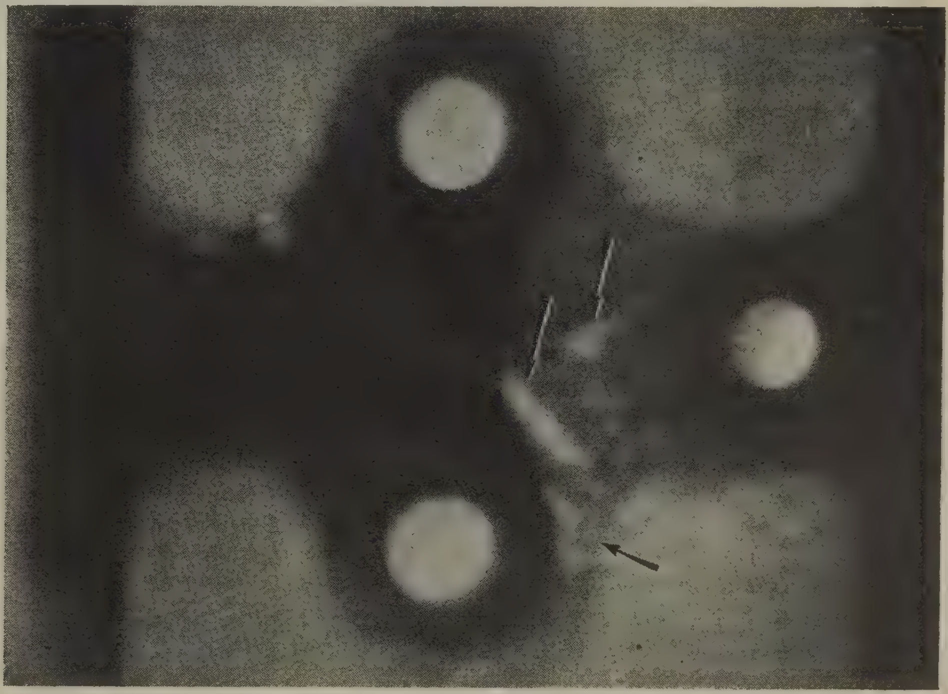


Fig. 1 (Above)—A Steel Casting Picked at Random for X-Ray Examination



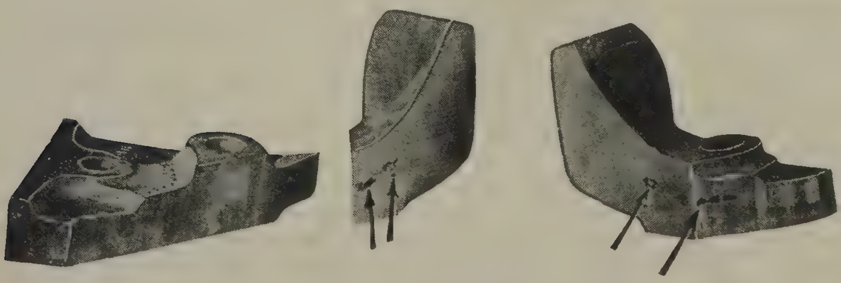
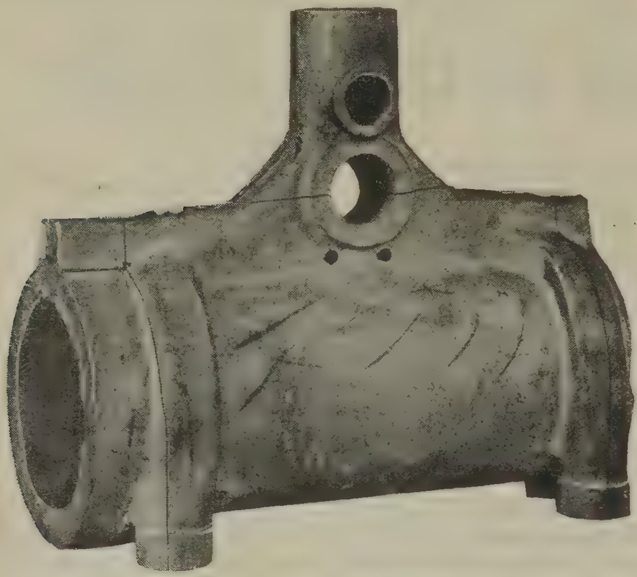


Fig. 2 (Above)—Reproduction of X-Ray Picture of Casting. Fig. 3 (left)—Defects located and revealed by X-rays

Since the war this work has progressed in several places and has resulted not only in the raying of relatively thick castings, but has demonstrated that there is a wide use for X-rays produced by relatively low-power equipment.

It will probably be possible, with quite simple equipment, to save a great deal of expense in the average foundry through the detection of faulty castings before they are delivered and worked up.

In the medical world the interpretation of X-ray shadows in the human anatomy has reached an exact stage and it seems likely that, in the course of a few years, an analogous situation will exist in the case of X-rays in industry, with the added advantage that in this work the subject can be cut up and examined at will to confirm diagnosis.



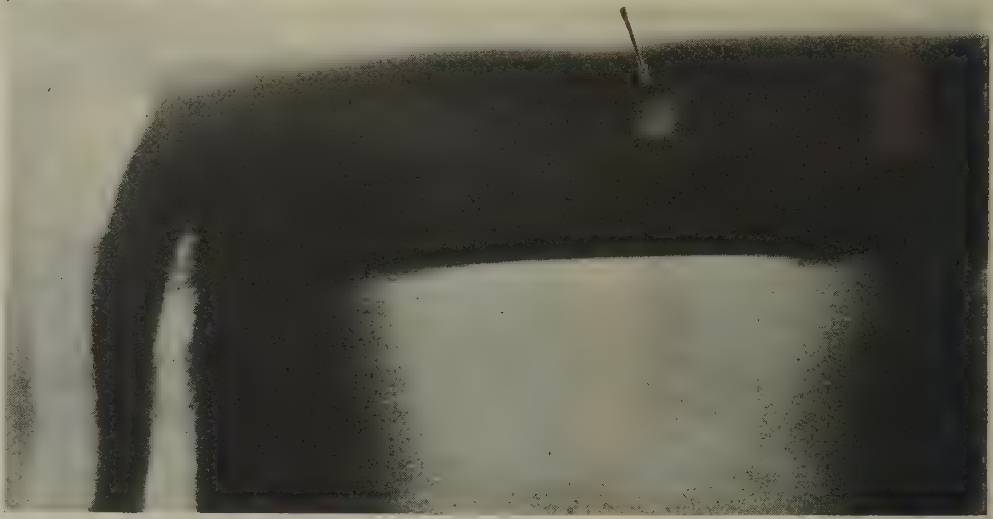


Fig. 4 (Above)—An Aluminum Casting and a Portion, Fig. 5 (Right) of the X-Ray Picture Showing Location of a Defect

Defects Which Are Uncovered

With gray iron or steel castings it is now possible to X-ray through a thickness of 3½ in., and, when it is considered that there are a vast number of castings in which the over-all thickness of actual material does not reach this figure, the wide application is appreciated. Such flaws as blow-holes, cracks, bubbles and foreign material are relatively easy to detect in one or two exposures on a modern X-ray film.

In the case of aluminum alloy castings, of which more and more are being used, X-ray equipment of low cost can be utilized to great advantage. To date there have been several laboratories equipped to do this work on a consulting basis, notably the United States Government arsenal at Watertown, Mass.

Some Actual Results

A few illustrations will show concretely just how this method works out.

Fig. 1 represents a casting picked at random from a run made under usual conditions.

The X-ray "picture" is shown in Fig. 2. It will be noticed that there is a light area running diagonally across the shadow. This indicates the presence of a flaw.

Fig. 3 indicates the same casting shown in Fig. 1, after it has been sawed in order to reveal the flaw indicated by the X-rays.

In Fig. 4 is shown a complicated aluminum casting which must be subjected to high pressure in actual use. Any flaws in such a casting would possibly endanger life and cause a serious loss of product. It is, therefore, necessary that these be produced as nearly flawless as possible.

This casting, when X-rayed, showed flaws such as are reproduced in Fig. 5. On sawing the casting, as indicated by the X-ray findings, these flaws were found and changes in casting technique recommended.

Examining the First Run of Castings

From these few examples it will be appreciated that here is available a new tool in industry. Its utility lies not entirely in its routine use for testing, but in its application for studying representative samples of first runs of a given type of casting. It is to be regretted that there is of necessity some loss in detail in reproducing the original negatives.

Through studying the findings and improving technique, it should be possible to have resulting castings practically free from flaws.

When it is considered that in many cases, particularly with fairly elaborate castings, a great deal of machine work may be put on them before the defect shows, it will be seen that, if such work can be saved, the primary cost of the examination will be negligible.

A foundry giving such service will be preeminently ahead of its competitors, and the user of the casting will be correspondingly better satisfied. The tests of the castings were made by the X-ray department of The Eastman Kodak Co., Rochester, N. Y.

The Standard Alloy Co., Cleveland, recently organized, has established a plant at 1679 Collamer Road and will make nickel-chrome alloy for use in heat-treating furnaces, carburizing boxes and other castings requiring the heat-resisting metal. The officers are F. R. Williams, president; F. F. Jackson, vice-president; Emerson Williams, treasurer; H. M. Smith, vice-president in charge of sales, and J. H. Williams, secretary.

Members of the Worcester section American Society of Mechanical Engineers will inspect the plant of Graton & Knight Mfg. Co., Worcester, Mass., on Thursday afternoon, March 8. A technical program will follow the plant visit.

Recovery of Non-Ferrous Scrap

Methods of Cleaning and Smelting Waste Metals, Skimmings and Slags from Copper, Brass, Bronze and Aluminum Foundries Discussed by Metallurgists

A NUMBER of papers on secondary metals constituted one of the features of the Institute of Metals' program, when it met Feb. 22 with the Mining Engineers. To illustrate the little-appreciated importance of this industry, J. P. Dunlop, statistician United States Bureau of Mines, Washington, presented data on "Non-Ferrous Secondary Metals Recovered in the United States."

Collection and Segregation of Material

FRAGMENTARY statistics were first collected in 1907 when a partial return on copper, lead, zinc and tin showed a recovery of 77,658 tons of metal valued at $17,196,436. The scope of the inquiry was broadened, and in 1917 (a year of high prices) nearly 300 million dollars worth of metal was recovered, more than the combined value of gold and silver production! Evidently figures on scrap recoveries are no less essential in appraising the metal market than are data on primary metal consumption. Details are included in the table.

The proportion of secondary metals to the metals produced from domestic ores varies considerably from year to year:

	1915 Per Cent	1921 Per Cent	1926 Per Cent
Copper	28	86	55
Lead	15	25	41
Zinc	19	39	23
Aluminum	27	33	60

High returns in copper after the World War were due to large imports of scrap from Europe. Lead has been increasing recently because of more general use of lead storage batteries. The figures for zinc do not include the dross, ashes and skimmings converted annually into zinc oxide and chloride, and containing 25,000 to 30,000 tons of metal.

Most of the tin recovered as metal is from drosses; solder, babbitt and bronze accounts for the tin as alloys. About 1142 net tons of metallic tin and 2047 tons of tin in chemical compounds were recovered in 1926 in the detinning plants of the country, treating scrap tin plate and clippings. Some 30,000 tons of ingot tin are used in making tin plate. Nearly all of it is wasted, as it costs more to collect old tin cans than the impure steel scrap and tin recovered are worth.

Sampling and Evaluating Copper-Bearing Metal

It is obvious that one of the most difficult problems connected with the marketing of valuable wastes is to determine the average metal content in a mixed lot. T. A. Wright, of Lucius Pitkin, Inc., New York, discussed this matter. He said that even when copper castings are carefully selected, they will be found to assay from 88 to 99 per cent copper. Metallic scrap, bundled or in large pieces, can only be sampled by hand picking a representative portion, satisfactory to both buyer and seller. Fine materials like borings, powders and ashes may be better sampled during unloading, either with automatic quartering cones or by reserving every tenth shovelful. Mr. Wright also gave approved methods of drying the sample and burning off oil and grease. During this operation, lead and low melting portions accumulate and can be rejected. Iron is usually removed by a magnet. Before cutting down a sample of fine material, it is frequently ground in a muller, after which the fines may be rejected. Copper-bearing materials thus prepared are then usually melted in a gas-fired crucible furnace, and the resulting slab drilled for chemical analysis.

Tin, Terne and Zinc Skimmings

Sampling methods on the above vary almost as much as assaying methods, depending upon the kind of material. Tin and terne drosses are often in the form of thick, wet sludge. After the sample is dried, it is ground and the relative amount of fines and metallic scales remaining on a 40-mesh screen determined. Proportionate amounts are mixed with flux and melted; settlements are made on the amount of metal resulting from this fusion. From 4 to 15 per cent tin may be lost in the slag, which is ignored, but it is claimed that this is approximately the loss to the smelter.

Zinc drosses are usually sold on "sample," which is often a grab sample. Settlement is made on the total zinc as determined by chemical analysis; sometimes penalties are exacted for chlorine contained.

Salvage in a Manufacturing Plant

H. F. Seifert, assistant superintendent Westinghouse Electric & Mfg. Co., East Pittsburgh, emphasized in a brief paper entitled "Classification and Preparation of Non-Ferrous Scrap Metals and Alloys," that these operations are not difficult, in fact, a very simple task when in the hands of the right man. He listed 96 different kinds of alloy scrap produced in his plant. Each machine is supplied with tote pans for the scrap produced, which is duly tagged, collected promptly, weighed, appraised and placed in suitable bin storage. The various manufacturing departments have an interest in the matter because they receive sizable credits for the material recovered. A large salvage department will find it profitable to operate a washery to remove oil and grease from metals, magnetic devices to separate tramp iron, an alligator shear to trim off soldered ends, etc., and a baling machine. Using such tools the grade of the scrap can be raised more than enough to pay for the operations.

Contamination of Metal Scrap

If sellers of scrap are to receive the most for their material, extra care must be taken to avoid contamination, in the opinion of Carl O. Thieme, chief chemist Michigan Smelting & Refining Co., Detroit. He noted five principal sources of contamination:

1. New and unusual alloys (such as hardened aluminum, lead and copper) will introduce unlooked for elements into the recovered metal.
2. Productive methods causing mixed metals. Soldered copper radiators or cable ends, bronze welded copper and electroplated articles are instances.
3. Carelessness in handling scrap from various machines and departments will cause trouble, and is inexcusable.
4. Ignorance on the part of laborers is subject to correction.
5. Unsuitable methods of refining will fail to remove undesirable elements.

Consequently, contamination can only be controlled by care at the point of origin of the scrap, skill in assembling it for smelting and proper knowledge and equipment in furnace practice. While it is well known that aluminum must be absent in metal for pressure valves, and sulphur must be very low in nickel-silver castings for the plumbing trade, the speaker voiced the opinion that users of secondary metals were uselessly penalizing themselves by demanding very low percentages of certain elements in ingots, when several times as much would cause no harm for ordinary uses. As an instance, most specifications require lead to be below 0.35 per cent in tin-base babbitt, but makers of high-grade automobiles are now accepting lead up to 1.5 per cent, which analysis can be had for a considerably lower figure.

Production of Ingot Brass and Bronze

COMPOSITION brass ingot manufacturers apparently are able to meet standard specifications easily. Walter F. Graham, Ohio Brass Co., Mansfield, Ohio, gave the following averages for his receipts during 1926, a total of 63 carloads:

	Alloy A		Alloy B	
	Specification *Per Cent*	Average Delivery *Per Cent*	Specification *Per Cent*	Average Delivery *Per Cent*
Copper	79 to 81	79	83 to 85	84.5
Tin	2.5 to 4	3.4	2.5 to 4	3.7
Lead	6.5 to 7.5	7.4	2.5 to 3.5	3.6
Zinc	9.5 to 10.5	9.9	9.5 to 10.5	8.0
Iron	0.25 max.	0.14	0.25 max.	0.08
Antimony	0.25 max	0.12	0.25 max.	0.10

In order to reduce the amount of non-metallics in secondary ingots, and to reduce the number of leaky castings made therefrom, it is necessary for the smelters to standardize their practices. At present furnaces ranging from 1 to 50 tons in capacity are in use. Some Bessemerize the impurities; others attempt to flux them. Wide variations in quality of output are consequently inevitable.

Don C. Blackmar, superintendent Great Western Smelting & Refining Branch of Federated Metals Corporation, Detroit, defended the secondary smelter, saying that he was paying more for the scrap and selling higher grade ingot than ever before, and consequently could not run anything but an efficient and economical business. Copper ingots are made following practice in the Lake Superior copper smelters. Brass and bronze ingots are made in reverberatory furnaces up to 30-ton capacity. Charges are properly fluxed; other impurities are removed by stirring with green poles or metallic deoxidizers. Metal is held in the furnace until a laboratory analysis shows correct analysis. Mr. Blackmar said that most foundrymen are able to make better castings from ingots prepared in this way than from alloy melts made by them from virgin metals.

Should a Bronze Foundry Attempt to Smelt Furnace Skimmings?

Methods used by most bronze foundries to recover metal from slag produced in open-flame furnaces were discussed by E. R. Darby, chairman of the meeting (metallurgist Bostwick Lyon Bronze Co., Chicago). It is usual to find them crushing the skimmings, when a large percentage of the entrapped metal can be recovered by water concentration on a table or jig. However, tin, the most expensive raw material bought, experiences the highest loss because it oxidizes easiest, and goes into the slag, where it is wasted in the tailings, diluted in the foundry sands or lost in sweepings.

He recommended that every bronze founder investigate this problem carefully. It can be done by accumulating dross, skimmings, slag and other wastes for one week. Weigh and sample the accumulation carefully and figure the pounds of valuable metal contained. Then concentrate this amount in the usual way, weighing, sampling and analyzing the various products so a metallurgical balance sheet can show how much of the metal is actually recovered.

In one plant melting 50,000 to 80,000 lb. of bronze a day where such a scheme was tried, it was found that the wastes amounted to 16,500 lb. in a week, three times as much as was supposed. From this pile 682 lb. of metal was recovered by concentration, analyzing 6.2 per cent tin. The tailings, however, contained 400 lb. of copper, 105 lb. tin and 40 lb. lead. A small blast furnace was installed at this place. In one year it smelted 140,000 lb. of slag and recovered 41,300 lb. of metal. If the slag had merely been concentrated, the recovery would only have amounted to 21,300 lb., thus showing that the new method practically doubled the savings.

Before such a small smelting plant is installed in a foundry, a very careful investigation of the costs of operation should be made, in the opinion of E. E. Thum, associate editor THE IRON AGE, New York. Intermittent and small-scale operations are seldom economical, and require a skilled personnel and accumulated experience not often contained in the foundry staff. Consequently, it will nearly always prove better to collect the drosses and sell them to smelting companies than to treat them in special furnaces on the spot. If the returns from the sale do not warrant the cost of collection, it will usually be best to throw them away altogether. This is especially true where there is more than one smelter within shipping range, so quotations can be compared.

Remelting Secondary Aluminum

A LENGTHY paper on this subject was presented by T. D. Stay, D. B. Hobbs and H. O. Burrows, Aluminum Co. of America, Cleveland. In it they defined secondary metal as that which has lost its original identity as to source. Most of it reaches the consumer in the form of "remelt ingot" or "remelt No. 12 ingot," and its principal difference from primary ingot is the less accurate control of composition, and the probability that it contains some dross and oxide.

Classification of Aluminum Scrap

The authors define the sources of the scrap as follows:

Clip and Sheet; from utensil makers and automobile body works.

Foil; sheet 0.0002 to 0.0005 in. thick, clean or coated.

Cable; "clean" if uncorroded; "dirty" otherwise.

Castings; pure or alloyed. Little of this comes from foundries, because they remelt their own scrap. Classified as (1) "clean," castings never in use; (2) "dirty," reclaimed from machinery; and (3) "dirty scrap, cleaned."

Borings, turnings and sawings; machine shops convert 10 to 12 per cent of rough weight of castings into fine particles. Its value depends upon its cleanliness.

Skimmings; from melting pots, varies widely in metal content.

Grindings and buffings.

Sludge; residue from refining operations, usually worthless.

SECONDARY METALS RECOVERED (NET TONS)

	1917	1921	1924	1926
Copper (including that in alloys other than brass)..	159,400	113,350	196,500	281,700
Scrap brass remelted..........	320,000	148,500	274,000	283,000
Lead as metal..........	45,100	46,370	90,400	125,000
Lead in alloys..........	48,400	57,410	114,100	152,300
Zinc as metal..........	31,400	33,833	58,886	64,570
Zinc in alloys other than brass..........	4,800	5.840	10,500	13,430
Tin as metal..........	6,000	5,400	7,700	9,750
Tin in alloys and chemical compounds..........	13,400	11,500	23,600	23,650
Antimony as metal..........	6	29	90	2,910
Antimony in alloys..........	4,955	4,691	9,314	13,320
Aluminum as metal..........	6,660	3,650	10,350	20,500
Aluminum in alloys..........	9,440	5,250	16,650	23,700
Nickel as metal..........	60	86	114	485
Nickel in non-ferrous alloys and salts..........	800	859	2,126	2,565
Total quantity	650,421	436,768	814,330	1,016,880
Total value	$295,854,900	$89,140,500	$200,578,600	$274,540,900

Dross; aluminum oxide and metal from a fluxing operation.

Prices that dealers are willing to pay for such scrap in comparatively small quantities vary with market conditions. In general, No. 12 remelt ingot will sell at about 4c. per lb. below 99 per cent virgin ingot. Clip will bring 7½c. below virgin ingot, clean scrap castings 10c. below, and borings 15c. below virgin ingot.

Remelting Secondary Aluminum

In order to get a good recovery of metal it is necessary to remember that all aluminum is coated with a layer of oxide, heavier on old material than on new, and in order that the melted metal may coalesce, this oxide skin must be removed or broken through, and prevented from reforming. Solid metal added to the melt should therefore be pushed down through the scum, so it will not be trapped and prevented from coalescing. This is especially necessary when handling borings; this finely divided metal can be partially separated from the honeycomb-like oxide by stirring or puddling, but this is more properly the function of the flux.

Fluxes are of three varieties: (a) those like common salt which are merely a covering to exclude air; (b) those like alkali double fluorides which actually dissolve the oxide; and (c) those like zinc chloride which evaporate readily and are useful mostly for mechanical effects.

Cleanliness is the principal requirement for secondary aluminum. Briquetting not only reduces the cost of handling borings some 40 per cent, but also improves the recovery by 6 per cent. If they have been cut with a water soluble, alkaline base compound, they should be washed and dried within a few days in order to prevent disintegration of the metal. When melting, start with a pot one-third full of remelted ingot. Add the borings slowly, and stir in with an iron bar (either by hand or by a mechanical puddler), continuing until the pot is nearly full. Then add a generous portion of mixed zinc chloride and cryolite, stir and settle. Skim and pig out two-thirds of the metal and repeat the operations.

Recovery of Metal from Skimmings

Skimmings should be ground, screened and freed from iron. Then add it slowly to a pot one-third full of molten ingot metal, stirring it in until the whole mass is pasty. The pot will then be about half full. Then add a little flux and fill the pot with skimmings without stirring. After some time has passed and the whole mass is thoroughly heated, resume stirring with a hook-shaped flat bar, driving the hook to the bottom, turning the hot skim over the cooler top crust and breaking up all lumps. The charge now consists of a puddle of molten metal with oxide and dirt on top, and looks like red-hot sand containing beads of metal. Now sprinkle on a mixture of 85 per cent cryolite and 15 per cent zinc chloride, and stir it in. This causes the dross to glow, apparently becoming white hot and having a tendency to ball up. Keep stirring, breaking up these balls until the whole mass cools to a bright orange color, when the scum becomes powdery and can easily be removed with a perforated skimmer, rapping each skimmerful on the edge of the pot to shake out droplets of metal. If an inclined, corrugated plate can be placed on a vibrating mechanism and the dross spread along its top edge, a little more metal can usually be shaken out.

Disk Rolling With Special Reference to Steel Differential Cases

A NEW method of steel working is found in the production of parts such as the new type steel differential case used by a leading manufacturer of automobiles. The machine for radially rolling this section was designed and built by the Aetna-Standard Engineering Co., Youngstown, Ohio. As designer of tube-making equipment, the company found a relationship between rolling radially and the diagonal rolling common to all piercing machines.

Machines rolling radially consist of two separately motor-driven disks, the axes of which are placed angularly. One roll is fixed and carries the work piece. The roll opposite is pushed on to the work by a motor-driven screw arrangement, and is withdrawn by compression springs.

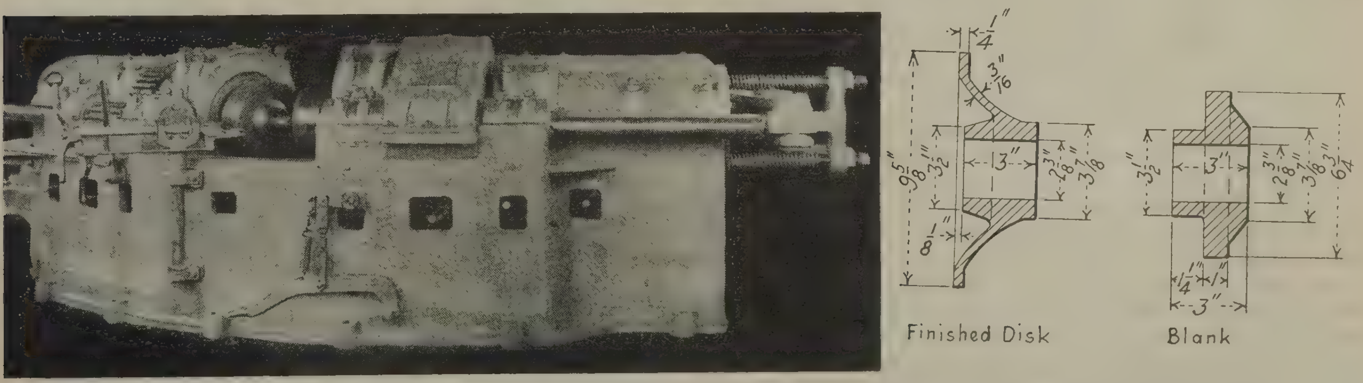
Blanks used are forgings made on an upsetting machine. Each blank has the hubs formed to suit the finished disk and the hole pierced for the proper diameter bore. The rolling machine has a production of about 10 disks a minute. The blanks are heated before rolling.

The blank is put on a hinged holder and is then placed on the centering pin of the fixed disk. A foot treadle on the front of the machine operates the screw clutch at the back and controls the forward movement of the disk. As the disk comes forward, rolling contact is made with the blank on the full radial length of the skirt. By compression the thickness is reduced and the diameter enlarged until the proper dimension is secured.

The centering pin on the fixed disk serves as a knock-out. Upon withdrawal of the movable roll, the finished disk is ejected and the restriking and trimming operations follow in a press without reheating.

Rolls are designed to give the proper speed relation to prevent distortion on the work piece as it is radially displaced. Each disk is driven by a motor of 150 hp., direct connected to the pinion shaft. Disk and pinion shaft bearings are mounted in roller bearings, excepting the thrust bearing on the disk shaft, which is of the conventional collar type.

Provision for lubricating has been made so that forced or gravity circulation is possible, which gives the best operating condition where anti-friction bearings are used. All parts subjected to stress are steel and where under severe strain are made from alloy steel heat-treated. The bed is a semi-steel casting made in one piece, so that maximum rigidity is built into the machine as a unit.



Disk Rolling Machine Equipped With Motor-Driven Disks, Placed at an Angle With Regard to Each Other and Driven Separately. At right is an example of the work done, showing how the arbor diameter and depth are maintained, while the rim is spun out to a much greater diameter and thinner section

New Competition More Constructive

Trend Is Away from That Which Has Brought Low Profits, Says Magnus W. Alexander at Cincinnati Conference on Industry's Problems—More Efficient Distribution May Relieve Economic Pressure

ECONOMIC problems affecting American industry were discussed exhaustively at a round-table conference at the Hotel Gibson, Cincinnati, March 1 and 2, in connection with the annual meeting of the Cincinnati branch of the National Metal Trades Association. The conference was conducted by the National Industrial Conference Board, Inc., under the leadership of Magnus W. Alexander, president of the board.

At an afternoon session on Thursday, March 1, the movement and relationship of wages and prices were studied, while public expenditures and taxation also were topics. In the evening the Cincinnati branch held its annual dinner meeting at which the agricultural problem and ways and means of remedying the present condition of so-called "profitless prosperity" were considered. The conference was concluded on Friday morning, March 2, with a discussion of industrial relations activities.

"Profitless Prosperity" Due to Sharp Competition

Sharp competition, not lack of business, is at the bottom of what has been called "profitless prosperity," declared Magnus W. Alexander, chairman of the board, in an address on "The Paradox of Profitless Prosperity." Competition is making itself felt to such a degree that in recent years about two in every five manufacturing corporations have either made no profits or have incurred a deficit. During the six-year period, 1920-1925, for every $100 earned by successful concerns, $32 was lost by unsuccessful companies.

The course of business failures and of new incorporations in the United States is worthy of note in this connection, explained Mr. Alexander. It is to be expected that the time during which the number of business failures is increasing will be the time during which business will be more difficult to conduct and in which there will be less incentive to launch new business enterprises. Since the end of 1925 the competitive struggle has been increasing and at present the insolvency record is near the high level reached following the depression of 1921.

Pointing to a double paradox in the present business situation, Mr. Alexander said that there is today great national prosperity with great business activity, but a competitive struggle which has resulted in precarious profit margins. Moreover, the very method which has contributed so much to our national income, namely, efficient mass production, is the factor which is accentuating the competitive struggle.

Trend Now Toward Constructive Competition

One of the encouraging signs, according to Mr. Alexander, is the trend toward constructive rather than destructive competition. It would be both unethical and unwise today to do things which a generation ago would have been considered justifiable as measures of self-defense in business. These objectionable practices have been eliminated as much through voluntary cooperation of industry as through legal compulsion, and in this respect trade associations have exerted a powerful and wholesome influence.

While it so happens that intensified mechanization and the better utilization and coordination of labor with other factors in production have been the principal needs, and indeed only a beginning has been made in that direction, further progress along that line may not prove sufficient to meet the new problems. Instead, it may be that the development of more efficient methods in the process of distribution will do much to relieve that economic pressure which increased competition is exerting. Mr. Alexander emphasized the fact that "much of what has been gained by achieving low unit cost of production is lost by the high cost of distribution."

The present plight of the farmer was outlined by Charles Nagel, St. Louis, Secretary of Commerce and Labor in the cabinet of President Taft. Mr. Nagel said that it was impossible for one legislative act to cure all of the agricultural ills and that it would take the combined cooperation of the Federal, State and local governments to aid in farmer relief.

Wages Have Reached Equilibrium

Wages in the United States probably have reached a point of equilibrium and cannot be expected to rise much higher without tending to increase the volume of unemployment, stated Virgil Jordan, chief economist of the National Industrial Conference Board, in discussing at the Thursday afternoon session "Wages and Prices—Their Movement and Relationship." The only factor that would disturb the wage situation would be an upward trend in commodity prices. Mr. Jordan pointed out that the high wage level in the United States is primarily due to three factors: the restriction of immigration, which has tended to eliminate a large labor reserve; higher standards of living among wage earners, which has tended to restrict the rapid increase of population; and the enormous volume of savings, combined with an abundance of technical knowledge and business talent, which has created an intense competition among investors and enterprises, as well as producers of raw material, from all of which the wage earners in certain manufacturing industries have benefited.

The level of wages, declared Mr. Jordan, depends upon the relative abundance of labor, on the one hand, and of capital, technical skill, business ability and raw materials, on the other. Immigration restriction and new standards of living have brought about a relative scarcity of labor in comparison with capital, technical knowledge, business ability and raw materials. The result has been that the average hourly earnings of industrial wage earners are about 133 per cent higher than before the war; the average yield of high-grade industrial securities is today at, or somewhat below, the pre-war level; men of technical training have difficulty in selling their knowledge at much above pre-war salary levels, and the competition among the vast majority of small business concerns is ruinously intense, while the producers of raw material, from the farmers to the coal operators, are either losing money or making little more for their investment and labor than before the war.

This process has gone so far that the expansion of mechanical equipment and the use of labor saving devices have gradually displaced labor in many of the important industries. Though a portion of this labor may have found work in some of the newer subsidiary occupations, it is likely that the labor reserve has slowly tended to grow since the end of the war, despite the enormous expansion in production and trade. Certainly employment in manufacturing industries has not only failed to keep pace with the growth of production, but has actually declined.

Problem of Future Is to Expand Consumer Purchasing Power

Mr. Jordan expressed the opinion that the main problem of future prosperity in the United States is that of expanding the domestic consumer purchasing power concurrently with the growth of production capacity. Employers have appreciated this problem, but have felt that high wages would solve it. High wages, according to Mr. Jordan, are not in themselves a guarantee of permanent prosperity, because it is not wage levels themselves that determine consumer purchasing power, but rather the relation of wages to prices and to employment. Wages may remain stable or even decline, while the purchasing power of the wage earning public is increased by falling prices or expanding employment. Prices can be reduced and employment increased only if there is sufficient incentive for saving and business enterprise, in the form of good returns on investments and of fair business profits.

"In the period since 1925," said Mr. Jordan, "falling prices of manufactured products, combined with rising prices of raw materials and high wages, have tended to put a damper upon business enterprise, to penalize the investor and to make prosperity exceedingly uneven and not widely diffused. Labor has become a fixed charge upon American industry, while profits and interest, as well as return to the producer of raw materials, have become a contingent charge—that is, they have had to take what they could get, which in some industries has been very little.

"The expansion of business in the future will depend upon whether we can find some way of increasing consumer purchasing power in greater proportion than we increase wages or volume of production. The use of banking credit for installment selling has done this in recent years, but the effect cannot be maintained without increasing the dose. The automobile industry has been a most important factor in expanding the purchasing power of consumers and it may continue to be so for some time to come. But, above all, this country needs some new incentive to business enterprise, such as the automobile industry originally afforded and such as will lead to the creation of new industries as large and as important as the automobile industry. Anything that will increase the agricultural purchasing power will make for business expansion in certain lines, although it may tend to cut business profits in others using agricultural raw materials, if wage levels remain high. Apart from such factors, the most important influence for business expansion would be the use of our enormous credit resources for the building of public works and the increasing of highway and transportation facilities, all of which add to the general consumer purchasing power, but do not augment, either directly or immediately, the volume of consumer goods in the market."

Tax Burden Due Frequently to Waste and Extravagance

American taxpayers today are bearing the heaviest peace-time burden of taxes this country has ever known, despite the considerable reductions effected by the Federal Government, stated W. J. Shultz, financial economist of the board, in an address on "Public Expenditures and Taxation." Expansion of the functions of State and local governments, waste and extravagance and lack of centralized control and organization on the part of local governments were cited as the chief causes of the increasing tax burden.

Mr. Shultz brought out the fact that a large portion of current expenditures is being financed by borrowing, most of which has been done by cities and urban communities. Of the total amount of money borrowed by State and local governments from 1923 to 1926 inclusive, the States were responsible for 15 per cent, the counties for 16 per cent, the school districts 13 per cent and the municipalities 56 per cent. The purposes of these borrowings in the order named were municipal improvements, roads, streets, bridges, schools and other miscellaneous purposes. The result of the excessive use of the borrowing power possessed by local and State governments will be a higher tax rate in the future.

"The crying need of State and local governments at present is a good healthy injection of the methods of practical business procedure that have brought American industry to its high grade of precision and workmanship," said Mr. Shultz. "The remedy for this situation is twofold. In the first place, reorganization of State and local governments with a view to greater efficiency of operation is essential. In the second place, there is a need for a centralized supervision and even control of finances of the local governments, which are the worst offenders. State and local taxes absorbed about one-fifth of the net income of Ohio corporations during the period from 1922 to 1924."

Industrial Relations Activities Getting Away from Paternalism

The tendency in the evolution of industrial relations is away from welfare work and paternalism and toward self help and intelligent cooperation, declared J. A. Morford, chief of the field research staff of the board, in discussing "Industrial Relations Activities and Experience in American Industry." Mr. Morford said that plans for industrial relations are designed to take the place of the personal contact and the intimate relationship between employer and employee which modern industrial organization has made impracticable. The rapid expansion of many industrial establishments during the war brought with it a hasty increase in industrial relations activities, many of which later did not stand the test of normal conditions. The fact that many plans had to be abandoned, however, is no criterion of the desirability or the efficacy of industrial relations programs in general. Among the activities which have proved successful in operation in recent years are supplemental bonuses, employee stock purchasing and other thrift plans, group insurance, industrial pensions, with a tendency toward contributory plans, foreman training of foremen, councils of workmen, job analyses, scientific hiring and discharging of workmen, health and accident analyses, medical care and reduction in turnover.

Cincinnati Branch Reelects E. A. Muller President

E. A. Muller, president and general manager King Machine Tool Co., was reelected president of the Cincinnati branch of the Metal Trades Association at the annual business meeting late Thursday afternoon. Other officers selected for the coming year are: Charles Fox, Ahrens-Fox Fire Engine Co., vice-president; George Seyler, Lunkenheimer Co., secretary; H. L. Feldbush, Worthington Pump & Machinery Corporation, treasurer; George Schiele, Cincinnati Milling Machine Co., Richard LeBlond, R. K. LeBlond Machine Tool Co., and August Marx, G. A. Gray Co., members of the executive committee. J. M. Manley, manager of the Cincinnati branch, made a brief report of the association's activities. Homer D. Sayre, national commissioner, was a guest at the meeting.

At a foremen's gathering immediately following the business session, 18 men were presented with certificates showing that they had completed the prescribed course in conference leadership training. The presentation was made by E. L. Heusch, supervisor of trades and industries of the Ohio State Department of Education at Columbus.

Structure of "Crystallized" Locomotive Forgings

In a talk delivered before the Montreal mid-winter meeting of the American Society for Steel Treating, F. H. Williams, Canadian National Railways, showed a series of microsections taken from axles, side rods and other locomotive forgings which had failed in service. He said that failures could sometimes be attributed to sharp fillets or other erroneous machine work or to the unauthorized use of welding.

However, most of the fractures, by far, were associated with a coarse-grained microstructure, coarse ferrite mesh, or ferrite bandings along stringers of inclusions. A broken surface which showed partly detailed or creeping fracture, and the rest a granular break, was spoken of by shop men as a "crystallized piece with a flaw." This company is now securing forgings which must meet the requirements of small-sized grain when polished, etched and viewed at 50 diameters.

The annual meeting of the American Refractories Institute will be held at White Sulphur Springs, W. Va., May 8 and 9, instead of May 16 and 17, as originally announced.

Steel Practice Determines Quality

Howe Memorial Lecturer Emphasizes View That Those Elements Making Inferior Steel Are Not Reported in Conventional Chemical Analysis

IN presenting an account of how a given element or impurity may affect the properties of steel in various ways depending upon its origin, Henry D. Hibbard, the Howe Memorial Lecturer for 1928, made a strong plea that the furnace practice be considered as a vital factor when investigating the effects of alloying elements and gases in simple steels.

Limitations of Chemical Analysis

Speaking on the topic, "Significance of the Simple Steel Analysis," he pointed out that the usual chemistry does not tell the whole story because it is incomplete, because it tells nothing of how the elements enter the constitution of the metal, because it tells nothing of the scavenging elements which have been lost, and because it gives no information about the portion of the ingot from which the sample is obtained, nor of the casting temperature. In the lecturer's opinion these are a few of the vital considerations affecting quality; a good steel is different from a better steel, largely by reason of differences in furnace working and subsequent treatment; a bad steel is bad most often because of chemical or physical elements wholly undetermined in the conventional analysis. He emphasized the view that "iron is iron" no matter what its origin; but in view of the infinite variety of circumstances which may occur between the ore pile and the finished bar, no two pieces of steel are exactly alike, nor is it possible to make perfect steel.

Carbon, of course, is the most powerful alloy in iron; the mutual interactions increasing strength either by simple alloying or after heat treatment are unique in metallurgy. Taking the tensile strength of commercial iron as 45,000 lb. per sq. in., the effect of alloying 0.9 per cent carbon is to add 105,000 lb., making the ultimate strength 150,000 lb. per sq. in. Heat treatment will add another 150,000 lb., and cold drawing 200,000 lb. more, making the strongest carbon steel, heat treated and cold worked, capable of carrying the extraordinary load of 500,000 lb. per sq. in. before rupture.

Other elements have a definite influence on the amount and distribution of solid non-metallic impurities and the properties of steel. As shown in the accompanying table, each of them is worthy of close attention, and no two of them are identical. (The discussion is limited to simple steels whose maximum analysis is as follows: Carbon 1.5 per cent, manganese 1.0 per cent, silicon 0.6 per cent, sulphur 0.15 per cent, phosphorus, 0.12.

All Insolubles Are Harmful to Steel

When classified in another way, it is found that all ingredients which are insoluble in the solid metal iron (either gases or solid non-metallic inclusions) are a detriment to quality. Of the soluble elements, the above mentioned are useful; that minute part of the oxygen and nitrogen which remains in true solution in the iron is harmful; sulphur and phosphorus in solution are usually harmful; arsenic in solution is neutral; and the effect of hydrogen in solution is not known.

Manganese Important at End

Proceeding from these general summations, the lecturer passed to a more particular examination of the effect of each of the soluble elements, and how these effects depend upon the presence of others, the time of addition, and the furnace practice. The important effects of manganese occur before and during casting of the ingot. In molten steel it eliminates and intercepts iron oxides, and after the reaction goes as oxide to the slag, if the slag is of the proper nature. In the acid process, emulsified silicon oxide is present in the bath to flux the manganese oxide; in basic steel the silicon must be added with the manganese. Residual manganese (that is, remaining from the raw materials charged) is essential for the best steel. "Killed steel" may have almost any amount of manganese, but it cannot be too high when a good boil is necessary. Manganese has pronounced effects on the working of the steel after it reaches the ingot. A high manganese safely allows a higher heat before forging or rolling. On the other hand, big carbon steel forgings must have lower manganese for commercial heat treatments, especially as carbon is increased.

Influence of the Elements

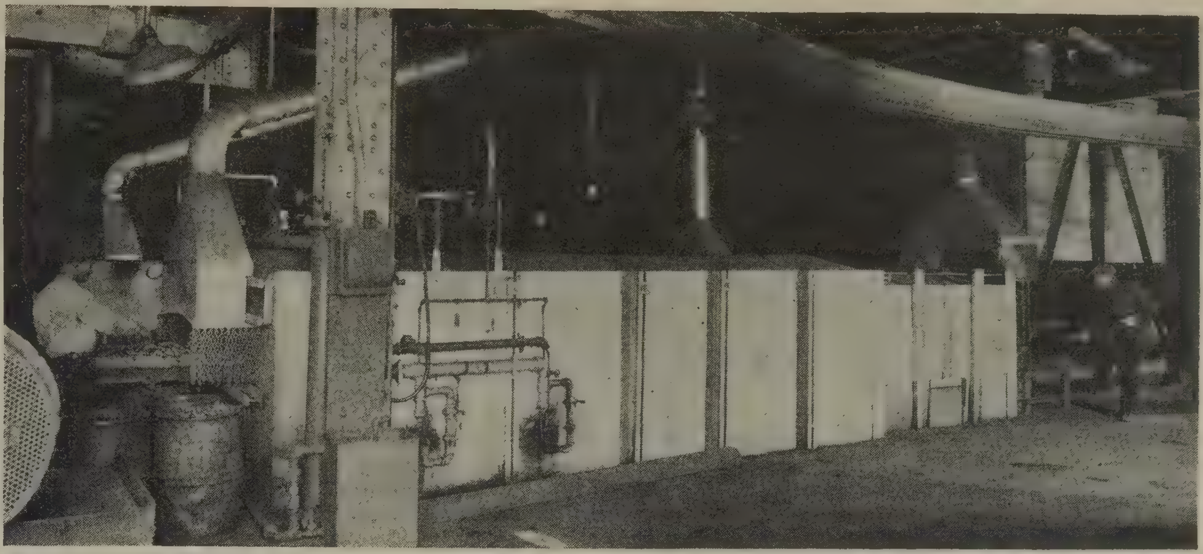
	Oxides	Silicates	Sulphides	Gases	Segregation	Mechanical Properties
Carbon	Neutral	Neutral	Neutral	Neutral	Neutral	Positive
Manganese ...	Positive	Positive	Positive	Neutral	Neutral	Moderate
Silicon	Positive	Positive	Neutral	Positive	Positive	Moderate
Aluminum	Positive	Neutral	Neutral	Positive	Positive	Neutral
Titanium	Positive	Positive	Neutral	Positive	Positive	Neutral
Vanadium	Positive	Positive	Neutral	Positive	Positive	Moderate

Silicon Is Medicine for Steel

Silicon is added to molten steel as a curative. It is residual in acid steels. As an element in solid solution in iron, its action is beneficial. As an oxide entrapped in the metal it is highly damaging, even if as low as 0.01 per cent in a low carbon steel; consequently much of the finishing stage is planned to remove its last traces. Residual silicon has considerable effect on the acid steel making process; for instance, when melting for high carbon steel so much pig is used that the bath contains 0.3 to 0.4 silicon and it lies dead in the furnace. In other melts, silicon must be added to the metal not only to deoxidize it, but also to "kill" it (which is not the same). For the latter, 0.2 to 0.6 per cent is necessary; sometimes it is added in the ladle, because the action is rapid.

In the basic process all silicon is eliminated during the early stages of the melt before the carbon drops, consequently any silicon in the metal as tapped must have been added near the end of the heat. Its functions when so added are several. It checks further elimination of carbon, when the bath has reached the proper analysis. Since this action is almost instantaneous, this is a great manufacturing convenience. Or it may be added to deoxidize unfinished steel. An addition of 0.15 per cent is necessary for this action, which only takes a few seconds. Another curative action, when added to the furnace, is to form an acid oxide to flux out the basic oxides of manganese and iron which may be in solution in the metal. This is a slower process—at best it requires several minutes for any considerable washing of the metal and hours would be required to clean out the resulting silicates completely. Lastly, silicon is added in the ladle to prevent the formation of gas holes in the solidified ingot.

Interactions between carbon, silicon and oxygen are complex and vary with the temperature. As noted by the lecturer, at 700 deg. C. silicon begins to rob carbon monoxide of its oxygen with the formation of silica and free carbon. At 1550 deg. C. silicon prevents the liberation of carbon monoxide from molten steel, thus killing the metal. At 1600 deg. C. carbon will reduce silicon from the slag and the acid hearth. At 1650 deg. it will prevent the oxidation of silicon in the Bessemer converter, and at 1900 deg. C. it reduces silicon from its oxides and from silicates in the blast furnace.



Some of the Smaller Gray Iron Castings, Made Both in Permanent and Sand Molds, Are Heat Treated to Soften the Metal, Increasing Its Machineability

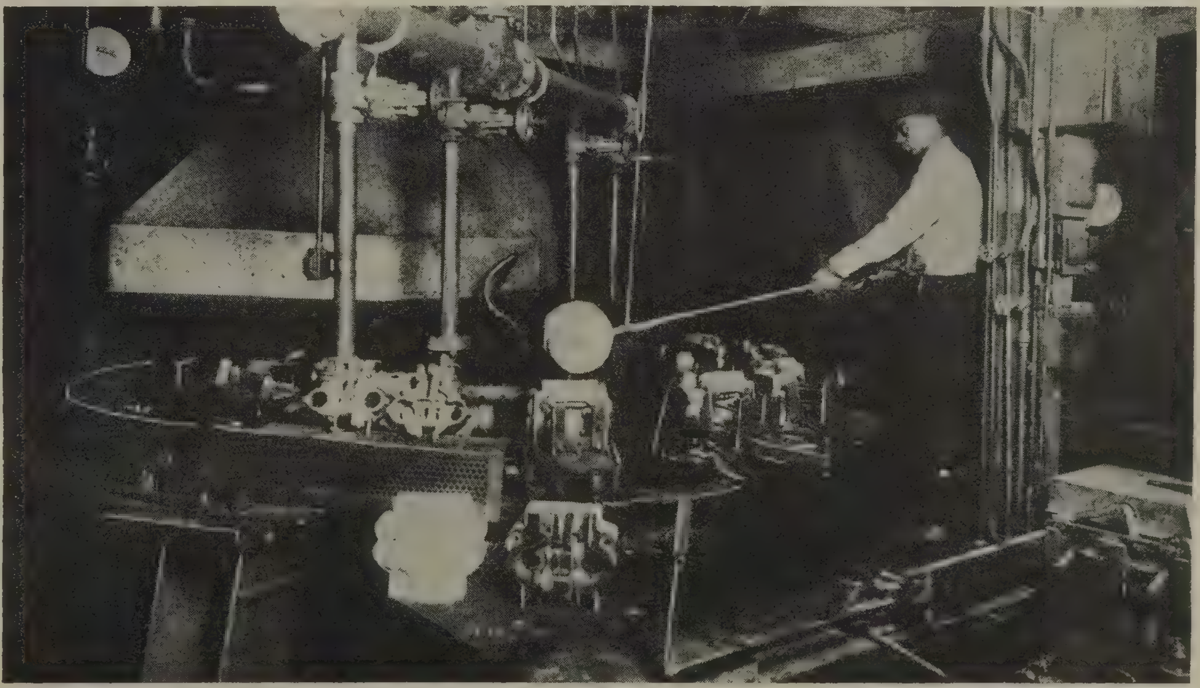
Gray Iron Castings Heat Treated

Smaller Parts, Some Sand Cast and Others Made in Permanent Molds, Passed Through Continuous Furnaces at Ford Plant

GRAY iron castings used by the Ford Motor Co., Fordson, Mich., for several of the smaller parts of its motor cars are heat treated in continuous furnaces before machining to eliminate hard spots, produce a fine grain structure, make the metal softer and easier to machine and consequently to speed up production in machine work on the castings. Some of the light castings, particularly carbureter castings, require small drill holes. After this annealing operation, drilling is done more rapidly and there is less breakage of drills.

The permanent mold process is used in making some of the small castings that are heat treated and others are made in sand molds. Castings made in permanent molds that are heat treated before machining include generator heads, timing gear housings and certain valves for automobiles, tractor pistons, timing gear blanks for tractors and various miscellaneous parts for plant equipment, such as conveyor wheels.

The permanent mold castings are poured on circular revolving platforms in iron molds. When shaken



Various Small Castings That Are Heat Treated Are Made in Permanent Iron Molds Which Are Poured on a Circular Revolving Platform from the molds and still red hot they are dumped on plate-type carriers 10 in. wide and 34 in. long and are moved through a furnace with a rocker arm-type of pusher. The furnace is 25 ft. long. The castings are usually kept in the furnace 80 min. The heating temperature is found to be more satisfactory at 1650 deg. Fahr., although castings have been heat treated at 1500 deg. by keeping them in the furnace a longer time and they are sometimes given a longer soaking time at around 1650 deg. to produce a softer metal. At times the furnace temperature is increased to 1700 to 1750 deg. to shorten the operation and increase the furnace output. In case cold castings are charged into the furnace the heating operation takes approximately 2 hr.

The usual Brinell hardness of the castings after heat treating is 187, but there is a hardness range of from 177 to 207 depending on the type of castings. Some that require particularly soft metal for machining have a hardness of 177, while pistons have a higher Brinell hardness.

Three duplicate furnaces are used for heat treating the permanent-mold castings. These have a capacity of 30 tons in an 8-hr. day, handling the output of eight permanent-mold molding machines. The furnaces are gas-fired with four burners on each side and are equipped with automatic heat regulators and recording charts.

From the discharge end of the furnace the castings are dumped into an adjoining elevator and taken to a cleaning room on the second floor. When they have reached that floor, they have cooled sufficiently to go into tumbling mills for removal of fins and scale. They are tumbled from 20 to 30 min., which, it is stated, is only one-fourth of the time required for tumbling similar castings made in sand molds.

Sand castings that are heat treated before machining include bushings and several of the small parts for carburetors. These castings, on leaving the furnace, go to tumbling mills and then to the machine shop. Two furnaces are provided for heat treating these castings, these being practically identical with those used for heat treating permanent-mold castings. The sand castings are left in the furnace from 2 to 3 hr. After heat treatment, they have a range in Brinell hardness of 143 to 207.

URGES BETTER COST-KEEPING

Effect of Incorrect Prorating of Overhead Pointed Out to Connecticut Manufacturers

UNDESIRABLE consequences following the use of two formerly accepted methods of prorating overhead expense were pointed out by J. M. Carney, industrial engineer, Hartford, Conn., in an address on "Ignorance of Costs Is a Menace to Industry," at a recent joint meeting of the Connecticut Manufacturers Association and the Hartford chapter of the National Association of Cost Accountants.

"Only about 25 years ago there were two generally accepted methods of prorating overhead expenses in cost accounting," said Mr. Carney. "The first of these was to add the cost of known or productive labor and material together, and then add 33 1/3 per cent or 50 per cent to cover all else or overhead. The other was to add to the known or producing labor 100 or 125 per cent, then add the material and call the total a cost upon which selling prices were based.

"Many concerns operating on these systems were successful and were greatly expanded. They succeeded in spite of the system rather than because of it, but those were the days when you could add 50 to 100 per cent for profit to the supposed cost and if you showed a net of 20 per cent real profit at the end of the year, all was well."

Mr. Carney pointed out that every manufacturing concern is really several concerns in one, that overhead expense is created by a definite operation or process and is a part of the cost of that process controlled by the time taken to produce, and that material, generally speaking, does not control overhead.

"By way of illustration, it was stated that in the manufacture of pins a mechanic and helper might operate a battery of 10 to 15 machines which might be used in manufacturing both steel and brass pins. Assuming that the known labor is 1c. per lb. and that steel wire costs 2c. per lb. and brass wire 17c. per lb., the labor and material or prime cost of steel pins would be 3c. per lb. and of the brass pins 18c. per lb. By the old method of adding 33 1/3 per cent to prime cost, the overhead added would equal 1c. per lb. on the steel pins and 6c. per lb. on the brass pins, whereas the actual overhead in pin making consisted of depreciation of machinery, repairs and replacements, power, heat, light, supervision, supplies, etc.

"As a matter of fact these elements of overhead are less when producing brass pins than when producing steel pins but by the 33 1/3 per cent method, six times as much is added to brass pins as to steel pins," he said.

He told of a metal novelty concern which, in addition to its standard cataloged lines, also did a large amount of jobbing in metal stamping and screw machine parts. Its old method of applying overhead was to add 125 per cent to the productive labor of all departments. A year came when the profits dropped to a large extent on an unusually large volume of sales. Analysis proved that while the profits on the standard lines exceeded $80,000, the net for the year was less than $20,000 due to losses in the jobbing departments. Naturally the stamping and screw machine departments cannot be operated on a 125 per cent basis.

"Everyone knows," said Mr. Carney, "that a man operating a battery of expensive automatic machines creates an overhead in depreciation, repairs, power, etc., that does not apply to a bench hand; yet when the same percentage is added to *all* labor, false costs are bound to result."

Former Methods Still Followed

Fearing that the illustration presented might be accepted as of old methods, not followed now, Mr. Carney told of visits to 44 manufacturers, only 12 of which had cost systems worthy of the name; and the lack of proper cost data prevailed in large as well as small concerns.

As an illustration of the need of better cost-keeping methods in Connecticut, as well as in many other industrial centers, Mr. Carney cited the following case: A Connecticut manufacturer required a large quantity of a brass part made on Brown & Sharpe screw machines. Bids per 100 pieces were received from six Connecticut parts makers as follows: *A*, $2.20; *B*, $2.47; *C*, $2.84; *D*, $3.60; *E*, $3.78; and *F*, $4.32.

The actual cost of material on the above was $1.94 per 100. *B* filled the order at $2.47 per 100, as *A* had made a clerical error using net material weight, making no allowance for scrap. A visit to all of the above resulted in the knowledge that only two had cost systems and the correct cost was $3.60 per 100, including all overhead.

A comparatively simple stamping wanted in large quantities was sent to 19 concerns in and out of the State. The quotations varied from $3.50 to $9.66 per 100. Bids on gray iron castings varied from 3.8c. to 7.6c. per lb.; malleable iron castings from 5.9c. to 12.8c. per lb.; and brass castings from 17.4c. to 32c. per lb. Quotations on an advertising booklet ranged from $5,270 to $12,230.

Continuous Enameling of Gas Stove Parts

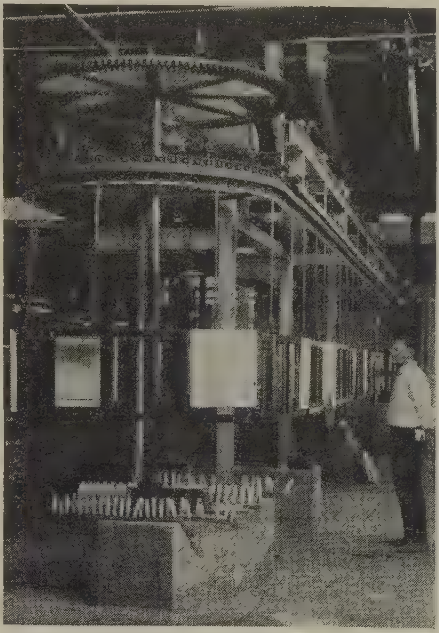
A CONTINUOUS furnace for fusing porcelain enamel on gas stove parts is a feature of the St. Louis plant of the Quickmeal Stove Co., a subsidiary of the American Stove Co. The new unit is a combination of a furnace and a traveling conveyor. Both the ground and finish coats are burned on to the steel and the drying operation is included, thereby doing away with the necessity for a separate drying oven.

Parts to be enameled are suspended from the conveyor, which is of the continuous chain type and is in the form of a closed loop. At both ends of the conveyor the chain engages large horizontal sprockets, one being driven by a motor and the other being an idler. Between the sprockets the chain is suspended from a steel framework. The conveyor is 119 ft. long.

On the driving end the conveyor extends 39½ ft. beyond the furnace; at the idler end it projects 19½ ft. beyond. The furnace itself, which is built of brick, is 60 ft. in length. Dipping tanks and spraying booths are arranged along the exposed portions of the conveyor, so that work, as soon as it is covered, is hung on hooks suspended from the chain. The work enters the furnace through small openings provided for that purpose. The furnace is divided into five zones along its longitudinal axis. The heating zone in the middle occupies 10 ft., while the preheating and drying zones are located at the ends and take up the remainder of the space, or 50 ft.

The drying and preheating zones are in a common chamber. The hot ware emerging from the heating chamber runs parallel with, but counterwise to, the cold work which has just entered the furnace. There is, therefore, a rapid transfer of heat from the hot work to the cold ware, reducing the fuel consumption necessary to bring work up to temperature in the heating zone.

A semi-muffle divides the heating zone into two longitudinal chambers, which are kept at separate temperatures for different classes of work. Each chamber is equipped with automatic pyrometer control. Ordinarily the temperature in one is set at the proper degree for the ground coat and in the other for burning on the finish coat. Heat is supplied by 16 gas burners located in the heating zone, half on either side. These are manifolded and supplied with inspirators which automatically proportion the gas-air mixture for efficient combustion and proper furnace atmosphere. With the use of the inspirators, which are of the venturi-tube type, an oxidizing, neutral or reducing atmosphere can be maintained in the furnace automatically.

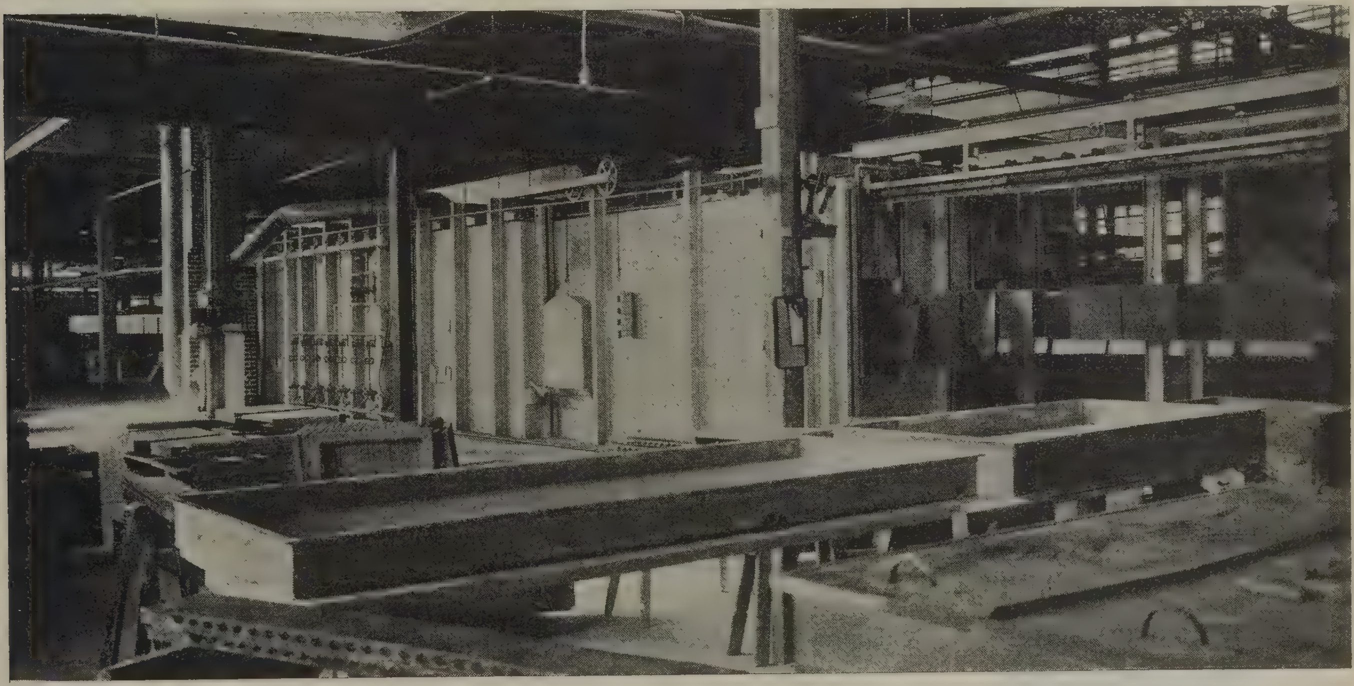


Driving End of the Chain Conveyor, Showing Large Horizontal Sprocket Operated by Motor

The ware is heated gradually as it travels the 35 ft. from the time it enters the furnace until it leaves the heating chamber. This takes 7 min., as the conveyor, driven through speed reduction gears, travels at a rate of only 5 ft. per minute. If time is allowed for the steel base to heat up close to the same temperature as the enamel, the latter will mature regardless of the gage of the ware.

One side of the conveyor is continuously loaded with ground coat, while the other side burns white or finish coats. The work with the fused ground coat is removed from the conveyor as it leaves the furnace, is dipped for the white coat and is then sent back through the other side of the furnace. One heating chamber is therefore kept at a temperature about 100 deg. Fahr. higher than the other, the ground coat requiring the more intense heat.

The furnace was installed by the Surface Combustion Co., Toledo, Ohio.



Continuous Enameling Furnace Equipped with Continuous Conveyor. Work is dipped in the tanks (shown in the foreground) for the ground coat and is hung on the conveyor and carried into the furnace where the enamel is burned on. Issuing from the other end of the furnace, the work is given a finish coat and is returned to the furnace for the final fusing operation

Metallic Flow During Rolling

Institute of Metals Lecturer Believes Formation of Twins Is as Essential to Flow in Many Metals During Working as Is Crystalline Slip

SLIP between fragments of the original crystals has been held to be the principal action during the plastic flow of metal upon rolling or forging. Much microscopic and experimental work has been published to support this conception, and the most lucid explanation of the hardening phenomena yet proposed is founded upon various factors which interfere with this process of slip, and therefore resist the plastic flow and harden the metal.

In the Institute of Metals Lecture, delivered in New York on Washington's Birthday, Prof. C. H. Mathewson of Yale University argued the proposition that the formation of twins in the original crystals is often the earliest effect of overstrain, and that subsequent severe deformation is a combination of the two processes, viz., development of crystalline twins, and of slip along crystal planes. Much of the argument is of a highly specialized nature, and to follow it requires a working knowledge of theoretical crystallography; however, the theory was developed primarily by reference to the action of large crystals of zinc, upon which the results of twinning are fairly clear, and which have been studied closely and described at length by the lecturer and his associates at Sheffield Scientific School.

Twinning Is an Action Requiring Small Atomic Displacements

Twinned crystals are most commonly illustrated by the microstructure of brass, wherein large crystals of solid solution are crossed by parallel bands of material which etches uniformly at a different tone from the adjacent metal. Studies of the crystal lattices usually show that relatively small movements of the constituent atoms in space are all that is necessary to produce a new crystalline system, which, for instance, may be merely the mirror reflection of the original—a "left-hand crystal," so to speak. Dr. Mathewson illustrated the action on a slab of zinc, split from a single crystal, and consisting essentially of a series of right prisms with hexagonal cross-sections, as shown at the left of Fig. 1. If this block is completely rearranged by twinning along one set of diagonal planes (known to crystallographers as the 1, 0, —1, 2 planes) the block will be found to have its thickness reduced 6.75 per cent, with corresponding increases in breadth and length, but the elementary hexagonal prisms are now on their side, as shown at the right of the figure. That such an action requires comparatively small atomic movements is indicated in Fig. 2, where the paths of the two rows of atoms to the right of the (1, 0, —1, 2) diagonal plane are indicated.

In his laboratory, Professor Mathewson has studied single zinc crystals after various degrees of reduction by rolling. The above indicated action actually occurs on slight compression. After a 7 per cent reduction of thickness by rolling, it is possible to identify the type of twinning of much of the metal. This is done by measuring the angles between the traces of twinning planes at their intersections with the surfaces of the block, by examination of the surface with polarized light (when all material of a given twinning system will flash out simultaneously) and by X-ray analysis. He finds that not only does the original metal form twins on a wholesale scale, but these twins again twin, thus forming "twins of the second and third generation." As the process continues it becomes impossible to distinguish the production of twin lamellæ from slip bands, because the intersections of a full complement of twins through only three generations would permit no angle greater than 5 deg. to separate adjacent traces of principal crystalline planes on the original cleavage surface.

Recrystallization Starts at Twin Boundaries

The lecturer then considered the meager evidence about similar actions in other metals. He favors the view that Neumann bands in iron are twins formed during work, and cited similarities between recrystallization phenomena in cold-worked iron and in zinc. A similar intimate connection between twinning and recrystallization is observed in pure beta brass. Diagrams like Fig. 2 show that the atomic spacing at the ends of twinning planes and at their intersections are different than in the body of the crystal; this is an indication that a state of high internal strain exists at such places, and they are probably the germinating centers for recrystallization. Fig. 3 also shows that an internal twin band, even if tapered in cross-section, will introduce strains varying from zero to very large amounts along the boundaries. Thus, intersecting sets of narrow bands of variable etching characteristics,

C. H. Mathewson

Institute of Metals Lecturer for 1914

PROFESSOR MATHEWSON received degrees from both Yale and Göttingen Universities, and has been engaged continually in research and educational activities. He has been a member of the faculty of Yale since 1907 and professor of metallurgy since 1919. He is recognized as an authority on theoretical metallurgy, and the metallography of zinc, copper and brass. His address is Hammond Laboratory, Sheffield Scientific School, Yale University, New Haven, Conn.

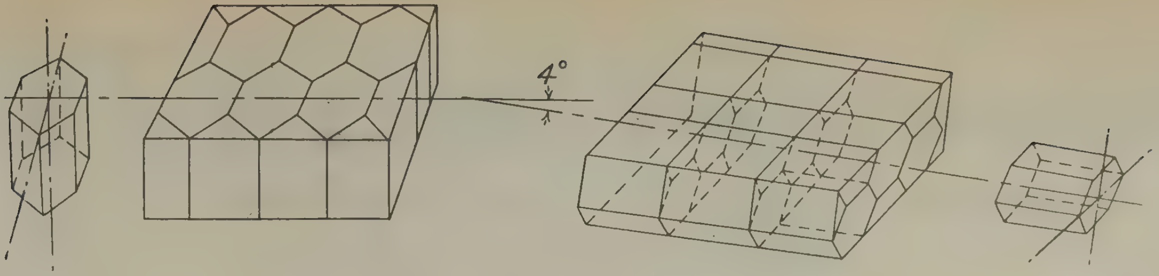


Fig. 1—By Complete Twinning a Slab Split from a Zinc Crystal Changes Its Entire Organization with Slight Change in Outer Shape

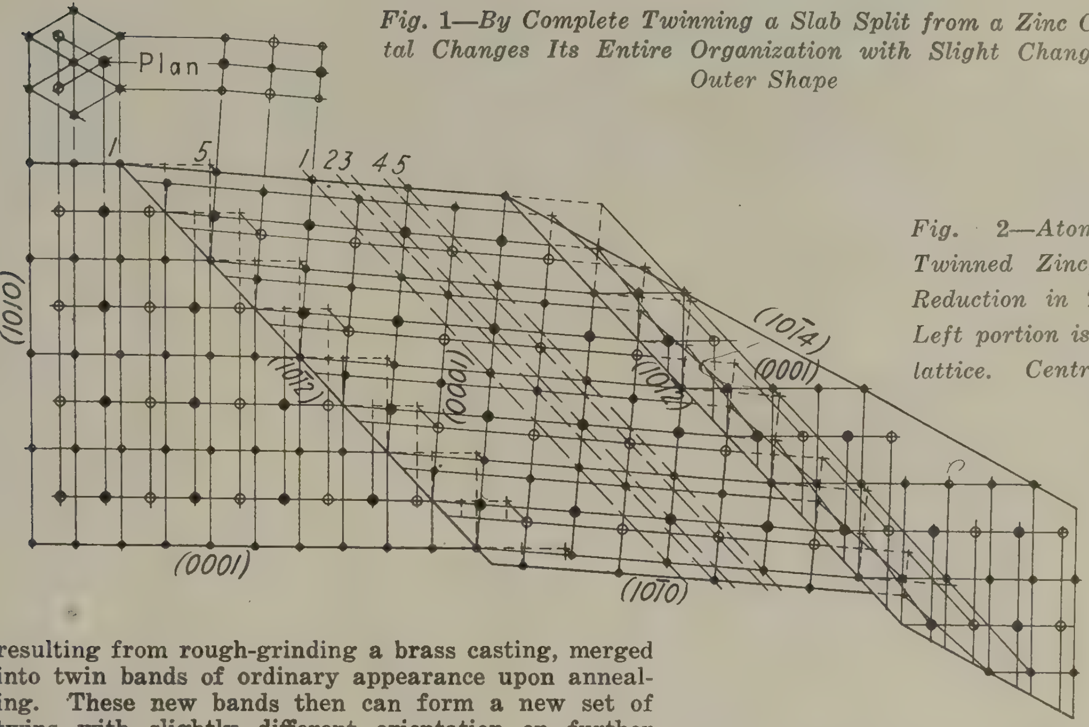


Fig. 2—Atomic Locations in Twinned Zinc, with Progressive Reduction in Thickness of Piece. Left portion is original crystalline lattice. Central portion is twin along (1, 0, −1, 2) *plane. Right portion is conjectured return to original orientation*

resulting from rough-grinding a brass casting, merged into twin bands of ordinary appearance upon annealing. These new bands then can form a new set of twins with slightly different orientation on further work. In such considerations Professor Mathewson explains the fact that a cast material rolled to gage and finished with one anneal would be less uniform and more directional in its properties than the same material annealed several times during the process, although both might look very similar under the microscope.

Combination of Twinning and Slip During Working of Metals

It is admitted that simple twinning unaccompanied by slip does not provide for any considerable change in the dimensions of the crystal. Twinning plus slip is necessary to account for the great plasticity observed during rolling. At present there is a difference of opinion as to what happens during severe cold work. One school holds that the movable surfaces of slip are forced into line with the direction of stress by rotation, or by fragmentation without any great change in orientation. The other opinion is that severe lattice distortion is produced by a combination of slip and bending. Mathewson and Phillips have pointed out that the observed conditions could be satisfied by twinning across slip planes. The mechanism in its early stages is illustrated in Fig. 4, where the specimen is a single crystal of zinc bounded top and bottom by basal surfaces. When the end is pinched between the rolls it may be twinned from top to bottom, as shown in 4a. Irregularities in the process will prevent the ideal development of twinning and slip shown at 4b; complicated invasion and interpenetration of twin bands will more likely occur as in 4c. Fig. 4d shows a reduction less than the amount produced by complete primary twinning; here the rolled material ideally consists of alternate lamellae of the original crystal and its twin.

(*Concluded on page* 710)

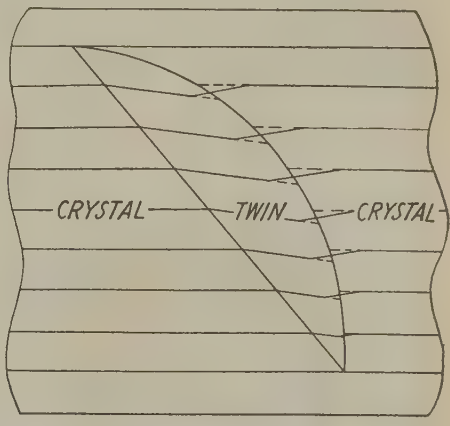


Fig. 3—Graduated Distortion From Low to Very Severe at Boundary of a Tapered Internal Twin Band

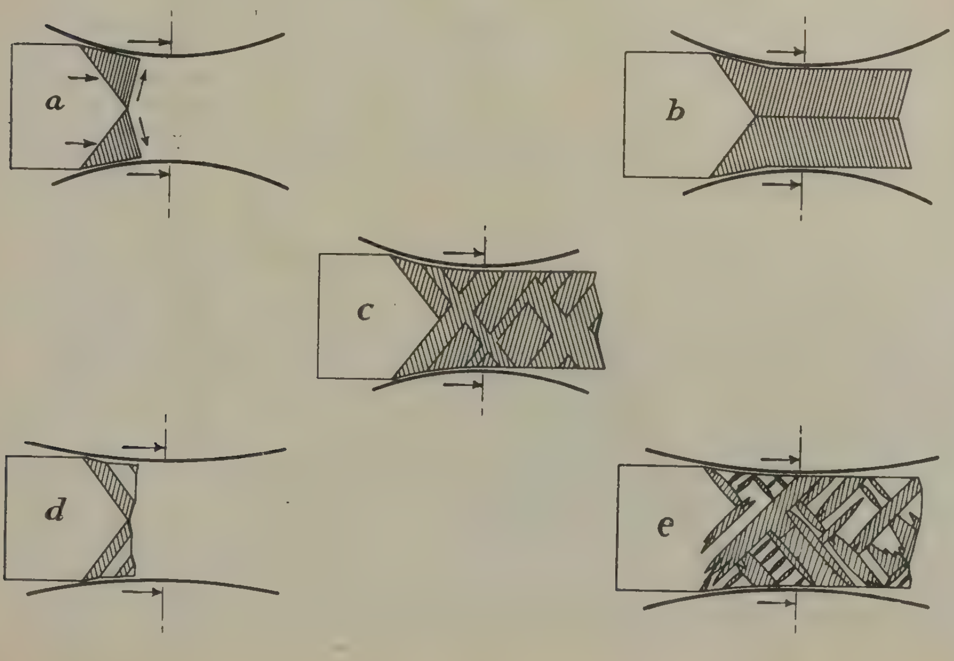


Fig. 4—Twinning and Slip in a Zinc Crystal During Small Reductions

Making Low-Grade Ores of Use

Present and Future of Beneficiation—Getting Rid of Water—Synchronous Operation of Train of Elements

BY EDWARD J. TOURNIER*

CONTINUOUS sintering of ferrous materials, as described at page 191 of THE IRON AGE for Jan. 19 and page 466 of the Feb. 16 issue, is carried to its logical conclusion in this article. Sintering in general, whether on the continuous or the intermittent principle, may be looked to as the medium for rendering available enormous tonnages of low-grade or wet materials now virtually unusable.

Crushed ore, which is minus ⅜-in. product, is delivered by an inclined belt conveyor to a shuttle belt located over a series of eight sintering plant bins. A standard-gage track is provided over two of the end bins for receiving flue-dust, sintering fuel, sinter fines and other material.

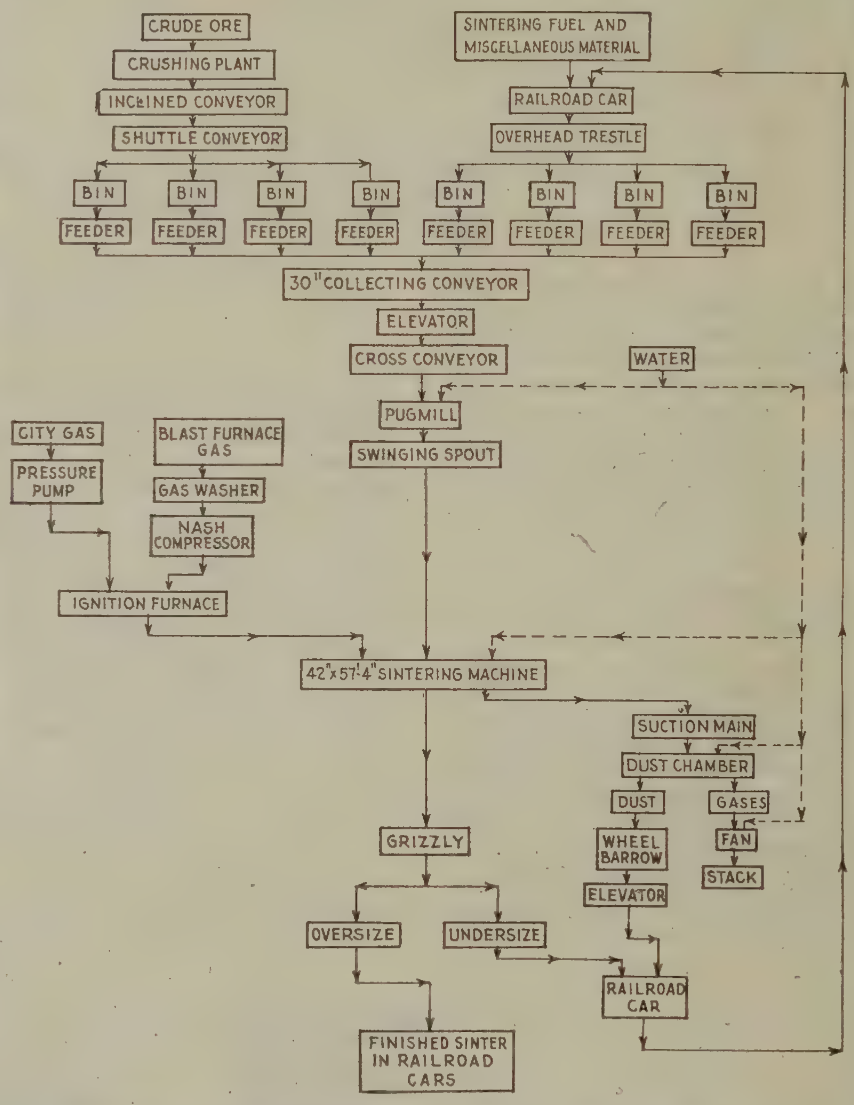
Each of the eight bins is fitted at the bottom with a revolving table feeder. (See Fig. 1, page 192, Jan. 19 issue.) Each table is equipped with a worm gear, driven by a worm fitted with a jaw clutch. The worms are all mounted on a common line shaft, but are capable of being placed in or out of service individually, by means of clutches. In this way the amount and kind of material drawn from the bins may be varied at will by the operator. Each feeder requires about 3 hp. for operation.

The feeders discharge to a 30-in. belt parallel to the longitudinal center line of the feeders. The material, as delivered from the several bins on to the belt, forms a continuous stratified layer which is maintained in a uniform proportionate mixture as discharged from the belt. Material which has been properly mixed on the collecting belt is delivered to the boot of a belt and bucket elevator, which in turn discharges to a short belt conveyor. The latter delivers to a pug-mill driven by a 20-hp. motor. The sintering mixture, after being properly moistened and uniformly mixed in the pub-mill, passes through a spout to the grates of the sintering machine.

To distribute the material uniformly on the grates, which is essential for correct sintering, the spout is arranged to swing across the top of the pallets. The chute is actuated by means of a wire rope passing over sheaves and receiving its power from a crank on the end of the sintering machine drive shaft. In this manner the motion of the swinging spout is a function of the machine speed. Any change in the latter is transferred to the spout and a corresponding alteration in the feed to the grates is effected.

Primary ignition is performed with illuminating gas, but provision is made for the use of blast furnace gas when the furnace is in blast. The piping is so arranged that illuminating gas may be turned on during short periods when the supply of blast furnace gas is interrupted. A standard ignition furnace of the American Ore Reclamation Co. design is used. This furnace performs equally well on any gas or oil fuel and produces a uniformly controllable ignition of the required intensity.

Combustion gases, after passing through the sintering charge, are drawn into the nine wind boxes of the sintering machine. They pass thence to a cast iron dust-settling chamber or collector located below the machine floor and parallel to the sintering machine. The gases are drawn from the settling chamber through a 60-in. diameter flue, by a 100-in. center-plate


CRUDE ORE
CRUSHING PLANT
INCLINED CONVEYOR
SHUTTLE CONVEYOR
SINTERING FUEL AND MISCELLANEOUS MATERIAL
RAILROAD CAR
OVERHEAD TRESTLE
BIN
FEEDER
30" COLLECTING CONVEYOR
ELEVATOR
CROSS CONVEYOR
WATER
PUGMILL
SWINGING SPOUT
CITY GAS
PRESSURE PUMP
BLAST FURNACE GAS
GAS WASHER
NASH COMPRESSOR
IGNITION FURNACE
42"x57'-4" SINTERING MACHINE
SUCTION MAIN
DUST CHAMBER
DUST
GASES
WHEEL BARROW
FAN
STACK
ELEVATOR
GRIZZLY
OVERSIZE
UNDERSIZE
RAILROAD CAR
FINISHED SINTER IN RAILROAD CARS

Flow Sheet of Plant Sintering Iron-Bearing Ores. This is the E. & G. Brooke Iron Co., Birdsboro, Pa.

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*Mechanical engineer, 110 Clinton Avenue, Clifton, N. J.

END of a Pallet, with Fully Sintered Charge. Note the homogeneous nature of the sinter and the absence of fines

fan especially designed for this work. (See page 469, Feb. 16 issue.) This fan, of the double-inlet type, has a capacity of 60,000 cu. ft. of free air a minute at a pressure of 20-in. water gage. The American Blower Co., Detroit, built this apparatus.

Owing to the heavy loads placed on the fan, its shaft bearings are of the double-sleeve water-cooled type, spherical and self-alining. The fan is direct-connected to a 350-hp. adjustable-speed induction motor. Exhaust gases are discharged to a brick stack 7½ ft, in diameter and 160 ft. high.

Synchronizing Drives and Controls

An essential requirement is the automatic control of the volume of material fed, in proportion to the requirements of the sintering machine. No less important is the control of the proportions of the sintering mixture. The controls must be synchronized and be capable of adjustment either individually or simultaneously.

The vital instruments for the accomplishment of these functions are generally Reeves variable-speed controllers, connected in series by a drive belt. The first controller, which for the purpose of description is termed *A*, is connected by a belt to a 30-hp. constant-speed motor. The variable-speed shaft of controller *A* drives the sintering machine countershaft and also drives the constant-speed shaft of second controller *B*. A drive is taken from *B* through its variable-speed shaft, to the sintering mixture feeders and the collecting belt system with its feeders.

It will be evident, from this disposition of the apparatus, that any change in the sintering machine by adjustment of controller *A* produces a corresponding change of speed of the feeders. In addition, if it is desired to change the volume of material delivered by the feeders to meet differences in sintering machine requirements, this is accomplished independently of the machine speed by adjustment of controller *B*. After such adjustment, the speed of the feeders will continue to be automatically controlled by any changes in the sintering machine speed, by adjustment on controller *A*. The proportion of the various materials fed, from any or all of the eight bins, is regulated manually by means of independent gates in each feeder.

The controls governing the functions described, as well as those for moistening, ignition, depth of charge, etc., are all arranged accessibly on the operating floor. Thus one attendant has instant direction of all operations and observations from a single point.

Performance and Capacity

The E. & G. Brooke plant at Birdsboro, Pa., has for its primary function the beneficiation of French Creek ore, which, in its raw state, as before stated, is practically valueless as a blast furnace material. At present high-carbon flue dust is being used as a source of sintering fuel, thereby reclaiming the iron values of the flue dust simultaneously with desulphurizing and beneficiating the ore. This material, owing to its comparative coarseness, requires no hearth layer, and, as it requires only about 3½ per cent of its weight of sintering fuel, it imposes no severe service on the grates. A typical analysis of the French Creek ore and the sintered product is as follows:

French Creek Ore	Raw, Per Cent	Sintered, Per Cent
Fe	52.70	54.80
SiO_2	11.50	12.90
Al_2O_3	2.10	2.50
CaO	1.70	2.30
S	2.60	0.10
P	0.04	0.05
Mn	0.15	0.21

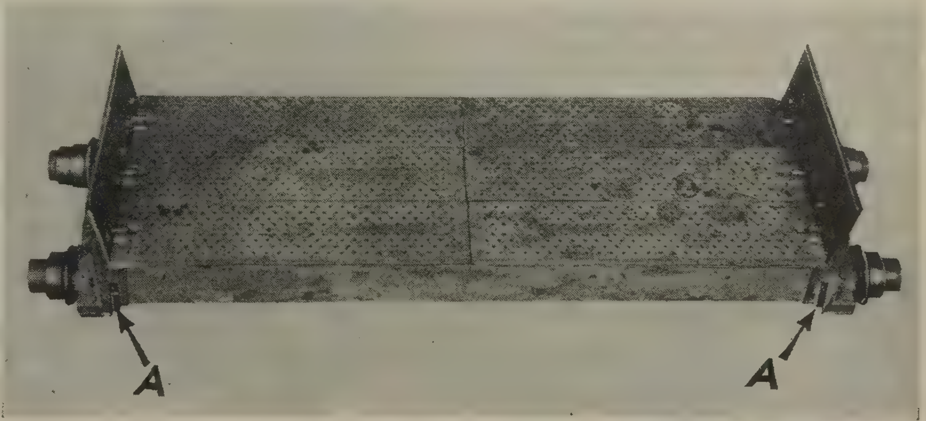
The plant and auxiliary equipment are laid out for two sintering machines, 42 in. x 57 ft. 4 in. Only one of these, however, has been installed. It has a capacity of 500 tons of sinter in 24 hr., and is operated by a 30-hp. motor. At the middle speed of the Reeves controller, the rate of pallet travel is 68 in. a min.

As the sintering plant necessitates 24 hr. a day operation, two labor shifts are employed, nine men being in the day shift and eight men at night. The capacity is equivalent to 29.4 tons of sinter for each man-day.

Future Trend of Sintering

High-grade and cheaply minable iron ores are rapidly diminishing. The decreasing average iron content of the ores being shipped each year indicates that the future ore supply from the Lake Superior district will require increasing expenditures in the production of ores.

Great tonnages of low-grade ores are available, but all require additional cost in some form of beneficiation to render them economical blast furnace material. The high-grade concentrated ores permit the use of limited quantities of low-grade ore by admixture therewith. However, the advantages of ores carrying mini-



TOP of Pallet and Grates, Showing Also the Air Seal Construction. The rectangular bars "A" rest on a track bar at either side of the sintering machine and prevent air leaks. The same air seals are noticeable at top of page mum slag-producing constituents is self-evident as related to economy of smelting, and high-grade concentrates will develop preference.

Millions of tons of iron ore in the Lake Superior regions are unmerchantable, due to their mosture contents. Elimination of water content would render this class of ores as good as, or better than, a large percentage of ore as shipped. A class of ore known generically as "paint rock" occurs in working mines, the shipping ore from which bears the burden of expense of its initial development. Mining paint rock could therefore be done without development cost.

The beneficiation of this class of ore, as well as other ores of highly hygroscopic nature, will require only sintering to render them not only equal to the average shipping ore, but of greatly superior physical state and perfectly dry, thus eliminating heavy wasted expense of freight on water content.

Flue-dust production varies with the class of ores used in the furnace. Based on an average of 5 per cent of ore burden, a 500-ton furnace would produce about 50 tons of dust, which in turn would make about 42 tons of sinter. This, however, would constitute only about 4½ per cent of the ore burden, thus necessitating drawing on the stock pile. Ultimately the stock pile will be used up, and the sintering plant will either have to go on part time, or other materials will have to be found, to utilize it.

Since most of the large flue-dust stock piles in the United States have disappeared, and the limited use of pyrites cinder renders this material a practically negligible quantity in the problem of selecting sintering materials, the natural direction of sintering is toward beneficiation of low-grade ores and of concentrates.

Our iron and steel industry has reached the point where rigid economy in pig iron production, and the preservation of the ore supply, are essential to its perpetuation. The use of sinter made from ores and concentrates otherwise useless in the blast furnace, however, points the way to the fullest utilization of potential sources of supplies for an indefinite time.

Steel Ties for American Railroads

A Form Shown Which Has Distinct Advantages—Answers to Many Objections

BY JOHN H. JONES[*]

ONE type of steel tie which I have seen manufactured always appealed to me as being the most suitable for use in this country. The design, roughly, is as shown in the diagram. The peculiarity of its form embodies some useful features, which may, in some degree, answer the points raised in previous articles,[†], which were as follows:

1. First and ultimate cost.
2. Problems of installation as compared with wooden ties.
3. Tendency to side creeping.
4. Difficulty of maintaining gage.
5. Failure due to corrosion.
6. Rolling or shifting position under sudden braking of fast rolling trains.
7. Tendency of the bolts to loosen under wave strain.
8. Satisfactory method of insulation for signal systems.

1. The cost of manufacturing these ties should be reasonable, as the section of the plate as rolled is of an easy rolling design, as shown in Fig. 1. The plant necessary for forming the tie and rail clips or holes, as desired, should be capable of making about 2000 tons of ties a week. Two 8-hr. shifts a day, a total of 11 shifts a week, would be used, with about 20 unskilled workmen per shift, or a total of 40 men. From this an approximate cost of manufacture can be derived which should not exceed, in my opinion, say $8 a ton after the rolling, which would include the cost of the necessary power for working the plant. Undoubtedly a reduction could be made on this by working three 8-hr. shifts a day.

The two forms of rail fastenings, (1) key and distant piece, and (2) bolt and clip, I am informed, can be manufactured at low cost. I have seen as many as 12 of these ties made in 1 min.

2. The difficulty of installation should be no greater than that of installing wooden ties, as the steel tie is no deeper and can be slid under the rail and packed up or bedded like the wooden tie.

3. The tendency to side creeping should be minimized by the down bend at each end of the steel tie (Fig. 3) which dig themselves into the ground.

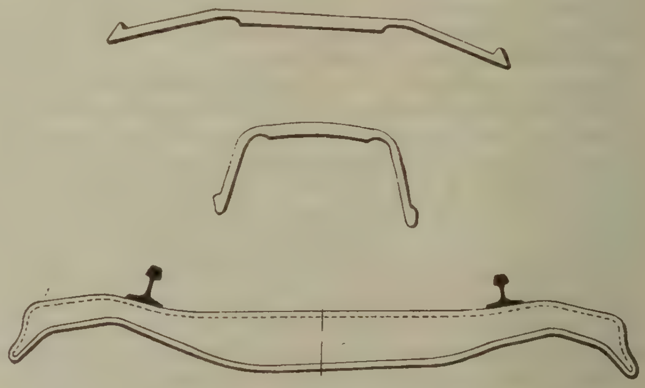
4. The difficulty of maintaining gage is not experienced where these ties are in general use, as both forms of rail fastenings have been in use for many years.

5. Failure due to corrosion is taken care of by dipping the tie, while still hot, into a bath of tar or creosote. The skin of protecting material thus formed remains on the tie for many years.

6. The hollow form of these ties and the manner in which they bed into the ground give them a great resistance to any shifting due to the action of moving trains.

7. The tendency for the bolts to loosen should be no greater than the tendency for the splice-bar bolts to loosen. However, should the bolts have a tendency to do so (which I doubt, seeing that strong split-spring washers are usually placed under the nuts), then the key and distant piece type of fastening could be used. This, I think, is the most favored fastening for steel ties.

8. A method of insulation for signal systems I know little about. It is possible that the hard tar coating might give some insulation effect, but this I cannot say.



Suggested Form of Steel Tie. Fig. 1 (top) is the section as rolled and before forming. Fig. 2 (center) is the formed section at mid-length. Fig. 3 (bottom) is a side view of the completed tie

In steel ties the rail seats must have the correct and necessary tilt or angle, and the fastenings should be designed so as to allow the necessary adjustments for gage widening on curves.

The favorable features referred to in Fig. 3 are (1) the ends bent down to resist side movement; (2) the middle part of the tie is well dished, giving it depth for strength; (3) the parts which come under the rail flange are left rather flat, to insure a wide bearing surface on the ground. Small steel ties could be used to advantage in mines, plantations and light railroads of all kinds, as the tie could be made of a light straight length of channel section. There are many useful and quickly applied rail fastenings for this type of tie.

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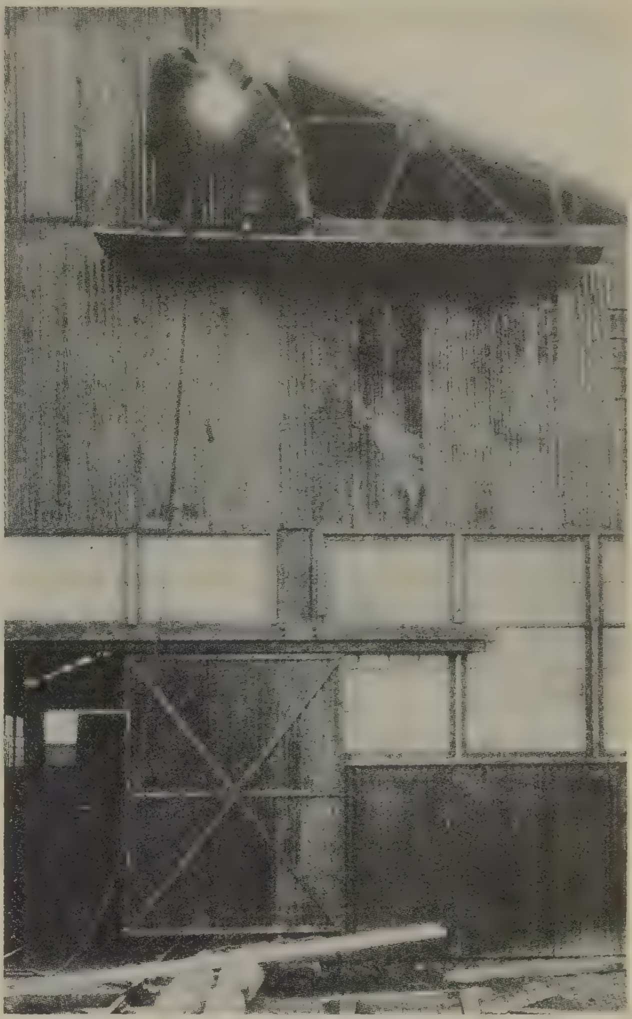
[*] Mechanical department, Colorado Fuel & Iron Co., Pueblo, Colo.

[†] See THE IRON AGE, Sept. 1, 1927, page 559; Oct. 13, page 1041; Dec. 1, page 1536; Dec. 22, page 1721.

Steel Building With Corrugated Sheets Welded On

CORRUGATED copper-bearing steel sheets were used for siding and roof of the new plant of the Alliance Tank Co., Cleveland. The roof is of 22-gage sheets and the siding of the same material but of 24-gage. Electric welding was utilized in fastening the corrugated steel sheet to the structural members. All the interior fittings, such as brackets, bracing, line-shafts, hangers, etc., were electric welded.

The company specializes in gasoline, oil storage and pressure tanks, vats, oil pits for filling stations, paint kettles and varnish tanks, distributed under the trade name of "Thoro-weld" tanks. The work is done by means of the Lincoln Electric Co. welding process.



Corrugated Steel Sheets Fastened by Welding to Structural Members

Improves Portable Arc Welder

ELIMINATION of live connections from the front of the control board is a major new feature of the type S welding machines of the Wilson Welder & Metals Co., Inc., Hoboken, N. J. The main switch is inclosed and mounted on the back of the board and only a dial and pointer appear on the front. The reactor is underslung and is so placed that it is protected from injury.

A rotary switch is incorporated to give close regulation for both repair and production welding operations. It is stated that short or long arc; high open circuit voltage for long arc; and low open circuit voltage for short arc, are available as required. The close control provided is claimed to adapt the machine for overhead welding. Several sizes of the machine, equipped with motor generator set, gasoline engine or for belt drive, are available.

Oxy-Acetylene Cutting Machine Has Many Automatic Features

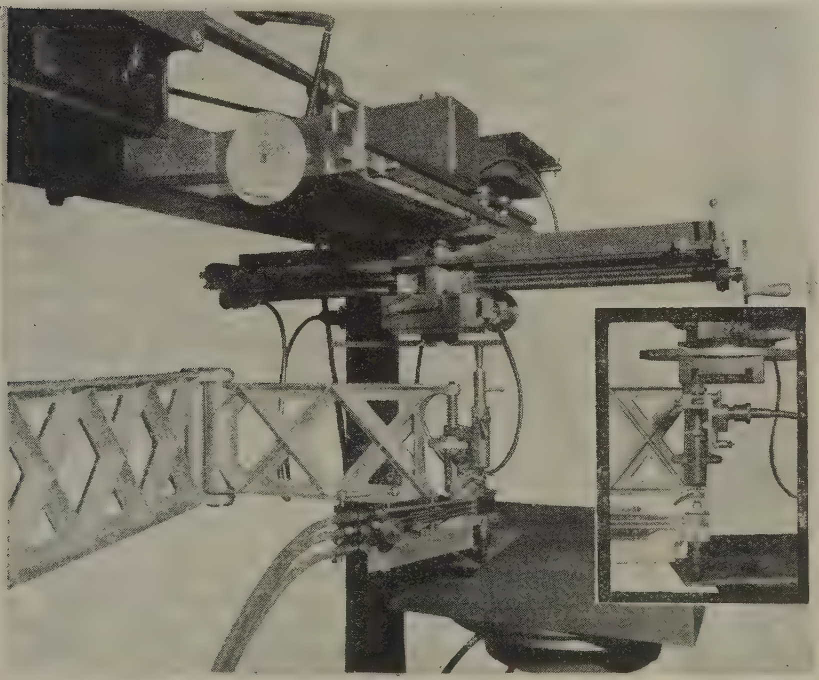
AN automatic machine for oxy-acetylene cutting containing many refinements is now being imported by the Hubar-Jones Corporation, 13 Astor Place, New York. Known as the "Godfrey Oxygen Jet Cutting Machine," it is said to have been in successful use in English and Continental railroad and shipbuilding shops for some years.

The traversing screw and cross-slide shown prominently in the view is set at any angle to the main frame, and is hung from a carriage driven as desired by a screw along the top girder of the guillotine frame. All movements are power driven at closely controlled speeds by means of flexible shafts, and are equipped with automatic stops and indexes so any shape bounded by straight lines can be cut and duplicated with certainty.

The weight of the cutting blowpipe and its attachments is carried by a pantograph arm hinged to the rear pillar of the main frame, not shown in the view. A short mast in line with the blowpipe axis connects with the driving mechanism above. In the illustration it is connected with a radius bar and a rotating mechanism attached to the cross-slide. By means of a flexible shaft, any circle up to 3 ft. in diameter can be cut. Larger circles up to 15 ft. can be cut by holding the torch stationary in proper position, and rotating the table carrying the plate. Ingenious automatic trips and stops enable the machine to cut more intricate shapes bounded by straight lines and circles, without special templates.

Templates are necessary for irregular curves such as gear teeth. These are affixed upside down to a plate which replaces the radius bar. The blowpipe is driven around the desired contour at a uniform speed by a wheel and pin engaging snugly in the template slot, as shown in the inset.

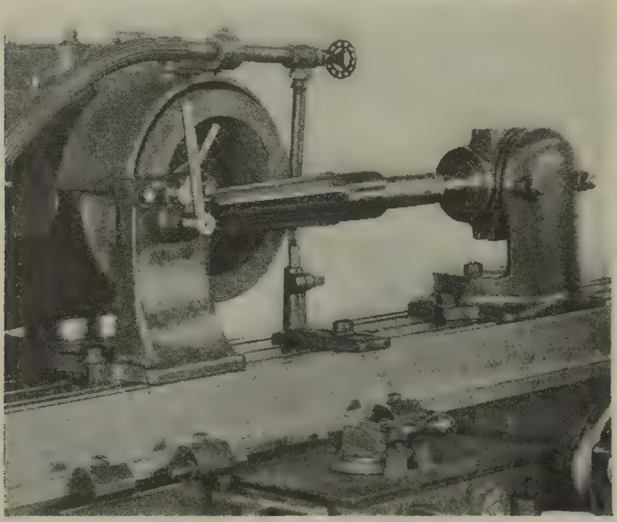
The blowpipe may be set at various angles for a beveled edge. It has graduated wheels on the gas valves for accurate resetting and a master lever which cuts off all gases simultaneously. Mixing of the preheating gases is done in spiral passages in the blowpipe head, and the preheating flame issues from an annular orifice entirely surrounding the cutting jet. An unusually thin kerf or slot is cut, and the cut surfaces are quite smooth, due to the uniform rate at which the cutting flame is driven and the stability of the machine generally.



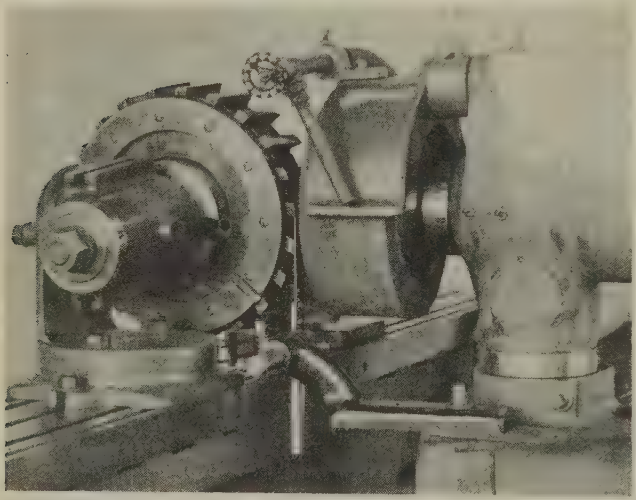
Godfrey Cutting Machine Set for Cutting Circles. Inset: Special drive for irregular outlines

Cutter and Reamer Holder for the Thompson Universal Grinder

An improved cutter and reamer holder with tailstock has been brought out by the Thompson Grinder Co., Springfield, Ohio, and will be included with the universal equipment for the company's 12 x 36-in. standard universal grinding machine. The cutter holder has capacity for milling cutters up to 12 in. in diameter, straight or spiral teeth. It can be swiveled through a vertical plane as well as through a horizontal plane, and is used with a cup wheel so that straight angle clearance may be obtained on the cutter teeth. The tailstock, used when reamers are to be ground on centers, has capacity for reamers from ½ in. to 12 in. in diameter, 36 in. long. It is designed to permit free passage of the cup wheel without interference on the smallest reamers. It has a sliding quick-action movement to the center and quick-acting clamp for locking-in position. The headstock is fitted with the new standard taper hole adopted by the milling machine group of the National Machine Tool Builders' Association, and can be bushed down to any size taper or straight hole with collets that fit the various sizes of reamer or arbor shanks.



The Cutter and Reamer Holder and Tailstock Used in Sharpening a Reamer Is Shown Above. The grinding of a milling cutter is shown below



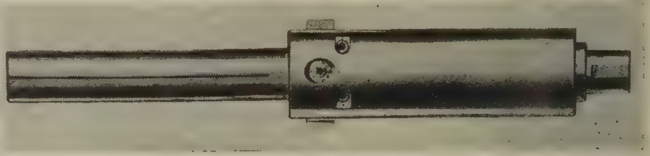
Approximately $75,000,000 has been invested by private interests in commercial river steamers, boats, barges and terminals on the Ohio River, states a report prepared by engineers attached to the office of the United States division engineer, Col. Charles W. Kutz, at Cincinnati. Of this amount, approximately $40,000,000 is invested in river craft and the remainder in terminals. The report shows that there has been a remarkable growth in river craft in the past 10 years, particularly in the number of steel barges and Diesel-type tow boats.

Expansion Boring Bars of Simplified Design

Simplicity of design and ease of adjustment are features of expansion boring bars recently placed on the market by the Larkin Packer Co., St. Louis. These bars are offered as production tools designed to maintain accuracy of bore and to compensate for wear on cutters by means of micrometer adjustment. There are only four main parts—an adjusting screw, with 0.001-in. graduations; a wedge threaded on the adjusting screw which serves to expand cutters; a thrust collar for piloting the adjusting screw; and a removable bushing for retaining expansion units in the body.

The method of expanding the cutters is said to provide accuracy and rigid construction. Wedge action, with bearing above and below center on angles of cutters, forces the cutters uniformly outward as the micrometer screw is turned. The hardened wedge, which is prevented from rotating by keyways, is threaded on the adjusting screw and travels forward or backward as the screw is turned. This adjusting screw rotates but does not travel. Thrust at the bottom is taken by a hardened and ground thrust collar, which serves as a centering unit for the conical point of adjusting screw, and also to support the adjusting screw on dead center. The wedge is arranged to support the thrust of the cutters and eliminate side play under strain.

The entire expansion unit is accurately fitted in place from the front of the bar and retained with a removable bushing, which provides access to the adjusting parts for purpose of replacement without damaging the bar. It is stated that by the arrangement adopted, the torsional strength of the bar body has been materially increased, as only a portion of the body is drilled and reamed to accommodate adjusting parts instead of drilling entirely through the bar and plugging.



Piloted Turret Lathe Boring Bar. The pilot is hardened and ground and has oil grooves. Micrometer cutter expansion is provided

A feature emphasized is the method of locking the cutters in place. A hardened and ground eccentric locking screw, with threads at both ends serving as pilots, employs a positive cam movement for clamping each cutter in its slip-fitted slot. The cutters are immovable until the locking screw is released. To facilitate removal of the cutters, the head of the locking screw has an indicator mark set at zero, located on point where the cam pressure on the cutter is released. Each cutter is held independently, and right- and left-hand threads throw the locking movement inwardly against the wedge.

The body of the boring bar is of forged chrome-nickel steel and is heat treated. Cutters are of high-speed steel, and are heat treated and tested to assure uniformity of hardness. When worn undersize, beyond range of expansion in one bar, the cutters can be used in smaller diameter bars of same slot dimensions.

Ten stock styles and 16 stock sizes of the tool for various boring operations, are available. Bars for boring car wheels, locomotive driving boxes, driving rods, rod brasses, rocker boxes and brasses, etc., can also be furnished, as well as bars for special requirements.

Production of electric power by public utility plants in the United States in January is reported by the Geological Survey at 7197 millions of kwhr. This is a slight reduction from the record-breaking total of December, at 7218, but is otherwise the largest month's output ever recorded. It compares with 6874 in November and with smaller totals in all preceding months.

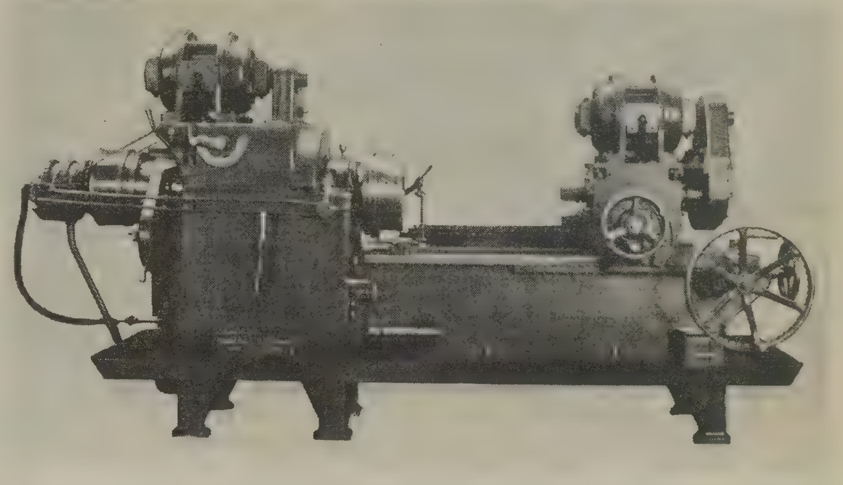
Thread Miller With Roller Bearing Milling Head and Other Improvements

Increased rigidity and flexibility in changing from one job to another were basic considerations in developing the thread miller here illustrated, which has been placed on the market by the Smalley-General Co., Bay City, Mich. This machine, designated as the No. 20, is offered as an improvement over the company's No. 23, previously marketed, and it is stated that, although designed for production purposes, the machine can be used to advantage on small runs of work.

Outside or inside, right or left-hand threads can be milled, and when equipped with a taper attachment the machine will mill straight or tapered threads up to 4-in. taper per foot. The range of external threading is ⅛ to 8 in. in diameter and of internal threading, ½ to 12 in. in diameter. Pitches range from 30 per in. up. It is claimed that form milling can also be done to advantage in many cases.

An outstanding improvement is the use of a roller bearing milling head, the spindle, and the pinion shaft which drives it, being mounted in Timken tapered roller bearings. The milling spindle is equipped with a No. 13 B&S taper and is driven by helical gears which run in oil. The milling head is arranged so that a turning tool can be attached conveniently and surfaces adjacent to the thread can be turned true with it. Rigid construction of the milling head is said to eliminate chatter and thus to add to the life of the hob. The main spindle has a 6⅝-in. hole and is flanged at the front end to facilitate quick changing of chucks. Several types of chuck may be used, depending upon the work to be done and the quantity of pieces to be milled. The chuck shown is a 5-in. three-jaw unit operated by an air cylinder, and with this equipment long work, 5 in. in diameter, can be put through the spindle. The main spindle is mounted in bearings cast integral with the bed. Two series of speeds are provided for the main spindle, one for turning and one for milling.

Either motor or belt drive may be employed. The motor-driven machine has eight speeds on the main spindle and six on the milling spindle, when four-speed motors are used. The belt-driven machine has a three-step cone on the main spindle, and a pulley on the pinion shaft of the milling head. Separate countershafts are provided for each spindle. Although the machine is primarily of the chucking type, it can be furnished with a tailstock and live center to permit work on centers. When a long overhung arbor is required an overarm can be used to support its outer end. A relieving attachment, for use in relieving taps and dies, can be furnished so that taps can be milled and relieved at the same time after fluting.



Mounting of the Spindle and Pinion Shaft in Tapered Roller Bearings Is an Improved Feature

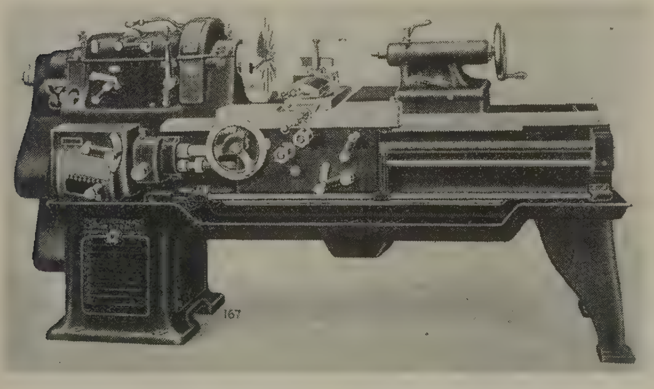
The feed mechanism, which is patented, is designed so that the wear is distributed over the entire length of the thread of the lead screw, instead of coming at one place. It is said to be unnecessary to wait for a split nut to pick up the thread. The feed lever can be thrown in at any time and by means of this device a thread can be started at any point on the circumference of the work. A reversible coolant pump is provided for supplying cutting fluid to the hob, and piping is arranged so that the fluid may be directed either from the inside or the outside of the work.

Geared-Head Lathes With Driving Motor in the Cabinet Leg

Geared-head lathes with the driving motor in the cabinet leg, under the head, have been brought out by the Cincinnati Lathe & Tool Co., Oakley, Cincinnati. Three sizes of the machine, 16, 18 and 20 in., can be furnished. A variety of types and sizes of a.c. or d.c. motor can be accommodated in the cabinet leg and the drive from the motor may be either by silent chain or belt.

The company's patented quick-change gear box, providing a wide range of threads and feeds, is incorporated in the new machine. Twelve spindle speeds are obtainable by shifting one or more of the three levers at the front of the lathe. All gears and shafts in the head are of chrome-manganese steel, heat treated and ground. A locking plunger is provided to facilitate removal of chucks and faceplates without strain on the shafts or the gear teeth. The clutch employed, of compression disk type, is said to transmit the full horsepower rating of the motor.

An index plate is prominently located on the front of the head to indicate the lever positions for each spindle speed. The lathes are supplied with or without oil pans, and with various lengths of bed.



A Plate in the Cabinet Leg May Be Adjusted to Accommodate Motors of Various Sizes and Types

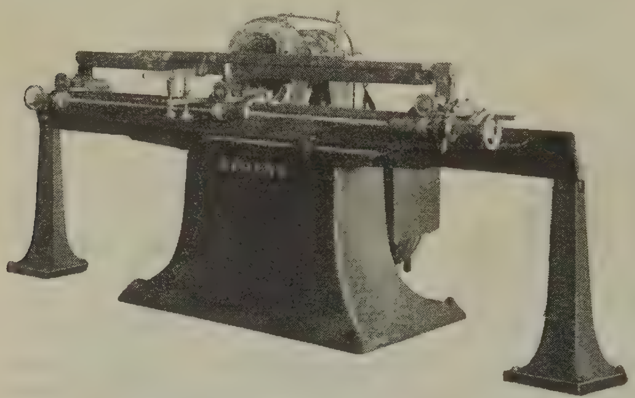
Lincoln Company Remodels Welding School

Lincoln Electric Co., Cleveland, has recently moved its welding school into larger and more convenient quarters. It now contains 10 curtained booths, each with welding table and all necessary accessories, and an individual arc welding machine. Students are accepted for an intensive course lasting one month; tuition is free. The school is under the general direction of A. F. Davis, vice-president; class work and individual coaching is given by special instructors. It is the aim to give men in this time a sound working knowledge of the fundamentals of arc welding, and fit them to engage competently in the trade.

Automatic Sectional-Wheel Knife Grinders

Sectional wheel automatic knife grinders, designated as the type R, have been added to the line of Samuel C. Rogers & Co., 191 Dutton Avenue, Buffalo. Eight different sizes, to accommodate shear and other blades from 76 in. to 146 in., in length, are available.

The machine is equipped with a 14-in. sectional grinding wheel mounted in a chuck having simple adjustment for holding and replacing segments. Rapid grinding with this type of grinding wheel is attributed to the spaces between the grinding sections, which form channels for carrying away the abrasive particles and the stock ground off the knife. The spaces also allow free entrance of the coolant to the point of grinding.

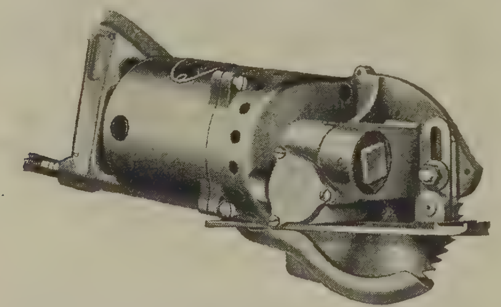


Sectional Type Grinding Wheels Are Used. The machine is available in eight sizes for shear blades up to 146 in. in length

Equipment on all sizes includes an improved water attachment; spring cross feed; heavy yoke bottom supports to eliminate vibration and double ratchet feeding with automatic stops. The machines may be equipped with direct motor drive which includes a standard 5-hp. 60-cycle motor, starter, extended shaft, brackets, etc. They may also be equipped for belt drive with tight and loose pulleys. The smallest machine, the 76-in. grinder, requires floor space of 4 x 9 ft., net, and 4 x 14 ft. 2 in. when in operation. The shipping weight is 2450 lb. The largest machine, the 144-in. grinder, requires floor space of 4 x 26 ft. when in operation; the shipping weight is 3900 lb.

Light-Weight Electric Hand Saw for Maintenance Work

Light weight and balance are features of a new electric hand saw, designated as the Junior model J, which has been added to the line of Skilsaw, Inc., 3814 Ravenswood Avenue, Chicago. The machine weighs 11 lb. It is designed for ripping and cross cutting dressed lumber up to 2 in., and is adapted for maintenance and repair work as well as for use in shipping rooms.



The Body of the Machine Is of Aluminum and Gears and Shafts Are of Chrome-Nickel Steel. The weight is 11 lb.

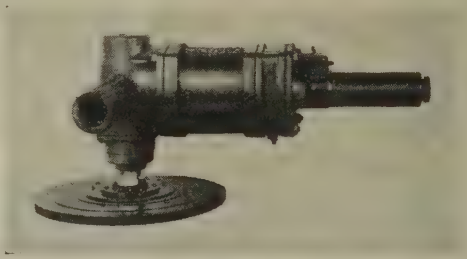
A ½-hp. special motor for direct current or alternating current, single-phase, 60-cycle or less, is employed. The speed of the motor is 1200 r.p.m., and the speed of the saw is 2500 r.p.m. The body of the machine is of aluminum and shafts and gears are of chrome-nickel steel. Ball bearings are used throughout. A kerf guide and safety guard are provided. The base is adjustable for various depths of cut. Standard equipment includes a combination 6-in. rip and cut-off saw blade; an adjustable rip fence attachment; 15 ft. of rubber-covered cord with connector; and a steel carrying case.

New Line of Rotary Air Grinders and Sanders

The Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has placed on the market a new line of Thor rotary air grinders and sanders, two models of which are here illustrated. Features include the motor, which is light in weight and carries four balanced bakelite blades, the latter being unaffected by oil, water or heat. It is mounted on a shaft suspended in ball bearings. The spindle is also suspended and held in alinement by large ball bearings.

The governor, which is fully inclosed and is adjustable, serves to keep the free-speed air consumption low, until the wheel is applied to the work, when it automatically throttles to the speed and air required for the job. An automatic oiler is provided and the unit carries sufficient light oil to lubricate all moving parts for eight hours. A baffle plate muffler is incorporated in the box-like lug on the spindle support.

One of the machines illustrated is the No. 271 R sander, which has a right-angle housing and carries flexible disks 9 in. in diameter and smaller. The length overall is 14 in. and the speed is 4000 r.p.m. Another machine is the No. 271 grinder, which weighs only 15½ lb. and is 21¼ in. long overall. It has a straight handle throttle, and the speed is 4000 r.p.m. It carries a 6-in. emery wheel having a face of 1½ in. A No. 272 grinder, illustrated herewith, is also available. This unit weighs 17¼ lb., measures 19¾ in. overall and is equipped with a grip handle throttle. It carries an 8-in. emery wheel having a 1½-in, face. The speed is 3200 r.p.m.



The Sander With Flexible Disk Is Above and the Air Grinder With Grip-Handle Throttle Is Shown Below

Employment in Cleveland during February showed a 2.6 per cent gain over January, according to the monthly statement of the labor relations committee of the Cleveland Chamber of Commerce, which is based on reports obtained from 100 large manufacturers. There was a gain of 6.6 per cent in January and February over the first two months last year. There was a gain of 4.5 per cent in the steel industry in February and a gain of 5.3 per cent in the automotive industry.

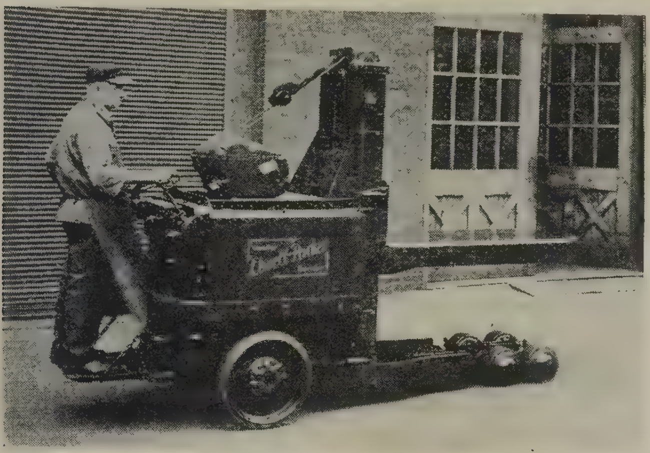
The fourteenth annual convention of the American Association of Engineers will be held in El Paso, Tex., on June 4, 5 and 6 at the Hotel Hussman. L. M. Lawson, First National Bank, El Paso, is chairman of the local committee.

Five-Ton Lift Truck With Platform Height of Over 11 In.

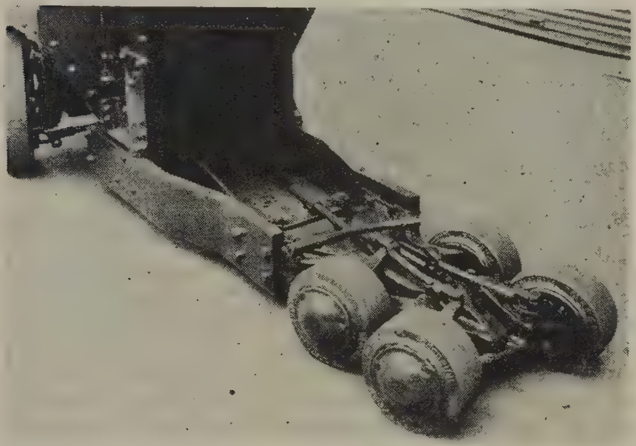
With capacity of 5 tons, a tier lift truck for handling material on skids, and having a platform height of only 11 in. when lowered (58 in. when elevated), has been brought out by the Elwell-Parker Electric Co., Cleveland. This company has been making a lift truck with the same minimum platform height, but it was of only 2 to 3-ton capacity.

Problems in the design of the truck were to provide a trail axle, wheels and their steering mechanism sufficiently low in height to permit a low platform, to steer all wheels simultaneously and on concentric circles, and at the same time have sufficient tire and bearing capacity to carry the load. The trail or front axle has four steerable wheels with tires 10 in. in diameter and 5 in. wide. The two driving wheels are 22 in. x 4½ in.

All six wheels are steered by a hand wheel through a miter and worm gearing. A feature of the truck is the general use of anti-friction bearings. The gear-reduction mechanism and motors have ball bearings, and there are ball bearings at the bottom of the steering column. The drive wheels have double radial and thrust ball bearings, and the trail wheels, tapered ball bearings.



Exceptionally Low Platform for a 5-Ton Lift Truck Features This Unit. Its steering capacity is unusual, inasmuch as all four of the small wheels under the platform are steerable in unison, as shown below

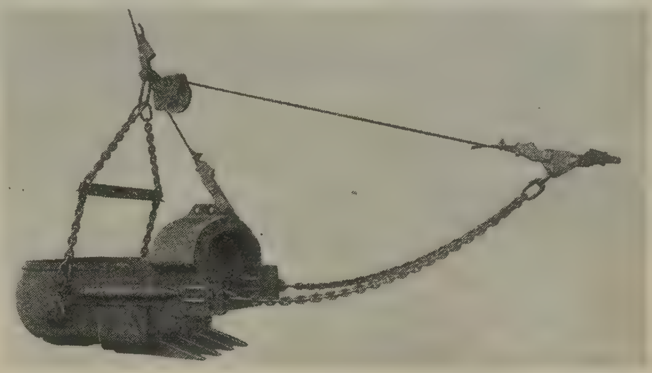


Separate motors for the drive and lift are located within the frame housing. The platform is 26½ in. wide and 60 in. long. The truck will turn in intersecting 78-in. aisles. It has a speed of 300 to 400 ft. a minute and a lifting speed of 6 ft. to 9 ft. a minute.

Employment figures of the National Metal Trades Association show a decline in January from a year ago of nearly 3 per cent, based on returns from 35 centers covering the area north of the Ohio and east of the Mississippi River. The total this year was 581,717, against 598,653 a year ago. There has been a recent improvement, however, for the January total is larger than that of any of the four preceding months. December was the lowest recent figure, at 541,232.

New Type of Dragline Bucket for Heavy Duty

Dragline buckets in four sizes from ½ to 1¼ cu. yd. are now being made by the Harnischfeger Corporation, Milwaukee. These buckets are designed to withstand severe service. The bottom and sides are shaped from a single piece of heavy tank steel, and all seams are electrically welded. Welded construction provides a smooth inside surface, and prevents sticky soil or weeds from clinging to the bucket. The bucket teeth, heavy steel forgings, are securely bolted through the cutting lip and bottom of the bucket.

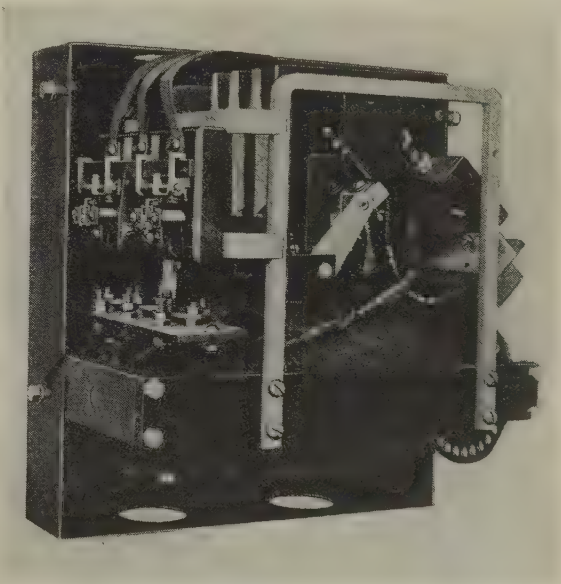


Designed for Rigidity in Heavy Service

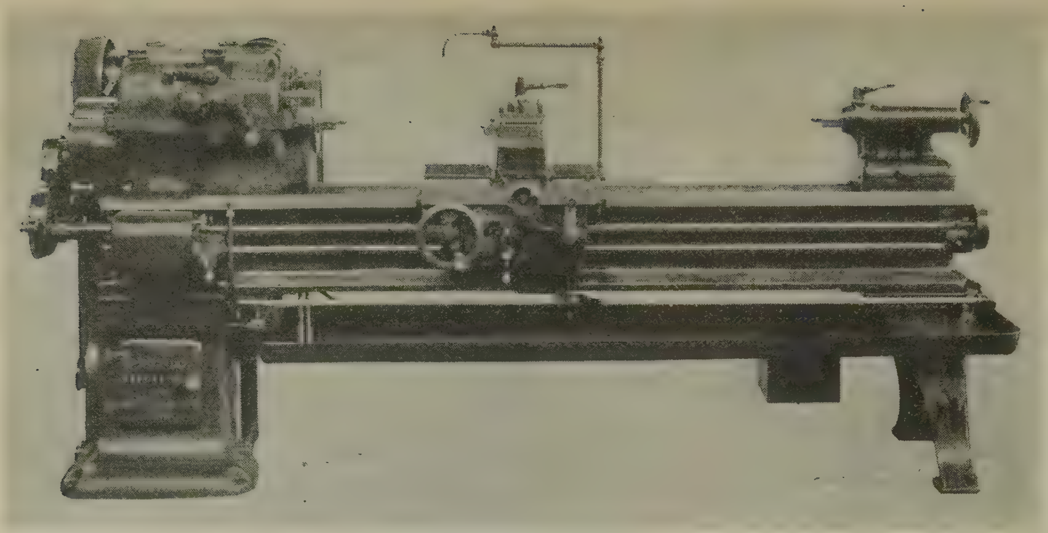
It is a difficult problem to prevent the sides of a dragline bucket from drawing together at the front end. However, the large box-section hood and heavy Z-bar supports here used promise to eliminate much of the trouble. The drag chain clevis is provided with lugs which pull against shoulders in the hitch plate, thereby transmitting the pulling stresses directly from the bucket to the chain, instead of through the connecting pin. The pin merely acts as a guide and is not subject to bending strains. This type of hitch plate is said to make it easy to adjust the cutting angle of the bucket.

Adjustable Automatic Induction Starter

An automatic induction starter with two adjustable features is being made by the Lincoln Electric Co., Cleveland. One of the adjustments is in the starting current and starting torque, and is made by changing the position of the rotor in the regulator. This rotor is index mounted and the starting torque and starting current of the motor are increased by going to the higher numbers of the scale and decreased by going to the lower.

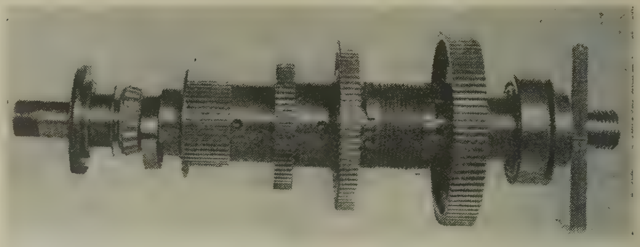


The other adjustment is in the current at which the throw-over takes place. The throw-over in this new starter is controlled by retarding solenoid, which is operated by the motor current. The pull of this solenoid can be adjusted by a simple lock rod arrangement carried on its plunger.



Tapered Roller Bearings, Arranged as Shown Below, May Be Provided for the Spindle. In place of the rapid change-gear device, the machine has an instantaneous feed box

Production Lathes with Tapered Roller Bearing Spindles

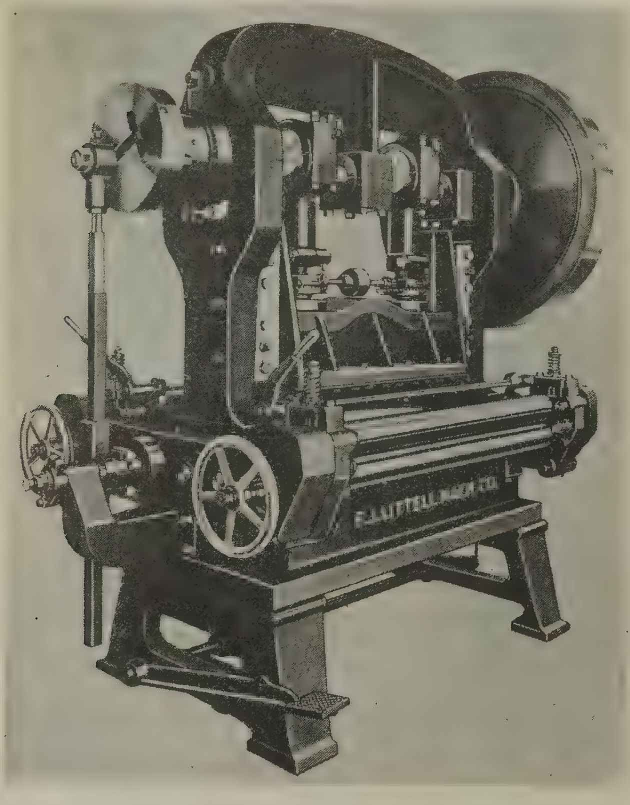


Ball-bearing geared-head production lathes equipped with Timken tapered roller bearings on the spindle have been brought out by the Springfield Machine Tool Co., Springfield, Ohio. This spindle mounting, shown in the separate illustration, is available for all sizes of lathes. Precision type roller bearings are employed and thrust is taken up on the front bearing, which has ample adjustment to keep the spindle free from slack at all times. This type of construction is recommended for production work because it tends to eliminate vibration and chatter and, in case of accident, the bearings can be replaced promptly from stock.

Although arranged for production work, the machine illustrated has the company's standard headstock with ball bearings and drop-forged, heat-treated gears which run in oil. In place of the rapid change-gear device, an instantaneous feed box, which gives six changes of feed for each setting of the change-gears, is used. There is an automatic stop on the feed rod. A power rapid traverse screw, operated entirely from the front, is used in place of the lead-screw. A taper attachment, oil pump and piping are mounted on the rear of the machine. The turret toolpost on the lathe illustrated can be interchanged with a compound or other type of tool-rest.

New Roll Feed for Use on Punch Presses

A punch press feed recently brought out by the F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago, for use on double-crank presses, is said to be capable of cutting over 1,000,000 blanks a day. The device is of double rack and pinion type and is designed to take any material, including rubber, up to 1 in. in thickness. In a test of the feed using rubber it is said that 37 blanks per stroke were cut at a speed of 80 r.p.m.



Punch Press Feed of Double Rack and Pinion Type for Material Up to 1 In. in Thickness

The feed is equipped with double rolls and with a roller drive handwheel which does not revolve when the feed is in operation, but which can be used to feed the stock forward. The feed has a hand lifter and also an automatic lifter.

New Limit Switch for Control Circuits

A new design of limit switch has been made by the General Electric Co., furnishing a simple, reliable means for controlling the limits of travel on such applications as motor-operated window or door-opening apparatus, valves, etc., where magnetic control is used.

The switch is provided with two normally-closed contacts, one for each extreme of travel. These contacts are operated by two cams, mounted on opposite faces of a molded gear. The two cams are adjustable with respect to each other and, as a further refinement, each contact has a micrometer screw which makes possible very close adjustment of the opening point for each contact, after the general position of the cams has been set. The molded gear, with the two cams, is driven by means of a worm gear. The entire mechanism is inclosed in a cast iron box with sheet-steel covers on front and back.

Milton Mfg. Co. Discharged from Receivership

The Milton Mfg. Co., Milton, Pa., manufacturer of bolts, nuts, rivets and iron and steel bars, has been discharged from the receivership under which it has been operating for some time. The receivers were W. W. Wilson and Charles Steele. Following their discharge, George S. Shimer, former president and a director of the company, resigned. Within the next week or 10 days the stockholders will meet and elect officers and a board of directors.

REPAIR CORRODED BRIDGES

Notable Structures in Pittsburgh and Rochester Reinforced by Welding on New Metal to Replace Losses

GEORGE J. GREEN, Pittsburgh Welding Corporation, Pittsburgh, who was the speaker at the monthly meeting of the Pittsburgh section, American Welding Society, at the William Penn Hotel, Pittsburgh, Wednesday evening, Feb. 29, not only outlined some interesting arc welding repair work on bridges, but described a new method that was worked out while some work was done on bridges of the Pittsburgh & Lake Erie Railroad.

One of the most interesting pieces of work along this line was rebuilding badly corroded members of a bridge over the Allegheny River, a 240-ft. through truss, pin-connected span, built 31 years ago.

Parts of the floor system, kept constantly moist by the proximity of timber, were greatly reduced in section. Columns were compression members built of Z-bars and web plate and, directly above and below the pin bearing plates, were perforated and reduced in section over 60 per cent.

Strips of steel, 1 in. by ½ in., extending from the bottom of the column to a point well beyond the corroded portion, were welded on after the surface of the original metal had been thoroughly cleaned by use of the acetylene torch, scrapers and wire brushes. Bars were welded into position vertically, and tied together at close intervals with crossbars of the same section. After each joint was completed, the strength of the weld was tested by a number of blows with an 8-lb. maul. Laboratory results showed practically no deterioration of the physical properties of the original metal when welded by the metallic arc process.

This bridge was further strengthened by having narrow cover plates welded to the top chord. The new plates fitted between the line of existing rivets and were secured to the chord by a continuous weld, thus eliminating the necessity of cutting out rivets or drilling holes in a structure already highly stressed.

Other work of similar nature mentioned by Mr. Green was done in Rochester, N. Y., on the steel arch known as Driving Park Avenue bridge. One of the main diagonals, a built-up section consisting of web plates, flange angles and lattice bars, was found badly corroded. The lost section was replaced by inserting a half-inch reinforcing plate about 40 ft. long between the flange angles and using the arc process to attach it to the original metal.

Slack diagonal eye bars and tie rods have been tightened for the Pittsburgh & Lake Erie Railroad. A device consisting of turnbuckles welded to wing plates, perfected by the Pittsburgh Welding Corporation, were assembled, taken to the bridge and welded to the bar to be tightened. The bar was then cut between the two wing plates and drawn taut by drawing up the turnbuckles.

Much welding was done on the new Mount Washington Roadway bridge, Pittsburgh. The concrete arches are reinforced with steel trusses, consisting of flanges and web members, the splices of which were completely welded. The steel skeleton was built upon false work and concrete poured in the forms built around this steel reinforcing, leaving keys open at all the splices to allow welding to be carried on. Portable welding outfits were installed upon the parts of the arch already poured and remained in one location while all the splices were welded. There were 16 keys in the 208-ft. main arch, each containing splices between angles, 6 x 4 x ⅝ in., butted together, and reinforced by welding splice plates over these angles.

Wage Scales for Sheet Workers Unchanged; Steel Average 3c.

The bi-monthly examination of the sales records of independent sheet steel manufacturers held in Youngstown March 2, by Elias Jenkins, representing the Western Sheet Steel Manufacturers Association, and Michael F. Tighe, representing the Amalgamated Association of Iron, Steel and Tin Workers, disclosed 3c. per lb. as the average sales price of Nos. 26, 27 and 28 gage black sheets in the 60 days ended Feb. 29. This is the same average as in the previous 60 days and accordingly wage scales for the next two months remain unchanged at an advance of 25½ per cent over base.

Payrolls in Metal-Working Plants Decline

Payrolls in 195 iron and steel plants were reduced from December to January by 1.3 per cent, whereas the number of men on the payroll was increased 0.4 per cent, according to figures of the United States Bureau of Labor Statistics. Using identical plants, the number of employees went from 245,260 in December to 246,137 in January, whereas the weekly payroll declined from $7,309,256 to $7,211,681.

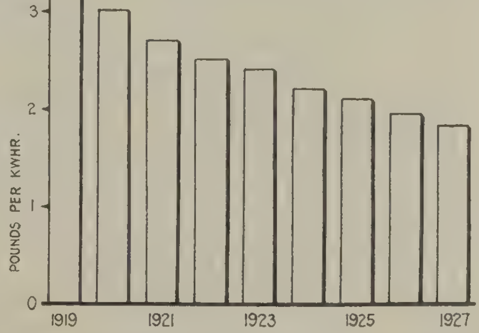
Foundry and machine shop plants to the number of 942 reported a slight decline in employees, from 218,126 to 217,610. The decline in amount of payroll was 2.9 per cent, from $6,405,569 to $6,221,243. Similar conditions in 148 machine tool plants showed a reduction of employees from 27,016 to 26,967, accompanied by a decline of 1.8 per cent in total payroll, from $845,612 to $830,477.

Prizes of $1,000 and $500 are being offered for the best essays on an economic subject, by Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass. The contest is open to everyone and essays are to be from 3500 to 5000 words in length.

Continued Improvement in Utilization of Fuel

Coal consumption by public utility plants in the United States in 1927 is estimated by the Geological Survey at 1.83 lb. per kwhr. This estimate takes account of the coal equivalent of other fuels. The figure is the lowest ever recorded, and displaces the previous low record of 1.95 lb. in 1926. As recently as 1919 the figure was 3.2 lb. The 1927 unit consumption was only 57 per cent of that for 1919.

If the 1927 output of power had required the unit consumption of 1919, the fuel requirements would have been almost 80 per cent greater than they were in 1927. In place of 45,709,000 net tons of coal (including coal equivalent of other fuels), the consumption would have been approximately 80,000,000 tons, or some 34,000,000 tons more than actually was consumed.



Reduction in Fuel Cost of Developing Power, as Shown Graphically Above, Saved 34,000,000 *Tons of Coal Last Year*

Progress from year to year has been steady. Not a year of the eight subsequent to 1919 but showed a drop in unit consumption from all of the preceding years. This reduction is indicated graphically in the diagram.

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This Issue in Brief

Sharp competition and not lack of business is responsible for "profitless prosperity," says National Industrial Conference Board president. During six-year period, 1920-1925, $32 was lost by unsuccessful companies for every $100 earned by profitable concerns.—Page 660.

Westinghouse plant produces 96 different kinds of alloy scrap. Machines are supplied with tote pans for accumulating scrap, which is then tagged, collected, weighed, appraised and placed in suitable storage bins.—Page 657.

Elimination of water content would make millions of tons of now unmerchantable iron ore in Lake Superior region worth mining. Beneficiation of these and many other types of ores would require only sintering to make them equal in value to average shipping ores.—Page 670.

Usual chemical analysis is often unsatisfactory in determining effects of alloying elements and gases in steels. Howe Memorial Lecturer says that such chemistry tells nothing of how elements enter constitution of metal or of scavenging elements which have been lost, and gives no information about portion of ingot from which sample is obtained or of casting temperature.—Page 662.

Conservation of fuel plays important part in creating unemployment in mining industry. Displacement of low-efficiency engines by large units of public utility plants has brought about annual saving of about 34,000,000 tons of fuel.—Page 680.

Encourages research to develop metals and methods for air craft construction. Materials and practices later used in many other ways are often developed in this way and are utilized to an extent in excess of anything that might be immediately expected of aeronautics.—Page 709.

Wages have probably reached point of equilibrium, says economist. Further rise would tend to increase unemployment, and only factor which might disturb present wage situation would be an upward trend in commodity prices.—Page 660.

Heat treat gray iron castings at Ford plant. Annealing before machining helps to eliminate hard spots, produces a fine grain structure and makes metal softer and easier to machine. Drilling may also be done more rapidly after annealing operation and there is less breakage of drills.—Page 663.

Manganese has important effects on working of steel after it reaches ingot. A high manganese safely allows a greater heat before forging or rolling, while large carbon steel forgings must have lower manganese for commercial heat treatment, especially as carbon is increased.—Page 662.

Formation of twins in original crystals is often earliest effect of overstrain in plastic flow of metal in rolling or forging operations, says Yale professor. Subsequent severe deformation is combination of development of crystalline twins and of slip along crystal planes.—Page 666.

Gray iron or steel castings may now be X-rayed through a thickness of 3½ in. Blow-holes, cracks, bubbles, foreign materials and other flaws are easily detected in one or two exposures.—Page 656.

Steel furniture orders in January, totaling $3,250,000, were largest on record. Orders for steel shelving also set new high, amounting to $768,000.—Page 714.

State and local taxes absorbed about one-fifth of Ohio corporations' profits during period from 1922 to 1924. Expansion of functions of State and local governments, waste and extravagance and lack of centralized control are cited as chief cost of increasing tax burdens.—Page 661.

February pig iron output was lowest for that month since 1922. However, actual production figures show daily rate of 100,004 tons, an increase of nearly 8 per cent over January, with a net gain of two active furnaces.—Page 684.

Continuous furnace for fusing porcelain enamel on gas stove parts combines features of furnace and traveling conveyor. Both ground and finish coats are burned on to steel and drying operation is included, thus eliminating need for separate drying oven.—Page 665.

Automatic control of volume of material fed, in proportion to requirements of machine is essential in sintering operations. Control of proportions of sintering mixture is also important.—Page 669.

ESTABLISHED 1855

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Fuel Efficiency Displaces Miners

CONSERVATION of fuel by its more efficient use creates no small share of the country's coal mining problem. It was estimated some years ago that we had 200,000 more miners than were required to mine the coal we then were consuming. More recently an expert estimate placed the excess at 300,000 miners.

Returns of fuel consumption by public utility plants give a total of about 39,000,000 net tons of coal and coal equivalent in other fuels for 1919. For 1927 the estimate is a little under 46,000,000 tons. Between these years, however, the output of electric energy had more than doubled, and the unit consumption for each kilowatt-hour had been reduced from 3.2 pounds to 1.83 pounds. Without the improvement in utilization of this fuel—that is, if the 1927 consumption had been at the same unit rate as in 1919—there would have been required in 1927 about 80,000,000 tons of fuel to produce the electric energy sent out. This means a saving of about 34,000,000 tons, or nearly 80 per cent of what was actually burned.

With the greater motorization of manufacturing plants, which has been going on at an accelerating pace since the Armistice, there has come about a gradual and in many cases rapid displacement of low-efficiency engines by the high-efficiency, large units of public utility generating plants. This is shown strikingly in the doubling of the output of public utility plants, whereas normal growth, aside from this displacement, would have been much slower. It is fair to assume also that the continued improvement in fuel utilization in the large plants has been paralleled in some measure in local plants. It might be too much to assume that there has been a *proportionate* increase in efficiency, but that there has been some, and probably a good deal, seems scarcely open to question.

If we put a miner's ouput at 800 tons of coal a year, the saving of 34,000,000 tons represents the work of over 42,000 miners. This is one-seventh of the high figure given above for excess of miners and more than one-fifth of the earlier estimate. Thus fuel economies have done more than is commonly reckoned in adding to the soft coal industry's unemployment problem, in which the coal-cutting machine and the large development of water-pawer have long been regarded as leading factors apart from those created by the workers themselves.

Rapid Advances in Non-Ferrous Metals

ON reflection, it appears that many more important metallurgical advances have taken place in recent years in non-ferrous metals and alloys than in iron and steel. Not that the steel industry has been stagnant. A better understanding of the essential physical and chemical processes involved has undoubtedly produced more and better mill products at a constantly decreasing cost. An army of men are constantly at work improving and controlling production processes. But it is chiefly refinements in detail and perfection of the mechanical equipment that have come in the last fifteen years.

Contrast this with fundamental changes in nonferrous metallurgy, such as the virtual disappearance of the copper blast furnace, supplanted by the reverberatory for handling fine flotation concentrates—themselves unknown at the turn of the century. Within the last three or four years differential flotation has been able to separate worthless mixed sulphides into marketable ores of lead, copper and zinc. Recently discovered electrolytic zinc is bidding for the market against metal made from bonanza deposits with cheap natural gas fuel.

And we have many new metals ready for use; most notable are hardened aluminum, lead, and now copper. Pure silicon metal has brought an entirely new technique in making aluminum castings—in fact, aluminum has changed from a rarity to a common metal. Many other metals, also, have come out of the electric furnace, and their alloys, with remarkable electric and magnetic properties, have provided practicable heating elements for household devices and industrial ovens and permitted rapid strides in telephony and radio communication.

Others have unique properties as cutting tools or in corrosion-resisting articles. A knowledge of tungsten and its properties has revolutionized electric lighting. Advances in theoretical metallurgy, in the knowledge of crystalline structure in metal, constitutional diagrams, grain growth, the effect of cold work, and the mechanism of fracture have also drawn heavily on data accumulated for metals other than iron.

But rather than extend this list, turn again to iron and steel. Prominent publicity has been given to the growth of alloy steels, but high-speed tool steel dates from the last century. Nickel steel armor plate was made in America nearly forty years ago. Chromium steels were described in detail almost that early. The recent advances, therefore, have not been so much the development of new alloys as the adaptation of the old, and the extension of heat-treatment practices, and even this progress has been largely from the efforts of machinery makers, rather than of the steel producers.

Of course some new and important alloys have been commercialized. Prominent among these are open-hearth iron, silicon irons, molybdenum steel and stainless steels; furthermore, centrifugal casting has made strides, particularly in pipe. We have other things which have received much study, and may be on the verge of more epoch-making applications. Synthetic wrought iron and direct iron or steel come to mind, and fusion welding (a metallurgical operation) has had as yet only a small chance to exert the profound influence it will eventually have on fabrication processes.

Stated broadly, it therefore appears that in the last fifteen to twenty years the steel industry has been busy in perfecting its processes. Expansion in steel has been in an increasing number of applications rather than in a more diverse line of alloys.

On the other hand, some branches of the nonferrous industry have revolutionized their smelting methods; many new metals have become commercial in fairly pure condition; and a great number of highly important alloys have been developed.

A New Tool for the Foundryman

X-RAYS may become as useful in examining metals as they are in the medical field. For several years their value has been largely theoretical, so far as metals are concerned. Some excellent work has been done in crystal analysis to establish the nature of the structure of metals and the changes which result from heat treatment.

Undoubtedly the detection of flaws in castings by X-ray penetration on a large and economical scale would be of great service to the foundryman. It would forestall the production of many defective castings and cut down losses in machining. Pioneer work in this field was done some years ago at the Watertown Arsenal which revealed some of the possibilities. The leading article in this issue of THE IRON AGE gives renewed assurance of what may be expected. Penetration of greater thicknesses of metal are now possible and cheaper but effective apparatus is available. Further progress in these two particulars is confidently expected. There seems little doubt that the foundryman of the future will have at hand a tool with which he can so regulate his molding practice that the percentage of defective castings, whether ferrous or non-ferrous, can be cut down materially. Non-destructive examination of metals, either with X-rays or by magnetic analysis, bids fair to play an important role in reducing costs and improving the product.

Shading of Steel Extras

YEARS ago a paper was presented to the steel trade decrying the practice more or less prevalent of shading extras and urging that these be maintained rigidly—let the shading, if any, be in the base price. But things have changed. Today a fruitful source of steel market irregularities is the apparent shading of base prices, the extras being technically maintained. Study of individual cases shows plainly that in essence it was the extra which the seller shaded, the quotation being in the form of a cut price base. The seller would not accept an order for material carrying no extras, at the base price named. He quoted with the full understanding that the order if placed would be for material carrying a known and large extra.

For the successful conduct of any line of merchandising reasonably stable prices are essential. The practice of shading the base price when a large extra is involved gives the appearance of an instability which does not really exist. There may be a hundred thousand tons a month made of the general class of material quoted on a given base pricing system and only a thousand tons of the particular product carrying the individual extra. Irregularity in a thousand-ton market is made to appear as irregularity in a hundred-thousand-ton market.

The practice has changed because the times have changed. Under the old régime the steel trade was committed strongly by habit to a system of uniform base prices, with "blanket" contracts made sometimes long in advance and subject to specification from time to time. Often the securing of the specification was like making a fresh sale, which would be accomplished by cutting the extra on the particular lot of material, the contract with its base price remaining intact. Nowadays individual sales are common, and to secure a doubtful prestige or through force of habit or as a result of maneuvers of the buyer the mill quotes a base price at a cut, leaving the extra intact.

To correct such situations the list of extras might be revised to a form in which each extra involves only its proportion of total profit. But there are difficulties in the way. Such a revision as suggested would naturally involve reductions, and reductions occur too often as it is to make the idea of a voluntary reduction attractive.

The adoption of a rigid practice of quoting net prices only in the particular case when a concession is contemplated would be helpful. By no means would this cover the whole matter, for sellers often do so quote and the would-be buyer disingenuously deducts the card extra and claims or infers he has been quoted a cut base price to apply on any specification he cares to make up.

Long ago there was a particularly strained situation of this sort in the strip market. The way out developed to date has been for the strip market to split itself into width brackets, of which there are now four, and net prices do not graduate smoothly but by jumps. According to the formal quotations, a difference of one-sixteenth inch in width may make a difference of $2 a ton in the price, which obviously is inconvenient. Yet there seems little hope among producers that a new card could be devised which would admit of a single base price being employed. At any rate the pricing is in the open under the present practice.

Tonnage in a Mature Industry

OFTEN the question is asked "What do you think this year's steel tonnage will be?" The form of the question is natural and proper, but the spirit of the question usually is, how will this year compare in tonnage with last year or year before? Those who expect an answer along that line do not realize what fine distinctions recent years in steel have made, for it is a fact that if this year were to show 47,000,000 tons of steel ingots produced it would make a new record, passing 1927, whereas if it were to show 43,000,000 tons it would take seventh place in the list of years. These two apparent extremes, however, are only 2,000,000 tons or 4.5 per cent away from 45,000,000 tons.

Five per cent is not much leeway for such a forecast, and there is an illustration of how closely distinctions are now made in steel. It is the natural result of steel having reached a maturity. A general principle is involved. In its adolescence an industry grows rapidly, while afterward it grows much less rapidly. An easily applied test is the length of time an industry takes to double its tonnage. Using pig iron as the general measure of the iron and steel industry, about 970,000,000 tons have been made in the United States up to the beginning of this year. Through the year 1912 about 475,000,000 tons had been made, so that it has required nearly fifteen years to make as much more. On Jan. 1, 1911, 51 per cent of all the pig iron made to that date had been made in the preceding decade. Lake Superior iron ore production to date has been about 1,347,000,000 tons, and half of that production has occurred in the past fourteen years, whereas previously production had frequently doubled in much less than a decade.

The steel industry shows the same principle in its details. Nails are a very old commodity. To date about 750,000,000 kegs of cut and wire nails have been produced. Half as large a tonnage had been made up to about the middle of 1910, so that between seventeen and eighteen years have been required for the aggregate to double. Tin plate and strips, on the other hand, are new commodities. Of the total tin plate made, one half has been made in the last nine years, and in strips the time is shorter still.

Outside the steel industry a great divergence is seen between coal, an old industry, and cement, a new industry. It has required the past sixteen and one half years for as much coal to be produced as in all the previous time, while during that period the great bulk of the total cement has been made. The automobile industry presents a divergence in another respect, for its period of adolescence has been short, and it should be recognized as having already matured. There is no chance of the automobile production of last year and this altogether equaling the combined production of the two preceding years.

When an industry matures, then, as steel has done, its growth is not to be considered by its pace during adolescence. It has become well poised and will show relatively little variation.

Guessing on the Far Future

HENRY FORD in an interview in the March *Forum* makes some remarks about what may occur in the long range future in the world, and indeed out of the world, for he refers to trips to other planets. Samuel Rea, retired president of the Pennsylvania Railroad, in a recent address before the Engineers' Club of Philadelphia, made some definite predictions as to the alinement 50 years hence of rail, water, highway and air transport.

It would be helpful to our current thinking if we had more of this sort of thing. We are disposed to confine our thoughts of the future to what we consider definite predictions, which usually are scarcely more than extrapolation. We observe the course of affairs and then project the graph into the future, giving it such curvature as the record to date suggests. Anything outside of that we consider guessing. But enlightened guessing gives a broader viewpoint and a safer one, for it tends to relieve us of our unknown restrictions.

The euthenists and eugenists are in controversy over the Lamarckian theory that acquired traits are inherited. According to the euthenists better living conditions will result in race improvement, while the eugenists hold that modern conditions are bound to produce race deterioration.

Research in pure science is growing rapidly, seeking new information without predetermined objective, on the principle that discoveries of almost any sort are likely to prove helpful in one way or another. It is urged that this research furnishes the most practical promise of solving the problem of how all of us can be kept gainfully employed when improvements are tending year by year to release workers, since the old commodities and forms of service require fewer workers per unit of accomplishment.

Along still another line, it is regrettable that only a conspicuous lack of visible progress is to be mentioned. At the beginning of this century the prediction was made that while the nineteenth century had been one of astonishing progress in material things, the twentieth century would be marked by men learning how really to think, so that a whole new practice in using the human brain would be set up. More than a fourth of the century has passed and we see no general progress in this respect. Rather it is urged that for the most part people think less than ever. James Harvey Robinson's admirable work "The Mind in the Making" was read or usefully applied only by those who least needed it, and his plea for "the humanizing of knowledge" has not brought results among the people.

The very difficulties in the way of looking into the future except by mechanically carrying forward for a few years the trends currently visible should be a great spur to enlightened guessing. It is easy to observe that even our present methods, had they been applied in the past, would have failed largely or wholly to project affairs into the condition in which we now find them.

"Where there is no vision the people perish."

For Higher Canadian Steel Duty

THE Canadian steel industry last year produced slightly more than 900,000 tons of steel ingots and imported from the United States 832,984 tons of finished steel. The fact that Canada buys from us an amount of steel about equal to that which is made in its own plants has frequently stirred the critics of our neighbor Government to attacks on the tariff policy which makes possible such large importations, particularly in view of Canada's unfavorable trade balance with the United States. The subject was recently introduced at length by the member of the House of Commons from Algoma, the district in which the plant of the Algoma Steel Corporation is located.

Canada's steel industry, said the member from Algoma, has for some years "had its back to the wall fighting for its very existence against the mass production of the United States and the production of the mills of Europe, where the standard of living is very much lower than it is in Canada."

The present duty on steel products imported by Canada is a specific duty. An ad valorem duty will probably be urged as a measure of greater protection. But it is in the matter of freight rates that Canadian steel plants suffer their principal disadvantage in competition with mills of the United States. The freight rate on steel bars and structural sections from Buffalo to Chatham, Ont., for example, is 26½c. per 100 lb., as compared with 41½c. per 100 lb. on the same material from Sault Ste. Marie, Ont. Thus, the tariff protection which the Canadian steel industry enjoys on structural shapes—15c. per 100 lb. on sections weighing 35 lb. per yard and over—is wiped out by this freight rate disadvantage.

St. Catharines, Ont., is one of the principal pig iron consuming centers in Canada. It draws much of its pig iron from Buffalo on a freight rate of $2.30 per ton as against a rate of $4.90 per ton from Sault Ste. Marie. The present duty on pig iron is $2.80 per ton.

These facts are among the arguments that have been set forth in the House of Commons in support of a higher tariff on pig iron and steel. Moreover, the money value of Canada's iron and steel imports rose from $134,684,441 in 1925 to $229,429,485 in 1927, a gain of nearly $100,000,000, which serves to explain the efforts that may be put forth to change Canada's tariff to an ad valorem basis.

Specific recommendation has been made that the present schedule providing a drawback of 99 per cent on flat spring steel, steel billets and steel axle bars, when used in the manufacture of springs and axles other than for railroad and tramway vehicles, be amended to exclude automobile manufacturers as well as railroads from this provision. It is further recommended that a tariff be placed on alloy steel bars, not now covered by any specific item in Canada's tariff schedule; also that the tariff on structural sections be amended to include large sizes which were not made in Canada when the tariff was drafted.

Back of the agitation across the border for greater tariff protection is the desire of the owners of Canadian mills to enlarge their facilities. The Algoma Steel Corporation, it is stated, is prepared to expend $10,000,000 for new plant, which will include the installation of a mill to roll structural sections larger than any now made in Canada. The recent acquisition of the British Empire Steel Corporation by strong Canadian banking interests has given rise to reports of contemplated plant expansion, which presumably depends somewhat on the success of the move to amend the tariff.

Steel for Normal Building Needs

CONSTRUCTION in the United States in 1928 will probably amount to more than $7,400,000,000, according to a recent forecast by *Building Age and National Builder*. In analyzing this figure the survey points out that it coincides roughly with a typical building year and adds that since 1924 the industry has not been engaged in making up for war-time shortages. In other words, nearly seven and one-half billion dollars is being spent yearly to take care of the needs of the average annual increase in population.

This increase, according to the Census Bureau, amounts to 2,250,000 persons, requiring more than 500,000 new homes yearly. The *Building Age* survey points out that 86 per cent of our population lives in single-family dwellings, 8.6 per cent in two-family houses and 5.4 per cent in multi-family buildings or apartments. By establishing conservative cost figures for each of these types of dwellings it is estimated that residential construction requires an annual expenditure of about $3,200,000,000. But dwellings represent in value less than 68 per cent of all classes of buildings, making the amount of all new construction necessary to provide for natural population increase over $4,700,000,000. One-third of all construction, the survey states, goes into replacements, alterations and repairs to existing structures. This is how we run up an annual building bill of $7,400,000,000.

Such an enormous outlay for new construction naturally opens up a large and diversified market for steel products. That the industry is taking advantage of this market is evidenced by THE IRON AGE distribution figures for 1927 which showed that more than 7,000,000 tons of steel, or 22 per cent of the country's total finished product, went into building. This was the largest aggregate taken by any steel-consuming industry.

In 1926 new construction required 6,800,000 tons or 19½ per cent of the year's steel output, and in 1925, 5,600,000 tons or 17½ per cent. Thus during the last three years, or since the construction industry has been building for normal population requirements rather than making up shortages, a steadily increasing amount of steel has been taken; and each year this tonnage has represented a larger percentage of the total production of finished steel.

Sharp Gain in February Iron Output

Actual Data Show Daily Rate Increased 7431 Tons or About 8 Per Cent Over January—Net Gain of Two Furnaces

COMPILATION of the actual data for the pig iron output in February shows the total to have been 2,900,126 gross tons or 100,004 tons per day. This is 364 tons per day higher than the estimated output of 99,640 tons per day published last week. Thus the actual gain in February over January was 7431 tons per day, or nearly 8 per cent. This compares with a gain in January over December of 5613 tons per day, or 6.4 per cent.

Total February pig iron output of 2,900,126 tons or 100,004 tons per day for the 29 days, compares with 2,869,761 tons or 92,573 tons per day for the 31 days in January. The February production last year was 105,024 tons per day. This year's February output is the smallest February since 1922.

Net Gain of Two Furnaces

Gain in active furnaces was only two. Eight furnaces were blown in and six were shut down. This compares with a net gain of 16 in January. Of the eight furnaces blown in last month, six were Steel Corporation stacks and two were merchant. Only one Steel Corporation furnace was blown out, making the net gain for that company five. There were four merchant stacks and one independent steel company stack shut down.

Capacity Active on March 1

On March 1 there were 187 furnaces active as compared with 185 on Feb. 1. The estimated daily operating rate of the 187 furnaces on March 1 was 100,060 tons; the 185 furnaces on Feb. 1 had an estimated operating rate of 99,640 tons per day.

Manganese Alloy Output

Production of ferromanganese in February was 19,320 tons; this compares with 22,298 tons made in January. Two companies made spiegeleisen last month but it is not possible to make public the actual data.

Possibly Active Furnaces Reduced

The Carnegie Steel Co. has dismantled its No. 1 Newcastle furnace in the Shenango Valley, thereby reducing the number of possibly active blast furnaces in the United States from 350 to 349.

Furnaces Blown In and Out.

Furnaces blown in during February include one Edgar Thomson furnace of the Carnegie Steel Co. in the

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)
New York and Mass.	204,744	203,715	199,726	212,778
Lehigh Valley	75,394	72,639	74,316	75,748
Schuylkill Valley	44,861	43,946	44,238	53,269
Lower Susq. and Lebanon Valleys	29,387	30,338	32,289	30,150
Pittsburgh district	597,543	582,497	523,875	495,005
Shenango Valley	90,179	77,023	58,982	64,752
Western Penna.	86,725	89,372	92,774	92,000
Maryland, Virginia and Kentucky	89,803	94,590	92,981	91,300
Wheeling district	118,108	108,188	114,030	110,055
Mahoning Valley	261,837	247,371	222,572	223.617
Central and Northern Ohio	294,427	313,697	295,179	306,395
Southern Ohio	24,773	32,480	32,413	32,750
Illinois and Indiana	639,763	608,771	537,892	508,545
Mich., Minn., Mo., Wis., Colo. and Utah	130,586	134,718	140,141	126,287
Alabama	207,108	224,132	227,775	219,478
Tennessee	4,888	6,284	6,572	6,247
Total	2,900,126	2,869,761	2,695,755	2,648,376

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	......
Apr.	107,781	108,632	115,004	114,074	......
May	84,358	94,542	112,304	109,385	......
June	67,541	89,115	107,844	102,988	......
½ year	95,794	105,039	109,660	107,351	......
July	57,577	85,936	103,978	95,199	......
Aug.	60,875	87,241	103,241	95,073	......
Sept.	68,442	90,873	104,543	92,498	......
Oct.	79,907	97,528	107,553	89,810	......
Nov.	83,656	100,767	107,890	88,279	......
Dec.	95,539	104,853	99,712	86,960	......
Year	85,075	99,735	107,043	99,266	......

Coke Furnaces in Blast

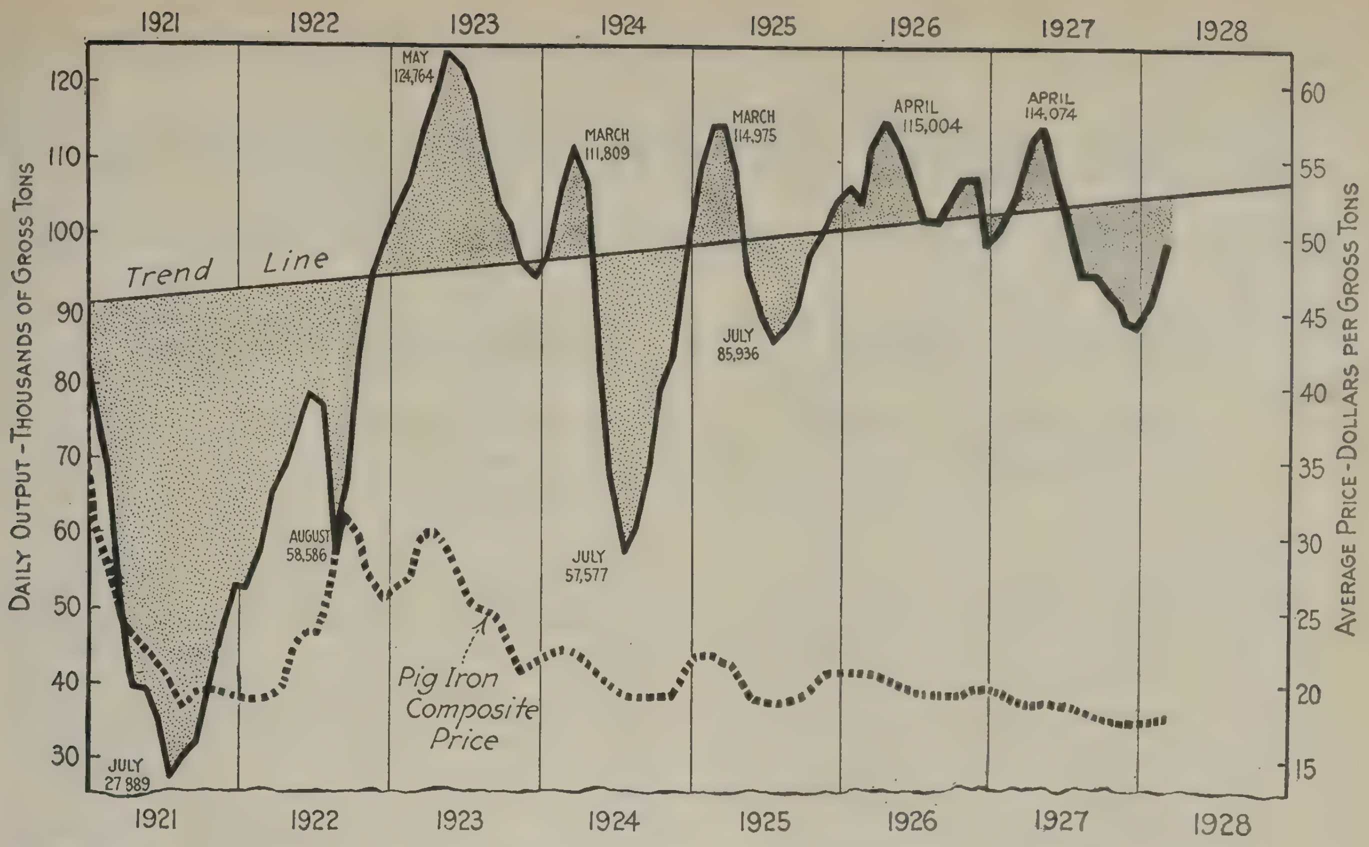
Furnaces	March 1		Feb. 1	
	Number in Blast	Capacity per Day	Number in Blast	Capacity Per Day
New York:				
Buffalo	12	5,910	12	5,795
Other N. Y. and Mass.	3	1,150	3	1,105
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,600*	5	2,430*
Schuylkill Valley	4	1,545	4	1,415
Susquehanna Valley	2	945	2	910
Ferromanganese	1	65	1	70
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	33	20,550	33	19,800
Ferro. and Spiegel.	1	240	1	250
Shenango Valley	6	3,100	6	2,840
Western Pennsylvania	5	2,580	5	2,485
Ferromanganese	2	420	2	400
Maryland	5	2,500	5	2,470
Wheeling District	7	4,200	6	3,490
Ohio:				
Mahoning Valley	15	9,030	15	8,700
Central and Northern	17	9,830	18	10,230
Southern	3	865	4	1,045
Illinois and Indiana	35	22,270	33	21,200
Mich., Wis. and Minn.	6	2,770	6	2,680
Colo., Mo. and Utah	4	1,600*	4	1,645*
The South:				
Virginia	1	225	1	215
Kentucky	1	370	1	365
Alabama	17	6,840	17	6,900
Tennessee	2	465	1	200
Total	187	100,060	185	96,640

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	....
Apr.	3,450,122	3,422,226	....
May	3,481,428	3,390,940	....
June	3,235,309	3,089,651	....
½ year	19,848,461	19,430,678	....
July	3,223,338	2,951,160	....
Aug.	3,200,479	2,947,276	....
Sept.	3,136,293	2,774,949	....
Oct.	3,334,132	2,784,112	....
Nov.	3,236,707	2,648,376	....
Dec.	3,091,060	2,695,755	....
Year*	39,070,470	36,232,306	....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in February Was 8.0 Per Cent More Than in January; Composite Price Increases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1927		1928	
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb. ...	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar. ..	2,675,417	....	27,834	7,650	....	....
Apr. ...	2,637,919	....	24,735	12,907	....	....
May ...	2,619,078	....	28,734	9,788	....	....
June ..	2,343,409	....	29,232	10,535	....	....
½ year.	14,876,355	....	166,939	55,411	....	....
July ...	2,163,101	....	26,394	9,350	....	....
Aug. ...	2,213,815	....	21,279	9,104	....	....
Sept. ..	2,090,200	....	20,675	6,037	....	....
Oct. ...	2,076,722	....	17,710	6,129	....	....
Nov. ...	1,938,043	....	17,851	6,521	....	....
Dec. ...	1,987,652	....	20,992	6,816	....	....
Year..	27,345,888	....	291,840	99,368	....	....

*Includes output of merchant furnaces.
†Data not available.

Pittsburgh district; one Newcastle furnace of the Carnegie Steel Co. and one Shenango furnace in the Shenango Valley; one Mingo furnace of the Carnegie Steel Co. in the Wheeling district; one South Chicago furnace of the Illinois Steel Co. and one Gary furnace in the Chicago district; one Bessemer furnace of the Tennessee Coal, Iron & Railroad Company in Alabama, and the Rockdale furnace in Tennessee.

Furnaces shut down during February were one Carrie furnace of the Carnegie Steel Co. in the Pittsburgh district; one Shenango furnace and the Stewart furnace in the Shenango Valley; one River furnace in northern Ohio; the Belfont furnace in southern Ohio, and one City furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Blast Furnace at Cleveland Makes 283,899 Tons of Iron in Year

A blast furnace output of 283,899 tons was made by the A furnace of the Central furnaces of the American Steel & Wire Co., Cleveland, during 1927, which established a production record for a Steel Corporation furnace and is believed to have set a tonnage record never before attained by any blast furnace. This stack is also making a remarkable production record on one lining. It has been in operation with its present lining since March 17, 1924, and has produced in that time 875,000 tons of pig iron. During the nearly four-year period it was banked twice. It is expected to produce 1,000,000 tons of pig iron before it will have to go out of blast for relining. Its best record for one day, 1003 tons, was made July 22, 1926.

Commercial Standard for Chain Link Fence Adopted by Industry

A general conference on chain link fence and chain link fabric held in Cleveland, Jan. 10, adopted a commercial standard for this commodity, according to an announcement of the assistant director in charge of commercial standards group, Bureau of Standards, Washington.

Prior to the adoption of this commercial standard, which includes simplification of sizes and dimensions, the fence was produced in the following heights: 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 9, 10, 11 and 12 ft. The standard heights are now: 5, 6, 7, 8, 9 and 10 ft. Gages 6, 7, 8, 9, 9½, 10, 11, 12 and 14 were formerly used, but have now been reduced to 6, 9 and 11.

Meshes formerly in 1½, 1¾, 2, 2¼, 2½ in. sizes are simplified to 1¾ and 2 in. The approximate percentages of reduction in heights, gages and meshes are as follows: Heights, 57 per cent; gages, 66 per cent; meshes, 60 per cent.

The conference appointed the following members on the standing committee to serve as a liaison between the Department of Commerce and industry: J. H. Kinney, Cyclone Fence Co., Waukegan, Ill.; W. T. Kyle, Page Steel & Wire Co., Bridgeport, Conn., and H. G. Thomson, Anchor Post Fence Co., Baltimore, to represent manufacturers; T. C. Potts, Horace T. Potts Co., Philadelphia; W. J. Thwing, Security Fence Co., Summerville, Mass., and A. R. Dinn, P. H. Dinn & Co., Boston, to represent the distributers; and National Electric Light Association, American Railway Association and Bureau of Yards and Docks, Navy Department, to represent the organized consumers.

This recommendation became effective Jan. 15, subject to annual revision by a similar conference or the standing committee.

Iron and Steel Markets

Steel Output Maintained

Automobile Makers Take More Steel—High Rail Production Assured Until June 1—Second Quarter Contracting in Plates, Shapes and Bars at 1.85c.

STEEL production is being well maintained, with Steel Corporation plants operating at 90 per cent of capacity and independents averaging about 80 per cent. While mill operations, as a whole, have ceased to expand and ingot output for this month is not expected to duplicate the record production of March, 1927, there are increasing indications that the present rate of operations may carry well through April, in contrast with the decline in that month a year ago.

The unfilled tonnage statement of the Steel Corporation, as of March 1, will probably show little change, owing to heavy shipments in February. So far this month, also, shipments continue to balance bookings for most mills, leaving backlogs undiminished. There are, of course, some exceptions both with respect to districts and commodities. At Chicago, where the week's specifications are the fourth largest in the past two years, shipping orders exceed ingot production, which is at a 95 per cent rate. In the Philadelphia district, where specifying has been lagging, more tonnage is being released for rolling than in February. At Pittsburgh some recession in specifications for heavier rolled products is reported, and it is inferred that buyers have accumulated enough stock so that further releases against low-priced contracts can be timed to carry shipments over into April.

Among individual rolled products, sheets have shown a marked gain in specifications. February tonnage releases received by the leading sheet maker were equal to 90 per cent of capacity, and for the first week in March actually exceeded full theoretical capacity. Both the automotive industry and farm implement makers are pressing for deliveries of sheets, as well as bars. Youngstown district mills are finding it necessary to operate extra turns to satisfy the increasing requirements of automobile builders, which in virtually no cases represent anticipated needs. In fact, many motor car plants are depending on daily deliveries to maintain their production schedules.

Steel prices show little change, following recent advances. The increase of $1 a ton to 1.90c., Pittsburgh, on plates, shapes and bars is not yet fully established, since some mills allowed their customers to cover for both early and second quarter needs at the previous price of 1.85c. In other products, outside of rails and tin plate, there has been little contracting for second quarter. Automobile companies, in many cases, are limiting forward purchases to their April requirements.

Makers of wire products and wire rods have opened books for second quarter at unchanged prices. Leading producers of large rivets have announced an advance of $3 a ton, effective at once. Steel tie plates, on the other hand, have generally declined $2 a ton to $43, mill.

Rail mill backlogs, which are fully 300,000 tons larger than a year ago, will help to sustain ingot output in the second quarter. Chicago rail mills have enough tonnage booked to insure a high rate of operations until June 1. A Western road has placed 13,000 tons with Chicago producers. Railroad equipment buying for the week totals 700 cars, of which 400 were for the Soo Line and 300 for Wilson & Co., Chicago meat packers.

Structural awards amount to 45,000 tons, while more than 40,000 tons was added to work under negotiation. Principal contracts were 5200 tons for a loft building in New York, 5000 tons for a building in Pittsburgh and 4500 tons for a club building in Chicago. Inquiries include 4800 tons for Mississippi River barges, 4000 tons for a department store at Oakland, Cal., and 5000 tons for subway work in New York, while 10,000 tons for subway work, on which bids recently went in, will be awarded within a few days.

Storage tanks ordered by three Texas oil producers call for a total of 12,000 tons of plates. Demand for oil country pipe, however, is slow, and while heavier orders for pipe for building work are looked for with the approach of spring, it is doubtful whether the expansion will be as great as usual. Distribution of pipe to a larger extent than in recent years is on consignee accounts, which have been well rounded out by mills since the first of the year.

Pig iron is fairly active at Chicago and Cleveland and in the New York district, but elsewhere is dull, being almost at the point of stagnation at Pittsburgh and in the Valleys. Prices are unchanged, but concessions on Buffalo iron are appearing more frequently at competitive points, while the adherence of eastern Pennsylvania furnaces to a $20 base resulted in the placing of 2000 tons of foundry grades by a Gloucester, N. J., melter with two outside furnaces and an importer at slightly lower prices.

Cast iron pipe prices again have weakened, notably in the Chicago district, where municipal business has brought out a bid of $26.70, Birmingham, on 8 and 12-in. sizes, while in the East the low prices of Northern foundries are discouraging Southern competition.

Scrap is weak in nearly all large consuming and producing districts. The heavy production of scrap by automobile companies has been reflected in lower prices at Middle West consuming centers.

Both of THE IRON AGE composite prices remain unchanged for the fourth consecutive week, that for pig iron at $17.75 a ton and that for finished steel at 2.364c. a lb. Steel is close to its level of one year ago, but pig iron is down $1.21 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

	Mar. 6, 1928	Feb. 28, 1928	Feb. 7, 1928	Mar. 8, 1927
Pig Iron, Per Gross Ton:				
No. 2, fdy., Philadelphia..	$20.76	$20.76	$20.26	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham........	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa. ..	19.50	19.50	19.50	21.00
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	100.00	100.00	100.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill.......	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	40.00
O.-h. billets, Phila.........	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	44.00	44.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12
Iron bars, Chicago.......	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.85	1.90
Steel bars, Chicago.......	1.95	1.95	1.95	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh...	1.85	1.85	1.85	1.85
Tank plates, Chicago.....	1.95	1.95	1.95	2.00
Tank plates, New York...	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	1.95	1.95	1.95	2.00
Beams, New York........	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Mar. 6, 1928	Feb. 28, 1928	Feb. 7, 1928	Mar. 8, 1927
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill.........	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv., No. 24, Chicago dist. mill.........	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh....	2.65	2.65	2.55	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.60	2.60
Plain wire, Pittsburgh....	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.45	2.45
Barbed wire, galv., P'gh..	3.35	3.35	3.25	3.25
Barbed wire, galv., Chicago dist. mill.........	3.40	3.40	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$14.75	$14.75	$15.00	$16.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.75	12.75	12.50	12.75
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot, Phila....	15.00	15.00	15.25	17.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.60	$3.50
Foundry coke, prompt....	3.75	3.75	3.75	4.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	**14.25**	14.20	14.25	13.50
Electrolytic copper, refinery	**14.00**	13.75	13.87½	13.12½
Zinc, St. Louis............	**5.50**	5.45	5.65	6.77½
Zinc, New York..........	**5.85**	5.80	6.00	7.12½
Lead, St. Louis...........	*5.75*	5.90	6.22½	7.35
Lead, New York.........	*6.00*	6.15	6.50	7.65
Tin (Straits), New York..	*51.62½*	51.75	53.25	70.00
Antimony (Asiatic), N. Y.	10.25	10.25	11.00	13.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Some Slackening in Steel Demand But Volume is Not Appreciably Affected

PITTSBURGH, March 6.—The showing of the steel market over the first two months of the year compares favorably in business, production and shipments with the same period last year. In shipments, this year has been somewhat better than 1927, since it was not until about the middle of February last year that the movement began to show real volume, while this year shipments began to mount very promptly in January and continued at a high rate through February. Some slackening in the past week has not appreciably reduced the volume of the outward movement from the mills. This month is starting a little more quietly than either January or February and generally the trade is not looking for March to equal in business that month last year, which was the record month of all time in production and shipments. On the other hand, it is not expected that April will show quite the sharp recession that April, last year, did, and it is rather generally expected that for the first four months of the year there will be little variation from the business of that period last year.

In a number of finished steel products, specifications still are pouring in very freely, sheets being a notable example, but in others shipping instructions are for definitely smaller tonnages than was the case recently. The price question enters into these cases. In plates, bars, shapes, strips and wire products, consumers are covered for this quarter at prices well under those now asked and, having taken shipments fairly liberally so far this year, there are some instances where stocks are sufficient to permit of conservation of low-priced tonnage for specification between now and the end of the month for April shipment. It perhaps is no exaggeration to say that it will probably be May before many of the steel manufacturers begin to derive full benefit of the higher prices that have been announced since the opening of the year. The second quarter promises to be highly interesting for the steel trade.

No change is noted in the rate of steel works' operations and in the rolling mills schedules, the alinement is much as it has been recently, with pipe mill operations making the poorest showing, since jobbers serving the building and construction industry have not yet made much of a reduction in their stocks and the oil industry is yet to evince much interest in drill and drive pipe and casing. The automobile industry still stands out as the heaviest user of steel, although its takings as a whole still are under what they were expected to be by this time because of the failure of a maker of low-priced cars to get up production as rapidly as was expected. Agricultural implement manufacturers are busy and buying a lot of steel. Except for rail tonnage, railroad business in this district is disappointing and other districts appear to be doing better in structural work than this.

Inactivity still rules in the pig iron market and prices appear to be maintained largely by reason of an absence of selling pressure. The scrap market is a small-lot affair with only moderate interest on the part of consumers. The depression in the coal industry continues. There are some hopes that the opening of Lake navigation will create a market for Pittsburgh district coal, but also fears that the starting up of mines to supply such a demand would bring labor troubles. Moreover, Southern mines are not going to surrender the business without a struggle.

Pig Iron.—Except for a sale of 500 tons of foundry iron to the Westinghouse Electric & Mfg. Co. for delivery over the remainder of this quarter to its Trafford, Pa., works, it has been an uneventful week in this market. There is some doubt as to the price paid for this lot, but it is generally believed to have been at the regular price of $17.25, Valley furnace, for No. 2 grade. Small lots of malleable iron have been moving at that price and carload lots of Bessemer have been sold in the week at $17.50. On the former, however, $17.25 appears to be all that the market will yield and there is no longer much basis for a higher quotation.

W. P. Snyder & Co. report February average prices of basic and Bessemer iron from Valley furnaces as $17 and $17.50, unchanged from the month before.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Good movement is noted of the commonly-used ferroalloys on contracts, but new business amounts to little. There is no change in prices.

Semi-Finished Steel.—Makers of billets, slabs and sheet bars are talking about higher prices on second quarter tonnages, but on such business as has been done in the past week, which included one fair-sized lot of small billets, recent prices have ruled. Youngstown mills feel the Cleveland mill competition on sheet bars and seem disposed to wait for some signs of strength in that market before taking a stand on prices. All local producers of wire rods are quoting $44, base, Pittsburgh or Cleveland, on spot or second quarter tonnages, but only a few spot demands are developing and consumers are not yet interested in second quarter requirements.

Bars, Plates and Shapes.—The first week of the new month has not been marked by quite as much activity in specifications as there had been over much of the first two months of the year. In some quarters there is a belief that consumers have become fairly well supplied as a result of heavy deliveries over the past six or eight weeks, and now are in a position to reduce their specifications. Contract buyers have until the end of the month to send in specifications on orders carrying a price of 1.80c., base Pittsburgh, and are believed to be holding back some tonnage for April shipment. Bar specifications are still good, though slightly less in volume than they have been. Steel for 41 barges to be built for the Mississippi River Commission, amounting to 4800 tons of plates and small shapes, will be rolled here. Steel for the Fort Lee bridge, New York City, is being fabricated. The larger fabricating shops are well supplied with business, but the smaller ones appear to need orders. As yet, 1.90c., base, is more of a small than a large-lot price.

Rails and Track Supplies.—Local makers now are quoting tie plates at $43 per net ton, a cut of $2 a ton. Recent prices are holding on the other track accessories, but business is not very active. Standard-section rails are moving well on 1928 contracts. Not much activity is noted in light-section rails.

Wire Products.—Makers quite generally have opened books for second quarter business at unchanged prices, or $2.65 per keg, base Pittsburgh, for nails and $2.50 per 100 lb., base, for plain wire. A little business for that period has been written at these levels, which represent an advance of $2 a ton over the contract prices for this quarter. Makers report very steady specifying against contracts and enough business to sustain mill operations of 65 to 70 per cent of capacity.

Tubular Goods.—The pipe market still is dull. While an increase in orders for pipe for building and construction is expected with the approach of spring, it is doubtful if the expansion will be as great as usual, for the reason that distribution, now more than in recent years, is on consignee accounts, and since the first of the year such accounts have been rounded out and built up by the mills. This leaves only the replacement of pipe sold to supply new mill orders. Oil country pipe still is slow of sale, and the several large gas pipe lines that have been mentioned in recent weeks are not much nearer the mills than they were when first broached. Only a fair demand is noted for boiler tubes, but mechanical tubing is going well. Prices continue irregular.

Sheets.—February tonnage releases received by the leading producer were equal to approximately 90 per cent of its productive capacity, and for the first week of March they have actually exceeded full theoretical capacity, with the result that on some finishes, notably blue annealed sheets, it cannot promise much earlier than April delivery on new orders. Several of its plants engaged on automobile body sheets are fully obligated against this month's production. Independent companies also are faring well, and some of them producing full-finished sheets are working their mills as many as 18 turns a week to keep up with the demands of the motor car builders. There are occasional deviations from 2.90c., base Pittsburgh, on black sheets and some irregularity still is noted in galvanized sheets, but the market is firm on blue annealed sheets and is holding well on electrical sheets. Agricultural implement manufacturers are very insistent for supplies, even more so than the motor car builders, although a much larger tonnage is going to the latter.

Tin Plate.—Specifications on contracts are still fairly heavy and mill operations hold up to 80 per cent of capacity, with enough business in sight to sustain that rate until April quotas are fully specified. It is

THE IRON AGE Composite Prices

Finished Steel

March 6, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.350c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

March 6, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.67
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per* 100 *Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.00 to 3.10
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.50 to 3.75
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrom Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.05 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.05 to 3.10
Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

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*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.15
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

understood that the Texas Co. inquiries for re-export oil can sizes of tin plate have been divided between a Pittsburgh district and a Chicago district mill. The Nippon Oil Co. business is reported here to have been placed abroad. No other new business of account recently has come out.

Cold-Finished Steel Bars and Shafting.—Buyers are not yet showing much interest in second quarter tonnages, but in a few instances where there has been a desire for coverage for that period, makers have named 2.30c., base Pittsburgh. It appears that while a higher price may later be announced, contract buyers will likely be given an opportunity to cover at 2.30c. for the next quarter. Specifications against first quarter contracts are good, but hardly as large as they were recently, buyers evidently conserving some of their tonnage carrying 2.20c. for specification late this month for April shipment.

Hot-Rolled Flats.—There is some evidence that, as a result of heavy shipments over the past two months, buyers have built stocks up sufficiently to get along with somewhat lighter new shipments. Business still is good, but not quite as good as it was during the last half of February. Some makers who did not get filled up and who now can make very prompt shipments have done better in the past few weeks than they did previously. Advanced prices announced for second quarter are adhered to and a fair amount of contracting is reported.

Cold-Rolled Strips.—A slight recession in new specifications does not mean that the market is quiet in point of production or shipments, but rather that consumers have fairly good stocks and are trying to prolong low-priced tonnage as long as possible.

Bolts, Nuts and Rivets.—Leading makers of rivets have announced an advance of $3 a ton on large rivets, effective immediately, and also applying on second quarter contracts. The new prices are $2.90 per 100 lb., base Pittsburgh or Cleveland, and $3, base Chicago or Birmingham. A few buyers who failed to contract for this quarter have been obliged to pay the advance, but the bulk of the movement still is at the first quarter contract prices, specifications having been somewhat stimulated by the advance. Bolt and nut business in February ran from 15 to 20 per cent above that for January, but the gain loses some of its significance in view of the fact that January business was not much in excess of 50 per cent of productive capacity.

Coke and Coal.—Spot offerings of furnace coke are ample and prices remain at the recent low levels. There are few blast furnaces using Connellsville coke that are not covered for the second quarter, and there is less than the usual amount of open market inquiry for that period. Producers are naming $3 per net ton at ovens as their idea on contract supplies for the period, but it is doubtful if any business now on producers' books carries more than $2.75. Spot foundry coke takes a full range of from $3.75 to $5.10 in open-top cars, but most of the current business is at prices ranging from $3.75 to $4.25. The coal market is still very dull and shows no strength as the supply is still too great for wants. A Youngstown district steel company is reported to have contracted for 1,000,000 tons of lump gas coal for delivery over the year beginning April 1 at $2 per net ton at mines. This plainly indicates the need of business by operators, since that price can hardly be profitable even on today's wage scales.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—The market still is very quiet so far as consumer interest goes. Heavy melting steel cannot be had freely at $14.50, but dealers are able to pick up small lots at that price and are not offering more than $14.25 for delivery at one point in the district. Fairly large quantities are available at $14.75 and dealers still are going up to $15 to cover against sales to consumers with rather exacting specifications. As much as $14.50 has been paid for compressed sheets, and on the present basis in Detroit they cannot be landed here under $14.75. In Youngstown the market is $14.50 and that district has a freight advantage over Pittsburgh on shipments from the West of about 60c. per ton. Machine shop turnings are weaker with sales at $10.50 to $11, the more recent sales being noted at the lower figure. Supplies are liberal as Youngstown is not taking much at present. Heavy breakable cast scrap is easier. The March list of the Norfolk & Western Railroad contains 8744 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.50
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.25
Railroad coil and leaf springs	16.75 to 17.25
Rolled steel wheels	16.75 to 17.25
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00
Short mixed borings and turnings	11.00
Cast iron borings	11.00
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Production of bitumiuous coal in February is estimated by the United States Bureau of Mines at 41,290,000 net tons, or an average of 1,658,000 tons each working day. This is lower than in January, when production was 44,208,000 tons, or 1,747,000 tons a day.

Coal production of the United States in 1927 is estimated by the Bureau of Mines at 600,456,000 net tons, a drop of 9 per cent from the 657,804,437 tons of 1926. Of the total, 519,804,000 tons was bituminous and 80,652,000 tons anthracite.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Ordering Continues at High Rate —Ingot Output 95 Per Cent

CHICAGO, March 6.—Recent advances in prices have served to drive in specifications, the total of which was the fourth largest of any week in the past two years. New sales, checked momentarily by the announcement of higher quotations, now show marked improvement, making the week one of the best in many months. Ingot output is holding steady at 95 per cent of capacity and at that rate is lagging behind both new business and shipping orders.

Farm implement manufacturers exert a steady pressure for steel deliveries and automobile production schedules picture a gradually expanding activity in that industry. Railroad equipment orders are not heavy but fresh inquiry is in sight from the Rock Island. It is reported that the board of directors of that railroad will meet this week and that consideration will be given to the purchase of 2000 freight cars. Structural awards continue in good volume and shops are entering the spring period with order books of good size. A 4500-ton and a 3000-ton order in Chicago and one for 2500 tons from Ottawa, Ill., head the list. The Agricultural Mart, a project that has shown no life for many months, now gives promise of being revived and the first unit may require 16,000 tons.

Of special interest is the fact that a Western railroad has ordered 13,000 tons of rails in addition to the tonnage placed last fall for spring delivery. Competition from producers south of Chicago has resulted in shading of $1 to $1.50 a net ton on steel tie plates.

Pig Iron.—Second quarter contracting is progressing steadily and sales are close in volume to the last week in February. Most of the larger buyers have covered and individual purchases now are smaller than in the first part of the move to cover for the next three months. While there is no general inclination to buy for the third quarter, some inquiry for that period is before the trade and several lots have been purchased. Northern foundry iron is steady at $18.50 a gross ton and full differentials are being obtained. Sale of 1000 tons of Southern iron is reported.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—In new sales this market is quiet but contract buyers are taking large shipments. A carload of 19 to 21 per cent spiegeleisen brought $32, Hazard, Pa. Quotations for ferromanganese are unchanged at $100, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Three oil producers in Texas have ordered a total of 12,000 tons of plates for storage tank construction. These orders practically wipe out inquiry that was before the trade, but there is evidence that additional tonnages are soon to come into the market. Railroad equipment is moderately active with orders for 700 cars. Wilson & Co. have placed 300 refrigerator cars with the Bettendorf Co. and the Soo Line has contracted for 400 box cars. Specifications from car shops are substantial in size and are so arranged that mills with good-sized order books are still meeting delivery demands in a satisfactory manner. Quotations on spot and future business are steady at 2c., Chicago, for 100 tons or more and at 2.10c. for smaller lots.

Mill prices on plates per lb.: 1.95c., base Chicago.

Shapes.—Structural awards in this district total 6000 tons in the week and fresh inquiry is for not less than 7000 tons. The Steuben Club Building, Chicago, which calls for 4500 tons, has been taken by the Gage Structural Steel Co., and the Union Carbide & Carbon Building, 3000 tons, by the American Bridge Co. Notable among fresh projects are 3000 tons for two buildings at Minneapolis, 1000 tons for the county's portion of the safety building at Milwaukee and a sizable tonnage for two steel frame high school buildings in Chicago. Although lettings in the last month have been large, shop operations are not well balanced and competition holds fabricated steel prices low regardless of the tonnage involved. Mill quotations on structural material are steady at 2c. to 2.10c., Chicago, depending on the tonnage. Most of the current shipments are being made against contracts placed at lower prices.

Mill prices on plain material per lb.: 1.95c. to 2.10c., base, Chicago.

Bars.—Specifications for soft steel bars are unusually heavy. The automobile trade is the largest user, with farm implement manufacturers a good second. It is now reported that the Chevrolet Motor Co. has revised its schedule for March and will produce 135,000 cars or 8000 more than were called for in the previous schedule. The iron bar market is quiet and without feature. Local alloy bar mills are heavily engaged and specifications are in excess of output. Increased service demanded by buyers of tractors is causing a rapidly expanding call for alloy steel bars for use in that class of machinery. Business in hard steel bars continues brisk and order books are well balanced and of good size for bars to be delivered over the next six weeks or two months. Second quarter contracting at 1.85c., Chicago Heights mills, is proceeding slowly. Specifications are about equal to shipments.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.10c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Demand for these commodities is shifting both as to commodity and classes of users. Rural sections are taking smaller tonnages of nails and there is a slight decline in orders from jobbers in the North Central States. Business in the South is steady, while both orders and specifications from the manufacturing trade are heavier. The net result is that shipments are about equal to mill output, which stands at 75 per cent of capacity.

Sheets.—Chicago district mills are heavily engaged and deliveries range from four to six weeks, depending on the grade desired. Reports of price advances are still heard but in the meantime producers are busily engaged taking in tonnages for delivery during the second quarter at prices that are unchanged. Demand is widespread and comes from practically all classes of users. Barrel manufacturers have speeded production and farm implement makers continue to issue heavy specifications.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—Return of moderate weather has added life to this market and during the week over 2000 tons of billet steel reinforcing bars and 700 tons of the rail steel bar commodity have been awarded to bending shops. The largest single contract was 1600 tons for a cold storage warehouse and 400 tons will be used in the Chicago Civic Opera Building. Fresh inquiry is promising and many new projects are now in the hands of estimators. Prices for billet steel reinforcing bars are moderately steady at 2.35c. to 2.75c., Chicago warehouses. Evidence of weakness is at hand on quotations for attractive tonnages. Hard steel reinforcing bars are quotable at 1.85c. to 1.95c., the higher price applying on bridge and culvert work.

Hot-Rolled Strip.—Production of this commodity is at capacity. Second quarter books are open at current quotations and forward buying is of fair proportions.

Billets.—The $1 a ton advance in billets announced a week ago by Chicago producers has been well tested by both spot and future orders. Rerolling billets, 4 in. and over, are being quoted at $34 a gross ton.

Sheet Bars.—New sales in this commodity have established prices at $35 per gross ton. Production is at capacity and specifications for the week are heavier than in any like period in the last year and a half.

Cold-Rolled Strip.—Second quarter books for cold-rolled strip are open at 3.15c., Cleveland, or 3.45c., delivered Chicago, in widths less than 12 in. and in lots of 1 to 3 tons. Forward buying is moderately active and specifications are heavy. Output is at close to plant capacity. Shipments in February this year were fully 20 per cent heavier than in the second month of last year.

Rails and Track Supplies.—Prices for steel tie plates are weak at $2.15, base, per 100 lb.. Quotations on other track accessories are steady. Of particular interest in the rail market is the purchase of 13,000 tons of standard-section rails by a Western railroad. This is the first order to be placed in what is referred to as the secondary buying movement. For several weeks past local rail mills have been engaged at 90 to 95 per cent of capacity and it is variously estimated that not more than 30 per cent of the rails purchased in the fall buying movement have been rolled. Shipping schedules are well arranged and they indicate a sustained rate of output up to June 1 or even beyond. Miscellaneous orders for track fastenings total 5000 tons and fresh inquiry is of fair size and active. The light rail market is dull.

Bolts, Nuts and Rivets.—New discounts on stove bolts are 75, 20, 10 and 5 off list in package lots and an additional 2½ per cent off list in bulk. Small rivets are steady at 70 and 10 to 70 per cent off list. Producers have named $3, Chicago, as the second quarter contract price for large rivets. Specifications have not held the gain made a week ago.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Coke.—Prices for by-product foundry coke are steady at $9, local ovens, and at $9.50, delivered in the Chicago switching district. Shipments have made a slight gain over a week ago. It is reported that sellers of foundry coke in Indiana have named lower prices for spot and future delivery.

Cast Iron Pipe.—Keen competition among producers has again weakened quotations on large tonnages of cast iron pipe. The United States Cast Iron Pipe & Foundry Co. has taken 1600 tons of 8 and 12-in. pipe for Chicago at $26.70, Birmingham, or $34.90, delivered. One competitive price was near these figures, while other bids were close to $30, Birmingham. At Rockford, Ill., the same seller took 500 tons at $36.97, delivered, or $28.77, Birmingham. A number of private lettings in the week were awarded at prices that ranged close to $30, Birmingham. Cast iron pipe is quotable in this market at $35.20 to $38.20, delivered, for 6-in. and larger diameters. Canton, Ohio, has closed for 300 tons of 6, 8 and 12-in. pipe. Noteworthy among fresh inquiries is 1040 tons of 4 to 12-in. class B pipe for Barberton, Ohio. This market is moderately active. Three contractors have placed large orders in the week and public utilities are actively engaged in buying against early spring requirements. Little interest in cast iron pipe is being shown by the railroads.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $35.20 to $38.20; 4-in., $39.20 to $42.20; Class A and gas pipe, $4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Old Material.—The Chicago scrap market shows a mixed situation. Several large users of heavy melting steel have been getting shipments faster than they could be handled and hold-up orders have been the result. Railroad shipments are large and steady. Distress tonnages are giving more trouble than in many months. Cast iron borings, which formerly were diverted to the Mayville, Wis., furnace when it was in operation, are now reaching the Chicago market and making a bad situation worse. Evidence of speculation is at hand in prices being obtained by the railroads. On such grades as railroad malleable, rerolling rails, short rails and heavy melting steel the Illinois Central got higher than the top of present published quotations. The Santa Fe is advertising a list of 5000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:		
Heavy melting steel	$12.75 to	$13.25
Shoveling steel	12.75 to	13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	14.25 to	14.75
Hydraulic compressed sheets	11.25 to	11.75
Drop forge flashings	9.75 to	10.25
Forged, cast and rolled steel carwheels	15.25 to	15.75
Railroad tires, charging box size	16.50 to	17.00
Railroad leaf springs, cut apart	16.50 to	17.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.50 to	15.00
Coil springs	16.50 to	17.00
Electric Furnace Grades:		
Axle turnings	13.00 to	13.50
Low phosphorus punchings	14.25 to	14.75
Low phosphorus plate, 12 in. and under	13.50 to	14.00
Blast Furnace Grades:		
Axle turnings	10.75 to	11.25
Cast iron borings	9.75 to	10.25
Short shoveling turnings	9.75 to	10.25
Machine shop turnings	7.25 to	7.75
Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	15.00 to	15.50
Cupola Grades:		
Steel rails less than 3 ft	15.50 to	16.00
Angle bars, steel	14.25 to	14.75
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	13.00 to	13.50
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00

Per Net Ton

Rolling Mill Grades:		
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	18.75 to	19.25
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	9.25 to	9.75
No. 2 busheling	4.25 to	4.75
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	13.00 to	13.50
No. 1 agricultural cast	13.00 to	13.50
Stove plate	11.25 to	11.75
Grate bars	11.50 to	12.00
Brake shoes	11.50 to	12.00

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The American Rolling Mill Co. has purchased two slab-heating furnaces, a holding furnace and a continuous rough-plate heating furnace from the Flinn & Dreffein Co., Chicago. This equipment will be installed at the company's East Side works at Middletown, Ohio, where extensive improvements are being made.

Philadelphia

Steel Contracts for Second Quarter Made at 1.85c. Pittsburgh

PHILADELPHIA, March 6.—Although plates, shapes and bars have been advanced to 1.90c. per lb., base Pittsburgh, contracts are being made for second quarter at 1.85c. per lb., Pittsburgh, for bars, 2c., Coatesville, for plates and at 2c., Bethlehem, for shapes. There is still expectation of a further advance about April 1, but with most consumers covered, the value of such an increase is beginning to be doubted. A producer of shapes in eastern Pennsylvania is quoting on the basis of current contracts, which are at 1.80c. per lb., Pittsburgh, or 2.12c. per lb., delivered Philadelphia. Sheet prices are developing a stronger tendency, particularly blue annealed and galvanized. Black sheets are still obtainable at small concessions from the nominal market price of 2.90c. per lb., Pittsburgh.

There is some pig iron inquiry for second quarter, but many consumers are apparently inclined to delay action pending further developments in the situation on Buffalo barge shipments, which they believe may result in more competition and a recession from the present price level. A small basic tonnage has been closed at about $20 per ton, delivered.

Pig Iron.—In the local market, eastern Pennsylvania furnaces are still quoting foundry iron at $20 per ton, base, and offers of lower prices by consumers have brought no concessions acceptable to the buyer. The probability of a decided increase in barge and barge and rail shipments of iron from Buffalo into eastern Pennsylvania is viewed with some concern, but producers here are inclined to doubt some of the extremely low barge rates reported. Nevertheless, even at the regular rates for barge shipment from Buffalo, a highly competitive situation might develop. A Gloucester, N. J., consumer has bought 2000 tons of foundry iron, part foreign and part domestic, at slightly under published prices. A purchase of 6000 to 7000 tons of basic iron has been made by an eastern Pennsylvania consumer at a delivered price about $20 per ton. Low phosphorus iron is quiet, but prices are firm.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Billets.—Despite advances in prices of plates, shapes and bars, rerolling billets continue at $33 per ton, base Pittsburgh, and forging grade at $38 per ton, Pittsburgh. A slight increase in small orders is reported.

Plates.—Quotations on small current purchases are 2.05c. per lb., Coatesville, or 2.15c. per lb., delivered Philadelphia, but contracts for second quarter are being made at 2c. per lb., Coatesville, or 2.10c. per lb., Philadelphia. Eastern Pennsylvania producers of plates are fairly busy and in one instance a mill has exhausted its reserve supply of ingots and now has additional open-hearth capacity in operation. The Reading Co. is inquiring for six car floats requiring about 200 tons of plates.

Shapes.—Current demand is small, but on small orders for prompt shipment 2.05c. per lb., Bethlehem, or 2.18c. per lb., Philadelphia, is being maintained with the exception of one eastern Pennsylvania mill, which is still quoting the current contract price of 1.80c. per lb., Pittsburgh, or 2.12c. per lb., Philadelphia. Specifications against first quarter contracts are slightly better than during February, but consumers are still delaying in asking for shipments. Six car floats for the Reading Co. will require 500 to 600 tons of shapes. Building permits issued in Philadelphia in January and February exceeded the first two months of 1927 and there is some sizable bridge construction in prospect for the present month.

Bars.—Specifications against contracts are coming out more freely than last month, but the market is rather inactive, particularly on current purchases for prompt shipment. On new business for immediate delivery, mills are quoting 1.90c. per lb., Pittsburgh, or 2.24c. per lb., Philadelphia. On contracts for second quarter 1.85c. per lb., Pittsburgh, or 2.17c. per lb., Philadelphia, are the prevailing quotations.

Sheets.—More firmness is evident in sheet prices. No concessions from 2.10c. per lb., base Pittsburgh, on blue annealed have been reported recently and galvanized sheets are fairly stable at 3.75c. per lb., Pittsburgh, with only small concessions obtainable. Black sheets are still off from the nominal basis of 2.90c. per lb., Pittsburgh. In line with the evident strengthening of sheets there is more interest among consumers in contracts for the next quarter, although very few such contracts have been closed.

Old Material.—The scrap market continues to show slight weakness in some grades. No. 1 heavy melting steel is going forward to consumers on $13.50 and $14 contracts, but no new purchases are reported. A Phoenixville, Pa., consumer has purchased a tonnage of stove plate at $12.50 per ton and is now offering to buy at $12, delivered. This mill is also offering to buy machine shop turnings at $10.50 per ton, delivered, but has not yet succeeded in closing at this price. A tonnage of forge fire has been purchased at $11 per ton, delivered Coatesville, Pa.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	15.00 to	15.50
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast boring (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars		12.50
Stove plate (for steel works)		12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to	18.50
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to	13.00
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	12.00
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.50
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Warehouse Business.—Jobbers report a moderate volume of purchasing. Effective March 2, warehouses in this district have advanced steel bars, hoops and

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bands $2 per ton. Bars are now quoted at 2.50c. per lb., hoops at 3.60c. per lb. and bands at 3.35c. per lb., base.

Imports.—In the week ended March 3, no pig iron ore arrived at Philadelphia. A total of 310 tons of structural shapes arrived from Belgium and 26 tons from France, 57 tons of steel bars from Belgium and 35 tons from Germany, 72 tons of bands and strip steel from Belgium and 21 tons from the United Kingdom, 20 tons of reinforcing bars from Belgium and 34 tons of steel scrap from Germany.

New York

Steel Contracting for Second Quarter at Former Prices—Pig Iron Active

NEW YORK, March 6.—Sustained interest in pig iron is reflected by the sales of local brokers for the week, which totaled close to 10,000 tons. While most of the larger buyers have covered for their second quarter needs, considerable business continues to be placed by small melters. Pig iron consumption in this district is holding its own, but shows few indications of increasing. Meanwhile, with the season of navigation approaching, competition among furnaces is growing keener. On 2100 tons of foundry for the Gloucester, N. J., plant of the American Radiator Co., eastern Pennsylvania producers refused to shade their price of $20, base furnace. The iron was bought at lower prices, however, being divided between foreign and outside domestic furnaces. Delivery will be by water. The Crane Co., Bridgeport, Conn., has bought 1500 tons of domestic iron for barge delivery. Buffalo foundry iron continues to be quoted at $16.50, base furnace. Indian iron has been sold at $19.75 to $20.25, duty paid, port of entry.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—Bids were taken this week on the anchorage and abutment towers for the Hudson River bridge, New York, involving approximately 500 tons of bars. Not all distributers in this territory have advanced their mill price to 2c., Pittsburgh, and 1.95c. is still the ruling price on any considerable tonnage. The Youngstown warehouse price is unchanged at 2.20c., or 2.57½c. on cars at New York, and out of New York warehouse the general quotations are 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Finished Steel.—Steel business, as represented by new orders and specifications against first quarter contracts, continues at a good rate in this district. The common report from most of the steel companies' offices is that orders and shipments about balance, but contract specifications form a large proportion of mill rollings for the reason that nearly all buyers are protected through the quarter. It is now two weeks since the Carnegie Steel Co. announced an advance to 1.90c., Pittsburgh, on plates, shapes and bars, and within that time nearly all other steel companies have taken like action, but the $1 advance has not become firmly established even as a second quarter contract price because of the wide coverage mills have given buyers for second quarter at 1.85c., Pittsburgh, or at corresponding levels at Eastern basing points. Eastern plate mills have made contracts for second quarter on the basis of 2c., Coatesville, and Eastern shape mills have contracted at 2c., Bethlehem. Moreover, additional tonnage for shipment this month has been taken from contract customers at the prices existing before the Feb. 21 advance. In sheets there has been very little second quarter contracting, but current shipments on contract remain at a high level. Structural steel contracts closed in New York within the last week totaled more than 14,000 tons, of which 5200 tons was for a loft building. Specifications for the Kill van Kull bridge, taking 15,000 tons, will be issued by the Port Authority on May 5.

Warehouse Business.—Since the first of the month there has been a slight increase in the volume of orders for material from stock and individual purchases are generally larger than for some time. Demand for structural material is good and there is a moderate tonnage of sheet buying. Prices are unchanged.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Although most makers are fairly well booked with enough tonnage of bell and spigot pipe to carry them for the next month to six weeks,

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2 in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

low prices continue to appear on desirable business. With Northern makers quoting low delivered prices, Southern producers who have a $9.25 per ton freight rate to pay are not offering much competition at present. Foundries have a fair total of business in small-size pipe, but are seeking tonnage in the larger diameters. The Long Island Lighting Co. is inquiring for about 600 tons of 20-in. pipe for Hempstead. The Department of Purchase, New York, is inquiring for about 3000 tons of cast iron pipe. Except for New York, no municipal buying of consequence has appeared in this district. Private purchasing continues fairly active.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Coke.—Purchasing of both furnace and foundry grades of coke is mostly in carload lots. Standard furnace coke ranges from $2.75 to $2.85 per ton, Connellsville, and standard foundry is quoted at about $4 per ton, Connellsville, with special brands bringing up to $5.10 per ton. Delivered prices of Connellsville foundry coke are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product prices are unchanged at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—No. 1 heavy melting steel is unchanged with brokers still buying at $13.50 per ton, delivered eastern Pennsylvania. Some other grades, however, show a tendency to weakness. On the basis of recent sales of stove plate at $12.50, brokers are offering $12 per ton, delivered Phoenixville, Pa. Machine shop turnings are being purchased at $10.50 per ton, delivered, but a consumer of turnings is refusing to pay more than $10.50 per ton on further contracts. A broker who has been paying $11 per ton, delivered eastern Pennsylvania, for yard grade of heavy melting steel is offering $10.75 per ton. The scrap list of the Pennsylvania Railroad opening this week offers 40,000 to 50,000 tons. As a result of recent meetings of dealers and brokers in New York and Philadelphia, a committee has been appointed to form an Eastern Scrap Iron Association.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

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*Net base, including boxing and cutting to length.

Cleveland

New Price of 1.90c. for Plates, Shapes and Bars Not Established

CLEVELAND, March 6.—Efforts to establish 1.90c., Pittsburgh, as the price on steel bars, plates and structural material for current orders and the second quarter have not been wholly successful. Some of the outside mills made contracts at 1.85c. before the advance and other buyers in some cases have insisted on getting the same price from their regular sources of supply. As a result there is at present a price range of from 1.85c. to 1.90c., Pittsburgh, for both current orders and contracts. A few contracts have been taken at the higher price. A local mill is quoting steel bars at 1.90c., Cleveland. Specifications against 1.80c. contracts are fairly heavy.

Orders for steel are more numerous than recently, but the average size is smaller. Some of the mills declare that they will not accept large specifications on first quarter contracts at the end of the month, but it is expected that considerable steel will be ordered against the expiring contracts, deliveries on which will extend well into April. Consumers as a rule are not yet showing a great deal of interest in second quarter contracts.

The automotive industry continues to take sheets, strip steel and steel bars in good volume. Some of the motor car builders have placed second quarter contracts and several inquiries for that delivery are pending from this source. However, there seems to be a disposition in that industry to limit purchases to April requirements. A lull has developed in structural activity in this territory and local contractors are reaching out into other districts for business. A good amount of highway bridge work is in prospect in Ohio, western New York and Pennsylvania. Present prices on wire products and wire rods have been reestablished for the second quarter.

Pig Iron.—Sales have been rather moderate in the northern Ohio, Michigan and Indiana territories the past week, but the Eastern market has continued active and this has kept up the total sales. Cleveland interests during the week sold 31,000 tons in foundry and malleable iron, a large share of which was for shipment from Buffalo. No change has developed in the price situation. Cleveland furnaces are taking some business in foundry and malleable grades at $17, with full differentials, but still seem willing to shade this price 25c. to 50c. a ton for shipment to competitive points. One Lake interest is able to make some small-lot sales at $17.50. In Michigan the market is firm at $18, furnace. The automotive industry has issued heavy shipping orders for March. While jobbing and other gray iron foundries in this territory are doing somewhat better than last month, they are taking iron in rather moderate volume and some of the furnaces are shipping less iron than they are making. Some of the stove manufacturers and other makers of heating equipment are not very busy. There is a little activity in low phosphorus iron. A Valley producer sold two lots aggregating 500 tons during the week at $27, furnace. The American Steel & Wire Co. blew in one of its Central furnaces this week, now operating three out of four.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—The present price of $44, Cleveland and Pittsburgh, for wire rods has been established for the second quarter. Specifications for sheet bars, billets and slabs for March delivery have been fairly heavy and the leading local producer has placed two additional open-hearth furnaces in operation, now running 12 out of 14. Prices are unchanged at $33, Cleveland, for the three products.

Wire Products.—The leading producer, effective March 5, opened its books for the second quarter at the present prices of $2.65 per keg for wire nails and $2.50 per 100 lb. for plain wire. Manufacturers' wire is moving well, but the demand for nails is moderate. Jobbers have large stocks bought late in the year at low prices and some are reported to be moving these stocks by meeting present mill prices.

Cold-Finished Steel Bars.—Specifications for March shipment against low-priced contracts are heavy. For current orders the market is firm at 2.35c., Cleveland. The second quarter price has not been announced. While there has been talk of a further advance, it seems probable that the present price will remain in effect.

Reinforcing Bars.—Inquiry is fair for small lots but no large projects are pending. New billet steel bars are still offered at 1.85c., Cleveland, and rail steel bars at 1.75c., mill. Stock prices continue irregular.

Sheets.—Mills have taken a fair amount of business in auto body sheets for the second quarter at the new 4.15c. price. Contracting for other grades is slow. Buyers show hesitancy because they do not seem convinced that the new prices will hold. Specifications for black and blue annealed sheets are fairly heavy and prices are firm. Some of the mills will be making shipments on present low-price contracts through the greater part of April. Galvanized sheets are still irregular but the price shading is attributed largely to jobbers who were able to place contracts late last year as low as 3.50c. Galvanized sheets sold during the week at 3.65c., Valley, equivalent to 3.55c., Pittsburgh, although 3.75c., Valley mill, is the more common minimum quotation.

Strip Steel.—Not much business in second quarter contracts for hot and cold-rolled strip has been taken at the higher prices recently announced, but the market appears firm at the new quotations. Specifications continue good.

Warehouse Business.—Jobbers are doing a fair volume of business, which shows a slight gain. With the approach of spring, galvanized sheets are moving better. Regular prices are well maintained.

Old Material.—With shipments still restricted by mills and no new demand, the market continues inactive. Dealers are buying very little scrap, as they have commitments for more than they can ship for some time. With the large output of the automotive industry, scrap is coming on the market faster than it is being absorbed and the tone of the market is weak. The local supply of old automobile cast scrap is in excess of the demand from Cleveland foundries and some of this grade is being shipped from here to Michigan points. This scrap is bringing $15.50 to $16 per net ton.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have re-established the present discounts for the second quarter, except on stove bolts, which have been advanced, new discounts being 80, 10 and 5 per cent off list. Rivet manufacturers have advanced large rivets $3 a ton to $2.90 per 100 lb., Pittsburgh and Cleveland, and $3, Chicago, effective March 1. A leading local interest has made no announcement of a higher price for small lots, but will adhere to its usual policy of charging more for very small miscellaneous lots. The new prices will apply to second quarter contracts. For small rivets the present discount of 70 and 10 per cent off list, Pittsburgh and Cleveland, has been re-established for the second quarter. Bolt and nut and rivet manufacturers have opened their books for that delivery. Specifications for bolts and nuts are fair, but hardly up to expectations. The demand for rivets is rather slow.

Coke.—New demand for foundry coke is slow, but consumers are taking shipments fairly well against contracts. Prices are unchanged at $8, Painesville, or $9.01, delivered Cleveland, for by-product coke and $3.75 and $5.10 for Connellsville foundry coke. Yard dealers are stocking up on by-product coke for domestic use, which has become more active. The price is unchanged at $4.50, Ohio ovens.

Jones & Laughlin Earned 6.9 Per Cent on Stockholders' Investment in 1927

The Jones & Laughlin Steel Corporation, in its pamphlet report for the year ended Dec. 31, last, shows a decrease of $3,910,155 in net income, as compared with 1926, and an addition to surplus of $4,293,002 or slightly more than half that added in the previous year. Stockholders' investment at the end of 1926 totaled $163,638,470, comprising $57,036,400 in preferred stock, $57,332,000 in common stock and $49,270,070 in surplus. The 1927 net income was equivalent to approximately 6.9 per cent on that investment, comparing with 9.8 per cent earned in 1926 on a stockholders' investment of $155,124,635.

In 1927 the company produced 2,348,719 gross tons of ingots and shipped 1,937,645 net tons of steel products, comparing with 2,591,140 and 2,136,141 tons respectively in 1926.

Earnings and other statistics for the year compare with those for 1926 as follows:

	1927	1926	*Decrease*
Total earnings	$16,559,320	$21,210,206	$4,650,886
Depreciation and depletion reserve	4,572,359	5,210,631	638,272
Interest, etc.	748,021	850,481	102,460
Net income	11,238,939	15,149,094	3,910,155
Dividends	6,945,937	6,570,859	*375,078
Surplus for year	4,293,002	8,578,235	4,285,233
Total surplus	53,413,072	49,270,071	*4,143,001

*Increase.

Production	1927	1926
Iron ore, gross tons	1,679,619	2,584,342
Coal, net tons	2,461,466	4,950,563
Limestone, gross tons	607,079	550,449
Coke, net tons	2,298,050	2,401,774
Pig iron, gross tons	2,054,615	2,246,054
Ingots, gross tons	2,348,719	2,591,140
Shipments		
All steel products, net tons	1,937,645	2,136,141
Inventories (value)		
Raw materials	$14,909,957	$18,481,808
Manufacturing supplies and stores	3,468,335	3,602,027
Materials in process	4,456,633	4,865,575
Finished materials	7,375,376	5,961,688
Total	$30,210,301	$32,911,098
Total payroll	$44,388,949	$49,037,542
Average No. of employees	21,810	23,760

Empire Steel Corporation Announces Further Sales Appointments

Glenn D. East, who was manager of sales of the Empire Steel Co., Cleveland, has been appointed Cleveland district sales manager of the new Empire Steel Corporation, succeeding F. F. Huber, formerly Cleveland sales manager of the Mansfield Sheet & Tin Plate Co., who will be transferred to the general sales office of the Empire Corporation in Mansfield. C. H. Beach, who represented the Mansfield Sheet & Tin Plate Co. in Indianapolis, has been appointed Indianapolis sales manager of the Empire Steel Corporation.

Boston

Large Pig Iron Sales Bring Out Low Prices—Scrap Weak

BOSTON, March 6.—Several thousand tons of pig iron were bought in this territory the past week, including 2000 tons of No. 2X and No. 1X by the General Fire Extinguisher Co., Providence, R. I., and 1000 tons of No. 2X by a central Massachusetts foundry. Most of this iron was for second quarter delivery. It is reported that the largest tonnages were sold on a basis of $16, Buffalo, slightly higher for No. 2X, and $17 for No. 1X. On small tonnages, Buffalo iron and iron made east of Buffalo sold generally on a basis of $17, Buffalo, for No. 2X, and $17.50 for No. 1X. Transactions included some western Pennsylvania and Southern iron at full prices for mixture purposes. Little eastern Pennsylvania or foreign iron is selling in New England at the moment.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Reinforcing Bars.—The local market for reinforcing bars is firmer. Some bids submitted on prospective business the past week were subsequently withdrawn, indicating higher prices. Mill representatives generally are holding to 1.90c. per lb., base Pittsburgh, but some business has been placed at 1.95c. Reinforcing bars from stock here are now generally 2.90c. per lb., base, compared with 2.75c. and 2.80c. a week ago.

Bars, Shapes and Plates.—Since mills announced an advance on bars, shapes and plates to 1.90c. per lb., base Pittsburgh, offers have been made consumers here at 1.85c. on contracts. Buying of finished material is light owing to the fact that most consumers and warehouses are well covered at 1.80c. Steel fabricators report practically no improvement in business, but say the outlook for early spring is encouraging.

Cold-Rolled Strip.—Although mills have opened books for second quarter, there has not been enough buying to test prices. On current business 3.15c. per lb., base Pittsburgh, prevails. The Worcester, Mass., mill is quoting 3.30c. per lb., base, on lots of 1 to 3 tons, and 3.05c. on larger lots.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Coke.—No improvement in the movement of by-product foundry coke is noted. Fuel is being billed at $11.50 a ton, delivered within a $3.10 freight rate zone. Demand for by-product domestic coke is fairly active on a basis of $8.50 a ton on cars at ovens. The large New England producers still have sizable reserve stocks.

Warehouse Business.—Warehouse prices on cold-rolled strip steel have been advanced from $5.10 to $5.30 per 100 lb., base. Iron and steel products otherwise are unchanged in price despite the advance in mill quotations. The movement of iron and steel out of warehouses is fairly heavy, but individual orders call for small amounts. February billings were about 30 per cent larger than those for that month last year, but as January billings fell off, the showing for the year to date is only a little larger than 1927. One warehouse recently made 239 charges in one day, a new high record.

Old Material.—A further falling off in old material sales has caused a shading of prices on some grades, but in contrast railroad wrought is up 50c. a ton, and $6 a ton on cars was the lowest price reported paid last week for mixed borings and turnings, as against $5.75 the previous week. Prices on forged flashings take an unusually wide range. While $8 a ton is the prevailing top on girder rails, $8.10 was paid in at least one instance. Demand for steel turnings has fallen off. For shafting the average top price is $13.50 a ton on cars, but selected stock for eastern Pennsylvania delivery, sold recently as high as $14. Shipments of pipe have been held up by consumers. Borings are in limited supply. The General Electric Co., West Lynn, Mass., this week will close bids on 40 cars of miscellaneous material.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.10
Scrap T rails	8.50 to	9.00
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought	8.50 to	9.00
Machine shop turnings	5.75 to	6.25
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	6.00 to	6.50
Forged flashings	6.10 to	7.00
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.00 to	15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.25
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate	10.50 to	11.00
Railroad malleable	13.50 to	14.00

Youngstown

Automobile Companies Specifying Steel Close to Requirements

YOUNGSTOWN, March 6.—With the exception of pipe, business in steel products is fairly satisfactory to manufacturers in this area. The automotive industry is taking sheets, bars and strips freely and makers of body sheets find it necessary to operate extra turns to satisfy delivery requirements. Automobile builders continue to place entire dependence upon the steel companies to produce and ship promptly and upon the railroads to deliver freight practically on an express schedule. The time was when they had at least two weeks' supply rolling; now in not a few products they are depending upon daily deliveries to maintain production schedules and inventories are not merely zero, they are zero minus, since it frequently happens that the arrival of a car of steel is the determining factor of maintenance of one department or another of automobile plants.

The backlogs of the mills in the area are for the most part the contracts written late last year, plus the additions that were allowed prior to the recent price advances. Specifications are coming along well, but there is not a company in the Youngstown district that can tell what its operations will be as much as two weeks ahead, so closely are specifications confined to nearby requirements.

The district is producing steel ingots at about 75 per cent of capacity, which is fairly good considering the smallness of the demand for pipe. That product may do better later on when the oil industry gets straightened out. Some think that such a development is nearer, in view of the strengthening tendency in oil prices, but just now there is at best only a moderate demand for oil country pipe, while line pipe orders are pretty well completed and the call for standard-weight pipe for building and construction work, though fairly good, is not yet up to the average of a year ago.

Some complaint is heard over prices, since the bulk of the movement is at lower figures than now are quoted and buyers have had such full coverage at the lower quotations that there is not much hope of net returns being better until after the turn of the second quarter because buyers under contract have until the end of this month to specify against their commitments. Manufacturers here still find prices competitive and do not take as cheerful a view of the situation as might be expected with a steady flow of specifications and production and shipments in keeping with that fact.

Bars now are quoted at 1.90c., base Pittsburgh, for large lots and 2c. for small lots, but it is admitted that not much business has been done at these prices, while it was necessary because of competitive conditions to take considerable business at 1.85c. Some success has attended the effort to establish sheets at 2.90c., base Pittsburgh, for black, 3.75c., base, for galvanized and 2.10c. base, for narrow, and 2.20c., base, for wide blue annealed, although getting the full price on galvanized remains difficult.

The Republic Iron & Steel Co. is making good progress in getting its spike-making equipment installed and expects to be producing in another 60 days.

Youngstown district steel makers are much interested in the proposal of the Pittsburgh Coal Co. to connect the district with the Ohio River through an extension of its Pittsburgh, Lisbon & Western Railroad, but are not yet ready to go on record as believing that the project will materialize. It is recognized that a railroad built solely to give Youngstown a river-rail service on coal would hardly pay unless it had something to carry on the return trip. It is also realized that existing railroads are likely to oppose the building of the line on the ground that additional trackage is not needed. It is probable that James A. Campbell, who on his way south a few weeks ago conferred with presidents of the railroads serving this district, may have some views on the matter when he returns this week.

In view of the suggestion that one end of the proposed road would connect with the Erie Railroad just outside Youngstown, some believe the move is being sponsored by that road, which lately has not been getting much of the soft coal that has been moving to the Lakes. There is also a suggestion that the request for permission to build the new line is an effort by the Pittsburgh Coal Co. to force existing railroads to do something about coal freight rates that would not merely open up the Youngstown district to greater tonnages of river coal, but would help the coal companies to more speedily recover the lost Lake trade.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Wabash Buys 5000 Tons of Tie Plates —Pig Iron Quieter

St. Louis, March 6.—The pig iron market is quiet. Sales for the last week amounted to about 3000 tons, ranging from 500 tons for a district melter to a carload. A radiator manufacturer is in the market for a round tonnage, including 2000 to 2500 tons for its plants in this district, for second quarter delivery. Melters are well supplied with pig iron for the remainder of first quarter, and very little interest is being taken in second quarter requirements.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The Wabash Railway has placed orders for 5000 tons of tie plates in equal amounts with Southwestern and Eastern mills at what a purchaser would call "attractive" prices. Buying of plates, shapes and bars for second quarter is fairly large. Warehouse business is picking up, February's sales being about 10 per cent ahead of January's, although 10 per cent less than in February, 1927. Business with structural fabricators is light.

Coke.—Demand for domestic grades of coke is holding up very well, especially in view of warmer weather in this section. A fairly good demand is reported for foundry grades. Prices are unchanged.

Old Material.—Although consumption of old material in the St. Louis district continues heavy, mills have ceased buying until they have liquidated stocks on hand and material still to be delivered on contracts. It is not expected the mills will resume buying until late in March. The result is the market is weaker. Heavy melting steel, heavy shoveling steel, No. 2 railroad wrought, while steel rails less than 3 ft. are 25c. a ton lower, while steel car axles and cast iron carwheels are off 50c. The remainder of the list is unchanged. Railroad lists include: Pennsylvania, 39,435 tons; Baltimore & Ohio, 9670 tons; Missouri Pacific, 4200 tons; New Orleans & Great Northern, 355 tons; Frisco lines, 55 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.50 to $12.00
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	14.25 to 14.75
Machine shop turnings	7.50 to 8.00
Steel car axles	19.00 to 19.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.50 to 16.00
Steel angle bars	12.50 to 13.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Manufacturing production in the United States in January is placed by the Department of Commerce at 116, on a basis of 100 in 1919. Iron and steel ranks high, at 130, with other metals at 139 and automobiles at 132.

More beehive coke was made in February than in January, according to the United States Bureau of Mines. The gain was from 376,000 net tons to 390,000 tons. Both were far below the 754,000 tons of February, 1927.

Buffalo

Pig Iron Inquiry Falls Off—Large Sale of Steel Mill Scrap

BUFFALO, March 6.—Inquiry for pig iron has fallen off and the lots that producers are quoting on are comparatively small. Carload lots are in demand and a few 200 to 300-ton inquiries are out but the larger consumers seem to have covered for nearby requirements, though there is considerable iron yet to be placed for second quarter. The price of $17 is steady in the district, though it is understood that a $16.50 quotation is still being offered to New England consumers by one Buffalo maker. Bethlehem has five stacks blowing; Donner Steel Co., two; Hanna Furnace Co., three; Wickwire-Spencer, one, and Tonawanda Iron Corporation, one.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Old Material.—A large sale of heavy melting steel, No. 1 and No. 2 grade, hydraulic compressed sheets and No. 1 busheling was made in the week. It is said that between 30,000 and 40,000 tons of material was involved. The price paid was around $14.50 to $14.75 for the No. 1 heavy melting steel, with $1.50 lower for the other grades. The specifications are slightly different from those of another mill which paid $15.25 for its last tonnage of heavy melting steel, around 8000 tons being involved in that purchase. Another sale of 1000 tons of No. 2 steel was recently made at $12.75, delivered.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.50
Agricultural	15.50
Industrial	15.50

Finished Iron and Steel.—Mill operation continues to improve. Bar, shape and plate mills are adhering to 2c., Lackawanna, for nearby delivery, or 1.90c., Pittsburgh, depending on the location. The market for automobile body sheets is particularly good. The Donner Steel Co. has established a cold-drawn department for carbon and alloy steel, though specializing in alloy. Bolt and nut specifications are better. A steel fabricator has obtained the contract for 550 tons of structural steel for a high school at Kenmore, N. Y.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Canada

Growing Demand Across Border for Iron and Steel Products

TORONTO, ONT., March 6.—Canadian steel companies report a growing demand for iron and steel products. In addition to orders booked for domestic consumption, Canadian interests have closed some contracts for export. The Algoma Steel Corporation, Sault Ste. Marie, Ont., reports its plant running on double shift with approximately $8,000,000 worth of orders on its books. The British Empire Steel Corporation, Sydney, N. S., has upward of $5,000,000 worth of orders ahead.

R. J. Magor, Dominion Iron & Steel Co., is en route to Europe to negotiate iron ore business, particularly in Germany and England, the ore to be supplied by the company's mines in Newfoundland. Iron ore contracts already closed for this year's delivery include 800,000 tons for delivery to Germany and 100,000 tons for delivery to the United States, in addition to upward of 400,000 tons to be shipped to the company's own furnaces at Sydney, N. S.

Pig Iron.—Business in this market shows very little change from last week. Demand is increasing, but sales for the week were chiefly for spot delivery. Inquiries are appearing for second quarter. A small number of melters have already covered for second quarter needs, but the majority have yet to make known their requirements.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Business is increasing and individual orders call for larger tonnages. Canadian interests are of the opinion that the bottom has been reached. Prices are firm but unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Pig Iron Buying Improves—Steady Flow of Steel Orders

BIRMINGHAM, March 6.—There was some improvement in the last week in pig iron buying. A number of plants had underestimated their requirements and came into the market for March fill-in tonnage. Some of the larger pipe plants are expected to place additional tonnage soon. There has been very little second quarter business, but some of the iron already booked will be carried forward. Quotations for foundry iron continue on a $16 base. The two new 600-ton Fairfield furnaces of the Tennessee Coal, Iron & Railroad Co. probably will be ready for operation some time next month. Seventeen blast furnaces are in operation, nine on foundry iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—New business is steadily coming in and inquiries indicate that a substantial tonnage is in prospect for second quarter. Bookings in some lines exceed current production, and forward tonnage is accumulating. Structural steel fabricators received several new orders last week, each being about 100 tons. Open-hearth operations are unchanged, the Tennessee company operating 13 and 14 and the Gulf States Steel Co. four.

Cast Iron Pipe.—A normal amount of new tonnage in small lots is being received. No large orders are reported. Plant operations have changed but little within the past several weeks. These are at a fair level due to accumulation of small orders. Quotations continue on a $29 to $30 base. The National Cast Iron Pipe Co. has awarded the structural steel contract for an addition to the Virginia Bridge & Iron Co.

Coke.—Spot demand is not active and little interest is being shown in second quarter tonnage. Quotations for March and second quarter remain at $5.

Old Material.—No improvement is reported in demand. The market has been quiet and prices stationary for some time.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to	$10.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	8.00 to	8.50
Cast iron borings	8.00 to	8.50
Stove plate	13.00 to	14.00
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		15.00
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Cincinnati

Pig Iron Sluggish—Scrap Weak—Steel Demand Steady

CINCINNATI, March 6.—Pig iron buyers are manifesting little interest in second quarter needs, with the result that the local market is sluggish. Aside from 1000 tons of malleable for a Parkersburg, W. Va., company and 500 tons of malleable for a Tennessee melter, inquiries are of little consequence. Sales likewise have been unimportant, the largest in the past week having called for 300 tons of foundry iron. The price situation is slightly firmer, with northern Ohio furnaces having advanced to a minimum of $16.75, base furnace, and some makers having quoted as high as $17.50. Ironton producers are holding firmly to $19, base furnace, and in the South both Alabama and Tennessee interests are maintaining foundry iron on a basis of $16, Birmingham, although movement of material into this territory is light. Demand for Jackson County silvery iron is only fair. Extensive improvements to the blast furnace of the Norton Iron Works Co. at Ashland, Ky., are nearing completion, but it probably will not be lighted for 30 to 60 days.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Specifications against current contracts have been liberal in the past week and forward buying is beginning to assume larger proportions. Many consuming industries are slowly increasing operations, but have not reached the point where they need to augment present stocks. The Stacey Mfg. Co., this city, has contracted for the erection of three gas tanks requiring about 1400 tons of steel. Bars, structural shapes and plates are quoted at 1.90c., base Pittsburgh. Sheet manufacturers are booking heavy specifications applying against present contracts, and new sales for second quarter delivery have been on the basis of 3.75c., base Pittsburgh, for galvanized, 2.90c. for black, 2.10c. for blue annealed and 4.15c. for automobile body stock. The only variation is to be found in light gage galvanized sheets for roofing purposes, which are being sold at concessions of from $2 to $3 a ton. Movement of wire goods has been about normal. Common wire nails are quoted at $2.65 per keg, base Ironton or Pittsburgh, and plain wire at $2.50 per 100 lb., Ironton or Pittsburgh.

Reinforcing Bars.—Rail steel bars are quoted mostly at 1.80c. or 1.85c., base mill, and it is becoming less easy to get large tonnages at 1.75c. Makers of new billet stock are asking from 1.90c. to 2c., base Pittsburgh.

Warehouse Business.—Local jobbers report that sales have been only fair. The number of orders has been liberal, but the total tonnage is below that in the same period of 1927. In view of the upward trend of mill prices, the schedule for delivery from Cincinnati warehouses is firm.

Coke.—An increase in the foundry melt in this district is responsible for heavier shipments of by-product foundry coke, the production of which has been expanded in the Portsmouth-Ironton district. The Portsmouth By-product Coke Co. has permanently doubled its output, while an Ironton company, formerly manufacturing furnace coke, has gone over to foundry coke principally because of the fact that no merchant blast furnaces at Ironton are active. Quotations of Wise County and New River bee-hive coke remain firm and unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Melting steel has declined 50c. a ton and a number of other items are off from 50c. to 75c. a ton because of the lack of interest on the part of consumers and the refusal of steel plants to buy material unless concessions are made. Dealers are of the opinion that quotations are likely to remain at about their present level during the next month.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to	$11.50
Scrap rails for melting	11.75 to	12.25
Loose sheet clippings	8.50 to	9.00
Bundled sheets	9.50 to	10.00
Cast iron borings	8.00 to	8.50
Machine shop turnings	7.50 to	8.00
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.50 to	11.00
Short rails	16.00 to	16.50
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	13.00 to	13.50
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	12.25 to	12.75
Agricultural malleable	11.75 to	12.25

San Francisco

Structural Steel, Plates and Cast Iron Pipe Fairly Active

SAN FRANCISCO, March 3 (*By Air Mail*).—Movement of steel products generally is being well maintained and some fair-sized structural plate and cast iron pipe awards were made this week. Awards included 1200 tons of plates for a penstock for the Southern California Edison Co., Los Angeles, and 1000 tons of plates for a municipal pipe line at Tacoma. Prices appear to be holding fairly firm.

Pig Iron.—Another shipment of Indian iron has arrived on the Coast, 1000 tons being unloaded at San Francisco and 400 at Los Angeles. Most of this was used to apply against contracts. The next shipment of Indian pig is due here during the first half of the month, about 1250 tons being aboard. Demand is only fair. Little improvement is noted in the rate of operations among foundries. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—The two outstanding structural awards of the week involved 800 tons for a power house at San Diego for the San Diego Consolidated Gas & Electric Co., booked by the McClintic-Marshall Co., and 480 tons for the Heinz plant addition in Berkeley, secured by Judson-Pacific Co. Awards this week exceeded 1800 tons. Considerable new work is in sight. Bids are being taken on 4000 tons for the Capwell store in Oakland and on 3000 tons for the Coyote Point bridge across San Francisco Bay. Pending business totals over 16,000 tons. While fabricated prices are still low in many instances, due to foreign competition of plain material, domestic plain shapes continue firm at 2.35c. c.i.f.

Plates.—Awards of plates during the past week were the heaviest of any week so far this year. The Southern Pacific Co. has placed a contract with an unnamed mill for three months' requirements, totaling about 400 to 500 tons. A pipe line project at Milton, Ore., involving 625 tons, was booked by King Brothers' Boiler Works. The Southern California Edison Co. has placed 800 tons and 400 tons respectively with the Western Pipe & Steel Co. and the Lacy Mfg. Co. for a penstock. The Birchfield Boiler Works, Tacoma, took 1015 tons of ¼ and 5/16 in. material for a pipe line for the city. Bids were opened this week on 2000 tons for a penstock at Seattle and the Navy Department has taken bids on 750 tons for Western yards. Prices are firm at 2.30c., c.i.f.

Bars.—Awards of reinforcing steel were mostly lots of less than 100 tons. A San Francisco jobber took 200 tons for a store in San Francisco and a memorial building at Oakland. Bids were opened this week on 1950 tons for Pier 48, San Francisco, and an award is expected soon. Foreign competition continues to keep the out-of-stock price in the bay district low and 2.25c. is being quoted. On the other hand, some interests using domestic material report the booking of less than carload lots at 2.75c. and larger lots from 2.50c. to 2.60c. High carbon angles range from 2.35c. to 2.40c., c.i.f., including extra for carbon. High carbon reinforcing bars are quoted the same as structural material, namely, 2.35c., c.i.f.

Cast Iron Pipe.—Awards were as follows: 218 tons of 12-in. class 150 universal pipe for Colfax, Wash., to Central Foundry Co.; 155 tons 4 to 10-in. for Modesto, Cal., to Grinnell Co. and the Pacific States Cast Iron Pipe Co.; the Southern Pacific Co., San Francisco, has placed 560 tons of 4 to 12-in. class B pipe with unnamed interests; James Young, Oakland, took 145 tons of 4 and 6-in. pipe for the fair grounds at Sacramento, Cal.; Grinnell Co. secured 624 tons of 6 to 12-in. class D pipe for Vancouver, B. C., and Leith Murray & Co. took 619 tons of 6 and 8-in. class C for the same city; Lafayette, Colo., has placed with an unnamed interest 651 tons of 4 to 12-in. class B pipe and the United States Cast Iron Pipe & Foundry Co. booked 128 tons of 48-in. class A pipe for Los Angeles. Bids were opened this week on 663 tons of 6 to 20-in. classes B and C pipe for Santa Barbara, Cal., and on 188 tons of 20-in. class C pipe for Tacoma, Wash. The National Cast Iron Pipe Co. was low bidder on 136 tons of 18-in. class C pipe for San Diego, Cal. Other pending business includes 3095 tons of 4 to 12-in. class B pipe for Southgate, Cal., and 222 tons of 4 and 8-in. class B for Armona, Cal.

Steel Pipe.—The Petroleum Securities Co., Los Angeles, has placed 650 tons of 3½ to 16-in. plain-end line pipe with the American Seamless Tube Co. and the South Chester Tube Co. for its new Richmond, Cal., plant. The Pacific Gas & Electric Co. has placed 1472 tons of 2 to 16-in. line pipe and 518 tons of ¾ to 3-in. black pipe with unnamed interests. The Standard Oil Co., San Francisco, is reported to be in the market for 22,000 tons of 8-in. line pipe for a line from Pasotex to El Paso, Tex.

Coke.—A shipment of English bee-hive and by-product foundry coke is scheduled to arrive about the middle of the month. There will be approximately 4000 tons aboard, part of it for Los Angeles and part for San Francisco consumers. By-product material is quoted from $11.50 to $13 a net ton at dock, depending upon the quality, while bee-hive coke is quoted at from $16 to $17 a net ton.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Detroit Scrap Market Shows Further Weakness

DETROIT, March 6.—Further reductions in the scrap market in this district were noted during the past week. Blast furnace materials showed the greatest declines. This is due in part to the large tonnage coming from producers and the fact that shipments to some districts have been restricted.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	10.00 to 10.15
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Permanent-Magnet Steel

Principles governing the choice and utilization of permanent-magnet steels are discussed in scientific paper No. 567 of the United States Bureau of Standards, which was prepared by Raymond L. Sanford, physicist of the bureau. A copy of this paper may be obtained from the Superintendent of Documents, Government Printing Office, Washington, for 5c. It was found that the addition of substantial percentages of cobalt to the composition of permanent-magnet steels leads to markedly superior qualities. Inasmuch as the cost of cobalt steels is much greater than that of older types, their use may be warranted only under special circumstances. Criterions for the comparison of the quality of magnet steels are discussed, and conditions are outlined under which the use of the more expensive steels is justified.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Mar. 6	Mar. 5	Mar. 3	Mar. 2	Mar. 1	Feb. 29
Lake copper, New York	14.25	14.20	14.20	14.20	14.20	14.20
Electrolytic copper, N. Y.*	14.00	13.75	13.62½	13.62½	13.62½	13.62½
Straits tin, spot, N. Y.	51.62½	52.00	....	51.50	51.37½	51.25
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00
Lead, St. Louis	5.75	5.75	5.75	5.75	5.75	5.75
Zinc, New York	5.85	5.82½	5.80	5.80	5.80	5.80
Zinc, St. Louis	5.50	5.47½	5.45	5.45	5.45	5.45

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, March 6.—There are signs of more activity and strength in several of the markets. Concessions on copper have virtually disappeared and inquiry is better. Demand for tin is moderate at practically unchanged prices. The lead market is more active and prices are firm. Quotations for zinc have started to advance and buying is a little better.

Copper.—After several weeks of decided inactivity and some weakness in prices, the market yesterday and today has turned stronger. One cause is advancing prices in London. Electrolytic copper, which was available from two or three sources as low as 13.87½c., delivered in the Connecticut Valley last week, is reported unobtainable today below 14.12½c., the price which leading producers have been quoting for some weeks. Sales to domestic consumers thus far have been light at any price, but inquiry has improved and it is stated that considerable metal must yet be bought even for March consumption. Last week Russia bought about 3500 tons and today buying for export has been considerably better, with sales estimated at over 2000 tons today and about 1000 tons yesterday. The official quotation of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f. usual European ports. Sellers generally today are more optimistic than in some time and predict higher prices.

Copper Averages.—The average price of Lake copper for February, based on daily quotations in THE IRON AGE, was 14.24c. The average price of electrolytic copper was 13.82c., refinery, or 14.07c., delivered in the Connecticut Valley.

Tin.—In an unusually quiet market sales were light for the week ended Saturday, March 3, totaling scarcely 600 tons. Dealers did most of the buying, consumers being inactive and uninterested. Yesterday, Monday, dealers bought the greater part of the 200 tons which changed hands and today the market was extremely quiet. Spot Straits tin today was quoted at 51.62½c., New York. Prices in London today were only slightly higher than a week ago, with spot standard quoted at £231 17s. 6d., future standard at £234 2s. 6d., and spot Straits at £235 17s. 6d. The Singapore market today was £237 10s. Statistics for February were considered very unfavorable, but the market has been holding well in spite of this. There was an increase in the world's visible supply of 2401 tons, which was considerably more than the 1500 to 2000 tons expected. Straits shipments were very large at about 8400 tons, while Banca shipments were small at 695 tons. Deliveries of metal in the United States were 5790 tons, which was lower than expected. Stocks of tin in the United Kingdom were 3240 tons of all brands and about 10,300 tons is reported as in sight for American consumers. Arrivals thus far this month have been 605 tons, with 8360 tons reported afloat.

Lead.—Consuming demand is reported more active and dealers are inclined to buy futures. The market in general is stronger in tone because of higher prices in London. The leading interest during the week changed its quotation to 6c., New York, as its contract price, which continues firm. In the outside market quotations are steady at 5.75c., St. Louis.

Zinc.—With higher prices for ore last Saturday and with a stronger market in London, prime Western zinc here has begun to develop strength and quotations are tending higher. The market today is stronger, with slab zinc quoted and sold at 5.50c., St. Louis, or 5.85c., New York. While demand is not heavy, a fair amount of buying is reported and specifications from consum-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.25c. to 54.25c.
Tin, bar	55.25c. to 56.25c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.50c.
Lead, American pig	6.85c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	61.50c.
Solder, ½ and ½	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets, (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed for more than three months. Lead full sheets and zinc sheet are being quoted at the reductions of Feb. 21 and 27 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	9.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

ers are satisfactory. Ore at Joplin on Saturday was quoted at $36, an advance of $1 per ton, with production last week at least 12,000 tons and sales about 9150 tons. Stocks are still large at close to 63,000 tons.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—Several carloads have been sold in the last week, but prices are practically unchanged, with Chinese metal for spot delivery quoted at 10.25c., and futures at 10.37½c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb. delivered.

Non-Ferrous Metals at Chicago

Chicago, March 6.—This market is quiet and buyers are resisting present prices. Quotations of tin and lead are lower. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 53.25c.; lead, 5.85c.; zinc, 5.60c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

New Projects Will Require 8200 Tons—5400 Tons in Awards

WITH a manufacturing building at Winston-Salem, N. C., and a pier at San Francisco requiring 2800 and 1950 tons respectively, new projects brought out during the week amounted to 8200 tons. Awards totaled 5400 tons, the largest of which was 1600 tons for a cold storage building in Chicago. Awards follow:

Baltimore, 300 tons of rail steel bars, barracks at Camp Meade, to Dietrich Brothers.

Philadelphia, 750 tons, Blum Store, to Concrete Steel Co.

Chicago, 300 tons of rail steel bars, apartment building at 73 East Elm Street, to Calumet Steel Co.

Chicago, 400 tons, Civic Opera Building, to American System of Reinforcing.

Chicago, 1600 tons, cold storage building, reported to have been awarded to Kalman Steel Co.

Chicago, 180 tons of rail steel bars, apartment building at 917 Eastwood Avenue, to Inland Steel Co.

Chicago, 270 tons of rail steel bars, Lincoln Hotel, to Calumet Steel Co.

Chicago, 200 tons of rail steel bars for two apartment buildings, to Olney J. Dean & Co.

State of Iowa, 700 tons, road work, to unnamed bidder.

State of Wisconsin, 350 tons, road work, to unnamed bidder.

Ellensburg, Wash., 118 tons, Kittitas diversion dam; C. F. Graff, Seattle, low bidder.

Oakland, Cal., 100 tons, Legion Memorial building, to unnamed San Francisco jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Burlington, Vt., 125 tons, bridge.

New York, 1000 tons, Eleto warehouse; White Construction Co., general contractor. Previously reported as 500 tons.

New York, 500 tons, anchorage and abutment towers for Hudson River Bridge; Arthur McMullen Co., low bidder on general contract.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.50c.	4.00c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.50c.

Philadelphia, 275 tons, public school at Sixth and Buttonwood Streets, bids in.

Cumberland, Md., 160 tons, hospital building, bids in.

Winston-Salem, N. C., 2800 tons, building for Reynolds Tobacco Co.; general contractor, James Baird, Washington.

Austin, Ill., tonnage being estimated, high school.

Chicago, 277 tons, superstructure for Women's Athletic Club; Phillip E. Maher, architect.

Chicago, tonnage not stated, 20-story office building at 301 West Jackson Boulevard; A. S. Alschuler, architect.

Chicago, tonnage being estimated, Ogden National Bank Building; K. M. Vitzthum, architect.

Chicago, tonnage not stated, Roosevelt State Bank; Emil Miska, architect.

Chicago, 1000 tons, printing plant for R. R. Donnelly Co.; Howard Shaw and Associates, architects.

Chicago, 100 tons, Chicago Sanitarium; W. C. Wallace, architect.

Chicago, 100 tons, Oscar Wolff office building.

West Pullman, Ill., tonnage being estimated, building for Columbia Mills, Inc.; Lockwood, Greene & Co., engineers.

St. Louis, 400 tons, track construction work for Missouri Pacific Railway between Allenton and Boles, Mo.

San Francisco, 1950 tons, Pier 48; Healy-Tibbetts Construction Co., low bidder.

RAILROAD EQUIPMENT

Orders for 400 Box Cars and 300 Refrigerators—Canadian National Will Buy 55 Passenger Cars

PURCHASES of 400 box cars by the Minneapolis, St. Paul & Sault Ste. Marie and of 300 refrigerator cars by Wilson & Co., packers, were the outstanding transactions in the equipment market in the last week. The Canadian National is inquiring for 55 passenger cars. Details of the week's business follow:

Western Union Telegraph Co. is inquiring for five steel underframes and trucks for box cars.

American Smelting & Refining Co. has ordered 60 30-ton gondola ore cars from Koppel Industrial Car & Equipment Co. for shipment to Newfoundland.

St. Louis-San Francisco has ordered six air-dump cars from Magor Car Corporation, and is in the market for 15 baggage cars.

Canadian National has issued inquiry for 55 passenger cars.

Northern Pacific is inquiring for four gas-electric rail motor cars.

Boston & Maine has made inquiry for 10 combination baggage and mail cars.

Missouri-Kansas-Texas is inquiring for eight combination mail and baggage cars.

Minneapolis, St. Paul & Sault Ste. Marie has ordered 200 box cars from Pullman Car & Mfg. Corporation, and a like number from Siems-Stembel Co.

Wilson & Co. have ordered 300 refrigerator cars from Bettendorf Co.

Akron, Canton & Youngstown is in the market for two Mikado type locomotives.

Southern Pacific will buy three Pacific type locomotives and either 21 Southern Pacific type or 17 Mallet type locomotives.

Chicago, Burlington & Quincy has ordered six baggage and three passenger baggage cars from Pullman Car & Mfg. Corporation.

FABRICATED STRUCTURAL STEEL

Awards of 45,000 Tons—40,000 Tons in New Work Under Negotiation

AWARDS of 45,000 tons in the last week were widely distributed in a number of fair-sized projects, the largest of which were a loft building in New York requiring 5200 tons, a building in Pittsburgh of 5000 tons and a club in Chicago which took 4500 tons. Including 5000 tons for a section of the subway in New York, 4800 tons for 41 Mississippi River barges and 4000 tons for a department store in Oakland, Cal., inquiries amounted to 40,000 tons. Awards follow:

Boston & Maine Railroad, 1700 tons, 13 small bridges, to Phoenix Bridge Co.

Bridgeport, Conn., 800 tons, department store, to Shoemaker Bridge Co.

New York, 5200 tons, Lefcourt Building at Seventh Avenue and Twenty-sixth Street, to Levering & Garrigues Co.

New York, 4000 tons, State Office Building, to A. E. Norton, Inc.

New York, 2300 tons, loft building at 235-247 East Forty-fifth Street, to Hay Foundry & Iron Works.

New York, 1800 tons, Kent Automatic Parking Garage at 209 East Forty-third Street, to Post & McCord.

New York, 400 tons, section 6 of Tudor City, to Harris Structural Steel Co.

New York, 400 tons, transfer bridge in Bronx, to American Bridge Co.

Albany, N. Y., 700 tons, law school building, to McClintic-Marshall Co.

Burlington, N. J., 190 tons, pattern storage building, to American Bridge Co.

Philadelphia, 480 tons, column cores and plate girders for Blum store, to American Bridge Co.

Philadelphia, 700 tons, bridge for Pennsylvania Railroad, to Bethlehem Steel Co.

Reading Railroad, 150 tons, bridges, to Shoemaker Bridge Co.

Hopewell, Va., 100 tons, 150,000-gal. gas tank for Atmospheric Nitrogen Corporation, to Stacey Mfg. Co.

Charleston, S. C., 175 tons, work for Port Authority, to Virginia Bridge & Iron Co.

Birmingham, 100 tons, National Cast Iron Pipe Co. plant addition, to Virginia Bridge & Iron Co.

Birmingham, 150 tons, Strowd-Holcombe Cotton Mills addition, to Ingalls Iron Works Co.

Columbus, Ohio, 470 tons, 120 tons for chemistry building and 350 tons for power house for Ohio State University, to Massillon Bridge & Structural Co.

Youngstown, 500 tons, furnace bindings for Youngstown Sheet & Tube Co., to Pittsburgh Bridge & Iron Co.

Pittsburgh, 5000 tons, building for Pittsburgh Plate Glass Co., to McClintic-Marshall Co.

Pittsburgh, 1450 tons, municipal boulevard extension and viaduct, to McClintic-Marshall Co.

Buffalo, 150 tons, plant building for Wickwire-Spencer Steel Co., Inc., to Lackawanna Steel Construction Co.

Kenmore, N. Y., 550 tons, high school, to R. S. McMannus Steel Construction Co.

Detroit, 625 tons, transmission towers for Detroit Edison Co., to American Bridge Co.

Chicago, 250 tons, Women's Athletic Club building, to Mississippi Valley Structural Steel Co.

Chicago, 4500 tons, Steuben Club building, to Gage Structural Steel Co., local.

Missouri-Kansas-Texas Railroad, 500 tons, bridges, distributed among three fabricators.

Chicago, 3000 tons, office building at Michigan Avenue and South Water Street, to American Bridge Co.

Ottawa, Ill., 2500 tons, building for National Plate Glass Co., to unnamed bidder.

Granite City, Ill., 1200 tons, 2,000,000-cu. ft. gas holder for Illinois Power & Light Co., to Stacey Mfg. Co.

St. Louis, 200 tons, southern approach to municipal bridge across Mississippi River, to Mississippi Valley Structural Steel Co.

Tacoma, Wash., 1015 tons, plates, 32 and 48-in. pipe line for city, to Birchfield Boiler Works.

Seattle, Wash., 100 tons, crane girders for Pacific Coast Steel Co., to Wallace Bridge & Structural Steel Co.

Milton, Ore., 625 tons, plates, pipe line and penstock for city, to King Brothers Boiler Works.

Los Angeles, 1200 tons, plates, penstock for Southern California Edison Co.; 800 tons to Western Pipe & Steel Co. and 400 tons to Lacy Mfg. Co.

San Diego, 800 tons, power house for San Diego Consolidated Gas & Electric Co., to McClintic-Marshall Co.

Berkeley, Cal., 480 tons, addition to Heinz plant, to Judson-Pacific Co.

San Francisco, 150 tons, apartment building, Pacific and Laguna Streets, to Western Iron Works.

San Francisco, 160 tons, apartment building, Fell and Buchanan Streets, to Golden Gate Iron Works.

Santa Ana, 100 tons, water tank tower for city, to Llewellyn Iron Works.

Santa Ana, 275 tons plates, tank for city, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Vermont, 715 tons; highway bridges at Montpelier, Sharon, West Hartford, Richmond and Richmond Village.

Boston, 200 tons columns, Sears, Roebuck & Co. warehouse.

New York, 5000 tons, section of subway in Bronx; bids in.

New York, 2250 tons, anchorage and tower foundations for Hudson River Bridge; Arthur McMullen Co., low bidder on general contract.

Jamaica, N. Y., 500 tons, Church of the Immaculate Conception.

Orange, N. J., 250 tons, substation for Public Service Corporation.

Kingston, Pa., 500 tons, Memorial Hospital.

Washington, 600 tons, seaplane hangars for Government at various locations.

Great Bridge, Va., 200 tons, highway bridge for Virginia State Highway Department.

Laurel, Md., 1600 tons, grandstand for race track, bids in.

Cleveland, 1000 tons, Main Street lift bridge.

Bay City, Mich., 1600 tons, building for Chevrolet Motor Co.

Buffalo, 300 tons, three Erie County bridges.

State of New York, 600 tons, four bridges for State Highway Department.

Dayton, Ohio, 250 tons, Municipal Art Institute.

Dayton, Ohio, 200 tons, building for Young Women's Christian Association.

Memphis, Tenn., 4800 tons, 41 barges for Mississippi River Commission; American Bridge Co., low bidder.

Chicago, 500 tons, warehouse for Illinois Central Railroad.

Chicago & North Western Railroad, 6000 tons, bridges.

Detroit, 2500 tons, building for National Plate Glass Co.

Shreveport, La., 450 tons, viaduct; Wisconsin Bridge & Iron Co., low bidder.

Chicago, 200 tons, auditorium and natatorium in Holden Park.

Chicago, 220 tons, apartment building at 3216 North Sheridan Road.

Chicago, 360 tons, apartment building at 3270 North Sheridan Road.

Minneapolis, 1600 tons, Medical Arts Building.

Minneapolis, 1500 tons, auditorium for University of Minnesota.

Shawano, Wis., 675 tons, State highway bridge over Wolf River; Wausau Iron Works, Wausau, Wis., low bidder at $157,342.

Marinette, Wis., 350 tons, new interstate bridge; bids about March 20, Klug & Smith, Milwaukee, engineers.

Saukville, Wis., 150 tons, State highway span over Milwaukee River; bids about March 19.

Des Moines, Iowa, 700 tons, United States Court House.

St. Louis, 500 tons, Knights of Pythias building.

San Francisco, 3000 tons, Coyote Point bridge across San Francisco bay; bids being taken.

San Francisco, 225 tons, sheet piling, Esplanade seawall; Healy-Tibbets Construction Co., low bidder.

South San Francisco, 370 tons, plant for E. H. Edwards Wire Rope Co.; bids in.

Oakland, Cal., 4000 tons, Capwell's Department Store; bids in next week.

San Francisco, 100 tons, Weinstein Department Store addition; bids next week.

Sacramento, Cal., 225 tons, theater; bids being taken.

Kellogg, Ore., 280 tons, bridge over Umpqua River; bids March 8.

Ellensburg, Wash., 155 tons, Kittitas diversion dam; general contract to C. F. Graff, Seattle.

PERSONAL

William B. Updegraff, for 15 years engaged in engineering and sales work for the Watson-Stillman Co., 75 West Street, New York, manufacturer of hydraulic machinery, has been elected vice-president in charge of sales of that company. He is a graduate of Harvard University and a member of the Harvard Engineering Society and of the American Society of Mechanical Engineers.

William J. Chapin, formerly combustion engineer for the Peoples Gas Light & Coke Co., Chicago, and more recently engineer with the Eclipse Fuel Engineering Co., Rockford, Ill., has become identified with the Chicago Steel Foundry Co., Chicago, and will have charge of engineering and sales of Pyrasteel, a heat-resisting alloy manufactured by that company.

W. S. Carson, formerly in the Cleveland office of Joseph T. Ryerson & Son, Inc., has been placed in charge of a new district sales office opened by the Globe Steel Tubes Co., Milwaukee, at 1436 Engineers National Bank Building, Cleveland.

D. K. Swartwout, Sr., president Swartwout Co., Cleveland, accompanied by Mrs. Swartwout, sailed on March 3 for a vacation of several weeks in the West Indies.

Joseph B. Montgomery, Jr., who has been assistant to the president of the Berger Division, Central Alloy Steel Corporation, Canton, Ohio, has been elected vice-president and a director of the division. Other officers have been reelected.

Edward H. Ingram, recently associated with the Landis Tool Co., Waynesboro, Pa., has been appointed general superintendent and works manager of the Automatic Nut-Thread Corporation, 3617 North Eighth Street, Philadelphia, manufacturer of automatic nut tapping machines.

F. E. Burgess, secretary and assistant treasurer of the Burgess-Norton Mfg. Co., Geneva, Ill., manufacturer of screw machine products, sheet metal stampings, piston pins and automotive replacement parts, has been elected vice-president and assistant treasurer of the company. W. D. Smith, auditor, has been made secretary. C. M. Burgess, president and treasurer, has been reelected.

Norman W. Foy, in charge of sales at Boston for the Republic Iron & Steel Co., has been appointed district sales manager at Birmingham for that company. He succeeds E. M. Barnes, who has been made manager of pig iron sales, with headquarters at Birmingham. The company's Boston office will continue to function as a branch of the New York sales office, which is in charge of W. H. Oliver.

O. C. Hoffman, president United States Can Co., Norwood, Ohio, was elected a director of the Continental Can Co., New York, at a recent meeting of the latter company's stockholders. I. W. England, president Passaic Metal Ware Co., Passaic, N. J., was also elected a director of the Continental company, succeeding T. R. Morgan, resigned. At the same meeting stockholders approved the purchase of the entire outstanding stock of the Passaic company and of the Seattle-Astoria Iron Works, Seattle, Wash. Acquisition of the United States Can Co. by the Continental organization was consummated a few weeks ago.

John J. Malloy and Ludwig Saudenmeir, designers in the plant of the National Lamp Works, Cleveland, have received the Charles A. Coffin Foundation Awards for 1927. The award came to Mr. Malloy for the designing and building of a basing and soldering machine for miniature incandescent lamps, and to Mr. Saudenmeir for a new type of combination stem and inserting machine for lamps. The Charles A. Coffin Foundation was established in 1922 by the General Electric Co. as an expression of appreciation of Mr. Coffin's work for the company and the industry as a whole, and the awards are made yearly to men who contribute the most to the efficiency of the company or to the progress of the electrical industry.

J. I. Andrews, vice-president and general manager of sales for the American Sheet & Tin Plate Co., accompanied by Mrs. Andrews, sailed this week for an extended European tour. Fred M. Fuller, assistant general manager of sales, will be in charge of the department until Mr. Andrews returns about the middle of June.

George R. Bennett, formerly vice-president and general manager Edgar Allen Steel Co., Inc., New York, has joined the Braeburn Alloy Steel Corporation, Braeburn, Pa., as assistant district manager at the Chicago branch, 223 North Desplaines Street. A. J. Coursen has become associated with the Braeburn corporation as special representative with headquarters in Chicago. He was formerly assistant sales manager of the Edgar Allen company.

Merrill P. Wolfe, Praetorian Building, Dallas, Tex., has been appointed sales representative of the Pennsylvania Pump & Compressor Co., Easton, Pa., in the Dallas territory.

James Otis Handy, director of chemical and metallurgical investigators for the Pittsburgh Testing Laboratory, now has his office at 72 Washington Street, New York.

B. S. Livingston, vice-president Foreign Traders Co., 17 Battery Place, New York, will leave March 10 on the Columbus for a short business trip to Germany, Belgium and Denmark.

D. F. Geissinger has been appointed direct factory representative in western Pennsylvania, with headquarters at 602 Oliver Building, Pittsburgh, of the Metal Saw & Machine Co., Inc., Springfield, Mass.

Myron F. Westover, for 34 years secretary of the General Electric Co., Schenectady, N. Y., retired on March 1, and has been succeeded by William W. Trench, who has been assistant secretary. Mr. Westover has been actively identified with the electrical industry for 40 years, his first position having been secretary to the late Charles A. Coffin, at that time treasurer and manager of the Thomson-Houston Electric Co., now the West Lynn, Mass., plant of the General Electric Co. The new secretary, a member of the New York bar, is a graduate of St. Lawrence University, Canton, N. Y., and of the Brooklyn Law School, Brooklyn.

T. F. Scannell, formerly associated with the Chain-Belt Co., Milwaukee, has been appointed exclusive representative at St. Louis for the Magnetic Mfg. Co., Milwaukee, manufacturer of magnetic separation equipment. His office will be at 502 Ambassador Building.

W. R. Bean, vice-president Grindle Fuel Equipment Co., Harvey, Ill., will speak on the "Relation of Melting Furnace Operation to Cost and Quality of Malleable Castings" at a meeting of the Quad City Foundrymen's Association, to be held at the Davenport, Iowa, Chamber of Commerce on March 19.

E. D. Hill has established headquarters at 42 Church Street, New Haven, Conn., as representative of the Allis-Chalmers Mfg. Co., Milwaukee. Sales will be under the direction of A. F. Rolf, manager of the company's New York office.

William G. Clyde, president Carnegie Steel Co., Pittsburgh, is back at his desk after a six weeks' stay in California.

W. W. Nichols, vice-president and mechanical engineer of D. P. Brown & Co., 1440 Park Place, Detroit, has recently had conferred upon him membership in the Masaryk Academy of Work, of Prague, Czechoslovakia. Mr. Nichols previously had been admitted to membership in the Institute of Scientific Management, Warsaw, Poland.

H. B. Hirsh, president Belmont Iron Works, Philadelphia, has been appointed first vice-president of the American Institute of Steel Construction. He has been a director of the institute for a number of years. His term of office expires in the fall of 1928.

Gordon E. McNamee, for seven years Milwaukee representative for Briggs & Turivas, Chicago, has organized the G. E. McNamee Co., with offices at 425 East Water Street, Milwaukee, and will handle iron and steel scrap and other iron and steel products.

A. L. Roberts, formerly with the railroad sales department of the Central Alloy Steel Corporation, Massillon, Ohio, has joined the development and research department of the International Nickel Co., Inc., New York, and will devote his time to railroad development work.

Earl H. McCarty, for the past six years general sales manager of the Nash Motors Co., Kenosha, Wis., has been elected a vice-president of the company, continuing in general charge of merchandising.

C. E. MacQuigg, manager Union Carbide and Carbon Research Laboratories, Long Island City, N. Y., will address the New Haven chapter of the American Society for Steel Treating, Thursday evening, March 8, his subject being "Some Present Trends in Engineering Steels."

George H. Cleaver, for 21 years connected with the Oswego Tool Works, Oswego, N. Y., has resigned to become treasurer of the Dime Building and Loan Association in that city.

Isaac Black has been made vice-president and manager of the Russell & Erwin Division, American Hardware Corporation, New Britain, Conn., succeeding the late B. A. Hawley.

Malcolm Farmer, vice-president of the Stanley Works, Bridgeport, Conn., spoke recently before the Worcester Exchange Club, Worcester, Mass.

Robert W. Adams, formerly manager of sales at the Providence office of the General Electric Co., has been made manager of the public utility division in Northeastern United States with offices at 83 State Street, Boston.

Robert E. Clingan has been made assistant to Lester G. Sigourney, secretary and sales manager New Departure Mfg. Co., Bristol, Conn.

Phillip S. Graver, president of the Graver Corporation, East Chicago, Ind., manufacturer of steel tanks, has been elected a member of the South Park Board, Chicago, succeeding Bernard E. Sunny, chairman of the board of the Illinois Bell Telephone Co.

E. W. Kempton, educational director of the American Steel & Wire Co., gave an illustrated talk on steel manufacturing on Feb. 21, at a dinner meeting of the Western Michigan Purchasing Agents' Association at the Rowe Hotel, Grand Rapids, Mich.

William J. Lavelle has resigned as sales manager of the New England Coal & Coke Co. He had been associated with the company about 20 years. Robert P. Tibolt, who has been with the company eight years, succeeds Mr. Lavelle.

V. C. Voight, formerly in the Pittsburgh office of Briggs & Turivas, has joined the sales department of Erman, Howell & Co., McCormick Building, Chicago, dealers in iron and steel scrap.

E. M. Adams, first vice-president and general sales manager of the Inland Steel Co., Chicago, returned March 7 from a four weeks' pleasure trip in California and the Hawaiian Islands.

Wilbur C. Otis, for 13 years associated with the Otis Elevator Co. at Quincy, Ill., has been transferred to the efficiency engineering department of the company at Yonkers, N. Y., factory.

New High-Speed Steel Developed for Cutting Manganese Steel

A new high-speed steel, claimed to be capable of machining manganese steel, has been placed upon the market. For some time tests have been conducted by the Firth-Sterling Steel Co., McKeesport, Pa., on a new type of high-speed steel, which has been designated "Circle C." While the experiments on this steel were being conducted, it was discovered that the capacity of the steel was such that standard test bars were not of a sufficiently rigorous nature to measure this capacity. It was, therefore, decided to use manganese steel in the tests.

The test bars used in testing the new high-speed steel were 3-in. diameter, rolled manganese steel, containing about 12 per cent manganese and 1.20 per cent carbon. The cutting test is reported to have been unusual. Using a test bar that was supposedly unmachinable, the accustomed "break-down" process was not attempted. Instead, all effort was directed to prevent tool failure, according to the statement of one of the company's engineers. The object of the test was to demonstrate that manganese steel can be machined on a commercial scale. The operating conditions and the details of the tests are reported to have been as follows:

> The tests were carried on under circumstances that would obtain in almost any ordinary machine shop. The lathe used was a 24-in. back-geared, cone-pulley, belt-driven and gear-feed machine in fair condition. The lathe tools were forged from ⅞ x 1¼-in. Circle C steel. In form these tools were similar to those used on heavy duty work and in many cutting tests, with a front and side clearance of between 6 and 8 deg., a top back rake or clearance of 8 deg. and a top side rake or angle of 14 deg. The nose had a radius of 7/16-in. (half the width of the tool). Cutting edge was on the center line of the work.
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> During the progress of the tests, cutting speeds ranging from 7½ to 28 ft. per minute were tried. It was found that the range from 7½ to 15 ft. per minute gave the best results. When suitable cutting speeds were established, various depths of cuts and feeds were tried. Within the speed range mentioned above, the tools stood up satisfactorily on feeds ranging from 1/60 to 1/50 in., taking cuts from 1/16 to 5/32 in.
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> The chip formed was a very tight and compactly curled ribbon, in color deep dark blue or the brownish gunmetal peculiar to manganese steel. This chip was oily smooth on the under side and would break only when it became entangled. Five to 10 min. before the tool was ready to be taken out for regrinding, the chip would begin to straighten out into a long wavy ribbon which, under an electric light, would show a dull red color 3 or 4 in. from the cut.
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> At no time during the test were the tools allowed to fail completely. At the first sign of failure they were removed and reground to carry on with further tests. When this stage of failure was reached the cutting edge was slightly rounded, and at a small spot a concentrated erosion and discoloration was evident.
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> The great pressure against the cutting edge suggested that the work might push the tool away on fine cuts. To determine this point, the tool was set to take a cut 1/64 in. deep, which it would hold accurately and without difficulty across the entire length of the test bar, indicating that manganese steel can be machined to close size limits.

Concerning the heat treatment of this new high-speed steel, the statement is made that this does not differ radically in procedure from that of other high-speed steels, except that it requires a distinct increase in the heats used.

OBITUARY

Henry Phelps Howland, superintendent of blast furnaces for the Wisconsin Steel Co., South Chicago, whose death in Boston on Feb. 24 was mentioned in THE IRON AGE last week, was widely known among blast furnace and coke oven operators. He was born at Marion, Mass., April 23, 1878, and later removed to Springfield, Mo., where he was graduated from Drury College in 1898. After two years of railroad work in the Southwest he entered the University of Wisconsin, receiving his degree in mechanical engineering from that institution in 1903. He entered the steel industry at the South works of the Illinois Steel Co., and the following year was transferred to the Joliet works. In 1905 he returned to Chicago to become superintendent of the old Union works at Thirty-first Street and the Chicago River. Late in 1907 he was transferred to the South works as assistant superintendent of blast furnaces, but in 1909 he left the Illinois company to become head of the blast furnace department of the Wisconsin Steel Co. In 1915 and 1916 he established new records for coke consumption on No. 1 furnace at that plant, making iron on less than 1700 lb. of coke per ton, and in April, 1915, he established a record of 1588 lb. per ton of iron on the same furnace. He also established a new record for production on one lining. This record was made on No. 2 furnace between September, 1915, and May, 1922, when the stack produced 1,332,665 tons of iron and was in blast continuously during the period. Besides effecting economies in production and in coke consumption and playing a prominent part in the development of blast furnace construction, he contributed to the science such papers as a "Discussion of Modern Methods of Burning Blast Furnace Gas in Stoves and Boilers," read before the American Iron and Steel Institute in 1915, and "Calculations With Reference to the Use of Carbon in Modern American Blast Furnaces," read before the American Institute of Mining and Metallurgical Engineers in 1916. Mr. Howland was one of the founders and charter members of the Blast Furnace and Coke Association of the Chicago District, organized in 1916. He served as a director of this organization during 1916, 1919 and 1920, and as vice-president and president respectively during 1917 and 1918. In March, 1917, in collaboration with Walter Mathesius, he presented a discussion before this organization of "Hot Dry vs. Cold Wet Gas Cleaning."

H. P. HOWLAND

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Arthur W. Fox, vice-president and general manager Billings & Spencer Co., Hartford, Conn., died at the Hartford Hospital on March 1, following an illness of three months. He was 46 years of age and began his business career with the Johns-Pratt Co., Hartford. He was successively advanced to factory manager of the company, and, following the death of its president, E. B. Hatch, was made vice-president and general manager. When the company became a part of the Colt's Patent Fire Arms Mfg. Co. in 1922 he retained his position with the Johns-Pratt organization and was responsible for the transfer of the plant to a site adjoining the Colt factories. He went to the Billings & Spencer Co. in 1924 as vice-president and general manager to assist in the reorganization and development of the company.

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William W. Hanlon, general superintendent of the Granite City Steel Co., Granite City, Ill., died recently at his home in St. Louis, aged 70 years. He also was vice-president of the Granite City National Bank and president of the Western Fire Brick Co., Granite City. He entered the steel business at Pittsburgh, and in 1895 moved to Granite City, where he became assistant superintendent of the National Enameling & Stamping Co., later the Granite City Steel Co. Two years later he became general superintendent.

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Frank A. Tyler, for the past 10 years president and treasurer of the J. C. Metcalf Machinery Co., Inc., Boston, died at his home in Lynn, Mass., Feb. 28, aged 59 years.

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John Bogenberger, a former president of the Consolidated Sheet Metal Works, Milwaukee, died suddenly on Feb. 25, aged 60 years. He was widely known for his development of hollow metal window frames and other fireproofing products for industrial and commercial buildings. In recent years he had been associated with the Biersach & Niedermeyer Co., Milwaukee, and was a past president of the Wisconsin Sheet Metal Contractors' Association.

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Orlando J. Root, in recent years associated with the Standard Calorimeter Co., East Moline, Ill., and a pioneer in the automotive industry of this country, died suddenly on Feb. 16 at his home at Moline, Ill. He was born at West Bay City, Mich., in 1869 and was graduated in mechanical engineering from the Michigan State Agricultural College, Lansing. He then became associated with William G. Vandervoort in the manufacture of gas engines at Champaign, Ill. Later the plant was removed to Moline, where automotive manufacture was begun. During the war the factory was expanded for the manufacture of ammunition, but operations were suspended some years ago.

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George W. Hite, for nine years in the roll sales department of the Pittsburgh Iron & Steel Foundries Co., Pittsburgh, prior to its absorption by the Mackintosh-Hemphill Co., died suddenly at Atlantic City, N. J., March 3. He had lived in that city in recent years on account of his health.

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Frank I. Hoover, assistant general sales manager Central Iron & Steel Co., Harrisburg, Pa., died of pneumonia, March 3, at his home in Harrisburg.

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Newton S. Calhoun, president Johnston & Jennings Co., Cleveland, died at Pasadena, Cal., on March 3, aged 73 years. He was born in Connecticut, was graduated from Brown University, Providence, in 1879, and had lived in Cleveland since 1882. A son, Tracy Jennings Calhoun, is vice-president of the Johnston & Jennings Co.

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William H. Taylor, president Goodwin Car & Mfg. Co., 17 Battery place, New York, died on Feb. 29 at his home in that city, aged 68 years. He had also been prominently identified with a number of coal companies in eastern Pennsylvania.

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Ernst Boley, assistant to the vice-president in charge of operations of the American Steel & Wire Co., Cleveland, and for years prominently identified with the operating department of that company, died suddenly Feb. 20, aged 66 years. He had been connected with the company since 1884. He was born in Germany and after going to Cleveland was employed in the H. P. nail works of the American Steel & Wire Co., of which his uncle, Michael Baackes, was superintendent. Later he became superintendent of the H. P. works. He then became assistant to the general superintendent of all the American Steel & Wire Co. plants. Later he was made assistant to the vice-president, holding that position until his death. A son, Ernest W., is connected with George W. Prentiss & Co., Holyoke, Mass., wire manufacturers, and another, Herman V., is president of an importing company in Buenos Aires, Argentina.

AIRCRAFT CONSTRUCTION STEEL

Steels and Special Alloys Used to a Greater Extent Than in Any Other Class of Machinery

DATA assembled in the table below are taken from a paper by Edward A. Richardson of Bethlehem, Pa., read before the recent New York meeting of the American Institute of Mining and Metallurgical Engineers. The author states that research to develop metals and methods for aircraft production is warranted, because it has frequently developed light construction later used in many other industries, and to an extent greatly in excess of anything that might be expected of aeronautics for many years to come.

"It is obvious that materials meeting the specialized demands of such light and strong structures as aircraft would, if sufficiently cheap in the fabricated condition, greatly modify methods in many fields. It is not inconceivable that all-metal house construction, for instance, might be rendered economically, esthetically and comfortably desirable if we could provide a 'board' of light metal, insulated and sound-proofed, resistant to corrosion, designed for ease of attachment to a metal frame and for ease of cutting (by special equipment, if necessary), and capable of architectural treatment."

Common Practice in Aircraft Manufacture

Part	Detail	Material
Wings	Beams	Wood
	Drag trussing	Stream-line wires
	Drag struts	Wood
	Leading edge	Thin sheet duralumin
	Fittings	S.A.E. 1020 sheets (a)
Tails	Frame	Drawn steel tubing (S.A.E. 1010 or 1020) bent and welded
	Ribs	Thin sheet steel, flanged
Fuselage	Frame	Steel tubing, S.A.E. 1010, 1020, or alloy (b)
	Engine cover	Aluminum sheet
	Rear cover	Fabric
	Formers	Wood
Interplane	Struts	Steel or duralumin tubing
	Wires	Streamline; special alloy, possibly S.A.E. 2330 or 3330
Landing gear	Axle tube	S.A.E. 2340 or 3140, at least 200,000 lb. ultimate.
	Struts	Steel tubing, S.A.E. 1020 or alloy (b)
	Disk wheels	Duralumin
Parts for surface control	Low strength	S.A.E. 1025 sheets
	Medium strength	S.A.E. 2330 bars
	High strength	S.A.E. 3315 and 6130 bars
	Elevator tubes	Rarely alloy
	Bolts	S.A.E. 2330
	Gasoline tanks	Welded aluminum sheet

(a) Cut, bent to shape, reinforcements welded on, dip-brazed, normalized, cleaned, electro-galvanized, and enamel baked on.

(b) Carbon, 0.25 to 0.35 per cent; chromium, 0.80 to 1.10 per cent; manganese, 0.40 to 0.60 per cent, molybdenum, 0.15 to 0.25 per cent. Used without heat treatment. Material is air-hardening, so butt-welded joints develop 84 per cent efficiency.

Canadian Rail Mill Practice

During the discussions held by the American Society for Steel Treating at Montreal, Que., during February, W. R. Werther, Algoma Steel Corporation, Sault Ste. Marie, Ont., said that it is necessary for his company to give extreme care to the open-hearth practice to avoid "off" heats, because its mills are not equipped to roll softer or harder steel into marketable shapes. The result is an unusual uniformity in chemical analysis.

Canadian railroads are following the practice originated by the Canadian Pacific Railway of rejecting *all* A rails. When, in addition to the normal crop, enough additional is taken to make a full-length rail, the discard becomes as great a percentage as is required for high-grade forging billets. To avoid the extra premium which such steel demands, the roads accept the steel which would ordinarily be put into the top rail after it has been rolled into tie plates.

Even after this excessive discard, the stub end cut from the top rail is tested under the drop. If it shows no evidence of seaminess, fissures or segregation, all the rails in that ingot are accepted. If it does, the top rail (which would be the B rail in American practice) is discarded, and its lower end is used for another drop test. If this passes, the rest of the rails are accepted; otherwise the process is continued until a satisfactory test is found.

In this way every ingot is given an individual fracture test, and only the rails from that ingot are accepted on the basis of that test. This is contrasted with the American plan of testing a few rails from each heat selected at random by the inspector.

Transverse fissures have been reduced by the practice of rolling only from reheated blooms, rather than direct from the hot ingot. In general, the problem to be met when making heavy-section rails is to produce a section free from sizable internal stresses or differences in composition, and possessing a fine-grained, uniform structure which resists wear and yet retains maximum toughness.

Refractory Problems of Electric Steel Foundries

The joint committee on foundry refractories has been active in several different ways recently. At present the subcommittee on survey for the electric steel castings industry is hard at work on the refractory problems of the electric castings foundries. This subcommittee is planning to circulate a questionnaire to all electric steel foundries to obtain additional information to aid them in their studies. They hope that the response to this will be generous. The committee is composed of the following members: Lee Everett, chairman, Illinois Clay Products Co.; J. M. Geopferd, Racine Steel Castings Co.; W. Harvey Payne, Pittsburgh Electric Furnace Co.; P. C. Leonard, General Refractories Co.; Samuel Arnold, Heroult Electric Furnace Co.; H. L. Smalley, Harbison-Walker Co.; A. C. Gierach, American Manganese Steel Co., and F. W. Brooke, William Swindell Brothers.

Paying Employees by Check for Safety

Advantages and disadvantages of check payment of employee wages are outlined in a pamphlet recently issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York. The pamphlet is based upon the experience of 50 companies which have lately adopted check payment. Only one of these firms has returned to the cash payroll system. In nearly every case the safety factor has been uppermost in prompting the adoption of check payment. The danger of the cash plan is evidenced by the fact that in a recent six months' period, according to the American Bankers' Association, there were 205 payroll robberies resulting in the loss of $1,850,000, the wounding of 40 employees and the death of 20.

The United States Steel Corporation, one of the companies which contributed to the survey, has recommended to its subsidiary companies that employees be paid by check. A few companies find check payment not practical, either because cash is preferred by their employees or because there are no banking facilities in the towns where the plants are situated. In such cases payment by check would be expensive and troublesome. Among the important reasons why the Steel Corporation prefers its subsidiaries to pay by check are the following: It reduces hazard to employees while protecting cash; eliminates temptation for theft; eliminates disputes as to amounts received by employees; reduces force and equipment which would be necessary if employees were paid by cash; saves time by making it possible to pay employees at their posts; is more economical, and encourages thrift.

Locomotive Shipments Still Low

WASHINGTON, March 6.—Railroad locomotives to the number of 59 were shipped in February, comparing with 47 in January, according to the Department of Commerce, and unfilled orders at the end of each month were 204 and 222 respectively. With two exceptions, the February shipments were the lowest in more than a year. In February, 1927, the total was 80 locomotives, and 163 were shipped in February, 1926.

Metallic Flow During Rolling

(*Continued from page* 667)

Conditions shown in Fig. 4c and 4d may be combined to yield the highly complicated condition shown in Fig. 4e. As the crystal rolls out, both twinning and slip undoubtedly occur, the former offering a rational plan for the shift in the crystalline orientation experimentally observed, and the latter providing for most of the plastic thinning of the crystal.

Postulates Advanced by Professor Mathewson

Such a brief account of the principal points in the lecture can do little more than glimpse the experimenation and deductions underlying the following postulates, a series of provisional conclusions, "which may at least stir up an amount of useful discussion":

1. When in the inhomogeneous deformation of a metal by slip combined with distortion, the atoms in certain zones reach positions more nearly approximating equilibrium positions in a possible twin than in the original crystal, twin lamellae will be formed with partial relief of stress and the residual distortion will be distributed in harmony with the geometrical requirements of each special case.
2. By far the great majority of the metals are subject to structural alteration of this character.
3. Under slowly applied loads there is a minimum occurrence of the continuous distortion from plane to plane required to initiate twining, owing to the tendency toward premature slip along "weak" planes of variable spacing depending upon the concentration of impurities or the operation of other factors which may affect the cohesion between planes.
4. Under impact loading a given small displacement is momentarily distributed among many planes, and favors the formation of sizable twin bands.
5. The distortion around simple twin bands wholly inclosed within the original crystal may be confined to the ends as distinguished from the parallel sides bounded by twinning planes and this brings about end growth on annealing which may spread along the sides. In other cases distortion may exist at the composition planes and bring about direct lateral growth.
6. Both the quantity and the size of deformational twins are greatly affected by the kinds of deformation and the purity of the metal.
7. Distortion and thermal instability are especially pronounced in the vicinity of faults or direct intersections where twin bands enter into conflict with one another.
8. One form of recrystallization is essentially granulation produced by irregular and competitive growth of interstratified twin lamellae (which may be termed "crystallographic fragments" in that they cannot be fitted together without distortion in spite of their crystallographic relationship through the parent crystal).
9. Recrystallization in the absence of twinning is a similar reaction between lamellae (fragments) formed by inhomogeneous distortion during slip, e.g., variable rotation of the slip planes. This leads to less pronounced changes in orientation from grain to grain than is effected by twinning.
10. In conformity with the conception of recrystallization expressed in (8) and (9), diversity of orientation after a succession of deformational and annealing treatments is due to multiple internal twinning, rotation during slip, or some combination of these two causes depending upon the nature of the metal, the initial orientation of the crystals and the kind of deformation.

Allis-Chalmers Mfg. Co. Buys Monarch Tractor Corporation

The Allis-Chalmers Mfg. Co., Milwaukee, has purchased the entire capital stock of the Monarch Tractor Corporation, Springfield, Ill., and will operate the plant as a subsidiary without immediate changes in personnel. Manufacturing, engineering, purchasing, accounting and sales activities will be coordinated with the Allis-Chalmers organization and arrangements are being made to install additional machinery and equipment to increase the range of production at Springfield.

The Monarch plant consists of assembly and machine shops of modern construction with approximately 75,000 sq. ft. of floor space, and a six-acre tract of land provides for further expansion. The corporation was formed in January, 1926, to succeed the Monarch Tractor Co., with plant at Watertown, Wis. The plant was moved to Springfield and operation begun in May, 1926.

Baldwin Locomotive Works Site in Philadelphia to Be Sold

The Baldwin Locomotive Works, which has gradually been moving its manufacturing facilities from its Philadelphia plant at Broad and Spring Garden Streets, that city, to the new plant at Eddystone, Pa., will have completely vacated the Philadelphia plant by July 1, it is announced, and the property will be offered for sale. Samuel M. Vauclain, president, said that there are no negotiations under way at present for its sale, but in the past year or so there have been various reports as to the use which would ultimately be made of the property, which is centrally located, one being that a group of railroads would use it as a site for a union station. At a meeting of the Baldwin stockholders on March 1 all of the directors were re-elected.

Ottawa Silica Co., Ottawa, Ill., has acquired the plant and property of the United States Silica Co., also at Ottawa. The plant of the United States company will be operated and all trade names of established brands of products will be used. General offices of the new company will be at Ottawa, Ill.

New McWane Cast Iron Pipe Plant Increases Operations

BIRMINGHAM, March 3.—The new 16-ft. pipe unit of the McWane Cast Iron Pipe Co., Birmingham, which began operations Jan. 1, has been pronounced so successful that the plant goes on double-shift early this month. This is in accordance with schedules fixed some time ago when the company announced that the manufacture of sand cast pipe by its new process would be put on a mechanical basis. The originators of this new method of making pipe claim that it promises to be of far-reaching importance.

The McWane mechanical method is said to be both revolutionary and evolutionary. It is termed an adaptation of up-to-date foundry processes and principles to the manufacture of pipe in green sand and follows the plan upon which the foundries of large automobile manufacturers operate.

The McWane method of manufacture differs from the old methods in that heretofore pipe has been cast vertically in pits, the molds and cores being dried before the iron is poured. By the use of a patented device for holding the cores central in the mold, the pipes are cast by this new method while the molds are in a horizontal position without the necessity of drying either the molds or the cores.

A distinct feature is that the operation is continuous. In ordinary foundry practice a certain number of molds is prepared and the iron is subsequently poured into them, which constitutes a day's work.

Another unusual feature is the flexibility of the plant under the process. Instead of a number of sizes of pipe being made each day and the capacity of a given size being limited to the amount of equipment available, the entire unit runs on a given size, as in a rolling mill, until the orders for that size are completed, when the equipment may quickly be changed to make another size. In this way the plant makes what the market demands, rather than having to sell what the plant makes.

Shipments of fire-extinguishing equipment in January included 53 pumping engines and 18 other automobile-type units, compared with 80 and 34 in December, and with 70 and 23 in January, 1927.

British Produce More Foundry Iron

Hematite Make Is Curtailed—Restriction of Tin Plate Output Still Effective—Japan Places Tin Plate With Welsh Mills

(*By Cable*)

LONDON, ENGLAND, March 5.

DEMAND for Cleveland pig iron has improved and makers are well booked both for prompt and forward delivery. Consequently output is to be increased by Bolckow, Vaughan & Co., blowing in an additional furnace.

Hematite is dull and makers have agreed to combat competition by regulating production, which has consequently been curtailed by Pease & Partners blowing out one Normanby furnace and Gjers, Mills & Co. blowing out their remaining two Ayresome furnaces and closing down entirely, dismissing 360 men. Foreign ore is firmer as a result of the Swedish strike, but buyers are not seeking to make new contracts.

Finished iron and steel is generally quiet for export and plate mills are still in need of tonnage. Domestic business is unimproved by the recent increase in rebates.

Tin plate inquiry is moderately active, but business is restricted as buyers are hoping makers will accept the schedule price. Sellers are firm at 18s. ($4.39) per base box, although some business has been done at less. Output is to be restricted by closing the mills for three weeks during a period of 13 weeks beginning March 5.

Galvanized sheets are moderately active in small lots and works are sold out for March in the heavy gages. Black sheets continue quiet.

The Clyde shipbuilding output in February was 16 vessels totaling 61,751 tons. This brings the total for January and February to 117,762 tons.

The Continental market is firm, but British consumers are purchasing no more than is necessary to cover immediate requirements.

EUROPEAN CARTELS WEAK

Division of Markets Has Failed—Overproduction Greater—Rails Only Price-Controlled Product

(*Special Correspondence*)

HAMBURG, GERMANY, Feb. 25.—There is a great deal of discussion among producers and consumers of iron and steel as to the future of the cartel system. There seems to be considerable misinformation and not a little misunderstanding of the entire cartel structure. If the existing cartels are to be judged by their actual success, they are far from satisfactory. Recently, at a meeting of shareholders of a German steel corporation, the statement was made that existence of cartels had not added a single ton to the production or exports of Germany or other European countries.

Today, the only cartels and syndicates of importance are the International Steel Cartel, which includes all European producers except Great Britain, Italy and Poland; the Wire Rod Cartel, which includes Germany, France, Belgium and Luxemburg; the International Tube Cartel, which consists of three groups of members, one including France, Belgium, Luxemburg and the Saar, another including Germany and Holland and a third for Poland and Czechoslovakia. The European Rail Makers' Association (E. R. M. A.), of which all European producing countries except Italy and Poland are members, attempts to maintain a minimum base price for rails and to a certain extent has been successful. Most other cartels have little or no influence. The wire, wood screw and wire netting cartels have failed to function and the enamelware association has no influence in its field.

The European Rail Makers' Association, which is one of the most successful of the international syndicates, not only seeks to maintain prices among its members, but a year ago devised a plan for the division of markets to reduce the severity of competition. Under this plan, the markets in British possessions are retained by British mills, those in French colonies are set aside for French producers, and Germany has cer-

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.	to £0 18¼s.	$4.39	to	$4.45
Bilbao Rubio ore*..	1 1¾		5.30		
Cleveland No. 1 fdy.	3 7½		16.44		
Cleveland No. 3 fdy.	3 5		15.83		
Cleveland No. 4 fdy.	3 4		15.59		
Cleveland No. 4 forge	3 3½		15.46		
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to	18.39
East Coast mixed...	3 9	to 3 10	16.80	to	17.05
East Coast hematite	3 9½	to 3 10½	16.93	to	17.17
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to	38.96
Billets	6 0	to 6 10	29.22	to	31.66
Ferromanganese ...	13 10		65.75		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to	28.01
Tin plate, base box.	0 17¾	to 0 18¼	4.33	to	4.45
Black sheets, Japanese specifications	13 5	to 13 10	64.53	to	65.75
			C. per Lb.		
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	9 2½	to 9 12½	1.98	to	2.09
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to	1.69
Steel hoops	10 10	to 11 0	2.28	to	2.39
Black sheets, 24 gage	10 0	to 10 5	2.17	to	2.23
Galv. sheets, 24 gage	13 7½	to 13 10	2.91	to	2.94
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

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*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)					
Belgium	£3 4s.	to £3 5s.	$15.58	to	$15.83
France	3 4	to 3 5	15.58	to	15.83
Luxemburg	3 4	to 3 5	15.58	to	15.83
Basic pig iron (nom.):					
Belgium	3 0	to 3 1	14.61	to	14.85
France	3 0	to 3 1	14.61	to	14.85
Luxemburg	3 0	to 3 1	14.61	to	14.85
Coke	0 18		4.39		
Billets:					
Belgium	4 13½		22.77		
France	4 13½		22.77		
Merchant bars:			C. per Lb.		
Belgium	5 7		1.18		
France	5 7		1.18		
Luxemburg	5 7		1.18		
Joists (beams):					
Belgium	4 17		1.07		
France	4 17		1.07		
Luxemburg	4 17		1.07		
Angles:					
Belgium	5 5		1.16		
⅛-in. plate:					
Belgium (a)	6 12½		1.46		
Germany (a)	6 12½		1.46		
$\frac{3}{16}$-in. ship plates:					
Belgium	6 7½		1.40		
Luxemburg	6 7½		1.40		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

tain priority rights in some European and Latin American markets. The Far East was to be allocated to all members on a tonnage basis. This plan of dividing world markets has proved unsuccessful and is understood to have been practically abandoned.

The purpose of all these international syndicates is to maintain prices, eliminate disastrous competition, avoid overproduction and to dispose of surplus output in foreign markets. After long negotiation Poland finally entered the tube cartel, but at the end of last year tube prices were lower than at the end of 1926. Under the regulations of the cartel, France and the Saar may not do business with Scandinavian countries, Germany, Spain or Portugal. Actually, merchants in London, Antwerp or Hamburg can buy as much as they wish from these countries and ship to any foreign markets. The International Steel Cartel has had no influence on prices, and European production of steel last year, instead of being reduced, was far in excess of 1926. Nor has the International cartel reduced competition between member countries. More steel was imported by Germany from France and Belgium in 1927 than in previous years.

While the cartels do not yet exercise much influence on business, it is believed in many quarters that they promise much for the future. If central sales offices are established—and there is a movement in that direction that may meet with success—there will be better distribution of orders and more rigid control of prices and output. Anything like complete success in central selling, however, is not regarded as at all probable.

Japan Buys Tin Plate from Welsh Mills

NEW YORK, March 6.—The total quarterly requirements of the Nippon Oil Co., Tokio, Japan, about 64,000 base boxes of oil can tin plate, has been placed with Welsh mills. It was first offered to American mills at the Welsh price, but was refused. This is the second successive order awarded to Britain by the Nippon Oil Co., which usually purchases a large part of its requirements from American mills. It is claimed by the purchasers that British tin plate has recently been improved in quality so that the American product is not worth a large premium over that of the Welsh mills.

The light-gage black sheet market is quiet, with Japanese merchants buying small lots from British sellers who continue to quote £14 18s. ($72.57) per ton, c.i.f. Japanese port. Mills in the United States are quoting $77 per ton, c.i.f. Japan, but buyers believe that this might be shaded slightly on a sizable tonnage.

Some inquiry for rails is appearing from Japanese railroads. The city of Tokio is in the market for about 4 miles of grooved and girder rails, and the Hanshin Electric Railroad, Osaka, will open bids shortly on about 1100 tons of high T-rails.

Disappointment Over Course of Coal Probe

PITTSBURGH, March 2.—Those who had expected that the Senatorial investigation of the soft coal industry in Pennsylvania, West Virginia and Ohio would be a thorough-going examination of the situation, and that all phases of the dispute between operators and the miners' union would be looked into, are disappointed over the course of the probe, which got under way here recently.

The committee has found that there has been suffering, misery and want among union miners and their families as a result of the idleness of the bread-winners, and it has been brought out that one or two coal companies, after signing the union wage scale agreement in Jacksonville in February, 1924, subsequently broke it, but so far nothing has been introduced as to the fundamental causes for the rupture, nor has anything been said that establishes the responsibility for the conditions under which miners and their families have been found to live.

EXPECT MORE JAPANESE BUYING

Merchants Stocks Smaller—Consumers Buying Tin Plate Seconds from Government Steel Works

Total Japanese imports of iron and steel in 1927 were about 715,000 tons, or nearly 30 per cent less than in 1926, says the monthly report of market conditions issued by A. Cameron & Co., Ltd., Kobe, Japan. The Yawata works' low prices and the increased domestic production, in addition to the trade depression, are responsible for the decline. There has also been a considerable falling off in stocks held by merchants. A conservative estimate would place stocks at 30 per cent lower than 12 months ago. So it is reasonable to expect resumption of imports of foreign material before very long, for the Japanese manufacturers cannot supply the entire normal consumption.

The recent decline in the prices of raw cotton has hit the Japanese spinning companies severely. The purchasing power of the nation has declined considerably because of the recent financial panic. A plan to stabilize raw silk prices is working better, and the price of raw silk has advanced slightly due to lower stocks. No spectacular advance is expected, however, in view of the improvement in the manufacture of artificial silk.

Business conditions in China remain chaotic. A revival of trade in China would aid Japanese business materially, and, in turn, an improvement in Japanese conditions would result in heavier imports.

Light-gage black sheets registered a considerable decline in prices in January. It had been expected that the Government would further increase the duty and, in anticipation of this advance, prices became firmer and there was some speculation. When the cabinet was dissolved and there was no further prospect of passage of the tariff bill before next fall, the price situation weakened. In addition, stocks at the Kawasaki Dockyard Co. are being liquidated at reduced prices.

The tin plate market has not been particularly active. There is a growing demand from consumers for tin plate seconds and wasters because of the lower price and the smaller duty. The recent heavy stocks of British 170-lb. boxes of tin plate have been considerably reduced, but there has been no fresh buying, as the Government works at Yawata is selling tin plate seconds of a quality equal to British seconds at a price 2s. 6d. (61c.) per box lower.

Effect of Variables in Foundry Practice

"The most difficult problem of the foundryman can be summed up in the word 'variable,'" said J. Ramsey Speer, president Mackintosh-Hemphill Co., Pittsburgh, before the February meeting of the Pittsburgh Foundrymen's Association. "Taking foundry practice in general, it is hard to conceive of any business where the variables which enter into the daily practice have more to do with success or failure than in the foundry business. Of course, every industry, where metallurgy plays a prominent part, is affected by a great many variables, but somehow or other it seems that the extent of these variables is greater in jobbing foundry practice than in almost any other line.

"There are three things among these 'variables' which stand out as dominating the situation to a greater extent than anything else—gating, heading, venting. Give us the man," said Mr. Speer, "who can gate his castings intelligently; who, when he sees a pattern, knows from his experience and intuition where and how it should be gated; couple this knowledge with the correct conception of how the casting should be headed to insure its being sound in every particular, and add to this the ability to diagnose the problem of venting the casting properly; give us such a man, I say, and he will add several per cent to the yields which we can expect and depend upon. With such yields, the foundryman's problem is more than half solved."

Machinery Exports Less in January

Seven-Month Total 13 Per Cent Ahead of Last Year—Imports Less Than Year Ago

EXPORTS of machinery of all kinds in January were valued at $36,183,571, against $38,169,898 in December, according to figures prepared in the Department of Commerce. For the seven months ended with January they were valued at $260,552,482, compared with $229,527,021 for the corresponding period of the previous year. In January, 1927, exports were valued at $33,447,732.

Imports of all machinery and vehicles in January were valued at $1,744,604, against $2,163,001 in January, 1927, and for the six months ended December, 1927 and 1926, they were valued at $12,185,838 and $12,683,740, respectively. Imports of machinery listed in THE IRON AGE table were valued in January at $1,157,964.

Exports of industrial machinery as classified by the division of statistics, Department of Commerce, were valued at $16,202,582 in January, against $17,206,531 in December. For the six months ended December, 1927 and 1926, they were valued at $101,334,260 and $91,968,259, respectively. Exports of "other industrial machinery" in January were valued at $5,729,391, against $5,224,582 in January, 1927, and for the six-month period ended December, 1927 and 1926, they were valued at $35,932,752 and $29,431,743, respectively.

Power-driven metal-working machinery to the value of $2,089,802 was exported in January, against $1,494,127 in January, 1927. For the six months ended December, 1927, the value was $11,599,377, compared with $7,336,956 during the six months ended December, 1926. Machine tools exported in January, 1928, totaled 686, valued at $1,315,771, against 623, valued at $1,215,992, in December.

Industrial, office and printing machinery imported in January were valued at $1,074,638, against $1,432,842 in January, 1927. For the six months ended December, 1927 and 1926, the values were $7,393,794 and $8,378,896, respectively.

Decline in Immigration

WASHINGTON, March 3.—Immigrant aliens admitted to the United States in December, 1927, totaled 22,350, the lowest number since February, 1927, with a total of 21,695. Departing emigrant aliens in December numbered 9085. During the six months ended Dec. 31 of last year 164,665 immigrant aliens were admitted, as against 159,220 for the first six months and 175,955 during the last half of 1926. Of the December admissions of aliens, 11,933 were quota immigrants, 11,753 coming from Europe, which during the last six months of last year provided 75,394 of the 76,852 quota immigrants. Iron and steel workers admitted in December totaled only 98, while for the six months period the number was 926.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Locomotives	$126	$1,133	$1,512	$3,580
Other steam engines	70	285	657	1,133
Boilers	75	271	835	1,212
Accessories and parts	47	33	456	330
Automobile engines	745	678	4,501	4,965
Other internal combustion engines	631	585	4,183	5,459
Accessories and parts	256	345	1,482	2,367
Electric locomotives	373	17	1,163	1,102
Excavating machinery	537	325	3,725	2,396
Concrete mixers	71	111	589	463
Road making machinery	183	133	1,165	821
Elevators and elevator machinery	366	342	2,770	2,978
Mining and quarrying machinery	1,046	1,136	7,443	7,798
Oil well machinery	985	1,978	7,875	10,247
Pumps	432	592	4,800	3,631
Bending and power presses	126	106	982	928
Machine tools*	1,281	812	7,837	4,384
Forging machinery	90	106	723	589
Rolling machines	58	70	310	156
Other metal-working machinery and parts	449	352	3,180	2,624
Textile machinery	2,191	2,003	14,538	12,392
Sewing machines	668	773	4,957	5,099
Shoe machinery	169	99	842	772
Flour-mill and gristmill machinery	37	47	428	414
Sugar-mill machinery	182	165	4,677	2,835
Paper and pulp mill machinery	296	586	1,875	2,059
Sawmill machinery	67	79	478	489
Other woodworking machinery	212	113	1,029	667
Refrigerating and ice-making machinery	520	514	3,430	3,105
Air compressors	355	325	3,251	2,488
Typewriters	1,956	1,651	12,031	9,823
Power laundry machinery	59	80	744	503
Typesetting machines	462	324	3,051	2,232
Printing presses	397	471	3,625	3,205
Agricultural machinery and implements	7,855	4,631	56,353	42.102
All other machinery and parts	12,812	12,177	93,052	84,181
Total	$36,184	$33,448	$260,552	$229,527

*Principal details are shown in another table.

Exports of Power-Driven Metal-Working Machinery

	January, 1928		December, 1927	
	No.	Value	No.	Value
Engine lathes	66	$157,399	79	$187,362
Turret lathes	26	82,136	31	89,766
Other lathes	57	155,744	39	56,443
Vertical boring mills and chucking machines	7	30,978	26	73,582
Thread-cutting and automatic screw machines	74	88,723	47	42,483
Knee and column type milling machines	30	69,761	32	76,947
Other milling machines	81	147,290	75	223,241
Gear-cutting machines	31	91,452	38	105,639
Vertical drilling machines	42	44,430	34	24,551
Radial drilling machines	18	31,519	10	27,129
Other drilling machines	42	76,167	36	25,704
Planers and shapers	40	62,459	44	57,808
External cylindrical grinding machines	77	166,151	67	148,073
Internal grinding machines	46	76,359	31	51,379
Metal-working tool-sharpening machines	49	35,203	34	25,885
Total	686	$1,315,771	623	$1,215,992

Imports of Machinery into the United States

(By Value)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Metal-working machine tools	$56,628	$33,570	$233,392	$302,923
Agricultural machinery and implements	402,515	336,044	2,245,799	2,049,756
Electrical machinery and apparatus	58,016	75,862	881,730	469,273
Other machinery	470,409	850,727	3,802,454	5,226,997
Vehicles, except agricultural	170,396	151,603	1,637,391	1,336,592
Total	$1,157,964	$1,447,806	$8,800,766	$9,385,541

Much Higher Tonnage of Iron Ore Imports

January imports of iron ore into the United States are reported by the Department of Commerce at 251,178 gross tons. This represents a gain of more than 90 per cent over the low tonnage that came in in December. It is, however, only moderately above the average month of 1927 and is 15 per cent below the imports in January of that year, at 295,480 tons. For the seven elapsed months of the fiscal year, the incoming movement has been 1,591,139 tons, which is within about 1 per cent of the slightly larger imports of the corresponding period of the preceding year.

Chile maintains a lead in incoming tonnage, having furnished 60 per cent of the total in January, compared with less than 39 per cent a year earlier. French Africa has taken second place, having advanced far ahead of Cuba, which was in second place a year ago. Details are shown in the table.

Sources of American Imports of Iron Ore
(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Canada	2,358	338	23,258	12,475
Cuba	14,000	42,000	163,113	322,500
Chile	150,800	110,300	832,100	787,700
Spain	....	....	23,246	13,393
Sweden	....	22,973	148,330	61,657
French Africa	63,675	29,900	289,714	182,439
Other countries	20,345	89,969	111,378	228,817
Total	251,178	295,480	1,591,139	1,608,981

German Iron Ore Imports Principally Swedish

HAMBURG, GERMANY, Feb. 11.—The change in sources of German iron ore supplies since the war is shown in the recently published import totals for 1927. While iron ore imports in the years 1910 to 1913 averaged 5,390,000 tons a year, 17,400,000 tons of iron ore was brought into Germany in 1927, compared with 9,550,000 tons in 1926. Of the 1927 total, Sweden supplied 8,620,000 tons, Spain 3,100,000 tons and France 2,900,000 tons.

German steel works are seeking to obtain their ore supplies from mines owned by them in foreign fields. The large Swedish mine, Aktiebolaget Nya Noragruffoorna, has been purchased by a combination of Krupp, Hoesch and Gutehoffnungshütte interests.

Molybdenum Output Increased in 1927—Price Reduced

Three companies produced molybdenum ore in the United States during 1927: the Climax Molybdenum Co., at Climax, Colo.; the Molybdenum Corporation of America at Sulphur Gulch, near Questa, N. M.; and the Santo Niño Mining Co. at Helvetia, Ariz., according to data collected by the United States Bureau of Mines. A total of 216,595 net tons of ore was milled, from which concentrates carrying from 75.14 to 95.4 per cent of molybdenum sulphide, MoS_2, equivalent to 2,299,217 lb. of elemental molybdenum, were obtained, an increase of about two-thirds over 1926. Of the concentrates produced 2,286,075 lb., valued at the mines at $1,858,786, was shipped. Nearly all of the output was made into calcium molybdate, in which form it is added to steel.

Perhaps the most important event of the year in the molybdenum industry was the announcement that the price of metal contained in calcium molybdate would be reduced at the beginning of 1928 from $1.20 to 95c. per lb. The reasons for the reduction were that the larger sales had allowed mills to be run more nearly at full capacity with consequent lower costs and that the lower prices would probably encourage a still larger use.

Net profits for 1927 of the United States Cast Iron Pipe & Foundry Co. were $3,373,976, compared with $5,049,367 in 1926, or a decrease of approximately 33 per cent.

Russian Iron and Steel Output Increased Last Year

WASHINGTON, March 5.—Provisional figures received by the iron and steel division, Department of Commerce, from Assistant Commercial Attaché Daniel J. Reagan, Paris, show that the heavy iron and steel industry of Soviet Russia greatly increased its output during the fiscal year 1926-27. The total output was 2,946,900 tons of pig iron and 3,533,000 tons of steel, increases of 34.9 per cent and 32.3 per cent when compared with the previous year. The figures also show a production of 2,687,100 tons of finished steel, an increase of 20.7 per cent.

Russian siderurgical production was valued at a total of 307,700,000 rubles (approximately $158,157,000) in 1926-27, an increase of 9.5 per cent over the preceding year. The number of workers increased 10.6 per cent, with a total of 191,154 engaged. In spite of the marked increases reported in the total output, the daily average production per man increased only 1 per cent while the average pay increased 18.40 per cent.

Reduction in Stocks of Industrial Coal

Bituminous coal stocks on Feb. 1, in industries in the United States, are estimated by the National Association of Purchasing Agents at 50,595,000 net tons. There has been a progressive decline from the high figure of last April at about 75,000,000 tons. Present stocks are estimated to constitute an average supply for 42 days, compared with a 40-day supply a year ago. Stocks are about equivalent to those of two years ago, but present consumption is 14 per cent below consumption at that time.

Industrial consumption in January is placed at 37,678,000 net tons. This shows an increase of more than 1 per cent above December and is the largest figure in about a year. The recent low was recorded in September, with 33,195,000 tons. Production of bituminous coal in January is placed at 49,645,000 tons.

Production of bituminous coal in the United States in the week ended Feb. 25 is reported by the Bureau of Mines at 10,181,000 net tons. This is a substantial gain over the production of the two preceding weeks, but it is considerably below the 12,763,000 tons of the corresponding week a year ago.

Steel Furniture and Shelving Orders at Highest Level Ever Reached

Steel furniture orders in January are reported by the United States Department of Commerce at $3,248,165. This is about 6 per cent higher than the largest month previously reported since these figures have been gathered—that is, since September, 1924. The increase over December was approximately $400,000, while the gain from January, 1927, was $361,000. The previous highest figure was that of January, 1926, at $3,063,833.

Shipments at $2,712,663 in January were about 1 per cent lower than in December and slightly lower than in the preceding January. They were, however, higher than the average month of either of the two preceding years. Unfilled orders at $2,000,450 made the highest total ever recorded, being about 1 per cent above the previous high of two years ago. The increase in unfilled orders during the month was $587,000, or nearly 42 per cent.

New orders for steel shelving made the highest total over recorded, at $768,748, in January. The gain over December was about $150,000, while the figure was nearly $200,000 above that of a year earlier. Shipments of steel shelving were $680,264, a gain of more than $100,000 over December, but a figure which was exceeded last March and also in March and April, 1926. Unfilled orders for shelving were $679,745, the highest total since September.

Oglebay, Norton & Co., Hanna Building, Cleveland, dealers in iron ore, on March 1 opened a department for the sale of coal and coke.

Machinery Markets and News of the Works

MARCH TRADE BETTER

Improved Business in Machine Tools Noted in Some Districts

St. Louis-San Francisco Railroad Issues Orders Against List—Radial Drill Manufacturer Advances Prices

MACHINE tool sales have turned upward, according to reports from some districts, and give promise of reaching a fairly high point this month. A considerable volume of inquiry is pending and fresh inquiries are being received at a good rate.

A feature of the current business is that orders are coming from diversified industries and most frequently are for single machines. Railroads and the automobile companies, which are usually depended upon to take a large share of the machine tool output, are not conspicuously large buyers.

In the railroad field the principal buying of the week has been done by the St. Louis-San Francisco, which ordered a number of tools against a recent inquiry. The Chicago, Burlington & Quincy is getting prices on several tools. The New York Central, Delaware, Lackawanna & Western and Atchison, Topeka & Santa Fe have taken no action on tools which builders have recently quoted on.

In the Chicago district the week's business was stepped up by the purchase of about $50,000 worth of tools by T. L. Smith & Co., Milwaukee. A list is expected soon for the Fort Wayne, Ind., plant of the International Harvester Co.

A radial drill manufacturer in Cincinnati has advanced its prices and similar action is expected on competitive lines.

New York

NEW YORK, March 6.

ACTIVITY in machine tools is well maintained, with a fairly steady flow of new inquiries and a substantial volume of purchasing. Most of the present business is in equipment of medium size, but it is fairly well distributed. There is steady purchasing by large industrial users, such as the General Electric Co., which has made further purchases in the past week and still has a considerable list of tools to buy, and the Wright Aeronautical Corporation, which has bought several tools in the past week. Engine and turret lathes have been a feature of recent sales. The American Machine & Foundry Co., Brooklyn, has purchased four lathes, the Fairchild Airplane Mfg. Corporation, Farmingdale, L. I., bought one lathe and the Worthington Mower Co., Stroudsburg, Pa., a small lathe.

The railroads which buy in this district continue inactive. No action is as yet reported on the list of about 30 items issued by the Delaware, Lackawanna & Western and no purchases have been made by the New York Central, although it has a considerable list of inquiries for single tools that have been sent out since the first of the year. In the West, the St. Louis-San Francisco has purchased a Niles combination journal turning and axle lathe.

Included in recent machine tool purchases are a 40 x 48-in. lathe by a company in Worcester, Mass., 6 x 20-in. and 6 x 60-in. thread milling machine by a Rhode Island tool maker, Pratt & Whitney No. 3 die sinker by a forge company in Chicago, 14-in. vertical surface grinder by a Dayton, Ohio, tool company, 16 x 36-in. lathe by an Ohio manufacturer, a lathe of the same size by a Detroit motor manufacturer, 16 x 60-in. lathe, by an electric manufacturing company in the East, Pratt & Whitney 6 x 60-in. thread milling machine, by a Connecticut machine tool company, single spindle Sigourney drill, 7 x 32-in. bench lathe and a 13 x 30-in. engine lathe by a company in Newark, N. J.

Bids have been asked on general contract by Progressive Table Co., Inc., 272-78 Newport Street, Brooklyn, for a two-story factory, to cost $60,000 with equipment. Kesster & Goldsmith, 4914 Church Avenue, are architects.

Packard Motor Car Co., Broadway and Sixty-first Street, New York, has filed plans for a three-story service, repair and garage building, 210 x 225 ft., to cost $500,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, is architect and engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids for 82 metal propeller blades for Long Island City base; also other similar blades for Great Lakes navy yard and Philadelphia navy yard, Schedule 8613.

Huschle Brothers, Inc., Anable Avenue and Creek Street, Long Island City, manufacturer of paper boxes and containers, has completed plans for a new three-story plant, 100 x 125 ft., to cost $130,000 with machinery. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer. Anthony J. Huschle is head.

Bids will be asked at once by Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, for a two-story addition to plant at Yonkers, N. Y., to cost more than $100,000 with equipment. W. O. Moyer is engineer in charge of construction.

Clark Lighter Co., Inc., has been formed to take over and expand W. G. Clark & Co., Inc., 9 Maiden Lane, New York, manufacturer of pocket lighters and kindred products. New company has capital of 150,000 shares of stock, no par value, and will dispose of a block of stock for increased production.

Board of Education, Amenia, N. Y., is considering installation of manual training equipment in two-story and basement high school to cost $175,000. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Henry Fuldner & Sons, Inc., 404 East Fourteenth Street, New York, manufacturer of furniture, has acquired property at 217-25 East Forty-seventh Street, as site for a sixteen-story factory, 100 x 100 ft., to cost in excess of $500,000. Present plant will be removed to new location.

Quartermaster Department, United States Army, Mitchel Field, N. Y., has plans for a new two-story repair field shop to cost about $80,000, for which it is expected to ask bids during the summer.

Associated Gas & Electric Co., 61 Broadway, New York, is arranging for bond issue of $50,000,000, a portion of fund to be used for extensions and improvements in light and power properties, and for acquisition of additional utilities.

Albany Perforated Wrapping Paper Co., Albany, N. Y., is arranging for increase in capital from 96,000 to 156,000 shares of stock, no par value, a portion of fund to be used for expansion. A special meeting has been called on April 2 for approval of new bond issue of $3,000,000, part of proceeds to be used for similar purposes.

Ovens, power equipment, conveying and other machinery will be installed in the one-story baking plant to be erected at Newburgh, N. Y., by W. E. Long Co., 155 North Clark Street, Chicago, to cost $100,000.

Safe-T-Stat Co., Inc., 79 Bridge Street, Brooklyn, manufacturer of patented thermo-electric indicating equipment for combustion engines, etc., is arranging for sale of 55,000 shares of common stock, portion of proceeds to be used for expansion. Company recently acquired plant and business of W. G. Nagel Electric Co., Toledo, Ohio, and will develop facilities for manufacture of a complete electric-controlled dashboard panel of gages for automobiles.

Fords Porcelain Works, Inc., Lehigh Avenue, Perth Amboy, N. J., manufacturer of sanitary ware, plans rebuilding portion of plant destroyed by fire March 1, with loss reported at $150,000 including equipment.

Asbury Park Ramp Garage, Inc., Asbury Park, N. J., has begun work on a four-story service, repair and garage building, 100 x 150 ft., to cost $125,000 with equipment.

American Smelting & Refining Co., Perth Amboy, N. J., has filed plans for a one-story addition, 78 x 432 ft., with lean-to extension, 25 x 90 ft., for lead refining, to cost about $75,000. Headquarters are at 120 Broadway, New York.

Vacuum Oil Co., 61 Broadway, New York, has awarded general contract to White Construction Co., 1015 Chestnut Street, Philadelphia, for a three-story addition to refinery at Paulsboro, N. J., for oil compounding and wax production, to cost $75,000.

Board of Education, New Milford, N. J., plans installation of manual training equipment in new junior high school to cost $400,000, for which plans will be drawn by Ernest Sibley, Bluff Road, Palisade, N. J., architect.

British-American Metals Co., South Second Street, Plainfield, N. J., manufacturer of brass and copper tubing, etc., is adjusting insurance on portion of plant recently destroyed by fire, with loss of close to $300,000, and contemplates rebuilding at an early date.

Curtisce Mfg. Co., Newark, manufacturer of furnace blowers, etc., has leased a floor in the building at Central Avenue and Washington Street, for a new plant.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has plans for erection of a two-story power substation, 30 x 62 ft., at Rahway, N. J., to cost close to $50,000 with equipment.

Board of Education, Great Neck, L. I., plans installation of manual training equipment in new high school to cost more than $400,000, for which bids will soon be asked on general contract. Guilbert & Betelle, 20 Branford Place, Newark, are architects.

Phoenix Welding & Machine Co., formerly at 389 Montgomery Street, Jersey City, has moved into larger quarters at 405 Montgomery Street. Additional machinery will be installed. W. A. Huff is president.

Wickes Machinery Co., 421 Clarmont Avenue, Jersey City, will sell its stock of machine tools and power equipment at public auction March 13. Sale will include machine tools, air compressors, motors, steam engines, hoisting engines, boilers, blowers and other equipment, nearly all of which has been rebuilt.

Buffalo

BUFFALO, March 5.

PLANS are being considered by Ansco Photo Products, Inc., Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, for an addition to cost upward of $50,000 with machinery.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing materials, building products, etc., is arranging for early acquisition of Beaver Board Companies, Inc., and Beaver Products Co., Inc., Buffalo, manufacturer of wallboard, roofing and kindred products. Local plants will be continued and expansion carried out. A bond issue of $13,500,000 is being sold by purchasing company, a considerable portion of proceeds to be used for project.

Thomas Carr, 1047 Monroe Parkway, Rochester, N. Y., and associates have organized Doraldina Co., capitalized at $30,000, to establish a local plant for manufacture of automatic machines and other equipment.

Foote & Carpenter, 14 Franklin Street, Rochester, architects, have plans for a two-story and basement automobile service, repair and garage building, to cost close to $90,000 with equipment.

Continental Can Co., Inc., Syracuse, N. Y., has purchased Passaic Metal Ware Co., Passaic, N. J., and will continue operations at same location as a subsidiary. Purchasing company also has recently acquired plant and property of United States Can Co., Norwood Station, Cincinnati, and Seattle-Astoria Iron Works, Inc., Seattle, both of which will be maintained in operation.

South Atlantic States

BALTIMORE, March 5.

PLANS are being considered by Bowker Chemical Co., Canton, Baltimore, for rebuilding portion of its fertilizer plant destroyed by fire Feb. 27, with loss in excess of $200,000 including equipment. Company is a subsidiary of American Agricultural Chemical Co., 420 Lexington Avenue, New York.

Board of Awards, office of City Register, City Hall, Baltimore, will receive bids until March 14 for pumping machinery and accessories for Guilford waterworks station and Montebello filtration plant. E. G. Rost is water engineer.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has secured permission to take over and consolidate Baltimore County Electric Co., Belair Electric Co., and other light and power properties with total capitalization of about $20,000,000, and plans expansion and betterments, including transmission line construction.

Willys-Overland Co., Toledo, Ohio, manufacturer of automobiles, is reported considering erection of new assembling plant at Columbia, S. C., to cost more than $500,000 with machinery.

Chief of Engineers, United States Army, Washington, will receive bids until March 13 for 15,000 ft. lead-covered cable and armored cable, with eight reels, circular 16.

C-P Motors, Inc., West Eighth Street, Charlotte, N. C., Edwin Burke, president, has plans for a new automobile manufacturing works, to cost in excess of $200,000 with equipment. J. C. Boyd, First National Bank Building, is architect.

Carolina Power & Light Co., Raleigh, N. C., plans early construction of one-story power substation at Sanford, N. C., to cost close to $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 13 for 24,080-lb. condenser tube sheets for Mare Island, Cal., Navy Yard, and for like amount for Puget Sound, Wash., yard, schedule 8589; for two electric winches and spares for Mare Island and two for Puget Sound, schedule 8595; until March 20 for hydraulic winches and parts for Mare Island and Puget Sound yards, schedule 8596; and for screwdrivers, etc., for Eastern and Western yards, schedule 8617.

Plainville Brick Co., Inc., Plainville, Ga., will make extensions and improvements in plant, with installation of crushing and other equipment. A light and power plant will be installed.

Lambeth Electric Supply Co., Winston-Salem, N. C., is planning establishment of a factory for manufacture of electrical specialties. Paul T. Lambeth is head.

Potomac Edison Co., Cumberland, Md., has secured permission to acquire Clear Spring Electric Light & Power Co., and controlling interest in Piedmont Electric Light & Power Co., and Potomac Light & Power Co., operating in western Maryland, and plans extensions and improvements, including transmission line construction.

Eagle Rock Lime Co., Eagle Rock, Va., plans installation of crushing and other machinery.

School Commissioners of Dorchester County, Cambridge, Md., contemplate installation of manual training equipment in three-story high school to cost $175,000, for which plans are being drawn by Henry P. Hopkins and Allan C. Burton, 347 North Charles Street, Baltimore, architects.

Foard Mfg. Co., Lenoir, N. C., recently formed by Fred Foard and S. S. Jennings, both of Lenoir, plans operation of a local mill for manufacture of dowel pins and kindred specialties, with initial equipment for output of about 100,000 per day.

Commissioners of Public Works, Seneca, S. C., are asking bids until March 15 for a steel tank on steel tower, capacity 150,000 to 200,000 gal. H. S. Jaudon Engineering Co., Elberton, Ga., is engineer.

General Purchasing Officer, Panama Canal, Washington, will receive bids until March 20 for twist drills, files, tinners' snips, shovels, valves and other equipment, Panama schedule 1862.

Eastern Shore Public Service Co., Salisbury, Md., plans construction of a high-tension transmission line from Salisbury to Vienna, Md., where work is under way on initial unit of steam-operated electric generating plant, to cost more than $500,000.

Wilder Lumber Co., 512 South Main Street, Tifton, Ga., is planning installation of a planer and other tools in woodworking plant. A new one-story mill, 50 x 120 ft., will be built.

American Radiator Co., West Thirty-eighth Street, Norfolk, Va., has leased a unit of property of Union Warehouses, Inc., for a new factory branch and distributing plant. Headquarters are at 40 West Fortieth Street, New York.

Georgia-Florida Motor Lines, Inc., Forsyth Theater Building, Atlanta, Ga., recently formed with capital of $1,000,000 to take over and consolidate ten motor bus transportation companies in Georgia and Florida, is planning the establishment of central repair and reconditioning shops, with parts department, etc., at Albany and Valdosta, Ga., to cost more than $85,000.

F. M. Collins, Jr., 144 Olympic Place, Decatur, Ga., plans purchase of a motor-driven portable power saw, for use at local lumber plant.

New England

BOSTON, March 5.

MACHINE tool sales the past week fell off somewhat, and in most instances involved low priced tools. A new jig borer, taken by a Massachusetts manufacturer, was almost the only exception. The city of Boston has placed two cone-head lathes with the Hendey Mfg. Co., and a milling machine and grinder with the Brown & Sharpe Mfg. Co., also a fairly long list of sheet metal equipment, for its new continuation school. Quite a list of machine tools and wood-working equipment has yet to be placed by the city. The Pneumatic Drop Hammer Co. reports the sale of a 600-lb. and a 300-lb. hammer to an Ontario manufacturer. This company has just completed assembling a 500-lb. hammer in a Columbus, Ohio, shop, and a large Providence jewelry manufacturer has just installed a battery of four hammers. It expects to close soon on an order for a battery of 23 hammers. Other recent sales include a No. 1 Lapointe broaching machine to a Massachusetts shop, a 16-in. lathe to a Maine company, a 14-in. and a 16-in. lathe, two two-spindle drills, two Brown & Sharpe millers, a small power press, a three-spindle drill, a surface grinder, a fairly large planer and several bench tools, most of them to Massachusetts and Rhode Island users.

New inquiries are coming in slowly, and manufacturers who have had inquiries out for tools as far back as last October apparently are in no hurry to purchase. General business in New England is increasing, particularly in the textile and shoe industries, but recovery in metal-working lines is slow and there is a large number of skilled mechanics out of employment. Customers of metal working plants are buying on a hand-to-mouth basis. With practically no backlog orders on their books metal workers are putting off purchases of equipment until the business outlook is more assuring.

February small tool sales fell short of those for the previous month. January, however, was better than any month last year as some large buyers placed orders for first half requirements.

Industrial conditions in Springfield, Mass., are a little better than in most New England centers. Gilbert & Barker Mfg. Co. has added 400 to its force and is operating full time. Blair Mfg. Co. is employing a full force and operating overtime. Increases in operating schedules are reported also by Moore Drop Forging Co., Package Machinery Co. and Indian Motocycle Co. Tiley Pratt Co., Essex, Conn., recently acquired by Torrington Co., is operating on a 24 hr. schedule with three shifts. Plant expansion this spring is under consideration.

Plant, real estate, machinery and equipment of Freeman-Daughaday Co., Chartley, Mass., will be sold at public auction March 13.

Plans are in progress for a two-story machine shop for Emile St. Jacques, Main Street, Wareham, Mass.

Lockwood Greene & Co., 24 Federal Street, Boston, are preparing plans for a three-story, 80 x 100 ft., automobile service and repair shop for Charles Street Garage Corporation, Boston. L. K. Morse is president.

E. Sykes Goodwin, 29 Weybosset Street, Providence, has completed plans for a $100,000 artificial ice plant at New Shoreham, R. I., to be built by Rhode Island Fish Co., 169 South Water Street, Providence.

Contract has been let by Royal Typewriter Co., New Park Avenue, Hartford, Conn., to Denis O'Brien & Sons, Inc., local, for a one-story addition, 35 x 120 ft., to cost about $40,000.

Department of Public Buildings, City Hall, Boston, will soon take bids for a one-story power plant, to cost approximately $100,000 with equipment. Desmond & Lord, 1 Beacon Street, are architects.

North Shore Delivery Co., 46 Lake Street, Lynn, Mass., is having plans drawn for a new one-story ice-manufacturing plant, to cost more than $40,000. Funk & Wilcox Co., 26 Pemberton Square, is architect.

Municipal Light Board, Chicopee, Mass., has asked bids on general contract for a three-story automobile service, repair and garage building, 60 x 75 ft., to cost close to $90,000 with equipment. H. J. Tessier, 1132 Main Street, Springfield, Mass., is architect.

Charles H. Tenney & Co., 200 Devonshire Street, Boston, operating public utility properties, including Salem Electric Lighting Co., Salem, Mass., have plans under way for a super-power electric generating plant at Salem, where waterfront site has been secured, to cost more than $750,000 with transmission lines.

P. J. Kiley, 101 Washington Street, Somerville, Mass., will erect a one-story plant, 95 x 100 ft., for manufacture of automobile bodies.

Beardsley & Wolcott Mfg. Co., Waterbury, Conn., has been formed to take over and consolidate Beardsley Mfg. Co., with local plant, and Wolcott Mfg. Co., Hartford, Conn., both manufacturers of electrical products. Operations will be continued at both factories at present, with anticipated consolidation at Waterbury. C. E. Beardsley is president and treasurer; Frank E. Wolcott, vice-president; and Rowley W. Phillips, secretary.

Jackson-Butler Corporation, St. Johnsbury, Vt., contemplates rebuilding its two wood-working plants partially destroyed by fire Feb. 27, with loss estimated at $75,000 including equipment.

Milwaukee

MILWAUKEE, March 5.

WHILE the volume of machine-tool sales is slow in making gains, the number and character of inquiries indicate a substantial improvement in business. In most quarters the expectancy relative to March trade is encouraging. Although the dearth of industrial construction in this locality is still evident, several of the largest industries are entering the market for additional equipment for replacement or to provide greater capacity. Foundry and machine shop employment continues to gain as automotive shops furnish delivery specifications in greater volume on castings, forgings, and other equipment.

Twin Disc Clutch Co., 1328 Racine Street, Racine, Wis., manufacturer of industrial and automotive clutches and transmission specialties, is erecting a one and two-story addition, 60 x 180 ft., and is inquiring for miscellaneous equipment, including automatic machinery. Investment will be approximately $65,000.

E. I. Du Pont de Nemours Co., Wilmington, Del., has plans for the remodeling of branch works at Barksdale, near Washburn, Wis., and erection of four additional units, with installation of a new acid process, at a cost of $425,000. R. T. Cann is general superintendent at Barksdale.

Appleton Steel Tube Co., 924 West Spencer Street, Appleton, Wis., a new organization which recently took over operation of an existing plant, is erecting a shop extension, 30 x 60 ft. and will require some additional equipment.

Fire, Feb. 25, destroyed one-story frame machine shop, 120 x 200 ft., of Racine Screw Works, Racine, Wis., and damaged a quantity of automatic screw machines and other equipment. Loss is estimated at fully $200,000.

United Coal & Dock Co., 8 Wells Street, Milwaukee, has plans for construction and equipment of a plant costing $250,000 for manufacturing coal briquettes. It will be the first industry of its kind in Milwaukee. Similar plants are operating at Duluth and Superior. Milwaukee plant will be ready to start operations about Oct. 1. Capt. A. P. King is president and general manager.

Wisconsin Motor Bus Lines, division of Milwaukee Electric Railway & Light Co., 215 Michigan Street, Milwaukee, has purchased a site at Madison, Wis., for a motorbus terminal, garage and service station, to be erected at once at a cost of $50,000. Fred H. Luber is company architect.

Minogue Engineering Co., Manitowoc, Wis., has been organized by Roland E. Minogue, engineer, 1302 Wisconsin Avenue, local, and will establish a plant for manufacture of machinery, motors, engines, etc. Definite details have not been made public.

Milwaukee Department of Public Works will soon be ready for bids for the erection of a two-story building, 100 x 140 ft., for use as a fire department construction and repair shop. Complete production equipment and a 5-ton electric, hand controlled crane are specified. C. E. Malig is city architect, and R. E. Stoelting, commissioner of public works. The cost is estimated at $100,000.

Parker Harvester Corporaton, Cedarburg, Wis., has been incorporated with $100,000 capital stock to take over plant of former Lowenbach Shoe Co., for production of a newly developed beet harvesting machine designed by Stanley F. Parker, 963 Mitchell Street, Milwaukee. Other principals are E. B. Lowenbach, 420 Newberry Boulevard, and Anton Harlfinger, 773 Twenty-second Avenue, Milwaukee. Alterations to plant are under way.

Detroit

DETROIT, March 5.

WORK will soon begin on an addition to plant of Sparks-Withington Co., Jackson, Mich., manufacturer of radio and automotive equipment, to cost upward of $75,000 with equipment. A boiler plant will also be erected. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are architects and engineers.

Consumers Power Co., Jackson, Mich., is considering a two-story equipment storage and distributing plant, with repair department, at Grand Rapids, Mich., to cost about $50,000.

City Council, Royal Oak, Mich., has plans under way for a municipal pumping plant to cost about $75,000, of which close to $50,000 will be expended for equipment.

Universal Cooler Co., 1214 Eighteenth Street, Detroit, manufacturer of electrical supplies and equipment, is arranging for sale of a bond issue for $250,000, a portion of proceeds to be used for expansion and improvements.

Karp Brothers Coal & Ice Co., 3900 Orleans Street, Detroit, has plans for a new one-story ice-manufacturing plant, 50 x 175 ft., to cost about $100,000 with equipment.

Aero-Craft Mfg. Co., Detroit, care of Peerless Pattern Works, 1489 East Fort Street, recently organized, is planning early erection of a new plant for manufacture of commercial airplanes, with main model of bi-plane type, equipped with 120-hp. motor. Initial planes will be manufactured at plant of Peerless company. Clement W. Brown is president, and Frederick West, vice-president.

United States Radiator Corporation, 133 East Grand River Boulevard, Detroit, is disposing of a bond issue of $3,500,000, a portion of proceeds to be used for expansion and improvements, including recent acquisition of Pacific Steel Boiler Co., Waukegan, Ill., to be operated as a subsidiary.

Chris Smith & Sons Boat Co., Algonac, Mich., manufacturer of motor boats, has an expansion and improvement program in progress, following partial destruction of plant a few months ago by fire. Increased floor space will be arranged, with installation of equipment and facilities to triple former output.

Detroit Edison Co., Second Avenue, Detroit, has plans for a new power substation at Royal Oak, Mich., to cost $135,000 with equipment. Extensions will be made in transmission lines.

Philadelphia

PHILADELPHIA, March 5.

CONTRACT has been let by Department of City Transit, 1211 Chestnut Street, Philadelphia, to Pennsylvania Engineering & Construction Co., Real Estate Trust Building, for a one-story equipment storage and distributing building, with repair department, to cost about $65,000.

Olney Foundry Co., 180 West Duncannon Street, Philadelphia, manufacturer of gray iron castings, etc., has filed plans for a one-story addition, to cost about $40,000 with equipment.

Philip S. Tyre, 114 South Fifteenth Street, Philadelphia, architect, has plans for a one and two-story automobile service, repair and garage building at Chester, Pa., to cost approximately $90,000 with equipment.

National Steel Equipment Co., 3342 Rorer Street, Philadelphia, manufacturer of filing cabinets, etc., has filed plans for two one-story additions, one to be equipped as a machine shop and other for general manufacturing, to cost about $24,000 with equipment.

Clarence E. Wunder, 1520 Locust Street, Philadelphia, architect, has filed plans for a one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Board of Trustees, Haverford College, Haverford, Pa., will soon take bids for a two-story and basement engineering laboratory, 70 x 80 ft., to cost approximately $110,000, with testing and other machinery. Mellor, Meigs & Howe, 205 South Juniper Street, Philadelphia, are architects.

Officials of Eureka Flint & Spar Co., New York Avenue, Trenton, N. J., operating a feldspar grinding mill and raw material properties, have formed new company of same name, with capital of $1,350,000, to take over and expand present organization. Thomas H. and Frank W. Thropp head new company.

John W. Knerr, Cedar Grove, near Belvidere, N. J., operating ice-manufacturing plants, has plans for a new plant on the Pequest River, Belvidere, to cost $60,000 with machinery.

School District of Upper Merion Township, Swedeland, Pa., is considering installation of manual training equipment in two-story junior high school to cost $200,000. Ritter & Shay, Fifteenth and Chestnut Streets, Philadelphia, are architects.

Roxborough Motors, Inc., Lyceum Street and Ridge Avenue, Philadelphia, local representative for Chrysler automobiles, has leased a new multi-story building, 45 x 200 ft., to be erected at 6221 Ridge Avenue, for a service, repair and sales building, to cost in excess of $125,000 including equipment.

National Power & Light Co., Allentown, Pa., operating Pennsylvania Power & Light Co., East Penn Electric Co., Harrisburg Light & Power Co., and other electric light and power properties, has arranged for preferred stock issue to total $10,314,000, a portion of fund to be used for expansion and improvements. Pennsylvania Power & Light Co. is arranging for construction of 66,000-volt transmission line from substation at Berwick, Pa., to power plant of Luzerne County Gas & Electric Co., in Hunlock Creek section. National company is under direction of Electric Bond & Share Co., 71 Broadway, New York.

Plant and machinery of Gehret Brothers, Inc., East Fourth Street, Bridgeport, Pa., manufacturer of structural steel and ornamental iron products, will be offered for sale by W. R. Browne, receiver, March 17.

Bellanca Aircraft Corporation, Arlington, S. I., will begin immediate construction of plant at New Castle, near Wilmington, Del., where 350 acres recently was acquired, to cost $100,000 with equipment. Giuseppe Bellanca is head.

Scranton Gas & Water Co., Scranton, Pa., has arranged for bond issue of $11,000,000, a portion of proceeds to be used for extensions and improvements in plant and system.

Danville Structural Steel Co., Danville, Pa., has plans for a new unit to cost in excess of $75,000. Company was acquired recently by Charles M. Schwab, head of Bethlehem Steel Corporation, Bethlehem, Pa.

Chicago

CHICAGO, March 5.

FEBRUARY closed with total sales above those in January and in excess of the same month last year. Purchases in the last seven days showed marked improvement, but orders and new inquiry are spotty. A number of old propositions have been revived. T. L. Smith & Co., Milwaukee, have purchased $50,000 worth of machine tools, and it is probable that the International Harvester Co. will soon issue a list for its Fort Wayne, Ind., plant.

Fresh railroad inquiry includes a 2 x 14-in. Norton grinder by the Santa Fe; a Canedy-Otto drill, a 36-in. drill press and a No. 660 CAW semi-portable grinder by the Rock Island, and a heavy-duty portable grinder, a two-wheel vertical spindle grinder, a 1 x 10-in. grinder and a 2 x 12-in. grinder by the Burlington. A fair amount of inquiry is noted for used machinery, but dealers are experiencing some trouble in finding good equipment of this kind.

Hayes-Custer Stove & Furnace Co., Bloomington, Ill., has recently acquired additional property on which it will erect a plant extension.

G. Phillips, Southerland Hotel, Chicago, will build a three-story brick garage, 100 x 175 ft.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a substation, 42 x 103 ft. H. V. Von Holst, 140 Monroe Street is architect.

Wenig & Tennis, 1406 Greenlea Avenue, Chicago, will build a four-story garage, 100 x 100 ft. to cost $150,000.

Troy Laundry Machinery Co., East Moline, Ill., has arranged for bond issue of $3,000,000, a portion of proceeds to be used for expansion and improvements. Company is operated by Manhattan Electrical Supply Co., Inc., 11 Park Place, New York.

Board of Trustees, Illinois College, Jacksonville, Ill., is considering a new steam power plant at the institution, primarily for heating service, to cost about $50,000 with equipment.

Chamberlain Machine Works, 2500 East Fourth Street, Waterloo, Iowa, Floyd L. Chamberlain, head, has filed plans for a one-story addition, 36 x 100 ft., a portion of structure to be used for assembling.

Northern States Power Co., Minneapolis, Minn., is arranging an expansion and improvement program to cost approximately $8,000,000, of which about $2,000,000 will be used for completion of projects now under way. New work includes a hydroelectric generating plant at Chippewa Falls,

The Crane Market

THERE is very little new inquiry for either overhead or locomotive cranes, but there is a fair volume of business to be placed that has accumulated since the first of the year. Apparently, with many prospective purchasers, business has not been quite as large as had been expected earlier in the year, so that they are inclined to delay placing orders for additional equipment pending further improvement. About the largest current inquiry for overhead cranes is the list of two 225-ton locomotive handling cranes and one 50-ton standard overhead crane for the Reading Co. In the locomotive crane field, the Amtorg Trading Corporation, 165 Broadway, New York, is reported about to close on six 15-ton, kerosene driven crawl-tread locomotive cranes and one 25-ton standard gage locomotive crane for Russia. This company is understood to be preparing a future inquiry for nine 40-ton locomotive cranes for export to Russia.

Among recent purchases are:

New York, New Haven & Hartford Railroad, New Haven, Conn., 10-ton, 70-ft. span electric traveling crane with 2-ton auxiliary from Niles Crane Corporation.

City of Hagerstown, Md., 10-ton, 42-ft. 6-in. span electric traveling crane from Niles Crane Corporation.

Sanderson & Porter, consulting engineers, New York, 10-ton, 22-ft. 10-in. span hand power crane for use in West Virginia from Box Crane & Hoist Corporation.

Wis., extensions in power plants at Minot and Grand Forks, N. D.; transmission lines, power substations and miscellaneous construction. Company is under direction of H. M. Byllesby & Co., 231 South La Salle Street, Chicago.

Board of Education, Great Falls, Mont., plans manual training department in three-story high school to cost $800,000, for which it is expected to ask bids on general contract in May. Bird & Van Teylingen, Great Falls, are architects, and Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., associate architects.

Chicago, Burlington & Quincy Railroad, 547 Jackson Boulevard, Chicago, will soon take bids for a one-story local power plant, to cost more than $40,000 with equipment. W. T. Krausch is chief engineer.

Reliance Enameling & Stamping Co., Belleville, Ill., is reported planning an addition, to cost in excess of $50,000 with equipment.

Kremer Motor Co., 1518 Hennepin Avenue, Minneapolis, Minn., expects to ask bids in about 30 days for a one-story and basement service, repair and garage building, 150 x 155 ft., to cost about $100,000 with equipment. Perry E. Crosier, New York Life Building, is architect.

J. I. Case Threshing Machine Co., Racine, Wis., has plans for a three-story and basement addition to its factory branch and distributing plant at Des Moines, Iowa, to cost about $34,000. C. V. Johnson, Commonwealth Building, Des Moines, is architect.

Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, manufacturer of air chucks, machine tool equipment, etc., has acquired adjacent property, 75 x 125 ft., and contemplates early erection of two-story plant to cost about $55,000. It is understood that present works will be removed to new location.

Barnes Zinc Products Co., 1531 Kingsbury Street, Chicago, fabricator of conductor pipe, eaves troughs and fittings, has changed its name to Barnes Metal Products Co.

St. Louis

ST. LOUIS, March 5.

PLANS are being drawn by Atchison, Topeka & Santa Fe Railroad Co., Topeka, Kan., for a one-story machine shop at repair works at Guthrie, Okla., 80 x 135 ft., to cost about $45,000.

Silica Mines Co., Meade, Kan., is planning to rebuild plant, with installation of new equipment, to cost $65,000. M. T. Garlow is head.

Oklahoma Power & Water Co., Tulsa and Sand Springs, Okla., is disposing of bond issue of $4,500,000, portion of fund to be used for expansion and improvements in electric light and power properties, including purchase of additional utilities. William H. Colvin is chairman of the board.

Arkansas Cold Storage Co., foot of Rock Street, Little Rock, Ark., will soon break ground for a three-story addition to ice-manufacturing and cold storage plant, to cost approximately $90,000 with equipment. Clarence E. Rose is general manager.

South Side Chevrolet Co., 3645 South Grand Boulevard, St. Louis, representative for Chevrolet automobile, has plans for a three-story automobile service, repair and garage building, to cost more than $100,000 with equipment. D. R. Harrison, Ambassador Building, is architect.

Corn Products Refining Co., Tenth and Cherry Streets, North Kansas City, Mo., has superstructure under way for a five-story and basement addition, 90 x 140 ft., to cost close to $200,000 with equipment. Engineering department, 208 East Illinois Street, Chicago, is in charge.

Camden Ice & Coal Co., Camden, Ark., has taken out a permit for an ice-manufacturing and cold storage plant, to cost $80,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in the new plant of Rex Baking Co., Tulsa, Okla., on which work has begun, to cost more than $200,000. Patterson Corporation, 4050 Pennsylvania Avenue, Kansas City, Mo., is in charge.

Oliver Anthony, Bearden, Ark., and associates are planning establishment of a furniture factory to cost about $55,000 with equipment. A company will be organized to carry out project. J. L. Williams, Bearden, is interested.

E. A. Liebman, 3509 Classen Street, Oklahoma City, Okla., is at head of a project to construct and operate an ice-manufacturing plant at Shawnee, Okla., to cost $75,000.

Studebaker-Riley Co., 2610 Grand Avenue, Kansas City, Mo., representative for Studebaker automobile, has leased a new two-story and basement building, 105 x 185 ft., to be erected on Ward Parkway, for a service, repair and sales building, to cost in excess of $100,000 with equipment. E. W. Tanner, Meyer Boulevard, is architect.

Board of Education, Lincoln, Neb., plans installation of manual training equipment in new two-story Everett Junior High School, for which bids are being received on general contract until March 13, to cost $300,000. Davis & Wilson, 525 South Thirteenth Street, are architects.

Cincinnati

CINCINNATI, March 5.

MACHINE tool sales again have turned upward and give promise of reaching a fairly high point during March. Fresh inquiries are in less volume, but the amount of pending business is large. One interesting development is that some builders reporting increased bookings did not participate in the flurry of buying in January and February. Orders are well diversified both as to the class of buyers and territories. Production in local plants is being maintained at a moderate rate.

The St. Louis-San Francisco Railroad closed the past week against its list. Some of the tools, including a shaper and a combination journal turning and axle lathe, were placed with companies in this district, but purchases also were made from Eastern builders. The Chicago, Burlington & Quincy has issued a list of equipment which Cincinnati manufacturers now are bidding on. It is understood that the Santa Fe has not yet taken action on its requirements.

A leading radial drill builder has revised its prices upward the past week. Advancing costs are likely to result in similar action on the part of other drill manufacturers in the near future.

Contract has been let by Cincinnati Ball Crank Co., Disney Street, Cincinnati, to Austin Co., Cleveland, for a one-story addition to cost about $15,000.

Harry Hake, 2400 Gilbert Avenue, Cincinnati, architect, has plans for a four-story automobile service, repair and garage building, to cost about $500,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in the one-story baking plant to be erected by Earl Dickason, Chillicothe, Ohio, to cost about $125,000. W. E. Long Co., 155 North Clark Street, Chicago, is architect.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until March 15 for airplane parts, including cowling assemblies, shutter and bracket assemblies, etc., circular 258; until March 12 for 1145 streamline tie rods, circular 255; and until March 15 for tubing, safety nipples, etc., circular 257.

City Council, Bowling Green, Ky., will receive bids until March 27 for a water-softening and filtration plant, including motor-driven pumps, traveling water screen, pipe lines, etc., and elevated water tank. J. N. Chester Engineers, Union Bank Building, Pittsburgh, are engineers.

Dayton Friction Toy Co., Hawthorn and Krug Streets, Dayton, Ohio, will proceed with erection of one-story addition to cost $21,000, for which general contract has been let to F. K. Vaughn Building Co., Dayton.

Mississippi River Commission, Memphis, Tenn., First and Second Districts, will receive bids until March 20 for two all-steel bins with batch-measuring devices, and for two concrete mixers with boom and bucket; also for machinery for concrete slab casting plant; until March 15 for one boiler and equipment.

Fire recently destroyed a portion of building at Louisville, occupied by Childers Electric Co., Brandeis Machinery & Supply Co., and Tafel Electric Co., with total loss estimated at $80,000.

Board of Education, Louisville, is considering installation of manual training equipment in new three-story junior high school to cost about $350,000, for which plans will be drawn by J. M. Colley, architect for board.

Service Motor Car Co., Memphis, Tenn., has plans for a one-story machine and repair works, 195 x 210 ft., to cost about $85,000 with equipment. Hanker & Cairns, Hill Building, are architects.

American Radiator Co., 40 West Fortieth Street, New York, has leased property at Brook Street and Eastern Parkway, Louisville, and contemplates establishment of new factory branch and distributing plant.

Board of County Commissioners, Springfield, Ohio, is considering purchase of new stone crushing plant and has instructed W. H. Sieverling, County engineer, to secure costs.

Pittsburgh

PITTSBURGH, March 5.

ALTHOUGH individually small, machine tool orders are sufficiently numerous for dealers to report business as fairly good. Purchases usually represent actual needs and there is not as much delay between the inquiry and sale as is often the case. In the heavier lines of equipment, a good inquiry is noted for cranes, but orders are few. The Jones & Laughlin Steel Corporation has ordered a second seamless pipe-making unit for its Aliquippa works and the Carnegie Steel Co. is reported as planning an extension of its McDonald, Ohio, bar mills.

Plans are being arranged by Allegheny Steam Heating Co., 435 Sixth Avenue, Pittsburgh, subsidiary of Duquesne Light Co., for a central steam power plant for heating service, with boilers, stokers, skip hoists and other coal and ash-handling machinery, to cost close to $1,800,000, including tunnels and underground pipe lines.

Pittsburgh Safety Glass Co., operated by Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has plans for first unit of plant at Creighton, Pa., adjoining works of parent company, for production of laminated shatterproof sheet glass, to cost more than $600,000 with equipment. Company was formed recently with capital of $1,000,000. H. S. Wherrett is president.

United States Engineer, Keenan Building, Pittsburgh, is asking bids until March 28 for a hydroelectric power plant at Lock 6, Allegheny River, near Clinton, Pa.

Beaver Valley Water Co., Beaver Falls, Pa., will soon take bids for a one and two-story equipment storage and repair shop, to cost more than $75,000 with equipment. J. E. Martsolf, 512 Third Avenue, New Brighton, Pa., is consulting architect.

City Council, Parkersburg, W. Va., is asking bids until March 13 for a high-lift pumping station, iron removal plant and other equipment for municipal waterworks. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is engineer.

Northside Garage, Pittsburgh, has leased two-story building, 50 x 180 ft., at 104-8 West North Avenue, and will remodel for a service, repair and garage building, total project to cost in excess of $120,000 including rental.

George & Sherrard Paper Co., Wellsburg, W. Va., operated by International Paper Co., 100 East Forty-second Street, New York, has approved plans for extensions and improvements in mill to double present capacity, including facilities for production of heavy bags for cement, lime, etc., to cost more than $50,000 with equipment.

Pennzoil Oil Co., Oil City, Pa., has plans for an addition to its generator plant at Rouseville, Pa., 50 x 80 ft., to cost approximately $45,000 with equipment.

Pittsburgh Water Heater Co., Jenkins Building, Pittsburgh, with plant at Crafton, Pa., is disposing of a bond issue of $1,200,000, a portion of proceeds to be used for expansion and improvements. Company also operates Pittsburgh Melting Co.

Board of Education, Ambridge, Pa., contemplates installation of manual training equipment in new junior high school to cost $180,000, for which plans will be drawn by W. Ward Williams, 309 Fourth Avenue, Pittsburgh, architect.

Cleveland

CLEVELAND, March 5.

A BRIGHTER outlook in the machine tool industry than for some time is indicated by a better volume of inquiry, according to reports of most manufacturers and dealers. Sales were fair the past week, although orders were limited to single machines. February sales with some dealers and manufacturers showed a slight gain over January, but with others business was slightly below the previous month. No inquiries of any size came out during the week. Following the recent spurt of activity in the automotive field, the Detroit market is rather quiet.

National Sanitary Co., Salem, Ohio, will rebuild its plant recently destroyed by fire. Contracts will be placed soon for new buildings, including foundry and cleaning room, enameling department and warehouse. Considerable equipment will be required.

Vermont Marble Co., 9508 Quincy Avenue, Cleveland, has awarded general contract to H. K. Ferguson Co., for a one-story plant, 80 x 280 ft., for cutting, grinding, polishing, etc., with two-story office, to cost $120,000 with equipment. A. T. Howe is branch manager. Headquarters are at Proctor, Vt.

Lake Erie Power & Light Co., Sandusky, Ohio, has applied for permission to purchase Suburban Power Co., operating in Erie, Wood and Sandusky counties, and plans expansion in power facilities and transmission lines.

Sun Oil Co., East Toledo, Ohio, will rebuild portion of local refinery and distributing plant destroyed by fire Feb. 26, with loss in excess of $150,000 including equipment.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated paper boxes and containers, etc., is arranging for sale of preferred stock to total about $4,500,000, a portion of fund to be used for expansion and improvement. Company recently acquired Thompson & Norris Co., Brooklyn, N. Y., and J. M. Raffel Co., Baltimore, manufacturers of kindred products, and is now operating thirty plants in sixteen different cities.

Federal Radiator & Boiler Co., Zanesville, Ohio, will rebuild portion of plant destroyed by fire Feb. 28, with loss close to $90,000 including equipment.

Gulf States

BIRMINGHAM, March 5.

PLANS are being considered by Louisiana Oil Refining Corporation, Minden Road, Shreveport, La., for rebuilding portion of refinery recently destroyed by fire, with loss estimated at $100,000 including equipment.

Uriah Ice & Gin Co., Pensacola, Fla., is planning construction of a new ice-manufacturing and cold storage plant, to cost approximately $90,000 with machinery.

Board of Education, Corpus Christi, Tex., plans installation of manual training equipment in new high school, for which bonds for $300,000 have been voted. Hardy & Curran, Nixon Building, are architects.

John E. Mitchell Co., 600 South Sixth Street, St. Louis, manufacturer of cotton ginning machinery, flour mill equipment, etc., has received a low bid from Lee Morris Co., 5617 East Grand Street, Dallas, Tex., for a two-story branch plant, 100 x 216 ft., at last noted place, to cost approximately $100,000 with equipment. J. A. Pitzinger, Southwestern Life Building, Dallas, is architect and engineer.

Texas-Louisiana Power Co., Pecos, Tex., will proceed with extensions and improvements in local power plant, including installation of three 1250-hp. generating units and auxiliary equipment; provision will be made for addition of two more units of like capacity. Extensions will be made in transmission lines. Entire project will cost more than $200,000. Allen J. Smith is general manager.

Sibert-Hayes Motors, Inc., 1920 South Fourth Avenue, Birmingham, has arranged for erection of two-story service, repair and garage building, 100 x 100 ft., to be occupied under lease, to cost close to $90,000 with equipment. Turner & McPherson, Martin Building, are architects.

United States Engineer, Galveston, Tex., will receive bids until March 12 for two 20-in. dredging pumps and other pumping units, with impeller shafts, liners, etc., circular 182.

Texas Ice & Fuel Co., Houston, Tex., will soon begin work on a one-story ice-manufacturing plant, to cost $85,000 with machinery.

Interstate Cotton Oil Refining Co., Sherman, Tex., has plans for a one-story addition for manufacture of containers, to cost $40,000 with machinery.

Southern Packing Corporation, Eleventh Avenue, St. Petersburg, Fla., recently formed by William Stephany, 119 West Fifty-seventh Street, New York, and associates, with capital of $300,000, is completing plans for a local plant for production of chemical specialties, to cost more than $100,000 with machinery.

C. F. Elledge, 554 Forest Street, Jacksonville, Fla., is in the market for a machine for compressing and baling sheet metal scrap.

Shreveport Producing & Refining Corporation, Commercial Bank Building, Shreveport, La., has begun an expansion and improvement program at its oil refinery at Jewella, La., with additional equipment for handling 10,000 bbl. of crude oil per day, to cost in excess of $200,000.

Hillsborough County Board of Public Instruction, Tampa, Fla., has approved plans for a one-story manual arts building at Ballast Point school, to cost close to $26,000 with equipment. Galliher & Crowe, Ashley Street, are architects.

Bayou State Refining Corporation, Slattery Building, Shreveport, La., has awarded general contract to Graver Corporation, 844 Rush Street, Chicago, for a new oil refinery at Rosston, La., to cost about $225,000 with machinery.

Glidden Co., 2876 Attleboro Road, Cleveland, manufacturer of paints, varnishes, etc., is reported considering erection of new plant at Houston, Tex., to cost close to $130,000 with equipment.

Wichita Falls Airport Co., Wichita Falls, Tex., plans construction of a hangar, machine and repair shop, and other buildings on a 240-acre tract on Burkburnett Road to be developed for an aviation field, to cost more than $45,000 with equipment.

Houston Lighting & Power Co., Houston, Tex., is said to be arranging an expansion and improvement program and is authorizing fund of about $6,000,000 for increased power and transmission facilities. Plans are being completed for a power substation to cost about $200,000 with equipment.

Southern Ice & Utilities Co., Santa Fe Building, Dallas, Tex., will proceed with erection of one-story ice-manufacturing plant at Odessa, Tex., to cost about $45,000 with equipment.

Union Carbide & Carbon Co., 30 East Forty-second Street, New York, is said to have plans for two one-story plant units at Shreveport, La., to cost $150,000 with equipment.

Indiana

INDIANAPOLIS, March 5.

PLANS are under way by E. F. Miller, Farmers' Trust Building, Anderson, Ind., architect, for a two-story and basement automobile service, repair and garage building, 85 x 125 ft., at Logansport, Ind., to cost $95,000 with equipment.

National Radiator Co., Utica, N. Y., formed by recent merger of Utica Radiator Co., Niagara Radiator & Boiler Co., Continental Boiler & Radiator Co., and other interests, has leased space on West Georgia Street, Indianapolis, for a new factory branch and distributing plant. A similar factory branch will be established at Louisville. H. Weers, 57 South Bolton Avenue, Indianapolis, is local manager.

Delco-Remy Corporation, Anderson, Ind., manufacturer of automobile starting and lighting equipment, will soon break ground for a one-story and basement foundry to cost about $75,000. Company is a division of General Motors Corporation.

Durant Motor Co., 250 West Fifty-seventh Street, New York, has disposed of its plant at Muncie, Ind., formerly works of Interstate Motor Co., to Merchants' Trust & Savings Co., Muncie, and will discontinue operations permanently at that point.

Dixon Burial Casket Co., Dixon, Ill., is said to be planning establishment of a branch plant at Richmond, Ind. It is understood that company has acquired local property of Richmond Casket Co., recently offered at a receiver's sale, and will remodel.

Board of Education, Elkhart, Ind., has begun superstructure for a three-story and basement high and vocational school addition at Second and High Streets, to cost $160,000. Hubert Miller, Monger Building, is associate architect.

Fame Canning Co., Shelbyville, Ind., contemplates rebuilding portion of plant recently destroyed by fire, with loss in excess of $350,000 including machinery. Headquarters are at 58 East Washington Street, Chicago.

Pacific Coast

SAN FRANCISCO, Feb. 29.

CONTRACT has been let by Bunting Iron Works, 820 Parker Street, Berkeley, Cal., to Lawton & Vezey, 354 Hobart Street, Oakland, Cal., for a new one and two-story plant to cost close to $28,000. Benjamin G. McDougall, 353 Sacramento Street, San Francisco, is architect.

Monolith Portland Cement Co., Bartlett Building, Los Angeles, is arranging an expansion and improvement program at its mill at Tehachapi, Cal., to cost about $250,000, including installation of additional equipment.

American Fiber Products Co., 526 Bay Street, San Francisco, contemplates a new plant in vicinity of Chico, Cal., for manufacture of strawboard, rice paper specialties, etc., to cost more than $75,000 with equipment.

East Bay Iron & Metal Works, 2310 Peralta Street, Oakland, Cal., is considering rebuilding portion of plant recently destroyed by fire, with loss estimated at $65,000 including equipment.

Santiago Orange Growers' Association, Orange, Cal., plans installation of an ice and pre-cooling plant in connection with a new one-story packing house. Conveying and other mechanical equipment will be installed in packing division. Entire project will cost about $125,000.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, is planning extensions and improvements in power plant and transmission lines at Lodi, Cal., and vicinity to cost about $75,000. A new power substation will be built in vicinity of Yuba City, Cal., and additions made in transmission lines to cost a like amount.

Doernbecker Mfg. Co., East Twenty-eighth Street, Portland, manufacturer of furniture, has plans under way for an addition, to cost about $450,000 including machinery.

Belmont Copper Co., Superior, Ariz., has approved plans for a new flotation plant with capacity of about 200 tons, to cost in excess of $450,000 with equipment.

San Juan Pulp Mfg. Co., Laurel Street and Cornwall Avenue, Bellingham, Wash., is contemplating an addition with capacity of about 40 tons of pulp per day, doubling present output, to cost more than $100,000. Ossin Anderson is president.

Cousins Tractor Co., Hanford, Cal., has acquired adjoining property, 50 x 150 ft., and plans erection of an addition, to be used primarily for machine shop and tractor assembly, to cost about $60,000. Edward Cecil is head.

Arizona Light & Power Co., Phoenix, Ariz., is arranging an expansion and improvement program to cost approximately $1,100,000, including additional power facilities, new transmission lines, power substations and miscellaneous work.

Board of Public Utilities, Riverside, Cal., is considering a new municipal steam-operated electric power plant, with capacity of 5000 kw., and has authorized R. L. Boulden, superintendent, to secure details of equipment and estimates of cost.

National Ice & Cold Storage Co., Postal Telegraph Building, San Francisco, plans construction of ice-manufacturing and cold storage plant at Hollister, Cal., where site, 70 x 240 ft., has just been purchased, to cost about $70,000.

Beall Pipe & Tank Corporation, Portland, Ore., has opened a branch office at 2342 Sixty-second Street, Seattle, under management of J. V. Hyde. It is stated company is considering building a branch plant there.

Barde Steel Co., Seattle, has been granted a charter with a capital of $300,000, and has succeeded to business formerly carried on under name of M. Barde & Sons Steel & Machinery Co.

A machine shop, 40 x 80 ft., will be built by Farrell Iron Works at 1215 Valley Street, Seattle.

Canada

TORONTO, March 5.

LOCAL dealers and builders report a good volume of machine tool business. While much of this consists of orders for single tools for garages and repair plants, some lists are in prospect for additions and replacements by automobile manufacturers. A strong demand for equipment features both Toronto and Montreal markets as a result of the heavy buying by mining interests in northern Ontario, Manitoba and Quebec. Municipal governing bodies are preparing to enter the market for equipment for local waterworks, sewage and power plants, and some large orders from this source are expected within the next few months.

Plans and specifications are being prepared by F. A. Dallyn, consulting engineer, 71 King Street West, Toronto, and tenders will be called in about a month for new waterworks and sewage systems to be installed at Blind River, Ont., to cost between $200,000 and $250,000.

Town Council, Glencoe, Ont., is having plans prepared by F. A. Dallyn, consulting engineer, 71 King Street West, Toronto, for waterworks plant and system to cost $70,000.

Loretteville, Que., will install new waterworks and sewage plants to cost $200,000. Langlais, Ricard & Royer, 126 St. Peter Street, Quebec, are engineers. Bids are being received by E. A. Martel, secretary, municipal council.

Springer Lock Works, Coleman Street, Belleville, Ont., will build a two-story addition, 40 x 60 ft., to cost $10,000.

W. E. Dillon Co., Ltd., 189 George Street, Toronto, manufacturer of sheet metal products, etc., will build a two-story addition, 35 x 56 ft.

A. Mason, 130 McRoberts Avenue, Toronto, has let contract to W. H. Little, 63 Edna Avenue, for erection of a one-story foundry, 80 x 200 ft., brick construction.

Brantford Roofing Co., 22 Sydenham Street, Brantford, Ont., has let contract to Schultz Construction Co., Ltd., local, for an addition to its plant.

Western Canada

British Columbia Refractories, Ltd., 265 Water Street, Vancouver, B. C., has let contract to A. Roger Contracting Co., 744 Hastings Street West, for a plant to cost $40,000.

Foreign

MUNICIPAL COUNCIL, Moscow, Russia, has plans for an automobile manufacturing plant to cost close to $12,000,000, to specialize in production of cars of light type, with facilities for output of approximately 10,000 automobiles per year. A special commission will be formed to purchase machinery, including equipment in United States.

Director of gas works, Zurich, Switzerland, has been authorized to have plans drawn for extensions and improvements in artificial gas plant, including installation of improved type ovens, reconstruction of gas-coke division, facilities for coal and coke-handling, storage, etc., and other work, to cost about $1,350,000. American Consulate, Berne, Switzerland, Charles E. Lyon, commercial attaché, has information regarding project.

Aluminum Co. of Italy, Marbhera, near Venice, Italy, officially known as Societa Italiana dell' Alluminio-Milano, has arranged for increase in capital from 1,000,000 to 80,000,000 lire, a considerable portion of proceeds to be used for extensions and improvements in hydroelectric power facilities, electric furnaces and other departments. Company has secured rights to process for treating bauxite and pyrite minerals in electric furnaces. Main offices are at Milan.

Supreme Council of National Economy, Petrograd, Russia, has plans under advisement for construction of a new graphite refinery in Ukraine. Information at American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Government Railways of New Zealand, Wellington, is asking bids until June 25 for machine tools and other equipment, including four milling machines, three boring mills, one is to be vertical type, two screening and mixing machines, one face grinding machine, welding machines, rivet heaters, pipe and tube bending machines, etc.

Oslo Gas & Electricity Works, Oslo, Norway, known as Oslo Gas og Elektricitetsverker, is disposing of bond issue of $6,000,000 in United States, a portion of proceeds to be used for extensions and improvements. H. Horn is director general.

San Salvador Electric Light Co., San Salvador, Salvador, has acquired additional properties suitable for hydroelectric power development and will complete plans soon for a station with capacity of 4500-hp. Extensions will be made in transmission lines.

P. Schreiner sen. & Co., Oslo, Norway, request catalogs describing brazing, welding and cutting equipment for iron, steel and metals.

NEW TRADE PUBLICATIONS

Board Drop Hammers.—Erie Foundry Co., Erie, Pa., has issued a 16-page bulletin, No. 160, describing the various types of construction regularly furnished, including the four-roll hammers and those with inserted guide box-section frames, and picturing installations of the several types.

Heat Control.—Brown Instrument Co., Philadelphia. 24-page illustrated booklet entitled "How the Other Fellow Does It," describing 20 installations, some of them in unusual applications, of automatically controlled heat-treatment furnaces.

Arc Welders.—Fusion Welding Corporation, 103rd Street and Torrence Avenue, Chicago. Bulletin of four pages devoted to the Fuzon flexible arc welder, with description of the operation, control and other features of the job. Three models are available with welding ranges going up to 300, 400 and 600 amp. respectively.

Heating Resistors.—Monitor Controller Co., Baltimore. Bulletin 111 of eight pages illustrates and describes Monitor resistors in three groups: Edgewound for highest current values; hexwound for intermediate current values; smoothwound for lowest current values. The units are designed for heavy-duty service and are stated to be unusually compact, light and practically unbreakable.

Air Filters.—National Air Filter Co., 5130 Ravenswood Avenue, Chicago. Folder illustrated and describing a set of air filters installed in a large rolling mill. Six units are designed to clean a total of 300,000 cu. ft. of air a minute, for ventilation of mill motors and motor-generator sets.

Dust Problems.—Dust Recovery, Inc., 15 Park Row, New York. Bulletin No. 1 of 36 pages is devoted to an analysis of dust problems, the selection of dust-collecting equipment and methods of testing that equipment. There are a number of line drawings and several pages of tables dealing with the matter of cleaning the air of dust.

Tube and Rod Straighteners.—Torrington Mfg. Co., Torrington, Conn. Two-page folder giving standard specifications and a description of a roll-type straightener for tubes and rods.

Recording Wattmeters.—Bristol Co., Waterbury, Conn. Catalog 1502 of 28 pages illustrates and describes a complete line of wattmeters for a wide variety of requirements. Charts of various descriptions are illustrated, as well.

Direct-Current Heavy-Duty Motors.—Reliance Electric & Engineering Co., Cleveland. Bulletin 202 of eight pages illustrates and describes heavy-duty motors of type 7, fitted with ball and roller bearings. The description is quite complete, including dimensioned sketches for the various sizes.

Airport Lighting Equipment.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2108, showing the necessary equipment for the guidance of night flying. Course lights, field beacons, boundary lights, obstacle lights and various special illuminators, such as ceiling projectors, are described.

Globe and Gate Valves.—Wellman-Seaver-Morgan Co., Cleveland. Bulletin No. 89, 20 pages, describes and illustrates a new line of Supertest globe and gate valves having bodies and bonnets of forged steel. Advantages claimed include simplicity of design, demountable cages, cage and seats integral, all parts interchangeable and easily removable without removing the valve bodies from the line. Gate valves are made from 1 in. to 6 in. and upward and globe valves from ½ in. to 2 in. and upward.

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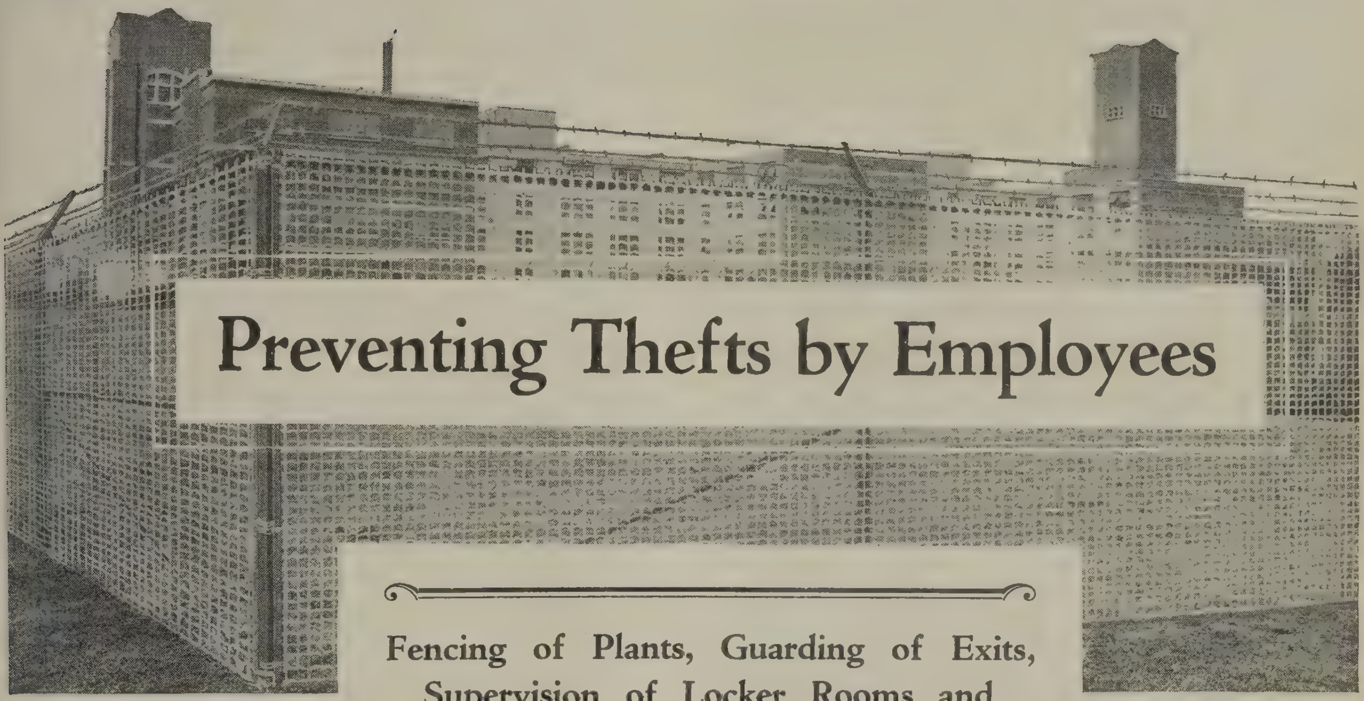


Preventing Thefts by Employees

Fencing of Plants, Guarding of Exits, Supervision of Locker Rooms and Building Up Trustworthy Personnel Are Effective Means

THEFT by workmen in plants manufacturing brass, copper or other metal products of relatively high intrinsic value is largely kept in check by regulating the entrance and exit of the employees and by building up a feeling of responsibility in the worker. This conclusion is borne out by a survey of a number of such plants by THE IRON AGE. The survey was prompted by the experience of a manufacturer in Iowa which had been faced with the problem of theft in its brass departments. This company's factory buildings are not surrounded by a fence, and although employees are expected to leave by definite doors, there is always possibility for exception.

Fencing of Plants a General Practice

A large number of the companies canvassed in THE IRON AGE survey have found that fencing the plant, thereby securing control of the entrance and egress of employees, is the most effective means of preventing theft. In most cases workmen are required to have passes for taking packages out of the gates. Examination of such packages is usually left to the judgment of the watchman at the gate, and employees seldom resent such inspection if the company frankly explains the reason. A large canning company states that the gate examination is "to prevent pilferage from the locker rooms as well as from manufacturing areas. It is taken for granted that a package will be examined, and as the employee bearing a parcel approaches the watchman he opens it for inspection."

By prohibiting automobiles within the mill inclosure most companies have effectively checked the stealing of large pieces. One company reported the extreme case of a workman's throwing a pig or ingot outside of the company inclosure during the day and returning in the evening to recover the material for subsequent sale to a scrap dealer.

The concealment of valuable articles in dinner buckets has always been a rather common form of petty thievery. Some companies prevent this by not permitting employees to take their dinner buckets into the work room. Under this plan workmen enter the shop through a locker or wash room, where they leave their dinner pails, and return to this room to eat their lunches. One plant which does not have such a system is seriously considering prohibiting workmen from eating their lunches in the work shop. A manufacturer of brass specialties in Los Angeles makes the observation that nearly all its employees bring their lunches to work in a paper sack or grocer's bag, which is, of course, destroyed as soon as the lunch is eaten. Of this company's 65 employees only one regularly carries a dinner pail.

Rigid Locker Room Practice

Preventing workmen from concealing valuable materials in their clothes is usually accomplished by careful supervision of the locker room. A large manufacturer of plumbing supplies and fittings in Philadelphia writes as follows: "Our locker rooms for the workmen all have open lockers without doors, and the rooms are in charge of reliable men who have supervision over the workmen. It would be difficult to carry anything into these rooms without being seen." Other plants require their workmen to change their clothing in a locker room that is constantly under supervision and have found this practice a very satisfactory one in preventing thievery.

A large brass works in Michigan, forced to take measures to prevent theft, established a separate locker room into which all men coming to the plant leave their street clothes, put on their factory clothing and overalls and also leave their dinner buckets. "During all the working hours," the company states, "this room is closed and the men cannot reach their street clothes or dinner pails. At noon and at night a watchman is at the entrance to the locker room, and any package or article the men bring with them at either time must be initialed by the inspector whose duty it is to do that work. When a man wishes to take his factory clothing home the package is O.K.'d by the foreman of the department in which the man is employed."

"In the past," this company relates, "we have found that the taking of overalls and other clothing home to be washed was a common excuse for having a package, and, of course, most anything could be concealed in such a bundle and taken out of the plant. To overcome this we established our own washing machine in the plant and wash our men's clothing as required, so that the only time they have occasion to take out such a package is when clothing is to be discarded. It is pertinent to state that we have never had the least objection to our system, and the honest men appreciate the fact that there is no reflection upon them to have some method of checking up on those who are dishonest."

Checking Up on Materials In Process

Another effective method of preventing theft is the checking up of materials in process. A Cleveland brass manufacturing company "accounts for all the castings the molder makes, checking up on the good castings as well as the defective ones. The number of good castings is recorded in the foundry and delivered to the machine department where the account is verified. Any loss through machining or in the form of defective castings is recorded on the machine shop time cards. This count is then passed on to the next department, and any losses which may occur in this department are handled in the same manner, and so through all departments."

"Our storerooms," writes a manufacturer of specialized office equipment in New England, "are very carefully operated. All of our raw materials, parts in process and finished machines are carefully accounted for, and about the only things an employee could get away with might be a few small parts of the machines which would have no real value to him."

Nearly all companies send their finished parts to the warehouse as soon as possible, and this helps considerably to remove temptation where the manufactured products are of rather high intrinsic value. A manufacturer of non-ferrous metal products at Milwaukee locks up its valuable products and employs a trustworthy watchman who is responsible for them. "It is also our practice," the company states, "to ship out all completed castings before the closing of the shop in the evening. Our last pour is left in the sand until the men have gone home, after which the castings are taken out under the care of the watchman."

Many of the companies which employ a careful system for accounting for work in process believe that the psychological effect upon the workmen is such as to reduce the likelihood of thievery.

Selling Stolen Scrap Metal

Some companies have suffered considerable losses in the sale of scrap metal from their yards. A large hardware manufacturer in New England writes as follows regarding its solution of the problem: "The greatest difficulty we have had has been when metal has been sold to junk men in the yard and they have taken away new metal with the old, or the weights have been juggled. This has been remedied by putting the sale of old metal in the hands of our purchasing department, where the handling and packing of the metal is done by men who do not know to whom it has been sold."

A manufacturer of metal products in Milwaukee reports an unusual experience of this sort. "A few years ago," the company writes, "a neighboring foundry was buying scrap metal from a local scrap dealer. The company's scrap purchases included sprues and gates and other material that would never be sold by a foundry. Realizing this, the neighboring company made an investigation and found that these sprues and gates came from our plant. We immediately made an investigation and found that there was a small scrap dealer who had influenced some of the men in our cleaning room to fill their dinner pails with our scrap and receive a nominal amount for it, possibly 10c. or 15c. for material which was worth five or 10 times as much. This dealer sold this material through responsible metal dealers."

This same company also suffered losses when pigs or ingots were buried in wheelbarrow loads of waste and taken out of the plant, but has been able to stop these practices by carefully watching suspected employees and taking particular precautions in the hiring of new men.

A company in Delaware has been able to prevent the theft of scrap materials by keeping in close touch with the police department in the town where the plant is located. "As we are in a small town," the company states, "we do not believe local junk dealers would take a chance on accepting anything which they suspected of having been stolen from local plants. We recall several cases where attempts have been made to sell stolen scrap, but they have quickly been reported to the police department and the guilty party has been immediately apprehended."

Employing Detectives Unpopular

A State manufacturers' association in the Middle West states that hiring a private detective in the plant has often been a satisfactory method of preventing thievery. Individual companies, however, have not always found this means successful. "Some companies go so far," says a brass manufacturer in Michigan, "as to hire private detectives who are mechanics to spy on the various ones who may have aroused suspicion. This method is rather expensive and, when found out, creates an ill feeling among employees."

A Cleveland company had similar experiences with this plan. "We have employed inside men for the purpose of checking up on thefts," the company observes, "but the results have not been good and the practice has led to several mix-ups. We later instructed our foremen in the different departments to keep a sharp look-out for any irregularities of this sort and this materially helped to solve our problem."

Many companies have found that the prosecution of guilty parties has helped prevent further dishonesty among employees and, therefore, do not stop at the mere discharge of the men who have been caught stealing.

Building Up a Trustworthy Personnel

Small companies having a low labor turnover are not often troubled with plant thefts. A small maker of water heaters in California states that its policy of maintaining its labor force practically constant has virtually eliminated the problem of stealing by employees. A manufacturer of office equipment in New England with a small labor turnover reports that this fact has been largely responsible for its success in dealing with the theft problem.

This plan of placing trust in its workmen has been very liberally interpreted by a Pennsylvania manufacturer. "We had trouble some time ago with petty thefts," the company writes, "but have eliminated them by letting our men know that what is worth having is worth asking for. We make it a practice not to charge our employees for such things as a single faucet or stop cock, and only charge them actual cost on a bill of goods for use in their homes when the bill covers two or more pieces. We also have a cooperative buying plan by which we purchase things which are needed in our workmen's homes and for which they cannot afford to pay cash. For such things we charge actual cost prices and allow the men to pay us by small weekly payments. We also frequently loan our employees limited amounts of money in case of emergencies, which we allow them to repay in small payments."

Careful selection and training of personnel has also solved the theft problems of a large manufacturer of barber shop equipment in St. Louis. "Before anyone is employed by us," the company states, "a careful investigation is made to ascertain his honesty and integrity. If he is employed he is trained to become a specialist in a particular line. In most cases the employee becomes a real asset to the firm and feels that it is to his best interest to keep things running smoothly. This also reduces the number of temporary workers."

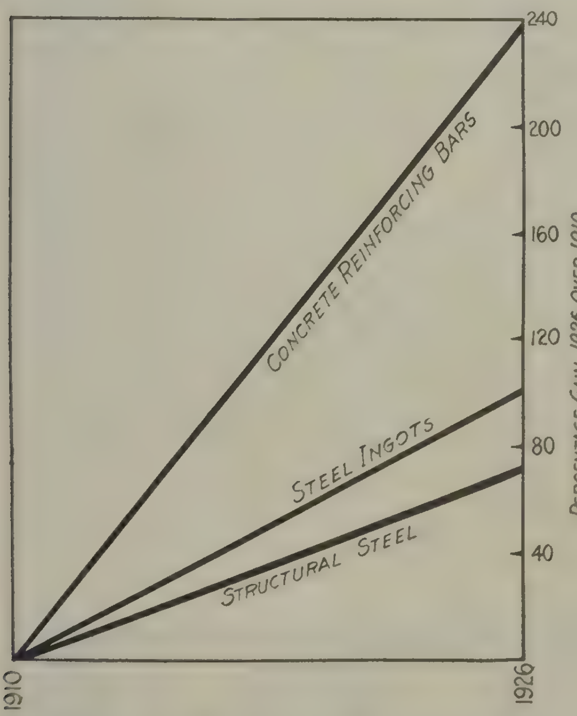
A brass and metal casting manufacturer in Minnesota has the following to say on the subject: "The only way we have been taking precautions in this line is by having 'trusty' foremen and a few of the older employees keep their eyes open at all times. Quite frequently in this way we get information leading to the discovery of a dishonest worker."

Structural Steel and Concrete Bars

Steel Market Lost to Concrete Estimated at Over 2,000,000 Tons a Year —Structural Shapes Not Keeping Pace with Ingots

MANY analyses have been made in an effort to determine the steel market which has been lost to reinforced concrete. Two independent calculations show results close enough to each other to indicate that a fair estimate has been made of the extent of that loss. Some of the data are given in the following paragraphs.

Production of concrete reinforcing bars in 1926 was reported by the American Iron and Steel Institute at 815,829 tons. It is estimated that 70 per cent of this, or 571,000 tons, was used in the structural part of buildings. When thus used it has been estimated that 1 ton of concrete bars displaces about 5 tons of structural steel. Consequently, the structural equivalent of the concrete bar tonnage which went into buildings would be 2,855,000 tons. If we deduct from this the tonnage of concrete bars used in the buildings, the possible steel market lost in one year to concrete is 2,284,000 tons.



Percentage Growth of Concrete Reinforcing Bar Production Since 1910 Has Been More Than Three Times That of Structural Steel. The latter has not made so good a showing as have ingots

Another method of approach is based on an estimate that 60 per cent of all the structural steel made goes into large buildings. Production of structural steel in 1926 was 3,911,663 tons, of which 60 per cent is 2,347,000 tons. It is reported that about half of our large buildings are erected with structural steel frames. As the other half are built of concrete, the possible structural steel market lost in one year would thus be about as great as the amount which is used. This figure is within 3 per cent of that determined by the other method. It does not, however, take account of the concrete bars.

Graphic representation of the growth in the use of concrete bars in buildings and of structural steel in buildings appears in a diagram. For purposes of comparison, the growth of steel ingot production is shown also. In this diagram no effort has been made to show intervening years between 1910 and 1926. Such years would provide varying figures and give irregular curves, instead of the straight lines shown.

It will be noted that the use of concrete bars has been more than trebled in the interval, whereas the use of structural steel has increased only about 73 per cent. Steel ingot production meantime has more than doubled.

As a further light on this general subject of the replacement of steel by concrete, a tabulation made some time ago of the percentage distribution of the cement production of the United States may be of interest. The information available is unfortunately inadequate to make a highly accurate tabulation, but the figures are given for what they may be worth.

Uses	*Per Cent*
Public and commercial buildings	26.0
Houses, exclusive of rural	8.5
Sidewalks and private driveways, exclusive of rural	5.5
Small town and farm uses	18.0
Sewerage, drainage, irrigation, culverts and concrete pipe	4.5
Paving and highways	27.5
Railroads	5.5
Bridges, river and harbor works, dams and water-power projects, storage tanks and reservoirs	3.0
Miscellaneous uses	1.5
Total	100.0

On this basis the 26 per cent use of cement in public and commercial buildings would represent over 40,000,000 bbl. in a year. More than half of this amount is believed to go into footings and other "mass" work, without reinforcing bars.

H. C. and W. C. Fownes have given 10,000 shares of the preferred stock of Spang, Chalfant & Co. received by them in exchange for their holdings of the Standard Seamless Tube Co. to 50 men long identified with the Standard company as department heads and plant officials. H. C. Fownes was president, and W. C. Fownes was vice-president, of the Standard company, and they held almost all of the stock. The par value of the preferred stock is $100 per share.

Aluminum Foundry Rearranged

Double Output with 40 Per Cent Less Molding Floor Space—Routing and Handling of Materials Well Planned

INCREASED production at the plant of the Packard Motor Car Co., Detroit, made it necessary to reduce the floor space of the aluminum foundry about 40 per cent to make room for a decided expansion of the core room and at the same time virtually to double the output of castings. After careful study it was decided that the installation of an extensive series of power-driven conveyors was not required. Instead, the desired expansion in production was achieved by the selection of other materials-handling units.

The drags of large crankcases are made in two Osborn roll-over machines, shown in the middle foreground of Fig. 1. These machines are served by overhead cranes which were moved from another department. The gravity conveyor shown in the left background is used to bring drags, with the crankcase castings in them, back to the molding department. The cranes pick them up from the conveyor and shake them out in the sand pile shown in front of the machines. The sand is wet down, cut over, and enough of it is put through a riddle to serve as facing. The castings themselves land in the foreground, where the core butts,

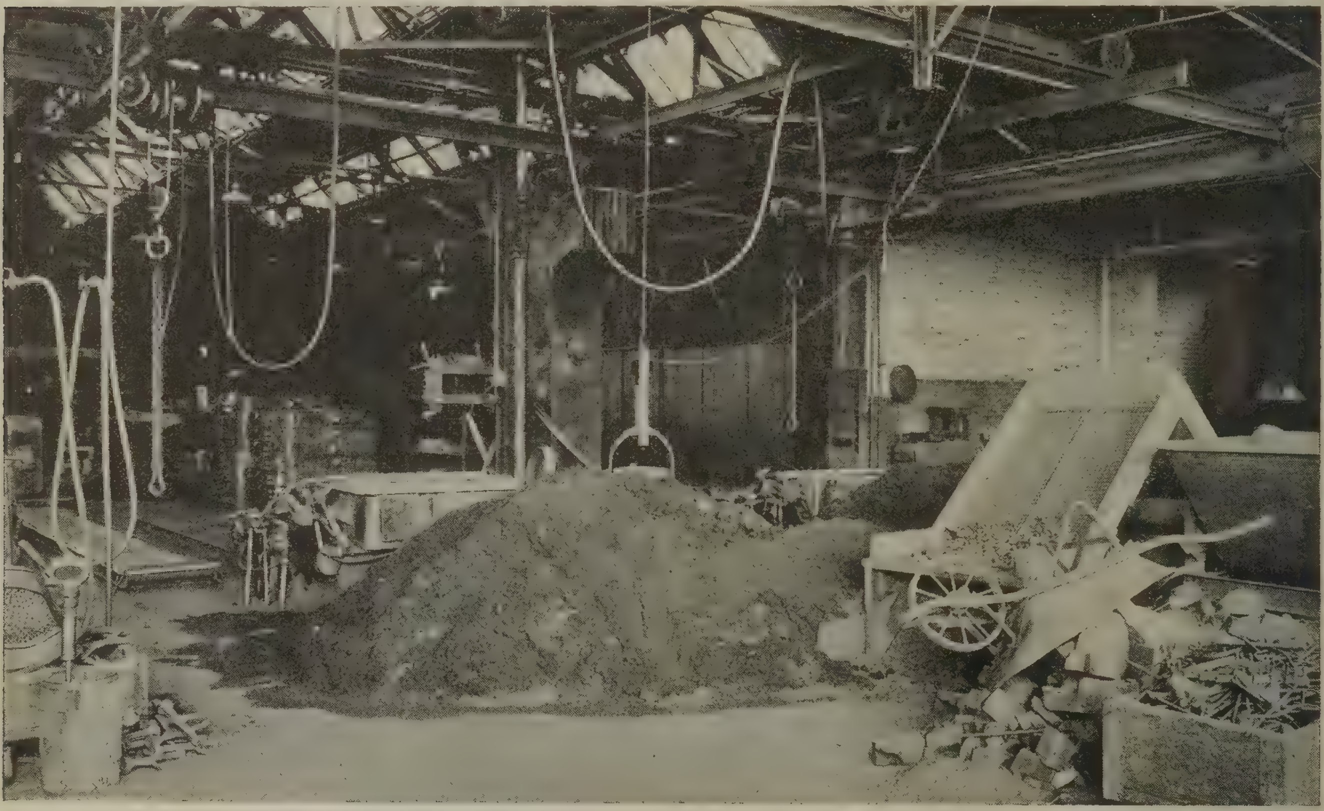


Fig. 1—In the Crankcase Molding Department the Drags Are Made on the Osborn Jar Roll-Over Machines Shown Behind the Sand Pile. The drags are delivered back into the foundry proper by carriages which run out from under the machines. Cranes then deliver them down the floors, and the poured molds come back on gravity carriers to be shaken out on the sand pile. The castings are knocked out in the foreground, and the rods, chills and chunk cores are recovered

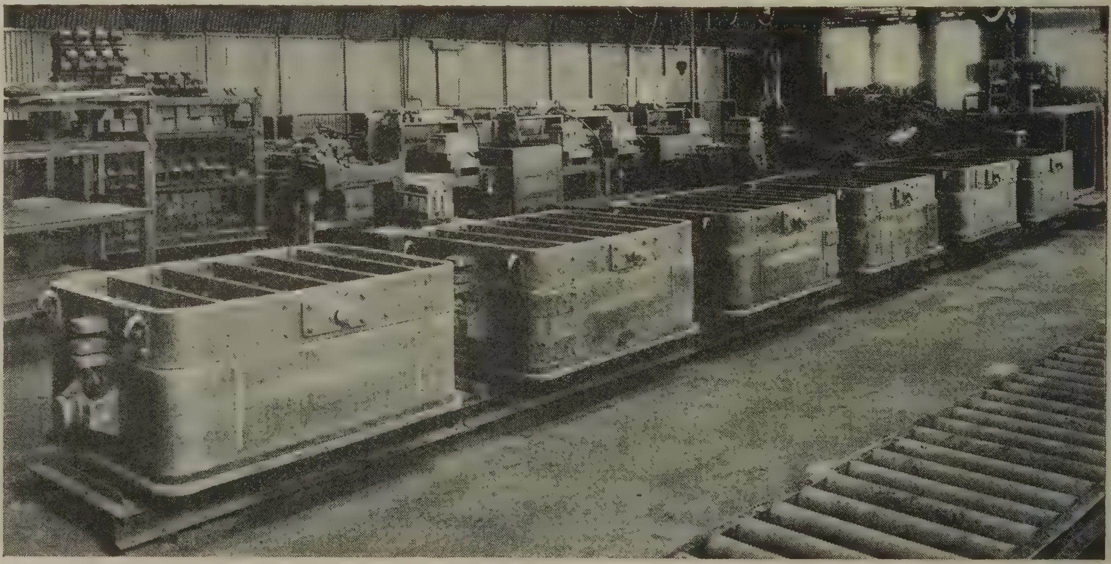


Fig. 2—The Finished Crankcase Drags Are Brought by a Crane to the End of the Gravity Carriers Shown. Here dry sand and green sand cores are assembled, the copes are closed on, and the molds are poured and run back for shaking out

rods, etc., are knocked out and put over the inclined riddle shown. The castings then pass to the cleaning room and the various materials knocked out go to the salvage or dump, as the case may be.

The flasks are returned by the crane to the molding machines. After a drag is completed, a car to which it is lowered transports it to a point where it is picked up by another crane and taken to the back end of another molding floor and placed in the position occupied by the empty flasks shown in Fig. 2. From this point the drags are pushed toward other molding machines.

Located between the two sets of gravity carriers is the green sand core department, as shown in detail in Fig. 3 and in the background of Fig. 2. Green sand

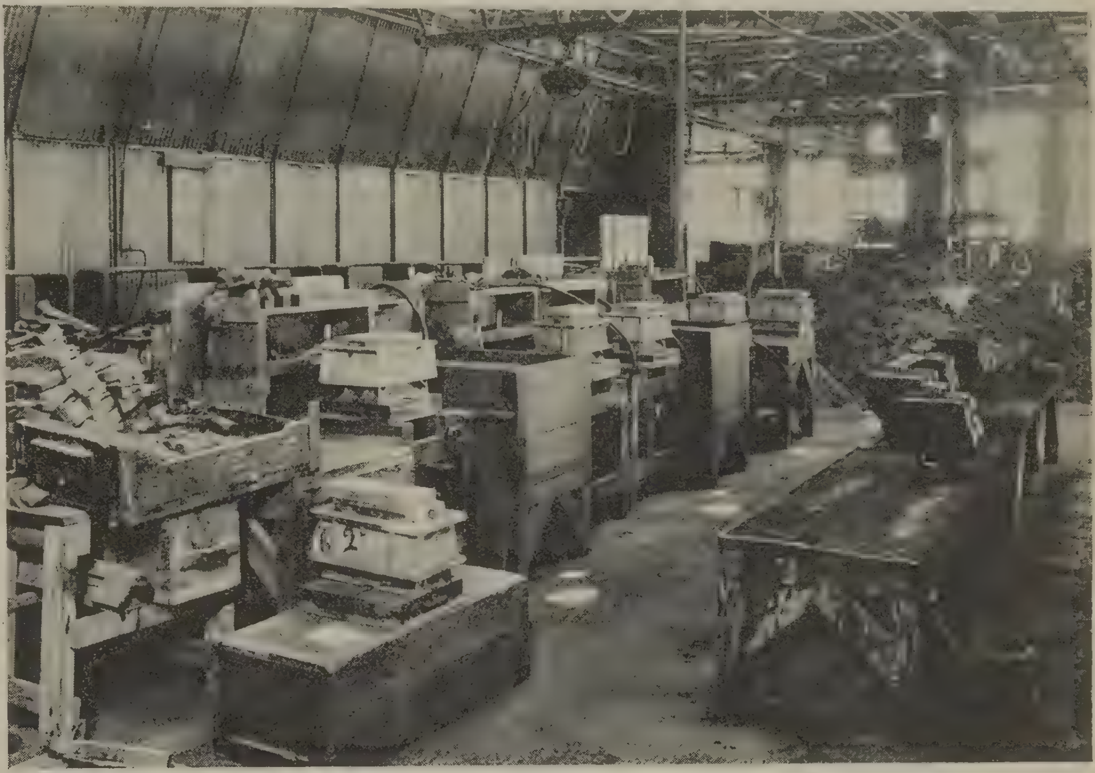


Fig. 3—Green Sand Core Department for Crankcases. The cores in the center of crankcases are made of green sand, being supported by special chairs and arbors, as shown on the bench in the right foreground

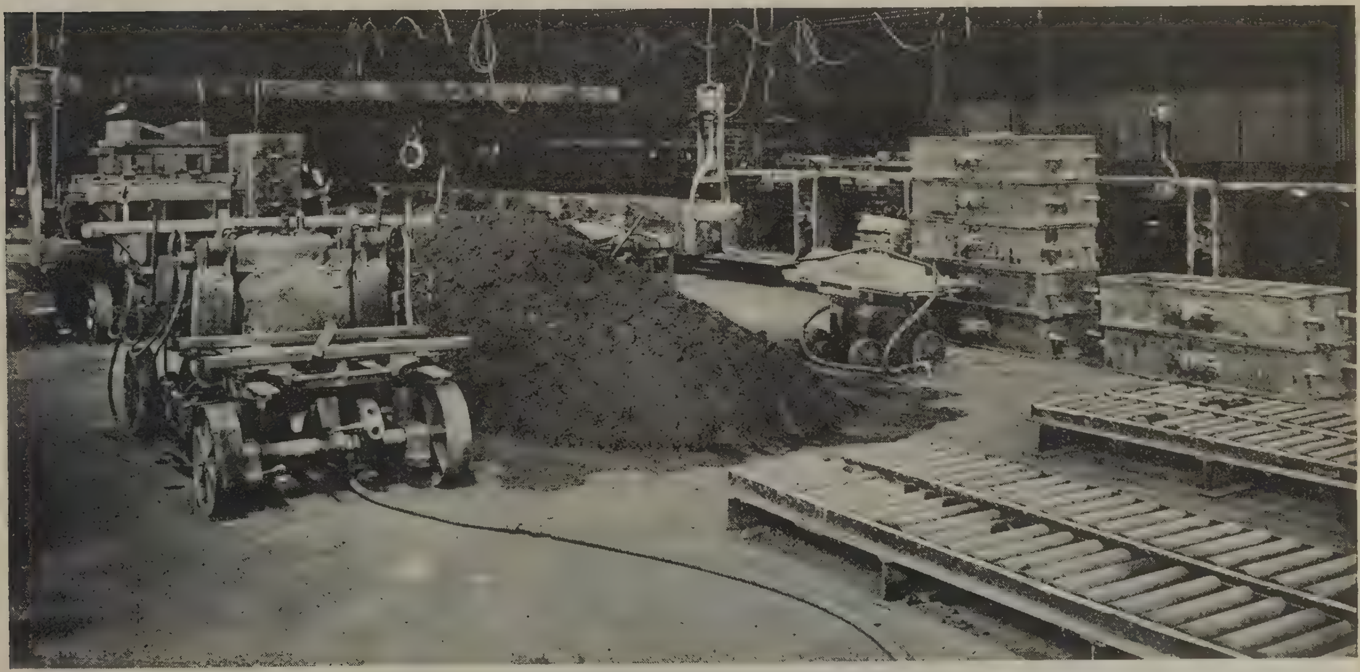


Fig. 4—In the Oil Pan and Floor Plate Molding Floor the Molds Are Lifted on and off Molding Machines by Light Overhead Cranes and Are Handled on the Floor by Gravity Carriers

Fig. 5—In the Light Work and Snap Molding Department, Molds Are Made on Molding Machines or Benches, and Then Are Run Down Gravity Carriers, Poured off, and Run Back for Shakeout

cores can be seen standing on the table in the right foreground of Fig. 3, and the green sand core boxes are shown on the various benches. As the drag progresses from where it is first set on the carrier, dry sand and green sand cores are placed in position, and then opposite the sand heap shown beyond the coremakers' benches a flat back cope is rammed up and closed on. The mold is then poured and, after the cope is shaken out in the sand heap shown at the end of the core room, progresses still further toward the final shakeout shown in Fig. 1.

For molding oil pans, foot plates and other fairly bulky castings a group of four machines is placed in the center of the foundry, with gravity carriers extending from it, as indicated in Fig. 4. In this case, the mold parts are handled with overhead cranes, while the work is transported on gravity carriers and is subsequently returned to a point near the molding machines for shakeout.

For making small work, raised gravity carriers are used in connection with benches or light molding machines. A portion of this department is shown in Fig. 5.

The melting department of the foundry consists of a battery of oil-fired furnaces arranged along the wall at one end but in such a position that the metal is relatively close to the pouring point for most of the work.

The principal gain from the rearrangement of the foundry was that by judicious selection of equipment and careful planning of the work increased output and a considerable saving in the number of man-hours entering into the product were obtained without a heavy capital investment.

The H. M. Lane Co., Detroit, acted as consulting foundry engineer in connection with the undertaking, and the work of the installation itself was done by the construction division of the Packard Motor Car Co.

Magnet Handles Strip Steel Successfully

Two Coils Lifted in Novel Manner with Flat Plate Without Uncoiling—Boxed Strip Picked Up Readily

COILED strip steel is a difficult material to handle, for unless the coils are tightly bound together they will pull apart and cause confusion to the handlers and damage to the steel. A strip steel coil, even though securely bound, is a heavy, awkward thing to handle and the moving of any amount of this steel requires a gang of husky men who must be continually cautioned against battering the finished steel strip.

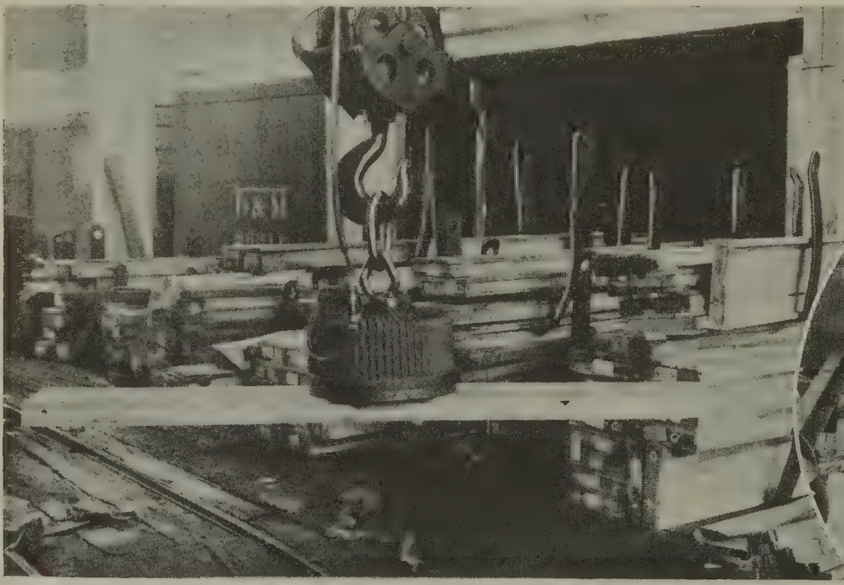
The Superior Steel Corporation, Carnegie, Pa., whose product is largely cold and hot-rolled strip that is shipped both in coils and boxed flat, has adopted lifting magnets for handling finished steel. Manual labor is used only where necessary to move the bundles or boxes into closed freight cars. At this plant they recently loaded 200,000 lb. of strip steel into box cars with the magnet and four men during a 10-hr. shift. Before the magnet was purchased, the most that six men could load was 140,000 lb. in a 10-hr. shift.

The magnets usually handle two coils at a time. If these two coils are not placed tightly up against each other, one or both of the coils have a tendency to fall away from the magnet and be held in a vertical position. Because the steel must not be battered, it is not satisfactory for the coils to be dropped on their edge.

In experimenting with the magnets on this job of handling coiled strip steel, the Superior company discovered that a thin sheet of steel placed over the two coils to be lifted would spread the flux from the magnet sufficiently to hold both coils flat against the plate. It is a peculiar fact that this plate does not short circuit the flux, but causes the magnet to do a better job than without the plate.

The fact that much of the strip steel is boxed flat does not interfere with its being handled by the lifting magnet. One photograph shows an Electric Controller & Mfg. Co. lifting magnet moving a long box of strip steel. This particular package weighed a little over 600 lb., while the same magnet is handling packages that run as high as 1000 lb.

A double-magnet lifting rig, used at the same plant for coils of wide strip steel, was illustrated in THE IRON AGE of Feb. 16, page 472.



Avoiding the Loosening of Coils and Damage to Material Resulting from Ordinary Handling of Strip Steel by Magnets (Upper Right) by the Use of a Flat Plate (Lower Right)

Systematic View of Stainless Steels

High-Chromium Steels Classified into Three Groups—Properties Briefly Described and Utility for Various Purposes Noted

BY FRANK R. PALMER*

DOZENS of brands of corrosion-resisting alloys or "stainless steels" are now being manufactured by many different mills, under a variety of trade names. It is only natural that data regarding them may be contradictory, incomplete and even inaccurate. After some 10 years' experience with them, it is possible to classify them into three general groups. These three groups may be designated as A, B, and C, and the rules which govern this sub-division are so fundamental and important that they may be called the "A B C of Stainless Steel."

Each group is characterized by certain properties

	Group A	Group B	Group C
Analysis	Chromium less than about 14 per cent. Carbon less than about 0.40 per cent. May contain small percentages of tungsten, copper, nickel, silicon or molybdenum. This group is magnetic.	Chromium more than about 16 per cent. Carbon less than about 0.40 per cent. May contain small percentages of copper, nickel, silicon, molybdenum or tungsten. The group is magnetic.	Contain enough chromium and nickel to make steel austenitic and non-magnetic. Usually contain twice as much chromium as nickel or vice versa.
Heat Treatment	Respond to hardening, tempering and drawing. Resulting physical properties depend on analysis.	Heat treatment not recommended. Are naturally soft — usually having a Brinell under 200 and seldom over 250.	Do not respond to heat treatment.
Toughness	Are structurally dependable. Are not brittle in sharp-notched sections or under impact.	Have low impact resistance especially in notched sections. Not dependable for bolts and similar notched parts when used under impact.	Extremely tough at all times. Thoroughly dependable for any type of shock service within the capacity of their strength.
Grain Growth	Not subject to excessive grain growth at incandescent temperatures. Thoroughly dependable at any temperature for supporting any load or shock within their carrying capacity.	This group is divided with regard to grain growth. The simple chromium irons and those containing high silicon or aluminum are subject to excessive and dangerous grain growth and become very brittle. Grain growth is reduced by use of carbon, manganese, copper and nickel. Some steels containing these elements are not subject to grain growth at all.	Do not become brittle because of grain growth—thoroughly dependable for high temperature service.
Hot Working Qualities	Readily forged, pierced or rolled. Air-harden on cooling.	May be forged, rolled or pierced. Those steels subject to grain growth must be heated very quickly. Those not subject to grain growth are heated in the usual way.	May be forged, rolled or pierced. Become work-hardened progressively below 1800 deg. Fahr. Do not air-harden.
Cold Working Qualities	Can be cold drawn into wire, cold rolled, bent, formed, upset, coined and deep drawn.	Can be cold drawn into wire, cold rolled, bent, formed, upset, coined and deep drawn. Not quite so easily worked as Group A with equal carbon content.	Can be cold drawn into wire, cold rolled, bent, formed, upset, coined and deep drawn. Work-harden twice as rapidly as Group A.
Machinability	Machine readily with properly designed tools.	Machine readily with properly designed tools.	Very difficult to machine. This is an outstanding objection to this group.
Riveting	Make excellent cold rivets. Not recommended for hot rivets driven above 1500 deg. Fahr. on account of air-hardening.	Due to low impact values, not desirable for either hot or cold rivets.	Excellent for either hot or cold rivets. Hot rivets may be driven at a high temperature.
Welding	Can be welded by oxy-acetylene flame, electric arc or resistance. Weld air-hardens. No grain growth.	Can be welded by oxy-acetylene flame, electric arc or resistance. Those metals subject to grain growth become very brittle adjacent to the weld. Those metals not subject to grain growth yield satisfactory welds.	Can be welded by oxy-acetylene flame, electric arc or resistance. Weld does not air-harden and is very tough. This is an excellent group for welded products.
Corrosion Resistance	Very satisfactory for resisting weather, water and many organic and inorganic corrodents.	Possesses corrosion-resisting properties superior to Group A.	Corrosion resistance depends largely upon chromium content. This group will resist some types of action that Groups A and B will not. With chromium over 16 per cent the resistance is excellent.
Scale Resistance	Useful for temperatures up to about 1500 deg. Fahr.	Superior to Group A—recommended for temperatures about 1500 deg. Fahr.	The high-chromium steels are as good or better than steels of equal chromium in Group B.
Strength at Elevated Temperatures	Much better than straight carbon steel for temperatures up to 1000 or 1200 deg. Fahr.	Steels subject to grain growth not safe at high temperatures. Steels not subject to grain growth are better than Group A above 800 deg. Fahr.	Better than Group B at temperatures over 1000 deg. Fahr.

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which are common to all steels falling therein. The exact properties of the individuals will vary considerably depending upon the percentage of carbon and chromium, and to a lesser extent upon special additions of other alloying elements, such as nickel. It does not therefore follow that all steels within a given group are interchangeable in their application, and we must still take cognizance of brand names and detailed analyses. On the other hand, it should be emphasized that all corrosion-resisting steels at present commercially produced fall into one of these three groups and therefore exhibit the general peculiarities of that group.

A most common error is the disposition of many to say "pigs is pigs" and accept or condemn all stainless steels on the performance of one grade or the performance of one group. As a matter of fact, the three groups of stainless steel have very little in common one with another—one might only say "they are all steels containing chromium and all of them have certain corrosion or heat-resisting properties." The three groups should no more become confused than should three totally different alloys like nickel silver, bronze and monel metal. Although these all contain copper and all possess corrosion-resisting properties, we are not tempted to classify them under one head for construction purposes. We should be just as careful not to comprehend all grades of stainless steel in any general statement.

For the sake of brevity the general properties of each group of stainless steels are presented in tabular form. It is not possible to deal fully with all details and exceptions, and furthermore no effort has been made to extend the table beyond the mere delineation of group characteristics. There is a considerable choice of brands available in each group and they will not all serve equally well for a given purpose. The detailed properties of any given steel should be secured from the manufacturer of the brand in question, or from experiment under the required conditions of service.

It should be noted under "Analysis" that Group A has for its top limit about 14 per cent chromium, while Group B has for its lower limit about 16 per cent chromium. Steels containing from 14 to 16 per cent chromium partake of the properties of both groups. It must be understood that these group limits are not rigidly set, but fluctuate with the other elements contained in the steel. For example, stainless iron with about 0.10 per cent carbon may contain up to about 14 per cent chromium and still remain in Group A. When the carbon is raised to 0.30 per cent the chromium can be increased to 15 or even 16 per cent and the steel will still exhibit the properties of Group A.† The introduction of high manganese or nickel will also tend to raise the chromium limits of Group A and the introduction of silicon or aluminum will tend to lower them. With these reservations, the table applies to all high-chromium corrosion-resisting steels regardless of brand names or identity of manufacturer.

While it should scarcely be necessary to emphasize the term "quality" in connection with highly specialized products such as stainless steel, a word on this subject is in order. There is no grade of steel which reflects more honestly the skill of the workmen and the diligence of the inspection than stainless steel. Quality in this class of product is evident not only in narrowness of chemical limits and the purity and cleanliness of the product, but is very conspicuous in the uniformity of different shipments carrying the same brand label. It should be emphasized, however, that no amount of "quality" injected into a stainless steel will lift it from one group into another.

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†EDITOR'S NOTE: The reason for these variations has been given by E. C. Bain. See THE IRON AGE, Feb. 23, 1928, page 535.

Iron-Silicon Equilibrium Diagram

A DISCUSSION of several published investigations on iron-silicon alloys, including an early one of his own together with careful studies of high silicon alloys, has enabled T. Murakami to prepare a complete equilibrium diagram. (Science Reports, Tohoku Imperial University, Japan, May, 1927). His original suggestion that the compound Fe_3Si_2 existed was doubted by Phragmen, but the latter has been able to find X-ray evidence of its occurrence subsequently in well-annealed specimens. Other students postulated a gamma to alpha change in alloys containing free iron, and occurring at 800 deg. to 400 deg. C., depending upon the silicon content. Murakami made careful X-ray and microscopic studies on this point, and finds only the body-centered cubic lattice characteristic of alpha or delta iron. A magnetic change does occur unaccompanied by any atomic rearrangement.

Studies on higher silicon alloys, where agreement by various investigators is far from complete, were made on special melts of Armco ingot iron plus measured amounts of carbon-free ferrosilicon. These were studied by thermal analysis, X-rays, and the microscope. All results are summarized in the diagram, the meaning of the various fields being as follows:

Area A B M P, alpha iron with silicon in solid solution

Line A_2 N O, magnetic change in iron.

Line P Q, magnetic change in Fe_3Si_2.

Line B J, solidification of iron-FeSi entectic.

Line B M, entectic mixture of iron and FeSi.

Area B J M K, iron-FeSi entectic plus excess FeSi.

Line M L K, formation of Fe_3Si_2 by reaction of iron and FeSi.

Area P M L O, saturated alpha solid solution plus Fe_3Si_2.

Line L O, solid compound, Fe_3Si_2.

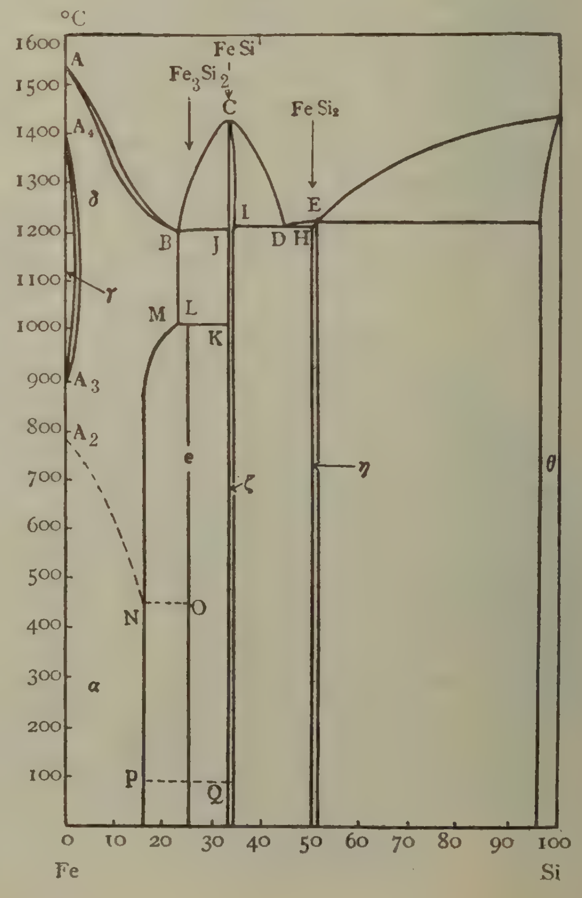
Area O L K Q, mixture of Fe_3Si_2 and FeSi.

Narrow strips at about 33 per cent silicon and 50 per cent silicon represent the ability of the compounds FeSi and $FeSi_2$ respectively to dissolve a small amount of silicon.

Between 96 and 100 per cent silicon, iron is held in solid solution.

The vertical hand between I and H is a mixture of FeSi and $FeSi_2$ (each with a little silicon in solution).

The broad area between 50 and 96 per cent silicon is a mixture of $FeSi_2$ (with a little silicon in solution) and silicon saturated with iron.



One-Ton Acid Open-Hearth Furnace

Some Experimental Results Obtained in a Small Furnace Operating Under Regular Conditions—Unusually High Temperatures Available

BY C. E. MEISSNER*

NEED for a practical method of deciding upon new alloy steel analyses to widen its markets was the problem facing the Chrome Steel Works at the beginning of 1927. In addition to determining the physical properties of the alloys under consideration, it was necessary to test their value in service. Small melts of steel in a crucible, from which test specimens could be made, were insufficient to determine more than physical properties. Therefore actual castings and ingots had to be made before the products could be placed in service. To save further experimental work, it was desirable that these heats should be made on a "pilot" basis; that is, actually duplicating regular open-hearth furnace practice. Therefore a 1-ton (2000-lb.) acid open-hearth furnace was built.

There are no special features in the design of this furnace. Standard acid open-hearth practice is followed, with the reproportioning of the dimensions necessitated by its small size. Notably, there is a considerably increased length in proportion to width, to get proper flame propagation. After the first heat was made it was found that the checkers were insufficient. The checker chambers were increased in size and the checker openings were made much smaller. The furnace was started late in March, 1927, and made 65 heats. The run was resumed in November and the furnace is still operating, having made 60 additional heats. For the last series there was some rebuilding of both the furnace itself and the checkers. Slag pockets were added.

Bottom is made of a regular acid bottom sand, using a sand paddle. It needs little repairing and lasts about five heats. Charging is done by hand. The charge generally consists of about 1800 lb. of scrap and 200 lb. of pig. Alloy additions bring up the charge to about 2000 lb. of metal. The furnace loss is 6 to 10 per cent. Alloy losses are not greater than in a standard furnace. All alloys are added in the furnace except ferromanganese, which is sometimes added in the ladle.

Melts can be made as high in carbon as desired. As our average analyses are high-carbon (0.65 to 0.90 per cent) alloy steels, a ratio of 10 to 20 per cent pig to scrap is mostly used. Practice is to melt about 15 points higher in carbon than the final carbon desired and then work down before additions of alloys. Ease of holding both heat and carbon is normal. Carbons as low as 0.04 per cent have been attained and 0.06 carbon is quite easily reached. Slags have been worked very successfully with iron reduced as low as 18 per cent FeO.

The furnace is oil-fired, using light, low-sulphur oil of 22 deg. Beaumé. The oil consumption is about 80 gal. per ton, which is double that normally used on the larger furnaces. This greater consumption is due to greater relative heat losses in this small unit. The oil is vaporized with compressed air at 100 lb. pressure. Standard burners are used. The flame is not more oxidizing than in the larger furnaces. Reversals are made every 15 min. Average time from charge to tap on normal heats is 4 hr.

Furnace life can only be estimated, but it is believed that the front and back walls will be the first to go, at around 200 heats. Metal temperatures during tapping have been noted as high as 3100 deg. Fahr. by optical pyrometers. The furnace crew consists of a first helper

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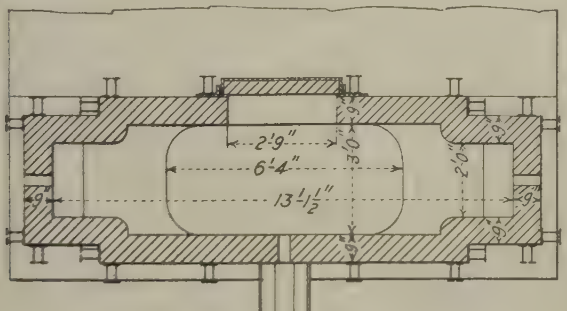
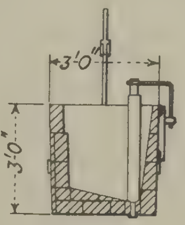
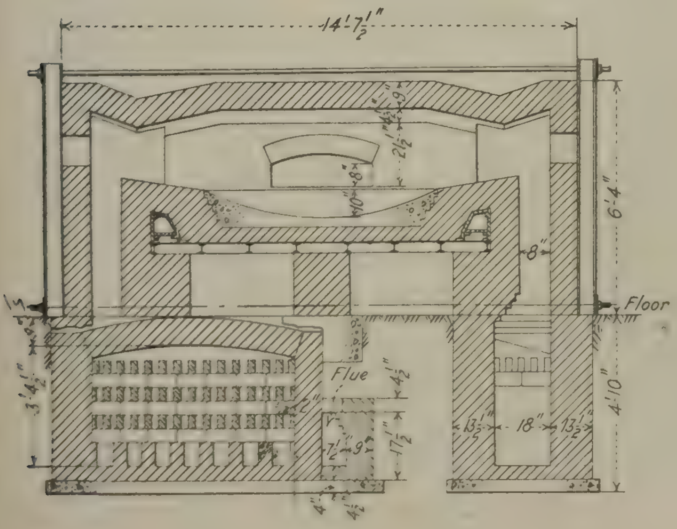
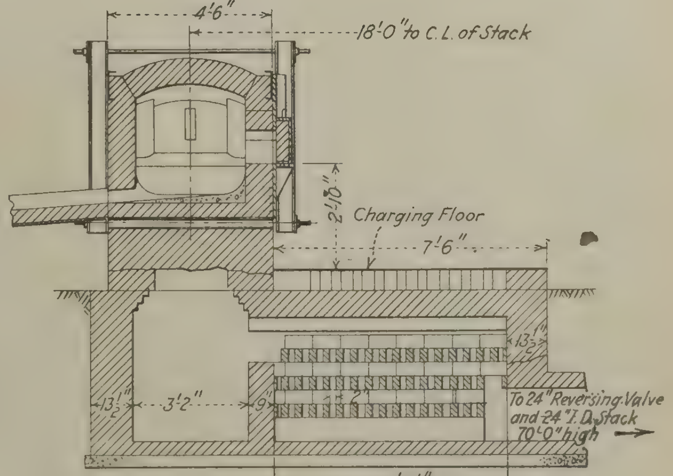
*Development engineer Chrome Steel Works, Carteret, N. J.





THREE Sections of the Furnace and One of the Ladle. At upper left the size of bath is shown, with arrangement of ports. At lower left is longitudinal section through bath, showing also the regenerator chamber. Transverse section is at lower right





with assistance from the regular pit gang for charging, tapping, etc. Heats as small as 1000 lb. have been made. Some of the steels have been very low in phosphorus and sulphur. Small ladles previously used for an old crucible plant were rebuilt for this furnace. Bottom pour was found to be more satisfactory than the teapot pour.

Several ranges of analysis have been worked on, which may be summarized as follows:

High-carbon steels with varying percentages of chromium from 0.30 to 1.00 per cent.

Chromium steels with carbon from 0.20 to 0.90 per cent and chromium from 1.00 to 3.57 per cent.

Chromium-molybdenum steels with carbon 0.60 to 1.45 per cent, Mo, 0.25 to 0.35, Cr from 0.80 to 2.50, and Mn from 0.60 to 2.50 per cent.

Chrome cast iron with carbon 2.75 per cent and chromium 12 to 18 per cent.

Chrome iron with carbon 2.75 per cent and chromium 23.0 to 27.0 per cent.

NEW LIST OF STANDARDS

Samples of Steels and Alloys Now Available from Bureau of Standards

THE United States Bureau of Standards is now prepared to furnish the tabulated standard samples, new and old, a list of which has not been published for some years.

Information as to the history of the standard samples, their use in checking methods of analyses, standardizing solutions, calibrating pyrometers, etc., is given in Bureau of Standards Circular No. 25. Summaries of analyses of the standard samples and general information are given in the supplement to Circular No. 25. These can be obtained without charge upon application to the Bureau of Standards, Washington. Detailed certificates of analyses are sent under separate cover to the same destination as the samples.

Orders should give both the number and name of the sample wanted. No samples of smaller size than those listed are distributed.

Sample Number	Name	Constituents Determined or Intended Use	Weight of Sample in Grams	Fee per Sample
88	Dolomite	Complete analysis	50	\$2.00
70	Feldspar	Complete analysis	40	2.00
80	Glass, soda-lime	Complete analysis	45	2.00
89	Lead barium glass	Complete analysis	45	2.00
76	Burnt refractory (40% Al_2O_3)	Complete analysis	60	2.00
77	Burnt refractory (60% Al_2O_3)	Complete analysis	60	2.00
78	Burnt refractory (70% Al_2O_3)	Complete analysis	60	2.00
81	Glass sand	Fe_2O_3, Al_2O_3, TiO_2, ZrO_2, CaO, MgO	60	2.00
2	Zinc ore D	Zinc	50	1.00
25b	Manganese ore	Manganese, available oxygen	100	2.00
26	Crescent iron ore	Al_2O_3, CaO, MgO	100	2.00
27a	Sibley iron ore	SiO_2, P, Fe	125	2.00
28	Norrie iron ore	Mn (low)	50	1.00
29	Magnetite iron ore (titaniferous)	Complete analysis	50	1.00
56	Phosphate rock	P_2O_5, Fe_2O_3, Al_2O_3, etc	60	2.00
69	Bauxite	Complete analysis	60	2.00
71	Calcium molybdate	Mo, Fe, Ti	60	2.50
4c	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
5e	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
6d	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
7b	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
55	Ingot iron	C, Mn, P, S, Si, Cu, Ni	150	2.00
74	Cast iron	C, Mn, P, S, Si, Ti, (Cu, Ni, Cr, V)	150	2.50
82	Nickel-chromium cast iron	C, Mn, P, S, Si, Cr, Ni, (Ti, Cu, V)	150	2.50
8c	Steel, Bessemer, 0.1 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
9c	Steel, Bessemer, 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
10d	Steel, Bessemer, 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
22b	Steel, Bessemer, 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
23a	Steel, Bessemer, 0.8 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
15b	Steel, B. O. H., 0.1 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
11c	Steel, B. O. H., 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
12c	Steel, B. O. H., 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
13c	Steel, B. O. H., 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr)	150	2.00
14b	Steel, B. O. H., 0.8 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
16b	Steel, B. O. H., 1.0 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V, As)	150	2.00
19b	Steel, A. O. H., 0.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
20c	Steel, A. O. H., 0.4 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
21b	Steel, A. O. H., 0.6 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
34	Steel, A. O. H., 0.8 C	C, Mn, P, S, Si, (Cu, Cr, Mo)	150	2.00
35a	Steel, A. O. H., 1.0 C	C, Mn, P, S, Si, (Cu, Cr)	150	2.00
51	Steel, electric furnace, 1.2 C	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
65	Steel, acid electric	C, Mn, P, S, Si, (Cu, Ni, Cr, V)	150	2.00
30b	Steel, chrome-vanadium	C, Mn, P, S, Si, Cr, V, (Cu, Ni)	150	3.00
32b	Steel, chrome-nickel	C, Mn, P, S, Si, Cr, Ni, (Cu)	150	3.00
33a	Steel, nickel	C, Mn, P, S, Si, Ni, (Cu, Cr, V)	150	3.00
50	Steel, chrome-tungsten-vanadium	C, Mn, P, S, Si, W, Cr, V, (Cu, Mo)	150	3.50
72	Steel, chrome-molybdenum	C, Mn, P, S, Si, Cr, Mo, (Cu, V)	150	3.00
73	Steel, stainless	C, Mn, P, S, Si, Cr, (Cu, V, Mo)	150	3.00
57	Refined silicon	Complete analysis	60	2.00
58	Ferrosilicon (75% silicon)	Complete analysis	75	2.00
59	Ferrosilicon (50% silicon)	Complete analysis	75	2.00
61	Ferrovanadium (high carbon)	Complete analysis	100	3.00
64	Ferrochromium (high carbon)	Complete analysis	100	3.00
66	Spiegeleisen	Complete analysis	100	2.00
67	Manganese metal	Complete analysis	100	2.50
68	Ferromanganese	Complete analysis	100	2.50
75	Ferrotungsten	W, C, Mn, P, S, Si, Sn, As, Mo, Cu, Sb	150	4.00
37b	Brass, sheet	Complete analysis	150	3.00
52	Bronze, cast	Complete analysis	150	3.00
53	Lead-base bearing metal	Complete analysis	200	3.00
54	Tin-base bearing metal	Complete analysis	200	3.00
62	Manganese bronze	Complete analysis	150	3.00
63	Phosphor-bronze bearing metal	Complete analysis	150	3.00
42b	Tin	Melting point 231.9° C	350	2.00
43b	Zinc	Melting point 419.4° C	350	2.00
44b	Aluminum	Melting point 658.9° C	200	1.00
45a	Copper	Melting point 1,083° C	450	2.00
49	Lead	Melting point 327.3° C	1,650	2.00
46m	Cement (normal)	Fineness (testing sieves)	160	1.00
47d	Cement (extra fine)	Fineness (testing sieves)	160	1.00
84	Acid potassium phthalate	Acidimetric value	60	3.00
39c	Benzoic acid	Acidimetric and calorimetric values	30	2.00
40b	Sodium oxalate	Oxidimetric value	60	2.00
83	Arsenious oxide	Oxidimetric value	75	2.00
38a	Naphthalene	Calorimetric value	50	2.00
17	Sucrose	Calorimetric and saccharimetric values	60	2.00
41	Dextrose	Reducing value	70	2.00

Unemployment Not Machine-Made

Mechanization of Industry, According to Magnus W. Alexander, Creates New Wants and New Tasks—Labor Reserve Normally Exceeds 1,500,000

AVAILABLE information indicates that employment conditions in the country as a whole have been improving since December, even though public attention was not focussed on the unemployment situation until late in January and in February, according to Magnus W. Alexander, president of the National Industrial Conference Board, speaking before the Fortnightly Forum at the Park Lane, New York, March 11. He characterized the claim that mechanization of industry is responsible for unemployment as a generally unwarranted contention.

"As mechanization of industry with its requirement of fewer workers per unit of production decreases production costs and prices, the demand for commodities simultaneously increases and causes not only the theoretically released workers to be reabsorbed but, in addition, calls new workers into production," Mr. Alexander declared.

The text of Mr. Alexander's address is, in part, as follows:

At all times, barring perhaps periods of warfare, there exists an unemployment situation and, therefore, an unemployment problem. I am, therefore, ready to admit that our country is facing an unemployment situation and I shall endeavor briefly to clarify the issue and to present some observations and facts on the causes, extent and effects of prevailing unemployment in the United States.

After nearly seven years, or since the depression period of 1921 to 1922, unemployment has again found its way to the front page of our newspapers and, as seems always to be the case, widely diverging guesses and assertions are made as to the extent of this unemployment and its consequences. As a matter of fact, there are in our country no comprehensive statistics available which would supply an adequate basis for measurement of unemployment. The National Industrial Conference Board, for instance, publishes every month, and has done so for many years, figures showing the fluctuating employment in about 2000 manufacturing establishments in the country employing somewhat over three-quarters of a million people.

Long-Time Changes in Occupational Distribution of Employment

These and all similar data reflect, therefore, employment fluctuations in a selected area of employment, but do not take into account new individual enterprises or new kinds of industries that are constantly springing up, nor employment in other fields of occupation. How interestingly this process of change in occupational distribution is going on is well illustrated by comparing United States Census figures of 1920, the latest available data, with similar information for 1870. In this 50-year period with its tremendous growth in gainfully occupied, from 12,500,000 to somewhat over 41,000,000 in a population of respectively 38,500,000 to substantially 106,000,000, the number of farmers and agricultural laborers per million population decreased from 152,100 to 95,100 or by about 37 per cent, while brick and stone masons decreased from 2300 to 1300 or by 43 per cent; blacksmiths from 3700 to 1850 or by 50 per cent; and boot and shoe workers from 4400 to 2900 or by 34 per cent, with servants, housekeepers and stewards decreasing from 25,300 to 16,300 or by 36 per cent. On the other hand, barbers, hairdressers and manicurists per million population increased from 621 to 2045 or by 229 per cent, and clerical workers in offices and stores from 8060 to 41,260 or by over 460 per cent.

Labor exchanges and employment bureaus of all sorts, public and private, are making reports from time to time, but even a marked increase for a certain time in applications for work, the same as in applications for charity to charity organizations, while it would generally suggest increasing unemployment, would hardly give a basis for accurate measurement of the number of unemployed. Then there are the valuable reports of unemployment among trade union members. But inasmuch as all trade union membership in the United States represents only about 10 per cent of all gainfully occupied, these data can hardly be called representative. They doubtless indicate conditions in highly labor-organized industries and in the few localities where the reports originate.

Statistics Show Considerable Range

Neither is the lack of generally accepted, broad statistical information, and with it the opportunity for guessing, a new phenomenon. In the reports of the President's Conference on Unemployment in 1921, issued under the auspices of Secretary Hoover, the number of unemployed at that time was placed at from "four to five millions." The United States Bureau of Labor Statistics furnished the United States Senate in August, 1921, an estimate of 5,735,000, basing its estimate on differences in numbers carried on payrolls in July, 1921, as compared with the peak of employment in 1920. It should here be remembered that 1920 was a year of high general inflation of production, prices and wages, in consequence of which many persons were drawn into industrial and other occupational employment who ordinarily would not have done so, such as women, young men and girls who would have remained at school or continued with household duties. When the inevitable contraction in business came, many women who had gainful jobs in 1920 returned in 1921 and 1922 to their homes for domestic duties, and many youths who had been attracted by high wages into the industrial establishments returned to their schools for further education. It would, therefore, seem clear that the 5,735,000 estimated by the United States Department of Labor as unemployed in 1921 did not picture unemployment in the usual sense.

Normally Unemployed Number 1,500,000

At that time, the National Industrial Conference Board published in the press an opinion that the total number of unemployed might be placed at about 3,500,000, and this figure was not challenged either by Governmental or private authority and was subsequently requoted many times. The Conference Board called attention at the same time to what might be considered a normal unemployment, or a normal "labor reserve," in our country of about 1,500,000 persons, composed of those who are unemployable because of sickness and similar reasons, of casual workers and drifters, seasonal workers who draw high wages because of the intermittent character of their employment and who, therefore, usually do not want to accept employment in other lower paid occupations, and of those who actually are deprived of opportunity of employment even though they are honestly seeking it. Considering our present population of perhaps 118,000,000, and our about 43,000,000 gainfully occupied persons, a steady minimum labor reserve, so-called, of about 1,500,000 would be relatively small.

We have definite indications that there has been a decline in employment in 1927, but there are also similar indications that employment since December, 1927, has again been slightly increasing, and the increase has continued until the present time.

Machine Production Not Cause of Unemployment

There has, however, in later years come a new aspect into the unemployment situation that seems not to be fully understood and, therefore, is leading to confusion of thought. That is the superficial interpretation of the effects of mechanization of industry. This substitution of power-driven machinery for manual labor, it is claimed, is throwing people out of work, and a magazine writer recently stated that "the price of industrial progress is unemployment." If this conception were true we might as well renounce our entire system of present-day civilization and return to the more primitive conditions of living as still exist in certain parts of Asia, where in spite of immense natural resources millions of people are near the starvation line or actually starving.

Let us concretely analyze the situation as the National Industrial Conference Board has found it by its study of the latest available comprehensive data, those revealed in the United States Census of Manufactures for 1925. At that time, 71 wage earners instead of 100, and 82 managerial and supervisory persons instead of 100, produced the same volume of production as was obtained in 1914. The cost of management in 1925 was actually 10 per cent less and the cost of labor, in spite of wage levels about twice as high as those prevailing before the war, was actually reduced by about 4 per cent per unit of production in contrast with the cost in 1914. Nor was this productivity of the wage earners achieved by longer hours or harder work, for the number of hours in 1925 per worker employed were about 9 per cent less than in 1914 and yet the productivity per wage earner was actually 40 per cent greater. A study of several hundred corporation returns leads me to say that this general picture holds good also for 1927, even to an increasing degree. This almost paradoxical condition is explainable largely on the ground of a more than 30 per cent increase in mechanical power in the productive process, of improved machinery, tools and production methods, of better organization in the utilization of human factors and their better coordination with all other production factors.

This process of mechanization, resulting in greater productivity per worker employed, has been a fundamental factor in our post-war national prosperity and has attracted world-wide attention. It has multiplied the available stock of consumption goods, has made possible the wider use of many products formerly in the class of luxuries, and is reflected in an effectual increase of our national wealth and our annual national income by about 40 per cent since 1914.

Released Workers Find New Occupations

The very pertinent question, however, arises as to what has become of the 29 per cent of workers in manufacturing without whom the same amount of production is now being carried on as compared with 1914. The answer is that although, as stated before, productive output per wage earner between 1914 and 1925 had increased by 40 per cent, the total manufacturing production in the same period increased over 65 per cent and necessitated an increase in the required labor force of about 1,500,000 wage earners. In other words, while 71 men in 1925 did produce as much as 100 men did in 1914, the demand for manufactured goods at their lower production cost and selling price expanded sufficiently to reabsorb not only the 29 per cent of workers theoretically released, but in addition called 1,500,000 more workers into action. The result was that the value of manufacturing production in 1925 amounted to nearly $63,000,000,000, as against only $24,000,000,000, in 1914, but manufacturing used nearly 36,000,000 hp. for its processes as against only 22,250,000 hp. in 1914. Consequently, an increase of 1,500,000 workers, but at the same time an increase of 13,750,000 hp. resulted in an increase in production of $39,000,000,000, of commodities within the 12-year period from 1914 to 1925.

These observations refer only to manufacturing industries. A similar contraction of the number of workers employed has, however, been found to have occurred in transportation, construction, mining and agriculture, and for similar reasons as in manufacturing. But all these activities do not exhaust the entire field of gainfully occupied. The point which I want to emphasize here is that the process of mechanization in industry is a gradual one, leaving ample leeway for adjustment. Moreover, only in rare instances does the substitution of machinery for hand labor actually remove large numbers of workers from the payroll.

It is a well demonstrated economic principle that increased production creates new wants, and that new industries bring with them new demands for both goods and services.

Labor Works Fewer Hours and Earns More

Increased mechanization of industry with its mass production at lower cost has had another very vital effect upon the economic status of the wage earner and is of great significance in relation to temporary unemployment such as we have no doubt been facing in the past few months. Under these new conditions of production, industry has been able to maintain the very high wage levels which the circumstance of the World War helped to establish, even though the cost of living has declined considerably from the peak of the post-war inflation period. At the present time, wages in manufacturing are considerably more than twice as high as they were in 1914, while the cost of living is only about 63 per cent above the level of 1914. The net result is that the real wage, that is, the purchasing power of the wage which the average industrial worker receives in his weekly pay envelope, is now by about one-third greater than it was just prior to the beginning of the World War. In other words, the worker of today, performing the same class of work and even during fewer hours of the week, can buy with his average weekly pay envelope fully one-third more of the same goods of the same quality that he bought in 1914 or, correspondingly, can buy goods of higher quality than he could afford to buy in 1914. In addition, employment has been fairly stable in the past five years or more with the exception of a brief interruption in 1924.

Great Increase in Savings Insurance Against Unemployment

The average industrial worker is thus enjoying a greater margin of earnings over his necessary living costs and is also enjoying stable earnings over a consecutive period of years. The wage-earning population is, therefore, in a better position to cope with temporary unemployment than it has been in our industrial history prior to the World War, when opportunity for saving money was considerably smaller. With a population of about 100,000,000 in 1914, the savings deposits in banks, building and loan association assets and life insurance premiums, all forms of savings of the great mass of people, amounted to $14,700,000,000, and in 1926, with an estimated population of 117,000,000 people, they amounted to $43,800,000,000. Eliminating the population increase, the growth in savings in the short span of 13 years was nearly 150 per cent per capita of population.

On the whole, while I will not undertake to estimate the total number of unemployed at the present time, I believe that there is a temporary condition of unemployment in excess of the so-called normal. I do not consider it, however, as acute or as critical. The weather man may be blamed in part for this condition. We must not forget, also, that certain extraordinary conditions, like the strike in the bituminous coal fields, are contributing to the amount of unemployment, although the solution of this particular problem transcends the field of unemployment relief. Taking it all in all, the striking feature is not that we have at this time of the year a somewhat greater amount of unemployment, but that the situation did not, as heretofore, come gradually to our attention, but was almost precipitated into the arena of public discussion by the dramatic way in which the Governor of New York State called attention to it just about a month ago. The main reason why we needed some one in a high place to call our attention to the unemployment situation, rather than to have the situation call attention to itself, may be found in the fact previously

(*Concluded on page* 780)

Emergency Repairs to Sheet Mill Drive Made by Cutting Blow Pipe and Oxygen Lance

BY W. I. GASTON*

AN INSTANCE of the manner in which the oxy-acetylene cutting flame is essential to the steel mill master mechanic in keeping essential units in constant operation occurred recently in a sheet mill in the Chicago district.

It was reported by the mill superintendent that the big split gear on the main drive was slipping on the shaft and it was impossible to tighten up the bolts enough to prevent slippage, even though the mill was throwing no undue load on the engine. Inspection showed that the gear had been already drawn up to the point where the split hub was closed, shoulder to shoulder. It would be necessary to cut away some metal in order to renew the grip on the shaft.

The master mechanic estimated that repairs would require taking the heavy 23-ft. gear apart, moving it to the machine shop and cutting ¾ in. of metal from one-half of the hub with a planer. Dismantling, handling, machine shop work and reerection would require four days and cost about $2,000.

Since the mill was then operating on a 100 per cent production basis, stoppage of work for three days would have meant further losses to the plant in profits, overhead, delayed production schedules and general all-around disorganization. In order to avoid, if possible, the large losses which always follow a shutdown in the height of the rush season, a service engineer of the company supplying oxygen to the steel mill was asked whether the excess metal could be removed by the cutting flame without removing the gear from the shaft. He reported that it could be done by a cutting blowpipe supported by an oxygen lance and offered to supervise the work, so it would be promptly done without damage to the main shaft.

It required 14 hr. for five men to remove the bolts and do this job of cutting. The total cost of the work, including oxygen, acetylene, labor and steel pipe for the oxygen lance, amounted to about $110.

The illustration gives some idea of the size of the gear. The section cut was 3 ft. 11 in. in its greatest length and 15½ in. in breadth; the cutting blowpipe removed altogether about 470 cu. in. of cast steel from the hub. A gap smooth enough for the purpose was left behind.

Cut Made in Hub of 23-Ft. Gear by Oxygen Lance

The cost of oxy-acetylene cutting was just a little over one-twentieth of the estimated cost of machining and handling to the machine shop and back. The important factor, however, was the saving in time. The job was completed by Sunday afternoon and the gear was tight in place ready for operation on Monday morning. Some time subsequent to this first work, when a good opportunity occurred, a similar cut was made on the opposite side of the hub in order to equalize the strain on the bolts and the internal strains in the hub and spokes of the gear.

About the only unusual feature of this gear job was the fact that the shaft must be protected. Most heavy cutting with the oxygen lance is such that the slag produced can run freely out the bottom of the cut. In the latter case the work may be done as follows:

One workman handles a cutting blowpipe. His cut starts at one corner and opens a kerf 2 in. wide, penetrating 6 to 8 in. and delivering a stream of hot slag dripping out of the bottom of the cut. After this slot has advanced 3 in. into the metal, the oxygen lance is brought into play by the second operator, and follows along after the cutting blowpipe. The lance should be ¼-in. pipe (no larger). Oxygen pressure at the regulator varies with the variety of steel, about 75 lb. for medium carbon or machinery steel containing up to 0.5 per cent carbon, and 100 lb. for low-carbon or soft steel. The pressure should not be so high as to "blow the flame cold."

It will be found that the stream of oxygen coming from the lance will pick up the hot slag drip prepared by the cutting blowpipe. The lance then is moved slowly down the face of the cut close behind the advancing incandescent region so produced. On reaching the bottom, the lance is lifted, and again lowered behind the glowing mass of slag and metal. The motion is like a cross-cut saw, up and down, each time removing a layer of metal.

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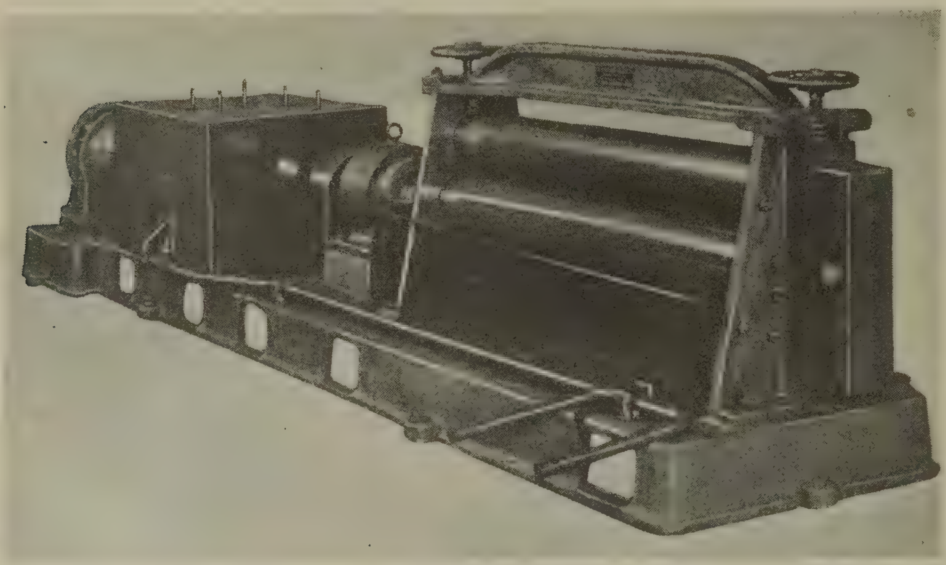
*Technical publicity department, Linde Air Products Co., New York.

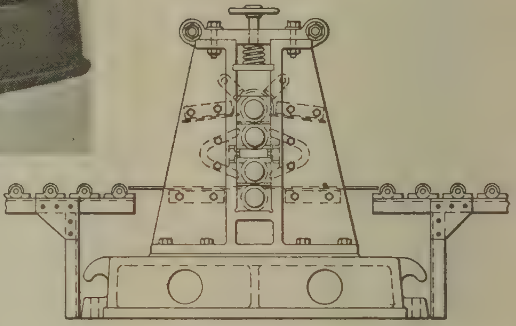
LARGE SHEET PACK OPENER

Machines May Be Operated from Either Side and Moved from One Location to Another

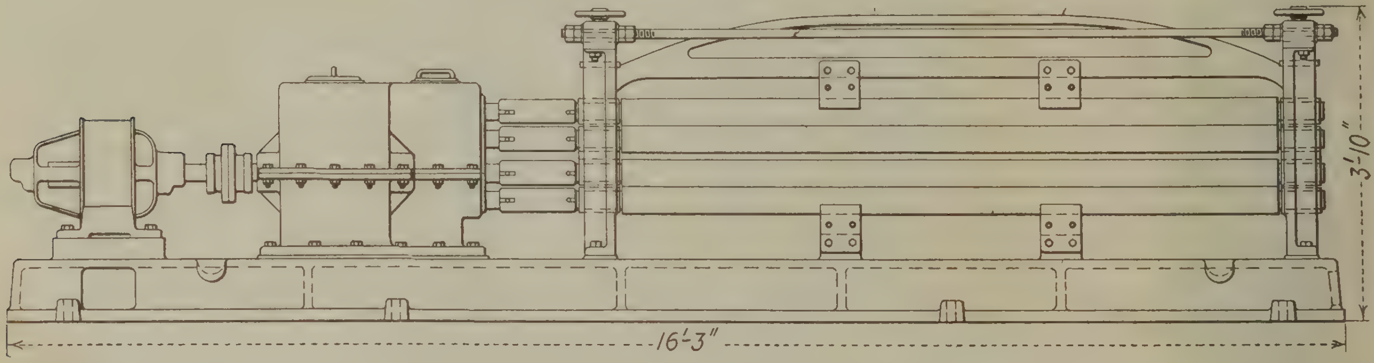
THE Aetna-Standard Engineering Co., Youngstown, Ohio, is adding to its line a sheet pack opener designed to handle 60-in. by 120-in. sheets when passing through the machine at an angle of 15 deg., and longer and wider sheets if straightened before passing through the rolls. A smaller opener of the same general design, for widths up to 36 in., is also available.



THE Smaller Sheet Pack Opener, Shown at the Left, Is for Widths Up to 36 In. The larger machine, below, is for sheets up to 60 x 120 in., when passed through the opener at 15-deg. angle



FOR Convenience in Handling the Packs, a Light Roller Table Is Provided on Each Side of the Machine, as Shown in the End View at the Right



Packs of sheets can be opened from either side of the machine. For instance, should a pack of six sheets be tightly stuck, it would be desirable to open one sheet from the pack going in one direction, and another sheet from the pack going in the opposite direction. In this way there is no time lost in handling the pack from one side to the other. For convenience in handling packs, a light roller table is provided on each side of the machine. The machines can be operated by one man and a helper.

The base of the machine is of cast iron and lifting lugs are provided so that the unit can be moved to different positions in the mill. It also has foundation bolt holes for use when the opener is to be set on a permanent foundation. The overall length of the unit is less than 17 ft. and the overall width is 4 ft. There are four opening rolls, which are of forged high-carbon steel and are 4 in. in diameter and 96 in. long. These rolls are carried in cast-iron housings and are backed up top and bottom, as well as horizontally, to take the pull of the sheets. At the front and back of the two middle rolls there is a U-shaped cross bar, over which the sheets being separated pass. This bar has a tendency to break the sheets apart without cutting or scratching them.

The rolls are carried in brass-bushed bearings and supported top and bottom and horizontally by brass backing-up bearings. They are adjusted by means of hand screws. The adjustment and play of the rolls is such that packs of sheets can be opened between any two sheets, that is, taking one sheet off the top of the pack, opening the pack in the middle, or taking one sheet from the bottom. The rolls are driven by flexible couplings from steel pinions that are mounted in an oil-tight case with the reduction gears. The machine is driven by a 20-hp. reversing motor which is controlled from a push-button station on a swinging arm which may be conveniently located on either side of the opener.

Acquires Lamb & Nash Line of Shears

The Shaw Crane-Putnam Machine Co., Inc., which is owned by Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, has purchased the sheet-metal cutting machine line of the Lamb & Nash Co., Boston.

Rotary gang slitting machines for shearing tin plate, blue annealed and other steel sheets, cold-rolled strip steel, and brass, copper and aluminum sheets and strips, are included in the line, as well as squaring shears for use in sheet mills. These machines will be built at the Putnam works, Fitchburg, Mass., of the Shaw Crane-Putnam Machine Co.

New Cold-Rolling Equipment

Several new cold-rolling mills are to be furnished to the Sharon Steel Hoop Co., Sharon, Pa., by the E. W. Bliss Co., Brooklyn. About half of these mills will be of the cluster type. Some of the mills will be arranged in tandem and will be fitted with roller bearings, motor screwdowns, etc. The tandem mills will have the Clark tension control, which permits the metal to be rolled under tension between stands.

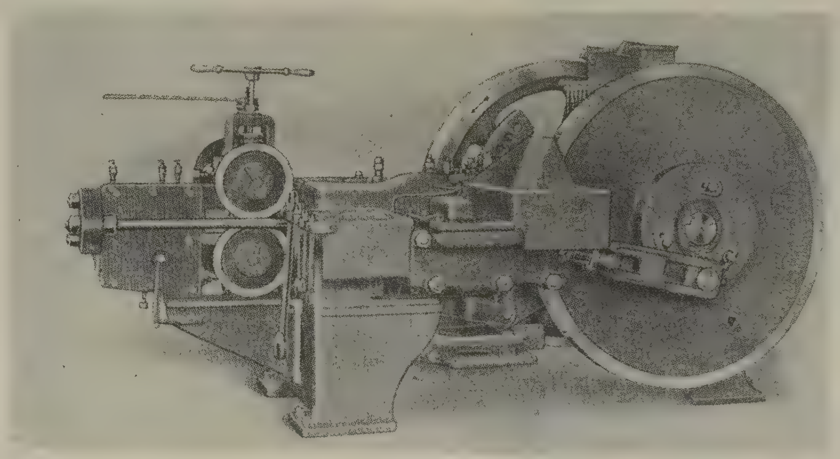
PLOW BOLT COLD HEADER

Single-Stroke Solid-Die Unit Incorporates Relief Mechanism and Other Features

A SINGLE-STROKE solid-die cold header, with relief mechanism and other features intended to make for rapid and economical production of plow bolt blanks or similar upsets, is being marketed by the E. J. Manville Machine Co., Waterbury, Conn.

Except for the relief mechanism, the general construction of the machine is similar to the company's recent model single-stroke solid-die rivet or ball headers. Three sizes, designated as the Nos. 375C, 500C and 625C respectively, are available. No. 500C, which is shown in the illustration, is for making plow bolts from ⅜ to ½ in., inclusive, in diameter, and from ¾ to 2½ in. long. Production is at the rate of 125 bolts per min. By reducing the speed, the machine can be used for making plow bolts 3 in. long.

The 500C machine will make a ⅜ or 7/16-in. carriage bolt with a head approximately ¾ in. in diameter, using 0.330-in. wire. The length of the square would be about 3/16 in. by 0.360 in. across flats. A ⅜-in. cut thread carriage bolt can also be made and a standard head with square ¼ in. long by 0.370 in. across flats developed. The machine will also make a Deering oval guard bolt that has an oval top and long countersunk head with four small keys on the side of the countersink. No. 3 plow bolts with a long square can also be produced.



Plow Bolts From ⅜ to ½ In., Inclusive, and From ¾ to 2½ In. Long Are Produced at the Rate of 125 Per Min.

The frame of the machine is of high-tensile cast iron and is heavily reinforced. An arch or tie is cast integral across the main crankshaft journal bearings to add to the strength and rigidity of the frame and to prevent deflection of the crankshaft and journal during the interval of heading. The heading ram side and bottom bearings in the frame consist of hardened and ground inserted steel plates, which, in the event of wear, can be removed and reground to a parallel thickness. Machines with frames of cast steel can also be furnished.

Crankshafts are of cheekless design, of chrome-nickel steel and heat treated. The crankpin and journal sections are of large proportions to minimize deflection. Journal bearings are of nickel bronze and are provided with means of lubrication.

The heading ram and bearing construction is of the same type as in the company's models B and C ball headers. To safeguard against bearing mutilation, use is made of hardened and ground inserted ram bearing plates in bottom and side bearings in the frame. To release the pressure on the blank and heading die, whenever the header is stopped on dead center, a large adjustable wedge is provided in the heading ram or gate. The wire feed, located on the left side of the machine, is usually of ratchet type, but a friction feed can be furnished if desired. The feed is operated from an eccentric on the crankshaft, connected with an adjustable rocker lever. In addition to general adjustments of the wire feed, made in the large feed rocker on the side of the machine, a finer feed adjustment, for small variations, is provided in the feed rocker on the lower feed shaft. Improved roll-feed bearing construction is a feature emphasized. Bearings in the feed frame are of hardened and ground tool steel and wear is taken on bronze bearings, which may be readily replaced when worn.

It is stated that the chief advantage of making plow bolts on this type of machine is in the relief mechanism, which permits the knock-out pin to recede while the head is being formed. This mechanism includes a substantial toggle unit, which is operated by a cam slide pivotally connected to a lower projection of the pitman connection, thus producing an elliptical motion as it actuates the movement of the toggle mechanism.

When the wire blank is pushed into the heading die and against the knock-out pin, that portion of the blank which projects unsupported in the front of the die is forced into the mouth of the die by the heading punch. In compressing the metal to form the head it is necessary, in order to fill out the square portions of the head, that the knock-out pin recede just as the first portion of the upset is formed in the mouth of the die. To properly coordinate the knock-out pin relief motion in relation to the compressed portion of the upset, suitable adjustments have been provided in the connection between the pitman connection and the reciprocating cam in the toggle motion. Fine adjustments, for varying the length of the blank, are also provided in the relief mechanism.

A cutting-off mechanism of improved construction is employed. The area of the cut-off slide has been markedly increased on the thrust side and the cutter bar is equipped with three bearings to minimize wear. The cutter bar is provided with an adjustable stop. By means of a spring mechanism, in combination with the hardened cam insets in the reciprocating slide, the bar can be adjusted to feed through or in front of the cut-off knife.

The punch block and die block are of hammered alloy steel, heat-treated. A split die block can be furnished in place of the solid block if desired. A foot brake is standard equipment, as well as a gravity feed lubricating system with piping leading to important parts of the machine. When motor driven, the motor is attached to a pad at the rear of the frame of the machine. The floor space occupied by the No. 500C machine is 81⅝ in. by 125 in. and the weight, net, is 17,188 lb. Approximately 15 hp. is required.

Pressure Burners Ordered for Blast Furnace Stoves

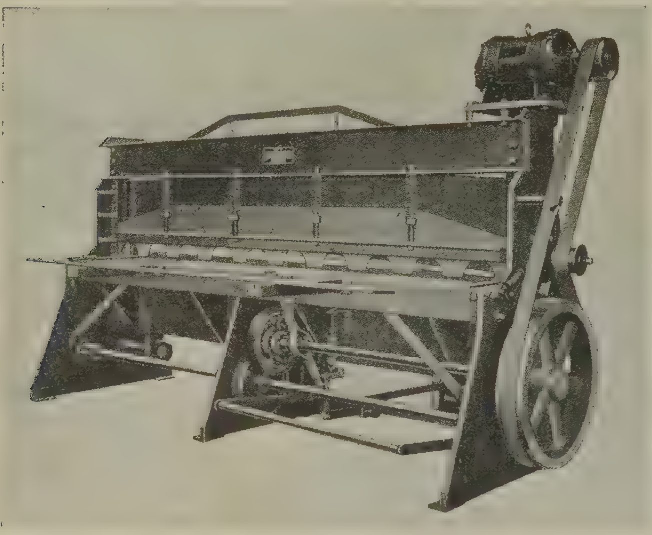
Pressure burners for blast furnace stoves have been ordered from the Freyn Engineering Co., Chicago, by the Sharon Steel Hoop Co., Sharon, Pa., and the Republic Iron & Steel Co., Youngstown, Ohio. This increases the number of Freyn-design pressure burner installations to include eight different plants.

These burners will be of the unit or integral type and will be motor driven. Both installations will have automatic control, governing the blower speed to supply the correct amount of air for the gas available. For the Republic installation a large burner, capable of burning 14,000 cu. ft. of gas a minute will be supplied. This size of burner is required because of the large size stove (95,000 sq. ft. heating surface) on which the burner will be operated.

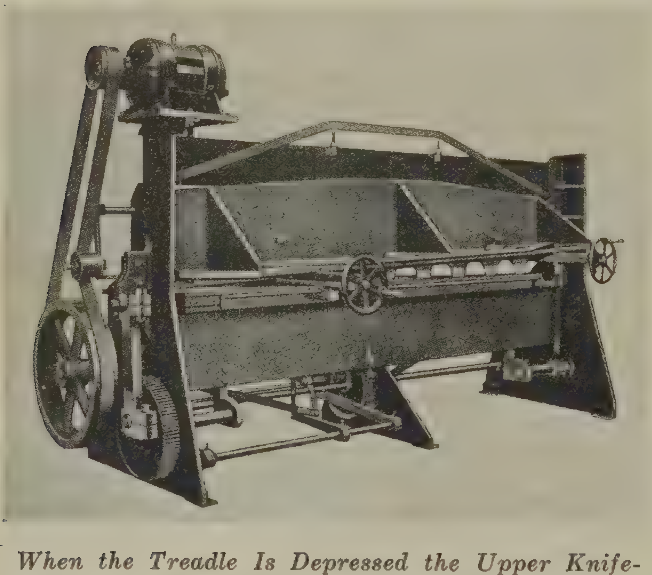
New Shears for 3/16 and ¼-In. Mild Steel

A new shear, in four sizes, with capacity for cutting mild steel 3/16 in. by 8 ft., 3/16 in. by 10 ft., ¼ in. by 8 ft., and ¼ in. by 10 ft., respectively, has been placed on the market by the Kutscheid Mfg. Co., 911 West Forty-ninth Place, Chicago.

The housings, upper knife-bar and bed of this machine are of high-carbon steel plates, the upper knife-bar and bed being of welded construction. The sliding surface of the upper knife-bar at each end is faced with phosphor-bronze. The crank gears at each end of the machine are carried on high-carbon steel shafts, the bar which connects them to the upper knife-bar being also of high-carbon steel. The connecting bars are split at each end and equipped with phosphor-bronze bearings. The pin through the bar and crank gear is of Nikrome axle steel. All gears are of steel, with cut teeth, and all bearings are split so that they may be taken up for wear. The shaft bearings are of Bearingoy metal and are grooved for oiling.



Housings, Upper Knife-Bar and Bed Are of High-Carbon Steel Plate, the Knife-Bar and Bed Being of Welded Construction



When the Treadle Is Depressed the Upper Knife-Bar Makes One Complete Stroke; When Held in Depressed Position, It Operates Continuously

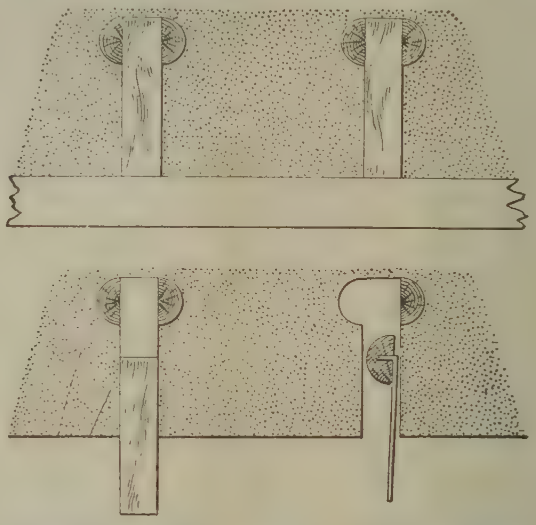
Simplicity of operation and effective performance of the holddown are features emphasized. Steel pins, which are welded at each end in back of the holddown, rest on two pins protruding from the upper knife-bar. These pins are arranged so that when the knife-bar is at its highest point the holddown is 1 in. above the table. When the upper knife-bar lowers to 1 in. above the table, pressure is applied on the metal just before the knife enters it by means of four large springs. As the upper knife-bar returns to its highest point at the completion of the stroke, it raises the holddown to its original position. An automatic friction clutch, with positive action, is employed. With a slight depression of the treadle the upper knife-bar makes one complete stroke and stops at the highest point. If the treadle is held in the depressed position the upper knife-bar will operate continuously. By means of a safety lever the upper knife-bar can be stopped at any point during the stroke.

Sectional or composite knives, with one cutting edge, are standard equipment, as well as front, side and back gages. The front gage has a steel scale set in the bed of the shear, and the back gage is of screw-adjusting type with steel scale and pointer. Lubrication is by means of oil cups at each bearing, but a centralized lubricating system can be furnished as an extra. The shear has been designed so that tapered roller bearings may be applied.

Beaded Ribs on a Pattern

To facilitate their removal from the mold, beaded ribs are sometimes arranged on the pattern in the mold as shown in a recent issue of *Power*. The patterns for the beads are separate from those for the ribs and the rib patterns are withdrawn first, as will be noted. Then the bead patterns are taken out by means of a small tool arranged to grip them through sockets left in the bead pattern.

Beaded ribbing has been used all over the outside of the casings for many steam turbines. The principal object of this was to avoid deformation under operating temperatures, while a secondary object was to minimize vibration. Loose cores would be likely to shift, thus interfering with uniformity of section. The design shown was adopted so that the beads could be picked conveniently out of the mold.



Illustrating the Method of Withdrawing the Pattern, in Sections, in Preparing a Mold for Beaded Ribs

Automotive Parts Makers Merged

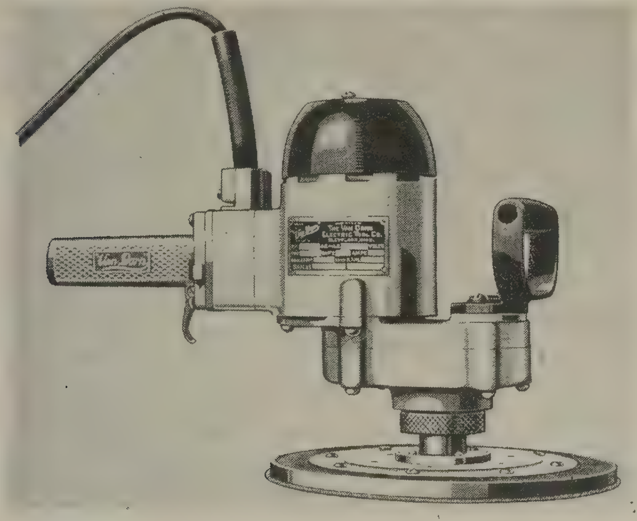
The Diamond Motor Parts Co., St. Cloud, Minn., has taken over the Gill Mfg. Co., Chicago, manufacturer of piston rings, and the Schlieder Mfg. Co., Detroit and Milford, Mich., maker of valves for the automotive industry. Operations have been discontinued in the Chicago and Milford plants, and all machinery, equipment and stocks have been removed to the Diamond plant at St. Cloud. The company now makes a complete line of piston rings, piston pins, diachrome, steel and cast head valves, steel and bronze bushings, steering knuckles, tie rod and spring bolts, water pump shafts and impellers. Plans of the company include the merging of other parts manufacturers, increasing the number of direct factory branches.

George G. Bouthinon, head of the Diamond company, is president, treasurer and general manager of the new company. E. J. Smith, president of the Gill company, is vice-president and will be in charge of sales, and V. W. Schlieder, vice-president of the company bearing his name, will be secretary and in charge of the equipment division of the new corporation.

Portable Electric Grinder and Sander Employs Flexible Disk

An electric grinder designated as the Flex-Disc, and intended to meet the demand for a portable grinding and sanding machine that will surface both metal and wood, has been brought out by the Van Dorn Electric Tool Co., Cleveland.

The general arrangement of the machine, including the motor, is the same as that of the company's electric drills. The motor can be operated either on alternating or direct current and has a no-load speed of 2400 r.p.m. The grinder is equipped with a 9-in. flexible rubber pad which serves as a base for 9¼-in, diameter abrasive disks, the flexible disk feature being emphasized as permitting grinding or sanding operations on curved surfaces. A smaller flexible rubber pad, 6 in. in diameter, is also available for use with the machine, and when the 9¼-in. abrasive disks become worn they may be cut down for use on the 6-in. flexible pad. A Duco or lacquer polishing pad of heavy felt, and covered with a removable cloth bonnet, is interchangeable with the flexible rubber pad for polishing operations. When the removable bonnets, five of which are supplied with each polishing pad, become soiled they may be laundered. In addition to the 9-in. flexible rubber pad, regular equipment includes 12 9¼-in. abrasive disks of various grits, and 15 ft. of cable, with plug. The machine can be furnished for use on 110, 220 or 250-volt current.

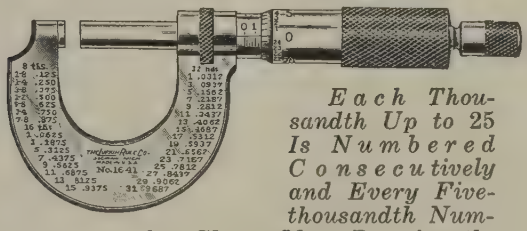


A Felt Polishing Pad, With Removable Cloth Bonnet, Is Interchangeable With the Rubber Pad

Micrometers Arranged for Rapid Reading

Micrometers with graduations intended to facilitate reading have been brought out by the Lufkin Rule Co., Saginaw, Mich.

Instead of numbering every five-thousandths on the sleeve of the tool, each thousandth is numbered consecutively up to 25, with every five-thousandths number showing more prominently. This tends to simplify reading and assist in eliminating mistakes, as it is only necessary to add the figure showing at the reading line on the sleeve to the last 25-thousandths line showing on the hub of the micrometer.



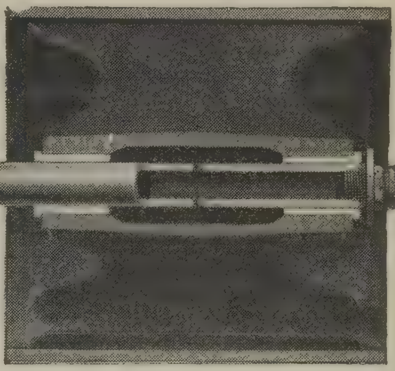
Each Thousandth Up to 25 Is Numbered Consecutively and Every Five-thousandth Number Shows More Prominently

Steel strip for shoe hooks, eyelets and buttons has been placed on the free list in connection with changes made by Italy in its tariff, and have a period of one year for reexportation.

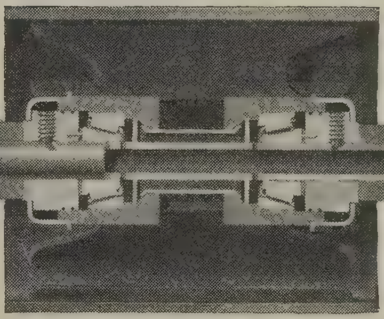
Conveyor Carriers Arranged to Use Three Types of Bearings

Belt carriers for belt conveyors manufactured by the Jeffrey Mfg. Co., Columbus, Ohio, have been standardized so that the same stands and bases can be used with any of three types of pulleys—plain bearing, bronze-bushed or roller bearing.

The pulleys are of gray iron and are made with open ends. In place of solid ends three arms connect the hub and the roll, additional rigidity being provided by six ribs between the arms. Pulleys with plain or bronze-bushed bearings have hubs which are cored out to form large recessed grease pockets, as shown in the illustrations. The latter connect with the Alemite pressure lubrication fittings at the end of the hollow shaft, and are designed to hold a reserve supply of grease. An advantage claimed for the grease pocket is that the grease does not harden in the feed holes. Plain bearing pulleys that are worn may be drilled out and put back into service with new bronze bushings. The roller-bearing pulley, which is pressure greased, accurately fitted and grease sealed, is for use on belt conveyors carrying coke breeze or other materials that are severe on metal bearings. The labyrinth construction is emphasized as providing five pairs of closely joined metal surfaces which keep powdery abrasives from reaching the bearings. In addition, the grease under pressure from the inside tends to flow all dirt outward. Slots are provided in each collar to permit adjustment and concentric running.



The Plain and Bronze Bushed Bearings Have Cored Out Hubs Which Form Grease Pockets Connecting to Fittings at End of the Shaft



The Pressure-Greased, Sealed Roller - Bearing Pulley, at Left, Is for Materials That Are Severe on Metal Bearings

"The Story of Iron" Motion Picture Produced by Bureau of Mines

WASHINGTON, March 13.—In cooperation with three large iron companies the Bureau of Mines has just produced "The Story of Iron," an educational motion picture. The film shows workings of iron ore mines in the various districts of the country, and goes into methods of mining, processes of treatment, etc., unloading at docks and shipment to furnaces. Another series of pictures shows blast furnace operations. Copies of "The Story of Iron" are available for distribution to schools, churches, clubs, civic and business organizations, miners' local unions, scientific societies and other bodies. The only charge to the exhibitor is the cost of transportation. Detailed information may be obtained from the Graphic Section, Pittsburgh Experiment Station, United States Bureau of Mines, Pittsburgh.

The Consolidated Steel Corporation, jobber in sheets and strip steel, has moved into a new warehouse at 2421 Smith Avenue, Detroit.

Testing Society's Committees Meet in Washington Next Week

Arrangements have been completed for holding a group meeting of committees of the American Society for Testing Materials at the Mayflower Hotel, Washington, March 21 to 23. The following committees in the metal-working field are scheduled: A-1 on steel, A-2 on wrought iron, A-3 on cast iron, A-5 on corrosion of iron and steel, A-6 on magnetic properties, A-8 on magnetic analysis, B-1 on copper wire, B-3 on corrosion of non-ferrous metals and alloys, D-1 on preservative coatings for structural materials, joint committee on phosphorus and sulphur in steel, and a few sectional and sub-committees of other major committees.

Inspection trips will be provided to various Government and other institutions. At an informal dinner on Thursday evening, March 22, one or two prominent speakers will be provided. Entertainment and other features are in the hands of a local committee of which Jerome Strauss, material engineer United States Naval Gun Factory, is chairman.

Pacific Northwest Iron and Steel Conference

The Northwest Iron and Steel Conference held its first meeting recently at Tacoma, Wash. It was attended by about 100 men representing the iron and steel industry of the Pacific Northwest States. Ray M. Hudson, Department of Commerce, Washington, and Charles F. Abbott, executive director American Institute of Steel Construction, New York, were among the speakers. E. C. Pape, president Willamette Iron & Steel Co., Portland, Ore., was elected chairman of the conference, whose next meeting is to be held at Olympia, Wash., Feb. 27, 1929.

Waste Material Dealers to Meet

The annual convention of the National Association of Waste Material Dealers, Inc., Times Building, New York, will be held March 20 and 21 at the Hotel Astor. The fifteenth annual dinner of the association is scheduled for March 21. Among the divisional meetings the first day of the convention, the foreign trade division meets at 12.30 and the metal division at 2 p. m. Following the general meeting of the convention on the second day, the scrap iron division will meet at 2 p. m.

Latin-American Trade to Be Subject at National Foreign Trade Convention

Trade with Latin America will be the principal theme at the fifteenth annual convention of the National Foreign Trade Council, to be held at Houston, Tex., on April 25-27. Business delegations from a numfer of Latin-American countries will attend the meetings and will confer with American executives on sales and distribution practices which are most successful south of the Rio Grande.

A special feature of the convention will be a series of nine addresses on the basic factors of export merchandising which will take the place of the usual group sessions of the convention. These talks will cover the entire subject of export practice, including preparatory market analysis, legal protection, trademarks and patents, distribution, merchandising, credit and finance, advertising, dealer cooperation, packing and shipping, and insurance. Among the speakers will be George P. Auld, Haskins & Sells, New York, formerly accountant-general of the Reparations Commission, who will speak on the "Prospects in Europe"; Norman F. Titus, chief of the transportation division, Bureau of Foreign and Domestic Commerce, Washington, whose subject will be "Fundamentals of an American Merchant Marine"; William Werckenthien, export manager Island Petroleum Co., Baltimore; Lawrence Langner, of Langner, Parry, Card & Langner, New York, and Allen B. Cook, vice-president Guardian Trust Co., Cleveland. James A. Farrell, president United States Steel Corporation and chairman of the National Foreign Trade Council, will deliver the closing address at the convention, his subject being "Foreign Trade Progress."

Metallurgical Fellowships Open at University of Michigan

Six industrial fellowships in metallurgical engineering and chemical engineering will be open at the University of Michigan, Ann Arbor, Mich., next fall, according to a statement issued by William P. Wood, associate professor of metallurgical engineering. The fellowships pay $750 a year and carry remission from tuition to courses of advanced study which the holder may elect, supplementing the main investigation assigned him. The announcement also says that holders of a fellowship usually receive an increase in stipend during the second year.

For administrative purposes, the department of metallurgical engineering at University of Michigan is associated with the department of chemical engineering, and is housed in the new East Engineering Building. Twenty rooms, including one double-unit and two single-unit research laboratories, are devoted exclusively to metallurgy, in addition to the general laboratries and those occupied by the teaching staff. Equipment is complete for the production and heat treatment of alloys and their study by metallography and physical testing.

Application for fellowships should be made to the university before April 1. Professor Wood is of the opinion that no one should make application for these fellowships, or indeed consider graduate work, unless his standing as an undergraduate has been in the upper third of his class, and unless he is interested in continuing studies in mathematics and physics.

Further information as to facilities, fellowships and requirements is contained in a bulletin just issued, which may be obtained by writing to the department of metallurgical engineering, East Engineering Building, Ann Arbor, Mich.

COMING MEETINGS

March

Concrete Reinforcing Steel Institute. March 19 to 21. Fourth annual meeting, Edgewater Gulf Hotel, Biloxi, Miss. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

American Society for Testing Materials. March 20 to 23. Spring group meetings of committees, Mayflower Hotel, Washington. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

April

American Oil Burner Association. April 3 to 5. Fifth annual convention, Hotel Stevens, Chicago. Leod D. Becker, 350 Madison Avenue, New York, secretary.

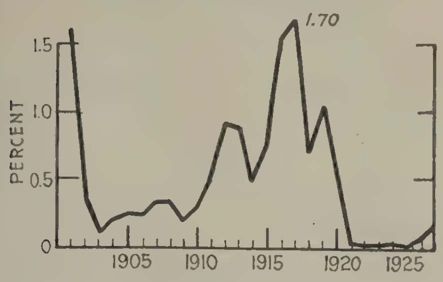
American Gear Manufacturers Association. April 19 to 21. Twelfth annual meeting, Hotel Seneca, Rochester, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. April 23, 24. Meeting of materials handling division, Benjamin Franklin Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

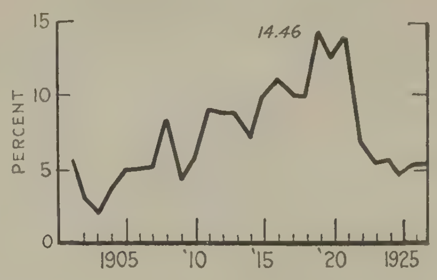
National Metal Trades Association. April 25, 26. Annual convention, Hotel Astor, New York. J. E. Nyhan, Peoples Gas Building, Chicago, secretary.

National Foreign Trade Council. April 25 to 27. Fifteenth annual convention, Rice Hotel, Houston, Tex. O. K. Davis, India House, New York, secretary.

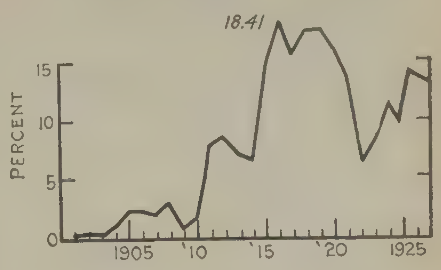
American Welding Society. April 25 to 27. Annual meeting, Engineering Societies Building, New York. Miss M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.



Exports of Pig Iron and Ferroalloys Have Been Well Below ¼ Per Cent of Production in the Last Several Years. This is in sharp contrast with some of the years shown in the diagram



Recent Exports of Rolled and Finished Steel Have Averaged Between 5 and 6 Per Cent of Total Production



Tin Plate Exports Since the Beginning of the World War Have Averaged Well Over 10 Per Cent of All the Tin Plate Produced in the United States. Heavy exports have featured the last two years

Changes in Exports and Imports

More Rough Material Going Out and More Finished Material Coming In—Great Increase in Imports of Structural Shapes and Plates

ABOUT 18 months ago THE IRON AGE published two articles dealing with (1) the trend of exports of iron and steel products from the United States and (2) of imports of those products into the country. The export article, "A Quarter-Century of Steel Exports," appeared at page 220 of our issue of July 2, 1926. The import article, "A Quarter-Century of Imports," appeared at page 492 of the Aug. 19 issue. The following paragraphs, together with the tables and diagrams, are designed to bring this story up to date. Figures to the end of 1927 are incorporated.

To avoid repetition of tabular matter, the tables are confined to the last seven years. They are on the same basis as the tables in the preceding articles and show the same things, with the addition of the two later years. Exports of the principal lines of finished products are covered in one table, exports of the principal items of rough material in another in which the total exports and the percentage of finished to total are shown, and imports of the pricipal items are given in the third table.

During the seven years under review there has been a fairly progressive decrease in the quantity of steel bars, plates and rails exported. Exports of tin plate have increased heavily, while sheets have shown a moderate gain. Structural material has declined irregularly, as have pipe and tubes. Wire manufactures are at about the level of the opening of the period, but were much higher in some of the intervening years.

Scrap exports have grown greatly. The 1927 total was more than six times that of 1921 and more than twice that of any of the preceding years in the table. Pig iron and ferroalloys made a larger total in 1927 than in any of the preceding years shown. The same is true of castings and forgings. As a result of the above, the total exports of rough material, so called, were more than 50 per cent higher in 1927 than in the largest of the six preceding years. Except for 1926, the

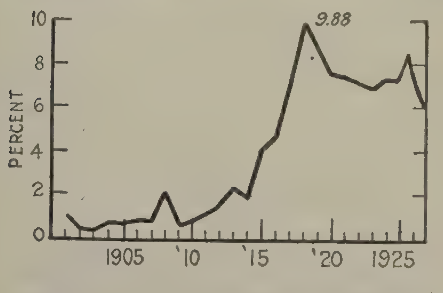
United States Exports of Finished Iron and Steel, in Gross Tons

	Bars, Steel and Iron	Plates	Sheets, Steel and Iron	Tin Plate	Hoops, Bands, Etc.	Structural Material	Rails and Fastenings	Pipes and Tubes	Wire and Manufactures	Nails, Bolts, Etc.
1921........	200,802	345,438	261,933	107,714	20,274	297,022	321,822	345,276	99,132	66,289
1922........	185,253	195,135	335,930	76,633	34,512	167,585	305,166	179,239	209,668	91,698
1923........	173,129	222,922	268,013	124,499	38,245	199,021	295,839	193,656	191,316	84,808
1924........	107,330	183,961	267,899	160,997	34,141	167,767	234,381	211,975	145,512	57,130
1925........	120,254	199,647	270,469	161,383	40,933	169,250	177,193	239,670	122,044	45,886
1926........	147,887	138,258	373,628	250,782	46,912	239,352	229,328	287,822	98,517	32,887
1927........	121,142	139,632	321,835	254,131	43,160	216,706	211,345	258,476	94,712	31,227

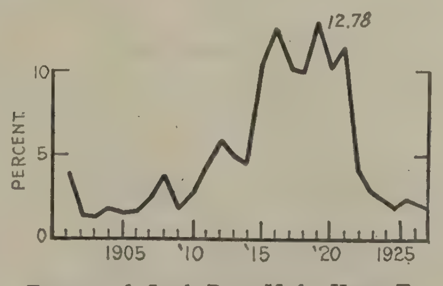
United States Exports of Iron and Steel Products, in Gross Tons

	Pig Iron and Ferroalloys	Scrap	Ingots and Blooms	Wire Rods	Cast Iron Pipe	Other Castings and Forgings	Total "Rough" Material	Total Rolled and Finished	Total Exports	Percentage Rolled and Finished
1921........	28,307	37,592	10,171	18,953	48,524	615	144,162	2,065,702	2,209,864	93.5
1922........	33,005	64,784	15,687	40,424	18,071	32,943	204,914	1,780,819	1,985,733	89.7
1923........	37,427	65,980	7,352	40,868	28,065	39,031	218,723	1,791,448	2,010,171	85.1
1924........	45,423	97,748	4,835	18,762	28,771	39,345	234,884	1,571,093	1,805,977	87.0
1925........	38,170	82,573	4,271	21,203	32,193	37,433	215,843	1,546,729	1,762,572	87.8
1926........	26,001	104,738	100,956(a)	19,646	34,111	36,488	321,940	1,845,373	2,167,313	85.1
1927........	52,633	238,303	98,613	16,128	27,964	54,962	488,603	1,692,366	2,180,969	77.6

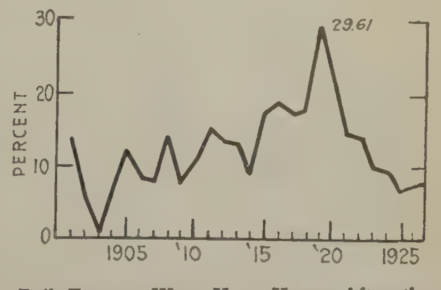
(a) Includes 93,865 tons of skelp.



Since the War, the Exports of Hoops and Bands Have Declined from Nearly 10 Per Cent to 6 Per Cent of Production, But Are Much Higher Than in the Pre-War Period

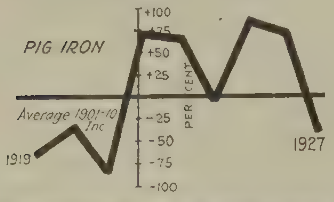


Exports of Steel Bars Made Huge Tonnages During the War Period, But Now Have Returned to about 2 Per Cent, Similar to 20 Years Ago

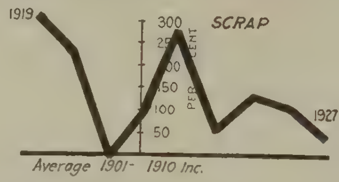


Rail Exports Were Very Heavy After the Armistice. They have dropped, now, however, to about one-quarter of that proportion of our output

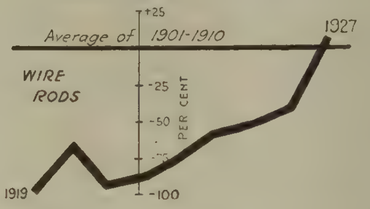
Foreign Pig Iron (Including Ferroalloys) Has Come into the United States in Large Quantities. The diagram traces the movement since the War. In four of the last six years the excess has been high



Scrap Imports Have Been Heavier in Each of the Past Six Years Than the Average of the First Ten Years of the Century, Particularly in 1923, When the Excess Over the Earlier Average Was Nearly 300 Per Cent



Wire Rods Have Been Coming into the United States in Continually Increasing Quantity Since the War. In only 1927, however, did the import tonnage reach as high as the average figures of 1901-1910



1927 total was more than double any of the years immediately before.

Consequently it follows that, although 1927 made the largest total for all iron and steel exports since 1921, it was exceeded by three of the five immediately preceding years in exports of rolled and finished material. Only in two years of the seven were the rolled and finished exports lower than in 1927.

Export diagrams for six particular products show the percentage between the amount exported and the total amount produced. These figures vary markedly over a period of 27 years of the study. Pig iron and ferroalloys reached almost 2 per cent in the early days of the war, but in the last two years have been less than one-sixth of 1 per cent. Rolled and finished steel as a whole approached 15 per cent near the end of the war, but in the last few years has hovered around 5 per cent. Tin plate exports exceeded 18 per cent early in the war and averaged about 14 per cent in 1926 and 1927. Hoops and bands, which were close to 10 per cent at the close of the war, are now down around 6 per cent. Steel bars, after approaching 13 per cent in 1919, are only slightly above 2 per cent. Rails reached almost 30 per cent in 1919 and lately have been between 7 and 8 per cent.

Pig Iron Imports Decline, Finished Steel Imports Gain

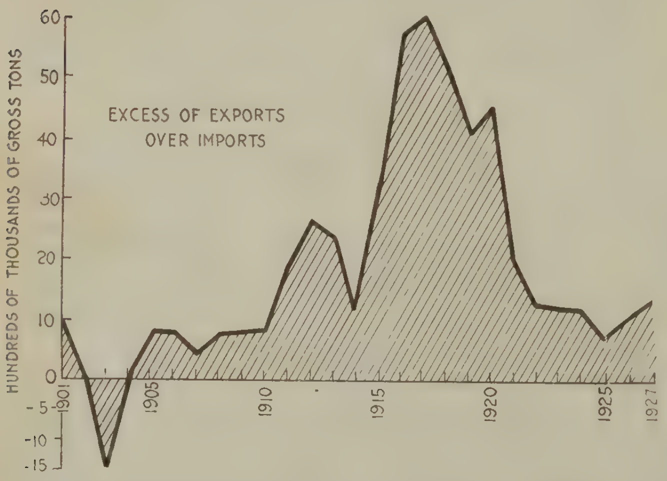
Pig iron has come into the country in very large quantities in four of the seven years under survey. In 1922, 1923, 1925 and 1926 the average was more than 495,000 tons a year. Last year, however, imports of

United States Imports of Iron and Steel Products, in Gross Tons

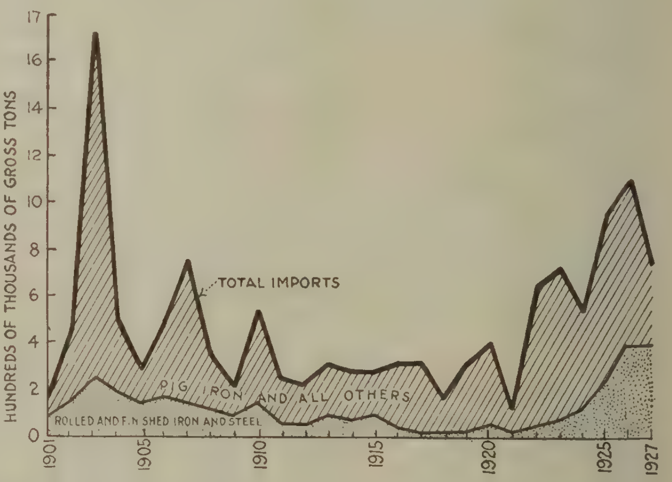
	Pig Iron and Ferroalloys	Scrap	Ingots, Blooms and Bars	Wire Rods	Plates, Sheets, Hoops, Etc.	Tin Plate	Structural Shapes	Rails	Iron Bars	Total*	Per Cent† Rolled and Finished
1921......	44,036	41,469	10,024	917	1,976	455	777	22,048	1,913	123,615	28.4
1922......	492,595	82,854	27,720	1,726	1,947	2,682	7,823	26,629	8,092	654,606	10.6
1923......	468,083	162,068	22,671	3,948	4,572	10,037	10,674	29,706	7,754	734,674	12.3
1924......	268,911	66,841	39,024	6,851	6,064	1,036	43,245	43,358	4,325	556,621	28.6
1925......	521,449	99,815	86,686	7,989	15,309	383	77,293	38,669	11,738	957,451	26.6
1926......	502,830	86,725	134,646	10,074	44,024	2,160	121,099	62,776	5,623	1,110,049	36.3
1927......	175,279	60,203	105,290	17,990	53,612	5,665	161,848	16,145	4,220	750,467	53.1

*Including items not separately shown. Cast iron pipe is the largest, with 46,900 tons in 1924; 50,939 tons in 1925; 83,873 tons in 1926, and 81,769 tons in 1927. Other pipe and tubes accounted for 7573 tons in 1924; 25,869 tons in 1925; 31,073 tons in 1926, and 50,088 tons in 1927.

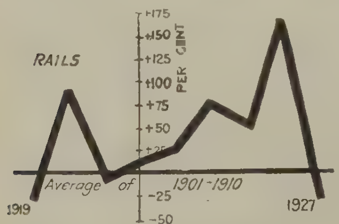
†Estimating 70 per cent in 1921 to 1924 for steel bars included with ingots and blooms.



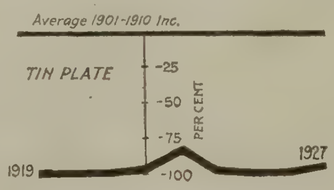
Only in One Year of the Last Quarter Century Have Imports of Iron and Steel Exceeded Exports. That was in 1903. In only one other year of that period—1926—have imports reached 1,000,000 tons. The excess of exports annually, as shown in the diagram, reached a peak in the early years of the War, at about 6,000,000 tons



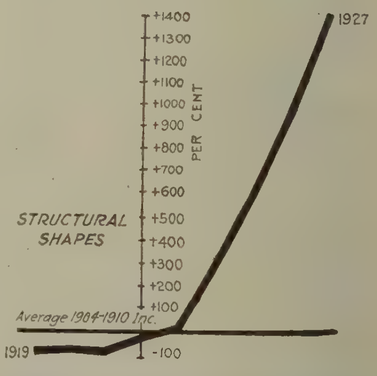
Rolled and Finished Iron and Steel, While Accounting for Only One-Quarter of All the Incoming Tonnage in the Last Quarter Century, Have Been Increasing Heavily in the Past Few Years. They reached a higher level in 1926 and 1927 than at any previous time covered in the diagram (upper right)



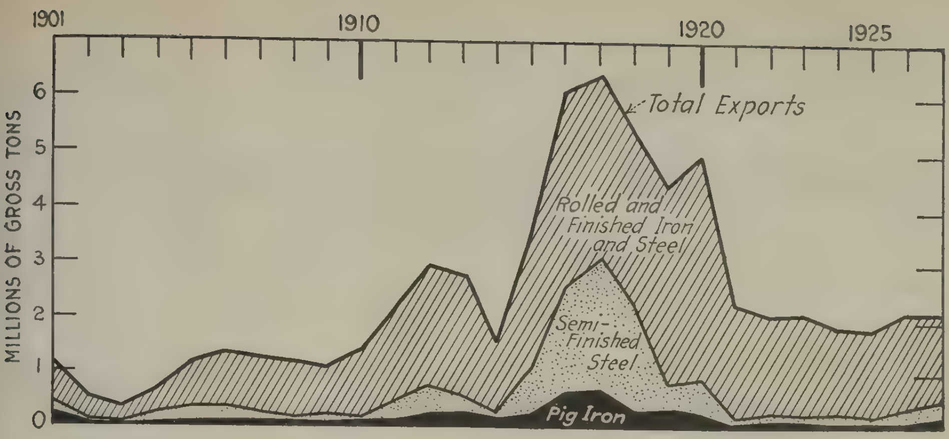
Rail Imports Since the War Culminated in 1926 in More Than 62,000 Tons. The incoming tonnage dropped last year to a figure lower than the average of 1901-10



Tin Plate Imports, While Slightly Fluctuating, Are No Longer of the Importance of 25 Years Ago. In place of an average of 62,000 tons a year, the average of the past seven years stands little more than 3000 tons



Imports of Structural Shapes Have Increased Greatly Over the 1904-1910 Average. Last year they were more than 14 times as heavy as in the early years of the century, while in 1926 the excess was nearly 1000 per cent



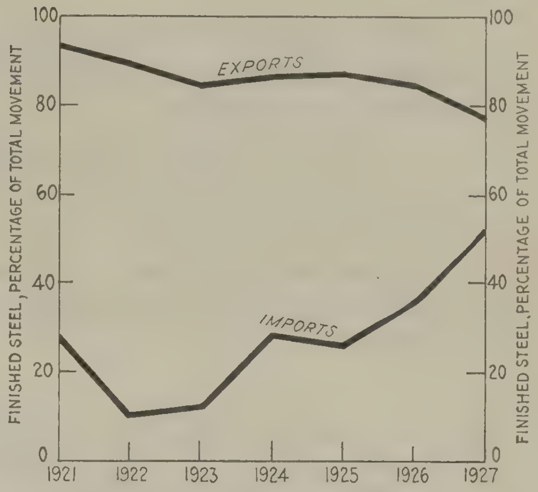
Exports of Rolled and Finished Steel and Iron Continue at Nearly Double the 1901-1910 Level (Left). The semi-finished steel tonnage sent abroad has dropped sharply since the War, while some of the rough materials, including pig iron and scrap, have made recent gains

pig iron dropped to 175,000 tons, or about one-third of the incoming movement of the two preceding years. This loss of more than 300,000 tons from 1926 accounts for almost all of the drop in total iron and steel imports between the two years.

What is of particular importance in many respects is the fact that in the last two years the amount of finished iron and steel products coming in has been much higher than in many years past. In each of the last two years it has been between 390,000 and 400,000 tons, and in 1927 was more than 53 per cent of the total incoming movement.

Most prominent in the increase has been the large amount of structural shapes coming in. The import total shows a steady and rapid increase from less than 1000 tons in 1921 to more than 160,000 tons in 1927. Each year has shown a large gain over the preceding year and each of the two last years has shown a gain in excess of 40,000 tons.

Plates, shapes and hoops, considered as one group, show a steady and rapid increase since 1922, when the incoming tonnage was less than 2000. During the past two years it has averaged nearly 49,000 tons, which is more than three times the highest of the preceding year's total. Imports of wire rods likewise have shown a steady, though less spectacular, gain. From less than 1000 tons in 1921, the quantity has risen to about 18,000 tons in 1927.



Our Exports Have Been Gaining Mainly in the Rougher Categories, While Imports of Finished Steel Have Made Larger and Larger Percentages of the Incoming Tonnages

One diagram shows the relation between the finished products and the total movement, both for exports and for imports. It shows an almost continuous rise in the import ratio from 1922 through 1927, and a steadily downward trend in the export ratio. In fact, in 1927 imports at more than 53 per cent of the total have approached the export ratio of 77.6 per cent. As a comparison, finished products in 1922 constituted only 10.6 per cent of imports and about 90 per cent of exports.

Increase in Shipments of Sheet-Metal Ware

Shipments of enameled sheet-metal ware in January, as reported to the Department of Commerce by 18 manufacturers, comprising approximately 80 per cent of the industry, totaled 319,218 dozens, valued at $1,091,350. This compares with 307,280 dozens, valued at $1,085,762, in December. The enameled ware included in the reports consists of cooking, household and hospital utensils having a vitreous coat on a sheet steel or iron base.

January shipments of galvanized sheet-metal ware, as reported by 15 concerns comprising a large proportion of the industry, were 184,993 dozens, valued at $691,348. This compares with 107,267 dozens, valued at $398,199 in December, and with 173,899 dozens, valued at $676,768, in January, 1927.

Statistical Abstract of the United States—1926

Following a series of 48 predecessors the Statistical Abstract of the United States for 1926 has been issued by the Department of Commrece. It consists of a book of 831 pages, and copies may be obtained at $1 each from the superintendent of documents, Government Printing Office, Washington. As in previous editions, it consists of a compendium of information covering many features of the progress of the United States along material lines.

It is divided into a series of general topics: Area and population, vital statistics, immigration and emigration, education, public lands and national parks, climate, army, navy, etc., national Government finance, State, city and local Government finance, money and banking, wealth, business finance, prices, wages, postal service, telephone, telegraph and cable, electric light and power, public roads and automobiles, steam and electric railroads and express companies, waterways and water-borne commerce, foreign commerce, irrigation and drainage, farms and their products, including crops and animals, forests, fisheries, mining and mineral products, and manufactures. All of these are reported in tabular form and in great profusion of detail.

Highest February Building Construction Ever Recorded

Building and engineering contracts in February in 37 States, east of the Rocky Mountains, are reported by F. W. Dodge Corporation at $465,331,000. This is the highest February total ever achieved. It represents a gain of 18 per cent over last year and is 9 per cent more than the preceding month. The area accounts for about 91 per cent of the total construction volume of the United States.

Four districts made new high records for February, these being New York and northern New Jersey, the Middle Atlantic States, the Central West and the Texas district. In New England the total was the second highest for February. More than half of the total was for residential buildings, these aggregating $238,985,000. Public works and utilities provided $59,980,000; commercial buildings, $57,695,000; social and recreational buildings, $35,414,000; and industrial buildings, $34,881,000.

For the first two months of this year contracts have been awarded to the extent of $892,500,000. This is 15 per cent ahead of the same two months last year.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Expansion of activity in chief consuming industries is at hand, but demand is not insistent.

Car and locomotive buying in February picked up from the unusually low January level.

Automobile production is clearly expanding, but severe competition is apparent.

Building volume continues large; residential building assures good demand for pipe and nails; structural sales are improving.

Outlook for tank plates in petroleum States may improve, as storage of oil is becoming a problem.

Iron and steel exports have been only moderately active.

ALL barometers indicate an increased demand for steel. In view of this fact it seems noteworthy that the demand is not urgent or keen. A large quantity of sheets and bars is obviously required by automobile manufacturers, and structural steel orders continue in good volume as building activity expands. But in almost every direction one notes a lack of snap and spontaneity, while close attention is paid to prices. This is far from suggesting the development of anything approaching boom conditions or a sustained advance in iron and steel prices. The condition is due to the obvious fact that iron and steel consumers are proceeding cautiously. Their volume of business is large in quantity and has picked up sharply, but competition is severe in many lines and the outlook for further expansion becomes more uncertain with each month of increased production. On the average, profits are not satisfactory.

The net conclusion appears to be that the volume of steel business will increase somewhat further and will be well sustained during the first half of the year. In fact, steel production has not yet responded fully to the influence of conditions reflected in the rising P-V line. But it seems probable that the volume of business will not be done on a very profitable basis.

Large Potential Demand Indicated

OUR composite demand line rose sharply in January, to a point nearly as high as that reached in February, 1927. This means that the activity of the chief iron and steel consuming industries was such as to indicate a large potential demand. Assuming operations in these industries to be profitable, their activity would sooner or later result in a proportionate increase in the buying of iron and steel and justify a similar increase in the steel output.

The composite demand index is estimated at 114 in January, against 101 in December, and 112 in January, 1927. This rise of 13 per cent in a month is the sharpest on our record and appears to justify completely the similar rise in the steel ingot output—the volume of which we were inclined to doubt a month ago. The chief factors in the rise were increased activities in the automobile, building and general manufacturing lines of industry. There were gains also in mining, machine tool orders, and exports of iron and steel. Strangely enough, the only factor in the composite demand index

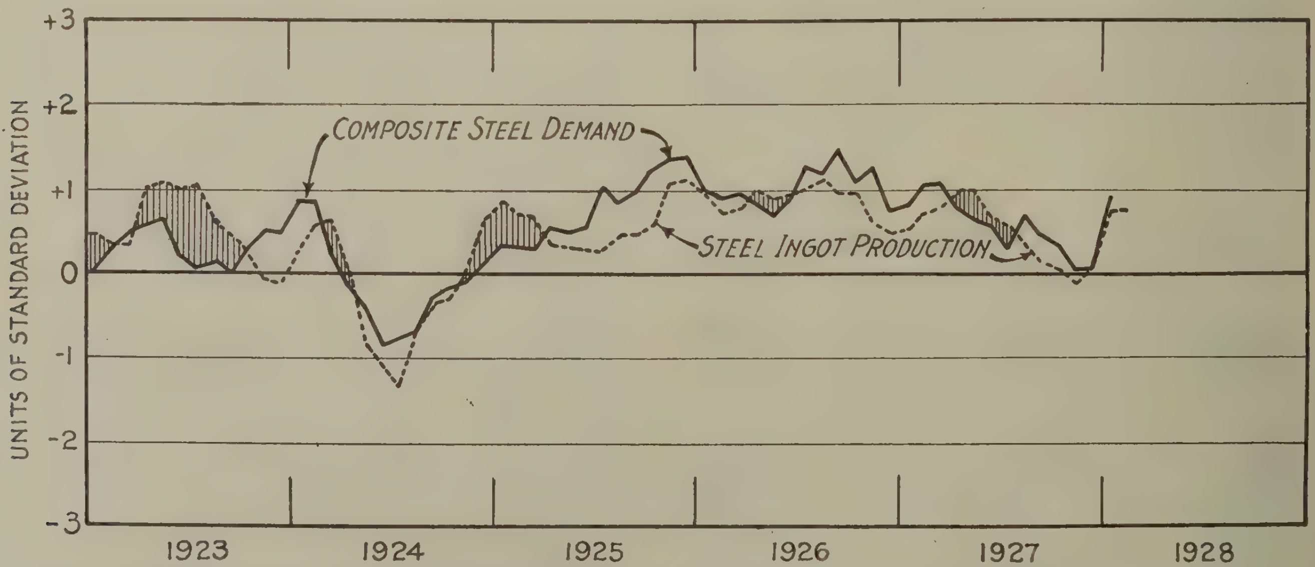


Fig. 1—Steel Production Carried Forward in February the High Level of January—the Sharpest Advance in Nearly Five Years. But the curve of composite demand rose still higher. The outlook for the immediate future is encouraging

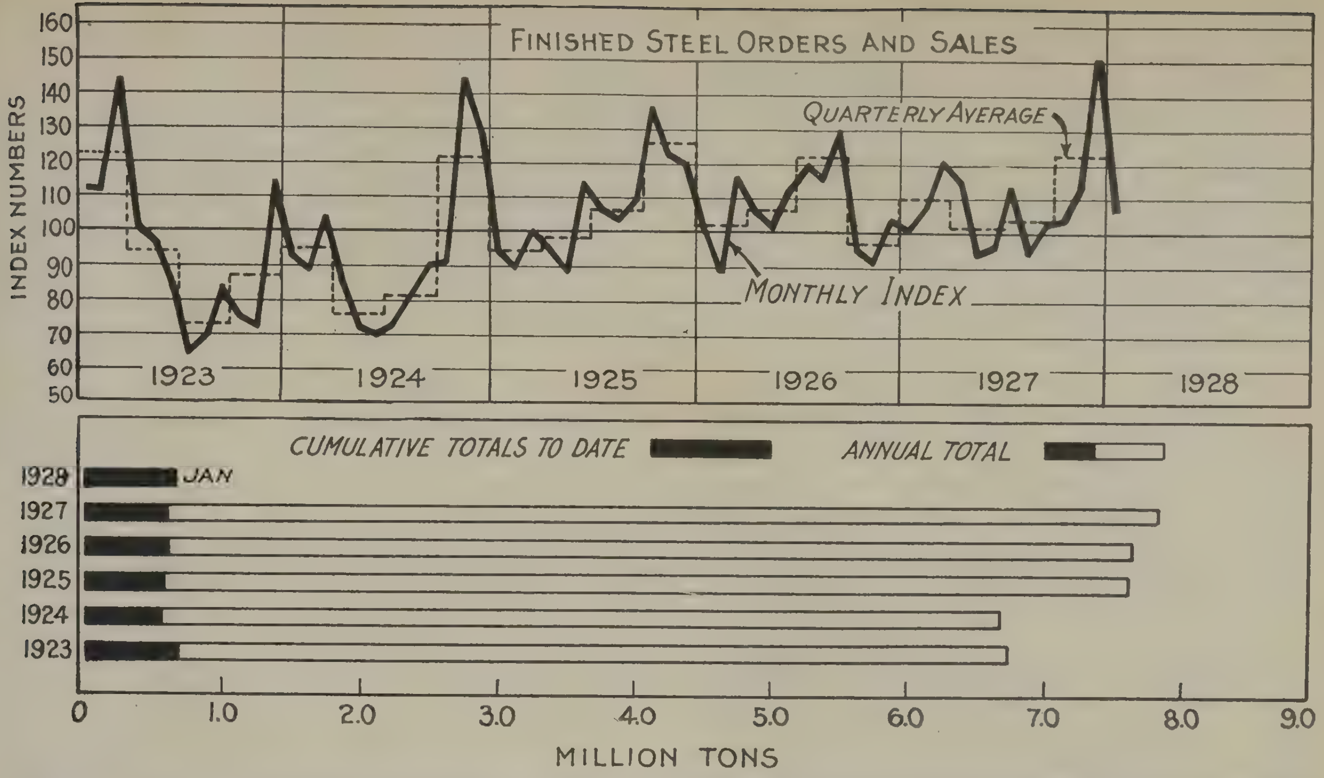


Fig. 2—Buying of Finished Steel Dropped Sharply After the Great Spurt in December, But Constituted the Highest January Since 1923. The peak of resultant production may follow in February or March

which declined in January was farm purchasing power, which was affected by the small marketings of the chief farm products and by somewhat lower farm prices.

Preliminary February data indicate a further sharp gain in the composite demand line. Allowing for seasonal variation, automobile production, building activity and railroad traffic were all considerably higher in that month. If we assume that this activity in the consuming industries means a proportional need of steel, it may therefore be said that the present level of steel output is conservative. But it must also be said that the price situation shows that the intensity of the demand, as measured in dollars, is not so great as the volume of demand measured in tons.

As shown in the chart, the average daily output of steel ingots, adjusted to eliminate the merely seasonal movements, held practically level in February at about the same figure that obtained in March last year.

Conditions in Certain Industries

As to the future, most indications favor the conclusion that further expansion of industrial activity is to be expected and that the output of steel will increase also. *Railroad freight traffic* was on the up-grade in February, making due allowance for seasonal conditions. The increase in basic industries, including building, automobile production and steel, indicates a more than seasonal gain this spring. The condition of railroad equipment also seems to indicate some increase in requirements for cars and locomotives. (This matter is touched upon again later.)

Building activity promises to continue in large volume. Easy money and a good investment demand are reassuring factors. Considering the season, building permits have steadily increased. This should mean a gain in residential construction sufficient to insure a better demand for nails, standard pipe and other similar items. Moreover, construction contracts as a whole increased sharply in February, which fact promises a continuation of the good demand for structural steel.

Manufacturing activity in general (excluding the iron and steel and automobile industries) has not increased in proportion to the large gains in a few of the more basic industries. But, even so, there has been a recovery that is sufficient to bring the general level higher than it has been since last fall. In this connection it is significant to note that the movement of machine tool orders has been upward for four months and that, considering the season, the volume of such orders in January was the largest since September, 1926. Moreover, current reports indicate continued good business in this line.

Automobile Industry Expanding Seasonally

The upward trend of *automobile* production carried through February, when, preliminary estimates indicate, approximately 350,000 cars and trucks were turned out. There seems every reason to anticipate a further increase that will last through April, and a proportionally large volume of business in sheets, bars and other automobile raw material. Every indication of severe competition, however, is apparent in this industry, and the tendency toward price cutting appears to mean that the profits in the industry will not be in proportion to the volume of business done.

Mining industries, including petroleum, have shown little change and are not likely to expand much during the next few months. The level here has been running along about steady at the general average of the last seven years. The coal business is poor, with no turn yet in prospect. The chief opportunity for improvement lies in the *oil industry,* although even here the huge stocks of crude oil now in storage constitute a problem. Current petroleum production, however, is not excessive and drilling activity is at a low level. The industry is dragging bottom, with improvement only a question of time.

As to *agriculture,* we do not find the immediate outlook for farmers as good as it seemed at the end of 1927. Average farm prices have declined and the purchasing power of the farm dollar is not quite so high. Also, the number of dollars received by farmers has been reduced by the relatively small quantity of the chief crops and animals marketed.

Seasonal Decline in Orders

AS usual, the orders for finished steel declined in January. Owing to the extraordinary peak attained by such orders in December, the decline was larger in amount than usual; but, even so, the January volume of finished steel orders, covering items that represent roughly 50 per cent of the steel business, was the largest for that month since 1923. Ordinarily the short month of February shows a decrease in such orders, 1927 furnishing the only recent expansion. This year, owing to the extra day in February and to the unusually sharp expansion in the automobile and building industries, it seems probable that little, if any, decline is to be expected in the orders. Thus 1928 is off to a good start.

The best showing made in the January figures is

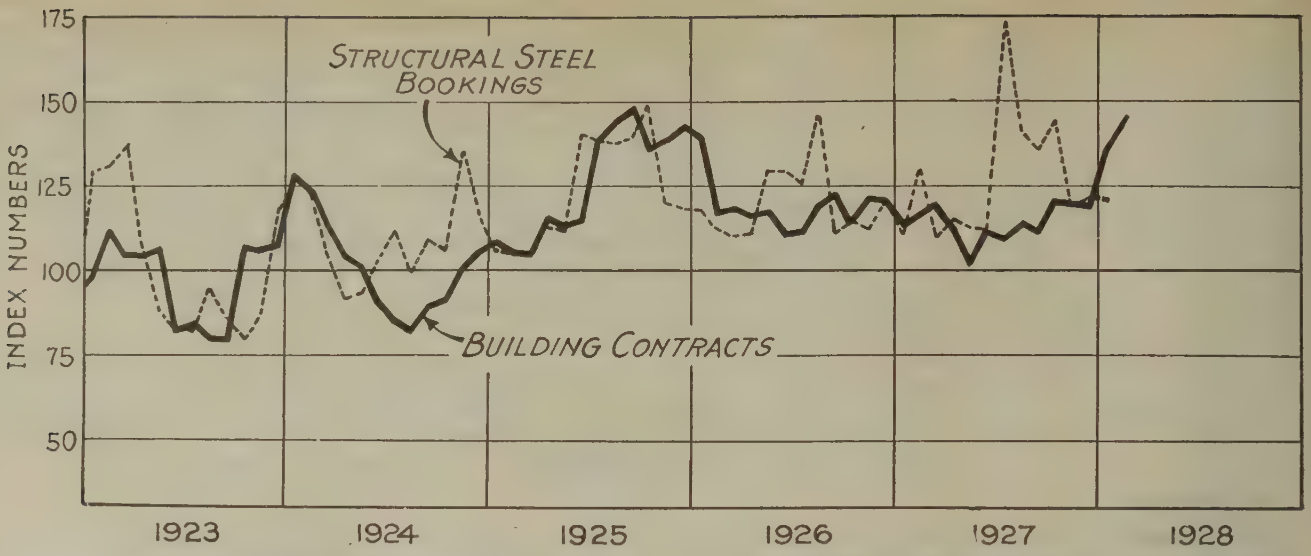


Fig. 3—Building Contracts Continued Upward in February. Structural steel bookings, after dropping in December, have remained above the seasonal average. The outlook is encouraging for the next few months

found in sheets and in fabricated structural steel. The January volume of independent sheet sales amounted to 302,900 tons, far exceeding the business in any previous January on our record. It compares with 261,400 tons in 1927 and 253,300 tons in 1926. Structural steel sales amounted to 213,800 tons, which is the largest January volume since 1924. The business in fabricated plates was about average for January, though somewhat below a year ago.

The poorest showing was made by steel castings, of which item only 90,900 tons is reported as ordered, against 107,800 tons in 1927 and 112,000 tons in January, 1926. The decrease in the orders for castings between December and January, however, was almost exactly the usual seasonal amount, so that no downward *trend* was indicated. The orders for castings seem to furnish an excellent index of general business conditions, and the low levels of recent months fairly represent the average situation. But the three months from November to January, inclusive, show a considerable recovery, which gives a favorable impression as to the recent trend, and the orders were above production in all three months.

Structural Steel Orders Above Average

OUR third chart has been revised in an attempt to allow for seasonal variation in the orders for structural steel. A seasonal factor exists, the peak of the orders usually coming in April and being about 13 per cent above the monthly average for the year, while the low point usually occurs in August or September, and is about 4 per cent under the average. Although the seasonal variaton is most irregular and the number of years available for determining it is too small for satisfactory results, it is believed that the adjusted curve gives a truer picture of the actual trend than would be presented by the actual figures.

The chart shows an extraordinarily high peak in July last year, since when the trend has been irregularly downward. But it may be said that December and January showed a sidewise movement, the bookings of structural steel being sustained at a level well above the average. The situation resembles that found at the turn of the year between 1925 and 1926, an analogy which is encouraging. Moreover, in January the level was well below that of the building activity curve.

After rising sharply in January, the adjusted curve of building activity (floor space in contracts awarded) continued upward in February, and *nearly reached the record peak made in September*, 1925. This is one of the most favorable indications as to business in general, and the iron and steel industry in particular, that has yet appeared. Perhaps the extra day in February helped make this showing, but even the average daily volume of building contracts would show a substantial gain. The index is now 155, against 142 in January and 124 a year ago, the average for the seven years 1921-1927 being taken as 100. More than this, both building permits and contemplated new construction gained more than usual in February. Thus all phases of building present favorable indications and strongly suggest a continued large volume in this basic industry throughout the spring.

Better Equipment Orders

WHILE the volume of railroad equipment orders also picked up in February, some allowance must be made for the extra day, due to the fact that 1928 is

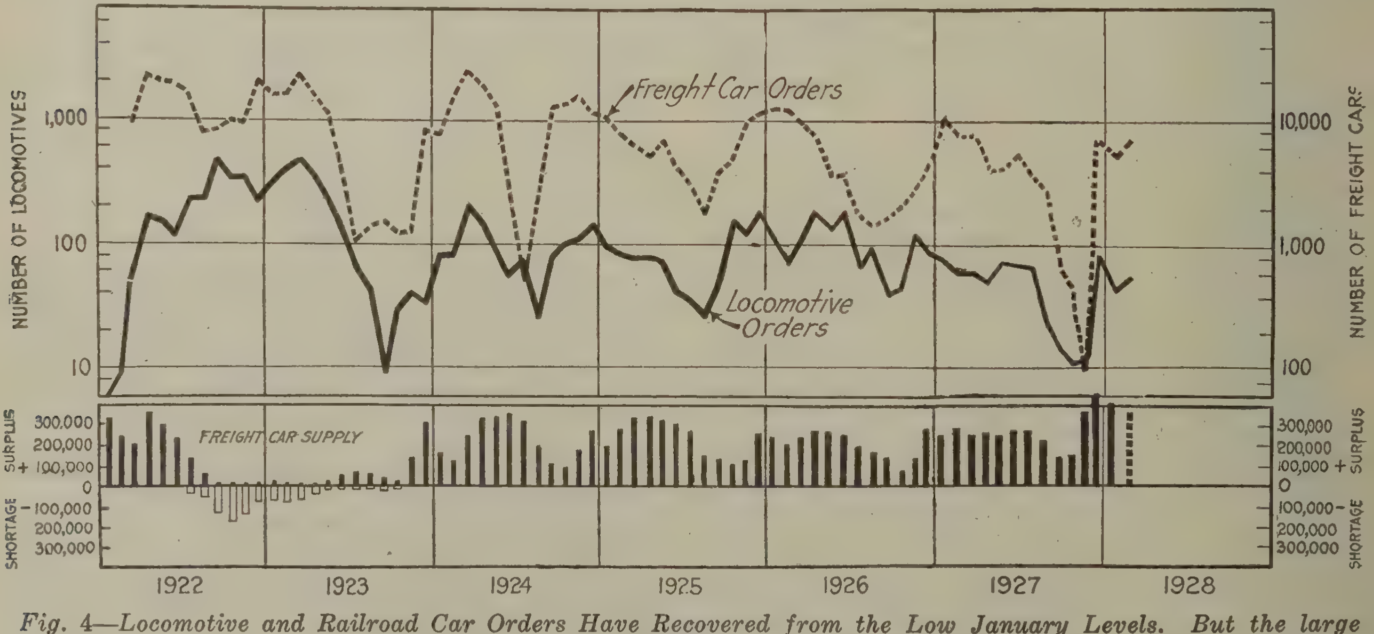


Fig. 4—Locomotive and Railroad Car Orders Have Recovered from the Low January Levels. But the large surplus of cars does not indicate need for heavy purchases

leap year. According to *Railway Age*, domestic freight car orders in February numbered 5876, an increase over January and, except for December last year, the largest since June, 1927. This figure may be called fairly good, but the fact remains that the first two months of 1928 saw the smallest volume of freight car orders for the period that has existed in any recent year. It must be remembered also that the surplus of freight cars is large. Nevertheless, freight traffic is gaining gradually, considering the season, and the outlook appears to be fair. The locomotive orders, too, showed a gain over January, the domestic business amounting to 30 units. This compares unfavorably, however, with domestic orders for 85 locomotives in February last year.

On the whole, it looks very much as if the equipment business touched bottom last November, and it does not seem too optimistic to conclude that, with the gradual improvement in railroad traffic that is indicated, it will expand this spring. In reaching this conclusion, however, one must allow for the existence of a considerable surplus of equipment and for the fact that railroad earnings are small, on the average. The latter fact makes it probable that the carriers will endeavor to use the more obsolete types of equipment, and that for a time they will not order new equipment in proportion to the growth of their traffic.

Steel Corporation's Unfilled Orders Increase Again in February

A moderate increase in the unfilled orders of the United States Steel Corporation was reported for February. The total on Feb. 29 was 4,398,189 tons, a gain of 122,242 tons over the 4,275,947 tons on Jan. 31. The increase in January over December was 303,073 tons. The February gain was the fifth in succession. A year ago the unfilled orders were 3,597,119 tons. The February total this year was the largest since February, 1926. The following table gives the unfilled tonnage by months, commencing with January, 1926:

	1928	1927	1926
Jan. 31.......	4,275,947	3,800,177	4,882,739
Feb. 28.......	4,398,189	3,597,119	4,616,822
Mar. 31.......	....	3,553,140	4,379,935
April 30.......	....	3,456,132	3,867,976
May 31.......	....	3,050,941	3,649,250
June 30.......	....	3,053,246	3,478,642
July 31.......	....	3,142,014	3,602,522
Aug. 31.......	....	3,196,037	3,542,335
Sept. 30.......	....	3,148,113	3,593,509
Oct. 31.......	....	3,341,040	3,683,661
Nov. 30.......	....	3,454,444	3,807,447
Dec. 31.......	....	3,972,874	3,960,969

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

Increase in Finished Iron and Steel Imported into India

Imports of all classes of iron and steel at the port of Karachi, India, in 1927 totaled 84,645 tons, against 73,333 tons in 1926, according to a report received by the iron and steel division, Department of Commerce, from E. Verne Richardson, consul at Karachi. The gain was the result of enlarged receipts of bars, 15,144 tons, against 8928 tons in 1926; of rods, 7490 tons, against 6608 tons; of galvanized sheets, 10,639 tons, against 5946 tons; and of miscellaneous iron and steel, 36,503 tons, against 30,783 tons. These were offset, however, in some measure by reduced imports of sheets and plates, 10,709 tons, against 12,049 tons; and of hoops, 4160 tons, against 9019 tons.

Report on Migration of Industry Nears Completion

WASHINGTON, March 13.—As a basis for determining the mobility of industry, data from more than 700 cities and towns in the United States designed to show the main currents for 1927 are being compiled by the organization service of the Chamber of Commerce of the United States. The report, nearing completion, will indicate geographically the establishment of new or primary industrial plants, the establishment of branches and the relocation of plants. It will indicate whether or not industry is shifting from large to smaller cities and towns. It is recognized, the organization service says, that industry is readjusting itself to new conditions, but no measure of the extent of this readjustment has been available.

"The scramble for industries on the part of many cities has been largely a free-for-all struggle with no knowledge of where the industry was coming from or why it was moving or whether one city's gain was to be another city's loss," it is pointed out. "The purpose of the present survey is to provide a basis for orderly economic and industrial development.

"Tabulated returns show, for example, an apparently unusual activity in Texas, where the establishment of 45 plants is reported, 35 of them being primary plants. But Ohio, an old industrial State, discloses a similar degree of adjustment."

New Alloy Steel Bar Schedule With Common Base Price Announced

A new schedule of alloy steel bar prices, based upon producing costs of the leading manufacturers, has been announced, and it shows slight advances in most grades and substantial declines in a few. All grades now take a common base price of $2.65 per 100 lb., mill, which, it is said, measures the increase in producing costs over carbon steel bars at $1.90 per 100 lb. In other words, the producing cost of alloy steel bar practice runs $15 a ton higher than that in ordinary carbon bar practice. To the base price is added a charge in keeping with the alloy content and what the study of the costs of the several manufacturers in this connection disclosed. The new and old schedules make the following comparison:

S.A.E. Series Numbers	Extra per 100 Lb. Over Base	New Price	Old Price
2000 (½% nickel)	$0.25	$2.90	......
2100 (1½% nickel)	0.55	3.20	......
2300 (3½% nickel)	1.50	4.15	$4.00 to $4.10
2500 (5% nickel)	2.25	4.90	5.00 to 5.25
3100 (nickel chromium)..	0.55	3.20	3.00 to 3.10
3200 (nickel chromium)..	1.00	3.65	4.75 to 5.00
3400 (nickel chromium)..	3.20	5.85	6.00 to 6.25
3300 (nickel chromium)..	3.80	6.45	6.75 to 7.00
4100 (chromium molybdenum, 0.25 to 0.40% molyb.)...	0.70	3.35	......
4100 (chromium molybdenum, 0.15 to 0.25% molyb.) ..	0.50	3.15	......
4600 (0.20 to 0.30% molyb., 1½% nickel)	1.05	3.70	......
5100 (low carbon, 0.60 to 0.90% chrom.)..	0.35	3.00	......
5100 (forging, 0.80 to 1.10% chrom.)..	0.45	3.10	......
5100 (chromium spring).	0.20	2.85	3.00 to 3.10
6100 (forging bars, chrom. vanadium)	1.20	3.85	4.00 to 4.15
6100 (spring steel, chrom. vanad.)	0.95	3.60	3.50 to 3.75
Nickel chromium vanadium	1.50	4.15	4.05 to 4.20
Carbon vanadium	0.95	3.60	4.10 to 4.20
9250 (sil. mang. spring steel)	0.25	2.90	3.00 to 3.15

*Schedule of the next installments of the **Business Analysis and Forecast,** by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: **March 22—Position of Iron and Steel Producers; March 29—General Business Outlook; April 12—Activity in Steel Consuming Industries.***

SMALLER ORE SHIPMENTS

Lake Superior Ranges Show Drop of 12.7 Per Cent from 1926 Movement

IRON ore shipments from Lake Superior district in 1927, as compiled by *Iron Trade Review*, amounted to 52,343,336 gross tons. This is a decline of more than 7,600,000 tons from the 1926 shipments, which totaled 59,972,038 tons, and is the smallest movement since 1924. Of the total, 51,107,136 tons was shipped by steamer and 1,236,200 tons by rail. Both methods of shipment participated in the decline, that by lake having dropped 12.7 per cent and that by rail 13.8 per cent.

As has been the case for many years, the lead was taken by the Oliver Iron Mining Co. (United States Steel Corporation subsidiary), which shipped 21,511,525 tons, or 41.10 per cent of the total. This was a reduction of 4,541,733 tons from the company's 1926 shipments, which aggregated 43.43 per cent of the total. Thus the Oliver tonnage decrease was approximately 60 per cent of the total tonnage decrease. The Oliver company has shipped 434,585,575 tons since 1908. In comparison with this all the ranges have shipped, since their several beginnings, 1,346,264,975 tons.

Six other operators shipped more than 1,000,000 tons each in 1927. Their aggregate was 23,299,720 tons. Adding this to the Oliver shipments, a total of 44,811,245 tons was shipped by seven companies, amounting to 85.6 per cent of all the ore. The remaining 14.4 per cent was shipped by a small group of independent companies.

All the ranges showed a decline in shipments from 1926. These declines varied from nearly 30 per cent of the small shipments from Mayville-Baraboo to less than 7 per cent from the Marquette range, less than 5 per cent from the Cuyuna range and less than 3 per cent from the Vermilion range.

In spite of the smaller shipments from all ranges there were 86 mines active on the Mesabi range in 1927, compared with 79 in 1926 and 87 in 1925. As a result the average production per mine declined considerably. It was 383,420 tons in 1927, compared with 479,111 tons in 1926. This range provided 63.0 per cent of the total tonnage, against 63.8 per cent in 1926.

Active mines in the other districts showed 34 for Menominee against 32 in 1926; 26 in Marquette against 22; 20 in Gogebic, the same as in 1926; 13 in Cuyuna against 15; five in Vermilion, as in 1926, and one in Mayville-Baraboo, as in 1926. The total for the seven ranges was 185 active mines, compared with 174 in 1926 and 186 in 1925. The average mine shipment for all ranges in 1927 was 282,922 tons, which is considerably lower than in the two preceding years. In 1926 the average was 344,737 tons, while in 1925 it was 298,475 tons.

Ore beneficiated before shipment made up nearly three-eighths of the total tonnage. The amount in 1927 was 19,266,850 tons, or 37 per cent of the total, the same proportion as in 1926. Of this, the quantity crushed in 1927 was 14,124,960 tons; washed ore was 4,766,997 tons; dried ore, 190,543 tons; sintered, nodulized and briquetted, 107,950 tons; jigged ore, 76,400 tons. All of these figures showed declines from 1926.

TABLE I.—SHIPMENTS BY PORTS AND ALL-RAIL

	1927	1926	1925	1924	1923	1922
Escanaba	5,865,224	6,599,597	5,644,278	4,244,669	5,607,411	4,592,354
Marquette	3,238,855	3,417,462	3,487,968	2,516,548	2,789,285	1,976,220
Ashland	6,239,774	7,139,865	6,664,501	4,807,565	6,237,449	5,813,207
Two Harbors	5,703,159	6,266,272	6,016,096	4,817,494	6,418,464	5,952,437
Superior	14,627,936	16,476,264	14,560,477	13,355,214	17,820,476	11,234,240
Duluth	15,432,188	18,638,395	17,707,978	12,882,082	20,163,619	13,044,771
Total by lake	51,107,136	58,537,855	54,081,298	42,623,572	59,036,704	42,613,229
Total by rail	1,236,200	1,434,183	1,435,046	1,271,538	1,743,299	1,376,867
Total	52,343,336	59,972,038	55,516,344	43,895,110	60,780,003	43,990,096

TABLE II.—IRON ORE SHIPMENTS BY RANGES

	1927	1926	1925	1924	1923	1922
Mesabi	32,974,157	38,249,793	35,889,988	29,141,665	41,814,463	28,055,394
Marquette	4,151,868	4,442,765	4,185,533	3,174,660	3,892,666	2,817,390
Menominee	5,211,215	5,945,811	5,268,846	3,836,707	4,854,781	4,078,519
Gogebic	6,383,408	7,536,389	7,068,296	5,159,838	6,579,950	6,218,610
Vermilion	1,547,732	1,586,054	1,437,577	978,097	1,278,598	1,211,467
Cuyuna	1,982,302	2,079,276	1,509,217	1,468,940	2,220,745	1,497,615
Mayville-Baraboo	92,654	131,950	156,887	135,203	138,800	110,101
Total	52,343,336	59,972,038	55,516,344	43,895,110	60,780,003	43,990,096

Nearly 6,000,000 Tons of Iron and Steel in Water-Borne Commerce

WASHINGTON, March 10.—Of the total of 531,614,691 net tons of freight, exclusive of lighterage, which constituted the 1926 water-borne commerce reported by the Bureau of the Census for continental United States and Alaska, domestic transportation made up 405,210,902 tons, or 76.2 per cent, and foreign commerce consisted of 126,403,861 tons. Of the foreign commerce, 76,324,861 tons was exports and 50,078,928 tons was imports. While, of course, all the domestic commerce was carried in American vessels, only a little more than one-third, 33.9 per cent, of the foreign commerce was carried in American vessels.

Unmanufactured iron and steel constituted 5,847,145 tons of the total water-borne transportation, 3,035,500 tons being in domestic commerce and 2,811,645 tons in foreign commerce. Foreign vessels carried 1,613,678 tons and American vessels 1,197,967 tons, or 42.6 per cent, of the foreign commerce. The total water-borne iron ore transportation was 69,514,069 tons, of which 64,581,613 tons was in domestic commerce and 3,932,456 tons in foreign commerce. Of the latter total, 2,303,719 tons was carried in foreign vessels and 1,628,737 tons, or 41.4 per cent, in United States ships.

The active fleet of continental United States in 1926 numbered 37,561 vessels, with a gross tonnage of 18,415,893, as against 40,383 vessels of 12,371,269 gross tons in 1916.

Danger of Extinction of Merchant Marine Is Emphasized

WASHINGTON, March 11.—The unsatisfactory condition of the United States merchant marine was recently emphasized before the House Committee on Merchant Marine and Fisheries by H. G. Smith, vice-president of the National Council of American Shipbuilders, in the course of testimony in connection with the White and Wood bills. The measures are designed to establish a privately owned and operated merchant marine by means of assistance in the form of construction loans and mail and naval subventions. Mr. Smith told the committee that the American shipbuilding industry is now in a far more unsatisfactory condition than it was before the World War and is threatened with extinction if a merchant marine is not developed through government assistance.

YOUNGSTOWN-INLAND MERGER

Negotiations Have Been Dropped—Sheet & Tube Company to Expand in Chicago District

YOUNGSTOWN, March 13.—Merger negotiations between the Youngstown Sheet & Tube Co., Youngstown, and the Inland Steel Co., Chicago, which were first made public late in December, have been dropped on account of disagreement on certain features of the consolidation. An official statement issued on March 8 follows:

"J. A. Campbell, president of the Youngstown Sheet & Tube Co., and L. E. Block, chairman of the board of the Inland Steel Co., announced today that the parties have been unable to agree on certain important features of the proposed merger of the two companies and that the merger therefore will be abandoned."

The Youngstown-Inland merger would have brought together steel ingot capacities amounting approximately to 5,000,000 tons, exceeded only by the Steel Corporation and the Bethlehem Steel Corporation. It was approved by the directors of both companies on Jan. 31 and meetings of stockholders to ratify the action had been called for March 15. Plans of the new company, which was to have been known as the Youngstown-Inland Steel Corporation, called for the issuance of 3,200,000 shares of stock, of which 2,000,000 shares were to have been given to holders of Sheet & Tube common stock on a basis of two new shares for one old, and 1,200,000 shares to holders of Inland common on a share for share basis.

Following the failure of the merger, the Youngstown Sheet & Tube Co. is planning to develop further its Chicago district properties. Installation of sheet and rail mills is under consideration and a further rounding out of present capacity is planned, while harbor frontage is to be improved.

President James A. Campbell, in his annual statement, states that last year the company expended $8,879,727 for new construction, improvement of equipment and for other capital outlays, and has under construction at present a new boiler and power plant at the Campbell works, and new coke ovens at the South Chicago plant. These two developments, together with some other improvements, will require a capital expenditure of about $12,500,000. Last year, the company put into operation its new tin plate plant at Indiana Harbor and seamless tube mills at the Campbell works.

"During January, 1928," the statement continues, "there has been a noticeable increase in volume of business and from every indication this volume should be maintained. It is expected that there will be an improvement in prices as compared with the last half of 1927."

Differences over directorate control were largely responsible for the failure of the merger plan, which was dropped after agreement had been reached upon nearly all other major details.

February Sheet Production by Independent Mills Was 330,565 Tons

PITTSBURGH, March 13.—February was a good shipping and production month for the independent sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers, which in its monthly report discloses production of 330,565 net tons or 14,024 tons ahead of that for January, while the month's shipments of 298,420 tons were 24,294 tons in excess of those of the month before.

Sales for the month were 266,210 tons, or 36,711 tons below those for January. Unfilled orders at the end of February amounted to 667,054 tons, a loss for the month of 27,143 tons.

The report does not include figures of orders on hand awaiting shipment or unsold stocks.

The total number of mills in the United States was 718, having a capacity for February of 461,750 tons and the percentage of that capacity reporting was 72.6. Sales were 79.5 per cent of capacity reporting, production 98.7 per cent, shipments 89.1 per cent and unfilled orders 199.2 per cent. Comparative figures follow:

	February	January	December
Total number of mills......	718	720	719
Capacity per month........	461,750	486,550	472,064
Per cent reporting.........	72.6	72.6	72.6
Sales	266,210	302,921	530,197
Production	330,565	316,541	260,130
Shipments	298,420	274,126	221,689
Unfilled orders	667,054	694,197	745,393
Unshipped orders	......	110,945	97,630
Unsold stocks	......	59,508	53,474
Percentages to Capacity			
Sales	79.5	85.7	154.7
Production	98.7	89.6	75.9
Shipments	89.1	77.6	64.7
Unfilled orders	199.2	196.5	217.5
Unshipped orders	....	31.4	28.5
Unsold stocks	....	16.8	15.3

The twelfth annual Swiss Industries Fair will be held at Basel, Switzerland, April 14 to 24, inclusive. The fair embraces 20 industrial groups and about 1000 exhibitors are expected. Information may be obtained from the Consulate General of Switzerland, 479 Fourth Avenue, New York.

British Steel Output Large in February—Pig Iron Small

LONDON, ENGLAND, March 13 (*By Cable*).—Pig iron output in February was 550,800 gross tons, while that of steel was 764,400 tons, castings included. In January pig iron was 560,600 tons and steel was 626,200 tons.

The February steel output was the largest since September, 1927, when it was 777,000 tons. The pig iron production last month was the smallest since January, 1927. A comparison of the February production with January and the monthly rate for previous years is shown in the following table in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly......	855,000	638,600
1920—Average monthly......	669,500	755,600
1922—Average monthly......	408,500	490,100
1923—Average monthly......	620,000	706,800
1924—Average monthly......	609,900	685,100
1925—Average monthly......	519,700	616,400
1926—Average monthly......	203,500	296,700
1927—Average monthly......	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400

Stronach Nail Co. to Manufacture Special Nails at Ellwood City, Pa.

The Stronach Nail Co., recently incorporated under the laws of Pennsylvania, is engaged in the manufacture of a special nail which, on account of a triangular point of smaller section than the cross-section of the shank, does not spread the fibers of the wood, thus helping to avoid splitting. The company has acquired the former plant of the American Steel Co., at Ellwood City, Pa., containing 110,000 sq. ft. of floor area and a 20-acre plot. Several of the special machines for making the new nail, which were built by the Pennsylvania Engineering Works, New Castle, Pa., have been installed, and the company plans eventually to install 100 of these machines at this plant and to locate manufacturing facilities in other parts of the country. The new nail was designed by H. S. Stronach, formerly head of the industrial department West Coast Lumber Trade Extension Bureau, who now is vice-president and sales manager of the Stronach Company.

OXYGEN PRODUCTION

Nearly All American Plants Use Liquid Air Process

DATA on the amount of oxygen produced for cutting and welding were given by H. J. Mueller, president Universal Oxygen Co., Sheboygan, Wis., in an address before a welding conference at the University of Wisconsin, Feb. 8, 1928. He noted that the commercial production of oxygen from water by electrolysis commenced in the United States in 1907. Many improvements were made by American engineers, and before long electrolytic oxygen plants were found in nearly every State.

Liquid air oxygen was first produced in 1907 by the Linde Air Products Co. at Buffalo. The Superior Oxygen Co., Pittsburgh, was started in 1913, using processes patented by the German, Doctor Hildebrand, but was later absorbed by the Air Reduction Co., operating under French patents of Doctor Claude. The majority of the electrolytic oxygen producers have also converted their plants to use either the "Messer" or the "Heylandt" system of separating oxygen from liquid air.

At the present time there are approximately 155 oxygen producing plants in the United States, and in addition at least 500 warehouses and distributing stations. From these sources an increasing amount of oxygen is being used for cutting and welding all kinds of metal.

Total production is estimated by Mr. Mueller as follows:

Year	Cubic Feet Produced	Total Value	Cost Per Cubic Foot
1909	3,814,000	$177,469	4.7c.
1914	104,714,000	1,829,446	1.75c.
1918	1,355,000,000	18,292,500	1.35c.
1919	1,173,414,000	16,545,137	1.41c.
1921	1,059,825,000	13,964,952	1.32c.
1923	2,057,526,000	23,382,236	1.14c.
1925	2,073,826,000	22,577,110	1.09c.

While the actual figures for 1926 and 1927 are not available, it is thought that the volume produced is steadily increasing. The average cost per cubic foot is now less than one cent.

Data for European countries in 1926 are as follows:

Germany	1,050,000,000 cu. ft.
France	700,000,000 cu. ft.
Italy	350,000,000 cu. ft.
Great Britain	320,000,000 cu. ft.
All other Europe	504,000,000 cu. ft.

Receivers Appointed for Bollinger-Andrews Construction Co.

Theodore I. See and John H. Lucas have been appointed temporary receivers of the Bollinger-Andrews Construction Co., Verona, Pa. A bill in equity filed by John W. Fisher and Violante Bennett, the latter the principal owner, in which they asked for the receivers, said that this was essential to safeguard the interests of the creditors and stockholders. The company, which is engaged in the manufacture and erection of structural steel buildings and steel fabricating, has a plant at Verona. The assets amount to $1,081,000, and there are liabilities of $770,000. The company has materials on hand and also contracts, and it is necessary to borrow funds with which to complete the contracts.

Butte to Produce Manganese Ore

BUTTE, MONT., March 12.—Construction work at the Domestic Manganese & Development Co. is nearing completion, according to a statement issued by John H. Cole, president. It is planned to start operations in the spring, when deliveries of ore from the Anaconda Copper Mining Co. are due to commence. The five-year contract calls for 400,000 to 500,000 tons of rhodochrosite ore, crushed through 2½-in. screen.

Equipment is being installed in the dust chamber of the late Sen. W. A. Clark's smelter, idle 17 years. Alongside this building has been built a 45-ft. trestle, with bins underneath for the incoming ore. Apron-type feeders discharge into a conveyor and elevator leading to a central overhead feed bin. From here the ore is spouted into four rotary kilns, 8 ft. in diameter by 125 ft. long, made by Allis-Chalmers Mfg. Co., Milwaukee. Moisture and carbon dioxide gas will be driven from the ore before it gets very far in these kilns, and toward the hot lower end it will be sintered into clinker.

Emerging from the lower end of the kiln, the hot clinker will fall through the floor into a rotary cooler, 5 ft. diameter by 50 ft. long, set in the cellar. Each kiln has its own cooler. Cooled clinker (a high grade manganese ore) will be loaded into box cars for shipment to eastern furnace plants. Furnace gases are wasted through the old smelter stack of concrete, 360 ft. high.

Aliquippa Furnace Produced 285,148 Tons of Iron in 1927

A remarkable blast furnace performance called to the attention of THE IRON AGE is that of No. 2 Aliquippa furnace of the Jones & Laughlin Steel Corporation. This furnace in 1927 produced 285,148 gross tons of pig iron, which exceeds by more than 1000 tons the production of the A furnace of the American Steel & Wire Co., Cleveland, reported last week. Since its last relining on Dec. 14, 1924, the Aliquippa stack has been in continuous operation and had produced up to March 9, this year, 863,545 gross tons. Its best daily performance was on March 1, 1927, when it produced 1022 gross tons.

Sheffield Steel Corporation Issues $2,000,000 Bonds for Expansion

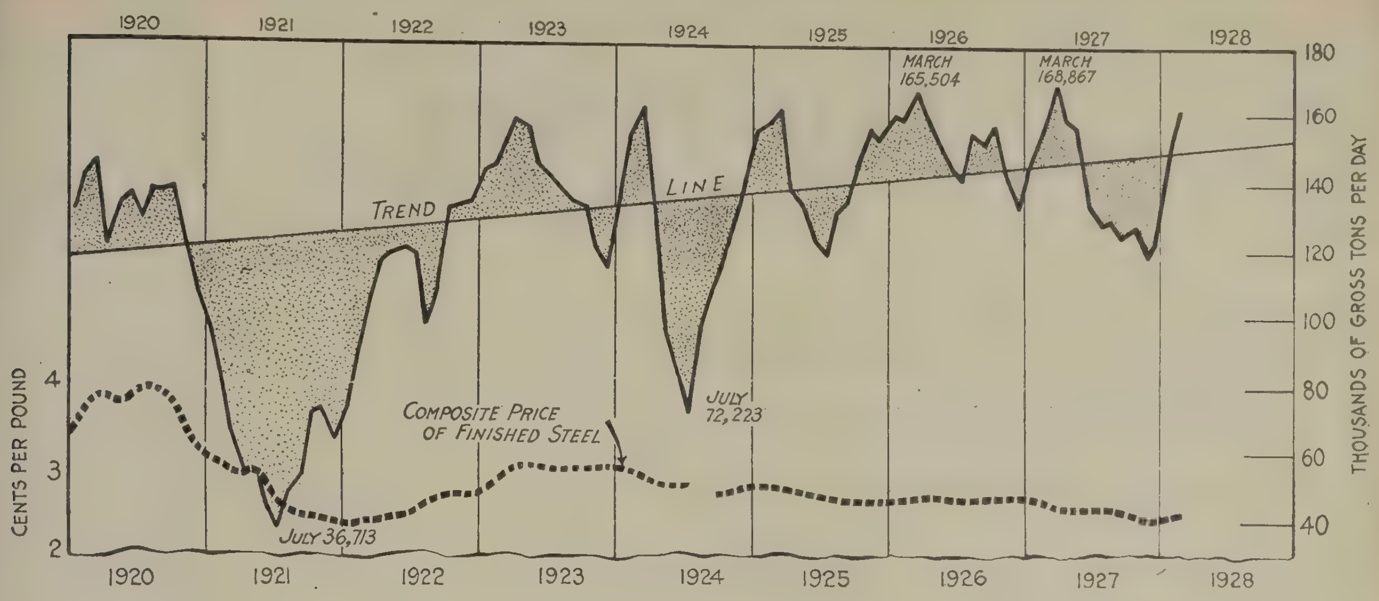
The Sheffield Steel Corporation, Kansas City, Mo., formerly the Kansas City Bolt & Nut Co., has announced the issuance of $2,000,000 worth of 5½ per cent gold bonds, the proceeds to be used for plant expansion. The company now has three open-hearth furnaces, a bar iron and rail rerolling mill, sheet mill and bolt, nut and forging works. To this equipment will be added a fourth open-hearth furnace, a wire mill, a combination bar and rod mill and a blooming mill. The bolt and nut department will be rearranged and enlarged. In addition to the $2,000,000 bond issue, the company has arranged for the sale of $1,250,000 preferred stock. Total expenditures for plant improvements will be about $3,000,000 and the balance, derived from bond and stock sales, will be added to working capital. W. L. Allen is president of the company. The bond issue has been arranged through Eastman, Dillon & Co. and the Prescott, Wright, Snider Co., New York.

The Sheffield company has awarded a contract to the Morgan Construction Co., Worcester, Mass., for a combination bar and rod mill and a continuous billet mill. Contracts for the blooming mill and wire equipment have not been awarded.

Rates on Pipe to Oklahoma Held Unreasonable

WASHINGTON, March 13.—Passing upon a complaint by the Oklahoma Natural Gas Co. and others, Examiner W. M. Carney, in a proposed report made to the Interstate Commerce Commission last week, held that freight rates charged on carload shipments of wrought iron and steel pipe, fittings and connections from certain points in Pennsylvania, Ohio and West Virginia to numerous destinations in Oklahoma were unreasonable. Reparation was recommended on the basis of the rates prescribed in the Southwestern cases. Typical rates to a large destination group in Oklahoma were 88.5c. and 85.5c. per 100 lb. from Pittsburgh and Youngstown respectively. In the decision in the Southwestern cases Youngstown was given the same rates as Pittsburgh, and the findings of the examiner are in accordance with that opinion but, he pointed out, "are in that respect without any prejudice to any different conclusion that may hereafter be adopted as to the proper relationship of rates from Pittsburgh and Youngstown."

With the Largest February Ingot Production Ever Recorded, the First Two Months of 1928 Are Ahead of Any Previous Year. Prices were slightly higher than in January



Largest February Ingot Production

Daily Rate of 160,591 Tons Was 5 Per Cent Above January —Two-Month Total Largest Ever Recorded

PRODUCTION of steel ingots in the United States in February is calculated by the American Iron and Steel Institute at 4,014,774 gross tons. This is based on returns from companies which in 1926 produced 95.40 per cent of the total. It represents the largest February tonnage ever recorded and is the fifteenth time any month has gone past 4,000,000 tons. With 25 working days, the estimated output was 160,591 tons a day, the fourth month which ever exceeded 160,000 tons a day. This compares with 152,354 tons (revised) in January and with less than 120,000 tons as recently as November. Only one month last year—March, with the highest tonnage ever made in one month—exceeded last month's daily rate.

For the two elapsed months of the year the calculated production of 7,975,983 tons is the greatest ever made in the first two months of any year. It exceeds by less than 1 per cent the corresponding figures of 1926 and 1925, and by a considerably larger margin the figures for 1927, 1924 and 1923, all of which showed more than 7,300,000 tons in the first two months. Gains in February were made both in open-hearth and in Bessemer steel. Compared with a year ago, however, the open-hearth production shows an increase of nearly 9 per cent, while the Bessemer production shows a drop of nearly 8 per cent. The total output, with one extra working day, represents a gain of about 6 per cent over February, 1927.

Estimating production in February of electric and crucible steel ingots (no longer covered in the institute's monthly figures) at 1200 tons a day, the total February ingot output would appear to be about 161,800 tons each working day. Details of the past 14 months are shown in the table.

Production of Steel Ingots*

(Gross Tons)

Months	Reported by Companies Which Made 95.40 Per Cent of the Steel Ingots in 1926 Open-Hearth	Bessemer	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
1928				
Jan.† ...	3,280,247	498,746	3,961,209	152,354
Feb.	3,308,728	521,366	4,014,774	160,591
2 Months	6,588,975	1,020,112	7,975,983	156,392
1927				
Jan.	3,041,233	545,690	3,759,877	144,611
Feb.	3,042,232	565,201	3,781,376	157,557
2 Months	6,083,465	1,110,891	7,541,253	150,825
March ..	3,701,418	590,716	4,499,092	166,633
April ...	3,340,852	565,634	4,094,849	157,494
May ...	3,272,810	557,683	4,015,192	154,430
June ...	2,822,477	486,047	3,468,055	133,387
July	2,595,692	436,446	3,178,342	127,134
Aug. ...	2,805,657	505,584	3,470,903	128,552
Sept. ...	2,611,976	471,455	3,232,108	124,312
Oct.	2,641,920	495,798	3,289,013	126,500
Nov. ...	2,477,253	481,830	3,101,764	119,299
Dec.	2,557,130	448,299	3,150,345	121,167
Total..	34,910,650	6,150,383	43,040,916	138,395

*Excluding crucible and electric steel ingots.
†Revised.

Lower Pig Iron Imports

Reduction of 22 per cent in imports of pig iron is shown by the January total of 11,090 gross tons, compared with 14,299 tons in December. A much greater decline is indicated by the totals for seven months ended Jan. 31, which were 83,376 tons this year, against 138,053 tons last year, a drop of over 39 per cent.

British India has dominated the scene in the seven months, having furnished nearly 60 per cent of the total, whereas in the preceding year Germany supplied 53 per cent of all and India only 11 per cent. Netherlands has occupied second position in each period. The table gives details.

UNITED STATES IMPORTS OF PIG IRON, BY COUNTRIES OF SHIPMENT

(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
United Kingdom	3,750	....	12,986	12,012
British India	5,637	246	49,469	15,476
Germany	40	5,272	1,440	73,019
Netherlands	1,446	3,700	14,805	28,020
Canada	172	....	208	1,749
France	....	....	3,000	3,416
Belgium	....	....	399	1,840
All others	45	108	1,069	2,521
Total	11,090	9,326	83,376	138,053

The fifth annual convention of the National Association of Foremen will be held on May 25 and 26 at Canton, Ohio, the general subject of the meetings being the "Foreman As An Executive." E. H. Tingley, 1249 U. B. Building, Dayton, Ohio, is secretary.

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This Issue in Brief

Unemployment situation is not critical, says economist. While the present number of unemployed is probably in excess of normal, the average industrial wage earner is in an excellent condition to cope with unemployment, inasmuch as the margin between wages and living expenses is larger than ever.—Page 734.

Prevent petty thefts on the part of employees by careful supervision of labor and materials in process. Hiring of paid spies is expensive and creates ill-will.—Page 723.

Aluminum foundry doubles output, with 40 per cent less floor space, by rearrangement of equipment. Careful planning of material-handling equipment installation enables foundry to make a considerable saving in man-hours without a heavy capital investment.—Page 728.

Cutting blowpipe saves $1,900 in repairing main drive gear. To remove gear from shaft and machine off surplus metal would have taken four days' time and cost $2,000. Cutting blowpipe and oxygen lance did the work in 14 hours, at a cost of $110. —Page 735.

Midget open-hearth furnace is found successful in experimental work. One-ton furnace duplicates results produced by its full-grown brothers. A very high temperature is obtainable. —Page 731.

Electro-magnet picks up wooden boxes filled with steel. Strip steel producer finds that magnet handles his product most satisfactorily. When coils are to be lifted, the lifting capacity of the magnet is increased by interposing a sheet of steel between the magnet and the coils.—Page 728.

Steel loses two million tons a year to concrete building construction. About half of our large buildings are now structural steel, and the other half are concrete, but the gains made in concrete are much larger than in steel.—Page 725.

In using stainless steel, be sure you select the right grade for your particular requirements. There are three distinct groups, each with its own properties. A metallurgist tells you which is best suited for each purpose.—Page 730.

You can obtain standard samples of raw materials from the Bureau of Standards for $1 to $3. The bureau lists the kinds available, and furnishes a certificate of analysis with each.—Page 732.

Favorable business is forecast by continued rise in building contracts, says Dr. Haney. The indications are for continued large volume, an optimistic omen of considerable weight.—Page 741.

More foreign steel coming into the country. Imports are considerably above pre-war totals, while steel exports are below the pre-war average.—Page 741.

Good business but small profits for steel industry during first half of year, Dr. Haney forecasts. Indications are that the volume of steel business will increase, but that it will not be done on a very profitable basis.—Page 744.

Labor-saving equipment is not responsible for unemployment, says National Industrial Conference Board chief. Mechanization of industry creates new wants and new tasks, he declares.—Page 733.

February daily steel output was highest in history, with a single exception. Daily tonnage was 160,591, a gain of 5 per cent over January, and exceeded only in March, 1926, with 166,633.—Page 751.

Automotive output gains 40 per cent. Total production of cars and trucks (without Ford) in February was 325,778, as against 232,685 in January. The increase over February, 1927, was 30 per cent.—Page 754.

Unfilled steel orders at highest point in two years. Steel Corporation reports a total of 4,398,189 tons of orders on Feb. 29, a gain of almost 3 per cent over January.—Page 747.

ESTABLISHED 1855

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Automobile Plants Doing Well

PRODUCTION of automobiles in February was remarkably heavy. Already the reports from the trade show larger production for this month, and shipping orders from that quarter to the steel mills indicate a further gain for April. As Ford is still in light production, and Ford output is not reported to the National Automobile Chamber of Commerce, the chamber figures are of particular interest. Covering substantially the total production of cars and trucks in the United States and Canada outside of Ford the chamber reports for February of this year 325,778, or 40 per cent increase over January of this year (232,685), and 30 per cent increase over February, 1927, for which the figure was 251,137.

Ford was in production in February, 1927, when the total production according to Department of Commerce figures was 323,418. Thus the N. A. C. C. members produced 2360 more units last month than the entire industry, including Ford, produced in the preceding February, and that production was not particularly low. It was under that of February in 1926 and 1924, but was above February production in 1923 and 1925.

There has been much speculation as to what will happen to the sale of other cars when Ford has been in heavy production for a while and will be able to make prompt deliveries. Such discussion is largely beside the mark, for the most active season will be long past when that occurs. In 1924, 1925 and 1926 April was by far the heaviest month, and in 1927 it yielded to May by only a few hundred cars. Ford produced 1200 daily last week with an expectation of a 1500 daily rate by the end of this week. With a five-day week a permanent fixture, that is a monthly rate of 32,500, or just one-tenth of last month's N. A. C. C. production. Obviously the Ford peak will not come until after July 1.

The automobile trade has reflected its prosperity by not being captious about the steel industry's efforts to secure higher prices for its products. Individual buyers in the automobile trade express their willingness to pay advanced prices for steel when such advances are being paid generally.

Yet heavy deliveries of steel to the automobile industry should not be interpreted as placing the steel industry in particularly favorable position. According to the annual presentations of THE IRON AGE as to the distribution of steel, the average allocation to the automobile industry in the past three years has been about 14 per cent, and as the average car is lighter now than formerly a little discount needs to be applied when figures of number of automobiles produced are considered. By far the more important showing of the automobile statistics is the evidence of the public's buying power. Granting for argument that the automobile has changed from a luxury to a necessity, it would still appear that a new car instead of retention of an old one may be regarded as a luxury.

Railroad Gage Runs High

THE freight ton-mileage of the railroads is one of the best indexes of general industrial activity; and as railroad work is industrial activity the total, including non-revenue freight movement, is perhaps a better index than the revenue ton-mileage alone. There has been remarkably little variation in the past five years, as shown by the following figures, with the percentage departure from 1923 indicated:

Freight Ton-Mileage

	Ton-Miles, Revenue and Non-Revenue	Percentage-Variation From 1923
1923........	456,237,879,523	....
1924........	426,833,710,571	—6.4
1925........	452,818,681,431	—0.7
1926........	488,701,825,000	+7.1
1927........	474,682,943,000	+4.1

It seems unfair in the light of these figures to call 1927 an off year at all. Rather there is plainly indicated a longer range increase. It is quite true there has been a much smaller increase in freight movement, on the ton-mile basis, in recent years than there used to be, but railroading is now mature and a slower growth is perfectly natural.

Of course, from the railroad viewpoint the showing is unfavorable. The railroads have been earnestly striving to show greater and greater efficiency, and one result of their success has been steadily increasing car surpluses. The average surplus in 1927 was 260,958 cars. It would be much better for the railroads if enough increase in freight movement were forthcoming to engage their facilities, which are thus increasing through gains in efficiency.

On the basis of public interest, the service rendered by the railroads has increased much more than the ton-mileage figures indicate. The railroads have lost business, so to speak, to water and motor transport. This was business which shippers preferred to divert. There is correspondingly greater increase in that service which railroads are best fitted to perform.

There has been also an improvement in the value of service relative to the ton-mile, the proportion of less valuable movement decreasing while the relative movement of foodstuffs and other high-class material has increased. Foods formerly considered out of season are made available by long hauls. There is no likelihood, therefore, that railroad freight movement will fail to continue increasing, though at what may seem like a moderate pace by comparison with old standards, for long ago the total railroad freight ton-mileage had a way of doubling approximately every dozen years.

Salvaged Metal Acquires Dignity

EVEN though all of us recognize the need of saving scrap metal in order to conserve natural resources, and most of us were once thrifty enough to seek a purchaser for any waste metal we may have had (from an old kitchen stove to continuous tonnages of brass turnings from screw machines), yet when we speak of the scrap metal industry there is commonly the vision of a miserable pony hauling a rickety spring wagon down the back alley, and a bearded junk dealer jangling a cracked cow-bell.

Eventually the gleanings of this lowliest member of a large industry reach the smelter or melter for conversion into useful ingot form. Before they can go to the furnace, however, they must all pass over the sorter's table, and he is a man whose skill must be uncanny. We who could not surely sort a lot of mixed malleable castings, steel castings and drop forgings without a laboratory full of scientific tools are lost in admiration for the man who with a file and a hammer can sort yellow brass into a dozen principal classes, who can throw zinc-bearing die castings into the proper bin and keep aluminum bronzes all by themselves, and can generally classify the incoming material into the 250 lots made necessary by the requirements of the smelting department and the ingenuity of the alloy makers. He must have all the attributes of a member of a skilled profession.

How well the secondary metal industry is organized from top to bottom may be inferred from the knowledge that more than half as much copper is salvaged and resold as is made from virgin ores. Of lead, 25 per cent; of aluminum 40 per cent. Obviously such large by-product supplies are effective balance wheels, preventing violent fluctuations in market prices. Higher prices of virgin metals tend to bring out increasing supplies of second-hand material; on the other hand, if prices drop unduly, the total supply of used material contracts sharply, because it is no longer profitable to collect and dispose of the old stuff. Low prices are checked by scarcity.

It is time to revise antique opinions about the salvaged metal industry. It requires the services of skilled professions; it is blessed by economic science, and it has a national trade association. In other words, it is quite respectable.

Steel Company Earnings

EARNINGS of steel producers in the first quarter probably will not greatly exceed those of the disappointing fourth quarter of last year, notwithstanding the heavier production and shipments in the current period, and it is not to be expected that this quarter's profits will equal those of the first quarter of last year. During 1927, it will be recalled, prices declined steadily and the average in December, as shown by THE IRON AGE composite price, was $2.44 per ton below that of the opening month of the year. It was upon the low level of last December that most of this quarter's contracts were based. In plates, shapes and bars, for example, a heavy tonnage moved to consumers during January and February at 1.75c., Pittsburgh, and not until this month have steel companies got the full benefit of the contracts made at 1.80c. The increased operations since the first of the year will help out earnings in this quarter to some extent, but it is to the second quarter that the steel trade looks for real improvements in the profit column.

The Senate and Coal Economics

EIGHTEEN years ago the United States Senate was moved by "the high cost of living" to instruct a committee to investigate and report. The committee's findings came out about the middle of 1910. The Senate did not act to bring down the cost of living, which continued to increase. The report stressed two things—the migration from farm to town (which has continued but which has not forestalled the development of the opposite problem, the farm problem) and the introduction of higher standards of living. James J. Hill previously had put it more briefly, that the trouble was not the high cost of living but the cost of high living.

The Senate committee on coal has gone into the earnings of coal mine employees and it considers them too low; but it does not compare these earnings relative to the effort with earnings similarly considered in other industries. If it were to study all other industries it would find that the total income of the people of the United States is quite insufficient to buy as many eggs and as much bacon and numerous other things as the people ought to have. Yet all the commodities produced find buyers. The committee would also find that in manufacturing and mining industries generally a high degree of efficiency has been reached, with men hard at work all year, while in coal there are so many miners that employment averages very light.

There is good reason to expect that the Senate report on coal will fall as flat as did the report on the cost of living 18 years ago. Things will keep working out along the lines already being followed.

The cost of living did not come down. The higher standard came to be expected, and as to the number of people working on farms the idea nowadays is that the number ought to be reduced—and by the help of revolutionary machinery it is being reduced—while the old investigation had it that the difficulty was the number had been reduced.

What chiefly interests the general public today is the position of the coal miners who went on strike nearly a year ago, though the United Mine Workers called the affair a "suspension"—a technical hedge against the payment of strike benefits. The essence of the matter today, in the relation of these miners to the public, is that the miners have gone on a hunger strike. They want employment in the coal mines at union wage rates. If Washington wants to do something useful, to meet the precise situation that exists, it should endeavor to decant miners, whether those now at work on the terms available or those who are idle. The condition will not grow better in the near future, for doubtless on April 1 the union men in Illinois and other western States who have been working for some five months past on a temporary arrangement will resume their strike.

The New Scrap Situation

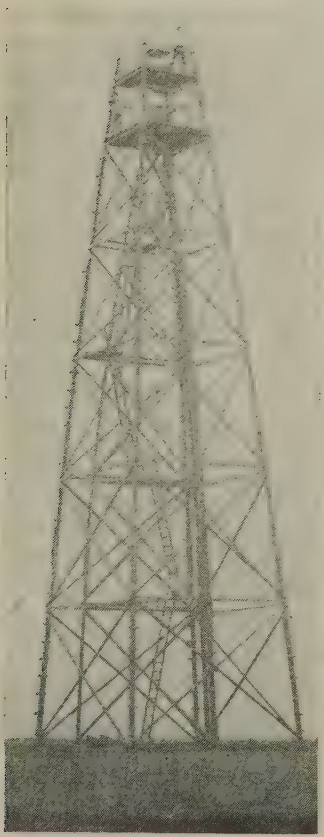
DEALERS in iron and steel scrap find it hard to account for a dull market at a time when steel works engagement is high; they are equally at sea in trying to formulate their plans. If steel manufacturers can get along with only moderate purchases of scrap when they are running at 85 per cent of capacity, there is naturally concern as to the scale of buying when the operating rate is at or below the average.

The problem is not nearly so complex as it appears. It is probable that the amount of commercial scrap taken by the steel makers is as large as it has been in recent years and that the dullness is more apparent than real. Buying of scrap, as of almost all commodities, has changed since it has become apparent to consumers that the necessity no longer exists for commitments well in advance of actual use. Steel works operating men must know the costs of their raw materials if they would make steel cheaply enough to meet the competition there has been and still is in prices of finished products. Scrap was the one item that in former years could not be safely figured until the scrap was ready to charge, because there never was absolute certainty that the manufacturer would get what he bought for the price he contracted to pay.

The remedy came in the large blast furnace and the reduction in unit cost which it afforded. Making pig iron in large quantities and at costs that were well defined, the steel companies merely figured pig iron instead of the fluctuating scrap price. Not only was speculation in old material largely eliminated, but control of prices passed from the scrap dealer to the consumer through the use of pig iron when the price of scrap was out of line. Thus the rate of steel works operation has had less than ever to do with the size of the demand for scrap. If the latter is cheap in relation to pig iron it will be bought, and there is just as much chance of good business in old material when steel production is moderate as when it is high.

Steel Replaces Wood in Survey Towers

BY J. S. BILBY*

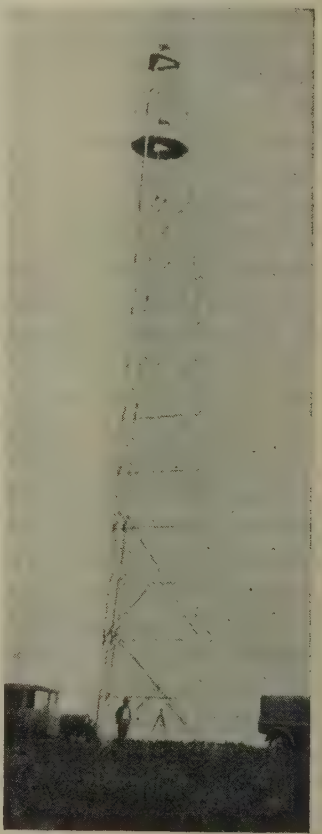


IN the measurement of long distances between primary survey points, the United States Coast and Geodetic Survey uses tall towers to enable the instrument men to sight over intervening obstacles. Formerly these were constructed of wood, at a labor and material cost of about $400 per tower.

During the winter of 1926, J. S. Bilby, chief of party, designed a steel tower for this duty. A trial tower was built by the Aeromotor Co., Chicago, and some modifications were made in the design. Thirteen additional towers were bought, and were used in South Dakota and Minnesota last summer with great success. It will be observed that the inner tower, which supports the theodolite, is entirely separate from the outer, which supports the observer's platform and the signal top. The steel towers are so much more rigid than the wooden ones that work is not interrupted by a breeze, as in the past, but can continue in a wind of 25 miles per hour.

One double tower 75 ft. high weighs 4000 lb. complete. It can be dismantled and loaded on a truck by four men in 3 hr. and re-erected in 3½ hr. The total cost of a move of about 90 miles is about $140, including all direct expense, overhead, depreciation and operation of truck, and subsistence.

Steel has thus effected a large saving in the cost of the triangulation towers, and an even greater saving in reducing the percentage of delays in observation time from windy weather.



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*Chief of party, United States Coast and Geodetic Survey, Washington.

FABRICATED STRUCTURAL STEEL

New Projects Will Take 38,000 Tons—Awards of 37,250 Tons

INCLUDING an office building at Toronto and a pipe line at Oakland, Cal., requiring 8000 tons each, new projects amounted to 38,000 tons. Awards totaled 37,250 tons, the largest of which were a manufacturing building at Ford City, Pa., requiring 5000 tons, and 41 barges for use on the Mississippi River which took 4800 tons. Awards follow:

Boston, 200 tons, columns for Sears, Roebuck & Co. warehouse, to New England Structural Co.

Richmond, Vt., 321 tons, two bridges, to Bethlehem Bridge Co.

State of Vermont, 400 tons, four bridges, to American Bridge Co.

New York, New Haven & Hartford Railroad, 150 tons, bridge, to American Bridge Co.

New York, 2000 tons, hotel at Forty-ninth Street and Lexington Avenue, to Harris Structural Steel Co.

New York, 1000 tons, loft building at 241 West Twenty-ninth Street, to Hinkle Steel Construction Co.

New York, 1075 tons, apartment buildings at 326 East Fifty-seventh Street and at 19 East Ninety-eighth Street, to Paterson Bridge Co.

New York, 300 tons, apartment building on East Eighty-fifth Street, to Easton Structural Steel Co.

Brooklyn, 3300 tons, Greenpoint Avenue Bridge over Newtown Creek, to Bethlehem Steel Co.

Yonkers, N. Y., 300 tons, Homeopathic Hospital, to Hinkle Steel Construction Co.

State of New Jersey, 400 tons, highway bridge, to Phoenix Bridge Co.

Philadelphia, 525 tons, American Bank & Trust Co. building, to American Bridge Co.

Philadelphia, 175 tons, Quaker City Garage, to McClintic-Marshall Co.

Seaboard Air Line Railroad, 166 tons, Stony Creek bridge, to Virginia Bridge & Iron Co.

Laurel, Md., 1800 tons, grandstand, to Belmont Iron Works.

Birmingham, 150 tons, river terminal at Birmingport, to Virginia Bridge & Iron Co.

Shreveport, La., 450 tons, viaduct, to Wisconsin Bridge & Iron Co., Milwaukee.

Memphis, Tenn., 4800 tons, 41 barges for Mississippi River Commission, to American Bridge Co.

Pittsburgh, 550 tons, Stanley East Liberty Theater, to Fort Pitt Bridge Works.

Ford City, Pa., 5000 tons, Pittsburgh Plate Glass Co. plant, to McClintic-Marshall Co.

Scranton, Pa., 475 tons, warehouse for Continental Terminals, Inc., to Bethlehem Fabricators, Inc.

Detroit, 2500 tons, building for National Plate Glass Co., to Mississippi Valley Structural Steel Co.

Toledo, Ohio, 650 tons, Catholic High School, to Massillon Bridge & Structural Co.

Dayton, Ohio, 250 tons, building for Dayton Art Museum, to Massillon Bridge & Structural Co.

Chicago, 100 tons, auditorium and natatorium in Holden Park, to Midland Structural Steel Co., local.

Chicago, 1500 tons, gas holder for By-Products Coke Corporation, to an unnamed bidder.

Chicago, 2800 tons, Robey Street viaduct; 1200 tons in Bascule span, to Mount Vernon Bridge Co., and 1600 tons in approach, to American Bridge Co.

Des Moines, Iowa, 1850 tons, telephone building, to Pittsburgh-Des Moines Steel Co.

Ottawa, Ill., 2500 tons, building for National Plate Glass Co., to Mississippi Valley Structural Steel Co.; reported last week as having gone to an unnamed fabricator.

St. Louis, 750 tons; 450 tons for Knights of Pythias Temple, and 300 tons for Nafziger Bakery, to Mississippi Valley Structural Steel Co.

Albuquerque, N. M., 350 tons, bridge across Rio Grande River, to Kansas City Structural Steel Co.

Seattle, Wash., 1500 tons, office building at Fourth Street and Union Avenue, to Wallace Bridge & Structural Steel Co.

San Francisco, 300 tons, apartment building at Stockton and Pine Streets, to Herrick Iron Works.

San Francisco, 225 tons sheet piling, Ocean Beach Esplanade, to United States Steel Products Co.

South Pasadena, Cal., 100 tons, high school, to Minneapolis Steel & Machinery Co.

Monrovia, Cal., 100 tons, high school, to Minneapolis Steel and Machinery Co.

Los Angeles, 620 tons, two 80,000-bbl. tanks for Western Oil Co., to Western Pipe & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New Haven, Conn., 1600 tons, power house for United Illuminating Co.

Weymouth, Mass., 600 tons, switch house addition for Edison Electric Illuminating Co. of Boston.

Albany, N. Y., 600 tons, office building.

New York, 5000 tons, section 2, route 109, of municipal subway system; bids March 23.

State of New York, 500 tons, highway bridges.

Ventnor, N. J., 165 tons, Town Hall, bids opened.

Perth Amboy, N. J., 218 tons, Fayette Street bridge.

Pennsylvania Railroad, 600 tons, bridges at Philadelphia and Harrisburg, Pa.

Rockland, Del., 104 tons, "Rising Sun" bridge over Brandywine Creek.

Cumberland, Md., 2300 tons, Celanese Corporation, plant addition, Hughes-Foulkrod Co., general contractor.

New Castle, Pa., 200 tons, garage for Shenango Motor Co.

Newark, Ohio, 200 tons, Baltimore & Ohio Railroad freight station.

Toronto, 8000 tons, office building for Canadian Bank of Commerce.

Toronto, 500 tons, electrical and engineering building for Canadian National Exhibition.

Toronto, 200 tons, addition for Patterson Canady factory.

Toronto, 200 tons, addition to Lackie Mfg. Co.

Evanston, Ill., 185 tons, Boltwood School.

Chicago, 125 tons, coal trestle for Department of Public Works.

Chicago, 5000 tons, building for Peet Soap Co., Holabird & Roche, architects.

Klamath Falls, Ore., 1000 tons, timber mill building.

Great Falls, Mont., 600 tons, high school.

Pullman, Wash., 130 tons, home economics building, Washington State College; bids in.

Seattle, 2000 tons plates, penstock for city; Puget Sound Machinery Depot, low bidder.

Oakland, Cal., 8000 tons, plates, pipe line for East Bay Municipal Utility District; bids April 20.

Hanna Company to Rebuild No. 4 Susquehanna Stack at Buffalo

The Hanna Furnace Co., Cleveland, will soon begin the rebuilding of one of its blast furnaces in Buffalo. The stack to be torn down and replaced by a larger furnace is the No. 4 Susquehanna furnace acquired from the Rogers-Brown Iron Co. last year. The present stack was built in 1912.

The new stack will have a 20-ft. hearth, 24-ft., 3-in. bosh and its height will be 85 ft., 4½ in. Its rated capacity will be 700 to 800 tons per day, but conforming to what is commonly regarded as good furnace practice in the manufacture of pig iron for the foundry trade, no attempt will be made to obtain a maximum output. It probably will be operated at a capacity of about 600 tons per day. Present stoves will not be replaced, but the stoves, boiler plant and auxiliary equipment will be modernized. Pressure burners will be installed on the stoves and boilers. The furnace will be equipped with a new gas washer and dust catcher.

Contracts for rebuilding the furnace will be placed shortly, and it is expected to be ready for operation next fall.

Higher Trackwork Shipments

February shipments of trackwork are reported by the American Iron and Steel Institute at 11,371 tons, the largest total since last August. The gain over January's 9332 tons was nearly 22 per cent. In February, 1927, the shipments were 13,678 tons, and the average month of 1927 showed 13,386 tons.

Iron and Steel Markets

Steel Prices Less Buoyant

Advance on Cold-Finished Steel Bars Withdrawn—Test of Increased Prices on Plates, Shapes and Bars Further Deferred—Steel Production Holds at High Rate

THE steel market has lost some of the momentum that carried production and prices sharply upward in the first two months of the year. Ingot output continues at a high rate, but there has been a shrinkage in new business, which is not uncommon following a period of heavy buying, and recent price advances have been proportionately less effective. In fact, a less uncompromising attitude toward prices on the part of the mills is interpreted as indicating their growing concern over the duration of the present high rate of operations.

The average daily output of ingots in February, at 160,591 tons, was unusually heavy, being the fourth highest rate ever reached and coming within 3.6 per cent of the record made in March, 1927. So far this month there has been no recession from the February rate, and it is now conceded that production for the 31 days may match that of March a year ago. Steel Corporation plants continue to operate at 90 per cent of ingot capacity, and independents are probably averaging somewhat better than 80 per cent, as a result of heavier output in the Youngstown district.

At Chicago the tendency is definitely in the direction of further increases in production, since buyers are specifying heavily against expiring contracts written at lower prices than now prevail. Shipping orders there, which were 20 per cent heavier than in the preceding week, were the fourth largest since 1925. Mill schedules are so well filled that deliveries, of necessity, will lap over into the second quarter.

Specifications, particularly for automobile steel, have also shown a gain at Cleveland. In the Pittsburgh and Philadelphia districts shipping orders for plates, shapes and bars are lagging and there is correspondingly less insistence on advanced prices. Buyers generally have been permitted to cover for second quarter at 1.85c., base Pittsburgh, or $1 a ton below the recent advance, and many of them still have considerable tonnage due them on first quarter contracts at 1.80c., possibly enough to supply their April requirements. The test of the advance to 1.85c., let alone the later one to 1.90c., may not come for another month.

Makers of cold-finished steel bars have withdrawn an advance of $2 a ton, announced early last month, and are continuing first quarter prices of 2.20c. per lb., Pittsburgh or Chicago, on second quarter business. Producers of wire nails, who raised prices and revised extras late last year, are being undersold, in some instances, by distributers who stocked more heavily than consuming demand warranted. Another factor for weakness in nails is the fact that mill shipments against low-priced contracts have not yet been completed. Unsatisfactory demand for pipe continues to be reflected in price irregularities.

Sheet prices, on the other hand, appear to have held their advance, although some shading on the galvanized finish is reported in northern Ohio. However, sheet and strip steel buyers, including the automobile companies, are showing little interest in second quarter contracts. Meanwhile, sheet mill operations for the country average 88 per cent of capacity, but backlogs are being reduced. Unfilled orders of independent mills at the end of February amounted to 667,054 tons, a loss of 27,143 tons in the month. Sales in February were at the rate of 79½ per cent of capacity, as against an output of 98.7 per cent.

This showing is regarded as a truer reflection of the current trend in the steel industry than the unfilled orders of the Steel Corporation as of Feb. 29, which, contrary to expectations, showed an increase of 122,242 tons. This gain, however, is believed to have been due in large part to one or two installments on running contracts for material apart from railroad, automobile or building steel.

Alloy steel bars have been placed on a common base of $2.65 per 100 lb., f.o.b. mill, with a schedule of alloy differentials for various grades. Changes in the prices of given alloys will be reflected in the differentials for the alloy steels affected, while general fluctuations of the steel market will show in the base price.

Among steel consuming lines, the automobile industry is conspicuous for its expanding operations. Railroad buying of rails has been virtually completed, but orders for track supplies at Chicago totaled 8000 tons for the week. The use of track accessories, particularly tie plates, has been increasing rapidly in recent years. Production of tie plates in 1926, at 608,878 tons, showed a gain of 100,000 tons over the preceding year and nearly 350,000 tons over the output of 1920.

Railroad car buying is still below expectations, but prospects have been brightened by the appearance of inquiries for 1000 automobile car bodies for the Chicago & North Western, 425 cars for the Southern Pacific and 192 for the Detroit, Toledo & Shore Line.

Two aqueducts to be built near Oakland, Cal., will require 8000 tons of steel pipe or 25,000 tons of cast iron pipe. Other construction work includes 41 Mississippi River barges, for which 4800 tons of steel was ordered, and a building at Ford City, Pa., calling for 5000 tons.

For oil storage tanks, orders have been received by Chicago mills for 15,500 tons of plates, and several new developments running into good-sized tonnage are taking form.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Mar. 13, 1928	Mar. 6, 1928	Feb. 14, 1928	Mar. 15, 1927
No. 2, fdy., Philadelphia..	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa....	19.50	19.50	19.50	20.75
Basic, Valley furnace.....	17.00	17.00	17.00	18.50
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*......	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill........	36.00	36.00	86.00	36.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh....	44.00	44.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12
Iron bars, Chicago.......	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.85	1.90
Steel bars, Chicago.......	1.95	1.95	1.95	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh...	1.85	1.85	1.85	1.85
Tank plates, Chicago.....	1.95	1.95	1.95	2.00
Tank plates, New York...	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh........	1.85	1.85	1.85	1.90
Beams, Chicago	1.95	1.95	1.95	2.00
Beams, New York........	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Mar. 13, 1928 Cents	Mar. 6, 1928 Cents	Feb. 14, 1928 Cents	Mar. 15, 1927 Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill.........	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv., No. 24, Chicago dist. mill.........	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh....	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill.........	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$14.75	$14.75	$15.00	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.75	12.75	12.50	12.75
Carwheels, Chicago.......	14.00	14.00	14.00	15.00
Carwheels, Philadelphia...	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh.....	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila....	15.00	15.00	15.00	17.00
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.00	12.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.75	$3.25
Foundry coke, prompt.....	3.75	3.75	3.75	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.25	13.50
Electrolytic copper, refinery	14.00	14.00	13.87½	13.12½
Zinc, St. Louis..........	**5.65**	5.50	5.60	6.75
Zinc, New York..........	**6.00**	5.85	5.95	7.10
Lead, St. Louis..........	**5.82½**	5.75	6.12½	7.40
Lead, New York..........	6.00	6.00	6.35	7.65
Tin (Straits), New York..	*50.12½*	51.62½	51.87½	69.50
Antimony (Asiatic), N. Y.	**10.50**	10.25	11.00	12.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Some Steel Price Weakness Develops—Output Averages 80 Per Cent

PITTSBURGH, March 13.—Major developments of interest in the market this week have to do chiefly with prices, and the showing has not been all on the side of strength. Makers of cold-finished steel bars have cancelled the advance of $2 per ton announced early last month and are continuing first quarter contract prices on second quarter business. There is lack of evidence that more than 1.85c. has been done on second quarter contracts for bars, plates and shapes, as against 1.90c., announced as effective Feb. 21 last, and there is also lack of any definite signs that manufacturers will cancel portions of first quarter contract tonnages carrying 1.80c. which remain unspecified at the end of this month. It develops that all of the low-priced contracts for nails entered late last year have not yet been completed, and the advances made in strips do not yet mean much in actual performance, since buyers are covered at low prices to the end of this month and will be able to carry these low prices at least through April, by specifying in the next few weeks, and even longer, unless makers insist upon shipping orders, with cancellation as the alternative. So far as the test has applied, sheet prices appear to have held their advance. Pipe prices are easy.

The volume of specifications and the rate of steel production remain satisfactory, but it is becoming plainer that the demand lacks the momentum of a few weeks ago, and whatever change there may be in the attitude of the mills on prices without doubt springs from the belief that there is not enough business to give all producers in this district a full or relatively full operation and from the fear that a too firm insistence on the advanced prices will be at the expense of orders. The weakness in prices of the primary materials has not been helpful to the advance in steel prices. Pig iron and scrap prices have not been as low in years as now.

Ingot production for the Greater Pittsburgh district, due to a high rate in the Youngstown district, where heavy sheet specifications make increased production essential and a high rate among the Steel Corporation units, is at least 80 per cent of capacity. The Steel Corporation is doing better both in orders and production than the independents. Activity is still lacking in pig iron, scrap and coal and coke. In these products prices still favor buyers.

Pig Iron.—A Pittsburgh district sheet steel manufacturer is reported to be getting prices on a round lot of basic iron and on a smaller lot of Bessemer iron for its steel foundry, but interest in the market on the part of other melters does not amount to much. It is doubtful if merchant producers will get any of the business in the steel-making irons because they are all located in the Valleys with a freight charge to Pittsburgh of $1.76 per ton as against $1.13 to $1.26, the rates from Pittsburgh district steel plants having surplus iron to sell. Thus, with the f.o.b. furnace prices the same, the nearby furnaces would have the advantage of lower delivered prices. Valley furnace prices are substantially where they have been for several months, but they are purely nominal, notably on basic iron. Recent transactions in steel-making iron have been merely sales by one steel company to another, and in not a few instances the seller conceded more than the freight advantage. It is probable that if Valley producers wanted business in the Pittsburgh district they would have to go to $16, furnace, to get it. On foundry iron $17.25, Valley furnace, for No. 2 is the usual price, but it is not the absolute minimum, and there are instances of price shading on Bessemer iron. The present merchant production added to the steel company's surplus means a supply too great for consumption and there is too much selling pressure for prices to develop strength. The Carnegie Steel Co. has taken off one of its Carrie furnaces, but the Youngstown Sheet & Tube Co. has put on a furnace at Hubbard, Ohio.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Steel makers' reserves of ferromanganese appear to be getting low, as their specifications call for very prompt shipment. A free movement of spiegeleisen on contracts is noted also, and high grade ferrosilicon is moving well. New business amounts to little.

Fluorspar.—While most producers are quoting $15, f.o.b. mines, for gravel spar, that price is still subject to concessions of as much as 50c. a ton. Producers say there is a loss of at least a dollar a ton in sales at present prices, and an advance to $16 is said to be under consideration.

Semi-Finished Steel.—There is a steady movement of billets, slabs and sheet bars to sheet, strip and tin plate companies which depend on outside sources for their crude steel, but the open market does not register this activity because most buyers are not sending out inquiries as they formerly did. No change in prices is reported. Pipe skelp is going rather slowly because of relatively light pipe mill operations. Wire rod buyers are not rushing to cover for second quarter tonnages at the present price of $44, base Pittsburgh or Cleveland, as that price is $4 a ton above the ruling figure on this quarter's contract tonnage.

Bars, Plates and Shapes.—The market does not appear to have advanced beyond 1.85c., base Pittsburgh. Buyers are generally covered for second quarter at that price, but they still have considerable tonnage due them on first quarter contracts at 1.80c., which perhaps will be sufficient to supply their April requirements. Therefore the test of 1.85c. may not come for another month. Not much variation is noted in the rate of mill shipments, but specifications with most makers are running lighter than deliveries. Cold-finished steel bar makers are ordering hot-rolled bars less freely in keeping with lighter releases for their product. Plates are helped by river craft business, but the smallness of railroad car and of pipe business leaves plenty of open capacity. Structural steel inquiry is good, but comes largely from points outside the immediate Pittsburgh district. Competition for medium and small jobs is sharp because the smaller fabricating companies are short of orders.

Rails and Track Supplies.—Track fastenings are beginning to move on old orders, but new business is negligible and probably will remain so until track laying is on a heavier scale. The roads are taking out standard-section rails steadily. Light section rails are slow.

Wire Products.—The movement of nails suffers now from the fact that January shipments of most producers were so heavy that distributers' stocks increased more rapidly than the consuming demand and these stocks still are ample without much new buying. Some jobbers who bought late last year at the then existing prices of around $2.45, base, per keg, Pittsburgh, and the old card of extras, have been underselling the mills, since with the application of the new extras they have a good margin of profit at well under the present mill base. It also develops that all mills have not yet completed orders taken late last year for delivery at mill convenience. Specifications on contracts for other wire products are coming in steadily and in good volume, but second quarter contracting is not active.

Tubular Goods.—The West Texas Gas Co., subsidiary of the Prairie Oil & Gas Co., has divided an order for 154 miles of 3-in., 4-in., 6-in., 8-in. and 10-in. line pipe between a Pittsburgh district and an Eastern mill. This order and a slightly better demand for buttweld pipe are the interesting developments of the week. Oil country goods still are dull and neither the Monroe-St. Louis nor the Amarillo-Kansas City gas pipe lines has reached the quoting stage. It is believed the former is nearer the mills than the latter. Price irregularity continues.

Sheets.—There has been no let-down in the specifications for sheets and there is an operation of independent capacity of approximately 90 per cent, while the American Sheet & Tin Plate Co. last week produced between 80 and 85 per cent of capacity. This would indicate an operation for all makers of 88 per cent. Sheet prices appear to be somewhat firmer, as is indicated by fair-sized pick-up orders at the full quotations. Even a very firm market usually is marked by some deviations and the present is no exception.

Tin Plate.—There is little business beyond specifications on contracts. While tonnage releases are substantial, it is necessary for manufacturers who want to operate economically to roll against specifications yet to come. The mills are averaging an 80 per cent operation, but some are doing better than others and buyers are not finding much difficulty in getting prompt shipments.

Cold-Finished Steel Bars and Shafting.—Makers generally are taking second quarter contracts at 2.20c., base Pittsburgh or Chicago, the same price as on first quarter contracts. This represents a recession of $2 a ton, as almost all makers went to 2.30c. several weeks

The Iron Age Composite Prices

Finished Steel

March 13, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

March 13, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.75
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according o gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in.. 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, gal'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production f that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.15
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ago, and it was expected that price would be named for the second quarter. The higher price, however, brought considerable resistance, particularly in Detroit, where buyers pointed out that they paid an advance on cold-finished bars for first quarter and had not paid higher for any other grades of steel.

Hot-Rolled Flats.—Consumers are specifying freely against lower-priced first quarter orders, but are not exhausting their coverages, and unless makers cancel unspecified tonnage on March 31 it will be at least another month before a real test of present prices will come. There has been some second quarter contracting at the advanced prices, but it is early for specifications against them.

Cold-Rolled Strips.—The advance of more than a month ago to 2.90c., base, for lots of 3 tons or more and to 3.15c., base, for lots of 1 to 3 tons, is not yet fully established, because of liberal coverage of consumers for this quarter. New requirements are not large enough to provide a test of the recent advance. Business both for prompt and second quarter shipment has been done at the higher levels, but it has been chiefly with buyers who take small lots and whose quality requirements are exacting.

Bolts, Nuts and Rivets.—Business in bolts and nuts is better than it was during the first five or six weeks of the year, but local producers are not fully engaged. Makers' prices are firm, but in the secondary market some irregularity exists, with Cleveland jobbers taking business here at less than the prices of local jobbers. Most rivet makers have gone along with the advances recently announced, but small wagon and tinners' rivets are obtainable at less than the quoted discounts.

Coke and Coal.—Only one Valley furnace now active is uncovered on second quarter requirements of coke. For that period coke producers are asking from $2.85 to $3, but $2.75 seems to have been the basis of most of the business now on the books and will probably be the basis of a contract now pending which amounts to approximately 16,000 tons a month. The market for spot furnace coke is limited and prices are largely of buyers' making. There is no change in foundry coke prices. The coal market shows no more life or strength than it has for some time. Some yearly contracts to run from April 1 next, are being written, but the prices indicate that operators are anxious to keep their mines active.

Old Material.—On the buying side there is little interest in the market except on the part of dealers, who, not being pressed for deliveries, are not taking hold hurriedly or without an effort to purchase against their sales at prices that mean a profit. It is commonly said that if any consumer wanted a sizable tonnage of heavy melting steel the price would not be under $15, but, in the absence of any such inquiry, this is merely conjecture. Dealers are not paying much higher than $14.75 for material to be applied against old orders of exacting melters. Machine shop turnings have dropped further, having sold at as low as $10; supplies out of Detroit are large, and there is not the usual market in Youngstown and to the west. Blast furnace scrap also is weaker, because consumptive demand is so light and dealers have been able to get supplies against short orders so readily that they have reduced their bids. There is little activity in the foundry grades, and on railroad specialties prices are at least 25c. a ton lower.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.00 to 14.50
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

New Coast Company to Manufacture and Distribute Corrugated Sheets

LOS ANGELES, CAL., March 10.—J. E. Webster, E. B. Fish, John A. Lambie and others have organized the Superior Culvert & Flume Mfg. Co., capital $100,000, with offices and factory at 2440 East Fifteenth Street, to manufacture and distribute corrugated culverts.

The Central Alloy Steel Corporation, Massillon, Ohio, has given the new company exclusive manufacturing and distributing rights for its Toncan molybdenum corrugated culverts in the States of California, Utah, Nevada, New Mexico and Arizona. In addition, a regular line of copper-bearing sheet steel culverts will be manufactured.

The first of the company's plants is now in operation at Union and Nineteenth Streets, Oakland, Cal., and the Los Angeles factory will be operating before April 1. Plants will also be established some time during this year in Phoenix, Ariz., and Salt Lake City, Utah.

The president of the company is J. E. Webster, one of the best known iron and steel men on the Pacific Coast. For some years he has been general manager of the Ducommun Corporation of Los Angeles, large distributer of steel and metal products. E. B. Fish is vice-president, John A. Lambie, secretary and manager, and Oliver P. Stewart, treasurer. The latter three men, all officers of the West Coast Pipe & Steel Co., Los Angeles, together with J. E. Webster and J. Overholtzer, compose the board of directors.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
erolling, 4-in. and over	$33.00
erolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
orging, ordinary	38.00 to 39.00
orging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
pen-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
ld range Bessemer, 51.50% iron	$4.55
ld range non-Bessemer, 51.50% iron	4.40
Iesabi Bessemer, 51.50% iron	4.40
Iesabi non-Bessemer, 51.50% iron	4.25
Iigh phosphorus, 51.50% iron	4.15

oreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
ron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
ron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Ianganese ore, washed, 52% manganese, from the Caucasus	39c.
Ianganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
ungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
hrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Iolybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
urnace, f.o.b. Connellsville prompt	$2.60 to $2.75
oundry, f.o.b. Connellsville prompt	3.75 to 4.50
oundry, by-products, Ch'go ovens	9.00
oundry, by-product, New England, del'd	11.50
oundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
oundry, Birmingham	5.00
oundry, by-products, St. Louis	9.75

Coal

	Per Net Ton
Iine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Iine run coking coal, f.o.b. W. Pa mines	1.50 to 1.75
as coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Iine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
team slack, f.o.b. W. Pa. mines	0.90 to 1.00
as slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
ag bolts	70
low bolts, Nos. 1, 2, 3 and 7 heads	70
Iot-pressed nuts, blank or tapped, square	70
Iot-pressed nuts, blank or tapped, hexagons	70
.p.c. and t. square or hex. nuts, blank or tapped	70
Vashers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Heavy and Deliveries Will Extend Into Second Quarter

CHICAGO, March 13.—Mill schedules are so well filled to the end of this month that much tonnage now being specified against contracts will of necessity be delivered after the turn of the second quarter, even though such tonnage was written at prices lower than those now asked. It was originally the intention of producers to terminate at the end of March deliveries on business taken at 1.90c. and 1.95c., but there has been an effort to satisfy users' urgent demands, and this has resulted in frequent rearrangements of rolling schedules and delaying of shipments not immediately needed.

It is not to be doubted that many buyers are resisting recent advances in prices and are specifying ahead of actual requirements, and by so doing are building stocks which will postpone the establishing of higher quotations. This situation is reflected by steel specifications that are 20 per cent heavier than a week ago and are the fourth largest for any like period since 1925. In the meantime, forward contracting is only moderately active. Among structural awards is 2900 tons for the Robey Street viaduct, Chicago. Orders have been placed by the Rock Island for 36 passenger and baggage cars. Sellers of hot-rolled strip are accepting 1.95c. for heavy gages and in widths over 12 in.

Pig Iron.—Various estimates place second quarter iron now under contract at 70 per cent of the normal requirements of users in this district. New contracts are less numerous than last week, though the volume is considered satisfactory by sellers. Spot sales are increasing, having so far this month passed the total of like purchases in February. The trade takes this as an indication that first quarter contracts were conservative, but it may also mean that many buyers were doubtful of the business trend in the early months of the year and therefore were not willing to buy until better demand for foundry products was in sight. Furnace output is steady but is below shipments, affording producers an opportunity to reduce stocks built up during the winter months.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for these commodities are large, but new buying is widely scattered and in car lots. A carload of ferromanganese has been sold at $100, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Oil tank storage programs are developing rapidly and for the second week purchases of plates for that purpose have been heavy. In the last week 15,500 tons has been added to local makers' books. All of this tonnage is for delivery in the Southwest, principally Texas. Subjected to sharp competition from other steel producing centers, prices did not hold to the full 2c. quotation which producers are naming in and near Chicago. Inquiry for new oil storage projects is lacking but several new developments are taking form. Shipments against recent tankage material contracts have moved forward rapidly and orders received this week are for delivery at the earliest convenience of mills. Small tank manufacturers in this district are busy and it is noticeable that general merchandising of plate mill products is becoming more extended. Plate business is well proportioned in accordance to capacity of sheared and universal mills. Of special interest to railroad equipment plants is an inquiry by the Chicago & North Western for 1000 automobile car bodies, and one from the Southern Pacific for 200 automobile cars and 175 oil cars. Orders are small but pending business is active. Buyers in many quarters are resisting the quotation at 2c. for second quarter delivery, but some tonnage has been sold at that price.

Mill prices on plates per lb.: 1.95c., base Chicago.

Structural Material.—New business in structural material is not heavy, but local shops are well fortified by order books which have grown rapidly because of recent heavy tonnage awards. Foremost among outstanding inquiries is 6000 tons of bridge work for the Chicago & North Western. The Chicago Board of Trade has leased temporary quarters, and it is not improbable that its building program, calling for a 35-story structure, will soon take definite form. The American Bridge Co. is furnishing foundation steel for the Robey Street bridge approach, Chicago. The entire project will require about 3000 tons. Fresh inquiry is widely scattered. A timber mill building in Oregon will take 1000 tons and a high school for Great Falls, Mont., calls for 600 tons. Chicago prices at 2c. for structural material require further tests, though some business is being taken at that figure. Mill deliveries range from four to six weeks.

Mill prices on plain material per lb.: 1.95c. to 2.10c., base, Chicago.

Bars.—New buying in soft steel bars is about equal to shipments. Specifications are practically equal to last week, making this the fourth largest seven-day period since the close of 1925. Forgers are busy, and a steady volume of specifications emanates from bolt and rivet manufacturers. Farm implement plants remain active. Soft steel bar prices are fairly well established at 2c., Chicago. Demand for iron bars is larger, but it still far from taxes local mill capacity. Sellers of alloy steel bar established March 9 a base price of 2.65c. per lb., to which are added alloy differentials. Announcement of these prices inaugurates the opening of second quarter books. In adopting the new schedule producers plan to hold differentials subject to changes in prices of alloys, whereas the base price will fluctuate with the general market. Second quarter contracting for alloy bars is making progress but not at a rapid pace. Deliveries range from two to three weeks and mills are operating at close to capacity. New business in rail steel bars is not as large as the weekly average in February, and specifications also have dropped. Notwithstanding this change in the last week, total shipments of hard steel bars in the first two and one-half months of this year are well ahead of the corresponding period in 1927. Spot business is being taken at 1.80c., Chicago Heights mills, while sales for delivery after March 31 are being made at 1.85c.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.10c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Indications are at hand that the peak of the spring demand for wire products has been reached. Producers already have adjusted operations downward about two points, or to a rate of 73 per cent of capacity. Orders from jobbers in the South are well sustained and some improvement is noted west of the Mississippi River and in the near Northwest, but business is lagging in the North Central States. Railroads are taking wire products in quantities which are normal for this time of the year. Orders from the manufacturing trade is steady. New business in nails is unusually dull because dealers have stocked more heavily than spring building activity warranted. Prices for wire and wire products are shown on page 761.

Rails and Track Supplies.—Miscellaneous track accessory orders for the week total 8000 tons. Inquiry is small, but requests for prices from several Western railroads are expected at an early date. Prices for steel tie plates are fairly steady at $43 per ton. Several buyers have placed orders for iron tie plates. Light rail business is confined to carlot orders.

Cast Iron Pipe.—Not less than 7000 tons of cast iron pipe has been ordered in the last week. Contractors' lettings, including 1000 tons for Niles Center, Ill., total more than 5000 tons. The National Cast Iron Pipe Co. has taken 150 tons of 6-in. and 125 tons of 8-in. pipe for Appleton, Wis., and the United States Cast Iron Pipe & Foundry Co. has been awarded 150 tons of 8 and 12-in. pipe by Grosse Point Farms, Mich. Saginaw, Mich., has ordered 475 tons of 6 to 24-in. pipe from James B. Clow & Sons. Fresh inquiry includes 380 tons of 24-in. class B pipe for Springfield, Ill., 600 tons of 10-in. pipe for Painesville, Ohio, and 115 tons of 4 and 6-in. class C pipe for Alliance, Ohio. Buying by public utilities and railroads is light, but fresh inquiry from the latter is promising. Deliveries are now not far from 40 days. Prices are not changed from a week ago, though sentiment among producers is becoming stronger for a closer adherence to a price level near $30, Birmingham, for 6-in. diameters and larger. This is indicated by the low bids at Columbus, Ohio, and at Berea, Ohio. The former were on 2000 tons of 6 to 16-in. pipe and the low bid was $27.95, Birmingham. The lowest quotation at Berea was $28.35, Birmingham, on 1100 tons.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $35.20 to $38.20; 4-in., $39.20 to $42.20; Class A and gas pipe, $4 extra.

Bolts, Nuts and Rivets.—Second quarter contracting is rapidly getting under way and reports indicate that little resistance is being offered to recent advances in prices for small and large rivets and stove bolts. Specifications are a shade lighter, but as yet this situation has not affected output of these commodities.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cold-Finished Steel Bars.—Efforts to hold prices for this commodity at 2.30c. have failed, and books for second quarter have been opened at 2.20c. Contracting is slow, and specifications are in smaller volume than at the turn of the month.

Sheets.—Specifications for sheets to Chicago district mills are steady, and output remains at 90 per cent of capacity. Orders from the Southwest are more numerous and manufacturers of roofing and conductor pipe are taking larger quantities. Second quarter contracting is moderately active at present quotations.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—Many projects that have been before the trade for some time now give promise of developing into actual orders. Although in recent years cold weather has not deterred buying materially, it is apparent that with the last of the extreme weather in sight many projects are becoming more active. State road contractors have placed fully 2000 tons of reinforcing bars. The bulk of this tonnage is in straight lengths and will be shipped directly from mills. Rail steel reinforcing bars are being quoted at 1.85c. to 1.95c., and warehouse prices on billet steel concrete bars range from 2.25c. to 2.75c.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Hot Rolled Strip.—Shipments of this commodity are at mill capacity, and prices are fairly well established. An automobile manufacturer near Chicago is operating at a 30 per cent higher rate than in February.

Coke.—This market is steady. Spot buying is dull, but specifications against first half contracts indicate that the local foundry melt is sustained.

Old Material.—A Chicago mill has bought about 8000 tons of No. 1 heavy melting steel at $13.25 a gross ton, delivered. This price is 25c. below that recently paid by the same user. Dealers have dropped their trading prices to $12.50 for the ordinary grade, but in some instances they must pay $13 for heavy melting steel that will meet the rigid inspections made at some receiving points. A user has taken a round tonnage of hydraulic compressed sheets at $11.60 a gross ton, delivered, but later in the week another user refused to consider that price. Malleable and cast grades are lower in price, and rerolling rails are off 50c. a gross ton. Buying of many specialties is moderately active, but in small lots and usually upon active solicitation by sellers. Although forged wheels and scrap plate have sold higher in the week, the general tendency of prices is to seek lower levels.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel car-wheels	15.50 to 16.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft	15.00 to 15.50
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The Rust Engineering Co., Pittsburgh, has received a contract from the American Mond Nickel Co. for the construction of a batch type in and out billet reheating furnace to be built at its Hyde, Pa., plant. The furnace will be used to reheat nickel billets 4 in. by 4 in. by 5 ft. for rolling down into rods and shapes.

Philadelphia

Pig Iron Price Menaced by Buffalo Offers—Steel Is Quiet

PHILADELPHIA, March 13.—Specifications against first quarter contracts on plates, shapes and bars are lagging, but most mills are able to maintain a good rate of operation. The intention seems to be to establish the current quotation of 1.90c. per lb., Pittsburgh, on bars, 2.05c., Bethlehem, on shapes and 2.05c., Coatesville, on plates for second quarter contracts not made by the end of this month. Black and galvanized sheet prices continue to show more firmness and mills are making a decided effort to establish the second quarter contract price at 2.90c., Pittsburgh, on black and 3.75c., Pittsburgh, on galvanized. Consumers, however, are receiving deliveries on current contracts at lower prices and are hesitant in placing second quarter contracts at current quotations.

Eastern Pennsylvania furnaces are maintaining $20 per ton, furnace, on foundry iron, but continued reports of low barge rates from Buffalo and some actual sales for second quarter have caused concern as to the future course of the market.

Pig Iron.—Some small tonnages for second quarter are being negotiated. Evidently $20 is being maintained as the contract price for the next quarter, despite competition offered by Buffalo furnaces quoting on water and rail and all water delivery. A Lancaster, Pa., company reports the purchase of 600 to 700 tons of foundry grade from a Buffalo producer at about $1 per ton under the lowest eastern Pennsylvania offer. Another eastern Pennsylvania consumer is reported to have bought a small tonnage for third quarter delivery from Buffalo at considerably less than the lowest eastern Pennsylvania quotation, which was based on $20, furnace. The Delaware, Lackawanna & Western is asking for 50 tons of foundry iron for Scranton. Foreign iron has appeared in sizable quantities, but the recent arrival of a cargo of foundry grade from the United Kingdom is understood to be one of four cargoes going to a Delaware River cast iron pipe producer. Indian foundry pig iron is obtainable at about $20.25, duty paid, Philadelphia. No sales of domestic low phosphorus are reported and the basic market is quiet.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Ferromanganese.—Requisitions against contracts are coming in more freely and there are occasional carload purchases in the open market. Prices continue firm at $100 per ton, seaboard.

Billets.—Some small inquiry for second quarter delivery has begun to develop and there is still the usual small-lot purchasing for prompt shipment. Producers believe that prices of semi-finished material should be advanced about $1 per ton in view of the higher finished material market, but $33, Pittsburgh, is still being quoted on rerolling billets with forging quality at $38, Pittsburgh.

Plates.—The market is quite firm at 2c., Coatesville, on contracts for the next quarter and 2.05c., Coatesville, is quoted for current delivery. Shipments on contracts are good, but new business is light.

Shapes.—Many consumers are delaying specifications against contracts, so it appears that there will be some shipments carried over into second quarter, unless mills cancel contracts not fully specified by the end of this month. Quotations continue at 2c., Bethlehem, or 2.13c., delivered Philadelphia, on contracts and 2.12c. to 2.18c., delivered Philadelphia, on current purchases. Bridge construction projects promise some desirable tonnage for the spring.

Bars.—There is a moderate volume of shipment on contracts, as a result of continued pressure by the mills for specifications. On contracts for the next quarter 1.85c., Pittsburgh, is quoted, or 2.17c., Philadelphia, while the current delivered price is 2.22c., Philadelphia.

Sheets.—Black and galvanized sheet prices continue to exhibit a tendency to greater strength and mills are quoting 2.90c., Pittsburgh, on black and 3.75c., Pittsburgh, on galvanized as the schedule for second quarter contracts. Consumers, however, are receiving deliveries on lower-priced purchases and manifest little interest in contracting at these prices. Blue annealed and strip sheets seem to be firm on the basis of 2.10c., Pittsburgh.

Warehouse Business.—There is a good volume of purchasing, but tonnages involved are small. Prices are being better maintained than in several months. The quantity differentials on bars and small shapes are being adhered to and jobbers are beginning to consider extension of these differentials to hoops, bands and other products.

Imports.—In the week ended March 10, a total of 250 tons of Spanish iron ore and three tons of British steel bars arrived at this port.

Old Material.—A continued tendency toward weakness in prices is noted. The market on all grades is quiet. Forge fire has been purchased at $11 per ton, Coatesville, and $11.50 per ton, Reading, Pa. Machine shop turnings are quoted at $11 per ton on the basis of current contracts, but consumers are offering to buy at lower prices. There was about 3500 tons of heavy melting steel on the Pennsylvania Railroad list this month. The only items sold in eastern Pennsylvania were a small tonnage of grate bars at about $12.65 per ton, delivered Harrisburg, and a tonnage of breakable cast at $15.40, Harrisburg, and turnings at $11.35, Pencoyd.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.00 to 11.50
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

New York

Pig Iron Sales About 8500 Tons—New Steel Buying Light

NEW YORK, March 13.—Sales of pig iron by local brokers during the week totaled about 8500 tons. The larger consumers seem to have covered their second quarter requirements, and only a small total of inquiries is pending. There is in evidence a tendency on the part of consumers to compare their inventories and order books and return to hand-to-mouth buying. Buffalo furnaces are maintaining $16.50 per ton, base, and consumers at water delivery points are showing increasing interest in barge shipments. About 2000 tons of foundry iron for a Port Chester, N. Y., consumer is still under negotiation, owing to difficulty in arranging for barge delivery at the buyer's dock. Competition for freight among companies operating barge service from Buffalo to New York has been so keen recently that less than $2 per ton is said to have been quoted if tonnage was available before the wheat movement from Buffalo. As a result, barge operators and shippers met yesterday to confer on the situation. Foreign pig iron has begun to appear, following a long period of high prices and small arrivals. A cargo of British foundry iron has arrived at Philadelphia, and several more are scheduled, also a cargo of low phosphorus. A small lot of German iron is reported to have been sold in eastern Pennsylvania, and Indian pig iron is slightly more competitive with the domestic product.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—New business in both ferromanganese and spiegeleisen is confined to carloads and small lots. Specifications on contract for both alloys are reported as exceedingly heavy. There is also a good specification demand for ferrosilicon and ferrochromium.

Reinforcing Bars.—The Truscon Steel Co. will furnish approximately 1500 tons of bars for the Eleto warehouse in New York. Other business taken during the week has been in small tonnages, although fair in point of total volume. Effective March 15, distributers will advance the mill price $1 a ton to 2c., Pittsburgh. No immediate change in warehouse prices is contemplated.

Finished Steel.—Conditions in this market have been quiet during the past week. Consumers and mill representatives seem hesitant about testing the advanced prices recently announced on a number of products. Although some scattered orders have been taken at the new prices, a real test is yet to be made. This condition applies mostly to bars, shapes and plates, on which 1.90c., Pittsburgh, and 2.05c., Eastern mills, were recently announced. While a considerable tonnage was placed on order for second quarter delivery at the old prices, $1 a ton less than the new, many consumers are not yet covered. In sheets and strip, specifications are coming in freely, but new business is not so satisfactory. Structural awards in the metropolitan territory, exclusive of bridges, subways, etc., as reported to the Structural Steel Board of Trade, fell off in February, amounting only to 24,000 tons. This compares with 30,000 tons in January and with 58,000 tons in February, 1927. Prospects for new business, however, are encouraging.

Cast Iron Pipe.—An effort is being made by Birmingham producers of cast iron bell and spigot pipe to establish $31 per ton, base, for lots of 200 tons or less and $29 or more for purchases in excess of 200 tons. A producer in the North which recently booked some business at less than the scheduled market is quoting on a higher basis. There is a moderate volume of private purchasing of pipe, but New England municipalities have not yet appeared with their usual pipe requirements for spring delivery. The Department of Purchase, New York, opens bids March 14 on 3280 tons of 8-in., 1830 tons of 12-in. and 245 tons of 6-in. pipe, a total of 5355 tons. Montclair, N. J., has placed 245 tons of 6, 8 and 12-in. water pipe with the National Cast Iron Pipe Co.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—The usual spring demand for structural material has increased the tonnage of purchases from stock. Steel bars are in fair demand. Jobbers in this district are showing interest in the possibility of adopting quantity differentials on steel bars

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke. 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

and small shapes. Black and galvanized sheets are quiet, with purchases confined to small lots. Prices are generally firm.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Coke.—Standard foundry grade is offered for prompt shipment at $4 per ton, Connellsville, and sometimes for less. Standard furnace coke is obtainable at $2.75 per ton, Connellsville. Current purchasing is in most cases limited to carload lots. Delivered prices of Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, $7.91. By-product coke is unchanged at $9 to $9.40 per net ton, delivered Newark or Jersey City.

Old Material.—Shipments of No. 1 heavy melting steel are going to Bethlehem, Steelton, Coatesville, Pa., and Claymont, Del. On recent contracts for steel mill stove plate, brokers are paying $12 per ton, delivered. Forge fire is being purchased at $10.50 per ton, delivered Coatesville, and $11 per ton, Reading. Machine shop turnings are still quoted by dealers at $10.50 per ton, delivered eastern Pennsylvania, and no sale at $10.50 per ton, the offering price of consumers, has been reported. Railroad grate bars on the Pennsylvania Railroad list brought $12.65 per ton, Harrisburg; heavy breakable cast, $15.40, Harrisburg; steel axles, $20.75 per ton, Columbia, Pa., and machine shop turnings, $11.35, Pencoyd, Pa.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Cleveland

Heaviest Demands Still from Automotive Industry—Alloy Bars Higher

CLEVELAND, March 13.—The demand for steel in specifications against contracts continues heavy from the automotive industry and good from other consuming industries. Orders booked so far this month by leading producers show quite a gain over the corresponding period in February. As considerable tonnage in steel bars, plates and structural material against first quarter 1.80c. contracts is still unspecified, a good volume of orders against these contracts is expected during the latter half of the month. Most contract buyers have placed second quarter contracts for steel bars, plates and shapes at 1.85c. and some contracts that had been taken at 1.90c. have been revised to the lower figure. Mills are now asking 1.90c., but this will apply to small consumers who do not place contracts. However, one Ohio plate mill is still quoting plates at 1.85c. The local mill price on steel bars is 1.90c., Cleveland.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Buyers of sheets and strip steel, including the large consumers in the automotive industry, are showing little interest in second quarter contracts. In the case of sheets, particularly, there is a hesitancy about buying, as many consumers seem to be doubtful whether present prices will hold. The automotive industry is covered by low-priced sheet and strip first quarter contracts and is devoting its attention to getting in specifications against these contracts, and these shipments will about cover its April requirements.

Inquiry in the structural field is light. Keen competition still prevails. On one job, for which bids were taken during the week, a price of $60 a ton fabricated and delivered is reported. The smaller local fabricating shops have little work. No Lake shipbuilding work is in prospect. The Akron, Cleveland & Youngstown Railroad is expected to be in the market shortly for 4000 to 5000 tons of rails.

The only important price announcements during the week were the establishment of new prices on alloy steel, including the adoption of a base price and the reestablishment of the first quarter price on cold-finished steel bars.

Pig Iron.—Sales for the second quarter, while not as large as during some of the previous weeks, are holding up well. Cleveland interests during the week sold 31,000 tons in foundry and malleable grades. While inquiry is light, producers believe there is considerable business yet to be placed for the second quarter. The market has a firm tone and Cleveland furnaces are holding closely to $17 for foundry and malleable iron for outside shipment and to $18, furnace, for local delivery. However, the lower price might still be shaded 25c. a ton for shipment to points where local furnaces have a freight disadvantage. One Lake furnace interest is holding to $17.50, and in Michigan the market is firm at $18. Shipments show some gain over last month. Several of the foundries in the automotive industry which took heavy shipments last month are taking the same volume of iron this month and one or two are taking larger quantities. Outside of the automotive industry, shipments show quite a little gain over February.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—All rail shipments of Lake Superior ore during 1927 amounted to 1,238,845 gross tons and the total movement both all rail and water for the season was 52,344,099 tons, according to figures just tabulated by the Lake Superior Iron Ore Association. Total shipments by ranges were: Mesabi, 32,975,506; Gogebic, 6,385,558; Menominee, 5,213,256; Marquette, 4,147,777; Cuyuna, 1,981,501; Vermilion, 1,547,847; Mayville-Baraboo, 92,654. Ore shipments from Lake Erie ports during February were 303,114 tons. The dock balance March 1 was 5,987,408 tons, compared with 6,062,608 tons on the same date a year ago.

Alloy Steel.—New net prices on alloy steel have been announced by leading manufacturers. The method of quoting prices for each grade heretofore followed has been abandoned and in its place one base price figured on alloy bars has been adopted and the price of each grade is determined by an alloy differential that is added to the base. The base adopted is 2.65c. per lb. Hereafter when market conditions warrant a change this will be made in the base, not disturbing the differential and preserving the price relationship between the grades. However, should changes in prices of any alloy user warrant a change on a certain grade irrespective of other grades, the differential on that grade will be changed. Widely varying changes are shown in the new prices. Two largely used grades, series 2300, 3½ per cent nickel, and 3100 nickel chromium are advanced $3 and $4 a ton respectively over the recently ruling minimum prices. Sharp declines have been made on some of the other nickel chromium series, being as much as $12 a ton on series 3200. Other grades show both declines and advances. The new prices became effective March 7 on current orders, but will not apply to contract customers until March 16. This will give these customers an opportunity to specify steel to be shipped during the remainder of March at the old prices. The leading Ohio producer who has been holding largely to a Pittsburgh base has abandoned the Pittsburgh base entirely, now quoting only a mill base.

Coke.—Foundry coke shipments are fair but the new demand is light. Connellsville foundry coke is steady at $3.75 to $5.10. Connellsville heating coke ranges from $2.65 to $3. Ohio by-product foundry coke is quoted at $8, Painesville, for March shipment.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have started to take contracts for the second quarter at the prices that prevailed this quarter, except on stove bolts, which were advanced 10 per cent, as announced last week. While specifications are fair, they do not show an increase over the previous few weeks. The industry is now operating at close to 70 per cent of capacity. Rivet makers have taken second quarter contracts from some of the large consumers at the $3 per ton price advance and do not expect to meet serious objection to the higher price.

Sheets.—The automotive industry continues to take heavy tonnages against contracts, but the demand from other sources is moderate, and there is not much activity either in current orders or in second quarter contracts. Mills are getting a good volume of orders for auto body sheets at the present 4.15c. price, but orders for other grades are largely against lower-priced contracts. Galvanized sheets are irregular, with concessions of $2 a ton from the regular 3.75c. Pittsburgh price, but other grades appear firm.

Cold-Finished Steel Bars.—One of the smaller producers took second quarter contracts in Detroit at 2.20c., Pittsburgh, during the week, and other manufacturers, who had expected to cover their trade at $2 a ton higher and to make another advance to 2.40c. for current orders, fell in line so that 2.20c., Pittsburgh, and 2.25c., Cleveland, are the established prices for the second quarter. These are the prices that prevailed on contracts during the present quarter.

Strip Steel.—Specifications are fairly heavy against first quarter contracts and shipments against these contracts will carry many consumers through April. Some of the smaller consumers, but not many of the large buyers, have placed second quarter contracts. Current orders are not numerous. Regular prices are being maintained.

Reinforcing Bars.—A local inquiry for 1000 tons for store and warehouse buildings has been issued, and small lots are in better demand. Billet steel reinforcing bars are still quoted at 1.85c., Cleveland, and rail steel bars are unchanged at 1.75c., mill.

Warehouse Business. — While sales are fair, the volume shows a slight falling off. There is not much demand from the building field. Reinforcing bars out of stock, which are affected by mill competition, are going as low at 2.25c. Other prices are firm.

Old Material.—The supply of scrap continues in excess of the demand and the market is inactive and has a weak tone, although prices are unchanged. Mills are still restricting shipments and local dealers are well covered against outstanding orders. Detroit dealers are reported to have sold considerable tonnage of compressed sheet scrap during the week for shipment to the Pittsburgh district at $14.50. A Buffalo consumer has purchased 20,000 tons of scrap in Detroit, mostly compressed sheets, for delivery when navigation opens. Two cargoes have been loaded and will probably be shipped late in the month. With turnings down to $7 in Detroit, the price is proving attractive to Canadian steel makers and a considerable tonnage has been sold for shipment from Detroit to Canada. Most of this will go to Hamilton.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Largest February Output of Cement

Portland cement production in February is reported by the United States Bureau of Mines at 8,785,000 bbl., a decline of 10 per cent from the January output of 9,766,000 bbl., but the largest February volume ever reached. Shipments were 6,559,000 bbl., about the same as in January, but 2½ per cent below February, 1927. Stocks at the end of the month were 27,339,000 bbl., a gain of 9 per cent on January and the largest total ever recorded.

Bibliography on Mechanical Springs

A notable contribution has been made by the special research committee on mechanical springs of the American Society of Mechanical Engineers in the compilation of a bibliography on mechanical springs, which has been published recently by the A. S. M. E.

More than 600 references to the design, materials, manufacture, testing, use, etc., of flat, helical, spiral and other types of springs are briefly abstracted. The publication, made up of 71 pages, is divided into three sections, in the first of which the material is arranged by authors. There is also a chronological index, beginning with the year 1678, and a subject index. References to articles published in 1927 are not included, and blank pages have been added to permit notation of 1927 and current references. Copies of the bibliography may be obtained from the A. S. M. E., 29 West Thirty-ninth Street, New York. The price per copy is $1.25.

Business Data in Tabular Form

In a "Record Book of Business Statistics," the Department of Commerce has issued a pamphlet of 60 pages, mostly tabular, giving pertinent facts regarding metals and machinery, in the shape of shipments, orders, production, prices, imports and exports, unfilled orders and other particulars. The materials covered include ores, pig iron, ingots, sheets, castings, fabricated material of various types, machine tools, stokers, pumps, farm implements, non-ferrous metals, plumbing fixtures and a number of other items. Some of the series of tables run back to 1910 and most of them are carried through to the end of 1926. As a pamphlet of reference, this record book is of great value. Copies may be obtained at 10c. each from the superintendent of documents, Government Printing Office, Washington.

Birmingham

Steel Demand Well Maintained—Pig Iron Buying for Spot Shipment Only

BIRMINGHAM, March 13.—Sales of pig iron during the past week were practically all for spot delivery. Very little second quarter tonnage has been placed. Shipments continue on about the same level as for the past few weeks. One company is slightly ahead of production. Ruling prices remain at $16, base furnace. The Tennessee Coal, Iron & Railroad Co., on March 6, blew in its No. 1 furnace at Bessemer, Ala., on foundry iron. There were no other changes. Eighteen furnaces are now in blast, 10 being on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic ◆	15.00

Finished Steel.—New business is developing at an even rate, and prices are unchanged but firm. Reinforcing bar manufacturers have taken a fair number of small orders, ranging from 50 to 75 tons each. Only a nominal amount of business has been booked by structural steel fabricators. Open-hearth operations are unchanged, the Tennessee company having 13 to 14 furnaces active and the Gulf States Steel Co. four.

Cast Iron Pipe.—A fair amount of new business is being received, consisting chiefly of small orders. Inquiries are more numerous, and the market appears stronger than last week. Tuscaloosa, Ala., is expected to place some tonnage within two or three weeks. The McWane Cast Iron Pipe Co. will ship 500 tons of 6 and 8-in. pipe to Syracuse, N. Y. The new mechanical unit of this company, placed in operation in January, is now on double shift. The ruling base quotation on pressure pipe remains at $29 to $30, Birmingham. Plant operations and shipments continue at about the same level as for the past several weeks.

Coke.—More interest is being shown in second quarter buying, and a fair amount of tonnage is being booked. No improvement is shown in spot buying of foundry coke. Both spot and contract quotations remain at $5, ovens. Shipments continue at a regular rate.

Old Material.—A slight increase in demand is evident, and more inquiries are being received. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Further Declines in Scrap Prices—Fair Bookings in Plates, Shapes and Bars

ST. LOUIS, March 13.—Melters have sufficient pig iron in stock or on the way for their first quarter requirements, and buying for second quarter has been done sparingly. Shipments have been holding up well, and prices are firm. The melt in the district is reported to be increasing. The Granite City maker during the week sold 3100 tons, all of which was foundry iron except 300 tons of malleable. An Illinois equipment builder bought 1000 tons, and a local specialty maker placed 300 tons. A leading Southern furnace sold 400 tons, 300 tons for prompt shipment.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Warmer weather is causing a decline in the demand for domestic grades. The consumption of foundry grades is being well maintained, but buying continues largely on a hand-to-mouth basis. Prices are unchanged.

Finished Steel. — New business and specifications against contracts for plates, shapes and bars were received in fair volume during the week. A slight improvement is reported in the bookings of structural steel fabricators. Warehouse business continues only in fair volume.

Old Material.—Consumers of scrap in the St. Louis district still refuse to buy, pending a further reduction of their stocks. Dealers are hoping that the mills, which are all busy, will resume buying by April 1 at least. In the meantime, the market is weak, with half a dozen items 25c. to 50c. a ton lower than a week ago. Railroad lists include: Santa Fe, 5980 tons; Chesapeake & Ohio, 8949 tons; Southern Pacific, 2325 tons; Wabash, 1655 tons; Texas & Pacific, 870 tons; International-Great Northern, 400 tons (steel rails); Ann Arbor, 360 tons; Toledo & Western, 350 tons; Kansas City Southern, 290 tons; Great Northern, 120 carloads; Nickel Plate, 34 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.50 to $12.00
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	13.50 to 14.00
Railroad springs	14.25 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	13.75 to 14.25
Machine shop turnings	7.50 to 8.00
Steel car axles	18.50 to 19.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Production of bituminous coal in the United States in the week ended March 3 is estimated by the Bureau of Mines at 10,044,000 net tons. This is 1 per cent under the preceding week and compares with 13,262,000 tons in the corresponding week of last year. Total coal raised in the coal year, to March 3, is given as 439,876,000 tons.

Canada

Steel Mills Operate at High Rate—Large Tonnage of Structural Work Pending

TORONTO, ONT., March 13.—With the opening of spring but a few days in the future, iron and steel interests of Canada are looking forward to improvement in many lines of industry. Business at the present time is good, and each week some branch of industry is able to report some betterment. While railroad equipment makers have not booked many orders for rolling stock, several have branched out into other lines, with the result that these plants are not faced with slack seasons as in former years. Canadian automobile plants are speeding up operations and in turn are placing orders with other manufacturers for castings, body frames, sheets, bolts, nuts, etc. Improvement in steel consuming lines is reflected in better conditions at steel mills. In addition to the large rail orders which have been placed, there has been better buying of other mill products, with the result that steel plant operations now average between 80 and 100 per cent.

Pig Iron.—Local blast furnace representatives have opened their books for second quarter contracts. So far, however, there has been no rush on the part of melters to cover, although several have come forward with contracts calling for 500 to 5000 tons. Inquiries, however, indicate that considerable business will be placed in this market during the next three months. Spot demand for foundry and malleable iron has also become stronger. Improvement in melt is resulting in more extensive raw material buying, and pig iron sales have increased accordingly. Low prices in the Buffalo market, together with a vigorous selling campaign carried on here by American pig iron interests, are responsible for the prevailing low prices of Canadian iron, and local interests do not expect advances until there has been some change in these conditions.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Inquiries for structural steel and reinforcing bars are increasing, and in the Toronto district alone building projects already announced call for upward of 25,000 tons of steel. Pending business includes 500 tons for the Electrical and Engineering Building at the Canadian National Exhibition, Toronto; 8000 tons for a new head office building for the Canadian Bank of Commerce, Toronto; 200 tons for an addition to the Patterson Canady factory, Toronto; 200 tons for an addition for Lackie Mfg. Co., Toronto. Several other buildings in Toronto, for which plans have not yet been completed, will require 500 to 5000 tons each.

Old Material.—Sales continue to increase and tonnages placed are larger than they were earlier in the year. Advance buying is again featuring the local market. Prices are firm but unchanged.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Scrap Price Trend Is Downward—Less Pig Iron Sold

BOSTON, March 13.—Sales of pig iron fell off the past week, and were just under 5000 tons. No large individual sales were made, and Buffalo furnaces and furnaces east of Buffalo again took the bulk of orders. The price situation is still unsettled. On the ordinary run of business, No. 2X Buffalo iron is obtainable at $16.50 a ton on cars, furnace, and No. 1X at $17, but on large tonnages these prices have been shaded. One Buffalo furnace is obtaining a limited amount of business at $17 a ton for No. 2X and $17.50 for No. 1X. New York State No. 2 plain is generally $18 a ton on cars, furnace, No. 2X, $18.50, and No. 1X, $19. The Mystic Iron Works, Everett, Mass., is meeting prices made by Buffalo stacks. Some interest is still shown in foreign irons, sales the past week including Indian iron equivalent to domestic No. 2X at $21.75 to $22 on dock here, duty paid. Sales of eastern and western Pennsylvania, Virginia and Alabama irons are confined to car lots for mixture or special purposes.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Bars.—There is a fair demand for steel bars at 1.90c. per lb., base Pittsburgh, or 2.26½c. delivered common Boston freight rate points. Buying for second quarter has not started. Current reinforcing bar orders are mostly small, but the weekly total is fairly good. The market on reinforcing bars is firm at 1.90c. to 1.95c. per lb., base Pittsburgh, and 2.90c. per lb. from stock here.

Shapes and Plates.—Fabricating prices on jobs of any size are lower than they have been in years owing to keen competition. The largest prospective job calls for 1600 tons of steel for a power house at New Haven, Conn. Small jobs are in fair supply.

Cold-Rolled Strip.—Mills continue to take small orders at 3.15c. per lb., base Pittsburgh. The Worcester, Mass., mill is quoting 3.30c. per lb., base, on lots of 1 to 3 tons, and 3.05c. on larger lots. In the absence of sufficiently large tonnages to test prices, the market appears steady. Mills will open their books for second quarter business within a week.

Coke.—By-product ovens are getting quite a few rush orders for foundry coke, indicating that some

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

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*Including quantity differentials.

foundries have been holding raw material supplies at a minimum. There is a slight improvement in contract specifications. New England ovens are billing foundry coke at $11.50 a ton, delivered within a $3.10 freight rate zone. Domestic coke is moving in large volume and the market is firmer, although not higher; $8.50 a ton on cars Everett, or its equivalent, is well maintained.

Old Material.—With scrap rails, railroad wrought, skeleton, forge flashings, chemical borings, stove plate and railroad malleable approximately 50c. a ton lower, and with wavering prices on other kinds of scrap, the old material market is weaker than it has been for some time. Offerings of textile machinery cast are in excess of demand. A shipper paid $9.25 a ton on cars for heavy melting steel, presumably on an old order, but on new business $9.10 is the best price offered.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.10
Scrap T rails	8.00 to 8.50
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Machine shop turnings	5.75 to 6.25
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.50 to 6.00
Forged flashings	6.00 to 6.50
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.00 to 15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.25
Rails for rolling	10.00 to 10.50
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	9.50 to 10.00
Railroad malleable	13.00 to 13.50

Buffalo

Steel Operations Continue at High Rate —Pig Iron Quieter

BUFFALO, March 13.—Pig iron inquiry has not been heavy. Most of the larger requirements apparently have been satisfied. A Utica inquiry is for 2000 tons of No. 2 plain and a Rochester consumer seeks 200 to 300 tons of foundry. Another inquiry was for 900 to 1000 tons of foundry and malleable, but this has apparently been withdrawn. In this district $17 continues firm, though it is being shaded at outside competitive points.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation continues at a high rate. Prices for most products are firm. Fair demand is reported for bars, shapes and plates and a particularly good demand is noted for automobile body sheets, some of the companies having placed large orders. Reinforcing bar business is brisk. Three Batavia schools will require 154 tons of structural steel. Bids are being taken this week on an addition to the Trico Products Co.'s plant, Buffalo, requiring 225 tons of reinforcing bars.

Old Material.—There have been no important purchases following the tonnage reported last week. Rejections on No. 2 grade heavy melting steel are considerable as mills are becoming more exacting on inspections. Prices are a little easier.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.75 to 10.25
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

San Francisco

Aqueducts to Take Large Tonnage —Heavy Building Permits

SAN FRANCISCO, March 10 (*By Air Mail*).—Outstanding among the awards this week was the placing of 1500 tons of shapes for an office building at Seattle and the award of two storage tanks, calling for 620 tons of plates and shapes, for an oil company in Los Angeles. The trade is particularly interested in an inquiry of the East Bay Municipal Utility District, Oakland, Cal., for two aqueducts involving either 8000 tons of plates or 25,000 tons of cast iron pipe, bids on which will be taken April 20.

Construction activity is being well maintained, and building permits issued during the past month were about on a par with those for the same month last year. For the five leading cities on the Coast the value of the permits issued were as follows:

Los Angeles	$7,947,728
Seattle	4,126,795
San Francisco	2,398,450
Portland	1,530,325
Oakland	1,349,380

Pig Iron.—The market for foundry pig iron is quiet, sales and inquiries being limited to unimportant lots. Imports of iron for the year 1927 on the Pacific Coast totaled 17,673 tons, of which 10,769 tons came from British India, 3876 tons from the Netherlands and 2562 tons from Germany. Interests in the San Francisco district took 8770 tons, and foundries in the Los Angeles district absorbed 6538 tons, the remainder having gone through the ports of Portland and Seattle. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—In addition to the Seattle office building reported above, 300 tons for an apartment house in San Francisco has been placed with the Herrick Iron Works. Approximately 4000 tons of steel are required in the 2000 underframes for refrigerator cars placed by the Pacific Fruit Express Co., as reported in THE IRON AGE last week. Bids have been opened on 3000 tons for the Coyote Point bridge across San Francisco Bay. Imports during 1927 totaled 34,029 tons, of which 24,812 tons came from Belgian producers, 6866 from French makers and 2083 from German mills. San Francisco interests took 20,123 tons, and Los Angeles buyers imported 7428 tons. Plain material continues firm at 2.35c., c.i.f., for domestic material, with foreign shapes being quoted around 1.55c., c.i.f., duty paid. Prices for fabricated material and fabricated and erected work in the San Francisco district, due to the use of foreign material, are exceptionally low, one apartment job recently going for less than $75 a ton, erected.

Plates.—Interest now centers on the inquiry for the Sequoia and Wildcat Canyon aqueducts for the East Bay Municipal District, requiring 8000 tons of plates. Bids will be taken on welded steel, lock-bar, cast iron and concrete steel-lined pipe. The pipe ranges in diameter from 50 to 60 in. The Puget Sound Machinery Depot was low bidder on 2000 tons for a penstock at Seattle, Wash. The only award of importance was 620 tons for two 80,000-bbl. tanks for the Western Oil Co. at Los Angeles. It was reported in last week's issue of THE IRON AGE that the Lacy Mfg. Co. secured 400 tons for a penstock for the Southern California Edison Co. This was in error, as another Los Angeles fabricator secured the tonnage. Prices are firm at 2.30c., c.i.f.

Bars.—Bookings of reinforcing steel this week were confined to small lots. Pending business, however, includes several large projects totaling over 16,000 tons. Bids were opened this week on 1950 tons for pier No. 48, San Francisco, and for 1000 tons for the Ocean Beach Esplanade. New inquiries include 5257 tons and 1220 tons respectively for drainage improvement districts Nos. 23 and 22, Los Angeles. Imports of bars, both merchant and reinforcing, totaled 37,220 tons in 1927. Of this total, Belgian mills supplied 22,558 tons, German mills 8459 tons and French makers 4599 tons. Distribution was as follows: San Francisco, 14,463 tons; Portland, 10,431 tons; Los Angeles, 9354 tons, and Seattle, 2972 tons.

Cast Iron Pipe.—One of the largest, if not the largest, inquiry that has ever come up for figures on the Pacific Coast developed this week, and calls for 25,000 tons of 50, 56 and 60-in. pipe for the Sequoia and Wildcat Canyon aqueducts in Oakland, bids on which go in April 20. Awards include 420 tons of 4 to 12-in. pipe for Tucson, Ariz., placed with an unnamed interest; 188 tons of 20-in. Class C for Tacoma, Wash., placed with the United States Cast Iron Pipe & Foundry Co.; and 136 tons of 18-in. Class C pipe for San Diego, Cal., booked by the National Cast Iron Pipe Co. Pending business embraces 500 tons of 10 to 24-in. Class B for Santa Ana, Cal., bids on which go in March 19. The Pacific States Cast Iron Pipe Co. is low bidder on 188 tons of 6 and 8-in. Classes 150 and 250 for the improvement of Municipal District No. 3, Monrovia, Cal. The United States Cast Iron Pipe & Foundry Co. was low bidder on 663 tons of 6 to 20-in. Classes B and C pipe for Santa Barbara, Cal. During the year 1927 imports totaled 37,563 tons. Belgium shipped 14,143 tons, and France, 21,874 tons. The largest portion, 23,824 tons, entered the port of Los Angeles, Seattle took 7025 tons, and San Francisco 6133 tons.

Steel Pipe.—Awards of standard pipe are limited to small lots. New inquiries include 360 tons of 8-in. steel pipe for Los Angeles, bids on which will be taken March 13, and 100 tons of 6 and 8-in. standard pipe, lapweld, for Monrovia, Cal., on which the Santa Fe Pipe & Supply Co. is low. Imports of tubular products, exclusive of cast iron pipe, aggregated 39,167 tons during the past year, and of this amount 21,027 tons originated in Germany. Los Angeles consumers took 31,296 tons of the total.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Coke.—Demand for foundry coke is quiet, and sales and inquiries involved unimportant lots. During the year 1927, 58,452 tons of foreign material was imported at Coast ports. The United Kingdom shipped 17,218 tons, and Germany, 32,179 tons. Los Angeles foundries took 21,410 tons, San Francisco interests took 26,803 tons, and Seattle melters, 6315 tons. Prices continue unchanged.

Cincinnati

Pig Iron Market More Active—Sheet Mills Continue High Operations

CINCINNATI, March 13.—Increased activity in the pig iron market is reflected by both sales and inquiries. Among sales were 1000 tons of malleable for a southern Ohio consumer and 500 tons of foundry for a Parkersburg, W. Va., company. Pending business is the largest in several months. The Marmon Motor Car Co., Indianapolis, is expected to buy 3000 tons of malleable and the Servel Corporation, Evansville, Ind., is asking for 1000 to 1500 tons of malleable. Competition between northern Ohio producers and those in this district is keen. A sale of 300 tons of foundry iron is reported to have been made to a local melter by a Lake Erie furnace at a base price of $16.75, furnace. Makers at Ironton continue to quote $19, base furnace, but are losing much tonnage, which is being purchased elsewhere at lower figures. Tennessee and Alabama irons are firm at $16, base Birmingham, while Jackson County silvery iron also is steady at $25, Jackson, for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Reinforcing Bars.—New billet bars are quoted at 1.90c. to 2c., base Pittsburgh, with most material being sold at the lower price. Rail steel makers are asking 1.85c., base mill, and are getting that amount for small tonnages, but sizable lots are being taken at 1.80c.

Warehouse Business.—There has been a slight increase in the volume of orders placed with local jobbers, but tonnage in the aggregate is still below the normal level for this time of the year. Prices are firm and unchanged.

Finished Material.—As the end of the first quarter approaches specifications against old contracts at low prices are growing heavier, and many customers will enter the new quarter with plenty of material on hand to care for their needs through the month of April. This is especially true of the larger buyers. Bars, structural shapes and plates are becoming more firmly established on the basis of 1.90c., Pittsburgh, which is being quoted by all mills. The structural steel market still shows a tendency to lag behind the normal scale of operations for March. Activity in sheets continues to afford encouragement to producers, who are well satis-

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

fied with the amount of material which has been sold in the past two weeks. Automobile makers are taking liberal tonnages, but are doing little forward buying, preferring instead to hold purchases down to current requirements. The stability of prices is a feature of the sheet market, blue annealed being steady at 2.10c., base Pittsburgh, black at 2.90c., automobile body sheets at 4.15c., and galvanized at 3.75c. Mills are operating at 100 per cent of capacity, and orders in hand are sufficient to insure the maintenance of production on the present basis for from two to three weeks. The movement of wire goods is considered fairly good, the demand for common wire nails having been brisk. Plain wire is selling at $2.50 per 100 lb., Ironton or Pittsburgh, and common wire nails at $2.65 per keg, Ironton or Pittsburgh. Sellers of cold-rolled bars report that bookings have been of fairly good volume.

Coke.—Specifications of by-product foundry coke from foundries making automobile castings have been heavy and in a few cases orders at hand are greater than producers can supply within the time specified. On the other hand, there has been a seasonal decline in the demand for domestic grades. A drop in prices of by-product domestic coke about April 1 is regarded as a possibility. One reason for such expectation is severe competition, especially in western Ohio and Indiana, which companies at Indianapolis, Portsmouth and Ashland have encountered from coke originating in the Youngstown, Canton and Massillon districts. Another reason is that sales of domestic coke in the past year have been below normal.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Shipments on contracts to district steel plants have been moderate and foundries are taking only a fair amount of material. Prices are firm and little change is anticipated in the immediate future. The Southern, Louisville & Nashville and Chesapeake & Ohio railroads have their usual monthly lists, which close this week.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.50 to 11.00
Short rails	16.00 to 16.50
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.25 to 12.75
Agricultural malleable	11.75 to 12.25

Commerce Commission to Consider Youngstown-Ohio River Railroad

WASHINGTON, March 13.—Reply is expected to be made within three or four weeks by the Pittsburgh, Lisbon & Western Railroad to the questionnaire of the Interstate Commerce Commission regarding the application of the carrier for permission to build two branch lines with a total of 40 miles trackage, which would provide direct rail connection between Youngstown and the Ohio River. The answer of the railroad, owned by the Pittsburgh Coal Co., will show the business the line expects together with its amount and character. Inasmuch as it will tap the Valley district through rail and water connection, development of substantial iron and steel tonnage with attractive rates is looked for, as well as lowering of rates on coal and coke into the Youngstown or Valley district from the Pittsburgh district.

Preliminary invitations to the World Engineering Congress, to be held at Tokio, Japan, in October, 1929, have been issued by the American Committee of the Congress. Maurice Holland, 29 West Thirty-ninth Street, New York, is secretary of the committee.

Detroit

Steady Gains in Automobile Production—95,000 Now on Ford Payroll

DETROIT, March 13.—The steel market here continues more than good. Production schedules in the automotive industry are still increasing, and the outlook for the next few months is very promising. The Hupp Motor Car Co. broke all production records in February with an output of 5214 cars. This compares with 4016 cars in February, 1927, and 3610 cars in January, 1928. In spite of this record the company has on its books about 3000 unfilled orders from the past month's sales. The projected schedule for March is 7000 cars.

The Oakland Motor Car Co. started February with a projected production schedule of 22,268 cars, which was later raised to 25,000, and again to 26,200, which is the final figure for last month. This may be compared with the January production of 19,273. The March quota as now set stands at 27,773 cars, which will be more than 10,000 units ahead of the March figure for 1927.

The Hudson Motor Car Co. established a new record in February with a volume of 30,300 cars. Their January production was 25,390 cars. The March schedule calls for a somewhat greater output than the February production.

The Packard Motor Car Co. turned out 4400 cars during the past month, which shows a sharp increase over that of February, 1927, when 2186 cars were produced.

The March production for the Chevrolet Motor Car Co. reached a new peak of 116,943. This figure represented an increase from a previous schedule of 110,000 cars for the month. Production for February last year totaled only 85,817. The schedule for this month is set at 135,000, having been increased from 127,000 cars.

February records were broken by the Willys-Overland Co. with a production of 25,000 units. At the close of the month this company was turning out about 1200 cars a day.

Output by Dodge Brothers, Inc., totaled 20,727 cars and trucks during February, comparing favorably with 12,764 units in the month previous and 16,463 in February of last year. The rate of production March 1 is given at 1650 units per day.

The Buick Motor Co.'s February production totaled 18,600, or better than 1500 cars more than in January. The projected schedule for March is now set at 20,000 units.

Production of the Cadillac Motor Car Co. in February was 44 per cent greater than for any previous February in the company's history.

The output of the Ford Motor Co. is probably more than 1200 units a day, with the 2000 mark only a short distance ahead. Employees in the Ford Motor Co. increased 1369 during the past week. This brings the total up to 95,369 and compares favorably with 52,000 a year ago and the peak of 108,000 in 1926.

Prices on Nos. 9 and 10 blue annealed sheets range from 2.10c. to 2.20c., Pittsburgh. Automobile body sheets are quoted at 4.15c., Pittsburgh.

There is no particular change in the structural market. Prices on plain material remain firm at 1.85c. to 1.90c., Pittsburgh.

Shipments of pig iron in the district promise to be on a par with those of March, 1927, which was the highest melting month during the past year.

There have been no further changes in the prices on old material in this district during the past week. Very few sales have been reported.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Mar. 13	Mar. 12	Mar. 10	Mar. 9	Mar. 8	Mar. 7
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.00	14.00	14.00	14.00	14.00	14.00
Straits tin, spot, N. Y.	50.12½	50.87½	....	51.25	51.37½	51.37½
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00
Lead, St. Louis	5.82½	5.82½	5.82½	5.85	5.85	5.85
Zinc, New York	6.00	6.00	5.97½	5.97½	5.95	5.90
Zinc, St. Louis	5.65	5.65	5.62½	5.62½	5.60	5.55

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, March 13.—Prices in all markets but tin are strong and demand is fairly good. Copper prices are firm in a quiet market. Quotations for tin are lower and buying is moderate. Prices for both lead and zinc have advanced and consumer buying has been good.

Copper.—Purchases of electrolytic copper for both domestic and foreign consumption have been quite heavy the last week. Foreign buying has predominated. Today demand turned quiet but prices remain exceedingly firm at 14.12½c., delivered in the Connecticut Valley. Practically no metal is obtainable at concessions and the sales referred to have been made in nearly every case at the firm quotation maintained by all producers. Statistics for February appeared today and showed a decrease in stocks of refined metal and an increase in copper in blister form, one practically offsetting the other. Deliveries into consumption were close to 135,000 tons, the largest in many months, and probably a record for February since the war. There is no change in the official price of Copper Exporters, Inc., which stands at 14.50c., c.i.f. European ports. Lake copper is moderately active and steady at 14.25c., delivered.

Tin.—Sales for the week ended Saturday, March 10, were light at about 850 tons. The market as a whole has been featureless both here and abroad, with sentiment veering easily. Transactions have been confined almost entirely to dealers and the decline in prices, which has been fairly sharp both in London and New York, has been due largely to lack of support by consumers. Today's London prices declined £4 per ton from yesterday's and prices stood at £224 10s. for spot standard, £226 15s. for future standard, and £228 10s. for spot Straits. These values are £7 to £8 per ton less than a week ago. The Singapore price was £232 5s. Today the market was exceedingly active, 500 to 600 tons being bought by both consumers and dealers. Spot Straits tin was quoted at 50.12½c., New York. The rumor, which was active some time ago, that consumers were to form a pool for the purchase of their requirements has again been revived, but no details are obtainable. Arrivals thus far this month have been 2865 tons, with 7760 tons reported afloat.

Lead.—Purchases were fairly heavy during the week ended Saturday, March 10, but thus far this week the market has been quiet. A moderate business is being done each day, principally for March-April delivery. The quotation of the leading interest continues unchanged at 6c., New York, and in the outside market prices are a little easier at 5.80c. to 5.85c., St. Louis.

Zinc.—Advancing prices of ore have stimulated those for prime Western slab zinc and quotations are about ¼c. higher than those recently touched. Buying has been fairly brisk, but has quieted down the last day or two, partly because sellers are restricting their offerings. For March and early April delivery, the market is quoted at 5.65c., St. Louis, or 6c., New York, and is very firm at these levels. Possibly 5.67½c., St. Louis, could be obtained. Ore advanced to $38 on March 10 and higher prices are expected this week. Production, contrary to expectations, continued heavy, but the promised curtailment is looked for this week. The ore has not been freely offered, sales being only about 9500 tons, with production over 12,000 tons. Statistics for February showed a reduction in stocks of refined

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.50c. to 34.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.50c.
Lead, American pig	6.85c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	61.50c.
Solder, ½ and ½	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets, (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on non-ferrous products have not changed. Quotations on bronze, brass and copper products were last revised more than three months ago, while lead full sheets and zinc sheets were reduced on Feb. 21 and 27 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	9.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

metal of about 800 tons, but this was considered significant because it is the first reduction in a long period.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Buying has been fairly good and prices are a little higher, with Chinese metal quoted at 10.50c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, March 13.—Demand for copper is steady and prices are firm. Sales of lead and zinc are brisk and quotations have advanced. Prices for tin continue to sag under the influence of foreign markets. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 52.50c.; lead, 5.925c.; zinc, 5.75c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

New York Warehouse Takes 1500 Tons—Sizable Projects in New Work

AWARDS of concrete reinforcing bars, as reported to THE IRON AGE in the last week, amounted to 4500 tons, outstanding among which was a warehouse in New York which took 1500 tons. Three projects requiring more than 1000 tons each brought the total of new work to 4700 tons. Awards follow:

BOSTON, 150 tons, North Station, to Joseph T. Ryerson & Son, Inc., Boston.

BURLINGTON, VT., 100 tons, bridge, to Edward A. Tucker Co.

NEW YORK, 1500 tons, Eleto warehouse, from White Construction Co., general contractor, to Truscon Steel Co.

PHILADELPHIA, 800 tons, Quaker City Cold Storage Co. building, to Kalman Steel Co.

BUFFALO, 100 tons, pack house for Huron Cement Co., to a local maker.

STATE OF ILLINOIS, 300 tons of rail steel bars for road work, to Calumet Steel Co.

CHICAGO, 100 tons of rail steel bars, apartment building at Seventy-fifth Street and South Shore Drive, to Inland Steel Co.

CHICAGO, 110 tons, arcade building on Thirty-seventh Street, to Kalman Steel Co.

CHICAGO, 350 tons of rail steel bars, Steuben Club, to Inland Steel Co.

CHICAGO, 300 tons, superstructure for Women's Athletic Club, to Olney J. Dean & Co.

MILWAUKEE, 440 tons, public school, to Concrete Steel Co.

ST. LOUIS, 440 tons; 280 tons for southern approach to municipal bridge across Mississippi River, and 260 tons for Jefferson Plaza garage, to Missouri Rolling Mills Corporation.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 500 tons, United Shoe Machinery Corporation office building.

BETHLEHEM, PA., 100 tons, Lehigh University building; bids in.

CUMBERLAND, MD., 180 tons, hospital, general contractor George A. Fuller Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.25c.	3.75c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.50c.

WASHINGTON, 1050 tons of 30-ft. round deformed bars for Panama Canal, delivery at Balboa or Cristobal; bids to be opened March 15.

BUFFALO, 225 tons, addition for Trico Products Co.; bids taken this week.

CLEVELAND, 1000 tons, two store buildings and warehouses for Sears, Roebuck & Co.

CLEVELAND, 100 tons, building for Cleveland Clinic.

AKRON, OHIO, 300 tons, garage.

LOS ANGELES, 1220 tons, Drainage Improvement District No. 22; bids April 9.

RAILROAD EQUIPMENT

Chicago & North Western Will Buy 1000 Automobile Car Bodies—12 Locomotives Placed

WITH inquiry for 1000 automobile car bodies from the Chicago & North Western, 250 automobile and 175 oil cars from the Southern Pacific and 192 gondolas from the Detroit & Toledo Shore Line, railroad business in prospect is somewhat larger than in recent weeks. The locomotive market has been featured by the purchase of 10 locomotives by the New York Central and an inquiry for eight switching units from the Chicago, St. Paul, Minneapolis & Omaha. Details of the week's business follow:

New York Central has ordered five Hudson-type and five suburban type locomotives for service on the Boston & Albany from American Locomotive Co.

Chicago, St. Paul, Minneapolis & Omaha is inquiring for eight 8-wheel switching locomotives.

Illinois Terminal Co. has ordered one Mogul-type locomotive from Baldwin Locomotive Works.

City of Seattle has ordered one Prairie-type locomotive from Baldwin Locomotive Works.

Union Refrigerator Transit Co. has placed an order for 50 refrigerator cars with American Car & Foundry Co.

Chicago & North Western has made inquiry for 1000 automobile car bodies.

Safety Car Heating & Lighting Co. has ordered 30 special refrigerator cars without ice bunkers from American Car & Foundry Co.

Detroit & Toledo Shore Line is inquiring for 192 50-ton gondola cars.

Chicago, Rock Island & Pacific has ordered 10 suburban cars from Standard Steel Car Co., 10 coaches from Pullman Car & Mfg. Corporation and 10 baggage and six baggage-mail cars from American Car & Foundry Co.

Southern Pacific will buy 250 automobile cars and 175 oil cars.

Northern Pacific will purchase 50 caboose car underframes.

The March meeting of the Pittsburgh Foundrymen's Association, at the Fort Pitt Hotel, Pittsburgh, Monday evening, March 19, will be featured by the presentation of a five-reel film, "Jewels of Industry," by Vernon W. Wells, of the Carborundum Co., Niagara Falls, N. Y. The film depicts the development of electric energy from Niagara Falls, the electric furnaces used in the manufacture of carborundum and aloxite and the uses of these grinding materials.

TO STUDY GRAY IRON FOUNDRY

Institute Formed at Pittsburgh to Study Problems Aims to Correct Economic Ills of Industry

PITTSBURGH, March 13.—Forty-six gray iron foundrymen from 14 States met here today at the Carnegie Institute of Technology and founded an organization which it is believed will provide the means for not only correcting the evils which have beset the gray iron casting industry for several years but for restoring it to its former prominent place in the general iron and steel industry. The new body, to be known as the American Gray Iron Institute, is to consist exclusively of those engaged in the production of gray iron castings. In a resolution offered by Walter Seelbach, Walworth Run-Forest City Foundry Co., Cleveland, and unanimously adopted, the following purposes of the organization were included:

> An intensive study to increase the quality of gray iron castings and of increasing their utilization by industry, and a study of foundry costs.
>
> A study of hand-to-mouth buying to ascertain whether it is here to stay.
>
> A study of the over-production facilities at present existing in the foundry industry.
>
> A study of new methods for merchandising the production of gray iron castings.
>
> A study of methods to strengthen present markets for gray iron.
>
> The development of new markets and ascertaining new products for manufacture.
>
> A study relating to the liquidation of unprofitable foundries and their space turned into other channels.
>
> A study of the possibility of consolidation or merging and strengthening of foundries.
>
> Discouraging further building of additional foundry capacity for some years.
>
> Encouraging users of castings who at present operate foundry departments to abandon these foundry departments if possible and again purchase their castings in the open market.
>
> The use of advertising and publicity in its many ways for the purpose of enhancing the use and purchase of the product.

B. H. Johnson, Cresson, Morris & Co., Philadelphia, was chairman of the meeting and D. M. Avey, editor *Foundry*, Cleveland, was secretary. A committee on organization was appointed to meet subject to call and it will offer its report at a meeting to be held during the annual convention of the American Foundrymen's Association in Philadelphia in the week of May 14.

The gathering brought together those active in the industry from all parts of the country for what proved to be a thorough-going discussion of the problems of the gray iron castings and their market. C. E. Hoyt, Chicago, secretary American Foundrymen's Association, was present and expressed not only the interest of that organization in the new body, but extended its cooperation in its efforts. W. H. Barr, president National Founders' Association, brought a similar message.

Walter Wood, R. D. Wood & Sons, Philadelphia; A. F. Jensen, Hanna Engineering Works, Chicago; Dr. Richard Moldenke (in letter read by J. L. Carter, Barlow Foundry Co., Newark, N. J.; A. J. Tuscany, secretary Ohio Foundrymen's Association, and J. T. McKenzie, American Cast Iron Pipe Co., Birmingham, were among those who contributed to the discussion of the need of such an organization as the meeting had been called to formulate and pointed out what should be its functions.

OBITUARY

CHARLES D. MASON, secretary of the Cleveland-Cliffs Iron Co., Cleveland, died March 7 of pneumonia after an illness of three weeks, aged 53 years. He had been connected with the Cleveland-Cliffs company 26 years, having started as an auditor in the blast furnace department at Gladstone, Mich. He was transferred to Cleveland as assistant auditor of the company in 1911 and was made secretary in 1926.

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JONATHAN DIXON MAXWELL, a pioneer automobile manufacturer of the United States, died on March 8 at his home at Worton Manor, Md. He was born in Indiana in 1864, and after learning the machinist's trade became associated with Elmer Apperson in a bicycle repair shop at Kokomo, Ind. Here, in association with Mr. Apperson and Elwood Haynes, he carried on experiments which led to the building of what is thought to have been the first automobile constructed in this country. Mr. Maxwell then went to Montreal, where he experimented with motor-driven tractors. He next became associated with R. E. Olds in the development of the Oldsmobile car. Finally establishing his own factory at Tarrytown, N. Y., he brought out the Maxwell automobile, and when the United States Motors Co. was formed he became vice-president. Mr. Maxwell retired from active business 15 years ago.

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ALFRED E. TRYON, since 1908 treasurer and manager of the Vermont Construction Co., Inc., Burlington, Vt., died on Feb. 29, at Roanoke, Va., following an operation. He was 69 years of age.

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WILLIAM E. WIGHTMAN, treasurer New Departure Mfg. Co., Bristol, Conn., died at his home in that city, March 7. He was born in South Meriden, Conn., in 1868, and at one time was associated with the Russell & Erwin Co. In 1903 he went with the New Departure company and became treasurer about 11 years ago.

LAZARD KAHN, president of the Estate Stove Co., Hamilton, Ohio, died at his home in Cincinnati, March 7. With his brothers, Felix and Samuel, he became associated with an old firm of stove founders at Hanging Rock, Ohio, in 1873, and in 1881 he and his brother Felix bought the business and continued to operate it under the name of F. and L. Kahn Brothers, with offices in Cincinnati. In 1884 the company erected a plant at Hamilton, but still retained its general offices at Cincinnati. The business was incorporated as the Estate Stove Co. in 1906, and the general offices were removed to Hamilton. Mr. Kahn was born in Alsace in 1850. At the International Exposition in Paris in 1900 he was a juror of awards, and a year later was made a Chevalier of the Legion of Honor of France. As president of the Estate Stove Co. he was active until about a year ago.

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C. ARTHUR SCHOESSEL, general superintendent of the John Deere Harvester Works, East Moline, Ill., died on March 8 at his home in Rock Island, Ill., aged 37 years. He had been associated with the John Deere industries for 15 years, having been transferred a few years ago from the Deere & Co. plant to the East Moline harvester works. He advanced from one plant executive position to another until he became general superintendent.

Electric industrial trucks and tractors to the number of 120 were shipped in February, as against 112 in January, according to reports received by the Department of Commerce from nine leading manufacturers. Of the February shipments, 102 units were for domestic use, 15 being tractors and 87 trucks. Shipments abroad included 18 units.

The Western Machine Tool Works, Holland, Mich., has appointed Manning, Maxwell & Moore, Inc., Chicago, agent in that territory for its radial drills and tappers.

PERSONAL

J. C. Gore, whose appointment as general sales manager of the St. Louis Gas & Coke Corporation, 1502 Telephone Building, St. Louis, to succeed Walter H. Underwood, was mentioned in The Iron Age of March 1, began his career in the pig iron business in 1906 as secretary to James Bonnyman, vice-president of the old Birmingham Coal & Iron Co., Birmingham. When that company was taken over by the Woodward Iron Co., Birmingham, Mr. Gore went to Cincinnati, where he became associated with the Domhoff & Joyce Co., Cincinnati, former sales agent for the Birmingham Coal & Iron Co. He remained with the Domhoff & Joyce organization for 12 years, two years at Cincinnati, eight years at Indianapolis and two years as manager of the company's Chicago office. He joined the St. Louis Coke & Iron Co. in 1923 as assistant sales manager at Chicago, and was transferred to the St. Louis office on July 1, 1927.

J. C. GORE

E. A. Lerner has been made vice-president of the Kensington Steel Co., Chicago, rather than president as announced recently in these columns.

J. L. Gregg, metallurgical engineer Western Electric Co., Chicago, addressed the Chicago Foundrymen's Club, March 10, on "Metallography."

Robert T. Rossell, vice-president of the Bessemer & Lake Erie Railroad, a subsidiary of the United States Steel Corporation, has been elected president to succeed the late James H. Reed.

Harold Strouse, advertising manager Harnischfeger Corporation, Milwaukee, has been elected president of the Milwaukee Association of Industrial Advertisers, succeeding the late Howard A. Winton, of the Heil Co.

Floyd W. Moore has been made manager of the Vermont Construction Co., Inc., Burlington, Vt., to succeed the late Alfred E. Tryon. He is a graduate of Syracuse University and has been chief engineer of the Burlington company since 1924.

Charles L. Allen, president and general manager of the Norton Co., Worcester, Mass., on March 6, his seventieth birthday, was presented with a bronze statuette, "The Scout," by employees of the company. He has been general manager of the company for 43 years and president for 10 years.

George B. Michie has been appointed Western representative of the Niagara Falls Smelting & Refining Corporation, Buffalo, and will have headquarters in Chicago.

Charles B. Acheson has been made district manager of a sales office opened at 122 South Michigan Avenue, Chicago, by the Erie City Iron Works, Erie, Pa. J. R. LeValley has been assigned to the office as special engineer and D. F. Lytle as sales representative. E. J. Clerget will be in charge of a sub-office at 511 Traction Terminal Building, Indianapolis.

Jordan Korp, of the Leeds & Northrup Co., Philadelphia, addressed the Indianapolis chapter of the American Society for Steel Treating on March 12. His subject was "Pyrometers and Furnaces." At a meeting on April 9 T. D. Taylor, metallurgist of the Bliss & Laughlin Steel Corporation, Chicago, will be the speaker.

James T. Lee and John O. Clark, of Lee & Clark, Inc., Chicago, have become associated with the Adkins, Young & Allen Co., 32 South Jefferson Street, Chicago, dealers in pumps, air compressors, hydraulic equipment and power plant supplies.

J. B. Stam, sales manager of the Portland, Ore., branch of the Clyde Equipment Co., has been made general sales manager of the company's Seattle office.

Tom Hanning, president; George Dierking, vice-president; R. T. Wetteland, secretary, and George Raitt, treasurer of the Steel Tank & Pipe Co. of Oregon, Portland, have been elected directors of the company. Plowden Stott, L. M. Pickett and George Priestley have been elected to the board, also.

Prof. Henry le Chatelier, noted French chemist, on Feb. 28 was presented with a medal and certificate of honorary membership in the American Society of Mechanical Engineers. The presentation was made by Charles M. Schwab, past-president of the society, at a luncheon at the American Embassy in Paris. The honor was in recognition of Professor le Chatelier for his introduction of new methods of physico-chemical analysis now widely used in metal-working establishments.

H. N. Kelsey has been placed in charge of a new branch office of the United States Electrical Tool Co., Cincinnati, at 205 University Building, Syracuse, N. Y. His territory will include all of New York State with the exception of region adjacent to New York City, which remains in charge of W. B. Da Silva. Mr. Kelsey was recently connected for five years with the Syracuse Twist Drill Co., Syracuse, and previously was identified with the Waltham Grinding Wheel Co., Waltham, Mass., and with the Ross Mfg. Co., Cleveland.

Charles A. Boultman has been appointed manager of the supply division in the sales department of the Pangborn Corporation, Hagerstown, Md., manufacturer of sand blast and dust collecting equipment. He was formerly with the Carborundum Co., Niagara Falls, N. Y., and later with the E. A. Kinsey Co., Cincinnati. In his new capacity he will have charge of abrasive and supplies service for sand blast users. Grant Davis, formerly advertising manager of the Marion Steam Shovel Co., Marion, Ohio, has joined the Pangborn organization as manager of its advertising division.

C. J. Walters, who has been with the Lamson & Sessions Co., Cleveland, for 21 years, the past eight years as assistant sales manager, has resigned to become associated with his brother, Cornelius G. Walters, in the Master Products Co., Cleveland, manufacturer of steel stampings, wrought washers and riveting burrs.

William M. Henry has been elected president and E. D. Clapp vice-president of the Crouse-Pope Foundry Corporation, Auburn, N. Y. Mr. Henry, who succeeds his father, the late William J. Henry, in the Crouse-Pope organization, is also president of the Henry Forge & Tool Co., Auburn. Mr. Clapp, who takes the place of the late William Crouse, founder of the corporation, is also treasurer of the E. D. Clapp Mfg. Co., Auburn.

E. W. Fulton has been made general manager of the Oswego Tool Co., Oswego, N. Y., succeeding the late William J. Henry, who was president and general manager. Mr. Fulton went to the Oswego company in August, 1924, as works manager and last June became sales manager.

J. R. Stebbins has been elected president of the Rebo Co., Watertown, N. Y., recently organized to succeed the Adams Equipment Co., manufacturer of extensions for hand trucks. O. L. Stevens will be vice-president of the new company and D. N. Gilbert secretary and treasurer.

Howard Bruce, for 18 years president of the Bartlett Hayward Co., Baltimore, has been elected chairman of the board, and has been succeeded by Howell Fisher, who has been first vice-president and general manager for 12 years. Albert C. Bruce has been made a vice-president. The remainder of the executive personnel remains unchanged.

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George C. McClure, formerly purchasing agent of the American Rolling Mill Co., Middletown, Ohio, and more recently Chattanooga, Tenn., representative of the Ashland Fire Brick Co., Ashland, Ky., has been transferred to the main office of the Ashland company and will have charge of sales in the Ohio territory.

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John R. Davis, for many years vice-president and a director of the Moore Push-Pin Co., Philadelphia, has been elected president, succeeding the late William Percy Mills.

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Dr. Harvey Nathaniel Davis, professor of mechanical engineering at Harvard University, has been elected president of the Stevens Institute of Technology, Hoboken, N. J., succeeding the late Dr. Alexander C. Humphreys, and will assume his new duties on Sept. 1. Dr. Davis has occupied the chair of mechanical engineering at Harvard since 1919 and previously served as instructor and assistant professor of physics at that institution. He was born at Providence in 1881, the son of the late Nathaniel French Davis, for many years head of the department of mathematics at Brown University. The younger Doctor Davis was graduated from Brown, receiving the degrees of A. B. and A. M. He later attended Harvard, his work there leading to the degrees of A.M. and Ph.D. His professional activities include service as an engineer in the turbine department of the General Electric Co., as an aeronautical mechanical engineer in the United States Air Service and as a consulting engineer in the Bureau of Mines and for the Franklin Railway Supply Co. and the Air Reduction Co. He is a fellow of the American Academy of Arts and Sciences, a member of the Washington Academy of Sciences, the American Society of Mechanical Engineers, the American Physical Society and of the American Mathematical Society. He is also a member of the honorary fraternities, Phi Beta Kappa and Sigma XI. He is the author, with Prof. L. S. Marks, of "Steam Tables and Diagrams," and of various papers on thermodynamic subjects.

DR. H. N. DAVIS

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Edward F. Hartnett, associated with the sales department of the United States Radiator Corporation, has been appointed sales manager of the Green Island, N. Y., plant.

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R. S. Archer, research metallurgist Aluminum Co. of America, Cleveland, discussed "Aluminum" before the Hartford, Conn., and the Worcester, Mass., chapters of the American Society for Steel Treating on March 13 and 14 respectively.

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Thomas A. Arthur has resigned as vice-president and a director of Hickman, Williams & Co., Pittsburgh, but expects to continue in the iron and steel brokerage business with which he has been identified for 30 years. He joined Hickman, Williams & Co. in 1907 and about 10 years ago was elected vice-president. Before making that connection he had been with Naylor & Co. and with Banning Cooper & Co., which in 1899 took over the Pittsburgh office of the Naylor organization.

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T. E. McLaughlin has been appointed superintendent of the Youngstown plant of the Truscon Steel Co., succeeding Albert Senf, who has been made manager of the company's new property at Los Angeles.

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Boyd B. Jack, who was vice-president and general manager of the Empire Steel Co., Cleveland, taken over by the new Empire Steel Corporation, Mansfield, Ohio, has resigned.

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G. A. Hughes, chief electrical engineer Truscon Steel Co., Youngstown, will address the Pittsburgh section of the American Welding Society at the monthly meeting, Wednesday evening, March 28, in the quarters of the Engineers Society of Western Pennsylvania, William Penn Hotel. His subject will be "Spot Welding."

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Fred E. Wilhelm has resigned from the Judson Mfg. Co., San Francisco, and has joined the sales organization of the Pacific Coast Steel Co., with headquarters in the Hunter-Dulin Building in that city. He had been with the sales department of the Judson company since 1919.

New Sheet and Strip Association to Be Incorporated in Ohio

PITTSBURGH, March 12.—A joint meeting of the members of the National Association of Sheet and Tin Plate Manufacturers, the Hot-Rolled Strip Steel Institute and the Cold-Rolled Strip Steel Institute held here last Wednesday considered and approved with minor alterations the plan for merging these organizations into one association to be known as the National Association of Flat Rolled Steel Manufacturers.

The new organization is to be chartered under the laws of Ohio, which are more favorable in respect to trade association incorporations than those of other States. This means that the new body must legally have an office in that State and strengthens the idea that the headquarters will be located in Cleveland. The sheet and cold-rolled strip associations now are located in Pittsburgh and headquarters of the Hot-Rolled Strip Steel Institute are in Canton, Ohio.

Before the new association becomes operative, it will be necessary to secure the signed acceptance of the plan by companies representing enough of the country's sheet, strip and wide strip productive capacity to assure its success, and the getting of acceptances now is in progress.

Foreign Commerce Handbook

Under date of February, 1928, the foreign commerce department of the Chamber of Commerce of the United States has issued its biennial edition of a handbook giving sources of information regarding exports, imports and foreign trade generally. References are listed under alphabetically arranged topical headings. One such, selected at random to indicate the method of treatment, follows:

Combination in Export.—Information regarding combinations in export trade formed under Export Trade Act (Webb-Pomerene Law) may be obtained from Federal Trade Commission, Washington. Names of all combinations formed under act are on record there. Consult also Bureau of Foreign and Domestic Commerce, Washington.

About 90 topics are treated in similar manner in the 42 pages of text.

The Illinois Commerce Commission has ordered a reduction in rates for the transportation of coal from Illinois mines to Chicago. The order states that rates maintained by railroads for transportation of coal from Pennsylvania, Maryland, Virginia, Kentucky, West Virginia and Tennessee are lower than corresponding rates in Illinois.

NEW TRADE PUBLICATIONS

Punches, Shears and Bending Rolls.—Hendley & Whittemore Co., Beloit, Wis. Catalog No. 12. Sixty pages, illustrating and describing both power and hand-operated punches and shears, slip roll hand-forming machines and various types of bending rolls.

Air Filters.—Staynew Filter Corporation, Rochester, N. Y. Bulletin 30D3, of 24 pages, illustrates and describes an industrial air filter designed to protect machinery, buildings and employees from abrasive dust. The device is attached to air inlets of various types of internal combustion engines and is made in various sizes.

Drum Controllers.—General Electric Co., Schenectady, N. Y. Bulletin GEA887, of four pages, illustrates and describes controllers for motors used on crane hoists and similar applications.

Parts Molded of Thermoplax.—Cutler-Hammer Mfg. Co., Milwaukee. Pamphlet of 24 pages devoted to the use of an insulating material having both electrical and mechanical strength and low cost for material and assembly. The material is synthetic and will stand temperatures up to 400 deg. Fahr., or more. It is used for electric plugs and many parts where momentary temperatures may run high.

Electric Crane Operation and Maintenance.—Whiting Corporation, Harvey, Ill. Bulletin 179 of 32 pages, thoroughly illustrated, gives a good deal of information and some advice in connection with assembly, operation and maintenance of electric overhead traveling cranes. Included is a pictorial representation of the standard signals to cranemen, as adopted by the Bethlehem Steel Co.

Helicoid and Sectional Flight Screw Conveyors.—H. W. Caldwell & Son Co. (Link Belt Co.), Western Avenue and Seventeenth Street, Chicago. List price book No. 989 of 88 pages, illustrated, is devoted to the helicoid type of screw conveyor and the gearing and parts necessary for its operation. Spare parts are listed in many tables, with dimensions and prices, covering the entire range of this type of equipment.

"Switch-Start" Motors.—Lincoln Electric Co., Cleveland. Four-page folder describing the starting and operating characteristics of a motor started by throwing the switch right across the line. This is one of a line of motors in which arc welding has had a large place.

Tiering and Piling Equipment.—Economy Engineering Co., 2639 West Van Buren Street, Chicago. Folder illustrating several types of lifting, tiering, stacking and piling equipment for use in manufacturing plants and warehouses and operated both by hand and electric power. Four units are shown, varying in capacity from 500 to 8000 lb., and in range from 10 to 30 ft.

Speed Reducers.—Palmer-Bee Co., Detroit. Catalog No. 48, 48 pages, devoted to speed reducers of both herringbone and spur gear types. The herringbone units employ the Sykes herringbone gear with continuous teeth and sharp apices, and are available in ratings from fractional to 200 hp., and in ratios from 2 to 1 up to 4000 to 1. Salient features, including the method of lubrication, are described and illustrated. Tables intended to facilitate selection of units for various classes of service are included, as well as tables of dimensions and weights. Other sections are devoted to spur gear reduction units and to the company's flexible couplings.

Sand-Mixing Equipment.—Standard Sand & Machine Co., 5151 St. Clair Avenue, Cleveland. Binder of 30 pages describes briefly some of the important features of design and construction of a line of sand-mixing machinery. Dimensions and capacity are given, with full-page illustrations of various types of the machine and sectional views.

Automatic Stokers.—American Engineering Co., Philadelphia. Pamphlet of 12 pages devoted to the use of the Taylor stoker for steam boilers. The pamphlet is well illustrated and shows the operation of the stoker in forcing coal into the fire zone and ashes out at the bottom of the grate.

Machinery and Equipment.—Walter A. Zelnicker Supply Co., St. Louis. Bulletin 355, listing various cranes, engines, motors, generators, air compressors, derricks, tanks, rails, shovels, locomotives, cars and other equipment in company's present stock.

Gas Burners.—Lee B. Mettler Co., 406 South Main Street, Los Angeles. Folder devoted to Mettler gas burners for various industrial installations.

Coking Equipment.—Semet-Solvay Engineering Corporation, 40 Rector Street, New York. Pamphlet 337, an index of literature on Semet-Solvay and Steere coke oven, by-product, water gas and gas plant equipment and processes.

Alloy Steel Castings.—Nugent Steel Castings Co., Wood and Thirty-first Street, Chicago. Booklet telling of the application of Nugent alloy steel to various types of machinery.

Magnetic Separator Pulleys.—Cutler-Hammer Mfg. Co., Milwaukee. Bulletin P-26, explaining in detail construction and design of all types of magnetic separator pulleys made by company. Several tables giving cu. ft. per hr. capacity of various sizes and correct width and thickness of belts to be used are included.

Vertical Chamber Gas Oven.—Carl Still Corporation, 114 Liberty Street, New York. Pamphlet of 14 pages devoted to the Indugas vertical chamber oven, operated on the recuperative or the regenerative principle and heated with its own or auxiliary gas. This is based on a German invention redesigned and adapted to American practice in gas works and coke oven construction.

Starter for Electric Motors.—Allen-Bradley Co., Milwaukee. Folder describing an automatic compression resistance starter, type J-3052, designed for smooth starting and gradual acceleration.

Refractory Materials.—General Refractories Co., 106 South Sixteenth Street, Philadelphia. Brief folder devoted to Arcofrax high-alumina brick for use in the hot zones of kilns.

Car Dumpers.—Roberts & Schaefer Co., Wrigley Building, Chicago. Bulletin 103, describing varied installations of company's rotary car dumpers for use in mines and industrial plants.

Steel Tanks.—Sistersville Tank & Boiler Works, Sistersville, W. Va. Catalog listing various types of tanks for filling station, bulk station, pressure, oil field, fuel oil and other liquid storage purposes. Tanks are built in welded, standard, riveted-welded and other types in capacities from 220 to 26,000 gal.

Rebuilt Machinery.—J. L. Lucas & Son, Inc., Bridgeport, Conn. List 73, containing wide range of used and rebuilt machine tools and machinery carried in stock by company.

Steel Shelving.—Universal Fixture Corporation, 133 West Twenty-third Street, New York. Leaflet dealing briefly with various types of unit and other steel shelving.

Electrical Fixtures.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2107, devoted to pipe hangers, flexible fixture hangers and self-threading unions and connections.

Portable Conveyors.—George Haiss Mfg. Co., 141st Street and Park Avenue, New York. Catalog 1127 of 24 pages illustrates and describes a line of portable conveyors driven by electric motors or gasoline engines and with different types of operating surfaces. These are shown in use in a wide variety of industrial activities.

Unemployment Not Machine-Made

(*Concluded from page 734*)

alluded to, that the large accumulated savings of the workers in our country and the greater ability of the workers to temporarily contract their standard of living, which had so greatly increased in the last decade, have allowed many of the unemployed to tide over for a short period.

It was the statesmanship of America's industrial management that was alert enough to make use of the power-driven machinery which led our country into a period of prosperity during the very years which proved so difficult for other industrial countries after the war. The machine releases men from routine hand labor so that more of them may devote themselves to tasks of higher order. It is now the task of industrial management so to increase the stability of production that employment fluctuations may be reduced to a minimum. Public authorities and private management should alike be watchful that no undue employment situation develops and should be ready to counteract by proper means the hardships of material unemployment that may exist in any particular locality. True signs, however, are lacking that there is a marked increase of forced idleness in the United States involving growing poverty.

European Mills in Firm Position

Prices Strong and Deliveries Becoming Extended—British Pig Iron Market Quiet But Steel Demand Improves

(*By Cable*)

LONDON, ENGLAND, March 12.

DEMAND for Cleveland pig iron has declined, but makers expect spring requirements to appear shortly. Imports of foreign iron into Tees are diminishing. Export demand has improved, but actual sales are small.

Hematite is still quiet although the East Coast output has been reduced to 10 blast furnaces. Producers, however, are hoping to reduce their stocks. Foreign ore is inactive, but prices are advancing as a result of the continued strike at the Swedish mines.

Finished steel demand is improving, with increased domestic shipbuilding orders, but export demand is generally poor and plate mills are in need of tonnage.

February exports of pig iron totaled 27,816 tons of which the United States received none. Total exports of iron and steel were 317,036 tons.

Tin plate is moderately active. The Asiatic Petroleum Co. has placed a large order with Welsh mills at a price that was not disclosed, but is believed to have been a minimum of 17s. 9d. ($4.33) per base box, f.o.b. works port. Tin plate makers are meeting Tuesday and it is believed they will increase the scheduled price to 18s. ($4.39) per base box, as there are few sellers below that figure. Users have been attracted by low prices and a fair general demand is developing.

Galvanized sheets are quiet and easier. Black sheets are idle.

Continental demand for iron and steel is generally quiet, as consumers are not inclined to pay the present high prices. British users of semi-finished material are purchasing only small lots for prompt delivery. Most Continental mills are reported to be well booked with business and many have withdrawn quotations. The International Wire Rod Cartel has advanced its price to £5 15s. ($28.01) per ton, f.o.b.

In France there were 144 furnaces in blast on Jan. 31. Production of pig iron in January totaled 809,000 metric tons and of steel ingots and castings, 750,000 tons. The pig iron output of the Saar in January was 156,000 metric tons and the steel production 170,000 tons. There were 25 furnaces in blast in the Saar Jan. 31.

FRENCH PRICES STRONG

Pig Iron and Steel Products Advancing—Mills Quoting Longer Deliveries

PARIS, FRANCE, Feb. 24.—Although the domestic iron and steel market still shows decided strength and some prices are advancing, sellers for export have encountered difficulty in obtaining the high prices asked on certain products. Prices for export are firm, however, and there has been an increase of business from South America and Japan. In the domestic market there is still a scarcity of certain products, but with the new comptoir for semi-finished material and beams effective a steadier market is expected. A further increase in freight rates of about 11 per cent is expected.

Pig Iron.—As a result of increased demand from domestic foundries, producers have increased the total iron available for March by 5000 tons, having made 38,000 tons of phosphoric foundry iron. The price established for March is 445 fr. ($17.49) per ton. Producers of hematite have made 35,000 tons available for March consumption and 15,000 tons for April. Domestic demand is good, with many buyers laying in stocks in anticipation of higher prices. In view of the prospective increase in freight rates, foundries have decided to add 5 fr. (20c.) per ton to quotations on all products which are sold at delivered prices. At a recent meeting of the entente of French, Belgian and Luxemburg producers of phosphoric pig iron the following export prices were established: For Great Britain and overseas countries, £3 5s. 6 d. ($15.95) per ton; for Holland, £3 7s. ($16.32) per metric ton, delivered Dutch

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	18s.				$4.39		
Bilbao Rubio ore*	1	1¾	to	£1	2s.	5.30	to	$5.36
Cleveland No. 1 fdy.	3	7½				16.44		
Cleveland No. 3 fdy.	3	5				15.83		
Cleveland No. 4 fdy.	3	4				15.59		
Cleveland No. 4 forge	3	3½				15.46		
Cleveland basic (nom.)	3	15	to	3	15½	18.27	to	18.39
East Coast mixed	3	9	to	3	10	16.80	to	17.05
East Coast hematite	3	9½	to	3	10½	16.93	to	17.17
Rails, 60 lb. and up.	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	10				65.75		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to	5	15	26.18	to	28.01
Tin plate, base box.	0	17¾	to	0	18¼	4.33	to	4.45
Black sheets, Japanese specifications	13	5	to	13	10	64.53	to	65.75
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	9	2½	to	9	12½	1.98	to	2.09
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	10	0	to	10	5	2.17	to	2.23
Galv. sheets, 24 gage	13	5	to	13	10	2.88	to	2.94
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	4s.	to	£3	5s.	$15.58	to	$15.83
France	3	4	to	3	5	15.58	to	15.83
Luxemburg	3	4	to	3	5	15.58	to	15.83
Basic pig iron (nom.):								
Belgium	3	0	to	3	1	14.61	to	14.85
France	3	0	to	3	1	14.61	to	14.85
Luxemburg	3	0	to	3	1	14.61	to	14.85
Coke	0	18				4.39		
Billets:								
Belgium	4	13½				22.77		
France	4	13½				22.77		
Merchant bars:						C. per Lb.		
Belgium	5	7				1.18		
France	5	7				1.18		
Luxemburg	5	7				1.18		
Joists (beams):								
Belgium	4	17				1.07		
France	4	17				1.07		
Luxemburg	4	17				1.07		
Angles:								
Belgium	5	5				1.16		
⅛-in. plate:								
Belgium (a)	6	10				1.44		
Germany (a)	6	10				1.44		
$\frac{3}{16}$-in. ship plates:								
Belgium	6	6				1.39		
Luxemburg	6	6				1.39		
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

frontier; for Italy, £2 19s. 6d. ($14.50), Thionville; for Switzerland, 79.25 Swiss francs ($15.25) per ton, delivered Basle, ex-duty. Reductions from these prices are granted for large tonnages. Basic pig iron for export is quoted at £2 18s. to £2 19s. ($14.13 to $14.42) per metric ton, f.o.b. Antwerp.

Semi-Finished Material.—Mills are well booked with business and in some cases cannot offer deliveries inside of three months. Export quotations range from £4 3s. 6d. to £4 7s. ($20.33 to $21.19) per ton on blooms; £4 10s. to £4 14s. ($21.92 to $22.90) per ton on billets and £4 13s. to £4 16s. ($22.65 to $23.38) per ton on sheet bars, all f.o.b. Antwerp.

Finished Material.—The market is firm, and, although beams are the only finished product controlled by the comptoir, others are following the same upward movement. Most rolling mills are well covered and are quoting prices 30 to 40 fr. ($1.18 to $1.57) per ton higher than at the beginning of February. For export, beams are quoted at £4 14s. to £4 16s. per ton (1.04c. to 1.06c. per lb.). Bars range from £5 6s. to £5 7s. per ton (1.17c. to 1.18c. per lb.), with some mills not seeking further tonnage quoting £5 7s. 6d. per ton (1.18c. per lb.). The sheet market is active, but the advance in prices has been less pronounced than in other products. Longer deliveries are being offered by mills. The tube market has been rather active lately. The European Tube Syndicate is negotiating for a steel pipe line in the oil fields of Baku, requiring about 50,000 tons. British and American makers, also, are competing for this business.

Italian Steel Cartel Formed

HAMBURG, GERMANY, Feb. 26.—It is reported from Italy that Italian steel producers, who have not been united in any association, have established a cartel similar to the German Steel Syndicate. Only one small producer is not a member. It is expected that the new association, which will control sales in Italy, will reduce prices.

German Armco Iron Output Increased

HAMBURG, GERMANY, Feb. 26. — Production of "Armco" ingot iron under license from the American Rolling Mill Co., Middletown, Ohio, was begun by the United States Works, Düsseldorf, last summer. Output has been about 340 tons a month and will be considerably increased as a result of heavy demand.

Japan to Use Heavier Rails

As part of a program to replace the rails on the Imperial Japanese Government railroads with 100-lb. sections, the entire track from Yokohama to Kobe is to be relaid in 1931. In line with this program it has been announced that work over a distance of about 70 miles out of Kozu will be undertaken soon, says a report received by the Department of Commerce, Washington, from J. H. Ehlers, assistant commercial attaché, Tokio.

Exports of Tractors at New Record Level

Tractors make up by far the largest item of farm equipment exported from the United States. Shipments abroad during the past few years have grown so rapidly that they are now in excess of the peak of $30,000,000 reached in the unusually active year of 1920, according to the agricultural division, Department of Commerce. This item represents more than 40 per cent of the total agricultural implement exports. In 1927 tractors to the value of $37,102,302 were exported, compared with $30,485,519 in 1926; $27,980,568 in 1925 and $14,669,971 in 1924.

Revenue freight loaded in the week ended Feb. 25 is reported by the American Railway Association at 869,590 carloads. This is the lowest figure for several weeks and is nearly 50,000 cars below the figures for the corresponding weeks of 1927 and 1926.

BELGIAN MILLS WELL BOOKED

Mills Adopt Independent Attitude Although Price Peak May Have Been Reached

ANTWERP, BELGIUM, Feb. 25.—The market continues active, and prices are firm and in some cases advancing. The volume of business being transacted is not large, however, as many mills are well booked with tonnage and willing to accept further business only at prices which consumers are as yet unwilling to pay. In some quarters it is believed that the peak of the present advance has been reached. It is pointed out in some quarters that the highest prices have been paid by speculators, most consumers not being inclined to buy at the prices quoted by the mills. In some cases, also, stocks have been replenished so that users have their immediate requirements well covered. Exporters have begun to quote foreign buyers on the higher price basis and are booking some tonnages which had been withheld in the hope that prices would decline. Although there may be a temporary reaction in prices, it is not expected to be of long duration, as output is restricted by the International Steel Cartel and unless there is a decided decline in demand there will be no surplus to depress the market.

Pig Iron.—Stocks are small, demand is good, and prices are firm. No advances have been made by the syndicate because of competition from British furnaces. No. 3 phosphoric foundry iron is quoted at about $16.25 per ton, f.o.b. furnace, while Middlesbrough foundry iron is offered at $16.70 per ton, delivered Antwerp. Export prices are being maintained at about £3 3s. ($15.34) per ton, f.o.b. Antwerp.

Semi-Finished Material.—There is a decided scarcity of semi-finished steel, so that, despite offers of high prices by buyers in need of material, little business is being booked. Current quotations are nominally £4 4s. to £4 7s. ($20.46 to $21.19) per ton for blooms; £4 11s. to £4 14s. ($22.16 to $22.90) per ton for billets and £4 16s. ($23.38) per ton for sheet bars.

Finished Material.—Prices are nominally higher, but mills are so well booked that even at the advances few are interested in additional tonnage. Beams are firm, and prices show an upward tendency at £4 15s. per ton (1.05c. per lb.). Bars are quoted at £5 7s. per ton (1.18c. per lb.). Hoops are quoted at £6 5s per ton (1.38c. per lb.). Corrugated reinforcing bars are £5 12s. 6d. per ton (1.24c. per lb.), f.o.b. Antwerp.

German Unemployment Payments Shifted to Industry

HAMBURG, GERMANY, Feb. 26.—Total payments to the unemployed during 1927 were 908,300,000 m. ($217,083,700), compared with 1,179,000,000 m. ($281,781,000) in 1926. These payments are now to be shifted to employers and employees. In 1927, by special tax, employers and employees paid to this fund a total of 682,300,000 m. ($163,069,700), compared with 523,600,000 m. ($125,140,400) in 1926; local municipalities paid 53,800,000 m. ($12,858,200), compared with 148,400,000 m. ($35,467,600) in 1926, counties paid 52,800,000 m. ($12,619,200), compared with 243,000,000 m. ($58,077,000) in 1926, and the Government paid 116,000,000 m. ($27,724,000) compared with 258,000,000 m. ($61,662,000) in 1926.

Luxemburg Increases Output

Production of pig iron and steel in Luxemburg, amounting to 2,723,359 and 2,470,172 metric tons respectively in 1927, reached the highest peaks in the history of the industry, according to a report received by the iron and steel division, Department of Commerce, Washington, from the office of the trade commissioner in Paris. In 1926 the totals were 2,511,561 tons of pig iron and 2,243,722 tons of steel. This gain, it is pointed out, is in line with the programs of the three large Luxemburg sales groups, the Columbia, the Sogeco and the Soco-Belge.

Machinery Markets and News of the Works

SALES IN FAIR VOLUME

Present Rate of Activity Expected to Continue Throughout March

International Harvester Co. Issues Inquiry and Willis Motors, Inc., Has List of Tools in Preparation

MACHINE tool sales continue in fair volume, and it is expected that bookings will be maintained at the present rate during the remainder of the month. It is reported from Cincinnati that, barring a radical change in conditions in the next two weeks, the volume of business booked by some companies during the first three months of this year will show an appreciable increase over the corresponding period of last year. In the Chicago district sales are at the rate of the latter part of February, with farm implement manufacturers the most active group.

A fair showing of machine tool sales for the first quarter of this year is also indicated by a tentative calculation of the machine tool orders index of the National Machine Tool Builders' Association. According to this index, allowing for the shorter month, orders during February were only slightly less than those of January, which were higher than for any month since May, 1920.

The automobile industry is expected to be more active in placing orders for machine tools in the next few months. One large builder in the Cincinnati district has quoted on about $300,000 worth of such equipment, most of which is expected to be placed during the first half of this year.

Railroad buying is comparatively light, although there are a number of pending lists. The Lehigh Valley is reported to be preparing a short list. The Transit Commission, New York, has asked for additional information regarding tools for one of the shops that will serve the new subway. In New England, inquiries have been received from railroads for radial drills and other heavy equipment.

The International Harvester Co. has issued a list for its Moline, Ill., tractor plant, and a tractor builder at Waterloo, Iowa, is in the market for a number of machine tools. The Willis Motors, Inc., Chicago, is said to be preparing a list, which will include lathes, milling machines and other standard tools.

Small lot purchases have been made by the Ford Motor Co., which placed 10 universal grinders during the week. Tool room equipment has been taken by the Studebaker Corporation, South Bend, Ind., and among other machines the Stewart-Warner Speedometer Corporation, Chicago, has ordered 15 presses.

New York

NEW YORK, March 13.

BUSINESS in machine tools is somewhat irregular, some sellers reporting continued activity and others slightly less demand. Many users are apparently inclined to delay placing orders, but there is still a fair volume of single tool purchases. The Delaware, Lackawanna & Western has closed for about half its original list of 30 items and has postponed indefinitely purchase of the remainder. The Lehigh Valley is reported to be preparing a short list of machine tools. The Transit Commission, New York, has been asking for additional information in preparing a list of tools for a shop at the 207th Street yard of the new subway. The New York Central, which has issued inquiries for 20 or more tools since the first of the year, has recently inquired for any changes that may have been made in prices submitted on inquiries made prior to Jan. 1.

Among industrial users of machine tools, the Wright Aeronautical Corporation, Paterson, N. J., has made some further purchases of used equipment the past week and expects to be in the market for more tools when its new building is started. The Fairchild Airplane Mfg. Corporation, Farmingdale, Long Island, which recently purchased a turret lathe, has also bought a boring mill. The General Electric Co. has made further purchases of tools in the week.

Other sales include a No. 1 Pratt & Whitney jig boring machine to a manufacturer in Connecticut, No. 3 die sinker to a company in Chicago, No. 4 A universal die sinker to a forge company in Illinois, two 13 x 30-in. lathes to a maker of automobile accessories in Chicago, No. 2 jig boring machine to a manufacturer in Cincinnati, four 5-in. production hand milling machines to a motor company in Detroit, No. 0 Sigourney drill to a manufacturer of office supplies in New York, No. 4 A universal die sinker to a railroad supply company in Pennsylvania and No. 2 A Browne & Sharpe universal milling machine and No. 2 surface grinder to a company in Salt Lake City.

Plans have been arranged by Transogram Co., Inc., 148 Thirty-ninth Street, Brooklyn, manufacturer of toys, etc., for a one-story and basement plant, 100 x 400 ft., at Haskell, N. J., to cost approximately $100,000 with equipment. Present business will be removed to new location. Oscar Goldschlag, Inc., 1482 Broadway, New York, is architect and engineer.

Max Pollak Iron Works, 504 East Seventy-sixth Street, New York, has purchased five-story building of Continental Baking Corporation at 337 East Seventy-fifth Street, and will remodel for an extension.

Board of Education, Bronxville, N. Y., plans installation of manual training equipment in two-story junior high school to cost $750,000, for which plans are being completed by H. Leslie Walker, 144 East Fifty-fourth Street, New York, architect.

Port of New York Authority, 75 West Street, New York, is asking bids until March 26 for electrical equipment for Elizabeth-Howland Hook bridge over the Arthur Kill, between New Jersey and Staten Island. J. E. Ramsey is chief executive officer.

United States Shipping Board, Department of Maintenance and Repair, 45 Broadway, New York, will receive bids until March 28 for 66 pumping units for salt-water cooling and general service, fresh-water piston cooling, lubricating oil, etc., and for eight electric motors; on March 26 for 6 thrust bearings.

A. E. Kluepelberg, 375 East Fordham Road, New York, architect, will take bids on general contract in about 30 days for a two-story automobile service, repair and garage building to cost close to $100,000 with equipment.

Cities Service Co., 60 Wall Street, New York, is arranging for sale of stock to total $20,000,000, proceeds to be used for expansion in public utility properties, including extensions and improvements in power plants and transmission lines, and acquisition of new light and power properties.

Board of Education, White Plains, N. Y., plans installation of manual training department in three-story high school to cost $1,000,000. Starrett & Van Vleck, 393 Seventh Avenue, New York, are architects.

William Shary, 41 Union Square, New York, architect, has filed plans for a two-story automobile service, repair and garage building, 100 x 142 ft., to cost about $90,000 with equipment.

Electric Bond & Share Co., 71 Broadway, New York, operating electric light and power properties, including Pennsylvania Power & Light Co., Utah Power Co. and Southwestern Power & Light Co., has arranged for increase in capital from $100,000,000 to $300,000,000, a portion of fund to be used for expansion in power and transmission lines, acquisition of additional properties, etc.

New York Central Railroad Co., C. S. White, room 344, 466 Lexington Avenue, New York, purchasing agent, is asking bids until March 19, for wire fence and fence posts, serial contract No. 5-1928.

Union Bag & Paper Corporation, Woolworth Building, New York, has awarded general contract to Star Iron & Steel Co., East Eleventh Street, Tacoma, Wash., for pulp and paper mill at Tacoma, to cost $800,000 with machinery. A lumber mill for raw material for pulp production will be operated.

Corona Corporation, 346 Claremont Avenue, Jersey City, N. J., manufacturer of gas and electric fixtures, has asked bids on a new five-story plant to cost in excess of $85,000 with equipment. Christian H. Ziegler, 75 Montgomery Street, is architect.

Betz Brothers, 32 James Avenue, Jersey City, N. J., manufacturers of hollow steel doors and trim, etc., have leased a portion of former mill of Passaic Cotton Mills, Passaic, N. J., and will remodel for new plant. It is understood that present works will be removed to new location later. Another portion of mill property was secured recently by Triplex Safety Glass Co., Hoboken Terminal Building, Hoboken, N. J., for manufacture of special sheet glass for automobile windshields, almost exclusively for Ford Motor Co.

Art Metal Works, 7 Mulberry Street, Newark, has taken title to adjoining property and will use for expansion.

Samuel Sanbar and Albert Caracus, Newark, have leased property at 510 North Eleventh Street and will establish a plant for manufacture of radiator enclosures.

Radio Frequency Laboratories, Inc., Richard W. Seabury, 245 Rockaway Avenue, Boonton, N. J., president, has leased 125 acres in Rockaway Valley section as site for a new laboratory and aircraft field, to be operated for experimental work in conjunction with Bureau of Standards, Department of Commerce, Washington. Hangars, repair shop and other airplane buildings will be erected.

George E. Edmunds, Detroit, formerly connected with Edmunds & Jones Corporation of that city, manufacturer of automobile headlights, etc., and Col. E. C. Carrington, chairman Hudson River Night Line, Pier 32, North River, New York, have secured a controlling interest in Eastwood Mfg. Corporation, Belleville, N. J., manufacturer of brass wire screen used for paper mill service, and other wire goods. New owners plan an expansion. C. H. Neally, heretofore principal owner, will continue as chairman of board; Mr. Edmunds will be president, Col. Carrington, vice-president, and George C. Warner, treasurer.

Commercial Steel Equipment Co., 45 Morris Street, Jersey City, has been formed to manufacture steel equipment for office, store and factory and will also produce household specialties, including radiator enclosures and kitchen cabinets. T. W. Becker is president of company, G. F. Meyer, vice-president, and V. C. Stephens, treasurer.

New York branch sales office and factory of Carbon Sales Division, National Carbon Co., Inc., Cleveland, will be moved on March 15 from 357 West Thirty-sixth Street, New York, to larger quarters at Fourteenth and Henderson Streets, Jersey City. Considerable additional manufacturing equipment has been added.

Kastwell Foundry Co., 185 Christie Street, Newark, formerly Transfer Metal Castings Co., is building extension to plant.

Ideal Plating & Polishing Co., 57 Bradford Street, Newark, has been licensed by Chromium Corporation of America to do "Crodon" chromium plating. Company also expects to build plant extension adding 50,000 sq. ft. to its present floor space.

Automatic Gear Shift Corporation, 55 West Forty-second Street, New York, has been organized to manufacture automatic gear shifts for automobiles. Manufacturing will be done by contract. Awards have not yet been made.

Hasselman & Szekely, Inc., 143 East Forty-fifth Street, New York, has been incorporated to manufacture wrought iron and bronze work, including stair railings, iron doors, lighting fixtures, lanterns, hardware, balconies, etc. Company has factory fully equipped.

New England

BOSTON, March 12.

THE machine tool market is more quiet than a week ago. Few new inquiries have been received, the largest coming from the railroads and calling for radial drills and other heavy-duty equipment. Outstanding inquiries apparently are no nearer closing than a fortnight ago and sales of new tools are at a minimum. A 14-in. lathe to a Providence shop and a Peerless power hack saw to a railroad, in addition to further awards by the city of Boston for its continuation school for approximately 16 machines, are the most important reported the past week. Quite a little used equipment has been sold to small shops, including a sizable punch, two blowers to a railroad, 3-in. inclinable power press, 16-in. x 6-ft. Reed-Prentice geared head lathe, two milling machines, shaper, and an Excelsior upright drill to Boston shops, and a 16-in. x 8-ft. lathe to a Gardner, Mass., plant, in addition to less important tools. Local firms handling radial drills have been notified that a change in the rating of such tools will soon be put into effect.

Small tool sales are keeping pace with those in February, but running behind those in January. Compared with a year ago they are slightly better.

Confirming previous statements regarding business conditions in the machine tool trade, the Associated Industries of Massachusetts has just issued its January report. Its index number for the metal trades is 81.5, contrasted with 101.3 for December and 79.6 for January, last year.

Barnes Airport Co., Westfield, Mass., will erect a 60 x 80-ft. hangar and 12 x 30-ft. machine shop. Plans are by Austin Co., New York.

Plans will be out this week for a two-story, 68 x 93-ft. automobile body manufacturing plant for the Waterhouse Co., Tracy Court, Webster, Mass. L. J. Chafee, Oxford, Mass., is architect.

Peter McLaughlin, 78 North Street, Pittsfield, Mass., has plans for a two-story, 60 x 65-ft. addition to be erected by Pittsfield Electric Co., 92 Renne Avenue.

Bids are about to close on a four-story and basement, 60 x 100-ft. plant to be built by Seth Thomas Clock Co., Thomaston, Conn. Lockwood, Greene & Co., Inc., 24 Federal Street, Boston, are engineers.

Ralph M. Siger, 12 Elm Street, Westfield, Mass., is preparing plans for a local two-story and basement, 72 x 118-ft., boys' trade school. C. Derby is principal.

New York offices of the Union Drawn Steel Co., Hartford, Conn., will be discontinued. New local offices are at 647 Main Street.

Crane Co. has purchased 50,000 ft. with 555 ft. frontage on Vassar Street, Cambridge, Mass., and Boston & Albany Railroad. New owner expects to improve and occupy property.

Hub Wire Cloth & Wire Work Co., 16 Chanal Street, Boston, has leased a portion of building at 28 Lancaster Street for expansion.

Smith, Seymour & Sons, Inc., Oakville, Conn., manufacturer of hardware, has plans for a two-story and basement addition, 50 x 150 ft., to cost about $80,000.

New England Metal Culvert Co., Tenneyville Street, Palmer, Mass., is having plans drawn by Monks & Johnson, 99 Chauncy Street, Boston, architects and engineers, for a new one-story plant, 80 x 90 ft., on site recently secured at South Boston.

Board of Public Works, Springfield, Mass., is considering construction of a new pumping plant, to cost more than $25,000 with equipment. McClintock & Craig, Springfield, are engineers.

Western Electric Co., 80 John Street, New Haven, Conn., is considering erection of a two-story factory branch at West Haven, Conn., to cost more than $50,000 with equipment. Headquarters are at 195 Broadway, New York.

Cinder Concrete Unit Corporation, 79 Milk Street, Boston, has awarded general contract to W. M. Bailey Co., 88 Broad Street, for a one-story plant, 85 x 100 ft., at Somerville, Mass., to cost approximately $40,000 with equipment.

General Electric Co., Pittsfield, Mass., has plans for a two-story addition in the Silver Lake section, 40 x 280 ft., to cost in excess of $80,000 with equipment. It will be used largely for mixing and molding.

Officials of Stone & Webster, Inc., 49 Federal Street, Boston, operating electric light and power properties, have formed Eastern Utilities Associates, Inc., with capital of 2,000,000 shares of stock, no par value, to take over and consolidate Blackstone Valley Gas & Electric Co., Pawtucket and Woonsocket, R. I.; Edison Electric Illuminating Co., Brockton, Mass.; and Electric Light & Power Co., Abington and Rockland, Mass. Company plans expansion and improvements, including transmission line construction.

Brockton Ice & Coal Co., Main Street, Brockton, Mass., will build a one-story ice-manufacturing plant, 80 x 150 ft., to cost more than $50,000 with equipment. Funk & Wilcox, 26 Pemberton Square, are architects.

Gulf States

BIRMINGHAM, March 12.

PLANS are being considered by Magnolia Petroleum Co., Dallas, Tex., for extensions and improvements in its oil refinery at Beaumont, Tex., with installations of additional units for lubricating oil production, to cost $200,000 with machinery.

West Texas Utilities Co., Abilene, Tex., is disposing of a block of 25,000 shares of stock, a considerable portion of proceeds to be used for extensions and improvements, including transmission line construction.

Southern Pacific Lines in Texas, Houston, R. W. Barnes, chief engineer, will make extensions and improvements in power plant at car shops at Jacksonville, Tex., with installation of additional equipment. Work will be carried out in connection with an expansion program at that point to cost $100,000.

Dothan Casket Co., Dothan, Ala., will rebuild portion of plant destroyed by fire March 1, with loss close to $40,000 including equipment.

Gulf Coast Shell & Cement Co., Kress Building, Houston, Tex., is reported planning a new cement mill on 75-acre tract at Palacios, Tex., to cost in excess of $100,000 with equipment. Company has arranged for an increase in capital to $150,000.

John W. Hooser, Dallas, and W. H. Eddleman, Wichita Falls, Tex., receivers for American Refineries Co., with plant at last-noted place, have been authorized to dispose of property of company on May 3. Refinery, pipe lines, etc., are said to be valued at $6,000,000.

San Antonio Public Service Co., San Antonio, Tex., has work under way on its power development at New Braunfels, Tex., including installation of 30,000-kw. turbo-generator and auxiliary equipment. Extensions will be made in transmission lines. Entire project will cost in excess of $350,000.

Western Mfg. Co., San Angelo, Tex., recently formed with capital of $100,000 to take over and expand Western Iron Works, Avenue D, has plans for four one-story additions, including machine shop, 40 x 275 ft.; foundry, 30 x 100 ft.; forge and blacksmith shop, 40 x 40 ft.; and warehouse, 40 x 40 ft. Work will begin at once. B. W. and M. S. Willig are heads.

Pasotex Petroleum Co., subsidiary of Standard Oil Co. of California, 225 Bush Street, San Francisco, will soon begin superstructure for initial units of its refinery near El Paso, Tex., to cost about $800,000 with machinery.

Tridex Corporation, Dallas, Tex., recently organized by W. P. Gage, Dallas, and associates, has closed negotiations with Guiberson Corporation, operating a local iron and steel works, for manufacture of a new automatic cleaning machine for garage service, and quantity production will be arranged. Later, Tridex company proposes to establish its own factory. Mr. Gage is president; S. A. Wier, vice-president, and H. E. Hobson, secretary.

F. A. Mason, 2058 College Avenue, Ocala, Fla., is at the head of a project to construct and operate an ice-manufacturing and cold storage plant at Ocala, Fla., to cost about $70,000.

Packard Motor Car Co., San Angelo, Tex., has plans for a two-story service, repair and garage building, 75 x 190 ft., to cost about $85,000 with equipment. Beverly W. Spillman & Son., Alamo National Bank Building, San Antonio, Tex., are architects.

Markle Steel Co., Shepherd Street, Houston, Tex., is said to have plans under way for two one-story additions to be used largely for storage and distributing service, to cost close to $70,000.

Board of Education, San Angelo, Tex., is planning construction of a new vocational school to cost close to $100,000, and will soon take bids on general contract. Phelps & Dewees, Gunter Building, San Antonio, Tex., are architects.

Humble Oil & Refining Co., Houston, Tex., is reported planning a new storage and distributing plant in Winkler County, comprising 40 tanks, each with capacity of 55,000 bbl., pumping and power equipment, and auxiliary apparatus. Site has been selected.

Southern Mfg. Co., Houston, Tex., has leased plant of Harlingen Planing Mills, Harlingen, Tex., and will remodel for manufacture of school furniture and supplies, to cost more than $35,000 with machinery.

City Council, Brownsville, Tex., has arranged for bond issue of $100,000 for a municipal airport, using tract about three miles from city. Plans will soon be arranged for hangars, machine and repair shops, oil storage and distributing building, and other structures.

Walter J. Lloyd, 702 N. E. First Avenue, Miami, Fla., is at head of a project to establish and operate a local plant for manufacture of extracts, using palmetto roots as raw material, reported to cost about $35,000 with equipment.

Birmingham Engine & Machinery Corporation, Birmingham, is in market for motor generator set of 100 to 150-kw. capacity. Direct current side must be 250 volts and alternating current motor side, three-phase, 60-cycle, 220 volts. Only modern unit with switchboard will be considered.

Philadelphia

PHILADELPHIA, March 12.

CONTRACT has been let by Brown Instrument Co., Roberts and Wayne Streets, to Robert E. Lamb Co., local, for a two-story addition to cost close to $40,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Locust Construction Co., Sixth and Locust Streets, Philadelphia, has plans for a three-story automobile service, repair and garage building to cost $150,000 with equipment.

Nice Ball Bearing Co., Thirtieth Street and Nicetown Avenue, Philadelphia, has awarded general contract to J. S. Rogers Co., Drexel Building, for a one-story and basement addition, 65 x 190 ft., with two extensions, each 40 x 65 ft., and for one-story garage and repair shop, 36 x 60 ft., to cost more than $50,000 with equipment.

Valvoline Oil Co., 4001 North Fifth Street, Philadelphia, has awarded general contract to William C. Wright & Son, 22 Harvey Street, for a one-story machine shop.

Silverman & Levy, 313 South Smedley Street, Philadelphia, architects, have awarded general contract to F. W. Mark Construction Co., Commercial Trust Building, for a three and four-story automobile service, repair and garage building, 93 x 110 ft., with extension, 17 x 55 ft., to cost $150,000.

Quaker City Cold Storage Co., Delaware and Spruce Streets, Philadelphia, has awarded contract to J. A. Hauser, Water and Spruce Streets, for an eleven-story and basement ice and cold storage plant, 110 x 130 ft., to cost close to $1,000,000 with machinery. Ballinger Co. is architect and engineer.

Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, has plans for a one-story addition to locomotive and car shops at Reading, Pa., to be equipped primarily as a welding works, to cost close to $35,000.

Penn-Jersey Transportation Co., Camden, N. J., operating a motor bus line, has begun erection of a one-story service, repair and terminal building with foundations for additional stories. Complete machine and repair shop will be installed. Entire project will cost $100,000. Company is reported planning erection of other such structures in different parts of this district.

Board of Education, Trenton, N. J., has plans for a new two-story high school on 36-acre tract, to cost about $2,000,000, and will install manual training department. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

General Aircraft Corporation, Hazleton, Pa., recently organized, has acquired local plant of Hazleton Mfg. Co., heretofore used for manufacture of caskets, etc., for establishment of a plant. B. S. Stewart is chief engineer.

Board of Education, Lock Haven, Pa., plans installation of manual training equipment in three-story high school to cost $275,000, for which bids are being asked on general contract. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Fire, March 6, destroyed a portion of ice plant and power house at the plant of Dairymen's League, Wyalusing, near Towanda, Pa., with loss reported at $22,000 including equipment. It is planned to rebuild.

Pennsylvania Gas & Electric Co., York, Pa., has arranged for a bond issue of $700,000, a portion of proceeds to be used for expansion, including transmission line construction.

Pennsylvania Railroad Co., C. E. Walsh, purchasing agent, room 415, 15 North Thirty-second Street, Philadelphia, is asking bids until March 22 for piston heads, contract No. 20,1928.

Haddock Mining Co., Silver Brook, Pa., will make extensions and improvements in its machine repair shops, including installation of additional equipment for repairs to engines, cars and other heavy machinery, including coal-mining equipment.

American Ice Co., City Centre Building, Philadelphia, is arranging an expansion and improvement program, including construction of a new ice-manufacturing plant at Brighton, Boston, with initial capacity of 180 tons per day, and a second plant in Boston district with output of about 120 tons daily. Another plant of like capacity will be built in New England district.

Muller & Postle, Inc., 2615 York Street, Philadelphia, has been organized to fabricate structural steel and ornamental iron, specializing in stair work and kindred lines. Company is opening new plant and desires catalogs of firms in its field. H. E. Muller is president and A. H. Postle, vice-president.

Pittsburgh

PITTSBURGH, March 12.

MACHINE tool business is notable more for the number than the size of orders, as is usually true when demand is for replacement rather than the tooling or retooling of complete shops.

Packard Motor Car Co. of Pittsburgh, 4709 Baum Boulevard, has awarded general contract to Rust Construction Co., 311 Ross Street, for a one-story and basement service, repair and sales building, 135 x 190 ft., to cost $130,000 with equipment.

Dravo Contracting Co., Neville Island, Pittsburgh, operating a shipyard for building steel barges, etc., has begun an extension and improvement program along Ohio River, including a new one-story machine shop, with outfitting dock to be equipped with a terminal crane and runway, to cost more than $75,000.

Lazote, Inc., Belle, W. Va., a subsidiary of E. I. du Pont de Nemours & Co., Wilmington, Del., has plans for enlargements for production of ammonia, methanol and kindred products, to cost in excess of $350,000 with machinery. DuPont Engineering Co., du Pont Building, Wilmington, is engineer in charge.

United States Corrugated Fibre Box Co., Wheeling, W. Va., is reported planning an addition to cost about $120,000 with equipment. H. J. Lacy is in charge.

Monongahela-West Penn Public Service Co., Fairmont, W. Va., is said to have concluded arrangements for acquisition of light and power properties in vicinity of Salem and West Union, W. Va., and plans expansion and betterments, including construction of transmission lines.

Cleveland

CLEVELAND, March 12.

SOME machine tool dealers report a fair number of single orders, although sales and inquiries dropped off the past week. A few moderate sized lots of machines are pending in this territory, but prospective purchasers seem to be in no hurry to place orders. The market in Detroit is dull, buying by the automotive industry which recently took a little spurt, having subsided. The Ford Motor Co. continues to purchase equipment in small lots and during the week bought 10 universal grinders. The Willys-Overland Co., Toledo, purchased two multiple spindle drilling machines.

Plans are being arranged by Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, for construction of a steel tower transmission line in northeastern Ohio, 59 miles long, to cost $1,800,000. Company will make extensions and improvements in Avon power plant to cost about $55,000. A fund of $11,600,000 is being developed for expansion and betterments in power lines, plants, substations, etc.

Hydraulic Pressed Brick Co., Central National Bank Building, St. Louis, is completing plans for a new works at Cleveland for manufacture of hollow tile, to cost $60,000 with equipment. K. H. Mittendorf, Interstate Building, Kansas City, Mo., is engineer.

Ludlow Window Ventilator Co., East Liverpool, Ohio, recently formed by Robert J. McElravy, East Liverpool, and James Ludlow, Carrollton, Ohio, has leased quarters in the Milliron Building, for manufacture of a patented window ventilator. Operations will begin at once.

Ohio Valley Gas Corporation, operating Zane Gas Co., Zanesville, Ohio, and other natural gas properties and pipe lines, is disposing of note issue of $400,000, portion of proceeds to be used for extensions and improvements, including acquisition of additional properties.

Fostoria Pressed Steel Co., Fostoria, Ohio, has plans for a one-story addition for enameling service, to cost more than $50,000. Forster & Wernert, Nicholas Building, Toledo, Ohio, are architects and engineers.

Officials of Akron Rubber Reclaiming Co., Barberton, Ohio, are organizing Midwest Rubber Reclaiming Co., capitalized at $1,000,000, to construct and operate a mill at East St. Louis, Ill. J. B. Huber is president of parent organization, and W. A. Hart, secretary.

Safety Stair Tread Co., Spruce Street, Wooster, Ohio, manufacturer of metal stair treads, has revised plans for an addition, to cost close to $40,000 with equipment. Bids on first plans were recently rejected. Christian, Schwarzenberg & Gaede Co., 1900 Euclid Avenue, Cleveland, is architect and engineer.

Detroit

DETROIT, March 12.

BIDS are being asked by Chrysler Motor Corporation, 12265 East Jefferson Avenue, Detroit, for a six-story addition, 25 x 75 ft., for body production, to cost $125,000. Smith, Hinchman & Grylls, Marquette Building, are architects.

Ralston Purina Mills, Inc., Battle Creek, Mich., plans rebuilding portion of mill destroyed by fire March 4, with loss estimated at close to $250,000 with equipment. Headquarters are at 801 South Eighth Street, St. Louis.

Lohman & Lohman, 2 Huron Street, Ypsilanti, Mich., architects, have plans under way for a two-story automobile service, repair and garage building at Ann Arbor, Mich., to cost about $100,000 with equipment.

Koestlin Tool & Die Co., 3601 Humboldt Avenue, Detroit, has awarded general contract to Krieghoff Co., 4815 Belleview Avenue, for an addition to cost more than $40,000 with equipment. Janke, Venman & Krecke, 1346 Broadway, are architects.

Board of Water Commissioners, 176 East Jefferson Avenue, Detroit, is asking bids until March 21 for two pumping units for auxiliary low-lift waterworks station, one pump to have a capacity of 260-million gal. per day, and other 200-million gal. per day, complete with accessory apparatus. George H. Fenkell is general manager and chief engineer.

Chevrolet Motor Car Co., Flint, Mich., has plans for a one-story addition, 225 x 900 ft., to cost in excess of $500,000 with equipment. Wright & Nice, South Saginaw Street, are architects. Company is also said to be planning a one-story forge shop to plant at Detroit, to cost more than $75,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect for last-noted structure.

Grand Trunk Railway Co., Detroit, is reported planning a new engine house with repair facilities at Muskegon, Mich., to cost upward of $70,000 with equipment. J. A. Heaman is chief engineer.

New Era Spring & Specialty Co., Grand Rapids, Mich., has developed a new type of pneumatic bumper for automobiles and will devote a considerable portion of plant output to this product. It consists of an inflated rubber tube supported by steel reinforcements.

Clark Equipment Co., Buchanan, Mich., manufacturer of automobile wheels, axles, transmissions, etc., is completing three new units, totaling about 40,000 sq. ft. of space, as a part of a general expansion program. Work is in progress on a two-story building at branch plant at Battle Creek, Mich., which is given over to the manufacture of tractors.

King-Seeley Co., Second Street, Ann Arbor, Mich., manufacturer of gasoline gages, etc., is having plans drawn for a two-story addition, to cost about $75,000 with equipment. Verner, Wilhelm & Molby, Book Building, Detroit, are architects.

Beecher, Peck & Lewis, 125 West Jefferson Avenue, Detroit, paper products, is having plans drawn for a new two-story storage and distributing plant to cost about $60,000 including mechanical-handling equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

The Crane Market

VERY little new inquiry for overhead cranes has appeared in the past week, but locomotive crane inquiries continue to accumulate. The New Haven Illuminating Co., New Haven, Conn., is about to close on a 50-ton electric crane. The Reading Railroad has not yet purchased two 225-ton locomotive handling cranes and a 50-ton standard overhead crane. The Amtorg Trading Corporation, 165 Broadway, New York, is reported to have closed on six 15-ton crawl-tread locomotive cranes and one 25-ton standard gage crane for Russia and has pending nine 40-ton locomotive cranes. The Delaware, Lackawanna & Western is taking bids on a 20-ton locomotive crane. The Frederick Snare Corporation, New York, which has closed on a 25-ton locomotive crane for Peru has purchased a steam shovel and is preparing an inquiry for a crawl-tread locomotive crane for the same project.

Among recent purchases are:

United Gas Improvement Co., Philadelphia, 20-ton locomotive crane for Vicksburg, Miss., from American Hoist & Derrick Co.

Frederick Snare Corporation, New York, 25-ton locomotive crane for Lima, Peru, from Ohio Locomotive Crane Co.

New York Edison Co., New York, 2-ton, monorail electric hoist with bucket from American Engineering Co.

Advance Bag & Paper Co., Boston, 5-ton hand power crane from Armington Engineering Co.

Union Bag & Paper Power Corporation, 233 Broadway, New York, 3-ton, grab bucket electric hoist and two 2-ton, 36-ft. 9-in. span, 3-motor overhead cranes for Tacoma, Wash., from Box Crane & Hoist Corporation.

South Atlantic States

BALTIMORE, March 12.

NEGOTIATIONS have been concluded by A. V. Moore Brass Works, Inc., Portsmouth, Va., for purchase of property in East Camp district, Norfolk, Va. New owner will remodel for a brass smelting and refining plant to cost in excess of $60,000.

Virginia Electric & Power Co., Richmond, Va., is arranging an expansion and improvement program to cost $4,000,000, including extensions in power facilities and transmission lines. About $1,700,000 of amount noted will be used for power substations and distributing systems.

Board of District Commissioners, District Building, Washington, is asking bids until March 23 for five road rollers.

Southern Metal Products Co., Winston-Salem, N. C., is arranging for erection of one-story plant, 40 x 79 ft., for manufacture of metal weatherstrips, etc., to cost about $18,000.

Duke Power Co., Charlotte, N. C., will proceed with construction of steel tower transmission line to Marion, N. C., and points in McDowell County, from power plant at Lake James. Tract of 5 acres has been purchased on outskirts of Marion as site for new power substation. Entire project will cost in excess of $100,000.

Wilson-Nash Motors Co., 1109 Cathedral Street, Baltimore, representative for Nash automobile, has awarded contract to Price Construction Co., Maryland Trust Building, for two-story service, repair and sales building, 130 x 200 ft., to cost about $85,000 with equipment. Owens & Sisco, Continental Building, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 20 for carbon and high speed twist drills for Eastern and Western yards, schedule 8615; for flat and soldering irons, and electric glue pots for Eastern and Western yards, schedule 8625; until March 22 for socket wrench equipment for Philadelphia yard, schedule 8544, and for one turret lathe, schedule 8104; until March 27 for 6000 lb. steel forgings, cruising turbine rotor, for Mare Island and Puget Sound yards, schedule 8682.

Chattahoochee Sand & Gravel Co., Columbus, Ga., is said to be planning new works on Chattahoochee River for gravel and sand washing, screening, etc., to cost in excess of $175,000 including machinery. A similar plant is contemplated in Floyd County.

Central Atlantic States Service Corporation, Lynchburg, Va., operating local light and power properties, with other plants and system at Staunton, Harrisonburg, Radford, Pulaski, Va., has arranged for a bond issue of $1,000,000 and note issue in same amount, proceeds to be used in part for extensions and improvements, including transmission line construction.

F. S. Royster Guano Co., Royster Building, Norfolk, Va., manufacturer of commercial fertilizer, has acquired 60 acres of water-front property at Wilmington, N. C., for a new plant, to cost in excess of $100,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, is asking bids until March 22, for 4¼-hp. electric motors, bench grinder, 5000 pipe clamps, six journal jacks, 100 steel reflectors, bolts, nuts, rivets, 3000 lb. cast iron washers, tacks, grindstone frames, and other mechanical equipment for Canal Zone, Panama, schedule 2456.

Board of Education, Charlotte, N. C., is considering installation of manual training equipment in an addition to Graham Junior High School to cost $150,000. Charles C. Hook, Commercial Bank Building, is architect.

A. J. Nackley, 1121 Rugby Boulevard, Roanoke, Va., is at head of a project to establish a local mill for production of dowel pins, brackets, cross-arms and other line equipment.

Aldrich Machine Works, Inc., Greenwood, S. C., is reported planning immediate rebuilding of portion of plant destroyed by fire recently, with loss reported in excess of $30,000, including equipment. Company specializes in textile mill equipment.

Atlanta Textile Supply Co., Austell Building, Atlanta, Ga., manufacturer and distributer of cotton mill equipment and supplies, is completing plans for a new factory, to cost close to $30,000 with equipment.

J. L. Dorning and W. R. Massey, 1020 Boylan Drive, Raleigh, N. C., are at head of a project to construct and operate an ice-manufacturing plant at Midway, near Burlington, N. C., to cost in excess of $40,000 with machinery.

Arnold Stone Co., Inc., Forty-seventh Street, Jacksonville, Fla., will erect a one-story plant at Greensboro, N. C., 50 x 100 ft., for cutting, polishing, grinding, etc., to cost $25,000 with equipment.

St. Louis

ST. LOUIS, March 12.

BIDS will soon be taken by Southwestern Bell Telephone Co., Bell Telephone Building, St. Louis, for a three-story addition to its equipment storage and distributing plant, to cost approximately $85,000 with equipment.

Associated Motors Terminal Co., 117 South Broadway, St. Louis, has asked bids on general contract for a six-story automobile service, repair and garage building, 80 x 100 ft., to cost close to $330,000 with equipment. Gill & Jackson, Buder Building, are architects; W. J. Knight & Co., Wainwright Building, are engineers.

Shaffer Oil & Refining Co., Cushing, Okla., operating a local refinery and pipe line, is disposing of a note issue of $10,000,000, a portion of fund to be used for extensions in plant and system.

City Council, Marshall, Mo., has authorized plans for a municipal electric light and power plant, to cost about $80,000 with equipment. Bonds will soon be voted. Henrici-Lowry Engineering Co., Security Building, Kansas City, Mo., is engineer.

Midwest Piping & Supply Co., 1452 South Second Street, St. Louis, manufacturer of pipe, pipe fittings, etc., has plans for a two-story addition, to cost upward of $75,000 with equipment. Klipstein & Rathman, Security Trust Building, are architects.

Southwest Pump & Machinery Co., 2720 McGee Road, Kansas City, Mo., has leased a two-story building at 2710-12 McGee Road for an addition. Considerable increase in production facilities will be arranged.

Landis Machine Co., Gano and Second Streets, St. Louis, manufacturer of leather stitching machinery, etc., is planning an expansion program, including purchase of additional property for early occupancy. A note issue of $500,000 will be sold.

Diamond Truck Co., 1737 Locust Street, Kansas City, Mo., has leased a building to be erected on Holmes Avenue for a new service, repair and garage building. Entire project will cost in excess of $90,000.

Empire Refineries, Inc., Tulsa, Okla., is considering erection of a new plant unit at Ponca City, Mo., for production of industrial alcohol, to cost in excess of $300,000 with machinery.

United States Cold Storage Co., Third and Locust Streets, Kansas City, Mo., is said to be arranging for extensions in cold storage and refrigerating plant, including remodeling of ice-manufacturing plant and installation of additional equipment, to cost more than $1,000,000.

United Motor Service Co., Twenty-seventh and Warwick Streets, Kansas City, Mo., is arranging for a lease of two-story and basement building, 100 x 120 ft., to be erected at Twenty-fifth and McGee Streets, and will occupy for a new service, repair and garage building. It will cost about $90,000. R. H. Sanneman, Lee Building, is architect.

Buffalo

BUFFALO, March 12.

PLANS are being drawn by Thompson, Holmes & Converse, 311 Alexander Street, Buffalo, architects, for a five-story automobile service, repair and garage building, to cost $100,000 with equipment.

Binghamton Brick Co., Binghamton, N. Y., is planning the early rebuilding of portion of plant destroyed by fire March 3, with loss reported in excess of $175,000 with equipment.

J. M. & L. A. Osborn Co., 64-72 Rapin Place, Buffalo, iron and steel products, has filed plans for a one-story addition for storage and distributing service, to cost about $21,000 with equipment.

Victor Plaster Co., Powers Building, Rochester, N. Y., A. H. Dewey, secretary and treasurer, is planning construction of a new mill at Victor, N. Y., for production of gypsum plaster, to cost in excess of $75,000 with machinery. S. Firestone, 59 South Avenue, is engineer.

Buffalo, Niagara & Eastern Power Corporation, Buffalo, is arranging for a consolidation of all associated interests, including Niagara, Lockport & Ontario Power Co., Niagara Falls Power Co., and Tonawanda Power Co., Niagara Falls and Tonawanda, N. Y., to include general expansion in combined facilities, with extensions in transmission lines.

Union School District, Penn Yan, N. Y., is considering installation of manual training equipment in new junior high school to cost approximately $250,000. John Johnson is president, in charge.

Indiana

INDIANAPOLIS, March 12.

BIDS are being asked by Board of Trustees, Water Works Department, Evansville, Ind., until March 29 for equipment for waterworks extensions and improvements, including steam engines, generators and switchboards, pumping machinery, boiler feed and sump pumps, coal and ash-handling machinery, boiler room equipment, valves and boxes, and traveling crane. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Interstate Public Service Co., Indianapolis, is disposing of bond issue of $12,554,000, a portion of fund to be used for extensions and improvements in power facilities and transmission lines, including acquisition of other properties. E. Van Arsdel is president.

Following recent acquisition of plant of Durant Motor Co. at Muncie, Ind., to Merchants' Trust & Savings Co., Muncie, property has been transferred to General Motors Corporation, Detroit, and will be used by Delco-Remy Corporation, Anderson, Ind., a division of purchasing company, for a new plant for manufacture of storage batteries. It is purposed to have factory ready for service in about 60 days. A. L. Hopkins, formerly chief engineer for Prest-O-Lite Co., Indianapolis, will be in charge of engineering at new unit; L. C. Goad, process engineer at Anderson plant, has been appointed superintendent at Muncie works.

Bantam Ball Bearing Co., Bantam, Conn., will proceed at once with superstructure for a one-story plant at South Bend, to cost about $70,000 with equipment, for which general contract was recently let to H. G. Christman & Co., 306 South Notre Dame Street. Company will remove from Bantam to new location and provide for increased output.

Doeppers & Lennox, 226 East Michigan Street, Indianapolis, architects, have asked bids on general contract for a two-story automobile service, repair and garage building, 90 x 145 ft., to cost about $90,000 with equipment.

Indiana General Service Co., Muncie, is arranging an expansion and improvement program to cost $2,500,000, including extensions in power facilities, transmission lines and power substations. Plans are under way for construction of a double circuit steel tower transmission line from Fort Wayne to Marion, Ind., about 58 miles. At last-noted place a 20,000-kw. switching and power substation will be built, and a 25,000-kw. substation will be constructed at Muncie. Company is operated under direction of American Gas & Electric Co., 30 Church Street, New York.

Major Brothers Packing Co., South Logan Street, Mishawaka, is said to be planning installation of ice and cold storage plant in three-story packing house to cost $350,000, for which bids will be asked on general contract in April. Packers' Architectural & Engineering Co., 431 South Dearborn Street, Chicago, is architect and engineer.

Board of Education, Burlington, has authorized installation of manual training department in two-story addition to high school to cost $75,000, for which plans have been drawn by C. E. Werking & Son, American Trust Building, Richmond, Ind., architects.

Mid-States Steel & Wire Co., Crawfordsville, formed recently by merger of Adrian Wire Fence Co., Adrian, Mich., Crawfordsville Wire & Nail Co., Crawfordsville, and Dwiggins Wire Fence Co., Anderson, will remove plant of Adrian company to Crawfordsville and consolidate with mill of Wire & Nail company. Facilities will be provided for production of field and poultry wire fencing, gates and ornamental fence, heretofore carried on at Adrian. Crawfordsville division will continue production of nails and kindred products, and Dwiggins plant will remain at Anderson without change in products.

Chicago

CHICAGO, March 12.

MACHINE tool sales the first two weeks in March were steady and at the rate of those in the latter part of February. Fresh inquiry gives promise that purchasing will be sustained over the next few weeks. Farm implement manufacturers are still the most active buyers. The International Harvester Co. has issued a list for its Moline plant and a tractor builder at Waterloo, Iowa, is in the market for a number of machine tools. Automobile accessory plants and a drop forge manufacturer are making purchases. The Stewart-Warner Speedometer Corporation, Chicago, has ordered 15 presses and other equipment. Willis Motors, Inc., Chicago, is preparing to issue a list including milling machines, lathes, boring mills and radial and multiple-spindle drills. Studebaker Corporation, South Bend, Ind., has purchased several tool-room items. Several inquiries emanate from Rockford, Ill., tool manufacturers who are improving their manufacturing facilities.

Two manufacturers of radial drills have advanced prices 10 per cent.

Plans are being considered by Blake Specialty Co., 360 North Michigan Avenue, Chicago, manufacturer of well augers, pipe bends, etc., for a new one-story foundry to cost about $35,000 with equipment.

Firebrand Fuel Co., Norris City, Ill., is considering early rebuilding of portion of power house at local coal mining property destroyed by fire March 7, with loss of $100,000, including boiler and engine equipment.

City Council, Cedar Falls, Iowa, is considering construction of municipal artificial gas plant, to cost about $150,000 with equipment. A bond issue is being arranged.

Iowa Power & Light Co., Adel, Iowa, is disposing of bond issue of $6,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction. Company is affiliated with Illinois Power & Light Corporation, Chicago.

Walter H. Wheeler, Metropolitan Life Building, Minneapolis, Minn., engineer, has plans for a steam-operated electric power house at Polson, Mont., to cost more than $50,000 with equipment.

Welfare Seating Co., 1119 Glenrock Avenue, Waukegan, Ill., W. J. Bargen, head manufacturer of car seats, etc., is planning for a new one-story factory to cost about $35,000.

Produce Terminal Cold Storage Co., Chicago, care of Henschin & McLaren, 1637 Prairie Avenue, engineers, has awarded general contract to Wells Brothers Construction Co., 53 West Jackson Boulevard, for an eleven-story cold storage and refrigerating plant, to cost approximately $2,000,000 with machinery.

Fire, March 2, destroyed a portion of the commissary department at car shops of Pullman Co., 110th Street, Chicago, with loss close to $100,000 including equipment.

Iowa Railway & Light Co., Cedar Rapids, Iowa, has approved plans for a new steam-operated electric power plant at Webster City, to cost about $40,000.

Solem Machine Co., 158 Morgan Street, Rockford, Ill., manufacturer of wood-working machinery and parts, has plans for a one-story addition, to cost in excess of $100,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

Corona Pen Co., 134 North La Salle Street, Chicago, will rebuild its plant at Antioch, Ill., recently partially destroyed by fire, with loss estimated at $50,000 including equipment. Edgar M. Newman, 107 North Clark Street, Chicago, is architect.

City Council, Carlisle, Iowa, is asking bids until March 20 for pumping equipment, water tank and tower, with accessory apparatus, for a municipal waterworks. W. E. Buell & Co., Davidson Building, Sioux City, Iowa, are consulting engineers.

National Plate Glass Co., General Motors Building, Detroit, will soon begin erection of new unit at plant at Ottawa, Ill., to cost in excess of $200,000 with equipment.

Shops of Rapid City, Black Hills & Western Railroad, Rapid City, S. D., were destroyed by fire March 5, with loss of $200,000.

Milwaukee

MILWAUKEE, March 12.

DEMAND for machine-tools is improving, and while the volume of new business is still limited, production schedules are tending upward. The automotive industries are furnishing a more substantial market, although purchases as yet are hardly equal to the broad average of recent years at this season. On the other hand, manufacturers of agricultural power machinery, building and road construction equipment and general metal products shops are relatively good customers. Inquiry is generally active and continued betterment of demand is believed in sight.

American Metal Products Co., 1348 Burnham Street, Milwaukee, manufacturer of bronze castings, bearing metal, forgings, etc., has placed contracts for construction of a brick and steel foundry addition, 80 x 100 ft., to cost about $40,000 complete. Inquiry is being made for equipment, including a 5-ton electric traveling crane. Improvements also are being made in forge shop and rolling mill.

Wisconsin Iron & Wire Works, 1660 Booth Street, Milwaukee, is erecting a one-story addition, 42 x 62 ft., designed by F. H. Hollister, consulting engineer, 428 Wisconsin Avenue. An investment of $25,000 is planned.

Minneapolis, St. Paul & Sault Ste. Marie Railway contemplates installation of a new turntable at its terminal and division shops at Stevens Point, Wis., at a cost of $35,000.

Reliable Mfg. Co., 417 Lake Avenue, Racine, Wis., manufacturer of hot plates, toasters and other electrical devices, has plans by A. L. Flegel, architect, Baker Building, for a new two-story shop, 40 x 120 ft., to cost about $40,000 complete.

Bluhm Cab Co., 410 Washington Street, Wausau, Wis., will build a two-story garage and service shop in two units, 60 x 65 ft. and 37 x 60 ft., starting work April 15. The architect is H. C. Manecke, care of Wausau Iron Works.

Kerner Automatic Hoist Co., Milwaukee, has been incorporated with 1050 common shares without par value, to take over operation of Milwaukee Hoist Co., 128-132 Ferry Street. Company manufactures hoists for building materials and expects to materially increase its output. Officers of new company also are officers and principal owners of Kerner Incinerator Co., Milwaukee, with Mackey Wells as president. Theodore and Herbert Zetterlund, principals in old company, are directors of new company and will be active in management.

Vincent-McCall Co., Kenosha, Wis., manufacturer of bed and cushion springs, is completing work on a $35,000 factory addition, to be ready about April 1.

Miller Investment Co., Milwaukee, has engaged Martin Tullgren & Sons Co., architects, 9 Waverly Place, to design a three-story and basement garage, 100 x 150 ft., to be erected at a cost of $200,000.

Bergstrom Paper Co., 225 West Wisconsin Avenue, Neenah, Wis., expects to start work May 1 on construction of a new power plant costing about $75,000, consisting of a turbine room, 50 ft. sq., and a boiler house, 50 x 110 ft., requiring turbines of 2500 kw. capacity and three boilers. Engineers are Orbison & Orbison, 110 West College Avenue, Appleton, Wis.

Carl Bobke, 3030 Lisbon Avenue, Milwaukee, manufacturer of copper building supplies and other goods, is preparing to build a two-story shop addition, 35 x 78 ft., designed by A. J. Pietsch, 3515 State Street, local. Machinery requirements have not been decided upon as yet.

Jambor Tool & Stamping Co., 1261 Thirtieth Street, Milwaukee, has increased its capital stock from $100,000 to $200,000. Plant has been enlarged during past year and further additions are contemplated. A. L. Kaems is president and general manager.

Wisconsin Fabricating Co., 401 Pearl Street, Geen Bay, Wis., is establishing a new department for manufacture of tanks for gasoline and oil trucks.

Century Boat Co., Milwaukee, has been incorporated with $100,000 capital to manufacture standard type of boat designed especially for outboard engines. Manufacturing plans call for an output of 500 to 1000 units this year. Principals are represented by law firm of Quarles, Spence & Quarles, 490 Broadway, Milwaukee.

Western Metal Specialty Co., Thirtieth Street and Calhoun Place, Milwaukee, manufacturer of automotive and industrial sheet metal products and freight car heaters, is building addition to its plant and purchasing new equipment.

Cincinnati

CINCINNATI, March 12.

MACHINE tool sales the past week have been of fairly good volume and indications are that bookings the remainder of the month will be maintained at about the present rate. Unless there should be a radical change in conditions in the next two weeks, machine tool builders estimate that the volume of business in the first quarter of 1928 will show an increase of from 15 to 20 per cent over that in the corresponding period last year. This, however, does not mean that the industry in general in the Cincinnati district has benefited to a marked extent, because the improvement has been confined to a relatively small number of companies.

That the automobile industry should be productive of a liberal amount of machine tool business in the next few months is the opinion of several manufacturers. At least one important machine tool company has quoted automobile makers in the Detroit district on about $300,000 worth of equipment, practically all of which will be purchased the first half of this year. A Detroit company has ordered eight large lathes from a local builder.

In the railroad field, buying has not opened up, although there are a considerable number of pending transactions. The Atlanta & West Point Railroad, Atlanta, Ga., has closed for a 48-in. 500-ton bevel-end wheel press and a No. 3 axle lathe, while the National Transit Pump & Machine Co., Oil City, Pa., has bought a 42-in. x 30-ft. heavy-duty engine lathe.

Bids will be received by Department of Water, Dayton, Ohio, W. W. Morehouse, director, until April 2, for five motor-driven centrifugal pumping units for sewage service, including complete lubricating system, cast iron pipe, fittings, etc. Metcalf & Eddy, Statler Building, Boston, are consulting engineers.

Board of County Commissioners, Springfield, Ohio, is taking bids until March 26 for equipment for a sand and gravel crushing plant, including crusher unit, power belting, etc.

Guinn Mfg. Co., East Maple Street, Johnson City, Tenn., manufacturer of toys, novelties, etc., plans rebuilding portion of factory recently destroyed by fire, with loss close to $50,000 including equipment.

Southern Refrigerating Co., Bristol, Tenn., will build a new ice-manufacturing and ice cream plant, 75 x 104 ft., at Kingsport, Tenn., to cost about $75,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until March 22, for one surface grinder, one radial drill, one thread comparator machine, one bench saw, one hack saw, one power saw and one nibbling machine, circular 264; until March 23, for 1000 high compression pistons, circular 265.

R. W. Flack, city manager, Springfield, Ohio, is considering installation of pumping plant on South Limestone Street for city sewage, to cost $25,000. William Lucas is city engineer.

Stowers Lumber & Mfg. Co., Harriman, Tenn., will rebuild portion of hardwood mill recently destroyed by fire, with loss more than $40,000. Company proposes to purchase a 300-kw. generator with accessories.

Gillette Grain Co., Nashville, Tenn., will soon begin work on a grain elevator, 200 ft. high, with storage annex, 110 ft. high, capacity 30,000 bu., to cost about $100,000 with conveying, elevating and other equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are engineers.

International Harvester Co., Chestnut and Water Streets, Columbus, Ohio, has awarded general contract to W. F. Hendrich, 2777 East Fifty-third Street, Cleveland, for a new factory branch, repair, service and sales building at Springfield, Ohio, to cost about $100,000 with equipment. Headquarters are at 606 South Michigan Avenue, Chicago.

United States Engineer, Nashville, Tenn., will receive bids until March 22 for a quantity of annealed steel wire rope sheaves, etc., circular 321; until March 26 for one wire rope block, circular 322.

Tennessee Electric Power Co., Chattanooga, Tenn., will issue preferred stock in amount of $1,250,000, considerable portion of fund to be used in connection with expansion and betterment program, including additional power facilities and transmission line construction.

Cleveland, Cincinnati, Chicago & St. Louis Railway Co., Cincinnati, is planning construction of locomotive and car repair shop units at Bellefontaine, Ohio, to cost in excess of $120,000 with equipment.

C. H. Gosiger Machinery Co., 413-15 West Fifth Street, Dayton, Ohio, dealer in iron and wood-working machinery, is building a new office and warehouse at Bacon and McDonough Streets.

Pacific Coast

San Francisco, March 7.

PLANS are being arranged by Western Oil & Refining Co., Inc., West Eighth Street, Los Angeles, for extensions and improvements in refinery at Wilmington, in harbor district, with installation of equipment to double capacity of lubricating oil division and asphalt refinery; machinery will also be installed in petroleum refinery. Company has arranged for a preferred stock issue of $2,000,000, a portion of proceeds to be used for work.

Bids will be received by United States Indian Irrigation Service, Los Angeles, until March 28 for one 150-hp. boiler, and one 125-hp. boiler, with two superheaters.

Pacific Can Co., 290 Division Street, San Francisco, has superstructure in progress on one-story plant to cost about $400,000, of which approximately $300,000 will be used for machinery installation. H. L. Nishkian, Monadnock Building, is engineer and manager of construction.

Board of County Supervisors, Hall of Records, Los Angeles, is asking bids until March 26 for six water softeners for County farm. Plans at office of County architect, Hall of Records.

Arizona Edison Co., Yuma, Ariz., is arranging an extension and improvement program to cost about $90,000 including transmission line construction.

Longview Fibre Co., Longview, Wash., is arranging for expansion, to include erection of two additional units and power house, to cost more than $90,000.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for one-story machine shop and repair works, with garage, to cost about $125,000 with equipment.

San Joaquin Light & Power Corporation, Fresno, Cal., plans extensions and betterments in steam-operated electric power plant at Bakersfield, to cost $45,000 with equipment. Improvements will also be made in similar plant at Midway, to cost approximately $41,000 with machinery.

Southern Counties Gas Co., 810 South Flower Street, Los Angeles, has filed plans for a meter repair shop and mechanical works, with garage, 35 x 203 ft., to cost about $40,000 with equipment.

General Electric Co., Portland, Ore., has leased a two-story building to be erected by David T. Honeyman, 703 Prospect Drive, for a new equipment storage and distributing plant; two craneways will be installed. Entire project will cost about $80,000. Morris H. Whitehouse, Railway Exchange Building, is architect.

Los Angeles Pump & Supply Co., 500 East Eleventh Street, Los Angeles, will soon place general contract for a new one-story plant in Maywood section, to cost about $27,000 with equipment.

Pan-American Western Petroleum Co., Los Angeles, E. L. Doheny, president, is arranging an expansion and improvement program to cost approximately $10,000,000, to include additions to present plants and acquisitions of additional properties.

Kendall-Hazelett Battery Mfg. Co., 546 Skinner Building, Seattle, has plans for a new one-story plant for manufacture of electric storage batteries, to cost about $30,000. Samuel W. Kendall is head.

Armijo Union High School District, Fairfield, Cal., has authorized plans for a one-story vocational shop at local high school to cost about $25,000. Coffman Sahlberg & Stafford, Plaza Building, Sacramento, Cal., are architects.

Halcomb Steel Co., Syracuse, N. Y., has opened a warehouse at 1207 Santa Fe Avenue, Los Angeles, under direction of A. A. Westcott. Halcomb high speed and tool steels in rounds, squares and flats will be carried in stock.

Hillman & Cooney, Inc., 2439 Hunter Street, Los Angeles, has been appointed distributer of oil field products manufactured by Standard Machine Co., Torrance, Cal.

Canada

Toronto, March 12.

SALES of machinery and tools are keeping pace with the general improvement in manufacturing business. Specifications on some fair-sized lists are out and others are in course of preparation. While the greater part of the new equipment has been purchased for the Ford plant at Ford City and other districts of Canada, and the Oshawa works of the General Motors Corporation, buying continues for items needed to fill some vacancies in equipment.

Railroads are purchasing tools for replacement, and some large lists are expected for the Point St. Charles plant of the Canadian National Railways and for the Weston shops at Winnipeg of the Canadian Pacific Railway, both of which are undergoing extensions. Demand from northern Ontario, Quebec and Manitoba mining fields is still strong.

Plans and specifications have been received from C. M. Croft, Canadian Trade commissioner at Auckland, New Zealand for equipment for New Zealand Government Railways and Public Works Department, Wellington. These are open for inspection at Commercial Intelligence Service, Department of Trade and Commerce, Ottawa. Tenders should be addressed to chairman, Railway Board, Wellington, New Zealand; the Secretary, Public Works Supplies and Tenders Committee, Wellington, New Zealand; and Secretary, Stores Division, General Post Office, Wellington. Items for New Zealand Government Railways include four ventilating and heating units; four battery shunting locomotives and charging sets; two boring mills for car and wagon tires; one face grinding machine; four plain milling machines; rack feed; 13 electric rivet heaters; two sand cutting machines; two screening and mixing machines for molding and core sands; two pattern makers' sanding machines; four automatic electric melting sets; four pipe and tube bending machines; one shearing machine; one vertical boring mill for wheel centres; four circular saw benches; three oil-fired spring furnaces; four universal spot welding machines; two heavy-duty suspension spot welding machines; one standard spot welding machine; one oil reclaiming plant; seven a.c. arc welding sets; two paint spraying machines, tenders close June 25.

Public Works Department list includes one turbine complete with governor; one generator complete; one complete bearing shell; one set of temperature indicating coils, tenders close May 29. Supply, delivery and erection of one-pipe line, approximately 2464 ft. long and an extension to bus-pipe about 59 ft. long, tenders close June 25.

A company in which I. W. Killam of Royal Securities Corporation, St. James Street, Montreal, is interested, contemplates establishing a pulp and paper plant in Nova Scotia, which will represent an expenditure of between $10,000,000 and $15,000,000. Sully Brass Foundries, Ltd., Toronto, has purchased a foundry building on Wabash Avenue.

Public Utilities Commission, London, Ont., proposes extensions and improvements to waterworks plant, including installation of a 4,000,000 gal. water pump to be operated by 500 kva. synchronous motor, for which bids will be called about April 1.

Grimsby Foundry Co., Ltd., 23-27 John Street, Grimsby, Ont., is having plans prepared for an addition.

Commercial Motor Bodies & Carriages, Ltd., Guelph, plans a three-story, 40 x 48 ft. addition to its plant.

Aerocrete Co. of Montreal, 759 Notre Dame Street West, Montreal, contemplates building factory at Hull, Que.

Willis & Co., Ltd., 580 St. Catherine Street West, Montreal, plans addition to factory at St. Therese, Que., for manufacture of pianos, musical instruments, etc.

Dominion Trap Rock Co., Bruce Mines, Ont., has started work on construction of quarry to cost approximately $185,000. Equipment will be electrically operated.

Department of Public Utilities, Port Arthur, Ont., is arranging for construction of an addition to power plant to cost $40,000.

Plant of Black Donald Graphite Mine, Calabogie, Ont., including refining mill and other buildings, was destroyed by fire with loss of $150,000. Reconstruction will start immediately.

THE IRON AGE

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Hidden Defects in Iron Castings

Method of Localizing Shrink Cavities and Blowholes to Places Where They Can Do No Real Harm to the Casting

BY PAUL R. RAMP*

A HIDDEN defect in a casting is a defect which occurs at a point that is not machined; it is under the surface, where it is not discovered unless the casting breaks. These defects are often the cause of failures in service. They are more dangerous than defects which appear upon the surface, or defects brought to light in machining, because the latter can often be repaired and the casting made safe and sound for the purpose for which it was intended.

For this reason we believe that, if a casting is so molded that all defects will appear on the surface, or will be discovered during machining, there will be fewer failures in service. And many valuable castings will be saved, which today find their way to the scrap pile.

A solid casting made of good metal, with defective places so located as to indicate that they represent all the defects there are, is a much safer proposition, if welded or repaired, than many apparently perfect castings which contain hidden defects, that cannot be discovered until they cause the casting to fail in service.

It is vitally important that more consideration be given to the method of molding, with a view to making a safe casting, free from hidden defects. The old plan of molding a casting—with the idea of keeping the parts to be machined clean and free from defects, and allowing the unavoidable and other defects to locate where they will not be discovered—should be discontinued.

A mold should be made in such a manner that, when poured, all the defects, if any, will be brought to the surface, or to a point where they will be discovered in machining. Then they can be repaired and a better and safer casting can be produced.

Engineers and machine shops are to some extent responsible for failures in castings in service. They often refuse to accept a large, difficult casting, because of visible defects which could be repaired. Hence, to satisfy them, the foundryman makes his mold in such a manner as to make the casting pass visual inspection. This is sometimes at the cost of strength and safety, because defects such as shrink cavities and blowholes, which he cannot eliminate, he moves to a point where they will not be detected on inspection.

Most large, difficult castings have hidden defects, and some of them are dangerous.

When it becomes possible to have all castings X-rayed for defects, there will be a decided change in molding methods; more minor repair work will be approved by the engineers. It may be demonstrated that many apparently perfect castings contain hidden defects that are dangerous; but which, if they could be moved to a point where they could be repaired, would not affect the quality or strength of the casting. While we cannot look into a casting and see these hidden defects, we know they are there. If the foundryman knows how a casting has been poured, he also knows where there is a possibility of a hidden defect.

Locating Hidden Defects

TWO methods of molding turbine casings—shown in Figs. 1 and 2—form a good illustration of what we are trying to bring out. Fig. 1 is a partial cross-section of a mold, with the bottom of the casing cast up. This plan insures a perfectly clean flange. When this casting has been machined it would readily be accepted, by the inspecting engineers, as a desirable casting. When the flanges are cast down in this manner, all foreign matter and indications of shrink holes are absent from the face of the flange. No trouble is likely to be experienced until the casting is put under pressure. Then it is possible that leaks will be found in the bottom or body of the casting, caused by blowholes or soggy metal.

Insufficient metal pressure on the surface of the molds and cores is the cause of these defects.

On the right-hand side of Fig. 1 (and of Fig. 2) is a scale representing the pounds pressure per square inch, at various depths, that is exerted against the surface of the mold and cores, while the metal is in the liquid state. In Fig. 1 only 6 lb. per square inch of pressure is exerted against the cores and mold that form the lower portion of the body of the casing. This is not enough pressure to prevent blowholes or soggy metal at points indicated by *B* and *C*.

To produce a sound casting of this character at this point the metal pressure against the surface of the mold should be from 15 to 16 lb. per square inch. If the risers and gates on this mold, shown in Fig. 1, were built up high enough to produce the required pressure at this point, the pressure at the joint flanges would be increased to 26 lb. per square inch, which would be

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*Superintendent of foundry and pattern shop, Newport News Shipbuilding and Dry Dock Co., Newport News, Va.

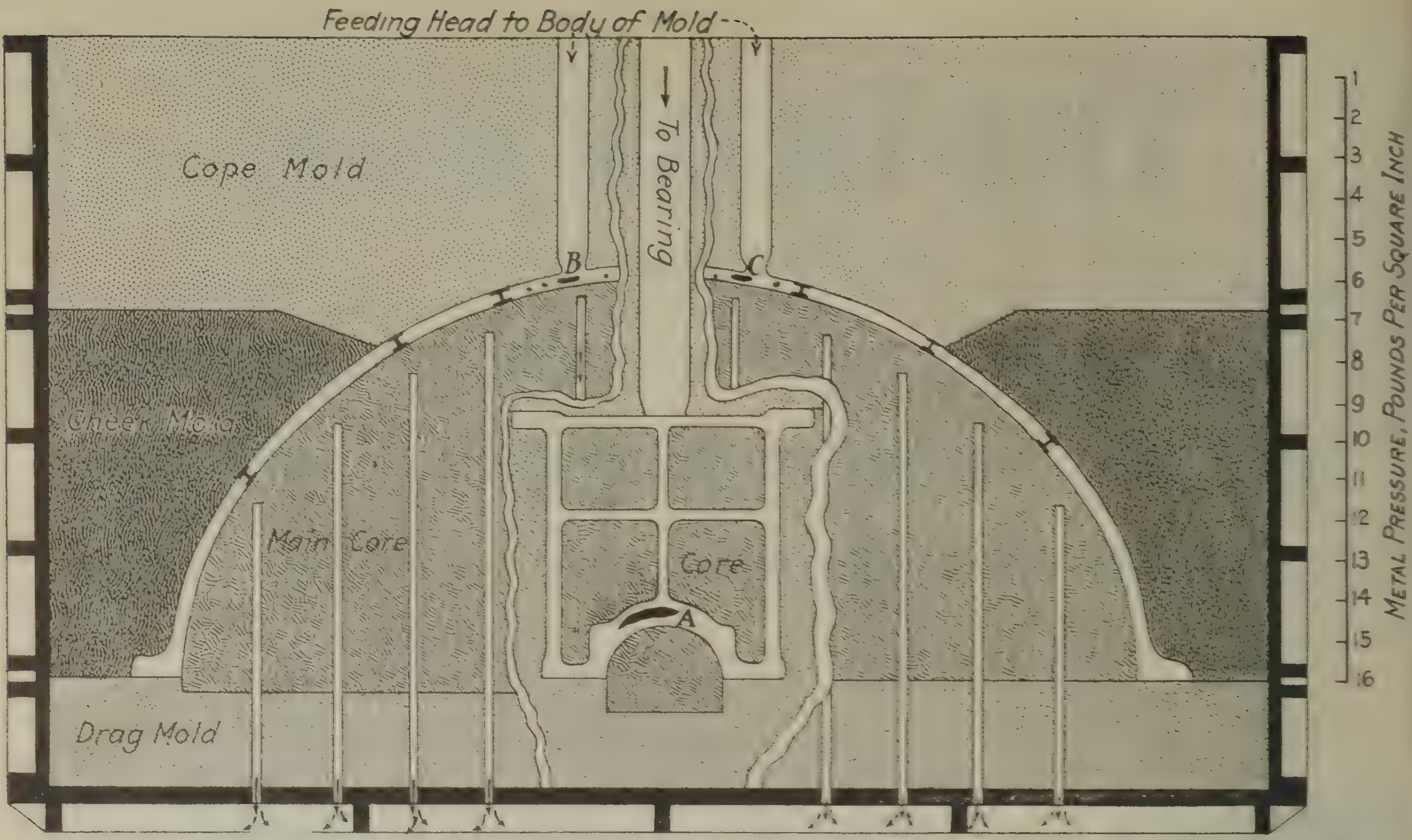


Fig. 1—Former Method of Casting Casing for Steam Turbine, with Flange Downward. Defects shown at A, B and C were caused by having insufficient metal pressure above the points indicated. Formation of defects at B and C was furthered by gases from the vents, working upward instead of downward, as intended

liable to strain the mold there and increase the thickness of the metal. Such irregularity in the thickness of the body is likely to create excessive internal strains in the casting, causing it to crack more easily under vibration.

Thus, while the plan of molding shown in Fig. 1 will produce a clean joint flange, it will produce also a very poor and unreliable metal in the bottom of the casting. When molding the casing in this manner it is impossible to provide the proper feeding heads for the heavy sections of the mold that form the bearings. The only feeding head possible is that shown in Fig. 1, which is a riser located directly over the bearing. But its only connection with the bearing section of the mold is through the thinner section of the housing. As a consequence, long before the bearing proper has solidified, the thinner section of the housing has become solid and shut off the supply of feeding metal from the risers to the bearing. The result is a hidden defect shown at *A*, which materially weakens the bearing. This defect is far more dangerous than a similar defect would be on the machined side of the bearing, where it could be detected and repaired.

Dense and Strong Metal Occurs Naturally at Lowest Point

It is well known that the metal in the lower part of the mold is denser, stronger and more free from blowholes and soggy places than the metal near the top of the mold. This is the result of the greater pressure exerted at the bottom while the metal is in the liquid state. This pressure is great enough in the lower parts to resist or counteract any action from generated gases to produce soggy metal. Consequently, sufficient pressure on the surface of the mold or cores is the best remedy for hidden defects.

This plan sometimes produces defects on the machined joints, as in case of the turbine casing, but these can be repaired readily. There should be no hesitancy on the part of engineers to accept such castings, when they realize that the method of molding has brought all defects to the surface, and at the same time has produced a sound, perfect casting at points where hidden defects have always existed, never to be discovered until the casting is put under pressure or fails in service.

Where the Gases Go

WHEN a turbine casing of this character is cast bottom up, as in Fig. 1, all of the gas generated in the cores must be forced down through the bottom of the mold. These vent passages are shown in Fig. 1. As the pressure of the metal against the cores is not great enough in this case, the casting is liable to have internal blowholes or soggy places at *B* and *C*. This follows, because, instead of the gas traveling down

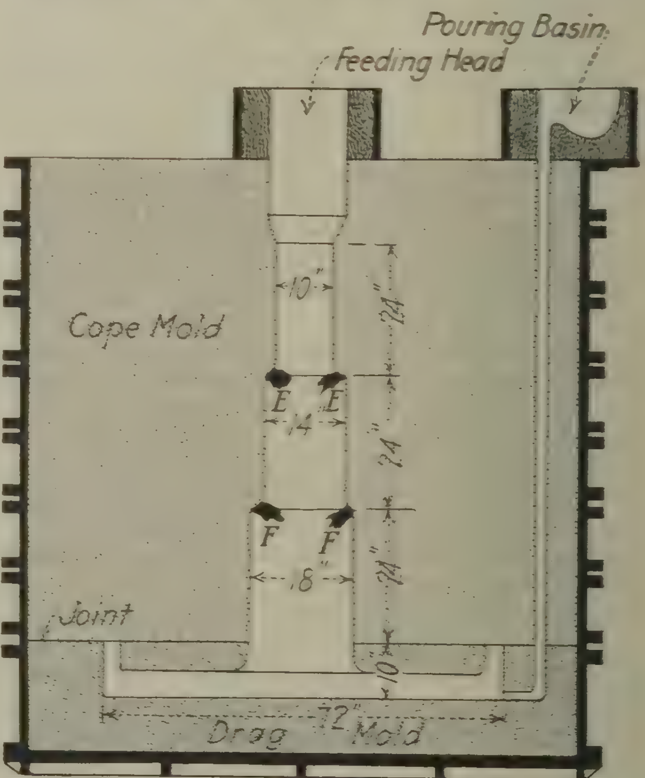


Fig. 3—Method Previously Used in Molding Shaft and Face Plate. This gave an excellent face to the plate, but defects at EE and FF produced a condition damaging to the strength of the shaft

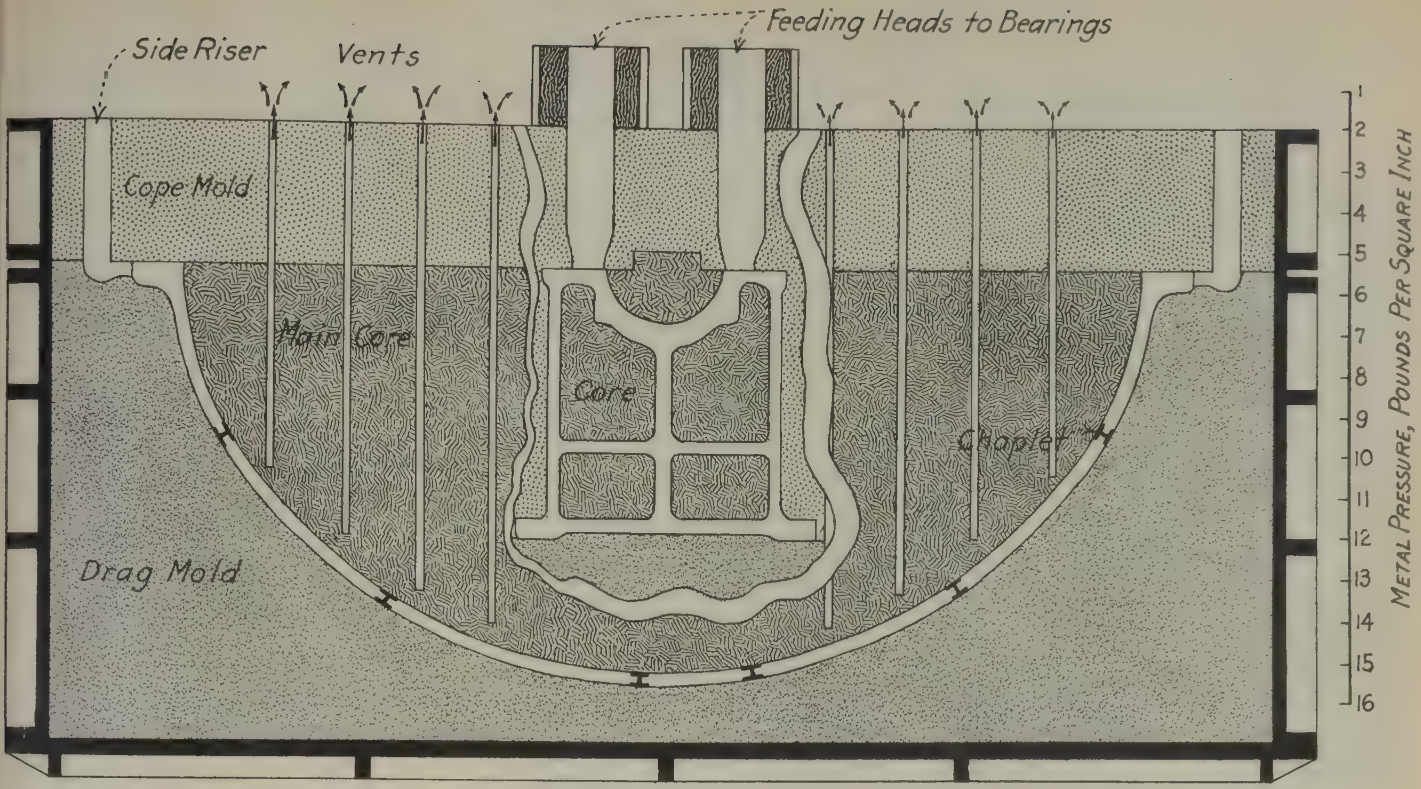


Fig. 2—Correct Method of Molding the Turbine Casing. With the flange placed upward, the defects forming, from whatever cause, will segregate themselves there. Extra thickness, to permit planing them off, may be allowed and welding will readily repair any holes remaining at that point

through the vent passages prepared for it, it will work its way through the metal against the insufficient metal pressure until the metal solidifies. This action produces blowholes, soggy metal and other hidden defects, which are the most difficult kinds of defects to repair.

A turbine casing cast as shown in Fig. 1 is liable to develop cold shuts. These are the most dangerous kind of defects, and can often be classed as hidden defects.

In producing iron castings of this character, it is important to remember that the height of the riser is of value only while the metal in the thinner sections is in the liquid state, except where the riser can be directly connected with a heavy section. It should then be kept open with a churning rod and additional hot metal added.

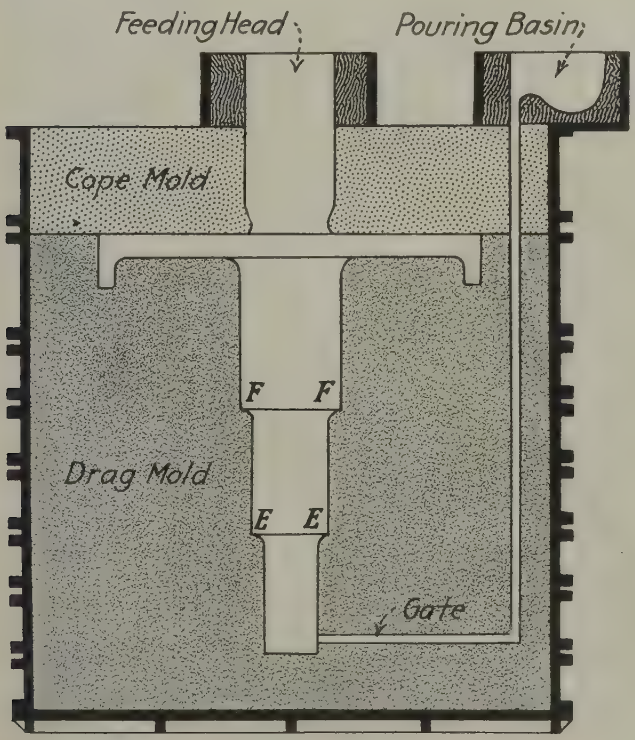


Fig. 4—Better Method of Molding the Shaft and Face Plate. Strength of the shaft is maintained, while extra metal put on the face to accommodate a poor top is planed off to a smooth surface

Avoiding Hidden Defects

WHEN a turbine casing is cast with the bottom down, as in Fig. 2, the gas generated in the cores takes its natural course upward through the vent passages prepared for it. In addition to this advantage, there is a pressure of liquid metal of 15 or 16 lb. per square inch exerted against the surface of the cores and molds at the lower point, instead of 6 lb. pressure per square inch, as when the bottom is cast up.

It is also possible to feed directly the heavy sections of the mold, such as bearings. This should entirely eliminate the danger of a hidden defect, such as shown in Fig. 1 at *A*. With the feeding head connected directly to the heavy section of the mold, it is possible by keeping the feeding head in a liquid state, by churning, to maintain an open channel from the head to the heavy section. This makes it possible to add new metal as the metal in the heavy section cools, and settles away from the upper surface of the mold. This insures a solid and safe bearing, as in any other heavy section where a feeding head can be used.

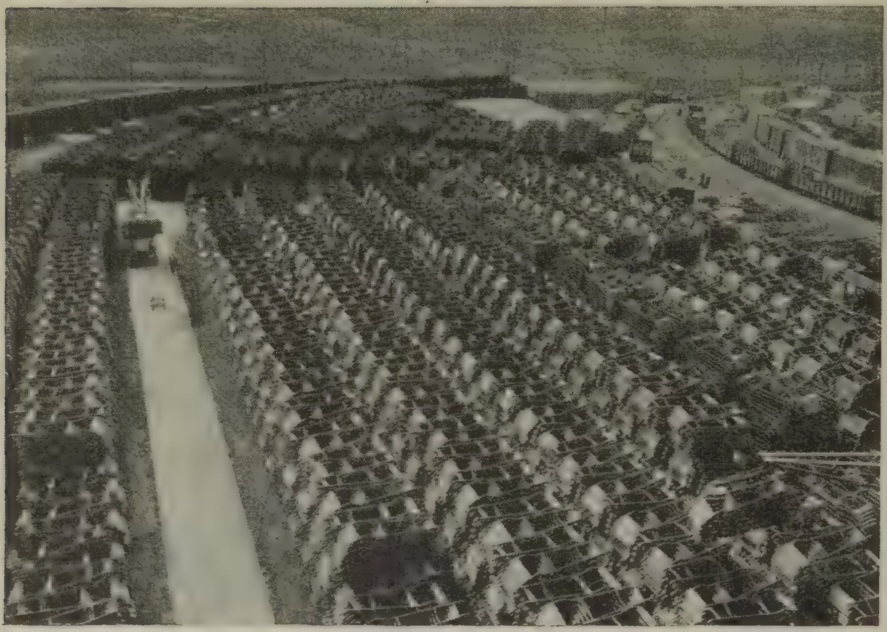
Often cavities are produced directly under the feeding heads, because the molder has neglected to keep this channel open long enough to add all the new metal required by the heavy section to make it absolutely solid. But a defect directly under the feeding head is never a hidden defect, and it can be safely repaired.

With proper care in preparing the molds, in providing adequate vent passages for carrying off the gas, and properly drying the molds and cores, defects on the flanges of turbine casings can be avoided, even though the flanges are cast up. This is done by the use of side risers, or feeding heads, providing the metal is of the right temperature. There is always less danger from a defect on a flange, cast up, than of a hidden defect and a leak in the body of the casing, with the joint flange cast down. And the defects in the joint flange can be safely repaired; but the defect in the body can seldom be safely repaired, except in case of a loose chaplet, which can be plugged.

In molding and casting large desilverizing kettles

(*Concluded on page* 841)

Makes Car Frames Automatically



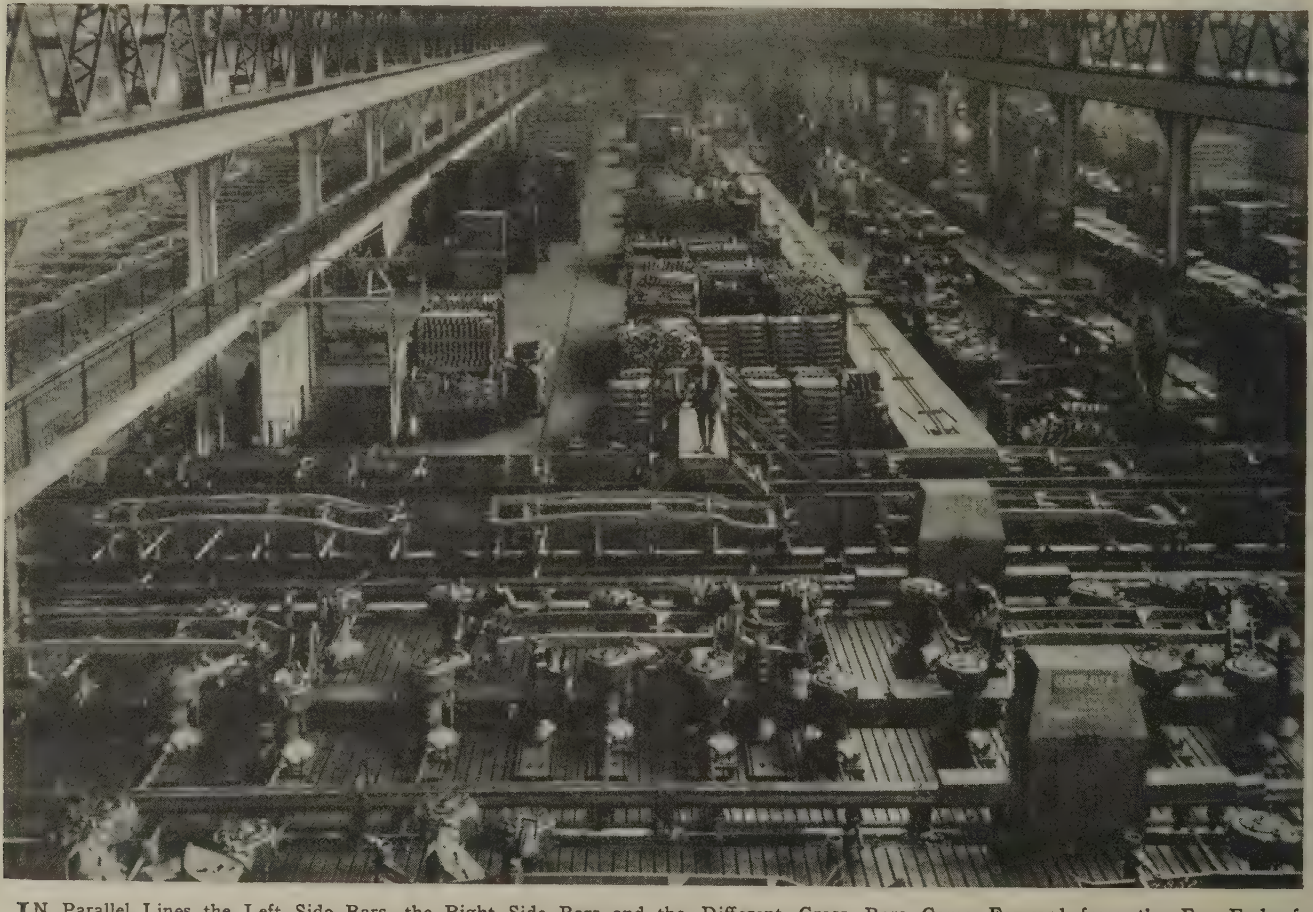
A. O. Smith Corporation, at Milwaukee, With What Is Virtually One Gigantic Machine Occupying an Entire Large Building, Can Turn Out Per Day 7000 Wholly Assembled Automobile Frames

APPLICATIONS of special machinery, both for heavy and light parts manufacture, and production control were the keynotes struck at a machine shop practice meeting of the Chicago section of the American Society of Mechanical Engineers, held at the Morrison Hotel, Chicago, March 14.

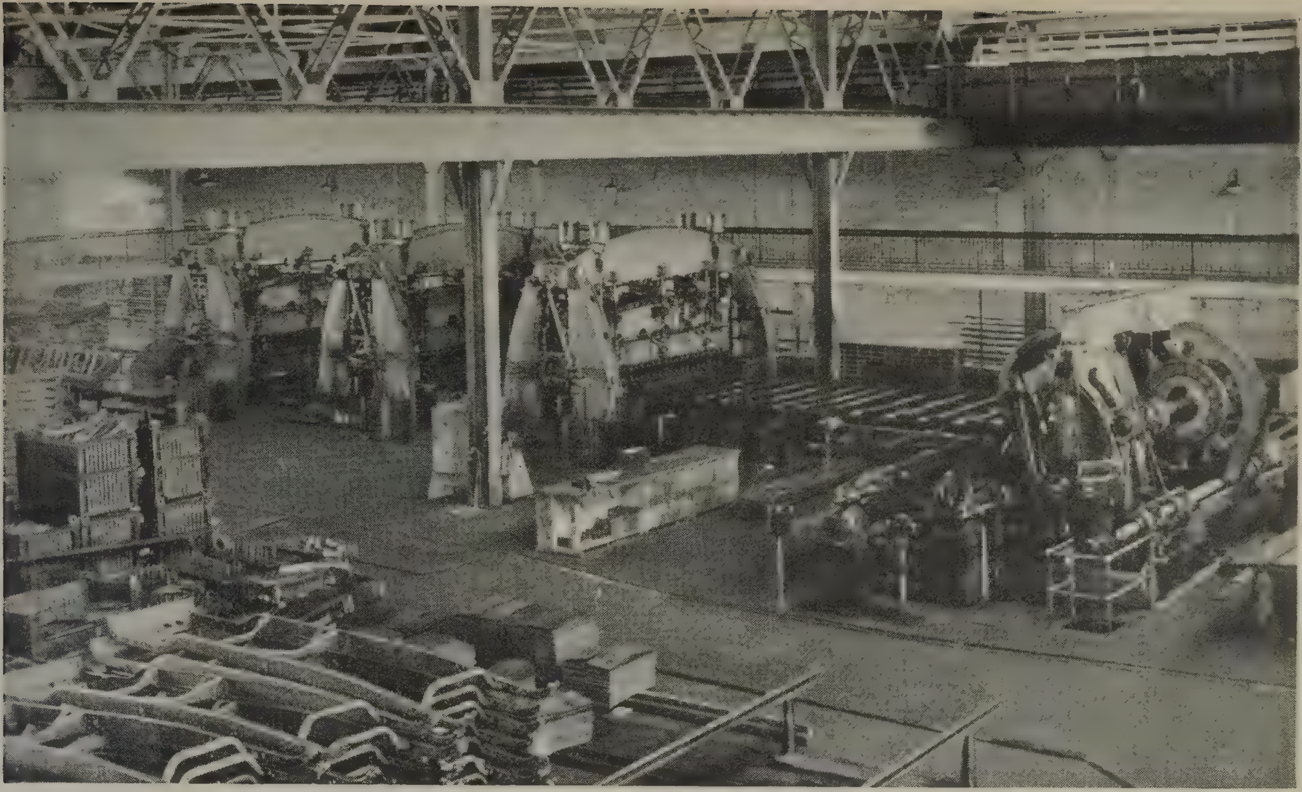
The history of the pressed steel automobile frame in this country dates back to 1903, said John P. Kelley, sales manager A. O. Smith Corporation, Milwaukee, who, in a paper entitled "Production of Pressed Steel Frames by Automatic Machinery," outlined methods employed in the frame plant operated by his company.

Counting 7000 frames as maximum daily production and 552 operations on each frame, the automatic machinery performs nearly 4,000,000 operations in a single day. The number of men employed to supervise this equipment is about 200, or less than one-fifth of the number that would be needed for equal production in a semi-automatic plant, one of which is also operated by the A. O. Smith Corporation. This machinery is tooled for individual orders calling for as many as 75,000 frames a year and has handled single runs of 10,000 frames. As many as 100,000 frames have been manufactured at a single set-up. A complete change of tools is accomplished in 6 to 8 hr.

The first unit in the manufacturing line is the automatic inspection machine. All side bars and most cross bars are made from strip steel, and the automatic inspec-



IN Parallel Lines the Left Side Bars, the Right Side Bars and the Different Cross Bars Come Forward from the Far End of the Building, Receiving Automatically on the Way Various Machining and Other Operations. In the foreground is the part of the machine to which these sub-assemblies of bars are delivered, progress now being transversely across the building. The parts are clamped together and fastened by rivets fed through compressed air tubes to the riveting guns



THERE Are Six Presses at the Starting End of the Side Bar Manufacturing Line. Besides the piercing, blanking and forming of the strip steel used, they give the offsets (in the plane of the strip) to provide for the "Kick off" over the rear axle and the front and rear end drops

tion machine rolls this steel to remove curvature, measures and stacks it in loads of predetermined sizes. The strips are measured for length, width, thickness and curvature, and all rejections are automatically thrown out into separate piles. The machine has a capacity of 900 strips per hour.

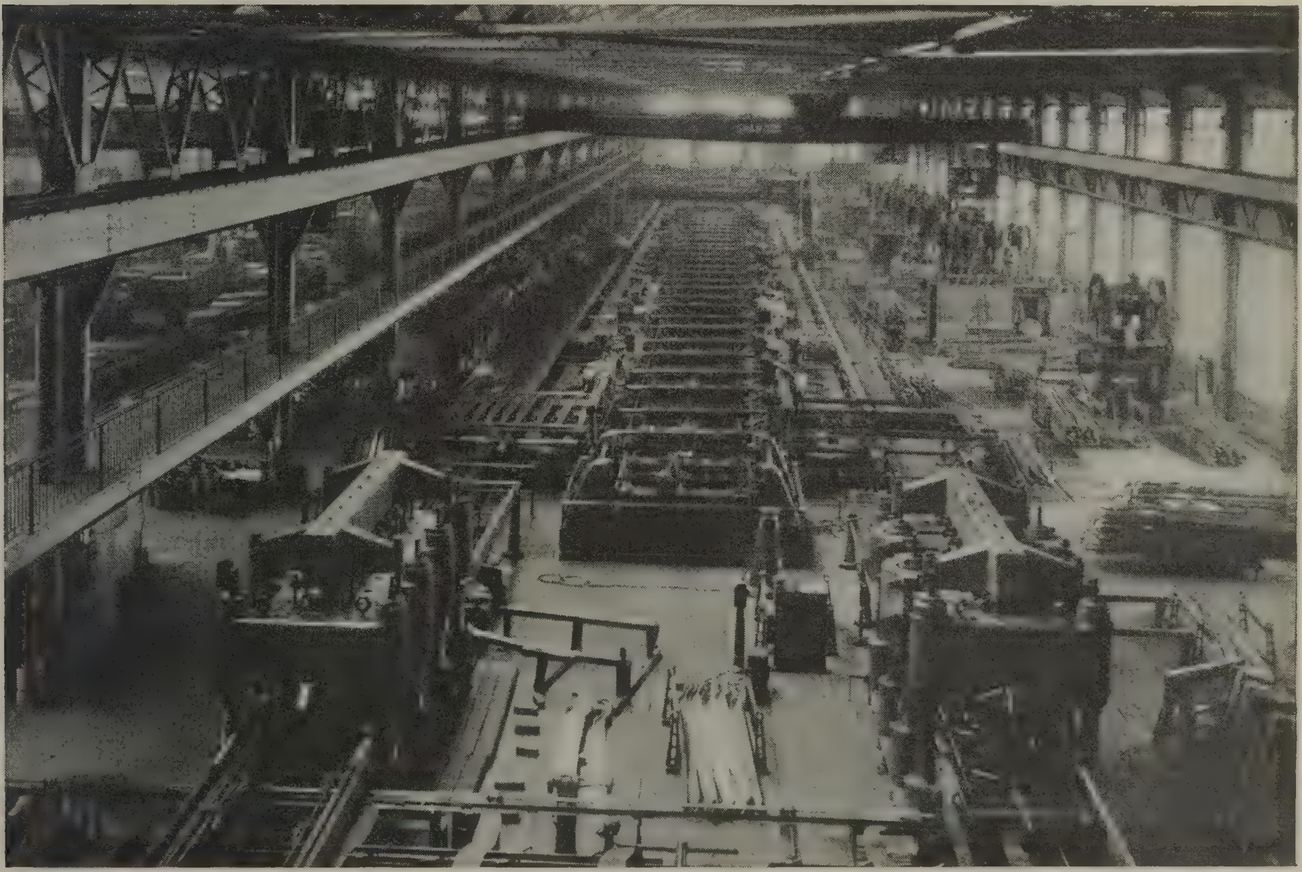
From the inspection machine the steel is conveyed by monorail crane to the pickling department. Loaded crates are carried through acid tanks, rinse tanks, alkali and oil, the last to give a sufficient protective coating of oil for the subsequent fabricating operations. The crew of this department consists of seven men in each shift, and the pickling capacity is 500 to 600 tons in 24 hrs.

Pickled steel for side bars is carried by monorail crane to the feeder for Unit No. 3, where the strips are automatically conveyed to the side bar manufacturing line. There are six presses in this line, all driven by a single 500-hp. motor, with the following order of operations:

1. Vertical offsetting of blanks for kick-up over rear axle; also for front and rear end drops.
2. Piercing left-hand bars.
3. Piercing right-hand bars.
4. Blanking left and right-hand bars.
5. Forming left-hand bars.
6. Forming right-hand bars.

The capacity of this line is 900 bars per hour.

The pickled steel for cross bars is conveyed by mono-



HERE Are Shown the Parallel Ways for the Right and Left Hand Side Bar Assemblies, Which Are Completed at the Far End. There are 19 stations at each of which there are special machines for various operations. The progressive shift from station to station of all this mass of metal is controlled by apparatus which spots every part to the precise position opposite the working tools rail cranes to Unit No. 4, which is the cross bar manufacturing and parts assembly line. There are four lines in this unit, each driven by a single motor of 100 hp. Each line consists of a blanking press, drawing press, automatic drilling machines and small power riveting presses—the latter for the completion of cross bar sub-assemblies, if required.

All holes that can be conveniently and correctly placed in the bars are pierced automatically in the blanking operation. The holes subject to distortion in the drawing operations are drilled with automatic machines after the forming of the bars. The end-lapping of cross bars is done in the forming operation.

Steel is fed to the four lines by automatic feeders and carried between the presses on reciprocating feed-

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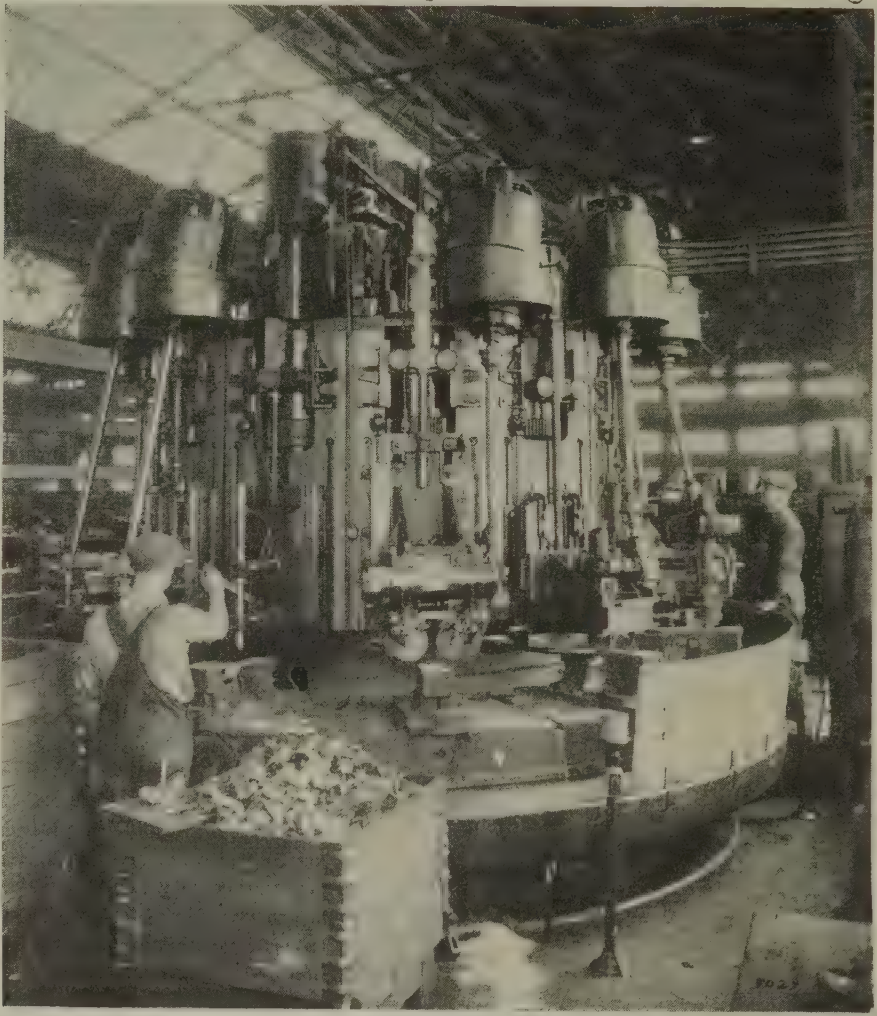
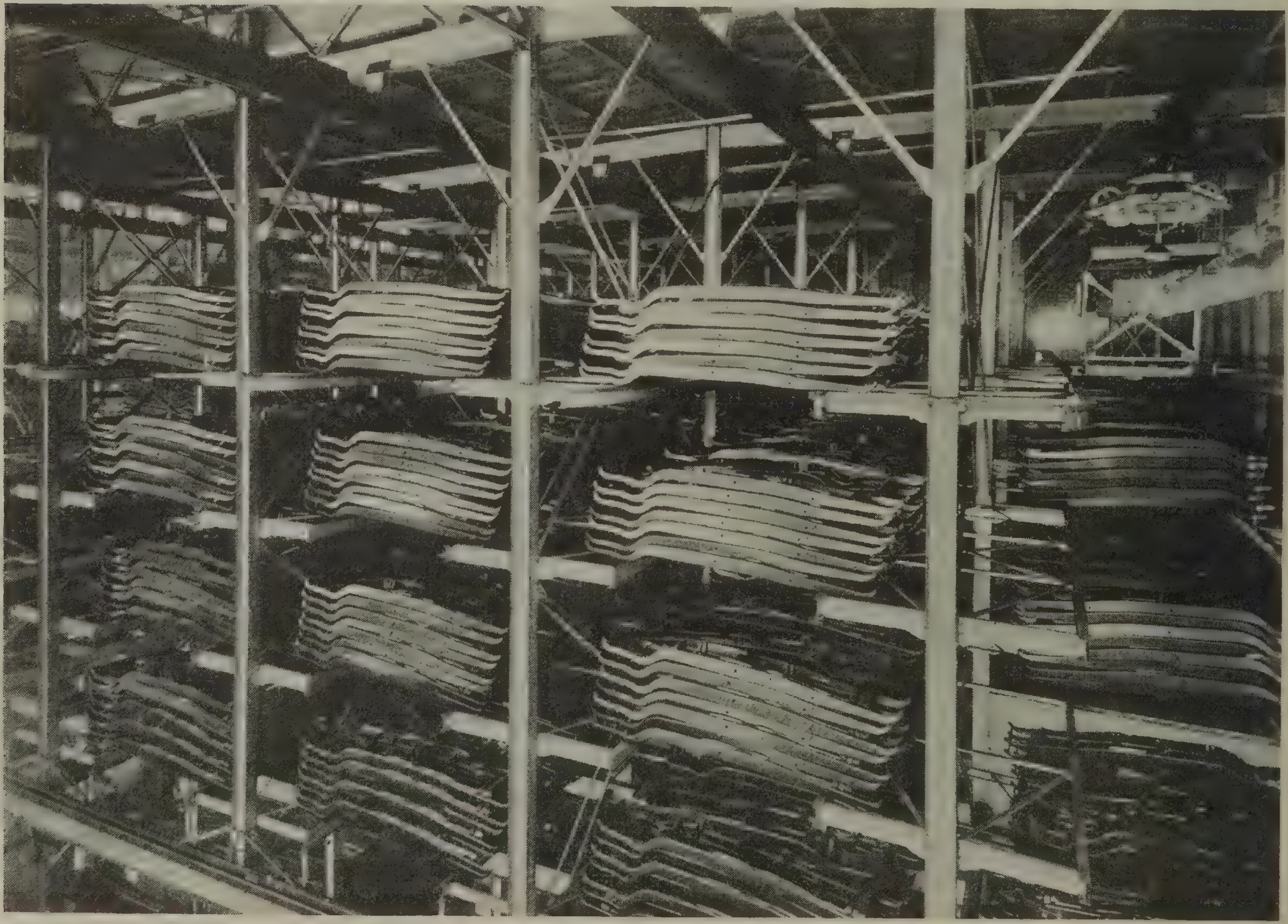


DISTRIBUTED Alongside the Sub-Assembly Section, (as indicated in the view on the bottom of page 795), Are a Number of Special Machines. One of them here shown is for finishing the spring hangers, which are attached at the proper station to the bars in process of assembly



BELOW Is a View of the Upper Part of a Lofty Storage Building, Which Communicates with a High Production Continuous Painting Machine. At the upper right may be seen the traveling monorail crane, which can be run over any aisle of the storage space, depositing groups of frames on the extending brackets

More Thinking Needed at the Top

Manufacturer Finds Danger in Delegating Too Much Authority — Courage Required to Make Necessary Changes in Policy

BY SAUNDERS NORVELL*

ONE night last week I had a most interesting talk with a manufacturer. He told me that he had always been successful in conducting a profitable business until the slump of 1921. That memorable year, in common with the rest of us, he was caught all spread out. He said that he did not get the worst of it until 1922, and then his concern almost went on the rocks. However, he secured financial assistance, sweetened up his loans at the banks and managed to pull through. Today his business, for its size, is one of the most profitable in the country.

As this manufacturer sat and smoked his cigar in an easy chair at the club, he smiled and remarked that no man's business education is complete unless he has been through such an experience—that getting a business on the rocks and then getting it off is one of the best commercial courses that any business man can receive.

"Now," said I, "tell me just what happened in your business. Give me some of the high spots." He smiled and replied: "First of all, we had a very high-priced sales manager. He was a good man and he was loyal to the concern, but he was just full of a lot of theories, and he never seemed to be able to get the idea into his head that finances had anything to do with the business. When we got into the 'hole,' he never took our condition seriously. When I told him about our financial situation, he always seemed to think that I could raise the money in some miraculous manner. He seemed to think that my talk to him about the real condition of our business was just for the purpose of heading him off from asking for a raise.

Sales Department Reorganized with Eye to Profits

"Now, of course," said this manufacturer, "this sales manager was an optimist. Every good sales manager should be an optimist. Then again, notwithstanding the fact that our concern was losing a great deal of money, he was getting his salary—and it was a large one—without any interruption whatever. Naturally, it is rather difficult for a man who has no stake in the business, and who is drawing a good salary, to fully sympathize with the management of a business when the losses are very heavy.

"Finally, after talking and talking to this sales manager, in an effort to get him to cut the suit in our selling expense according to our cloth, and after finding it was simply impossible to secure his cooperation, I decided to let him go, save his salary and take charge of the sales myself. When I announced this to my partners, they were very much opposed to it. They called my attention to the fact that this sales manager knew all the details of our business. He knew all of our business. He knew all of our salesmen. He knew all of our customers. To let him out at a critical time like this was almost suicide. 'All right,' I replied. 'If we are so dependent upon our sales manager, I am more than ever convinced that I should let him go and learn to be the sales manager myself.'

"I did let him go. I did take up the work of being sales manager. I did work about 12 hr. per day myself. At the end of six months, I knew our selling organization thoroughly. Somehow instructions going to salesmen direct from the president of the organization seemed to carry more weight. Somehow letters to customers on selling matters, signed by the president, seemed to carry more weight. Somehow, when I was in selling conferences with customers and with salesmen, we seemed to get better and quicker action than through the sales manager. As a matter of fact, by getting into the details personally, I was able to reduce the number of our salesmen, to cut down expenses, to advance the price of our product where we were selling entirely too low and, strangest of all, to increase the volume of our sales. Now, of course, I had known the business thoroughly in years past. I had grown up in it, but in later years I had become 'rusty.' Nevertheless, it did not take me long, when I got back into the game, to pick up the threads and to see a hole in the grindstone when the hole was there!"

Conservative Factory Superintendent Blocked Changes

Then he continued: "Having got our sales department reorganized and straightened out, I decided to devote practically all of my time for a few months to production. Our factory superintendent was one of the old school type. He constantly talked about old times. He was wedded to old methods. He had never left our factory for a single week for years. When I talked to him about new methods that were being adopted to reduce costs in modern factories, he shook his head and talked in a derogatory manner about these 'efficiency experts.'

"When I put in a large part of my time at the factory, even though I have never claimed to be a factory expert, common sense indicated that many improvements and changes could be made that would lead to economy. In many directions there was duplication of work. Many things were being done which, while interesting, were not profitable. We were in a condition where it was necessary for us to cut things down to hard pan.

"Again, just as in the case of the sales manager, I found strong opposition to these changes that would save money, on the part of our factory superintendent. He talked about the loyalty of our employees, about the splendid organization we had, about what a fine lot of men they were, etc. As a matter of fact, he had a fatherly feeling toward the whole organization. The workmen were his children. Even if some of them were pretty poor, he sympathized with them. When it came to a question of replacing them with others of more ability, he could not part with them for sentimental reasons. Yes," said my friend, "personal acquaintance in a business is a fine thing. Personality is an excellent thing. The human touch is great. However, all these things can be overdone when they lead to losses and inefficiency and when the business itself is going on the rocks because profits are too small and costs and expenses are too high.

Engineer Hired to Introduce New Methods

"I thought the matter out very slowly and carefully, and in the end I hired a man who knew nothing whatever about our business. He was, however, a trained engineer. He had worked in several modern plants. He had an analytical mind. He was not the type of man who thought the main object in life for a factory superintendent was to be popular with his employees. We let out our old superintendent, and then I worked with this new man in reorganizing our factory.

"Of course, at first there were attempts to block these changes. There were murmurings. There were threats on the part of a number of employees that they would quit. But somehow they did not quit, and after a while the foremen began to see that the new factory superintendent knew his business. When he put in changes, he would call his foremen together and ask what objections they had to the changes. If they could bring up sound objections, he would sometimes modify his plans, but usually, by the time the suggestions were made to the foremen, they were so well worked out that the new factory superintendent could answer every question and explain the advantage of every move.

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*President Remington Arms Co., Inc., New York.

"To make a long story short, at the end of six months this new superintendent had the respect, if not the affection, of all the foremen and workers in our factory. They saw clearly that he was not working for personal popularity. That did not seem to cut any figure with him. However, he was working to handle our factory in a manner that would lead to reduced costs and greater efficiency. At the end of the year this new factory superintendent was able to show us reduced costs in almost every department.

"Another thing that appealed to me in his work was the fact that he worked with records. He put everything on paper. It was not a case of carrying things in his head. He divided the work and the responsibility, so that, when it was necessary for him to leave from time to time, everything was not held up for his return. He organized things so that the factory apparently ran just as well without him as with him.

Success of Large Companies Due to Emphasis on Getting Results

"Too many manufacturers," said my friend, "are afraid to take hold of the business themselves. They are afraid of the amount of work that is involved. One trouble today with a good many manufacturers in the United States who are not making any profits is the fact that the owners—the head men—have delegated practically all of the authority, along with all of the work, to sales managers and factory superintendents. Now, these men are usually on fixed salaries. They get their salaries whether the business makes any money or not, and with this condition they are naturally not so keen to study improvements, economies and possibilities of making profit as direct owners who manage a business and who, by reason of their stock holdings, share largely in the profits or, on the other hand, suffer severely when there are losses."

"But," I inquired of this manufacturer, "how does it happen that so many large corporations in this country are doing very well indeed and are taking the business away from the smaller corporations, when these large corporations are managed almost entirely by salaried officials?"

"Well," said this manufacturer, "in almost all such cases you will find not only that these managers have arrangements by which they share in the profits of the business, but that there are comptrollers, auditors and accountants who are carefully checking the results of every department. One of the advantages of a large corporation is the fact that the personal element actually cuts so little figure that it is a question, not of personal popularity, but of results. The men at the top in these large corporations hardly know the men at the bottom, but they do receive regular reports giving the progress in all parts of the business. The executive committees of these organizations are influenced, not by the charming manners or pleasant ways of some department manager, but only by the results in his department. Just as soon as satisfactory results are not obtained in an organization, you can count on a change following very quickly. These great corporations as a rule are not expecting men who do unsatisfactory work to reform. They haven't time to bother with reformation. They work on the basis that there are plenty of good men to be found for the jobs if they will take the time and trouble to look for the good men."

Lack of Thinking at Top Main Weakness of Business

"What were the weaknesses you discovered in your business," I inquired, "when you took hold personally?"

"One of the main weaknesses," he replied, "was lack of thinking at the top of the business. By that I mean that the men I had running the business were too much immersed in details. They were cleaning up their desks every day. They were too much inclined to do a clerk's work.

"For instance, when I asked our sales manager to tell me the three most important things we should do in our business in the next year, he had to stop and think a long time before he could offer any suggestions. Now, don't you think that any first-class, thinking sales manager would know the three most important things that were needed to make the business prosperous? Then, when he did make suggestions, they were of a detailed nature. The same thing was true of our old factory superintendent. When I asked him to tell me the three most important things we should do in our business in the next year, he also immediately went into comparatively small details.

"Now, when I took hold of the business myself, in a very short time it became apparent to me that three things could be done that would help the business very much. Two of these things were in the direction of increasing our profits. The other important thing was in the direction of economies. I immediately went to work to do these three things and I finally put them over, but in concentrating my effort on these three things, there were, of course, a lot of little things that I neglected. I was working 12 hr. per day. I could not do everything. I could not see to everything. However, I just made up my mind that I would concentrate my efforts in certain directions, and the result in the end proved that this policy was wise."

Competition That Proved Mythical

One of the things that this manufacturer soon discovered when he went into the details about his business was that a very large part of his product was being sold at its figured cost. He was assured that competition made this absolutely necessary—to advance the price was out of the question. This manufacturer very carefully went into the entire situation. He decided that on this important line of goods he must do two things, viz., he must reduce the cost of production and he must get a slight advance in price. He accomplished both results. It was freely predicted that when the price was advanced there would be a large drop in sales.

As a matter of fact, while in the beginning there was some slight resistance to the advanced price on the part of buyers, at the end of the year he found that he had sold more of this line at the advanced price than ever before. In other words, the competition which seemed so serious to his sales manager was largely mythical.

The goods of this house had been well made for years. They had an established reputation. The trade was in the habit of buying them. Therefore, when the small advance came along, which amounted to next to nothing to the jobber, to the retailer and to the consumer, it was easily absorbed, while to the manufacturer this advance, coupled with a reduction in the cost of the goods, was a life-saver.

World's Largest Stainless Iron Chain

London, England, March 10.—Special Sheffield steel has already been employed in the work which is being carried on for the strengthening of St. Paul's Cathedral in this city, and two further interesting applications of this material have been decided upon.

One of them consists of a stainless iron chain which is to be embedded in concrete inside the dome in order to strengthen it and preserve its shape. This chain, which is being made at Brown Bayley's Steelworks, Sheffield, will be 450 ft. long, each link having a length of 15 ft. 4 in. and a width of 3⅜ in. The links are laid in four parallel lines. The chain will weigh 33.5 tons. It will be the largest chain ever made of stainless iron.

The second application consists of the use of large tie bars of stainless iron, which have previously been used in the repairs to the cathedral, for bracing the masonry together.

10-Stand Continuous Sheet Bar Mill

Straight-Line Layout Has Also Three Edgers—All Driven by Seven Electric Motors, Two Being Askew

BY ROGERS A. FISKE*

WHEN the Youngstown Sheet & Tube Co. first reached a decision to build a 21-in. continuous sheet bar and skelp mill at its Indiana Harbor, Ind., plant, thought was given to the necessity of installing additional power plant equipment to furnish part of the electrical energy required by the new unit. Through an ingenious method of electrical hookup, however, it has been possible to increase the power factor of the entire system by more than 20 points, so that the power factor is now close to unity. The greater effectiveness of power equipment thus derived has made unnecessary any expansion in the number of generating units in the power plant.

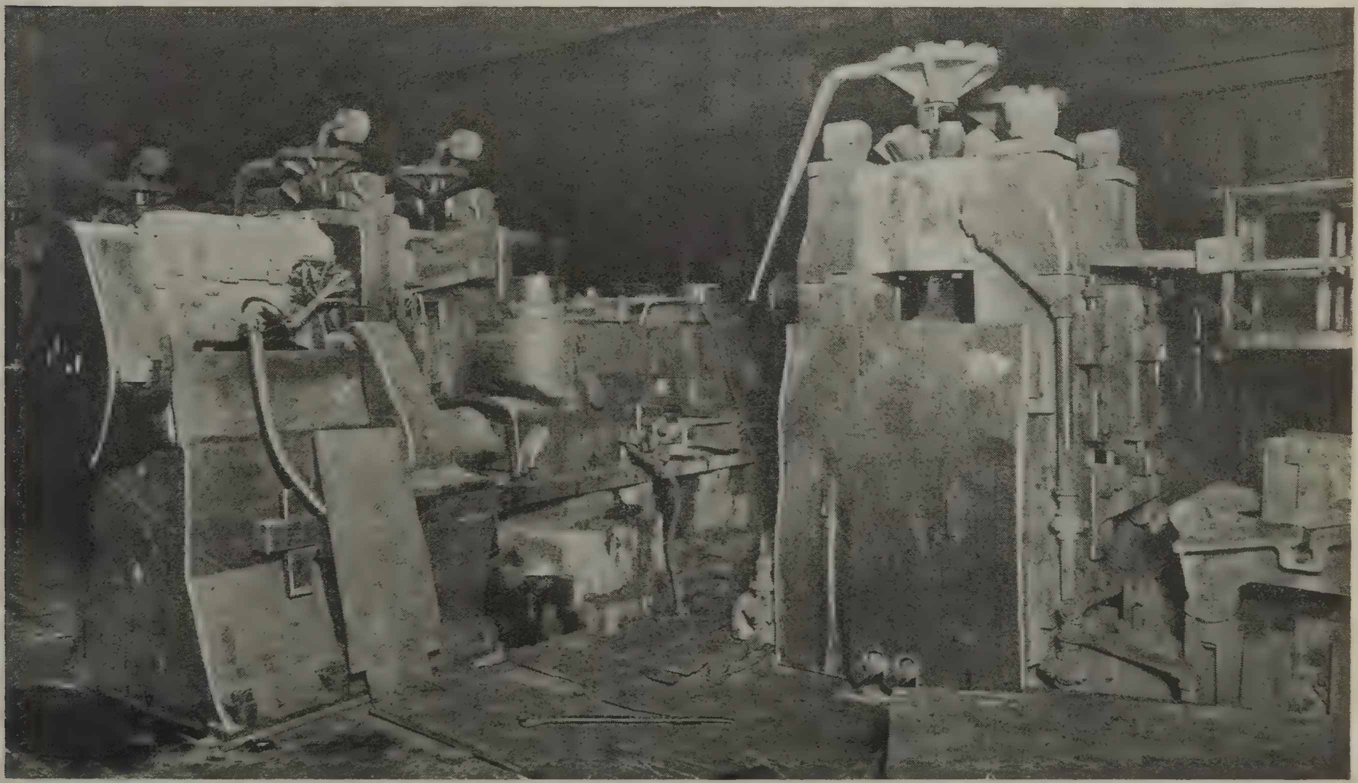
Prior to the installation of the 21-in. continuous mill there was in operation a 28-in. two-high reversing mill which stood in line with the blooming mill. The 28-in. mill was housed in a building 58 ft. wide. Billets rolled on that mill were transferred to the skelp mill furnace by rope-operated cars that traveled on a track. This 28-in. unit still serves the skelp mill, but billets are now delivered from the run-out table to the heating furnace by a direct conveyor line. This method has practically made obsolete the cooling table which formerly served this mill.

That the blooming mill might adequately meet the requirements of the new continuous mill, it was decided to place the latter parallel with the 28-in. mill and adjacent to it. Therefore the old building was widened to 85 ft., so that it now houses both the 28-in. and the 21-in. mills.

Formerly the bloomer rolled plate slabs and also blooms for the 28-in. mill. It now furnishes blooms and slabs for the 21-in. continuous mill, also. This arrangement called for special equipment to be installed between the blooming mill and the two bar mills. At the end of the run-out table from the blooming mill there has been built a slab transfer table, a 1000-ton up-cut, motor-driven shear; a run-out table; scales; a kick-off and slab pilers. The shear was furnished by the Mesta Machine Co., Pittsburgh, and the transfer and tables were built by the Mackintosh-Hemphill Co., Pittsburgh. All of this equipment was placed to one side of the old shear that was ahead of the 28-in. mill. Immediately beyond the old shear a transfer table was built by means of which blooms are delivered to the new 21-in. continuous mill.

The 28-in. mill was left undisturbed except for the installation of Mesta Machine Co. electric manipulators. At a later date electric screw-down mechanisms may be substituted for the present hydraulic devices. This mill now rolls steel into sections varying from 1¾-in. squares up to 2-in. x 9½-in. billets.

The Morgan Construction Co., Worcester, Mass, furnished the complete mechanical equipment for the 21-in. continuous mill, and the General Electric Co., Schenectady, N. Y., built the motors, converters and the electrical control system. Sections rolled include 6¼-in. to 16¾-in. skelp and standard sheet bars in all thicknesses. The feed table to this mill is equipped with roller bearings on the off-drive side. Bronze bushings are used on the drive side. All the drive gears have



Between the Roughing and Intermediate Sections Is an 18-In. Vertical Edger Which Is Driven by a 200-Hp. Separate Motor cut teeth and are run in an oil bath. Ahead of the No. 1 roll stand is an up-and-down-cut shear which is used for cropping ends or for the emergency of cobbles in the mill.

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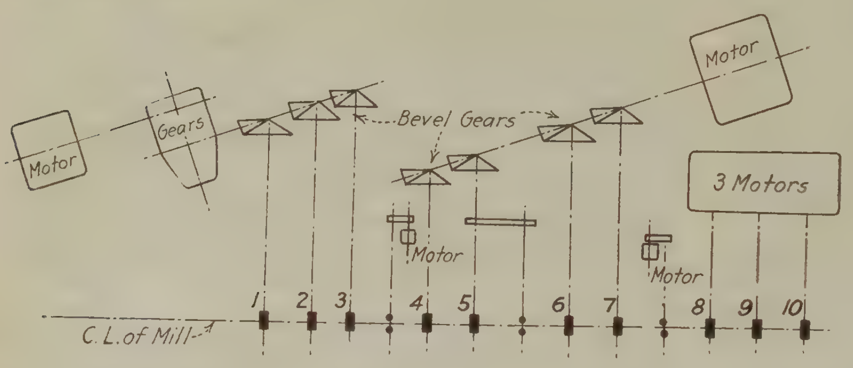
*Western Editor, THE IRON AGE, Chicago.

Make-Up of the New Mill

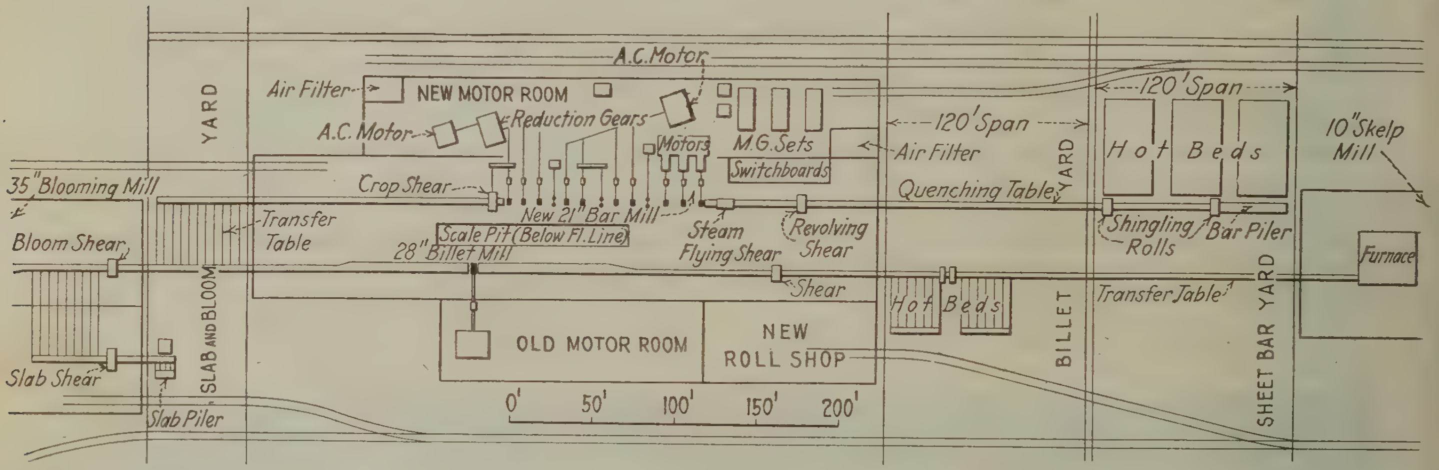
Ten horizontal stands and three edging stands comprise the new 21-in. continuous mill. Rolls on the first three stands, which make up the roughing section of this mill, are 24 in. in diameter. These are driven by a 3600-hp. motor through reduction gears and three sets of bevel gears. Following these stands is an 18-in. edger, which is driven by a separate 200-hp., 300 to 900 r.p.m., 230-volt motor. Stands Nos. 4, 5, 6 and 7 are known as the intermediate section of the mill. The rolls are 21 in. in diameter, and they are driven by a 4040 to 7500-hp. motor through four sets of bevel gears. A 16-in. edger located between stands 5 and 6 is driven from the same large motor. A similar edger, independently driven, has been placed between stands 7 and 8, or between the intermediate and finishing sections of the mill. The three finishing stands, Nos. 8, 9 and 10, are driven by separate direct-current variable-speed motors, each rated at 2000 hp., 86 to 165 r.p.m., 600 volts. The rolls in the last three stands are 21 in. in diameter.

As billets are delivered direct from the blooming mill to the continuous 21-in. mill, the question of conserving heat is important. The bars must reach the finishing stands hot enough to be properly worked. To further this condition it was found advisable to space all of the stands in the continuous mill as closely as possible. Their distance center to center is only a matter of some 10 or 12 ft.

In connection with the low-speed motors operating these stands, bevel gears have been used on the first seven regular stands. On account of the speed relations some of these gears are as much as 13 ft. in diameter. This is greater than the distance center to center of the stands. To avoid increasing the spacing between stands, a diagonal arrangement of the motor shaft was used, so that there would be no interference of the one set of gears with its neighbor. This arrangement in sketch form is shown in a diagram.


Motor
Gears
Bevel Gears
Motor
Motor
3 Motors
Motor
1
2
3
4
5
6
7
8
9
10
C.L. of Mill

GENERAL Arrangement of Motors and Gearing Driving the Mill (Left). Two large motors were placed "askew," to accommodate clearances


A.C. Motor
Air Filter
NEW MOTOR ROOM
A.C. Motor
Reduction Gears
Motors
M.G. Sets
Switchboards
120' Span
120' Span
Air Filter
Hot Beds
10" Skelp Mill
YARD
35" Blooming Mill
Crop Shear
Quenching Table
YARD
Transfer Table
New 21" Bar Mill
Bloom Shear
Scale Pit (Below Fl. Line)
Steam Flying Shear
Revolving Shear
Shingling Rolls
Bar Piler
28" Billet Mill
Furnace
Shear
Hot Beds
Transfer Table
SLAB AND BLOOM
OLD MOTOR ROOM
NEW ROLL SHOP
BILLET
SHEET BAR YARD
Slab Shear
Slab Piler
0'
50'
100'
150'
200'

LAYOUT (Below) of the New 21-In. Bar Mill, Showing Also Its Relation to the 28-In. Billet Mill, the 35-In. Blooming Mill (Off the Picture, to the Left) and the 10-In. Skelp Mill (Off the Right Border). Steel passes from blooming mill through the new mill without reheating. The blooming mill feeds, also, the billet mill and a plate mill (not shown)

A short section of table delivers the rolled product to a steam-operated flyer shear, which is used for cutting sheet bars and wide skelp. Then follows a motor-driven, rotary-type shear which is used for cutting the smaller sizes of skelp and other sections up to ⅜-in. x 15-in. Each shear has its own automatic measuring device.

Sheet bars or skelp, as the case may be, are then run out on a conveying table to a traveling bar piler located in the sheet-bar yard. The run-out table from the 21-in. mill extends across two storage spaces. The first is the billet yard and the second, in which are located the bar piler and three cooling beds, each 30 x 60 ft., is the sheet bar storage. Each of these yards is 120 ft. wide. The Morgan Engineering Co., Alliance, Ohio, furnished three 15-ton, 120-ft.-span cranes, one of which serves the billet yard and two the sheet bar yard. Sheet bars are loaded on cars by cranes for shipment to the tin mill, and skelp is loaded by the same means on transfer cars for delivery to the pipe mills.

Of special interest in the new mill is the fact that the last run-out table is equipped for "shingling" the bars so that they overlap before reaching the bar piler. This table is designed with inclosed spray boxes for quenching the sheet bars. Water for this purpose is drawn by three motor-driven centrifugal pumps from a 200,000-gal. capacity underground tank. Overflow water drains back to the tank and make-up is taken from the yard mains.

The distance center to center between the 28-in. and the 21-in. mills is 40 ft. The scale pit, which is located between the two mills, measures 21 x 28 ft. It is built of concrete and is lined with rails. A 20-ton Morgan crane serves both mills. Looper tables on the 21-in. mill are hydraulically operated. Roll turning shop space was obtained by building a 110-ft. extension to the 28-in. mill motor house, and rolls are stored between the feed tables to the two mills.

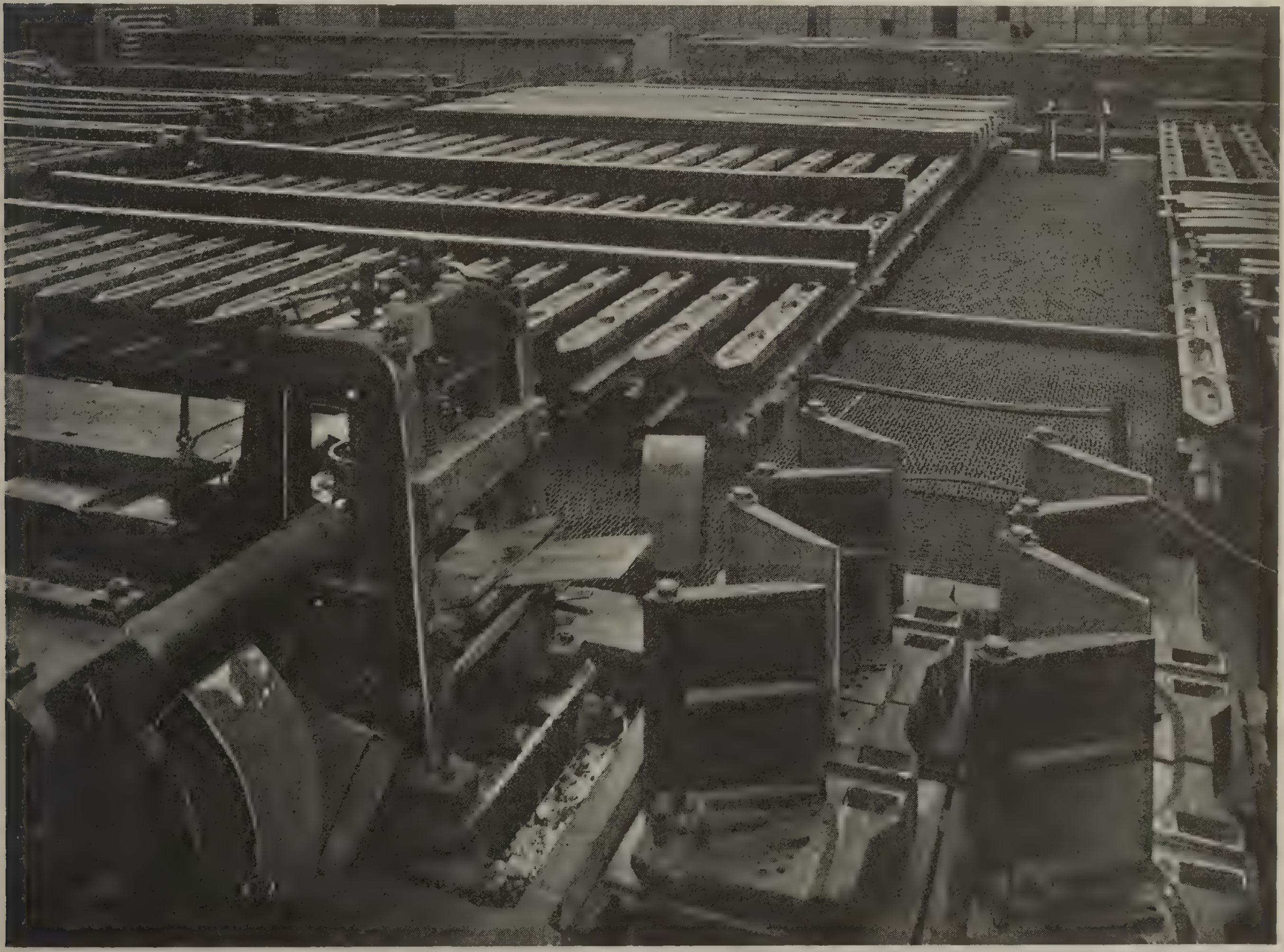
The central pulpit for the five main drives of the new mill is located above and just beyond the last finishing stand. It was built in the wall which separates the mill room from the motor building, so that the operators can readily see into the motor room and also con-

A 16-In. Edger Is Located Between Stands Nos. 5 and 6. A hinged looping table has been placed between this edger and the next intermediate roll stand

trol operations on the mill. Bench board controls are used throughout. Other pulpits for auxiliary motors are located in the incoming end of the building and at the first shear and opposite the intermediate stands. The 18-in. edger, looping tables and roll setting of first and second edgers are controlled from this last station.

Served by a 50-ton crane, the motor room is 308 ft. long and 47 ft. wide. The roof is constructed of tile made by the Federal Cement Tile Co., Chicago. The tile has been overlaid with cork insulation, which in turn is water-proofed by means of a composition roofing material. The walls are laid up with bricks, the inner surface being coated with aluminum paint.

Air filters made by Midwest Air Filters, Inc., Brad-



The Traveling Bar Piler Has Been Placed Under a 120-Ft. Span Crane Which Serves the Billet Yard ford, Pa., are mounted in the outer walls. Air which is used for cooling the motors is drawn through the filters by three Sturtevant motor-driven fans. These force the air through the motors, after which it is discharged into the motor room. The switch gear and the substation are located in the basement and the main switchboard panels are mounted on the motor-room floor.

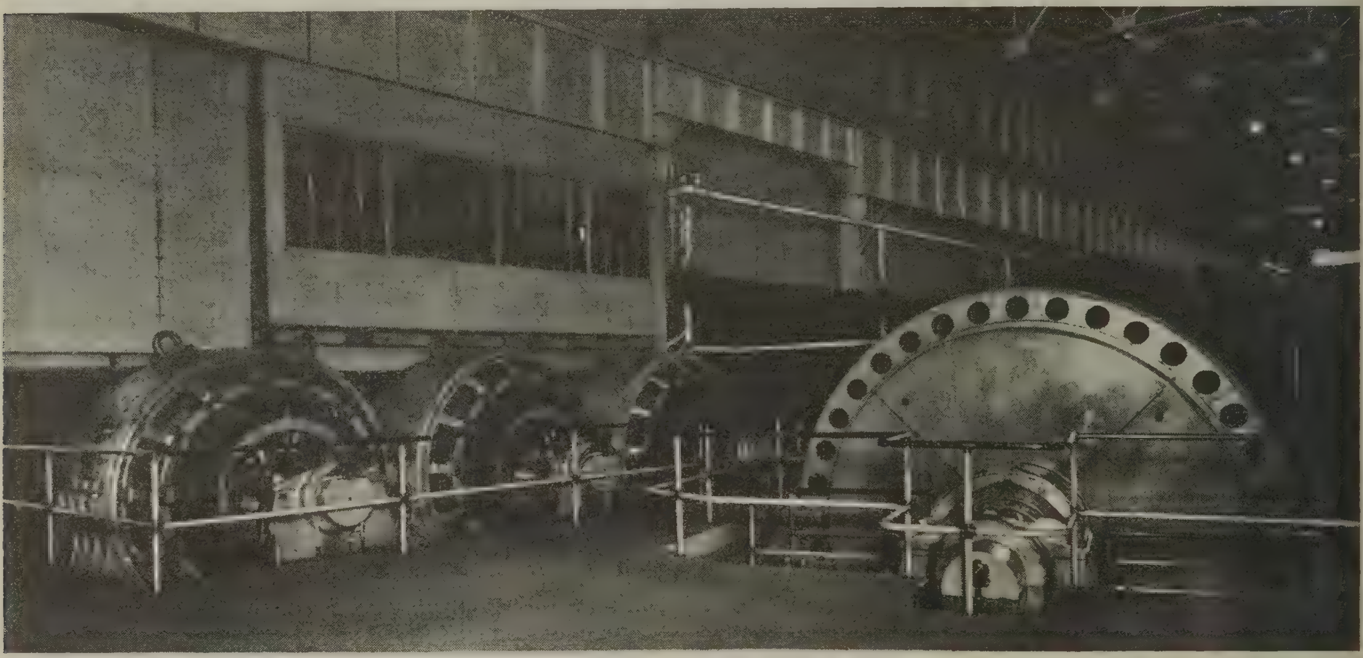
Electric Drive Units

Mill motor equipment consists of five units. The three roughing mills are driven by a 1940 to 3600-hp. induction motor provided with speed regulation from 156 to 290 r.p.m. The 5 to 1 reduction unit on this drive consists of a gear with 147 herringbone teeth and a pinion with 29 teeth. The pitch is 3.14 in. and the faces are 36 in. wide. Each of these three stands is driven through a set of bevel gears. The four intermediate stands are driven through bevel gears by a 4040 to 7500-hp. induction-type motor with speed regulation from 134 to 250 r.p.m. Each of the three finishing roll sets is driven separately by a 2000-hp., 85 to 165-r.p.m., 600-volt, 50-deg. C. rise direct-current motor.

This room also houses three 3400-kw. motor-generator sets of the two-generator type and three synchronous converters, each of which is rated at 1700 kw. The generators are all interchangeable, so that only one set of spare parts is kept in stock. Current is brought to the motor switch gear at 2200 volts, three phase and 60 cycles. Current of these characteristics is used in the two mill induction motors and in the three motor-generator sets.

One generator on each motor-generator set is connected direct to one of the three finishing mill direct-current motors through a Ward-Leonard control system. Speed regulation on the two large induction motors is accomplished by means of interconnection between the two synchronous converters and the three remaining direct-current generators on the motor-generator sets. This hook-up functions essentially as a Kramer drive.

Steel partitions between the motor room and the mill room are bolted in place, to facilitate removal when repairs are being made to the mill drive. Sheet metal housings over the bevel and reduction gears in the motor room are easily removed by the overhead crane.



Each of the Three Finishing Stands Is Driven by an Individual Motor, as Shown. The main pulpit is located above these motors. At right is the "askew" motor driving the four intermediate stands and the edger operated with them

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Materials-Handling Meeting to Be Held in Philadelphia

Papers and speakers for the national materials-handling meeting of the American Society of Mechanical Engineers at the Benjamin Franklin Hotel, Philadelphia, April 23 and 24, have been announced. At the morning session, April 23, Frank D. Campbell, chief engineer Eastern Steel Castings Co., Newark, N. J., will read a paper on materials-handling methods in his plant. A second paper, "Materials-Handling Features of the DeLavaud Process of Casting Pipe Centrifugally," will be read by H. A. Hoffer, Eastern manager United States Cast Iron Pipe & Foundry Co., Philadelphia.

That afternoon will be devoted to inspection tours, four trips being offered. One trip will be devoted to a study of interior plant handling in Philadelphia; a second, to interior plant handling in Camden; a third, to bulk exterior handling, and the fourth will be a visit to the plant of the United States Cast Iron Pipe & Foundry Co. at Burlington, N. J. At an informal dinner Monday evening addresses will be presented on certain interesting aspects and sidelights on the materials-handling problem.

A technical session Tuesday morning will be featured by three papers. G. C. Woodruff, assistant freight traffic manager New York Central Railroad, will read a paper on "Modern Handling Methods in Railroad Transportation." This will be followed by "Material Handling on Steamship Piers at Home and Abroad," by Willard C. Brinton, president Terminal Engineering Co., New York. A third paper, "Storedoor Delivery of Freight by Motor Trucks," will be read by F. J. Scarr of the Scarr Transportation Service, New York.

Two technical sessions Tuesday afternoon will be devoted respectively to interior handling and to bulk handling of coal, ore, ash, etc. The interior handling papers are two: "Handling Methods and Equipment in a Large Mail Order House," by H. E. Odenath, chief engineer Sears-Roebuck & Co., Philadelphia; "Pneumatic Handling of Materials," by Harry S. Parks of the Holly Pneumatic Systems, Inc., Philadelphia. A technical session Tuesday evening will be devoted primarily to mining problems. The outstanding paper, entitled "Materials Handling," will be read by Harold V. Coes, vice-president Belden Mfg. Co., Chicago, and past vice-president American Society of Mechanical Engineers.

Blast Furnace Practice in Germany

Ores of Various Characteristics Used in Burden—Some Good Coke Available—Methods of Charging Outlined

BY F. H. WILLCOX*

RAW materials used in the Ruhr District of Germany are assembled from Newfoundland, Sweden, Spain, Africa, and from the minette mines of France and Luxemburg. Perhaps 20 per cent of the raw materials originate in Germany. Fifteen years ago the furnaces were based on a larger proportion of minettes and the steel works used Thomas iron, i. e., 0.3 to 0.4 per cent silicon and 1.5 to 3.0 per cent phosphorus.

While the steel capacity of recent installations is largely open-hearth furnaces, usually tilting type, there remains a heavy preponderance of Thomas converter capacity, and the major part of the iron production is Thomas quality. This requires high-phosphorus ores. The basic iron for open-hearth work is very high manganese, up to 4 per cent, always over 2.5 per cent as far as I observed. I believe this is because they concentrate practically all their scrap into the open-hearth, where the pig iron charge is about 25 per cent, the remainder being good plant scrap from mills and pits, with a major part being rather poor light outside scrap.

So the high-scrap heat, with its low iron content, melts down with about a 1 per cent manganese, about the same starting point as with our 50 per cent hot metal of 2 per cent Mn. content open-hearth practice, and is tapped with the same residual Mn. This digression is to explain why they use high-manganese basic pig iron. Manganiferous ore is nil in Germany. The Germans import all of the manganese and conserve it, reusing open-hearth slag and using old ferromanganese and even spiegeleisen slag. This is concentrated, and so-called slag concentrate—running 12 per cent Mn—is recharged. Manganese ore comes from Sweden, Africa and the Near East.

Burdens Most Composite

With such wide sources of supply the burdens found at various plants are of the most composite character. One extreme case was a three-furnace plant, each stack with 17,000 cu. ft. capacity, producing 1500 to 1800 tons of iron a day and using 32 different iron-bearing materials.

An inland plant nearby used a burden made up of 40 per cent Wabana, 20 per cent high-grade lump minette, and 40 per cent roasted and sintered German spathic and limonite ores, together with the usual plant by-products. Going over toward Dortmund, one large plant was using 85 per cent Swedish magnetites, about 40 per cent sintered, with the remainder made up of manganese ore and plant by-products, while at an adjacent operation Wabana made up the major part of the burden. At Bochum, with four furnaces, the burden was made up of sinter, produced from a mixture of flue dust, Spanish, African and Swedish concentrates, all fines, mixed with from 8 per cent to 12 per cent coke braize and sintered on Dwight-Lloyd machines. The Swedish would correspond roughly to our Harmony concentrates in fineness, but the hematites were seemingly as fine as flour.

Low-Grade Native Ore Not Much Used

Germany has considerable ore reserves in Bavaria and southern Germany. They are low-grade and apparently have to be roasted before they can be concentrated. It has been found cheaper to import ores than to develop the low-grade deposits. It is interesting to note that the turn toward imported ores has given the Ruhr District a distinctly better grade ore to work with than was the case formerly. It gives a distinctly superior burden, as compared with our somewhat easily reducible ore burdens. The magnetites, sinters and probably Wabanas are not so quickly affected by the reducing influence of the furnace gas.

Their smoothly working furnaces have a practice which follows that of our Eastern district, where mixtures have been used for many years ranging from 20 per cent sintered ores and 80 per cent hematite, up to 85 per cent sintered ores and 15 per cent hematite, not to mention the 100 per cent sintered ore practice. Such burdens invariably give lower blast pressures, lower coke and greater regularity, the furnace taking heat—even on unfavorable lines—without serious tendency to stick and hang.

They use some ores in a lumpy condition which I think we would refuse to charge. In two plants we are designing for Germany we have to provide clearance in the throat for 14-in. lumps. It is surprising that the German furnaces work as well as they do. It is again surprising, at first glance, that, working with a burden naturally coarse, they show so much interest in rendering fine ores coarser.

I think this can be traced to two factors: First, the fear of fine ores is well founded because many plants where the tonnage has been brought up are blown by gas engines that cannot keep the volume up with much over 15 lb. blast pressure. Moreover, the production of Thomas iron, with its lower silicon, is more sensitive, and, regardless of furnace lines, combustibility of coke and slag characteristics, high blast pressure has to be avoided. Second, the Germans have materials that naturally have to be agglomerated or nodulized or sintered—the latter process being later in practice than with us. Some of the Spanish and Algerian ores are finer than any we have to contend with and are as dry as a bone, and then large quantities of undesirable grades, like pyritic residue and spathic ore, have to be treated.

Sintering African Ores Difficult

I was informed that it is not so easy to sinter fine African hematite ores as a mixture of hematite and magnetite. The tonnage in the Dwight-Lloyd machines drops off by 20 per cent. In this respect, I believe they check our experience with flue dust and a well prepared magnetite concentrate, such as is found at Chateaugay. However, their Dwight-Lloyds are not so well laid out as are certain of our sintering plants with respect to return of screenings for admixture with the fine ores.

They often have good preparation plants for the mixture of ores, the different components being weighed in correct proportion, put through a concrete type mixer before being charged on the machine. As compared with the rate of production here, they run slower on a tons per square foot per day basis. The quality of sinter is poor, compared with some of the American sinter, but it is so much superior to an admixture of fine hematites and magnetites that it is not difficult to see justification for the practice. Their cost is stated to be 35c. a ton.

Swedish shippers are said to screen out the lumps,

(*Concluded on page* 842)

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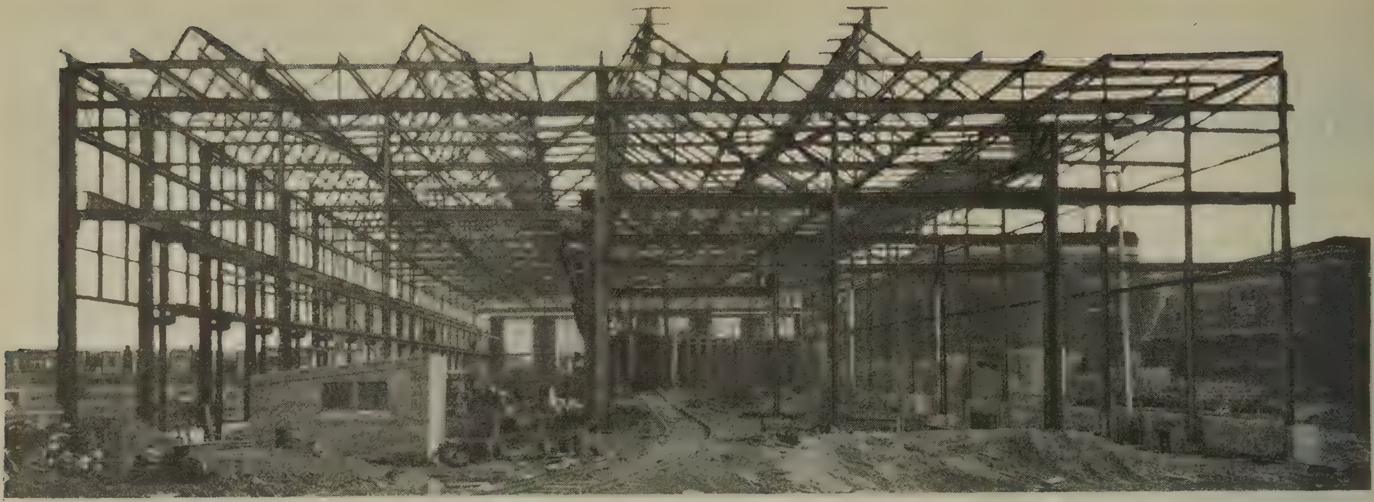
*Vice-president Freyn Engineering Co., Chicago. This is an abstract of an address before the Eastern States Blast Furnace and Coke Oven Association, at the William Penn Hotel, Pittsburgh, on Feb. 17. A second and concluding installment will be published in an early issue.



Thousand-Ton Structure Welded

Simplicity of Joints in Trusses and in Erection Details Eliminates Several Thousand Gusset Plates and Short Angles—11 Per Cent Saving in Steel Effected

A LARGE manufacturing building has been erected by the General Electric Co. at its West Philadelphia, Pa., plant, in which the structural steel was fabricated and the erection joints were made by means of metallic arc welding. The building, shown in end elevation in the view, is approximately 145 x 550 ft. A line of columns runs down the center, thus dividing the structure into two bays, the one to the left being equipped for overhead cranes.

Steel was fabricated in the Trenton, N. J., plant of the American Bridge Co., which also erected it. The structure weighs 989 tons, of which 745 tons passed through the welding shop. The remainder is made up of purlins, punched for angle-iron connecting clips, and erected by bolts. A design made for the more conventional riveted details was figured to weigh 1114 tons; thus a saving of 125 tons, or over 11 per cent, was made in the weight of steel.

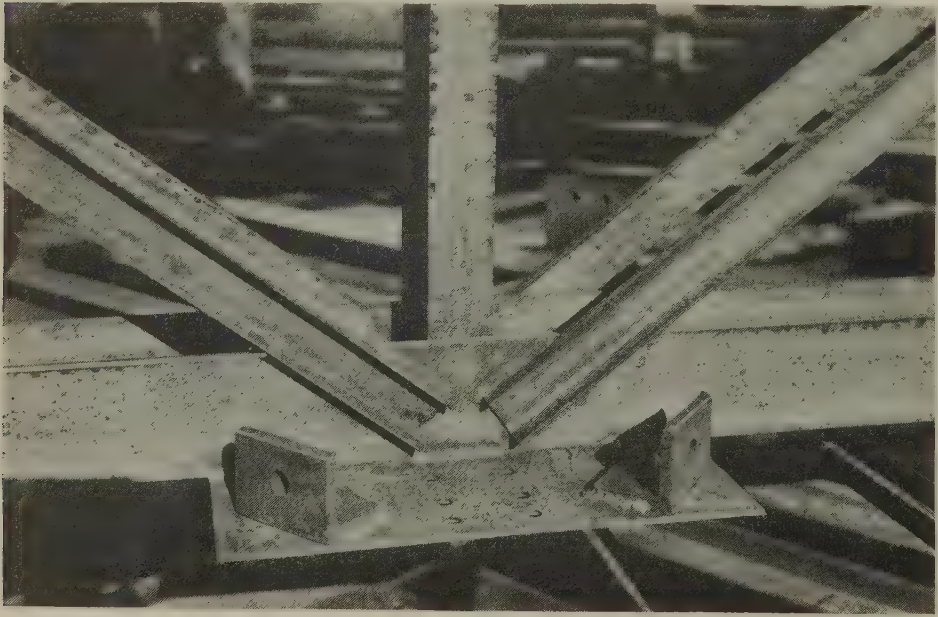
Prof. Frank P. McKibben, formerly of Union College but now consulting engineer for the owners, described the structure in detail at the Philadelphia Engineers Club, March 14. He said that this building is notable for its size, weight and the use of heavy roof trusses, but that it merely represents an orderly development of a new art. He has data concerning 35 buildings with frames either wholly welded or welded in great part; of 25 miscellaneous structures which have either been constructed or reconstructed and reinforced by welding, and 15 ships or barges which have completely welded main frames.

He believes that arc welding has a very promising future for steel truss work, because it requires less steel and is a cheaper method of fabrication, yet producing just as good (or even a better) a joint, and with no noise. The problems yet to be solved before the method is widely used are (a) revision of building codes and education of building inspectors, (b) methods of insuring the skill of welders, (c) educating the draftsmen and detailers, (d) devising proper shop fixtures and jigs and (f) adapting automatic welding machinery.

As indicated by the view, the truss is assembled without gussets, except for the lateral bracing, and the metal is symmetrically placed. All the welds are so placed as to act in shear. Previous tests had shown that a ⅜-in. fillet has an average ultimate strength in shear of 13,400 lb. per linear inch, and a ¼-in. fillet, 10,900 lb. A design stress of 3000 lb. per linear inch of ⅜-in. fillet weld was adopted, thus giving a factor of safety of 4.5.

Column details are very simple. As shown in the photograph, the loose base slab was usually grouted to correct level, and the Carnegie H-beam column with milled end was placed thereon. The single-angle bolt bracket is much more economical than a riveted detail requiring at least five nicely fitted pieces.

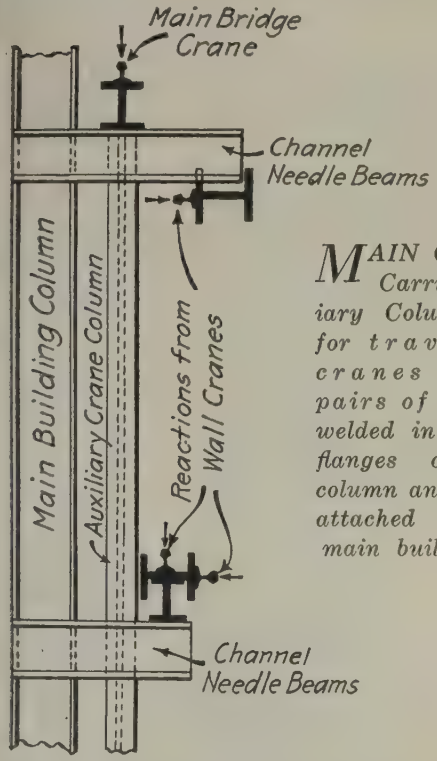
A 1½-in. cap plate was welded to the top of each column, and clip angles to land the lower chords of roof trusses and longitudinal wall trusses. These connections were punched for erection bolts, but were later welded to take all working stresses. It may therefore be seen



LOWER Panel Point of Roof Truss. Chords of main trusses are 8-inch Carnegie H-beams, placed with web horizontal. Verticals are 7-inch I-beams slipped between upstanding flanges, and edge welded. Diagonals are pairs of channels, welded to sides of chords. Gussets for horizontal bracing in plane of bottom chord are welded to lower flanges of bottom chord that one feature of the building is the extreme simplicity of all connections, both in the shop joints and the field joints, thus avoiding the expense of making, routing and assembling several thousand small clip angles, gussets and fillers, and reducing the fabrication expense more than the value of the steel saved.

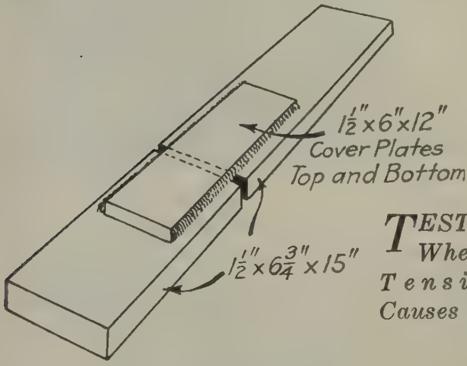
Two fundamentals of procedure control were also discussed by Professor McKibben, namely, verifying the skill of the workmen and testing the completed structure. The five workmen who welded the trusses in the Trenton shops were required to make test pieces. These developed the following strengths in shear:

Welder	Bars, Lb. per Inch	Welder	Bars, Lb. per Inch
A	13,267	D	11,551
	12,070		11,158
B	12,785	E	10,566
	12,063		10,137
C	12,057		
	11,393		



MAIN Crane Beams Carried on Auxiliary Columns. Beams for traveling wall cranes supported by pairs of channels, welded in the field to flanges of auxiliary column and to brackets attached to web of main building column

"While the two specimens made by any individual welder showed remarkably close results, the variation between the poorest and best welder was about 22 per cent of the lowest," said Professor McKibben. "The lowest values, however, were practically the same as those used in design. Taken in connection with other tests and accomplishments of these five shop welders, it is believed that these few specimens represent shop variations. These are no greater than exist in concrete tests, or in riveted-joint tests."



TEST Piece Which, When Pulled in Tension Machine, Causes Welds to Fail in Shear

To test the completed trusses, three were taken and erected on cribbing with the regular cross bracing. Then the center was loaded to twice the maximum design load. The deflection measured 0.89 in. (less than the calculated 0.97 in., because of continuity at all joints). When the load was removed, the deflection returned to zero, which showed there had been no permanent set in any member or slip at any joint.

J. H. Edwards, chief engineer American Bridge Co., in discussing Professor McKibben's paper, said that, after some three years' study, experimentation and practical application, he would have no hesitation in accepting a welded structure if it were designed for the purpose by competent engineers and fabricated and erected by skilled workmen.

Fabrication of the trusses for the West Philadelphia building required a minimum of shop preparation. Five welders did the work, each using a "single-operator motor-generator set." Two of these sufficed for the erection. In the shop a series of 18-in. I-beam skids 24 ft. long were placed about 9 ft. apart, blocked level, and connected together with a steel bar, welded to each beam. The positive terminal of each welding machine was bolted to the web of one of these beams. The large trusses were put together by first laying the bottom chord against a long 8 x 8-in. angle, welded to the I-beam skids and bent to the proper camber. Then the top chord was spaced and clamped to the skids. Finally verticals and diagonals were clamped to the chords with C-clamps, and the joints were welded. All trusses were assembled and welded lying flat on the skids.

Column Foot Saves Five Pieces for Every Foundation Bolt

The 206 skylight trusses were nearly alike and were assembled in jigs. These fixtures were made by tack-welding flat plates to skids, then welding small clips to the plates so that when the truss members were laid against the clips the truss was properly assembled for clamping together. It is then either welded in place, or removed for welding while another truss is being assembled.

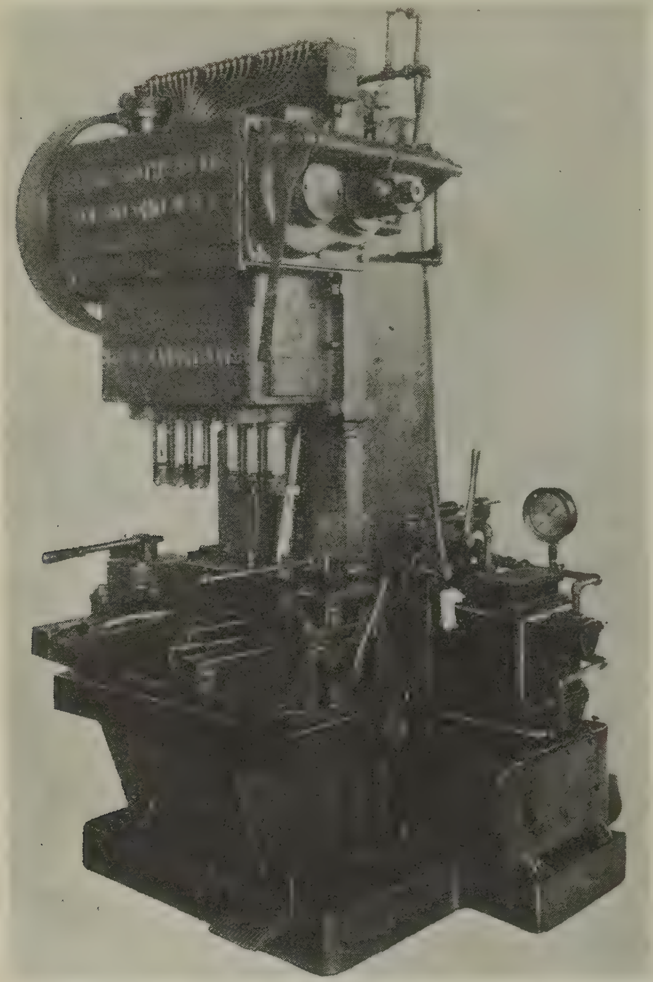
Fabrication and erection took nearly two months.

M. E. Hibbs, representing the Philadelphia Bureau of Building Inspection, said the principal obstacle in his mind preventing a readier acceptance of welded structures was the supposed difficulty in distinguishing a good weld from a bad one after it has been made. Primarily that would be the first duty of an inspector of such structures. But after he had visited a welding school and had had an opportunity to compare the work of beginners, apprentices and expert welders, he found that quality was as easily discernible in such joints as in any other of the more familiar varieties. He was of the opinion, however, that some shapes are more adaptable to welding than others; consequently the Philadelphia regulations now include a provision that certain shapes may be rejected by the chief inspector.

Multiple-Spindle Cylinder Boring Machine with Hydraulic Feed

Simplicity of design is a feature of the new multiple-spindle cylinder boring machine with hydraulic feed which has been added recently to the line of Baker Brothers, Inc., Toledo, Ohio. The machine is built with fixed centers to individual requirements, and can be furnished for two, four, six or eight-cylinder blocks.

Spindles are of forged high-carbon steel and are of maximum diameter permitted by the center distance of the bores of the blocks. Two adjustable taper bearings of ample size are located at the lower end of the head, as close to the start of the cut as possible. The bearings are long and are accessible for adjustment when necessary. It is claimed that machines of this design are being used by a number of companies without any support for the bars, boring both roughing and finishing cuts with a guaranteed accuracy. This, it is pointed out, means greatly simplified tool set-up.



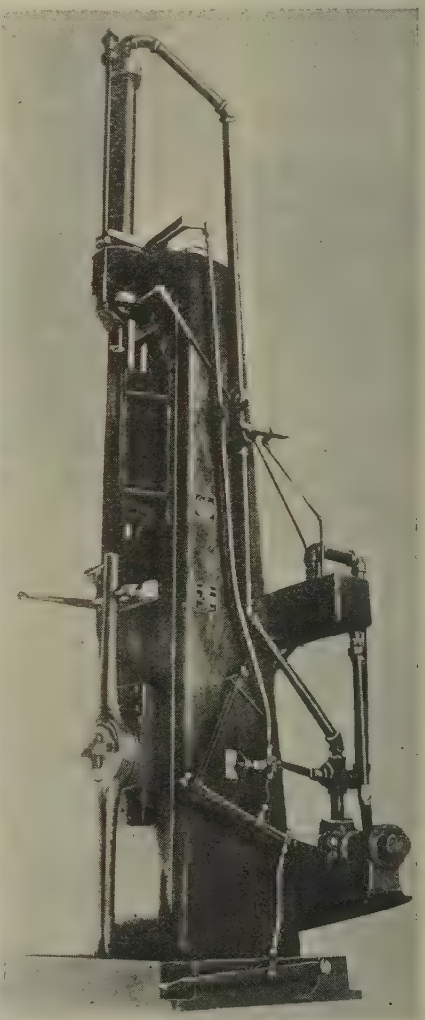
The Hydraulic Feed Cylinder Is Mounted at an Angle So That There Is a Thrust Component Which Holds the Table Rigidly Against the Ways, Assuring Positive Alinement

Feed of the table is actuated by an Oilgear hydraulic pump, which provides rapid advance to the work, automatic engagement of feed at a predetermined point, rapid return, and automatic stopping at the end of the cycle of the machine. The position at which changes from rapid traverse to working feed take place may be made conveniently, the changes being by means of flat cams which may be set at any position. The rate of feed may also be adjusted readily. The rapid traverse and quick return are constant.

The table is equipped with taper take-up gibs and has an extra long bearing on its ways. Feeding of the table is accomplished through the hydraulic cylinder which is mounted on a pivot at the top of the main frame of the machine. This cylinder is arranged at an angle and it is stated that, in addition to feeding the table up there is also a thrust component which at all times holds the table rigidly against the ways of the machine, further assuring positive alinement and accuracy. Careful analysis of conditions is said to have been made in determining the proper angle to give the results desired.

Either belt or motor drive arrangement can be furnished. The main drive to the spindles is through hardened alloy-steel gears with the shafts mounted on ball bearings. Speeds for the spindles are designed with consideration to the size of bores of the cylinder block to be machined. Mechanical start and stop of the spindles is provided by means of a conveniently located lever. Feeds are variable through a wide range through the Oilgear pump. An automatic lubricator provides adequate lubrication for all gears and bearings on the machine. The Oilgear pump is driven by a 2-hp. motor, and this is furnished as part of the standard equipment.

Special Hydraulic Axle-Housing Broaching Machine



For broaching out the flash thrown up from welding operations on axle housings, the American Broach & Machine Co., Ann Arbor, Mich., is offering the special hydraulically operated broaching machine shown in the accompanying illustration.

The machine, shown without the broach in place, is equipped with a rotating head that holds the broach. On the downward stroke the broach cuts out the flash metal left by the welding operation, and upon completion of the cut the head rotates by means of a cam device attached to an angle plate, which is bolted to the frame of the machine. The head rotates so that the broach may be positioned out of the path that it has traveled in its downward stroke. This brings the cutter out of line of contact with the metal surface that it has cut, permitting it to return through the housing without interference. This prevents dragging of the tool on the return stroke.

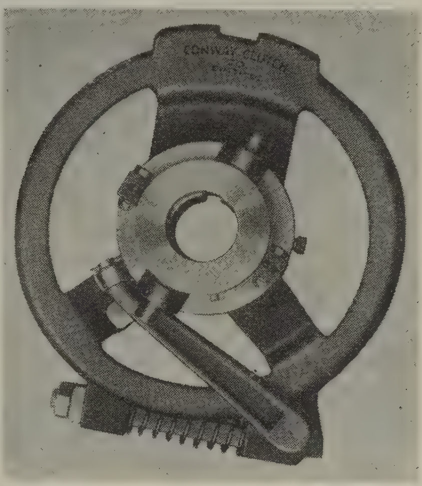
The axle housing is mounted on a large stud and is centered by means of a centering device at the upper end. It is claimed that both ends of the housing are broached in approximately 1 min.

Direct motor drive from a 10-hp. motor is employed. Automatic stops regulate the length of stroke, and both foot pedal control and hand lever control are provided. The machine is of 12-ton capacity and the stroke is 24 in. The operating height is 17 ft. overall.

Orders for 967 steel boilers were placed in February, as reported by the Department of Commerce. These aggregated 1,150,711 sq. ft. of heating surface, compared with 859,301 sq. ft. in 1029 boilers in January. The February rating is the highest for several months, but is considerably lower than that of February, 1927, when 1101 boilers of 1,389,984 sq. ft. were ordered.

Contracting Band Clutch of Compact Design

The Conway Clutch Co., Cincinnati, has placed on the market a new contracting band clutch of simple design and compact construction, both as to swing diameter and lengthwise shaft space required for a given horsepower. Ease of engagement, instant release, drag-free idling and unusually high power capabilities are features claimed. The device is available in four sizes for transmitting up to 75 hp., at 100 r.p.m.; the diameters of the friction surfaces range from 12 to 20 in.



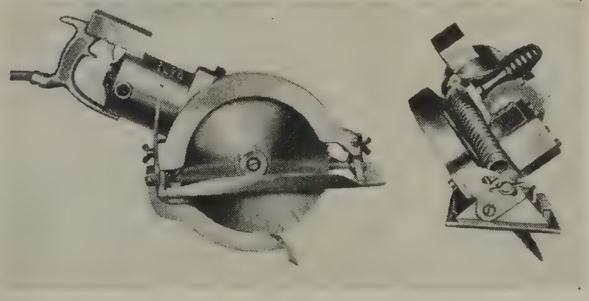
Ease of Replacing the Friction Lining Without Removing the Clutch From the Shaft Is a Feature

This clutch is operated by the familiar form of shifter yoke which slides a cone member under a roller on the end of an operating lever. When the cone slides under this lever, contracting the friction band, high leverage ratio causes the application of ample driving power. When the operating lever is thrown in the reverse direction to release the clutch, a spring assists in throwing the friction band out of engagement. The clutch is of steel and the shifter cone, also of steel, is hardened. As the shifter cone is pushed under the operating roller, the lever slides on a finished surface on the clutch carrier. This takes the end thrust and allows this lever to move freely up and down.

Ease of replacing the friction lining, without removing the clutch from the shaft, is a feature emphasized. By removing two screws and moving the pulley, sprocket, gear or drum along the shaft a distance of slightly more than the width of the friction band, the latter can be slipped over the line shaft.

Portable Hand Saw with Provisions for Bevel Sawing

Bevel sawing at any angle up to 60 deg., as well as the usual vertical sawing, may be done with the new portable electric hand saw recently brought out by the Wodack Electric Tool Corporation, 4627 West Huron Street, Chicago. The bevel sawing is accomplished by a tilting saw base which may be set and locked at any angle within the 60-deg. range by means of a slide and locknut.



Bevel Sawing Is Accomplished by a Tilting Saw Base

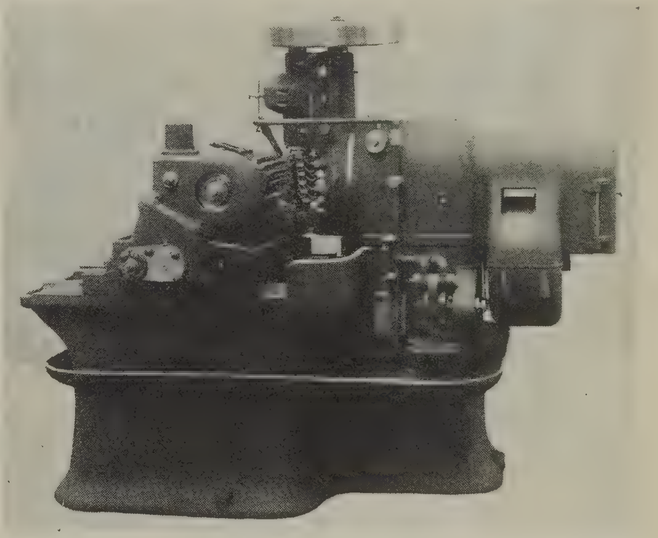
Another feature is the width gage for vertical sawing, which can be set for widths up to 6 in. and is intended to permit sawing strips of various widths with uniform accuracy and without the necessity of marking. The machine, which is designated as the type B, is equipped with a General Electric motor which operates on both alternating and direct current and is available for 110, 220 and 250 volts. Regular equipment includes one 9-in. and one 11-in. saw blade.

Production Hobbing Machine

A high production Pfauter hobbing machine, said to be suitable for spline shafts and spur gears of small diameter, coarse pitch and wide face, and for worms for automobile rear axles, is being introduced by the O. Zernickow Co., 15 Park Row, New York.

The machine is designated as the No. 9, and has a capacity for gears up to 10⅝ in. in diameter and up to 2¼ D.P. It has single pulley drive and can be arranged for direct-connected motor drive, a 7-hp., 1000-r.p.m. motor being employed. Hob speeds are obtained through change gears which have large tapered bores and may, therefore, be easily put on or taken off. The cutter head swivels 100 deg. in either direction. The setting is accomplished by means of a worm drive located inside of the head.

The hob is driven by means of a spur gear drive having a heavy flywheel on the driving pinion to impart steady motion to the hob. The hob spindle is hardened and ground and is adjustable lengthwise and sidewise. The index drive consists of an accurately cut worm gear and a hardened worm which is ground all over. The worm runs in a bath of oil and is adjustable in both directions.



The Cutter Head Remains Stationary While the Work Travels. The work is held between centers or in split collets

The cutter head remains stationary while the work travels. The work is held between centers or in split collets. Radial pressure of the hob is taken on a steady-rest. Feeds are obtained through change gears and the feed may be stopped automatically or by hand. All outside change gears are inclosed within cast-iron guards, but are accessibly located. The coolant tank is located in the bed of the machine.

Specifications include: Swing, 10⅝ in.; distance between centers, 21⅝ in.; minimum center distance, hob and work arbor, 1¼ in.; number of teeth, 4-100; bore of spindle, 3⅛ in.; diameter of hob arbor, 1¼ or 1½ in.; maximum diameter and length of hob, 5¾ in. and 5½ in., and adjustment of hob, 1⅝ in. Speeds of hob are: 44, 53, 67, 84, 106 and 127 r.p.m. The floor space occupied by the machine is 69 x 86 in., and the weight, net, is 5500 lb.

A newly designed calculator that weighs less than 7 lb. is announced by the Burroughs Adding Machine Co., Detroit. It is equipped with regulation size keys, a standard keyboard, visible adding dials and the like, and is 6½ in. wide and 11¼ in. long.

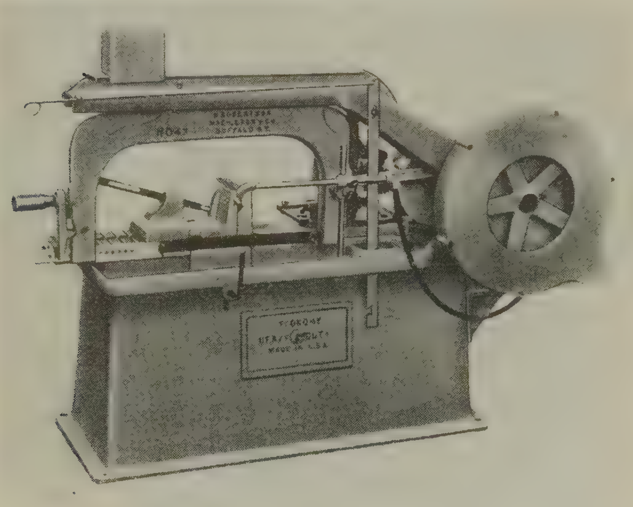
Employment in February showed a good gain over January in the barometer of the National Metal Trades Association. The total reported went up from 583,118 to 602,457, or 3.3 per cent.

Production Metal-Cutting Power Hacksaw

The W. Robertson Machine & Foundry Co., Buffalo, N. Y., has placed on the market a new power hacksaw, designated as the No. 4X, the rated capacity of which is 9 x 9 in.

The machine is of heavy construction and all parts under strain are of alloy steel. The base is of box type and forms a receptacle for the cutting fluid. Bearings are large. There are two shafts, the back or drive shaft, which is 1 in. in diameter and is suspended in a 13-in. long steel sleeve, and the main shaft, or crankshaft, which is 1⅛ in. in diameter and runs in a 6¼-in. long head bearing. These bearings, as well as the connecting rod bearings, are phosphor-bronze bushed. The outer ends of these two shafts are supported in bearings formed by the heavy overhanging gear guard. The frame has a 2½-in. flat dovetail bearing, 14 in. long, running in a hand-scraped bearing to match, with gib for adjustment. All gears have teeth cut from the solid.

Frame speeds of 72 or 100 strokes per min., for cutting hard or soft metals, are available. Change of speed is made by a push or pull on a button lever at the end of the drive shaft. The drive of the machine is from a single pulley on the drive shaft and through the gears to an expanding clutch on the crankshaft. No countershaft is required. Motor driven types are driven direct from a fiber pinion on the motor shaft to a cut gear on the machine which replaces the pulley. The clutch, which nests inside the large gear, is 4½ in. in diameter, 1 13/16 in. face, and is expanded by a hardened steel cone. It is engaged by a conveniently located extended lever and disengages automatically when the cut is completed.



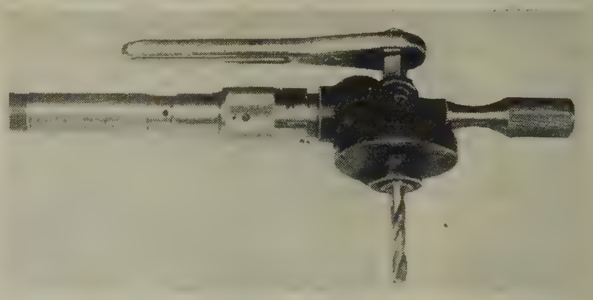
The Saw Frame Is Lifted by an Oil-Compression-Lift Device to Relieve the Blade Teeth of Back Drag on the Return Stroke

The machine is equipped with the company's oil-compression-lift device, which serves to lift the frame and relieve the teeth of the saw blade of all drag on the return stroke. This feature also serves to prevent falling of the frame on the work, eliminating breakage of blades. The device is arranged so that when the machine stops at the end of the cut the frame will stay at any position of its swing until released by the opening valve. Feed is obtained by gravity with the aid of the large weight which is adjustable on a T-rail cast on the top center of the main slide bearing. This arrangement is intended to eliminate the vibration of a weight rod and to apply the feed directly over the center of the blade.

Coolant is pumped from the receptacle in the base to any part of the blade by means of a piston pump and an adjustable piping arrangement. The vise is quickly adjustable up to 9 in. and may be swiveled to 45 deg. for cutting stock at angles. Blades 12 to 18 in. may be used. For motor drive a ¾-hp., 1200 or 1500-r.p.m. motor is employed. The height of the machine overall is 41 in., and the working floor space is 26 x 62 in. The net weight of the belt-driven unit is 700 lb.

Angle Drilling Head for Use With Flexible Shaft Equipment

For drilling in inaccessible locations, where an ordinary electric drill or hand bit cannot readily be used, the Stow Mfg. Co., Binghamton, N. Y., is offering the angle head illustrated. The tool derives its power through flexible shaft that may be driven by an electric drill or by any other available motor. The device is of rigid construction. It is regularly available in ½-in. capacity, but may be furnished in other sizes and with 1¼-in. screw feed with ratchet handle. The socket takes Morse taper shank drills and where space permits a chuck may be applied.



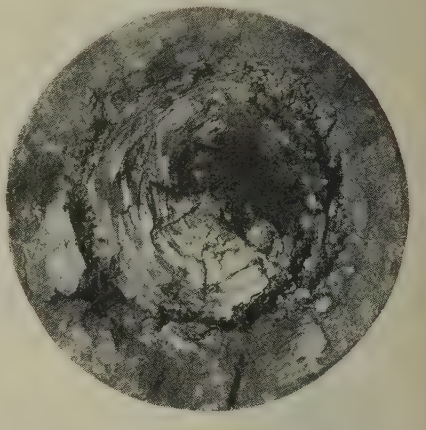
The Device Is Intended for Use in Inaccessible Locations

Axle Failures from Hot Boxes

In the course of a paper on "Types of Failure of Steel," Robert Job, Milton Hersey Co., Ltd., Montreal, Que., read before the midwinter meeting of the American Society for Steel Treating, a fractured freight car axle (known in shop parlance as a "burn-off") was shown. It was dark and discolored on most of the surface, and at places had a magnetic scale adhering. A crater-like spiral of shear surfaces is characteristic of such failures.

The cause was an excessive hot box, which actually caused the axle to run red hot, and the wheel twisted off in the hot soft metal.

Other failures caused by creeping fracture from a tool mark or a sharp fillet were illustrated. Incipient cracks may sometimes be determined by cleaning the surfaces carefully, painting with thin white lead and then sledging the axle on its end. A little ridge in the paint will be a tell-tale of a fine crack.



"Burn-Off" Failure of Freight Car Axle

S. W. Miller in discussion said that hot boxes were likely to cause more serious trouble than often appreciated, especially if the bushings were made of copper-tin bearing alloys. This bronze penetrates readily into hot steel, inducing brittleness. Consequently it is good practice to polish the bearing surface on the steel axle after it has run hot and before repacking, and examine it minutely with a high-powered reading glass to discover stringers or tiny threads of bronze embedded in the steel surface.

The new battery of 63 Koppers-Becker by-product coke ovens of the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., recently was started. There are now 497 ovens at this plant with an annual coke production of 2,436,250 net tons.

Labor Time Recorded by Machine

Electro-Mechanical Dispatching Device Used by Workmen to Signal Job-Time Changes to Central Board

AN electro-mechanical dispatching device by means of which workmen signal job-time changes to a central board was described by K. R. Wood, works manager Bell & Howell Co., Chicago, at a machine shop practice meeting of the Chicago section of the American Society of Mechanical Engineers, held at the Morrison Hotel, Chicago, March 14. With this equipment it has been possible to eliminate several handlings of shop "paper," to cut the timekeeping force in half, to stop production leaks and to avoid confusion.

When notice of a change from one job to another is dispatched by the workmen to the central station, the change is recorded and the elapsed time is figured. This is accomplished by means of a "temporator" which operates by a dialing method. The central station closely resembles a telephone switchboard in that it has its plugs, jacks and signal lamps. It is different in one respect, i.e., the human voice does not enter into its operation. The dials which the workmen use are the same as those employed in automatic telephones. At the central station the indicating device is a step-by-step mechanism which reveals visually behind a window a row of digits corresponding to the code number dialed by the workmen. Not only does the digit or letter dialed appear in front of the central station operator, but it shows up also in a window at the top of the sending unit. These dispatching units are placed in convenient positions about the departments, wherever there are workmen who have occasion to report direct labor.

Job time cards are printed both in red and in black, and they are alternated daily. Thus one color of card carries Monday, Wednesday and Friday, and the other, Tuesday, Thursday and Saturday. When one set is in use at the central board, the preceding day's cards are in the hands of the accounting department where a disposition is made of elapsed time against the cost card. This dispatching method makes possible the accumulation of the elapsed time on cost cards with but one handling between workmen and accounting department.

The routing or shop order is made in quadruplicate and it carries all the information necessary for directing the routing of tools and work to the department, the reporting of time change, the allowed time to perform the work and the number of pieces to be made. One copy is put into a pocket at the central temporator board and filed under the department heading. The second copy similarly goes into one of a series of pockets at the foreman's desk. The third copy serves as a "traveler" and remains with the work as a means of identification. It is this copy which is used by the workman to dial his time change. The fourth copy is sent directly to the tool storage crib, where it gives information so that tools necessary to perform the work may be turned over to the transfer clerk who dispatches them to the job. This copy is then returned to the central station, where it is placed in a follow-up file against the starting time of the job. Only the first two copies of the routing order bear the allowed time of the operation. Thus, this information is in the hands of the planning department and the foreman only.

As the workman nears the completion of a job upon which he is working, the foreman assigns him his next job. When the job in hand is finished the workman notifies the central office of all the facts by means of the temporator. He steps to the nearest signaling station, presses a button, is assigned a line, and dials his department and check number, the operation number, the design number, the number of pieces completed, together with the symbol for "job finished."

There are available in the temporator apparatus 12 digits and symbols, so that the numbers may be dialed without clearing the line and starting a fresh series. These 12 separate digits are arranged as follows: At the left comes first one letter, then five digits, then two letters and finally four digits. This is sufficient to give all the necessary information relative to finishing the job in hand. After this information has been transcribed by the central operator, the line is cleared and the workman repeats the dialing in reference to the new job about to be started.

While this is going on, the central operator reaches for the job time card in the file and strikes it twice in the time clock—once for a finished job, and once for new job—records the number of pieces completed, the work station, operation number and manufacturing order of the job started. He then passes this card along to an assistant operator, who pulls the routing orders for both jobs and stamps them in the time clock. The assistant then refiles the new job order and turns over the order covering the finished job to the planning clerk who uses it in bringing his pre-planned graph up to date, recording the whereabouts of work in process.

When the planning clerk is through with it the order card is turned over to an assistant who figures the elapsed time against the number of pieces made and time allowed. If the time is bettered, this is recorded on a labor analysis card to be used in the future as allowed time on the job when it is run again.

An interesting feature of the control concerns the watching of elapsed time. If the foreman is doubtful about any job, or thinks he is losing time on it, he is privileged to signal through the temporator signaling station nearest his desk to the central board for a check-up figure. The central operator then dials back to him the total elapsed time on that job. This gives the foreman an opportunity to catch up or speed up on his work before it is too late.

Automobile Production Records Large Gain Over January

WASHINGTON, March 20.—Showing an increase of 91,721, production of motor vehicles in the United States in February totaled 323,368, against 231,647 in January, according to reports received by the Department of Commerce. Of the February output 290,830 vehicles were passenger cars and 32,538 were trucks, compared with 205,543 passenger cars and 26,104 trucks in January. Output in Canada in February totaled 12,504 vehicles, of which 10,315 were passenger cars and 2189 were trucks. Canadian production in January totaled 8463 units, of which 6705 were passenger cars and 1758 were trucks.

February made the largest United States total since last May, when 404,106 vehicles were produced—357,150 passenger cars and 46,956 trucks. It showed a larger total than in February, 1927, when 304,763 vehicles were turned out, but was exceeded by February, 1926, with 364,180 units.

Schedule of the next instalments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***March 29****—General Business Outlook;* ***April 12****—Activity in Steel Consuming Industries;* ***April 19****—Position of Iron and Steel Producers.*

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Gradual rounding off of unfilled orders may indicate approaching lessening of activity and difficulty of long maintaining the new prices.

Pig iron production has come into line with ingots. But prices probably will not advance while coke and scrap prices are weak.

Commodity prices have begun a downward movement which is accelerating and may cause steel prices to follow by mid-year.

In a good many respects, we find the steel industry at the beginning of March in much the same position as in December, 1925. The rise in the output of steel ingots has been checked after a sharp advance, and the unfilled orders of the Steel Corporation have tapered off in their ascent. Prices of finished steel have risen slightly for three months, but the upward tendency is losing its momentum. Pig iron production has been increasing, but is gaining on the steel-making requirements and prices are barely holding a small rise. Sheet prices are higher. At the same time, the price of steel scrap is sagging.

The chief differences between the two periods lie in the facts that the whole price structure in the iron and steel industry is lower now, and that coke is weak, while at the end of 1925 it was about to begin the rise which occurred in January, 1926. Also, the activity in the chief iron and steel consuming industries averaged a little higher at the end of 1925 than it does now and was notably so in the automobile industry. Building activity, however, is now higher than then, making due allowance for seasonal conditions. On the other hand, the output per employee and per dollar of payrolls is higher now than in the earlier period and it is not improbable that the January earnings of the more efficient steel companies will be about as good as in December, 1925.

The similarity of conditions in the two periods seems sufficiently marked to suggest that, as was the case in the earlier time, the industry is now near the peak of a short period of expansion, and is likely to round off in another month or two.

Three Barometers Point Upward

We find ourselves this month in the pleasant situation of noting that all the curves in the steel chart point upward—production, unfilled orders and finished steel prices. This is as one likes to see the trends in the nation's basic industry. Moreover, some encouraging features are apparent to one examining the chart. In the first place, even after making adjustments to eliminate the merely seasonal variations, the unfilled orders curve has risen to the highest point since March, 1926. It is nearly up to the average of the last five years. It has risen well above its average relationship with the price of finished steel, as indicated by the price curve in the chart. This condition usually means higher prices, and the advance in the price index for February was the answer. There has been no comparable advance in the monthly average price of finished steel since December, 1924. The price level in February was back to about where it was in the months of stability last summer (June, July and August).

Average daily steel ingot output is seen to have increased but slightly in February, when allowance is made for the usual seasonal variation. Usually the average daily production gains more than 4½ per cent in February; the increase this year was hardly 5½ per cent. Accordingly, the adjusted index is 105.3 per cent of normal against 104.7 per cent in January. It compares with 105.4 per cent a year ago, thus being practically at the same level (after making conservative allowance for normal growth). It is reassuring to find this moderation in the rate of activity in steel production, for it indicates that the steel makers are adjusting production to demand and proceeding cautiously. Production is 5 per cent above normal requirements, but, in view of the sharp gains in the building industries, which are doubtless reflected in the increase in unfilled orders, the February level seems reasonable enough.

Perhaps the least favorable aspect of the situation is seen in the marked rounding off of unfilled orders, the increases having been successively smaller in each of the last two months. Presumably, this means that new business has not gained as fast as shipments. Such a rounding off almost always marks the approach of a decline in the unfilled orders of the Steel Corporation.

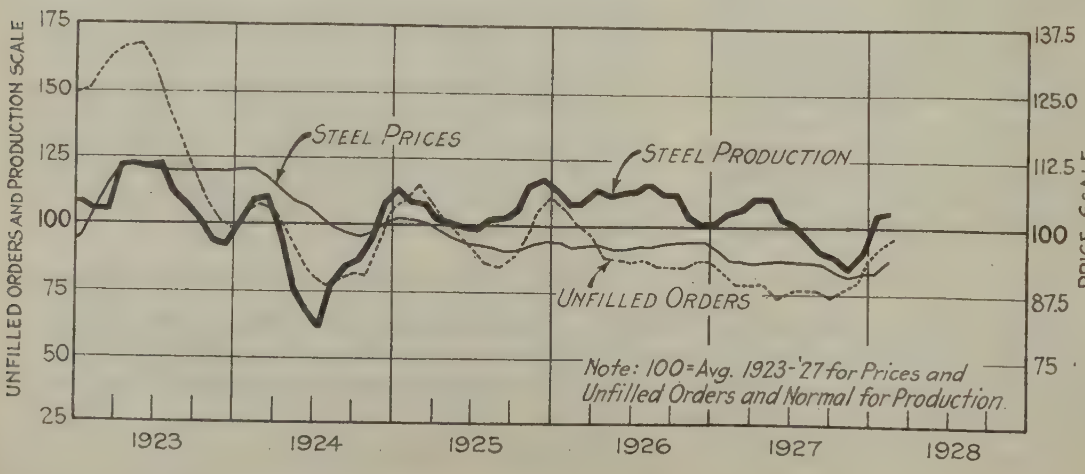
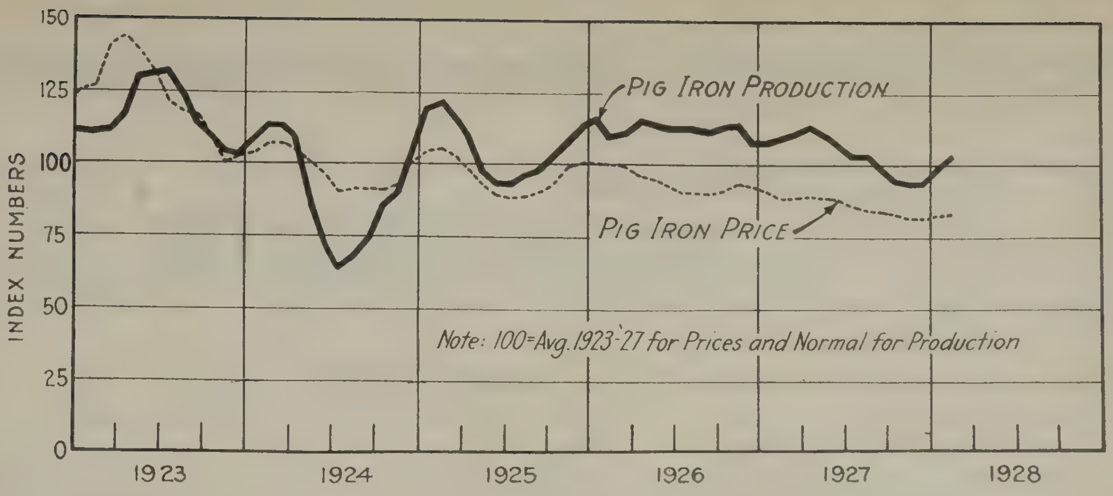


Fig. 1—All Three Curves Point Upward. Finished steel prices advanced well in February; production increased moderately; unfilled orders were higher. But their rounding off tendency is disappointing

Fig. 2—Output of Pig Iron Is Well in Line With Steel. But weakness in fuel and scrap prices may retard pig iron price recovery



This, together with the flattening of the production curve (see Fig. 1), indicates that the recent spurt may not carry through very far, perhaps not even to the middle of the year.

Pig Iron Output in Line with Steel

PIG iron production in February (average daily rate), was 103.8 per cent of our estimate of normal. Thus pig iron production is not so much above normal as is steel production. The February average compares with 99.7 in January and with 110.1 a year ago. It is not only not so far above normal as is steel production, but it is considerably below the level of a year ago, while steel production is about the same as then. In short, pig iron production seems very reasonable in comparison with the steel output, and if all pig iron were consumed in making steel this commodity would be in a strong position market-wise.

That such is not the case, however, one may infer from the fact that pig iron prices advanced less than steel prices in February. At an average of $17.73 for the month we get a pig iron price index which is only 82.9 per cent of the average during the last five years. This is but little above the January average of 82.5 and compares with 88.8 a year ago. Meanwhile, finished steel prices averaged 93.5 per cent of the five-year average. Furthermore, though pig iron production is still relatively low in comparison with the ingot output, *it increased much more rapidly in February than was the case with steel*, as a comparison of the first two charts will show. If March is to see a similar relative trend we will find pig iron production again too high in comparison with steel production.

The net conclusion from the available statistics (which are now all too few) is that the position of pig iron is still moderately favorable, but that it is somewhat less so than seemed true a month ago. In view of the weakness in the prices of fuel and steel scrap, it now seems probable that the most that can be expected of the pig iron market during the near future is stability. The slightly recessionary trend in the general level of commodity prices, and the inability of steel prices to advance further, support this conclusion.

In short, while our usual pig iron barometers do not indicate a decline in the price of that commodity, the general situation does not indicate a rise.

Commodity Prices on Down-Grade

ONE of the least encouraging features of the general price situation in the steel industry is the fact that the level of commodity prices declined in February and continued irregular in March. As the third chart shows, there is a broad general relationship between finished steel prices and the general trend of commodity price averages. The Bradstreet price index and THE IRON AGE composite index of finished steel prices have held surprisingly similar levels during the last decade, the two curves crossing and recrossing. Frequently turns in the general price level anticipate similar turns in finished steel prices by 4 to 6 months.

For at least two months now, the Bradstreet index has sagged, while steel prices have edged a little higher, so that the two are at about par, judged by their average relationship. Perhaps the present situation most closely resembles that found at the end of 1925, when steel prices, after a small rise, sagged slightly and then stabilized.

Be that as it may, the fact is now apparent that price advances during the last month or two are not yet well established, and that the volume of business offered is not sufficient to allow all producers to operate at as high a rate as they desire. Signs of price competition are not lacking. The advance in finished steel prices is not backed by advances in semi-finished steel or pig iron, and under such circumstances it is likely to be short-lived.

Finished steel prices are not high. In fact, such advances as have occurred fail to bring the price of sheets, nails or bars up to a point that gives a normal spread over billets. But independent sheet makers find their shipments running behind production, and distributers of nails are amply stocked.

The steel scrap price situation is not encouraging; the declining rate of increase in the unfilled orders of the Steel Corporation and the continued evidence of large supplies of old material indicate further weakness.

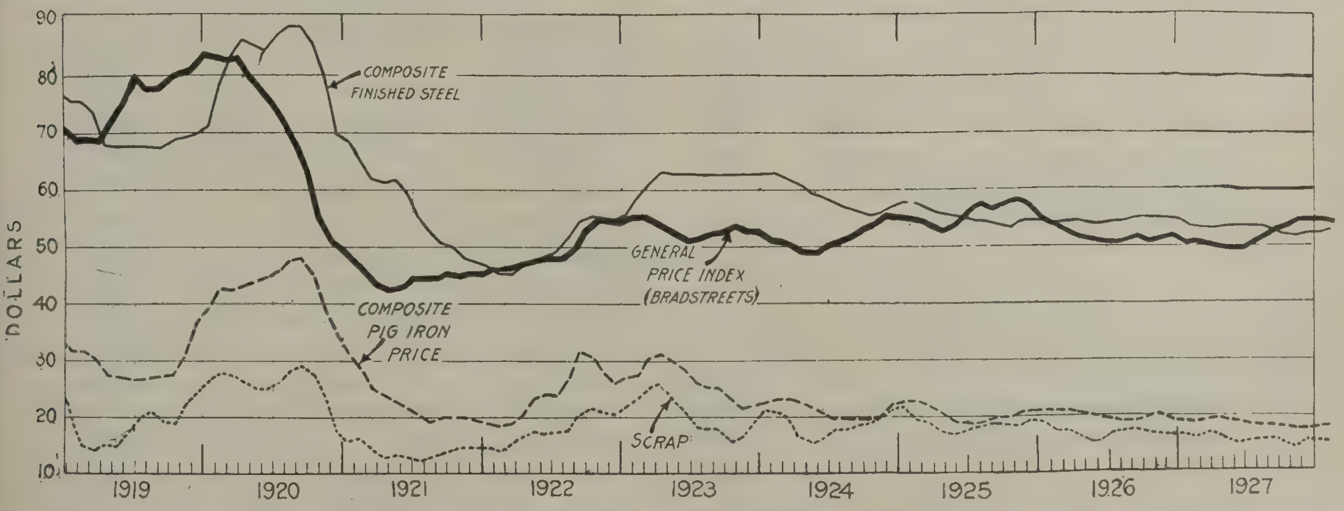


Fig. 3—Commodity Prices Have Been Sagging Slowly. Finished steel price advances are not yet well established. Pig iron prices may be unable to move upward so long as fuels and scrap remain low

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This Issue in Brief

Elapsed time on each job is signaled from various stations throughout the shop to a central recording station. The signaling device operates like the dial on an automatic telephone. Thus, only one recording system is needed for the entire plant, and the time-cards receive only one handling.—Page 809.

Slight rise in wholesale prices. Average commodity price was 96.4 in February, 96.3 in January, and 95.9 in February, 1927.—Page 841.

President takes charge of selling, with eminently successful results. He cuts selling expense and increases sales, finding that things move faster and more productively when salesmen and customers learn that the head of the business is at the sales helm.—Page 797.

Saves 11 per cent of steel by welding structural steel building. New factory structure, arc welded, weighs 989 tons. If riveted, the weight would have been 1114 tons.—Page 804.

Encouraging picture of business conditions is presented by upward trend of steel output, unfilled orders and prices, Dr. Haney indicates. Unfilled tonnage is nearly up to average for past five years.—Page 810.

Earnings of steel industry dropped sharply in 1927. In each case 20 of the leading producers earned less than in 1926. Average per cent of earnings to stockholders' value was 5.1 per cent.—Page 845.

One man does the work of five in plant making automobile car frames automatically. With a force of 200 men, 7000 frames are produced per day. The plant is practically wholly automatic, and is virtually a huge machine.—Page 794

Too little thinking at the top is oftentimes the cause of declining profits. "Too many men are cleaning up their desks every day and doing a clerk's work," says manufacturer. He recommends that they concern themselves more with the operations of each department.—Page 798.

Close spacing of stands conserves heat in new continuous sheet-bar mill. The center to center distance between the 10 stands is only 10 or 12 ft., permitting the bars to reach the finishing stands hot enough to be worked properly.—Page 800

Steel chaplets are safer than iron chaplets, says foundrymen, for the former can be much smaller without fusing when the metal is poured around them.—Page 841.

Imperfect steel is automatically rejected by special inspecting machine. Strip steel is measured for length, width, thickness and curvature. Rejections are automatically thrown out into separate piles —Page 795.

Blast furnace produces 1500 to 1800 tons of iron per day. German furnace, with 17,000 cu ft. capacity, owes its high output partially to composite character of burden. In one plant 32 different iron-bearing materials are used.—Page 803.

"Too many manufacturers are afraid to take hold of the business themselves." In many firms too much authority has been delegated, says manufacturer, evils creeping in which would be avoided were the head of the business in closer contact.—Page 798

Better make the casting so that defects will occur where they can be seen, and repaired, rather than hide them and run the danger of failure in service. Buyers are often at fault in demanding that the machined surfaces be free of defects, for this forces the foundryman to cast so that the flaws will be hidden. —Page 792

Will pig iron prices advance or decline? In view of weakness in prices of fuel and steel scrap, it now seems probable, says Dr. Haney, that the most that can be expected of the pig iron market during the near future is stability.—Page 811

Tests of truss welds made by five different welders reveal a 22 per cent variation in strength. "Variations are no greater than exist in concrete tests, or in riveted-joint tests," says consulting engineer.—Page 805

Maintenance of an adequate munitions industry would be endangered by passage of bill prohibiting export of munitions, says Secretary of War. In emergency, the Government would be handicapped were industry totally unequipped for munitions manufacture.—Page 846.

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Gray Iron Foundrymen Moving

CONFRONTED for some time with unsatisfactory business conditions, gray iron foundrymen have finally gathered in consultation and the first steps have been taken in a movement which may be of great benefit to the industry. Last week at Pittsburgh representative foundrymen from many parts of the country, after an all-day session, initiated the American Gray Iron Institute, as told in THE IRON AGE of March 15.

Complaints of the quality of gray iron castings, with special reference to the pig iron used, have been rife for several years. The subject has been much discussed and some progress has been made by cooperation between the American Foundrymen's Association and other societies. But more serious conditions have developed in respect to marketing. According to a leading foundryman who presented his views at Pittsburgh, "not only are there over-production facilities, hand-to-mouth buying and competition from users of castings who have added foundry departments and who are now seeking orders in an endeavor to keep these departments going," but gray iron foundries "are finding competition from other branches of the foundry industry, and there is also creeping in competition from other industries which have begun to make inroads on the gray iron business."

Just what the necessary steps are to meet these unfavorable conditions agreement is not unanimous. Research to improve the product and intensive effort for the development of new uses as well as for strengthening the hold on present markets are obviously good suggestions. Cooperation for stabilizing the gray iron castings market should be gone into seriously. A curb must be put on the practice of supplementing orders that yield a profit by business taken at cut prices and serving only to make a small contribution to overhead. By cooperative organization the copper industry has been stabilized and put upon a sound basis in recent years. Likewise, the steel castings and malleable castings industries have profited by association effort. While its wide extent and the diversity of conditions make the problem of the gray iron castings industry especially complicated and difficult, the formation of the American Gray Iron Institute should not be without important results. Certainly it has not come upon the scene before its time.

Usury in Instalment Financing

VARIOUS methods are resorted to by "acceptance corporations," or companies financing instalment purchases, to conceal the usurious interest charged for the accommodation. Professor Seligman, in his monograph on "The Economics of Instalment Selling," holds some of them up for condemnation. One way is to charge interest on the cash price of the article, even though one-third may be paid down on the purchase. Thus, if an oil burner is sold for 5 per cent over cash price when the buyer elects to pay one-third down and the balance in ten monthly payments, the buyer is actually charged at the rate of nearly 17 per cent per annum on the continually decreasing loan outstanding.

Another method is to conceal the insurance charge. On an automobile this is higher than on other commodities, due to the added risk that the car may be destroyed by wreck or lost by unlawful conversion. To protect themselves, finance companies insure the car in their favor for the outstanding loan (ordinarily two-thirds of the purchase price) despite the fact that the balance due is continually decreasing, and the insurance companies would put up a vigorous fight before they would pay two-thirds the purchase price to the owner for his lost car.

The most common method of disguising the finance charge is to quote it as an interest payment on the unpaid balance. Suppose 10 per cent of the unpaid balance on an automatic refrigerator is charged, and the note is liquidated in 12 monthly instalments. Of course, that is the equivalent of treating about one-half the full sum as outstanding for the entire period. Mathematically it would amount to ten times 1.85 or 18½ per cent per annum.

Professor Seligman quotes some "actual examples picked at random from the published rates" and finds that the finance charges on automobiles figure to the following annual rates on the unpaid balances: (a) 26.7 per cent; (b) 27.9 per cent; (c) 38.15 per cent; (d) 13.9 per cent. Details for the last are as follows:

Cash delivered price	$1,500.00
Insurance	13.20
Finance charge	70.80
Total cost to buyer, if cash	$1,584.00
Down payment	564.00
Deferred balance	$1,020.00
Cost of financing	70.80
Unpaid balance on car	$949.20

$70.80 charged for $949.20 to be paid in 12 monthly instalments is at an annual rate of 13.9 per cent.

These figures represent the approximate rates now charged by the reputable companies operating in the Metropolitan district, and, according to the annual report of General Motors Acceptance Corporation, issued last week, are about what this organization is doing. Quoting from this report, during last year 824,190 accounts were liquidated in full. The total volume of business was $842,819,877, which indicates that the average acceptance was for about $1,025. Net profit was $8,578,475, or about $10.50 per account, and is equivalent to 19.04 per cent earned on capital funds. Other computations show that more than three-quarters of the financing was evidently done with cheap money from banks.

This indicates that an organization, whose assets rest directly upon the honesty of the individual customer, conservatively managed and taking carefully selected risks, is able to earn a handsome profit even when charging the lowest rates. Further proof is not needed that those financing charges, running from 20 to 84.5 per cent (cited by Professor Seligman), are usurious and unjustifiable. Economic disaster must overtake a man who is so improvident and so poor a risk that these high rates are necessary to cover losses in expensive collections and unpaid accounts.

A NOTABLE tribute to mechanical engineering design and an example of the courage of American industry is the great aggregation of machinery at Milwaukee for making automatically the chassis frames of automobiles. Some of the features are described elsewhere in this issue, but until fuller particulars become available it will be difficult to convey an adequate idea of the unusual and ingenious character of the mechanisms or of the immense investment involved in such trail-blazing engineering. Imagine several parallel conveying systems carrying lengths of strip steel step by step from one end of a truly large building to cross conveyors at the other end, where parts are assembled into complete frames; remember that this great mass of machinery and metal reciprocates in unison and that not only is it stopped and started as one huge machine but stopped so the parts in process are accurately spotted for a definite operation at each station; realize that at every station is special apparatus to form, to drill holes, to apply a part, to do some riveting, and that manufacturing is thus automatic and men are observers rather than workers; be reminded that the whole affair operates at high speed, as it completes six frames a minute, and that it is adaptable for frames of various sizes and forms of chassis—thus can one appreciate that the Milwaukee development is veritably in a class by itself. It is automatic mass production at high potential—a result of the large volumes peculiar to the automobile industry and of the judgment, which proved well founded, that one company could become the source of supply of a part for many makes of automobiles.

Progress in Using Coal and Steel

WORLD coal production has increased by a trifle less than 10 per cent in 14 years. Obviously that is much less than the gain in the results obtained from coal, for the world is doing a great deal more work and using a great deal more power.

The matter comes up at the moment through the issuance by the Bureau of Mines of its annual report of coal production, covering the year 1927. The figures are in metric tons of 2204.6 lb. For the two pre-war years and the last three years the Bureau of Mines figures are as follows:

World's Production of Coal, Including Anthracite and Lignite

	Metric Tons
1912	1,249,000,000
1913	1,342,000,000
1925	1,372,000,000
1926	1,365,000,000
1927	1,475,000,000

From 1925 to 1926 British coal production dropped by 118,773,919 metric tons and with a drop of only 7,000,000 tons in the world total it is reasonable to conclude that consumption increased at the expense of stocks, replenished in 1927. Accordingly, a comparison between the mean of 1912 and 1913 and the mean of 1926 and 1927 fairly represents the real increase in coal consumption in 14 years. This increase as precisely computed was 9.6 per cent.

That the world's activities increased by much more than 10 per cent in the 14 years will readily be granted, which means that ton for ton coal is doing much more good than 14 years ago. A strong hint in that direction is furnished by the fact that in the same time the world's production of steel increased 26 per cent. It is true the world's pig iron production increased by only 7 per cent. The divergence is due partly to the iron casting not having increased as has rolled steel and partly to more scrap being used in making steel. As a measure of industrial activity, after the pig iron or steel has been made, steel is by far the more indicative.

It is a notable fact, as heretofore commented on in these columns, that in the United States much progress has been made in using coal, so that year by year it renders more service. The public utilities averaged 3.2 lb. of coal per kilowatt-hour in 1919 and 1.83 lb. in 1927, representing a saving of 43 per cent in eight years.

While from 1912-3 to 1926-7 the world's coal production increased by 9.6 per cent, United States production increased 14 per cent and the remainder of the world 7 per cent. We have grown much more than the rest of the world, but it has grown, in service secured, much more than 7 per cent; hence it is evident that it also has developed economies in using coal as we have.

As soon as any statistics are furnished and are studied intelligently, a wish arises for more statistics. It would be interesting to know from year to year what good is got out of this coal production. The same is true of steel. Quality and therefore service per ton has greatly increased, and one would like to have a measure of that increasing service. The railroads give us their statistics, vertically downward. Of locomotives the number is given, then the miles of service and the weight of trains drawn. Ton for ton steel is doing much more good than before the war, but we have no precise measures of the progress.

Structural Steel Lettings Heavy

FABRICATED structural steel lettings in January and February as given in Department of Commerce reports totaled 480,000 net tons, against 439,000 tons in 1927 and 418,000 tons in 1926. With a gain of 10 per cent over a year ago and 15 per cent gain over two years ago 1928 has started out very well. Of course, there is no precise augury in these figures for the whole year, for the incidence of a few large jobs in a given short period may make quite a difference. That a steady and large trade is to be expected on general principles, however, is indicated by the remarkable record of the past three years, which with all their apparent variations from time to time came out just about the same, no one of the three years varying more than 3 per cent from the average.

The increasing fullness of the weekly data of THE IRON AGE on structural steel lettings is shown by comparison of our reports for the first nine weeks with the January and February statements of the Department of Commerce. For 1926 our tonnage was 63 per cent of the department's announced total; for 1927 the proportion was 82 per cent and for this year it was 81 per cent, our nine-weeks totals being: 1926, 262,000 tons; 1927, 353,000 tons; 1928, 390,000 tons. For last year and this our totals were substantially the same as the actual tonnages reported to the Department of Commerce, the department prorating for fabricating shop capacity not reporting. Its reported tonnage was 81 per cent of the computed total for January and February, 1926, 82 per cent for 1927 and 79 per cent for this year. Thus the department is not receiving fuller reports than two years ago, while those of THE IRON AGE are fuller.

Recently there was a little talk that an unusual amount of structural business might have been forced to closing by prospective price advances on plain material, but it is now steel market information that for some time to come steel will be available at such cost as to prevent any hesitancy in construction, while it does not appear that any of the recent business was forced. The tonnage record to date, therefore, stands as a favorable augury for structural steel work in general.

CORRESPONDENCE

Knowing "Why" in Drafting

To the Editor: In the machine shop it is not necessary for the operator on an automatic to be capable of building such a machine in full, but he ought to have a sufficient understanding of its functioning to set it up or to meet an emergency jam or break. The handbook is the automatic screw machine of the drafting room, and its value cannot be overestimated.

But like the machine operator, the draftsman should understand something of the basic facts from which the formulæ and tables are derived. In hiring draftsmen it is often found that the simplest fundamental question about tension, shear or bearing throws them into a panic. They reply that they could answer the question if they had a "Machinery" or "Kent." Provided with it, they nervously fumble through the pages seeking a formula. Finally they apologetically admit they guess they are a little rusty, and at the same time they probably feel the old handbook has fallen down on them in their time of greatest need.

Yet, a few leading questions, adroitly put, soon bring out the fact that back in their minds, suffering from disuse, is at least some knowledge of the "reason why" on which the handbook is based. It is really unfortunate that the mechanical perfection of the handbook has advanced to such a state that draftsmen erroneously believe that it removes the necessity for thinking. The handbook performs many services for draftsmen, but it does not think. Any draftsman using certain sections of the handbook frequently should make it his business to find out why and how a certain formula or table is evolved and used, so that he can be full master of it in applying it.

Similarly a slide rule becomes a mere mechanical adjunct, and the draftsman loses all knowledge of how to perform his mathematical operations without it. Yet the easiest way to explain its use to a novice is to tell him how it functions by adding logarithms to multiply, subtracting them to divide, etc. But it is really good mental exercise to forget the slide rule once in a while and figure things out by long hand or with logarithm tables. In fact, one university regards this idea so highly that it prohibits the use of the slide rule by senior students. We should use these various mechanical helps to aid us, but we should never permit them to master us through losing our greatest asset—our ability to think.

WILLIAM T. VAN HORN.

Oaklyn. N. J.

Eastern Scrap Iron Association Elects Officers

The recently formed Eastern Scrap Iron Association, at a meeting March 15 at the Hotel Astor, New York, elected the following officers: President, Joseph J. Hitner, Henry A. Hitner's Sons Co., Philadelphia; first vice-president, J. V. Bishop, Bishop & Co., Philadelphia; second vice-president, David Straus, Continental Iron & Steel Co., New York; third vice-president, Ben Cohen, L. Cohen & Son, Wilkes-Barre, Pa.; fourth vice-president, S. Dreifus, S. Snyder Corporation, Rochester; fifth vice-president, David Pollock, Mayer, Pollock, Inc., Pottstown, Pa.; secretary, H. Moskowitz, M. Samuel & Sons, Inc., New York; treasurer, Thomas F. Kelly, Brooklyn.

The association, which will include in its membership brokers and dealers in iron and steel scrap in Boston, New York, Philadelphia and other cities of the East, will hold meetings once a month.

Upholds Joint Barge-and-Rail Rates for Warrior River Line

WASHINGTON, March 20.—Refusal of the Southern Railway System to join the Inland Waterways Corporation, operating the Mississippi-Warrior River service under the jurisdiction of the War Department, in certain barge-and-rail and rail-and-barge rates was held to be unreasonable but not unduly prejudicial by Paul Coyle, examiner of the Interstate Commerce Commission, in a report made public last Friday. The water line asked for joint and differential class and commodity rates from New Orleans, and Mobile, Ala., to certain points on the Southern lines in Alabama, Georgia and Tennessee and to all points on the Southern lines in North Carolina, South Carolina and Virginia in both directions. The rates would apply to shipments which are not accorded free storage-in-transit at Birmingport, Ala.

The examiner held that joint rates should be established which are the same as contemporaneous all-rail rates, less differentials of 20 per cent of the all-rail rate between Birmingport, on the one hand, and New Orleans and Mobile, on the other. Wherever rates are established from and to New Orleans, the report said, they should also be established from and to Mobile. In establishing the rates from or to intermediate points, it was held, they should not exceed the rates from or to more distant points. The complainants had sought differentials of 7.5c. per 100 lb. under the all-rail rates on iron and steel products northbound from New Orleans and 7c. northbound from Mobile and 7c. and 5.5c. respectively southbound to New Orleans and Mobile. On steel rails the water line sought differentials of 5c. and 4.5c. respectively southbound to New Orleans and Mobile, and on cast iron pipe it asked for differentials of 11c. and 5c. respectively on southbound traffic to New Orleans and Mobile. These differentials are 20 per cent of the all-rail rates from New Orleans and Mobile to Birmingport and in the reverse direction.

Unemployment Situation to Be Reported on by Labor Department

WASHINGTON, March 20.—The Department of Labor is about to make a report on a labor survey and has already made it known that the unemployment situation, while having a serious aspect, has been greatly overstated. As a matter of fact it has been indicated that unemployment is probably not greatly in excess of the usual idleness throughout the country and is roughly estimated at 1,000,000 workers. Some of the reports have placed the estimate of unemployment as high as 4,000,000. The Department of Labor notified President Coolidge that employment in February showed an increase of 1.5 per cent over February of last year and that the volume of wages paid during February of the current year exceed that of the same month last year by 4 per cent.

Secretary of Labor Davis has stated that the unemployment situation is not so alarming as "interested parties endeavor to make it," but has conceded that it is sufficiently large to give serious thought. Conviction has been expressed by him, however, that with the advancing season much of the present unemployment will disappear of its own accord. Farm labor is opening up, the Government and private enterprises have elaborate building programs and the improvement in the steel industry indicates a general improvement due in industry, he stated.

The broad economic inquiry instituted by the Bureau of Economic Research of New York recently got under way. It likely will take the committee, appointed by Secretary of Commerce Hoover, one year before it makes its report. The scope of the inquiry is extremely broad. It will deal with shifts in employment, changes in methods of production in industry and agriculture, shifts in price levels and profits, movements in the business cycle, shifts in standards of living, foreign trade and foreign credits and other allied subjects which bear upon an understanding of the general business situation of the country.

Ask Modification of Wrought Washer Case Decision

WASHINGTON, March 20.—Modification of the order of the Interstate Commerce Commission in the case of the Wrought Washer Mfg. Co., Milwaukee, in which the commission listed items as scrap which should take the billet rather than the finished product rate is sought in a petition filed yesterday by the Baltimore & Ohio Railroad and other carriers which seek a supplemental hearing in the proceedings. Subsequent to the decision the carriers successfully petitioned the commission to postpone for 90 days the effective date of March 21.

It is contended by the railroads that the finding as to skelp, the defining of the minimum length of strip steel as 10 ft., the inclusion in the order of waster sheets and the definition of crop ends are erroneous. The railroads declare their readiness to introduce evidence to the effect that strip steel is salable and is being regularly sold as such in various lengths under 10 ft. and that skelp is sold in competition with strip steel. These items, together with waster sheets, which are held to constitute prime material, the petition says, should be omitted from the order. It is maintained there is no well recognized distinction between waster sheets and prime material and that waster sheets are being used as substitute for prime material. A definition of crop ends is asked that will cover only such material as comes within the intent of the order. The language of the order would defeat its purpose, the carriers say. To indicate the far-reaching effect the order would have the railroads mention a list of steel producers and consumers in various sections of the country who are seeking billet rates or less on the basis of the decision in the Wrought Washer case

Larger Total of Orders for Fabricated Steel Plate

WASHINGTON, March 20.—Making a gain of 13,801 tons, orders for fabricated steel plate in February totaled 49,588 tons, or 62.1 per cent of capacity, according to reports received by the Department of Commerce from 51 concerns. This compares with 35,787 tons, or 44.8 per cent of capacity, in January.

Bookings for oil storage tanks amounted to 25,532 tons, as against 11,101 tons in January; refinery materials and equipment, 4454 tons, as compared with 2575 tons; tank cars, 592 tons, as against 2412 tons; gas holders, 3679 tons, as compared with 2062 tons; blast furnaces, 143 tons, as against 1225 tons; and stacks and miscellaneous, 15,188 tons, as compared with 16,412 tons.

Truscon Steel Co. Only Bidder on Hydraulic Steel Property

A bid of $1,000,000 cash for the plant and assets of the Hydraulic Steel Co., Cleveland, was made by the Truscon Steel Co., Youngstown, March 14, the date set for taking bids for the property. The Youngstown company was the only bidder. The bid is based on the Hydraulic company's balance sheet as of Oct. 31, 1927. The Hydraulic Steel Co. has been operated by Thomas P. Goodbody, receiver, since 1923. It is understood that if the sale is confirmed, as is expected, the Truscon company will spend considerable money in remodeling.

Railroad and Water Freight Service for Upper Mississippi

Announcement has been made by the War Department that a four-day rail and water freight service between Chicago, St. Paul and Minneapolis will be put into effect April 2, with a saving in cost of approximately 15 per cent as against the all-rail rate. The service will make use of the upper Mississippi division of the Mississippi Barge Line, with sailings from St. Louis for St. Paul and Minneapolis on Mondays and Thursdays. Barges will leave Dubuque, Iowa, on Tuesdays and Saturdays, making the trip in three days.

Iron and Steel Markets

Large April Output Assured

Heavy Steel Specifications on Expiring First Quarter Contracts—Tin Plate Demand Improves—Possible Advance in Pipe—Pig Iron Melt Gains

STEEL production, in contrast with an uneven and not entirely reassuring general business situation, is holding its own and in some districts is making further gains. Steel ingot output for the first quarter now promises to exceed that of the same period of 1927, possibly by several hundred thousand tons. There are no signs of any distinct let-up in production in April. The way business is coming in, mill operations are likely to continue at substantially the pace of March instead of declining as in April last year.

Steel Corporation plants continue to operate at 90 per cent of capacity. Bethlehem operations early in the month were at 75 per cent and for the month up to this time averaged 81 per cent. Among important producing districts, Chicago is still running at 95 per cent, while the Greater Pittsburgh area, including the Youngstown district, is showing a gain over the 80 per cent rate that prevailed last month.

Expanding building operations, increasing automobile production, large backlogs in rails and track supplies, sustained activity among farm implement plants and prospects for heavier tin plate consumption are favorable market factors.

High output in the automobile industry throughout the second quarter is now regarded as assured, but motor car builders are showing hesitancy in placing second quarter contracts. Steel rail producers have had a good operation since Jan. 1, and most of them have sufficient bookings to keep going at an equal rate up to the middle of June. Chicago mills took orders for 8000 tons additional during the week, and there is still some rail business to be placed in the South, Southwest and Far West. The Western Pacific is inquiring for 10,000 tons. The increasing use of track supplies was reflected in orders taken in the past winter, which were 20 per cent heavier than a year ago.

Prospects for a larger pack of canned goods than in 1927 are indicated by heavier specifications for tin plate. Mill operations have increased to 85 per cent of capacity, as against a recent rate of 80 per cent. Both producers and consumers of tin plate are concerned over the price of pig tin, which has advanced from a low of 50c. to 52c. per lb., New York, on heavy sales, totaling 3000 tons for the week. Little spot tin is now available, and metal for nearby delivery is commanding a premium.

Merchant pipe production is commencing to improve under the stimulus of increasing building activity, although pipe mill operations in the Youngstown district are still at a 60 per cent rate. A possible price advance—about 5 per cent—effective early in April, is having consideration in the merchant pipe trade. In the line pipe field, seamless pipe is competing with lapweld pipe in a large way. An order for 200 miles of 8-in. seamless pipe, totaling 13,000 tons, has been placed by the Standard Oil Co. of California for a line from Pecos County, Tex., to El Paso.

Buyers, as a rule, are not hastening to contract for second quarter, believing that the upward movement of prices has reached its peak. On the other hand, the mills, not wishing to discourage the flow of tonnage supporting the current high rate of operations, are accepting heavy specifications on expiring first quarter contracts. In plates, shapes and bars, for instance, shipments of material invoiced at 1.80c. will probably extend through April, deferring a real test of the second quarter contract price of 1.85c. until May.

Recently revised prices on alloy steel bars will not apply to contract consumers until after April 1. While there were some reductions, four grades of alloy steel comprising over 90 per cent of the tonnage used were advanced $2 to $4 a ton.

Irregularities in prices of wire nails and plain wire, although not general, are more numerous.

Structural steel awards of nearly 33,000 tons include 10,000 tons for subway work in New York and 7600 tons for a manufacturing plant at Cumberland, Md. Bids are being taken on 7700 tons of subway work in New York, a bridge approach in St. Louis calling for 6000 tons and an aqueduct at Oakland, Cal., requiring 4830 tons. The total of fresh structural projects is more than 34,000 tons.

February orders for fabricated structural steel are computed at 270,000 tons, the highest figure since last October and the sixth highest in the history of the industry.

Pig iron shows its greatest strength in the Chicago district, where sales for second quarter are much heavier than for the first quarter. In the Central West, shipments of iron to foundries are showing gains, and to some extent this is also true of other sections. With sales of 10,000 tons, of which half was in one lot, the Pittsburgh market was lifted out of a lethargy of many weeks. In New England, sales of Buffalo iron have been made at a new low level.

Steel scrap shows no marked strength, but it is slightly firmer at Pittsburgh while weaker at Chicago. Sales of compressed sheets were made to a Pittsburgh district consumer at $15, an advance of $1 a ton, and heavy melting steel is quotable there at $14.50 to $15.50, a slight rise.

For the sixth successive week THE IRON AGE composite prices remain at the same levels, that for pig iron at $17.75 a ton, while that for finished steel is at 2.364c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	20.75
Basic, Valley furnace	17.00	17.00	17.00	18.50
Valley Bessemer, del. P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars. Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	**2.00**	1.90	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	**2.00**	1.95	1.95	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	**2.00**	1.95	1.95	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	**2.00**	1.95	1.95	2.00
Beams, New York	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Mar. 20, 1928 Cents	Mar. 13, 1928 Cents	Feb. 21, 1928 Cents	Mar. 22, 1927 Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.75	$14.75	$15.00	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	*12.50*	12.75	13.00	13.00
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila.	15.00	15.00	15.00	17.00
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.50	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.75	$3.25
Foundry coke, prompt	3.75	3.75	3.75	4.25
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.25	13.50
Electrolytic copper, refinery	14.00	14.00	13.82½	13.12½
Zinc, St. Louis	**5.72½**	5.65	5.47½	6.65
Zinc, New York	**6.07½**	6.00	5.82½	7.00
Lead, St. Louis	*5.80*	5.82½	6.07½	7.30
Lead, New York	6.00	6.00	6.32½	7.65
Tin (Straits), New York	**52.00**	50.12½	51.50	69.25
Antimony (Asiatic), N. Y.	*10.25*	10.50	10.87½	13.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Mills Accumulate Considerable Steel Tonnage—Price Tests Deferred

PITTSBURGH, March 20.—Steel manufacturers have accumulated considerable tonnage this month either by the extension of existing first quarter contracts into the second quarter or by permitting additions to these contracts. Since consumers generally are covered through April and in some cases and in some products for a longer period at first quarter prices, the test of the higher prices which have been announced since the opening of the year, which ordinarily would come in the next week or 10 days, has been deferred at least a month.

By the course they have pursued, steel manufacturers have pretty well assured themselves of a continued good rate of operation in April and, as this month has shown a gain rather than a loss in ingot production in the Greater Pittsburgh area as compared with February, the expectation that the first four months of the year will compare favorably with that period last year is strengthened.

The steel trade has been disappointed in its expectation of railroad business except in rails and track material. The oil industry, which was counted on to provide a large volume of pipe tonnage, has made no definite progress in the correction of the over-supply situation, and while some storage tank business has been placed and more is ahead, there is no thought that this tonnage will equal that ordinarily taken for oil and gas well development. Incidentally, oil production last week increased to 2,400,000 bbl. a day, and that is well beyond the rate at which it can be consumed.

The total takings of steel by the automotive industry are large and satisfactory, but some motor car builders are operating at a relatively higher rate than others. The agricultural implement industry is doing well, and the only fault that is found with structural steel awards is that the tonnage is mostly in a few large jobs.

Primary materials still are depressed. While there has been a tendency to dissociate the prices of merchant pig iron and those of steel, it is a fairly commonly held idea that the trouble which the manufacturers have encountered in establishing the advances they have proposed this year is partly due to the low prices at which pig iron and other raw materials of steel have been selling. It has been estimated that in this district fully half of the merchant iron that has been marketed in the past few years has been shipped from steel works as distinct from merchant furnaces.

Pig Iron.—In point of tonnage sold, the past week has been the best that local producers have had in some time, but the market has not shown real activity, as half of a total of approximately 10,000 tons in known sales was in one transaction. This lot of 5000 tons was No. 2 foundry sold to a maker of railroad equipment and is for shipment during the next 60 days. The price was $17.25, Valley furnace. Sale of 1000 tons of No. 1 foundry is reported at $18.25, Valley furnace, or at the full silicon differential over the base grade. Scattering sales in lots of a carload up to 250 tons of foundry, malleable and Bessemer iron account for the remainder of the week's business. Prices have developed no important change but some irregularity, ascribable chiefly to freight equalization by Valley furnaces, with more favorably located producers, still is noted. Sales of Bessemer iron at $17.25, Valley furnace, are more representative of equalizing competitive freight rates than of an actual reduction of the price at Valley furnaces. The movement of iron against old orders still is good.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Sustained high rate of steel ingot production accounts for free specifying against contracts for the commonly used alloys, but there is very little new business. Prices are unchanged.

Semi-Finished Steel.—Open market activity in the various forms of crude steel is limited. Strip, sheet and tin plate makers who depend upon others for their steel are having a good operation, but are covered by requirement contracts and are drawing against them instead of broadcasting their inquiries. There is not enough activity in pipe to create much demand for skelp. While specifications on old and lower-priced wire rod contracts are fairly good, consumers are slow to contract for second quarter requirements at the present prices, since secondary manufacturers have not found it possible to advance prices of their products.

Bars, Plates and Shapes.—Buyers are showing less anxiety in getting their orders on mill books than in the first two months of the year, when they were covering against price advances. Bars are still moving well on old orders generally carrying 1.80c., base Pittsburgh, but many buyers still have enough coverage to take them into the second quarter and it will be May before some are called upon to specify against second quarter contracts recently written at 1.85c. The same conditions rule in plates and shapes. Some small tonnages of these products command 1.90c., Pittsburgh, but in a general way 1.85c. is not often exceeded.

Rails and Track Supplies.—Standard-section rails are moving steadily on 1928 contracts, but not much new business is developing. In track fastenings, the railroads are specifying steadily against old orders, but new business amounts to little. Light-section rails are slow.

Wire Products.—Prices, which have shown some irregularity without materially affecting the general market quotations, have in the past week or 10 days developed an unevenness that is attracting notice. Some sales of nails are being made at the full price, but concessions which were pretty well confined to a few localities now are developing elsewhere, notably in the East. In plain wire rather strong resistance is developing to the present base of $2.50 per 100 lb., Pittsburgh, since that represents an advance of $2 a ton over present invoice prices, which manufacturing consumers have not found possible to pass along to the secondary products. Nail business is slow because of the heavy deliveries to jobbers since the opening of the year, but there is a fair degree of activity in other products.

Tubular Goods.—Seamless pipe has invaded the line pipe field in a large way. An order for 200 miles of 8-in. pipe recently placed by the Standard Oil Co. of California for a line from Pecos County, Texas, to its refinery at El Paso, with the National Tube Co., calls for seamless pipe, and this is not the first time it has been ordered for that purpose, as part of the most recent pipe line laid by the Roxana Petroleum Co. was seamless. The latest award emphasizes the growing competition that lapweld pipe must face. Except for this business and a fairly steady expansion in the movement into consumption of buttweld pipe, the general situation is featureless. Oil country demands still are light. Prices are irregular.

Sheets.—There is little complaint as to the volume of specifications on old orders carrying prices lower than now are commonly quoted, but most mills still find limited interest in second quarter tonnages, and while a fair amount of new business is being booked at current prices, it is mostly for early shipment. As the general steel market has halted in its price advances, sheet buyers seem to feel they have nothing to lose by holding off for a while on second quarter commitments. Some producers which lack full rolling mill schedules are disposed to round them out at the expense of prices, but these cases appear to be the extent of the deviations from the regular market quotations. Sheet mill operations average very close to 90 per cent of capacity.

Tin Plate.—There has been a quickening both in specifications and mill operations. The latter have moved up to 86 per cent with the American Sheet & Tin Plate Co. and with independent capacity holding its recent rate, the general average now is not much under 85 per cent, as against 80 per cent, the rate of the past few weeks. Canners are taking a more optimistic view of the season's prospects for perishable foods, and it is now estimated that the requirements will be above the average of the past two years. The market is steady at $5.25 per base box, Pittsburgh, for standard coke tin plate.

Cold-Finished Steel Bars and Shafting.—The market has lost some of its recent activity. Although there has not been much variation in the rate of specifications on contracts for this quarter, buyers are not rushing to cover for the second quarter. The retreat of producers from 2.30c., base, to 2.20c., probably has created conservatism among buyers.

Hot Rolled Flats.—The market is active, but leaves much to be desired from the price angle and in prospects for the second quarter. Buyers are specifying so freely against low-priced first quarter contracts for April shipment that there is a fear that next month's specifications will be light. While it is not a general condition, there is enough extending of first quarter

THE IRON AGE Composite Prices

Finished Steel

March 20, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

March 20, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.75
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, gal'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower	2.10c
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
	Chrome Nickel Vanadium	4.15
	Carbon Vanadium	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb*
Spikes, 9/16 in. and larger	$2.70 to $2.8
Spikes, ½ in. and smaller	2.70 to 2.8
Spikes, boat and barge	2.90 to 3.0
Tie plates, steel	2.1
Angle, bars	2.7
Track bolts, to steam railroads	3.80 to 4.9
Track bolts. to jobbers. all sizes, per 100 count,	70 per cent off lis

Welded Pipe

Base Discounts, f.o.b. Pittsburgh Distric and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Ga
⅛	45	19½	¼ to ⅜	+11	+30
¼ to ⅜	51	25½	½	22	1
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	3
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	19
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	13
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	9
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	40
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	50
2½ and 2¾ in.	45	4 in.	58
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

contracts into the second quarter to create doubt about the maintenance of the higher prices named about five weeks ago.

Cold-Rolled Strips.—There seems to be some wavering in prices, particularly as applying to the large tonnage buyers, whose recent tendency to hold back specifications with an idea of conserving tonnage for April shipment has prompted increased sales efforts by some producers. If there has not been actual extension of first quarter contracts, there has been acceptance of additional tonnage on first quarter contracts and at first quarter prices. On the large tonnages, therefore, the test of the higher prices announced late in January has been further deferred. There has been a gain in orders but at the expense of prices.

Bolts, Nuts and Rivets.—Rivet makers are insisting firmly on the higher prices recently named, and while very little current business carries the advance, buyers being covered quite generally for this quarter at the old prices, all second quarter contracts are at the new prices. It is of course early for specifications against these contracts. Bolt and nut business is better now than it was at the outset of the year, but is not taxing productive capacity.

Coke and Coal.—Outside of the usual contracting for coal for the year beginning April 1 and some interest on the part of gas companies in furnace coke, the market is devoid of life and of fresh developments. Anxiety on the part of coal operators for backlog tonnage and the keen competition offered by southern West Virginia mines combine to keep prices on future shipments low. The spot market continues depressed by the fact that offerings exceed the demand. Contracting for second quarter tonnages of both furnace and foundry coke is pretty well completed. Almost no spot demand exists for coke for blast furnaces, but gas producers are seeking tonnages of low ash coke, one inquiry calling for approximately 75,000 tons. Producers still are trying to get $2.85 per net ton at ovens on contract furnace coke and $2.75 for spot tonnages, but the actual market is 10c. to 15c. per ton lower.

Old Material.—The event of the week has been a sale of 5000 tons or more of compressed sheets at $15, which is as much as can be obtained for the best of the ordinary heavy melting steel and actually is 25c. per ton more than was paid within the week for a fair-sized lot of that grade. This situation is unusual and may be expected to change quickly. Some consumers in this district prefer the carefully prepared compressed sheet scrap out of Detroit to the regular run of heavy melting steel at even prices, and it is said that purchases also were prompted by fears of a diversion of shipments from Detroit with the opening of the Lake shipping season. While the general scrap market appears weak on the surface and actually is weak on machine shop turnings and blast furnace grades, it is noted that offerings of heavy melting steel at prices under $15 are small, and there is not a dealer who would take orders for strictly No. 1 railroad steel at less than $15.50. The steel in the March list of the Pennsylvania Railroad sold at $15.35 delivered this district. Taking in railroad steel, heavy melting grade is quotable here at $14.50 to $15.50, the lower price applying to small lots picked up by dealers.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50
Short mixed borings and turnings	10.50
Cast iron borings	10.50
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.25 to 14.75
Industrial	13.75 to 14.25
Agricultural	13.25 to 13.75

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Gain in Steel Barrel Output

Steel barrels to the number of 518,944 were manufactured in February, a gain of 43,038 over the longer month of January, according to reports received by the Department of Commerce, Washington, from 27 companies owning or operating 31 plants. Shipments were 514,362 and 474,159 barrels respectively, and stocks at the end of the two months were 58,935 and 54,353 barrels. Unfilled orders for delivery within 30 days at the end of February totaled 297,889 barrels, against 241,145 at the end of January. Orders for delivery beyond 30 days were 1,119,738 and 1,110,652 barrels respectively.

Production in February was the highest for any month since October. It compares with 504,134 units in February, 1927, and with 522,486 in February, 1926.

Shipments by members of the Steel Barrel Manufacturers Association in February were 313,163 barrels and orders unfilled March 1 were for 469,553 units. Operation was at 28.7 per cent of capacity for I. C. C. barrels and 52 per cent for light barrels. Total business during the month was $949,825.

The United States Steel Products Co. has been awarded the contract for 1050 tons of 30-ft. round deformed structural reinforcing steel bars for the Panama Canal, the prices being on a delivered basis at either Balboa or Cristobal. The quotations were 2.435c. per lb. for 150 tons of ⅜-in. bars; 2.235c. for 300 tons of ½-in. bars; 2.135c. for 175 tons of ⅝-in. bars and 2.035c. for 100 tons of ¾-in., 75 tons of ⅞-in. and 250 tons of 1-in. bars. Delivery is to be made within 18 to 21 days.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$15.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts. blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Continue in Heavy Volume—Price Resistance Lessens

CHICAGO, March 20.—Specifications for finished steel continue in large volume, the past week having been the fourth largest of the year. Purchases are on the increase, but the total falls short of the current shipping rate. The fact that buying is expanding lends strength to the experience of some sellers that resistance to price advances is less pronounced and that a larger portion of current shipments may be going into actual production than had been supposed earlier in the month. Ingot production in this district remains steady, and steel mill backlogs range from six to eight weeks.

Open weather has started the movement of automobiles away from dealers' floors and an increased demand for steel by automobile plants and parts makers is noted. The Overland factories are reported to be on a daily schedule of 1300 cars and Chevrolet has planned a schedule of 370,000 cars to be built in the second quarter.

The Chicago & Eastern Illinois has received revised proposals on 500 freight cars, but is withholding orders until a study can be made of building cost in its own shops. Fresh railroad equipment inquiry is confined to 100 motor cars and 100 trailers by the Chicago Rapid Transit Co.

Pig Iron.—An interesting situation in this market is that second quarter coverage, which is now about 80 per cent completed, is heavier than for either the first quarter of this year or for the second quarter in 1927. Since inventories are usually run low at the end of the year, it is to be expected that first quarter contracts should be heavier than for the second period. Foundry iron production is steady and producers continue to draw on stocks for the difference between output and shipping orders. While forward buying is slowing down, there is an increased tonnage of spot business and also evidence that many purchasers underestimated their requirements for the first quarter. Several users to the west have ordered April iron delivered in March. A foundry in southern Wisconsin has ordered 2500 tons. An inquiry is out for 250 tons of charcoal iron, and brokers are trying to dispose of 500 tons of basic iron that is on track in Chicago. The silvery price schedule is steady, and forward contracting is making fair progress. Low phosphorus iron sales are confined to car lots.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys. — Specifications for ferroalloys are heavy, but new buying is confined to car lot sales. Current quotations on ferromanganese are $100, seaboard, and spiegeleisen of the 19 to 21 per cent grade in carloads is being sold at $32, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—New business in plates is confined to a moderate tonnage placed for second quarter requirements. Following the placing of 25,000 to 30,000 tons of tankage materials in the last few weeks, fresh inquiry has developed for 5000 tons from an oil producer in Texas. Specifications from car builders are of fair size, but new railroad equipment orders are needed if the rate is to be sustained. Reports vary as to the probability of early orders for cars from the Chicago, Milwaukee, St. Paul & Pacific. In some quarters it is believed that at least a portion of the requirements will be placed in the next 10 days. Following several weeks of uncertainty as to the trend of prices for plates, it now appears that 2c., Chicago, is well established for lots of 100 tons each or more. By the latter part of this week mill shipments will start against business taken at this figure. Deliveries range from four to six weeks.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—News in the construction field this week is concerned more with records of the immediate past than with what the future holds. Cost of new building construction started in February in Illinois was in excess of $84,000,000, of which $63,500,000 was for work in Chicago. Both of these totals establish records for the second month of the year. In the first two months of this year building construction in Illinois gained 61 per cent over January and February, 1927. The several large tonnage projects on which the trade in this district has been waiting give no indication that they are beyond the designing stage. In the meantime, competition among shops grows keener for the daily lettings of small size, and prices for fabricated materials are unstable and show a tendency to seek lower levels. Mill prices, however, are well stabilized at 2c., Chicago. The Buick Motor Co. has purchased property in Chicago and will erect a warehouse having 240,000 sq. ft. of floor space.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Demand for mild steel bars is steady, with new buying running equal to and specifications well ahead of shipments. No recession is noted in activity among farm implement manufacturers, while greater speed of production is the aim of tractor builders, who are feeling the impulse of added business brought about through discontinuance of tractor assembly by one of the largest makers. Soft steel bars are commonly priced at 2c., Chicago. Larger producers still adhere to 2.10c. for lots of less than 100 tons each, but some mills are waiving the extra $2 a ton regardless of the size of the order. Spot orders for iron bars at 2c., Chicago, are more numerous, but the aggregate tonnage is not large. Forward contracting is light. Alloy bar mills continue to operate at not far from capacity. Contracting is moderately active at the new base price, which is 2.65c., f.o.b. maker's mill. In rail steel bars, new business is equal to and specifications are fully 15 per cent above shipments. For the most part purchasers are taking this commodity at close range and as a result future buying has gained little momentum. Deliveries are made in two to three weeks, and prices are steady at 1.80c. to 1.85c., Chicago Heights. Bed manufacturers are speeding production and barn equipment makers are taking their full schedules. Shipments of fence posts are normal for this time of the year.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Specifications against contracts and new orders for immediate shipment to wire mills are heavier, and production has more than gained the two points lost a week or 10 days ago. In fact, output is now close to 77 per cent of mill capacity. Some improvement is noted in shipments of wire nails, although this commodity is not as active as it should be at this time of the year. It is evident that jobbers' stocks are more than ample and mill stocks in wire nails are growing larger. Woven wire fencing is moving steadily and orders for barbed wire are of good size. Slackening in the demand from jobbers, noted in the Middle West a week ago, is no longer in evidence. Orders are somewhat more plentiful from the Northwest. Prices for wire and wire products are shown on page 821.

Rails and Track Supplies.—A Western railroad has bought 5000 tons of standard-section rails. Inquiry before the trade is of small size. Rail mill operations in this district are steady at 90 per cent of capacity. A steam operated railroad has closed for 5000 tons of track accessories and two roads have come into the market for a total of 12,000 tons. Track supply production has reached the highest point so far this year. Light rail orders are confined to carloads.

Cast Iron Pipe.—Evidence is at hand that the spring buying movement in cast iron pipe is under way and with it comes a stronger tone in prices. Detroit will open bids March 26 on 2000 tons of 16-in. class C pipe and Chicago will buy 3200 tons of 24 and 48-in. class B pipe. Milwaukee will soon buy 450 tons of 30-in. pipe and Oshkosh, Wis., will purchase a round tonnage on March 29. James B. Clow & Sons have taken 2000 tons for Columbus, Ohio, at $34.95, delivered, or $27.95, Birmingham, a figure $1 a ton above those on recent lettings. A contractor's award of 1100 tons at Berea, Ohio, is said to have been taken at $28.35, Birmingham. La Porte, Ind., has closed for 230 tons of 6, 10 and 12-in. pipe at $29, Birmingham. Recent quotations show that attractive tonnages now bring $28 to $29, Birmingham, for 6-in. and larger diameters, while on less attractive orders as high as $31 is obtained. Delivered prices at Chicago range from $36.20 to $39.20. Public utilities are buying in small lots. The Northern Indiana Public Service Co. contemplates the construction of a gas line from Valparaiso to Michigan City, Ind., a distance of 23 miles.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Sheet Bars.—Specifications are heavy and prices are firm at $34 per gross ton.

Bolts, Nuts and Rivets.—Second quarter contracting is not far from 50 per cent completed, and little resistance has been offered to recent advances in prices. Production in this district is not far from 75 per cent of capacity, but for the country as a whole the rate is a shade less. Specifications for bolts and nuts from the railroads are more numerous and in larger total volume.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—The volume of specifications is well sustained, and hot mills are now scheduled two to three weeks ahead, while output averages 90 per cent of capacity. Territorially, the demand is widespread except for the Northwest, where the winter is not yet broken. Among the more active users may be named the roofing trade and manufacturers of small tanks. Distribution from warehouses has grown measurably in the last week. Forward buying is dull, but spot purchases are quite active. Chicago delivered prices are steady at 3.05c. for black, 3.90c. for galvanized and 2.25c. to 2.35c. for blue annealed.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Warehouse Prices. f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets. structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Reinforcing Bars.—Two 1000-ton projects are holding the attention of local dealers. One, a printing plant for the Reuben H. Donnelley Corporation, is up for bids. The 1000 tons for the *Daily News* building is assured of early placement as the foundation work on the structure is well advanced. Recent large tonnage awards, coupled with a greater number of orders for less than 100 tons, are strengthening the position of bar dealers who have speeded shop operations. Prices for reinforcing bars are more stable at 2.25c. to 2.75c. for billet stock bars out of warehouses, and 1.85c. to 1.95c., Chicago Heights, for the rail steel commodity. Recent awards and fresh inquiry are shown on page 836.

Coke.—Shipments are gaining slowly. All Chicago ovens are lighted, and the foundry by-product grade is quoted at $9, local ovens, and at $9.50, delivered in the Chicago switching district.

Old Material.—Tendencies in the Chicago scrap market are mixed. Steel mill buyers, who recently purchased heavy melting steel at $13.25 per gross ton, delivered, are now offering $13. The same interests, however, have taken 2000 tons of cast iron borings at 25c. up, or at $10.25 per gross ton, delivered. Brokers are having no trouble in covering on borings, but for heavy melting steel they are often forced to pay $13 for acceptable grades. A recent purchase of rerolling rails brought $14.75 per gross ton. This is 25c. below recent consumer purchases and is the same price obtained by the railroads. Numerous specialties have turned active after many weeks of slow demand. Steel and gray iron foundry grades are being sought by melters. The Gary mills are purchasing scrap from time to time, and with the greater consumption in this district country scrap has again started to flow to Chicago. The Chicago, Rock Island & Pacific is offering 5000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton		
Basic Open-Hearth Grades:		
Heavy melting steel	$12.50 to	$13.00
Shoveling steel	12.50 to	13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to	14.00
Hydraulic compressed sheets	11.00 to	11.50
Drop forge flashings	9.75 to	10.25
Forged, cast and rolled steel carwheels	15.50 to	16.00
Railroad tires, charging box size	16.50 to	17.00
Railroad leaf springs, cut apart	16.50 to	17.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.00 to	14.50
Coil springs	16.50 to	17.00
Electric Furnace Grades:		
Axle turnings	13.00 to	13.50
Low phosphorus punchings	14.25 to	14.75
Low phosphorus plate, 12 in. and under	13.75 to	14.25
Blast Furnace Grades:		
Axle turnings	10.00 to	10.50
Cast iron borings	9.75 to	10.25
Short shoveling turnings	9.75 to	10.25
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	13.50 to	14.00
Rerolling rails	14.50 to	15.00
Cupola Grades:		
Steel rails less than 3 ft.	15.00 to	15.50
Angle bars, steel	14.00 to	14.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	12.50 to	13.00
Agricultural	12.00 to	12.50
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	18.75 to	19.25
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	11.00 to	11.50
No. 1 busheling	9.25 to	9.75
No. 2 busheling	5.25 to	5.75
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	12.50 to	13.00
No. 1 agricultural cast	12.50 to	13.00
Stove plate	11.25 to	11.75
Grate bars	11.25 to	11.75
Brake shoes	11.00 to	11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Pig Iron Quiet—Steel Business Largely Confined to Contract Shipments

PHILADELPHIA, March 20.—Most mills are endeavoring to maintain 1.90c., Pittsburgh, on bars; 2.05c., Coatesville, on plates, and 2.05c., Bethlehem, on shapes for current delivery and second quarter contracts. Consumers, however, are in most cases covered for the next quarter at prices $1 a ton lower. There is very little purchasing for prompt shipment, as buyers are apparently covered for all or more than they will require for the rest of the present quarter. Mills expect a large number of consumers to specify fully against current contracts by the end of this month.

There is a fair tonnage of steel in fabricated projects, of which bridge construction is a feature. Activity in new construction appears to be in prospect, with the city considering expenditures for public works to relieve unemployment and the United Gas Improvement Co. reported as contemplating considerable construction in the belief that the time is opportune from the standpoint of costs of materials and labor.

Consumers of pig iron have thus far purchased only moderately for the next quarter, their present rate of operation in most cases promising a carry-over of present contracts well into the second quarter. Recent sales of Buffalo iron in this district have also been a factor, buyers preferring to await possible price developments from this competition.

Pig Iron.—Buyers do not seem to expect any advance in the present market of $20, furnace, on foundry iron, and as their present contracts are in many cases sufficient to carry them well into the next quarter, not much interest has developed in new contracting. The competition of Buffalo iron has caused some hesitation, consumers preferring to await further price developments. Recent inquiries have included 600 tons of foundry iron and 50 tons of basic for the Hilles & Jones plant of the Consolidated Machine Tool Corporation at Wilmington, Del., and about 900 tons of foundry for the **Foran Foundry & Mfg. Co., Flemington, N. J.** No further purchasing of basic is reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Billets.—Only small tonnages are under inquiry. Rerolling grade continues at $33 per ton, Pittsburgh, and forging quality at $38, Pittsburgh.

Bars.—There is a lag in specifications, so that there may be some tonnage carried over into the next quarter unless extensions are refused by the mills. While 1.90c., Pittsburgh, is being quoted on both prompt business and second quarter contracts, most consumers are covered for the coming quarter at 1.85c. per lb., Pittsburgh.

Shapes.—Quotations for immediate shipment are 1.97½c. per lb., Pottsville, and 2.05c. per lb., Bethlehem, or 2.12c. to 2.18c., delivered Philadelphia. Although 2.05c., Bethlehem, is being quoted on second quarter contracts, it is admittedly difficult to maintain this in view of the large number of contracts already made at 2c., Bethlehem. Fabricators are working on a number of bridge contracts and some sizable projects are in prospect.

Plates.—Most mills are moderately active, but buyers evidently encounter no difficulty in getting prompt shipments. The pressure is still by the mills for more specifications rather than by consumers for deliveries. Prices are being maintained at 2.05c., Coatesville, or 2.15c., delivered Philadelphia, but contracts for next quarter have been made at 2c., Coatesville.

Sheets.—The blue annealed market seems to be quite firm at 2.10c., Pittsburgh. Occasionally 2.15c. per lb. is being obtained on small lots. Black sheets are 2.90c., Pittsburgh, and galvanized 3.75c., per lb., Pittsburgh, with occasional concessions.

Warehouse Business.—Concessions still appear on galvanized sheets and black sheets are inactive. Quantity differentials on bars and small shapes are being adhered to successfully and if differentials on bands are adopted by the mills generally warehouses will take like action.

Imports.—Pig iron arrivals at this port were the feature of the week ended March 17. Of a total of 8596 gross tons, 7947 tons came from the United Kingdom, 348 tons from India and 301 tons from the Netherlands. A total of 300 tons of spiegeleisen arrived from Germany. Steel imports consisted of 455 tons of shapes and 38 tons of bars from Belgium, 12 tons of strip steel and 52 tons of steel bars from Sweden.

Old Material.—Consumers show little interest in purchasing. No. 1 heavy melting steel is active only in shipments on contracts. A Phoenixville consumer is offering to purchase machine shop turnings at $10 per ton, delivered, stove plate at $11.50 per ton, and No. 2 heavy melting steel at $11 per ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)	10.50 to	11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)	12.00 to	12.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)		12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

The January report of the interplant accident reporting system, industrial safety division of the Springfield, Mass., Safety Council, shows that 33 plants in Springfield and vicinity operated during the month without a loss-time accident. The report covers figures from 60 manufacturing concerns with 21,435 employees. who worked 3,830,336 hr.

Cleveland

Steel Tonnage Exceeding February Rate —Motor Car Industry Heavy User

CLEVELAND, March 20.—Specifications for steel bars, plates and structural material against 1.80c. first quarter contracts continue heavy, and some of the mills have booked more tonnage so far this month than during the corresponding period in February. On new business, both for early shipment and for the second quarter, 1.85c., Pittsburgh, is still in effect. While some attempt is being made to establish the market on a 1.90c. basis, this price so far applies only to small miscellaneous lots. Most buyers, except some of the smaller consumers, have placed second quarter contracts at 1.85c. Some of the mills have advised their trade that specifications against 1.80c. contracts must be in by April 1, and this is bringing out specifications. This price will apply on much of the steel shipped in April. The new prices on alloy steel bars have not yet been tested, as they will not apply to contract consumers until after April 1. While there were some price reductions, four grades comprising over 90 per cent of the tonnage used, are advanced from $2 to $4 a ton.

The automotive industry continues to take steel in good volume against contracts, and it is now predicted that this industry will continue at good operation through the second quarter. However, the motor car builders are showing hesitancy in placing second quarter contracts. While some contracts have come from this source for sheets and hot and cold rolled strip steel at the currently quoted prices, the business has not been sufficient in volume to test the present prices, against which some resistance is being offered. The Ford Motor Co. is reported to have increased its production to 1600 cars per day with an expectation of a further increase to 2000 by the end of the week.

Structural inquiry is light in this territory, although fabricators are getting a good volume of small orders. Awards include 2500 tons for power transmission towers in northern Ohio. A bridge project in Louisville, Ky., involving 15,000 tons of structural shapes has been revived.

Pig Iron.—Buying for the second quarter is gradually tapering off, although furnaces are still taking a fair amount of business. Sales by Cleveland interests during the week totaled 23,000 tons. Quite a few sales were made in the northern Ohio territory, but the activity was more pronounced in Michigan and in Buffalo, where some business was taken for Eastern shipment. Two inquiries for foundry iron came out for the third quarter, one from a Kokomo, Ind., stove manufacturer for 1000 tons and the other from western Ohio for 3000 to 4000 tons. Some furnaces are not inclined to encourage third quarter buying at the present time and may not quote prices for that delivery for several weeks. Prices show no change. Cleveland furnaces are holding closely to $17, furnace, shading this to $16.75 only for shipment to extremely competitive points. One Lake furnace is on a $17.50 basis except in Michigan, where the market is holding at $18. Shipping orders from the automotive industry continue heavy and may show a gain this month over February. Shipments to jobbing foundries and to manufacturers in some other fields show a slight gain. Malleable foundries are doing better than a few weeks ago. Low phosphorus iron is inactive.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Coke.—The present price of $8, Painesville, or $9.01, delivered Cleveland, has been re-established for Ohio by-product foundry coke for April shipment. Prices of Connellsville foundry coke are unchanged at $3.75 to $5.10, ovens. The demand shows some gain over the previous few weeks.

Fluorspar.—Some small-lot sales of gravel fluorspar are being made at $15, mines, but at least one producer is still on a $14.50 basis. There is talk of an advance to $16.

Cold Finished Steel Bars.—Since the establishment of 2.25c., Cleveland, or 2.20c., Pittsburgh, as the second quarter price, most consumers have either placed second quarter contracts or have arranged to carry over through the next quarter contracts placed for this quarter at the same price. Specifications are only fair.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are showing a little gain this month over February, and makers are operating their plants at about 65 per cent of capacity. Some contracts are being taken for the second quarter. The $3 a ton advance on rivets for the second quarter was expected to stimulate orders against first quarter contracts, but so far there has been little gain.

Iron Ore.—There is an expectation that Lake Superior ore prices for the season will be named before the end of the month. The inquiry of the Ford Motor Co. for 440,000 tons is the only one so far in the market, and it seems probable that the prices will be established on the Ford business, on which sellers have not yet put in bids. It is generally expected that last season's prices will be re-established. Sellers look for a movement in 1928 of about the same volume as last year when Lake and rail shipments amounted to 52,344,099 tons. Stocks at furnaces and on Lake Erie docks May 1 will be about 1,000,000 tons less than on the same date a year ago. These stocks on March 1 amounted to 29,002,800 tons, compared with 29,808,552 tons on March 1, last year. The amount at furnaces on March 1 was 23,015,392 tons. Consumption of Lake ore during February amounted to 4,394,931 tons, a gain of 91,779 tons over January. Central district furnaces during the month consumed 2,135,684 tons, a gain of 71,813 tons. Lake front furnaces used 2,084,656 tons, a gain of 24,194 tons. Eastern furnaces melted 58,984 tons, a gain of 14,542 tons, and all-rail furnaces used 115,607 tons, a decrease of 18,748 tons. On Feb. 29 there were 159 furnaces using Lake ore in blast, a gain of three for the month.

Semi-Finished Steel.—In the hope of getting somewhat better prices, the local producer is still holding off in naming second quarter quotations and has made reservations for that delivery for some of the large consumers subject to the fixing of prices later. Specifications are fairly heavy.

Sheets.—Irregularities have developed on black sheets for prompt shipment in both the Cleveland and Detroit territories. A quotation of 2.75c., Pittsburgh, is reported in the latter market. While mills have taken quite a few second quarter contracts at 2.90c., there is considerable hesitation among consumers about placing contracts for any grade. Galvanized sheets are still offered at 3.75c., Ohio mill. Blue annealed and auto body sheets appear to be firm. Extensions of present 2.90c. contracts for tin mill black plate through the second quarter are reported. New demand is slow, but specifications against contracts from the automotive industry are heavy. Recent buying by this industry has not been in lots of sufficient size to test the market, although the business that has been placed in auto body sheets is understood to have gone at regular prices.

Strip Steel.—Consumers are freely specifying against old low-priced contracts for both hot and cold-rolled strip. While some second quarter contracts have been placed at the currently quoted prices, they have not been for large lots, as considerable hesitation is being shown among consumers in placing contracts and the test of the market is yet to come.

Reinforcing Bars.—Inquiry is light. Some rail steel mills have advanced prices $1 a ton to 1.80c., mill. Billet steel bars are unchanged at 1.80c. to 1.85c., Cleveland.

Warehouse Business.—While jobbers' sales are fair. they are not holding up in volume to last month. Prices are being well maintained.

Old Material.—There is no new consumer demand and dealers are still covered against contracts. Consequently the market is almost at a standstill. Mills continue to regulate shipments and are not taking much scrap. Some are evidently reducing their scrap inventories because of the approach of the Ohio tax return day, April 8. The supply of scrap is in excess of the demand and the market has a weak tone. Quotations are unchanged, but in the absence of transactions are nominal.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

New York

Pig Iron Consumers Delaying Purchases —Steel Volume Continues Heavy

NEW YORK, March 20.—Sales of pig iron by local brokers during the week did not exceed 7000 tons. Little new inquiry has appeared in the market, and consumers are showing an increasing inclination to delay purchases on the possibility that they may obtain better prices later. A Port Chester, N. Y., plant, which was in the market for 2000 tons of foundry iron, has postponed buying. The Foran Foundry & Mfg. Co., Flemington, N. J., is about to close on 400 tons of No. 2 and 500 tons of No. 2X foundry iron. The General Electric Co., Schenectady, N. Y., has entered the market for a total of 2500 tons of various grades of foundry iron for shipment as follows: 600 tons to Bayway, N. J.; 500 tons to Lynn, Mass., 400 tons to Everett, Mass.; 300 tons to Pittsfield, Mass.; 200 tons to Schenectady, and 500 tons to Erie, Pa. Another inquiry calls for 1000 tons for delivery during the second quarter. The New York Central Railroad is inquiring for 300 tons of foundry iron for delivery at Frankfort, N. Y., or Elkhart, Ind., and the Delaware, Lackawanna & Western Railroad has purchased 50 tons of foundry grade. About 1500 tons of foundry iron bought by the Westinghouse Electric & Mfg. Co. for Springfield, Mass., is understood to have been placed with a Buffalo producer at $16 per ton, Buffalo, for No. 2X and $16.50 for No. 1X. Economies in freight rates through the use of barge shipments are still receiving careful consideration by Buffalo producers. At a meeting of shippers and barge operators in New York last week no material progress toward establishing maximum and minimum rates for canal shipment was made. Operators wanted a minimum rate of $2.75 per ton from Buffalo to Jersey City docks, but producers contended that this is too high to permit competitive selling. Previous reports to the contrary, it is said that no Buffalo iron has been sold this year for through barge shipment to Delaware River points. although barge-and-rail contracts with eastern Pennsylvania consumers have been made.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Most jobbers are maintaining the present price schedule on products from stock. Concessions are infrequent. Discounts on bolts and screws are being maintained, with only occasional increases in the usual discount. Blue annealed sheet prices continue fairly firm, but concessions of not more than $1 a ton are still obtainable on desirable purchases. There is a good movement of structural material from warehouse and March is expected by most jobbers to prove the best month thus far this year.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Finished Steel.—Contract buyers of plates, shapes and bars have generally been covered for second quarter at 1.85c., Pittsburgh, for bars, at 2c., Coatesville, for plates, and at 2c., Bethlehem, for structural shapes. Some consumers who will be able to specify enough tonnage against first quarter contracts to carry them through April or beyond have preferred not to contract for the next quarter, evidently believing that the upward movement of prices has reached its peak for the present and that nothing is to be gained by covering. In sheets, strip steel and wire products there has been less second quarter coverage than in plates, shapes and bars. Some sheet buyers object to paying the higher prices asked for black and galvanized sheets for the next quarter and contracting is slow. Jobbers of wire nails are loaded up so heavily with stocks that some halting in the demand for that product is in evidence. The volume of specifications against first quarter contracts is well up to the recent levels and is quite satisfactory. Some mills insisted on customers specifying their March quotas by the 15th, but the majority will accept shipping orders up to the end of the month. This means that considerable of the lower-priced tonnage will not be shipped until late in April. Eastern mills are operating at 70 to 80 per cent. Structural steel lettings in this district during the week were light. Among pending inquiries is 7700 tons for a section of the subway in Brooklyn.

Cast Iron Pipe.—Prices continue to show greater firmness, most makers having sufficient business on order to carry them through the next four or five weeks. One Northern maker is still quoting prices which Birmingham foundries are declining to meet, and imported pipe has been sold on a basis of about $28 per net ton, Birmingham. Inquiries are in most cases for lots of less than 100 tons for small municipalities and private users. Madison, N. J., has purchased 56 tons of 6-in. water pipe from B. Nicoll & Co., New York. At the opening of bids March 14 by the Department of Purchase, New York, on 5355 tons of pipe, R. D. Wood & Co. were low bidders on 3280 tons of 8-in. and 1830 tons of 12-in. pipe and about 3000 tons of fittings. The United States Cast Iron Pipe & Foundry Co. was low on 245 tons of 6-in. pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—Several hundred tons of bars are involved in a number of road jobs for the State of New Jersey, some of which are likely to be closed this week. Another sizable tonnage will be required for two additional sections of the subway in New York, on which general contract bids are to be taken later in the month. Awards have not been plentiful during the last week. Although distributers are generally quoting 2c., Pittsburgh, at least one large contract closed recently went at a considerably lower figure. Warehouse prices are unchanged.

Coke.—There is some renewal of expiring contracts for both furnace and foundry coke, but in a few instances consumers are evidently intending to purchase in the open market until the beginning of the second half. Connellsville furnace coke is quoted at $2.75 to $3 per ton, Connellsville. Delivered prices in this district of special brands of beehive foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40 per ton, Newark or Jersey City, and $10.09 to $10.95, New York or Brooklyn.

Old Material.—Prices of most grades are unchanged, but the market as a whole does not show much strength. Brokers are offering $10.50 per ton or less for yard grade of heavy melting steel, delivered to eastern Pennsylvania consumers. Machine shop turnings are still being purchased for $10.25 to $10.50 per ton, delivered, but it is noteworthy that one consumer of turnings in eastern Pennsylvania is offering only $10 per ton, delivered, and another user is not accepting shipments. Stove plate prices have also receded for eastern Pennsylvania delivery, brokers offering only $11 to $11.50 per ton, delivered, about 50c. a ton less than a week ago.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

High Rate of Sales and Production of Steel Castings Continues

WASHINGTON, March 20.—Orders for commercial steel castings in February totaled 90,059 tons, representing 62 per cent of the capacity of the 129 reporting firms, against 91,069 tons or 63 per cent of capacity in January, according to the Department of Commerce. The reporting producers have a total monthly capacity of 145,600 tons, or more than 80 per cent of the commercial castings capacity of the United States. Production in February amounted to 86,626 tons, or 60 per cent of capacity, against 74,079 tons in January, or 51 per cent of capacity.

Of the new orders in February, 41,096 tons was for railroad specialties, being 61 per cent of this class of capacity, compared with 41,276 tons in January. Orders for miscellaneous castings in February totaled 48,963 tons, or 63 per cent of this kind of capacity, against 49,793 tons in January.

Casting produced for railroad specialties in February aggregated 37,719 tons, or 56 per cent of this kind of capacity, against 28,714 tons in January. Output of miscellaneous castings totaled 48,907 tons, or 63 per cent of this class of capacity in February, against 45,365 tons in January.

Except for January, the February orders were the largest since last June, when the total was 90,898 tons. Production in February was the largest since last August, with 87,004 tons.

New Management Proposed for N. & G. Taylor Co.

Following consultation with a number of its larger creditors, the N. & G. Taylor Co., Philadelphia, tin plate manufacturer, has requested an extension of time for payment of the claims of its creditors. The president of the company, H. N. Taylor, has agreed to cause a new management to be elected to conduct the affairs of the company and a meeting with the larger creditors is scheduled for this week, at which the creditors are expected to appoint a representative.

The company points out that economies of operation have been put into effect during the past few months and that business as a result has recently been profitable.

San Francisco

Car Company Buys 5000 Tons of Shapes and Plates—Outlook Good

SAN FRANCISCO, March 17 (*By Air Mail*).—Activity in the Pacific Coast markets fell off somewhat this week, but the trade is encouraged over the fact that considerable new work is in sight. Important lettings included 5000 tons of small shapes and universal plates for the Pacific Car & Foundry Co., Seattle, placed with the Pacific Coast Steel Co., 2000 tons of plates for the Seattle penstock, booked by the Puget Sound Machinery Depot, and 3100 tons of cast iron pipe for Southgate, Cal., awarded to Leo Vuksich.

The price structure in most lines is holding well to the established levels, but fabricated and erected prices on structural steel are decidedly weak in the San Francisco district.

Pig Iron.—Demand for foundry pig iron remains quiet, the majority of both sales and inquiries involving small lots. Another shipment of Indian iron has arrived on the Coast. Of this, 400 tons was unloaded at Los Angeles, 600 tons at San Francisco and the remainder was reshipped to north Pacific ports. The next shipment, 850 tons, is due about April 1. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

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*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—The Pacific Coast Engineering Co. took 370 tons for a plant in South San Francisco for the Edwards Wire Co. Demand for plain material continues strong and pending business exceeds 13,000 tons. Bids have been received on 4000 tons for the Capewell Store in Oakland, on 3000 tons for the Coyote Point bridge, San Francisco, and on 450 tons for a hotel in San Francisco. Plain material continues firm at 2.35c. c.i.f.

Plates.—Two important awards were noted this week. In addition to the 2000-ton penstock at Seattle, reported above, the Traylor Engineering Co. took 600 tons for kilns for the Pacific Coast Cement Co. at Seattle. Plate fabricators have figured the tonnage involved in the aqueducts in Oakland for the East Bay Municipal District, bids on which go in April 20. The Wildcat aqueduct will require 4830 tons for 56 and 60-in. pipe and the Sequoia aqueduct will take 3668 tons for 50, 56 and 60-in. pipe. All the material will be 7/16 in. Bids will be taken April 10 for 445 tons for siphons for the Kittitas Canal in Washington. Prices are firm at 2.30c. c.i.f.

Bars.—Reinforcing steel bookings were confined, with one exception, to lots of less than 100 tons. A subway in Los Angeles, involving 475 tons, was placed with an unnamed interest. Bids have been opened on 1000 tons for the Panama Canal Zone. Bids on 5257 tons for the Drainage Improvement District No. 23, Los Angeles, were returned unopened and new bids will be taken April 2. Pending business calls for more than 14,000 tons. Prices in the Bay district remain weak because of foreign competition, and 2.25c. on out-of-stock material continues to be quoted in a number of instances.

Cast Iron Pipe.—The largest cast iron pipe award so far this year was 3096 tons of 4 to 12-in. class B pipe for Southgate, Cal., the general contract going to Leo Vuksich, Los Angeles. Two San Diego street improvement jobs of 110 tons of 4 to 8-in. class B pipe for Whitman Street and 271 tons of 2 to 10-in. class C for Twenty-eighth Street, were placed with unnamed interests. Corrected estimates of the quantity involved in the East Bay Municipal Utility District aqueducts in Oakland, Cal., show 17,440 tons of 56 and 60-in. class C pipe for the Wildcat aqueduct and 13,250 tons of 50, 56 and 60-in. class C pipe for the Sequoia aqueduct. This brings the total to 30,690 tons instead of 25,000 tons, as reported in THE IRON AGE last week. Bids on this project will be opened April 20. All bids on 663 tons of 6 to 20-in. classes B and C pipe for Santa Barbara, Cal., were rejected and new bids will be taken March 22. Red Bluff, Cal., will open bids on March 26 for 114 tons of 6 and 10-in. class B or centrifugal pipe. Armona, Cal., rejected all bids on 222 tons of 4 to 8-in. class B pipe and has purchased standard pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Steel Pipe.—The only award reported this week was 100 tons of 6 and 8-in. lapweld pipe for Municipal District No. 3, Monrovia, Cal., which was placed with the Santa Fe Pipe & Supply Co., Los Angeles. The Grinnell Co. was low bidder at 89c. per ft. for 25,000 ft. or 360 tons of 8-in. seamless pipe for Los Angeles. Bids will be opened on March 19 for 510 tons of 4 and 6-in. seamless pipe for Brighouse, B. C.

Coke.—About 4000 tons of English coke has arrived on the Coast and part of it is now being unloaded at Los Angeles. The rest will be delivered to San Francisco Bay foundries. This market reflects the quiet condition of the pig iron market.

Birmingham

Steel Sales and Inquiries Show Decided Improvement

BIRMINGHAM, March 20.—The pig iron market continues to await second quarter developments. Buying during the week has been in small lots and most of the sales have been to melters who are running short on their first quarter requirements. Very little interest has been shown in second quarter buying and none of the three merchant producers in the district report forward bookings of any consequence. Only a few inquiries are being received. Sales of foundry iron are still on a $16 base. There were no changes last week in furnace operations, 18 being in blast. Of this number, 10 were on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Sales and inquiries last week showed a decided improvement. Demand has increased and a considerable volume of business is being booked. Prices are unchanged. Structural steel fabricators report a better feeling in the market. Open-hearth operations continue the same as for the past two weeks. The Tennessee company is alternately operating 13 and 14 and the Gulf States Steel Co. four.

Cast Iron Pipe.—A fair amount of tonnage has been placed during the first half of the month, consisting almost entirely of small orders. Inquiries indicate that buyers are taking more interest in second quarter buying, and the last half of the month is expected to be much better than the first half. It is understood that a number of municipalities in the North are shaping their requirements and considerable activity is looked for from that field with the opening of spring. Prices on second quarter deliveries are being quoted at $29 to $31. Plants are operating at around a three-fourths capacity rate.

Coke.—Second quarter buying has continued to improve and more tonnage is being booked than for some time. Shipments are at a nominal rate. The Tennessee Coal, Iron & Railroad Co. on March 6 placed in operation its new by-product unit, consisting of 63 Koppers-

Becker ovens. Both spot and contract quotations are still at $5.

Old Material.—Sales continue low and in small lots. A slight increase in inquiries has been shown and a better demand is expected. Stove plate and No. 1 cast are being quoted at $14.50. Other prices are the same.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to	$10.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	8.00 to	8.50
Cast iron borings		8.00
Stove plate		14.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.50
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Boston

Buffalo Furnace Sells 1000 Tons of Pig Iron at Low Prices

BOSTON, March 20.—The outstanding sale of pig iron the past week was one of 400 tons No. 2X and 600 tons No. 1X made by a Buffalo furnace to the Westinghouse Electric & Mfg. Co., Springfield, Mass., deliveries to begin in April and to extend into the third quarter. The No. 2X was sold at approximately $16 a ton, furnace, and the No. 1X at $16.50, the lowest prices made this year. Otherwise the pig iron market is devoid of special feature. Current orders range from car lots to 100 tons, mostly car lots, with Buffalo furnaces, other New York State furnaces and the Mystic Iron Works taking 90 per cent of the business. A little Indian iron was sold at $21.75 to $22 on dock here, duty paid.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Pig Iron Imports.—Imports of pig iron at this port during the first half of March were 199 tons of Indian. In the first half of February, this year, 986 tons was received at Boston; in the first half of March, 1926, 4910 tons, and in the first half of March, 1925, 2033 tons. No iron arrived in March, last year.

Coke.—Ovens are still billing out by-product foundry coke at $11.50 a ton, delivered within a $3.10 freight rate zone. Specifications against contracts continue to come in slowly. Domestic by-product coke sells on a basis of $8.50 a ton on cars, Everett, Mass.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Reinforcing Bars.—A sizable business in lots of 50 tons or less was closed in the week. Some attractive tonnages in the Providence, R. I., district are expected shortly. Competition is keen, and 2.90c. per lb., base, from stock has been shaded. Mills are holding to 1.90c. to 1.95c. per lb., base Pittsburgh.

Cold-Rolled Strip.—Mills have opened their books for second quarter. No large tonnages are in the market, however, as consumers continue to buy on a hand-to-mouth basis. Mills are holding to 3.30c. per lb., base Worcester, Mass., for 1 to 3 ton lots.

Old Material.—Machine shop turnings are 25c. a ton lower. Prices for other kinds of scrap are practically unchanged from a week ago, but the market appears easier because inside prices are being paid more often than outside prices. Business is spotty and largely in car lots, and embraces all kinds of material except specification pipe and skeleton. The largest turnover the past week was in turnings and borings, with forged flashings and forged scrap second in activity. Brokers are shipping quite a little textile machinery cast into Pennsylvania, paying around $11.50 a ton on cars, shipping point. Scattered sales of long and short bundled cotton ties at $6 to $6.50 on cars, shipping point, are noted, and the Mystic Iron Works is taking sheared pipe and stove plate at $10 a ton, delivered.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.10
Scrap T rails	8.00 to	8.50
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought	8.00 to	8.50
Machine shop turnings	5.50 to	6.00
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.50 to	6.00
Forged flashings	6.00 to	6.50
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.00 to	15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.25
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	9.00 to	9.50

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate	9.50 to	10.00
Railroad malleable	13.00 to	13.50

Youngstown

Ingot Output at About 85 Per Cent—Sheets and Bars Most Active Products

YOUNGSTOWN, March 20.—In point of steel ingot production this district has been running very close to physically full capacity this month and there will be surprise if the month's output falls materially below that of the same month last year. The Youngstown Sheet & Tube Co. has put on another blast furnace, one of the Campbell stacks, and now has six of its nine iron-making units in this district in production—three of the four Campbell furnaces, one of the Brier Hill furnaces and the two at Hubbard, Ohio. The Republic Iron & Steel Co. has three of its four Hazelton furnaces in production, while the single furnaces of the Trumbull Steel Co., Warren, Ohio, and of the Sharon Steel Hoop Co., Lowellville, Ohio, are in blast. The Carnegie Steel Co. has four of six Ohio furnaces in Youngstown in production and in the Shenango Valley four of the six units at Sharon and New Castle, Pa., are operating. Thus, 19 of the 27 steel works blast furnaces in the Greater Youngstown area are active, and in view of improvements and enlargements made in recent years in these furnaces, as much iron now is being made as could have been produced in the full number a few years ago.

The Youngstown Sheet & Tube Co. has 20 of its 24 open-hearth furnaces in this district in production. All eight of the steel-making units at Trumbull Steel Co., Warren, are active, as are all six of the Sharon Steel Hoop Co. There are 15 open-hearth furnaces in the Republic Iron & Steel Co. group, but two of these were built by the Government during the war and are not yet listed as the property of the company. Of the 13 owned, 12 are melting. The Carnegie Steel Co. is producing steel in this district at approximately 85 per cent of capacity and that is probably a good estimate of the independent production, although the numerical rating indicates a higher output.

The picture is not quite so bright from the angle of finishing mill operations. There is good engagement of sheet rolling capacity, although as with active melting units, the number of active mills is a little misleading as to the actual production, since at only a few plants are the mills being operated the full number of turns possible each week. The week of 5½ days permits the working of 16 turns of 8 hr. each, but with the exception of the companies producing full finished and automobile body sheets, the average is around 13 turns weekly. Bar mill operations are good, and specifications against old orders are sufficient to sustain relatively full operation of the strip mills, but pipe mills are not much more than 60 per cent engaged and the general demand is not even that good. A common complaint is the brevity of the rolling mill schedules. Consumers still take full advantage of mill and railroad efficiency to keep their specifications down to actual requirements and expect the mills to ship promptly on releases.

Invoice prices are not very satisfactory because the mills here, as in other producing centers, found their order books pretty heavy when price advances were made and conditions have not shaped themselves in a way to give the manufacturers much benefit. Average prices for steel bars for this quarter will be slightly higher than for the final quarter of 1927, but advances in sheets and strips since the opening of the year mean little so far in larger net returns, as so much of the business of this quarter was taken late last year when prices were low. Putting prices up is a slow process, when advances are preceded by full coverage of consumers at lower figures. Pipe prices are highly competitive and are not yielding as much profit as a year ago and the showing is further reduced by a smaller demand than existed at this time last year.

Not much activity is noted in pig iron, the Pittsburgh district market for the steel-making grades being practically cut off by the fact that Pittsburgh steel companies have iron for sale at lower delivered prices than can be made by local furnaces. There is only moderate interest in scrap supplies among local melters, and prices tend to weaken. Most recent sales of heavy melting steel were at $15, but present ideas of consumers are at least 50c. a ton lower. On compressed sheets $14.50 has been paid, but there are offerings at $14.25. There is no market here at present for machine shop turnings.

The reason for the ending of the negotiations for a merger of the Inland Steel Co. and the Youngstown Sheet & Tube Co. continues to be the subject of speculation. Officials of the latter company decline to comment on the termination of the negotiations beyond the official statement given out by Mr. Campbell following his return from the South. No additional information was forthcoming at the special meeting of the stockholders held here last Thursday which voted down the proposed merger.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Cincinnati

Pig Iron Sales Decline—Steel Specifications Hold at Recent Level

CINCINNATI, March 20.—Pig iron buyers are showing little interest in second quarter requirements, and consequently sales in the past week dropped to a low point. In many cases consumers have been slow in releasing shipments on current contracts, so that considerable iron bought in the first two months of the year will not be delivered until April. For this reason no important buying movement is expected in the next 30 days. An Indianapolis melter has closed for 3000 tons of malleable with a Lake producer. A Kokomo, Ind., company is inquiring for 1000 tons of foundry iron for third quarter delivery, while the Louisville & Nashville Railroad is taking bids on 590 tons of foundry and charcoal iron. Northern Ohio furnaces are quoting $16.75 to $17, base furnace, and are getting a large share of the business in this territory at those prices. Ironton makers decline to go below $19, base Ironton, and as a result are booking only meager tonnages. Southern interests are soliciting second quarter orders on a basis of $16, Birmingham.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—From a tonnage standpoint specifications have held up to the level reached two weeks ago, and releases on current contracts are expected to attain substantial proportions before the end of the first quarter. Consuming industries are operating at a fair rate, but are taking steel only as they need it for immediate use. Small fabricators in this district have a comfortable amount of work ahead of them, but large companies are feeling the absence of major propects. The Louisville & Nashville Railroad has taken bids on about 800 tons of steel for eight bridges. Bars, structural shapes and plates are quoted at 1.90c. to 2c., base Pittsburgh, although there still is a tendency on the part of certain mills to accept attractive orders at 1.85c. In the sheet market, conditions are regarded as favorable. Orders from automobile companies have been heavy and have enabled mills to sustain production on a basis approaching full capacity. The jobbing trade also has been buying consistently, while demand for electrical sheets has been normal. Aside from concessions in galvanized sheets for roofing purposes in the South, prices for second quarter are becoming more firmly established. Blue annealed stock is steady at 2.10c., base Pittsburgh, black at 2.90c. and automobile body sheets at 4.15c. In this territory galvanized sheets are being sold at 3.75c., but shading of from $2 to $3 a ton is reported from the South. The American Rolling Mill Co. states that all of its units are operating at 100 per cent of capacity. Common wire nails are quoted at $2.65 per keg, Ironton or Pittsburgh, and plain wire at $2.50 per 100 lb., Ironton or Pittsburgh.

Reinforcing Bars.—Makers of new billet bars are asking from 1.90c. to 2c., base Pittsburgh, for second quarter delivery, while rail steel stock is being sold at 1.80c. to 1.85c., base mill.

Warehouse Business.—Sales have been moderate in volume and indications are that business in the first quarter of 1928 will equal that in the same period last year. Bars, structural shapes and plates are the most active commodities at the moment. Prices are steady and unchanged.

Coke.—Shipments of by-product foundry coke from ovens at Indianapolis, Portsmouth and Ironton have been holding up well, and the total volume in March promises to be the best in many months. While foundries supplying the automobile trade are taking most of the tonnage, demand from jobbing foundries also has been good. Movement of beehive foundry coke from the Wise County and New River districts has been comparatively light in the last two weeks. Prices are unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The scrap market is listless. Steel plants are doing practically no forward buying, although releases on present contracts have been about normal. Blast furnace grades are quiet. Railroad lists closing last week are reported to have brought prices only slightly under those in February.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.50 to 11.00
Short rails	16.00 to 16.50
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.25 to 12.75
Agricultural malleable	11.75 to 12.25

St. Louis

Bridge Approach Requires 6000 Tons of Steel—Pig Iron Quiet

St. Louis, March 20.—The pig iron market continues quiet. Considerable iron is yet to be bought for second quarter delivery, and this demand is expected to come soon. The melt in this district is keeping up well. The Granite City maker's sales totaled 3000 tons, all foundry grades, including 1000 tons to a specialty maker, several lots of 300 tons each to stove foundries. A leading Southern interest sold 400 tons, and has inquiries for an additional 300 tons. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Finished Iron and Steel.—Bids will be received April 15 by the Board of Public Service for 6000 tons of structural steel to be used in the southern approach to the municipal bridge across the Mississippi River. About 5000 ft. of double track will be built, but bids for the rails will not be asked for until fall. Lettings of the structural steel and reinforcing bars for the embankment and foundation for the bridge has been reported in THE IRON AGE. The Manufacturers Railway of St. Louis bought 490 tons of steel for car repair work from the Illinois Steel Co. Renewed activity is reported in the oil fields, but it has not yet affected the demand for steel. Warehouse business is better, but the improvement is coming only from the St. Louis industrial district.

Coke.—Another spell of cold weather has helped the demand for domestic grades of coke. Buying of industrial grades continues active, although consumers are covering only as their needs arise.

Old Material.—The old material market continues weak because consumers have sufficient material on hand or contracted for to last at least another month, and it is not likely they will buy until then. Dealers are buying only to cover orders. No. 1 locomotive tires, miscellaneous standard section rails, etc., and machine shop turnings are 50c. a ton lower; the remainder of the list is unchanged. Railroad lists include: Southern Railway, 7300 tons; International-Great Northern, 3000 tons; Wabash, 251 tons; Rock Island, 175 carloads; Frisco Lines, 17 carloads, and Chicago, Burlington & Quincy, 15 miles of 60 to 70 lb. relaying rails.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.50 to $12.00
No. 1 locomotive tires	12.25 to 12.75
Heavy shoveling steel	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	13.00 to 13.50
Railroad springs	14.25 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	13.75 to 14.25
Machine shop turnings	7.00 to 7.50
Steel car axles	18.50 to 19.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Buffalo

Pig Iron Fairly Active—Steel Output at 80 to 85 Per Cent

Buffalo, March 20.—A Buffalo pig iron maker reports taking an order of 2000 to 3000 tons of foundry from a New York State consumer. The General Electric Co. is in the market for 2900 tons of foundry iron for its plants. The Consolidated Machine Tool Co., Rochester, is inquiring for 650 tons of malleable iron for its Delaware plant. A Scranton, Pa., order was for about 1000 tons of foundry. Two Erie consumers bought, the tonnage running from 300 to 500 tons of foundry iron in each case. Quotations are firm at $17

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

in the district, with one maker quoting below this on New England delivery.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation is around 80 to 85 per cent of capacity on bars, shapes and sheets. Sheet business is good, with the automobile companies specifying freely. The price is unchanged at 2.90c. per lb. for black and 4.15c. for automobile body sheets. Bolt and nut demand is fair, with business being placed for second quarter at the same discounts as for first quarter. A Rochester garage will require 200 tons of reinforcing bars and a new Buffalo terminal for the C. & B. Steamship Line is expected to come out within a week.

Old Material.—The market has been very quiet during the past week. The only purchasing noted has been among dealers. None of the mills or other large consumers has been in the market. Steel mills are operating just as heavily as they have been for the past two weeks and consumption of scrap has been large.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.75 to 10.25
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Detroit Scrap Market Dull and Prices Unchanged

DETROIT, March 20.—No changes in prices on old material have developed during the past week in this district. The general tone of the market is decidedly weak. There have been few sales of size.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

The Bureau of Standards, Washington, has sent to representative manufacturers a proposed revision of General Specification for Metals, with a view to getting comment before the revision is promulgated.

Canada

Pig Iron Buying at High Level —Scrap Markets More Active

TORONTO, ONT., March 20.—Buying of pig iron in the Canadian markets continues at a high level. Some buyers are delaying purchases as long as possible and are entering the market only when needs make it necessary. This attitude is chiefly due to the fact that they prefer to wait until the opening of Lake and St. Lawrence navigation before placing large tonnage orders; thus they are in a position to obtain the benefits of lower freight charges. Melters who are out of reach of water ports, however, are placing orders for spot delivery. During the past week advance buying has been more general, and it is estimated that about 25 per cent of those who place contracts are now covered for second quarter needs. Inquiries are increasing. While Canadian pig iron makers are doing little price shading, they have strong competition from United States producers and there is little prospect of early advances here.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—The better conditions prevailing among plants using scrap as a raw material have been reflected in more extensive buying in both the Toronto and Montreal districts. Dealers' buying prices are gaining in strength, but not sufficiently so to warrant a revision in quotations.

Dealers' buying prices.

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	$15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Oppose Increased Rates on Chain Steel and Bolt, Rivet and Nail Rods

WASHINGTON, March 20.—Briefs were filed last week with the Interstate Commerce Commission in connection with the proposal of the railroads in Official Classification territory to increase rates on chain iron and steel, and bolt, rivet and nail-wire rods. The producing steel companies and users of the rods ask the commission to cancel the proposed rates, now under suspension, while the railroads uphold the tariffs. The proceeding involves the question of classification.

The steel producers and users of the rods state that the proposed tariffs would raise the gross billet ratings on rods in coils, in use for 40 years, to finished steel ratings, and in many cases, to fifth class ratings. The new rates, according to the railroads, are based upon the order of the commission in the Standard Nut & Bolt Co. and related cases. The producers and users contend the articles are semi-finished material while the railroads hold they are finished and are subject to the same rates as steel bars, etc.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Mar. 20	Mar. 19	Mar. 17	Mar. 16	Mar. 15	Mar. 14
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.00	13.82	13.80	13.80	13.82	14.00
Straits tin, spot, N. Y.	52.00	53.00	....	51.80	50.87½	50.50
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00
Lead, St. Louis	5.80	5.80	5.80	5.80	5.80	5.80
Zinc, New York	6.07½	6.02½	6.00	6.00	6.00	6.02½
Zinc, St. Louis	5.72½	5.67½	5.65	5.65	5.65	5.67½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, March 20.—Tin has been the most active market, with prices advancing sharply. Copper has again turned quiet, with quotations inclined to soften. Conditions in lead are practically unchanged. Demand for zinc is fair and prices are becoming stronger.

Copper.—A tendency toward weakness in electrolytic copper has unexpectedly developed following the strength manifested a week ago. Demand from both foreign and domestic consumers fell off during the week and, as a result, some metal was available at concessions from one or two sources. Practically all large producers still firmly maintain their quotations at 14.12½c., delivered in the Connecticut Valley. In the last week sales have been made at 14.05c. to 14.07c., but the quantity which has changed hands has been small. Yesterday and today a stronger tone has developed and metal below 14.12½c. is very difficult to obtain, if at all. Buying during the week by foreign consumers has been better than by domestic. It is stated that there is a large backlog of metal still to be bought by both foreign and domesic consumers, particularly the former. The official price of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f. European ports. Lake copper is inactive at 14.25c., delivered.

Tin.—With sales of over 3000 tons for the week ended Saturday, March 17, the market has experienced one of the most active periods in many months. The feature has been large purchases by consumers, dealers taking very little metal. Even on Saturday, which is usually an inactive day, the remarkable total of 500 tons for that day was sold. This general activity has resulted in a sharp increase in prices, the low point having been 50c. on March 13, with 52.75c. realized on Saturday, March 17. The principal buying was for March-April delivery, but some spot and March metal was included. Demand for June, July and August delivery was very light. Yesterday, Monday, the market was quieter and consumers showed little interest. Sales dropped to about 200 tons. Today the market has been only moderately active with spot Straits tin quoted at 52c., New York. Throughout the week London has been stimulated by the advances here and has been dependent on American orders. Quotations there today were considerably higher than a week ago, with spot standard quoted at £232, future standard at £232 17s. 6d. and spot Straits at £236 10s. Arrivals thus far this month have been 4700 tons and 7130 tons is reported afloat.

Lead.—Demand continues of small proportions and is confined to carload lots, mostly for prompt and March shipment. Quotations are virtually unchanged. The leading interest still maintains 6c. as its contract price at New York, and in the outside market 5.80c., St. Louis, is the established quotation.

Zinc.—Because of considerably higher prices for ore, the tone of the market is stronger. Ore at Joplin last week sold at $39 and $40 per ton, sales amounting to over 10,500 tons. Another element of strength was the reduced output which fell to around 8000 tons for the week. Prime Western slab zinc is not correspondingly higher and the advance in price has been comparatively small. For March and early April delivery it is quoted at 5.72½c., St. Louis, or 6.07½c., New York. To correspond to the advance in ore, however, it should be

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	55.00c. to 56.00c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.50c.
Lead, American pig	6.85c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	61.50c.
Solder, ½ and ½	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since Dec. 5. Quotations on lead full sheets and zinc sheets were last revised on Feb. 21 and 27 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	9.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

selling at 5.90c. to 6c., St. Louis. A moderately good consuming demand is reported, but sellers as a whole are rather reserved under present conditions.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Buying by consumers has been of fair proportions recently, but prices are a little lower with Chinese metal quoted at 10.25c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, March 20.—Demand for copper is easier but the price is steady. Heavier buying of tin and zinc is noted and prices have been advanced. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 54.50c.; lead, 5.90c.; zinc, 5.80c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 4050 Tons—4700 Tons in New Projects

AWARDS of concrete reinforcing bars amounted to 1850 tons, as reported to THE IRON AGE. New work amounted to 4700 tons, including 1000 tons each for a printing building and an office structure in Chicago. Awards follow:

NEW YORK, 250 tons, Erie Railroad pier, to Faitoute Iron & Steel Co.

TOLEDO, OHIO, 1600 tons, building for Willys-Overland Co., to Building Products Co.

TOLEDO, 600 tons, addition to Lamson store, to Building Products Co.

CHICAGO, 100 tons of rail steel bars, Geneva Terrace apartment building, to Inland Steel Co.

CHICAGO, 100 tons of rail steel bars, Traemour Hotel, to Calumet Steel Co.

STATE OF ILLINOIS, 120 tons of rail steel bars for road work to Concrete Steel Co.

STATE OF IOWA, 160 tons for road work, to Concrete Steel Co

HINE, MO., 260 tons, basin for St. Louis municipal waterworks, to Laclede Steel Co.

ST. LOUIS, 400 tons, track construction work for Missouri Pacific Railway between Allenton and Boles, Mo., to Laclede Steel Co.

LOS ANGELES, 475 tons, subway at Myra Avenue: S M Kerns, Long Beach, Cal., general contractor

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BROOKLYN, 350 tons, section of subway at Prospect Park; bids March 30.

ALLENTOWN, PA., 1000 tons, bridge at Tilghman Street; bids in.

ROCHESTER, N. Y., 200 tons, Auto Inns, Inc., garage; bids being taken.

CHICAGO, 600 tons, apartment hotel at 1500 Sheridan Road; McNally & Quinn, architects.

CHICAGO, 1000 tons, printing plant for Reuben H. Donnelley Corporation; Leonard Construction Co., general contractor.

CHICAGO, 1000 tons, *Daily News* building, Holabird & Roche, architects.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.25c.	3.75c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

CHICAGO, 500 tons, State and Washington Building; W. W Alschlager, architect.

CHICAGO, 250 tons, building for Rapid Roller Co.; Schmid & Ryan, architects.

AUSTIN, ILL., 250 tons, high school; Harvey Hansen, low bidder on general contract.

ST. LOUIS, 400 tons, warehouse for Atlantic & Pacific Tea Co., Scott and Taylor Avenues.

PORTLAND, ORE., 150 tons, bridge over Willamette River at Springfield; bids March 27.

LOS ANGELES, 5257 tons, Drainage District Improvement No. 23; bids rejected and new bids will be taken April 2

RAILROAD EQUIPMENT

Chinese Road Will Buy 990 Box Cars—Inquiry for 200 Rapid Transit Coaches

INQUIRIES from the Chinese Eastern Railways for 990 box cars and from the Chicago Rapid Transit Co. for 200 motor elevated coaches and trailers are the most important developments in the railroad equipment market. The Pittsburgh Coal Co. has purchased 600 mine cars. Details of the week's business follow:

Chicago Rapid Transit Co. has made inquiry for 100 motor elevated cars and a like number of trailers.

Atchison, Topeka & Santa Fe is inquiring for 15 locomotive tenders.

Minneapolis, St. Paul & Sault Ste. Marie contemplates the purchase of eight Mountain-type locomotives.

Seaboard Air Line will purchase 500 steel underframes for box cars.

Protane Corporation, Erie, Pa., has ordered three 11,000-gal. tank cars from General American Tank Car Corporation

Pittsburgh Coal Co. has purchased 600 mine cars from Lorain Steel Co.

Atlantic Coast Line is inquiring for 300 freight cars.

Michigan & Limestone Chemical Co. has purchased two six-wheel switching locomotives from Baldwin Locomotive Works.

Chinese Eastern Railways have made inquiry for 660 25-ton, four-wheel box cars and 330 50-ton, eight-wheel box cars.

High Tonnage in February Orders for Fabricated Structural Steel

WASHINGTON, March 19.—Orders for fabricated structural steel in February totaled 208,241 tons, representing 72 per cent of capacity, based on reports received by the Department of Commerce from 187 firms with a monthly capacity of 289,010 tons. This reflects an increase of 37,412 tons over January, when bookings were 170,829 tons, or 56 per cent of the capacity of the 215 reporting concerns. Computed bookings in February were 270,000 tons, against 210,000 tons, while shipments were 232,500 tons, or 62 per cent of capacity, compared with 210,000 tons, or 56 per cent of capacity.

Both months are ahead of the corresponding months of last year and of 1926. The February gain in computed tonnage of new orders is nearly 11 per cent over 1927 and almost 30 per cent over 1926. The January gains were 7.7 per cent over 1927 and 0.6 per cent over 1926. Only three months in 1927 (July, August and October), one in 1926 (August) and one in 1925 (October) exceeded the figure registered last month, and all were 31-day months, against 29 days.

FABRICATED STRUCTURAL STEEL

New Projects Will Require 34,350 Tons—Awards Decline to 32,700 Tons

WITH 7600 tons for a plant building at Cumberland, Md., and 10,000 tons for subway work in New York, awards in the last week amounted to 32,700 tons. New pending work totaled 34,350 tons, the outstanding projects being a section of the subway in New York requiring 7700 tons, a bridge approach at St. Louis which will take 6000 tons and an aqueduct at Oakland, Cal., requiring 4830 tons. Awards follow:

New Haven, Conn., 1600 tons, power house for United Illuminating Co., to unnamed fabricator.

Middletown, Conn., 200 tons, bank and office building, to American Bridge Co.

Weymouth, Mass., 600 tons, switch house for Edison Electric Illuminating Co. of Boston, to New England Structural Co.

Marshfield, Mass., 200 tons of plates, standpipe, to Chicago Bridge & Iron Co.

New York, 10,000 tons, subway work, to American Bridge Co.; Triest Contracting Corporation, general contractor.

New York, 200 tons, Arts Club building, to McClintic-Marshall Co.

State of New York, 500 tons, highway bridges, to American Bridge Co.

East Orange, N. J., 600 tons, Municipal Building, to Albert Smith & Sons, Inc.

Philadelphia, 100 tons, school at Buttonwood and Sixth Streets, to Robinson Iron & Steel Co.

Pennsylvania Railroad, 558 tons, bridges; 175 tons at Akron, Ohio, to Bethlehem Steel Co.; 257 tons at Baltimore, to American Bridge Co., and 126 tons at Stoney Brook, Pa., to Fort Pitt Bridge Works.

Philadelphia, 440 tons, building for La Salle College, to Bethlehem Fabricators, Inc.

Cumberland, Md., 7600 tons, plant building for Celanese Corporation of America, to McClintic-Marshall Co.

Kingston, Pa., 500 tons, Nesbitt Memorial Hospital, to Bethlehem Fabricators, Inc.

Pittsburgh, 500 tons, East Liberty Theater, to Fort Pitt Bridge Works.

Wilkes-Barre, Pa., 685 tons, drill shed for 109th Field Artillery, to Bethlehem Construction Co.

Cleveland, 2500 tons, transmission towers for Cleveland Electric Illuminating Co., to Blaw-Knox Co.

Bloomington, Ind., 700 tons, building for University of Indiana, to Bedford Foundry & Machine Co., Bedford, Ind.

State of Michigan, 125 tons, highway bridges, Massillon Bridge & Structural Co.

Shawano, Wis., 700 tons, highway bridge, to Wausau Iron Works.

Chicago, 112 tons, building for Samuel Olsen & Co., to Midland Structural Steel Co., local.

Comal, Tex., 650 tons, addition to United Gas Improvement Co. power plant, to Virginia Bridge & Iron Co.

Seattle, 2000 tons of plates, penstock for city, to Puget Sound Machinery Depot.

Seattle, 600 tons of plates, kilns for Pacific Coast Cement Co., to Traylor Engineering Co.

Oakland, Cal., 200 tons, theater, Seventeenth Street and San Pablo Avenue, to Pacific Coast Engineering Co.

San Francisco, 150 tons, apartment building, Fourteenth and Dolores Streets, to Judson-Pacific Co.

South San Francisco, 370 tons, plant for E. H. Edwards Mfg. Co., to Pacific Coast Engineering Co.

San Francisco, 100 tons, bridge over Colorado River, Grand Canyon, Ariz., to Llewellyn Iron Works.

Los Angeles, 200 tons, Convent of Good Shepherd, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Boston, 178 tons, bridge for Boston & Albany Railroad in Brighton district.

New York, 1000 tons, Vardmont Theater.

New York, 250 tons, pier on North River for Erie Railroad.

Brooklyn, 7700 tons, section of subway at Prospect Park: bids March 30.

State of New York, 500 tons, highway bridges.

Jersey City, 700 tons, theater on Journal Square.

Pennsylvania Railroad, 150 tons, bridge.

Allentown, Pa., 200 tons, steel centers for reinforced concrete bridge at Tilghman Street; bids in.

Wilmington, N. C., 3000 tons, highway bridge.

Louisville, Ky., 200 tons, war memorial.

Louisville & Nashville Railroad, 800 tons, bridges; bids in.

Big Four Railroad, 150 tons, work at Sharonville, Ohio.

Detroit, tonnage unstated, addition to gear and axle plant of Chevrolet Motor Car Co.

Fort Wayne, Ind., 400 tons, warehouse for International Harvester Co.

Austin, Ill., 3500 tons, high school; Harvey Hansen, low bidder on general contract.

Chicago, 120 tons, coal trestle for city pumping plant; Midland Structural Steel Co., local, low bidder.

Chicago, 200 tons, Haymarket substation for Commonwealth Edison Co.

Chicago, 900 tons, approach to La Salle Street bridge; R. H. Simpson & Co., low bidders on general contract.

South Chicago, 380 tons, power house for Federal Furnace Co.

Gardner, Ill., tonnage not stated, highway bridge for Chicago & Alton Railroad.

Aurora, Ill., 242 tons, public school.

Milwaukee, 1580 tons, County portion of Milwaukee Safety Building; Lakeside Bridge & Steel Co., low bidder on material at $96,440; Worden-Allen Co., low bidder on erection at $23,838.

St. Louis, 6000 tons, southern approach to municipal bridge across Mississippi River; bids to be received April 17 by Board of Public Service.

Kellogg, Ore., 280 tons, bridge over Umpqua River, general contract to Clyde Catching, Roseburg, Ore.

Portland, Ore., 530 tons, bridge over Willamette River at Springfield; bids March 27.

Portland, 220 tons, bridge over McKenzie River near Coburg; bids March 27.

Chehalis, Wash., 100 tons, bridge over Chehalis River; bids March 26.

San Francisco, 165 tons, apartment building, Bay and Pols Streets; bids being taken.

San Francisco, 450 tons, hotel, Geary and Maggie Streets; bids being taken.

San Francisco, 400 tons, Medical-Dental Building addition; bids received.

Oakland, Cal., 4830 tons, plates for Sequoia Aqueduct, East Bay Municipal Utility District; bids April 20.

Oakland, 3668 tons, plates for Wildcat Aqueduct, East Bay Municipal Utility District; bids April 20.

Sacramento, Cal., 600 tons, bridge over Smith River, Del Norte County; bids April 4.

Denver, Colo., 445 tons, plates, siphons for Kittitas Canal project, Yakima, Wash.; bids April 10 by United States Bureau of Reclamation.

Employment in Manufacturing Is Increasing; Low Point Last November

Employment and activity in the manufacturing industry of the United States have been on the increase since November, 1927, it is indicated by the January, 1928, returns from about 2000 manufacturing plants reporting monthly to the National Industrial Conference Board, 247 Park Avenue, New York. These plants are located throughout the country, are of both large and small size and represent 25 different divisions of manufacturing. Inasmuch as mid-winter is a quiet period in many industries, seasonal influences should show further improvement in February and March.

January figures show more than 1 per cent increase over the number employed last November which, according to the Conference Board's reports, was the lowest ebb of employment for the year 1927 and the lowest since the last quarter in 1924. However, not only has the number of employed increased, but the total number of hours worked in these plants shows an even greater increase, totaling 3½ per cent more than in November, 1927. This, the Conference Board points out, indicates not only more employees at work but an increased number of working hours per employee, and thus an increase in activity exceeding that indicated by the additional number of men engaged. Average weekly earnings per worker during January showed a proportionate increase.

To Show "The Story of Iron"

"The Story of Iron," a new educational motion picture film produced by the United States Bureau of Mines, in cooperation with three iron companies, will be shown for the first time before the New York section of the American Institute of Mining Engineers, at the Machinery Club, on the evening of March 22. The preparation of this film was noted on page 739 of The Iron Age, March 15. C. S. Robinson, vice-president of the Youngstown Sheet & Tube Co., will describe in some detail the features shown in the film.

PERSONAL

Charles M. Schwab returned on Tuesday from his European trip, coming on the Aquitania.

Albert C. Marble, superintendent Curtis & Marble Machine Co., Worcester, Mass., was elected president of the Worcester branch of the National Metal Trades Association at its twenty-seventh annual business meeting held last week. He succeeds A. Sherman Miller. Other officers elected were John C. Spence, Norton Co., vice-president, and William Arter, Arter Grinding Machine Co., treasurer. F. A. Ball, L. S. Starrett Co., Athol, Mass.; Richard C. Fosdick, Fitchburg Steam Engine Co., Fitchburg, Mass.; Elliot J. McKnight, L. G. McKnight Co., Gardner, Mass.; Charles A. Clarke, Universal Boring Machine Co., Hudson, Mass.; and J. J. Adams, J. J. Adams Co.; H. H. Wright, M. S. Wright Co.; Philip M. Morgan, Morgan Construction Co.; Fred S. Morton, Matthews Mfg. Co.; William B. Smith, James Smith & Sons, and Fred W. McIntyre, Reed-Prentice Co., all of Worcester, were elected to serve on the executive board.

Edward L. Steinle, sales manager of the New Britain Machine Co., has returned from a trip through England, France, Germany, Italy and Belgium.

Marcus A. Thompson, welding superintendent of the Boston & Maine Railroad, spoke on metal cutting and welding at the March meeting of the Boston section of the American Welding Society.

Joseph H. Barber, assistant to the president Walworth Co., Boston, spoke recently on "Planning Tomorrow's Business" before the executive club of the Boston Chamber of Commerce.

H. M. Lane, president H. M. Lane Co., Detroit, made an illustrated address before the New England Foundrymen's Association at its monthly meeting in Boston on March 14. He discussed foundry problems.

Leonard S. Taylor has retired as vice-president in charge of operations of the Acme Wire Co., New Haven, Conn. Edgar L. Hartpence, general manager, succeeds Mr. Taylor and also retains his old position.

Charles W. Beaver has been made president and treasurer of the Lockwood Mfg. Co., South Norwalk, Conn., to succeed George H. Lockwood, who has retired on account of ill health. Gen. Russell Frost has been made vice-president, and Nelson T. Hayes, secretary and assistant treasurer. Until two years ago Mr. Beaver was foreign representative of the Yale & Towne Mfg. Co., Stamford, Conn.

C. D. Baldwin, purchasing agent of the Bangor & Aroostook Railroad, has been elected president of the New England Railroad Club, succeeding F. C. Shepherd, chief construction engineer of the Boston & Maine Railroad.

Richmond Fletcher of Scovell, Wellington & Co., Boston, engineers and accountants, has been made a director of the Kinney Mfg. Co., Boston, maker of pumps.

W. G. Prasse has been appointed to represent the Oilgear Co., Milwaukee, in the New York district, and will have offices at 342 Madison Avenue.

Stanley A. Daniels, who has been in charge of the roll department of the Trumbull Steel Co., Warren, Ohio, has been appointed superintendent of the company's hot strip department, succeeding A. J. Schink. Before going with the Trumbull organization Mr. Daniels was identified with the Republic Iron & Steel Co. at Youngstown. J. A. Lafferty has been placed in charge of the Trumbull roll department. Recently he was associated with the Weirton Steel Co., Weirton, W. Va., and previously with the Pittsburgh Steel Co., Monessen, Pa.

J. B. Hamilton has opened an office at 221 Journal Square National Bank Building, 40 Journal Square, Jersey City, N. J., and will engage in the sale of new and used machinery. His line will include machine tools, plate rolls, punches and shears, air compressors, pumps and contractors' machinery.

Edmund J. Lowry, for the past six years consulting metallurgist for Hickman, Williams & Co., in that capacity serving the several offices of the company, has resigned, to enter consulting engineering work on his own account, and has opened an office in the General Motors Building, Detroit. Mr. Lowry has been active in studying the metallurgy of foundries, and is the author of the American Foundrymen's Association exchange paper to be presented at the convention of the Belgian Foundrymen's Association on April 18.

Clarence R. Falk, secretary-treasurer Falk Corporation, Milwaukee, has been appointed general chairman of the annual campaign of the Milwaukee County Community Fund. The campaign will be undertaken in October with the objective of raising approximately $1,000,000 for the support of a joint budget of 35 charitable organizations.

Eugene W. Stern, consulting civil engineer, 56 West Forty-fifth Street, New York, has been appointed vice-president of the Colonial Iron Works, Cleveland. For many years he was chief engineer of highways, Borough of Manhattan, New York. He will act in an advisory capacity to the Colonial company.

P. P. Barrett has been appointed representative in the Cincinnati territory for the Reading Iron Co., Reading, Pa., and will have headquarters in Indianapolis.

J. V. Coulter, for the last five years connected with the San Francisco sales organization of the Midvale Co., Philadelphia, has been appointed manager of a new branch office and warehouse recently opened at 568 Third Street, San Francisco, by the Earle M. Jorgensen Co., Los Angeles, distributer of alloy and tool steels.

Edward Hankin, superintendent of the blacksmith department New York Air Brake Co., Watertown, N. Y., on March 13 was honored at a banquet given by the executive staff of the company in recognition of his 50 years' service with the plant.

William E. Allen, for a number of years chief engineer of the Robbins Body Corporation, Indianapolis, has been appointed vice-president and general manager of Motor Bodies, Inc., Evansville, Ind., recently formed as an automobile body manufacturing subsidiary of the Graham-Paige Motors Corporation, Detroit. The new company has taken over the plant formerly operated by the Johann Mfg. Co. W. H. Neely, assistant to the president of the Graham-Paige organization, is president of the new division.

Lewis Buckley Stillwell has been elected to serve his fourth term as chairman of the Engineering Foundation, the research organization of the National Engineering societies.

Jordan Korp, Leeds & Northrup Co., Philadelphia, spoke before the St. Louis chapter, American Society for Steel Treating, March 14 on "Tool Design and Heat Treating and Relationship to Production."

Ralph T. Montag, manager Montag Stove Works, Portland, Ore., has been elected second vice-president of the Oregon Manufacturers' Association.

T. A. Hyde, for some years associated with the Henry G. Thompson & Son Co., New Haven, Conn., has been elected a vice-president. He has recently taken charge of the New York territory, including export business, with offices at 126 Chambers Street. A. W.

Tucker has been elected secretary of the company. He has been identified with the Thompson organization for a number of years and will have charge of the home office at New Haven.

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N. Morton Skillin, for the last three years associated with Oakes Brothers, Boston, has been placed in charge of the Boston office of the Cohoes Rolling Mill Co., Cohoes, N. Y., manufacturer of wrought iron pipe. He succeeds P. L. Watkins, who has been transferred to the company's Chicago office.

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C. L. Shedd, general manager of automotive sales in the Western district for the American Bosch Magneto Corporation, with headquarters at Chicago, has been placed in charge of the Detroit district in addition to the Chicago territory, following the merging of the company's branches in those cities. Elliott S. Hanson, who was automotive divisional sales manager at Detroit, has been promoted to the general sales division of the factory at Springfield, Mass., and will be engaged as special representative in the New York branch.

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William J. Wooley has been elected president of the L. Wolff Mfg. Co., Chicago, manufacturer of plumbing supplies, under its recent reorganization in which the management and control of the company was turned over to employees. He went to the Wolff company three years ago to aid in the conduct of the business which had suffered serious financial losses, and was largely responsible for the reorganization. Other officers are William T. Mahoney, vice-president in charge of production; Henry I. Warden, vice-president; Arthur H. Jolliffe, secretary, and O. P. Decker, treasurer.

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Arthur B. Hykes, who has been associated with the Central Iron & Steel Co., Harrisburg, Pa., since Nov. 1, 1926, has been appointed assistant general sales manager, succeeding the late Frank I. Hoover. From 1909 to 1926 Mr. Hykes was connected with the Shanghai office of the United States Steel Products Co., the last four years as manager for China. Shortly after his return to this country he entered the employ of the Central company as a traveling representative, and within the past nine months has been in charge for short periods of the company's district offices at Baltimore, Boston and Philadelphia.

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William Manealoff, until recently in charge of steel imports for Winter, Wolff & Co., 225 Broadway, New York, has formed Manealoff & Co., Inc., 11 Broadway, to import and export steel products. He is president and L. M. Solis-Cohen, treasurer.

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Julian Burdick, president West Penn Steel Co., Brackenridge, Pa., is reported to be recovering satisfactorily from injuries sustained in an automobile accident, March 10. He is at the Pittsburgh Hospital.

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Walter H. Pfeil has been appointed roll foundry superintendent of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He is a native of Pittsburgh and has spent the greater part of his life as a metallurgical engineer in the steel industry. He attended the Colorado School of Mines and Carnegie Institute of Technology, specializing in metallurgy. He was first associated with the Lewis Foundry & Machine Co., Pittsburgh, and later built the roll department of the Standard Engineering Co., Ellwood City, Pa., having been with this concern for five years. He then spent two years with Farrel Foundry & Machine Co., Ansonia, Conn., as metallurgist, and seven years with Hubbard Steel Foundry, East Chicago, Ind., as chief metallurgist and roll foundry superintendent.

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W. J. Borst, who has been master mechanic of the John Deere Harvester Works, East Moline, Ill., has been made acting superintendent of the plant, succeeding the late C. Arthur Schoessel. He has been associated with Deere & Co. for 16 years.

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George H. Laib, recently president of the Laib Co., Inc., Louisville, has been elected president of the J. L. Mott Co., Inc., recently formed by a consolidation of the Laib Co. and Columbia Sanitary Mfg. Co., Louisville, and the J. L. Mott Co., Trenton, N. J. Other officers are W. G. Probst, vice-president and general manager; Jordan L. Mott, 3d, vice-president and secretary, and J. E. Siegel, treasurer. Mr. Mott will be in charge of the New York offices and showroom, which will be removed shortly from Fifth Avenue and Seventeenth Street to 369 Lexington Avenue, and will have supervision over the metropolitan district and northern New Jersey. H. J. Carey will be sales manager for this district. The various branches of the Mott and Laib companies will be retained with few important changes in personnel.

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George T. Thomas has been appointed New York sales representative of the Empire Steel Corporation, Mansfield, Ohio. He was formerly connected with the Columbia Steel Co., Butler, Pa., and later with the United Alloy Steel Corporation, Canton, Ohio.

OBITUARY

Howard Melvin Davis, general superintendent of the Newport Rolling Mill Co., Newport, Ky., died March 18, following an operation for appendicitis. He was born at Plumville, Pa., 55 years ago and during most of his life had been identified with the sheet steel industry. He had been connected with the Newport plant for about 10 years and previously had been superintendent of one of the departments of the American Sheet & Tin Plate Co., at its Gary, Ind., plant.

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Walter B. Leach, president of the Hunt-Spiller Mfg. Corporation, Boston, died on March 13 at his home in Brookline, Mass., aged 58 years.

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Ole C. Syvertsen, for 25 years a heating engineer and representative of the Weir Stove Co., Taunton, Mass., and more recently with the Magee Furnace Co., Boston, died on March 15 at the Exeter Hospital, Exeter, N. H., following a long illness. He was born in Norway, July 17, 1865.

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R. E. Hart, manager and owner of the R. E. Hart Mfg. Co., Battle Creek, Mich., maker of revolution counters, died suddenly on March 5.

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Dean E. Hethington, secretary and assistant treasurer of the Globe Forge & Foundries, Inc., Syracuse, N. Y., was drowned recently in the St. Lawrence River near Clayton, N. Y., when an automobile in which he was driving broke through the ice of the river. He was 49 years of age.

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Edward A. Jones, president and treasurer E. D. Jones & Sons Co., Pittsfield, Mass, died Feb. 29.

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Alfred Barker, president of James Barker, Inc., and of the Barker Machine & Foundry Co., Philadelphia, died March 13, at his home in that city.

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Edgar H. Fuller, formerly general manager of the Fuller Mfg. Co., East Moline, Ill., and later general sales manager of Root & VanderVoort, East Moline, died on March 16 at his home in Joliet, Ill. In recent years he had been associated with the Witte Iron Works, Kansas City, Mo., and with the Moline Iron Works, Moline, Ill.

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Herbert E. Hardin, superintendent of the Acme Harvester Co. at the time it was removed from Peoria to Pekin, Ill., for a time superintendent of the old Kingman Plow Co., Peoria, and for many years superintendent of the Ohio Rake Co., Dayton, Ohio, died on March 16 at Anchorage, Ky. He was 66 years of age.

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Carl D. Bradley, president Michigan Limestone & Chemical Co., Rogers City, Mich., a subsidiary of the United States Steel Corporation, and president Bradley Transportation Co., Rogers City, died March 19, at Pasadena, Cal.

Cleveland Branch of Metal Trades Association Holds Annual Meeting

The annual meeting and banquet of the Cleveland branch of the National Metal Trades Association was held at the Hotel Cleveland, that city, March 15, with an attendance of 110, which was said to be the largest in the history of the branch. Jacob D. Cox, Jr., Cleveland Twist Drill Co., was reelected president. Other officers elected were: vice-president, E. J. Stahl, Baker-Raulang Co.; treasurer, W. C. Sayle, Cleveland Punch & Shear Works Co.; executive committee, P. A. Geier, P. A. Geier Co.; J. H. Hertner, Hertner Electric Co.; George E. Randles, Foote-Burt Co., and E. T. Causer, Chandler-Cleveland Motors Corporation.

H. J. Briggs, vocational director of the Cleveland schools, in a paper discussed the work of the Cleveland trade school and machinists' apprentice group, which is being conducted with the cooperation of the members of the Cleveland branch. At the conclusion of his address President Cox urged the full cooperation of the members in this work. Homer D. Sayre, commissioner of the National Metal Trades Association, discussed association and business conditions from the national viewpoint. T. Yeoman Williams, executive secretary of the League for Industrial Rights, discussed labor's attitude toward anti-trust and anti-injunction laws.

Reports of the officers showed that the Cleveland branch is in a prosperous condition. There was a membership gain of six during the year and no losses.

American Association of Engineers to Meet

The American Association of Engineers will hold its fourteenth annual convention in El Paso, Tex., on June 4, 5 and 6. M. E. McIver, 63 East Adams Street, Chicago, is secretary. After preliminary organization matters, the annual address will be delivered by the president, W. R. Harris, at 11.30 on the first morning. Sessions will be held that afternoon and the two following mornings, leaving the second and third afternoons free for inspection trips.

Electrochemists Plan April Meeting

The American Electrochemical Society will hold its annual meeting at Bridgeport, Conn., April 26 to 28, attracted to that district because of important developments in the electric manufacture of brass. On April 26, the society will convene at the Hotel Stratfield. It will devote all of Friday morning, April 27, to the discussion of electric heating, melting and electric furnace linings. Among those who will participate in this discussion are R. E. Talley, president and chief engineer of George J. Hagan Co., Pittsburgh; R. M. Keeney, industrial heating engineer Connecticut Light & Power Co.; John L. Christie, metallurgist Bridgeport Brass Co.; Dr. B. D. Saklatwalla, vice-president Vanadium Corporation of America, and others.

The president of the society is Prof. S. C. Lind, head of the department of chemistry of the University of Minnesota and well-known radium expert of America. He is also the American representative of the International Radium Standards Commission. Professor Lind will show the members a number of startling gas reactions brought about by radium emanations.

The Thursday morning session, April 26, will be devoted to a discussion of new batteries, at which Dr. George W. Vinal, the expert of the United States Bureau of Standards, will preside. Thursday afternoon the members will visit plants in Bridgeport and vicinity. Thursday evening there will be a public lecture by Prof. Bergen Davis of Columbia University, who will demonstrate the use of the X-ray in the study of metals and compounds. Professor Davis will show by means of slides the results of years of careful investigation.

The local committee is headed by John L. Christie, metallurgist Bridgeport Brass Co. Other members of his committee include the following: F. M. Turner, Charles J. McElroy, W. G. Stratten, Raymond O'Connor, W. O. Mitscherling, Karl Pitschner, Walter M. Bradley, William Delage, George B. Hogaboom and J. C. Bradley.

The final session, to be held Saturday morning, will be devoted to papers on electropolating of nickel, gold, silver, chromium and thallium. Prof. E. M. Baker of the University of Michigan, will preside over this session.

British Imports of Iron and Steel Increase, While Exports Decrease

WASHINGTON, March 19.—Imports of iron and steel products into Great Britain in February totaled 292,918 gross tons, against 283,921 tons in January, while exports aggregated 317,036 tons, compared with 332,185 tons. The increase in imports and the decrease in exports began in January. The increases in imports in February were made in 13 of the 19 classifications and applied mostly to steel bars, rods and angles, and iron bars, rods and angles. Decreases in exports in February also included 13 classifications out of 19, and involved such lines as plates and sheets, steel pipe and rails. The most notable increases were made in tin plate, galvanized sheets and pig iron.

Production of pig iron in the British Isles, according to a radiogram received by the Department of Commerce from William L. Cooper, commercial attaché, London, decreased slightly during February, as compared with January. Raw steel, on the other hand, registered a gain of 18.1 per cent. Reports indicate that at the close of February there were 148 blast furnaces and 278 open-hearth furnaces in operation.

Makes Car Frames Automatically

(Concluded from page 796)

ers. The finished bars are carried on conveyors direct to the general assembly line. Each line in this unit has a capacity of 450 pieces per hour.

Unit No. 5 is the side bar finishing and parts assembly line. This unit consists of a single line carrying both right and left-hand bars for all operations, and is driven by a single motor of 200 hp. This machine has 38 trucks, on which the formed bars are automatically loaded, one right-hand and one left-hand bar to each truck. The trucks are moved on a reciprocating conveyor and stop at 19 stations. At each station several machines are performing, and the work done includes the pinning and riveting of the brackets to make complete side bar sub-assemblies. The capacity of this line is 900 right and left-hand bars, or 450 each, per hour.

Unit No. 6 is the general assembly line. Here a machine picks up the side bar sub-assemblies and cross bars, clamps them together, and drives the rivets into position. Rivets are fed through compressed air tubes to guns which discharge the rivets when the frame is in proper position. The capacity of this line is 360 frames per hour.

Unit No. 7 is the inspection and conveyor line. The finished frames are carried to the final inspection line, where they are checked for alinement, holes, rivets, etc. The frames are then conveyed to Unite No. 8, which is the washing and painting department. The frames are automatically loaded on a washing machine, where they are subjected to a thorough cleaning to remove all oil, grease and dirt which has accumulated during the manufacturing processes. With the washing machine is combined a dryer, where the excess water is taken off, and the frames are then conveyed by gravity to the loading station of a painting machine. The paint, which is a high-temperature baking enamel, flows at the rate of 750 gal. per minute, the excess enamel being drained off and returned to the tanks. The conveyor chain on the painting machine is about 700 ft. long and passes through a two-story oven. The time of baking is 60 min.

Hidden Defects in Iron Castings

(*Concluded from page* 793)

or similar castings, foundrymen agree that the only way to produce a kettle which will not leak is to cast it with the bottom down. No one would attempt to cast one of these kettles with the bottom up, and expect to get a casting which would not have a leaky bottom. The bottom of the turbine casing and the bottom of a kettle casting are identical as far as the question of producing a solid casting is concerned.

Hidden Defects Caused by Chaplets

OCCASIONALLY objections are raised to the use of chaplets in a casting, because it is sometimes necessary to drill them out and plug the hole. But when we realize the great value a chaplet has, in maintaining the proper thickness of metal throughout the casting, we can well afford to plug one occasionally.

Steel chaplets are safer than cast iron chaplets, because a steel chaplet can be much smaller than an iron chaplet without fusing when the metal is poured around it. The objection to using a cast iron chaplet is the danger of liquid metal melting the chaplet, thus taking the necessary support away from the cores and allowing them to move with the flow of the metal. As the steel chaplet does not melt so readily as the iron chaplet, there is less danger of the cores being deprived of their necessary support.

Years ago, when cast iron chaplets were used almost universally, it was necessary to make them very large to keep them from melting when the mold was poured. It was found that, in cases where the chaplet was not tight, a large chilled hole was produced. This objectionable feature of iron chaplets led to the steel chaplets.

A loose chaplet is safer than a fused or partly melted chaplet. With a loose chaplet all that is necessary is to drill it out and plug a nice, smooth hole. With a partly fused chaplet, a blowhole is produced of such irregular shape that plugging is often impossible.

If a chaplet melts completely, the core loses its support; if a chaplet melts partially, while it may still act as the support it was intended for, the partial fusing always produces a bubble or a blowhole. Hence we contend that a loose chaplet will produce a safer casting than a partially fused chaplet.

A leak in a casting caused by a loose chaplet does not in any way indicate defective metal, or that there are soggy places in the casting. But it does indicate that the metal was allowed to cool before pouring, and was not hot enough to burn into the surface of the chaplet.

It is not always advisable to pour metal into a mold at too high a temperature; and cleaner metal is produced when it is allowed to remain in the ladle for a period before pouring. This is because, during this period, large portions of the impurities rise to the surface of the metal and can be skimmed off. The ideal temperature of metal for pouring castings similar to turbine casings would be just hot enough to run into the thinner sections. Maintaining this temperature would have a tendency to reduce the shrinkage cavities in the heavier sections.

This is not always true with all castings. But when it is employed, it often results in a loose or leaky chaplet. It has been considered safer to take the chance of having a leaking chaplet, by not pouring the metal too hot, than to pour it hot and probably create internal shrinkage cavities, near the heavy sections.

Other Types of Hidden Defects

ANOTHER illustration of the creation of hidden defects, in making the casting pass inspection, is shown in Fig. 3. Figs. 3 and 4 are cross-sections of two molds for a cast iron combination face plate and shaft, cast in one piece. Fig. 3 shows the method formerly used to make this casting.

This plan of casting the shaft up had been resorted to, to assure a perfectly clean surface on the face of the 6-ft. face plate. A clean face was produced, but at the cost of the strength of the shaft, because, in spite of the best attention to feeding and churning, large shrink cavities occurred at the points where the smaller sections of the shaft joined the larger sections, shown at *EE* and *FF*. Often these defects were uncovered during the machining process, and the castings had to be either welded or scrapped.

The remedy for these defects in the shaft was to pour the mold with the face plate up, as shown in Fig. 4. More stock (½ in. extra) was allowed for machining the face. The result was a perfectly solid shaft, and a clean surface on the face plate. However, had a defect developed on the surface of the face plate, it would have been a much safer proposition to weld this surface than to weld the defects previously found in the shaft section of the casting, where the strength was materially affected.

Another important item connected with the revised molding of this casting was that it required only one-half the molding time to produce it. This applies to many castings of this character, where hidden defects are produced in the effort to make the casting pass inspection.

Most heavy sections in an iron casting must be fed with a properly prepared feeding head. These heads must be churned to keep them open and to make it possible to feed additional metal down as the metal already poured begins to solidify and settle. If this is not done, a shrink cavity will result, and a weaker casting than the engineers have figured on will be produced. The dangerous part of it all is that the defect is too often hidden.

Slight Increase in Wholesale Prices

Prices of commodities in February are reported by the United States Bureau of Labor Statistics at 96.4, compared with 96.3 in January. Both figures are a little higher than the 95.9 of February, 1927, and all are related to 100 as the average of 1926. Foods, fuel and lighting, metals and building materials showed fractional increases over January, while hides and leather products made an increase of 3 per cent. Farm products, textiles, chemicals and drugs and house furnishings showed fractional declines.

Metals and metal products, at 98.3, compared with 98.1 a month earlier and with 98 a year earlier, showed an increase because of advances in iron and steel prices. There was a decline in non-ferrous metals and a stationary condition in agricultural implements and automobiles.

New Oakland Assembly Plant Completed

The new assembly and shipping plant of the Oakland Motor Car Co. at Pontiac, Mich., has been completed, according to an announcement by A. R. Glancy, president of the company, and installation of conveyors and line equipment will begin at once. The new buildings provide the company with 580,191 sq. ft. of additional floor space. Contract for the foundations of the building was let on Oct. 29 last, and the structure was completed in what is thought to be record time. Nearly all of the machinery to be used in the plant is to be new, but the old assembly factory will be closed down on March 24, when a part of its equipment will be transferred to the new building. Production will be resumed, in the recently completed building, on April 2.

Blast Furnace Practice in Germany

(*Concluded from page* 803)

sending them to Germany and the rubble to America. So, while we in America have come to like, or at least tolerate, fine ores, and have developed furnace lines, fuel, blowers and charging equipment to fine natural ores, the Ruhr District has clung to coarse ores, natural or artificial. And this is all logical: After we had set a pace in tonnage output and coke economy, the only way the Ruhr District could follow, with the low-pressure blowing equipment and inflexible tub charging system, was to keep the burden open.

Coke More Irregular Than Ours

My distinct impression is that, leaving aside an exception here and there, German coke is not so well prepared as ours, being more irregular in size, more irregular in analysis and moisture. As another general proposition, the Ruhr coals do not seem to produce a by-product coke as dense and incombustible as is still the case with many of our coal and oven operations, and one finds a distinctly larger coke in use than I see here.

From data I secured the coke will average 30 lb. per cu. ft., and sometimes 32 lb. Ash and sulphur are 8 to 9 per cent, with 1.0 to 1.3 per cent sulphur and 4 to 8 per cent moisture. There is remarkable absence of fingery coke and cross fracture, and the coke does not break up easily. The structure seems close but regular, and little of sponge or pebble.

Ruhr coke is excellent, regardless of irregularity in size and moisture, and probably not so delicate or reactive to furnace variations as is much of ours.

Charging Less Scrap Than We Do

Scrap is not used to the extent that one encounters here, unless its use is camouflaged most successfully. Much of the borings and turnings is briquetted for open-hearth, or even foundry, use, thereby eliminating this large source of supply.

Flue dust is not recharged raw, except at one plant of nine I visited, where it is put back in to the extent of 5 per cent. They were, however, installing a Greenawalt plant. One plant was blowing the dust back in, 45 ft. beneath the top, or say 30 ft. below the stockline, in a single 3-in. opening. They use clean blast furnace gas, compressed to 60 lb., as a conveying fluid means, using 2200 cu. ft. of gas a minute. They reuse all dust made on three furnaces into one furnace, amounting to 70 tons a day. The regularity of the furnace is good and the result not discernible at the tuyeres, as far as sloppy conditions or burning of tuyeres is concerned. The same system is used at one other plant, where over 100 tons a day is injected into a single furnace.

Charging Less Flexible Than With Us

Coming to stocking and charging equipment: As a comparison, at one plant are three furnaces with Neeland tub filling, as modified after its adoption in the Ruhr District. The material modification is in the use of a tub much larger than those at Youngstown, Canton, Duquesne and Sparrows Point. There are two other furnaces with double skip and McKee top. The furnaces differ in lines and capacity, but not materially, and are of typical German construction. The skip-filled furnaces make 7 per cent dust and the tub-filled furnaces 3 per cent dust.

Skip-filled furnaces burn but three-fourths as many tuyeres as do the tub-filled furnaces. The skip-filled furnaces make about 20 tons more iron a day, and use about 40 lb. less coke. The pressure is said to be a bit higher on the skip-filled furnace, but both are under 16 lb. I recite this since it is the only going comparison I found abroad between tub-filling and skip-filling. I believe there is a trend toward skip-filling abroad.

While there may be found some over-engineered tub-filling systems, where one hoist handles the tubs for two furnaces, with a complicated transfer system on top, that is not representative. Standard equipment is one hoist per furnace, with well-worked out control. The disadvantage of the large tub-filling system as applied to our materials is obviously its lack of flexibility as compared with the double skip. The structure is heavier and more expensive.

Control Tube Much Used

A most striking departure in the top is the use of a control tube. On a 17-ft. stockline, the tube is 7 ft. 9 in. in diameter. It is held by brackets and extends down about 8 ft. The bell is from 8 ft. to 12 ft. 9 in. in diameter. It is, I believe, more largely characteristic of minette ore practice than of the present Ruhr mix. It has been abandoned at some works, and some men stated that its helpfulness was problematical. Sometimes it becomes detached and goes down along with the burden. In Luxemburg it is considerably used, with arrangements for changing its position.

(*To be concluded*)

Oil and Gas Power Meeting

A national meeting on oil and gas power is being planned by the American Society of Mechanical Engineers for June 14, 15 and 16, at Pennsylvania State College, State College, Pa. In connection with the meeting there will be an exhibition—the first of its kind—of oil and gas engines, parts and accessories. It will be located in the new mechanical laboratory of the college, which has 20,000 sq. ft. of floor space. The college is providing exhibition space free of charge and is supplying light, power, steam and compressed air for the use of exhibitors.

The technical program calls for a number of sessions on subjects of vital interest to this field of engineering. Such subjects as power economics, fuel oil specifications, research and specialization in engine manufacturing will be discussed by prominent engineers and executives in the industry.

Electric Power Capacity of Japan 15 Per Cent Greater in 1926

The total authorized capital of Japan's electrical industry at the end of 1926 was 3,495,000,000 yen ($1,642,650,000 at the present yen value of 47c.), a 24 per cent gain over the preceding year, according to a report received from Tokio by the Department of Commerce, Washington. Power-generating capacity increased 15 per cent to 33,190,000 kw., of which 2,000,000 kw. was from hydroelectric plants. The total horsepower of electric motors in operation was 2,290,000, an increase of 210,000 hp.

Safety Guides Published

Handbooks covering the national electrical safety code, together with safety rules for installation and maintenance of various types of electrical equipment and for their operation, have been issued by the United States Department of Commerce. They may be obtained from the Government Printing Office, Washington, at $1 for the "National Electrical Safety Code"; 60c. for "Line Construction"; 15c. each for "Electric Utilization Equipment" and "Rules for Operation of Electrical Machinery and Lines"; 10c. each for "Electrical Supply Stations" and "Radio Installations."

More Mechanical Stokers Sold

Sales of mechanical stokers in February are reported by the Department of Commerce at 85 units, aggregating 43,643 hp. This is the largest rating since last August, and with two exceptions the largest since March, 1927. It compares with 75 units of 26,572 hp. in January. A year ago there were 105 units sold in February, amounting to 41,400 hp.

Low Prices Depress Steel Earnings

Steel Corporation Profits in 1927 Were 24.7 Per Cent Less Than in 1926 — Independents Had Larger Decrease — 20 Companies Earned Only 5.1 Per Cent on Stockholders' Value

WITH a decrease of 1,304,646 tons or 9.12 per cent in total shipments of rolled and finished products and a decline of $2.38 and 81c. respectively in the average domestic and export prices as compared with the preceding year, the net profits of the United States Steel Corporation in 1927 fell off 24.7 per cent from the previous year. According to the corporation's annual financial statement, last year's profits were also about 3 per cent less than those of 1925, as were also total shipments of rolled and finished steel. However, the average price on identical products for both domestic and export shipments declined about $3.50 per ton in the two years, and a similar comparison of 1924 with 1927 shows a decrease of $6.78 per ton in prices received for domestic business and of $6.40 per ton for export shipments.

Operations Fairly Satisfactory

"Conditions attending operations during 1927," says the report, "were not as favorable as they were in the preceding year, yet despite the restrictive influence of decreased production and lower prices, the results secured were on the whole fairly satisfactory. Operating efficiency was well maintained, notwithstanding during a considerable part of the year it was necessary to adjust production to demand. The fair volume of demand for steel products which prevailed at the opening of the year continued only during the first four months, following which there was a marked decline which continued during the balance of the year. The substantial tonnage of unfilled orders carried over from 1926, with the rather liberal tonnage of business received during the first quarter, enabled the mills to operate at an average of about 87 per cent of capacity during the first six months, while during the last half the average was reduced to 70 per cent. The average for the entire year was 78.9 per cent, compared with 88 per cent in 1926. . . . Beginning about the middle of December, 1927, there was a substantial increase in the demand for products, with a greater stability in selling prices which has continued to the present time." This led to an increase in unfilled orders which stood at 4,398,189 on March 1, 1928, as compared with 3,972,874 on Dec. 31, 1927, and with 3,960,969 at the close of 1926. Operations during the first two months of 1928 averaged 86.5 per cent of capacity.

Table I.—Production in 1927 and 1926

Products	1927 Tons	1926 Tons	Decrease, Per Cent
Ores mined	25,646,927	29,262,741	12.4
Limestone quarried (includes dolomite and fluorspar)	4,656,150	5,513,739	15.6
Coal mined	27,430,329	34,294,657	20.0
Beehive coke	1,815,910	3.823,047	52.5
By-product coke	12,691,070	13,513,287	6.1
Pig iron	13,631,498	15,540,912	12.3
Spiegel, ferromanganese and ferrosilicon	152,728	164,389	7.1
Bessemer ingots	3,706,404	4,343,788	14.7
Open-hearth ingots	14,780,040	15,962,880	7.4
Rolled and finished steel products:			
Steel rails (heavy and light tee and girder)	1,482,353	1,764,589	16.0
Blooms, billets, slabs, sheet and tin plate bars	758,847	750,137	1.2*
Plates	1,423,277	1,526,153	6.7
Heavy structural shapes	929,175	1,029,152	9.7
Merchant bars, hoops, skelp, light shapes, etc.	2,426,363	2,821,093	14.0
Tubing and pipe	1,625,994	1,690,798	3.8
Wire rods	177,770	168,754	5.3*
Wire and wire products	1,259,907	1,307,099	3.6
Sheets (black and galvanized) and tin plates	1,645,358	1,884,789	12.7
Finished structural work	553,988	615,315	10.0
Angle splice bars and all other rail joints	273,916	313,345	12.6
Spikes, bolts, nuts and rivets	63,987	73,941	13.5
Axles	50.379	84,585	40.4
Steel car wheels	74,898	77,317	3.1
Sundry steel and iron products	233,070	227,345	2.5*
Total	12,979,282	14,334,412	9.5
Miscellaneous products:			
Zinc	75,074	73,730	1.8*
Sulphate of iron	34,260	29,114	17.7*
Fertilizer—"Duplex basic phosphate"	11,639	21,771	46.5
Fertilizer — Sulphate of ammonia	193,434	194,010	.3
Ammonia (as liquor)	709	664	6.8*
Benzol products	169,603	171,435	1.1
	Bbl.	Bbl.	
Universal Portland cement	15,425,000	14,526,000	6.2*

*Increase.

Production and Volume of Business

Decrease in output during 1927 as compared with 1926 was general in all lines except cement. Incidentally the exact reverse was true in 1926 compared with 1925. "In the case of finished products for sale," the report continues, "the decreases in 1927 were particularly large in the heavier classes of products used to a large extent by railroads, and in sheets and tin plates. A very considerable part of this latter decrease is attributable to a lessened demand for tin plates due to the canning industry's having carried over a large pack from 1926." Detailed production figures are shown in Table I.

The total value of business transacted by all subsidiaries during 1927 was $1,310,392,861, as against $1,508,076,090 in 1926. Of the 1927 total $870,235,942 resulted from sales of manufacturing, iron ore and coal and coke companies, while $319,445,504 was represented by inter-company sales. In 1926 the corresponding figures were $987,137,166 and $384,586,172. The remainder of the gross receipts from business was accounted for by transportation and miscellaneous companies.

In shipments in 1927 the greatest decrease as compared with 1926 was shown by iron ore, coal and coke, the decline having been 48.85 per cent. The decrease in rolled and finished steel products shipped was only 9.12 per cent. Domestic shipments of these products declined 8.57 per cent and export shipments 14.57 per cent. Detailed comparisons of shipments may be found in Table II.

Capital Expenditures and Dividends

Expenditures for additional property, new plants, extensions and betterments less credits for sales of property and salvage, and including lock-up in stripping and development expenses at mines, amounted to $97,585,998 in 1927. As usual the greater part of this sum, or $64,368,107, was taken by manufacturing properties, while $15,466,896 went into by-product coke plants. In the previous year capital expenditures amounted to $76,060,520, of which $59,485,328 went into manufacturing plants. In 1926 only $4,149,217 was taken by by-product coke plants, the large outlay last year having been occasioned by the construction of a gas line from the Clairton, Pa., plant to works in the Pittsburgh district. The more important plant additions

Table II.—Foreign and Domestic Shipments and Business

	1927 Tons	1926 Tons	Increase or Decrease Tons	Increase or Decrease Per Cent
Domestic Shipments				
Rolled and finished steel products	11,859,548	12,970,877	1,111,329	8.57 Dec.
Pig iron, ingots, ferro and scrap	228,028	227,537	491	.22 Inc.
Coal, coke and iron ore	564,814	1,104,191	539,377	48.85 Dec.
Sundry materials and by-products	129,688	132,024	2,336	1.77 Dec.
Total tons all kinds of materials, except cement	12,782,078	14,434,629	1,652,551	11.45 Dec.
Universal Portland cement (bbl.)	15,261,966	15,101,788	160,178	1.06 Inc.
Export Shipments				
Rolled and finished steel products	1,133,735	1,327,052	193,317	14.57 Dec.
Pig iron, ferro and scrap	6,790	2,887	3,903	135.19 Inc.
Sundry materials and by-products	145,571	143,400	2,171	1.51 Inc.
Total tons all kinds of materials	1,286,096	1,473,339	187,243	12.71 Dec.
Aggregate tonnage of rolled and finished steel products shipped to both domestic and export trade	12,993,283	14,297,929	1,304,646	9.12 Dec.
Total value of business (covering all of above shipments, including cement, railroad and marine equipment delivered and other business not measured by the ton unit):				
Domestic (not including inter-company sales)	$784.453,995	$886,710,521	$102,256,526	11.53 Dec.
Export	85,781,947	100,426,645	14,644,698	14.58 Dec.
Total	$870,235,942	$987,137,166	$116,901,224	11.84 Dec.

and betterments for which expenditures were made in 1927 were mentioned in THE IRON AGE of Jan. 5, 1928, page 78.

Expenditures and appropriations from earnings for maintenance, depletion, depreciation and amortization amounted to $172,781,272 in 1927, compared with $185,231,386 in 1926. Ordinary repairs and maintenance of manufacturing plants took $108,366,997 of this total in 1927 and $114,866,352 in 1926. For blast furnace and coke oven relinings $5,369,448 was expended last year and $4,693,324 in 1926.

The common stock issue was increased during the year in the amount of $203,321,000 by a 40 per cent stock dividend declared from undivided surplus and paid on June 1. This brought the common stock to $711,623,500 and, as the dividend rate of 7 per cent annually was continued on the new issue, the yearly common dividend requirements were increased from $35,581,175 to $49,813,645. With preferred stock dividends of $25,219,677, total dividends paid or declared during the year amounted to $75,033,322, which taken from net profits of $87,896,836 left an addition to surplus of $12,863,514. In 1926 surplus income amounted to $55,866,553, of which $30,000,000 was appropriated for plant improvement and betterments and the remainder added to undivided surplus. On Dec. 31, 1927, undivided surplus stood at $363,044,914. Comparative income account is shown in Table III.

Employees and Welfare Activities

The average number of employees during 1927 was 231,549, compared with 253,199 in 1926, a decrease of 8.55 per cent. Manufacturing properties required an average of 167,405 employees last year and 183,389 in the previous 12 months. Total wages and salaries in 1927 aggregated $430,727,005, as against $467,409,446

Table III.—Comparative Income Account For the Fiscal Years Ended Dec. 31, 1927 and 1926

	1927	1926	+ Increase — Decrease
Earnings—Before charging interest on bonds and mortgages of subsidiary companies:			
First quarter	$47,610,344.88	$47,155,460.85	+ $454,884.03
Second quarter	48,055,635.44	49,911,150.34	— 1,855,514.90
Third quarter	43,355,091.74	54,693,856.01	— 11,338,764.27
Fourth quarter	33,294,417.11	55,584,685.98	— 22,290,268.87
Total for year	*$172,315,489.17	*$207,345,153.18	—*$35,029,664.01
Less, interest on outstanding bonds and mortgages of the subsidiary companies	7,991,113.37	8,286,284.27	— 295,170.90
Balance of earnings	$164,324,375.80	$199,058,868.91	— $34,734,493.11
Less, charges and allowances for depletion, depreciation and amortization applied as follows:			
To depletion and depreciation reserves of subsidiary companies	47,390,338.57	53,171,075.95	— 5,780,737.38
To sinking funds on United States Steel Corporation bonds	11,515,668.84	11,049,835.37	+ 465,833.47
Net income in the year	$105,418,368.39	$134,837,957.59	— $29,419,589.20
Deduct:			
Interest on United States Steel Corporation bonds outstanding	16,674,175.68	17,228,669.16	— 554,493.48
Premium paid on bonds redeemed by sinking fund:			
On subsidiary companies' bonds	320,215.05	255,059.29	+ 65,155.76
On United States Steel Corporation bonds	1,078,000.02	987,924.94	+ 90,075.08
Balance	$87,345,977.64	$116,366,304.20	— $29,020,326.56
Add: Net balance of sundry receipts and charges, including adjustments of various accounts	550,858.39	301,100.69	+ 249,757.70
	$87,896,836.03	$116,667,404.89	— $28,770,568.86
Dividends on United States Steel Corporation stocks:			
Preferred, 7 per cent	25,219,677.00	25,219,677.00	....
Common, 7 per cent	49,813,645.00	35,581,175.00	+ 14.232,470.00
Surplus net income	$12,863,514.03	$55,866,552.89	— $43,003,038.86
Less, sums appropriated and expended or to be expended account of additions, improvements or betterments to plants and property	....	30,000,000.00	— 30,000,000.00
Balance carried forward to undivided surplus	$12,863,514.03	$25,866,552.89	— $13,003,038.86

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*Balance of earnings after making allowances for estimated amount of Federal income taxes.

in the preceding year, resulting in an average daily earning per employee, exclusive of general administrative and selling forces, of $5.86 in 1927 and $5.82 in 1926. Including the administrative and selling forces, the average daily earnings per employee were $5.99 and $5.94 respectively.

Expenditures for pensions, housing and welfare, sanitation, accident prevention and other welfare activities were made at about the same rate as in recent years, and are taken up separately in these columns as they are dealt with in the bulletins issued from time to time by the corporation's Bureau of Safety, Sanitation and Welfare.

The number of registered stockholders on Dec. 31, 1927, was 151,596, compared with 143,703 one year ago.

Bethlehem Profits Declined 21.8 Per Cent

Net income of the Bethlehem Steel Corporation in 1927 amounted to $15,826,142, as compared with $20,246,167 in 1926, a decline of 21.8 per cent. "The value of orders booked during the year," says this corporation's annual report, "aggregated $280,199,101, as compared with $283,707,678 in 1926. Unfilled orders on Dec. 31, 1927, amounted to $58,609,006, as compared with $49,912,796 at the end of 1926.

"The construction program together with a better coordination of the various properties acquired from the Lackawanna, Cambria and Midvale companies have been largely responsible for a reduction of $7.27 per ton in the average cost of producing the finished steel products shipped by the corporation in 1927, as compared with the corresponding average based upon equivalent tonnages of the same products in 1923.

"Unfortunately the economies in production have not resulted in a corresponding increase in the net income of the corporation because, during the same period, the prices of steel products have steadily declined. The average billing price per ton of all rolled steel and other finished products shipped by the corporation during 1927 was $1.87 less than the corresponding average for 1926 and $8.60 less than the corresponding average for 1923."

Bethlehem's operations averaged 73.6 per cent of capacity in 1927, as compared with 81.1 in 1926. This resulted in a production of 5,590,754 tons of ingots in 1927 as against 6,162,759 in 1926 and of 4,315,509 tons of pig iron and ferromanganese, as compared with 4,551,353 tons in 1926. Production of rolled and finished products aggregated 4,006,612 in 1927 and 4,337,957 in 1926. Other comparative figures appear in Table VI.

Sharp Decline in Sheet & Tube Earnings

The Youngstown Sheet & Tube Co. had net profits of $7,023,334 in 1927, as compared with $15,148,876 in the previous year, a decline of 53.6 per cent. In commenting upon the decrease President James A. Campbell said in part: "The results of the year's business were not satisfactory, due principally to lower selling prices, reduction in volume, and particularly to the depression in the oil country trade, in which the company is largely interested through the manufacture of tubular products. We have also suffered very materially from lower selling prices of zinc ore, of which the company is a large producer."

Table IV.—Inventories

		Dec. 31, 1927	Dec. 31, 1926
Ores—Iron, manganese and zinc..		$80,099,036	$78,369,662
Limestone, fluxes and refractories.		5,686,874	5,149,877
Coal, coke and other fuel.........		12,414,147	14,910,624
Pig iron, scrap, ferro and spiegel..		23,649,267	26,951,753
Pig tin, lead, spelter, copper, nickel, aluminum and dross and skimmings		10,291,340	11,651,089
Rolls, molds, stools, annealing boxes, etc.		14,591,359	13,921,215
Ingots—Steel		1,513,534	2,000,864
Blooms, billets, slabs, sheet and tin plate bars, etc.		21,803,436	23,612,592
Wire rods		1,617,466	1,619,575
Skelp		1,971,460	2,729,222
Finished products		65,112,328	63,598,782
Manufacturing supplies, stores and sundry items not otherwise classified		31,003,952	35,298,964
Mining supplies and stores (for ore and coal properties)............		4,968,476	5,813,012
Railroad supplies and stores......		5,971,851	7,141,801
Merchandise of supply companies..		1,691,169	1,951,588
Material, labor and expense locked up in uncompleted bridge, structural and other contract work	$43,484,055		
Less bills rendered on account	40,309,054		
		3,175,001	1,192,881
Stocks abroad and on consignment		28,863,576	28,345,964
Material in transit...............		4,759,388	7,139,276
Total		$319,183,660	$331,398,741
Less, inventory reserve.......		48,015,658	50,143,280
Balance		$271,168,002	$281,255,461

Profits Declined Throughout Industry

That the decline in profits during 1927 was general throughout the industry is evidenced by the fact that 20 companies, with a theoretical ingot capacity of 47,908,200 tons, or more than 82 per cent of the country's total rated capacity, earned $153,574,000 in 1927, as compared with $207,293,000 in the previous year, a decline of 25.9 per cent. Not including the Steel Corporation, the decline was 27.5 per cent. Of the larger companies, the Inland Steel Co., the American Rolling

Table V.—Comparative Earnings in 1927 and 1926 in Thousands of Dollars

Company	Total Ingot Capacity	1926 Total Stockholders' Value	1926 Net Profits	1926 Per Cent Earnings to Stockholders' Value	1927 Total Stockholders' Value	1927 Net Profits	1927 Per Cent Earnings to Stockholders' Value	Per Cent Decrease in Profits
American Rolling Mill Co.	1,750,000	$45,909	$4,064	8.8	$47,298	$3,749	7.9	6.7
Bethlehem Steel Corporation...........	7,900,000	343,143	20,246	5.9	392,283	15,826	4.0	21.8
Central Alloy Steel Corporation........	1,400,000	63,032	3,331	5.3	62,749	2,726	4.3	18.2
Columbia Steel Corporation............	203,200	18,569	1,090	5.9	21,187	1,066	5.0	2.2
Crucible Steel Co. of America..........	950,000	102,790	6,548	6.4	105,988	5,617	5.3	14.4
Donner Steel Co., Inc.	540,000	15,492	737	4.7	15,868	372	2.3	49.5
Gulf States Steel Co.	288,000	17,621	800	4.5	17,656	756	4.3	5.5
M. A. Hanna Co.	......	27,999	1,548	5.4	32.594	1,247	4.1	19.4
Inland Steel Co.	1,800,000	64,830	7,148	11.0	67,120	6,807	10.1	4.8
Interstate Iron & Steel Co.	375,000	9,889	900	9.1	9,788	410	4.2	54.4
Jones & Laughlin Steel Corporation....	3,000,000	155,125	15,149	9.8	163,638	11,239	6.9	25.1
Ludlum Steel Co.	22,000	3,727	286	7.7	3,707	225	6.1	21.3
Otis Steel Co.	421,000	22,091	1,907	8.6	21,407	1,383	6.5	27.5
Republic Iron & Steel Co.	1,300,000	88,562	5,065	5.7	89.836	3,018	3.3	40.4
Sharon Steel Hoop Co.	400,000	15,297	1,296	8.5	15,464	556	3.6	57.1
Superior Steel Corporation............	......	4,792	272	5.7	4.914	*190	...	169.8
United States Steel Corporation........	23,046,000	1,630,447	116,667	7.2	1,692,086	87,897	5.2	24.7
Virginia Iron, Coal & Coke Co.	......	15,344	84	.6	15,275	*182	...	316.6
Wheeling Steel Corporation............	1,273,000	74,790	5,006	6.7	76.877	4,029	5.2	19.5
Youngstown Sheet & Tube Co.	3,240,000	122,623	15,149	12.3	131,879	7,023	5.3	53.6
Total	47,908,200	$2,842,072	$207,293	7.3	$2,987.614	$153,574	5.1	25.9
Total without United States Steel......	24,862,200	1,211,625	90,626	7.5	1,295,528	65,677	5.1	27.5

*Deficit.

Table VI.—Comparative Production and Other Statistics for Leading Companies in 1927 and 1926

Company	Total Volume of Sales	Gross Earnings	Inventories, As of Dec. 31	Pig Iron Production, Gross Tons	Steel Ingot Production, Gross Tons	Finished Steel Production, Net Tons	Total Payroll	Average No. of Employees	Average Yearly Earnings per Employee
U. S. Steel Corporation									
1927	$870,235,942*	$172,315,489	$271,168,002	13,784,226	18,486,444	12,979,282	$430,727,095	231,549	$1,860
1926	987,137,166*	207,345,153	281,255,461	15,705,301	20,306,668	14,334,412	467,409,446	253,199	1,846
Bethlehem Steel Corporation									
1927	271,502,892	40,378,900	67,695,369	4,315,509	5,590,754	4,006,612	111,193,699	61,978	1,794
1926	304,361,805	45,405,253	68,438,649	4,551,353	6,162,759	4,337,957	121,891,931	66,072	1,845
Youngstown Sheet & Tube Co.									
1927	......	22,923,265	52,879,232	......	......	......	......	....	....
1926	......	33,139,007	49,513,567	......	......	......	......	....	....
Jones & Laughlin Steel Corp.									
1927	......	16,559,320	30,210,301	2,054,615	2,348,719	1,937,645†	44,388,949	21,810	2,035
1926	......	21,210,206	32,911,098	2,246,054	2,591,140	2,136,141†	49,037,542	23,760	2,064
Inland Steel Co.									
1927	......	11,342,054	12,935,618	......	......	......	......	....	....
1926	......	11,180,782	12,537,329	......	......	......	......	....	....
American Rolling Mill Co.									
1927	39,087,519	8,931,293	13,558,048	......	......	......	......	9,760	....
1926	35,392,968	8,154,905	12,445,330	......	......	......	......	7,279	....
Republic Iron & Steel Co.									
1927	44,550,040	6,037,862	13,521,192	846,253	820,680	755,398	17,487,442	10,125	1,727
1926	53,890,445	8,442,681	13,017,883	914,655	949,018	864,195	20,008,683	11,481	1,743
Central Alloy Steel Corp.									
1927	......	5,721,950	14,726,287	452,282	948,778	788,861	19,379,822	9,559	2,027
1926	......	......	17,000,710	262,423	1,041,800	948,166	19,839,532	10,063	1,972
Wheeling Steel Corporation									
1927	72,596,950	9,521,099	25,684,633	821,215	1,147,867	......	27,756,135	15,593	1,780
1926	83,427,942	10,612,122	25,369,181	709,950	1,242,971	......	31,433,262	17,249	1,822

*Not including Inter-company sales.
†Shipments.

Mill Co. and the Gulf States Steel Co. were the only ones reporting a decline of less than 10 per cent.

On a total stockholders' investment, including common and preferred stock and surplus of $2,987,614,000, these 20 companies in 1927 earned 5.1 per cent, as against 7.3 per cent on a stockholders' investment of $2,842,072,000 in 1926. Comparative figures of these companies for the two years are shown in Table V.

ASK RATE MODIFICATION

Chicago District Steel Makers Seek Reconsideration of Consolidated Southwestern Decision

WASHINGTON, March 20.—Independent steel producers in the Chicago district, following similar action by other steel makers, last Wednesday filed a petition with the Interstate Commerce Commission asking that it reopen or modify its decision in the Consolidated Southwestern cases. It is contended that the decision fails to include a complete list of iron and steel products moving to the Southwestern destination territory involved and thus places a restriction on the free movement of such traffic. Objection is made also on the grounds that the scale prescribed is improper, unduly excessive and detrimental to iron and steel commerce. It is contended that it is improper to relate rates upon carload iron and steel traffic to class rate scales because of the widely different circumstances in transportation conditions governing the two classes of movement. Rates constructed upon consideration of distance alone are held to be restrictive to the free movement of heavy and bulky commodities such as iron and steel.

The scale provided, it is charged, unduly disrupts relationships of long standing between competitive producing points and will destroy commerce. Large markets, it is stated, will be diverted to foreign interests, and the movement of iron and steel traffic from the principal producing points of the United States will be revolutionized.

Railroads Also Object to Scale

From the carriers' standpoint, it is declared, a large volume of business which at present moves by rail from such points as Chicago, Cleveland and Youngstown to Southwestern territory will be diverted to mills situated at points available to barge or vessel movement, depriving rail carriers of substantial revenue. The purpose of the increased rates, it is stated, will be defeated as a result of this diversion of markets and tonnage.

Concurring in the view of other petitioners for reopening of the case on the principle of insufficient evidence, the Chicago producers also maintain that the revenue contributed by the iron and steel traffic is greatly in excess of revenues from general traffic. Consequently, it is stated, revenues derived from iron and steel traffic under the Southwestern scale would be greatly in excess of reasonable revenues and contrary to the intent of the Hoch-Smith resolution.

The petitioners include the Acme Steel Co., Clayton Mark & Co., the Crane Co., the Inland Steel Co., the Interstate Iron & Steel Co., Joseph T. Ryerson & Son, Inc., the Youngstown Sheet & Tube Co. and the North Western Expanded Metal Co.

Steel products which, it is asserted, are not included in the decision, but should be, are chain, concrete road joints, rails and fastenings in mixed carloads, strip steel, stays, box strap, bale tie buckles, wood joint fasteners, expanded metal ribbing lathing, corner bead clips, coiling or roofing clips, cove base fastenings, tin and terne plate, concrete and plaster reinforcement, wire mesh and expanded metal, wrought conduit pipe, building doors other than rolling, concrete road points and joists, studding, iron or iron-body valves, siding, traps and steam or oil separators.

Secretary of War Opposes Bill to Prohibit Export of Munitions

WASHINGTON, March 20.—The resolution of Representative Burton of Ohio to prohibit export from the United States of war munitions is so broad that it might endanger the maintenance of an adequate American munitions industry, Secretary of War Davis told the House Committee on Foreign Affairs last Thursday. Members of the committee dissented from the view of the Secretary of War, but the latter insisted that the resolution as drawn might apply not only to munitions as such but also to products such as steel, cotton, and copper, used in the manufacture of the finished product. Secretary Davis also recalled the position taken by President Wilson during the World War that it would be a violation of neutrality to prohibit munition shipments to the Allies. This was in response to the effort to put through an embargo on shipments of munitions.

European Markets Are Less Active

Steel Prices Still Firm—Germany to Eliminate Export Rebates —British Advance Pig Iron

(By Cable)

LONDON, ENGLAND, March 19.

CLEVELAND producers have increased foundry and forge iron prices by 1s. (24c.) per ton, as most of the current output is sold for two months forward and some contracts have been made for delivery up to September. The rise in prices brought out increased buying, especially by domestic consumers, as foreign pig iron is not competitive.

Hematite iron is steadier, but stocks are still heavy and makers are seeking orders. Foreign ore continues firm as a result of the Swedish strike. British demand for ore is poor, but German consumers are purchasing for early shipment.

Finished steel is generally quiet for export, but in the domestic market there is a good volume of structural and engineering orders. Plate mills are in need of orders, but consumers are not attracted by the rebate plan.

Tin plate is strong and active. The Asiatic Petroleum Co. has purchased 1,000,000 boxes for third quarter delivery and other consumers are showing marked interest. The larger makers are sold out until the end of June and have booked one-third of their output for the rest of the year. Makers have agreed not to accept orders at less than 18s. ($4.39) per base box, although the minimum price continues at 17s. 9d. ($4.33) per base box, f.o.b. works port. Some oil tin plate business has been done at 18s. 3d. ($4.45) per base box.

Galvanized sheets are inactive and the market is weak. Black sheets continue quiet.

The Australian Iron & Steel Co. has been formed by Dorman, Long & Co., Baldwins, Ltd., Howard Smith of Melbourne and the Hoskins Iron & Steel Co., with capital of £5,000,000, to develop an Australian iron and steel industry at Port Kembla.

Continental iron and steel is generally quiet, although British consumers have bought fair tonnages of billets and wire rods. The European Rail Makers' Association will meet in Paris, March 29. Negotiations are proceeding for reorganization of the International Wire Rod Syndicate.

GERMANY TO SEEK EXPORTS

Decline in Domestic Trade Expected—Mills to Eliminate Export Rebates—Shipyards Active

BERLIN, GERMANY, March 4.—The industrial situation is still satisfactory. Steel works are well booked with business for delivery into the second quarter, the number of unemployed has been declining for several weeks, and there was a recession in bankruptcies in February. According to the Institute for the Study of Trade Fluctuations, however, the intense industrial activity carried over from last year began to slacken in February. The decline in business, however, is expected to develop slowly and will be accompanied by increased German competition for export business. There is some labor unrest, and, following rejection by labor representatives of a compromise, the Siemens, Bergmann and the Mix und Genest companies in Berlin have suspended operations, releasing about 50,000 workmen.

Price disagreement between steel producers and consumers, which recently culminated in an advance by the steel syndicate, has been terminated. The Ministry of Industry has withdrawn an ordinance which brought the steel syndicates under the price-regulation provisions of the cartel law. This ordinance required the syndicates to report to the Government all price changes or agreements before they became effective. The steel producers have reached an agreement with the Ministry of Industry, under which the spread between domestic and export prices is to be gradually decreased until it disappears. This change, it is believed, will remove the principal grievance of consumers, who contend that the consumption of finished steel products in the domestic market is continually checked by high prices.

The Pig Iron Syndicate has made no change in prices for March. Domestic business has improved, but exports of pig iron are light. The ingot steel syndicate has made no change in domestic prices for March, but has increased its "world market" prices, so that rebates

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.		$4.39		
Bilbao Rubio ore*	1 1¾	to £1 2s.	5.30	to	$5.36
Cleveland No. 1 fdy.	3 8½		16.56		
Cleveland No. 3 fdy.	3 6		16.07		
Cleveland No. 4 fdy.	3 5		15.83		
Cleveland No. 4 forge	3 4½		15.71		
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to	18.39
East Coast mixed	3 10		17.05		
East Coast hematite	3 10½		17.17		
Rails, 60 lb. and up	7 15	to 8 0	37.75	to	38.96
Billets	6 0	to 6 10	29.22	to	31.66
Ferromanganese	13 10		65.75		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to	28.01
Tin plate, base box	0 18	to 0 18¼	4.39	to	4.45
Black sheets, Japanese specifications	13 5	to 13 10	64.53	to	65.75
			C. per Lb.		
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	9 2½	to 9 12½	1.98	to	2.09
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to	1.69
Steel hoops	10 10	to 11 0	2.28	to	2.39
Black sheets, 24 gage	10 0	to 10 5	2.17	to	2.23
Galv. sheets, 24 gage	13 2½		2.85		
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)					
Belgium	£3 4s.	to £3 5s.	$15.58	to	$15.83
France	3 4	to 3 5	15.58	to	15.83
Luxemburg	3 4	to 3 5	15.58	to	15.83
Basic pig iron (nom.):					
Belgium	3 0	to 3 1	14.61	to	14.85
France	3 0	to 3 1	14.61	to	14.85
Luxemburg	3 0	to 3 1	14.61	to	14.85
Coke	0 18		4.39		
Billets:					
Belgium	4 14		22.90		
France	4 14		22.90		
			C. per Lb.		
Merchant bars:					
Belgium	5 6		1.17		
France	5 6		1.17		
Luxemburg	5 6		1.17		
Joists (beams):					
Belgium	4 17		1.07		
France	4 17		1.07		
Luxemburg	4 17		1.07		
Angles:					
Belgium	5 5		1.16		
⅛-in. plate:					
Belgium (a)	6 10		1.44		
Germany (a)	6 10		1.44		
$\frac{3}{16}$-in. ship plates:					
Belgium	6 6		1.39		
Luxemburg	6 6		1.39		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

to domestic manufacturers for export are to that extent reduced. This is a result of the recent strength of prices in other Continental producing countries. The rebate on steel bars manufactured into export products has been reduced by about 10m. ($2.39) per ton. The new steel ingot price is 79m. ($18.88) per ton, compared with 100m. ($23.90) per ton on domestic sales. Blooms are quoted at 84m. ($20.08) per ton, compared with 107.50m. ($25.69) per ton in the domestic market; slabs, 96m. ($22.94), compared with 120m. ($30.68) per ton; medium gage sheets, 130m. ($31.07), compared with 155m. ($37.05) per ton.

The price spread between home and export prices is still large, and producers declare that the rebate system cannot be continued much longer and that the International Steel Cartel should take more effective action in raising Continental prices. Both output and sales of steel were slightly smaller at the beginning of March. Rolling mills are still well booked with business in bars, heavy-gage sheets and wire rods, but demand for structural material and medium and light-gage sheets is less active. Buying by German railroads has slackened considerably. Deliveries, however, are still extended. The average delivery offered on pig iron and steel ingots is two months, on steel bars two to three months and on light-gage sheets one to two months. The present decline in domestic buying is partly explained by the heavy purchases by consumers last fall, when a strike or lockout in the steel industry was believed imminent.

Export demand for iron and steel has been extremely active, but much of the recent purchasing was seasonal and a decrease in this business is expected. Imports of steel have increased slightly as a result of the extended deliveries quoted by domestic steel mills. Exports of semi-finished products are large and prices are firm. Demand for light railroad materials is better than for the heavier products, and there is heavy inquiry for bands, the price of which has advanced.

The Solingen steel industry reports considerable improvement, although manufacturers are suffering from an acute shortage of working capital and are encountering difficulty in paying wages. This is a result of the demand for long-term credits from customers. There is continued improvement in exports of Solingen cutlery and high-grade steels, despite strong competition from Sheffield. Exports to Switzerland, which normally buys about 50 per cent of its requirements of cutlery and special steels from Germany, are quite active.

Shipyards are prosperous. The Germanische Lloyd annual report records a total of 524,991 gross tons of construction registered in 1927, compared with 372,681 tons in 1926. Motor ship construction totaled 277,400 gross tons, while steam construction amounted to only 246,671 tons. This is the first year in which motor ship construction was in excess of steam vessel building. Of all the 1927 construction, 35 per cent represented foreign orders.

United States Second Largest Buyer of German Hoops

HAMBURG, GERMANY, March 3.—The United States has become Germany's second largest market for hoops. In 1927 exports from Germany totaled 129,204 metric tons, compared with 131,597 tons in 1926. Great Britain was the largest purchaser of German hoops, with 38,243 tons in 1927, and the United States was next with 18,083 tons, of which the greater portion was in cotton ties. Germany imported almost exactly as much as was exported, imports for 1927 totaling 129,209 metric tons, mostly from the Saar.

German Direct Steel Process Reaches Practical Stage

LONDON, ENGLAND, March 10.—The discovery of the Hoesch Steel Works (Germany), first announced a few months ago, by which it is claimed steel can be produced direct from ore, has now passed the laboratory tests and reached a practical stage. A plant is in process of erection and will be ready for operation next June. It is stated that this new method will reduce costs of steel production approximately 30 per cent.

JAPANESE BUYING RAILS

Small Inquiries in Market—Steel Importers in New York Report Improvement

NEW YORK, March 20.—Except for some pending rail business the Japanese market is quiet. Yokohama municipality opens bids March 23 on 10 miles of 91-lb. high T-rails and three miles of 136-lb. T-rails. Tokio municipality has taken bids on six miles of 122-lb. grooved rails and one mile of 140-lb. guard rails. An inquiry from the South Manchuria Electric Co., Dairen, Manchuria, for 290 tons of 91-lb. high T-rails is understood to have been awarded to a Japanese export house in New York for execution by an American mill.

The Chinese market is quiet. Chinese merchants continue to offer $27.50 to $28 per ton, c.i.f. Chinese port, for second-hand material and plate cuttings, but, as this figures back to a price equivalent to no more than the domestic market on heavy melting steel, very little business can be done. Some wire shorts have been sold, but Chinese offers on this material are also low. Recently an exporter in New York received a firm offer from China of about 25c. per base box under the current American mill quotation on about 1000 double boxes of tin plate.

New York importers of European steel report a moderate volume of interest on the part of consumers, but few sales have been made. A small tonnage of reinforcing bars for a sewer project in the New York district is being bid on. Prices of Continental material are high, and importers, in most cases, are quoting 1.65c. to 1.75c. per lb. on structural material and 1.75c. to 1.85c. per lb. on plain steel bars, duty paid, Atlantic port. Steel hoops are offered at about 2.15c. per lb., duty paid, New York.

Luxemburg's Exports to South America Improving

LUXEMBURG, March 6.—As a result of increases in German export prices, both French and Luxemburg mills have been enabled to advance their quotations. Export to the Far East continues difficult, with Japanese steel producers offering keen competition in their domestic market and with China still inactive as a result of the political situation. Business with South American markets, however, has improved, and there has been a slight revival of trade with the United States.

February has been more active than January, although prices have been reduced from the prohibitive levels of a few weeks ago. There is considerable confusion in the semi-finished material market. Few mills are able to offer early deliveries, and German sellers are quoting high prices. Most producers are booked with tonnage until May. Billets are held at £4 12s. to £4 15s. ($22.41 to $23.14) per ton, f.o.b. Antwerp, and blooms have been offered as high as £4 14s. ($22.90) per ton. Beams are quoted at £4 15s. 6d. to £4 17s. per ton (1.05c. to 1.07c. per lb.), and steel bars at £5 7s. to £5 7s. 6d. per ton (1.18c. to 1.19c. per lb.), f.o.b. Antwerp.

January production of pig iron totaled 229,602 metric tons, and there were 38 out of 47 furnaces in blast on Feb. 1. Steel ingot output in January was 212,938 metric tons.

Copper-Bearing Steel Scrap Causes Trouble in Germany

HAMBURG, GERMANY, March 3.—Copper-bearing steel in Germany (containing 0.2 to 0.75 per cent copper) is causing difficulties when it returns to industry in the form of scrap. A fair tonnage of such steel is beginning to appear on the scrap market, and the small percentage of copper that it contains renders it difficult for scrap dealers to classify it as an alloy, so that it has been delivered to mills as copper-free. Mills and dealers are endeavoring to work out a plan for its classification so that there will be no adverse effects from using it unintentionally.

Machinery Markets and News of the Works

PRICE TENDENCY HIGHER

Milling Machines, Shapers and Radial Drills Have Been Advanced

Business in Machine Tools Continues Moderately Active—Large Orders Placed at Chicago

PRICE advances have been announced by a number of machine tool manufacturers. Radial drill companies have generally followed the lead of a Cincinnati maker in putting up prices and in introducing a new method of quoting whereby the diameter of the column as well as of the length of the arm enters into the price, so that there are two or three prices for each arm length. The new prices on radial drills range from 8 to 30 per cent higher. Shapers have been increased in price about 8 per cent and some makers of milling machines have named higher prices.

Machine tool buying continues moderately active and indications are that sales for this month will equal, and perhaps exceed, those of February. At Chicago, the International Harvester Co. has bought $140,000 worth of equipment for its Rock Island, Ill., plant, and the Allis Chalmers Mfg. Co., Milwaukee, has bought about $40,000 worth. Among the pending projects in the Detroit district is a lot of special machines calling for an expenditure of about $400,000. The Apex Electric Mfg. Co., Cleveland, and the Champion Spark Plug Co., Toledo, have been among the larger buyers in the Cleveland district. The Mergenthaler Linotype Co., Brooklyn, and the Wright Aeronautical Corporation, Paterson, N. J., continue their purchases in the New York market. The Theodore A. Crane's Sons Co., Brooklyn, has bought 14 tools for its shipyard.

New York

NEW YORK, March 20.

ACTIVE demand for machine tools continues from industrial users and the railroads are beginning to show some interest in new shop equipment. Advances in prices are appearing in some branches of the industry. Shapers have been increased in most cases about 8 per cent, some makers of milling machines have made slight advances and, following the increase in lathe prices about the first of the year, lathe accessories have been advanced from 8 to 12 per cent. Radial drill prices are up from 8 to 30 per cent. Manufacturers of radial drills are quoting on a new basis, the diameter of the column being considered as well as the length of the arm, so that there are two or three prices for each arm length, depending upon whether the column is small, medium or large size. Tables are no longer included in the price of the drill, but are quoted separately.

Among the railroads, the Lehigh Valley is reported still preparing a short list of machine tool requirements. The New York Central, which has not been a purchaser of tools since the first of the year, placed some orders last week. The Western Railway of Alabama has closed on a 13 x 30-in. Pratt & Whitney lathe. The Atlanta & West Point Railroad Co. and the Central of Georgia have each closed on a Niles 48-in., 500-ton, double end wheel press and the former has also purchased a Niles No. 3 axle lathe. The Merchants Despatch Transportation Co., Rochester, N. Y., has purchased a No. 3 die sinking machine.

The Mergenthaler Linotype Co., Brooklyn, has made some further purchases of machine tools. The Wright Aeronautical Corporation, Paterson, N. J., is awaiting a further appropriation before making additional purchases. A recent purchase of about 14 tools by Theodore A. Crane's Sons Co., Brooklyn, included new and used engine lathes, a used planer, new shapers and radial drills.

Other purchases of machine tools included the following: An Indiana manufacturer, 6-in. vertical shaper, 13 x 30-in., 13 x 36-in. and 20 x 48-in. lathes and No. 2 jig boring machine from Pratt & Whitney Co.; a company in Hartford, Conn., an engine lathe; an electrical manufacturer, 12-in. vertical shaper; a Cleveland manufacturer, rebuilt Pratt & Whitney 14-in. grinder; a company in Pennsylvania, hob and cutter grinder; a manufacturer in western Pennsylvania, 16 x 60-in. lathe and a No. 2 jig boring machine; a Connecticut manufacturer, 1100-lb., single frame Niles steam hammer; a Pittsburgh company, Long & Allstatter type E single vertical punch; a manufacturer of drills, Mitts & Merrill No. 4 giant keyseater; a Wisconsin motor manufacturer, 3-ft. Morris radial drill; a Pittsburgh company, used 18-in. x 8-ft. Le Blonde lathe and used 26 x 17-ft. Pond lathe; a California company, No. 2 G Brown & Sharpe automatic cutting off machine; Harrisburg Light & Power Co., Harrisburg, Pa., 3½-ft. heavy-duty Morris radial drill, and Pratt & Whitney Aircraft Co., three United States pedestal tool grinders.

A stock issue to total about $2,200,000, is being arranged by Warner-Quinlan Co., 26 Beaver Street, New York, operating oil and asphalt refining plants, with main refinery in the Raritan River section, New Jersey, a considerable portion of proceeds to be used for extensions and betterments to double present capacity, including storage and distributing facilities.

J. Edward Birmingham, 45 Warburton Avenue, Yonkers, N. Y., architect, has plans ready for bids for a two-story automobile service, repair and garage building, 88 x 100 ft., at 5120 Broadway, New York, to cost about $100,000 with equipment.

Quartermaster supply officer, United States Army, Brooklyn, will receive bids until April 2 for one feed water heater, two boiler feed pumps, two 35-hp. steam boilers, and two ammonia compressors, 5 and 7½-tons, respectively, circular 162.

Orange & Rockland Electric Co., Monroe, N. Y., is disposing of bond issue of $1,250,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

New York Edison Co., 130 East Fifteenth Street, New York, plans a new power substation at Laconia Avenue and Gun Hill Road, to cost $100,000 with equipment. T. E. Murray, 55 Duane Street, is architect.

Louis Shiffman, 1885 Prospect Avenue, Brooklyn, manufacturer of lighting fixtures, has filed plans for a one-story factory, 45 x 105 ft., to cost about $21,000 with equipment. Kavy & Kavovitt, 350 Stone Avenue, are architects.

Packard Motor Service Co., 206 South Broadway, Yonkers, N. Y., has awarded general contract to F. C. Berube, 418 West 260th Street, New York, for a two-story addition to its service and repair building, to cost close to $85,000 with equipment. William P. Katz, 45 South Broadway, is architect.

Signal corps procurement district, Governor's Island, N. Y., is asking bids until April 3 for 1500 steel spools, circular 134.

Federal-New York Co., Inc., Goshen, N. Y., is concluding negotiations for purchase of Goshen Illuminating Co., operating artificial gas plant and system. New owner contemplates addition in gas-generating facilities, new storage holder and extensions in system.

International Nickel Co., 67 Wall Street, New York, is arranging an expansion and improvement program at its Port Colborne, Ont., properties to cost $12,000,000. Work will include immediate installation of hoisting machinery, air compressors and auxiliary mining machinery, and additional equipment for hydroelectric power development. Later an addition will be built to electrolytic refinery at Port Colborne and other smelter development carried out. A new electrolytic copper refinery is contemplated at Copper Cliff, Ont., not included in above estimate of cost. Robert C. Stanley is president.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has awarded a general contract to Turner Construction Co., Graybar Building, for a two-story addition to plant at Yonkers, N. Y., to cost approximately $100,000 with equipment. W. O. Moyer is engineer in charge of construction.

Continental Baking Corporation, 285 Madison Avenue, New York, has approved a fund for extensions and betterments in different plants, including installation of ovens, power equipment, conveying machinery, electric mixing equipment and other apparatus.

New York Dock Co., 44 Whitehall Street, New York, has awarded general contract to William E. Anderson, Inc., 885 Flatbush Avenue, Brooklyn, for a three-story addition to its factory and terminal at foot of Joralemon Street, Brooklyn, to cost about $85,000.

Town Council, Belleville, N. J., has plans for a one-story municipal machine and repair shop to cost about $20,000 with equipment. Paul B. West, 24 Commerce Street, Newark, is architect.

Chamber of Commerce, Paterson, N. J., is negotiating with an aircraft manufacturing company, name temporarily withheld, to establish a local plant. Works will include parts and assembling departments, motors to be purchased from Wright Aeronautical Corporation. Reuben H. Reiffin, 152 Market Street, Paterson, is corporate representative for company.

Raymond N. Burke, Newark, has leased property at 15 Coates Street and will remodel for a brass foundry.

Kantor Brothers, Inc., 205 Waverly Avenue, Newark, plumbing equipment and supplies, has acquired adjoining property, 90 x 122 ft., improved with several buildings, and will use for expansion. Site has been used by Cook & Genung Co., building materials, which will build a new plant and yard on property lately purchased at Irvington.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, has authorized immediate work on different features of construction and improvement program to cost $22,000,000, including transmission line and power substation construction to cost more than $10,000,000; underground conduit electric lines to cost $500,000; switching stations, distributing facilities, etc. Nathaniel A. Carle is vice-president in charge of operation.

Barozzi Drying Machine Co., 940 Van Wagenen Avenue, North Bergen, N. J., has asked bids on general contract for a two-story and basement addition, 50 x 100 ft., to cost approximately $65,000. P. O. Simone & Co., 22 Journal Square, Jersey City, N. J., are architects.

New England

BOSTON, March 19.

MACHINE tool houses report little business transacted the past week and a decrease in new inquiries. The most important sales were a new boring mill and a 20-in. Pratt & Whitney lathe to two Connecticut manufacturers, and some radial drills, details of which are withheld; a used boring mill, used 20-in. motor-driven drill, 3-hp. Blount grinder to local shops; two 16-in. and one 20-in. drill to Massachusetts plants; and a two-spindle drill to a Vermont user. The situation is not as quiet as it might appear, however. Dealers are still negotiating on a large amount of machinery, inquiries for which have been out for several months in some instances. General opinion is that industry, particularly as it pertains to the metal-working trade, will show a slow but steady expansion.

Small tool business is spotty and March sales are a shade below those of February. Recent sales included a measuring machine costing $1,600.

March report of Worcester Bank & Trust Co. states that since the first of the year a marked improvement has been shown in activities of Worcester manufacturers. A large majority of mills, shops and factories had much better business in January and February than in November and December, and more than in first two months of 1927.

Some large Fitchburg manufacturers of machine equipment are operating on a day and night basis. Increased production is partly due to manufacture of a new automobile gear.

Plans are in progress for a new factory for Massachusetts Electro Mfg. Co., 11 Margin Street, Lynn, Mass., to replace one recently damaged by fire.

Bids close March 26 on a three-story and basement, 68 x 93-ft., junior high school at Providence, R. I., to contain metal-working shops. T. J. H. Pierce, city engineer, has plans.

L. C. Titus, 50 Lincoln Street, Watertown, Mass., architect, is taking bids on a one-story, 80 x 200-ft. manufacturing plant for Peerless Pressed Metal Corporation, 14 Electric Avenue, Brighton district, Boston.

Foundations are going in for a one-story, 60 x 160-ft. plant at Millbury, Mass., for New England High Carbon Wire Co., of which Frank Kilmer is president. Plans are private.

Work has started on a one-story, 50 x 85-ft., automobile repair shop for Cambridge Auto Forge, Sidney Street, Cambridge, Mass. E. T. P. Graham, 171 Newbury Street, Boston, is architect.

Plans are in progress for doubling output of airplane engines by Pratt & Whitney Aircraft Co., Hartford, Conn. Government orders on hand will keep present day shift of 400 men and night shift of 200 men busy for two years.

Plans have been approved by Boston Rubber Shoe Co., Malden, Mass., for electrification of mills at Malden and Melrose, replacing steam-power apparatus heretofore in service.

New England Water, Light & Power Associates, Inc., Providence, R. I., recently organized with capital of $4,000,000, is disposing of a preferred stock issue of $750,000, a portion of proceeds to be used for property purchases, transmission line construction, etc.

E. M. Jennings, 27 Harrison Street, Bridgeport, Conn., and associates, plan construction of a multi-story automobile service, repair and garage building to cost $100,000 with equipment.

Boston & Maine Railroad Co., North Station, Boston, will soon begin construction of a new boiler house at Westboro, N. H., to cost more than $55,000 with equipment.

Arlington Gas Light Co., 589 Massachusetts Avenue, Arlington, Mass., will soon begin construction of a one-story heater and governor plant unit reported to cost in excess of $50,000.

Board of Education, Bridgeport, Conn., has approved installation of manual training shops in basement of new three-story Bassick junior high school, for which bids will be received on general contract March 27. Structure will cost in excess of $400,000. Ernest G. Southey, Bridgeport, is architect.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has filed plans for a one-story repair shop and automobile service building, to cost close to $70,000 with equipment.

United States Gypsum Co., Chicago, has purchased property with water frontage at Charlestown, formerly occupied by Philadelphia & Reading Coal Co., and contemplates erection of 12 plant units. Handling equipment will be required.

Gulf States

BIRMINGHAM, March 19.

ARRANGEMENTS have been made by San Antonio Public Service Co., San Antonio, Tex., for acquisition of Comal Power Co., New Braunfels, Tex. Purchasing company will carry out an expansion program, including installation of 30,000-kw. turbo-generating unit and auxiliary equipment, and will make extensions in transmission lines. Company has approved bond issue of $7,500,000, a portion of fund to be used in connection with purchase of property and additions. James Lawrence is vice-president.

Hahn & Clay Co., 102 Milan Street, Houston, Tex., has completed plans for a one-story machine and forge shop, 95 x 115 ft., to cost close to $20,000 with equipment.

Interstate Cotton Oil Refining Co., Sherman, Tex., is considering construction of a one-story addition, to cost close to $45,000 with equipment. It is proposed to establish department for manufacture of containers.

New Orleans Public Service Co., New Orleans, has approved plans for construction of 22-in. diameter natural gas pipe line from Destrahan to New Orleans, to cost $275,000 with booster stations, etc.

Board of Education, Fairfield, Ala., is considering installation of manual training equipment in three-story high school to cost $150,000. Denham, Vankeuren & Denham, Age-Herald Building, Birmingham, are architects.

Board of Education, Alamo Heights, Tex., is planning installation of manual training equipment in one-story junior high school to cost $175,000, for which plans will be drawn by H. P. Smith, National Bank of Commerce Building, San Antonio, Tex., architect.

Ovens, power equipment, conveying and other machinery will be installed in new plant, 100 x 100 ft., to be erected by Schepps Baking Co., Fort Worth, Tex., to cost $200,000 with machinery.

National Cast Iron Pipe Co., Birmingham, will soon begin a one-story foundry addition, to cost in excess of $50,000 with equipment.

J. A. Burke, 3217 Cadiz Street, New Orleans, is planning purchase of machinery for production of cement roofing tile.

United Shutter & Awning Co., 801 First National Bank Building, Fort Lauderdale, Fla., is planning establishment of a local plant. Installation will include a punch and shear, band saw and wood-working machinery.

Board of Regents, University of Texas, Austin, Tex., is considering a fund of $8,000,000 for new buildings, including mechanical engineering and shop building, $350,000; electrical engineering building, $350,000; aeronautical building, $350,000; general shops, $200,000; chemical building, with laboratories, etc., $900,000; additions and improvements in power house, grounds and various operating buildings, $750,000. Edward Crane, Dallas, is a member of board. Herbert M. Greene Co., Construction Industries Building, Dallas, is architect.

Magnolia Gas Co., operated by Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., is reported planning installation of a pipe line from Wheeler County gas field to Fort Worth, Tex., for natural gas supply, to cost more than $2,000,000.

Southwestern Gas & Electric Co., Marshall Street, Shreveport, La., is said to be considering construction of steam-operated electric power plant in northern part of State, to cost more than $1,000,000 with transmission lines.

J. D. Wrather, Amarillo Building Amarillo, Tex., is at head of project to construct and operate an oil refinery at Pyote, Tex., to cost more than $100,000. A company will be formed to carry out work.

Texarkana Water Corporation, Texarkana, Tex., is planning extensions and improvements in plant and system, including installation of a new pumping station with capacity of 2,000,000 gal. per day. Total program is estimated to cost close to $250,000.

Philadelphia

PHILADELPHIA, March 19.

PLANS have been filed by board of trustees, Mount Sinai Hospital, Philadelphia, for a steam power house to cost approximately $50,000 with equipment. Magaziner, Eberhard & Harris, 603 Chestnut Street, are architects.

U. S. M. C. Garages, Inc., 1401-7 Locust Street, Philadelphia, plans a three-story addition to service, repair and garage building to cost about $110,000 with equipment.

Tidewater Oil Sales Co., 11 Broadway, New York, has filed plans for a one-story storage and distributing plant, to cost about $35,000 with equipment.

United Gas Improvement Co., Broad and Arch Streets, Philadelphia, is arranging a construction and improvement program for Philadelphia Gas Works, an affiliated organization, to cost approximately $2,000,000 with equipment. Work will include expansion at gas-generating station at Richmond and Tioga Streets to cost $380,000, including completion of new gas holder; installation of new metering equipment to cost $92,000; installation of gas-pumping and coal-handling equipment at Point Breeze station to cost $130,000; extension of distributing lines and main to cost in excess of $1,000,000 with equipment. Koppers Co., Pittsburgh, will proceed with construction of new gas-generating and by-products coke plants for Philadelphia Gas Co., on 60-acre tract for which plans have been filed, to cost approximately $7,000,000 with machinery.

David Supowitz, 929 Chestnut Street, Philadelphia, architect, has plans for a two-story automobile service, repair and garage building, 74 x 200 ft., to cost in excess of $100,000 with equipment.

In connection with an expansion program in Philadelphia district to cost $9,000,000, Bell Telephone Co. of Pennsylvania, Philadelphia, has arranged an appropriation of $1,948,000 for purchase of new equipment, cables, conduits, manholes, manhole covers, etc., and $1,422,000 for underground cable installation.

Ryan Monoplane Co., St. Louis, has concluded negotiations for lease of Phillips tract, Camden, N. J., comprising 245 acres, as site for a new aviation field. Work will soon begin on hangar to house six airplanes, with repair and reconditioning shops, oil storage and distributing station, etc.

Campbell Soup Co., Camden, N. J., has begun erection of new plant to double present canning and distributing capacity. Project will include a new steam power plant and will cost close to $2,000,000. Harry A. Kelleher is superintendent.

County Board of Education, West Chester, Pa., C. T. Saylor, superintendent, is considering installation of manual training equipment in new high school to be erected at Lynhurst for West Grove, Avondale and London Grove townships, for which plans are nearing completion. A fund of $600,000 is available for structure.

Metropolitan Edison Co., Reading, Pa., is disposing of bond issue of $23,000,000, a portion of proceeds to be used for extensions and improvements in power plants and transmission lines. Company is under direction of General Gas & Electric Corporation, 50 Pine Street, New York.

Luzerne County Gas & Electric Co., Wilkes-Barre, Pa., plans extensions and betterments in plants and system to cost $900,000, including installation of additional equipment.

Board of Education of South Fayette Township, Cuddy, Pa., is considering installation of manual training equipment in new two-story high school at Sturgeon, Pa., to cost $200,000, for which bids will be asked on general contract this month. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Delaware Electric Power Co., Wilmington, Del., an interest of United Gas Improvement Co., Philadelphia, is planning for extensions and improvements to cost $1,600,000, including transmission line construction, power substations, etc. Thomas W. Wilson is general manager.

Pittsburgh

PITTSBURGH, March 19.

THE Westinghouse Electric & Mfg. Co. has issued its regular quarterly machine tool list, totaling 30 items, with about 20 in which machine tool dealers will be interested. The Pittsburgh Plate Glass Co. is reported to have bought a few tools for its Ford City, Pa., works. Business in general is fairly active, but demand is largely for replacement and sales rarely include more than one item.

Bids will be received by Borough Council, Coraopolis, Pa., until April 2 for one triplex plunger pump, capacity 1,500,000 gal. per 24 hr. W. E. Cain, 1018 Fifth Avenue, is secretary.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has extended plans for expansion at its Ford City, Pa., sheet glass plant, and will expend close to $5,000,000 over about 18 months for new buildings and equipment. A complete new operating unit will be provided. Contract for building has been let to McClintic-Marshall Co.

Allegheny Metal Products Co., 1902 Brighton Road, Pittsburgh, has taken over a two-story building at Verona, Pa., and will remodel for a machine works.

Consolidated Gas Co., Huntington, W. Va., recently formed with a capital of $4,000,000 by W. P. Floyd and George I. Neal, Huntington, plans construction of a pipe line in Wayne and Mingo counties for natural gas supply.

Cities Service Power Co., 60 Wall Street, New York, is reported planning a steam-operated electric power house on Ohio River, opposite Moundsville, W. Va., to cost in excess of $300,000 including transmission lines.

Lawson Mfg. Co., Lexington Avenue and Thomas Boulevard, Pittsburgh, manufacturer of heaters and heating equipment, has asked bids on general contract for a one-story addition, to cost $50,000 with equipment. Barnard H. Prack, Martin Building, is architect.

Stetson Rubber Co., East Butler, Pa., recently formed by H. B. Callahan, general manager, Corona Cord Tire Co., with local mill, and other officials of that company, contemplates early erection of new plant on neighboring site, consisting of three one-story units, each 42 x 100 ft., to cost more than $70,000 with equipment. New mill will be used for production of automobile tires of special type.

Board of Education, Pitcairn, Pa., contemplates installation of manual training equipment in a two-story addition to high school to cost in excess of $160,000. W. Ward Williams, 309 Fourth Avenue, Pittsburgh, is architect.

Lewistown Overhead Door Corporation, Lewistown, Pa., is said to be planning an expansion program and contemplates doubling facilities in a number of departments.

Rolland Glass Co., Clarksburg, W. Va., manufacturer of sheet glass, has purchased plant of Lafayette Window Glass Co., Clarksburg, and will use for expansion.

City of Mannington, W. Va., is receiving bids until March 31 for construction of a concrete water tank. Plans and specifications at office of the city clerk.

The Crane Market

THERE is very little new inquiry for overhead or locomotive cranes, but there is a good volume of business still pending. In locomotive cranes, the Amtorg Trading Corporation, 165 Broadway, New York, still has nine 40-ton cranes to purchase for export to Russia and there is a 20-ton locomotive crane for the Delaware, Lackawanna & Western Railroad. In the overhead crane field there is a 25-ton, 1-motor crane for F. L. Smidth & Co., New York, two 225-ton and one 50-ton cranes for the Reading Railroad and two 15-ton lumber handling cranes for the Franklin Lumber Co., Newark, N. J. No action has been taken by Thomas E. Murray, consulting engineer, New York, on the 100-ton crane for the New York Edison Co.

In the Pittsburgh district, the Wheeling Steel Corporation is inquiring for eight overhead cranes for its projected 60-in. continuous 4-high strip mill at Steubenville, Ohio.

Among recent purchases are:

E. L. Phillips & Co., 50 Church Street, New York, 40-ton, 1-motor overhead crane for Long Island Lighting Co., from Cleveland Crane & Engineering Co.

Bethlehem Steel Co., Bethlehem, Pa., five 3-ton and four 2-ton, 2-motor hoists for Wilmington, Del., from American Engineering Co.

McClintic-Marshall Co., Pittsburgh, 20-ton, 84-ft. span overhead crane with 5-ton auxiliary for Pottstown, Pa., plant, from Wisconsin builder.

Valley Mould & Iron Corporation, Pittsburgh, 5-ton, 60-ft. span overhead crane for South Chicago works from Shaw Electric Crane Co.

Danville Structural Steel Co., Danville, Pa., two 10-ton, 96-ft. span overhead cranes from Northern Engineering Works.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., 5-ton, 26-ft. 6-in. span overhead crane for warehouse and service station at Utica, N. Y., from Northern Engineering Works.

W. S. McDowell Lumber Co., Chester, Pa., 10-ton crawl-tread locomotive crane from Browning Crane Co.

National Plate Glass Co., Ottawa, Ill., 13 2-ton, 3-motor electric cranes and two 20-ton, 3-motor overhead cranes from Harnischfeger Corporation.

Byllesby Engineering & Management Corporation, for delivery in Iowa, 50-ton power house crane from Harnischfeger Corporation.

St. Louis

ST. LOUIS, March 19.

PLANS are being drawn by Polar Wave Ice & Fuel Co., 3638 Olive Street, St. Louis, for an ice-manufacturing plant to cost more than $50,000 with equipment. H. G. Clymer, Wainwright Building, is architect.

Sphinx Electrical Mfg. Co., recently organized to take over and expand Bartholomew Battery & Supply Co., 4247 Beethoven Street, St. Louis, is considering a new plant in vicinity of Columbia, Mo., for manufacture of electric storage batteries to cost close to $75,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in multi-story baking, storage and distributing plant to be erected by Great Atlantic and Pacific Tea Co., 3127 South Grand Boulevard, St. Louis, in Mill Creek Valley section, to cost more than $500,000. Headquarters are at 150 Bay Street, Jersey City, N. J.

Board of Education, Stillwater, Okla., has filed plans for a one-story manual training school, 100 x 100 ft., to cost approximately $40,000 with equipment. Phil A. Wilbur, Architectural Department, Agricultural and Mechanical College, is architect.

Black River Hydro-Electric Co., Railway Exchange Building, St. Louis, W. A. Fuller, secretary, is said to have plans for a hydroelectric generating station on Black River, near Poplar Bluff, Mo., to cost more than $3,000,000 with transmission lines. It is understood that project will be carried out in cooperation with Middle West Utilities Co., 72 West Adams Street, Chicago, which purposes to operate station under lease.

Missouri Portland Cement Co., Southwestern Bell Telephone Building, St. Louis, has awarded general contract to Gamble Construction Co., 620 Chestnut Street, for new cement mill in Prospect Hill section, to cost in excess of $250,000.

Board of Education, District No. 69, Lyons, Kan., plans installation of manual training equipment in new two-story high school to cost $250,000. Mann & Co., R. W. Building, Hutchinson, Kan., are architects.

Normandy Consolidated School District, Normandy, Mo., will take bids in April for a two-story and basement vocational school, 60 x 270 ft., to cost approximately $115,000 with equipment. William B. Ittner, Board of Education Building, St. Louis, is architect.

Capital Garage, Inc., Kansas City, Mo., has plans for a seven-story automobile service, repair and garage building, 125 x 180 ft., to cost close to $200,000.

City Council, Harvard, Neb., has authorized plans for a municipal electric light and power house to cost $40,000, in which amount bonds have been approved. Grant, Fulton & Letton, 525 South Thirteenth Street, Lincoln, Neb., are architects.

Larkin Packer Co., 6200 Maple Avenue, St. Louis, manufacturer of oil well supplies and expansion boring bars and cutters, has purchased at receiver's sale entire assets of Davis Boring Tool Co., including two-story factory at 3963 Forest Park Boulevard. Two companies will be operated separately with general offices at Larkin plant. No changes will be made in products, but Larkin company will confine itself solely to oil field equipment manufacture while boring bar, cutter and reamer production will be centered at Davis plant.

Superior Oxy-Acetylene Co., 511 Locust Street, St. Louis, has been organized to manufacture oxygen and acetylene and job Rego welding and cutting equipment. Plant has been built and all equipment purchased.

Chicago

CHICAGO, March 21.

SALES of machine tools are moderately active, but are not well distributed among the various sellers. The past week marked the closing of several sizable industrial lists. The International Harvester Co. has purchased $140,000 worth of equipment for its Rock Island plant, and Allis-Chalmers Mfg. Co., Milwaukee, has closed for machine tools amounting to $40,000. The Nash Motors Co. has purchased a number of replacement items and several new machines for its plants at Kenosha, Racine and Milwaukee. Prompt delivery is asked on these orders. A machinery manufacturer in Chicago has ordered a 48-in. planer.

The Santa Fe list remains the only railroad business of note before the trade. This request for prices came earlier than usual this year and the trade anticipates that some orders may be placed before the end of April. Inquiry for used machines is active but the available supply has been well picked over.

Nichol Foundry Co., 309 West Austin Avenue, Chicago, will build a foundry, 60 x 71 ft. G. E. Pearson, 400 West North Avenue, is architect.

Stocker, Rumely, Wachs Co., 117 North Jefferson Street, Chicago, dealer in machine tools, has been appointed Chicago district representative for line of shapers and lathes manufactured by Rockford Machine Tool Co., Rockford, Ill.

Theodore Geissmann & Co., Inc., 180 North Michigan Avenue, Chicago, dealer in iron and steel rolling mill products, has been appointed district sales agent in Central West for Van Huffel Tube Corporation, Warren, Ohio, manufacturer of lock-joint butted and open seam tubing.

City of Moline, Ill., will issue $350,000 in bonds for erection of a municipal barge terminal and grain elevator.

Plans are being arranged by Miehle Printing Press & Mfg. Co., Fourteenth and Robey Streets, Chicago, for new plant units and equipment for increase in capacity. A bond issue of $5,000,000 is being sold, portion of fund to be used for expansion.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturers of roofing products, etc., will take bids on general contract in April for one-story plant unit at Marseilles, Ill., largely for storage and distribution, to cost about $40,000 with equipment. Klipstein & Rathman, Security Trust Building, St. Louis, are architects.

City Council, Hawarden, Iowa, will soon begin construction of addition to municipal electric light and power plant, to cost about $40,000 including equipment. K. C. Gaynor, Norfolk, Neb., is engineer.

Iowa Railway & Light Co., Cedar Rapids, Iowa, has applied for permission to construct a hydroelectric power plant on Cedar River, near Rochester, to cost about $2,000,000, including power dam and transmission lines. Isaac B. Smith is president.

Denver & Rio Grande Western Railway Co., Equitable Building, Denver, Colo., is planning for new car and locomotive repair shops at Salida, Colo., to cost approximately $100,000 with equipment. It is also proposed to install several water-treating plants in Colorado and Utah at a cost of about $200,000.

Chicago, Burlington & Quincy Railroad Co., Omaha, Neb., is said to be planning enlargements in its engine house and shops at Denver, Colo., to cost more than $50,000 with equipment.

Mechanical Plating Co., 620 West Monroe Street, Chicago, has purchased one and two-story building at 1522-26 West Austin Avenue, 75 x 110 ft., and will remodel for a new plant.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co., National Soo Line Building, Minneapolis, Minn., is considering extensions and betterments in engine house and shops at Stevens Point, Wis., to cost about $30,000.

Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn., will make extensions and improvements in steam-operated electric power plants at Fargo, Grand Forks and Minot, N. D., including installation of electrical and mechanical equipment, boiler-feed pumps, coal crushers, etc. Company is operated by Byllesby Engineering & Management Corporation, 231 South La Salle Street, Chicago.

Barber-Greene Co., Aurora, Ill., manufacturer of portable conveyors, bucket loaders and other mechanical equipment, contemplates a one-story addition to cost more than $30,000.

Dayton Co., Seventh Street and Nicollet Avenue, Minneapolis, Minn., has asked bids on general contract for a four-story addition to automobile service repair and garage building, to cost about $400,000 with equipment. Long & Thorshov, Andrus Building, are architects.

Consolidated Machine Tool Corporation will move its Chicago office April 1 to room 417, Machinery Hall, 547 West Washington Boulevard.

American Bosch Magneto Corporation, Springfield, Mass., has merged its Detroit and Chicago sales and service branches under general management of C. L. Shedd, automotive general sales manager at Chicago. Detroit manufacturer's sales division will maintain offices and personnel at 89-95 Hancock Avenue West, Detroit, under management of Max Tost.

Combustioneer, Inc., 570 West Randolph Street, Chicago, has been organized by men formerly interested in Iron Fireman Corporation, Chicago, to manufacture new automatic stoker designed to feed coal automatically to fire bed by underfeed principle and distribute it evenly over entire bed.

Fantus Factory Locating Service, formerly at 1313 South Oakley Avenue, Chicago, has removed to 129 North Clark Street, Chicago.

Milwaukee

MILWAUKEE, March 19.

FURTHER improvement in the call for machine tools has developed although not all shops are sharing in the betterment. Production averages well, however, and the trend is upward. Miscellaneous business still predominates, although automotive and power farm machinery industries are advancing steadily. Replacement business is relatively good and there is a moderate movement of the better class of used tools. Confidence is expressed that a substantial volume of new business is in the foreground, and that the hesitating tone of business is gradually disappearing.

Union Refrigerator Transit Co., Milwaukee, manufacturer of refrigerator cars, has increased its capitalization from $2,000,000 to $3,500,000. While no plant extensions are contemplated at present, considerable replacement of equipment is being done. Walter Alexander is president and general manager.

Frank Kriwanik, Denmark, Wis., has placed general contract for erection of a garage, sales and service building, 54 x 105 ft., part two stories and basement, with Jorgenson Construction Co., local.

Smalley Corporation, Manitowoc, Wis., has been incorporated with $50,000 capital stock to take over and continue operation of Smalley Mfg. Co., farm machinery and tools. Business has been conducted for some time by a committee of creditors. W. R. Carr, Anderson, Ind., has now acquired entire interest and becomes vice-president of new corporation. Frank J. Kerscher, Manitowoc, is president, and John G. Kelley, who has been in charge of affairs for creditors, is assistant secretary and manager.

H. Vingren, formerly connected with Nash Motors Co., Kenosha, Wis., has organized Vingren Pattern Works and is establishing a shop in Kenosha for production of wood and metal patterns, templates and allied goods.

Allen-Bradley Co., 494 Reed Street, Milwaukee, manufacturer of electric controlling devices, radio specialties and equipment, is taking bids for erection of a furnace house and substation, 44 x 140 ft., one and two stories. Work on plant additions, costing about $350,000, is nearing completion and includes a nine-story wing, 50 x 150 ft., and a five-story addition on present three-story shop, 67 x 90 ft.

F. Rosenberg Elevator Co., Milwaukee, manufacturer of freight and passenger elevators, has established a branch office at 113 Main Street, La Crosse, Wis., in charge of Henry Schulz. A service station equipped to give service on all makes of elevators will be maintained.

South Atlantic States

BALTIMORE, March 19.

CONTRACT has been let by Virginia Barrel Co., Ostend and Leadenhall Streets, Baltimore, to Maryland Metal Building Co., local, for a one-story addition, totaling about 8500 sq. ft. floor space, for production of steel drums. Headquarters are at Winchester, Va.

Board of District Commissioners, District Building, Washington, is asking bids until March 29, for sheet steel for use in automobile license manufacturing plant at district reformatory, including 199,500 lb. No. 22 gage, and 33,320 lb. No. 20 gage; until March 26 for metal lamp posts and fittings for electrical department.

Celluloid Corporation, Ancelle, near Cumberland, Md., operated by Celanese Corporation, same location, has awarded general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for initial units of plant for production of cellulose acetate, to cost $1,500,000 with machinery.

Norfolk & Western Railway Co., Roanoke, Va., Clyde Cocke, room 351, purchasing agent, is asking bids until March 28 for parts for electrical equipment, electrical apparatus and repair parts for mechanical stokers, contract serial AA-519.

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 27 for welding wire and rods for Eastern and Western yards, schedule 8693; insulated wire and cable, schedule 8708; pliers and nippers, schedule 8666; steel tubing for Mare Island and Puget Sound yards, schedule 8671; four cruising turbine reduction gears and oil clutch assembly and one set of spares for Mare Island and Puget Sound yards, schedule 8672.

Georgia Portland Cement Corporation, Sandersville, Ga., has plans for a new cement mill, work to begin in 60 to 90 days. Initial plant will have output of 50,000 bbl. per month of special quick-hardening cement and will cost in excess of $1,200,000 with machinery. H. K. Ferguson Co., Cleveland, is engineer for project, and has opened offices in Southern Finance Corporation Building, Augusta, Ga. W. H. Kewish is special engineer in charge of machinery purchases.

General Minerals Corporation, Mather Building, 516 G Street, N. W., Washington, Lyle N. Gillis, secretary, is completing plans for mining plant on about 1000 acres at Chula, Va. Installation will include steam-operated power plant, with boilers, engines and generators; hoisting equipment with maximum capacity of 6 tons; conveying equipment, etc.

Public Improvement Commission, Baltimore, has approved fund of $700,000 for establishment of municipal airport, including construction of hangars, repair and reconditioning shops, oil storage and distributing plant, etc. A special committee, Robert Garrett, chairman, has been appointed to carry out project. Charles F. Goob is chief engineer of city.

Georgia Car & Locomotive Works, Weyman and Ridge Avenues, Atlanta, Ga., plans erection of one-story unit to replace building destroyed by fire March 9.

Standard Construction Co., 514 St. Paul Street, Baltimore, is planning purchase of portable type air compressor, capacity about 110 cu. ft. per min.

Board of Awards, office of city register, City Hall, Baltimore, has approved plans for immediate erection of one-story repair shop and equipment storage and distributing building, to cost about $125,000 with equipment.

General purchasing officer, Panama Canal, Washington, is asking bids until April 5 for steel filing equipment, electrical fixtures, cable, wire, transformers, switches, screws, bolts, steel drums, etc., for canal zone service, Panama schedule 1865.

Cincinnati

CINCINNATI, March 19.

THERE has been no diminution in machine tool sales which continue at about the same rate that has prevailed so far this month. Orders have come mostly from scattered sources and have been well diversified, although automobile manufacturers probably have contributed the largest volume. Among pending transactions in the Detroit district is one calling for the purchase of a number of special machines at an expenditure of more than $400,000. Analysis of sales made by local machine tool companies shows that demand centers about high production tools.

Radial drill builders have followed the lead of a Cincinnati company in raising prices. Operations in metal-working plants in this city are moderate, employment having increased slowly but steadily since the first of the year. In used machinery an order for two 144-in. planers is noted.

Contract has been let by Gruen Watch Co., Iowa and McMillan Streets, Cincinnati, to Lehigh Construction Co., Newport, Ky., for a one-story addition, including improvements in present plant, to cost about $25,000. G. C. Burroughs, Cincinnati, is architect.

Sycamore Garage Co., 2400 Gilbert Avenue, Cincinnati, has taken out a permit for a four-story service, repair and garage building, to cost about $250,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until March 28 for one tractor and one 1-ton crane, 18-ft. lift, circular 274; until March 27 for eight vertical view finder assemblies, and March 28 for tanks.

Common Council, Henderson, Ky., is reported planning extensions and improvements in municipal electric light and power plant, including new generating equipment, to cost about $50,000.

Stimpson Computing Scale Co., Breckenridge and Logan Streets, Louisville, has awarded general contract to J. F. Russell & Co., Louisville, for an addition to cost close to 100,000 with equipment. O. D. Mock, 221 South Fifth Street, is architect.

Memphis Power & Light Co., Memphis, Tenn., is disposing of a bond issue of $2,275,000, a portion of proceeds to be used for extensions and improvements in power facilities and transmission lines.

King Powder Co., First National Bank Building, Cincinnati, is said to be planning erection of addition to smokeless powder mill at Ashland, Ky., to cost close to $45,000 including wheel mills, corning mill and auxiliary equipment.

Southern United Ice Co., Memphis, Tenn., has arranged for bond issue of $1,000,000, a portion of proceeds to be used for extensions and betterments in ice-manufacturing and cold storage plants, and for acquisition of additional properties at Meridian and Newton, Miss.

Board of Education, 216 East Ninth Street, Cincinnati, will take bids on general contract in about 60 days for a two-story automotive trade school, to cost in excess of $80,000 with equipment. Bert L. Baldwin, Second National Bank Building, is architect.

Cleveland

CLEVELAND, March 19.

MACHINE tool sales in this territory are rather slow and confined for the most part to single machines. Manufacturers report a fair volume of widely distributed orders, also mostly for single tools. Demand from the automotive industry in Michigan and other districts continues light. The Apex Electric Mfg. Co., Cleveland, has purchased a few machines against its recent list and the Champion Spark Plug Co., Toledo, is buying some equipment. A Cleveland maker of turret lathes reports a good volume of sales this month, and orders during the week included two machines for shipment to Sweden. Rebuilt used machinery is in active demand.

Plans have been filed by Arcade Garage Co., Akron, Ohio, for a four-story service, repair and garage building, 132 x 135 ft., to cost about $250,000 with equipment.

Dockray Brass & Iron Co., North Sixth Street, Zanesville, Ohio, will soon take bids for a one-story addition, to cost close to 40,000 with equipment. J. P. Schooley, Masonic Building, is architect.

Empire Floor & Wall Tile Co., Zanesville, Ohio, contemplates early rebuilding of portion of plant recently destroyed by fire, with loss close to $80,000 including equipment.

Lima-Cadillac Co., Lima, Ohio, local representative for Cadillac automobile, has approved plans for a two-story and basement service, repair and garage building, 66 x 205 ft., to cost approximately $100,000 with equipment.

Vulcan Last Co., Portsmouth, Ohio, manufacturer of iron shoe lasts, is said to have purchased property at Brockton, Mass., for a branch plant.

Grasselli Chemical Co., Guardian Building, Cleveland, has plans for a one-story power plant at mill, to cost approximately $40,000 with equipment.

Simplex Aircraft Corporation, Defiance, Ohio, has been formed to manufacture Red Arrow monoplanes. Company is at present operating in a building of American Steel Package Co. and has made no plans toward construction of plant.

Austin Co., Cleveland, will erect a new and larger woodworking shop on site of steel fabricating plant at Euclid, Ohio, to replace former shop on East 152nd Street, Cleveland. Ground has been broken for a two-story and basement addition to main office at Cleveland.

Buffalo

BUFFALO, March 19.

AN expansion program is under consideration by Curtiss Aeroplane & Motor Co., Buffalo, for increased facilities for motor and airplane parts and assembling. It is proposed to increase the stock from 218,060 to 300,000 shares, no par value, a portion of proceeds to be used for development. C. M. Keys is president.

The duPont Cellophane Co., Inc., River Road, Buffalo, manufacturer of special processed papers, has plans for a one-story addition to cost more than $200,000 with equipment. DuPont Engineering Co., duPont Building, Wilmington, Del., is engineer.

McCabe & Sheeran Machinery Corporation, 244 Larkin Street, Buffalo, purchaser of plant and equipment of Sizer Steel Co., is disposing of machinery, tools and other equipment, and will soon place factory property on the market.

Ansco Photo Products, Inc., Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, has engaged Otto S. Schlick, 136 Liberty Street, New York, engineer, to prepare plans for an addition to cost more than $50,000 with equipment. Company has recently formed a consolidation with Agfa Products, Inc., and Agfa Raw Film Corporation, manufacturers of kindred apparatus.

Brockway Motor Truck Corporation, Cortland, N. Y., is disposing of a preferred stock issue of $3,000,000, a portion of fund to be used in connection with merger with Indiana Truck Co., Marion, Ind., and general plant expansion. Production at Cortland and Marion plants, as well as branch factories, will include a complete line of motor trucks from light type to 7-ton capacity. George A. Brockway is president. Martin A. O'Mara, formerly connected with White Co., Cleveland, has been made vice-president and general manager.

Board of Education, Genesee Building, Buffalo, plans installation of manual training equipment in two-story high school on Ontario Street, to cost $1,000,000, for which bids will soon be asked on general contract. F. J. & A. Kidd, 522 Franklin Street, are architects.

Josiah Anstice Co., Inc., Rochester, N. Y., has let general contract to Alexander, Shumway & Utz, for an addition to its foundry, to be completed in about six weeks.

Otis-Sawyer Boiler & Foundry Co., Oswego, N. Y., has separated its boiler and foundry departments under names of the Sawyer Brass & Iron Foundry Co. and Otis Boiler Co., Inc. Former company will continue to operate foundry, while boiler department, which was destroyed by fire about two months ago, will be rebuilt and operated by Otis company.

Indiana

INDIANAPOLIS, March 19.

BIDS have been asked on general contract by Truck Engineering Co., Fort Wayne, manufacturer of motor truck bodies, etc., for a one-story addition to cost close to $75,000 with equipment. Guy Kahurin, Standard Building, is architect. Headquarters are at 1801 East Thirty-seventh Street, Cleveland.

In connection with expansion and improvement program to cost $2,500,000, Indiana General Service Co., Muncie, will expend about $250,000 for a new local substation and switching plant.

United Brick Co., Brazil, recently formed by J. E. Hendrix, Veedersburg, and associates, has acquired local property of Chicago Sewer Pipe Co., and will build new works for daily production of 150,000 face brick. A boiler plant and machine shop will be provided. Entire project will cost upward of $85,000.

Board of Education, Brazil, has authorized installation of manual training equipment in two-story addition to junior high school to cost $120,000. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Graham-Paige Co., West Warren Street, Detroit, manufacturer of automobiles, has formed Motor Bodies, Inc., a subsidiary, to operate such division of the business. Work is in progress on improvements in former plant of Karges Wagon Co., Evansville, recently taken over, with main unit, 100 x 400 ft., and production will soon begin on bodies for 110½-in. wheel-base cars. Later this plant will be extended for manufacture of custom bodies for larger cars.

Marvel Carburetor Co., Flint, has arranged for purchase of controlling interest in Wheeler-Schebler Carburetor Co., Indianapolis, for about $1,000,000, and will consolidate with its organization. It is proposed to continue both plants in operation and carry out an expansion program.

Board of Education, Crisman, plans installation of manual training equipment in new two-story high school to cost $110,000, for which plans will be drawn by W. M. Ellwood, Christman Building, South Bend, Architect.

Hammond Bolt & Nut Co., Hammond, has purchased bolt, nut and rivet department formerly owned by Illinois Car & Mfg. Co. and will operate it under practically same management.

Canada

TORONTO, March 19.

THE volume of business placed for machinery and tools the past week or two indicates that industrial, mining and other fields still have considerable needs to be taken care of. Lists are not numerous, but orders for single tools total large. Demand for replacement is active and much buying is being done on this account.

Reid & Brown, Toronto, have purchased property on Fleet Street, 64 x 670 ft., for erection of a new steel fabricating plant. Work on foundations will start at once. Building will be 300 ft. long and cost approximately $200,000. An electric traveling crane will be installed.

S. Shupe, city engineer, Kitchener, Ont., is preparing plans for a 3,000,000-gal. activated sludge sewage disposal plant for the city. Construction work will start in spring.

I. T. S. Rubber Co. of Canada, Ltd., 28 Alpine Avenue, Toronto, is receiving bids for erection of an addition, three stories and basement, 80 x 150 ft. B. Clayton, care of company, is engineer.

Burroughs Wellcome & Co., 410 St. Nicholas Street, Ville Lasalle, Que., plans erection of a factory to cost $75,000.

Crown Cork & Seal Co., Ltd., 87 Parliament Street, Toronto, has let contract to Wells & Gray, Ltd., Confederation Life Building, for erection of a factory to cost $100,000. It will be one story, 120 x 200 ft., steel and brick.

Galetta Electric Co., Arnprior, Ont., plans installation of an electric generator, 400 kva. waterwheel and governor in its plant at Galetta, Ont.

Gatineau Power Co., 91 Cartier Street, Ottawa, Ont., contemplates construction of a power plant on North River at St. Jerome, Que., and another at Chute-A-Pateau on North River near St. Adele d'Abercombe, Que.

British Columbia Electric Power & Light Co., Victoria, B. C., plans the erection of a substation at Government and Bay Streets, to cost $250,000.

Detroit

DETROIT, March 19.

PLANS are being considered by Consumers Power Co., Jackson, Mich., for a new power house in vicinity of Morley, Mich., to cost close to $10,000,000, including transmission lines.

Detroit Show Case Co., 1654 West Fort Street, Detroit, has plans for a two-story addition to cost more than $60,000 with equipment. B. C. Wetzel & Co., Dime Bank Building, are architects.

Pines Winterfront Co., 2636 Indiana Avenue, Chicago, manufacturer of automatic radiator shutter fronts for automobiles, has purchased controlling interest in Detroit Motor Appliance Co., Stephenson Building, Detroit, manufacturer of kindred products, and will consolidate with its organization.

Chrysler Motor Car Co., Detroit, has awarded general contract to A. W. Kutsche, 2111 Woodward Avenue, for a one-story addition, 80 x 150 ft., to cost close to $100,000. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Manufacturers' Steel Supply Co., 2162 Clay Avenue, Detroit, is said to be planning installation of power press and other equipment.

Chevrolet Motor Car Co., Detroit, has awarded general contract to Everett Winters Co., 1651 East Grand Boulevard, for a one-story addition, 80 x 400 ft., to be equipped as a forge shop, to cost close to $100,000. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Liberman & Gittlen Metal Co., 322 Front Street, S. W., Grand Rapids, Mich., will soon take bids on general contract for a one-story addition, to be used largely for storage and distribution, to cost $40,000 with equipment. D. R. McEachron, Association of Commerce Building, is architect and engineer.

Wolverine Mill & Lumber Co., 8931 Greeley Avenue, Detroit, is completing plans for a one-story and basement addition to cost about $70,000 with woodworking machinery and auxiliary equipment. Maurice H. Finkel, Book Building, is architect.

Kewaunee Mfg. Co., South Center Street, Adrian, Mich., manufacturer of enameled iron laboratory furniture and equipment, will ask bids in April for a two-story addition to cost close to $40,000 with equipment. Headquarters are at Kewaunee, Wis.

Detroit Chain & Service Co., Detroit, has been formed to manufacture roller chain and sprockets. Manufacturing operations have not yet begun, but company is acting as agent for American High Speed Chain Co., Indianapolis.

Losinger Aircraft & Propeller Corporation, 5257 Brooklyn Avenue, Detroit, has been organized to manufacture airplanes with special type of changeable pitch propellor. Company is leasing shop and will be in market for material and equipment.

Pacific Coast

SAN FRANCISCO, March 14.

PLANS have been filed by Laher Auto Spring Co., Twenty-sixth and Magnolia Streets, Oakland, Cal., for one-story addition, to cost about 20,000 with equipment; general contract let to Austin Co.

Southern Sierras Power Co., Riverside, Cal., has authorized plans for construction of steel tower transmission line from San Bernardino to plant of Los Angeles Gas & Electric Co., at Seal Beach, 58 miles, to cost $750,000.

Ovens, power equipment, conveying and other machinery will be installed in one-story plant to be built by Union Maid Bakery, Los Angeles, to cost about $85,000. L. A. Parker, Architect's Building, is architect.

In connection with an expansion and improvement program now in progress, Hawley Pulp & Paper Co., Oregon City, Ore., plans construction of new central steam power plant with high-pressure boilers and other equipment; also new pulp mill equipment for electrification of this division, replacing present water-power service. Entire project is estimated to cost $2,000,000.

Pacific Power & Light Co., Portland Gas & Coke Co., and Northwestern Electric Co., Portland, affiliated organizations, are arranging an expansion and improvement program to cost $2,250,000, including additions to power plants, transmission lines and power substations.

Willapa Pulp & Paper Mills, Inc., South Bend, Wash., has awarded general contract to Puget Sound Bridge & Dredging Co., Central Building, Seattle, for new one-story pulp mill, to cost about $600,000 with equipment

Webber Machine Works, Columbia Street, Vancouver, Wash., has filed plans for one-story machine shop addition, 50 x 80 ft., to cost about $20,000 with equipment.

Utah Power & Light Co., Salt Lake City, has arranged for bond issue of $5,500,000, a portion of proceeds to be used for extensions and improvements in power facilities and transmission system.

Southern Counties Gas Co., Los Angeles, has plans for a two-story equipment storage and repair shop addition at Venice, Cal., to cost about $45,000 with equipment. Francis D. Rutherford, Mills-Fraser Building, Santa Monica, Cal., is architect.

Harry S. Scott, president Mission Rock Co., San Francisco, is at head of project to construct and operate a cold storage and refrigerating plant in Mission Rock district, to cost more than $150,000 with equipment.

Olympic Motorboat Corporation, Seattle, has plans for expansion to double present capacity, to cost more than $75,000 with equipment. Company has recently concluded negotiations for acquisition of Gordon Boat Co., New York, and will consolidate with organization. It will operate in future as Gordon Olympic Motorboat Corporation.

Earle M. Jorgensen Co., Los Angeles, distributer of alloy and tool steels, has established branch office and warehouse at 568 Third Street, San Francisco.

Foreign

PLANS have been approved by Demerara Electric Co., Ltd., Georgetown, British Guiana, for a new steam-operated electric power plant, with turbo-generator unit of 3750 kw. capacity and auxiliary equipment, scheduled for completion in September. Extensions will be made also in transmission lines. Company has recently secured a 50-year franchise.

A fund of close to $60,000,000 has been arranged for new plant construction at Leningrad, Russia, under Government direction, including works for production of tractors and parts, for manufacture of typewriters; woodworking mill; plant for production of abrasive products, and artificial silk mill. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding projects.

United Steel Works of Germany, Hamborn, Germany, has an expansion and improvement program in progress scheduled for completion this year.

Plans are being completed for new car repair shops in conjunction with car depot, warehouse and distributing plant at Cardiff, England, for a transportation company, to cost about $600,000 with equipment; also for an automobile repair, service and garage building at London. Information at Bureau of Foreign and Domestic Commerce, Washington, reference England No. 63200; also, at American Consulate, London, William L. Cooper, commercial attaché.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has concluded arrangements for purchase of controlling interest in Creole Syndicate, operating oil properties in Venezuela, and will consolidate with its interests in that district. Creole Syndicate will take over oil lands, refineries, pipe lines and other properties of parent company and its subsidiaries, including Standard Oil Co. of Venezuela and American-British Oil Co., and will carry out an expansion program. It will be operated under direction of purchasing company.

Swiss Federal Railways, Berne, Switzerland, has begun work on initial unit of new cold storage and refrigerating plant at Geneva, with total capacity of 229,544 cu. ft. It is purposed to construct additional units in the future. American Consulate, Geneva, Gilson G. Blake, Jr., Geneva, consul.

Plans are being arranged by Government of Burma, Rangoon, Burma, India, for a hydroelectric power development on Law Klo River, a tributary of Yunzalin River, with initial capacity of 13,500 kw., to be increased by a second unit to develop a gross output of 27,000 kw. A transmission line 130 miles long will be built to Rangoon and vicinity. Entire project is estimated to cost in excess of $25,000,000. American Consulate, Bombay, India, C. B. Spofford, Jr., trade commissioner, has information on enterprise.

Foundation Co., 120 Liberty Street, New York, has secured contract from Government of Greece, Athens, for construction of proposed Strouma-Phillipon drainage works in Thessaly, Greece, including power and mechanical equipment, to cost about $40,000,000. Project will be financed by American banking interests, headed by Blair & Co., 24 Broad Street, New York.

Plans are under way by a company at Johannesburg, South Africa, for a new electric generating plant, to cost close to $1,500,000 with transmission lines. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Africa No. 63420; also at American Consulate, Johannesburg, William L. Kilcoin, assistant trade commissioner.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has secured controlling interest in Norwegian Industrial Mfg. Co., Christiania, Norway, manufacturer of electric equipment, and will expand production to include machinery of Westinghouse type. Other expansion will also be carried out by purchasing company in different European countries, as well as in South America; for production and distribution of electrical machinery in Chile, a subsidiary, Compania Electrica Westinghouse de Chile, recently has been formed, with headquarters at Valparaiso.

NEW TRADE PUBLICATIONS

Metal Truck.—Lyon Iron Works, Greene, N. Y. Bulletin 101 of four pages illustrates and describes a utility truck for warehouse and factory use, made of metal, with low height, on the tilting principle, and with rollers to aid in loading and unloading. Its capacity is 500 lb. or more.

Blast Heaters.—Aerofin Corporation, 750 Frelinghuysen Avenue, Newark, N. J. Folder of six pages devoted to low-pressure and high-pressure blast heaters for factory and other building requirements.

Motors, Generators and Motor-Generators.—Engberg's Electric & Mechanical Works, St. Joseph, Mo. Bulletin 6023 of eight pages is devoted to direct-current motors, with ball bearings, and designed for constant or adjustable speed. Bulletin 6025 of four pages is devoted to motor-generators. Bulletin 6022 of eight pages is devoted to direct-current generators up to 45 kw. All three bulletins are well illustrated and carry clearance diagrams and tables.

Winches and Capstans.—Silent Hoist Winch & Crane Co., 772 Henry Street, Brooklyn. Bulletin 27 of four pages illustrates a series of winches and capstans used in a variety of industrial and other service.

Metal Stampings.—Crosby Co., Buffalo. Pamphlet of 24 pages illustrating a large variety of products made by stamping from steel and other metals, running up to as much as ⅝-in. thickness. These have gone into a wide variety of machinery and other equipment. They include both cold and hot-rolled open-hearth steel, high-carbon and other special steels, duralumin, aluminum, brass, copper and zinc.

Polyphase Induction Motors.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1118-E of 16 pages illustrates and describes induction motors of the polyphase type, together with control apparatus.

Gear Grinding Chucks.—City Machine & Tool Works, Dayton, Ohio. Bulletin BC-I, eight pages, devoted to features of the Bollender chuck for holding gears while grinding the bore. Typical jobs are illustrated.

Vertical Milling Attachments.—Porter-Cable Machine Co., Syracuse, N. Y. Booklet of 24 pages outlining the features and illustrating the company's universal milling attachments, which permit the cutter to operate at any angle and in any plane, thereby extending the range of the milling machine on which they are used. The attachments are available in various sizes for use on any standard hand or power feed milling machine, and radius, angle, form and tee slotting cutters, as well as end mills, may be employed.

Electric Meters.—Sangamo Electric Co., Springfield, Ill. Supplement to Bulletin 67, of 8 pages, illustrated, describing type HC meter.

Steel Reels and Spools.—Mossberg Pressed Steel Corporation, Attleboro, Mass. Forty-page catalog showing a special line of reels made of steel stampings (with joints either crimped, bolted, brazed or welded), suitable for such purposes as handling, annealing, impregnating or shipping wires of all dimensions and shapes.

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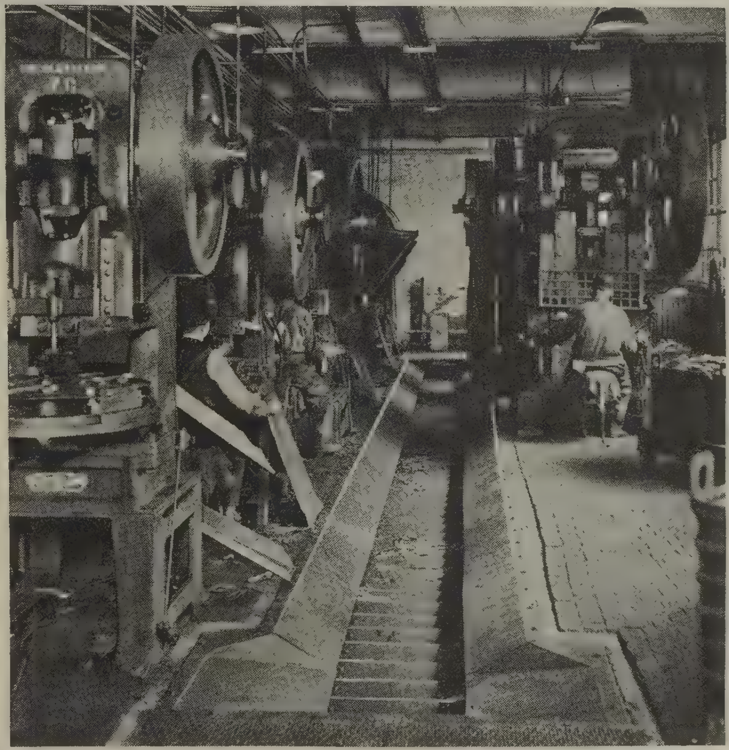
More Tools Made With Fewer Men

Elimination of Manual Handling Has Speeded Up Production—Twice as Much Output per Man

BY FRED L. PRENTISS*

PRODUCTION has been increased and labor costs have been sharply reduced in the plan of the Vlchek Tool Co., Cleveland, by the installation of materials-handling equipment, through the use of which hand lifting has been almost eliminated while the work is moving through the various manufacturing operations. A complete cycle of materials handling is provided, from the unloading of the stock from cars until the finished tools reach the shipping platform. The handling equipment includes gravity-roller and live-roller conveyors, belt conveyors, elevators, elevating buckets, monorails and cranes. No stock in process is piled up on the floors, and the work is kept moving almost continuously from the time it enters the machine shop until it reaches the storage department. Intermediate storage is confined to some work in process, mostly tools that require polishing.



PRESSES in the Trimming Department Are Arranged in Two Rows, Between Which Is an Apron-Type Conveyor Slightly Below the Floor Level, on Which the Flashings Are Discharged. This carries them outside the building, and eventually into a freight car. Forgings pass from the machines through chutes to bucket elevators, which carry them to the storage floor above

One step in the rearrangement for greater production and economy in handling that is now being made, but is not yet fully completed, is the elimination of storage bins for finished products. The bulk of the tools comprising the big production and fast moving items, instead of being placed in storage bins and taken out from bins for shipment, are stored in the standard shop boxes in which they are carried through the machine shop and other departments for succeeding operations. These boxes of finished stock are piled in tiers in the stock room. Storage in bins, with the rearrangement of the stock room, will be confined to certain small and slowly moving tools.

The company manufactures drop-forged hand tools, including hammers, automobile, open-end and other types of wrenches, chisels, punches and screw drivers. A portion of the product is assembled into automobile tool kits. The forgings are delivered to the machine shop in standard shop boxes, in which they travel in standard quantities through the various departments until they reach the stock room, where they are stored in the same boxes. Platform scales are provided at various points in the gravity conveyor lines for counting the pieces by weight. These make a count within 1 per cent of accuracy, which is regarded as close enough for production purposes. When the tools reach the inspection department they are accurately counted by weight by a computing scale located in the gravity conveyor line.

Stock in the form of steel bars is unloaded from cars with a monorail trolley that extends out over the receiving platform and through the raw stock room.

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*Resident editor at Cleveland for THE IRON AGE.

which adjoins one end of the forge shop. Stock used for chisels, screw drivers and other products that are not forged on drop hammers is cut to length in the forge shop, and goes to trip-hammers and upsetters. All stock that goes to the drop forging machines is delivered to the hammer men in full length bars, which are worked down until the stock is used up. Bars are loaded on skids in the stock room. An electric lift truck takes the skids down aisles on either side of the forge shop and sets them in front of hammers located in two rows near the center. The forging equipment includes 22 drop hammers.

Forgings drop from the hammers into corrugated steel boxes which are 22 x 40 in. x 24 in. deep. These boxes are picked up by a hand-propelled overhead trolley, equipped with 2000-lb. electric hoist, which extends through the center of the forge shop between the two rows of hammers, and are carried to an adjoining trimming department. This is located in a two-story structure, the upper floor of which, used for the storage of forgings, both before and after trimming, is served by a 1-ton electric traveling crane. Boxes of forgings are raised through an opening in the floor at one end of the trimming department and are kept in storage in the boxes in which they are received.

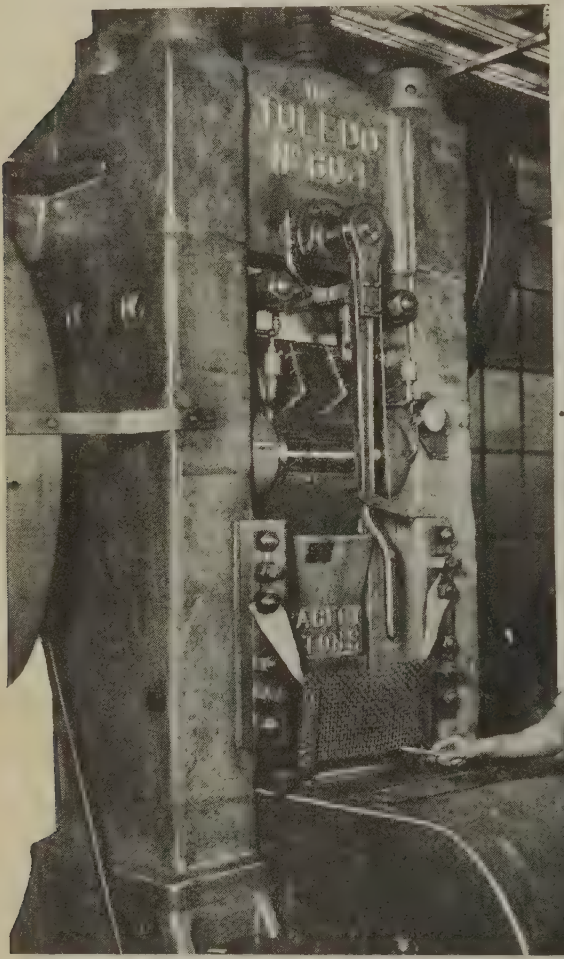
Nine trimming presses are arranged in two rows on the first floor. The boxes of stock are let down from storage through two openings in the floor, one on each side near the center of the building, one opening for delivering forgings being provided for each line of presses. Boxes as emptied at the trimming presses go back to the forge shop. Some of the trimming presses, used in trimming forgings for tools that are made in large quantities, are equipped with rotary trimming fixtures.

Forgings fall from the trimming presses through underground chutes and are delivered into bucket elevators. These carry them back to the storage floor above, and dump them into shop boxes similar to those used for bringing the work from the forging hammers to the trimming department. The flashings fall on to a steel apron-type conveyor which extends, just below the floor level, between the two rows of trimming presses. This carries them outside of the building, where the conveyor rises a few feet and discharges them into a large steel scrap box. An overhead electrically operated monorail carries the box of scrap to an elevated bin, into which the contents are dumped by opening the bottom of the box. The scrap bin is located alongside a railroad siding, and the flashings are chuted from the storage bin into a car, upon opening the side of the bin.

Trimmed forgings, after being taken back to the second or storage floor, are carried by the storage floor crane to the opposite side of the room. Here they are delivered to tumbling mills located on a mezzanine floor between the storage room and trimming department. Steel plate sections form a floor covering over the tumbling mills. One of these sections may be raised, providing an opening in the floor through which the work is dumped by the crane into the tumbling mill beneath. There are four tumbling mills, with 24 x 40-in. and 28 x 40-in. barrels.

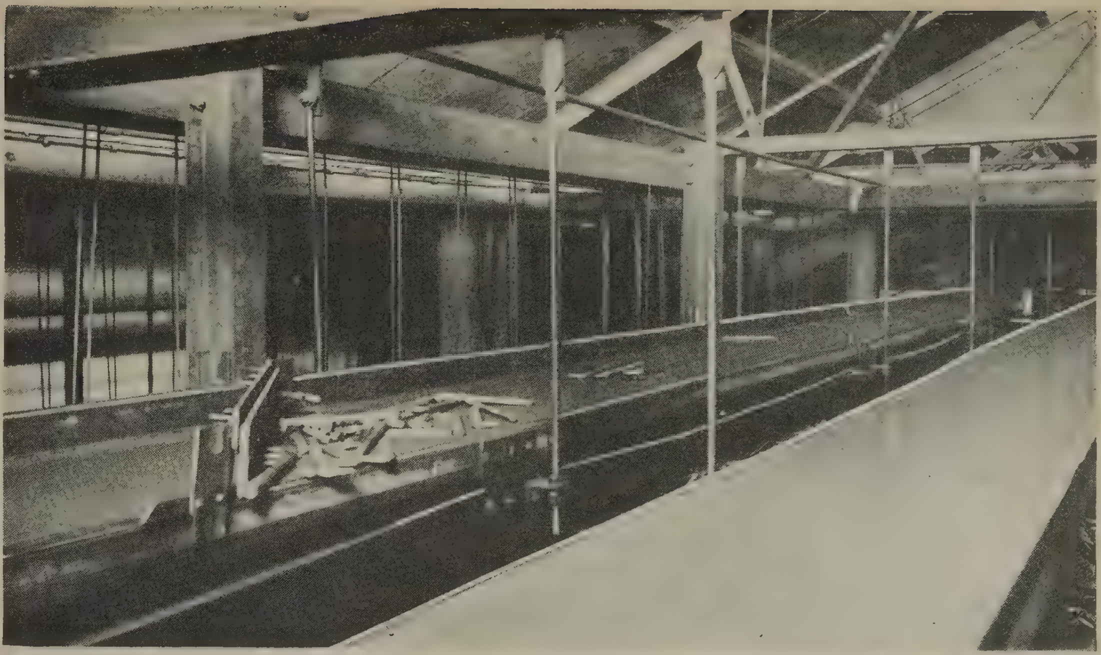
From the tumbling mills the forgings are discharged

BUCKET Elevators (Above) Delivering the Forgings from the Trimming Department to the Storage Floor Above. The work is discharged from the buckets through chutes into shop boxes, which an overhead crane carries to the opposite side of the room, dumping the contents through the floor into tumbling mills



EACH Coining Press Is Equipped With Feeding Mechanism Operated by an Endless Chain. The operator lays the tools in a holder attached to a revolving steel belt or carrier. They are discharged at the back of the machine into a bucket elevator which carries them to storage bins

FORGINGS Carried From the Coining Presses by Bucket Elevators Are Discharged on the Two Belts Shown, Located Above a Series of 30 Storage Bins at One End of the Machine Shop. The movable plow shown near left in the picture is set to push the work into any desired bin. Where the pieces go from the bins is indicated at bottom of page



into chutes which converge into one main chute, through which they fall into a shop box placed on a hand truck on the trimming room floor. This arrangement for handling work through the tumbling mills by gravity eliminates hand labor in loading and unloading the mills. Only one man is required for handling the forgings on the second floor, to which they make the two trips, before and after trimming. The man's work includes also loading and tending to the operation of the tumbling mills.

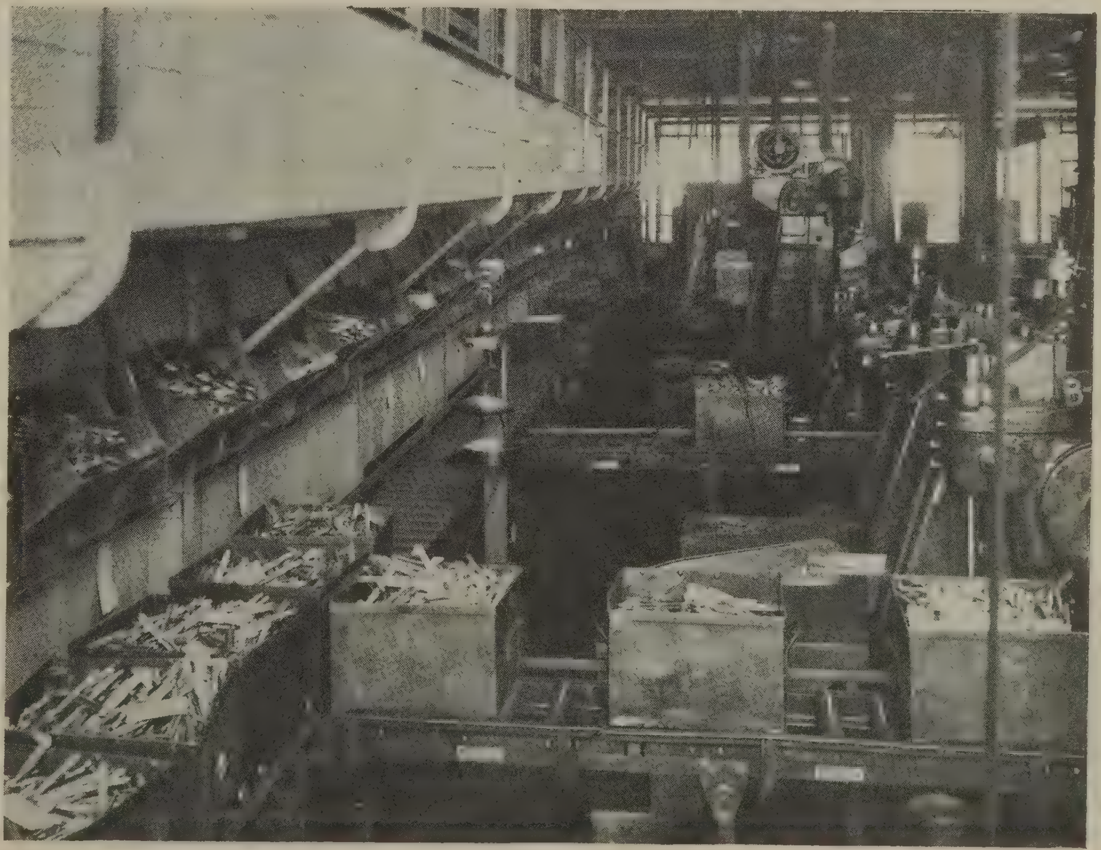
Boxes loaded with forgings delivered from the tumbling mills are pushed a short distance to coining presses, for straightening and sizing. The two coining presses are of 400-ton and of 600-ton capacity. Each press is equipped with an efficient feeding mechanism which was developed in the plant. This consists of a work carrier attached to an endless chain. The operator, standing in front of the press, places the forgings on the carrier, which carries them through the press. After the coining operation the work falls off the carrier on to an incline and thence into a bucket conveyor. The 600-ton press is operated at the rate of 38 strokes a minute and the 400-ton machine at 40 strokes a minute. Not only is production increased by the feeding mechanism, but the injury hazard is entirely eliminated.

The bucket elevators which handle the work from the coining presses deliver the forgings to a short belt booster conveyor. The latter discharges them through chutes on to a long belt conveyor located above a series of wooden bins above one end of the adjoining machining department. There are two of these belt conveyors, each 18 in. wide. The bins, about 30 in number, are 6 ft. high, 6 ft. deep and of various widths. A separate bin is provided for each kind of forging. These are discharged from the belt into any desired bin by means of a discharge plow. These conveyors are similar in operation to belt conveyors used to deliver sand into hoppers above a foundry floor.

Each bin has a slanting bottom leading to a hopper on the front side. Smaller forgings are dumped from the hoppers into shop boxes on a gravity roller conveyor extending alongside the bins. Some of the larger forgings are taken out of the hoppers by hand and piled into the boxes.

These boxes are the standard containers, in which

FRONT of the Storage Bins, the Belt Conveyors Being Back of the Railing Above, Which Incloses an Aisle at the Side of the Conveyors. Tools are dumped from the hoppers into the standard shop boxes shown or, if large tools, are removed from the hoppers by hand and piled in the boxes. From the gravity conveyor alongside the bins the boxes move to other gravity conveyors, two of which, shown in the picture, lead to the milling machines

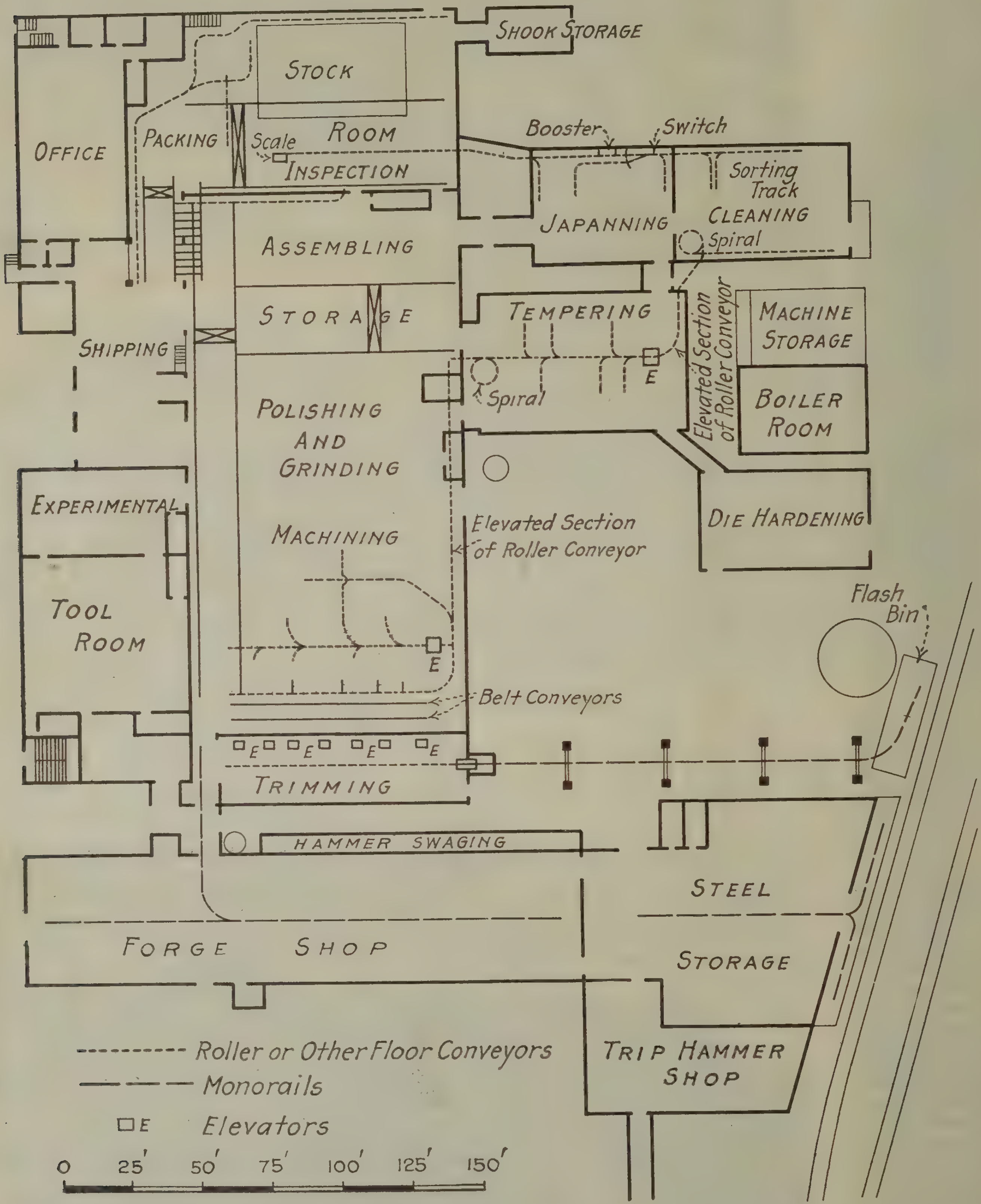


the work is carried through the plant for the various processes after leaving the storage bins for finished forgings, and finally for the storage of the finished product. They are of pressed steel, 18 x 18 in. x 12 in. deep, and have a maximum capacity of 500 lb.

When loaded from the bin, the box moves along the gravity conveyor at the side of the bins and on to another of a series of gravity conveyors which form a network of conveyors that feed the milling machines. After milling the operator throws the work into shop boxes on an opposite gravity conveyor.

This is one of various feeder lines that lead from the milling machines to a live roller conveyor 12 in. above the floor. The live conveyor carries the boxes to an electrically operated elevator at one side of the machine shop. As soon as the box is on the carriage the elevator automatically is set in motion and the box is carried up to a point near the ceiling. Here it is automatically discharged on to an overhead gravity conveyor which carries it to the tempering department. There a spiral section of the gravity conveyor carries the box down to the working level.

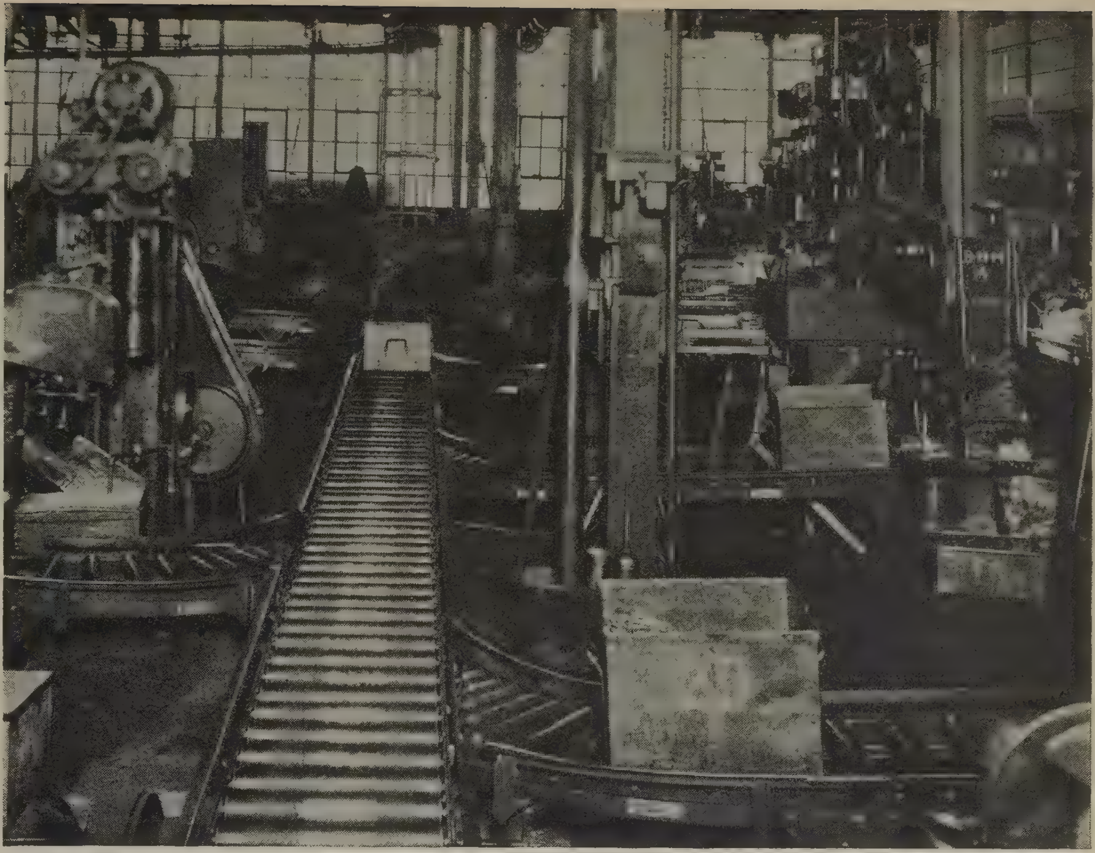
In the tempering department there is a dividing point in the movement of the work. Forgings which do not require tempering move, on leaving the spiral, in a straight line on a gravity roller conveyor located between cyanide tempering furnaces. Near the opposite end of the tempering room this conveyor connects with an automatic elevator, similar to that in the machine department, except that it is air-operated. This hoist raises the boxes to an overhead gravity conveyor, on which they are carried to the cleaning department.



Shook Storage
Stock
Room
Office
Packing
Scale
Inspection
Booster
Switch
Sorting Track
Japanning
Cleaning
Spiral
Assembling
Storage
Tempering
Machine Storage
Elevated Section of Roller Conveyor
Shipping
E
Spiral
Boiler Room
Polishing And Grinding
Experimental
Machining
Elevated Section of Roller Conveyor
Die Hardening
Tool Room
Flash Bin
E
Belt Conveyors
E E E E
Trimming
Hammer Swaging
Steel
Storage
Forge Shop
Trip Hammer Shop
Roller or Other Floor Conveyors
Monorails
E Elevators
0 25' 50' 75' 100' 125' 150'

LAYOUT of the Plant, Showing Arrangement of Conveyor and Monorail Systems and How They Serve the Several Manufacturing Departments

After the Tools Are Machined They Are Put Back in Shop Boxes Which Are Placed on Other Gravity Conveyors Feeding into the Live Roller Conveyor in Center. They move on this to the steel-frame elevator in background. A box moving on to the elevator is automatically lifted and is discharged near the ceiling on to a gravity conveyor which takes it to the tempering department



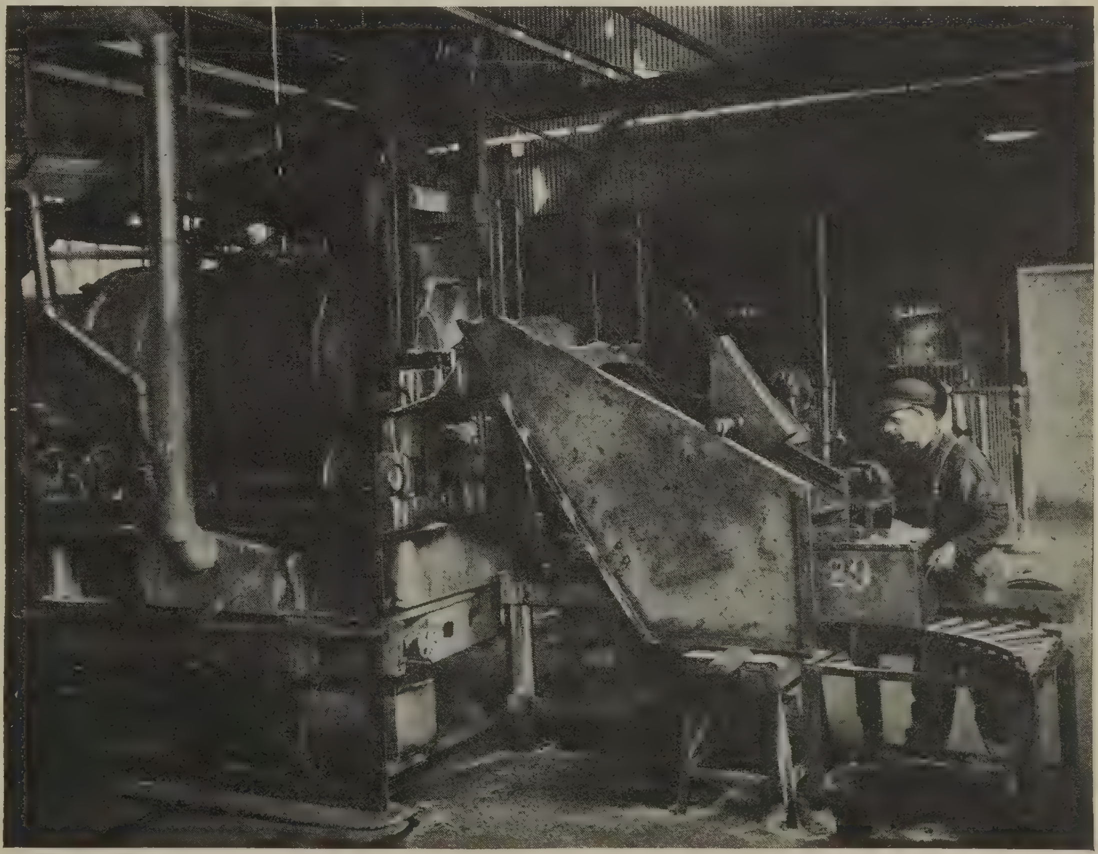
Here a second spiral conveyor carries the boxes down to the working level.

On reaching the bottom of the spiral in the tempering department, boxes of tools to be tempered are switched to a gravity conveyor line which extends in front of the furnaces. Here they are delivered to bundling tables, where they are placed in baskets or wired in bundles for immersion in the cyanide bath. Levers suspended from overhead tracks are provided for handling the work in and out of the furnaces and into the quenching tanks. From the latter the hardened tools are dumped into shop boxes on a short section of gravity conveyor provided on each side of the furnace. These conveyors feed back into the conveyor line referred to above, which extends between the rows of furnaces and leads to the cleaning department.

In the cleaning department the forgings pass along a gravity conveyor at the side of the room and from this are switched on to a short section of portable conveyor mounted on wheels. A box of work is pushed off the main conveyor line on to the portable roller conveyor, and the truck on which this is mounted is moved 3 or 4 ft. to the loading end of a cleaning machine. The box is shoved into a mechanically operated hopper which, when raised, lifts the forgings and discharges them into the machine. At the discharge end of this machine they pass into boxes on another gravity-roller conveyor. With this tie-up of the cleaning machine with the roller conveyors, at both its loading and discharge ends, hand lifting of work going through this machine is avoided.

The cleaning machine consists of two connected

In the Cleaning Department Forgings Pass Along a Gravity Conveyor at the Side of the Room (Not Shown) and Are Pushed on to a Short Section of Portable Conveyor. This is pushed 3 or 4 ft. to the mechanical loading hopper of the machine. The end of this hopper is raised to discharge the work into the tumbling mill, which is the first unit of the cleaning machine



units. The first includes a tumbling mill with large-diameter drum in which the work, 1500 to 2000 lb. to a load, is tumbled in a hot cleaning solution for 15 to 25 min. Then the rotation of the barrel is reversed and the forgings are carried into a smaller perforated drum, in which the solution is drained off. From this they are dumped into a washing unit consisting of a large metal drum, in which they are washed in water containing a rust-proofing solution. From this unit the tools pass through a wire screen drum for drying and from the latter are discharged, both clean and dry, into a shop box on a gravity conveyor. The cleaning machine was built by the Ideal Concrete Machine Co.

Leaving the cleaning department, tools move on the gravity conveyor to the inspection department, or if they are to be japanned are switched through the japanning department. A short motor-driven booster section is provided in the conveyor line in this department, to raise the work a few feet so that it can continue its movement by gravity.

In the inspection department the tools are inspected and weigh-counted. The boxes, except those containing tools which are to be packed loose, are picked up by a ½-ton traveling crane equipped with electric hoist and piled, five boxes high, in the storage room adjoining. From here they are sent over short roller conveyors to the assembling department, where tool kits are assembled and packed into boxes. Tools which are to be loose-packed go, in their shop boxes, on a gravity roller conveyor from the inspection department to the loose-packing store room, where they are stocked four boxes high. From these boxes they are transferred to packing boxes.

A roller conveyor extends the length of the shipping room. This is used for conveying the packed shipping boxes to a scale for weighing, the covers being nailed on them on the conveyor from which they are transferred to a truck for shipment. It is used also for bringing empty shipping boxes to points at which they are to be packed, and for taking empty shop boxes out of the shipping room. These are loaded on electric trucks and are taken back to their starting point beneath the discharge hoppers of the bins at the side of the machining department. Other cranes, and monorails and hand trucks also, serve the store room and the assembly and packing departments.

The gravity and live-rolled conveyors, belt conveyors and elevators operating in conjunction with the roller conveyors were supplied by the Mathews Conveyor Co.

In 1918 the Vlchek company had 16 drop hammers and employed 480 men. In 1927 it had increased its drop hammers to 22 and reduced its working force to 280 men; and with the reduced labor force it had increased its output 30 to 40 per cent. The increased production is not attributed entirely to the installation of materials-handling equipment, as various other changes have been made to increase the plant efficiency. Improved materials-handling facilities have created a demand for more rapid production tools in the machining department, and speedier tools have called for the faster moving of material. Consequently the two factors, the use of more rapid machine tools and the better materials-handling facilities, have gone hand in hand.

As work no longer piles up in process, a marked reduction has been made in the time it takes to go through the plant. Formerly in its usual routing it took an open-end wrench from three to four days from the time the blank reached the forging hammers until the finished tool reached the stock room. Now it is stated that that tool, finished, can reach the stock room 6 hr. after forging.

WELDED CONDUIT PIPE

Thin-Wall Steel Conduits, Electrically Welded, Offered in Place of Heavier, Standard Pipe

AN electrically-welded conduit pipe for carrying electric wires in buildings has been developed by Steel & Tubes, Inc., Cleveland, which will place the new product on the market shortly. This is a thin-wall conduit which will be known as "Steeltubes" metallic tubing. It will be fabricated from cold-rolled open-hearth strip steel and welded under a process used by the company in the manufacture of electrically-welded tubing for the automotive and other industries. The process and product will be covered by patents owned by the company. A continuous process is used in both forming and welding the tubing.

Additional operations required for making the tubing for conduits will include galvanizing the exterior and enameling the interior, to provide a smooth raceway for the wires as well as to resist corrosion. After being formed and welded, the tube will be run through a continuous automatic machine in which it will be cleaned and dried and then galvanized and enameled. Experimental work in developing the tubing has been under way for several years.

The conduit will be made in ⅜-in., ½-in., ¾-in. and 1-in. diameters, of 17, 18 and 19-gage strip steel, which it is stated provides a wall of more than the required strength for electric tubing. It is expected that 80 per cent of the product will be in one size, of ½-in. stock. With a production mainly of one size, and in standard lengths, a large output can be obtained from one manufacturing unit.

Since the introduction of steel conduit pipe for carrying electric wires, standard steel pipe has been used for this purpose. This pipe, it is contended, is heavier than required and its use results in a needless waste of steel. However, the comparatively heavy wall is necessary to carry the threads and allow the use of standard fittings. It is asserted, also, that the development of electrical conduit in the lighter and cheaper form will result in more general use of steel electrical conduits than at present. One advantage claimed for the welded steel conduit is its economy in installation. The ends will be joined by a slip coupling, eliminating threaded joints, and the only tools required for installation will be a hacksaw and wrench.

The electrical committee of the National Fire Protective Association, compiler of the National Electrical Code, at its recent annual meeting decided to change the code to allow the use of electrical metallic tubing, and will provide installation rules covering its use. It is expected that this tubing will be listed shortly as a standard by the Underwriters' Laboratories, Inc.

Steel & Tubes, Inc., will begin the manufacture of the metallic tubing shortly at its Brooklyn, N. Y., plant and later will add departments for its manufacture in some of its other plants.

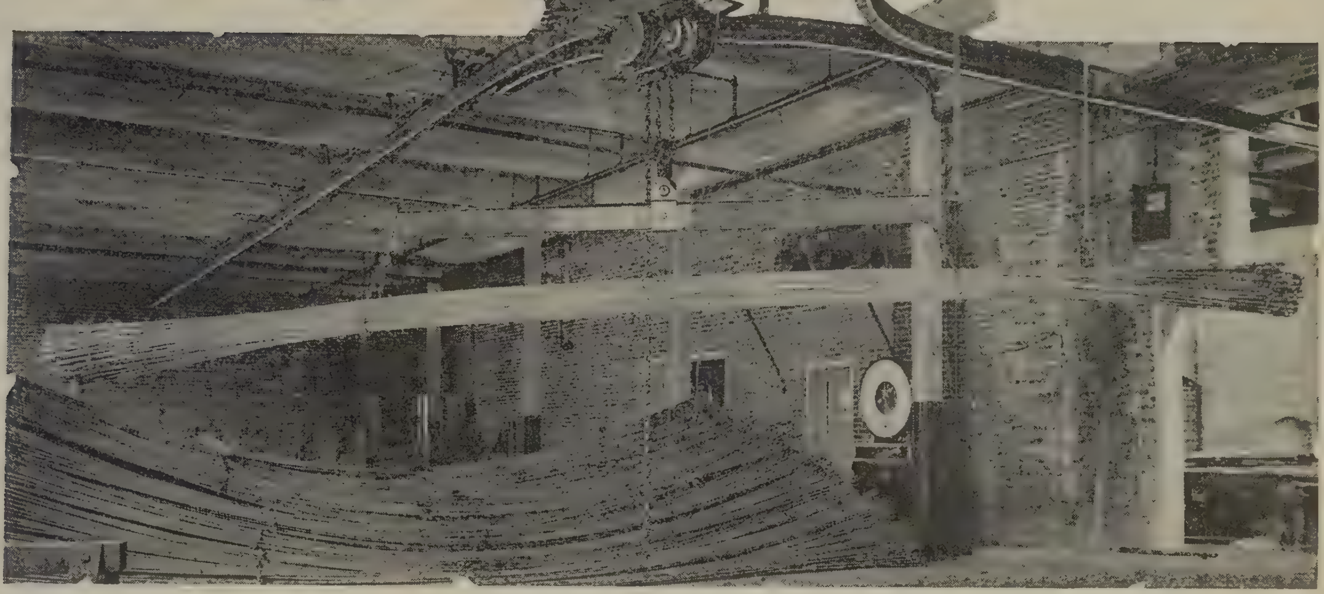
To Study Annealing of Crane Chain

A committee of the National Safety Council has arranged with the Carnegie Institute of Technology, Pittsburgh, to conduct a series of tests on ½-in. chain. The proposed investigation will cover the following items:

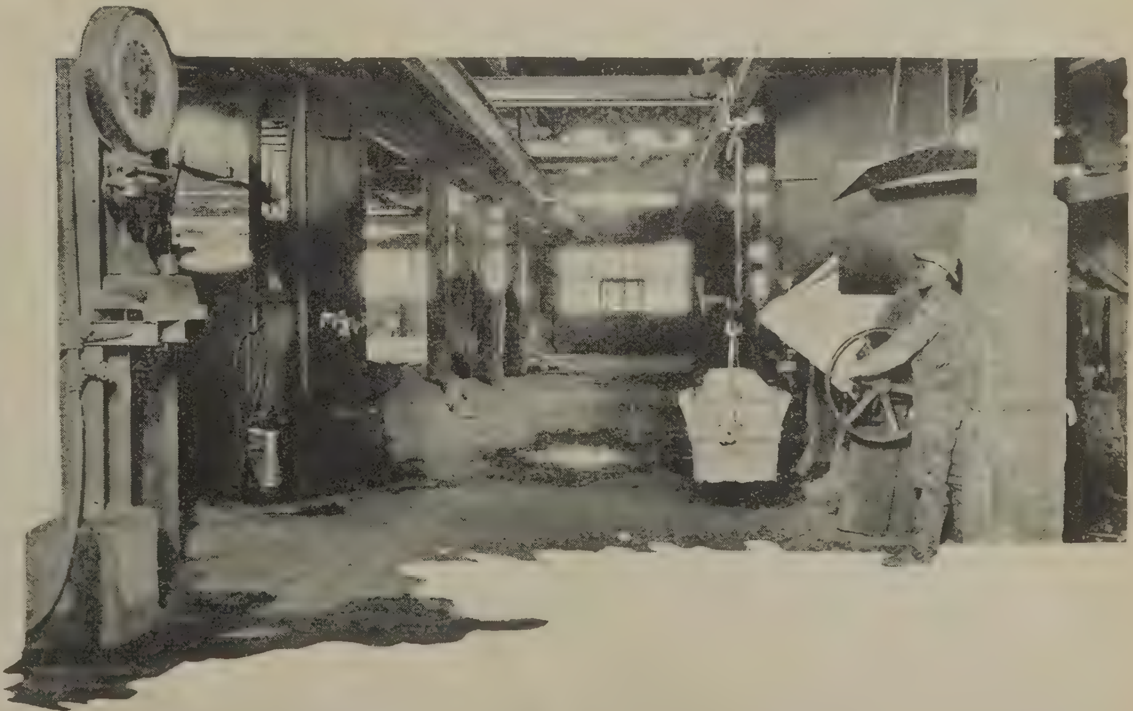
(1) Analysis of chain stock; (2) tension-proof load and tension test to destruction of chain as received; (3) impact test of chain stock; (4) chain as received to be subjected to a repeated stress test; (5) tension-proof load and tension test to destruction of chain after test 4; (6) impact test of chain stock after being subjected to a repeated stress test; (7) anneal chain at various temperatures; (8) cooling chain in air and in furnace after being heated for annealing; (9) tension-proof load and tension test to destruction of chain after each annealing and cooling operation has been completed; (10) impact test of chain stock after each annealing and cooling operation has been completed; (11) study of the effect of low-temperature heating, following the same procedure as given above; (12) metallographic studies of chain under the various conditions outlined above.

Scales Used for Production Control and Inspection

SPRINGS of all sorts, but especially automobile leaf springs and gas engine valve springs, are tested by measuring the weight required to compress them completely. The Packard Motor Car Co. has devised a simple attachment to a platform scale whereby the force required to compress each motor valve spring a definite distance can be tested.



AN overhead monorail scale enables the S. M. Jones Co., Toledo, Ohio, to keep close check on all drill rods, either coming from plant to warehouse or from warehouse to railroad car. Since weight and number of units are interchangeable in all items of mass production, small parts may be most readily counted by weighing the unknown quantity against a known number placed in a counterpoise pan.



PRODUCTION control at Wilson Foundry & Machine Co., Pontiac, Mich., requires weighing molten pig iron at the cupola. It is easily accomplished by means of a forehearth ladle discharging into bull ladles. A section of trolley track at the cupola is hung from scale levers, and the weight of the iron is plainly visible on a large dial. This and the other photographs were taken for the Toledo Scale Co., Toledo, Ohio.

Low-Manganese Steels Gain Favor

May Be Heat Treated to Properties Comparable with More Expensive Alloy Steels and Consequently Are Finding Increasing Application

BY JEROME STRAUSS*

RECENT years have witnessed an increasing interest in alloy steels containing the low-cost elements silicon and manganese, particularly in such compositions as secure high hardness and good ductility. The largest tonnage has contained manganese as the principal alloying element; 0.9 per cent manganese may be regarded as the amount separating a common steel from an alloy steel. Most of the commercial production has been of steels containing 0.3 to 0.5 per cent carbon and 1 to 2 per cent manganese. Steels containing lower carbons and manganese up to 4 per cent have been the subject of much study. However, this paper is concerned with steels of the former range.

For all these carbon-manganese steels, the foremost American proponent has been John Howe Hall (THE IRON AGE, Sept. 28, 1922, page 786), particularly for their use as castings. Recently, however, several American producers of rolled steel bars have manufactured manganese steels in quantity, and their use for forgings or articles machined directly from the bars has spread rapidly. Lower-carbon steels of 1 to 2 per cent manganese are being applied both for carburized parts and for pressings or forgings, but they will be omitted from this discussion.

Critical Points Displaced So Air-Hardening May Result

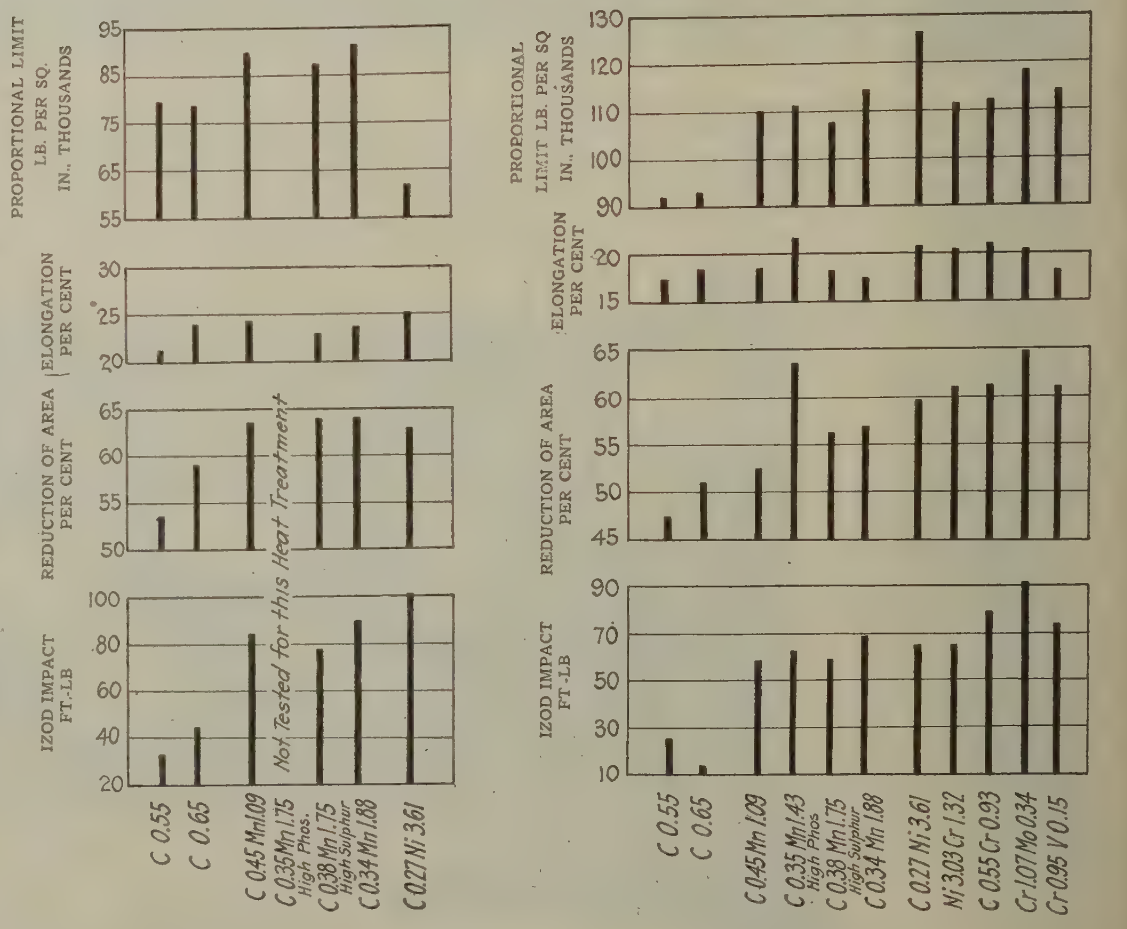
Published data on critical points yield approximate information tabulated below:

Ac_1 is lowered 11 deg. Fahr. for each per cent manganese.
Ac_3 drops 110 deg. Fahr. at 1 per cent Mn; thereafter little change.
Ar_1 is lowered 90 deg. Fahr. or more for each per cent manganese.
Ar_3 is lowered 125 deg. Fahr. for each per cent manganese.

Since A_3 is lowered more rapidly than A_1 with either carbon or manganese, the two overlap in a steel containing 0.40 per cent carbon and 2.0 per cent manganese, or another containing 0.20 per cent carbon and 3.0 per cent manganese.

Obviously the above involves a lowering of the eutectoid carbon content, which appears to be about 0.78 carbon for 1.0 per cent manganese, or 0.50 carbon for 3.5 per cent manganese.

One very important feature of the lowered transformations is the ability to harden at temperatures below the usual quenching point, after a furnace cooling from the latter. On ½-in. sections, for instance, a 0.45 C, 1.09 Mn steel heated to 1550 deg. Fahr., slowly cooled to 1300 deg. and quenched, is just as hard as



PHYSICAL Properties of Typical Carbon Steels, Manganese and Alloy Steels. In the left diagram all steels were heat treated to 110,000 lb. per sq. in. ultimate strength; in the next to 135,000 lb. per sq. in.; in the next to 200,000 lb. per sq. in. and in the diagram at the extreme right all steels broke at 225,000 lb. per sq. in.

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*Material engineer, United States Naval Gun Factory, Washington. This is an abstracted version of a paper read before the Montreal meeting of the American Society for Steel Treating.

though quenched from 1550. That the tension and impact properties do not suffer from this method of heat treatment is indicated by the following data for 1-in. sections of a 0.51 C, 1.17 Mn steel:

	Quenched from 1500 deg. Fahr.	Heated to 1500 deg. Quenched from 1350 deg. Fahr.
Ultimate	144,100 lb. per sq. in.	142,800 lb. per sq. in.
Proportional limit	101,900 lb. per sq. in.	109.500 lb. per sq. in.
Elongation in 2 in.	17.5 per cent	17.1 per cent
Reduction in area	53.2 per cent	52.6 per cent
Izod impact.....	62.5	62.6

Properties of Heat-Treated One-Inch Bars

In order to compare the properties of manganese steel with those of the more conventional analyses, a series of tests were made which are summarized in the four diagrams at the bottom of the page. Values plotted are the results of interpolations between averages of two tension and four impact tests for each heat treatment.

Bars heat treated to moderate strength were annealed at 1450 to 1500 deg. Fahr., then quenched and tempered to develop 110,000 or 135,000 lb. per sq. in. ultimate strength; then machined to size. Tension bars were ½ in. in diameter; 2 in. gage length, with threaded ends. Izod impact bars were 10 mm. square, 4 in. long. Each had two Mesnager notches (drilled hole, 2 mm. in. diameter, with center 1 mm. below the surface). When heat treated for 200,000 lb. or over, the tempering temperatures were below 900 deg. Fahr. In this instance the tension and impact bars were normalized and annealed, then rough-machined 0.035 in. oversize and the impact bars drilled, then all were heat treated and finally finish-ground. This method gives a better indication of the properties of steels which are to be used for gears, springs and other parts similarly processed.

Although comparisons rarely show superiority in all properties, it becomes immediately apparent from the diagrams that manganese steels, and especially those higher in this added element, are more closely allied to the other structural alloy steels than to carbon steel. It is also of interest that neither moderately high phosphorus (0.078 per cent) nor moderately high sulphur (0.103 per cent) adversely affect the strength and toughness.

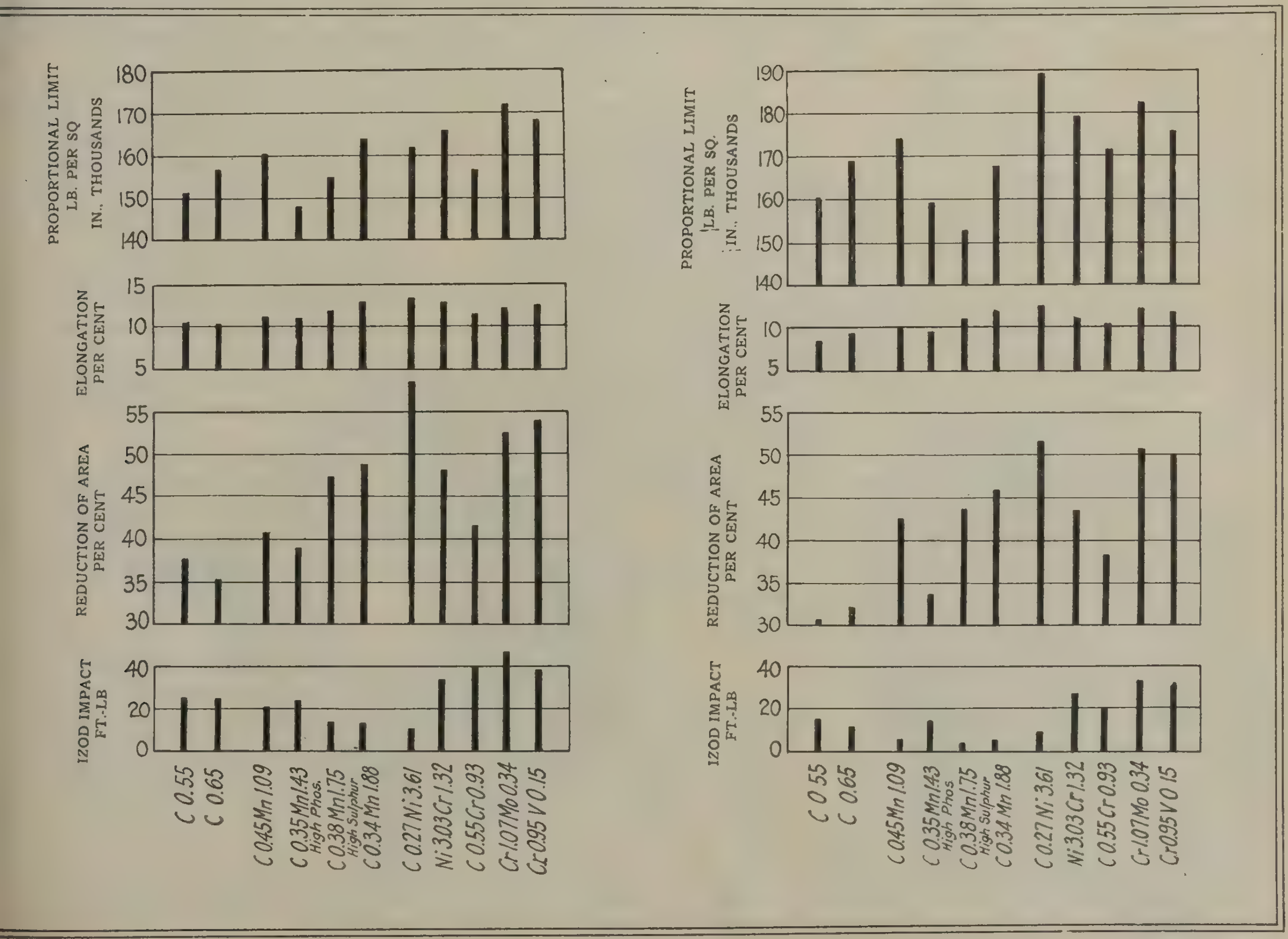
Overheating Not Especially Damaging

As a result of the efforts of Hall and others, the association of "brittleness" with steels of manganese containing more than 1 per cent has almost vanished. One additional item of evidence may be cited. Steels showing undue sensitiveness when quenched rapidly enough to produce high hardness might be expected to show deterioration in ductility or impact resistance, or to crack when quenched after overheating. To determine this point, a number of tension and impact test bars were quenched from a temperature 200 deg. Fahr. higher than that usually employed. Comparing these data with those of the diagrams showed that the deterioration in elongation or impact is no greater than in the other alloy steels (in many cases of both no decrease was noted). The losses by cracking were no greater for manganese steels quenched in water than for the chrome-nickel steels quenched in oil and far less than for the chrome steel quenched in water.

It will be noted from the graphs that Izod impact values of the manganese steels in the higher hardness ranges are below some of the other alloy steels. Other and more complex heat treatments were tried without improving this result.

Temper Brittleness Depends on Method of Manufacture

J. A. Jones of the research department, Woolwich Arsenal, England, in Report No. 61 on "The Properties of Medium-Carbon Steel with High-Manganese Content" expresses the opinion that such steels have an increased likelihood of temper brittleness, very marked at 2 per cent manganese. The same author suggests a method of determining the degree of susceptibility to this defect. This test consists in tempering the hardened specimens at 1050 deg. Fahr., cooling half of them

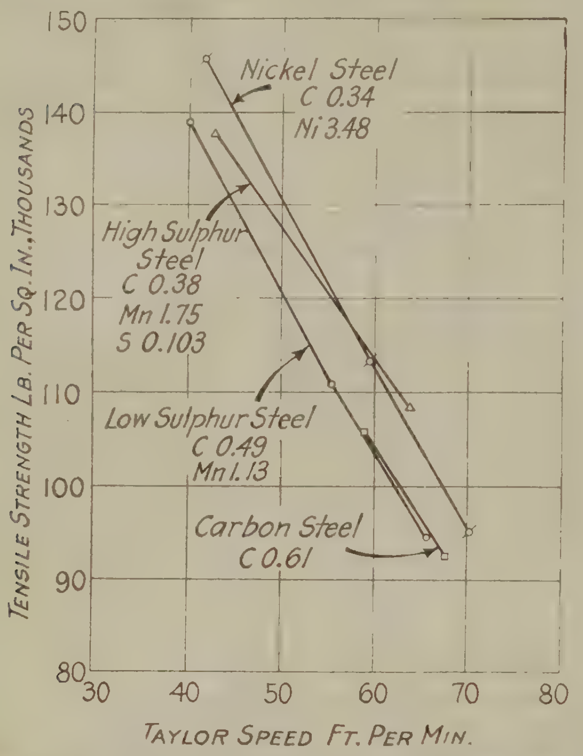


in the chosen quenching medium (water) and the other half at the desired slow rate (0.5 deg. Fahr. per min.). These same pieces are then all reheated to the same tempering temperature, but those which were cooled slowly are now quenched, and vice versa. Data secured in this manner follow:

Analysis				
C	Mn	Izod Slow-Cooled	Izod Quenched	Ratio
0.45	1.09	43.5	60.8	1.40
0.46	1.12	71.3	76.6	1.07
0.51	1.17	49.3	53.3	1.08
0.33	1.34	49.4	58.5	1.19
0.38	1.75 (high S)	55.1	61.1	1.11
0.34	1.88	30.5	64.0	2.10

One of the least temper-brittle chrome-nickel steels that was available to the author was hardened in oil and tempered at 1080 deg., and the ratio secured was 1.11.

Embrittlement on slow cooling found in this way was much less than anticipated. Chrome-nickel steels often show these effects, and, when tested by both the British standard notch and the Mesnager notch, ratios have been reported as high as 30. But since these steels are being produced continuously with ratios of less than 1.5, methods of manufacture can doubtless be adjusted so as to reduce greatly this susceptibility to temper-brittleness. It is possible that the temper-brittleness in the manganese steel studied by Jones is due to manufacturing maladjustments.



Cutting Tests Show That a High-Sulphur Manganese Steel Is Less Damaging to Roughing Tool Than Lower-Sulphur Steels

Hardening of Larger Sections

Of several series, of tests the following are typical: Rolled or forged rounds, 5⅛ in. in diameter and 12 in. long, were held at heat 60 min. and quenched in water. They were then reheated to 900 deg. Fahr., held 2 hr. and furnace-cooled. Physical tests are summarized in the Rockwell C hardness as shown.

Steel				Hardness	
Carbon, Per Cent	Manganese, Per Cent	Nickel, Per Cent	Quenching Temperature, Deg. Fahr.	Surface	Center
0.44	1.05	...	1475 1525	33.3 34.2	19.3 24.0
0.48	1.09	...	1525 1575	32.6 31.3	15.7 16.6
0.31	...	3.31	1475 1525	38.0 36.6	27.0 25.7
0.41	...	3.02	1475 1525	38.1 36.1	25.6 22.5

An examination of all the data shows that manganese steels compare very favorably with other structural alloy steels in ductility and impact resistance, when heat treated in heavy sections.

Disadvantage in respect to elastic ratio appears to grow rapidly with increase in cross-section above 4 in. Maximum hardness and depth of penetration are also not so good for manganese steels as for some of the more expensive alloys.

Machining Qualities

The manufacturer of the high-sulphur manganese steel contends it is suitable for cutting speeds higher than for open-hearth screw stock, and nearly as high as for Bessemer screw stock. To determine this point, rough-turning tests were made in the manner described by H. J. French and the author in *Transactions* of the American Society for Steel Treating, Vol. 2, 1922, page 1125. Results are shown on the chart printed herewith, which contains data secured on a similar manganese steel with normal sulphur (0.023 per cent), a carbon steel with 0.55 per cent manganese, and a nickel steel, all steels heat treated successively to two or more degrees of hardness and tensile strength.

It is shown by the figure that, in rough-turning, the cutting tool will perform about equal work prior to failure when cutting the higher-manganese high-sulphur steel and when cutting the 3½ per cent nickel steel, the comparison being based on equal tensile strengths. In a like manner the rough-turning properties of the lower-manganese steel and the plain carbon steel are comparable, and both produce more rapid failure of the cutting tool than do the first two steels mentioned. Whether this difference is due to sulphur or to manganese or both cannot be stated.

Miscellaneous Properties

It is generally recognized that pearlitic manganese steels are more resistant to sea water and most natural waters than are carbon steels. This has resulted in the use of much steel of about 0.35 per cent carbon and 1.35 per cent manganese for cast steel anchor chain. It has rendered exceptional service because of the combination of corrosion resistance, high strength and ability to sustain suddenly applied loads.

A. E. White and C. L. Clark have commented upon the ability of 1.5 per cent manganese steels to retain their strength properties at slightly elevated temperatures, and this has led to their employment for bolts in high-pressure steam lines. Exact data are still lacking to enable one to predict performance in this service.

Segregation in lower-manganese steels is to the direction usually encountered in carbon and many alloy steels, and to a degree comparable with that occurring in properly poured ingots. In higher-manganese steel made in the same plants, however, inverse segregation has been encountered, extremely pronounced in one lot of the high-sulphur product.

Heavier sections of cast steels containing 1.5 per cent manganese or more may show appreciable segregation and coarse dendritic formation. The latter are particularly persistent, and present a problem of some magnitude in the manufacture and treatment of these alloys.

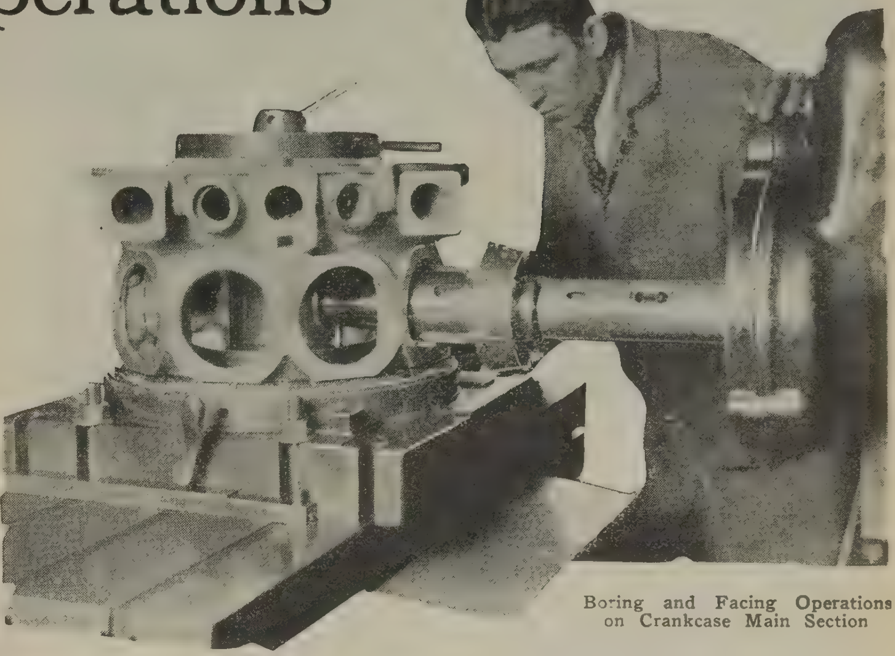
A hearing on the sale of the property of the Hydraulic Steel Co., Cleveland, will be conducted March 31 in the United States District Court in that city. Following the bid of $1,000,000 for the plant by the Truscon Steel Co., Youngstown, a bid of $1,525,000 was submitted by Lewis Levitt and Theodore Friedberg of New York.

The American Oil Burner Association, Inc., 350 Madison Avenue, New York, will hold its annual convention at the Hotel Stevens, Chicago, April 3-5.

Whirlwind Engine Parts Require Many Operations

Crankcase Sections Call for Expert Care in Molding—Eighty-Five Operations Needed to Complete Crankshaft

BY FAY LEONE FAUROTE*



Boring and Facing Operations on Crankcase Main Section

PRODUCTION of the crankcase, pistons, piston pins, valves, valve springs, and crankshaft of the Wright Whirlwind J-5 series airplane engine calls for the same careful handling, testing and inspection that characterized the manufacture of the cylinder and cylinder head of the engine, described in THE IRON AGE of March 1, page 590.

The crankcase is made up of five aluminum-alloy sections: Front section; intermediate section; main section; rear section; and the intake-manifold and oil-sump section. These crankcase parts, like the cylinder heads and pistons, are made in the Wright company's foundry. The alloy, however, differs slightly, the composition being: Copper, 10 per cent; nickel, 2 per cent; magnesium, 1.5 per cent; silicon, 1.5 per cent; iron, 0.75 per cent, and aluminum, 84.25 per cent.

Crankcase Castings Made in Company's Foundry

Because of the complicated character of these castings, special care is required in preparing the mold and placing the cores and chills. The sprues are very large, an excess of metal being used to assure homogeneity of the casting and to prevent blowholes by

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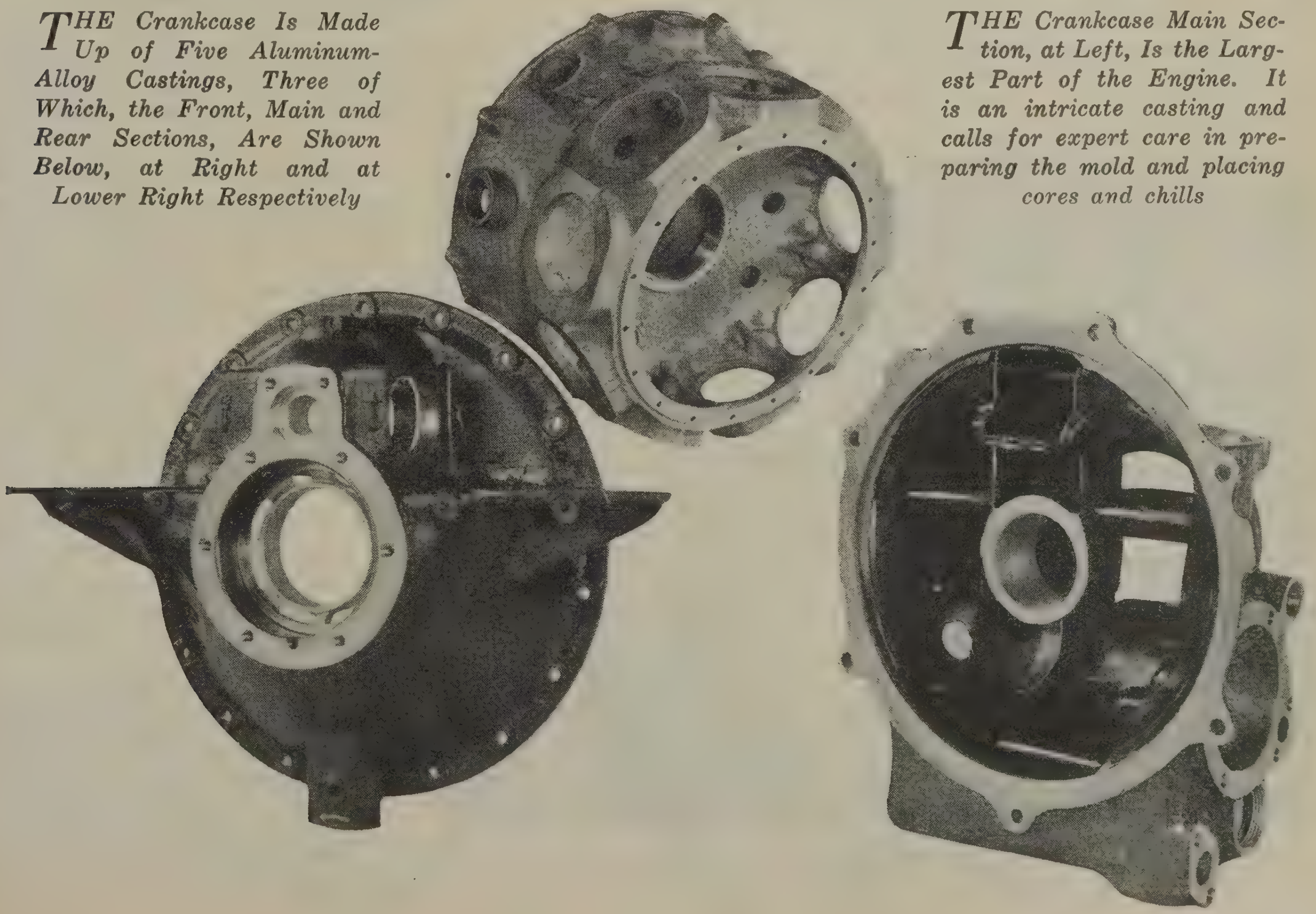
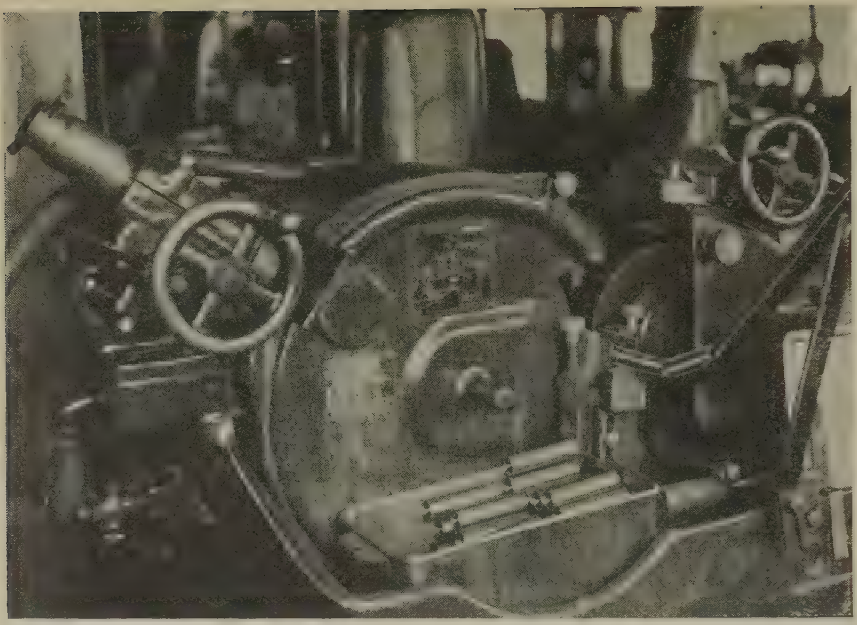
*Mechanical engineer, New York, and former editor of the *Aircraft Yearbook*. This is the third and concluding article of a series on the Wright Whirlwind engine.

THE Crankcase Is Made Up of Five Aluminum-Alloy Castings, Three of Which, the Front, Main and Rear Sections, Are Shown Below, at Right and at Lower Right Respectively

THE Crankcase Main Section, at Left, Is the Largest Part of the Engine. It is an intricate casting and calls for expert care in preparing the mold and placing cores and chills

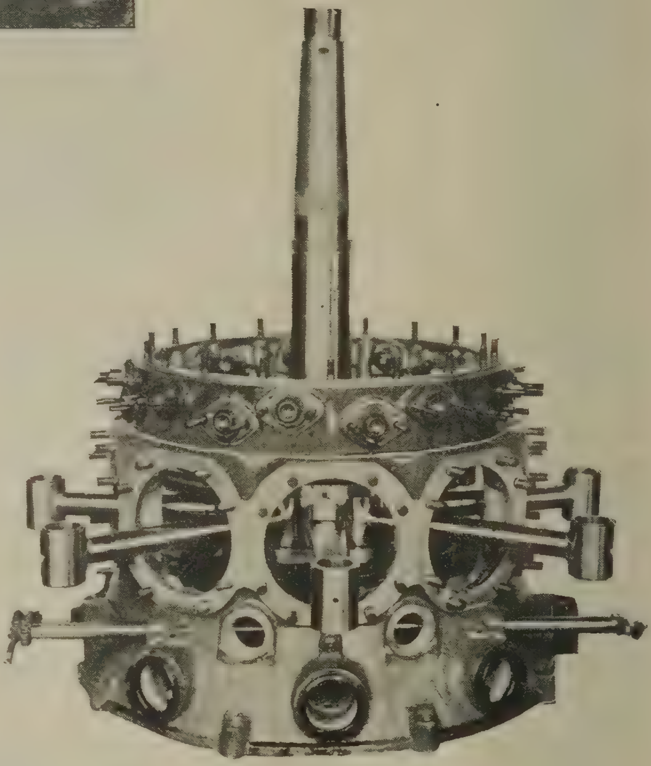




PISTON Pins, of Special Steel Tubing, Are Ground on Centerless Grinders, Which Make Five Passes, Removing Less Stock at Each Pass

giving the gas plenty of chance to get out. Air chisels and a power bandsaw are used to clean up the castings afterward. They are also thoroughly sandblasted, given careful inspection and a series of tests to determine their fitness. Since a portion of the interior of the crankcase is utilized as an intake header for the carburetion system, these passages are carefully cleaned and tested by applying air pressure of 70 lb. per sq. in. submerging the castings in water and looking for indications of bubbles. As in the case of a cylinder head the castings are next subjected to a specified heat treatment to relieve internal strains and to refine the grain. They are also submerged in an hydrochloric acid solution for about 20 min. in order that cracks, seams or other defects may be readily spotted.

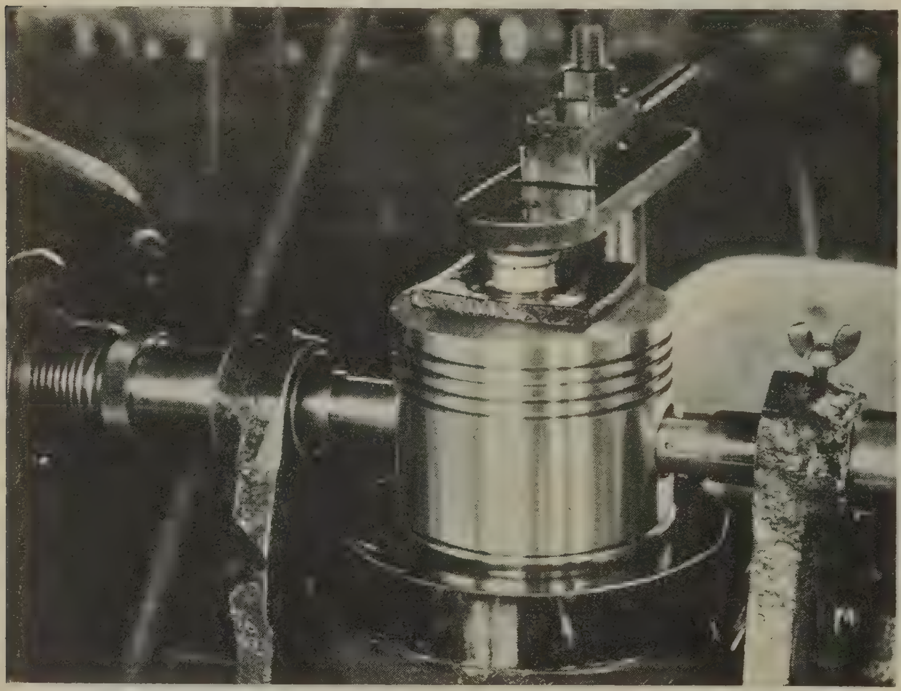
A Bullard vertical boring mill equipped with standard tools is used to bore and face the ends of the main crankcase section. The bronze bearing ring is then inserted, and in addition to having a shrink fit it is anchored with a pin. The bearing ring is bored and the open end is faced on a vertical boring machine. Next, the nine cylinder flange holes, which are equally spaced around the circumference, are bored and faced on a horizontal boring machine, the work being held on an indexing fixture. Combination facing and boring heads are used. Then the nine intake-pipe bosses are bored and faced and tapped. Other small holes are drilled and tapped, with the exception of the cylinder stud hole in the nine cylinder pads. The eight holes in each pad are drilled on an upright drill equipped with a multiple drill head. After several more minor operations are performed the crankcase receives the usual final inspection and is then enamelled.



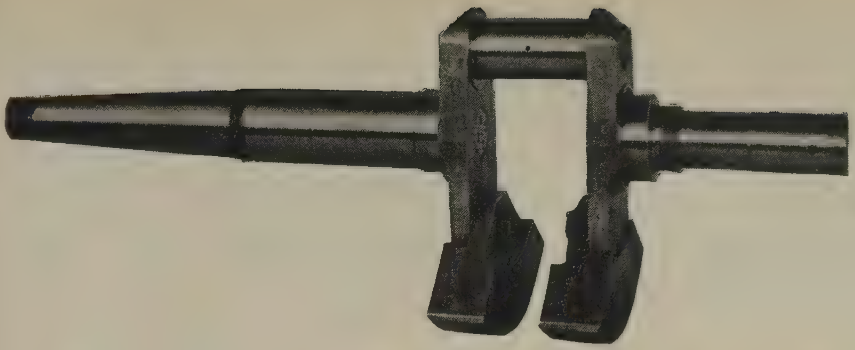
CRANKCASE Main and Intermediate Section Assembled With Master and Articulated Rods and Valve Tappets

The other parts of the crankcase are treated in a similar way, and in addition to the usual turning and boring operations, they undergo a number of milling operations. The rear section has a number of oil passages in it; therefore, it has to be carefully machined and pressure-tested.

The 18 rocker boxes, nine exhaust and nine intake, are also cast in the Wright company's foundry from aluminum alloy, S. A. E. No. 30. This alloy contains from 7 to 8.5 per cent of copper. These small parts are, of course, of very thin section and require great care in machin-



BORING Piston Pin Holes on Engine Lathe. During transit between machining operations the pistons are kept in individual containers



EIGHTY-FIVE Machining Operations Are Required to Complete the Crankshaft. The balance weights are attached and turned in a lathe, exacting balance requirements being met

ing to prevent distortion. There are a number of drilling and milling operations on high-speed sensitive drill presses. Multiple-cutting and continuous-milling methods are also employed in later processes. Disk grinders finish the cover face. The parts are subjected to the same enamelling and baking process as the larger parts. The rocker box covers are punched and formed complete from sheet aluminum on a punch press.

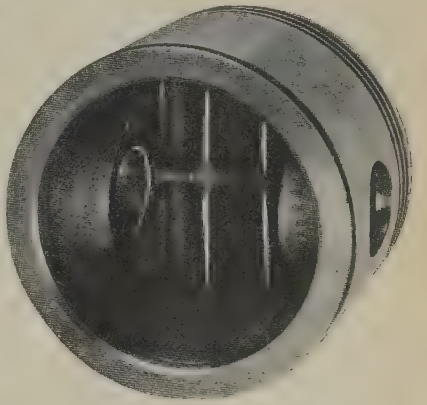
The oil and the fuel pump parts, bearing retainers, and other small aluminum castings are also cast in the company's aluminum foundry. In this department many of the problems of weight reduction have been solved. A careful physical check and laboratory test to determine molecular structure, combined with rigid inspection and exhaustive pressure tests, insure good quality at all times; and a uniform run of good material free from the high percentage of defects many times found in such foundries.

Pistons Seasoned by Special Heat Treatment

The pistons of the Whirlwind engine are of an aluminum-alloy of the following composition: Copper, 4 per cent; nickel, 2 per cent; magnesium, 1.5 per cent; iron, 0.75 per cent; silicon, 0.5 per cent, and aluminum, 91.25 per cent. As in the case of the cylinder head they are seasoned by special heat treatment; an excess amount of metal is used to insure a clean interior. I was informed that some difficulty had been experienced in getting cutting tools which would operate satisfactorily on the pistons. After considerable research in cutting steels, a satisfactory method was found.

Before the "Y" alloy was used, the wristpin holes were bored with a boring bar carrying a diamond cutting point. This gave good results. But on the new metal this tool will not give smooth, true holes. Various high-speed and carbon steels were tried but without success. Finally, it was found that a chromium-plated tool gave the best results. I have been informed that the company has been broaching the wristpin hole and this method has greatly increased their production. An ordinary round broach fitted with detachable chromium-plated burnishing buttons on the end is now used.

In machining the piston the excess metal is first removed and the part subjected to a heat treatment to refine the interior structure. Boring the skirt or open end to a close dimension is the second machine operation, after which the piston is held in a special chuck locating the inside diameter of the piston. The skirt opening is bored concentric with the inside diameter within 1/64 of an inch. The sequence of operations then is: Drilling of the wristpin hole on a drill press; turning of the outside diameter; facing and centering the boss on the head; and rough cutting the ring grooves, which is done on a semi-automatic machine. The wristpin hole is then redrilled and the outside diameters are finish turned, leaving enough stock for grinding. The ring grooves are finish turned and burnished by rolling, after which the wristpin hole is rough bored on a special horizontal machine. The pistons are then tested for leaks using hydraulic pressure. Following this the wristpin hole is broached and the outside diameters are ground. After finish facing the head and removing the working boss the pistons are inspected and weighed carefully. Wright requirements are met within close limits by reboring the skirt. Kerosene is used as a cutting lubricant for all finishing operations. The pistons are carefully kept in individual containers between operations and during transit.

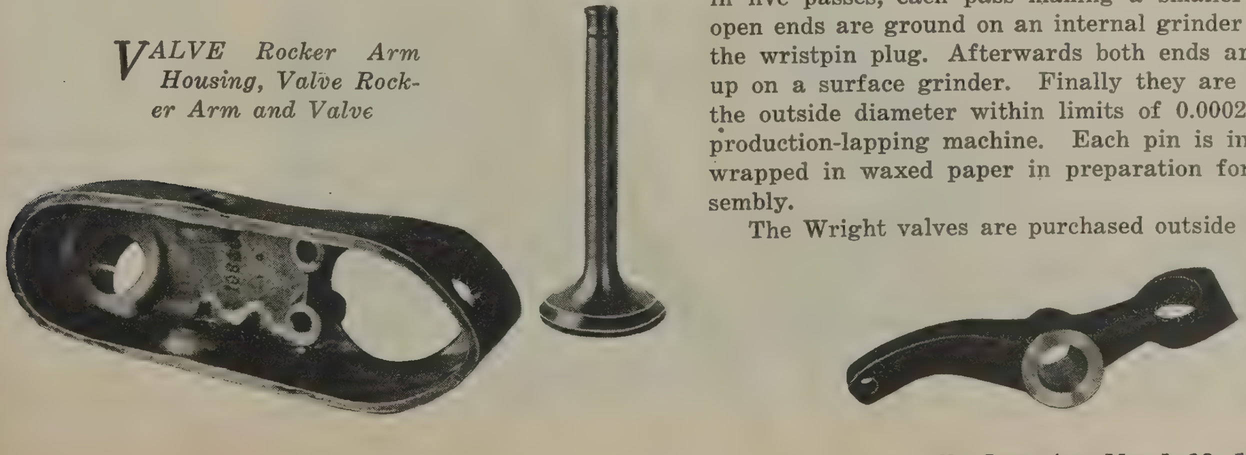


THE Piston Is of Y-Metal. Wristpin holes are broached with an ordinary tool having detachable chromium-plated burnishing buttons in the end

Pins Quenched in Vertical Position to Prevent Warping

Piston pins are of special steel tubing bored and cut to length in automatic machines. They are heat treated, rebored in semi-automatic machines and then hardened. After the heat treatment in electrically-controlled gas furnaces the parts are quenched in a vertical position to prevent warping. Finally they are submerged for 20 min. in a 50 per cent hydrochloric acid solution to enable the inspectors to spot unsound sections and defects. The pins are ground on a centerlesss grinder in five passes, each pass making a smaller cut. The open ends are ground on an internal grinder to receive the wristpin plug. Afterwards both ends are squared up on a surface grinder. Finally they are lapped on the outside diameter within limits of 0.0002 in., on a production-lapping machine. Each pin is individually wrapped in waxed paper in preparation for final assembly.

The Wright valves are purchased outside to specifi-



VALVE Rocker Arm Housing, Valve Rocker Arm and Valve cations supplied by the company and the product is checked by chemical and metallurgical tests in the plant. An additional treatment undergone by the exhaust valves is interesting. They are cleaned by dipping in gasoline and a boiling caustic soda solution, then immersed head down in a bath of chemically pure potassium nitrate kept at a temperature from 700 to 900 deg. Fahr. until bubbling ceases. They are then raised above the liquid and a ¼-in. diameter ejector rod, which has been preheated to the temperature of the bath, is pushed down until it strikes the bottom of the hole in the valve. The ejector rod is then removed and the valves taken from the bath and permitted to cool. The valve stem plugs are driven into the valve stem with an arbor press. The whole assembly is then washed and placed in the furnace where it is heated to 700 to 750 deg. Fahr. for 30 min. After cooling they are inspected for leaks, dipped into the 50 per cent hydrochloric acid solution at 180 deg. Fahr. and finally washed and inspected and placed in assembly cartons.

Valve springs, also made by outside specialists, receive careful inspection by means of electrical testing equipment. The intake valve guide is made of a special bronze alloy bar stock on an automatic machine. The exhaust valve guide is made from tungsten steel bar stock. Valve washers are made from bar stock on automatic machines and are hardened by a special cyanide process. The valve tappet guides are special steel forgings; the tappets are turned from bar stock drilled and cut off complete on an automatic turret lathe. Slotting is accomplished by a horizontal milling machine which cuts several parts at one time. The ball socket and push-rod balls are of special steel and are formed completely on automatic machines. These parts are hardened by a cyanide process and tested for hardness by a Rockwell machine using a diamond cone. The hardness range is from 64 minimum to 68 maximum. Next they are immersed in a nitric acid solution and examined for defects. Before hardening these parts, the ball ends are ground on a plain grinder using a special ball grinding device.

Crankshaft Requires 85 Operations

According to the operation sheet 85 operations are required to finish the crankshaft. It is received as a forging of special steel and a test piece is cut off and checked for physical characteristics. The shaft is first rough machined all over, placed in a 50 per cent hydrochloric acid bath for 30 min., inspected for defects and then finally finished, machined and ground all over. During the progress of the 85 operations of turning, milling, gun-drilling and grinding, two shafts are generally worked upon at the same time. Great care is exercised in the manufacture of this part as it is one of the most important components in the whole mechanism. Much depends upon its perfect balance and the balance weights which are attached and turned on a lathe are checked in a high-speed balancing machine until the exact balancing requirements have been satisfied. The balance weights are made of bronze and steel and are attached to the shaft by means of special bolts and screws.

Loading and Unloading Pipe by Magnet on Truck Crane

MUCH greater unloading speed is reported by the East Ohio Gas Co., Cleveland, through the use of a magnet instead of a hook block for pipe handling with a truck crane.

Unloading, stacking, rehandling and loading of pipe are all handled by this company by means of a Universal Crane Co. crane mounted on a 5-ton White truck. Formerly this crane was used with hook block and slings for such work, but recently this was changed by the installation on the crane of a 22-in. diameter, 230-volt pipe type of magnet, resulting in 60 per cent saving in time.

The photograph shows the truck crane unit loading pipe into trailers from stock piles. It is claimed that the following unloading speeds from railroad cars are averages for the crane and magnet unit:

1½ to 2 in. pipe,	3 hr. per car
3 to 4 in. pipe,	2 hr. per car
6 to 8 in. pipe,	1½ hr. per car
10 in. and over,	1 hr. per car

Total savings were greater than represented by just this unloading speed. After the magnet was attached there were two less men needed in handling 1½ to 4-in. pipe and four less men on 6 to 18-in. pipe. Another item of savings was less spoilage of pipe from ruining the threads or warping.

The magnet on this unit is excited by a generator mounted in the rear of the crane cab and driven by the crane gasoline motor. This makes the entire outfit completely contained and does not detract in any way from the mobility of the motor truck. With a mobile unit of this type the company has been able to serve several yards scattered throughout the city. For emergency jobs the crane can be sent at full truck speed.

USING the Magnet and Truck, Much Time Is Saved in Loading Pipe on the Trailer and in Unloading from Railroad Car

Testing Society Committees Confer

Large Attendance at Annual Group Meeting—Work on Stainless Iron and Alloy Steel Castings Inaugurated —Advances in Research and Specifications

ANNUAL group meetings of various committees of the American Society for Testing Materials have now become virtually a fixed policy of the society. The seventh meeting of this nature was held last week, March 21 and 23, at the Mayflower Hotel, Washington, and was one of the most successful and best attended of the series. Close to 450 members and visitors registered for attendance at the numerous gatherings of over 30 committees. Sessions of main and subcommittees were held morning, afternoon and evening of each day, the conferences being preliminary to the annual convention at Atlantic City, June 25 to 29.

These group meetings were initiated in the spring of 1924 at Pittsburgh. The second one met in Washington in the fall of the same year. In the spring of 1925 Philadelphia entertained the third meeting, while the fourth occurred in Cleveland in the fall of that year. Annual meetings were inaugurated in March, 1926, with a gathering at Providence, R. I. The 1927 sessions were held at Philadelphia last March. The features of most of these group meetings have been described in THE IRON AGE, and some of those of the sessions last week are here presented.

Metal and allied committees which were active last week were the following: A-1 on steel, A-2 on wrought iron, A-3 on cast iron, A-5 on corrosion of iron and steel, A-6 on magnetic properties, A-8 on magnetic analysis, B-3 on corrosion of non-ferrous metals and alloys, joint committee on phosphorus and sulphur in steel, and joint research committee on the effect of temperature on the properties of metals, as well as a few other minor groups. There was also a meeting of the cast iron research committee of the American Foundrymen's Association.

Progress in Steel Specifications

Attendance at the meeting of committee A-1 on steel Friday afternoon, March 23, was not so large as on previous occasions, and the session was comparatively brief. Minor revisions in several standards and tentative specifications were favorably acted upon. A note regarding the permissible overweight of plates ordered to thickness was approved for inclusion in standard specifications for structural steel for bridges, structural nickel steel, structural steel for buildings, and structural silicon steel. This note is the same as that which appears in the American Railway Engineering Association's general specifications for steel railroad bridges. The specifications for locomotives and cars were revised by the inclusion of the same note as embraced in the four standards just mentioned.

Specifications for Alloy Steel Castings

The specifications for carbon steel castings for valves were revised by the adoption of several revisions agreed to last year, but which were referred back to the committee at the annual meeting as a result of controversy over other revisions proposed at that time. The questions which were in controversy have been temporarily dealt with in another manner for settlement later. As a result of replies to questionnaires sent out to users of high-temperature and high-pressure equipment, the committee finds that there is not sufficient demand, nor are the practices sufficiently standardized, to warrant the preparation of specifications for materials for use at 1000 or 1200 deg. Fahr.

The subcommittee on steel castings, through one of its subcommittees, is engaged in determining the limits of physical requirements for alloy steel castings, which it is expected will lead to specifications. Definite requirements have not yet been fully agreed upon.

Progress is also being made in the preparation of two new specifications for alloy steel forgings, one for annealed and normalized forgings and the second for quenched and tempered forgings.

Interest in Cast Iron

Two important meetings were held on the subject of cast iron, one that of committee A-3 of the A. S. T. M., and the other the research committee of the American Foundrymen's Association.

New Light on Fatigue of Cast Iron

Attendance at the meeting of committee A-3 on cast iron was quite large. Considerable interest was manifested in the announcement of a paper on fatigue tests for the program of the annual meeting of the society in June, to be presented by J. B. Kommers, associate professor of mechanics, University of Wisconsin, Madison, Wis. This paper will cover results of testing nine or 10 sets of cast iron test bars received from various sections of the country. The complete results of tension, transverse, impact and fatigue tests, as well as chemical analyses and casting conditions, will be included.

Under the auspices of the committee there has been conducted during the last year an elaborate series of tests to determine the relation between the properties of specimens cut from iron castings and the properties of separately cast test bars from the same heat. These results, prepared by Jesse L. Jones of the Westinghouse Electric & Mfg. Co., Pittsburgh, will be included in the committee's annual report.

There was considerable discussion of the arbitration test bar and the tension test bar for cast iron, and progress was made toward advancing the specifications covering these to a further stage of development.

Research in Gray Iron

Under the chairmanship of J. T. MacKenzie, chief chemist American Cast Iron Pipe Co., Birmingham, Ala., a well attended meeting of the research committee of the American Foundrymen's Association was held Thursday morning, March 22. Some of the progress made by members of this committee in studying the fluidity and viscosity of gray iron was discussed. Work which is contemplated in studying the machinability and wear of cast iron was gone into quite extensively. Plans are also under way to investigate certain phases of the shrinkage of cast iron.

New Work in Magnetic Research

In the field of magnetic studies two important committees held meetings. At a session of committee A-8 on magnetic analysis, reports were received on several investigations now under way, the present studies of which will be outlined in the committee's next annual report, while in a subsequent report a more detailed summary will be given. A new investigation was announced which will involve a material other than that in use in the present investigations of high-speed tool steel.

In the field of magnetic properties committee A-6 at its meeting organized a new committee on tests at high magnetizing force, under the chairmanship of L. E. Howard. The scope and proposed activities of this committee were given very careful consideration. Last year the committee submitted an extensive list of terms relating to magnetic tests of materials. This list has been reviewed and is now being revised and amplified.

Wrought Iron Committee Active

New specifications for iron and steel chain are being recommended by committee A-2 on wrought iron to supersede eventually the present standard specification.

The desirability of revising requirements in specifications covering the method of manufacturing wrought iron is being considered by a committee. Requirements now call for wrought iron made from "all-pig puddled iron," whereas wrought iron that meets the most exacting tests for high quality is being produced commercially by a radically different process without the use of a puddling furnace.

The committee is investigating the differences between the physical properties of rolled and hammered wrought iron forgings. Additional data are required. An investigation of the effect of phosphorus on the physical properties of staybolt iron is progressing. Several groups of samples have been furnished in which the method of manufacture and the chemical composition, with the exception of phosphorus, are as nearly as possible identical. These samples will be analyzed and tested physically in the annealed and unannealed state.

Progress in Joint Research

Two important joint research committees held sessions last week, one on the effect of phosphorus and sulphur in steel, and the other on the effect of temperature on the properties of metal.

Added Phosphorus in Steel Pipe

One of the most important matters brought before the joint committee on investigation of the effect of phosphorus and sulphur in steel, under the chairmanship of George K. Burgess, director United States Bureau of Standards, Washington, was the effect of phosphorus added to low-carbon steel. Suggestions had been made by the American Petroleum Institute that this matter be studied by the committee, and favorable consideration was given to these suggestions. The manufacturers of steel pipe also are interested in a study of this subject, particularly in the manufacture of welded pipe having a carbon range of approximately 0.06 to 0.12 per cent. The importance of such an investigation has been emphasized by the practice of rephosphorizing open-hearth steel of this grade to increase its machinability and strength without affecting its welding properties. It is believed that arrangements for procuring the steel can be effected, and it is tentatively planned to coordinate this research with tests of finished pipe from the same heats of steel, that will be made by the American Petroleum Institute. A program of tests of the material itself is being drafted and will be considered by the committee at its next meeting.

Regarding the study of phosphorus in steel castings, the committee on manufacture reported that the various materials had been produced and heat-treated and are now in the hands of the various laboratories for test.

How Temperature Affects Metal Properties

Many important phases of the study of the effect of temperature on the properties of metal were discussed at a well attended meeting of the joint research committee of the A. S. T. M. and the American Society of Mechanical Engineers. Further progress was reported concerning cooperative laboratory work, which has been under way for some time. Most of the short-time tests have been completed, and one laboratory submitted its report on flow test. An attempt will be made to coordinate results from short-time and flow tests. Satisfactory arrangements being assured, it is expected that laboratory work on fatigue at elevated temperatures and thermal conductivity will be under way in the near future.

Work on Corrosion of Iron and Steel

In the corrosion of iron and steel, committee A-5 on this subject at its meeting reported that several specifications for zinc-coated products had been prepared or had been under consideration during the past year. New specifications are being issued covering zinc-coated barbed wire and zinc-coated steel wire strand. A sub-committee has been at work formulating methods of test of an accelerated nature in an attempt to get results in a short time, which will indicate serviceability of materials in various classes of service. Some of the suggested methods have been carefully considered and are approaching the stage of actual value.

Stainless Steel Alloys to Be Studied

Important action was taken by the joint advisory committee on corrosion, whose chairman is W. H. Bassett, technical superintendent American Brass Co., Waterbury, Conn. This committee is an administrative one, consisting of appointed representatives from the two A. S. T. M. corrosion committees, A-5 on iron and steel, and B-3 on non-ferrous metals and alloys. Its function is to correlate the activities of the two committees and particularly to advise the executive committee of the society in matters relating to new fields to be entered.

At the meeting last week a proposal was considered which had been made to form a committee of the society to study a group of corrosion-resistant alloys which lies between the fields at present being developed by the two committees. An enlightening and valuable discussion developed, which crystallized in a recommendation to the executive committee that it form a new standing committee in the society to study the alloys of the iron-chromium-nickel system, the committee to have adequate representation from both producing and consuming interests and to function under the scope which would include studies of all properties of the alloys in this system.

On Thursday evening, March 22, an informal dinner was held, at which over 100 were present. Two prominent Government speakers delivered addresses after the dinner: Hon. William P. MacCracken, Jr., Assistant Secretary of Commerce for Aviation, and Admiral H. H. Rousseau, in charge of Naval oil reserves. Several inspection trips to the Naval Gun Factory, the Bureau of Standards, the Bureau of Chemistry and other Government institutions were taken advantage of by various members under the direction of the local entertainment committee, of which Jerome Strauss, Naval Gun Factory, was chairman.

"Forward Atlanta" Campaign Takes 309 Companies to That City

The Forward Atlanta Commission of the Chamber of Commerce of Atlanta, Ga., has distributed a booklet summarizing the results of the two-year campaign to promote that city commercially and industrially. Within the period that the community-promotion campaign has been in operation 309 new companies have located in Atlanta, 9158 new jobs have been created and $14,919,350 annually in new payrolls has been added. Atlanta is now regional headquarters for more than 900 of the country's leading manufacturers. George West, chairman Forward Atlanta Commission, says: "Atlanta's success should be an inspiration to all cities that may today be working toward a similar movement."

Financial Executives' Conference in New York, April 26 and 27

The fourth financial executives' conference of the American Management Association will be held at the Hotel Pennsylvania, New York, April 26 and 27. Among the subjects to be considered are "Trends in Corporate Finance," "Operating the 13-Month Work-Calendar," "Technique of Costing Marketing Activities," "Organizing, Financial, Accounting and Related Functions" and "Trends in the Composition of Boards of Directors." The salary administration group of the association will hold a round table conference at the same hotel on Saturday morning, April 28. W. J. Donald, 20 Vesey Street, New York, is managing director of the American Management Association.

British Institute Considers Brass

Cause of Blowholes, Hardening After Heat Treatment, Forgeability, and Corrosion in Sea Water Occupy Institute of Metals

LONDON, March 8 (*By Mail*).—Dr. Walter Rosenhain, chief of the metallurgy department of the National Physical Laboratory, and president of the Institute of Metals, occupied the chair at the annual meeting of the institute, which opened yesterday. The council's report reflected the continued progress of the institute, whose membership has increased to 1903, including 700 overseas members resident in 41 countries. The international character of the institute is incidental rather than fundamental, but the members realize that the advancement and development of their own science can achieve its full measure of success only if it is carried out in cordial cooperation with the able and successful workers in other countries.

Copper Hardened with Beryllium

In his inaugural address, Doctor Rosenhain pointed out that although he is regarded as a scientific worker rather than a practical man he attached the greatest importance to practical papers and to the interchange of ideas and knowledge between practical men and scientific workers engaged on similar subjects. He hoped that the mutual understanding might be extended also to the business men who control the finance of the non-ferrous metals industries and who are therefore the deciding factor in determining how far and how soon the results of research are to be utilized.

Some may think that the number of equilibrium diagrams described in the *Journal* of the institute is too large, but he pointed out that the formidable term "equilibrium diagram" merely means that the diagram represents those conditions which the alloys tend to assume if they are allowed to attain their final condition of balance. As an example of the need of great accuracy and completeness in the study of these diagrams, an account was given of the method of determining the "solid solubility lines" of various alloy systems. These determinations, which at first sight appear to yield results of purely academic interest, have not only furnished the explanation of the age-hardening of duralumin and other aluminum alloys, but form the foundation for a series of new and important alloys of copper and other metals. In some of these, notably the alloys of copper and beryllium recently developed in Germany, the age-hardening effects are very large. An alloy containing only a small percentage of beryllium could have its hardness raised from 80 to 410 by age-hardening, the tensile strength in the latter condition being of the order of 200,000 lb. per square inch.

Heat Treatment of 60 : 40 Brass

A study of rolled brasses containing from 55 to 63 per cent copper was made by T. Matsuda of Sumitomo Steel & Copper Works, Osaka, Japan. He finds that the Brinell hardness as rolled and furnace-annealed (varying from 92 for the 55 per cent copper brass to 56 for the 63 per cent copper) remains unchanged until the quenching temperature passes the transformation range where the alpha constituent dissolves in the beta. Quenched from the beta range, the brasses attain a uniform hardness of 100. Slower coolings from the beta range give intermediate hardnesses, depending upon the amount of the alpha constituent which can separate. The highest hardness he was able to prepare by heat treatment is in a 60 : 40 brass, quenched in water from above 800 deg. C. and tempered at 300 deg. C. for 30 min. This gave the following physical properties:

Tensile strength...........	70,400 lb. per sq. in.
Elongation	22 per cent
Brinell hardness..........	127
Stanton impact number....	5,835
Izod impact energy.......	17.9 m.-kg.

Strength and hardness curves, plotted against annealing temperature, show a sharp peak at 300 deg. C., this corresponding to the precipitation from the solid solution of alpha crystals of critical size for maximum slip interference.

Soundness of 70 : 30 Brass Ingots

Presence of rounded cavities in cast brass has been ascribed to the evolution of dissolved gases just before solidification, and various experimenters have reported the extraction of comparatively large volumes of gas from the solid alloy. In order to determine whether melts previously saturated with gas had undue porosity on solidification, G. L. Bailey, metallurgist in the research department, Woolwich Arsenal, cast a series of small round ingots, 6 in. high and 1½ in. in diameter, with hot tops. Each cast was made in four molds, as follows:

Mold	Temperature (Degrees Centigrade)	Blackening	Approximate Solidification Time (Seconds)
Thick-walled copper..	100	Soot	16
Thin-walled cast iron.	100	Soot	22
Calorized steel.......	800	None	145
Dry sand............	100	None	310

By preliminary experiments with a 5-per cent tin bronze (especially difficult to cast sound) it was determined that nitrogen, bubbled through the melt when held in a carborundum-lined electric furnace, is able to sweep out substantially all the dissolved gases, and any porosity on solidification is then due to shrinkage cavities.

This determined, 70 : 30 brass was then melted in the electric furnace and treated at temperatures corresponding with the limits of good foundry practice. First nitrogen was bubbled through it for 20 min. at 1100 deg. C., and a set of ingots was cast. Another melt was bubbled at 1050 deg. C., and cast from 1000 deg. C. A third was treated similarly, but was heated after bubbling to 1140 deg. and then cooled in the ladle to 1000 deg. C. This program was repeated with hydrogen and with sulphur dioxide, the two supposed offenders causing gas cavities. After the sink head was cut off, porosity was determined by measuring the specific gravity and comparing it with that of the alloy solidified in a vacuum, rolled and annealed.

The various temperature programs made no differences in the amount of voids, within the limit of experimental accuracy. Voids produced by the gases were as follows (in per cent):

Time of Solidification	Nitrogen Saturated	Hydrogen Saturated	Sulphur Dioxide Saturated
16	0.39	0.20	0.61
22	0.41	0.19	0.66
145	0.59	0.18	1.12
310	3.28	3.40	3.31

From these figures, and from the results of microscopic examination, Mr. Bailey concludes that 70 : 30 brass is not liable to unsoundness caused by gases, whatever the conditions of casting. Slow speeds of cooling, as in dry sand, are associated with much more pronounced shrinkage cavities than after casting in metal molds. Spherical cavities of varying size and unequal distribution frequently found in brass ingots are, in his opinion, caused by mechanical entrapping of gases within the mold; any gases actually in solution in the liquid metal just before freezing are retained in the solid without blowhole formation.

Testing Brass for Forgeability

Since it is well known that the ordinary physical tests do not indicate the forgeability of metal, W. L. Kent of the University of Birmingham studied the action of hot pellets, struck by a single blow of a drop hammer. He regards the amount of flattening as being a rough measure of forgeability.

A single blow reduced pure copper at room temperature 15 per cent. Reduction increased steadily with rising temperature, until it reached 28 per cent at 800 deg. C. Above that the malleability increased very rapidly. Brinell tests taken on the flattened pellets after cooling showed that the cold copper (which was originally 43 hard) measured 70 after one blow, and this hardness decreased uniformly with the temperature of forging until at 500 deg. C. a hardness of 67 was reached. Recrystallization is rapid in the range 500 to 650 deg. C., so that the hardness of pellets struck once and cooled is about 43 if the work is done at any temperature above 650 deg.

Both pure and leaded 70 : 30 brass were tested similarly. Malleability increases very little from room temperature (reduction 15 per cent under single blow) up to 700 deg. C. (reduction 18 per cent). Above that the increase is rapid. Hardness is maintained at about 92 after all impacts up to 400 deg. C. Decrease is then uniform with temperature, reaching 54 after cooling from one blow at 900 deg. C. Originally these pellets were 54 hard. The presence of lead causes no change in these figures. However, the leaded brass developed intercrystalline cracks when tested at 350 deg. C. and above.

Sixty-forty brass (Brinell hardness 70) deformed 12 per cent when struck once at any temperature up to 400 deg. C., from 400 to 650 the malleability increased gradually to 23 per cent, and quite rapidly thereafter. Hardness of pellets cooled after testing sagged from 103 (100 deg.) to 85 (550 deg.) but increased to 92 after testing at 850 deg. C., where the brass is all in the beta phase. The lead-free samples forged well up to 650 deg. C., but had marked side cracks after testing at higher temperatures, a condition opposite that for the leady brass. This corresponds with rolling mill experience.

A study of the results convinces the author that this test will indicate whether a certain material can be forged at a given temperature without cracking and its relative forgeability at various temperatures. The best temperature for working can be discovered with the further aid of a series of Izod impact tests on hot samples. In interpreting the results it should be borne in mind that strain hardening occurs during hot work as well as during cold work, and the amount of work which can be done by successive blows or rolling mill passes will depend upon whether the temperature is high enough to cause rapid recrystallization, or to soften the metal even though it does not recrystallize.

Corrodibility of Metals in Sea Water

Four years ago, a rack containing 50 bars (1⅛ in. in diameter, 2 ft. long) of various alloys was fixed to the sea bottom at lowest tide in the Bristol channel. After four years' continuous exposure to sea water, they have been examined by Prof. J. Newton Friend, of Birmingham Technical College, and given the following rating, the first mentioned having the highest order of merit:

1. Ingot tin. Cast bars became dull colored, freckled with minute white dots, appearing to be centers of incipient pitting.

2. Rolled Mond nickel. Lost 0.44 per cent in weight. It was originally covered with hot mill scale, and most of this remained after four years' exposure. Very minute pits were numerous.

3. Lead, both commercial soft lead, and an alloy with 1.6 per cent antimony, extruded. These had been bruised by stones dashed against the rack during storms. The surface was dull, and in some places hidden by a white deposit, easily rubbed off. These bars lost about 0.6 per cent in weight, thus being inferior to tin.

4. Screw stock (Cu : Zn : Pb 60 : 38.6 : 1.4). It was covered with a smooth pale green coat without eruptions, (which classes it above the nickeled copper described below). It had uniform, small-sized crystalline grain. It lost 3.8 per cent in strength and 1.4 per cent in weight.

5. Copper with 1.8 per cent nickel. Dull brick-red in color, with a scattering of small green excrescences. The diameter of the bar had been reduced 1.4 per cent, and the strength, an equal amount.

6. Copper. Both ordinary (99.8 per cent) and arsenical, in cold-drawn bars, developed far more and larger excrescences than the above. These proved to be caps to portions of slightly elevated metal. The diameter of the bar was reduced by 2.4 per cent, and the strength, about 4.5 per cent. The entire freedom from pits is noteworthy.

7. Nergandin brass (Cu : Zn : Pb 70 : 28 : 2). Similar in appearance to 5 above, although the coating tended toward greenish. At the ends, where the bars had been fixed in the wooden frame, considerable erosion had taken place. Loss in weight was 5 per cent; loss in strength, 6.1 per cent. Microstructure is essentially alpha brass, and while the loss in weight is heavy, it was uniform and showed no tendency to develop pits. The lead content appears to prevent pitting.

8. Naval brass (Cu : Zn : Sn 62 : 36.7 : 1, with 0.2 lead). Covered with a smooth, tight coat of greenish-ocher color, marked with a number of flat wart-like excrescences, representing filled-in pits where dezincification had proceeded. The diameter of the bar was reduced 3.1 per cent, and the strength, 4.8 per cent. In the development of this composition tin was introduced in order to check the decay frequently noted in Muntz metal, and appears to increase the tenacity with which the protective coat clings to the metal. If naval brass is situated where this coat is scoured off by mechanical action, its corrosion rate will probably be on the same order as Muntz metal.

9. Muntz metal (Cu : Zn 61 : 38.7 with 0.4 lead) had a thin pale green coating, thickly studded with warts. As in the naval brass, these warts were metallic, consisting of copper replacing the beta constituent. The extent of the action is measured better by the loss in strength (9.4 per cent) than by the reduction in diameter (1.4 per cent). Rate of corrosion in Muntz metal will vary if it is in contact with other metals; it also depends on the surface condition of the newly made metal—the cold-worked surface being more resistant to sea water than the underlying metal free from strain hardening.

10. Commercial zinc in rolled bars, (1.1 per cent lead). It was covered with small dome-shaped excrescences of brittle material, so closely attached to the metal that it could not be removed. The bar appeared to be covered with pits nearly 1 mm. deep, which are responsible for its low rating. Loss in weight was 4.7 per cent; loss in tensile strength, 10.3 per cent.

11. Aluminum (99.4 per cent). Corroded very deeply at the ends, where it was embedded in putty. The rest of the bar was covered by a stone-colored layer, broken by pits up to 6 mm. deep, thus penetrating nearly 20 per cent of the diameter. The loss in weight was only 4.5 per cent, although the tensile strength was reduced 16 per cent. It is believed that these pits result from cracks or fissures in the primary oxide skin on the freshly manufactured bar, rather than from segregated impurities or localized differences in metallic structure.

Baldwin Plant in Canada to Make Seamless Tubing

TORONTO, ONT., March 27.—Arrangements have been effected by which Page-Hersey Tubes, Ltd., will take over the plant of the Canadian Baldwin Corporation, Ltd., at a price said to be $500,000.

The official statement issued after a meeting of the Page-Hersey board of directors, was as follows:

"The Baldwin Canadian Steel property has been merged with Page-Hersey Tubes, Ltd., and its works will be utilized for the manufacture of seamless steel tubing and kindred products.

"The Page-Hersey Co. is the largest manufacturer in Canada of what is known as wrought iron and steel welded pipe, but the demand for seamless pipe is growing rapidly and the merger allows them to enter this field under advantageous conditions, as the Baldwin plant is well suited for the industry and the location particularly good as a manufacturing and distributing center.

"The combined enterprise will be in a position to supply a complete line of steel and wrought iron pipe of all grades, both for domestic and foreign markets, and will consequently effect important savings in manufacturing and sales costs, which, as separate units, they could not enjoy.

"No new issue of securities is contemplated."

Schwab Testifies in Coal Hearing

Chairman of Bethlehem Steel Corporation Recommends Hegira of Surplus Labor from Bituminous Fields—Says Repeal of Sherman Law Would Not Help Coal

WASHINGTON, March 27.—The application of the law of supply and demand as a means of solving the ills in the depressed bituminous coal industry was suggested by Chairman Charles M. Schwab of the Bethlehem Steel Corporation to the Senate Committee on Interstate Commerce when he, together with John D. Rockefeller, Jr., and R. B. Mellon, appeared as witnesses last Friday in connection with the inquiry the committee is making into conditions in that industry. Testifying freely, Mr. Schwab at times spoke in a lighter vein but when serious questions arose he became earnest in his remarks and frequently displayed strong determination in supporting his views.

Except for the coal industry, Mr. Schwab told the committee, labor conditions in the United States are "happily prosperous," and he emphasized the need of mutual understanding between employer and employee as the real basis of the solution of the coal problem. He pointed out that laws of supply and demand are unchanging and must be recognized in coal as in any other industry. Disclaiming first-hand knowledge of conditions in the bituminous coal fields or operating conditions of the subsidiary mining properties of Bethlehem, Mr. Schwab gave views concerning relations between employer and employee and discussed labor conditions in the steel industry. Full cooperation was promised by Mr. Schwab in solving the coal problem and he agreed to join any conference toward that end.

Settlement must be found in a natural way, Mr. Schwab said, and sensational charges by employers and employees alike must be avoided. He asked the committee and counsel for the United Mine Workers not to take an antagonistic attitude toward him and was told there was no desire to criticize adversely, a statement which appeared to please Mr. Schwab.

Excess Mining Labor Should Go Elsewhere

Mr. Schwab told the committee that a two-fifths oversupply of labor in the coal industry must not be disregarded and recommended that this surplus of labor be encouraged to direct its efforts elsewhere. He suggested that a wealthy man could do a monumental social service by financing an hegira of the excess labor from the coal fields. He also declared that combinations of units for the sake of economical operation must be permitted by the Government. It was pointed out that it is a great economic waste to the country to have 500 mining companies operating where there perhaps ought to be 10. Mr. Schwab asserted that the depression in the coal industry might possibly be due to the efforts of President John L. Lewis of the United Mine Workers Union to maintain wages at too high levels in the face of economic conditions. Mr. Lewis, with whom Mr. Schwab had shaken hands before taking the stand, replied to Mr. Schwab, declaring that "the lowest, most unfortunate wage earner in the West Virginia coal fields should not be used as the yardstick for measuring the wages of workers throughout the industry." He also insisted that if union wages were lowered the non-union wages would likewise be lowered.

Considerable questioning of Mr. Schwab concerned the Bethlehem Mines Corporation and the Ellsworth Collieries, a Bethlehem subsidiary, but Mr. Schwab said he had no knowledge of alleged degrading conditions in these or any other Bethlehem company. He promised, however, that he would make a personal investigation. Senator Wheeler, Democrat, asked Mr. Schwab about the alleged abrogation by the Bethlehem Mines Corporation of the Jacksonville agreement.

"I don't know anything about it," relied Mr. Schwab, "but I never would admit that our company abrogated any agreement."

He declared that the mines would be shut down in preference to violation of an agreement if that were the only means of preventing loss of money.

"My course has been to follow the highest moral and business integrity that is possible and I cannot believe that our people violated this agreement," said Mr. Schwab.

When Senator Wheeler declared that the public required protection from huge industries, Mr. Schwab replied by saying that the United States Steel Corporation did not earn 6 per cent on its investment last year.

Repeal of Anti-Trust Law Only a Palliative

As the inquiry proceeded, Chairman Watson, Republican, of the committee said: "We're seeking here a remedy for a manifest evil in the coal industry. Do you think the Sherman Anti-Trust Law should be repealed to enable the coal operators to fix prices to help the miners and to guarantee a fair profit to the investor?"

"I do not," replied Mr. Schwab. "That remedy would be a palliative, and would not alleviate the present serious condition."

Getting back to the Ellsworth mines of the Bethlehem Corporation, a verbal tilt arose between Senator Gooding, Republican, and Mr. Schwab when the former criticized Mr. Schwab for not being familiar with conditions in those mines.

"You don't know about some conditions in your own house, do you?" Mr. Schwab inquired rather sharply, but in a tone not unmixed with humor.

"I know that," admitted Senator Gooding, as the audience broke into loud laughter.

The attitude of Senator Gooding toward Mr. Schwab became cordial and he declared that "if every man employing labor were a Mr. Schwab we would not have the present condition, but unfortunately that is not true."

Attorney Eaton, representing the miners' union, quizzed Mr. Schwab about conditions at the Ellsworth mines and finally drew a remonstrance from Mr. Schwab. The latter declared he had come to Washington "with my heart filled with a desire to do anything to help, but your questions are not strengthening the conviction in that heart. I would work harder than you or any one at this table to correct conditions that are wrong."

Artificial Labor Conditions Cannot Be Helpful

When he turned to general questions of labor policy, Mr. Schwab asked for and was given permission to make a statement on that subject, based on an experience of 40 years in labor management, "during which, I say boastfully, I have never had a serious labor difficulty." Insisting that all great economic questions of labor rest on the old theory of supply and demand, Mr. Schwab said that the creation of any artificial condition with reference to labor and industry cannot be sound and helpful. There must be, he said, a true, complete and thorough understanding.

The method of the Bethlehem Steel Corporation, Mr. Schwab explained, is to have all labor questions debated in conference with the management, each 300 workers electing representatives who meet once a month or oftener with the management. In the event the conference is unable to settle a question it is left to arbitration, Mr. Schwab told the committee, the Secretary of Labor of the United States being the arbiter.

In 10,000 or more questions, Mr. Schwab said, not once had arbitration been necessary.

"The result is that we take the employee completely into our confidence," he continued. "When we meet, we give them all the information that we would give our stockholders. We have had reductions in wages, and when the workingmen understand the reasons there are no complaints. On the other hand, we have had more advances, due to prosperity in the industry." Mr. Schwab said the average earnings of all employees, exclusive of executives, are now 63.8c. per hour, and asserted he was proud of that average in view of the great number of unskilled workers in the industry. Direct contact with the men was called "human engineering."

"But we know we can't have the heart of our men in the business unless they are part of it," Mr. Schwab stated. "The most important stockholders in the Bethlehem Steel Corporation are the men. They own from one-fourth to one-third of all the preferred stock, amounting to about $37,000,000." Of this, he said, about $3,000,000 worth is held by miners.

In the mines, Mr. Schwab declared, the same development of employer-employee relations has not been possible, but he expressed the hope that he could bring about the same condition in the coal properties as in the steel industry. Coal has presented so many difficulties, he said, that "nobody would be happier to get out of the mining industry than the Bethlehem Steel Corporation."

Never Made a Dollar Out of Bethlehem Steel Co.

He told the committee that he had never made a dollar out of Bethlehem Steel, that he was not now working for money, had no sons or heirs to whom to leave his fortune and that he spoke as one who hoped to leave as a monument to his efforts the humanization of industry.

He was asked by Senator Watson if he believed in collective bargaining.

"Collective bargaining," replied Mr. Schwab, "is a bad term; it is understanding with each other that I'd prefer to call it. Mr. Lewis remembers that the greatest autocrat in industry was the sub-foreman, against whom a workman was afraid to complain. With understanding, the worker can come forward with his grievances, and the result is that everybody is happy."

When Senator Gooding declared that the coal and steel industries could not be compared, Mr. Schwab responded that they ought to be exactly alike and that "so far as our mines are concerned, that's the way we intend to operate them."

Mr. Schwab disagreed with Senator Gooding when the latter said he could not concede that wages should be made subject to the law of supply and demand, adding that he believed there was not enough employment in the country for its increasing population. Mr. Schwab declared that the steel industry is far from its saturation point. The United States, with 5 per cent of the total population, said Mr. Schwab, does 50 per cent of the world's manufacturing. He asserted that industry in this country is "still in its swaddling clothes." Mr. Schwab said that the average employer is glad to have his workers make money, adding that the average earnings have increased year by year until last year they were the highest in history. The Government can help only if it will give capital a chance to operate its business economically, said Mr. Schwab, who stated that the Government has not been successful in the supervision of business.

Deplores Waste in Steel Distribution

Mr. Schwab discussed the steel situation at considerable length. For one thing, he expressed the view that Federal laws prevent economies which might well be applied to steel distribution. In replying to Senator Couzens, Republican, of Michigan, formerly associated with Henry Ford, Mr. Schwab said that the things that would give profit to the manufacturer are the things that Washington has prevented the manufacturers from doing. For example, he stated, the Bethlehem Steel Co. ships steel to Chicago and to other points where there are steel works, while Chicago, through the United States Steel Corporation, ships steel to places in the East where Bethlehem has steel works. That was declared to be economically wasteful and unsound. He explained to Senator Wheeler, Democrat, of Montana, that it is contrary to the law of the land for the steel manufacturers to have an understanding with each other as to where they will sell their steel, but that it would mean a great deal more money for the workingmen of the country if Congress would pass sane laws permitting business men to conduct their business in the most economical manner.

"Now let us do some such thing in our business and we will earn a return on our capital," said Mr. Schwab. "The steel industry in the last year, with $8,000,000,000 of capital invested, did not earn more than 5 per cent on the money invested."

Mr. Schwab said he was not criticizing the laws but the conditions, and Senator Wheeler declared that he believed in Mr. Schwab's theory.

Senator Couzens, who was somewhat critical of some of Bethlehem's policies as to labor, told Mr. Schwab that the latter had "a very idealistic plan of cooperation with your workmen," but pictured a condition where he might be competing in a nearby coal field with Mr. Schwab and if he offered the coal at less money than Mr. Schwab did it was apparent that the latter would have to revise his plans "every once in a while." Mr. Schwab said that the plan is operated in the steel industry successfully, whereupon Senator Wheeler replied that the steel industry is controlled practically by two or three great concerns.

Reduces Steel-Making Costs but Gives It Away

"No, by no means," Mr. Schwab responded. "We have 18 or 20 big companies in the United States and more than 100 companies. For example, I showed my own directors the other day where we had spent $90,000,000 the last three years to reduce our cost $6 a ton, and yet we were selling our steel at $8 a ton cheaper than we were three years ago, but despite all that the wages of the workmen have gone up year by year."

Senator Couzens insisted that it is obvious that the United States Steel Corporation practically dominates the market, but Mr. Schwab said he did not know that, though agreeing that the small steel producer cannot compete with the United States Steel Corporation or any other big producer.

Earnings of steel producers were discussed at some length, Mr. Schwab stating the United States Steel Corporation did not make 6 per cent last year on its investment of something like $2,500,000,000. Senator Wheeler suggested that in the past steel companies made money.

"But those were days when you permitted us to have pools and agreements to get good prices for our steel," said Mr. Schwab. "We cannot do that today." He told Senator Wheeler he did not think it was necessary for the Government to "step in" to prevent those things because "you have had the cheapest steel in the world during all of these years. The steel industry as a whole has never earned big returns on the money invested, and I know of no industry today, excepting coal—and that is a part of the steel industry—that is earning as little on the actual money invested as the steel industry."

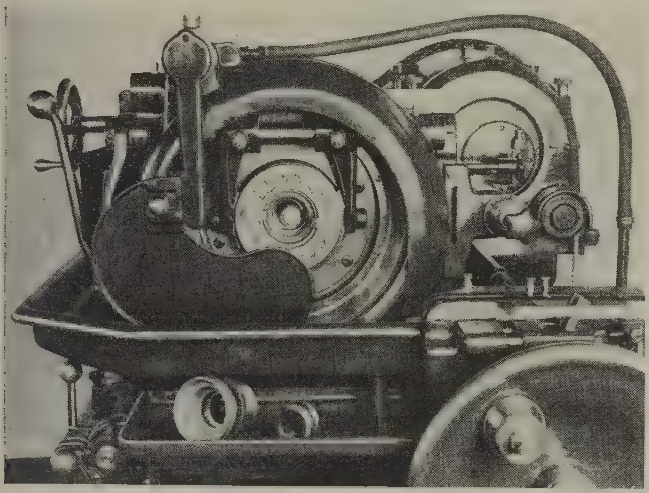
"Fifty years ago I started in the steel industry when this country was believed to have reached its zenith with 10,000,000 tons production per year," said Mr. Schwab. "Every year in the succeeding 50 years I have advocated spending money for the enlargement of our industry. Today the steel industry is producing 50,000,000 tons a year. We think we are near the saturation point, but, as a matter of fact, I think we are only just beginning. And so strong am I in that conviction—and there is no conviction so strong as that which a man is willing to back with his money—I say so strong am I in that conviction that the Bethlehem Steel Co. is spending from $30,000,000 to $40,000,000 every year for the extension of its business. I am as fully convinced now as ever that we will have just as great an advancement for the industry in this country in the next 50 years as we have enjoyed in the past 50 years."

NEW INTERNAL GRINDER

Grinding Wheel Enters Work from Rear—Work Spindle Arranged to Eliminate Overhang

AN internal grinder which incorporates departures from the usual design and which is claimed to establish new standards in production, accuracy, safety, and compactness is being placed on the market by the Greenfield Tap & Die Corporation, Greenfield, Mass. The machine is designated as the No. 12 Hydro-Matic.

An outstanding departure is in the use of an unusually large hollow work spindle through which the grinding wheel travels, thereby approaching the work from the rear. This, it will be noted, is a reversal of the usual practice in which the grinding wheel enters the work from the front. As in other internal grinders made by the company, the work-head which is mounted upon the table is reciprocated by means of oil under pressure, thus giving an infinite number of feeds.



A Departure Is the Hollow Work Spindle Through Which the Grinding Wheel Travels, Approaching the Work from the Rear. The wheel-head is at no time exposed

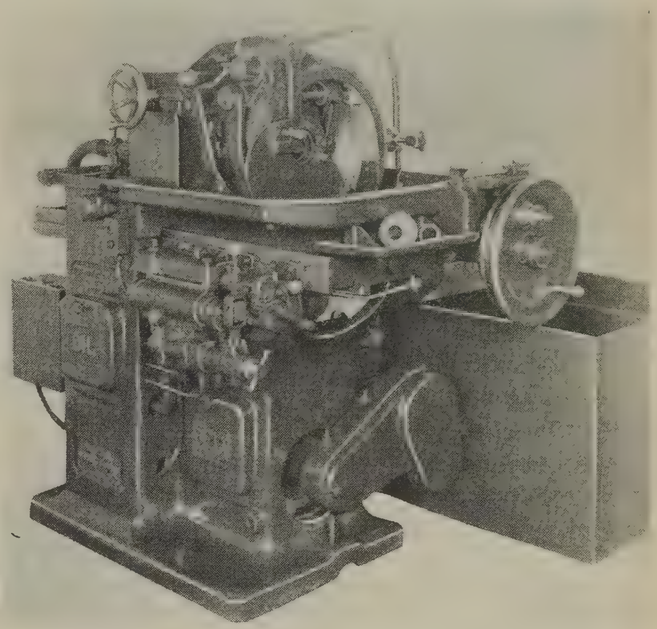
Since the wheel-head is stationary, and enters from the rear, it is at no time exposed. When the work-head is in the loading or unloading position the wheel is back out of the way, practically out of sight, and completely protected. The operator is thus in no danger of coming in contact with the wheel and can give his entire attention to loading and unloading the work. It is pointed out that in not having his movements circumscribed because of the danger of a rapidly revolving wheel, the operator can work faster and more effectively. It should be noted that the operator's position is at the front of the work instead of at the side, the advantage of which position is further enhanced by the arrangement of the levers all of which are located at the front end of the machine, facing the work, and within easy reach from the normal working position.

Further advantages claimed for the arrangement of the wheel-head is that the wheel is entirely inclosed; the coolant floods the work, interior of work spindle, truing device and wheel spindle at all times, maintaining a constant temperature and preventing the slight expansion and contraction of the mechanism which may cause inaccuracy of the finished product.

Sizing is by means of a semi-automatic device of new design. Automatic action of the feed screw is governed by a cam arranged so that successive strokes of the table result in progressively diminishing increments of feed. Upon the completion of roughing cuts a convenient lever serves to pass the diamond over the face of the wheel in preparation for the finishing cut. Definite and predetermined increments of feed are taken after the wheel is trued for the finishing cut, which increments, in being governed by the positive action of a cam, will not vary. The diamond is in a fixed position at all times, which arrangement is intended to eliminate minute variations which it is said may occur when a diamond is moved in and out of a fixed position.

Advantages claimed for the cam feed with its diminishing increments are that the heavier roughing cuts are taken with a clean, sharp wheel. As the wheel dulls or becomes loaded, less and less strain is put upon it, thus minimizing the tendency of the spindle to spring under pressure and grind bell mouth. Truing of the wheel just before the finishing cut removes the dulled or loaded surface and assures an accurate mirror-like finish.

Instead of mounting the work spindle in two relatively small bearings, in which minute inaccuracies might be amplified by the crank action of the spindle, the work spindle of the machine illustrated runs in an unusually large bearing and is arranged so that the work is practically inside of the bearing. It is pointed out that in this construction misalinement of the bearing is minimized. It is stated that the result of the improved design is that the machine will grind on a production basis to limits of 0.0002 in. to 0.0003 in.



Since the machine is primarily for production purposes it is regularly furnished with one work-head speed. Other speeds are available through change gears located at the end of the machine. Ball bearings are employed throughout, including hand-operated shafts.

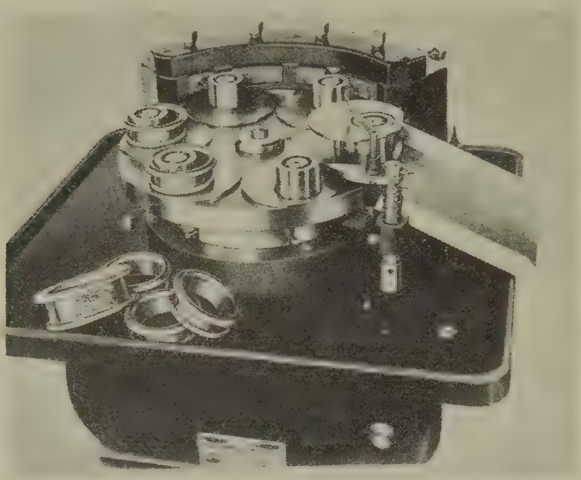
Compactness is a feature of the grinder. Operation of the machine is entirely mechanical and has no electrical contacts. The present size machine grinds holes ranging from ¾ to 3 in. in diameter, 4 in. in depth. The work-head swivels for taper grinding. For motor drive only one motor is employed, and when arranged for belt drive, there is only one belt, which operates directly from the lineshaft to a clutch pulley on the machine. The floor space occupied by the machine is 42½ in. by 73 in. and the weight is 5500 lb.

Valve for Reversing Furnaces

The Egler reversing valve for air or gas, manufactured by the Duff Patents Co., Inc., 321 Union Trust Building, Pittsburgh, is being offered as a solution of the valve troubles common to reversing furnaces. Simplicity of construction is said to make installation easy, and operation is made simple by a light cover. Moving parts are accessible, and through accurately controlled flow of gas or air, live and inert gases are not present in the valve at the same time. This insures against burning out of the interior of the valve. The valve is readily centered, leaving the flues well open. It can be operated by hand hydraulically or electrically.

Machine for Marking in Four Different Positions on the Same Piece

Marking in four different locations on the same ring is accomplished by a new machine which has been developed by the Noble & Westbrook Mfg. Co., East Hartford, Conn. The machine is equipped with a large die holder, which carries four marking dies, and the marks are spaced at approximately equal distances apart.



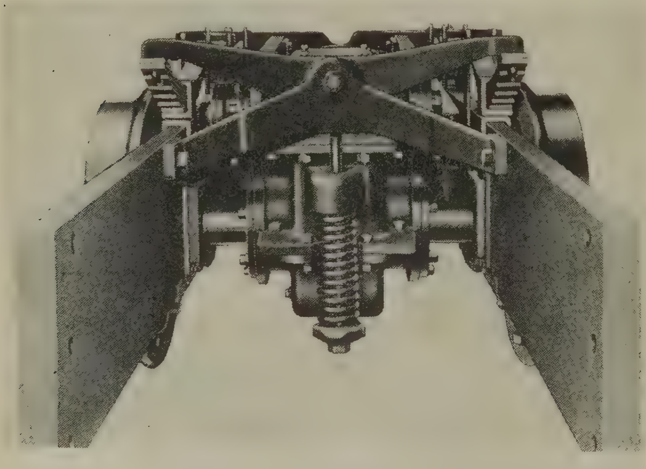
The Dial Revolves Continuously, Carrying the Pieces to the Marking Dies. Marked pieces are unloaded automatically

Parts to be marked are placed on the stations or pins on the dial, which revolves continuously, carrying the pieces to the die where they are marked. Operation is automatic, the only duty of the operator being to place the parts on the stations as the dial revolves. The dial is driven by a worm and gear which operates in a bath of oil.

The machine, designated at the No. 24 Rapid Production marking machine, is designed for marking a variety of tubular parts of thin material, without distortion. Production up to 100 pieces per min., depending upon the size of the piece and the speed of the operator, is said to be obtainable. The machine is motor driven and is self-contained. It weighs approximately 425 lb.

Gasoline Locomotive with Spring-Suspended Power Plant

A gasoline locomotive said to be new in design and drive principle has been brought out by the H. K. Porter Co., Pittsburgh. The power plant, clutch and transmission are mounted on a steel sub-frame and form a straight-line drive to the reverse unit. This sub-frame acts as a torque arm pivoted on the rear axle and spring-suspended at the front to the main frame. By an ingenious arrangement the weight of the rear end of the sub-frame is carried on the main frame by a coil spring.



Showing the Method of Spring Suspension of the Sub-Frame and Power Unit

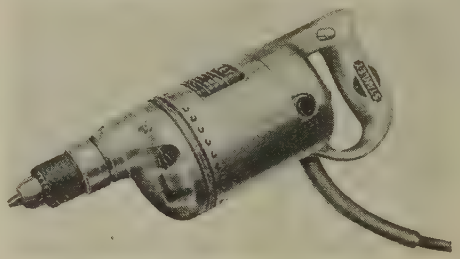
As a result, all the vital parts of the locomotive—the engine, radiator, clutch transmission and reverse unit—are mounted on a sub-frame which is spring-suspended to a spring-suspended cross-equalized main frame. For the power plant and transmission, as mounted on the sub-frame, patent is pending.

Main frames and bumpers are made of rolled steel slabs, as used on Porter steel works locomotives. The running gear, including steel-tired driving wheels, side rods, driving boxes, shoes, wedges, springs, etc., is the same as on the Porter steam dinkey.

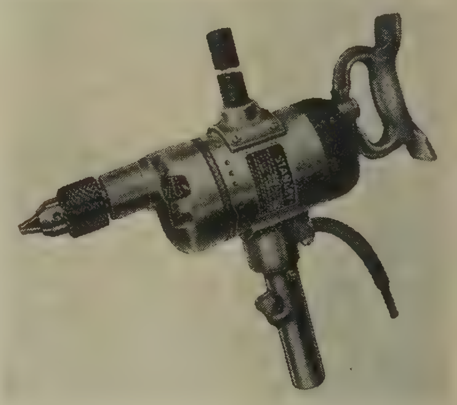
New Line of Portable Electric Drills

The Stanley Rule and Level Plant, New Britain, Conn., has placed on the market a line of portable electric drills, two models of which are illustrated herewith.

General features include strong and rigid construction and offset spindles to permit drilling in close corners. The handle is shaped to fit the hand, and the control switch, of standard quick make-and-break type, is placed so that it can be operated to start or stop the motor without releasing the firm grip of the fingers on the handle. Ample supply of air around the motor for cooling purposes is provided by means of a fan on the armature shaft. This fan draws air into the frame at the rear of the drill, cooling the brushes and the commutator and, by means of baffles, the air is passed between the armature and field and out through tangential holes in the housing. Universal motors with large reserve capacity are employed and are arranged so that they may be observed while running. Commutators and brushes may be cleaned conveniently. The brushes are of standard pig-tail type having 500 hours working life and may be readily replaced when necessary.



The Chuck Key Is Securely Fastened in a Recess on the Drill



Alloy Steel Gears and Ball Bearing Motor Shaft Are Features of Both Machines

Gears are of alloy steel, heat-treated, and operate in grease in leak- and dust-proof housings. Ball bearings set in steel jackets molded into the aluminum castings are used on both ends of the armature shaft of all machines except the ¼-in. capacity standard-duty drill. The latter, which is designated as the type No. DG23, has a ball bearing at the outer end only. Radial ball thrust bearings are used on all chuck spindles in addition to long bronze sleeves to maintain alinement and obviate wear. Three-jaw chucks are fitted to the ground spindles and on all machines the chuck key is securely fastened in a recess on the drill. The key is arranged so that it may be released instantly for use.

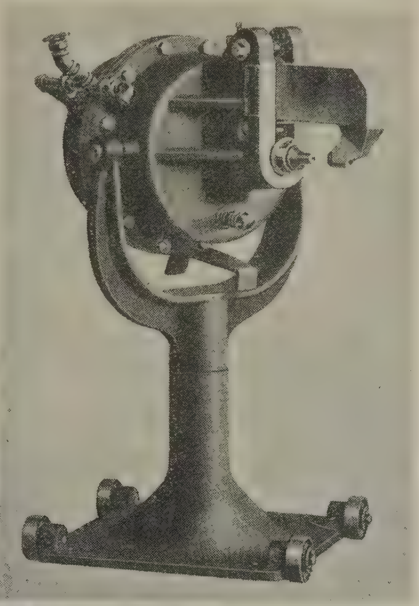
Each machine is equipped with 12½ ft. of duplex rubber covered cable which is fastened to the drill by a clamp designed to take all strain from the wire connections. At the other end there is a heavy armored plug with a cable grip, which is also intended to relieve the strain on the wire connections.

One of the machines illustrated is the type No. DB14 for heavy duty and with capacity for ¼ in. in steel. It is designed for continuous production work. The chuck speed is 1300 r.p.m. at no load and 750 r.p.m. at full load. The length of the machine, overall, is 13 in. and the net weight is 8 lb. The ½-in, heavy-duty drill, designated as the type No. DJ6, is also illustrated. The chuck speed of this machine is 550 r.p.m. at no load and 350 r.p.m. at full load. The length, overall, is 17½ in. and the net weight is 17½ lb.

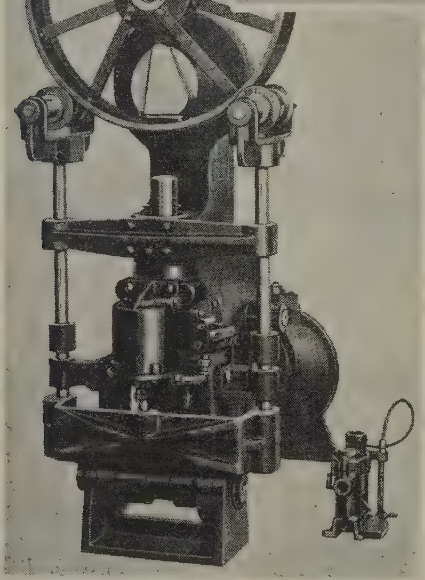
SPECIAL RIVETING MACHINES

Tractor Wheel Unit and Push-Type Chassis Frame Machine for Cold Riveting

TWO new pneumatic riveting machines, one a tractor wheel riveter and the other a push-type chassis frame riveting machine, have been brought out by the Hanna Engineering Works, 1765 Elston Avenue, Chicago.



The Tractor Wheel Riveter, Below, Cold Heads Two Rivets at One Stroke



The Chassis Frame Riveter, Above, Is Available in 15 and 20-Ton Capacities

The arrangement of the tractor wheel riveter may be noted from the accompanying illustration. The machine has a reach of 4 in., a gap of 10 in., and is designed to cold-head two ⅜-in. rivets, which secure the spoke to the rim, at each stroke. Rivets are inserted from above and headed from below, an air-actuated elevating device nesting the manufactured heads of the rivets in the upper die. The machine is adjustable for tractor wheels from 32 in. to 56 in. in diameter.

The riveting driving unit is the company's pneumatic toggle and lever mechanism. The toggles are designed to close the gap between the riveting dies with minimum of air consumption and the lever serves to exert uniform tonnage on the dies through a considerable portion of die stroke, regardless of variation in thickness of the work.

Wide acceptance of cold riveting by the automotive industry has resulted in the development of a number of single-purpose riveters. One such machine is the Hanna pneumatic "push-type" chassis frame riveter, shown in the second illustration, claims for which include accuracy of die alinement for cold riveting, and simplicity and ruggedness to assure continuous operation.

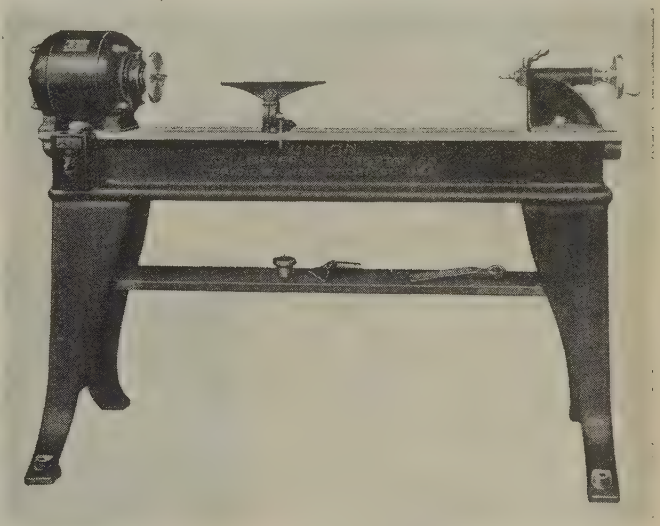
The riveter drives the horizontal rivets which secure the chassis frame cross members to the web of the side bar, as well as the rivets which secure step hanger brackets to chassis frame. The inner, or stationary, nose is "C" shaped to hook over the flange of the side bar, which operation is facilitated by the provision for tilting the rivet driving mechanism above the horizontal axis of the dies.

Arranged as shown, the rivet driving mechanism may also be rotated upon a vertical axis which, with the cross travel provided, permits riveting on both sides of the chassis frame as it passes through the riveting line. The riveter has 3-in. reach, 7-in. gap, 2½-in. die stroke. It is available in 15 and 20 tons capacity for driving 5/16-in. and ⅜-in. rivets cold.

Speed Lathe With Motor in the Head

The Gallmeyer & Livingston Co., Grand Rapids, Mich., is placing on the market a new "Union" motor-in-head speed lathe equipped with single-speed motor. The machine is available in three sizes, for work 24, 40 and 52 in. respectively, between centers. The beds are furnished in lengths of 4 ft. 2 in., 5 ft. 4 in., and 6 ft. 4 in.

The machine may be equipped with one, two or three-phase alternating current, or 115-volt or 230-volt direct current, ½-hp. ball-bearing motors, and may be furnished for spindle speeds of either 1725 r.p.m. or 3450 r.p.m. Where the machine is desired for both large and small work, and only one machine can be installed, two interchangeable motors, one high-speed and one low-speed, can be furnished for use on the one machine. Change from one motor to another may be made conveniently.



Low and High Motors Are Interchangeable to Give Suitable Spindle Speeds for Large and Small Work

Work up to 12 in. in diameter may be handled over the bed and work up to 9½ in. over the tool rest. The distance from the floor to the top of the bed is 36 in. and from the bed to the centers, 6 in. The bed is cast in one piece, machined the entire length and supported by heavy cast legs. The lathes are equipped with a rigid and accurate tailstock which may be located in position or released from fixed position by a half turn of a special wrench. The tailstock spindle is 1 5/16 in. in diameter, bored for No. 2 Morse taper, and adjustments are made by means of a conveniently located handwheel. The spindle is clamped rigidly in place by means of a quarter turn of the lever provided for the purpose. The tool rest is adjustable vertically, to and from the work, and swings at any desired angle. The rest may be moved to any point on the bed and instantly located in the desired setting.

DIAL INDICATING GAGES

Devices for Shop and Inspection Use Show Variations Up to 0.00004 In. from Master

DIAL gages, designated as Mikrotasts, brought out by Friedrich Krupp, A.G., Essen, Germany, for measuring external and internal diameters and tapers, for thread gaging and as special instruments for a variety of applications, have been placed on the American market by the Coats Machine Tool Co., 110 West Fortieth Street, New York.

The gages are intended for shop, as well as for inspection department and laboratory, use. They measure up to one-thousandth part of a millimeter or one twenty-five-thousandth of an inch (0.00004 in.) and such readings can be seen with the naked eye. All gages are set to masters and deviations from a given master or sample are indicated in plain figures on the dial. It is claimed that one of the Mikrotast gages with a range of 1½ to 3 in., and having 16 measuring plates, will replace 48 snap gages with their respective master gages. This is attributed to the large range of the indicator needle of the Mikrotast, and to the large capacity of the various adapters.

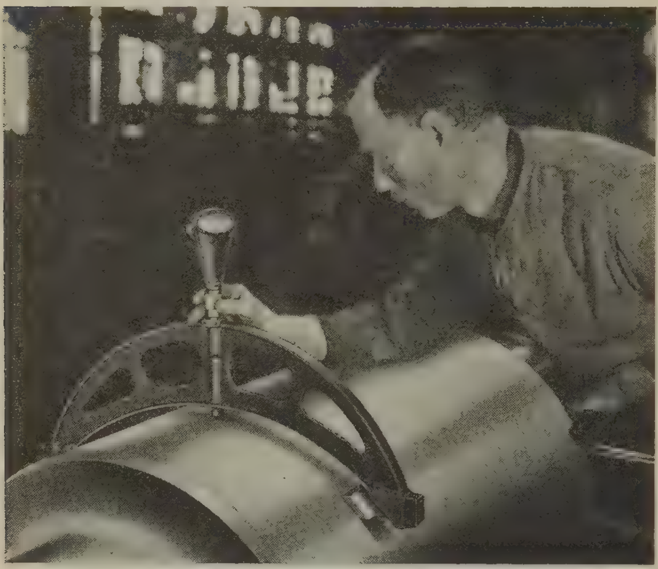
Two types of the gage are made, the large type, the 60E, with 60 dial divisions, and a smaller model, the 12E, with 12 dial divisions. Dials may be graduated in millimeters or in inches. Red limit pointers are provided, these pointers being adjustable and locked in position by means of knurled screws at the back of the dial element. All measuring parts of the gage are of Krupp steel, surface hardened by a special nitrogenizing process. Wear on the measuring faces may be taken up by means of positive adjustment. All measuring parts are interchangeable.

Various adapters, with ball or needle points, are supplied for using the gage with special measuring appliances, such as height comparators, eccentricity testers, or for fine adjustments during accurate machine tool operations. By turning a thumb nut the contact point is raised or lowered during the gaging process.

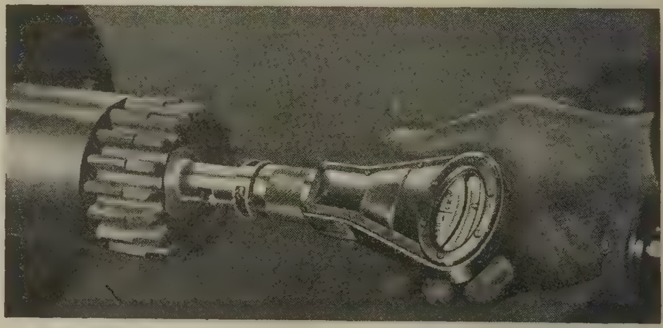
Saddle Gages for Checking Rolls

One form of Mikrotast gage available is the saddle type, for measuring external cylindrical diameters. This gage, illustrated herewith, consists of a Mikrotast mounted on a saddle with adjustable hardened and ground measuring flats of 39-deg. angle and a movable gaging point which acts on the Mikrotast through a lower and upper transmitting rod. The angle of 39 deg. on the saddle makes the path traveled by the gaging point equal to the change in diameter of the work. After having been set to the master and placed upon the work, the gage will register any variation in size or deviations from a true circle. The measuring flats on the saddle are relieved to assure positive seating on the work with immediate action of the indicator needle on the dial.

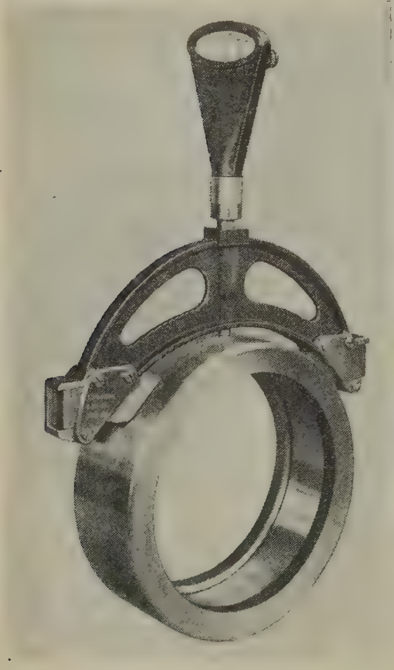
Saddle gages with 39-deg. angle are available in six

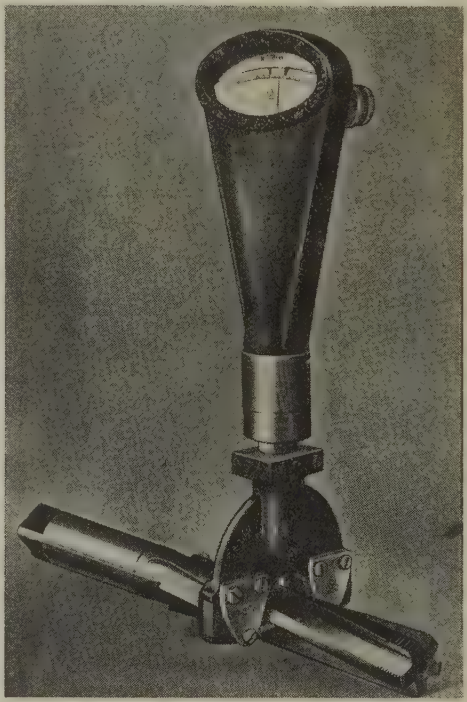


The Saddle Gage of 90-Deg. Angle for Checking Rolls During Grinding Is Shown Above. The same type of gage with adjustable flats of 39 deg., and movable gaging point, is shown below

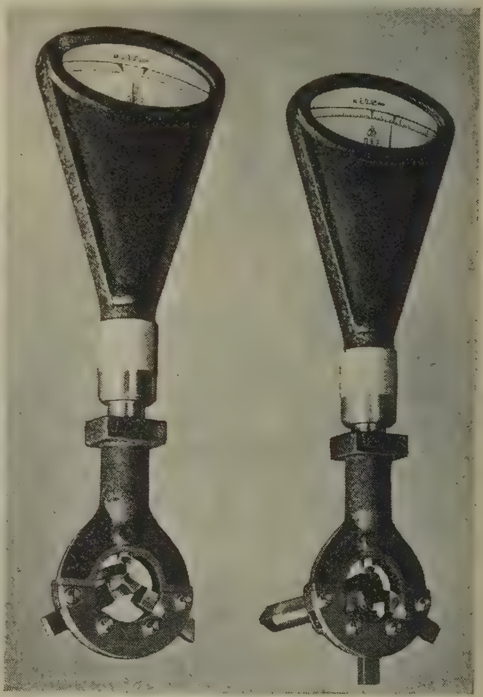


Use of the Internal Gage for Checking a Ball Bearing Seat, a Blind Hole, During the Grinding Operation Is Pictured Above





Mikrotast Saddle Gage With 36-Deg. Angle for Checking Lands of a Spiral Reamer With Five Flutes Is Above, at Left



Pitch Diameters of Taps With Three or Four Flutes Are Measured by the Gages Shown Above, at Right. For root and outside diameters, interchangeable measuring pieces and movable contact points are available sizes for diameters from ¼ to 8 in., and ranging in weight from 5¼ oz. to 4¼ lb.

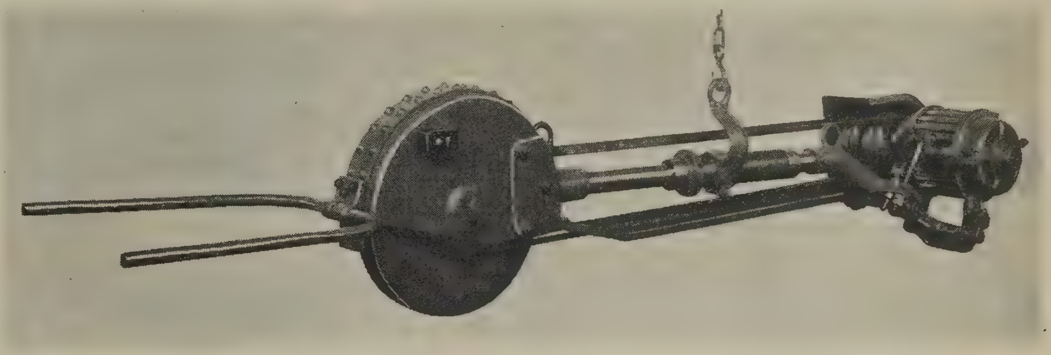
The gages can be used on wet grinding operations, as the gaging point is above the work and thus is not exposed to the grinding coolant. The work remains in position on the machine during the gaging. The gages are also offered for use in connection with spherical, hollow, or cylindrical grinding operations, also for checking camber and wear on rolls, etc. For roll work, saddle gages with a measuring angle of 90 deg. are available. The ratio of expansion of the cast-iron body of these gages is practically the same as in the rolls. When using a saddle of 90-deg. angle, the travel of the gaging point is only equal to one-fifth of the difference in diameter on the work; with an angle of 39 deg. the travel would equal the difference in diameter. The Mikrotast used with the 90-deg. saddle is adjusted to compensate for this difference.

Use of these gages for checking the lands of a spiral reamer with five flutes is illustrated. In checking such reamers, with odd or even numbers of flutes, it is not necessary to remove the work from the machine. The angle of the measuring flats must conform to the work, a saddle with a 36-deg. angle being used for a five-fluted reamer.

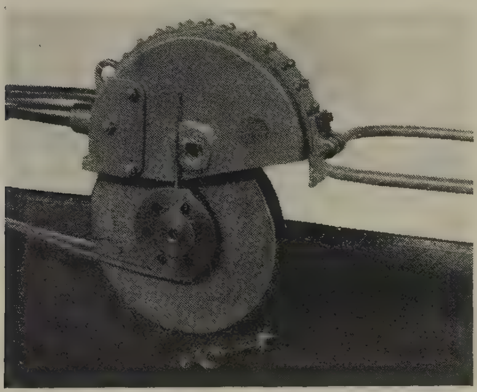
Internal gages are manufactured in two types, fixed gages and self-accommodating gages. The range of the two types differ. On the fixed gages, one of which is

(*Concluded on page* 917)

Swing-Frame Grinder for High-Speed Snagging



Bakelite - Bonded Wheels, Which May Be Operated at 9000 Surface Ft. Per Min., Are Employed. Wheel changes may be made conveniently. A toggle arrangement on the motor serves to release the V-belt. A single bolt is removed and the wheel head drops to the floor



The swing-frame grinding machine shown in the accompanying illustration was designed by the Norton Co., Worcester, Mass., to meet the requirements of the high-speed wheel service that has resulted from the development of the Bakelite-bonded grinding wheels, which, as described in The Iron Age of July 7, 1927, may be operated at a surface speed of 9000 ft. per min.

Although ruggedly built, the machine weighs only 850 lb. In addition to the light weight, the machine is balanced both laterally and rotatively to facilitate handling. A fabricated steel hood, which complies with the safety code requirements for wheels operated at the rated speed of the machine, provides protection for the operator. Grinding wheels 24-in. in diameter, 2-in. to 3-in. thick, with either 8-in. or 12-in. holes can be accommodated, and either the 20-in. or the 24-in. may be operated at 9000 surface ft. per min. Two speed changes are provided by means of a duplex sheave on the driving motor.

The grinding wheel is driven by two flexible V-belts, one on each side of the wheel. This drive arrangement permits making the wheel-flanges and sheaves integral, which results in narrow wheel-head assembly. The operator has a clear view of the work being ground from either side of the machine, there being no outboard bearings nor wide belts to intervene. This unobstructed view of the work is emphasized as making the machine particularly suited for the grinding of billets. In addition to providing positive drive, the V-belts shed grinding dust and other foreign material.

Suspension of the machine may be from the center only, where the headroom is limited or where for other reasons it may be preferred. The machine may also be fastened rigidly to the ceiling by means of a cable at the rear, and the wheel-head supported by a counterweighted rope running over pulleys.

Heavy-duty barrel-type ball bearings are employed, the complete bearing assembly, which is dust-proof, being within the hole of the wheel. Wheel changes may be made conveniently. A toggle arrangement on the motor serves to release the V belts; a single bolt is removed and the wheel-head drops to the floor. The old wheel is removed by taking off a combination sheave and flange. Completely inclosed 10-hp. ball-bearing motors, designed for grinding duty, are used for alternating current installations. Control is by push buttons on the wheel-guard within convenient reach of the operator. A sheet iron guard to protect the V-belts and motor sheaves from grinding chips is a part of the standard equipment.

Small Motors Designed to Start Across the Line

A line of squirrel cage motors from 1 to 30 hp. has been developed by the Triumph Electric Corporation, Cincinnati, for control by automatic push button system. These are designed to develop at least 150 per cent of the full load torque at starting, when connected directly across the line. There is no compensator or resistance type starter used, and the current taken is below the limits set by regulations.

These motors are fitted with Timken roller bearings, but can be supplied with either ball or sleeve bearings if desired. The price is less than for the squirrel cage motor and compensator.

Exports of Aircraft Growing Rapidly

Exports of aircraft, engines and parts from the United States in 1927 were valued at $1,903,460, a gain of 85 per cent over 1926 and 143 per cent over 1925, according to the transportation division, Department of Commerce, Washington. Purchases made from us by 47 countries during the three years amounted to $3,714,429. The leading amounts purchased were by Canada, Peru, Soviet Russia, United Kingdom, Chile, Argentina, Germany, Philippine Islands, Mexico, Colombia, Belgium, Brazil, Japan, Siam, China, Australia, Netherlands, Honduras and Nicaragua.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. Building activity large and increasing; real estate markets show increased activity.

2. Automobile production expanding.

3. Unfilled orders continue to gain.

4. Retail trade recovered a little in February.

5. Foreign trade increased.

6. Commodity prices stable.

7. Money abundant and interest rates moderate.

8. Strong financial position of most leading companies.

Unfavorable Factors

1. The P-V line declines, indicating that the demand for commodities has not increased in proportion to the supply.

2. Farm prices and the purchasing power of the farm dollar decreased in February.

3. Bank credit over-extended for stock market purposes; brokers' loans excessive; speculative excesses in the stock market.

4. Gold exports rather heavy.

5. Average daily crude oil production increased.

6. Severe competition in the automobile business.

7. Profits small in many industries.

8. Disturbed political conditions; possible injury to Republican party from the oil scandal.

FACTORS mentioned in the above list are of very unequal importance. The most important ones indicate that business expansion will proceed during the spring. The failure of commodity prices to show strength, however, and the downturn of the P-V line indicate that the supply of commodities has gained on the demand, and this suggests that recovery in business will be halted by mid-year, if not sooner. The possibility of a crash in the stock market exists, and that would have unfavorable effects on business. Political uncertainties are obvious. But during the next two or three months a general upward trend in industrial activity is to be expected, though profits will probably not be in proportion to the volume of business.

In connection with the existing absence of buoyancy in commodity markets, it is to be remembered that industrial production did not fall much below normal requirements during the recession last year and that, consequently, no general shortages of commodities developed. Such evidence as we have indicates that stocks of manufactured commodities (other than foodstuffs) held by manufacturers are large and have decreased little. We need continually to remember that the capacity of our great basic industries is in excess of normal requirements. This fact is illustrated by the rapid stepping-up of production to above-normal levels in the course of a month or two.

The duration of the present rising trend will depend upon the moderation with which producers in various industries proceed, and upon the balance which is maintained among the different branches of industry and agriculture.

P-V Line Predicts Downturn in Fall

FROM the point of view of a business forecaster, perhaps the most interesting development to report this month is the fact that the P-V line has turned downward. This is the first decline in about a year. This general business barometer (a ratio of commodity prices to the physical volume of trade) has a remarkable record and its decline merits careful attention.

First, however, one should note that the P-V line gives its indications several months in advance. Thus its upturning last May was not reflected in general business conditions, sufficiently to cause a rise in steel production, until last December, or seven months later. At present the P-V line is well above normal and its period of rise from May, 1927, to January, 1928, is still to be reflected in the industrial situation. In short, it

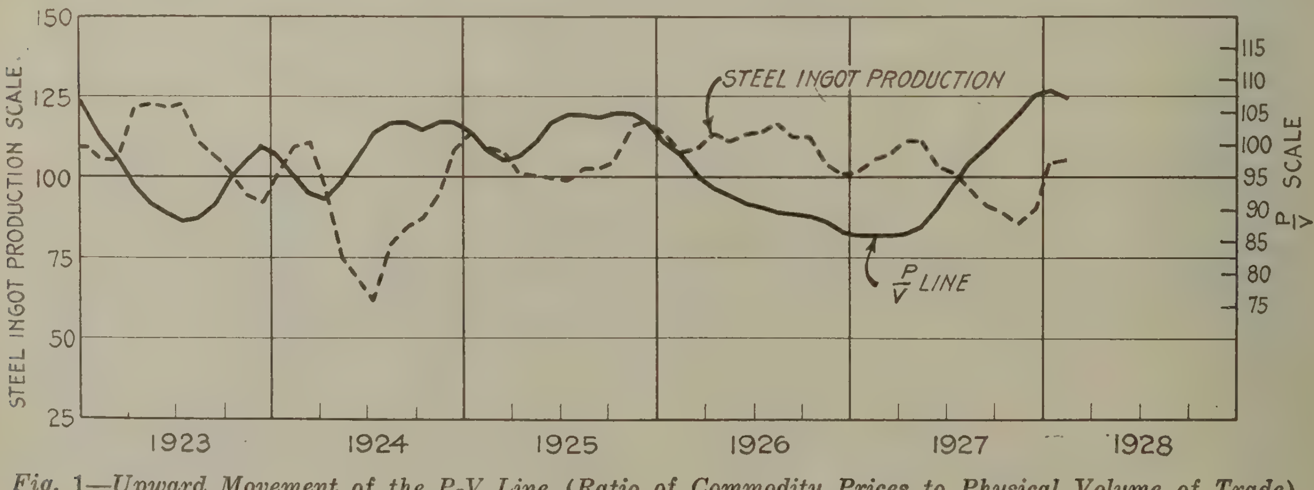
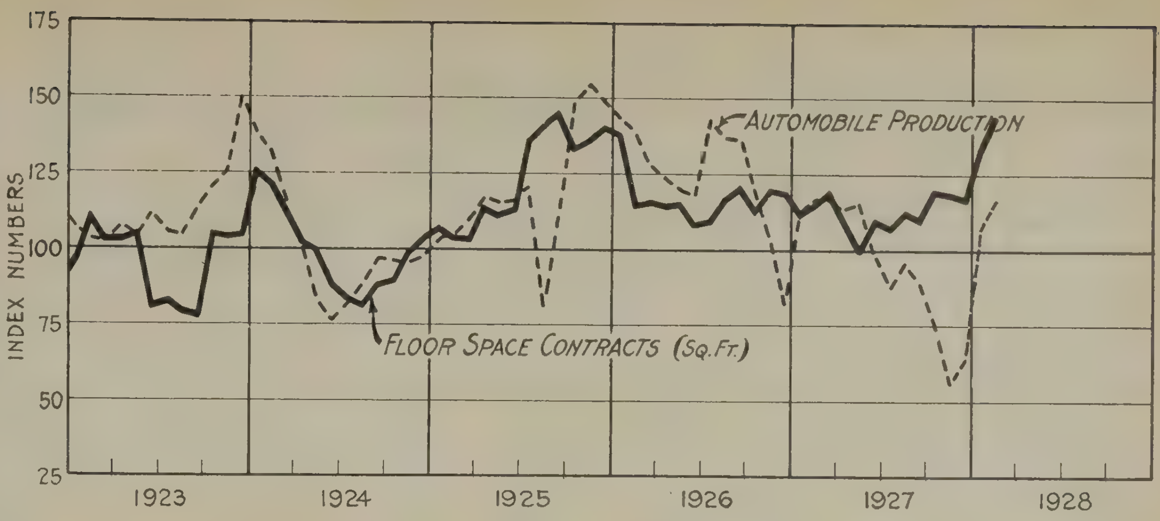


Fig. 1—Upward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Has Been Checked After Nine Months. Steel production advanced further in February and heavy tonnages may be expected for several months

Fig. 2—Potential Demand for Steel from Construction Activity Continues Strong. Improvement in the automobile demand for steel should proceed through the spring



is not probable that we will have a general business setback or any considerable recession in steel production for several months.

Experience shows the following facts: The peak of the P-V line toward the end of 1922 was followed about seven months later by the peak of steel production. The lag in 1924 was about three months. The decline in the barometer line in December, 1925, was fully reflected in the steel situation only in September, 1926, a lag of nine months. Thus there is no uniformity. But, judging by the past, the peak of steel production this year is to be expected some time between April and August.

Production Large in Relation to Demand

Of course, we do not know what the P-V line will do during the next few months. It might continue sidewise, as it did in the latter parts of both 1924 and 1925, or it might decline, as it did following the peaks in 1922 and 1923. We can say this much: The present decline in the barometer line is chiefly due to the failure of commodity prices to rise while the physical volume of trade has turned upward. As there is every indication of a further expansion in the industrial output, while there is equally strong evidence that the commodity markets are showing no considerable upward trend, we may infer the probability that the P-V line will decline further. This would mean that production is too large to be supported by the markets at present price levels and that probably lower prices and profits will follow.

We will suspend judgment for another month or two, until the situation is registered more definitely in the course of the barometer. Meanwhile, industry in general and the steel industry in particular may be expected to show further gains. Even should this prove to be the beginning of a continued decline in the P-V line, steel production might not reach a peak before June.

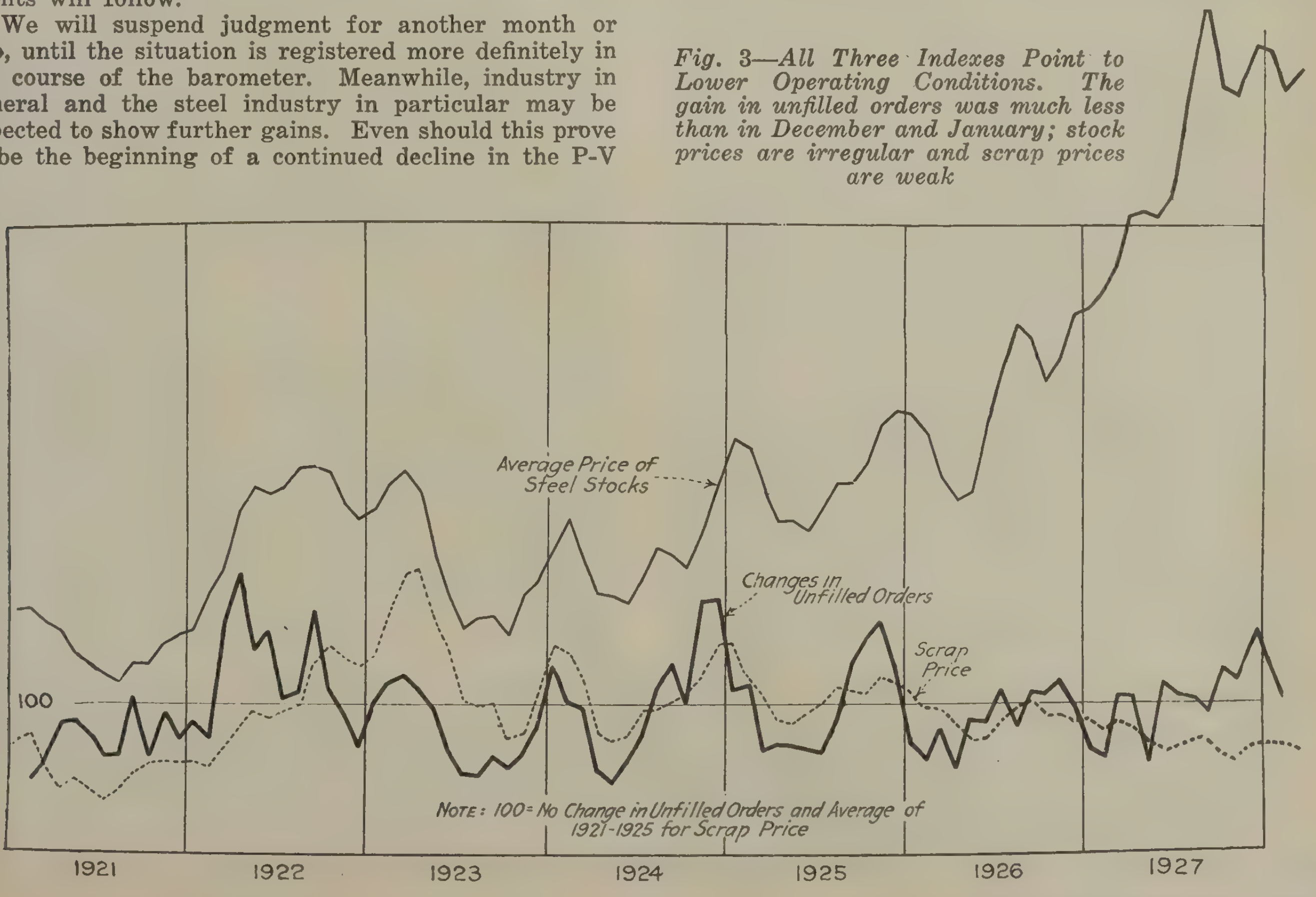
Increasing Building Operations and Car Output

SHARP gains in building activity and automobile production are for the near future the most favorable auguries. This is particularly true as to the outlook for the steel industry. It is almost inconceivable that the steel industry should not benefit by the trends shown in the second chart.

Building activity (measured by the floor space in contracts awarded) almost attained a new peak in February, having been exceeded only in September, 1925. Of course, this statement concerns figures which have been so adjusted as to exclude the merely seasonal changes from month to month. The February index shows building contracts to have been 144.1 per cent of the average for 1921-1927. This compares with 133.6 in January and 114.8 a year ago. The September, 1925, index was 145.1. The condition is practically certain to be reflected in large orders for structural steel and other building materials and should be sufficient to insure good business for producers of building material throughout the spring, even should some decline ensue.

Total production of motor cars and trucks in the United States and Canada amounted in February to about 335,900, which is the largest number produced in any month since last June. Our seasonally adjusted

Fig. 3—All Three Indexes Point to Lower Operating Conditions. The gain in unfilled orders was much less than in December and January; stock prices are irregular and scrap prices are weak



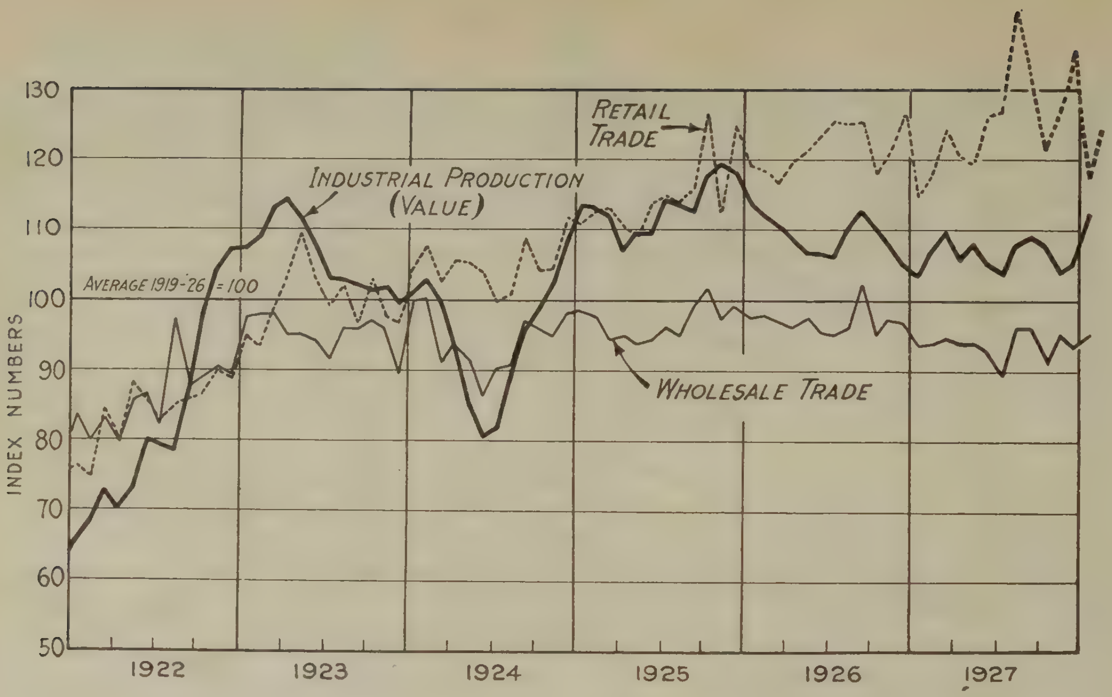


Fig. 4—Continued Favorable Indications Are Seen from the Relations of Retail Trade, Wholesale Trade and Industrial Output. Retail trade shows improved buying sentiment. Wholesale business continues slow, while industrial production is well above normal

index for the month was 116.8, against 106.1 in January and 117.3 a year ago (the average for 1921-1927 being 100). The similarity between the building curve and the automobile curve indicates that the same conditions that stimulate building activity affect the purchase of automobiles and trucks. Indeed, building activity is one of the chief factors in the demand for trucks. We may, therefore, expect a further rise in the automobile curve during the spring.

Unfilled Orders and Stock Prices Hesitant

WHEN we turn to the third chart, we find a somewhat different situation, since all the curves here point downward, and these suggest a not distant termination of the expansion in steel. It should be noted, however, that the immediate condition of the barometers shown in the chart is one of stability or very slight decline, rather than of any severe reaction.

The unfilled steel orders barometer, for example, shows that in the case of the United States Steel Corporation these orders are still gaining, but at a less rapid rate. The February increase was only 122,000 tons, against an increase of over 500,000 tons in December. The declining rate of increase in the unfilled orders usually indicates that shipments are gaining on the volume of new business, a condition which usually precedes a setback. The real trouble, however, is not likely to appear until an actual decline in the unfilled orders occurs, and it remains to be seen what the March results will be.

The scrap market of late may have temporarily lost some of its significance as an industrial barometer. Certainly the trend of scrap prices did not reflect the improvement in the steel industry that developed toward the end of 1927, or at least did so but slightly. The average price of heavy melting steel scrap at Pittsburgh was slightly lower in February than in January, and at the present writing it is only $14.75, which is lower than the February average.

The average price of a representative group of steel stocks is considerably below the peak reached last September, and the general impression one gets is that these stocks have been very irregular, though maintained at a high level. The reaction since last December is in conformity with the indications given by the unfilled orders barometer. On the whole, it seems worth noting that the decline in this barometer, together with the rather weak tone in the scrap market, gives ground for doubts concerning any large expansion in the steel industry or the possibility of a further sustained advance in the price of steel stocks.

Trade Indexes Point Strongly Upward

TURNING to more general indications of the state of industry and trade, the fourth chart shows that retail trade, wholesale trade, and the total value of industrial production all point upward, as of the latest available dates. Moreover, retail sales are well up to the average of the last two years, which may fairly be called a high level, and are well above the estimated value of the total industrial output.

Our adjusted index of retail trade, based on the average for the years 1919-1926 as 100, stood at 124.3 in February and compares with 117 in January and 117.9 a year ago. Some allowance is to be made for the extra day in February this year; but, even so, there was a net gain over the preceding month and a year ago. As the usual seasonal variation from month to month is eliminated, the February recovery may be taken to indicate improved buying on the part of the great mass of the people.

Changes in Wholesale Situation

Wholesale trade levels continue well below the average for 1919-1926, but this is chiefly due to changes in methods of distribution. Probably wholesale trade has settled by this time to something like its new normal level, however, and the current trend from month to month has some significance. The low point was reached last October, when the adjusted index was 91. In January it had risen to 95. This may well have reflected a month in advance the February recovery in retail sales.

The estimated *value* of the total industrial production gained sharply in January, reaching the highest point since September, 1926. The January index was 112 per cent of the average for 1919-1926. This is a decidedly favorable indication. It shows that, in spite of the sharp increase in the output of mines and factories, the general level of commodity prices has been sufficiently well maintained to make the product—production × price—rise. This is a clearer demonstration of real business expansion than can be made on the basis of physical volume alone. No business recession is near, while the total *value* of industrial production is gaining and is below the level of retail sales.

Schedule of the next instalments of the ***Business Analysis and Forecast,*** *by* ***Dr. Lewis H. Haney,*** *Director New York University Bureau of Business Research, follows:* ***April 12***—*Activity in Steel Consuming Industries;* ***April 19***—*Position of Iron and Steel Producers;* ***April 26***—*General Business Outlook.*

Exports and Imports Decline

Drop in Short Month Was 9⅔ Per Cent in Exports and 19 Per Cent in Imports—Fewer Rails Sent Abroad

WASHINGTON, March 26.—Making a decline of 19,851 gross tons, exports of iron and steel products from the United States in February totaled 185,915 tons, against 205,766 tons in January. Imports dropped to 47,628 tons, as compared with 58,635 tons. For the eight months ended with February, exports aggregated 1,441,049 tons, against 1,527,656 tons for the corresponding period of last year. Imports totaled 472,798 tons for the eight months ended with February, 1928, against 606,945 tons for the eight months ended with February, 1927.

On a daily basis exports in February were 6411 tons against 6638 tons in January. February shipments, however, showed a fair increase over those for the same month of last year, when the total was 166,129 tons. The January shipments were the largest for any month since January, 1927, and it is believed they, like February shipments, were stimulated by the lower export rates which went into effect on Jan. 1, 1928.

The heaviest decline in exports in February of the present year was in rails, 15,846 tons having been exported against 23,174 tons in January, a loss of 7743 tons. This item has been showing gradual decreases in exports, apparently because of the fact that some countries which formerly drew substantial tonnages from the United States have now become self-contained or nearly so. Other decreases in exports in February when compared with January were in boiler tubes and welded pipe, black steel sheets and wire rods. Gains were made in 16 classes, including plain structural shapes, steel bars, raw and semi-finished material and ferrogmanganese. Notable losses made in the eight months ended with February were in steel bars, black and galvanized sheets, tin plate, steel rails, and boiler tubes and welded pipe. The more important gains were made in scrap, structural shapes and barbed wire and woven wire fencing.

Of the 6214 tons of black welded pipe exported in February, 1605 tons went to Japan, 769 tons to the United Kingdom, 544 tons to Mexico, 410 tons to Peru, 399 tons to Argentina, and 389 tons to Canada. Of the 2400 tons of galvanized welded pipe exported during the month, 393 tons went to Cuba, 344 tons to Argentina, 247 tons to the Philippine Islands and 142 tons to Costa Rica. Chile was the largest buyer in February of American rails, taking 3627 tons; the Philippine Islands came second with 2247 tons and Colombia third with 1308 tons. Canada's purchases,

Exports of Iron and Steel from the United States

(In Gross Tons)

	February		Eight Months Ended February	
	1928	1927	1928	1927
Pig iron	3,494	2,427	36,350	22,253
Ferromanganese	2,069	39	3,418	507
Scrap	29,618	7,693	193,244	53,860
Pig iron, ferroalloys and scrap	*35,181*	*10,159*	*233,012*	*76,620*
Ingots, blooms, billets, sheet bar, skelp	7,868	2,552	72,820	77,545
Wire rods	1,345	1,383	12,831	13,606
Semi-finished steel	*9,213*	*3,935*	*85,651*	*91,151*
Steel bars	10,468	10,052	73,106	92,093
Alloy steel bars	1,017	372	4,658	3,233
Iron bars	175	354	1,918	3,809
Plates, iron and steel	11,195	8,850	90,484	89,326
Sheets, galvanized	11,319	11,457	88,823	121,224
Sheets, black steel	13,291	17,708	93,139	122,138
Sheets, black iron	1,069	2,450	10,375	12,385
Hoops, bands, strip steel	3,786	4,113	24,896	29,263
Tin plate; terne plate	18,129	28,776	139,162	223,086
Structural shapes, plain material	13,406	7,122	105,172	97,372
Structural material, fabricated	4,254	4,739	47,032	43,931
Steel rails	15,431	19,123	116,140	159,079
Rail fastenings, switches, frogs, etc.	3,512	2,115	30,624	26,877
Boiler tubes, welded pipe and fittings	15,846	21,495	148,260	221,268
Plain wire	3,212	2,239	26,574	16,379
Barbed wire and woven wire fencing	4,641	2,186	39,099	24,308
Wire cloth and screening	114	143	1,434	1,358
Wire rope	552	339	3,175	2,972
Wire nails	1,035	404	8,933	6,729
Other nails and tacks	692	557	5,882	4,329
Horseshoes	19	15	390	385
Bolts, nuts, rivets and washers, except track	944	846	8,276	7,997
Rolled and finished steel	*134,107*	*145,455*	*1,067,552*	*1,309,541*
Cast iron pipe and fittings	2,404	3,312	20,111	20,197
Car wheels and axles	1,416	681	9,404	9,908
Iron castings	1,206	1,013	8,199	6,143
Steel castings	896	261	4,419	3,588
Forgings	473	468	3,006	1,814
Castings and forgings	*6,395*	*5,735*	*45,139*	*41,650*
All other	1,019	845	9,695	8,694
Total	185,915	166,129	1,441,049	1,527,656

Imports of Iron and Steel into the United States

(In Gross Tons)

	February		Eight Months Ended February	
	1928	1927	1928	1927
Pig iron	6,387	4,417	89,763	141,185
Ferromanganese*	1,025	2,056	27,804	23,950
Ferrosilicon†	293	912	2,788	9,702
Ferrochrome‡	107	.....	191	359
Scrap	2,019	4,686	32,974	65,405
Pig iron, ferroalloys, and scrap	*9,831*	*12,071*	*153,520*	*240,601*
Steel ingots, blooms, billets and slabs	1,034	1,540	9,509	14,261
Iron blooms, slabs, etc.	1	.....	92	306
Wire rods	2,185	929	14,655	7,626
Semi-finished steel	*3,220*	*2,469*	*24,256*	*22,193*
Rails and splice bars	181	1,110	9,362	30,137
Structural shapes	13,450	10,294	111,042	94,935
Boiler and other plates	14	222	1,567	2,543
Sheets and saw plates	1,490	1,100	14,067	10,104
Steel bars	8,810	5,428	57,359	61,029
Bar iron	284	233	2,271	3,347
Hoops, bands and cotton ties	1,720	2,784	22,484	23,253
Tubular products (wrought)	2,396	3,061	22,086	27,755
Nails, tacks, staples	756	521	3,428	4,485
Tin plate	6	19	217	260
Bolts, nuts, rivets and washers	31	38	275	180
Round iron and steel wire	281	405	2,186	2,941
Barbed wire	236	839	1,767	2,206
Flat wire; strip steel	213	65	1,470	2,342
Steel telegraph and telephone wire	.....	1	51	1,070
Wire rope and strand	174	202	1,083	1,625
Other wire	53	18	984	476
Wire cloth and screening	.....	9	.....	281
Rolled and finished steel	*30,095*	*26,349*	*251,699*	*268,969*
Cast iron pipe	4,218	8,376	41,215	72,982
Castings and forgings	264	195	2,108	2,007
Total	47,628	49,460	472,798	606,752
Manganese ore*	18,215	21,585	188,230	225,908
Iron ore	229,578	192,904	1,820,717	1,793,841
Magnesite (dead burned)	.....	6,916	29,235	27,375

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*Manganese content only.
†Silicon content only.
‡Chromium content only.

United States Imports of Iron and Steel Products in February

(In Gross Tons)

Austria	64
Belgium	17,056
Bulgaria	2
Czechoslovakia	30
Denmark	134
France	9,816
Germany	6,776
Italy	10
Netherlands	2,999
Norway	21
Poland and Danzig	213
Sweden	1,897
Switzerland	1
United Kingdom	1,536
Total Europe	*40,555*
Canada	3,217
Mexico	61
British India	3,794
Japan	1
Total	47,628

which have been declining, dropped to only 444 tons, while Japan, which also has been taking smaller rail tonnages from abroad, took none.

Canada was the heaviest buyer during the month of tin plate, taking 3139 tons of the total of 18,129 tons. Japan came next with 2761 tons, while Mexico was third with 1141 tons. Of the 13,408 tons of plain structural shapes exported in February, Canada took 11,299 tons; Cuba, 660 tons, and Japan, 441 tons. Canada took 10,242 tons of the 11,195 tons of plates exported during the month, and 2789 tons of the 11,319 tons of galvanized sheets exported. The Philippine Islands took 2670 tons of the latter. Of the 13,291 tons of black sheets exported, Japan took 6268 tons and Canada, 5518 tons. Canada purchased a total of 76,016 tons of the February exports; Japan came next with 25,220 tons.

The greatest declines in imports in February when compared with January were in pig iron, ferromanganese and scrap, while the most notable gains were made in structural shapes and steel bars. For the eight months ended with February the heaviest declines in imports, when compared with the corresponding period of last year, were made in pig iron, cast iron pipe, scrap, rails and steel bars. Gains were made in ferromanganese, wire rods and structural shapes.

Of the 1025 tons of ferromanganese imported in February, 594 tons came from the United Kingdom and 411 tons from Canada. Belgium provided 6032 tons of the 8810 tons of steel bars imported, while 1025 tons came from France and 945 tons from Germany. Belgium was the source of 6608 tons of the 13,450 tons of structural shapes imported; France, 4747 tons; Germany, 1137 tons, and the Netherlands, 742 tons. Of the 4218 tons of cast iron pipe imported, 3278 tons came from France and 928 tons from Belgium. British India provided 3794 tons of the 6387 tons of pig iron imported, and 2154 tons came from the Netherlands. Of the 18,215 tons of manganese ore imported during the month, 7169 tons came from Soviet Russia, 6643 tons from Brazil and 440 tons from British India.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	February, 1928	January and February 1928	January and February 1927
North and Central America and West Indies	*93,330*	*171,808*	*150,609*
Canada and Newfoundland	76,160	137,807	108,019
Cuba	6,544	10,436	16,721
Mexico	5,714	10,588	13,359
Guatemala	633	3,917	1,945
Panama	1,581	2,029	2,326
Salvador	295	512	639
British West Indies	478	1,019	1,957
Other West Indies	838	3,457	3,074
Other Central America	1,087	2,043	2,569
South America	*25,401*	*64,436*	*83,647*
Argentina	5,392	15,455	17,231
Brazil	1,772	10,790	17,321
Chile	6,450	12,260	4,687
Colombia	6,086	10,742	18,684
Peru	2,913	4,174	2,773
Uruguay	299	958	3,467
Venezuela	1,931	9,276	19,178
Other South America	558	781	306
Europe	*15,970*	*25,317*	*26,566*
Belgium	2,564	3,083	652
France	252	489	593
Greece	34	72	671
Italy	835	1,683	2,588
Netherlands	320	632	989
Russia	90	1,193	613
United Kingdom	4,521	9,226	15,543
Other Europe	7,354	8,939	4,917
Far East	*49,643*	*127,504*	*117,457*
British Malaya	566	1,070	3,439
China	8,649	23,506	18,052
Dutch East Indies	1,873	4,063	9,509
India and Ceylon	4,935	6,128	8,445
Japan and Chosen	25,220	72,540	58,807
Kwangtung	91	1,526	677
Philippine Islands	7,226	14,616	7,630
Australia	623	3,182	6,873
New Zealand	262	442	286
Other Asia and Far East	198	431	3,739
Africa	*1,571*	*2,616*	*3,304*
British South Africa	594	1,346	1,372
Egypt	668	734	476
Mozambique	124	170	1,147
Other Africa	185	366	309
Total	185,915	391,681	381,583

Belgium was the principal source of the total imports, providing 17,056 tons. France ranked second with 9816 tons; Germany, third, 6776 tons, and the Netherlands, fourth, 2999 tons.

Much Lower Pig Iron Imports

Reduction of 41 per cent in imports of pig iron is shown by the February total of 6387 gross tons, compared with 11,090 tons in January. This follows a 22 per cent reduction in January from the 14,299 tons of December. A heavy decline is shown also in imports for the eight months ended Feb. 29, compared with the corresponding period of last year. There were 89,763 tons this year, against 141,185 tons a year ago. The drop was approximately 37 per cent.

United States Imports of Pig Iron by Countries of Shipment

(In Gross Tons)

	February		Eight Months Ended February	
	1928	1927	1928	1927
United Kingdom	50	....	13,036	12,012
British India	3,794	1,565	53,263	17,041
Germany	....	634	1,440	73,653
Netherlands	2,154	....	16,959	28,020
Canada	93	248	301	1,997
France	....	....	3,000	3,416
Belgium	197	....	596	1,840
All others	99	1,970	1,168	3,206
Total	6,387	4,417	89,763	141,185

British India supplied more than half of the February imports and much more than half the total for the eight months. This is in contrast with a year ago, when Germany in eight months supplied more than half the total, with British India in third place, following the Netherlands. The table gives details.

High Tonnage of Iron Ore Imports Continues in February

Imports of iron ore in February are reported by the Department of Commerce at 229,578 gross tons. While this is a drop of 9 per cent from the January total of 251,178 tons, it is far ahead of the December figure and represents a gain of 19 per cent over February, 1927. For the eight months of the fiscal year the total has been 1,820,717 tons, a gain of about 1½ per cent over the corresponding period of the preceding year.

Sources of American Imports of Iron Ore

(In Gross Tons)

	February		Eight Months Ended February	
	1928	1927	1928	1927
Canada	36,270	488	59,528	12,963
Cuba	33,500	54,000	196,613	376,500
Chile	121,300	101,900	953,400	889,600
Spain	5,000	....	28,246	13,393
Sweden	....	7,008	148,330	68,665
French Africa	28,656	26,850	318,370	209,289
Other countries	4,852	2,658	116,230	223,431
Total	229,578	192,904	1,820,717	1,793,841

Chile has maintained a substantial lead over all other countries, having supplied more than half the February total and more than half the eight-month total. Details are shown in the table.

European Mill Prices Continue Firm

French Home Market Active—Germany Seeking More Exports —British Build Plant for Direct Steel Process

(By Cable)

LONDON, ENGLAND, March 26.

CLEVELAND pig iron has been quiet since the recent rise, but makers are well sold and stocks depleted. Some furnaces are in arrears with deliveries. Hematite is dull, but output is now about equal to demand so that makers are able to maintain prices.

Foreign ore is quiet, but consumers are pressing for deliveries on tonnage already purchased and, with congestion at loading ports increasing, there is some talk of price advances.

Finished steel is quiet, especially for export. Some works are busy on domestic orders, but others are reaching the end of their order books. The Barrow rail mills are closing at Easter for lack of business. Government supporters are endeavoring to secure protection for the iron and steel industry, but Parliament is not likely to take further steps.

The first plant operating under the Duffield process for making steel direct from ore is now in course of construction at Manchester and is expected to be completed in six months.

Tin plate is active and makers, being well situated, are not accepting less than 18s. ($4.39) per base box, f.o.b. works port. Export and domestic demand is broadening. Galvanized sheets continue quiet. Japan has purchased some fair quantities of light-gage black sheet specifications.

Continental iron and steel markets are quiet and prices of semi-finished material are declining, with German producers keen sellers for export. British users, however, are buying only sparingly.

Belgian production in February was 302,000 metric tons of pig iron and 301,000 tons of raw steel. At the end of February there were 55 furnaces in blast. The German steel mill association is maintaining domestic prices of semi-finished material and beams unchanged for April. The Luxemburg output in February was 220,000 metric tons of pig iron and 205,000 tons of raw steel. There were 38 furnaces in blast on March 1.

FRENCH HOME ORDERS LARGE

Mills Show Less Interest in Export Orders —Turkish Rail Contract Booked

PARIS, FRANCE, March 9.—Domestic business is still improving, but there is less activity in the export market. French producers are in a situation comparable with the German position last year. Demand in the home market is so great that mills are not seeking export orders and are quoting deliveries of from three to five months on most steel products. Iron and steel output is steadily increasing. Production of pig iron in January was 809,000 metric tons, compared with 796,000 tons in December and 762,000 tons in November. Steel output was 750,000 tons in January, comparing with 735,000 tons in December and 682,000 tons in November.

At the meeting of the International Steel Cartel in Paris, March 5, it was agreed that production quotas should be maintained without change. It was also agreed that part of the fines paid by Czechoslovakia for overproduction should be returned, the precedent being similar action taken last year in the case of Germany. The application of Poland for membership in the cartel was given further consideration, but no agreement could be reached, as Poland demands an export quota of 350,000 tons and exclusive rights to the Polish domestic market. The cartel has offered a quota of 300,000 tons, subject to reduction should the Polish domestic demand increase.

Following the sudden death of M. Mayrisch, president of the International Steel Cartel, it was reported that Fritz Thyssen might be the new president. He is temporarily occupying that position. It is understood, however, that the next president of the cartel will be selected from the Luxemburg membership.

Pig Iron.—In an effort to meet the competition of foreign pig iron, the entente, at a recent meeting, made price reduction of 15 to 30 fr. (59c. to $1.18) per metric

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	18s.			$4.39		
Bilbao Rubio ore*..	1	1¾	to £1	2s.	5.30	to	$5.36
Cleveland No. 1 fdy.	3	8½			16.56		
Cleveland No. 3 fdy.	3	6			16.07		
Cleveland No. 4 fdy.	3	5			15.83		
Cleveland No. 4 forge	3	4½			15.71		
Cleveland basic (nom.)	3	15	to 3	15½	18.27	to	18.39
East Coast mixed...	3	10			17.05		
East Coast hematite	3	10½			17.17		
Rails, 60 lb. and up.	7	15	to 8	0	37.75	to	38.96
Billets	6	0	to 6	10	29.22	to	31.66
Ferromanganese ...	13	10			65.75		
Ferromanganese (export)	13	0	to 13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to 5	15	26.18	to	28.01
Tin plate, base box.	0	18	to 0	18¼	4.39	to	4.45
Black sheets, Japanese specifications.	13	5	to 13	10	64.53	to	65.75
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.66	to	1.77
Boiler plates........	9	2½	to 9	12½	1.98	to	2.09
Tees	8	2½	to 8	12½	1.77	to	1.99
Channels	7	7½	to 7	17½	1.60	to	1.71
Beams	7	2½	to 7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to 7	15	1.58	to	1.69
Steel hoops	10	10	to 11	0	2.28	to	2.39
Black sheets, 24 gage	10	0	to 10	5	2.17	to	2.23
Galv. sheets, 24 gage	13	2½			2.85		
Cold rolled steel strip, 20 gage, nom.	14	0	to 14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)							
Belgium	£3	4s.	to £3	5s.	$15.58	to	$15.83
France	3	4	to 3	5	15.58	to	15.83
Luxemburg	3	4	to 3	5	15.58	to	15.83
Basic pig iron (nom.):							
Belgium	3	0	to 3	1	14.61	to	14.85
France	3	0	to 3	1	14.61	to	14.85
Luxemburg	3	0	to 3	1	14.61	to	14.85
Coke	0	18			4.39		
Billets:							
Belgium	4	13			22.65		
France	4	13			22.65		
Merchant bars:					C. per Lb.		
Belgium	5	5			1.16		
France	5	5			1.16		
Luxemburg	5	5			1.16		
Joists (beams):							
Belgium	4	16			1.06		
France	4	16			1.06		
Luxemburg	4	16			1.06		
Angles:							
Belgium	5	5			1.16		
⅛-in. plate:							
Belgium (a).....	6	10			1.44		
Germany (a).....	6	10			1.44		
$\frac{3}{16}$-in. ship plates:							
Belgium	6	6			1.39		
Luxemburg	6	6			1.39		
Sheets, heavy:							
Belgium	6	1			1.34		
Germany	6	1			1.34		

(a) Nominal.

ton in certain market centers where this competition is particularly keen, such as Lille, Roubaix, Valenciennes, Maubeuge, Dunkirk. Hematite iron prices were advanced 5 fr. (20c.) per metric ton, effective since March 1. For export, Continental pig iron producers are quoting phosphoric foundry iron at £3 3s. ($15.34) per ton, f.o.b. Antwerp, on orders for 1000 tons or more, an advance of about 1s. (24c.) per ton.

Semi-Finished Material.—Export offers of billets and blooms are scarce, and the tendency of prices is upward. Blooms are quoted at £4 4s. to £4 10s. ($20.46 to $21.92) and billets at £4 12s. to £4 15s. ($22.41 to $23.14) per ton.

Finished Material.—There is still considerable domestic business, but prices have ceased to advance. The recent rise in quotations ranged from 10 to 15 per cent. Most rolling mills are out of the market for the present or are quoting extended deliveries. For export, beams are held at £4 15s. to £4 17s. 6d. per ton (1.05c. to 1.07c. per lb.), and steel bars, at £5 7s. to £5 7s. 6d. per ton (1.18c. to 1.19c. per lb.). The new sales syndicate for beams is trying to reduce the wide margin that exists between beam and merchant steel prices. This evidently entails further increases in beam quotations.

Rails.—The Comptoir Siderurgique de France has received a contract from the Turkish Government for about 40,000 tons of rails, cross bars, bolts, fish plates and other railroad permanent-way material. Construction of the railroad in Anatolia is in the hands of a Swedish company. It is reported that a suggestion has been submitted to the European Rail Makers' Association that rail prices be advanced.

Bolt Maker Compares German and American Methods

HAMBURG, GERMANY, March 10.—In a paper read at a recent meeting of the Federation of German Hardware Manufacturers, Herr Schauerte, president of Bauer & Schauerte, Neuss, one of the largest German manufacturers of bolts and nuts, said that although American and European tools are the same, there are 20 to 30 times more tools wasted in bolt and nut production in Germany than in the United States.

Since 1920, Herr Schauerte has been to the United States five times and recently returned from an extensive investigation of the American bolt and nut industry and its methods. He recommended the introduction of American methods of manufacture, particularly as far as the heads of bolts are concerned. Raw material used in the United States, he said, was evidently much superior to the European. This, he said, was due principally to the fact that American bolt makers can obtain the exact analysis of steel they require and not, as in Germany, the grade of steel that the producer wishes to ship. He pointed out also that in the United States few of the large companies using bolts and nuts, such as motor car manufacturers, machinery builders and shipyards, make bolts for themselves as is the case among German users. The situation in Germany results in a larger number of small orders and higher costs, compared with fewer and larger orders in the United States and proportionately lower costs.

It was decided at the meeting to issue a list of specifications covering the quality of steel required for bolt and nut production.

Decline in German Aluminum Exports

WASHINGTON, March 27.—German exports of bar aluminum, plates and scrap declined to 5070 metric tons in 1927 from 13,896 tons in 1926, according to a report from the United States consul at Frankfort-on-Main, Germany. Exports to the United States dropped to 2073 tons in 1927.

The Société Lorraine des Aciéries de Rombas is proceeding with the construction of No. 3 blast furnace at Rombas, Moselle, France, under the direction of Emile Hemmer, director of mines and works. The Freyn Engineering Co., Chicago, has been retained in a consulting capacity for the work, particularly to determine the size and type of furnace best suited.

BELGIAN PRICES FIRM

Mills Seek Additional Business but Refuse to Make Concessions—Pig Iron Strong

ANTWERP, BELGIUM, March 9.—Prices on certain iron and steel products have receded slightly from the high levels reached a fortnight ago, but still reflect the independent attitude of producers. Mills rolling semi-finished material are granting no concessions, but are showing more interest in new business. Purchasing is confined to small lots, buyers preferring to wait as long as possible for further developments in the price situation. Mills, however, are well booked with tonnage and in a position to wait.

Pig Iron.—Demand is improving, and stocks at the furnaces and in consumers' yards are small. The export quotation on No. 3 phosphoric foundry iron is £3 3s. ($15.34) per metric ton, f.o.b. Antwerp. Bessemer hematite is quoted at 670 to 680 fr. ($26.33 to $26.72) per metric ton, f.o.b. furnace, but little business is being done, as German offers for this grade are much lower.

Semi-Finished Material.—Makers are well booked and are able to maintain prices, despite the recent decline in demand following advances in quotations. Billets are quiet, with prices firm at £4 13s. to £4 15s. ($22.65 to $23.14) per metric ton, f.o.b. Antwerp. Mills show little interest in booking further orders for blooms, which are quoted at £4 5s. to £4 10s. ($20.70 to $21.92) per metric ton, depending upon the sizes specified. Sheet bars are quoted at about £4 17s. 6d. ($23.75) per ton, f.o.b. Antwerp.

Finished Material.—Although mills are evidently seeking more tonnage, there is no disposition to make concessions. There is a steady flow of small-tonnage business. Steel bars are quoted at about £5 7s. 6d. per ton (1.19c. per lb.) and beams at £4 17s. 6d. per ton (1.08c. per lb.) f.o.b. Antwerp. Corrugated reinforcing bars are offered at about £5 17s. 6d. per ton (1.29c. per lb.). Hoops are quoted at £6 5s. per ton (1.38c. per lb.), f.o.b. Antwerp.

Russian Ore Trust Officials on Visit of Inspection Here

Chief Engineer A. N. Bakhtiarov of the Yurt, the Soviet Southern Ore Trust, has arrived in this country accompanied by three other officials of the trust, it was announced by the Amtorg Trading Corporation, 165 Broadway, New York. Representatives of the Yurt expect to make a three months' study of American production methods and of the mining equipment market.

"While we have not as yet reached the pre-war iron ore output," said Mr. Bakhtiarov, "the progress made during the past few years has been encouraging. Four years ago the Yurt produced less than half a million tons of ore. During each of the next two years we succeeded in doubling production, and increased the output by 47 per cent last year, with the result that in 1927 we produced three and one-half million tons of iron ore. Production of manganese ore reached 450,000 tons last year. This production, however, does not fully satisfy the needs of the expanding Soviet iron and steel industry. We intend to study American production methods and equipment with a view of increasing production in the Yurt mines. The allotment for capital construction by the trust for this year is $9,000,000."

New Aluminum Alloy in Germany

HAMBURG, GERMANY, March 10.—A new aluminum alloy with the trade name "Ultralumin" has been brought out by the Ultralumin A. G., Cologne. According to the maker, it is slightly lighter, of higher tensile strength and lower-priced than other aluminum alloys.

Steere cooling coils are to be built for the Sloss-Sheffield Steel & Iron Co., Birmingham, by the Semet-Solvay Engineering Corporation, New York, for use on gas scrubbers. There will be 26 stacks, 40 tubes high, zinc coated by sherardizing to resist corrosion.

Adopts Standards for Reinforcing Steel

Concrete Reinforcing Steel Institute Seeks Better Cooperation from Mills and Elimination of Ruinous Competitive Methods

ADOPTION of standard practices in the industry and the establishment of the intermediate grade as the single new billet standard for concrete reinforcement were cited as the outstanding accomplishments in the past year of the Concrete Reinforcing Steel Institute at its fourth annual convention, held March 19 to 21 at Biloxi, Miss. In pointing out these achievements, however, George E. Routh, Jr., Kalman Steel Co., Chicago, president of the institute, called attention to the fact that in some of its efforts, notably an attempt to gain the support of the mills in securing reports of tonnage and warehouse costs, the organization had been without success.

"The mills do not appreciate the possibilities of extending their market through the work of our institute," said Mr. Routh in commenting upon the situation. "We have not only been unable to enlist support and cooperation, but now the American Association of Steel Manufacturers has protested to the Department of Commerce against the adoption of intermediate as the single standard grade of new billet reinforcement. Apparently the mills look upon this standardization work from a narrow viewpoint and do not realize that they likewise benefit in direct proportion to the benefits accruing to the distributers.

"Any reduction in our fabricating costs," the speaker went on, "puts the mills and the distributers in a better position to compete with foreign steel. The attitude of the mills, to which I have referred, is typical of their attitude in many other ways. With the exception of the efforts of one large Eastern producer, none of the other mills has made an effort to cooperate in combating foreign steel, although we have repeatedly asked for their assistance. Another indication of the lack of consideration for the needs of distributers was evidenced a few months ago when the producers, without consulting us in any way, eliminated the quantity cutting extras which had been previously put in for the primary purpose of protecting the reinforcing bar distributers."

Adoption of Standard Practices

Discussing the work of the committee on standard practice, Mr. Routh stated that the institute has adopted standard contracts to cover the use of removable forms, and these contracts, in addition to the standard bar sales contract and the standard rules for bundling and tagging, have been very largely adopted by the members.

At a later session of the convention Edwin W. Ely, chief of the division of simplified practice, Department of Commerce, conferred with the institute members on the adoption of standardized form dimensions for concrete ribbed floor construction. A series of recommendations was made for adoption upon the conclusion of a referendum vote in the industry to be taken by the Department of Commerce.

At another session the joint building code which was adopted at a recent meeting of the American Concrete Institute in Philadelphia was adopted as a tentative standard by the members of the Concrete Reinforcing Steel Institute.

With the establishment of intermediate grade as the single new billet standard for concrete reinforcement, Mr. Routh pointed out that it had been necessary for the institute to conduct a campaign in the leading cities of the country to the end that building codes and other specifications should be revised in accordance with the new standard and thus obviate the necessity of carrying other grades of steel in stock. A national committee on building codes was appointed some months ago, and a considerable amount of work has been done.

"For several years," Mr. Routh said, "members have been receiving the composite tonnage reports of the institute, showing the tonnage sold and shipped, stocks on hand, average stocks and unfilled orders. These reports have been compiled long enough to indicate each month the conditions existing in the same month of the preceding year. This information is of assistance in showing the condition of the market and in guiding executives in their sales and purchase policies for the ensuing months.

"Likewise monthly composite warehouse cost reports, based upon a simple but effective system of cost accounting, have been sent to members. Of late these reports have been amended to show the 'highest' and 'lowest' costs under each operation and in each district, with warehouses grouped according to their average monthly loadings. This new arrangement of costs gives members a real basis for comparing the cost of their own operations with the warehouses of the same size."

Urges a Fair Profit

In concluding his address Mr. Routh called attention to the low profits which existed in the industry in 1927. "In the past," he said, "any improvement in conditions in the general steel business has resulted in an improvement in our profits, as we have reaped the benefits of our purchases of steel in anticipation of an increase in prices. During the past few months the steel mills have been advancing their prices, but instead of advancing our prices as the mills advance theirs and enjoying the benefits of these rising prices we are giving them to the buyer.

"The existing conditions are caused by the sellers thinking one case of sharp competition justifies a small loss. He finds that later sales bring out even lower prices, as his competitor feels he must maintain his position, so that ultimately all of the business is handled at a small or even no margin of profit.

"Is it fair when you know a competitor is close to a buyer and will be favored with the business at an equal price to quote a price lower than you would in the course of regular business, hoping to force the buyer to place the business with you against his own wishes? It is my feeling that if you cannot secure the business at an equal price it does not belong to you.

"The Sherman law operates as a barrier against the fixing of prices; against the enjoyment of a fixed profit such as accrues to railroads and public service corporations under the supervision of the State and Federal governments. There is no reason why our members cannot sell their products at a profit and still not violate the Sherman law."

What the Future Holds

In a paper entitled "Coming Changes in Industry," Dr. John T. Holdsworth, professor of economics, University of Miami, Coral Gables, Fla., outlined the development of the industrial prosperity of the country and outlined its probable future. "The great economic problem of tomorrow," he said, "is the adjustment of steadily increasing production to the needs of consumption. The lack of such adjustment is responsible for the present so-called 'profitless prosperity.' Profits are the main springs of the business mechanism. The keen business competition of recent years, bound to become more keen as time goes on, is but the stimulus to more careful, economical and scientific production and distribution. Human wants never can be wholly met and satisfied. The luxuries of yesterday are the necessaries of today. Under free democratic institutions and with constantly rising standards of living, the field of consumption ever widens. The man who, or the industry that, creates a new want and satisfies it will continue to reap rich rewards."

George E. Routh, Jr., was reelected president of the institute for another year. Other officers were reelected as follows: C. Louis Meyer, Concrete Engineering Co., Omaha, Neb., vice-president; Hugh J. Baker, Hugh J. Baker Co., Indianapolis, treasurer; M. A. Beeman, Tribune Tower, Chicago, secretary, and R. W. Johnson, engineer. A. E. Lindau, American System of Reinforcing, Chicago, was reelected a director for three years, and O. W. Irwin, Truscon Steel Co., Youngstown, was made a director for a similar period, succeeding Gustave Kahn, of the same company.

UNEMPLOYMENT EVALUATED

Total Less Than One-Third That of 1921—Mechanization Heavily Responsible

WASHINGTON, March 26.—Workers in the United States now out of employment are estimated at 1,874,050 by Ethelbert Stewart, commissioner of labor statistics, in a report which Secretary of Labor J. J. Davis submitted today to the Senate in connection with one of his own in response to a resolution by Senator Wagner of New York. The number unemployed is declared to constitute only a small percentage of the number at work, now stated to be 23,348,692, taking into account those in either a wage or salary basis. The volume of employment tended downward from April, 1927, up to and through January, 1928, but the February report of the Bureau of Labor Statistics shows an upward trend in employment. The year 1925 is used as the basis for arriving at the shrinkage, fixed at 7.43 per cent.

Commissioner Stewart's report presents the employment situation in two parts, which consider those temporarily out of employment and those displaced by changes in industrial and commercial methods. Farm labor depressions are declared to have been due almost wholly to the first group. It was added that, if public work is not furnished quickly enough to relieve them, these men have no course but to wait until their own jobs are available again. Prompt relief here is due from the Government's elaborate building program, from similar programs of States, municipalities and counties, and from private building and construction, according to Secretary Davis. He said he had no way of "timing" seasonal employment, and that appropriations would have to be provided if more complete unemployment surveys are to be made regularly.

Based on the known number of wage earners in manufacturing and railroading in 1925, it is estimated that of the former there were 7,739,907 employed in January, 1928, and of the latter 1,643,356 in December, 1927. The manufacturing employment shrinkage since 1925 is given as 643,874 and the railroad employment shrinkage as 109,233.

The reports do not deal with the situation in separate industries. Commissioner Stewart reported that "it is not unreasonable to believe that a considerable percentage of the employment shrinkage shown in this report is due to new machines and new mechanical devices. Waiting for industrial development in these cases is of no avail. Their jobs are gone. Inventive genius must devise new industries, commercial agencies must create new wants, to provide new occupations for these people, insofar as age permits them to learn new occupations or adapt themselves to new industries."

This need for new industries and new occupations, said Secretary Davis, daily becomes more pressing. The Department of Labor was said to be in constant receipt of reports of acute situations resulting from the introduction of new machines. It is believed in many quarters, he declared, and with good reason, that mechanical development will probably proceed as rapidly in the immediate future as it has in the immediate past.

Figures of percentage of change in employment show great variation in different districts. This the Bureau of Labor Statistics interprets to mean that unemployment is not universal, nor in all places or industries is it acute, but that it is spotted by geographical sections and by industries. In actual numbers it is believed to have not more than one-third of the magnitude of the labor depression of 1921, which caused a shrinkage, according to estimates of the bureau, of 5,735,000, between the peak of 1920 and July, 1921. The greatest present shrinkage in employment, 19.7 per cent, was shown in Oklahoma, between January, 1927, and January, 1928, and the smallest in factory workers of Wisconsin, 3.9 per cent.

A tabulation shows that 79.8 per cent of all employees were in establishments that worked full-time and 87.2 per cent in establishments that worked more than 90 per cent of full-time, while less than 1 per cent of the employees are in establishments working half time or less.

In addition to the 9095 establishments in operation which reported their percentage of full-time employment, 108 establishments reported that they had recently become temporarily idle. These establishments were said to be smaller than the average, and several of them made the report during their slack season.

Production of Coal in World Was Higher in 1927

World production of coal of all grades in 1927, according to preliminary figures compiled by the Bureau of Mines, Washington, was 1,475,000,000 metric tons. Of this, approximately 197,000,000 tons was lignite and 1,278,000,000 tons was bituminous and anthracite. The lignite production was the largest on record. The United States production totaled 73,164,000 tons of anthracite and 471,556,000 tons of bituminous and lignite coal, comparing with 76,599,008 tons and 520,147,061 tons respectively in 1926. The United Kingdom was the third largest producer with an output of 259,516,600 tons of bituminous coal in 1927, comparing with 128,305,291 tons in 1926, the year of the strike, and with 247,079,210 tons in 1925.

Germany's production of 304,403,311 tons was almost equally divided between lignite (150,805,711 tons) and bituminous coal (153,597,600 tons). Both showed substantial increases over the two preceding years. No country, other than the three mentioned, reached as much as 55,000,000 tons, France being in fourth position, with 52,846,700 tons total.

Due mainly to the British strike in 1926, world production in 1927 showed a gain of 110,000,000 tons, or 8 per cent.

Wages Increase as Hours Shorten

The biennial survey of wages and hours in foundries and machine shops made by the Bureau of Labor Statistics, Department of Labor, Washington, shows that there was an increase in average earnings between 1925 and 1927 and a decrease in the average full-time hours per week. Thus, the average full-time weekly earnings in foundries increased from $31.42 in 1925 to $31.89 in 1927, while the average full-time hours per week were 51.5 in 1925, compared with 51.1 in 1927. In machine shops average full-time earnings increased from $30.34 to $31.31 per week during the two-year period, while the average week was reduced from 50.4 to 50.1 hr.

Average hourly compensation showed gains: in machine shops, from 60.2c. to 62.5c.; in foundries, from 61c. to 62.4c.

Shipments of enameled sanitary ware in February, as reported by 22 manufacturers to the Department of Commerce, totaled 295,773 pieces. This is a gain of nearly 1 per cent over January, but records a decline of 7 per cent from February, 1927. Bathtubs, at 75,663 units, show a considerable gain over the three preceding months, but a reduction of 9 per cent from February of last year.

REOPEN SOUTHWESTERN CASES

Commerce Commission Report Extends Commodity List and Changes Effective Date

WASHINGTON, March 27.—The supplemental report of the Interstate Commerce Commission in the Consolidated Southwestern cases, made public last Wednesday, grants a reopening of the proceedings relating to a number of iron and steel products. It increases the commodity description to include a list of iron and steel items not heretofore specifically named, and changes the effective date of the new rates on cast iron pipe and fittings pending possible further revision. It is provided that the rates on cast iron pipe and fittings, after July 8, 1928, shall not exceed the maximum reasonable class rates prescribed in the proceedings, subject to Western Classification ratings. One of the outstanding features of the report was a denial of the petition of the carriers for an increase of 10 per cent over the scale of rates prescribed in the original report.

The iron and steel articles to be considered in the proceedings to be reopened include wrought iron and steel pipe, riveted, seamless and welded, with fittings; cast iron pipe and fittings; iron-body well-pipe screens or strainers; spiral columns or column hoops, knocked down or collapsed; iron or steel joints for concrete road construction; castings and forgings; joists and building doors, other than rolling; studding; iron or iron body valves and siding, sash weights and wire rope.

The commodity description in the iron and steel list was amended to include the following items: expanded metal ribbing lathings; tin and terne plate; concrete and plaster reinforcement, consisting of spiral columns or column hoops, knocked down or collapsed; wire mesh and expanded metal, and wrought conduit pipe. The supplemental report on cotton ties amends the first finding by fixing the rates at 27.5 per cent instead of 25 per cent of first class. The petitions of a number of iron and steel interests to lower the scale on the general iron and steel list was denied, the 32.5 per cent scale being maintained. The commission said that it was not convinced that railroad revenues from iron and steel traffic to Texas would be increased. Undoubtedly, it was stated, the rates on many articles will be materially reduced.

The time accorded the carriers for revising rates on the numerous articles for which rates were not specifically prescribed in the earlier report was extended to Dec. 10, 1928. In order to afford time in which to publish tariffs embodying the revisions and changes in an orderly way, the effective date of the order was made July 8 instead of May 16. The new tariffs are to be posted 45 days in advance of the effective date.

A New Book on American Industry

The name of Charles M. Schwab appears as the author of a chapter entitled "Steel—Its Part in American Progress" in the volume just published for the American Institute (Edwin Forrest Murdock, president) by Doubleday, Doran & Co. Mr. Schwab's chapter consists of 20 pages which deal with developments familiar to most men in the industry. There is a two-page quotation from an address by Mr. Schwab at the Carnegie memorial service in Pittsburgh on Feb. 25, 1919. In it he spoke of Mr. Carnegie's insistence on plant of the highest obtainable efficiency and of his willingness to tear down that which did not represent the latest discovery and the most approved methods. In one case a new converting mill, which had been running only two months, was torn down and rebuilt to introduce an economy discovered after its completion.

Mr. Schwab points out that the steel industry, after spending vast sums to reduce the cost of production, has in recent years been realizing only about the same return per ton of output as before the expenditures were made. In 1913 earnings of the ten largest steel companies were equal to $6.13 per ton of ingot produced, as compared with $6.21 per ton in the three-year period 1924-26.

In referring to the penetration of steel into all departments of industrial activity, Mr. Schwab cites THE IRON AGE compilation of Jan. 5, 1928, estimating the production of finished steel in 1927 at 32,039,000 gross tons, of which the building and construction industries took 22 per cent, the railroads 19 per cent, the automotive industry 14 per cent, oil, gas, water and mining 8½ per cent, exports 6 per cent, agriculture 5½ per cent, food containers 5 per cent, machinery 4 per cent, and all other uses 16 per cent.

Among other chapters of the book are "Ships and Shipping," by Edward N. Hurley; "Foreign Trade," by Dr. Julius Klein; "Mines and Mining," by H. Foster Bain; "Railroads," by L. F. Lowry; "Machinery and Power," by Dexter S. Kimball; "The Electric Industry," by Owen D. Young; "Building Construction," by Hugh White, George A. Fuller Co.; "Labor and America's Century of Industry," by William Green.

Engineers of the World to Collaborate

WASHINGTON, March 27.—At a dinner given at the Carlton Hotel here last Thursday night by the Japanese Ambassador, T. Matsudaira, to the American committee of the World Engineering Congress, plans were made for participation of the United States at the meeting of the Congress in Tokio next year. Dr. Elmer A. Sperry, Brooklyn, elected chairman of the committee, declared that general development of industry would be facilitated through collaboration of engineers of the world. The Japanese Ambassador emphasized the debt which he said Japan owes the Western world in progress made in engineering and science.

Officers elected by the committee were: Herbert Hoover, honorary chairman; Dr. Sperry, chairman; John W. Lieb, New York, vice-chairman and chairman of the executive committee; C. E. Grunsky, San Francisco, vice-chairman (Pacific Coast); C. E. Kettering, Detroit, vice-chairman (Middle West); Maurice Holland, New York, executive secretary.

French Iron Ore Output a Record in 1927

WASHINGTON, March 20.—The production of iron ore in France in 1927, according to provisional official figures issued by the Bureau of Mines, Ministry of Public Works, reached the record figure of 44,678,415 metric tons, according to a report received by the Department of Commerce from its commercial attaché at Paris. In 1926 the output was 39,480,400 tons; in 1925, 35,741,195 tons; in 1924, 23,248,000 tons; and in 1913, 42,980,424 tons. The totals include Lorraine production. Domestic requirements are about 25,000,000 metric tons. Exports in 1927 were 14,662,382 tons.

COMING MEETINGS

April

American Oil Burner Association. April 3 to 5. Fifth annual convention, Hotel Stevens, Chicago. Leod D. Becker, 350 Madison Avenue, New York, secretary.

American Gear Manufacturers Association. April 19 to 21. Twelfth annual meeting, Hotel Seneca, Rochester, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Society of Mechanical Engineers, April 23, 24. Meeting of materials handling division, Benjamin Franklin Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Metal Trades Association. April 25, 26. Annual convention, Hotel Astor, New York. J. E. Nyhan, Peoples Gas Building, Chicago, secretary.

National Foreign Trade Council. April 25 to 27. Fifteenth annual convention, Rice Hotel, Houston, Tex. O. K. Davis, India House, New York, secretary.

American Welding Society. April 25 to 27. Annual meeting, Engineering Societies Building, New York. Miss M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

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This Issue in Brief

American steel industry will continue to grow steadily, says C. M. Schwab. The next 50 years will see as great an advance as took place in the past half-century, he tells Congressional committee.—Page 876.

Doubles output per man by eliminating manual handling of materials. Small-tool manufacturer reduces costs and working force, while production mounts, by handling all materials mechanically. Stock is kept constantly moving, no work piling up in process.—Page 857.

Strength and toughness of manganese steels are not affected by moderately high phosphorus or moderately high sulphur. Tests reveal that steels high in manganese content are more closely allied to structural alloy steels than to carbon steel.—Page 865.

Tests forgeability of various metals by flattening pellets under forging hammer. Pellets should be struck at various temperatures to determine relative forgeability.—Page 874.

Four-year seawater immersion test proves ingot tin most durable of 50 non-ferrous metals and alloys. Sample bars were fixed to seabottom in the Bristol Channel.—Page 874.

Steel exports fall off, while imports gain. We shipped 134,107 tons of finished steel out of the country in February, a loss of 8 per cent compared with February, 1927. We bought 30,095 tons from foreign makers, 14 per cent more than we imported in the same month of last year.—Page 885.

Production is large in relation to demand, says Dr. Haney. The P-V line predicts a downturn in the fall. Decline is attributed chiefly to the failure of commodity prices to rise, while physical volume of trade has turned upward, forecaster declares.—Page 883.

Urges German steel producers to cooperate with customers as American producers do. American consumers get the exact analysis of steel they require, and not, as in Germany, the grade the producer wishes to ship, German bolt and nut manufacturer tells trade association.—Page 888.

Government partly responsible for high cost of distribution, C. M. Schwab indicates. Government can help if it will give capital a chance to operate its business economically—for example, permitting steel manufacturers to have an understanding with each other as to where they will sell their steel.—Page 876.

Broach with detachable chromium-plated burnishing buttons is found to be best suited for boring wrist pin holes in Whirlwind engine pistons of "Y" metal. Chromium-plated tool enables airplane engine builder to increase production.—Page 869.

If you can't secure it at an equal price, the business does not belong to you, says trade association head. Underquoting a competitor who is close to a certain buyer is not only unfair but, in the long run, unprofitable as well.—Page 889.

Overheating is not especially damaging to manganese steels, investigator finds. Tests of bars quenched from a temperature 200 deg. Fahr. higher than that usually employed show that deterioration in elongation or impact value is no greater than in other alloy steels.—Page 865.

Hardness of copper is increased from 80 to 410 by adding a small percentage of beryllium. And tensile strength is increased to about 200,000 lb. per sq. in.—Page 873.

Machineability of high-manganese, high-sulphur steel is higher than that of plain carbon steel or lower-manganese steel. The first mentioned is suitable for cutting speeds higher than for open-hearth screw stock, one manufacturer says, and nearly as high as for Bessemer screw stock.—Page 866.

70:30 brass is not liable to unsoundness caused by gases, whatever the conditions of casting, British metallurgist declares after investigation. Spherical cavities frequently found in brass ingots are, in his opinion, caused by mechanical entrapping of gases within the mold rather than by gases actually in solution in the liquid metal.—Page 873.

Unemployment below two millions, Bureau of Labor Statistics reports. The figure reported is 1,874,050. Shrinkage in industrial employment since 1925 amounts to 8.3 per cent, due almost wholly to mechanization. Need for new industries daily becomes more pressing, says Secretary Davis. — Page 890.

ESTABLISHED 1855

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The New Unemployment

THE high-wage doctrine of recent years has rested on the premise that mass production demands mass consumption. On the one hand, management and technical staff have been steadily cutting manufacturing costs; on the other hand, wage rates have been maintained and buying power expanded through instalment selling—all in an effort to develop a market large enough to absorb the accelerated output of large-scale repetitive processes. Unfortunately, cost reduction has caused a steady decline in the number of workmen required for a given output. While those employees retained are commanding unchanged, and in some cases even advanced, wages, an increasing number have been released to find employment elsewhere. A new kind of idleness, "technological unemployment," has made its appearance. Technological advances in industry, while cheapening production, are reducing the number of buyers so essential to the maintenance of mass consumption. Shall we say that industrial efficiency has created a Frankenstein which is starting in to destroy?

Frequently the initial effect of labor-saving equipment is to cause distress among the workmen displaced, although the ultimate gains have always outweighed temporary disadvantages. Following the World War and the restriction of immigration, however, the shortage of man power put a premium on the mechanization of industry. So rapid were the strides in this direction that what had been a serious deficiency of labor now appears to have been converted into a surplus.

At the moment unemployment seems to be less serious than late last year; it is a curious fact, indeed, that its magnitude did not become apparent until some time after it had passed its worst. This is possibly testimony to the fact that much of the enforced idleness of workmen was due to technological causes rather than to business depression. The condition stole on the country unawares, as it were.

That technological unemployment presents a problem of prime importance is not yet clear. The growth of luxury industries and various forms of personal service, made possible by increased consumer buying power, have been taking surplus labor, but the diversion of workmen into these pursuits apparently has failed to keep pace with the release of man power through gains in efficiency.

In some industries, notably in textiles, there have been recent reductions in wages. No general trend in that direction has developed, and some of the leading industrial companies of the country are opposed to any such move. They are concerned not only with preserving mass buying power but with keeping all important business factors stable. A collapse of the wage structure would bring an industrial depression of first magnitude.

It is this desire for business stability that has caused so much interest in the initiation of public work as a means of relieving unemployment. One difficulty with municipal, county, State or Federal undertakings is the slowness with which they ordinarily get under way. Legislative authorization of appropriation, votes on bond issues, the making of plans, the getting of bids, etc., all take time and frequently delay the actual starting of such work until the motivating emergency is past.

Another measure in the interest of labor stabilizing is unemployment insurance. So far this remedy has been tried chiefly in Europe. It has not found favor in this country because of its paternalistic character. Whatever steps are taken to cope with unemployment, it is essential first to obtain more accurate statistics regarding the number of unemployed. Existing data are so incomplete that estimates vary by the millions. Comprehensive, dependable statistics upon which a national employment index might be based would replace guesses with facts.

PRESSED steel highway signs bearing "Stop" and other directions, including warnings at railroad crossings for automobilists, have come into general use in a number of States in the past two years and have opened another field for the output of stamping plants. The signs are made of 16 or

18-gage sheets, and the processes of manufacturing, including embossing, enameling and inking of the letters, are practically the same as those employed in making automobile license plates. Signs standardized in form and size have been adopted to some extent. The steel signs take the place of wood and cast iron. Their superiority to wood is obvious. Claimed advantages over cast iron signs include cheapness, less danger of breakage, and lightness, which makes them easier to transport and erect. It is estimated that 500 tons of sheet steel was used in the manufacture of road signs of this type last year.

The Steel Corporation's Share

STEEL CORPORATION production of steel ingots decreased by 9 per cent from 1926 to 1927; its production of finished lines decreased 9.5 per cent and its shipments 9.1 per cent. Total earnings, after taxes but before any bond interest, fell off 16.9 per cent, thus reflecting a decrease in earnings per ton shipped, while earnings available for dividends decreased 24.7 per cent.

Comparing last year with 1925, however, there was a decrease of less than 1 per cent in total earnings but a decrease of 3 per cent in shipments. Thus in return per ton 1927 proved a shade better than 1925. Last year was handicapped by the very poor fourth quarter, when realized prices were distinctly below the year's average. Total earnings and profits per ton were somewhat better in the first three quarters of last year than they were in 1925 as a whole.

The significance of the comparison is simply this, that while the relatively poor showing of 1927 can be partly explained away, the poor start it furnished for 1928 stands out prominently. The steel industry greatly needed the price advances it since has striven to put into effect. That they are not in full force on current shipments is only what was to be expected in the light of experience. The last general and important rise in steel prices was completed early in 1923, and in 1924 prices declined, yet the Steel Corporation had distinctly larger earnings relative to tonnage in 1924 than in 1923.

The corporation's report gives the operation in 1927 at 78.9 per cent of capacity, which compares with 88 per cent for 1926, 78.4 per cent for 1925, 70 per cent for 1924 and 88.3 per cent for 1923. Last year's percentage was just a trifle under the average of the four preceding years. Capacity was slightly larger, while the proportion of Steel Corporation production to total production of the industry decreased slightly, being 43.3 per cent in 1927 against 46.8 per cent in 1923.

The corporation got along with less raw material in 1927, percentage variations in production from 1926 being as follows:

	Per cent Decrease.
Iron ore mined	12.4
Coke manufactured	16.3
Blast furnace production	12.2
Steel ingot production	9.0

In finished steel production, with a total decrease of 9 per cent, from 14,334,412 tons in 1926 to 12,979,282 tons in 1927, the largest decrease was in rails, 16 per cent; bar mill products followed with 14 per cent. The smallest decreases were in tubing and pipe, 3.8 per cent and in wire products, 3.6 per cent. The small decrease in wire products, which are quite a staple, seems natural; but to find tubing and pipe holding up so well is certainly surprising. That 1926 was an exceptionally active year in oil and gas well drilling and 1927 an extremely poor year has been generally said and fully credited. A very interesting comparison with the pipe and tube total is due when the official statistics of the industry are published.

Rest Pauses in Industry

IN establishing the rest period in shop work, to increase efficiency and output by correcting the effects of fatigue, it is not sufficient arbitrarily to fix the length of the recess at a certain number of minutes. Each industry, in fact each plant, has its own problem to solve as to the frequency and length of pauses, according to a report of the Industrial Fatigue Research Board of Great Britain. The board finds that the introduction of frequent rest pauses lessens the feeling of fatigue among the workers and tends to increase the output, even though the working time is less.

Each establishment, to secure efficient results, must consider the character of its work in relation to fatigue, whether from bodily exertion or from mental stress which comes with concentration and from such influences as that of extremely monotonous tasks. A rest period may be so short that it is only an irritation to the worker, or it may be so long that it is difficult for him to resume his labor with the same drive he had before dropping it.

The board points out that in most occupations the workers themselves introduce pauses. Tin plate workers take from twelve to fourteen minutes rest each hour. But the research indicates that voluntary pauses are not so advantageous in procuring high production as authorized rest. In one cited case the substitution of prescribed for voluntary rest pauses increased the output more than 4 per cent. In another case it was found that workers taking spontaneous rests turned out sixteen pieces per hour; when working twenty-five minutes and resting five they produced eighteen pieces; when working seventeen minutes and resting three they produced twenty-two pieces; and when working ten minutes and resting two they produced twenty-five pieces per hour. The output increased with the frequency of the pauses.

In one experiment rest periods of one-half minute, two minutes and five minutes were used after a work period of forty minutes. The two-minute pause was found to be most beneficial. In another test five minutes rest was found to be better than one minute, three or ten minutes, after eighty minutes of work. In still another a rest of fifteen minutes in the middle of a work period of one hour had an unfavorable effect upon output.

Stress is put upon the use the employee makes of his rest pauses. Physical and mental relaxation are sought. In one American plant cots are provided and the workers lie down for a certain number of minutes, often going to sleep. Nothing so quickly restores strength as to relax in a prone position, and a short nap is a great restorer of vitality, bodily and mental. Many busy executives have learned the value of this, making it a rule to stretch out for a few minutes, perhaps snatching a nap, as a break in their business day. As a rule, the worker in his rest period should assume a posture the opposite of that which his labor compels. If he stands to his task, he should sit or lie down. If his occupation requires him to sit, he should stand and perhaps walk about during his recess.

Value of Low-Manganese Alloy Steels

REFERENCE has been made recently in these columns to the fact that manganese is gradually living down a questionable reputation as an element in low-alloy steels. Steel castings, carrying considerably more manganese than is ordinarily present, have long been known to have superior physical properties when proper care is taken to prevent segregation and to break up dendritic crystallization. Carburizing steel popularly known as S.A.E. 1315 X, containing 0.10 to 0.20 carbon, 0.08 to 0.13 sulphur and 1.25 to 1.55 manganese, has also been marketed. Some users like it, others not at all. It has been said that a basic open-hearth steel, if low in sulphur and containing more than 0.8 per cent manganese, will never act "abnormally" in the carburizing pot. Furthermore, acid open-hearth steels containing 0.25 to 0.50 carbon and about 1.0 per cent manganese have been successfully marketed in competition with higher alloy steels, and are now being vigorously exploited under different trade names.

This last classification, known to metallographists as pearlitic manganese steel, is described fully in a paper by Jerome Strauss in this issue of THE IRON AGE. Well over a thousand tons of it have been used by the Naval Gun Factory recently. Under ballistic tests artillery shells do not split; if they cannot penetrate the armor they merely mash out of shape. This is certainly good indication that well made manganese steel, properly heat treated, has none of that brittleness which has commonly been assumed.

Such a searching test in practice is more convincing than the good results on Izod impact specimens reported by Mr. Strauss. On the whole, his tests indicate a material which should be of great service for machined parts requiring higher strength and toughness than medium carbon steel, yet hardly warranting the more expensive steels containing nickel, chromium, molybdenum, or a combination of them.

While the reported tests on manganese steels unduly high in sulphur or phosphorus are interesting, a warning should be given against placing too much reliance just yet upon the ability of manganese to counteract the expected deterioration from these impurities, in addition to enhancing the physical properties due to carbon. Let us take one thing at a time. Several metallurgists still remember unhappy experiences with manganese steels in as diverse forms as thin tubular sections, coiled springs and heavy armature shafts. Failures seemed to be associated with large pearlitic grains, considerable chemical segregation and even seaminess and excessive silicate inclusions.

Without shutting one's eyes to these undoubted facts, it is only fair to remark that much has been learned in recent years about the control of grain size in fairly massive forgings. Furthermore, several steel makers have studied the low-manganese steels sufficiently to have developed a correct furnace refining practice, to have discovered the proper relationship of ingot mold and cooling rate, and corrected the adjustment of carbon to manganese, with the result that the steels now made are much superior to those turned out without particular care several years ago. The inverse relationship between carbon and manganese is especially important. To prevent brittleness and excessive machining costs, the carbon must be 0.30 or lower as the manganese passes 1.75 per cent.

Simplifying Rolling Mill Design

MANUFACTURERS who have taken up in a comprehensive way the simplification of their products, following the modern trend toward standardization and the throwing out of unprofitable lines, have profited in a large way by their enterprise. This is true in particular of older houses, whose products represent a long evolution in mechanical design, in sizes and in uses. A house-cleaning on well-studied engineering lines is quite sure to result in a large measure of simplification and consequent reduction in costs.

A typical experience is that of one of the great American builders of rolling mill and wire-making machinery. For the last three years the company has maintained a special department to study in the lines mentioned. Its activities have contributed largely to a 58 per cent reduction in inventories.

The proper selection and simplification of materials has been of vast importance in keeping machines working with the least confusion and change. Many designs of machines specified by the steel trade are called for too infrequently to warrant their manufacture. These have been eliminated.

Roll housings were formerly built in 50 different sizes and types. The number is now reduced to two types, with 12 sizes in each type, or 24 in all. Pinion housings were formerly built in three types requiring 30 different sizes. The company now puts out one type which comes in 12 sizes. This procedure is being applied to the entire product of the company, so that specific sizes and types are prescribed for all machines. As a result, materials for service requirements can be easily stocked. Repair orders will be filled more promptly. The cost and storage of patterns are reduced and there is also a lowered cost for jigs and fixtures.

The greatest saving brought about has been in the decrease in inventory. For instance, mill construction calls for quantities of angles. Formerly, to meet the requirements of many sizes and many types for each machine produced, it was necessary to carry in stock 74 different sections. Under the present practice it is necessary to carry only 11 sections and all new developments must conform to the revised standards.

For Large Scale Manufacture of Steel Sanitary Fixtures

The Steel Sanitary Co. has been organized at Alliance, Ohio, to manufacture from enameled and stainless sheet steel a full line of sanitary fixtures, including bath tubs, lavatories, sinks and laundry tubs. The plans contemplate operations at Alliance and the turning out of 1200 enamel steel and 400 stainless steel sanitary fixtures daily. The enterprise is the result of a development by J. C. Cromwell, applying mass production methods to the utilizing of sheet steel in the sanitary field, now almost entirely occupied by cast iron.

The officers of the new company are the following: Chairman of the board, W. H. Purcell, president Alliance Machine Co. and other Alliance corporations; president and treasurer, F. E. Dussell, president and treasurer Buckeye Twist Drill Co. and formerly president of the Transue & Williams Steel Forging Corporation Alliance; general manager, J. C. Cromwell, formerly of the Garrett-Cromwell Engineering Co., Cleveland.

It is estimated that 300,000 tons of steel would be required each year if the entire sanitary industry were converted from cast iron to steel. This equals the amount of steel now consumed in the metal furniture industry. Previous attempts to produce sanitary ware of steel failed because of small scale operations and uneconomical methods, which resulted in higher costs than for cast iron ware. With the production methods devised by Mr. Cromwell the organizers of the new company expect to produce steel ware on a basis competitive with cast iron. The methods and processes are covered by patents. The materials employed will include steel sheets having special analysis and treatment and also special stainless enamel, both white and colored.

Gain of 8½ Per Cent in Two-Months Exports of Industrial Machinery

WASHINGTON, March 26.—Exports of industrial machinery from the United States in February, according to the industrial machinery division of the Department of Commerce, totaled $15,053,902, practically the same as in January, despite the fact that February was the shorter month. Exports in February of last year amounted to $12,643,669. For the two months ended February of the current year and correspondingly last year they were $30,169,059 and $27,821,315 respectively.

Shipments of metal-working machinery made the best showing in February, with a value of $2,372,864, as compared with $1,406,142 in February of last year, a gain of 69½ per cent. The largest gains in this group were made in engine lathes, thread-cutting and automatic screw machines, gear-cutting machines and cylindrical grinding machines. In the construction machinery group exports of excavators, including power shovels, amounted to $607,869 in February, against $287,733 for the corresponding month of 1927, and shipments for the two months were valued at $1,117,000, or nearly double the figure for the same period of last year.

Exports of freight and passenger elevators, on the other hand, declined from $150,569 to $23,810, based on the monthly comparison, and from $209,183 to $126,506 for the two-month periods. Exports of the entire construction group, however, were in excess of those of February, 1927, the values being $1,506,281 and $1,293,117 respectively. For the two months ended with February the total was $3,132,317, against $2,547,605 for the corresponding period of last year. Exports of textile machinery in February amounted to $1,397,930, against $1,079,837 in February of last year. For the two months ended with February the value was $3,131,975, compared with $2,438,758 for the corresponding period of last year.

Exports of miscellaneous industrial machinery in February were valued at $6,682,252, against $4,787,234 in February, 1927. For the two months of each year the values were $12,352,593 and $9,948,846 respectively.

Princess Blast Furnace in Virginia to Be Sold at Public Auction

The blast furnace and all other property of the Princess Iron Corporation at Glen Wilton, Va., will be offered for sale at public auction Saturday, April 7, at 11 a. m. at the office of the company at Glen Wilton. The sale has been ordered by the United States District Court for the Western District of Virginia in a pending action brought by the Bank of North America & Trust Co., Philadelphia.

The Princess furnace was built in 1883-84 and rebuilt in 1912. Its brand of pig iron at one time enjoyed a wide reputation throughout the East. The furnace has not been operated during the last few years. Its annual capacity is 36,000 tons.

United States Exports of Industrial Machinery

	February		Two Months Ended February	
Class	1928	1927	1928	1927
Power-generating, except electric and automotive:				
Steam engines (a)	$423,473	$586,087	$1,009,137	$1,706,389
Internal-combustion engines (b)	478,532	604,336	1,090,944	1,374,161
Water wheels and turbines	42,120	......	52,619	20,991
	$944,125	$1,190,423	$2,152,700	$3,101,541
Construction and conveying machinery	1,506,281	1,293,117	3,132,317	2,547,605
Mining, oil-well and pumping machinery:				
Mining and quarrying	1,024,523	1,069,586	1,960,918	2,205,639
Well-drilling	380,469	649,895	956,500	1,622,547
Other oil-well and oil-refining	418,426	785,152	907,408	1,790,115
	$798,895	$1,435,047	$1,863,908	$3,412,662
Pumping, power (c)	287,032	382,283	663,417	913,822
	$2,110,450	$2,886,916	$4,488,243	$6,532,123
Metal-working machinery:				
Power-driven	1,940,147	1,121,256	4,029,949	2,615,383
Other	432,707	284,886	881,282	637,060
	$2,372,864	$1,406,142	$4,911,231	$3,252,443
Textile, sewing, and shoe machinery:				
Textile	921,642	721,241	2,137,989	1,746,443
Sewing, industrial	343,297	283,982	691,602	518,677
Shoe	132,991	74,614	302,384	173,635
	$1,397,930	$1,079,837	$3,131,975	$2,438,755
Other industrial machinery (d)	6,682,252	4,787,234	12,352,593	9,948,848
Total	$15,053,902	$12,643,669	$30,169,059	$27,821,315

(a) Excludes locomotives.
(b) Excludes engines not over 10 hp.
(c) Excludes windmill pumps, also parts of pumps.
(d) Excludes domestic washing machines; includes mine cars.

Price Trend Mixed as Output Gains

Pittsburgh District Steel Production at 85 Per Cent Compared with Recent Average of 80 Per Cent—Tin Plate Output Expands—Shading in Sheets and Nails—Pig Iron Weaker

HEAVY steel output is being maintained and, in some districts, notably at Pittsburgh, is showing further gains, but the trend of prices is no longer upward and irregularities in quotations are more numerous. The opportunity to reduce costs with a high rate of operations has, no doubt, influenced mills to accept additions to contracts at lower than prevailing prices or to shade the market on spot business.

Prices of sheets, strips and wire nails are increasingly irregular. Underlying the finished steel market is an unpromising situation in the primary materials. The scrap and coke markets have a weak tone, and in some sectors pig iron prices are commencing to give ground.

The Steel Corporation is again operating at a 90 per cent rate after having dipped to 88 per cent. Its subsidiary, the Carnegie Steel Co., has lighted three blast furnaces during the week, now having 34 of its 50 stacks active. For both Corporation and independent plants in the Greater Pittsburgh district, steel ingot output now averages 85 per cent, as against 80 per cent two weeks ago. Contributing to improved output of raw steel has been a gain in tin plate mill operations, the current average being 90 per cent of capacity compared with 85 per cent last week.

New orders for finished steel are comparatively light, but, with some mills advising their trade that unspecified tonnage on contracts will be cancelled March 31, specifying is in larger volume. However, there has been less of a rush to enter specifications than was expected; in the Cleveland district, buyers whose plants are not busy are permitting their contracts to lapse.

Nevertheless, much of the steel that will be shipped in April will be at first quarter contract prices, thereby deferring a severe test of recent advances for several weeks more. In a few products the price issue has already been raised. Irregularities in black sheets are increasingly numerous, with some producers taking business, at least temporarily, at $1 to $2 a ton below the recent ruling quotation of 2.90c. per lb., Pittsburgh. Concessions of $2 a ton from 3.75c. on galvanized sheets have been made by both mills and jobbers.

Two producers of wire nails have notified middlemen that they will cancel first quarter tonnage not specified by March 31. Jobbers, however, are heavily stocked and sales of retailers' carloads have been made at $2.60, base per keg, or $1 a ton below the mill quotation on new business.

Price concessions of $2 a ton are reported on hot-rolled strip apart from cooperage stock, and one of the smaller makers of cold-rolled strip has announced a reduction of $3 a ton for second quarter, going back to the prices at which most contracts for the current quarter were made.

Leading Pittsburgh makers of track spikes have discontinued taking orders for less than a carload and have advanced carload prices $2 a ton to $2.80 per 100 lb.

The automotive industry is expected to keep up its present high rate of production through April, with good operations in sight at least through May. There is a heavy demand for steel from motor car builders, but they are ordering cautiously—as a rule only far enough ahead to assure a steady flow of materials from the mills.

Heavy backlogs in rails have been augmented by 18,000 tons placed by the Great Northern. The Gary mill took half of the tonnage, while the Inland and Bethlehem companies booked 4500 tons each. Another Western road which placed a contract in the winter has ordered 4000 tons additional.

Steel mills will furnish about 15,000 tons of steel for 1000 car bodies bought by the Chicago & North Western and 200 ore cars ordered by the Chicago, Milwaukee, St. Paul & Pacific. The latter road has still to buy 4650 freight cars. The New York Central is inquiring for 119 passenger cars, and, according to an unconfirmed report, the Pennsylvania will enter the market for 10,000 to 12,000 freight cars.

A contract for laying a pipe line from Amarillo, Tex., to Kansas City, Mo., has been awarded, but the steel, amounting to 100,000 tons, has not yet been placed.

A bridge over the Delaware River near Philadelphia and an apartment building in New York, each requiring 8000 tons, account for about half of the structural steel work added to pending projects. Awards amounted to 22,400 tons, one of the lowest totals for any week this year. Orders were placed for 13,000 tons of reinforcing steel bars.

Basic pig iron has been sold by a Pittsburgh district producer at more than $1 a ton below the delivered price of Valley iron based on $17 at Valley furnace. Buffalo foundry iron in the New England and New York markets has declined to a base price of $16, furnace, and the delivered prices on Buffalo iron to water points are setting a pace for competitive furnaces because of low canal barge rates. In the Boston market the local producer has met the low quotations of Buffalo iron.

Exports of iron and steel in February were 185,915 tons, a decline from 205,766 tons in January, but higher than the 166,129 tons of February, 1927. The gain from a year ago was more than accounted for by increased shipments of scrap.

Both of THE IRON AGE composite prices have declined, that for pig iron to $17.67 from the $17.75 held for six weeks and that for finished steel to 2.357c. a lb., from the 2.364c. of the preceding six weeks. Both are still well above the year's low figures.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Mar. 27, 1928	Mar. 20, 1928	Feb. 28, 1928	Mar. 29, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	20.75
Basic, Valley furnace	17.00	17.00	17.00	19.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	2.00	2.00	1.95	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	1.95	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	2.00	2.00	1.95	2.00
Beams, New York	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Mar. 27, 1928 Cents	Mar. 20, 1928 Cents	Feb. 28, 1928 Cents	Mar. 29, 1927 Cents
Sheets, black, No. 24, P'gh	*2.85*	2.90	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$15.00**	$14.75	$14.75	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.75	13.25
Carwheels, Chicago	*13.50*	14.00	14.00	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila	15.00	15.00	15.00	17.00
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.00	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.25
Foundry coke, prompt	3.75	3.75	3.75	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*14.20*	14.25	14.20	13.37½
Electrolytic copper, refinery	14.00	14.00	13.75	12.87½
Zinc, St. Louis	5.72½	5.72½	5.45	6.52½
Zinc, New York	6.07½	6.07½	5.80	6.87½
Lead, St. Louis	**5.82½**	5.80	5.90	7.10
Lead, New York	6.00	6.00	6.15	7.35
Tin (Straits), New York	**52.75**	52.00	51.75	68.00
Antimony (Asiatic), N. Y.	*10.00*	10.25	10.25	14.00

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Output of 85 Per Cent Maintained —Some Price Irregularity

PITTSBURGH, March 27.—Production of steel ingots in this and nearby districts is around 85 per cent of capacity. All companies are not operating that well, but a few are running considerably above that rate and one company with an annual capacity of around 1,000,000 tons probably will produce more than 90,000 tons this month. March is usually a month of high production and this year will be no exception. March pig iron production also will be heavy, not only because of additions to the list of active stacks but because many of the large furnaces are being pushed to the limit. One furnace in the district will produce close to 30,000 tons, if, indeed, it does not exceed that mark.

Except that the movement of finished steel from the mills got under way a little earlier than it did last year, there is a remarkable similarity in the performances of this year and last. April, however, promises to show less of a recession than that month last year, although the expectation is not strong that next month's specifications will be as large as they have been this month.

Prices still show much irregularity, with comparatively little of the business carrying the full or top quotations. The effort is being made to preserve the advance by some, but the more general condition is that steel manufacturers are desirous of avoiding price resistance.

The steel industry has no reason for complaint over the volume of orders and specifications, and it is still operating at a rate that insures producing costs as low as are physically possible. This combination of conditions partially counterbalances the fact that it has not been overly successful in securing the advances it set out to obtain during the early weeks of the year.

Confidence would be greater if the railroads were in a position to buy more rolling stock. The St. Paul inquiry for 4650 cars is the largest business of this sort now in sight, although the Pennsylvania is said to be getting ready to put out a good-sized inquiry, despite the fact that an official of that road recently said it would not need cars this year.

Low prices are being made on steel-making iron on sales between steel companies, but merchant iron is held at the prices that long have been observed. Dealers having short orders in heavy melting steel scrap are getting anxious to cover and are raising their bids under increased pressure from the melters for deliveries. The strength of compressed sheet scrap still is a feature of the situation. The fuel market is featured by some good-sized orders and inquiries for coking coal.

Pig Iron.—A Pittsburgh district steel company has closed for a round tonnage of basic iron and a smaller tonnage of Bessemer iron for a steel foundry which it operates, but no details as to prices are available. The iron, however, will not come from Valley furnaces, the transaction being another demonstration of the fact that Valley steel-making iron cannot be brought into the Pittsburgh district in competition with Pittsburgh district steel company iron, which enjoys a substantially lower rate of freight for one thing, and for another, the steel companies with surplus iron for market not infrequently pass on to buyers more than their freight rate advantages. In the case of the basic iron, there are reports that it sold at $15.87, Valley furnace basis, which would mean $17.63, delivered, but it is probably nearer the facts that the iron carried a freight rate of $1.13 and the price at shipping furnace was $16.50. It was noted in these reports a fortnight ago that while Valley furnaces were still quoting $17 for this grade, they would have to go to about $16 to meet local competition. An inquiry in the market is for 5000 tons of basic iron of special analysis, but it is believed to be for shipment outside the natural territory of Pittsburgh or Valley furnaces. Except for this business, the market has been extremely quiet, with only small lots of Valley iron moving, and these at the prices which have ruled for some time. The Carnegie Steel Co. has put on a Duquesne, a Carrie and an Isabella furnace within the week and now has 34 of its 50 stacks in production.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Business is entirely a matter of specifications on contracts, as there are few, if any, users of ferromanganese, spiegeleisen, or high grade ferrosilicon who are not covered. So far as can be learned, not a carload of high grade ferrosilicon has been billed to consumers in this district at the higher prices which makers announced early in the year.

Semi-Finished Steel.—As open market trading in billets, slabs and sheet bars has largely ceased and the movement is mostly on requirement contracts of indefinite duration between consumers and makers, there are no tests of what are commonly regarded as the market prices. For more than a year, mills have called the market $33, Pittsburgh or Youngstown, for large billets and slabs, and $34 for sheet bars and small billets and slabs, but as in that time there has been wide variation in the prices of most of the finished products, it is assumed that the contracts are flexible as to prices as well as duration. Wire rods are nominal at $44, base. There has not been much contracting at that price, buyers having some doubt as to its maintenance, and this feeling has increased since some makers are accepting increased specifications on first quarter contracts carrying $2 to $4 a ton less.

Rails and Track Supplies.—Leading local makers of spikes have announced that they no longer will take orders of less than a carload and at the same time have placed the carload price at $2.80, base, per 100 lb. for all sizes. This represents an advance of $2 a ton, as the ruling price has been $2.70, and restricting that price to a minimum of a carload means a stiffer advance to small-lot buyers, who have been able to buy at the mill prices. Standard-section rails and track supplies continue to move well on old orders, but not much new business is coming in. Light-section rails still are very dull.

Wire Products.—Two producers are notifying jobbers that after next Monday no business in nails will be accepted at less than $2.65, base, per keg Pittsburgh. In other words, first quarter business not specified by Saturday is to be cancelled. So far as can be observed, however, this action has not materially stimulated second quarter contracting, as jobbers generally are well stocked and are not much concerned about additional coverage in view of the fact that the movement into consumption has not been particularly brisk. Some resistance to the price also is being encountered, as jobbers who would go along with the advance find considerable competition in the resale prices; sales of retailers' carloads have been made at $2.60, base. It is said the extra of $1 a ton over Pittsburgh is not being closely adhered to in the Central West, and price irregularity is reported in the East and South. There is resistance by consumers of plain wire to $2.50, base, per 100 lb. General business is regarded as satisfactory by most producers, but price uncertainty is disturbing.

Tubular Goods.—Pipe for building and construction is moving steadily into consumption and jobbers are replacing shipments, but the market lacks activity in other classes of tubular products. The oil industry still struggles with overproduction. Some good-sized pipe line projects appear to be held up by legal or financial obstacles. Mills are interested in the suggestion of a possible stiffening of secondary market prices, since such a large percentage of the standard-weight pipe is distributed on consigned accounts and makers would benefit by higher resale prices. Evidence, however, is lacking here that the movement yet is nearing accomplishment.

Sheets.—There has been much less than the usual amount of contracting for the second quarter in the common finishes, and in view of the high engagement of mills, it is becoming apparent that what has happened in a number of other products, is happening in sheets—there is either extension of existing contracts or additions to them are being accepted. While the full quotations of 2.90c., base, on black, 3.75c., base, on galvanized and 2.10c. to 2.20c., base, on blue annealed have been paid for small pick-up tonnages for quick shipment, a good deal heavier tonnage is moving on the basis of first quarter commitments. The market is better maintained on blue annealed than on galvanized and black sheets, but the weakness in strips is not conducive to strength in blue annealed sheets 40 in. and narrower. Galvanized sheets are being sold in small lots by jobbers in some parts of the country at 3.65c., base, Pittsburgh, which, of course, makes mill sales difficult at more in those localities. Specifications have been lighter in the past week than in the week before, which suggests that consumers are fairly well stocked.

Tin Plate.—Mill operations continue to expand and the leading producer now is operating at 93 per cent of capacity, while the general average of operations is not under 90 per cent. That compares with approximately 85 per cent last week. The prospect continues bright for a large use of tin plate in packers'

THE IRON AGE Composite Prices

Finished Steel

March 27, 1928, 2.357c. a Lb.

One week ago	2.364c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

March 27, 1928, $17.67 a Gross Ton

One week ago	$17.75
One month ago	17.75
One year ago	19.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, gal'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.94c. to 3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.74c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per 100 Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	3
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	13
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	9
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 3
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	44
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	48
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

cans, but just now the principal demand is for general line can sizes. This demand is exceptionally good.

Cold-Finished Steel Bars and Shafting.—Specifications are lighter than they have been with most makers in this district. The fact that prices have stopped advancing encourages buyers to defer purchases against future needs.

Bars, Plates and Shapes.—Makers in this district note no marked variation in the rate of incoming tonnage releases. If there has been any definite change, it has been slightly upward because of the increase that comes in the final week of each month in preparation for the following month's requirements. The price situation is not entirely satisfactory to the mills, but at the same time steel manufacturers have retained enough of the advances made the past few months to have slightly lifted their average prices. Some consumers of hot-rolled bars appear to have accumulated fair-sized stocks, more especially those having warehousing facilities. Structural steel lettings in this area still are moderate and only the larger shops seem to have good order books.

Hot-Rolled Flats.—The effect of a good demand is tempered by irregularity in prices. While cooperage stock is holding well at 2.20c., base, the more common price on narrow material up to 3 in. wide, is 2.10c. and on 3-in. to 6-in. widths 2.10c. is somewhat exceptional, with an increasing number of sales going at 2c. On very wide strips, makers are obliged to recognize plate prices, which are not over 1.85c. base, on worth-while tonnages.

Cold-Rolled Strips.—Makers still note a good flow of specifications on old business, carrying prices $3 a ton under present regular quotations, but in going after second quarter business at the advance considerable resistance is uncovered. The large tonnage buyers have been given additional protection at the lower prices and so far as large lots go, the test of the present base of 3.15c. for lots of 1 to 3 tons is still to come.

Bolts, Nuts and Rivets.—Manufacturers who produce only rivets are quoting large sizes at $2.75, base, per 100 lb., Pittsburgh or Cleveland, and $3, base, Chicago and Birmingham, and small sizes at 70 per cent off list and report sales at these prices. These prices are not, however, the bottom of the market if sales by bolt and nut makers with rivet-making capacity are to be recognized. Few of the latter can supply the full range of sizes of rivets and some are said to be accepting rivet business at concessions in order to get bolt and nut orders at the full prices. Demand for bolts and nuts is good, but does not heavily tax productive capacity.

Coke and Coal.—There is little of interest in the coke market, which still is dull and easy under excessive supplies in relation to wants. The coal market, however, is showing a fair degree of activity. A Cleveland steel company late last week closed for 450,000 tons of coking coal, which will be shipped from the Fairmont, W. Va., district over the year beginning April 1. The Central Alloy Steel Corporation is in the market for its annual requirements of coking coal. The market still is slow on contract coal, but is developing some resistance to pressure exerted by buyers, notably on gas coal, which seems to have hit bottom at $2.15 per net ton at mines for lump grade.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—A number of consumers are now demanding deliveries against orders for heavy melting steel and something of a scramble among dealers to cover their sales is responsible for a decidedly firmer market in that grade. There is a demand from dealers for tonnages for shipment to Johnstown, Monessen, Midland, and Weirton and on ordinary steel the market is not less than $15, while for No. 1 railroad or its equivalent $15.50 would be paid by several dealers and little is to be had. Compressed sheet scrap is still selling at substantially the same price as the ordinary run of heavy melting steel, additional sales being noted of the best lots at $15. The market also is stronger on cast iron borings, which have sold at $11.25 and lately no machine shop turnings have sold under $10.50. The Baltimore & Ohio March scrap list contains 14,820 gross tons. Through an error in transmission, the prices of heavy melting steel last week read $14.50 to $15 and on compressed sheets $14 to $14.25; they should have been $14.50 to $15.50, and $14.50 to $15, respectively.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.00 to $15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.75 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	15.00 to 15.50
Industrial	14.50 to 15.00
Agricultural	14.00 to 14.50

Two Orders for Sandberg Rails

The Boston Elevated Railway has placed its twelfth order with the Bethlehem Steel Co. for Sandberg sorbitic steel rails—475 tons of 85-lb. ASCE section. From the Chilean State Railways has also come an order for Sandberg rails—200 tons of 100-lb. section, to be rolled and treated by the Bethlehem Steel Co.

The works of the Jones & Laughlin Steel Corporation on the north side of the Monongahela River has completed 60 days' operation without a single disabling accident to any of its employees. Approximately 1,000,000 man-hours have been worked since the last lost-time accident. These plants embrace the by-product coke plant, Eliza Furnace department, Keystone structural fabricating department and the Soho department, which is made up of an open-hearth department, spike factory, chain works and three plate mills.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
erolling, 4-in. and over	$33.00
erolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
orging, ordinary	38.00 to 39.00
orging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
pen-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
ld range Bessemer, 51.50% iron	$4.55
ld range non-Bessemer, 51.50% iron	4.40
esabi Bessemer, 51.50% iron	4.40
esabi non-Bessemer, 51.50% iron	4.25
igh phosphorus, 51.50% iron	4.15

oreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
on ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
on ore, Swedish, average 66% iron,	9.25c. to 9.50c.
anganese ore, washed, 52% manganese, from the Caucasus	39c.
anganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
ungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
hrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
olybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
urnace, f.o.b. Connellsville prompt	$2.60 to $2.75
oundry, f.o.b. Connellsville prompt	3.75 to 4.50
oundry, by-product, Ch'go ovens	9.00
oundry, by-product, New England, del'd	11.50
oundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
oundry, Birmingham	5.00
oundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
ine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
ine run coking coal, f.o.b. W. Pa mines	1.50 to 1.75
as coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
ine run gas coal, f.o,b. Pa. mines	1.75 to 1.90
team slack, f.o.b. W. Pa. mines	0.90 to 1.00
as slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
ag bolts	70
low bolts, Nos. 1, 2, 3 and 7 heads	70
ot-pressed nuts, blank or tapped, square	70
ot-pressed nuts, blank or tapped, hexagons	70
.p.c. and t. square or hex. nuts, blank or tapped	70
ashers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Market Steady—Prices Less Certain Than Volume of Business

CHICAGO, March 27.—The Chicago steel market in entering the second quarter is showing a degree of steadiness that had not been expected by many in the trade. Least certain of all factors is that of price, for there are still some sellers who are not strictly adhering to 2c. on bars and narrow plates. The bulk of new sales, however, is being made at the new level. Purchases are heavier than a week ago and fresh inquiry gives promise of a high rate of forward buying. Specifications exceed shipments, making this one of the best seven-day periods since the beginning of the year. Consumers, still intent on holding stocks to a workable minimum, continue to order out steel in accordance with their production schedules. There are no indications that buyers are inclined to speculate in the heavy tonnage products.

Railroad equipment orders include 200 ore cars and 1000 automobile car bodies. Reports are persistent that the Illinois Central is preparing a car-building program, and it is probable that the Chicago & North Western will soon enter the market for about 40 suburban cars. Mild weather in the past few weeks has resulted in early demands for farm machinery that had been placed in stock for spring delivery.

Pig Iron.—Spot buying has assumed the major role in this market as second quarter contracting is practically completed. Indications are that the foundry melt is increasing and several users have already ordered second quarter purchases delivered in April and May. Prices in this market are steady at $18.50, base, though sellers will cut this figure to reach into Michigan. Competition to the south is less keen and producers are holding to natural territories as defined by freight differentials. Furnace output is steady and in smaller volume than shipments, which for March will exceed deliveries in February by at least 10 per cent. Some Southern iron on an all-rail rate is reaching into Michigan. The silvery market is quiet and prices are unchanged.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A small order for ferromanganese has been taken at $100, seaboard. Spiegeleisen is quiet, and buyers are making efforts to place small lots at figures below current quotations.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Bolts, Nuts and Rivets.—Forward contracting is nearly completed. New prices on stove bolts and large rivets are holding. Specifications are in good volume and producers are engaged close to 70 per cent of capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Plates.—Interest in the railroad equipment market centers around orders for 200 ore cars by the Chicago, Milwaukee, St. Paul & Pacific and 1000 automobile car bodies by the Chicago & North Western. Steel mills will be called on for close to 15,000 tons of materials for these orders. Fresh inquiries for passenger car equipment bulk large, the New York Central alone having asked for prices on 119 cars. Car shops in the Chicago district are moderately busy, and specifications issued by them from week to week are steady and of decided advantage to mills in arranging rolling schedules. An oil producer in the Southwest is asking for 5000 tons of plates. This inquiry, added to the 5000 tons that came before the trade a week ago, brings total outstanding inquiry for oil storage tanks to not less than 10,000 tons. Car shops, fabricators, tank shops and the general manufacturing trade are all contributing a steady flow of business to local mills. Specifications for plates are about equal to shipments, and new buying is close to the current rate of output.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—It is expected that the formal contract for the Palmolive-Peet Building, Chicago, requiring close to 5000 tons of structural steel, will be signed this week. Fresh inquiry of note includes 1800 tons for a building for the Chicago Motor Club. The Rochester Bridge Co. has taken 400 tons for a warehouse for the International Harvester Co., Fort Wayne, Ind. The Buick Division of the General Motors Corporation is planning the erection of a large distributing plant at Clearing, Ill. Fabricating shops in the Chicago district are well engaged, especially since several of the large contracts recently placed are being farmed out to competitive shops by the successful bidders. The general contractor on the approach to the La Salle Street bridge, which will take 900 tons of steel, will fabricate part of the work in his shop and will distribute the remainder of the tonnage to various fabricators. In spite of higher prices for plates, shapes and bars, fabricators have not succeeded in raising the general level of quotations on their work. While several weeks ago some steps along this line were taken, it is evident that not much progress was made, because current quotations are on a level that is not above that which prevailed when shops were eagerly seeking work in order to hold together the skeletons of their organizations. Mill deliveries on shapes range from four to six weeks.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Mild steel bars are the first of the heavy tonnage steel mill products to gain prominence from the viewpoint of an active interest in second quarter contracting. Sales, counting both current business and forward buying, are well ahead of shipments. The motor car industry and accessory manufacturers are largely responsible for this situation. A motor car builder with several plants in Indiana will have produced 27,000 cars at the close of March, an increase of 8000 units over February, and the schedule for April is materially heavier than for this month. Reports from various tractor plants throughout the Central West show that capacity output will not supply the demand, and several manufacturers are talking of expanding plant facilities. Current orders for iron bars are small in total volume. Prices of alloy bars are steady at 2.65c., base, f.o.b. maker's mill. Chicago district mills making alloy bars are engaged at close to capacity. The flow of orders for hard steel bars is steady. New buying and specifications against old orders are well balanced with production. Both Chicago Heights mills continue to operate double turn. Producers are holding to 1.85c., Chicago Heights, for new purchases that are to be delivered in the second quarter. Old contracts at 1.80c. that have not been fully specified will not be cancelled April 1. Deliveries of this commodity range from 10 days to two weeks.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Cast Iron Pipe.—Evansville, Ind., will open bids March 29 on 5000 tons of cast iron pipe in sizes ranging from 8 to 24 in., all class B. R. D. Wood & Co. and the American Cast Iron Pipe Co. are low bidders on various classes of centrifugal pipe for Akron, Ohio. James B. Clow & Sons have taken 1000 tons of 4 to 12-in. class B pipe for Barberton, Ohio, and 115 tons of 4 and 6-in. class C pipe for Alliance, Ohio. The National Cast Iron Pipe Co. has been awarded 380 tons of 24-in. class B pipe by Springfield, Ill., and 600 tons of 10-in. pipe at Painesville, Ohio, has been taken by a local contractor. The National company is low bidder on 200 tons of fittings for Chicago. Several large contractors' jobs are open for bids in nearby Chicago territory. Prices for 6-in. and larger diameters are steady at $29 to $31, Birmingham.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Hot-Rolled Strip.—Specifications for this commodity are heavy and local mills are fully engaged. New sales lack only a narrow margin of being equal to shipments.

Sheets.—Prices in the immediate Chicago territory are holding, but to the south and in the Southwest competition remains keen and quotations are below the levels of the local market. Hot mills are engaged at 80 per cent of capacity and schedules range from 10 days to two weeks. Current buying is of fair proportions, but forward contracting is dull, with the result that the sum of all sales fall short of shipments.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Rails and Track Supplies.—A Western railroad has ordered 4000 tons of standard-section rails. This tonnage is in addition to the contract placed last winter by that railroad. The inquiry for 4000 tons of rails noted last week is still pending. New business in track fastenings totals 5000 tons, while fresh inquiry is for not less than 16,000 tons. Several carloads of light rails have been ordered. Angle bars are quoted at $2.75 per 100 lb., base, local mills, and tie plates are priced at $2.15 per 100 lb., f.o.b. Chicago.

Reinforcing Bars.—Outstanding among reinforcing bar awards this week is 1000 tons of rail and billet steel bars for a printing plant in Chicago. Fresh inquiry is dull, but old projects are numerous and the trade believes that the bulk of them are active. In the meantime, shop backlogs continue to dwindle more rapidly now than earlier in the month for the reason that open weather is urging contractors to speed work and clear the way for new contracts. This move has resulted in a higher rate of shop activity. Small orders, up to 25 tons, are numerous, and it is on work of this kind that prices are stable. The practice of shading continues on large tonnage quotations. New business and fresh inquiries appear on page 917.

Wire Products.—Shipments of wire products this month are heavier than in any like period in the last four years. As March comes to a close order books are well filled and forward contracting is expanding. Producers, having cut stocks lower than in the midwinter months, are not allowing them to accumulate now because of a slackening in shipments which usually comes in May. Shipments of woven wire fencing are smaller as farmers busy themselves in the fields. The nail market is dull and irregular. Jobbers, having stocks that are out of balance with demand, are showing some anxiety over the situation and resale lots are being offered. To make matters worse, the bulk of these nails were ordered at prices that were below present quotations, and in some instances even at preferential prices. Mills are stubbornly resisting changes in prices, although the matter is somewhat out of their hands at this time.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Coke.—By-product foundry coke is steady at $9, local ovens, and $9.50, delivered in the Chicago switching district. Shipments are moving forward rapidly.

Old Material.—Prices of a number of grades have followed the downward lead taken by heavy melting steel a week ago. Close to 1000 tons of rerolling rails have been purchased by a user at $14.25 a gross ton, delivered, this being a drop of 75c. from the last reported sale. Further weakness is noted in heavy melting steel. A few weeks ago mills became anxious concerning the size of stocks on hand. Purchases were made rather freely and shipments moved forward rapidly in a market that was well supplied with this grade. Since that time stocks in the hands of consumers have grown and buyers, feeling that the emergency is past, are tightening up on inspections and are turning deaf ears to sellers. Melters have refused offers at $13, while on the other hand the close inspection by mills is forcing dealers to pay top prices for a large part of current shipments against old orders. Brokers' trading prices for heavy melting steel range from $12.50 to $13 a gross ton. At Gary shipments are being held back. Strength that had been expected by some in the market for borings has not developed beyond a spurt a week ago. This market is weakened by shipments from producing centers to the east of Chicago. Taken as a whole, this market lacks stability and it is openly declared by some that even lower prices may be expected. Railroad shipments are moving more freely with the present open weather. Yard dealers are not inclined to speculate and in most instances are shipping scrap as fast as it is prepared. Brokers appear to be anxious to speed coverage on old contracts. A producer is offering 1000 tons of borings, and the St. Paul Railroad will sell 6000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.00 to 15.50
Railroad tires, charging box size	16.00 to 16.50
Railroad leaf springs, cut apart	16.00 to 16.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	16.25 to 16.75
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.75 to 14.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	13.75 to 14.25
Cupola Grades:	
Steel rails less than 3 ft.	15.00 to 15.50
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	21.50 to 22.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling	5.25 to 5.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Steel Market Inactive but Prices Are Firm—Pig Iron Dull

PHILADELPHIA, March 26.—Transactions in plates, shapes and bars are almost completely confined to shipments against current contracts. Specifications for plates are reported to be coming out quite freely, but there is a lag in bars and shapes, consumers evidently having sufficient tonnage on hand for nearby requirements. Mills are maintaining 1.90c., Pittsburgh, on bars, 2.05c., Coatesville, on plates and 2.05c., Bethlehem, on shapes when quoting on new business, but these prices have been subjected to very little test as most consumers are receiving shipments on first quarter contracts at $2 a ton less and have made second quarter purchases at $1 a ton less.

Contracts for bridge construction continue to feature the structural steel market. One fabricator estimates that about 75 per cent of the business on his books is for small and medium-size bridges. Railroads are prominent in this field, but there is also some public work. Bids will be opened April 2 on the Tacony-Palmyra bridge, which will require 8000 tons of structural steel. Some plate business is in prospect from the recent award by the Reading Railroad of six car floats to Delaware River shipyards and the inquiry of the Pennsylvania Railroad for 10 hulls.

Pig Iron.—There is less activity in foundry pig iron than for some time, but the foundry grade is firm at $20, base furnace. Not only are consumers inclined to await price developments, but the smaller foundries are reported to be melting less iron than earlier in the quarter and at the present rate of consumption have sufficient iron due on their present contracts to carry them well into the next quarter. The larger foundry consumers, however, are taking full deliveries on contracts and are operating at a good rate. Low phosphorus is quiet, but prices are firm.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Quotations are unchanged at $33 per ton, Pittsburgh, for rerolling billets and $38, Pittsburgh, for forging quality. Current business is confined to small lots for early delivery.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Bars.—Specifications are coming in rather slowly, but prices are being maintained firmly at 1.85c., Pittsburgh, for second quarter contracts and 1.90c., Pittsburgh, for current delivery. Some desirable tonnages of reinforcing bars are included in pending projects, such as the Allentown, Pa., bridge with 1000 tons, Alden Park Manor apartments, Philadelphia, 800 tons, and marine barracks at Quantico, Va., 600 tons.

Shapes.—Little new business is being booked, but there are some substantial bridge projects in prospect, including the Tacony-Palmyra bridge, requiring 8000 tons of structural steel, and a projected bridge for the Pennsylvania Railroad over the Schuylkill River. Specifications on contracts are coming in slowly and at a rate that in some cases does not require completion of present commitments by the end of the month. Contracts for the coming quarter are at 2c., Bethlehem, or 2.13c., delivered Philadelphia, and the current price on new business is 2.18c., Philadelphia. One eastern Pennsylvania mill continues to meet the contract price on current orders.

Plates.—Consumers are fairly well covered for the next quarter at 2c., Coatesville, or 2.10c., delivered Philadelphia, and on new business at 2.05c., Coatesville, or 2.15c., Philadelphia, is quoted. Specifications are coming out freely from most consumers. Some plate tonnage is in prospect from the award by the Reading Railroad of four car floats to the Sun Shipbuilding & Drydock Co., Chester, and two to the American Brown Boveri Electric Corporation, Camden, N. J. The Pennsylvania Railroad has revived an inquiry for 10 hulls, including car floats, barges and a tug boat hull.

Sheets.—Demand is moderate. There has been some contracting for small second quarter tonnages. Blue annealed sheets are quoted at 2.10c., Pittsburgh, black at 2.90c., Pittsburgh, and galvanized at 3.75c., Pittsburgh. Concessions are rare.

Warehouse Business.—Purchasing from stock is not as large as usual at this season, but prices are being maintained with only occasional reports of concessions, and quantity differentials are adhered to firmly.

Imports.—In the week ended March 24, pig iron receipts at this port totaled 3103 gross tons, of which 303 tons was Dutch and 2800 tons British iron. A total of 4000 tons of chrome ore arrived from Portuguese Africa. Steel imports consisted of 30 tons of bands, 22 tons of steel bars and 180 tons of structural shapes from France, 56 tons of shapes from Belgium and 54 tons of shapes from Germany.

Old Material.—Prices are substantially unchanged. A sizable tonnage of heavy breakable cast has been purchased by an eastern Pennsylvania mill at $16 per ton, delivered. Consumers at Harrisburg, Conshohocken, Pa., and Claymont, Del., are reported to have temporarily held up deliveries of steel on their contracts.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)	10.50 to	11.00
Machine shop turnings (for steel works)	10.50 to	11.00
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)		11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)	12.00 to	12.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)		12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Cleveland

March Steel Business About Equals February's—Weakness in Sheets

CLEVELAND, March 27.—The volume of business in steel bars, plates and structural material fell off somewhat the past week, the market not bearing out expectations that there would be a rush of specifications against 1.80c. contracts expiring March 31. However, March business will about equal that of February. Mills generally have advised their trade that unspecified tonnage will be cancelled. Some buyers are taking out all steel covered by their contracts and others whose plants are not very busy will allow cancellations. Much of the steel shipped during the first half of April will be against the old 1.80c. contracts. On steel bars, plates and structural shapes the price range remains at 1.85c. to 1.90c., Pittsburgh, the lower price being for contracts or fair-sized lots, as most buyers are now under contract at the lower price. New demand is confined largely to small lots that are bringing 1.90c. Local mills quote the same prices f.o.b. Cleveland. To meet the Cleveland competition, an Ohio mill is quoting forging steel bars at 1.90c., base, mill, equivalent to 1.80c., Pittsburgh, for Cleveland delivery. The demand for steel from the automotive industry continues heavy, but motor car builders as a rule are ordering only far enough ahead to assure a steady flow of material from the mills as needed. This business is keeping the mills well filled and recent operations are being maintained. The automotive industry evidently will keep up its present production through April and good operations are predicted at least through May. While metalworking plants in some lines outside of the automotive industry are somewhat busier than recently, others show little if any improvement. Inquiry in the building field is slow.

Pig Iron.—The market was not as active the past week as in preceding weeks, sales by Cleveland interests having declined to 16,000 tons. Some of the business came from foundries that had previously covered for only part of their second quarter requirements. Inquiry is not very plentiful, although one Lake furnace has inquiries for several lots aggregating 8000 tons. While a few third quarter inquiries have come out, producers so far have refused to quote for that delivery. First quarter business with some foundries has been considerably below expectations and, as a result, several of the furnaces will carry considerable first quarter iron over to the second quarter. Several of the automobile foundries have issued April specifications and will take as much iron during the next month as in March. Central Western foundries in the radiator, stove and heater fields are reported to be operating at about normal capacity. Agricultural implement foundries are operating better than recently. Business with many of the jobbing foundries is still slack. There is little interest in the price situation, as producers are not attempting to get higher prices and on the other hand are not showing a disposition to shade ruling quotations. Cleveland furnaces are adhering to $17, furnace, for foundry and malleable iron except on business for shipment to highly competitive points, for which they are going to $16.75. One Lake furnace interest is on a $17.50 minimum basis. In Michigan the market is firm at $18.50.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Coke.—A $1 a ton price reduction on egg coke for domestic use to $6, ovens, has been made in the Detroit territory. Ohio producers are still adhering to $4.50, which is meeting with resistance from dealers who want a lower summer price. Foundry coke sales are limited to small lots with prices unchanged. Ohio byproduct foundry coke is quoted at $8, Painesville, or $9.01, delivered Cleveland, for April shipment.

Iron Ore.—Producers have not yet submitted quotations on the inquiry of the Ford Motor Co., which may establish the market for the season. Consumers seem to be in no hurry to have prices named. The volume of open market buying, which has become greatly reduced the past few years because of long-term contracts, is expected to be about the same this year as during 1927. There is a disposition among vessel men to delay the starting of boats until May 1, even should navigation open sooner, in order that they be assured of better operations later in the season. However, if consumers are in need of ore they will be able to secure April shipments, provided ice conditions permit the operation of boats.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair and March business will show a gain over February. Many buyers are placing second quarter contracts. Rivet makers report that they are not meeting much resistance to the $3 a ton price advance for the second quarter and have closed considerable business at the new price of $2.90 per 100 lb., Cleveland and Pittsburgh, large rivets. However, specifications against present $2.75 contracts are only moderate.

Sheets.—Weakness in black sheets reported a week ago became more pronounced the past week. Some of the producers have abandoned, at least temporarily, a Pittsburgh base and quotations of 2.85c. to 2.90c., Valley mill, have become rather common and prices as low as 2.70c., mill, are reported. Galvanized sheets also show further weakness, being quoted at 3.65c. and lower at Ohio mill. Some of the mills have agreed to accept specifications on old low-priced contracts up to April 1, and this is evidently one reason for the weakness, another being the need by some of the mills for tonnage. Although occasional concessions to 4c. are reported on auto body sheets, these generally are holding firm and considerable business is coming from the Michigan territory at the regular 4.15c. price. Blue annealed sheets are firm. Demand is slow outside of the automotive industry, and few buyers are placing second quarter contracts.

Wire Products.—Weakness has appeared on wire nails in some sections, where a price of $2.55 per 100 lb. keg, Ironton, is reported. Jobbers who have large low-priced stocks have also been a disturbing factor. However, mills appear to be holding to the regular price in this territory. The demand is not active.

Strip Steel.—Strip steel mills are accepting specifications against old low-priced contracts for hot-rolled strip up to April 1 and these are coming out in good volume. While some second quarter contracts have been placed at present prices, these prices have not yet been tested by large-lot buyers. A 3c. base price, or a $3 a ton reduction, has appeared on cold-rolled strip, but leading producers appear to be holding to the regular price. However, there has not been much test of the market, as most orders are against old contracts.

Semi-Finished Steel.—A local producer has taken additional reservations for sheet bars, billets and slabs for the second quarter without naming prices. Some wire rod contracts have been placed at the regular $44 Cleveland price.

Alloy Steel.—Some second quarter contracts have been placed at the new prices. Mills generally are asking a quantity differential of $2 a ton or 2.75c., base, for less than car lots and up to 2.85c., base, for very small lots.

Reinforcing Bars.—The only large award is for 1000 tons for store buildings in Cleveland. New inquiry is confined to small lots. Rail steel bars are commonly quoted at 1.75c., mill.

Warehouse Business.—Jobbers are getting a good volume of orders, but they are for small lots. The total volume of business shows a slight gain. Regular prices are well maintained.

Old Material.—A Cleveland mill purchased a small tonnage of scrap during the week, paying $14 for No. 1 heavy melting steel and $11.25 for short shoveling turnings. No new demand is coming from other northern Ohio or Valley district mills. Shipments are still closely restricted, although one Cleveland mill is taking scrap somewhat more freely than recently. While the market has a weak tone, quotations are unchanged. Dealers are able to buy car lots for quick movement at slightly below quoted prices. Several automobile makers in the Michigan territory have issued their scrap lists for April. These include: Buick, 4000 tons; Chevrolet, 25,000 tons; Cadillac, 400 tons. The Muncie Products Co. is offering 500 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

New York

Keener Competition in Pig Iron—March Steel Tonnage High

NEW YORK, March 27.—The volume of pig iron sales is holding up rather well, but increasingly keen competition among furnaces is having an adverse effect on prices. Unusually favorable barge rates from Buffalo have resulted in lower delivered prices on foundry iron at many points in this territory, but even for all-rail shipment base prices at Buffalo are somewhat weaker, ranging from $16 to $16.50. Furnaces east of Buffalo are meeting this competition in some instances, but eastern Pennsylvania furnaces, which are still quoting $20, base, are taking little business in this district. No longer expecting advances in prices, melters have resumed a policy of short-term buying and are showing little interest in requirements beyond second quarter. Purchases for the past week, which were to a large extent for nearby shipment, covered a total of 9000 tons, a gain of 2000 tons over the previous week. The Foran Foundry & Mfg. Co., Flemington, N. J., has closed for 500 tons of No. 2 plain and 400 tons of No. 2X for second quarter and is understood to have obtained a lower delivered price than was quoted by eastern Pennsylvania furnaces. The General Electric Co. has bought 500 tons for its Erie, Pa., plant, but still has 2000 tons to buy for various other foundries. The Singer Mfg. Co., Elizabeth, N. J., is inquiring for a substantial tonnage for Elizabeth and for its Canadian plant. The Abendroth & Root Mfg. Co., Newburgh, N. Y., is also in the market for a tonnage for second quarter delivery. In general, melt is holding its own and in some directions is expanding.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—A few makers of cold-rolled strip steel have formally announced a reduction of $3 a ton for second quarter, going back to the prices at which most of the first quarter contracts were made, namely 3c., Pittsburgh or Cleveland, for lots of 1 to 3 tons and 2.75c. for lots of more than 3 tons. Some second quarter contracts have been made at 2.90c. for lots of more

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish. 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

than 3 tons. On other products prices are fairly steady, although the market on galvanized sheets in New York is somewhat upset by sales from jobbers' stocks at 3.65c., Pittsburgh, when mills are trying to obtain 3.75c. on second quarter contracts. Contracting for sheets for second quarter has not been large, but mills are adhering quite firmly to published quotations. In plates, shapes and bars the bulk of second quarter contracting has been done at 1.85c., Pittsburgh, for bars, 2c., Coatesville, for plates and 2c., Bethlehem, for shapes, but quotations $1 higher are applying on small-lot orders. Some weakness has developed in hot-rolled strip, but mainly in the wide sizes that meet plate mill competition. Concessions of $1 a ton have been granted in such instances. Demand for steel products, represented chiefly by specifications against contracts, has held at a high rate during March, and the total scheduled for shipment by sales offices is running larger than in the same number of days in February. Merchant pipe is moving more freely out of jobbers' stocks and this is reflected in a slightly better operating rate at the mills. A heavy volume of specifications for plates, shapes, bars, sheets and strip steel is expected this week, some mills insisting on complete first quarter specifications by March 31, with unspecified portions to be cancelled. These specifications will provide many consumers with enough steel for April, and as a result second quarter prices will not take real effect for some little time. Considerable building work is in prospect in New York, but meanwhile competition among fabricators is so keen that prices of fabricated material do not increase. The largest structural steel inquiry is for 8000 tons for unit No. 9 in the Tudor City development, New York.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—There is a fair volume of purchasing and prices are quite firm, except for occasional shading on structural material when competition from foreign steel is encountered. Sheet prices are fairly firm at 4c. to 4.20c. per lb., base, for black and 4.70c. to 4.95c. per lb. for galvanized. Mill prices on zinc sheets have been reduced 1c. per lb. to 8.50c. per lb., base, but no corresponding reduction has been made as yet by jobbers.

Cast Iron Pipe.—Private purchases of bell and spigot pipe are principally of small tonnages, but the number of such purchases is increasing. Prices show greater firmness and, although delivered prices of Northern makers are still slightly under the delivered quotations of Birmingham foundries, the tendency evidently is upward. There are some small tonnages in the market for export, but the foreign purchasers are slow to close.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—A highway bridge across the Raritan River at New Brunswick, N. J., on which bids will be opened April 9, will require 1700 tons of bars. No other new projects of large size have been reported in the last week, but some distributers report an increase in the number of small jobs for which bars will soon be bought. The mill price ranges from 1.95c. to 2c., Pittsburgh, with the majority of business being placed at the latter figure. Distributers are quoting 2.20c., Youngstown warehouse, or 2.57½c. on cars at New York, and out of New York warehouse the general quotations are 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Coke.—The market continues quiet and prices are unchanged. Standard furnace is quoted at $2.75 to $3 per ton, Connellsville. Delivered prices in this district of special brands of beehive foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40 per ton, Newark or Jersey City, and $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—Prices still show a slight downward tendency on some grades, with the market quiet. No. 1 heavy melting steel is being shipped to consumers at Coatesville and Bethlehem, Pa., and yard grade to Pottsville and Phoenixville, Pa. Users at Claymont, Del., and Conshohocken, Pa., have temporarily suspended shipments on their contracts and a Harrisburg consumer of steel is taking only a few carloads. Brokers are offering $15.50 per ton, delivered Coatesville, for heavy breakable cast.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	15.50 to 16.00
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.50 to 11.00
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

RAILROAD EQUIPMENT

Atlantic Coast Line has made inquiry for 200 70-ton phosphate cars.

Manganiferous Iron Co., Ironton, Minn., has purchased four 20-cu. yd. air dump cars from Koppel Industrial Car & Equipment Co.

Cudahy Packing Co. will buy 100 steel underframes for refrigerator cars.

Pacific Fruit Express contemplates purchasing 400 to 800 steel underframes for refrigerator cars.

Chicago & North Western has ordered 500 automobile car bodies from Standard Steel Car Co. and 500 from General American Car Co.

Southern Pacific has made inquiry for 10 air-dump cars.

Chicago, South Shore & South Bend is inquiring for 10 interurban coaches.

St. Louis-San Francisco has ordered five gas-electric rail motor mail and baggage cars.

Amtorg Trading Corporation, 165 Broadway, New York, is inquiring for 15 20-ton flat cars.

Pere Marquette will make inquiry for 20 steel air-dump cars of 30 cu. yd. capacity.

Chicago, Aurora & Elgin will buy 10 interurban coaches.

New York Central has issued inquiry for 119 passenger train cars for service on its various lines as follows: 19 passenger coaches, 10 motor car bodies, three passenger and baggage and two baggage and mail coaches, 30 baggage cars, 19 horse cars, 30 milk cars and six dining cars.

Chicago, Milwaukee, St. Paul & Pacific has ordered 200 ore cars from Pressed Steel Car Co. This railroad will also buy 10 baggage cars.

February Production of Malleable Castings Best in 10 Months

WASHINGTON, March 24.—Production of malleable castings in February totaled 59,045 tons against 54,818 tons in January, shipments were 53,407 tons and 47,691 tons respectively, and orders booked, 55,452 tons and 53,153 tons respectively, according to reports received by the Department of Commerce from 133 identical plants, five of which, with an aggregate monthly capacity of 4700 tons, were idle in February. The percentage of operation in February was 63.8, against 59.6 in January.

Compared with a year ago, production showed a gain of 3 per cent in February, but shipments fell off 2 per cent and orders booked dropped 4½ per cent. Production last month was the best for any month since last April. There has been a steady gain since a low point of 40,845 tons was reached in November.

Canada

General Business Trend Is Upward—Weakness in Pig Iron at Montreal

TORONTO, ONT., March 27.—The general trend of business in the iron and steel industry of Canada shows more evidence of strength than it has for several years past. Steel mills, foundries, railroad equipment builders, automobile plants, agricultural implement makers, radiator manufacturers and various other units of the metal working field all report some improvement. Steel mills are behind in filling orders, with the result that plants are running from 18 to 24 hr. a day.

The Canadian National Railways placed orders during the week for rolling stock equipment to the value of $3,250,000. The orders were distributed among the National Steel Car Corporation, the Canadian Car & Foundry Co., Ltd., and the Eastern Car Co.

Included in the work to be undertaken this year by the Canadian Pacific Railway on its Eastern lines will be the replacement of five large steel bridges on the Oshawa subdivision east of Toronto, with heavier spans so that the largest engines may be operated between Montreal and Toronto. The new Canadian Pacific Railway rail allotments for 1928 includes 150 miles of 100 lb. rails, of which 68 miles will be laid on the Nipigon subdivision in continuation of a plan to equip the main line from Toronto to Fort William with heavier steel, and 50 miles will be laid between Toronto and London, Ont.

Pig Iron.—Improvement in business continues. Sales on spot account are steadily increasing both in number and tonnage, and indications are that second quarter business will show improvement of from 10 to 15 per cent over that of the first quarter. Advance contract placing has been active during the past couple of weeks. Competition from United States sources of supply is causing increasing concern to Canadian producers. In the Niagara Peninsula, Buffalo interests have gained a rather strong footing in addition to the big business they have developed in this country from the agricultural implement industry. Blast furnace representatives in the Montreal market also have strong competition with which to contend, especially from the Port Henry, N. Y., producer. This competition has had a tendency to shut out foundry iron from Hamilton and Sault Ste. Marie, Ont., which iron quoted at the Toronto base with freight added brings it much higher than the prices quoted by American rivals. Sydney, N. S., is the most likely Canadian source of supply for the Montreal market, but prevailing Canadian prices are also against Sydney furnaces. Strong competition at Montreal has been reflected in a softening of prices, and it is understood that sales have been made at approximately $1 per ton below former quotations. Production of coke pig iron in Canada at 64,691 gross tons in February showed little change from the 65,006 tons in January, but was 28 per cent above the 50,695 tons produced in February last year.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$24.50 to $25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Sales for the week again showed improvement over those of former weeks this year and inquiries indicate that the stronger demand may continue for some time. In addition to the improvement in spot demand, advance buying has become more general, with a number of consumers placing forward delivery contracts. Some big contracts have been placed for second quarter delivery, and others are pending. Taken as a whole, the Canadian scrap market has been slowly but steadily making progress since the first of the year, and despite the fact that prices remain unchanged they are stronger than formerly and much of the shading has disappeared.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

St. Louis

Steel Operations at a High Rate—Spurt in Pig Iron Buying

ST. LOUIS, March 27.—Pig iron sales took a spurt during the last week. The St. Louis Gas & Coke Corporation sold 9000 tons of all grades, including 5000 tons of basic to an East Side melter; 2500 tons of malleable to a nearby melter for second quarter shipment and the remainder in foundry grades in lots from a carload up to 300 tons. A leading Southern maker sold 500 tons in lots of about 100 tons. The principal inquiry is for 1000 tons of Northern iron for an Evansville, Ind., melter, and a consumer of Southern iron wants 400 tons. Prices are unchanged, and business is being taken for second quarter on the basis prevailing now.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The Granite City Steel Co. reports that it has sufficient business booked to operate its plate mill at capacity for several weeks, that its tin plate department promises to run full for some time, that blue annealed sheet demand is high for this time of year and its jobbing mill is operating full time, and that its open-hearth department is operating at about 90 per cent. Black sheets are in good demand, but orders for galvanized sheets are showing some falling off. Warehouse business continues quiet.

Coke.—Warmer weather has affected adversely the demand for domestic coke. Foundry grades are moving well, but buying continues only for immediate needs.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material.—The market for old material continues weak. Heavy melting steel, heavy shoveling steel, railroad springs and No. 2 railroad wrought are 25c. a ton lower; miscellaneous rails, steel angle bars and cast iron carwheels are 50c. lower, and rails for rolling are $1 lower. Consumers are liquidating stocks on hand, and it is not likely that they will buy much old material for the next 60 to 90 days. In the meantime, the only activity is among dealers, who are buying to cover contracts. Railroad lists include: New York Central, 6500 tons; Chicago, Burlington & Quincy, 4990 tons; Mobile & Ohio, 1300 tons; Chicago, Milwaukee & St. Paul, 139 carloads; and Nickel Plate, 24 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.25 to $11.75
No. 1 locomotive tires	12.25 to 12.75
Heavy shoveling steel	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	14.00 to 14.50
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	7.00 to 7.50
Steel car axles	18.50 to 19.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Birmingham

Steel Demand Continues on Upgrade —Pig Iron Buying Light

BIRMINGHAM, March 27.—New pig iron tonnage is not large, and buying continues on a hand-to-mouth basis. Most of the new tonnage is in lots of from one to three carloads. A slight movement in forward buying was noted during the past week, but very few consumers have covered for their second quarter requirements. Spot sales are at about the same level as for the past several weeks. Quotations on foundry iron remain on a $16 base. Shipments continue close to production. Eighteen furnaces are in blast, the same as for the past two weeks.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—Demand is carrying forward the improvement shown in the preceding weeks of March, and the market has a firm tone. Inquiries dropped slightly last week, but still continue to come in at a fair rate. Mill prices are unchanged. Structural steel fabricators report a good increase in new business and an improved outlook. The Connors Steel Co. last week booked several new orders for reinforcing bars, ranging from 35 to 120 tons. The Tennessee Coal, Iron & Railroad Co. continues to operate 13 or 14 of its open-hearths and the Gulf States Steel Co. is still working four of its six.

Cast Iron Pipe.—Pressure pipe manufacturers continue to find a better feeling in the market, and inquiries indicate that a good volume of tonnage is in prospect. New business for the past week has been in small tonnage orders. Plant operations have changed but little in the past several weeks. Prices are firmer, with the base quotations still at $29 to $31.

Coke.—Although several of the larger consumers have covered for their second quarter requirements, considerable tonnage is still being booked for second and third quarter deliveries. Spot sales are holding up well. Quotations for spot, second and third quarter coke remain at $5.

Old Material.—Demand is still light. Regular customers are buying for present requirements only and are showing very little interest in increasing stocks. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	14.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.50
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Pacific Northwest

Inquiry for Steel More Active— Prices Are Holding Firmly

SEATTLE, March 23 (*By Air Mail*).—Local inquiry for steel is more active, and several fairly large jobs in plates and shapes were placed in the past week. Jobbers report more tonnage moving, and March sales are larger than last month's. Prices are holding, but so far there is not much disposition on the part of buyers to anticipate needs. The local building situation is active, and building permits issued in this quarter show a heavy increase over the same period of last year.

Pig Iron.—The local market is very quiet. Small lots of foundry iron from India and Germany continue to come into this market. Utah basic and No. 2 foundry are quoted at $24 to $25, delivered Seattle.

Structural Steel.—The largest contract for the week was for 1500 tons for the Stimson Building, taken by the Wallace Bridge & Structural Steel Co. The city of Seattle has voted bonds for the building of the West Waterway and Stoneway bridges, which are expected to take 5000 tons or more. Bids will not be requested for some time. Two State highway bridges, one at Kettle Falls, the other at Queets River, Wash., together taking about 1600 tons, will come up for bidding in April. Shapes are firm at 2.35c., f.o.b. Seattle.

Plates.—The Steel Pipe & Tank Co., Portland, has booked 700 tons for a water line for Everett, Wash., the material to be furnished by Bethlehem Steel Corporation. The city penstock at Cedar River, 1200 to 1500 tons, will be placed in a few days. General demand for plates is quiet, with not much new work in sight. Plates are firm at 2.30c., c.i.f. Seattle, for tank quality.

Track Supplies.—The city of Seattle is in the market for 200 tons of 80-lb. rails for local street railway work. The order may be placed within the next week.

Reinforcing Bars.—Contracts placed in the week include 200 tons for the Stimson Building, 180 tons for a Seattle fire station and 225 tons for the physics building at the University of Washington. Work in sight calls for about 2200 tons for the Bon Marche Building, 420 tons for the Bolker warehouse and 1000 tons or more for the Peck & Hill warehouse, all in Seattle. Bars are 2.20c. to 3c.

Hoops and Bands.—Demand for hoops is fair, but for bands is very quiet. The current quotation is 2.87c., c.i.f. Seattle.

Cold-Finished Steel Bars and Shafting.—Local demand is reported somewhat better, but is only for small lots for early needs. The local quotation is 3.20c.

Sheets.—The market is fairly active for galvanized, but for black and blue annealed sheets is very quiet. A local maker of hot water heaters recently imported

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Tees, bar sizes	3.25c.
Reinforcing bars	3.00c.
Blue annealed sheets (No. 10)	4.00c.
Black sheets (No. 24)	5.00c.
Galvanized sheets (No. 24)	5.75c.
Structural rivets, ½-in. and larger	5.50c.

about 200 tons of black sheets from Germany. Local quotations are: No. 24 black, 3.60c.; No. 24 galvanized, 4.35c., and No. 10 blue annealed, 2.75c.

Warehouse Business.—Jobbers report that orders and deliveries of steel products in March will show some increase over last month, customers showing also more inclination to buy in larger lots. Prices are firmer. A new price list just issued by a leading jobber shows several advances.

San Francisco

Reinforcing Steel Awards Total 5000 Tons—3000 Tons of Shapes for Bridge

SAN FRANCISCO, March 27. (*By Telegraph*).—Trading continues well sustained for this season of year, the reinforcing steel bar market being the most active. Awards totaled over 5000 tons, a San Francisco jobber taking 1950 tons for Pier 48. Gunn, Carl & Co. secured 1000 tons for Ocean Beach Esplanade, San Francisco, and Pacific Coast Steel Co. booked 750 tons for Veterans' Hospital at Portland, Ore. Pending business is now in excess of 13,000 tons.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Plates.—Only two plate awards are reported. The Steel Tank & Pipe Co. booked 240 tons for a pipe line at Everett, Wash., and a Seattle interest secured 175 tons for repair of the steamer Iroquois. Interest is still centered in the inquiry for the Wildcat and Sequoia aqueducts in Oakland requiring 8400 tons.

Structural Shapes.—The largest structural award of the week called for 3000 tons for the Coyote Point bridge across San Francisco Bay, booked by the Virginia Bridge & Iron Co. Pending business totals over 14,000 tons. Bids have been received on 4000 tons for Capwell's Store in Oakland. Fabricators in the San Francisco district have agreed not to purchase any more foreign shapes and more stabilized fabricated and erected prices are now expected.

Cast Iron Pipe.—The only cast iron pipe award was secured by the United States Cast Iron Pipe & Foundry Co. and involved 712 tons of 6 to 20-in. classes B and C pipe for Santa Barbara, Cal. This company was low bidder on 500 tons of 10 to 24-in. class B pipe for Santa Ana, Cal. Bids have been taken on 170 tons of 4 to 8-in. class B for Aberdeen, Wash., and on 132 tons of 4 and 6-in. class B for Oak Harbor, Wash. Bids will be opened next week on 553 tons of 6 to 12-in. class C for San Bernardino, Cal., also 181 tons of 6 and 8-in. class B for the improvement of Foothill Boulevard, Azusa, Cal., and on 114 tons of 6 to 10-in. class B for Red Bluff, Cal. Buckeye, Ariz., will open bids on April 16 for 234 tons of 4 to 8-in. class B, and Riverside, Cal., will take bids on April 3 for 127 tons of 6-in. class B for improvement of Washington Street. The Grinnell Co. took 360 tons of 8-in. seamless pipe for Los Angeles and will supply foreign material. Bids have gone in on 510 tons of 4 and 6-in. seamless pipe for Brighouse, B. C., and the Armona Public Utility District, California, will open bids on April 3 for 125 tons of 2 to 8-in. O. D. pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Cincinnati

Pig Iron Sales Decline—Slight Weakness in Scrap Market

CINCINNATI, March 27.—Pig iron sales in the past week have been light and indications are that there will be no improvement in the immediate future. The Louisville & Nashville has bought 590 tons of foundry and charcoal iron, a Chattanooga, Tenn., melter 500 tons of malleable, and a Michigan company 500 tons of Jackson County silvery iron. Aside from these transactions, orders have been for lots ranging from single carloads up to 200 tons. The only sizable inquiry before the trade is for 1000 tons of foundry for second quarter delivery to a Hamilton, Ohio, consumer. Prices have not been changed, southern Ohio foundry iron remaining firm at $19, base Ironton; Tennessee and Alabama iron at $16, base Birmingham, and northern Ohio foundry at $16.75 to $17, base furnace.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabam fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Demand for steel from consuming industries has been well sustained in the past week, and mills are encouraged by the amount of business they are getting out of this territory. There has been a slow upward movement in the volume of specifications against old contracts at low prices, many users of bars, structural shapes and plates having provided themselves with sufficient tonnage to carry them through a considerable part of the second quarter. Aside from an award of about 800 tons of structural steel for bridges by the Louisville & Nashville Railroad, the structural market has been quiet. Small fabricators continue to be fairly well engaged, but the larger shops are in need of work. The placing of second quarter orders for sheets has been accelerated in the last seven days, and the result is that prices are becoming more firmly established at 2.10c., base Pittsburgh, for blue annealed, 3.75c. for galvanized, 2.90c. for black and 4.15c. for automobile body stock. Sales have been diversified so that mills turning out all kinds of sheets have been enabled to operate on an economical basis. The American Rolling Mill Co. declares that all of its units still are on a production schedule calling for 100 per cent of capacity. There has been a slight decrease in sales of nails, which are quoted at $2.65 per keg, base Ironton or Pittsburgh. Makers of cold-rolled bars and cold-rolled strips report that the volume of orders has been only fair.

Warehouse Business.—Shipments from local warehouses in March were approximately the same as those in February, although several companies reported slight increases. Bars and structural steel are the most active commodities, while sales of common wire nails have been good. Prices are steady and unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

Coke.—While by-product foundry coke specifications have fallen off slightly, shipments in March will be the largest in at least six months. Prospects for April are regarded as good, although the volume of business is not expected to equal that in either February or March. Continuation during the next 30 days of the present price of $7.50 per net ton, f.o.b. ovens, for foundry coke is practically assured, although no formal announcement to that effect has been made. That there will be a sharp cut in domestic grades is conceded by dealers, but the exact amount of the reduction has not yet been determined.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Further weakness in the scrap market has necessitated a drop of from 25c. to 50c. a ton on railroad wrought, short rails, railroad malleable and agricultural malleable. Meanwhile, heavy melting steel remains unchanged at $11 to $11.50. Steel plant operations in this district are on a basis approaching capacity and therefore shipments of material on current contracts have been fully up to normal. Mills, however, are not anticipating future requirements, preferring to purchase scrap only when they can use it immediately.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to	$11.50
Scrap rails for melting	11.75 to	12.25
Loose sheet clippings	8.50 to	9.00
Bundled sheets	9.50 to	10.00
Cast iron borings	8.00 to	8.50
Machine shop turnings	7.50 to	8.00
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.00 to	10.50
Short rails	15.75 to	16.25
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	13.00 to	13.50
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	12.00 to	12.50
Agricultural malleable	11.50 to	12.00

Boston

Pig Iron Prices Unsettled—Scrap Market Weaker

BOSTON, March 27.—Little pig iron was sold in this territory in the past week. No open inquiry of importance is reported, but three or four fairly large consumers are sounding out the market for second and third quarter iron. Actual purchase will depend on the development of pending business with melters. Prices are unsettled owing to the possibility of reductions in rail and water freight rates. Buffalo iron is still available, figuring on all rail rates, at $16 a ton, base furnace, with differentials or at $16.50 with differentials waived. The Mystic Iron Works is meeting these prices on a delivered basis. Eastern Pennsylvania iron is generally $20 a ton, base furnace, but this price has been shaded on recent offers without resulting in orders. Alabama iron is steady at $16 a ton, base furnace. Proposed new rail rates from Troy, N. Y., to New England points figure out more to such points as Worcester and Springfield, Mass., and less to Long Island Sound points than existing rates. It is intimated that some low water rates from Buffalo to New England have been made for this summer.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—Indications are that New England by-product foundry coke ovens will bill out fuel next month against first half contracts at $11.50 a ton, delivered within a $3.10 freight rate zone, as they have in March. The movement of such coke shows little if any increase, an indication that the foundry melt is not increasing perceptibly. A still further contraction in the demand for domestic coke has come with warmer weather. Such coke is selling on a basis of $8.50 a ton on cars ovens, Everett, Mass.

Warehouse Business.—Structural rivets, ½-in. and larger, have been advanced 25c. to $4.75 per 100 lb., base. Soft steel rivets are unchanged at 40 and 10 per cent off in full kegs. For less than full keg lots of a size, the discount is 40 per cent, an advance, and all manufacturers' extras for quantities must be added to the list price before deducting the discount. The movement of iron and steel out of warehouses is not as brisk as it was a month ago. Stove bolts are now 70 and 10 per cent off list.

Pipe.—The Warren Foundry & Pipe Co. was the successful bidder for the Springfield, Mass., pipe and special fittings requirements at $1,920.59. The Chapman Valve Mfg. Co., Springfield, was awarded the valves at $20,105.75, and the Rensselaer Valve Co., Troy, the hydrants at $476.50.

Cold-Rolled Strip.—Bookings for second quarter are generally in small tonnages, but the aggregate is fairly satisfactory.

Bars.—Steel bars are moving in fairly good volume at 1.85c. to 1.90c. per lb., base Pittsburgh, for second quarter delivery. Buying of reinforcing bars for consumption is on a hand-to-mouth basis, with prices holding well at about 2.90c. per lb., base, from stock. Mills quote 1.90c. to 1.95c. per lb., base Pittsburgh.

Shapes and Plates.—Mills report a somewhat better demand for shapes and plates for second quarter delivery. No large jobs came up the past week for fabricators to figure, but there is a sizable amount of small work. Competition for small jobs is almost as keen as it is on large ones owing to the limited amount of business on fabricators' books.

Old Material.—Prices for machine shop turnings range from $5 a ton on cars, shipping point, to $5.75, with the general quotation $5 to $5.50, a drop of 50c. as compared with a week ago, and of 75c. within a fortnight. Buying is confined to one Pennsylvania steel mill, which accounts for the weakness of prices. Quotations on other materials are about the same as a week ago, but the market is generally weak. The Mystic Iron Works has taken additional tonnages of stove plate and sheared pipe at $10 a ton, delivered. Other recent sales include cotton ties at $6 to $6.50 a ton on cars, shipping point; heavy cast iron at $11; No. 2 steel at $7.25 to $7.50; textile machinery cast at $14 a ton, delivered, and No. 1 machinery cast at $14.50 and $15.

The Boston & Maine Railroad has closed bids on 65 cars of miscellaneous material.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.10
Scrap T rails	8.00 to	8.50
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought	8.00 to	8.50
Machine shop turnings	5.00 to	5.50
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.50 to	6.00
Forge flashings	6.00 to	6.50
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.00 to	15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.25
Rails for rolling	10.00 to	10.50
Cast iron borings, chemical	9.00 to	9.50

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	12.50 to	13.00
Stove plate	9.50 to	10.00
Railroad malleable	13.00 to	13.50

Detroit

Industrial Activity Continues Upward—Motor Car Production Increasing

DETROIT, March 27.—Industrial activity in the Detroit area continues upward, with a corresponding increase in steel inquiries and bookings. Automobile production is constantly developing new "highs," with no apparent slowing down in sight, at least during the first half of the year.

The Hudson Motor Car Co. will end March with a production of better than 35,700, which will bring the total for the first quarter to 90,000 units. April estimates run between 39,000 and 40,000 units, with a tentative schedule of 110,000 units for the second quarter.

The Willys-Overland Co. is now turning out about 1300 cars per day. The February total of 24,017 cars has already been surpassed, with a volume of unfilled orders still amounting to 31,000 cars. It is estimated that Willys-Overland will reach a 1500 unit per day production by May 1.

Cadillac's production for the first two months of this year amounted to 3083, to which may be added 2754 units for LaSalle. This compares with 2692 units for the same period of 1927.

The Hupp Motor Car Co. is breaking all its previous records with 17,670 units, the total production for the four months ending Feb. 29, which is a 73 per cent increase over the same period a year ago.

The Graham-Paige Motors Co. has attained a production thus far of 285 cars a day. This compares with 161 cars as the highest daily production attained in 1927. The Graham-Paige plant now has a payroll of 480 more than was ever attained in the past.

Employment generally in Detroit increased 3453 for the week ended March 20. This brings the total industrial employment to 365,124.

The past week has shown an encouraging increase in structural steel orders, the demand being almost entirely for industrial structures. Small fabricating shops are particularly active, and a fair volume has been done in the larger structural units. Prices for shapes continue firm at 1.90c., Pittsburgh, for spot deliveries and 1.85c. on contract.

With automobile production on the highest basis for the year, the tonnage of scrap from the largest producers is likewise at a high point. Current orders are sufficient to absorb this tonnage, but there have been no evidences of strengthening in the market on old material.

Dealers' buying prices per gross ton, f.o.b. cars. Detroit:

Heavy melting and shoveling steel	$11.00 to	$11.50
Borings and short turnings	7.25 to	7.75
Long turnings	6.75 to	7.25
No. 1 machinery cast	14.00 to	15.00
Automobile cast	19.50 to	21.00
Hydraulic compressed sheets	9.75 to	10.25
Stove plate	11.00 to	12.00
No. 1 busheling	8.50 to	9.00
Sheet clippings	6.00 to	7.00
Flashings	9.25 to	9.75

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Buffalo

Small-Lot Inquiry for Pig Iron—Steel Demand Holds

BUFFALO, March 27.—The only pig iron inquiries now being figured are small lots, except that the General Electric Co. inquiry for 2900 tons is said still to be open. Some misunderstanding apparently has arisen over Buffalo prices in connection with barge canal shipments. One lot, which was said to have been sold at a price figuring back to $15.50, Buffalo, on the basis of rail delivery, was actually sold, it is stated, for barge canal shipment, so that the maker will net $16.50, Buffalo, and possibly better. This price was made for No. 2X; some No. 1 iron went into the same transaction at $17, Buffalo. One Buffalo maker declines to quote less than $17 for No. 2 plain, 1.75 to 2.25 silicon, for any delivery.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25		$17.00
No. 2 foundry, sil. 2.25 to 2.75		17.50
No. 1X foundry, sil. 2.75 to 3.25		18.50
Malleable, sil. up to 2.25	$17.00 to	17.50
Basic	16.50 to	17.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—There is a good demand for bars, shapes and plates. Prices are holding. Sheet mill operation has increased to 90 per cent of capacity and sheets are firm at 2.90c. for black and 4.15c. for automobile body. Inquiry for sheets is good. Reinforcing bar business is quiet this week and there are no lettings of size.

Old Material.—The market shows a heavy consumption of material, but there has been little new buying. The large orders recently placed are taking most of the available scrap, and there is considerable activity among dealers in this connection. Dealers are offering $12.75 to $13.25 for No. 2 steel and $14.50 to $15 for No. 1. Some machine shop turnings have been sold at Niagara Falls at a delivered price of $9.75. Borings and turnings are weaker, with some tonnage of this material coming through from Detroit.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.75 to	$15.25
No. 2 heavy melting steel	13.00 to	13.50
Scrap rails	13.75 to	14.25
Hydraulic compressed sheets	13.25 to	13.75
Hand bundled sheets	9.00 to	9.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.50 to	12.75
Machine shop turnings	8.50 to	9.00
Acid Open-Hearth Grades		
Railroad knuckles and couplers	15.50 to	16.00
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
Low phosphorus billet and bloom ends	17.00 to	17.50
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.75 to	10.25
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades		
Steel car axles	17.00 to	17.50
Iron axles	22.00 to	23.00
No. 1 railroad wrought	12.50 to	13.00
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.00 to	13.50
Locomotive grate bars	11.50 to	12.00
Steel rails, 3 ft. and under	17.00 to	17.25
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Railroad	15.00 to	15.25
Agricultural	15.00 to	15.25
Industrial	15.00 to	15.25

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Mar. 27	Mar. 26	Mar. 24	Mar. 23	Mar. 22	Mar. 21
Lake copper, New York	14.20	14.20	14.20	14.20	14.20	14.25
Electrolytic copper, N. Y.*	14.00	14.00	13.82	13.82	13.82	13.82
Straits tin, spot, N. Y.	52.75	53.00	....	53.62½	53.50	53.87½
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00
Lead, St. Louis	5.82½	5.82½	5.80	5.80	5.80	5.80
Zinc, New York	6.07½	6.07½	6.07½	6.07½	6.07½	6.05
Zinc, St. Louis	5.72½	5.72½	5.72½	5.72½	5.72½	5.70

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, March 27.—There have been very few developments in any of the markets. Copper has a better tone after a week of inactivity and some shading. Tin has quieted down with prices steady. Very little change is noted in lead or zinc.

Copper.—The softer tendency, noted last week, persisted until yesterday and today, when a stronger tone developed. There is better inquiry from both domestic and foreign consumers, with considerable buying by the latter. For most of the week the light demand has been satisfied by one or two sellers at concessions down to as low as 14.07c., delivered, but it is believed that most of this metal, pressing on the market, has been absorbed. Today electrolytic copper is quoted quite firm at 14.12½c., delivered in the Connecticut Valley. The official quotation of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f., European ports. Lake copper has been dull most of the week, but a better inquiry is reported today. Sales have been made at 14.15c. to 14.25c., delivered.

Tin.—About 1600 tons changed hands during the week ended Saturday, March 24. This is in decided contrast with the exceedingly active week just preceding when 3000 tons was sold. At that time consumers were the chief buyers, but during the week just passed dealers took most of the metal. The week was characterized by considerable profit taking which had a depressing effect upon the market here. Yesterday dealers were again active, 200 tons changing hands. The unfavorable feature of the situation is the lack of interest from consumers. Today the market was only moderately active, with spot Straits tin quoted at 52.75c., New York. Prices in London today were considerably higher than a week ago, with spot standard quoted at £239 17s. 6d., future standard at £239 5s. and spot Straits at £243 17s. 6d. The Singapore price today was £244 10s. It is to be noted that whereas a week ago future standard was at a premium over spot, the situation is reversed this week. Arrivals thus far this month have been 6195 tons with 7725 tons reported afloat.

Lead.—Buying in the West has been better than in the East and prices in St. Louis are a little higher at 5.82½c. Orders have been of fairly large proportions in the Middle West. The market is quieter here and the contract price of the leading interest is unchanged at 6c. There is considerable buying interest for April and May with earlier positions in good demand. An absence of selling interest in future positions is noted.

Zinc.—Only moderate activity is reported and prices have held steady at 5.70c., St. Louis, for nearby delivery, and 5.72½c., for April. This is due largely to the attitude of sellers which is averse to pressing metal on the market. There has, however, been some anxiety to sell March metal. Ore declined last week $2 per ton to $38, Joplin, with sales small at 4990 tons and output again restricted to about 9000 tons.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—It is reliably reported that the Ford Motor Co. will abandon the manufacture of storage batteries and this is expected to affect ultimately the antimony market. Quotations are lower, due largely to pressure to sell, with Chinese metal for spot delivery

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	55.00c. to 56.00c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.75c.
Tin, bar	61.75c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.85c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	63.50c.
Solder, ½ and ½	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier,	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

The leading interest on March 26 reduced its quotation on zinc sheets 1c. per lb., the base price now being 8.50c. per lb. Mill prices on bronze, brass and copper products are unchanged and lead full sheets are holding at the prices announced Feb. 21.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	8.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c..
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.25c.	3.75c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

quoted at 10c., New York, duty paid, and futures at 9.87½c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, March 27.—Sales are more numerous and prices are stronger. The supply of old metals is large, but little consumer interest is being shown.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 55c.; lead, 6c.; zinc, 5.85c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

New Work Will Require 33,000 Tons—Awards Continue to Decline, Totaling 24,425 Tons

NEW projects amounting to 33,000 tons were the feature of the structural market in the last week, although the total was somewhat below the weekly average for the year. Of outstanding size were an apartment building in New York and a bridge across the Delaware River near Philadelphia, which will require 8000 tons each. Awards amounted to 22,400 tons, one of the lowest totals for the year, the largest of which was a manufacturing building at Chicago taking 4500 tons. Awards follow:

State of Vermont, 150 tons, three bridges, to American Bridge Co.

North Adams, Mass., 140 tons, bridge, to Jordan Construction Co., Albany.

Boston, 100 tons, artificial ice making plant, Boston Ice Co., to New England Structural Co.

Nashua, N. H., 100 tons, publishing plant, to New England Structural Co.

Nashua, 100 tons, mercantile building, to New England Structural Co.

Hartford, Conn., 400 tons, office building, to Standard Structural Co.

Middletown, Conn., 600 tons, savings bank, to Levering & Garrigues Co.

New Haven, Conn., 1600 tons, power house for New Haven Illuminating Co., to Levering & Garrigues Co.; reported last week to an unnamed fabricator.

New York, 1000 tons, loft building at 347 West Thirty-ninth Street, to Levering & Garrigues Co.

New York, 900 tons, theater and office building on Fifty-third Street, to George A. Just Co.

New York, 400 tons, apartment building on East Forty-third Street, to Harris Structural Steel Co.

New York, 300 tons, building for New York Genealogical and Biographical Society at 122 West Fifty-eighth Street, to Harris Structural Steel Co.

State of Pennsylvania, 200 tons, bridge over Tioga River, to American Bridge Co.

Winston-Salem, N. C., 3000 tons, building for Reynolds Tobacco Co., to Virginia Bridge & Iron Co.

Tuscaloosa, Ala., 100 tons, Libby, McNeil & Libby milk condensary, to Ingalls Iron Works Co.

Chattanooga, Tenn., 100 tons, Lookout Boiler & Tank Co. addition, to Southern Steel Works, Birmingham.

Louisville & Nashville Railroad, 830 tons, bridges; 670 tons to Bethlehem Steel Co. and remainder to Virginia Bridge & Iron Co. and Ingalls Iron Co.

McKeesport, Pa., 250 tons, County highway bridge, to Fort Pitt Bridge Works.

Pittsburgh, 100 tons, Emory Memorial Church extension, to Pittsburgh-Des Moines Steel Co.

Youngstown, Ohio, 350 tons, power house for Youngstown Sheet & Tube Co., to Pittsburgh-Des Moines Steel Co.

Bay City, Mich., 1250 tons, Chevrolet Motor Co. buildings, to Flint Structural Steel Co.

Detroit, 1100 tons, Chevrolet gear and axle plant, to Whitehead & Kales.

Pontiac, Mich., 800 tons, Riker Building, to Whitehead & Kales.

Jackson, Mich., 200 tons, for Fox, Withington Co., to Whitehead & Kales.

Fort Wayne, Ind., 400 tons, warehouse for International Harvester Co., to Rochester Bridge Co., Rochester, Ind.

Chicago & Illinois Midland Railroad, 530 tons, bridges, to American Bridge Co.

Chicago, 135 tons, tunnel car bodies for Department of Public Works, to Gage Structural Steel Co.

Chicago, 120 tons, coal trestle for city pumping plant, to Midland Structural Steel Co., local.

Chicago, 4500 tons, Palm Olive-Teet building, to an unnamed bidder.

Evanston, Ill., 180 tons, public school, to an unnamed bidder.

Milwaukee, 1580 tons, County portion of Milwaukee Public Safety Building, to Lakeside Bridge & Steel Co.

East St. Louis, Ill., 150 tons, building for American Zinc Co., to Mississippi Valley Structural Steel Co.

St. Louis, 750 tons, building for Missouri Valley Portland Cement Co., to Mississippi Valley Structural Steel Co.

Los Angeles, 295 tons, shapes, apartment building at 308 North Sycamore Street, to Brombacher Iron Works.

Culver City, Cal., 150 tons, City Hall, to McClintic-Marshall Co.

San Francisco, 165 tons, apartment building at Bay and Polk Streets, to McClintic-Marshall Co.

San Francisco, 3000 tons, Coyote Point bridge across San Francisco Bay, to Virginia Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

West Boylston, Mass., 130 tons, bridge.

New York, approximately 8000 tons, units 8 and 9 of Tudor City; plans soon.

Huntington, L. I., 800 tons, Catholic Church.

New York Central Railroad, 400 tons, bridges.

Metuchen, N. J., 425 tons, power station for Public Service Corporation.

Standard Oil Co. of New Jersey, 400 tons, tanks.

Williamsport, Pa., 500 tons, Y. W. C. A.

Philadelphia, 400 tons, building for Kensington Trust Co.

Philadelphia, 800 tons, Nurses' Home at Frankford Hospital.

Philadelphia 8000 tons, Tacony-Palmyra bridge; bids open April 2.

Philadelphia 400 tons, building for Terminal Title & Trust Co.; Roberts & Roller, Philadelphia, general contractors.

Philadelphia 2400 tons, Navy Central Y. M. C. A.; Irwin & Leighton, Philadelphia, general contractors.

Elmira, N. Y., 500 tons, Mark Twain High School.

Coraopolis, Pa., 800 tons, County bridge repairs; Farris Engineering Co., general contractor.

Memphis, Tenn., 3500 tons, 29 barges for Mississippi River Commission for Mississippi flood repair work; bids close March 30.

Memphis, Tenn., 550 tons, Starrett Building.

Cleveland, 1000 tons, two bridges for Cleveland Union Terminals Co.; bids taken.

Detroit, 1100 tons, Detroit's section of river tunnel.

State of Michigan, 120 tons, State highway bridge, over Cedar Creek, Muskegon County; Massillon Bridge & Structural Co., low bidder.

Chicago, 1800 tons, building for Chicago Motor Club; Holabird & Roche, architects.

Chicago, 240 tons, temporary building for Board of Trade; Holabird & Roche, architects.

Rock Island, Ill., 500 tons, repairs to the Rock Island railroad bridge across Mississippi River.

Saukville, Wis., 200 tons, State highway bridge over Milwaukee River; bids close April 4.

Ogden, Utah, 650 tons, train shed for Union Pacific Railroad.

REINFORCING STEEL

Awards of 13,000 Tons—4000 Tons in New Projects

State of New Jersey, 200 tons, road work, from Jennerone Contracting Co., general contractor, to Igoe Brothers.

Philadelphia, 275 tons, school at Sixth and Buttonwood Streets, to Robinson Iron & Steel Co.

Harrisburg, Pa., 310 tons, Market Street subway, to McClintic-Marshall Co.

Johnstown, Pa., 425 tons, municipal retaining wall work, to Carlem Engineering Co., Pittsburgh.

Pittsburgh, 300 tons, William Penn Hotel addition, to Kalman Steel Co.

Davidson, N. C., 120 tons, Davidson College, to Connors Steel Co., Birmingham.

Cleveland, 1000 tons, two store and warehouse buildings for Sears, Roebuck & Co., to Truscon Steel Co.

Dayton, Ohio, 800 tons, hotel, to Joseph T. Ryerson & Son, Inc.

Chicago, 1000 tons of rail and billet steel bars, printing plant for Reuben H. Donnelley Corporation, to Joseph T. Ryerson & Son, Inc.

Chicago, 260 tons of rail steel bars, apartment building at 1500 Lake Shore Drive, to Calumet Steel Co.

Chicago, 400 tons of rail steel bars, garage at Federal and Lake Streets, to Inland Steel Co.

Chicago, 250 tons, building for Rapid Roller Mfg. Co., to Barton Spiderweb System.

Oak Park, Ill., 700 tons, Nicholas stores, to Barton Spiderweb System.

Chicago, 500 tons, sewer work on Northwest side, to Barton Spiderweb System.

Chicago, 600 tons, apartment building on Oglesby Avenue, to Olney J. Dean & Co.

State of Illinois, 300 tons, bridge and road work, to Calumet Steel Co.

St. Louis, 650 tons, apartment house at 4401 West Pine, 350 tons; warehouse for Great Atlantic & Pacific Tea Co., 300 tons, to Missouri Rolling Mills Corporation.

Portland, Ore., 750 tons, Veterans' Hospital, to Pacific Coast Steel Co.

San Francisco, 1950 tons, for Pier 48, to San Francisco jobber.

San Francisco, 1000 tons, for Ocean Beach Esplanade, to Gunn, Carl & Co.

San Francisco, 125 tons, factory, Fifteenth and Potrero Streets, to Badt Falk Co.

Santa Monica, Cal., 210 tons, office building, Seventeenth and Wilshire Boulevard, to unnamed interest.

Los Angeles, 340 tons, apartment building at 5930 Franklin Avenue, to an unnamed bidder.

Seattle, 225 tons, hotel, Fourth and Spring Streets, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Brooklyn, 150 tons, telephone building; bids not in.

New Brunswick, N. J., 1700 tons, Raritan River bridge; bids April 9.

Philadelphia 800 tons, addition to Alden Park Manor apartments; bids in.

Cumberland, Md., 175 tons, building for Cumberland Hospital.

Quantico, Va., 600 tons, Marine barracks.

Pittsburgh, 250 tons, Koppers Building; Mellon-Stuart Co., general contractors.

Cleveland, 190 tons, Henry Street viaduct; general contract awarded to Great Lakes Construction Co.

Chicago, 200 tons, building at 301 West Jackson Boulevard; McLennan Construction Co., general contractor.

St. Louis, 200 tons, Knights of Pythias temple at Grand and Lindell Boulevards.

Dial Indicating Gages

(*Concluded from page* 881)

illustrated, the adapter carries an interchangeable square plate, with one measuring point and three points of abutment, formed by its crowned corners. Different plates are substituted for different diameters. The movable measuring point moves diagonally and its movement, considerably magnified, is transmitted to the indicator needle. The fixed gages are intended for mass production of one or two lines, and the self-accommodating gages for use on a greater variety of work. The Mikrotast and measuring base of both types are connected by an adapter and for deep holes extension rods are provided. It is claimed for these internal gages that control of every part of a bore is possible, and that blind holes may be checked to the bottom. Any deviation from the standard diameter is indicated by the indicator needle. A special self-accommodating gage with long extension rods is available for checking deep holes. Several of these rods, each 1250 mm. in length, can be connected.

External taper gaging is performed with accuracy by gages which consist of interchangeable Mikrotasts and two saddles that are securely connected by a rigid bridge piece, with narrow locating flats and stop plate from which the work is registered. This gage is said to give instantly in actual measurement the errors in diameter as compared with a master to which it has been previously set.

For checking internal tapers two Mikrotast internal gages are required, one each at the top and bottom of the taper respectively. They have special stop plates with adjusting and clamping screws. To adjust these gages the stop plates are placed against the face of the master and clamped in position, after having adjusted the Mikrotast needle and limit pointers. Upon entering the gage into the work, the indicator needle will show the deviation from the master. Where the slides of the machine on which the work is mounted accurately control the angle of the taper produced, only one gage is needed for checking the taper.

Pitch and root diameters of external threads are checked by Mikrotasts which are used in conjunction with saddles fitted with suitable locating pieces and gaging points. Pitch, root and outside diameters of right- and left-hand taps with three or four flutes from 6 mm. up are checked by the gage shown in the illustration. The Mikrotast is fitted to an annular frame with two interchangeable locating fixed points and one movable gaging point. An advantage claimed for these gages is the constant and even pressure during the gaging, due to the weight of the instrument.

The foot of the gage for measuring effective diameters of internal threads has one fixed abutment and, exactly opposite, a movable measuring contact point, the movements of the latter being transferred to the dial indicator needle. Both are ball shaped and adjusted to engage on the line of the effective diameter. A bush slightly less in diameter than the bore is placed over the gaging foot as a center of support. A separate gaging foot and bush are required for gaging various diameters. They are suitable for gaging right- or left-hand threads from ½ in. up.

The gages for measuring pitch diameters on internal threads up to 2 in. are supplied with interchangeable measuring bolts. Gages are also available for threads larger than 2 in. and other for checking the pitch of external threads.

PERSONAL

Herbert Hoover, Secretary of Commerce, has been appointed a member of the endowment committee for the Engineering Foundation and Engineering Societies Library and its executive subcommittee. Secretary Hoover is a past-president of the American Institute of Mining and Metallurgical Engineers, a member of the American Society of Mechanical Engineers and an honorary member of the American Society of Civil Engineers.

Harold P. Sigwalt, vice-president of the National Industrial Advertisers' Association, who has been advertising manager for the Milwaukee Corrugating Co., Milwaukee, has resigned from the latter position to become associated with the Cramer-Krasselt Co., Milwaukee.

A. Oram Fulton, president Wheelock, Lovejoy & Co., Inc., Cambridge, Mass., will return on the Berengaria, March 30, from a two months' European trip.

W. W. Wilson, recently one of the receivers of the Milton Mfg. Co., Milton, Pa., has been elected president of the company to serve until a meeting of the new stockholders. At that time a board of directors will be elected, who will in turn elect officers.

M. D. Troyer has been made manager of the logging machinery department of the Clyde Equipment Co., Portland, Ore., succeeding J. B. Stam, who was recently made manager of the company's Seattle branch. Mr. Troyer for a number of years has been associated with the Clyde Iron Works, Duluth, Minn., for the last five years having been district manager for that company at Vancouver, B. C.

R. C. Bird, formerly with the Chain Belt Co., Milwaukee, has joined the sales department of the D. O. James Mfg. Co., Chicago, maker of speed reducers and cut gearing, and will serve as traveling sales manager.

Milton C. Ryer, for 24 years manager of the Denver, Colo., branch of the Crucible Steel Co. of America, is now representing the Ryer Co., 124 West Fourth Street, Los Angeles, representative in western United States and Mexico for the United Swedish Steel Works, Sweden, and the Heppenstall Forge & Knife Co., Pittsburgh.

Gilbert Butler, secretary of the Bossert Corporation, Utica, N. Y., recently returned from a business trip abroad.

Walter Harnischfeger, vice-president Harnischfeger Corporation, Milwaukee, has returned from a three months' tour of Central America and Colombia.

F. H. Clauson, president Van Brunt Mfg. Co., Horicon, Wis., maker of farm machinery and tools, and president Wisconsin Manufacturers Association, will uphold the negative of the question, "Does Industry Need Collective Bargaining Through Trade Unionism?" in a debate with John P. Frey, Washington, former editor the *International Molders' Journal*, before the Intergroup Forum of the Milwaukee State Teachers' College on March 28.

Charles S. Belsterling has been appointed chairman of the traffic committee of the United States Steel Corporation, succeeding John S. Keefe, who recently became president of the American Steel & Wire Co. Mr. Belsterling has been associated with the Steel Corporation and its subsidiaries for many years, having been originally in the general sales department of the A. & P. Roberts Co. At the formation of the American Bridge Co. he became executive head of the traffic department. Later he was made a member of the legal staff of the Steel Corporation in the capacity of general commerce attorney in charge of traffic and transportation matters. Mr. Belsterling is a member of the bar of Pennsylvania and of New York and of the Supreme Court of the United States.

R. P. Dieckelman has been elected vice-president of the Pressed Steel Tank Co., Milwaukee, and Herman Merker, secretary.

Thomas S. Hammond, president Whiting Corporation, Harvey, Ill., was elected president of the Chicago branch of the National Metal Trades Association at its thirteenth annual dinner meeting, March 22. Sterling Morton, president Morkrum-Kleinschmidt Corporation, was elected vice-president, and Arthur E. Blackwood, vice-president Sullivan Machinery Co., treasurer. The directors are J. D. Cunningham, president Republic Flow Meter Co.; Charles E. Finkl, general manager A. Finkl & Sons Co.; William Ganschow, vice-president Gars & Forgings, Inc.; Warren G. Jones, president W. A. Jones Foundry & Machine Co.; W. H. Kent, president Weller Mfg. Co., and Charles H. Strawbridge, president Goodman Mfg. Co.

H. D. Jenkins has been appointed Chicago district representative for the Elliott Blair Steel Co., New Castle, Pa., maker of cold-rolled strip, and of the American Nickeloid Co., Peru, Ill., manufacturer of nickel-plated zinc, copper and tin, copper-plated zinc and tin and nickel-plated cold-rolled strip. His offices are at 1520 Otis Building.

E. J. Kulas, president Otis Steel Co., Cleveland, has renewed an agreement with that company under which he will continue as its president until Dec. 31, 1929.

M. C. Summers and S. P. Ker, Jr., formerly president and vice-president and general sales manager respectively of the Thomas Sheet Steel Co., Niles, Ohio, have become affiliated with the sales organization of the Empire Steel Corporation, Mansfield, Ohio. Mr. Summers will be connected with the Mansfield office and will specialize in the sale of galvanized sheets and Mr. Ker will be identified with the Cleveland sales office.

Paul Wick, formerly vice-president of the Falcon Steel Co., Niles, Ohio, has been elected vice-president in charge of sales of the Youngstown Boiler & Tank Co., Youngstown.

George C. Brainard, who has been vice-president in charge of operations of the General Fireproofing Co., Youngstown, Ohio, manufacturer of metal furniture and steel shelving, has been elected president of that company, succeeding W. H. Foster, who has been made chairman of the board of directors. Mr. Brainard was formerly associated with the Hydraulic Steel Co., Cleveland.

T. M. Girdler, president Jones & Laughlin Steel Corporation, Pittsburgh, has been elected a director of the Union National Bank in that city.

Henry F. Schmidt, consulting engineer at the South Philadelphia works, Westinghouse Electric & Mfg. Co., has been awarded the medal of the American Society of Naval Engineers for the best article submitted during 1927. He has also been given an honorary life membership in the society and a cash prize for his paper, entitled "Some Screw Propeller Experiments with Particular Reference to Pumps and Blowers." The presentation of the awards will be made by Secretary Wilbur at the annual dinner of the society, to be held March 29 at the Willard Hotel, Washington.

E. E. Arnold again has become associated with the Westinghouse Electric & Mfg. Co., East Pittsburgh, as mechanical engineer for special assignment. For 10 years following his graduation from Ohio State University in 1898, he was with the Westinghouse Machine Co., and was engineering assistant to the vice-president when he resigned to become chief engineer of the Metal Products Co., Detroit. Subsequently he was consulting engineer A. O. Smith Corporation, Milwaukee; vice-president Standard Screw Products Co., Detroit, and chief engineer New Departure Mfg. Co., Bristol, Conn.

Jacob F. Savela has been appointed welding service manager in the Detroit district for the Lincoln Electric Co., Cleveland, and will work under the direction of J. M. Robinson, Detroit district sales manager for the Lincoln organization.

John Keenan, general superintendent of the Tata Iron & Steel Co., who left India about a month ago, arrived in New York from England on March 27 for a stay of two or three months in the United States. His headquarters will probably be at the offices of Perin & Marshall, consulting engineers, New York.

H. Oliver Williams has been appointed director of production for the J. Elliott Hall agency of the Penn Mutual Life Insurance Co., 50 Church Street, New York. He has had many years of experience in sales, system and personnel work, having been associated during the last 20 years with the Carnegie Steel Co., the Midvale Steel & Ordnance Co., and the Bethlehem Steel Corporation.

A. O. Jones, president United States Register Co., Battle Creek, Mich., has been elected president of Lubrication Devices, Inc., Battle Creek, recently formed by a reorganization of Farmer Lubrication Systems, Inc., Detroit. The company will occupy its new plant at Battle Creek about April 15, and will engage in the manufacture of Farmer centralized lubrication systems for the industrial and automotive fields. Other officers are Charles C. Green, president City National Bank, Battle Creek, vice-president; L. E. Gordon, treasurer; P. J. Daniels, formerly purchasing agent Duplex Printing Press Co., Battle Creek, secretary; A. J. Jennings, recently manager of the lubrication division of E. F. Houghton & Co., Philadelphia, sales manager, and A. J. Farmer, chief engineer.

N. A. Hall of the Sprague Hoist Division, Shepard Electric Crane & Hoist Co., New York, and H. J. Fuller, Yale & Towne Mfg. Co., Stamford, Conn., were elected chairman and vice-chairman respectively of the Electric Hoist Manufacturers' Association at a meeting held recently in New York.

Rhys T. Harris, for many years identified with the operating departments of several steel companies, has joined the sales department of the Globe Brick Co., East Liverpool, Ohio, and will specialize in ladle brick for open-hearth and blast furnace use.

John S. Casey has been elected president of the Treadwell Construction Co. and the Midland Barge Co., Midland, Pa., succeeding the late Samuel N. Craig. Mr. Casey has long been identified with the Treadwell interests, with which these two companies are affiliated, having been president for several years of the M. H. Treadwell Co., New York, and the Treadwell Engineering Co., Easton, Pa. He will continue to make his headquarters in New York. B. W. Hunsicker, who is secretary and treasurer of the construction company and treasurer of the barge company, will be the active head of both companies at Midland.

Einar Ryden, who has been connected with the Northwest Engineering Co., Green Bay, Wis., is now associated with the Link-Belt Co., 310 West Pershing Road, Chicago, as a machine designer.

J. Ross Pilling of the pig iron, coal and coke firm of Pilling & Co., Inc., Philadelphia, has become identified with Geare, Marston & Pilling, Inc., Philadelphia, a newly organized advertising agency. Mr. Pilling, who is a son of W. S. Pilling, president of the firm bearing his name, will retain his interest in and continue as vice-president of Pilling & Co., Inc.

Robert J. Deneen and Frederic Attwood have been elected vice-presidents of the Ohio Brass Co., Mansfield, Ohio. Mr. Deneen is in charge of the company's sales in the Chicago district and Mr. Attwood serves in a similar capacity for the Eastern district, with headquarters in New York.

G. O. Carlson has resigned as superintendent of the cylinder department of William Wharton, Jr., & Co., Inc., Easton, Pa., and has joined the sales department of the Latrobe Electric Steel Co., 8 West Fortieth Street, New York.

Edward H. Branson, assistant to the chief engineer in the Pittsfield, Mass., works laboratory of the General Electric Co., has resigned and early in April will take charge of the new testing and research laboratory of the General Railway Signal Co., Rochester, N. Y. He is a graduate of Union College, Schenectady, N. Y., and in 1912 entered the employ of the General Electric Co. at its Schenectady plant. In 1913 he was transferred to Pittsfield, where he has since remained, with the exception of a period during the World War, when he served with the United States Ordnance Department at Washington.

Fred C. Conners has resigned as secretary, assistant treasurer and a director of A. M. Castle & Co., 1300 North Branch Street, Chicago, iron and steel warehouse, and has been succeeded as secretary and a director by Leonard J. Quetsch.

William K. Capers, who has been engaged in tank sales at Pittsburgh, New York and Chicago for the William B. Scaife & Sons Co., Oakmont, Pa., has been appointed manager of the company's Chicago office in the First National Bank Building, succeeding Charles F. O'Hagan. At present Mr. Capers will not relinquish any of the territory which he formerly covered.

C. Snelling Robinson, vice-president Youngstown Sheet & Tube Co., Youngstown, addressed the New York section of the American Institute of Mining and Metallurgical Engineers, March 22, on iron mining problems. In connection with the talk he presented for the first time a film entitled "The Story of Iron," taken by the Bureau of Mines at the mines and blast furnace plants of Pickands, Mather & Co., the Youngstown Sheet & Tube Co. and the Bethlehem Steel Corporation.

J. King Hoyt, Jr., of A. Milne & Co., 741 Washington Street, New York, steel merchants and importers, has returned from an extended visit at his firm's plant connections at Sheffield, England, Sweden, and in other Continental countries.

Arthur Lowy, for a number of years vice-president and chief engineer of the New York Engineering Co., 75 West Street, New York, has been elected president of the company, succeeding the late A. C. Ludlum. F. N. Ludlum has been named vice-president, and George Sommer, secretary and treasurer.

C. L. Wood, general manager of sales for the Carnegie Steel Co., recently sailed for an extended European tour.

William S. Rogers, formerly president of the Rogers Brown Iron Co., Buffalo, is president and treasurer of the Alloy Boat Corporation, 190 Elk Street, Buffalo, which was formed recently to manufacture boats of aluminum alloy for use with outboard motors.

Samuel M. Harrington has been elected president of the Frost Mfg. Co., Galesburg, Ill., manufacturer of steel heating boilers, to succeed W. S. Cameron.

J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, Ohio, was elected president of the Society of Ohio Safety Engineers at the annual meeting held at the Hotel Cleveland, Cleveland, March 24. J. E. Roof, Willard Storage Battery Co., Cleveland, was elected vice-president; A. C. Cook, Carnegie Steel Co., Youngstown, secretary, and E. R. Rose, Republic Iron & Steel Co., Youngstown, treasurer.

OBITUARY

William Cameron Sproul, former governor of Pennsylvania, who died at his home near Chester, Pa., on March 21, had long been prominent in industrial as well as political life in his native State. He was born at Octoraro, Lancaster County, Pa., Sept. 16, 1870, and attended Swarthmore College, Philadelphia, from which he was graduated in 1891. He first engaged in newspaper work, but soon extended his activities to the manufacturing field, organizing and serving as the first president of the Seaboard Steel Casting Co., now a part of the American Locomotive Co. He also organized and for many years served as chairman of the board of the General Refractories Co., Philadelphia. In this connection he took an active part in the formation of the American Refractories Institute, serving as its first president, and continuing as a director of the organization. He also aided in the development of the Lebanon Iron Co. and the Lackawanna & Wyoming Valley Railroad. His political career began when he was elected to the Pennsylvania Senate in 1896, and culminated with his election to the governorship in 1918.

W. C. SPROUL

Gaetano Lanza, for nearly 40 years a member of the faculty of the Massachusetts Institute of Technology, Cambridge, and well known as a consultant in mechanics, died on March 22 at his home in Philadelphia, aged 79 years. He was born in Boston, but attended college in Virginia, serving for a time as an assistant instructor at the University of Virginia. He later joined the faculty of the Massachusetts technical school, where he was professor of theoretical and applied mechanics from 1875 until 1911, when he became professor emeritus of mechanics. Removing to Philadelphia he served as special consultant in mechanics for the Baldwin Locomotive Works and was for a time associate editor of the Franklin Institute Journal. He was active in the American Society for Testing Materials and in 1920 was made an honorary member of that organization.

James W. Packard, founder, first president and for many years directing head of the Packard Motor Car Co., Detroit, died on March 20 at the Cleveland Clinic Hospital, where he had been a patient since November, 1926. He was born at Warren, Ohio, in 1863 and was graduated in mechanical engineering from Lehigh University, Bethlehem, Pa., in 1884. After working for a time as superintendent of the incandescent department of a New York electrical company, he returned in 1890 to Warren, where he organized the Packard Electric Co., manufacturer of incandescent lamps. A few years later he became interested in automobile manufacture and in 1897 organized the Packard Motor Car Co., which was soon moved to Detroit. Mr. Packard had lived in comparative retirement since 1915, interesting himself in philanthropy and the advancement of medical sciences. His largest and most recent gift was $1,000,000 to Lehigh University for a mechanical and electrical engineer laboratory.

William C. Fownes, vice-president of the Standard Seamless Tube Co., Pittsburgh, until its absorption early this year by Spang, Chalfant & Co., Pittsburgh, died March 24 at the Mayo Hospital, Rochester, Minn. Mr. Fownes was 70 years of age and with his brother, H. C. Fownes, had long been prominent in the steel industry of Pittsburgh. They were identified with the old Pittsburgh iron and steel firm of William F. Clark & Sons, and with the liquidation of that interest, they organized the Carrie Furnace Co., and built the Carrie furnaces at Rankin, Pa., which the Carnegie Steel Co. bought in 1898. They organized the Midland Steel Co., Midland, Pa., which was sold to the Pittsburgh Crucible Co. in 1911. In 1914 they founded the Standard Seamless Tube Co. at Ambridge, Pa. Other companies in which Mr. Fownes and his brother were interested were the Rust Boiler Co., Midland, Pa., which was acquired by the Babcock & Wilcox Co.; the Reliance Coke Co., Denbo, Pa., and the S. Jarvis Adams Co., started in Pittsburgh in the early days of the iron and steel industry, but later located at Midland, Pa., where it became the Pittsburgh Iron & Steel Foundries Co., which was merged with the Garrison Foundry Co. and then taken over by the Mackintosh-Hemphill Co.

William Melville Bowman, president Somersworth Foundry Co., Salmon Falls, N. H., died suddenly March 25. He was born in Falmouth, Mass., 67 years ago, and at the time of his death was a director of the Salmon Falls State Bank and of the Somersworth National Bank.

John G. Brierly, president Brierly-Lombard Co., Worcester, Mass., formerly the Lombard Machinery Co., died recently in Florida.

Peter J. MacNamara, president of the MacNamara-Koster Foundry Co., Indianapolis, died March 19, after a short illness.

Wolcott Remington, vice-president and a director of the Thompson Electric Welding Co., Lynn, Mass., died on March 20 at a Lynn hospital, following a week's illness, aged 53 years.

William Blackwood Smith, president, treasurer and one of the founders of the Smith & Caffrey Co., Syracuse, N. Y., structural steel fabricator, died at his home in that city on March 24, aged 68 years. He was born at Willimantic, Conn., June 22, 1860, and began his business career in Syracuse with the E. C. Stearns Co. In 1893 he became associated with James S. Caffrey, now vice-president of the Smith & Caffrey Co., in the firm bearing their names, continuing to be active in the company until his death.

Halward G. Westmore, general forman A. O. Smith Corporation, Milwaukee, and associated with the company since 1895, died March 19 after a brief illness. He was born in Norway in 1852 and came to America in 1863. Mr. Westmore is credited with notable achievements in the establishment of the automatic pressed steel automobile frame shop in the Smith plant, described in THE IRON AGE last week.

Henry A. Runkel, president Security Lightning Rod Co., Burlington, Wis., died March 10, aged 59 years. He was president also of the Burlington National Bank and identified with other business interests.

John T. Corbett, for many years head of Stadler & Corbett, Aurora, Ill., boiler manufacturers, and for 20 years head of the boiler department of Joseph T. Ryerson & Son, Inc., Chicago, died March 19 in Aurora. He was 77 years of age and had retired from the Ryerson company eight years ago.

Apparent consumption of babbitt metal in February is reported by the Department of Commerce at 4,470,368 lb., compared with 4,928,517 lb. in January. Except for December, the February total was the lowest for any month in more than three years. In February, 1927, it was 5,452,200 lb.

Machinery Markets and News of the Works

MARCH BUSINESS GOOD

Machine Tool Orders This Month Equal to February's

Detroit Automobile Company Buys $100,000 Worth of Special Lathes—German Order Amounts to $40,000

MACHINE tool business in March will equal that of February, and in a few instances will run ahead of that month. A Cincinnati manufacturer reports that bookings this month are the largest, with one exception, of any month since 1919. In the first quarter of the year some manufacturers have had about 50 per cent more business than in the corresponding period of 1927, but 25 per cent is perhaps more representative of the gain for the entire industry.

Business continues to come largely from the general industrial field. Automobile companies have not been buying as heavily as they usually do at this time of year, while the orders coming from the railroads have been unusually light.

Outstanding transactions of the week were $100,000 worth of special lathes bought by a Detroit automobile company and $40,000 worth of machines to be shipped to Germany. The Nash Motors Co., Kenosha, Wis., has ordered 18 presses, and a large press order has also been placed by the Stewart-Warner Speedometer Corporation, Chicago. The Allis-Chalmers Mfg. Co. has added about $15,000 worth of equipment to the plant of the Monarch Tractor Co., Springfield, Ill., which it recently acquired.

Business in prospect is in volume sufficient to encourage the belief that sales during April will not fall below those of this month. Particularly in the automobile industry is the outlook bright for the purchase of considerable shop equipment.

New York

NEW YORK, March 27.

MACHINE tool buying in this market has kept up during the past week at a pace which indicates that total sales for March will equal those of February. Most of the buying is in single tools, but demand is well scattered among nearly all classes of industrial buyers. Railroads are buying comparatively little, but the New York Central has asked for revised quotations on a number of tools, a move that may be the forerunner of early purchasing by that road. Orders for radial drills were fairly numerous during the week, buyers taking advantage of the brief period of protection given them on quotations outstanding when the recent price advances were announced. One of the dullest items in the machine tool list is lathes, demand for which has declined since the general price advances early in the year.

Among the week's sales were the following: Pratt & Whitney No. 2 jig borer to a Detroit automobile company; two 1 x 18-in. automatic lathes to a company in New Jersey; 36 to 44-in. side-head boring mill to Pratt & Whitney Aircraft Corporation, Hartford, Conn.; 3-ft. radial drill to Central Station Steam Co., Detroit; 3-ft. radial drill to a company in eastern Pennsylvania.

Used tools as follows were sold during the week: 16-in. lathe and a 3-spindle drilling machine to a company in Boston; 36 x 36-in. x 12-ft. Pond planer to a Detroit company; Niles 6-spindle floor boring machine to a company in Pennsylvania; 12 x 10-ft. x 26-in. Pond planer to a Pennsylvania company; 72 x 72-in. x 36-ft. Pond planer to a Pittsburgh company.

R. Hoe & Co., 504 Grand Street, New York, manufacturer of printing presses, saws, etc., is said to be planning a two-story addition to plant at Dunellen, N. J., to cost more than $75,000, and purposes to concentrate production at that location, removing all branch works. Additional equipment will be provided for increased output.

Bright Star Electric Co., New York, has been formed to take over and expand Bright Star Battery Co., with headquarters and plant on Fifteenth Street, Hoboken, N. J., manufacturer of dry batteries. New owner will continue production at same location and proposes to add to present line of output. A stock issue to total about $960,000 has been arranged, a portion of fund to be used for expansion. Battery company will maintain present identity as a subsidiary.

A. P. W. Paper Co., Broadway, Albany, N. Y., has awarded general contract to H. K. Ferguson Co., Cleveland, for new plant unit near North Barge Canal Terminal, to cost in excess of $900,000 with machinery. Contractor will prepare plans and act as engineer.

Board of Trustees, Westchester Joint Water Works No. 1, Mamaroneck, N. Y., is asking bids until April 6 for equipment for pumping station and filtration plant, including two Diesel engine generator units, each with capacity of 275 kw.; two high-lift and two low-lift centrifugal pumping units, motor-driven, and each with capacity of 3,000,000 gal. per day; mechanical mixing tanks; switchboard; wash water pumps, air compressors, mechanical equipment for chemical feed apparatus, etc., for a filter plant. Alexander Potter, 50 Church Street, New York, and Robert H. Stevens, Larchmont, N. Y., are associate engineers.

Huschle Brothers, Anable Avenue and Creek Street, Long Island City, Anthony J. Huschle, head, manufacturer of paper boxes and containers, has awarded general contract to Ettinger Security Construction Co., 50 Court Street, Brooklyn, for a new three-story plant on Thirty-seventh Street, Long Island City, to cost about $130,000, with equipment. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect.

Rainbow Light, Inc., Thirteenth Street, Long Island City, manufacturer of luminous lighting tubes, has arranged for establishment of nine operating plants at Long Island City, Philadelphia, Pittsburgh, Detroit, Cleveland, Chicago, Kansas City, Mo., New Orleans, and Atlanta Ga., and will develop these units for a maximum output of 300,000 ft. per month. E. C. Bull, formerly head of Hahn Motor Co., has become president and general manager.

Robinson Brothers Buffalo Ammonia Co., Montrose and Seneca Avenues, Brooklyn, is having plans drawn for a new one-story plant, 70 x 200 ft., to cost upward of $80,000 with equipment. H. C. Bracker, 2424 Myrtle Avenue, is architect.

Perth Amboy Airplanes Corporation, 218 Smith Street, Perth Amboy, N. J., Thomas L. Hanson, representative, has been formed with capital of $500,000 and 15,000 shares common stock, no par value, to succeed to Huff Airplanes, Inc., recently in financial difficulties. New organization will proceed with construction of plant, started by Huff Company, on portion of tract of Pardee Steel Corporation, to be one story, 190 x 260 ft., to cost about $75,000 with equipment. A number of buildings formerly used by steel company will be utilized for aircraft works.

Guarantee Finding Co., Inc., Orchard and Kinney Streets, Newark, jewelry manufacturer, has purchased one-story factory, 50 x 100 ft., at 145-47 Jackson Street, and will occupy for a new plant.

Myers, Bigelow & Shanley, 24 Walnut Street, Newark, architects, have completed plans for a two-story automobile service, repair and garage building, to cost about $180,000 with equipment.

Board of Education, Paterson, N. J., is considering an addition to its vocational school at Ellison and Summer Streets, to cost about $115,000 with equipment.

Art Metal Works, 7 Mulberry Street, Newark, has engaged Henry Baechlin, 665 Broad Street, architect, to prepare plans for an addition, to cost more than $40,000 with equipment.

Gibraltar Tire & Rubber Corporation, 4912 Hudson Boulevard, West New York, N. J., is considering rebuilding portion of plant destroyed by fire March 21, with loss estimated at more than $80,000 with machinery. Charles Cholerton is president.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, is asking bids until April 4, for equipment and supplies for schools, including steel and iron, machine tools, hand tools; machine, sheet metal, automobile mechanical, electrical and wood-working supplies; steel lockers, etc. Robert O. Beebe is director.

Benjamin Hacker, since 1919 engaged in marketing automotive products for export and export manager for William & Harvey Rowland, Inc., Frankford, Philadelphia, and other companies, has removed to larger offices at 280 Broadway, New York. A display room has been opened for products he represents.

Worthington Pump & Machinery Corporation, New York, on April 1 will remove its executive offices and its export and New York district sales departments to 2 Park Avenue. General sales and advertising departments of corporation were recently moved to Harrison plant at 421 Worthington Avenue, Harrison, N. J.

New England

BOSTON, March 26.

REPORTS of inactivity still come from New England machine tool dealers. Sales, in practically all cases, are for single machines of minor importance. Orders by a majority of houses this month will probably fall below those of January and February, and the last three months of 1927. Business by dealers in used tools is hindered by auctions of surplus machinery or of companies going out of business. Sales the past week included a new speed lathe to a Connecticut shop, and motor-driven pedestal grinder with a 7-in. wheel to a Connecticut plant, a new high-speed hammer to a Rhode Island shop, fairly large used press to a Massachusetts company, two Bliss presses to a Springfield metal worker, 16-in. used lathe to a Maine machine shop, and a two-spindle drill to a New Hampshire plant.

The metal-working equipment of the H. & S. Tool Co., Brockton, Mass., was sold at auction March 22.

Some New England railroads are inquiring for fairly expensive single tools; otherwise no new inquiries of importance have developed. Sales of small tools have fallen off.

Cement mill, at Thomaston, Me., of Lawrence Portland Cement Co., with annual capacity of 1,000,000 bbl., has started preliminary operations and will begin production of cement next month. Its annual wages are estimated at $500,000, and consumption of raw materials, products and supplies, under normal conditions, will cost approximately $700,000. In addition, company operates a lime plant at Thomaston with a 25,000-ton annual capacity. Home office of Lawrence Portland Cement Co. is at Northampton, Pa. Company has under consideration plans for another cement works north of Bath, Me., but nothing definite has been decided.

Foundations are in for a three-story addition, 20 x 52 ft. for Specialty Products Co., 15 Gordon Avenue, Providence, R. I. Plans are private.

Leslie Weir, 41 East Forty-second Street, New York, architect, has closed bids on two one-story ice plants, 89 x 122 ft., and 77 x 87 ft., respectively, at Cambridge for Boston Ice Co., 110 State Street, Boston.

Stark Tool Co., Inc., 416 to 424 Moody Street, Waltham, Mass., contemplates building a one and one-half-story, 30 x 80 ft., addition. Plans are private.

Work will start at once on a one-story, 60 x 170 ft., sales and service station at 1172 Commonwealth Avenue, Boston, for Boston Buick Co. Mechanical equipment will be required. Edward B. Stratton, 25 Arch Street, Boston, is architect.

Oxford Paper Co., 200 Fifth Avenue, New York, will build an addition to its plant at Rumford, Me., to cost, with grinding and other equipment $125,000. Percy Searle, Rumford, company engineer, has plans.

North Shore Ice Delivery Co., 46 Lake Avenue, Lynn, Mass., has plans for a one-story, 100 x 175 ft. ice plant to cost, with equipment, $200,000. Funk & Wilcox, 26 Pemberton Square, Boston, are architects.

Bentley & Holmgren, 406 Court Exchange Building, Bridgeport, Conn., have been appointed representatives in Connecticut and western Massachustts for Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago.

Bids will be received by Board of Water Commissioners, Marshfield, Mass., for two duplicate pumping units, 10 x 12 in., vertical triplex, deep-well type, and 50-hp. Diesel engine, with accessories, for municipal waterworks. Symonds & Stevens, 70 State Street, Boston, are engineers.

Public Service Co. of New Hampshire, Manchester, N. H., has applied for permission to dispose of preferred stock to an amount of about $480,000, a portion of proceeds to be used for extensions and betterments in power plants and system, including transmission lines. Expansion and improvements planned prior to Sept. 1 are estimated to cost $700,000.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has approved plans for a new steam-operated power plant and switching station at Weymouth, Mass., to cost in excess of $1,000,000. Stone & Webster, Inc., 49 Federal Street, is engineer.

A. C. Gilbert Co., New Haven, Conn., manufacturer of electric fans and other electrical appliances, metal toys, etc., is arranging for sale of a preferred stock issue of 25,000 shares, portion of proceeds to be used for expansion.

Townsend Motor Car Co., Derby Street, Salem, Mass., has plans for a one-story addition to service and repair department, to cost $60,000 with equipment. G. H. Fanning, 221 Essex Street, is architect.

New England Metal Culvert Co., Palmer, Mass., has awarded general contract to J. Gascoigne & Co., Inc., 6 Beacon Street, Boston, for a new one-story plant, 80 x 90 ft., at South Boston. Monks & Johnson, 99 Chauncy Street, Boston, are architects and engineers.

Boston & Albany Railroad Co., South Station, Boston, has work under way on a new boiler plant at its shops at West Springfield, Mass., to cost about $400,000 with equipment. A mechanical coal and ash-handling system will be installed, and other automatic machinery. Dinsmore, McClear & Robbins, Springfield, Mass., are architects.

Lynn Gas & Electric Co., Lynn, Mass., has plans for a new steam power house, to cost about $225,000 with equipment. Stone & Webster, Inc., 49 Federal Street, Boston, is engineer.

City Ice & Fuel Co., Cleveland, has been awarded contract for refrigeration plant in Boston for Boston & Maine Railroad, to have a daily capacity of 200 to 300 tons. Cleveland company will also install a refrigeration system for a coliseum to be built in connection with that railroad's North Station.

Gulf States

BIRMINGHAM, March 26.

PLANS are being arranged by Crystal Oil Refining Corporation, Shreveport, La., for a new refinery at Monahans, Tex., with initial capacity of 5000 bbl. per day, to cost approximately $400,000 with equipment.

Continental Roofing and Mfg. Co., Tacoma Street, Mobile, Ala., has acquired property in Murrell district and is reported planning a new factory, to cost more than $45,000 with equipment.

Godfrey L. Cabot, Inc., Old South Building, Boston, has plans for a carbon black plant near Pampa, Tex., with air compressors and power equipment, to cost in excess of $350,000.

John E. Mitchell Co., 600 South Sixth Street, St. Louis, manufacturer of cotton ginning and flour milling machinery, has begun erection of new two-story plant, 100 x 200 ft., at Dallas, Tex., to cost approximately $50,000. A portion of equipment will be transferred from St. Louis plant and additional machinery provided.

Linde Air Products Co., 30 East Forty-second Street, New York, operated by Union Carbide & Carbon Co., same address, manufacturer of welding apparatus, etc., is reported planning erection of new plant at San Antonio, Tex., to cost about $50,000 with equipment. Prest-O-Lite Co., Inc., manufacturer of acetylene equipment, an affiliated organization, same headquarters, is said to be arranging for plant on adjoining site to cost close to like amount.

South Texas Gas Co., Laredo, Tex., is planning an expansion program, including construction of gasoline refinery, pipe lines, etc. A bond issue of $2,000,000 is being sold, a portion of proceeds to be used for work.

Standard Building Material Co., 2700 North Seventh Street, Birmingham, has asked bids on general contract for a new two-story storage and distributing plant, 60 x 122 ft., to cost about $35,000 with equipment.

Thompson Can Co., Dallas, Tex., has work under way on a new one-story tin can manufacturing plant at 1304-8 South Austin Street, totaling about 16,000 sq. ft. of floor space, to cost close to $40,000 with equipment.

Pasotex Petroleum Co., a subsidiary of Standard Oil Co. of California, 225 Bush Street, San Francisco, is completing plans for a 200-mile pipe line from El Paso to west Texas oilfield district, to cost more than $2,500,000. Work will be carried out in conjunction with proposed oil refinery at El Paso, Tex., to cost upward of $450,000 with equipment.

Vacherie Sugar Refinery, Jeanerette, La., will rebuild portion of cane sugar refinery recently destroyed by fire, with loss reported at close to $100,000 with equipment,

Atchison, Topeka & Santa Fe Railroad Co., 80 East Jackson Boulevard, Chicago, has awarded general contract to H. D. McCoy, Cleburne, Tex., for additional machine and repair shops at Cleburne, to cost more than $100,000 including equipment. Frank Merritt is chief engineer at Galveston, Tex.

E. L. Smith Oil Co., Mexia, Tex., has arranged for increase in capital from $5,000,000 to $10,000,000, a portion of fund to be used for extensions and betterments in oil refining and distributing plants, including acquisition of additional properties. Company has recently taken over properties of J. K. Hughes Development Co., in this district.

Exide Battery Co., Fifth and Lavaca Streets, Austin, Tex., has leased a one-story building, 70 x 130 ft., to be erected for a new service and repair works, to cost about $40,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in one and two-story baking plant, 150 x 175 ft., to be erected by C. J. Patterson Corporation, 4050 Penn Street, Kansas City, Mo., at Houston, Tex., to cost upward of $200,000 with machinery.

Texas Utilities Co., Slaton, Tex., has authorized construction of transmission lines from Slaton to Tahoka, Tex., by way of Wilson, with power substations at last-noted places, to cost about $50,000.

Philadelphia

PHILADELPHIA, March 26.

PLANS are being completed for a one-story motor bus service, repair and terminal building for Philadelphia Rapid Transit Co., Broad and Locust Streets, Philadelphia, to cost approximately $1,000,000 with equipment. Company engineering department is in charge.

Board of Public Education, Keystone Building, Nineteenth Street, Philadelphia, is asking bids until April 3 for boilers, electrical equipment, air filter, copper screens, etc., for school on Belgrade Street. William Dick is secretary and business manager.

A. C. Bieber, 1520 Locust Street, Philadelphia, architect, has completed plans for a two-story automobile service, repair and garage building at Rosemont, Pa., to cost upward of $80,000 with equipment.

Richard L. DeCou Co., Philadelphia, has purchased at public auction structural steel and ornamental iron plant formerly conducted at Norristown, Pa., by Gehret Brothers, Inc. New owner will operate plant as in past.

Philadelphia Auto Body Works, Inc., Philadelphia, has leased the one-story building at 1405-7 Race Street for a new plant.

Trenton Potteries Co., North Clinton and Ott Streets, Trenton, N. J., manufacturer of sanitary ware, has awarded general contract to J. H. Morris & Co., 211 North Montgomery Street, for a one-story addition, 65 x 170 ft., with extension, 35 x 74 ft., to cost more than $75,000 with equipment. W. A. Klemann, First National Bank Building, is architect.

Lawson Aircraft Co., 1819 Broadway, New York, has arranged with city council, Trenton, N. J., to occupy a portion of municipal machine shop on Lewis Street, and will use as an assembling works.

Concrete Steel Co., Camden, N. J., has filed plans for two one-story shop additions.

American Electric Power Co., operated by American Gas & Electric Co., 30 Church Street, New York, will begin work on its steam-operated electric power plant at Pennsville, N. J. Initial unit will have a rated capacity of 114,000 kw., divided into three turbo-generating units, with boilers, condensers and auxiliary equipment. Entire plant will develop an output of 400,000 kw. A steel tower transmission will be built for service for Atlantic City Electric Co., Atlantic City, N. J., and Delaware Electric Power Co., Wilmington, Del., affiliated organizations. Entire project will cost more than $7,500,000. Stevens & Wood, Inc., 120 Broadway, New York, is engineer.

Reading Airplane Co., Reading, Pa., recently organized, contemplates operation of a local plant for manufacture of aircraft, including parts, assembling and repair works. Allen K. Owen, Reading, is treasurer; Joseph E. Logan, Reading, is also an official.

Great Atlantic & Pacific Tea Co., 150 Bay Street, Jersey City, N. J., will install ovens, power equipment, conveying machinery, etc., in a baking plant, with storage and distributing plant, at Altoona, Pa. A refrigerating plant will also be installed. Entire project will cost $375,000.

Scranton Electric Co., Scranton, Pa., has secured permission to take over and consolidate eight light and power companies in Carbondale, Clifford, Laflin, Newton, Ransom and Scott Townships. Plans are under way for expansion, including transmission line construction.

Pennsylvania Power & Light Co., Allentown, Pa., is arranging for an increase in indebtedness from $80,000,000 to $180,000,000, a portion of fund to be used for expansion. Work will soon begin on a 66,000-volt power line in Berwick district, with rebuilding of transmission lines to Wilkes-Barre and Drums, Pa.

Chicago

CHICAGO, March 26.

FROM the viewpoint of sales, March is rounding out a trifle better than February, which likewise led January, making the showing in the first three months of 1928 better than the corresponding period of 1927. Business in prospect is encouraging and dealers are of the belief that orders will be well sustained in April.

Allis-Chalmers Mfg. Co. has purchased about $15,000 worth of equipment for its newly acquired Monarch tractor plant at Springfield, Ill., and other items are pending. Nash Motors Co., Kenosha, Wis., bought 18 presses and the Stewart-Warner Speedometer Corporation, Chicago, has ordered similar equipment.

A 10 per cent advance on shapers was made effective March 15.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a sub-station at 6136 South Crawford Avenue, and another at 262 North Harding Street each to cost $40,000.

Mechanical Mfg. Co., Union Stock Yards, will build a two-story addition, 20 x 80 ft. H. H. Taisekamp is architect.

Chicago Bridge & Iron Works, 1305 West 105th Street, will build an addition, 100 x 200 ft., to cost $20,000.

Peoples Gas Light & Coke Co., 222 South Michigan Avenue, Chicago, will build a gas purifier to cost $170,000. Western Gas Construction Co., Fort Wayne, Ind., is general contractor.

Plant of Midwest Engineering & Equipment Co., 617 West Fulton Street, Chicago, recently was damaged by fire to the extent of $20,000.

Hitchcock & Tinker, Inc., 330 United States National Bank Building, Denver, Colo., contractor which recently completed building Moffat Tunnel, has formed Hitchcock & Tinker Equipment Co., to handle sale of entire machinery, camp equipment and supplies used in building tunnel.

Vergan Schmidt Co., engineer and manufacturer, formerly at Champaign, Ill., has acquired a new plant and additional production facilities at Dubuque, Iowa, and removed to that city.

Ornamental Brass Shops, Tenth Street and Tenth Avenue, Rockford, Ill., will soon start construction of an addition containing 17,000 sq. ft. to provide for expansion. Company manufactures furniture, phonograph hardware, brass and aluminum casting, punch press products and ornamental iron.

S. G. Taylor Chain Co., Chicago, has removed its general sales offices to Hammond, Ind. Chicago sales office will remain at 140 South Dearborn Street.

Healy-Ruff Co., 765 Hampden Avenue, St. Paul, Minn., has been organized to manufacture radiator hangers and concrete inserts. Hangers are made of gray iron castings and steel and inserts entirely of castings.

Plans are being arranged by Dextex Watch Clock corporation, 4147 East Ravenswood Avenue, Chicago, for rebuilding portion of four-story plant recently destroyed by fire, with loss of $32,000.

Hudson Metal Products Co., 120 North Green Street, Chicago, manufacturer of machine screw products, has acquired one-story building, 60 x 125 ft., at 4500-6 West

The Crane Market

FRESH inquiry for overhead cranes has been small, but the locomotive crane field is quite active. The Chicago district has been considerably more active than in the East. Inquiries for locomotive cranes include some railroad business. Dwight P. Robinson & Co., New York, are asking for prices on several locomotive cranes. The Franklin Lumber Co., Newark, N. J., in the market for two 15-ton lumber handling cranes and several electric hoists, is not expected to purchase much before May. Rockford Drop Forge Co., Rockford, Ill., will buy two 5-ton floor operated electric cranes.

Among recent purchases are:

F. L. Smidth & Co., 50 Church Street, New York, 25-ton, 1-motor overhead crane from Whiting Corporation.

National Sanitary Mfg. Co., Salem, Ohio, one 5-ton, 58-ft. span crane from Alliance Machine Co.

Augusta Street, for a new plant. Additional facilities will be provided for enlarged output.

Western States Public Utilities Co., Terminal Building, Omaha, Neb., has approved plans for a new one and two-story power house at Sheldon, Iowa, to cost close to $250,000 with transmission lines.

Central Illinois Public Service Co., Springfield, Ill., will build a new ice manufacturing plant at Bluford, Ill., to cost approximately $100,000 with machinery. Murray Hanes, 205 South Sixth Street, Springfield, is architect.

Iowa Soap Co., Valley Street, Burlington, Iowa, will install a power plant in connection with factory addition. Entire project will cost about $110,000. Federal Engineering Co., Central Office Building, Davenport, Iowa, is architect and engineer.

Southern Colorado Power Co., Pueblo, Colo., plans extensions and improvements in power house at Lamar, Colo., with installation of additional equipment. Plant was recently acquired from city. Transmission lines in that section will also be built.

Chicago Solder Co., 4201 Wrightwood Avenue, Chicago, Ill., has work in progress on a two-story building, totaling about 19,000 sq. ft. floor space, as a second plant unit. It will cost about $80,000. Schmidt, Garden & Erikson, 104 South Michigan Boulevard, are architects.

Fox & Fox, 38 South Dearborn Street, Chicago, architects, have plans for a five-story automobile service, repair and garage building, 80 x 145 ft., to cost in excess of $450,000 with equipment.

Otter Tail Power Co., Fergus Falls, Minn., has authorized plans for extensions and improvements in steam-operated power house at Jamestown, N. D., including installation of boilers, stokers and auxiliary equipment. Betterments will also be made at hydroelectric power plant at Dayton Hollow, near Fargo, N. D., to include installation of set of horizontal waterwheels, generating equipment, exciters and auxiliary apparatus.

C. B. Isett & Son, 1701 Winnebago Avenue, Chicago, manufacturer of boilers and other plate products, have acquired two-story plant, 50 x 100 ft., at 3035-37 North Rockwell Street, for a new works.

A. P. DeVore, 810 Palmer Avenue, Pueblo, Colo., is at head of a project to construct and operate a local plant for manufacture of airplanes and parts, to cost about $45,000. Site is being secured.

Mall Tool Co., 7740 South Chicago Avenue, Chicago, has authorized plans for a one and two-story addition to cost approximately $30,000. Buckley & Skidmore, First Trust & Savings Bank Building, Hammond, Ind., are architects.

Common Council, Mott, N. D., will take bids late in April for equipment for municipal waterworks, including electric-pumping machinery, elevated water tank and steel tower, etc., to cost $55,000. E. R. Griffin is engineer.

Buffalo

BUFFALO, March 26.

PLANS are being drawn for a one-story addition, 40 x 180 ft., to factory of S. B. Whistler & Sons, Inc., 1459 Niagara Street, Buffalo, manufacturer of tools, dies, etc., to cost close to $25,000. Nathan Sturdy and Harry A. Wander, Prudential Building, are engineer and architect respectively.

Board of Education, Syracuse, N. Y., is considering installation of manual training equipment in addition to central high school to cost $275,000. Nelson F. Pitts, Jr., City Hall, is city engineer, in charge of plans. G. Carl Alverson, Educational Building, is superintendent.

Board of Works, Lockport, N. Y., will install pumping machinery, air compressors, mechanical equipment for chemical feed machinery, meters, regulators, etc., in connection with a filtration plant for municipal waterworks to cost $550,000. J. N. Chester Engineers, Inc., Union Bank Building, Pittsburgh, is engineer.

Fairbanks Co., Binghamton, N. Y., manufacturer of valves and kindred equipment, will rebuild main unit of local plant destroyed by fire March 21, with loss close to $150,000 including equipment. Headquarters are at Broome and Lafayette Streets, New York.

Board of Education, Binghamton, N. Y., contemplates installation of manual training equipment in new junior high school to cost about $650,000. Edward W. Prentice, City Hall, is city engineer, in charge.

Buffalo, Niagara & Eastern Power Corporation, Buffalo, is arranging for a preferred stock issue to total 500,000 shares of stock, a portion of proceeds to be used for extensions and improvements, including transmission line construction, and to complete merger with Niagara Falls Power Co., Niagara Falls, N. Y., and other power utilities in this section.

Penn Yan Union High School District, Penn Yan, N. Y., plans installation of manual training equipment in new junior high school to cost about $250,000. J. Johnson, president, is in charge.

Common Council, North Elba, N. Y., Willis Wells, supervisor, is arranging fund of $75,000 for a municipal airport in Plain Farms district, to include hangar, machine and repair shop, oil storage and distributing plant.

J. C. Harding & Son, Oswego, N. Y., have been awarded contract for rebuilding plant of Oswego Boiler Co., Oswego, recently destroyed by fire.

Pittsburgh

PITTSBURGH, March 26.

MACHINE tool business is of only moderate volume. Inquiries are fairly constant and sales are frequent, but usually are for single tools.

Plans are being drawn by Mine Safety Appliance Co., Braddock and Thomas Avenues, Pittsburgh, manufacturer of coal-mining equipment and apparatus, for a three-story addition, to cost upward of $150,000 with equipment, Bernard H. Prack, Martin Building, is architect and engineer.

Pittsburg Water Heater Co., Jenkins Building, Pittsburgh, with main plant at Crafton, Pa., has arranged for purchase of nine acres of factory property at Herrs Island, vicinity of Charles Street, with building, for $580,000, and will remodel for a new plant unit. Company is reported to be planning acquisition of other property in Northside district in connection with expansion program, for which a fund of $1,200,000 recently was arranged.

Mayer Body Corporation, 6461 Frankstown Avenue, Pittsburgh, manufacturer of automobile bodies, has awarded general contract to Conley & Demey, 127 North Highland Avenue, for a one-story addition.

Ovens, power equipment, conveying and other machinery will be installed in new two and three-story plant, 90 x 250 ft., to be erected by Grennan Bakeries, Inc., 6016 Rodman Street, Pittsburgh, to cost more than $125,000, for which bids have been asked on general contract.

Appalachian Electric Power Co., Bluefield, W. Va., is said to be planning construction of a new power substation in Williamson district, to cost $135,000 with equipment.

United States Engineer, Keenan Building, Pittsburgh, is asking bids until April 19, for lock-operating machinery for Lock No. 6, Allegheny River.

Board of Education of Cumberland Township, Carmichael, Pa., is planning installation of manual training equipment in a new high school to cost $250,000. C. C. Compton, Fourth Street and Thompson Avenue, Donora, Pa., is architect.

City Council, Pittsburgh, is considering an appropriation of $30,000 for purchase of special machinery and trucks for bureau of street-cleaning, including two flushers and two graders.

Board of Education, Martinsburg, W. Va., is considering installation of manual training equipment in new high school to cost $270,000, for which bids have been asked on general contract until April 16. Frampton & Bowers, 412 Eleventh Street, Huntington, W. Va., are architects.

Pennsylvania-Ohio Power Co., Youngstown, Ohio plans construction of steel tower transmission line over Mahoning River, near Mahoningtown, Pa.

Pittsburgh-Des Moines Steel Co., on May 1 will occupy its new office building at its plant on Neville Island, Pa., and sales and engineering divisions now located in Professional Building, Pittsburgh, will be transferred to new building.

City Commissioners, Mannington, W. Va., are asking bids until April 24 for motor-driven pumps and air compressors for city waterworks.

Leonard R. Nourie, Park Building, Pittsburgh, has been appointed representative in Pittsburgh district for Barrett-Cravens Co., Chicago, manufacturer of lift trucks and portable elevators.

Cleveland

CLEVELAND, March 26.

MACHINE tool sales showed quite an increase the past week. Single orders were more plentiful than for some time and a few lots of three or four machines were placed. Business was scattered among automobile parts manufacturers and other industries. The call was largely for production machinery. The New York Central Railroad has allowed requistions for two or three machines for which inquiry was made several months ago and these are expected to be placed shortly. Business in the Detroit territory continues rather slow.

Cleveland Electric Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, Ohio, has appointed Leeds, Tozzer & Co., Inc., 75 West Street, New York, representative of its tramrail system in Manhattan, Bronx and Staten Island sections of New York.

Ludlow Window Ventilator Co., East Liverpool, Ohio, has been organized to manufacture special type of window ventilator. Plant has been completed, equipment installed and company is now assembling special dies and presses. Materials used will include copper screen wire, bolts and nuts, sheet iron, screws, brass brads, filter cloth and while pine lumber.

Peerless Malleable Castings Co., Toledo, Ohio, organized about a year ago to take over local malleable iron foundry of United Malleable Iron Co., has discontinued operations and business will be liquidated.

Detroit Range Boiler & Steel Barrel Co., recently at 375 Phillips Avenue, Toledo, Ohio, has removed to 454 Earl Street, that city.

Toledo Safety Device Co., 141 North Erie Street, Toledo, has been organized to manufacture mechanical safety devices and fire alarm systems. Company does not contemplate building plant at present and work will be done by contract.

William Hamilton Sons Car Co., Newark, Ohio, successor to Jewett Car Co., will be sold at public auction April 10 and 11, as result of liquidation proceedings. Company went into receivership Nov. 1, 1927. Sale will include plant, land and buildings, machinery, equipment, tools, dies, etc.

Plans are being drawn by Scott & Fetzer Co., 11401 Locust Avenue, Cleveland, manufacturer of vacuum cleaners, parts, etc., for a two-story addition, 43 x 60 ft., to cost about $45,000 with equipment. A. G. Wolf, Swetland Building, is architect.

Steel Improvement & Forge Co., 5003 Windsor Street, Cleveland, has awarded general contract to J. L. Hunting, Guarantee Title Building, for a one-story plant at 940-50 Addison Road, 60 x 200 ft., to cost close to $90,000 with equipment.

Air-Way Electric Appliance Corporation, Toledo, is disposing of a preferred stock issue to total $387,900, a portion of proceeds to be used for enlargements and additional equipment.

National Sanitary Co., Salem, Ohio, manufacturer of sanitary ware, has awarded a general contract to Boyd-Meinhart Construction Co., Massillon, Ohio, for a new one-story plant to replace a factory recently destroyed by fire. It will cost approximately $100,000 with equipment.

Midwest Rubber Reclaiming Co., recently formed as an interest of Akron Rubber Reclaiming Co., Barberton, Ohio, S. G. Luther, manager latter company in charge, is asking bids on general contract for a new plant at East St. Louis, Ill., with main one-story unit, 90 x 500 ft., power house and other buildings, to cost close to $200,000 with machinery. Refining equipment, mechanical washers, motors and other power equipment will be installed.

Enameled Sanitary Co., Alliance, Ohio, has purchased local foundry of Buckeye Jack Co., on 35-acre tract and will remodel for a new plant.

G. Schaefer Wagon Co., 4180 Lorain Avenue, manufacturer of automobile bodies, wagons, etc., will soon begin rebuilding plant recently destroyed by fire, to be four stories and basement, and to cost $135,000 with equipment. W. S. Longee, Marshall Building, is architect.

St. Louis

ST. LOUIS, March 26.

WORK will begin by Stewart Inso Board Co., Lake Road, St. Joseph, Mo., manufacturer of wallboard, on three additions, comprising three-story rotary unit, 50 x 72 ft.; one-story main factory, 40 x 600 ft.; and one-story storage and distributing plant, 60 x 200 ft., to cost $200,000 with equipment. A. G. Gibson is company engineer, in charge.

General Tire & Rubber Co., Akron, Ohio, is completing plans for a three-story factory branch and distributing plant at Kansas City, Mo., to cost $210,000 with equipment. Greenbau, Hardy & Schumacher, Scarritt Building, Kansas City, are architects.

Kansas City Public Service Co., Kansas City, Mo., is disposing of a bond issue of $4,400,000, a portion of fund to be used for extensions and improvements in power plants and systems; approximately $2,500,000 will be used for 1928 program.

Carter Carburetor Co., 2838 North Spring Avenue, St. Louis, manufacturer of carburetors and kindred equipment, has awarded general contract to Fruin-Conlon Contracting Co., Merchants Laclede Building, for a two-story addition, 90 x 240 ft., to cost about $75,000 with machinery.

Common Council, Kennett, Mo., is said to have plans maturing for installation of a municipal electric light and power plant.

Kaysing Iron Works, 2525 Montgomery Street, St. Louis, has plans for a one-story addition, totaling about 30,000 sq. ft. floor space, to cost approximately $50,000.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has awarded general contract to H. W. Underhill Construction Co., Wichita, Kan., for a one-story machine and boiler shop, 42 x 150 ft., at Guthrie, Okla., to cost about $50,000 with equipment. E. A. Harrison is company architect.

Missouri Farmers' Association, Virginia Building, Columbia, Mo., has plans for a one-story cold storage and refrigerating plant at Willows Springs, Mo., to cost about $40,000 with equipment. F. M. Scott is secretary.

Pillsbury Flour Mills Co., Minneapolis, Minn., is considering a new flour mill and grain elevator on site, 300 x 1300 ft., at Enid, Okla., to cost more than $850,000 with machinery.

Board of Trustees, Wichita Municipal University, Wichita, Kan., has authorized plans for a steam power plant to cost about $50,000 with equipment. Edward Forsblom, Sedgwick Building, is architect.

City Council, Marshall, Mo., has secured a fund of $80,000 for extensions and improvements in municipal electric light and power plant, including installation of generating, boiler and other equipment.

Simmons Bed Co., Kenosha, Wis., has awarded general contract to Peter Kiewit's Sons, Omaha National Bank Building, Omaha, Neb., for a one-story factory branch and distributing plant at Omaha, to cost close to $40,000.

Board of Education, Wellington, Kan., plans installation of manual training equipment in new two-story high school, to cost $250,000, for which bids have been asked on general contract. Schmidt, Boucher & Overend, Fourth National Bank Building, Wichita, Kan., are architects.

South Atlantic States

BALTIMORE, March 26.

PLANS are being completed by Chesapeake Paper Board Co., Key Highway and Baltimore & Ohio Railroad, Baltimore, for four new plant units, to cost more than $100,000 with equipment. Karl A. Lefern, 171 Madison Avenue, New York, is architect and engineer.

J. W. Geddes, 1523 L Street, N. W., Washington, architect, will soon ask bids on general contract for five-story automobile service, repair and garage building, to cost $185,000 with equipment.

Carolina Power & Light Co., Raleigh, N. C., plans construction of new transmission line from Canton to Asheville, N. C., and from Canton to Greenville, S. C. about 70 miles, to operate at 110,000 volts, to cost more than $200,000.

Quartermaster Department, United States Army, Third Corps Area, Baltimore, will receive bids until April 13, for a deep-well pump with accessories for installation at Fort Hunt, Va., circular 15.

A. A. Roudabush, Shenandoah, Va., formerly head of Page Power Co., operating in Page County, Va., is interested in a new power enterprise to include construction of a power dam and hydroelectric generating plant on Shenandoah River, about one mile from Shenandoah, to cost more than $750,000 with transmission lines. It is purposed to organize a company to carry out project.

American Commonwealths Power Corporation, operating Savannah Gas Co., Savannah, Ga., and other light and power properties in Missouri, Arkansas, Kansas and Texas, is disposing of a preferred stock issue to total $4,750,000, a portion of proceeds to be used for extensions and improvements, including purchase of additional properties.

Board of Awards, office of city register, Baltimore, has awarded a general contract to B. H. B. Ennis, 1933 East Thirty-first Street, for a three-story and basement municipal repair and reconditioning shop, with equipment storage and distributing department, to cost $130,000. Structure will be used by Board of Education.

Isaac Andrews, president, Andrews Loom & Harness Co., Spartanburg, S. C., is reported planning a new plant for the manufacture of textile looms and other textile mill equipment, to cost more than $150,000 with machinery.

Eastern Shore Gas & Electric Co., Salisbury, Md., is negotiating for purchase of municipal electric light and power plant at Centerville, Md., for $160,000, and plans extensions and improvements, including transmission line construction.

Atlanta Textile Supply Co., Austell Building, Atlanta, Ga., manufacturer of cotton mill equipment and supplies, is said to be planning erection of new factory, to cost about $35,000 with machinery.

C. F. Palmer, head of Palmer, Inc., Palmer Building, Atlanta, Ga., has plans for a multi-story automobile service, repair and garage building, to cost about $250,000 with equipment.

Virginia Electric & Power Co., Richmond, Va., is arranging for bond issue of $8,000,000, a portion of fund to be used for extensions and betterments in plants and transmission lines.

Cincinnati

CINCINNATI, March 26.

MARCH is closing with a notable lack of uniformity in sales of local machine tool companies. A number of builders report that orders have declined sharply in the past 30 days, but, on the other hand, there is an equally important group which has had good business. In at least one case a large manufacturer states that bookings in March have been the best, with one exception, of any month since 1919.

Preliminary review of activities in the first quarter of this year shows that considerable unevenness has existed in both sales and production. Some companies have increased orders about 50 per cent over the same period of 1927, while several builders have been disappointed at the small amount of business received. In general, however, sales have averaged close to 25 per cent ahead of first quarter last year. One of the healthiest signs has been that most of the business has come from the general industrial field. Automobile makers have bought a fair amount of equipment, but have confined purchases to a comparatively small number of builders. Orders placed by railroads have been extremely light.

The outlook for the next three months is considered good by the majority of machine tool companies, all of which have a large volume of pending inquiries. Particularly in the automobile industry is the prospect bright for buying considerable equipment.

Outstanding among transactions the past week have been the sale of about $100,000 worth of special lathes to a company in the Detroit district and the receipt by a local builder of an order for approximately $40,000 worth of machines from Germany.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until April 20, for aircraft parts, including windshield assemblies, control assemblies, pulleys, lever assembies, tube assemblies, wiring plates, hinges, radiators, etc., circular 28283.

Phillips & Buttorff Mfg. Co., Fourteenth Avenue and Hamilton Street, Nashville, Tenn., manufacturer of stoves, ranges, etc., plans a two-story addition to cost about $45,000. Madison P. Jones, 336 Chesterfield Avenue, is architect.

R. R. Ogilvie, American Trust Building, Nashville, Tenn., has filed plans for a three-story automobile service, repair and garage building, to cost close to $85,000 with equipment.

City Council, Knoxville, Tenn., has approved plans for a one-story municipal service, repair and garage building, 50 x 300 ft., to cost approximately $100,000 with equipment. L. M. Dow, Brownlow Building, is achitect.

City Transit Department, Cincinnati, has plans for installation of 19 automatic power substations for street railroad system, to cost more than $500,000 with equipment. Power will be secured from Union Gas & Electric Co., which is interested in project.

Glasgow Oil Refining Co., Glasgow, Ky., is said to have plans under advisement for rebuilding portion of plant recently destroyed by fire with loss of about $35,000 including equipment.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, is said to be completing plans for a new one-story plant in Hollywood section, Memphis, Tenn., to cost about $60,000. An adjoining tract will be used for a plant by Prest-O-Lite Co., a subsidiary, for manufacture of acetylene equipment, etc., to cost close to like sum.

City Council, Paducah, Ky., is considering construction of a municipal electric light and power plant, to cost more than $45,000 with machinery. Surveys have been authorized.

Board of Education, Nashville, Tenn., is considering installation of manual training equipment in proposed new two-story and basement high school on Park Avenue, to cost in excess of $250,000, for which superstructure will soon begin. Ausmus & Clark, Nashville Trust Building, are architects.

Detroit

DETROIT, March 26.

BIDS will soon be asked by Chevrolet Motor Car Co., Holbrook Avenue, Detroit, for a one-story addition to be used as a gear and axle works, to cost more than $90,000. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Consumers Power Co., Jackson, Mich., has plans nearing completion for an addition to its steam-operated electric generating plant, Grand Rapids, Mich., with installation of turbo-generating unit and auxiliary equipment to double present capacity, totaling about 55,000 hp. Following completion of this work other expansion will be carried out to more than triple capacity. Extensions will be made in transmission lines. Entire project will cost more than $1,000,000. Charles W. Tippy is vice-president and general manager.

Huron Forge & Machine Co., 9041 Alpine Avenue, Detroit, is planning installation of additional equipment in its machine shop.

Board of Education, Pontiac, Mich., will soon take bids for a two-story manual arts school on Central High School campus, to cost $100,000. Childs & Smith, 720 North Michigan Avenue, Chicago, are architects.

Frank F. Taylor Co., Inc., 2801 Highland Avenue, Norwood, Cincinnati, manufacturer of automobile wheels, juvenile vehicles, etc., has purchased Central Wheel Co., Muskegon, Mich., and will consolidate with its organization. Equipment will be removed to Cincinnati works which will be extended to accommodate increase.

L. A. Young Spring & Wire Corporation, 9200 Russell Street, Detroit, manufacturer of special springs and other wire goods, is disposing of preferred stock issue to total $2,550,000, a portion of fund to be used for expansion.

New interests headed by F. C. Bowers and A. J. Jennings are completing arrangements for purchase of controlling interest in Farmer Lubrication Systems, Inc., 2633 Sixteenth Street, Detroit, manufacturer of lubricating devices and equipment, and will carry out an improvement and development program. A new company will be formed with capital of $375,000 to take over property.

Board of Education, Lincoln Park, Mich., plans installation of manual training equipment in new three-story high and grade school to cost about $900,000, for which plans will be prepared by Verner, Wilhelm & Molby, Book Building, Detroit, architects.

Karp Brothers Coal & Ice Co., 3900 Orleans Street, Detroit, has awarded general contract to Zacks & Lerner, Broadway Exchange Building, for a one-story ice-manufacturing plant, 50 x 175 ft., to cost approximately $100,000 including equipment.

Buick Motor Car Co., Flint, Mich., has acquired property at West Sixty-fifth Street and LaVergne Avenue, Chicago, and plans early erection of one-story factory branch, parts and distributing plant, totaling 240,000 sq. ft. floor space, to cost about $650,000 with equipment. Factory branch at Calumet Avenue and Twenty-first Street, Chicago, will be transferred to new location.

Brown Instrument Co., Philadelphia, maker of recording instruments, has removed its Detroit branch to larger quarters at 576 Maccabee Building. R. W. Mayer is district manager.

Milwaukee

MILWAUKEE, March 26.

A MODERATE run of orders is being booked by local machine-tool manufacturers. Sources of new business cover a wide range of industries, and while individual bookings usually represent only one or two items, the aggregate is relatively satisfactory. Purchasers as a rule request quick delivery. Automotive and farm machinery plants are probably the best buyers and most active in putting forth inquiries. The tool market as a whole exhibits less of the dragging tendency and while activity is uneven, improvement is discernible.

Follen-Lorenz Tool Co., Kenosha, Wis., has acquired plant of former Marwin Motor Truck Co., with 35,000-sq. ft. of floor area, and is expanding output and character of product. It manufactures tools, dies, special tools, bank and postal cancelling machines, and in new plant will also manufacture metal stampings and do deep drawn work, equipment for which is now being purchased. Firm title is being changed to Follen-Strom Mfg. Co. Carl Arthur Strom will join the company as vice-president and general sales manager about June 1. Fred Lorenz, while retaining an interest, has not been active in company's affairs for some time. James H. Follen is president-treasurer and general manager, and E. Mindermann, secretary.

Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., plans investment of $350,000 in a new digester plant designed by Childs & Smith, architects and engineers, Chicago. Work will begin April 1. Plant will be 60 x 180 ft., 90 ft. high, to house nine Mitscherlich process digesters. Biggs Boiler Works Co., Akron, Ohio, has contract for tanks. W. F. Thiele is chief engineer.

H. Barkow Co, 179 Milwaukee Street, Milwaukee, manufacturer of automobile bodies, truck bodies, cabs, etc,, will replace its present factory with a new plant, 60 x 120 ft., two stories and part basement, at a cost of about $40,000. Construction work has been placed with H. Schmitt & Son, Inc., 14 Burleigh Street, local.

Johnsen Engine Devices Co., Milwaukee, has been organized by Peter Johnsen and associates to develop and promote use of a new injection system for Diesel engines which he recently designed and patented. New concern will specialize in marine engines but will also do work in converting tractor and industrial gasoline engines into oil-burning engines. J. Gilbert Hickcox and Arthur Kowarsch are associated with Mr. Johnsen. Offices have been opened at 110 East Wisconsin Avenue.

Indiana

INDIANAPOLIS, March 26.

BIDS will be asked soon for extensions and betterments in municipal electric light and power at Logansport, including installation of additional equipment. C. J. Horn, Citizens' Loan & Trust Building, is architect.

George J. Mayer Co., 36 South Meridian Street, Indianapolis, manufacturer of dies, stamps, etc., has awarded general contract to Brandt Brothers & Co., Indiana Trust Building, for a two-story addition, 50 x 150 ft., to cost about $25,000. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

Showers Brothers Co., Bloomington, manufacturer of kitchen cabinets, etc., has completed plans for a one-story addition, 78 x 100 ft., to cost approximately $50,000.

Board of Public Works, Evansville, will take bids early in April for a one-story municipal automobile repair, service and garage buiding, to cost about $45,000. Frank Schletter, 113 South Fourth Street, is architect.

United Public Utilities Co., Winchester, operating light, power and ice-manufacturing plants, is disposing of an issue of $3,750,000, part of the proceeds to be used for extensions and improvements, including transmission line construction.

Board of Education, Tell City, plans installation of manual training equipment in a new high school, to cost $200,000, for which bids will be asked on general contract early in April. Troutman & Kreisel, American Trust Building, Evansville, are architects.

North Indiana Public Service Co., Valparaiso, Ind., has approved plans for construction of a pipe line for gas supply between Valparaiso and Michigan City, Ind.

Board of Sanitary Commissioners, Indianapolis, is planning installation of a new turbine pumping unit for municipal sewage system, to replace an engine destroyed by explosion several months ago. A fund of $110,000 is being arranged for this and other sewage station work.

Case Electric Co., Marion, is erecting a factory, 137 x 140 ft., to replace structure destroyed by fire several weeks ago.

Finnell System, Inc., Elkhart, has taken over business of American Scrubbing Equipment Co., Hannibal, Mo., and removed plant to Elkhart. Company manufactures floor machinery, requiring sheet steel, malleable, gray iron and aluminum castings. Castings are machined, but not made in plant and pressed steel is produced.

Pacific Coast

SAN FRANCISCO, March 21.

CONTRACT has been let by E. H. Edwards Co., Butler Road, South San Francisco, manufacturer of wire rope, for a one-story addition, 60 x 720 ft., to cost about $80,000 with equipment. Engineering department of company is in charge.

R. M. Faliday, Los Angeles, has engaged J. Thomas Payne, Mutual Life Building, architect, to prepare plans for a one-story machine shop, 40 x 140 ft., to cost close to $20,000 with equipment.

Crane Co., 836 South Michigan Avenue, Chicago, has plans for a one and one-half story factory branch and distributing plant at Tucson, Ariz., to cost about $45,000 with equipment.

Wolfe & Higgins, Realty Building, San Jose, Cal., architects, have plans for a one and two-story machine shop for company whose name is temporarily withheld, to cost about $19,000 with equipment.

East Bay Iron & Metal Works, Oakland, Cal., has awarded general contract to Spivock & Spivock, Hobart Building, San Francisco, for rebuilding portion of plant at 2310 Peralta Street, to cost about $25,000. Charles Wagner, Hobart Building, is architect.

O. L. Cowan, San Bernardino, Cal., local representative for Lincoln and Ford automobiles, is having plans drawn for a new two-story automobile service, repair and garage building, 150 x 300 ft., to cost about $150,000 with equipment. John P. Perrine, Lincoln Building, Los Angeles, and Howard E. Jones, San Bernardino, are architects.

Salt Water Valley Water Users Association, Phoenix, Ariz., has plans for construction of hydroelectric power plant in Stewart Mountain district, with initial output of 8000 kw., to cost more than $250,000 with equipment. A transmission line will be built for connection with lines of Central Arizona Light & Power Co., which will use majority of output.

Federated Fruit & Vegetable Growers Association, Merced, Cal., is considering construction of new one-story cold storage and refrigerating plant to cost close to $50,000. E. W. Yeager and L. E. Arnold, are at head of organization.

Apple Growers Cold Storage Co., Watsonville, Cal., will soon take bids on general contract for one-story cold storage and refrigerating plant, 300 x 500 ft., to cost $240,000 with equipment. Uttley & Kleindinst, 354 Hobart Street, Oakland, Cal., are engineers.

Clyde Equipment Co., Portland, Ore., has been appointed distributer in Northwest for Jaeger Machine Co., Columbus, Ohio; C. S. Johnson Co., Champaign, Ill.; Milwaukee Gas Tool Corporation, Milwaukee; Alloy Steel & Metals Co., Los Angeles, and Bucyrus-Erie Co., Erie, Pa., and Milwaukee.

Canada

TORONTO, March 26.

THE general upward trend in industrial activities in the Dominion is reflected in more extensive buying of machinery and machine tools. The automotive industry continues to place orders and local builders and dealers are receiving considerable new business from this source. Both the Canadian National and Canadian Pacific railroads have been in the market of late for shop equipment and much other business is pending. The Canadian Pacific will purchase considerable equipment for replacement at shops at Brownville Junction, Me.; McAdam, N. B.; Newport, Vt.; Three Rivers, Que., and at Ottawa, Kingston, London, Windsor, Sudbury and Toronto. At Vankleek Hills, Buckskin and Ayr, Ont., water stations will be improved by the installation of electrically operated pumps.

Waltheimer Paint & Varnish Corporation, London, England, will establish a manufacturing plant at Toronto, Ont., to cost $500,000. R. Mellor, president and general manager, has been in Toronto and will refer plans to the board in London. He expects to return to Toronto in about six weeks when building operations will be started.

National Refractories, Ltd., has purchased land and buildings at Welland, Ont., formerly occupied by Niagara Appliances, Ltd., for establishment of a plant to manufacture fire brick, etc. Building will be razed to make room for a modern manufacturing plant. H. I. Darby, Montreal, is general manager.

L. & N. Co., Ltd., St. Johns, Que., manufacturer of electrical conduits, plans erection of a $100,000 addition. Company is interested in purchase of machinery and tools.

Lorne Fire Engine Co., Ingersoll, Ont., has purchased a building at Mitchell, Ont., and will remove its business to that city.

Sully Brass Foundry, Ltd., which recently purchased Bigley Foundry on Wabash Avenue, Toronto, will spend $10,000 on improvements and installation of new machinery to use for an extension. Two machine shops on site have not been in operation for two years but will be reopened at once.

Andrew Malcolm Furniture Co., Listowel, Ont., is planning an addition to its factory. Details have not been completed, but is is understood that construction work will start this summer.

James Playfair and Associates, Midland, Ont., are having plans prepared by C. D. Howe & Co., Whalen Building, Port Arthur, Ont., for a 1,000,000-bu. reinforced concrete grain elevator at Toronto. Provision will be made for an additional 1,000,000-bu. storage. Construction work will start immediately.

Stephens-Adamson Mfg. Co. of Canada, Ltd., with plant at Belleville, Ont., Canadian subsidiary of Stephens-Adamson Mfg. Co., Aurora, Ill., maker of conveying, transmission and screening machinery, has established branch sales engineering offices in Bank of Hamilton Building, Toronto, in charge of A. F. White, and in New Birks Building, Montreal, in charge of George H. Smith.

MacLaren Co., Buckingham, Que., contemplates erection of a power development plant on Lievre River at High Falls, Que.

Durham Furniture Co., Durham, Ont., will add another story to its factory and will be in market for wood-working machinery, tools, etc. Construction work will start in summer.

Goodyear Cotton Co. of Canada, Ltd., Laframboise Street, St. Hyacinthe, Que., is planning erection of a four story factory, 200 ft. long, to cost $600,000.

Western Canada

International Clay Products, Ltd., plans erection of a factory at Estevan, Sask., to cost $75,000.

Reliance Motor & Machine Works, Ltd., 1039 Georgia Street West., Vancouver, B. C., has awarded contract to Dominion Construction Co., local, for construction of machine shop and garage to cost $35,000. Building will be one story and basement, 100x120 ft., of reinforced concrete construction.

Midland Pacific Terminals, Ltd., care of Harbor Board, Vancouver, B. C., plans construction of 500,000 bu. grain elevator at North Vancouver, to cost $300,000.

Cork Province Mines, Ltd., Vancouver, B. C., has awarded contract to Bartholomew, Montgomery & Co., engineers, for installation of a hydroelectric plant to cost $60,000. Company also proposes installation of additional machinery in milling plant.

Foreign

BIDS will be received by State Electricity Commission, Melbourne, Australia, until May 21 for 22,000-volt transformer equipment and spares. Specifications available at office of Bureau of Foreign and Domestic Commerce, Customhouse, New York, and 33 South Clark Street, Chicago.

Municipal Gas & Electric Corporation, Recklinghausen, Germany, owned and operated by the municipality, has arranged for sale of securities in United States, through E. H. Rollins & Sons, 44 Wall Street, and Foreign Trade Securities, Ltd., 43 Exchange Place, New York, totaling $1,500,000, entire proceeds to be used for extensions and improvements in power plant and system, including installation of additional equipment.

Rumanian Council of Ministers, Bucharest, Rumania, has approved plans for a hydroelectric power development on Ialomitza River, Moreni, with construction of transmission line to connect with present system from Ploesti to Bucharest. Plant is to be completed in 24 months. Information at office of American Consulate, Bucharest, L. J. Cochrane, assistant trade commissioner.

American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has received an inquiry (No. E-3648) from a company at Paris desiring to get in touch with American manufacturers of special automatic screw drivers, suitable for use in garages and by electricians; also an inquiry (No. F-3655) from a company at Paris desiring to get in touch with American manufacturers of paint polishing equipment and abrasive papers.

Plans are being completed for construction of an electric generating plant by a company at Hull, England, to cost close to $1,900,000. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference England No. 63592; also at office of American Consulate, London, England, William L. Cooper, commercial attaché.

State Council, Helsingfors, Finland, is considering construction of a State-owned nitrogen plant and has appointed a committee to secure information and estimates of cost, headed by Prime Minister Sunila. Information at office of American Consulate, Helsingfors, Frederick B. Lyon, commercial attaché.

Central Electricity Board, London, England, is planning purchases of electrical machinery, including generators, engines, condensers, substation and line equipment, to cost more than $1,000,000 covering a period of several months.

NEW TRADE PUBLICATIONS

Limit Switch.—General Electric Co., Schenectady, N. Y. Folder G. E. A. 914, describing operating mechanism of a compact control for motor-opened doors, windows or valves. Major adjustment for limit of travel is made by a split cam, pinned against a gear driven from the motor to be controlled. Cams open and close contactors. Fine adjustment on contactors is made by micrometer screws.

Motors for Dusty Places.—Wagner Electric Corporation, St. Louis. Broadside illustrating air-jacketed motors. Standard induction motors from 1 to 30 hp. are totally enclosed. Stub end of shaft is prolonged to receive fan blades, and a perforated end and body shield incloses the whole so that cooling air is blown around the tight motor casing rather than through the windings.

New and Used Equipment.—Ross Power Equipment Co., 11 South Meridian Street, Indianapolis. Catalog of steam and electrical equipment, including rock crushers, engines, kilns, boilers, pulverizers, pumps, heaters, heat exchangers, bridge and locomotive cranes, compressors, machine tools, shovels, motors, generators, electric furnaces, steam turbines, hoists, etc.

Pipe Hangers, Unions, Signal Switches, Etc.—Crouse-Hinds Co., Syracuse, N. Y. Advance sheets 97, 98, 99 and 100 are devoted to hangers for pipe or wire, telephone jack condulets, self-threading unions and connectors for pipe, and signal switches for mines.

Leveling or Stretching Machines.—Torrington Mfg. Co., Torrington, Conn. Four-page folder, illustrated, describing stretching machines operated with reciprocating and also with rotary pumps. Two machines are shown which are of the mechanical type.

Electric Magnets.—Electric Controller & Mfg. Co., Cleveland. Four-page folder showing the use of electric magnets on a truck to pick up nails, tacks and other magnetic material on highways.

Centrifugal Pumps.—Pennsylvania Pump & Compressor Co., Easton, Pa. Bulletin 209, devoted to the company's double suction, single stage centrifugal pump, built in sizes to handle capacities up to 20,000 gal. per min. and for heads up to 290 ft.

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THE IRON AGE

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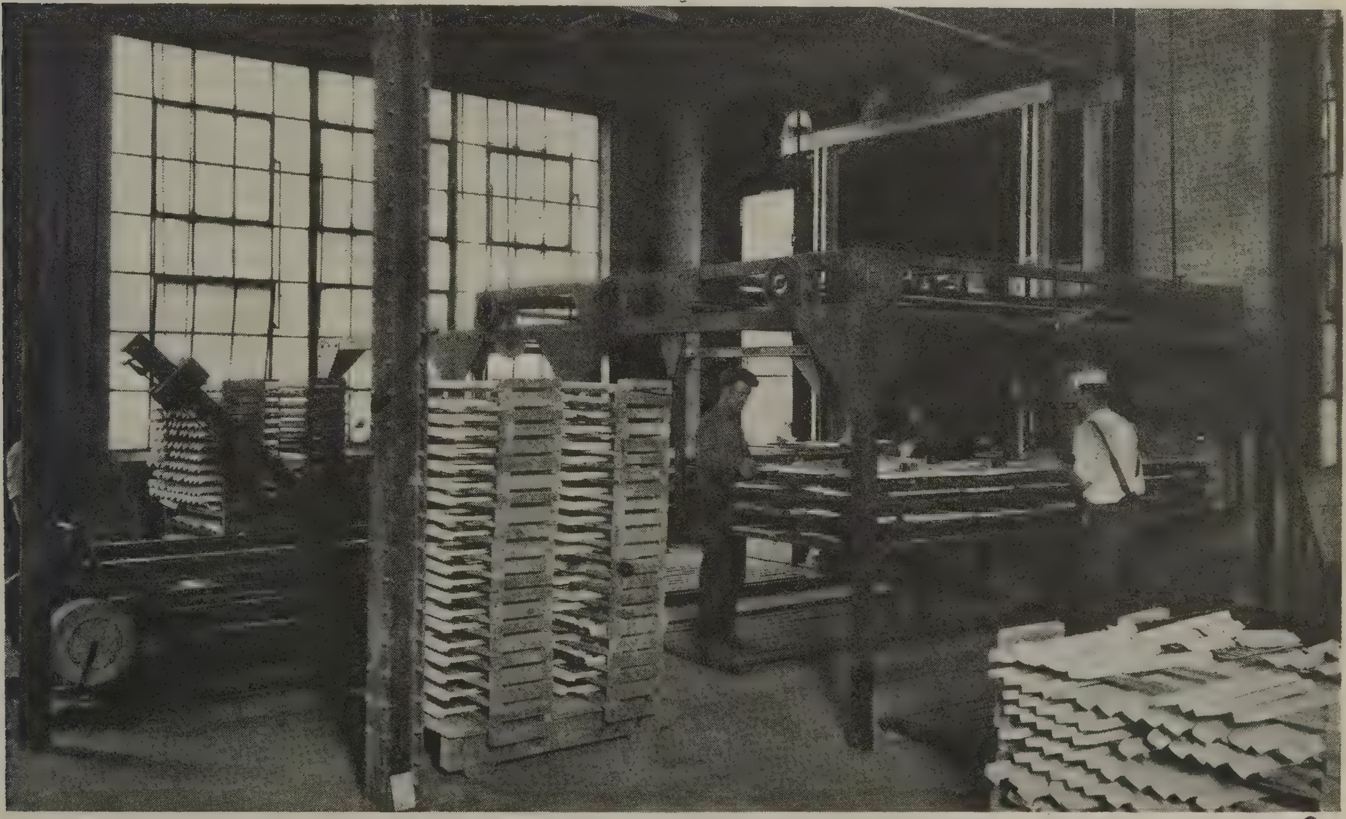
Handling of Materials Is Feature of Plant Changes

Chicago Company Readapts Its Buildings and Equipment for Increased Production of Gas Stoves —Method of Loading Trucks and Various Applications of Mechanical Conveying Are Noteworthy

OCCASIONALLY a manufacturer is compelled to change from one product to another to keep a step ahead of public demand. In taking such a step he will naturally try to choose a product with a wider market appeal. At the same time he will give full consideration to the selection and arrangement of production and material handling equipment so that costs will be held at the minimum consistent with quality of product.

In 65 years of manufacturing experience the Cribben & Sexton Co., Chicago, has kept in close touch with the pulse of demand. Until 30 years ago the bulk of its business was in plumbing supplies, but about 1897 it sold that branch and swung into the production of coal ranges and, to some extent, gas stoves. As rapidly as localities were served by gas housewives were quick to recognize the advantage of that fuel as compared with coal. The rural trade, to a large extent, was left for the coal range manufacturer, although even in this field increasing competition from oil stove makers was

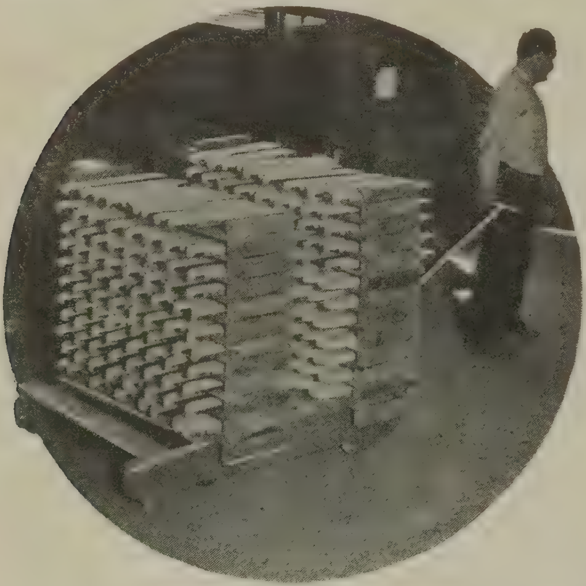


Enameling Furnaces Are Charged by Means of a Buggy With a Rising and Lowering Bed. The buggy takes its load from a carriage which is suspended from an overhead track encountered. To make a long story short, the Cribben & Sexton Co. still manufactures coal ranges, but not in quantities comparable with its output of gas stoves.

Large Press Department Installed to Make Gas Stove Parts

The decision to swing over to heavy production of gas stoves made it necessary to use pressed metal on a larger scale, thus releasing part of the foundry capacity and entailing the expense of constructing a large press department and installing a complete assortment of machine tools for the production of dies. About the time this was done it became evident that social prestige was diminished unless the kitchen gas stove was red, green, yellow or some other color besides the conventional gray, black or white. With attractive gas stoves in heavy demand, it occurred to the manufacturer that a yellow or light blue enameled coal range would strike the fancy of the "domestic engineer," whose duty for years has been to blacken an old-fashioned stove.

Probably the most far-reaching change resulting from tendencies in stove design and demand has been a wider use of pressed metal parts. Before this trend got under way, 180 molders and two cupolas were employed in the Cribben & Sexton foundry. At the present time stove castings occupy only one cupola and 110 molders, and a larger amount of jobbing work is being done.



To Prevent Damage to Enameled Parts Through Their Rubbing Against Each Other, Platform or Skeleton Trucks Are Used. In loading a platform truck, such as the one shown above, the operator mounts one tray over another as rapidly as each is covered with enameled parts. The tray used consists of end spacers and crosswise slats

Three buildings make up the Cribben & Sexton plant. The foundry is a one-story building, as is also the structure which houses the enameling department. The third building is of the multi-story type with basement. Shears and forming presses are located in the basement, and the finished stock room and assembling department are on the upper floors.

Careful attention is given to economy in materials-handling from the time the pig iron for the foundry is unloaded from the railroad cars and placed on piles that are separated by concrete runways. Cupola charges are made up in four-wheeled box trucks which are moved by means of an electric battery lift truck. The same transport equipment is used to remove castings from the pouring floor to the cleaning department and from the cleaning department to the enameling building.

Automatic Machines in Polishing Room

Incidentally, it is standard enameling practice in this plant to apply the undercoat to castings within 48 min. after the casting is sand blasted. This time limit is set to prevent oxidation of the casting prior to its receiving its protective coating of enamel. Parts that are to be nickel-plated go to the plating department, where standard equipment is used.

Ingenious equipment for handling material features the polishing room. One machine, used for polishing the tops of stoves, is 50 ft. long and is equipped with 24 emery wheels. It is entirely automatic, a moving platform carrying a stove under the different wheels. In this department also is an automatic pipe polisher, which employs rotating idlers to force the pipe along and against power-driven polishing belts.

Parts Mechanically Handled through Enameling Furnace

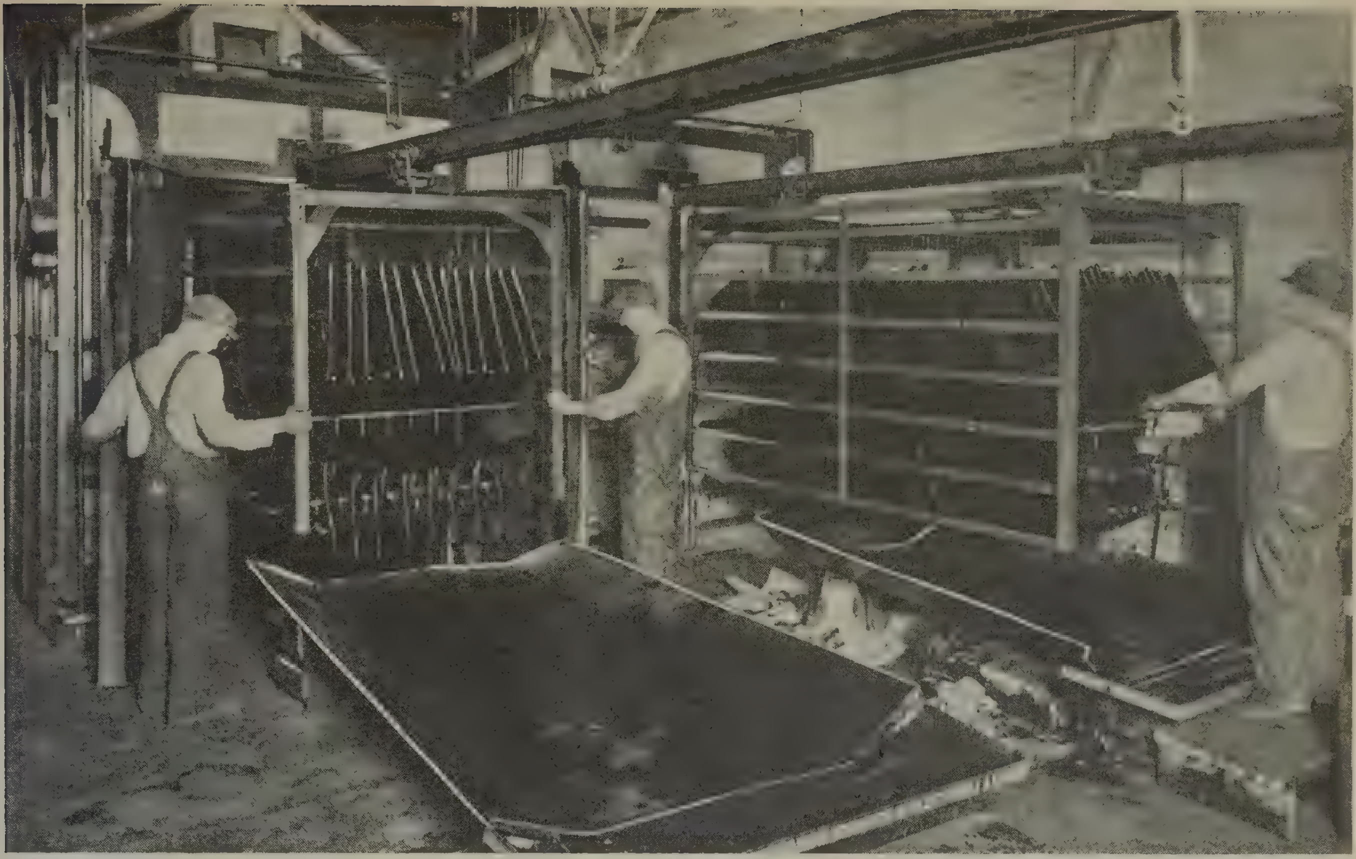
Castings to be enameled are mounted on small metal racks. These are placed in spray booths, and liquid enamel is applied with air guns. The racks are then delivered to a dryer, where they remain from 30 min. to 1 hr, in a stream of air heated to 125 deg. Fahr. by radiator-type heaters, which are equipped with motor-driven fans. Following the drying operation, the racks or trays are placed on either one of two carriages that hang from a structural frame which is directly in front of the burner furnace. This furnace has a capacity of 7500 to 10,000 lb. daily. As soon as a carriage is loaded it is picked up by a charging buggy, which is designed with a rising and lowering bed. The furnace doors are then opened, and the charging buggy delivers the load into the furnace, after which the charging buggy bed is lowered and withdrawn while the burning operation of 30 min. duration is carried on at temperatures that range between 1300 and 1350 deg. Fahr.

Special Trucks Used to Prevent Damage to Enamel

As previously stated, castings are delivered to the enameling department in box trucks. After the enamel is applied great care must be used in handling the various parts so that the enamel coat will not be damaged. Therefore the trucks that are spotted at the spray booths are of a skeleton type with four corner uprights fixed to the truck floor. Cross bars and trays are superimposed on the truck as the spray operator needs space for newly enameled parts. Trucks of this type prevent considerable losses, because they eliminate the necessity of sliding parts between shelves, with the danger of one part rubbing against another or of a part rubbing against a shelf, thus destroying or impairing the enamel coat. Many of the trucks used in this department consist merely of a platform and wheels. A truck of this kind is spotted at a work station. Here within reach of the operator are a number of wooden trays, which consist essentially of end spacers and a number of crosswise slats. The operator mounts a tray on the floor of the truck and, after having covered it with the product on which he is working, places another tray on top of the first one. In this way he gradually builds up the truck load to as great height as is safe for transport purposes.

Sheet Metal Handled by Chute, Elevator and Truck

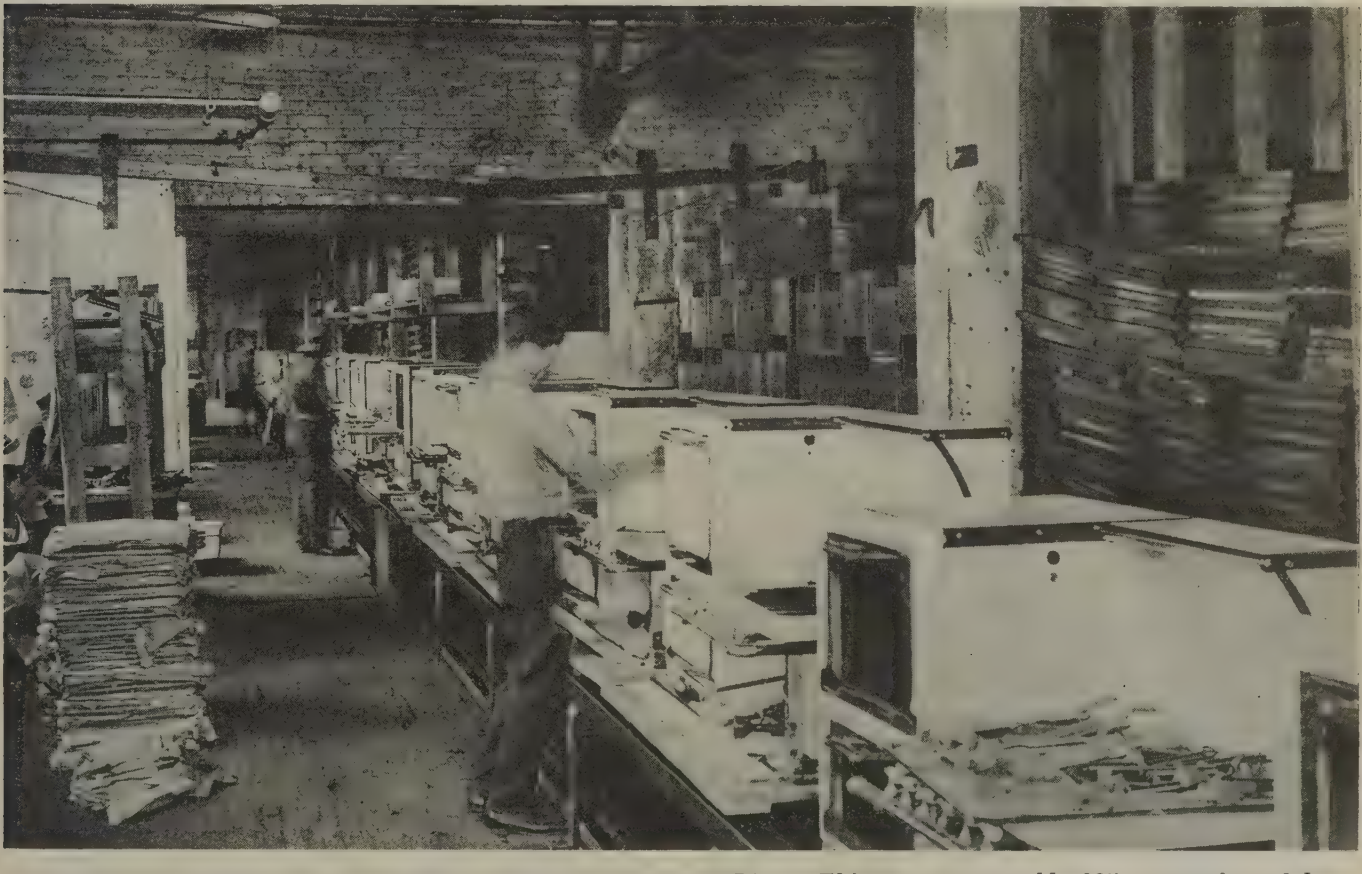
Sheets for press work are unloaded from railroad cars and passed down a chute to the press department, in the basement of the multi-story building, where they are placed in stock. After having been sheared and formed they are loaded in box trucks, which are moved by an electrically operated truck to the end of the building, where an elevator brings the load up to the yard level. The electric truck then transports its load over a concrete roadway to the enameling building, where the formed sheets are delivered to the cleaning department. Here they are first dipped for 10 min. in a caustic solution, which removes all traces of grease. They are then given a cold water bath and allowed to remain 8 min. in a 7 to 8 per cent sulphuric acid bath heated to about 75 deg. Fahr. The next operation is to rinse and sub-



Parts That Are to Be Japanned Are Hand-Dipped and Suspended on a Rack Which Hangs from an Overhead Trolley Beam. The drip pan is located only a few feet from the japanning oven

merge the sheets in a soda solution to assure the removal of any acid solution which may remain on them. The soda tank is heated by means of a steam coil. The sheets attain the temperature of the soda solution before they are removed and, therefore, are warm enough when brought into the air so that evaporation is rapid and they are quickly air-dried, thus avoiding the installation of a dryer.

Sheet metal parts are hand-dipped in the ground coat, which is always of the same color regardless of the color of the finished coat. Trucks used for transporting enameled pressed steel parts are similar to, and in many cases interchangeable with, those used for handling enameled castings. The burning period for the ground coat is 4 min. Each part is then given a thorough inspection and, if passed, is delivered to a spray booth, where it is given the first finish coat. Before burning the first finish coat some stove parts are brushed back by means of stencils and brushing wheels in order to produce an attractive trim and also to protect the enamel from chipping on edges that are bolted together. Finish coats are burned for 2½ min. at a

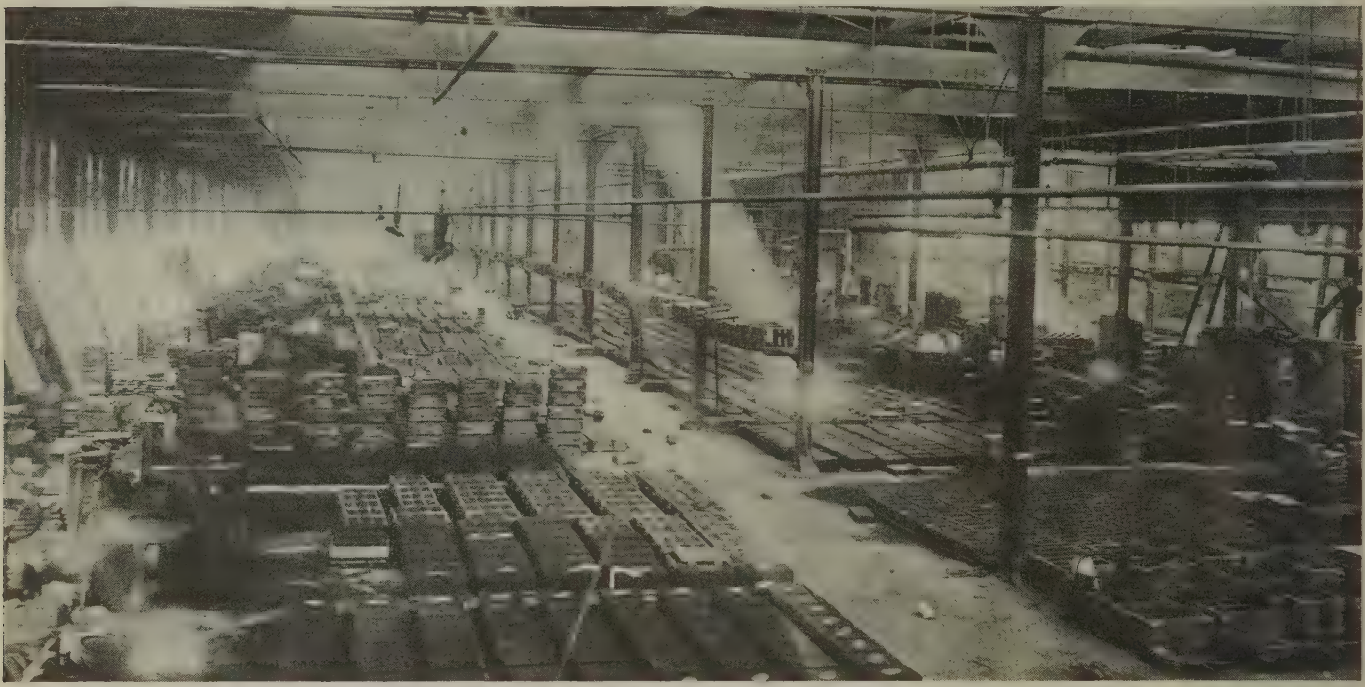


Stoves Are Assembled and Tested on a 130-Ft. Conveyor Line. Thirty men assemble 225 stoves in a 9-hr. day temperature of 1600 deg. Fahr. Careful inspection is given each part before the final color coat is applied. If defects discovered are not too serious, they are retouched and then the second finish coat is applied and burned.

Belt Conveyor Carries Parts to Store Room

All enameled parts, including both castings and pressed metal, come together in a final inspection room, which is on the ground floor of the enameling building. From this room a 36-in, canvas conveyor belt pitches upward at a 17-deg. angle and then extends overhead across the yard to a store room, where a complete line of all parts is kept to facilitate the assembly operations. The conveyor is completely inclosed in a structure which is sufficiently high to provide headroom above an adjacent walkway. This equipment was furnished by the Chain Belt Co., Milwaukee, Wis.

Enameled parts placed on this conveyor are so spaced that they do not touch. Formerly enameled parts were transported from the enameling building to the store room in trucks. It was necessary at that time to carefully pack each part in the truck, and even then there was always the danger of chipping and scratching surfaces, which necessitated an additional inspection in the store room and the rejection of many parts that had reached the stage where they should have been ready for assembly. With the conveyor system, the final inspection is made in the enameling department. The conveyor is reversible so that at the end of a day's run materials may be delivered from the store room back to the enameling department if need be.



The Foundry Is Well Equipped to Supply All the Needs of a Modern Stove Factory. Proper ventilation and the admission of daylight are features of this building

Monorail System Serves Japanning Furnaces

Parts manufactured in the multi-story building that can go directly to the stock room are transported from one floor to another by means of elevators. In this building are two japanning furnaces provided with a loop monorail system, from which six baskets are suspended. Two baskets are always in the oven and two are spotted in front of the charging door, where the parts to be japanned are dipped and suspended over drip pans. Two baskets that are being unloaded are run out on the free length of monorail, which is a return line, to the front of the furnaces.

Conveyor 130 Ft. Long Serves Straight-Line Assembly

The assembly and crating departments are on the same floor with the store room. Assembly starts on benches, where the skeleton of the burner and the oven are put together. A wooden skid, which is part of the shipping crate, is bolted to the skeleton, which is then placed on the receiving end of a 130-ft. assembly conveyor. Thirty men work at given spaces on both sides of this conveyor. Before a stove reaches the end of the conveyor it has been completely assembled, accessories have been wired to it, gas connections have been tested for leaks and burners have been adjusted for proper combustion. The assembly schedule on this conveyor is 225 stoves in a 9-hr. day.

American Steel & Wire Co. Studies Special Properties of Wire

Research with various forms of wire which, when under tension, are subjected to vibration, is being undertaken by the American Steel & Wire Co. in a laboratory at 5149 Agatite Avenue, Chicago. The work is under the direction of William Braid White.

Among the instruments are two that have been developed especially for piano wire investigations. One of these is a "monocord," which consists essentially of an iron frame similar to a lathe bed, except that the sides of the horizontal box member are open and a longitudinal slot extends the full length of the top. At the left end of the frame is a tuning wheel and a jaw for holding one end of the wire. At the opposite end of the frame is a spring-loaded dynamometer. A movable bridge makes this machine adaptable for testing strings from 1 in. to 6 ft. long. A piano action slides along the lower member of the box frame, and, when the key is struck, the hammer reaches the string through the slot in the top section of the frame. The piano action can be moved to strike the string at any point in its length.

Photographic studies of strings under vibration are made by the use of an oscillograph furnished by the Westinghouse Electric & Mfg. Co., Pittsburgh. This instrument is special in that it is adaptable to the study of low-frequency vibrations, the range being from 30 to 50,000 cycles per second. This unit, including a microphone, is portable and may be used for experiments on the "monocord" or on any stringed musical instrument.

Pipe Bends Made by New Process

Typical Large Bend Made in 16-In. Pipe to 40-In. Radius

Forcing Hot Pipe Over Horn-Shaped Mandrel Produces Short-Radius Bends Without Buckling at Inside of Turn or Excessive Thinning at Outer Diameter

PRODUCTION of short-radius pipe bends by a new and unusual process has been started by the Pipe Bending Process Co., Louisville, Ky. The bends are really short arcs of pipe made on a production basis in a standard series of sizes, and can be made of any "bendable" material in any thickness. They should not be confused with the long sweeping curves made to order for expansion joints in steam or hot water lines. Their utility lies in a separate and distinct field, taking the same place in welded pipe lines that cast fittings, elbows, goose necks and returns do in screw-coupled lines.

The manufacturers believe that a definite series of bends with long and short radius will take care of practically every requirement in the way of a fitting for welded piping. Standardized shapes make available to the trade those advantages incident to mass production, such as quick delivery, low cost and small inventory.

A typical standard series of bends would include 180-deg., 90-deg. and 45-deg. turns, of a single radius, for each common size of pipe. It is apparent that any angle of bend can be cut from the 180-deg. return bend. Should it be found inconvenient to anticipate an exact requirement, a small supply of 180-deg. bends in long and short-radius types will provide for any kind of turn at less cost, it is said, than if the pipe were mitered and welded in the field.

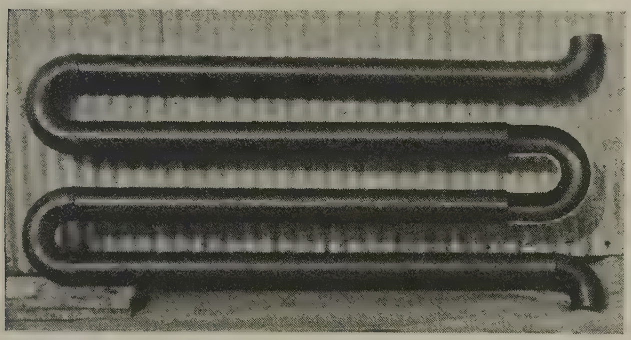


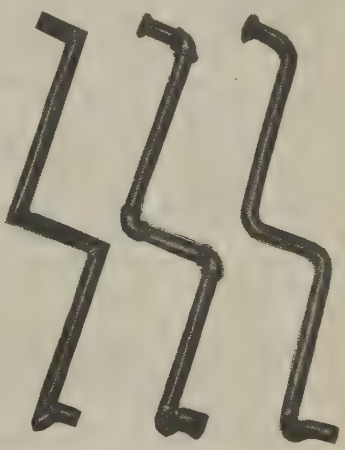
Fig. 2—Flat Coil Spaced at Two Diameters

Steel, copper, brass, aluminum and special alloys have been successfully formed into short-radius bends by the Louisville company. Bends are furnished with square or chamfered ends as desired, but are normally without tangents or straight lengths, although short tangents for threading or welding on flanges can be made by an additional press operation. When long tangents are necessary, they are welded on.

In contrast with other methods of bending, the company finds that thin tubes of large or small diameters can be bent easily to radii of from one to one and a half pipe diameters without buckling the inner walls.

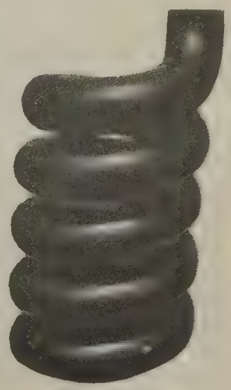
The manufacturing process was invented in Germany and is protected by patents. The essential parts of the equipment consist of a gas furnace, special mandrels and a hydraulic press. The ram from the latter travels over a long steel shaft, fixed into the stationary head of the hydraulic cylinder. Over this shaft a straight length of pipe is slipped until it strikes a flat ring fixed on the nose of the ram. After the straight pipe is placed on the shaft, a horn-shaped mandrel is attached to the forward end of the shaft by a double-threaded turnbuckle coupling. The ram then moves the pipe outward until the forward end binds against the turn at the base of the mandrel. A gas furnace is then moved up to surround the mandrel and the pipe end, and three gas blow torches play flames on the end of the pipe until it is plastic. More pressure is applied from the hydraulic cylinder so the pipe is pushed over the mandrel as fast as it is hot enough to work. The design of the mandrel determines the curvature of the bend and the wall thickness, and variations from a straight bend to a wide coil are obtained by the location of the heat during the operation.

Fig. 1—Complicated Outlet Pipe Made by Three Methods: Left, Mitered Joints, Welded; Middle, Screw Fittings; Right, Short-Radius Bends, Welded



Applications of the bend are numerous. Changes in direction in welded pipe lines can be secured with comparative ease by using different combinations of

Fig. 3—Four-Inch Pipe Coiled in Spiral with 12-In. Outside Diameter



the standard unit. To illustrate this fact a tortuous pipe string was made up, the same dimensions built using malleable iron fittings, and a third by mitering and welding all joints (Fig. 1). A tank of water was filled and drained three times, once through each of these strings. The time noted was as follows:

With short-radius bends	7 min.
With cast elbows	8.5 min.
With mitered joints	12 min.

This indicates that pipe on a true curve, smooth inside, sets up fewer eddy currents at changes in direction and has a greater capacity of flow.

Tests of these bends are said to show them to be equivalent to standard straight pipe in strength.

Of interest to fabricators of flat coils in which a close spacing of pipe is important is the return bend shown in Fig. 2. This coil is made of straight pieces of pipe of standard thickness welded to bends with a radius equal to the pipe diameter, thus providing a center-to-center spacing of only twice the diameter of the pipe. Full strength is maintained at the returns; the wall thickness is correct, both inside and outside, as shown by the bend which has been cut open.

Spiral coils, to give a maximum heating or refrigeration area in minimum volume, are made in any pipe size. Fig. 3 shows a coil of standard 4-in. pipe formed to a diameter of only 12 in. It is composed of a single section, the only weld being at the outlet. Similar coils of indefinite length can be made by welding together duplicate sections.

In underground piping of any kind such bends afford an easy means of passing various obstructions. If flanges are desired, they can be gas, electric or hammer-welded on the bend section, thus providing a fitting for attaching standard flanged castings.

STEEL HOUSES IN GERMANY

Dwellings of Steel Plate Construction Adapted to Mass Production by German Steel Trust

WASHINGTON, April 3.—Domestic steel producers have shown considerable interest in a circular issued by the iron and steel division, Department of Commerce, on the subject of building steel houses in Germany. The circular, based on a report received by Hugh S. Fullerton, consul at Cologne, shows that the steel houses of German manufacture which have been on view or on sale in the Cologne district appear to have features similar to those found in structures in the United States. Durability, warmth and protection from dampness are outstanding selling points in these houses, and it is proposed to have their parts available in stock in order that no time may be lost in supplying the public. It is also planned to have the construction so simple that the purchaser may complete the house himself merely by putting the various parts together and following directions of an elemental nature. The report indicates that German manufacturers obtained their ideas from achievements in the steel house construction field in the United States and England.

Houses Will Be Built in Quantities

A report has been confirmed that the Vereinigte Stahlwerke, the German steel trust, is soon to begin mass production of steel houses and it is declared to be probable that many settlements for industrial operatives, similar to one at Duisburg-Laar, will be the result. Row and block houses of steel construction are reported to be in strong demand in the Rhineland, and large industrial firms are beginning to find in them a ready and rapid solution for housing problems. At present, the report says, the plant of the Vereinigte Stahlwerke at Weidenau, Westphalia, is supplying the demand for steel houses in western Germany, while it is understood that the BAMAG (Berlin-Anhaltische Maschinen-Fabrik Aktiengesellschaft) is intrusted with this responsibility for eastern Germany. The German firms of Gropius, Holzman, Phonix and Czech are reported to be producing or experimenting with steel house construction. The so-called "Boehlerhaus system" (Viennese), employing interior steel plates and plates covered with plaster for the exterior, is said also to be used in some parts of Germany.

Walls and Roofs of Steel Plates

Describing the steel houses in the Cologne district, the report says: "The roof and the side walls are made of strong steel plates which are connected by means of screws with the rims which are turned. Wood borders, which are affixed to the latter, serve as supports for the inner partition walls, consisting of light boards (Tekton plates, etc.) which are nailed on them. Between the outer steel wall and the inner light boards is an air space for protection against cold and sound. The walls, with a thickness of 14 cm., which have been installed in a very short time, are claimed to be as much of an insurance against cold as a brick wall of 51 cm. thickness.

"As the steel plates are all of uniform size, 1.15 m. in width, it is possible to build the house in any desired length. It is also practicable to divide the dwelling space into more spacious rooms if desired. As the partition walls, apart from a supporting middle wall, have no basic connection with the outer walls, they may be transferred according to the individual desires of the purchaser. Construction, therefore, is very simple. The types described and now being manufactured to the greatest extent in Germany are the three, four, and five-room dwelling.

"The foundation is made with concrete walls, 30 cm. thick, beneath the outer walls. Usually, one-third to one-fourth of the building space is occupied by cellars. The roof consists entirely of steel. The steel sheets require no stays to support them so that no framework is required. Doors and windows are furnished in several sizes."

Costs Are Very Low

A five-room house, with two attic rooms, varies in cost between 6,000 and 10,000 marks, or about $1,429 and $2,390. A four-family structure, with cellar space under every room on the ground floor, is quoted at about 22,000 marks, or about $5,238. Each of the four apartments involved has 50 square meters of dwelling space. To complete steel houses of all sizes in this part of Germany, three or four weeks are required, depending upon the size. That so short a period is needed for the construction contributes in no small degree to the low cost of the completed building, as labor charges are reduced to a minimum. According to specifications for inner fittings, the price for a one-family house, consisting of two rooms, plus kitchen, bath and closets, ready for occupancy, inclusive of installations for gas, light and water, amounts to from 6,000 to 7,000 marks, or about $1,429 to $1,667. These figures do not include the cost of fittings for the bath and kitchen.

The weight of a one-family steel house, all materials included and ready to be put together, is approximately 50 tons, according to the claims of German manufacturers, while a stone house of similar dimensions weighs from 150 to 175 tons.

The Interstate Commerce Commission has suspended from March 29 to Oct. 29 the operation of tariff schedules which propose to cancel commodity rates on iron and steel articles, in less-than-carload lots, from the Pittsburgh district to Pennsylvania Railroad stations between Salisbury, Md., and Portsmouth, Va., and to apply fourth class rates instead. The proposal would result in increasing the rates from 47.5c. to 48c. per 100 lb.

Perin & Marshall, consulting engineers, New York, have moved to the seventeenth floor, Salmon Tower Building, 11 West Forty-second Street, New York.

Why So Much Talk About Safety?

Considerations of Responsibility Both to Society and to Shareholders—Safety of Workers Menaced by Automobiles

BY W. H. MEESE*

VIEWING the question of industrial safety from the angle of public safety, it appears that there was no grave question of the safety of the public until the advent of the automobile. Today we have in the United States more automobiles than telephones. With the tremendous increase in the number of cars, the increase in the number of automobile accidents has been enormous—so great, in fact, that adequate protection for the public has almost got out of hand.

We recently prepared statistics in our company, which showed that an employee's chances of losing time from being hurt outside of employment were twice as great as that of being injured while at work. Think of that condition—when a few years ago it was felt necessary to legislate industry into safe practices. No doubt, statistics of other industries would prove the same point.

With industrial accidents going down, motor accidents are decidedly on the increase. The Metropolitan Life Insurance Co. paid in accident claims during 1927 about $10,000,000. Deaths from motor vehicles were the most important, both from the number of deaths and the amount of claims. Over $2,500,000 was paid by that company alone in claims arising from motor vehicle fatalities, an increase of 67.6 per cent since 1920.

In Cook County (Illinois), since Jan. 1, 196 people have been killed in automobile accidents. In most of these cases the people killed or injured were going about their business with no more thought of possible injury or death than any one of us in this room has at this moment.

Irresponsibility at the Steering Wheel

Yet this tremendous increase in motor deaths and accidents is not greatly to be wondered at, when it is remembered that there are about 30,000,000 drivers. In other words, one person in every four in the United States is supposed to be capable of handling a motor car—a car which in an instant may become a juggernaut of destruction. Again, bearing in mind that nearly 500,000 persons in this country are confined in institutions maintained for irresponsible people, it surely looks as if we, as a people, are willing to take some long chances with ourselves.

In 1927 there were over 14,000 motor accidents in Chicago alone. Ten thousand adults and 4600 children were injured, and over 600 adults and 200 children were killed. Many of us came from small farming communities of less than 1000 souls. Picture every man, woman and child in your little home town killed by motor cars within a year.

Industry would not for one moment think of intrusting to inexperienced hands the operation of a punch press, drill press, or a high-powered machine. In filling a vacancy one insists upon the applicant meeting certain necessary requirements.

The State, in fact, prohibits the employment of an individual under 14 years of age and between the ages of 14 and 16 he must present a working certificate. The main purpose, of course, in so far as the State is concerned, is to see that the boy's education is continued, at least until he is 17 years of age. But another real reason is to postpone until that age his introduction to industrial life, and the machine hazards which inexperienced hands might meet.

At the same time, another law permits any boy or girl, provided he or she is accompanied by an adult person, to drive an automobile which, in an instant, can be changed from a pleasure vehicle to an instrument of destruction. And any person 16 years or older, is, by law, qualified to drive a car on his own responsibility.

As this daily toll of injuries and deaths from automobile accidents mounts higher and higher, I believe it is time to consider seriously the adoption of more rigid requirements for persons who are to be allowed to operate motor vehicles.

Safety Promotion Accomplished in Industry

Within the memory of most of us, the danger of snuffing out a life existed primarily in industry. Industry was on the defensive. Finally the recognition of the hazards of industry, and the possible loss of the breadwinner of the family, resulted in legislation regarding guarding of machines, workmen's compensation acts, industrial boards and other means of insuring that industry did carry what the law considered was its responsibility.

Industry proceeded to see that its machines were well guarded, only to find that, even with the guards, the number of accidents did not decrease materially. Then industry began to preach to its personnel the gospel of "Safety First" and the accident ratio began coming down.

During the 10 years preceding 1925, our own company expended about a million dollars in machine guards. In 1925, with our equipment as well guarded as it is today, our lost-time accidents were 4.5 per 1000 employees per month. In 1927, after an intensive effort to train our people to think, talk and act safety, our lost-time accidents were only 1.2 per 1000 employees per month. And we don't believe that we have reached the ultimate.

Small Plants Must Fall in Line

It may be argued that the smaller industries cannot afford to devote as much time and effort to safety work as do some of the larger ones. I do not believe they can afford not to. No matter what the business is, large or small, its owners are interested in eliminating waste and improving methods of operation so that the plant may be run efficiently. But how can efficiency be had, without consideration of the men and women who *are* the plant? Machines without competent operators are worse than useless.

The extent of the cooperation of the men and women in the plant largely determines the success or failure of the enterprise. To make that cooperation possible, if for no other reason, management is justified in making any expenditure necessary to keep its force safe.

If industry will fully meet its moral obligations to its workers, it will not need to worry much about its financial responsibilities to its stockholders. Industry has made splendid progress in its safety work, as industrial statistics show, but we have by no means approached its possibilities.

A shipment of 22 all-steel passenger cars was made March 16 by the American Car & Foundry Export Co., to Sao Paulo, Brazil, for the Paulista Railroad. This is the first all-steel passenger equipment installed on South American railroads. There are 7 first-class coaches; 6 second-class coaches; 3 parlor cars; 2 dining cars; 2 mail cars and 2 baggage cars. These cars were built at Berwick, Pa.

The Erie Railroad Co., development service, has issued an industrial map of its system for use in the locating of new industries. The map is available at the company's offices, 50 Church Street, New York.

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*Assistant works manager, Hawthorne Works, Western Electric Co., Chicago. Extracts from an address at the sixth annual Mid-West Safety Conference, March 19, at Chicago.

Cap Screws Made by New Method

Blank for Threading Produced by Extrusion Process—Tumbling and Lubricating Machine, Electric Heat Treating Furnace and Quenching Machine Are Features

BY FRED L. PRENTISS*

TO satisfy the more exacting requirements of the automotive industry, manufacturers of cap screws have given increased attention to improving the quality of their product. The importance of this small part in the construction of a motor car is indicated by the fact that about 400 cap screws are used in the average motor car, and it is stated that the new Ford Model A, taking less than other cars, uses nearly 300.

Recent improvements in manufacturing processes in making cold-headed cap screws include a new method that is employed by the Cleveland Cap Screw Co., Cleveland. This method is designed to increase the quality of the product both in accuracy and in tensile strength and, at the same time, to save material and to reduce the cost of manufacture as compared with the usual method of cutting the thread. An increase of 30 per cent in tensile strength is claimed for the product, as compared with cap screws made by the ordinary upset method. The process used was developed by Charles Kaufman of the Cleveland Cap Screw Co. and is covered by patents owned by that company.

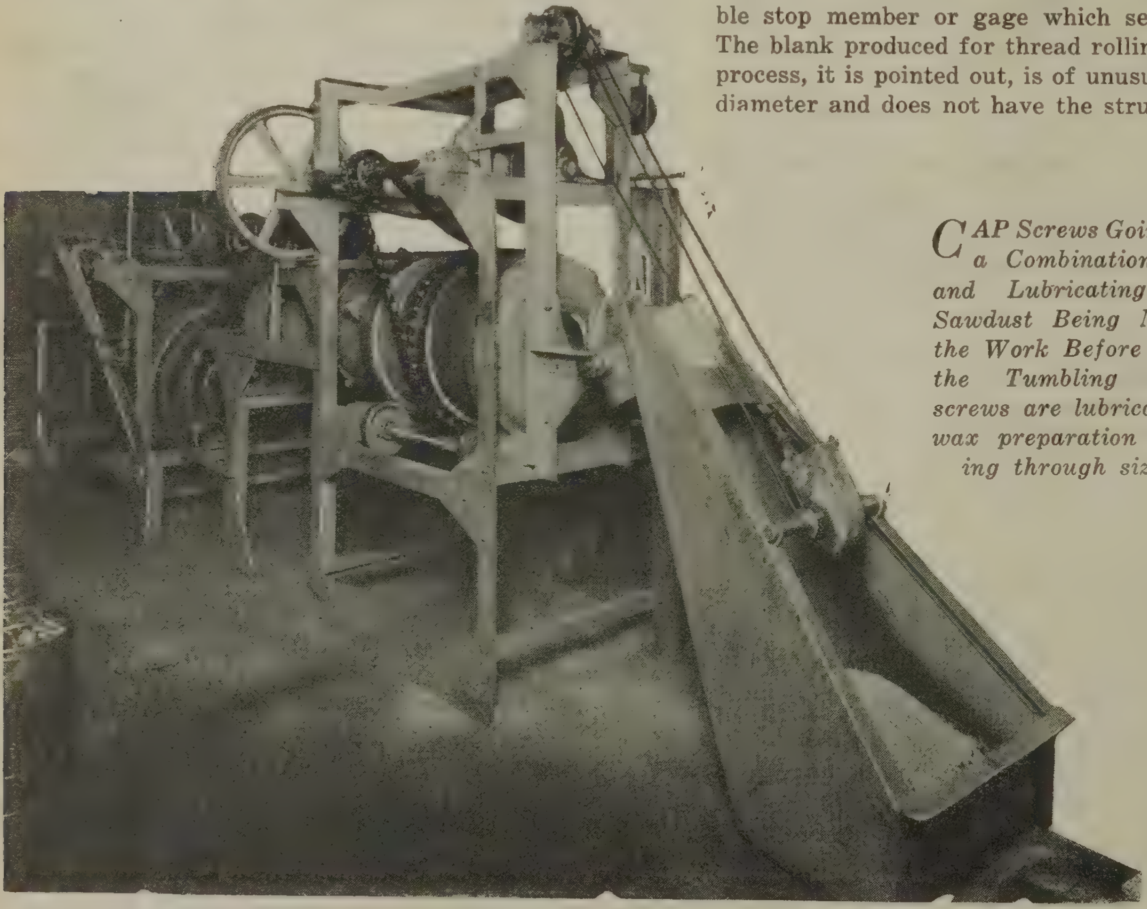
One of the important parts in the process is the heat treating, which is done in a recently installed electric furnace, which insures close temperature control and, consequently, uniformity in the heat treating operation and a finished product that is very uniform in hardness. The furnace was built by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

In the method commonly employed in making cold-headed cap screws the threads are rolled on the blank in the original diameter of the mill stock and the portion of the blank that forms the shank or body between the threaded portion and head is built up by being expanded in a die by the upsetting process, so that its diameter corresponds to the external diameter of the threads. As a part of the same upsetting operation the head is formed.

Wire Reduced to Proper Pitch Diameter Simultaneously with Heading

Under the new process, wire of the same diameter as the body of the unthreaded portion of the finished screw is fed into the solid die of a double-stroke header of a standard type and is cut off to the proper length. As the wire is forced into the die the portion to be threaded is reduced in diameter to the pitch diameter of the thread to be formed. The heading operation is completed on the second stroke of the plunger.

The female die member, which is stationary, has an irregular-shaped cavity including an outer head-forming portion, a section of smaller diameter or approximately the same diameter as the stock and, at the base of this, a section having a further reduction in diameter in which the stock is forced, decreasing the diameter of the portion to be threaded to the pitch diameter of the thread and lengthening that part of the blank by the drawing or extruding process. The stock is driven into the die cavity to a point at which it engages an adjustable stop member or gage which serves as an ejector. The blank produced for thread rolling by the extrusion process, it is pointed out, is of unusually accurate pitch diameter and does not have the structural weakness of



CAP Screws Going Through a Combination Tumbling and Lubricating Machine, Sawdust Being Mixed with the Work Before It Goes to the Tumbling Mill. The screws are lubricated with a wax preparation before going through sizing dies

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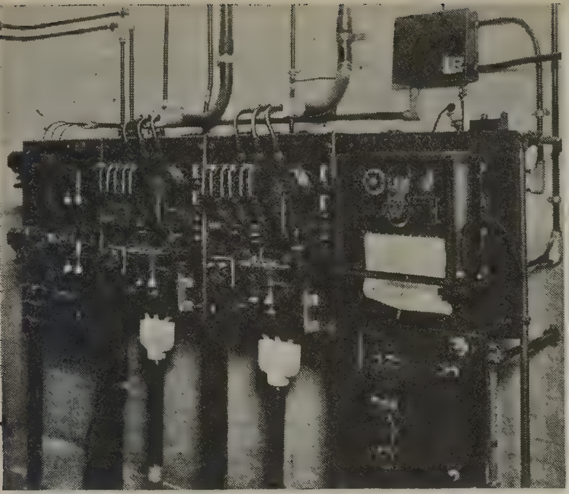
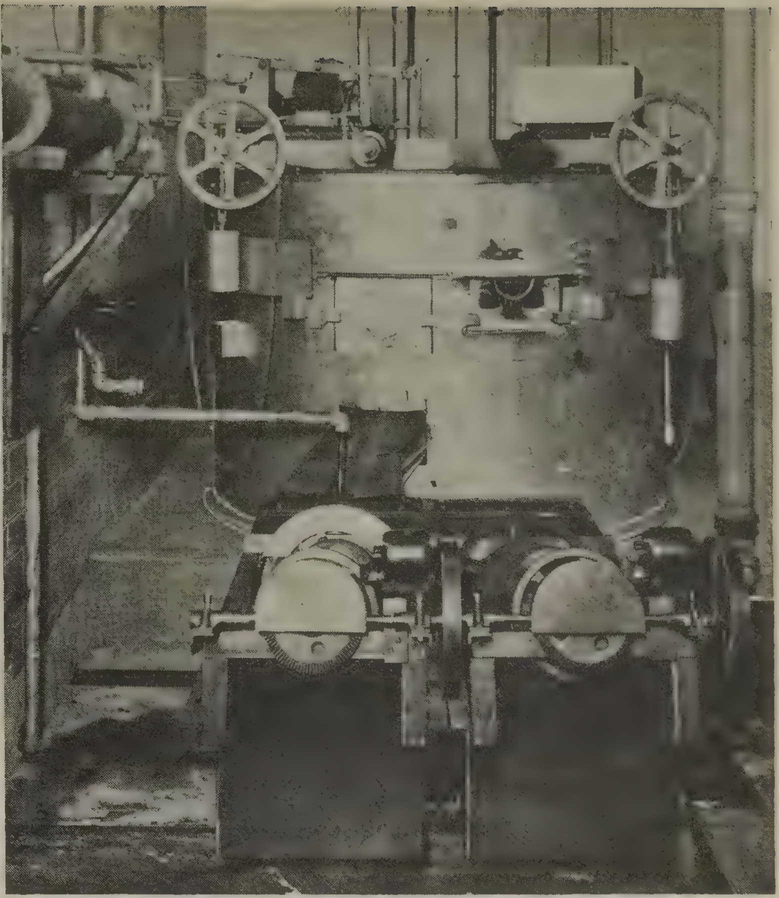
*Resident editor THE IRON AGE at Cleveland.





UNIFORMITY in the Heat Treating Operation and in the Hardness of the Finished Product Is Secured by Passing the Screws Through an Electric Furnace of the Rotary Type. From the furnace the work is dumped into a quenching machine. There are two of these machines, one for quenching carbon steel screws in water and the other for oil quenching alloy steel screws. At the left, the control equipment for the furnace

crystallization. An outstanding feature of the process is the reduction of the wire to the proper pitch diameter at the same time that the heading operation is performed.

The part of the blank that is reduced in diameter is given a skin or surface hardening by the drawing process, which, it is pointed out, is of advantage in steel used for screw-forming purposes. As the shank retains its original diameter, it can be of any length, which is also true of the part to be threaded. As previously stated, the diameter of the shank is the same as the stock, but should there be any variation in the size of the stock the shank portion is enlarged or reduced in the die, assuring greater accuracy, it is said, than is provided by mill tolerances.

Less Severe Upsetting Blow Reduces Possibility of Crystallization

Since the head is formed of larger stock than is usually used in the cold-heading process, not as severe an upsetting blow is required in forming the head as would be necessary were the shank and head upset from smaller stock as in the more common process. Consequently, it is pointed out, there is less possibility of crystallization and fracture in the body and there is less tendency to set up strains in the body and head. The method of heading is said to knit the steel structure more closely together, increasing the tensile strength so that there is less danger of heads shearing or breaking.

In using the more common upsetting process in manufacturing cap screws in which the body is built up by upsetting, stock 0.340 in. in diameter with mill tolerances is used for a ⅜-in. cap screw. Under the process described 0.370 in. stock is used, and this is reduced on the threaded end to 0.344 in. in diameter. The finished product is held, on a screw with 24 threads to the inch, within 0.3479 in. maximum and 0.3455 in. minimum pitch diameter, allowing a maximum tolerance of 0.0024 in., including lead and angle errors. This is an American standard screw thread, Class 3 fit, a classification that includes the better grades of interchangeable screw thread work for cap screws for automobiles. The manufacturer claims that because of holding the blanks to very close limits it is possible to keep within the above tolerances more easily than when screws are made by the standard upsetting process. The cold-heading and drawing operations are performed on standard cold-heading machines, the plant being equipped with eight of these machines, supplied by the E. J. Manville Machine Co., Waterbury, Conn.

Trimmed Screws Pass Through Tumbling and Lubricating Machine

After the combined upsetting and drawing operation the secondary operations of trimming the head into its hexagonal form, sizing and burnishing, pointing, facing, shaving, threading and heat treating are performed in the order named. The common thread-rolling process is used in making the threads.

After trimming, the screws go through a combination tumbling and lubricating machine that has a series of three rotating barrels. The screws are shoveled into a loading skip with sawdust, which adheres to the oil on the work and aids in taking off the rough edges during tumbling. While one lot is going through the tumbling mill another lot is being dumped into the skip. The tumbling barrel is 24 in. in diameter by 30 in. long. Work is tumbled for 5 to 10 min. From the tumbling barrel the screws pass over a revolving screen, through which the sawdust is discharged, and from there to a second rotating section—a perforated metal barrel, 36 x 36 in. The barrel extends into a tank containing a hot wax preparation through which the screws pass. The barrel then dumps the screws into a small revolving barrel in which the surplus lubricant is drained off, and a spiral in the latter barrel discharges them into a handling receptacle.

The lubrication provides a film on the screws and takes the place of oil that would be required on the sizing dies if the screws themselves were not lubricated. All stock sizes pass through the tumbling and lubricating machine and then are sized in a die on a punch press to secure good fits on wrenches having close tolerances. The head is forced through the die, which burnishes it, at the same time bringing it to accurate size.

Some of the products made of alloy steel are annealed after heading and before the secondary operations to relieve strains. This is done on a rotary-type gas-fired annealing furnace.

Screws Heat Treated in Electric Furnace

The heat treating, which is the final operation, is done in a 90-kw. three-phase 60-cycle 230-volt rotary, tilting, tray-type, automatic discharge, hardening furnace having a capacity of 900 lb. per hour. While the furnace does not differ materially from other furnaces of this type, some of its construction features are new. Screws 5/16 in. to ½ in. in diameter are kept in the furnace 22 min., during which they make one rotation of the hearth. The time cycle is slightly increased for the larger sizes. The furnace can be set for a time range in the rotation of the hearth of from 14 to 50 min. The work is carried through the furnace in 12 cast nickel-chrome trays, each having a capacity of 25 lb. The screws are shoveled into the trays through the charging door, the trays usually carrying two layers of work weighing about 15 lb.

The furnace is divided into two zones, a heating and a soaking zone. A temperature of 1525 to 1550 deg. Fahr. is maintained in the soaking zone, and a slightly lower temperature in the heating zone. When a tray completes its circuit of the hearth, it is automatically dumped by a mechanism operated by a motor located on top of the furnace. The motor that operates the hearth is located at the back of the furnace. The automatic electric control of the two motors is interlocked so that the hearth makes one-twelfth of a complete circuit, bringing a trap to a discharge position, and stops. Then the tilting motor operates the lifting mechanism, causing the tray to tilt and discharge its load. The hearth motor cannot again operate until the tilting motor returns the lifting mechanism to its starting position and the timing mechanism has completed its cycle. The furnace has push button control and magnetic starters.

Each heating zone has a separate Leeds & Northrup temperature controller. The heating zone has a non-indicating controller and the soaking zone a recording controller. One thermocouple is located in the heating zone and a second in the soaking zone. The temperature control is very close, the range being within 7½ deg. plus or minus of the temperature at which the control is set. By having accurate control over the rate of heating and the actual temperature readings there is a range of only ½ point plus or minus in the Brinell hardness of the product.

An important new construction feature of the furnace is that the roof can be removed to permit the rebuilding of the hearth. When a replacement of the hearth is necessary the roof is raised as a unit by means of a hoist. In other types of rotating furnaces the rotating member is dropped into a pit beneath when the hearth is to be replaced. Access to the furnace for minor repairs is made through the charging door.

Screws Passed Through Quenching Machine into Rust-Proofing Solution

The screws are dumped from the furnace trays through a chute into a Greene quenching machine. This consists of a rectangular tank in which a motor-driven perforated drum revolves. One end is submerged in the quenching liquid, and the other projects over the end of the tank. The work slides down an inclined plate through the quenching medium into the drum, and the spiral in the drum causes it to circulate through the medium and, at the same time, elevates it out of the tank and discharges it into a rust-proofing solution. The screws are then ready for packing.

Two quenching machines are provided, one for quenching in water, which is used for carbon steel screws, and the other for oil, in which alloy screws are quenched. The oil quenching tank is connected with oil cooling equipment, the oil being circulated in coils through a drum in which water is kept in circulation. This has a capacity for cooling 100 gal. of oil per min. Cooling equipment was supplied by the Griscom-Russell Co., New York.

The furnace is made as airtight as possible, so that air and moisture are kept out and the work in passing through the chute to the quenching tank is exposed only a moment to the cooling action of the air. Consequently oxidation is held at a minimum.

To assure the accuracy in the product now demanded by the automotive industry the company has just completed a chemical and metallurgical laboratory, and its manufacturing processes will be closely tied up with laboratory work. A check will be made on all incoming shipments of steel to make sure that the material conforms to the specified analysis. Other checks will be made during the various stages of manufacture, and the finished product will be tested for tensile strength and hardness.

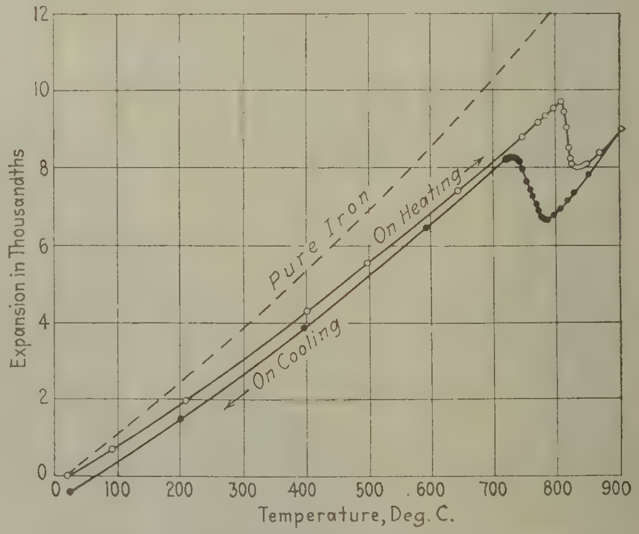
The products of the company include cold-headed cap screws made of carbon and of various grades of alloy steels in both S. A. E. and U. S. S. threads in sizes ¼ to 1 in. in diameter and in maximum lengths up to 8 in. The plant equipment includes one of the first 1-in. heading machines built for cold upset work.

Expansion of Stainless Iron

SCIENTIFIC PAPER No. 570 of the Bureau of Standards contains data on the thermal expansion of stainless iron secured by Peter Hidnert and W. T. Sweeney. Nine samples were investigated within the following ranges of composition:

Carbon	0.09 to 0.13	per cent
Chromium	12.0 to 16.4	per cent
Manganese	0.16 to 0.60	per cent
Silicon	0.25 to 0.57	per cent
Nickel	none to 0.39	per cent
Phosphorus	0.01 to 0.03	per cent
Sulphur	0.01 to 0.02	per cent

The sketch shows the relation between change in length and temperature for a C 0.09, Cr 12.2 steel, which is quite typical of the group. Transformations at about 800 deg. C. are quite marked. It will be observed that the coefficient of expansion increases slightly with increasing temperature (that is, the curve turns upward); furthermore, that the expansion is quite markedly lower than that for pure iron.



Linear Thermal Expansion of Stainless Steel on Heating and Cooling as Compared to That of Pure Iron

Large Expansion in Electric Drive

Nearly 2,000,000 Hp. in 1510 Mill Motors—Units Purchased in 1927 Added 9 Per Cent to Horsepower Previously Employed

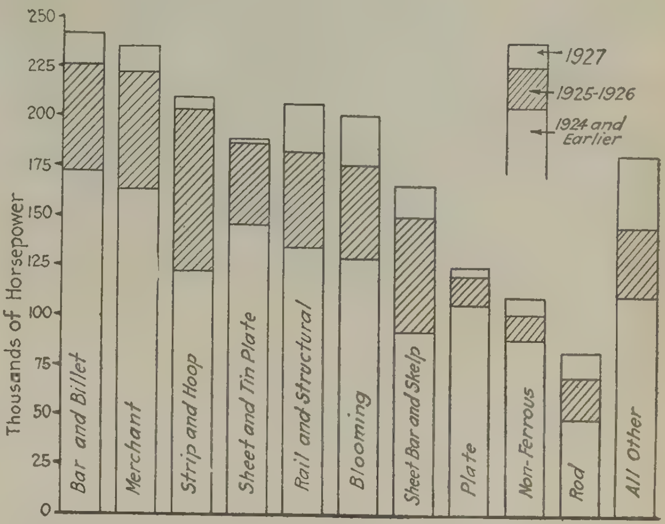
BY SIDNEY G. KOON

THREE years ago (Feb. 12, 1925), page 488, and June 25, 1925, page 1880) THE IRON AGE published details regarding the extent of installation of electric drives in rolling mills of the United States and Canada. This was based on a comprehensive tabular compilation made by the Association of Iron and Steel Electrical Engineers. Data covering 1927 and the entire list to the end of that year have now been made available.

Present installations, as analyzed by THE IRON AGE, aggregate 1510 units of a total of 1,949,800 hp. Of these, 116 motors of 170,350 hp. were added in 1927. The average size of the 1927 units was 1469 hp., while the average of all units is 1291 hp. No motors of under 300 hp. are covered in the tabulation.

Types of Mills Showing Heaviest Use

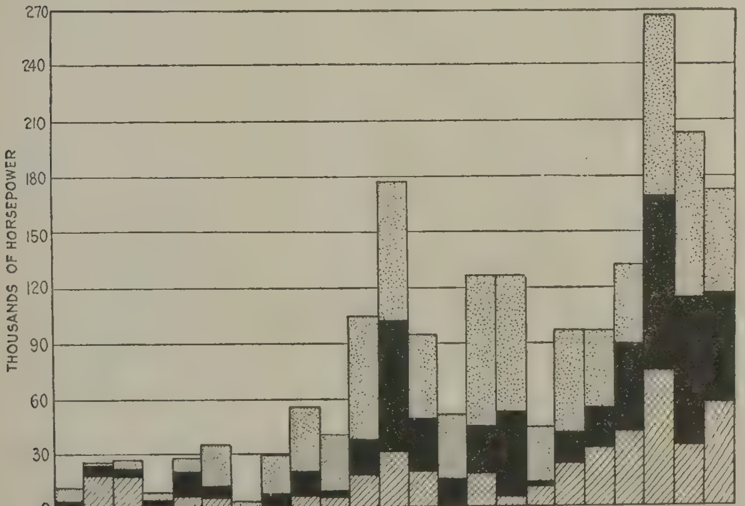
Bar and billet mills, with 242,175 hp. in 152 units, lead the list. Merchant mills make a close second, with 235,100 hp. in 277 units. Strip and hoop mills have 217,355 hp. in 150 units, while rail and structural mills with 73 units aggregate 205,800 hp., and 44 blooming mill units make a total of 200,500 hp. Other types of mills are powered as shown in Table I.



Total Horsepower of All the Mill Motors in the Principal Classes of Mills, Showing Separately the Additions of 1927 and of the Two Preceding Years Upon the Accumulated Totals of All Earlier Years

TABLE I—ELECTRIC DRIVE IN AMERICAN ROLLING MILLS

Type of Mill	Total Equipment			1924 and Earlier			1925, 1926 and 1927			Added in 1925-27, Per Cent
	Motors	Hp.	Avg.	Motors	Hp.	Avg.	Motors	Hp.	Avg.	
Blooming	44	200,500	4,557	31	128,450	4,144	13	72,050	5,542	53.6
Bar and billet	152	242,175	1,593	114	172,135	1,510	38	70,040	1,843	40.7
Sheet bar and skelp	68	165,000	2,426	41	91,300	2,227	27	73,700	2,730	80.7
Rail and structural	73	205,800	2,819	46	134,550	2,925	27	71,250	2,639	53.0
Plate	53	125,150	2,361	47	105,900	2,253	6	19,250	3,208	18.2
Strip and hoop	150	217,355	1,449	95	122,170	1,286	55	95,185	1,731	77.9
Merchant	277	235,100	849	202	162,610	805	75	72,490	967	44.6
Sheet and tin plate	135	183,800	1,361	109	145,250	1,333	26	38,550	1,483	26.5
Rod	66	83,560	1,266	37	48,360	1,307	29	35,200	1,214	72.8
Piercing	35	50,600	1,446	20	15,850	793	15	34.750	2,317	219.2
Tube rolling	85	48,340	569	57	29,540	518	28	18,800	671	63.6
Wire	22	7,425	337	22	7,425	337	..	.....	....	...
Wheel	17	12,900	759	13	10,000	769	4	2,900	725	29.0
Cold roll	108	49,845	462	68	28,475	419	40	21,370	534	75.1
Non-ferrous	210	110,100	524	173	88,350	517	37	21,750	588	24.6
Miscellaneous	15	12,150	810	9	6,800	756	6	5,350	892	78.7
Totals	1,510	1,949,800		1,084	1,297,165		426	652,635		50.3
Averages			1,291			1,197			1,532	



Growth in the Application of Electric Drive to Main Rolls Is Shown Clearly Above. The dotted portions of the yearly columns are motors of 300 to 1999 hp.; solid black, those of 2000 to 4999 hp.; shaded, those of 5000 hp. and over

Blooming mills made the largest gain in 1927, with 25,050 hp. in five units. Rail and structural mills, with five units, added 22,000 hp., while ten sheet bar and skelp mills accounted for 20,800 hp. Additions in 1927 were smaller than in the two preceding years, which saw 313 new motors aggregating 482,000 hp., or an average of over 240,000 hp. a year. Except for wire mills, however, all of the 16 types represented showed some addition during the year.

Something of the advance being made in production of seamless tubes is shown by the piercing mills. With 17,300 hp. added, they showed a gain of more than 50 per cent over the 33,300 hp. previously installed. The 1927 addition was almost equal to the 17,450 hp. of 1925, and was greater than the total in all years preceding 1925, which was but 15,850 hp. The average size of these mills increased from less than 800 hp., in units installed prior to 1925, to more than 1900 hp. in the 1925 additions and almost 2900 hp. in the 1927 additions.

While the total number of motors advanced in 1927 only 8 per cent, the total horsepower rat-

TABLE II—LARGE MOTORS OPERATING ROLLING MILLS

	5000 Hp. and Up		2000 to 4999 Hp.		Added in 1925-26-27	
Type of Mill	Motors	Hp.	Motors	Hp.	Hp.	Per Cent
Blooming	21	139,500	17	54,650	71,250	58.0
Bar and billet.....	15	90,500	21	60,900	46,550	44.4
Sheet bar and skelp	6	37,200	37	98,750	67,400	98.3
Rail and structural	14	86,000	29	81,000	54,500	48.4
Plate	7	40,500	22	64,650	15,850	17.8
Strip and hoop.....	3	15,500	30	72,150	50,700	137.2
Merchant	1	5,610	20	52,900	17,610	43.1
Sheet and tin plate	..	.....	18	40,000	21,500	116.2
Rod	..	.....	12	33,300	15,000	82.0
Piercing	1	5,000	10	29,000	31,500	1260.0
Wheel	..	.....	1	2,000	.....	....
Miscellaneous	..	.....	2	4,000	4,000	....
Total	68	419,810	219	593,300	395,860	64.1
Average size.......		6,174		2,709	3,503	
Percentage of total list, now.......	4.5	21.5	14.5	30.4		
Three years ago..	3.9	19.6	11.7	27.1		

TABLE III—RANGE OF SIZES OF MILL DRIVES

	Total		1924 and Earlier		1925, 1926 and 1927		Per Cent
Size Group	Motors	Hp.	Motors	Hp.	Motors	Hp.	Added
300 to 499 hp.	375	133,325	307	108,155	68	25,170	23.3
500 to 999	488	314,750	351	224,750	137	90,000	40.0
1000 to 1999	359	486,545	261	355,930	98	130,615	36.7
2000 to 2999	127	278,120	74	162,770	53	115,350	70.9
3000 to 4999	93	317,250	58	200,050	35	117,200	58.6
5000 and over	68	419,810	43	256,500	25	163,310	63.7
Total	1,510	1,949,800	1,094	1,308,155	416	641,645	49.0

ing increased about 9 per cent and the average size of motor installed in 1927 was 15 per cent greater than the average previous installation. This gain shows up in particular in the largest size units.

In 1927 there were installed 23 motors of 3000 hp. and more to operate American rolling mills. This compares with 138 in service at the end of 1926 and represents an increase of over 16½ per cent in number. Of motors under 3000 hp., there were 93 added in 1927 to the 1256 previously in use, representing a gain of not quite 7½ per cent, or less than half the rate of gain of the heavier motors.

Horsepower added in 1925, 1926 and 1927, to the list of units of 2000 hp. and over, added 64.1 per cent to the aggregate power existing in those units at the end of 1924. Additions to the smaller units represented only 35.7 per cent of the earlier installed horsepower.

Diagrams and tables show the principal characteristics of the motors, both as a total driving force for American rolling mills and as regards distribution according to size, type of mill and other particulars.

Warns Against Quickly Applied Chromium Plating

From Ten Minutes to Twenty Hours Required to Make Satisfactory Surface Depending Upon Expected Duty and Character of Underlying Metal

AT a meeting of the Chicago section of the American Society of Mechanical Engineers, held on March 14, Dr. J. Becker, chief research chemist Vacuum Can Co., read a paper on "The Relation of Chromium Plating to Industries and the Truth About Its Value and Application." After recounting the history of the metal and describing the rapid increase in interest in plating experiments during the past four years, the speaker emphasized that slight variations of the chemicals in the solutions or any other factor relating to deposition create distinct variations in the properties of the plate.

Rule of Thumb Inadequate

"The man who can chromium plate a few steel golf heads will dispute this and in 15 min. explain all the factors which he thinks have produced the result, but ask him to plate golf heads that not only look pretty but will stand hard service, in a quantity run and at a reasonable cost, and then he must either deal with it as an exact science or grope in the dark. If the amateur should be asked to chromium plate golf heads of different shape or made of a different metal or to plate an entirely different article for a different kind of service he will find himself completely lost.

"Any intelligent, careful and systematic workman can successfully chromium plate particular types of articles to the highest standard of quality, but when and only when he is furnished complete detailed instructions.

"Decorative chromium plating may be adapted to all instances where beauty of appearance and easy cleaning is desired, but unless it is a real plate and not merely a superficial coloring it is of no value. In the first place the base metal determines the thickness of a chromium plate which should be applied. Naturally a decorative coat not subjected to wear need not be very heavy, provided, however, that such a plate is produced from a solution which will give a coherent and homogeneous plate. Otherwise such a plate is worse than none and will hasten instead of retard corrosion.

"When it is considered that good chromium solutions have no higher efficiency than 30 per cent, that there are many with an efficiency as low as 6 per cent, and further that the deposit of chromium from an excellent chromium solution is only about 0.00025 in. thick from 150 amp. current density per square foot in 1 hr. of plating time, you will realize how little metal and how thin a plate you receive from the average plater, who considers 30 sec. to 1 min. plating time sufficient for chromium plating a radiator shell, a reflector or a plumbing fixture. Such a plate is less than 2 to 4 millionths of an inch thick and, though of nice appearance immediately after plating, will last but a very short time.

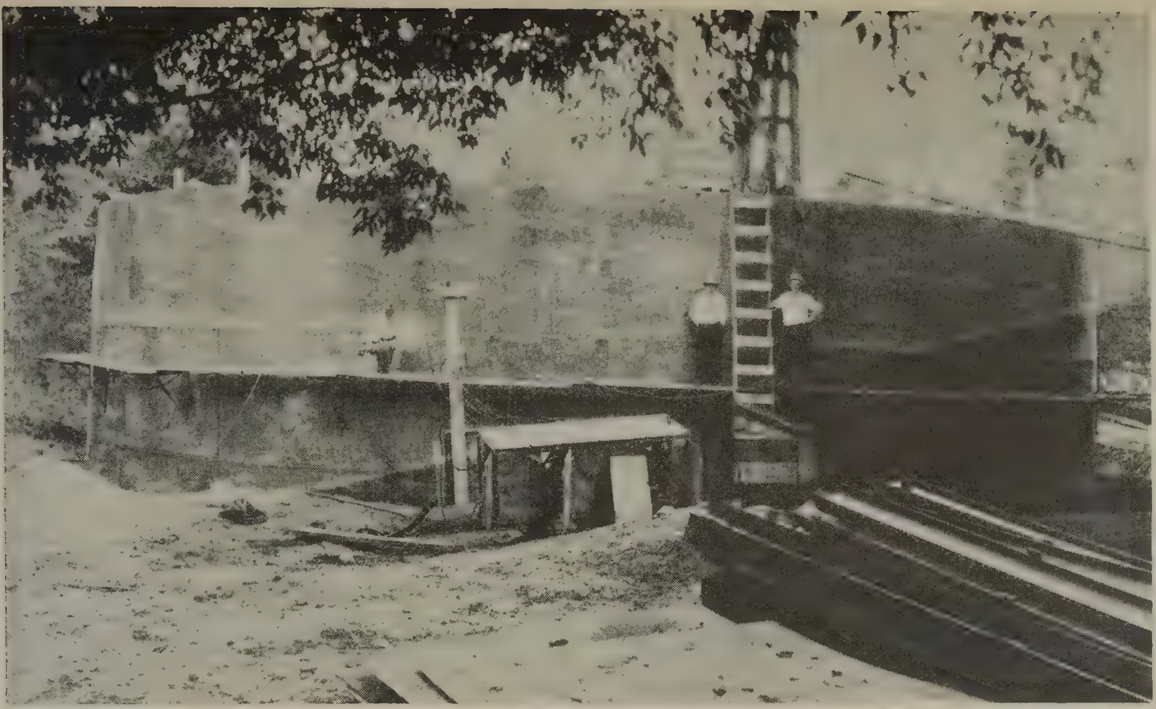
Thickness of Decorative Coatings

"If copper, brass or zinc is to be given a decorative chromium plate, I consider it necessary that such pieces should be in the solution about 30 min., which will result in a plate of about 1½ ten-thousandths of an inch thick, provided a highly efficient chromium solution is used. If the base metal has a homogeneous adherent and continuous nickel plate or (as in the case of steel) copper or copper-and-nickel plate, a chromium plate in 5 to 10 min. will be sufficient as a decorative coat, resulting in a thickness of from 2 to 4 hundred-thousandths of an inch.

"Articles which have to withstand abrasion and corrosion, like plumbing fixtures and valves, should be treated entirely differently. If chromium is applied directly to brass or bronze fixtures, 1 hr. of plating time is recommended. If such fixtures are first nickel plated, 30 min. should be the minimum, resulting in a thickness of about 1½ ten-thousandths of an inch of chromium.

"The average nickel plating is not adapted as a base for chromium plating. It has been pointed out that chromium plating has a tendency to raise and make the nickel plating peel, but this occurs only when the nickel plating is not adherent. A great deal of nickel plating will stand buffing and give a good appearance, though it does not adhere to the base metal, and such a layer may withstand 30 to 60 sec. in a chromium solution, but will peel and blister if immersed longer than this period. This is the reason why only a flash-coat, taking less than a minute, is often given by platers.

"Where chromium is applied for wear, as in bearings, shafts, rollers, plungers, pistons or valves, special solutions are necessary which give the desired and demanded characteristic of the plate. The applications are more or less individual, and no specific rules can be given as to thickness, hardness and character of the plate. Especially if hardened steel is the base metal to be plated, a plating time of from 2 to 24 hr. is necessary."



THE Water Tank With All Plates Erected. Welding generator near tank is covered with wooden shed to protect it from weather

All-Welded Gas Holder Takes 258 Tons of Plates and Shapes

Plates Are Erected with Narrow Overlap and Held with Bolts at Wide Spacing Until Welder Completes the Seam

BY F. H. BEEBE*

A GAS holder of 300,000 cu. ft. capacity has just been completed at Albion, Mich. It is believed to be the largest all-welded low-pressure gas holder ever built and was designed and constructed by the Western Gas Construction Co., Fort Wayne, Ind. With all lifts elevated the holder stands 113 ft. 7 in. above the foundation; it has a diameter of 74 ft. and required 258 tons of plates and shapes plus 4 tons of welding rod.

A 15,000-cu. ft. single-lift gas holder, all arc-welded construction, was built by the same company for the Missouri Gas & Electric Co. at Lexington, Mo., in 1924. Experience with this rather small structure proved that welded joints were perfectly satisfactory in strength and are gas and water tight.

Electric welding for gas holder construction has inherent practical advantages. It reduces fabricating cost, because it is only necessary to lay out and punch a few holes for erection bolts. After the plates are erected in position with bolts, they may be tack-welded for additional stability, and then all lapping edges welded in a continuous seam. In the Albion job, cups and grips were fabricated in the shop, assembled in sections on the ground and welded in place.

The bottom was assembled flat on the concrete foundation and all seams were welded. The first course of 7/16-in. steel plates was then erected and welded, and water was allowed to stand in the foundation pit about 12 in. deep. In this manner the bottom and lower curb was tested for leaks, and it is interesting to know that none was found.

What is known in gas holder construction as the cup is easily attached by electric welding. It is a narrow trough attached to the inside shell about 2 ft. from the floor. Two dozen sets of I-beams were welded together and to the floor to form the landing blocks to receive the weight of the successive lifts when the holder is low.

One illustration shows the gas holder when the final welding was being done on the water tank. It can be seen that the joints are lap joints, bolted at long intervals, a variety easy to erect and to weld. This picture also indicates the timber scaffolding erected inside the tank to carry the erection traveler, and the wooden cleats for holding the upper course at the required position until the joints were completed. Scaffold brackets for outside welding were bolted on, and the holes later welded shut. Such construction devices consisted of

THE Largest All-Welded Gas Holder Is 113 Ft. Tall and Has a Diameter of 74 Ft. Seventy per cent of the welding necessary for complete fabrication was done in the field virtually the same elements that would be necessary on a riveted job. All through this work it was the simplicity of welding that was its greatest virtue.

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*Vice-president Western Gas Construction Co., Fort Wayne, Ind.

The other view shows the gas holder after completion of the final lift. The guide frame was entirely arc welded, the only bolts that were used being those employed in assembly. Around the top of the different lifts can be seen the goose necks. In the past these have been of riveted construction. On this job they were fabricated with metallic arc welding.

Plates forming the sides of the water tank range from 7/16 to ¼ in. thick, and the three lifts are of No. 10 gage. Everything on this gas holder, the ladders, the platforms and the crown, is assembled by welding.

On this gas holder 4 tons of electrode was used. If a holder of the same size were made of riveted construction, 7½ tons of rivets would be necessary. Four "stable-arc" welders manufactured by the Lincoln Electric Co., Cleveland, placed 21,414 ft. of seam. The entire job was carried through almost without a hitch and with much less difficulty than would naturally be expected with a new structural process.

This holder at Albion was built largely through the cooperation of D. F. Burritt, vice-president in charge of engineering Middle West Utilities Co., Chicago, and Roy Campbell, president Albion Gas Light Co.

Forging and Heat Treating of Long Cylinders

Special Furnaces Used by Manufacturer of Printing Presses for Swaging Ends and Carbonizing Surfaces

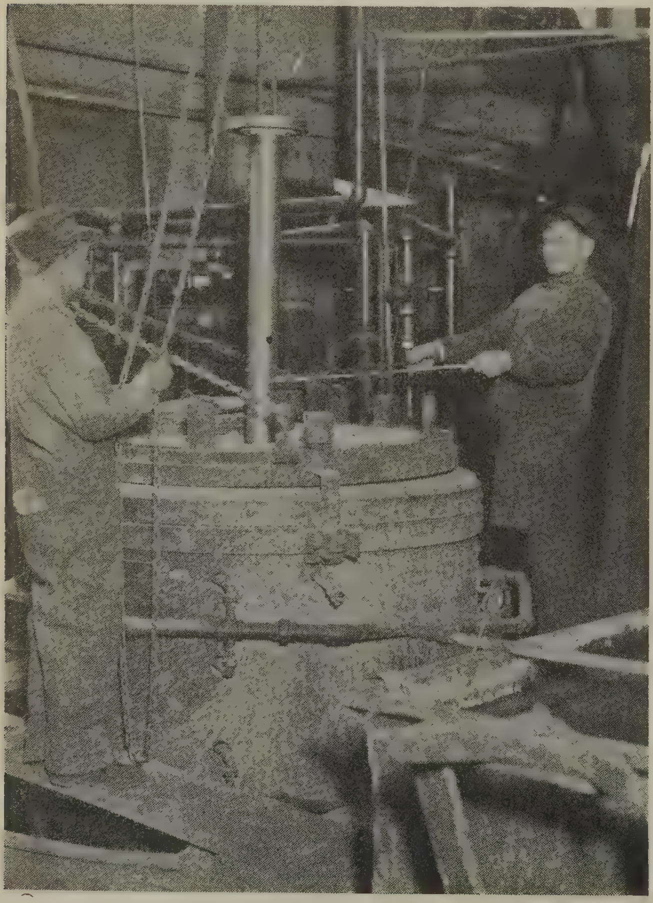
BY J. B. NEALEY

IN addition to the more usual types of heat-treating furnaces, some special equipment has been installed at the Miehle Printing Press & Mfg. Co., Chicago. Many of the parts to be treated are long cylinders of various diameters. To case-harden rollers and shafts an interesting vertical furnace has been installed.

As shown in the view, it is 5 ft. in diameter and 7 ft. high, set in a pit. It is heated with 18 gas burners. Instead of packing the parts with carbonizers in pipes or boxes, they are lowered into vertical retorts (of which there are three) fixed within the combustion chamber. These retorts are charged with a small amount of carbonizing material, and gas is passed through them continually during the heating period. Parts that required 24 hr. to carbonize in coal-fired furnaces are treated in 8 hr. in this unit.

Another furnace which is a little unusual is a three-high furnace—that is, it has three chambers, one above the other. The upper chamber gets the first impact of the gas flame, and the waste heat from it is passed down into the other two. The three chambers are maintained at 2400, 1700 and 1000 deg. Fahr. respectively and are used progressively for pre-heating and heating. This furnace is very compact—5½ ft. high and about 3 ft. square in cross-section.

Other unique furnaces are installed in the blacksmith shop. Two helve hammers are used for swaging ends on press rollers and for similar work on rounds up to 6 in. diameter. Each hammer has a battery of six cylindrical furnaces, set side by side under a ventilating hood. Each furnace is a steel casing about 18 in. long and 12 in. in diameter, lined with fire brick and heated with two gas burners so set as to produce a swirling flame within the brick lining. Air is supplied at from 4 to 5 lb. pressure, and the gas is inspirated. As shown in the view, one pipe or bar is a complete furnace charge.



(At Left) Withdrawing Shaft from Vertical Carbonizing Furnace. Swaging hammer (above) served by battery of small cylindrical furnaces

Treated Fuels Feature Meeting

Powdered Coal and Dry Quenching of Coke Discussed by Combustion Engineers—Steel Mill Looks for Record

MORE than 100 men, drawn largely from the combustion engineers' division of the Association of Iron and Steel Electrical Engineers, participated last Thursday in an inspection of the Edgar Thomson Steel Works of the Carnegie Steel Co., Braddock, Pa., and a technical meeting devoted to two topics in their particular line. One of these was the dry quenching of coke, while the other dealt with the use of pulverized coal as an industrial fuel.

Great efforts were being put forth in the steel mill to produce a record month. This, with 28 days of the month completed, was already assured. It was reported unofficially that the preceding day had witnessed the production of some 4800 tons of open-hearth ingots from sixteen 100-ton furnaces. The expectation for the month was about 100,000 tons, against a previous high record of about 90,000 tons. Rail production of the preceding 24 hr. was put at 95 tons an hour and sheet bar production at 70 tons an hour.

Among the new pieces of equipment shown in this plant are three turbo-blowers for the blast furnaces. These have replaced 10 old reciprocating engines, of which eight or nine were normally active and the other one or two spares. Each of the new blowers provides sufficient wind for one furnace. Two were made by the Ingersoll-Rand Co., New York, and one by the Brown-Boveri Co. of Switzerland. Each was designed for a normal load of 60,000 cu. ft. a minute. The maximum pressure under the design is 30 lb., and the normal pressure 18 lb. to the square inch. At 18 or 20 lb. the machines run at 2600 r.p.m., going up to 2975 r.p.m. for maximum pressure. The steam turbines, on the same shaft with the blowers, are rated at 7000 hp., taking steam at 225 lb. to the square inch, with 150 deg. superheat and 28½ in. of vacuum.

Development of Andrew Carnegie's First Steel Plant

After luncheon in the company's club dining room the technical session was put under way without changing location. L. C. Edgar, chief engineer of the works, told something of the history of the development of the plant, from the first Bessemer blow of Aug. 26, 1875, and the first rail rolled, Sept. 1, 1875, through the first open-hearth heat, Aug. 16, 1913, and up to the present, when the high records above mentioned are being made.

This plant was started by Mr. Carnegie and associates as his first venture in steel making. It had capital stock originally of $700,000, and a daily capacity of 225 tons of rails. Rails had been $175 a ton shortly before this plant was put into operation, these being wrought iron rails. The price dropped from $120 a ton in 1873 to $42 in 1878, causing a great deal of trouble in meeting expenses by the new Bessemer method of manufacture. The first blast furnace, erected in 1880, had a daily capacity of 56 tons. The furnaces were gradually increased in size until in 1890 one made the best record of that time, of 457 tons in 24 hr. About this time the mill was rolling a maximum of 277,000 tons of rails in a year.

In 1905 a second rail mill was added, this being the first mill in America to utilize electric drive. The capacity of the original rail mill had been increased from 1120 tons rolled from ingots in September, 1875 (its first month of operation), and 30,632 tons in the 12 months of 1876, to 213,000 tons in the 12 months of 1906. That mill was then changed over to roll sheet bars, as the other rail mill had been installed. It made a high record in sheet bar production of 250,929 tons shortly after the conversion. In March, 1927—just a year ago—that mill turned out 24,320 tons. This figure is likely to be bettered in the current month, although the mill is 52½ years old.

Dry Quenching of Coke

QUENCHING of coke without dousing it in water was the subject of a paper by Col. H. B. Savage, which, in his absence, was read by Walter Sennhauser, engineer of Sulzer Brothers, Winterthür, Switzerland. The paper dealt with the system whereby successive charges of incandescent coke are passed through a large container, which holds from six to a dozen or more such charges for a period of 3½ to 4 hr. Inert gas drawn from the coke by the action of a fan, at a temperature of about 1800 deg. Fahr., is operated in a closed circuit through tubes of boiler units, whereby steam is raised. Heat is taken from this gas to such an extent that it is relatively cool as it enters the bottom of the coke container and passes up through the mass again. After each coke charge is entered at the top of the container an equivalent amount is withdrawn from the bottom, at a low enough temperature to satisfy requirements.

A complete description of a plant operating on this principle was published in THE IRON AGE of Feb. 10, 1927, page 425. This description covered the plant at Rochester, N. Y., which is the only one of this type in the United States. The speaker showed a large number of slides of similar plants in various sections of Continental Europe, some of which are considerably larger than the Rochester installation, while others are much smaller.

In the paper as read it was estimated that the loss of coke in water quenching, through carrying away fine particles and from other sources, amounted in the United States to about 2,250,000 tons a year, which was figured at 5 per cent of the production. This coke is largely saved in the dry quenching process. In some cases there is no measurable change in the production of coke braize. Other cases, however, have shown a reduction in braize from as much as 14 per cent down to 8 per cent—a gain of 6 per cent.

Steam Makes the Plant Pay

Production of steam is the paying part of this proposition. The various units have been figured at 400 to 450 lb. of steam for each 1000 lb. of coke put through the apparatus. At Rochester the average for six months on this basis was 420 lb. of steam, equivalent to 840 lb. for each net ton of coke. It is figured that this return is sufficient to amortize the investment in about four years. After that the gain is largely clear profit. One speaker in the discussion reported that the Rochester plant had proved capable of handling about 520 tons of coke a day, in place of 420 tons nominal figure. This meant a return, on the money invested, about 20 per cent higher than the original calculation.

While the first experimental plant on this basis was installed in Switzerland in 1918, it was not until 1922 that the first commercial plant was put in. The largest present plant has a capacity for handling 1000 tons of coke a day. This consists of four units (that at Rochester has two), each with a capacity of about 333 tons, one unit being a standby. Power consumption was placed at about 3 kwhr. for each ton of coke, this including power for both the fan and the hoist. A plant now under design will have a capacity of 1500 tons, and Mr. Sennhauser spoke of 2000 tons as being a near possibility. It was brought out that there is no dry quenching of coke in any of the German steel works or blast furnace plants. Hence, there was no opportunity to observe the action of dry-quenched coke in making pig iron.

Powdered Coal for Industrial Furnaces

CLEAN gas was called the best possible form of fuel, because of its molecular condition, by Prof. William B. Shoudy of Columbia University in his paper entitled "Powdered Coal Applications to Industrial Furnaces." Clean oil was listed as next in order of merit, because of the ease with which this can be broken up into a condition approaching the molecular. Coal is not so easy to handle from this point of view. Combustion takes place on the surface of each chunk or particle. The heat gradually breaks up the coal, exposing a larger amount of surface for each pound of fuel. Air gets through the interstices and wipes off from the surface the CO or CO_2 produced, changing the former to the latter, and combustion proceeds.

Pulverized coal particles, while they do not approach very closely to molecular dimensions, are yet such a long step in that direction that they overcome largely the disabilities of coal as ordinarily fed into furnaces. This coal is usually so pulverized that about 85 per cent of it will pass through a 200-mesh screen. A comparison was made with a molecule, whereby the speaker visualized this 200-mesh particle as being enlarged to the size of the dirigible Los Angeles, compared with which a molecule would be 0.08 in. in diameter. Incidentally, another comparison made later by another speaker considered particles of coal with a diameter of 0.002 in. If these were to be expanded 1,000,000 diameters, we would have a sphere or balloon shape nearly 200 ft. in diameter. Compared with this a molecule would be about the size of a poppy seed.

With powdered coal blown into a furnace the air has to move faster than the coal, if it is to wipe off the CO and CO_2 particles from its surface. Otherwise, if the air and coal moved together, the combustion chamber would have to be very large and the flame would be long. It has been found that a turbulent motion gives a good mixture and shortens the flame requirements. This is commercially important, because it makes available furnaces much smaller than would otherwise be required. Greater fineness in the coal has somewhat the same effect.

Ash Deposits May Be Harmful

Another reason for great fineness in the coal lies in the ash element. Ash from coal used in industrial furnaces, if it lands on the product, may affect the quality of the surface of that product. As yet we do not know completely what this effect is, but we do know that it is likely to be deleterious. Hence, with the finest possible coal the ash particles are so fine that they are carried on by the gases from the furnace to the stack, with much less likelihood of landing on the product. Professor Shoudy believes that coal pulverized so that 85 per cent will pass a 200-mesh screen is sufficiently fine for most industrial processes. For boiler use the coal can be much coarser.

Several photomicrographs were thrown on the screen, showing the results of pulverization by different types of pulverizing equipment. In each of these highly magnified views particles were pointed out which were about the measure that would readily pass through the 200-mesh screen. It was notable that each sample showed a number of particles much too large for that screen, but the great majority of particles were so small that it was difficult to see them. Some of them undoubtedly were less than 0.001 in. in diameter and a goodly proportion must have been less than 0.002 in.

Central vs. Unit Systems

Taking up the question of central supply of pulverized fuel vs. unit supply, the speaker pointed out that sometimes a unit installation may be shut down through some trouble in the pulverizer, with considerable loss to the industrial process under way. He advocated, where such loss might be experienced, a sort of compromise between the two systems. His proposal was to introduce between the pulverizer of the unit system and the burner an auxiliary bunker sufficient to carry a supply which would last the burner 2 or 3 hr. This would permit adjustment or repair of the pulverizing element, should this become necessary, without necessitating shutting down the whole equipment.

Inherent moisture in the fuel does not ordinarily cause trouble. Surface moisture does. It is for this reason that drying is usually resorted to before the coal goes into the pulverizer. Sometimes the pulverized coal itself is passed through a drier operated with a steam jacket as its heating element. There are, of course, industrial plants which dispense altogether with driers. One of these in which an air furnace figures is that of the Eastern Malleable Iron Co. at Naugatuck, Conn., described in THE IRON AGE of March 1, page 600.

Discussion of this paper by Henry Kreisinger took the form of running comment on a large part of the material which Professor Shoudy had furnished. The expansion of the fine coal particle by 1,000,000 diameters was Mr. Kreisinger's illustration. In this particular case he pointed out that, if this enlarged particle of 200 ft. in diameter were to receive 100 per cent of the air necessary for its complete combustion, this air surrounding the particle would, at the temperature of combustion, have a diameter of two miles. Particles of air on the circumference of this two-mile sphere would have a long travel before they could pick up particles of carbon on the incandescent surface of the burning coal. This example was given principally to show the relationship between the fuel and the oxygen supply from the air.

The speaker pointed out that it is possible to go as high as 3 lb. of coal to the hour for each cubic foot of combustion space, if the walls of the furnace are water-cooled. This figure takes the place of 2 lb. in the ordinary furnace without water cooling. Hence, the supply of heat with water-cooled walls may reach around 35,000 B.t.u. an hour for each cubit foot of combustion space.

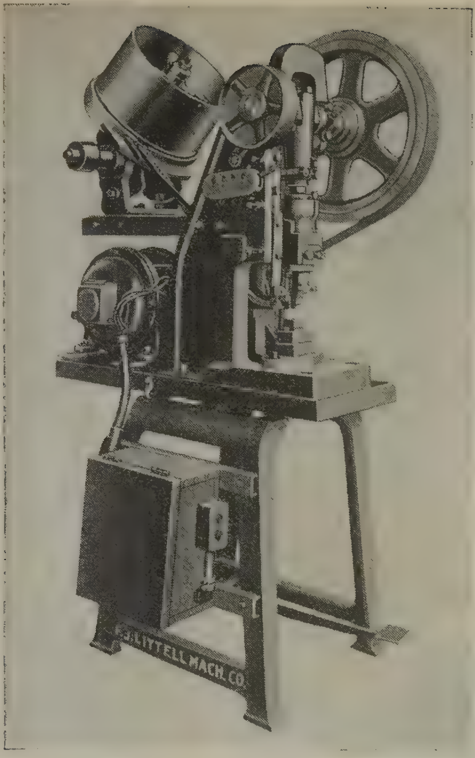
How the Section Came Into Being

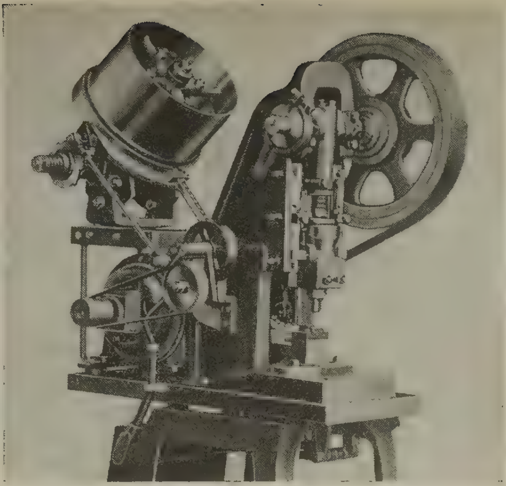
Preceding the presentation of the papers, A. J. Standing, president of the Association of Iron and Steel Electrical Engineers, extolled the work which the combustion section has done since its inception. In particular, he told about how the group of combustion engineers, without any parent society, had begun to do a certain amount of work. The directors of the Association of Iron and Steel Electrical Engineers, observing the work under way, decided that it would be a good thing to bring the two groups together, inasmuch as the combustion engineers naturally would sooner or later become affiliated with some one of the national societies. This approach was made first in 1922, and from a small beginning the division has already presented more than 75 major papers along its specialized line.

Fellowships Offered by Carnegie Institute of Technology

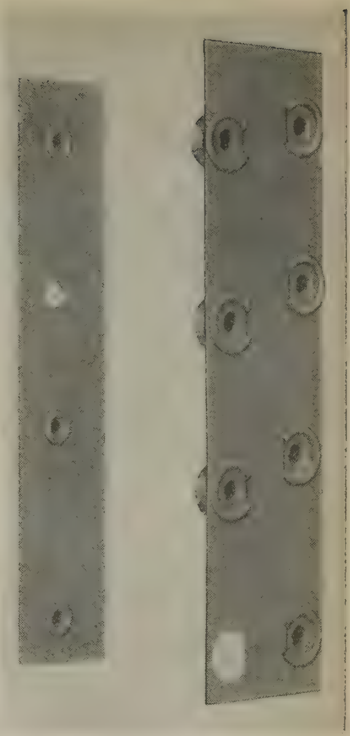
Several fellowships are open, as of Aug. 13, 1928, at the Carnegie Institute of Technology, Pittsburgh, for investigations in the physical chemistry of steel making. As noted in THE IRON AGE for Oct. 27, 1927, page 1171, provision has been made for a five-year program of intensive study through the cooperative action of the institute, the United States Bureau of Mines and several leading steel makers.

Fellowships are open to the graduates of colleges, universities and technical schools who are properly qualified to undertake research investigations. Each fellowship carries a stipend of $750, paid in 10 monthly instalments. Fellowship holders are required to register as graduate students and become candidates for the degree of Master of Science unless an equivalent degree has previously been earned. Fellows will not be required to pay registration fees. Application blanks will be furnished by Prof. Edward Steidle. Each applicant will be required to supply a copy of his collegiate record from the registrar's office of his college. He will also submit a photograph and names and addresses of at least three persons who are familiar with his character, training and ability, together with a statement of his technical or practical experience. Applications are due not later than May 1, 1928.





THE Feed Used for Fastening Round Nuts to Grooved or Curved Body Parts Is on Press at Left. The feed above is for handling D-shaped clinch nuts, samples of which, together with the round nuts, are shown at right



Special Punch Press Feeds for Clinch Nuts

PUNCH press feeds for use in connection with the fastening of clinch nuts in automobile body parts have been developed by the F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago. Five types are available and, although developed primarily for use on automobile bodies, the machines are offered for other work involving similar problems. Increased production is claimed, as well as adaptability for fastening nuts in inaccessible places.

The feeds are designed to take flat-sided as well as round nuts, which may be fed either from the top or the bottom. One type, designated as the model A, feeds the nuts from the bottom, and lifts the body piece out by means of an automatic lifter. The lifter has a disappearing action, so that another piece may be fed to the button immediately. This model feed is for round clinch nuts. The model B, illustrated herewith, is made in two styles, for long and short strokes respectively. This feed is particularly useful for fastening round nuts to body parts that are deeply grooved or curved in such a way that access is difficult. The round nuts fed by this model are fastened into hexagonal holes, and are curled over the hexagon sides of the hole to prevent the nuts from turning.

Model C feed is similar to the model A but has an automatic lifter which ejects the piece to the front instead of raising it straight up. This style feed is also arranged with a thin anvil so that nuts may be inserted inside of U-shaped body parts. The fifth model of feed is especially designed for feeding D-shaped or flat-sided nuts to the body parts. This type of feed can be supplied to feed the nuts either from the top or the bottom, the model illustrated herewith being arranged to feed the nuts from the bottom.

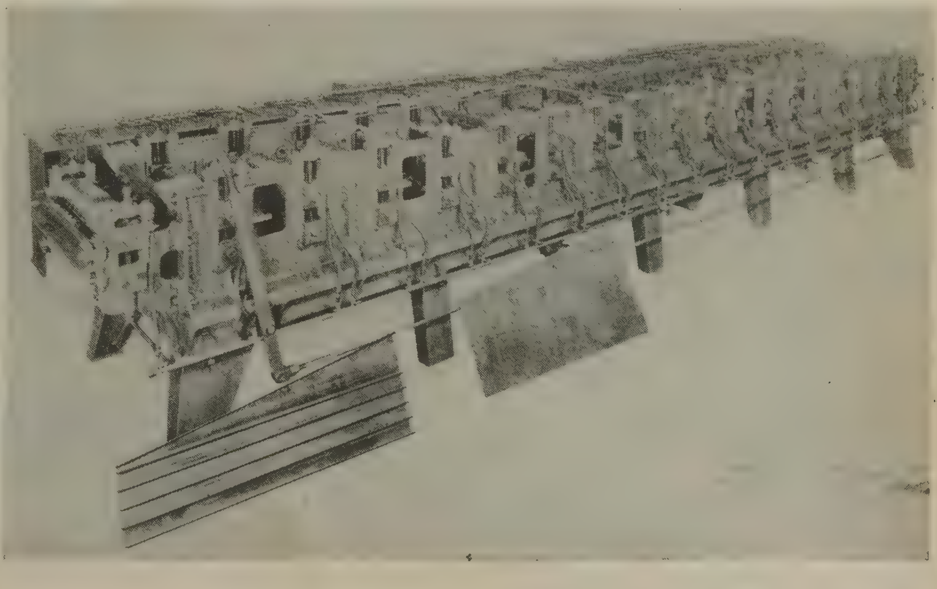
All of the feeds are arranged so that the operator merely has to put the body piece over the clinch nut and trip the press. A new nut is then automatically pushed into place. It is claimed that an operator can set 25 to 40 or more of the nuts per minute.

Automatic Machine to Form Automobile Running Boards

DEMANDS of the automotive industry for rapid and economical production of parts has led to the development of many one-operation machines which perform the work that formerly required several operations. A recent addition to this list of special production machines, designed to speed up output and reduce labor costs, is a rolling machine for forming automobile running boards. It has been brought out by the Yoder Co., Cleveland.

With this machine, running boards having parallel

STOCK of Sheet Steel or Cold Rolled Strip, as Shown at Right, Is Made in This Machine into Automobile Running Boards, One of Which Appears at Left of the Sample of Stock. Operation is automatic, including rolling ribs and hemming one edge



edges are completely formed in one pass through the machine, the operations including making the ribs and hemming the edges. Boards tapered on one side go from this machine to a smaller, standard open-side rolling machine on which the tapered edge is hemmed. The board is then ready for the necessary machine work and for parts for attaching it to a car.

The machine has a series of rolls or dies which successively form the ribs and hem the parallel edge or edges. Each machine is built to meet the special requirements of the purchaser. It is made with from 14 to 18 sets of rolls and for forming running boards from stock ranging from No. 16 to No. 22 gage. The machine illustrated has 18 sets of rolls and is built for making running boards from No. 20-gage steel.

Stock, either of sheet steel or of cold-rolled strip, is cut to the required length, 4½ to 5 ft. It is fed into guides at the feed end, at the right in the picture, and passes first through flat feed rolls. Then it goes through rolls that form the ribs, which are about ¾ in. deep, and finally through the rolls that hem both sides of boards having parallel sides and one side of boards having one tapered side. The machine illustrated was built for rolling two, three or four ribs and hemming one edge.

If there are three ribs, the center rib is made in the first rib-forming rolls, then the two outside ribs in the next rolls and the hemming is done on the last rolls. If there are four ribs, the two inside ribs are rolled first and then the two outer ribs. The machine has a capacity of forming 20 running boards a minute or approximately 100 ft. of stock a minute. It is driven by two 15-hp. motors mounted at the back, each operating nine sets of rolls. All bearings are lubricated by a one-shot lubricating system.

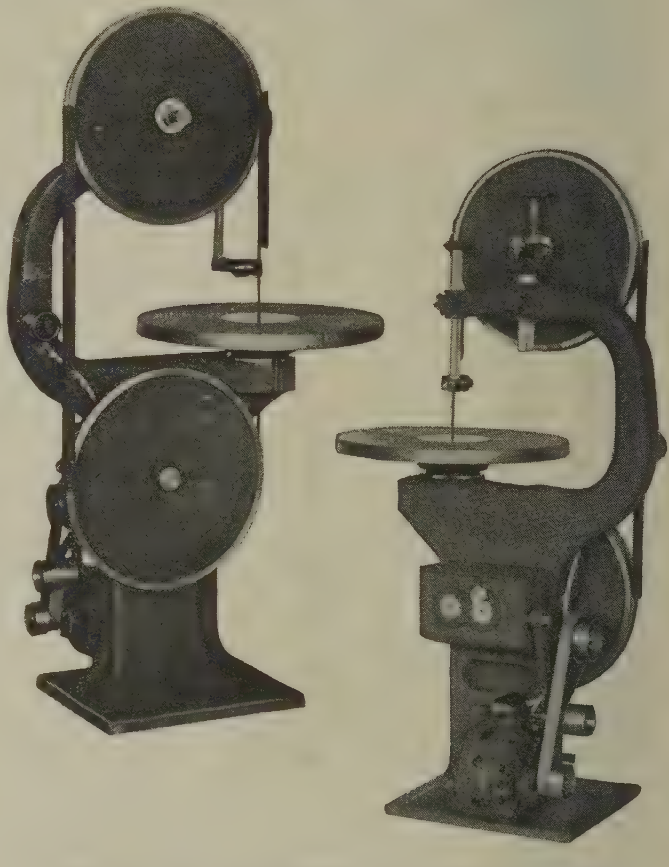
Band Saw for Cutting Brass and Other Soft Metals

FOR brass foundries, metal pattern and other shops having soft metals to cut, William Laidlaw, Inc., Belmont, N. Y., is offering a metal cutting band saw improved features of which include the mounting of the ½-hp. 1750-r.p.m. driving motor on the side of the frame directly under the gear box. Control of the motor is from a switch on the side of the column. The machine is compact, the floor space occupied being 25 by 36 in.

From the motor the drive is by endless belt which runs over a ball-bearing idler. A two-step cone pulley is mounted on the motor shaft and also on the worm shaft, and these pulleys are interchangeable. Eight speed changes are obtainable, two of which are secured through the gear box without shifting the belt or interchanging the pulleys. Changes through the gear box are made by sliding gears and lever.

Ball-bearings are used throughout. The lower bearings are lubricated from the gear box and the upper wheel bearings have a large grease chamber which requires attention only at long intervals. The worm wheel is of bronze and the worm, hardened and ground, runs in oil. Transmission gears also run in oil.

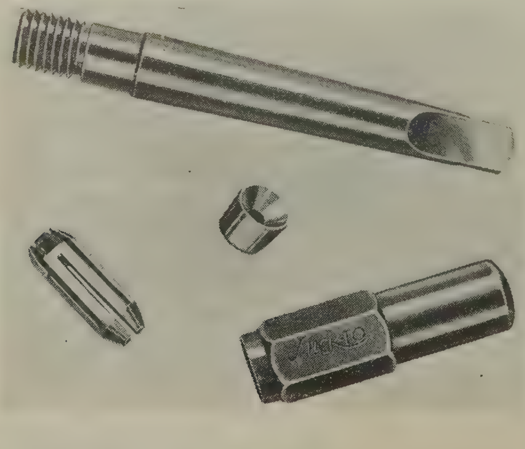
Band wheels are of web construction and are 20 in. in diameter. They are flanged on the front side to protect the operator in case the saw breaks. With this construction wheel guards are not necessary. Upper and lower guides are interchangeable; either guide can be used for two widths of saws simply by loosening one screw and turning the guide half over. The machine will take any width of saw blade up to and including 1 in. in width. Guide plates are made for ½ in. and ⅝ in. saws, but guide plates for other widths of saw can be furnished.



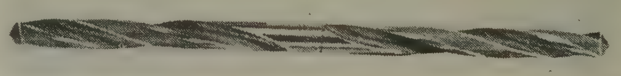
Compactness Is a Feature. The drive is by motor and ball bearings are used throughout

Chuck Designed to Hold Broken and Double Twist Drills

DRILL chuck and double-end twist drills bearing the trade name of Stick-To are being marketed by the Specialty Trading Corporation, 551 Fifth Avenue, New York. The chuck is designed to prevent breakage of twist drills and to permit use of broken drills. It is said to grip the tool without marring or dulling the cutting edge and will also grip the round shank.



Construction of the chuck may be noted from the illustration. There are two main parts, a hollow arbor and an outer sleeve, which when screwed together hold the twist drill firmly. This is accomplished with the aid of internal taper surfaces and a jam sleeve that is slit and beveled at both ends. One of the beveled ends is jammed against the tapered surface in the outer sleeve, while the other end is pressed together by a loose interior collar, which is tapered and beveled on the inside at one end. The twist drill in the chuck is held at two places, providing eight contact points, which is



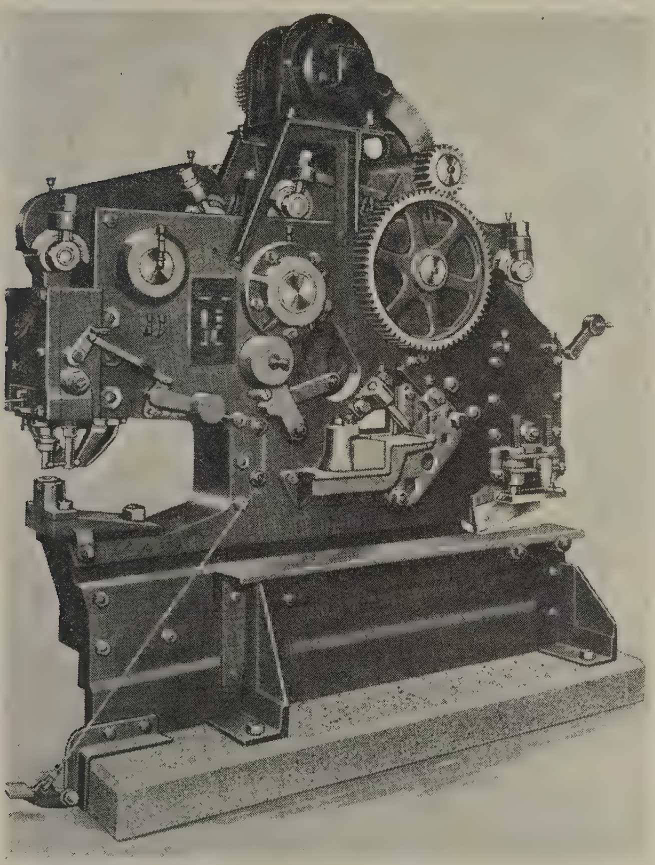
Double Drills May Be Used in the Chuck, the Parts of Which Are Shown at Left said to prevent slippage of drills and provide proper alinement.

Projection of the twist drill outside of the chuck may be regulated to the depth of the hole or to the most effective free length desired. The chucks are recommended for use with the quick-change collet system, and adaptability for multiple-spindle work, both drilling and tapping, is attributed to the small diameter of the chuck, which permits working to close centers. Each chuck has capacity to take five sizes of drills, by sixty-fourths of an inch. Simplicity of construction is emphasized as minimizing repair and maintenance expense.

Double-twist drills, one of which is illustrated, are offered for use in these chucks. A feature of these tools is that when one end becomes dull the drill may be inverted in the chuck and the other end used. The full length of the drill may be consumed and there is no shank to be discarded. Both high-carbon and high speed double-end drills of Swedish steel are available.

Combination Punch, Slitting Shear and Bar Cutter

TWO combination punches, slitting shears and bar cutters have been added to the all-steel universal iron worker line of the Buffalo Forge Co., Buffalo, N. Y. These machines, designated as the Nos. 2½ and 3½, are intended for use where a machine of greater capacity than the company's smaller iron workers is required, but not the high punch throat of the Buffalo 25 to 29 U D punch, slitting shear and bar cutters. The lower throat permits compact design.



One Eccentric Operates the Three Tools Successively During One Revolution

One eccentric operates all three tools in succession, all three tools being actuated during one revolution of the eccentric but not at the same instant. This prevents overloading the machine and permits using the three separately controlled parts of the machine at the same time.

Interchangeable high and low die blocks on the punch end permit the handling of beams, channels, girders, Bethlehem beams and H-sections. The stripper swings out of the way when changing tools. Shear blades are unusually long and are reversible. The bar cutter is the same as on other U D machines. Angles can be cut on a miter without inclining the stock. A triple punching attachment is available.

The No. 2½ machine is designed for punching holes up to 1 3/16 in. in ¾-in. plate or 1-in. holes in ⅞-in. plate. The larger machine, the No. 3½, has capacity for punching 1¼-in. holes in ⅞-in. plate or 1 1/16-in. holes in 1 1/16-in. material. Angles up to 3 x ⅜ in. can be notched, and I-beams up to 5 to 9 in. and channels 5 to 8 in. can be coped by the smaller machine. The depth of throat of the punch unit of both machines is 20 in.

Shearing of ¾-in. plates through the center and trimming of ⅞-in. material may be done on the No. 2½ machine. Flats up to 6 x ⅞ in. can be cut with standard knives, and flats from 3 x ⅞ in. to 10¼ x ½ in. with a special upper knife. The knives of both machines are 12 in. long.

The bar cutter of the smaller machine will handle 2¼-in. rounds; 2-in. squares; 6 x ½-in. 90-deg. angles; 4 x ½-in. 45-deg. angles; 4 x 5 x 9/16-in. 90-deg. tees; as well as 9-in. 21.8-lb. I-beams and channels; 10-in. 20-lb. channels; 6-in. 22.8-lb. H-sections; and 9-in. 20.5-lb. Bethlehem beams.

A 10-hp. motor is employed to drive the smaller machine and a 15-hp. motor for the No. 3½ machine. The No. 2½ machine is 7 ft. 4 in. long, 4 ft. wide and 6 ft. 10 in. high, the same measurements of the larger machine being 8 ft., 4 ft. 3 in. and 8 ft. 8 in. The weights are 8250 lb. and 9600 lb. respectively.

Deterioration of Lead Cable Sheathing

S. Beckinsale, Callender's Cable & Construction Co., London, and H. Waterhouse, metallurgist research department, Woolwich Arsenal, reported to the recent meeting of the British Institute of Metals the results of an examination of large numbers of cables with cracked lead sheaths. The cracks were found to be intercrystalline, had commenced on the inside of the sheaths and were generally free from corrosion. The lead in the region of the cracks was not distorted. Definite evidence was obtained that where lead sheathing failed by cracking the cable was in a state of vibration. Alternating stress tests indicate that lead has a very low fatigue limit, and the fractures obtained in the pure lead test pieces were similar in all respects to those found in failed cable sheathing. The conclusion was therefore reached that the cracking is a fatigue type of failure.

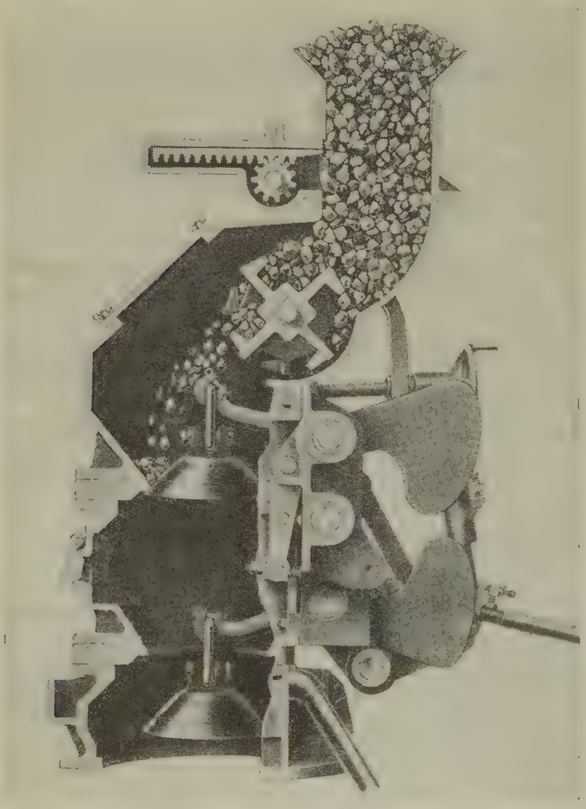
Other explanations have been advanced to account for the cracking. Of these only two, corrosion and prolonged stress, might cause intercrystalline cracking in lead, but cracks produced by the former are associated with much corrosion product, and by the latter with much deformation of the lead.

In America, the work of J. R. Townsend, R. S. Dean and their collaborators in the Bell Telephone and Western Electric Laboratories have developed the fact that pure lead hardened with a little antimony gives much better resistance to cracking after repeated bending. The British authors favor the lead-cadmium alloys, with or without tin or antimony. Comparative fatigue limits, in pounds per square inch after annealing 1 hr. at 250 deg. C., are as follows:

Metal	Analysis	Fatigue Limit
Pb	99.99	450
Pb:Sn	97:3	1,070
Pb:Sb	99:1	1,390
Pb:Cd	99.7:0.3	940
Pb:Cd	99.5:0.5	1,320
Pb:Cd:Sn	98.25:0.25:1.5	1,140
Pb:Cd:Sb	99.25:0.25:0.5	1,590

Mechanical Gas Producer Fed by New Device

A new type of fuel feed for mechanical gas producers has been brought out by the Wellman-Seaver-Morgan Co., Cleveland. This is a double-bell type of feed that operates on an entirely different principle from the commonly used revolving pocketed vane-wheel type of feed. Two bells, which automatically lower and rise alternately, pass the fuel into the producer. Their action is so timed that one bell is open when the other is closed. Their operation requires but a fraction of a horsepower, which is supplied by the producer motor. The rate of feeding is regulated by a rotating fingered vane-wheel, located above the upper bell, through a control traveling nut, screw and hand wheel. At the top of the feed there is a shut-off valve which, when closed, stops the flow of fuel from the overhead bin when the working parts beneath require removal and replacement.



Double Bell Type of Feed in New Producer

The bells and seats are of alloy steel, machined to secure the closure of a spherical surface against the circular seat. This, it is stated, insures a gas tightness even when the parts are worn from long use.

Any granular fuel may be used, such as bituminous or anthracite coal, coke or lignite, in any size from slack up to 3-in. lumps. The use of this feed, it is pointed out, assures an even distribution of the fuel in a sprinkled layer on the fuel bed. The volatile constituents are quickly gasified, and an incandescent bed of coke is maintained for the reception of a fresh charge of fuel. The feed is made in two sizes, one with a capacity up to 5000 lb. and the other with a capacity up to 10,000 lb. per hour. Only one feeding device is required for a producer. The new double-bell fuel feed has been adopted as standard equipment on the W-S-M Type L producer. It is also interchangeable with previous types of mechanical feeds supplied with the Hughes type of producers.

By-Product Coke at Higher Rate

Output of by-product coke during the 29 days of February amounted to 3,708,000 net tons, a decrease of 172,000 tons, or 4.4 per cent, compared with January, according to the Bureau of Mines, Washington. The daily rate, however, increased from 125,161 tons in January to 127,862 tons in February, a gain of 2.2 per cent. There were 78 active plants and one was idle, production being at the rate of 82 per cent of capacity.

Exhibits Open Side Planer for Tool Room Use

A specially designed open side planer for tool room operations, built by the Cleveland Planer Co., Cleveland, was on exhibition at the company's plant April 3. In response to invitations by the company, the machine was inspected by a number of machine tool users and others. This is a 30-in. x 30-in. x 8-ft. unit built for the Brown-Lipe-Chapin Co., Syracuse, N. Y. Features include rapid power traverse, dial feed, forced feed lubrication to the vees, parallel belted motor drive, two rail heads and one side head.

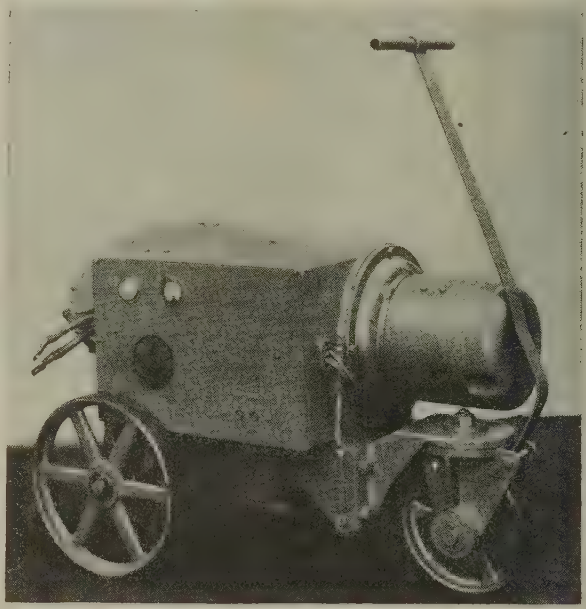
Wholly Inclosed Arc Welder

A new 200-amp. single-operator welding set, for both shop and field, has been designed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Simplicity of operation and compactness in construction are the features of the new unit.

The set is connected directly across an alternating current line. Starting, by means of a linestarter and linestart motor, is accomplished by a push button. A single rheostat varies the arc current in steps of 5 amp. over the entire welding range from 60 to 300 amp.

Motor, constant-current generator and control equipment are assembled in a completely inclosed frame. The separater exciter, which is overhung from the motor end, is securely fastened to the unit frame. This type of construction guards the operator against injury, and protects the set from dirt and falling objects. In performance tests, entirely satisfactory welding operations have been carried on while the sets were suspended at all angles and positions.

The unit is rated at 200 amp., 1 hr., 50 deg. rise on a resistance load at 25 volts, which conforms to the standard rating of the National Electrical Manufacturers Association. The motor is wound for single-phase, 220 or 440-volt, alternating current. If it is desired to operate the unit from a 440-volt, three-phase 60-cycle circuit, it is only necessary to replace the operating coil on the magnetic starter and to reconnect the motor leads.



The Chicago Association of Commerce has started a movement for the immediate establishment of a Government barge line on the Illinois River in case the Deneen-Denison bill increasing the capital stock of the Inland Waterways Corporation is passed at this session of Congress. The purpose of this move is primarily to make it possible to extend Government service to those parts of the Illinois River where navigable channels are maintained. The bill in question provides $10,000,000 for use by the corporation in the purchase of new equipment for expanding the barge service.

Foreign Markets Less Active

United Steel Works to Reduce Output 40,000 Tons a Month—Welsh Tin Plate Business Good—British Pig Iron Quiet

(*By Cable*)

LONDON, ENGLAND, April 2.

PIG iron is quiet, but Cleveland prices are firm and makers are well sold ahead, with output going directly into consumption and stocks of both foundry and forge iron depleted. Scotland has purchased fair tonnages through the Cleveland producers' agency, at less than the official quotations.

Foreign iron is being offered, but users are not attracted by present quotations. Hematite is still rather quiet, but inquiry is improving and makers hope to reduce their heavy supplies. Foreign ore continues quiet, as consumers are well covered. Prices of the foreign product, however, are stiffening as a result of the Swedish situation.

Finished iron and steel is quiet, makers being in need of orders, but being unwilling to reduce prices. Export demand for plates and shapes is especially poor.

Tin plate bars are active and non-members of the association are increasing prices. Baldwin's, Ltd., is operating in three Landore steel furnaces after 12 months of idleness.

Tin plate is active, with foreign and domestic consumers buying well and works in a satisfactory position. Makers are to meet April 17, when it is expected that the minimum price will be advanced. Meanwhile no mills are quoting less than 18s. ($4.39) per base box, f.o.b. works port.

Galvanized sheets are quiet in the Indian market, but South America, South Africa and Australia have purchased moderately. Black sheets continue inactive.

Continental iron and steel is quiet and prices are generally weakening, while consumers are awaiting some evidence of stability at lower levels. Some works are holding out for the full market price, but others are offering concessions for new business. The European Rail Makers' Association has reaffirmed the rail price at £6 7s. 6d. ($31.05) per ton, f.o.b. Antwerp, for second quarter shipment.

GERMAN EXPORT QUOTA HIGHER

International Cartel Gives Additional 50,000 Tons—No Action on Selling Syndicate

BERLIN, GERMANY, March 15.—Improved business and firmer prices in Continental markets evidently accounted for lack of action at the recent meeting of the International Steel Cartel in Paris. At the preceding meeting of the cartel there were evidences of dissatisfaction with the price situation, and member countries showed interest in the establishment of selling syndicates as a means of insuring more profitable prices. The recent death of M. Mayerisch, president of the cartel, was also a reason for inactivity at the recent meeting.

Early this year the French mills established a national selling syndicate for semi-finished material and beams, thus eliminating one of the obstacles to the formation of international syndicates. Similar action, however, is still to be taken by Belgium.

The expected increase of steel quotas for the second quarter of the year was not made. Such an increase would have reduced the penalties payable to the cartel for overproduction, but the countries which habitually produce more than their quotas preferred to continue paying the penalties rather than to risk a general price decline from an incresae of Continental production. Germany, therefore, will continue to pay a fine of $1 a metric ton upon surplus output sold in the domestic market and $4 a ton on excess production exported. The German export quota, however, has been increased 50,000 tons a month on the declaration of the German delegates that export business cannot be longer neglected. In January, the German export surplus was only 101,000 metric tons, compared with an average monthly export surplus in 1926 of 340,000 tons. The willingness of other cartel members to agree to this increase in exports was evidently based on the belief

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.		$4.39	
Bilbao Rubio ore*..	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to 18.39
East Coast mixed...	3 10		17.05	
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese ...	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18	to 0 18¼	4.39	to 4.45
Black sheets, Japanese specifications.	13 5	to 13 10	64.53	to 65.75
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates........	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	10 0	to 10 5	2.17	to 2.23
Galv. sheets, 24 gage	13 2½		2.85	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)		
Belgium	£3 3s.	$15.34
France	3 3	15.34
Luxemburg	3 3	15.34
Basic pig iron (nom.):		
Belgium	3 0	14.61
France	3 0	14.61
Luxemburg	3 0	14.61
Coke	0 18	4.39
Billets:		
Belgium	4 13	22.65
France	4 13	22.65
Merchant bars:		C. per Lb.
Belgium	5 4	1.15
France	5 4	1.15
Luxemburg	5 4	1.15
Joists (beams):		
Belgium	4 14½	1.04
France	4 14½	1.04
Luxemburg	4 14½	1.04
Angles:		
Belgium	5 5	1.16
⅛-in. plate:		
Belgium (a)	6 9	1.42
Germany (a)	6 9	1.42
$\frac{3}{16}$-in. ship plates:		
Belgium	6 5	1.33
Luxemburg	6 5	1.33
Sheets, heavy:		
Belgium	6 1	1.34
Germany	6 1	1.34

(a) Nominal.

that foreign business will be better this year than in 1927.

The penalty payable for overproduction by the Central European group of producing countries (Austria, Hungary and Czechoslovakia) was reduced to $2 a ton. This concession was based on the fact that most of the surplus output of Central Europe is consumed in domestic markets. The International Wire Rod Cartel has advanced prices 5m. ($1.20) per ton.

The secretary of the Verein Deutscher Eisen und Stahl Industrieller (Association of German Iron and Steel Producers) recently stated that Germany can best meet the competition of low French and Belgian prices by concentrating on the export of high-quality products. He estimates that $250,000,000 has been invested in German industry since the beginning of 1924 for expansion of production in heavy iron and steel.

German Domestic Market Less Active—Prices Unchanged

(By Radio)

BERLIN, GERMANY, April 2.

ALL steel prices are unchanged for April. Orders are coming in unsatisfactorily and the pig iron and steel markets are weaker. It is reported that the United Steel Works will reduce its steel output by 40,000 tons monthly and will also curtail its rolling mill operations.

The most active domestic demand is for semi-finished material, steel bars, wire rods, wire and heavy gage sheets.

Demand for structural material, light gage sheets and rails is declining. The domestic tube market is decidedly weak. Steel consuming manufacturers are buying cautiously. Export trade in all products, especially tubes, is better, but the price advance has temporarily ceased.

Considerable Iron and Steel Shipped by Water in Germany

HAMBURG, GERMANY, March 17.—The steel industry has developed considerable traffic on the German rivers and canals, a fact which accounts, at least in part, for the ability of the industry to quote prices competitive with Belgian, French and Luxemburg mills, although wages and taxes are higher. Some German works receive and ship almost all their materials by water. This is especially true of seaboard blast furnaces at Bremen, Lübeck and Stettin. Their iron ore comes from Sweden, Spain or North Africa to their own docks, and the coal for their coke ovens, from British ports or Rotterdam, Holland. Limestone is received from the interior by canal. The finished product is either shipped abroad or to German consumers able to accept shipment by river or canal.

Simplified Practice in Belgium

Standardization of industry through simplification of manufacturing processes and its resultant elimination of waste in money, time and material is attracting the increased attention of Belgian industries, according to a report received by the Department of Commerce from George W. Berkalow, assistant trade commissioner, Brussels. The Belgian Association of Standardization has inaugurated a campaign to impress the industrialists, merchants and economists with their responsibility in the matter and has published pamphlets on various subjects regarding standardization. Among those treated are construction of bridges, simplification of steel rivets, copper rivets, chains, metallic cables and water pipes.

"Generated vs. Purchased Electric Energy" is the subject of a brief paper which has been reprinted from *Power Plant Engineering* and is being distributed by its author, H. O. Swoboda, consulting engineer, 3400 Forbes Street, Pittsburgh. The pamphlet, of 16 small pages, contains a number of illustrations. It deals with some concrete problems involved in an investigation of the subject matter covered in the title.

GERMAN HOME MARKET ACTIVE

Unemployment Declining as Spring Demand Develops—Steel Output Near 1913

BERLIN, GERMANY, March 15.—Despite a favorable business situation, it is still believed that the present year will show less activity in domestic steel-consuming industries than 1927. Unemployment is declining and the usual spring demand for materials, especially for building operations, has begun.

February iron and steel output was considerably better than a year ago. Production of pig iron totaled 1,122,384 metric tons, compared with 968,774 tons in February, 1927, and steel output was 1,322,695 tons, compared with 1,233,609 tons in the same month of last year. Steel production is now at 92 per cent of the 1913 figure for pre-war Germany, and 1913 was a year of heavy production. It is noteworthy that consumption of iron and steel scrap last year totaled 9,200,000 tons, compared with 5,500,000 tons in 1913. The scrap used in 1927 equaled iron ore consumption, while 70 per cent of all materials used in 1913 was ore and only 30 per cent scrap. Ore imports last year totaled 17,409,000 metric tons, which included 8,652,000 tons from Sweden, 3,081,000 tons from Spain and 2,867,000 tons from France.

Domestic iron and steel prices are unchanged. As a result of a buying movement in the French domestic market, low quotations to German consumers by French mills have been withdrawn. Another favorable factor in current business is increased demand from abroad, particularly from the Far East. Higher export quotations seem to have served to stimulate purchasing. Although the margin between German domestic prices and quotations in the "world market" has been reduced by recent advances in the export market, the difference is still great. The price of Belgian bar iron, f.o.b. Antwerp, has advanced steadily since October, but the German domestic price still exceeds it by about 25 per cent.

Foundries report a decline in business. Belgian and Dutch competitors are underselling them in the Western frontier districts, especially on castings for electrical and agricultural machinery and machine tools. This is attributed in part to the high cost of working capital in Germany. Nearly all German manufacturers are short of capital and the Reichsbank policy of restricting municipal borrowing from abroad is given as one cause. Not being permitted to obtain foreign loans, the municipalities are obtaining credit from domestic manufacturers who supply them with materials required for various projects.

The efforts to promote an international understanding on tin plate recently made by British tin plate manufacturers are not expected to have much success. German competition for tin plate business is increasing, and German exports of tin plate in 1927 exceeded the 1926 figure by about 90 per cent. In the past two years Germany has had export surpluses of tin plate, whereas formerly there was an import surplus. Compared with 1913, the output has about doubled.

The machine tool and textile machinery industries report some slackening of business. Demand for agricultural machinery has increased, but business is hampered by purchasers' demands for long-term credits. Builders of railroad and street cars are seeking an agreement for a distribution of orders. Under an agreement made last year, all orders for cars from the Railroads Corporation are distributed among the member firms of the car builders' syndicate, the Deutsche Wagenbauvereinigung, on a quota basis. The present plan is to extend this distribution to cars purchased by private companies and municipalities.

German Workers Have Shorter Week

HAMBURG, GERMANY, March 17.—Effective April 1, the working time in the steel industry will be 60 hr. per week for blast furnace workers, 52 hr. per week for employees in open-hearth plants, 48 hr. per week in structural mills and 51 hr. per week in plate and sheet mills.

STEEL IMPORTERS MORE ACTIVE

Bidding On Some Bridge Work—Prices Lower —Japanese Railroads Revise Specifications

NEW YORK, April 3.—Steel importers in New York report slightly more activity in sizable projects, but current buying of foreign steel is small and there is not much expectation that foreign steel will be bought for work on which bids have been submitted. Quotations on open-hearth reinforcing bars have been made to contractors bidding on the Bayonne-Port Morris, N. J., bridge and on a bridge at Raritan, N. J. Prices on European steel are slightly lower than after reaching a peak about a fortnight ago. Current quotations range from 1.70c. to 1.75c. per lb., base, on plain steel bars and 1.65c. per lb., base, on structural material. There is some business in hot-rolled strip steel, the foreign product being from 80c. to $2 per ton under the current domestic market.

No appeal from the decision by Justice I. F. Fischer, sitting in Customs Court, that reinforcing bars are dutiable as construction material instead of steel bars, has been entered by the Government. Meanwhile, a similar decision based on Justice Fischer's finding has been rendered in the case of Henry L. Exstein & Co., New York. This second decision involved imports of about $100,000 worth of reinforcing bars.

Exports to Japan Light

Except for small purchases of tin plate by Japanese merchants and some grooved and girder rail business, trade with the Far East has been light. A tonnage of six miles of 122-lb. and one mile of 140-lb. guard rails has been placed by Tokio municipality with an American mill. Yokohama municipality has awarded 10 miles of 91-lb. high T-rails and three miles of 136-lb. T-rails to a Japanese export house. Part of the order is expected to go to a Continental maker. The Han-Shin Electric Railway in Japan has closed on five miles of 100-lb. rails, A. R. A. specifications, with a Continental mill and has placed two miles of 60-lb. rails and 50 pieces of 91-lb. high T-rails with the Yawata steel works in Japan.

According to recent reports from Japan, the Imperial Government Railways, which contemplates gradually replacing all its track with 100-lb. rail sections, will probably buy most of its future requirements from the Government works at Yawata. At present only the main lines of the Government railroads are constructed with 100-lb. sections, such as the Tokio-Yokohama division and the Kobe-Osaka division. It is understood that a new specification will call for 45-ft. lengths.

Cancellation of Certain Commodity Rates on Iron and Steel Products

WASHINGTON, April 2.—The Interstate Commerce Commission, in a recent decision, justified the proposed cancellation by the railroads of certain commodity rates on iron and steel articles, in less-than-carload lots, in the Official, Illinois and Western classifications. The commission said the cancellations would eliminate preferences and discriminations. The products affected generally are given a fourth-class rating, but a few of them are rated as high as first class and others between first and fourth.

The commodity rates which the railroads proposed to cancel were established to favor particular movements, especially between important commercial centers in northern Illinois, southern Wisconsin and adjacent territory, according to the decision. For the most part, it was declared, these commodity rates applicable to interstate traffic now approximate the level of the fourth-class rates. The opinion added that the few accompanying cancellations of commodity rates in Central territory proper merely do away with rates which have fallen into disuse, restore the classification bases without change in rate levels, or cancel rate groups which do not correspond with those of the class rates. For movements wholly within Illinois territory, however, it is stated, the present commodity rates are much below the fourth-class level.

JAPANESE SHEET PRICES LOW

Domestic Maker Moving Good Tonnages at Less Than Foreign Prices—Tin Plate Firm

February business in Japan was generally considered the worst on record, says the monthly report of A. Cameron & Co., Kobe. However, customs returns indicate that for the first two months of the year the adverse trade balance was reduced by yen 15,000,000 ($7,153,500) compared with the same period of 1927.

Slack money conditions still prevail, and it was reported on the Tokio stock exchange that the Bank of Japan would be compelled again to lower its rediscount rates. Further lowering is not generally approved, it being contended that such action would stimulate the demand for money, creating an exorbitant note circulation, false prosperity and depreciated currency.

At the end of last year, in expectation of a higher tariff on sheets which did not develop, there was considerable speculative buying. As a result, about 7000 tons of sheets arrived during February, and, with no possibility of any tariff increase this year, the importers are now seeking to dispose of their stocks. Meanwhile, the Kawasaki Dockyard Co. continues to sell black sheets in lots of 1500 to 2000 tons, and each sale shows a further recession in price, as low as 50 sen (25c.) per sheet having been quoted. The market price based on most sales, however, ranges from 73 to 73.50 sen (36½c. to 36¾c.) per sheet for American, 72 to 72.50 sen (36c. to 36¼c.) for British and about 71 sen (35½c.) per sheet for the domestic product.

Local galvanizing plants have booked a good tonnage of galvanized sheets from Chinese merchants. As the business was taken at low prices, defective sheets have been used in rather large quantities. Heretofore British defective sheets were about the only imports, but recently American defective sheets have been finding a ready market.

Not long ago the Kawasaki Dockyard Co. contracted with Belgian and German makers for 12,000 tons of sheet bars a month. The dockyard, however, had insufficient stock to await April-June delivery and has been experimenting on the production of its own sheet bars. Should present efforts prove successful, it is expected that the largest sheet bar consumer in Japan will begin to make its own supplies.

Only a small tonnage of tin plate was imported during January, so that local stocks have been somewhat depleted and the market has taken on additional firmness. The Government works prices for tin plate are about 50 sen (25c.) per base box lower than the British delivered price, and the Government plant is pressing for business for forward delivery. Nevertheless, there are a number of consumers and dealers who prefer foreign tin plate, so that there has been considerable buying of the American and British product recently.

German Freight Rates on Scrap Reduced

HAMBURG, GERMANY, March 17.—Freight rates on imported iron and steel scrap have again been reduced, provided the material is shipped from a German port and not from a frontier. This reduction directly benefits American and British shippers of scrap to Germany. Varying 25 to 40 per cent from the present freight rates, the new rates apply only to companies shipping a minimum of 40,000 tons annually, who must post a security bond of 100,000 m. ($23,910) with the German railroads.

Bolivian Tin Industry Hit by Low Prices

WASHINGTON, April 3.—Low prices for tin, with the possibility of causing curtailed output, are depressing the Bolivian tin industry, according to a cablegram from Consul Joseph F. McGurk, La Paz. The price of tin fell as low as £223 17.5 shillings during March and the month's average price was £228 14.5 shillings. A few of the smaller mines are now said to be working at a loss and others have either reduced the number of employees or have cut wages 10 per cent. The industry, however, is reported generally optimistic in the hope of better prices during the next few months.

Atlantic Seaboard Imports Dominate

Finished Iron and Steel Coming In on East Coast About Half of Total—Five-Sixths of Pig Iron Total

BY L. W. MOFFETT*

DESPITE the 34 per cent decline in the total iron and steel imports into the United States in 1927, compared with those of 1926, there was an increase in the incoming movement of finished products. Shipments of finished steel from abroad last year aggregated 483,202 tons, while those of the previous year amounted to 478,722 tons. The larger total importations in 1926, with 1,110,049 tons as compared with 750,467 tons in 1927, were due mainly to the much heavier 1926 imports of pig iron.

The four principal lines of importations entering the American market are steel bars, structural shapes, cast iron pipe and "other pipe," the latter made up chiefly of seamless tubes. Imports of these four products in 1927 were 385,202 tons, or 79 per cent of the total incoming movement of all finished lines. During the preceding year imports of the four finished lines amounted to 339,518 tons, or 70.9 per cent of the aggregate of imported finished steel. Each year structural shapes led in tonnage of the four finished lines, with steel bars coming second, cast iron pipe third and "other pipe" fourth.

Imports of structural shapes in 1927 amounted to 161,848 tons, increasing from 121,099 tons in 1926, while steel bar imports declined to 91,497 tons from 103,473 tons. Cast iron pipe imports decreased to 81,769 tons from 83,873 tons and imports of "other pipe" rose to 50,088 tons from 31,073 tons. Pig iron imports showed a remarkable drop to 133,068 tons in 1927 from 445,773 tons the previous year.

Belgium was the principal source of imports, during both years, of structural shapes and steel bars. France led in both years as the source of cast iron pipe imports, while Germany supplied the bulk of "other pipe" imports during the two periods. India was the largest supplier of pig iron imports in 1927, succeeding to the position held in 1926 by Germany, when the latter country furnished 157,094 tons of pig iron for the American market. In 1926 Germany supplied only 9711 tons of pig iron, a drop of 93.8 per cent.

The Atlantic seaboard was the largest recipient each year of pig iron and the aggregated four finished line imports, taking 107,797 tons and 388,781 tons of pig iron in 1927 and 1926, respectively, and 183,530 tons and 169,120 tons of the four finished lines. The Pacific Coast each year received more than half the total imports of "other pipe." The Atlantic Coast led in receipts of other lines, but with a margin in certain instances which reflected a shift toward greater imports into the Pacific Coast area particularly.

Imports of the four finished products through the Atlantic Coast last year represented 47.7 per cent of

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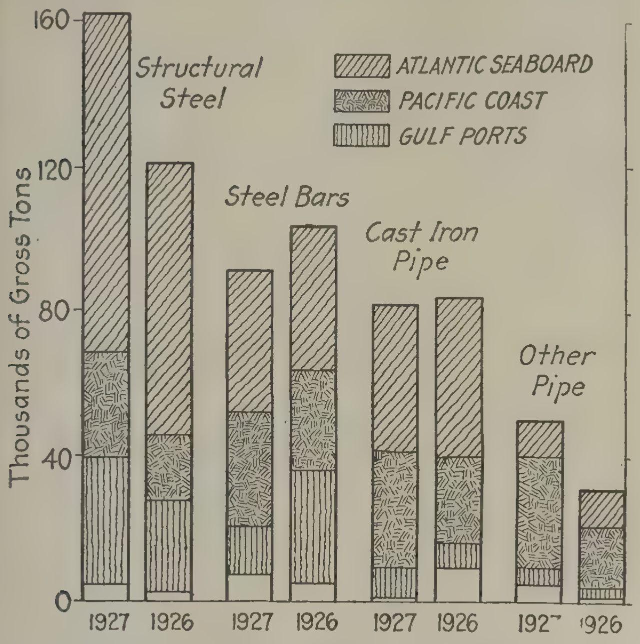
*Washington editor THE IRON AGE.

Imports for Calendar Years 1927-1926

(Gross Tons)

Ports of Entry and Countries of Origin	Steel Bars		Shapes		Cast Iron Pipe		Other Pipe	
	1927	1926	1927	1926	1927	1926	1927	1926
ATLANTIC:								
Belgium	17,017	15,001	58,209	53,454	2,065	9,167	30	40
France	8,979	7,630	20,202	6,143	36,547	34,229	160	153
Germany	4,232	3,118	14,387	14,007	1,817	541	2,482	4,010
Netherlands	439	4,418	61	923	....	....	371	821
Sweden	7,234	7,666	....	....	....	....	437	459
United Kingdom	1,252	866	769	598	....	37	2,220	2,325
Canada	1	....	32	70	....	....	3,735	2,477
All other	71	632	36	289	453	....	292	46
Total	39,225	39,331	93,696	75,484	40,882	43,974	9,727	10,331
GULF:								
Belgium	9,220	20,050	21,806	14,559	....	....	1,324	1,374
France	952	4,609	780	1,630	7,015	6,445	1,027	808
Germany	2,268	6,039	11,253	5,644	....	....	2,253	245
Netherlands	....	2	66	3,765	....	....	28	....
Sweden	144	380	....	1	....	....	....	....
United Kingdom	....	....	....	3	....	....	1	139
Canada	....	....	....	....	....	....	....	....
All other	604	....	1,235	....	1,194	....	....	....
Total	13,188	31,080	35,140	25,602	8,209	6,445	4,633	2,566
PACIFIC:								
Belgium	20,110	21,277	21,727	16,878	12,768	12,091	1,930	163
France	4,148	580	6,076	36	19,895	9,507	3,155	484
Germany	6,743	5,652	1,124	1,274	....	1,472	22,184	15,517
Netherlands	343	280	....	174	....	946	90	....
Sweden	285	438	....	....	....	....	....	....
United Kingdom	45	....	187	108	....	....	338	....
Canada	....	....	....	....	....	....	....	....
All other	....	....	137	101	2	....	3,316	1,033
Total	31,674	28,227	29,251	18,571	32,665	24,016	31,013	17,197
OTHER PORTS:								
Belgium	2,169	245	1,362	286	1	990	27	....
France	55	22	218	19	1	7,173	4	2
Germany	1,861	1,116	1,496	652	1	....	69	67
Netherlands	636	368	471	386	....	....	....	....
Sweden	1,112	1,077	....	....	....	....	....	....
United Kingdom	638	633	51	18	6	1	208	29
Canada	116	188	88	81	4	698	483	313
All other	823	1,186	75	....	....	576	3,924	568
Total	7,410	4,835	3,761	1,442	13	9,438	4,715	979

the total incoming movement of these tonnages, while in 1926 they were 49.8 per cent. Imports of these products through the Gulf Coast last year, amounting to 61,170 tons, constituted 15.8 per cent of the total, as compared with 65,693 tons or 19.3 per cent in 1926. Imports of these products through the Pacific Coast in 1927 amounted to 124,603 tons or 32.3 per cent of their total, while in 1926 they were 88,011 tons or 25.2 per cent. Receipts of the four products through inland ports of continental United States and into Porto Rico were 15,899 tons or 4.2 per cent last year and 16,694 tons or 5.7 per cent the preceding year.



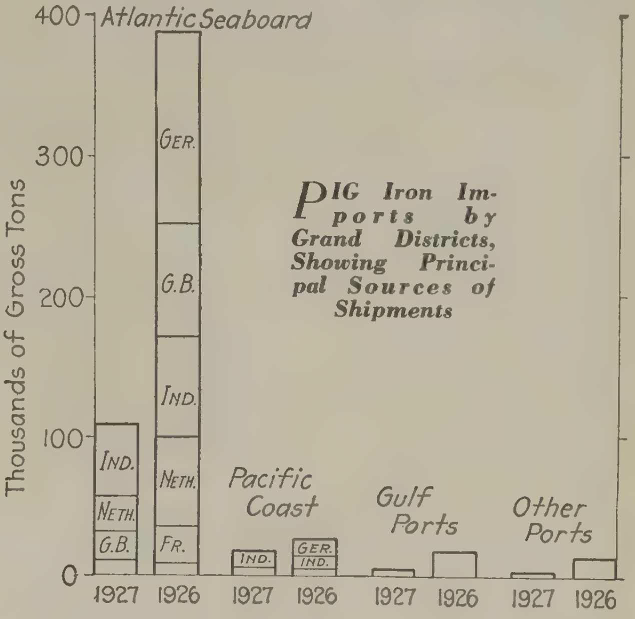
IMPORTS of Four Leading Finished Lines of Iron and Steel in 1927 and in 1926, Showing Where the Tonnages Came In

Belgium supplied 48,516 tons, or 53 per cent, of the steel bar imports last year. In the previous year Belgium supplied 56,573 tons, or 54.6 per cent, of the 103,473 tons of steel bars imported. The Pacific Coast received 31,674 tons of steel bar imports, 34.5 per cent of the total, in 1927, Belgium supplying 20,110 tons. In 1926 receipts of steel bars from abroad through the Pacific Coast amounted to 28,227 tons, or 27.2 per cent of the total, Belgium furnishing 21,277 tons.

Belgium was the source of 103,104 tons, or 65.3 per cent, of structural steel imports in 1927, the Atlantic Coast receiving 93,696 tons or 57.8 per cent of the total, with the Gulf ports taking 35,140 tons or 21.9 per cent. In 1926 Belgium supplied 85,177 tons, or 70 per cent, of the total structural steel imports of 121,109 tons. Receipts through the Atlantic Coast were 75,484 tons or 62.3 per cent of the total.

France furnished 63,458 tons of cast iron pipe, or 77.6 per cent of the total imported in 1927. Imports of cast iron pipe from France in 1926 amounted to 57,354 tons, or 68.1 per cent of the total of 83,873 tons.

Germany supplied 26,988 tons, or 53.9 per cent, of the "other pipe" imported in 1927, the Pacific Coast receiving a total of 31,013 tons. In 1926 Germany was the source of 19,839 tons, or 63.8 per cent of the 31,073 tons of imported "other pipe."



PIG Iron Imports by Grand Districts, Showing Principal Sources of Shipments

Germany supplied only 7.29 per cent of the 1927 pig iron imports, against 35.2 per cent in 1927, while India furnished 50 per cent and 18.7 per cent, respectively; the Netherlands 22 per cent and 15.4 per cent; and the United Kingdom, 15.1 per cent and 20.6 per cent. The Atlantic Coast received 81 per cent of the total pig iron imports in 1927 and 84.5 per cent in 1926.

The Erie Foundry Co., Erie, Pa., has shipped to Milan, Italy, one of its latest improved type high-speed steam drop hammers for exhibition at the Milan Fair, which is to be held during April, May and June. There are already installations of Erie hammers in many of the drop forging shops in Europe, notably in the shops of the leading automobile builders.

Imports for Calendar Years 1927-1926

(In Gross Tons for All Ports of Entry)

Countries of Origin	Steel Bars		Shapes		Cast Iron Pipe		Other Pipe	
	1927	1926	1927	1926	1927	1926	1927	1926
Belgium	48,516	56,573	103,104	85,177	14,834	22,248	3,311	1,577
France	14,134	12,841	27,276	7,828	63,458	57,354	4,346	1,447
Germany	15,104	15,925	28,260	21,577	1,818	2,013	26,988	19,839
Netherlands	1,418	5,068	598	5,248	....	946	489	821
Sweden	8,775	9,561	1	1	....	....	437	459
United Kingdom	1,935	1,499	1,006	727	6	38	2,767	2,493
Canada	117	188	120	151	4	698	4,218	2,790
All other	1,498	1,818	1,483	390	1,649	576	7,532	1,647
Grand total	91,497	103,473	161,848	121,099	81,769	83,873	50,088	31,073

Imports of Pig Iron for Calendar Years 1927-1926

(By Ports of Entry, in Gross Tons)

Countries of Origin	Total Imports		Atlantic Seaboard		Gulf Ports		Pacific Coast		Other Ports	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
India	66,627	83,311	51,802	71,097	3,154	3,246	11,354	7,836	317	1,132
Belgium	699	7,488	100	3,887	....	550	399	3,051	200	....
France	3,000	28,449	3,000	27,799	....	450	....	200	....	....
Germany	9,711	157,094	5,881	137,295	1,075	5,725	2,105	12,074	650	2,000
Netherlands	29,383	69,054	25,298	63,765	80	600	3,265	2,923	750	1,756
Sweden	1,704	3,455	1,077	3,057	....	....	300	5	327	393
United Kingdom	21,139	92,083	20,639	81,381	100	6,700	230	150	170	3,852
Canada	725	4,767	....	500	....	....	....	37	725	4,230
All other	80	72	....	....	....	....	....	....	80	72
Total	133,068	445,773	107,797	388,781	4,409	17,271	17,653	26,276	3,219	13,435
Per cent	100	100	81.0	87.2	3.3	3.9	13.3	5.9	2.4	3.0

SORTING NON-FERROUS SCRAP

Color, Fracture, Knowledge of Source and Type of Casting, and Specific Gravity All Used

SOME 250 different stock items will be found on the inventory of a typical producer of non-ferrous metals or centralized dealer in such wastes, according to Don C. Blackmar, superintendent Federated Metals Corporation, Detroit. In a paper read before the February meeting of the Institute of Metals at New York he gave a representative classification for yellow brass and said that something like this must be used if the maximum profit is to be secured from miscellaneous purchases of scrap.

Sorting and Storage Classifications for Yellow Brass

- No. 1 brass tubes
- No. 1 brass pipe
- Clean nickel-plated tubes
- Soldered brass tubes and clips
- No. 1 brass clippings
- Leaded brass clippings
- Medium brass
- Light brass
- Old rolled brass
- Leaded brass rod ends
- Automobile radiators
- Rifle shells
- Tableware (nickel and silver-plated)
- Mixed small clippings (soldered or plated)
- Gaskets
- Yellow brass faucets
- No. 1 high yellow cast scrap
- Aluminum-brass cast scrap
- Brazing spelter scrap
- No. 1 manganese-bronze cast scrap
- Manganese-bronze cast turnings
- No. 1 yellow rod turnings
- Yellow cast brass turnings
- Yellow brass grindings
- Yellow brass furnace residues
- Yellow brass with iron

Actual sorting of non-ferrous scrap (the most important operation prior to remelting it into usable ingots) calls for a combination of knowledge of its source, observation of color and shape, and laboratory tests. Large shipments of uniform materials offer no difficulties. Mixed lots must be screened through a coarse riddle, hand picked, and magneted. The hand sorting may be done while screening, and heavy brass wire riddles are used so that no interference is offered to using hand magnets. Screenings, borings and small scrap are machine-magneted on double-belt pick-up machines. A second magnet completes the work, so that reasonably dry material may then be considered iron-free. After sorting and magneting, sheet clippings, wire and light material are bricked in a hydraulic press to convenient size. Certain classes are pressed into bales weighing around 1000 lb. and are wired and wrapped in burlap for convenient shipping. Other materials are stocked in bins according to class.

Other groups of waste materials which are treated according to the same general scheme include copper, red brass, babbitt, solder, typemetals, lead, tin, zinc, zinc-base die castings, nickel-bearing alloys and aluminum. Any one or all of these materials may be received in a few hundred pounds or a carload. The sorters differentiate between several grades of red and yellow brass by color and fracture. Files and scrapers are used on dirty, painted or plated pieces to show color, and every casting must be closely examined for iron screws and other harmful materials.

Long experience and a wide knowledge of the current commercial practice and use of metals in every trade are the most valuable assets to supervisors of sorting. It is vitally important, for example, to know what type of casting will probably be aluminum bronze; therefore all gears, welding-machine parts, acid-tank rods and paper-mill pipe fittings, or plating baskets are regarded with utmost suspicion. Manganese bronze may also be recognized by the type of casting. Different grades of sheet-metal clippings may be identified by similar knowledge, coupled with color and fracture tests. The aluminum-sheet and extruded-shape wastes are becoming complicated due to use of alloys, but by recognizing the purpose and knowing the source, together with hardness and bending tests, a very close grading is accomplished. Rapid laboratory tests are constantly made to check and establish precedents for materials of uncertain antecedents. Sorters use the specific gravity balance to check solders and other soft white metals, as well as melting and pouring tests, whereby the "set" of a small bar discloses the difference between a typemetal and a similar composition of lead-base alloy containing copper.

Sorting of copper scrap for remelting presents no special difficulties. Elimination of iron and segregation of tinned and soldered clips and wire and bronze alloys are fairly easy. Common sense, knowledge of uses of metals, and laboratory tests make it possible to grade all these materials very precisely. Where there is any doubt as to exactness in sorting, the lower grade is selected or else the material goes to a smelting furnace.

Residues, which include all skimmings, drosses and ashes are almost wholly classified by chemical analysis. The laboratory tests show the percentage of metallic, analysis of metallic, acid content (chlorine), iron, sulphur, aluminum and silicon. These elements are considered in smelting to avoid unnecessary losses.

It is at times economical to screen and magnet drosses; with the fines and iron removed, contaminants may be easily picked out. Examples of this are solder sweepings from automobile-radiator manufacturers, which may contain brass tubes, and electrotypers' dross containing copper trimmings.

Americans Handicapped in Selling to Japan by F. A. S. Quotations

Most American business men feel that a prime requisite in selling goods in Japan is to ask for payment f.a.s. American ports, but this is a handicap to the American business house trying to sell goods in the Orient, declared J. S. Ruble, vice-president and manager of construction of the H. K. Ferguson Co., Cleveland, in a talk before the Foreign Trade Division of the Cleveland Chamber of Commerce March 30. Mr. Ruble has just returned from his fourth trip to Japan, where his company is engaged in construction work.

The English and Germans, the latter particularly, he said, have an arrangement whereby they can accept payment on delivery to consumer or at least on delivery to the Japanese importer. It is important to make arrangements by which deliveries can be made in Japan without handicap to the consumer. A large manufacturer can have personal representation in that country and small business concerns might combine to have a personal representative there. The third alternative is to arrange with a large Japanese importing concern to handle the business. These concerns import anything on which they can make a commission and are not particularly qualified to exploit and demonstrate the merchandise they import. They may make a quotation on a product and on two or three competitors' corresponding products at the same time.

The danger in making shipments c.i.f. or on actual delivery to the consumer, he said, is that an unscrupulous consumer may refuse to accept the shipment on the ground that it did not meet its specifications, was delivered in bad condition, or he may misrepresent the quantity. However, if an exporter has a personal representative or an importer in good standing to deal with, there is little difficulty from this type of complaint.

Apparently the best thing to do, said Mr. Ruble, is to make an arrangement with an Oriental importer with proper credit standing, who can be held responsible for payments, but who will sell the product with the aid and inspection of the American representative.

The financial situation in Japan is still bad, said Mr. Ruble. For the last six years Japanese imports have largely exceeded exports and no healthy financial condition can be expected until their production exceeds consumption.

Referring to conditions in industrial plants, he said that there are factories in Japan where an employee produces the same number of parts per hour as are produced by a workman in a similar American factory. When Japan generally speeds up production it will become a competitor of other manufacturing nations, because of its low labor costs. The successful manufacturing industries in Japan include electric lamp production, telephone production, electric power equipment and steel fabrication. Their steel mill operation is Government subsidized and is not successful. Many important large businesses in Japan are now being subsidized. One of the handicaps of Japanese industry is that an employer is not permitted to discharge a factory worker except for causes that are satisfactory to the Government and then only on the payment of a bonus for discharge which is equivalent to one month's pay for each year of service.

ELECTRIC FURNACE IRON

Results of Extended Experiments Show Practicability, Advantages and Costs

ALTHOUGH the cupola is the cheapest melting device for the production of molten iron under normal market conditions for pig iron, coke and clean cast iron scrap, there are conditions under which expense of melting is not the major factor, so that certain other advantages possessed by the electric furnace sometimes make it more desirable, says the United States Bureau of Mines. A comprehensive investigation of the making of electric furnace cast iron has been completed by the bureau at its Northwest Experiment Station, Seattle, Wash., in cooperation with the College of Mines of the University of Washington. The investigation involved a year's successful operation of a jobbing foundry making miscellaneous gray iron castings from steel scrap.

Under the special conditions that make the electric furnace advantageous, this type of furnace need not necessarily displace the cupola but can be used in conjunction with it. The ability of the electric furnace, and not of the cupola, to refine and to superheat iron and the superiority in many ways of electric furnace iron to cupola iron make the electric furnace advantageous under special conditions. In addition, the possibility of producing electric furnace cast iron from cheap grades of ferrous scrap has brought the electric furnace into prominence.

Electric furnace cast iron is stronger, tougher, and more dense than cupola iron, and a higher recovery of metal in casting can be obtained as a result of the higher pouring temperature, state C. E. Williams and C. E. Sims, in Technical Paper 418, just issued by the Bureau of Mines. Cast iron scrap of high-sulphur content can be converted into high-grade cast iron, low in sulphur, either by melting directly in the electric furnace or by refining molten metal from the cupola. Large additions of steel scrap may be used if desirable, or steel scrap can be used entirely and synthetic cast iron made. Some of the advantages of the production of synthetic cast iron are outlined below.

Both Iron and Steel Can Be Made

One electric furnace can be used to produce both iron and steel and can thereby be kept in operation during periods when it might otherwise be idle. By operating an electric furnace continuously labor is kept usefully employed, the heat of the furnace is conserved, life of the refractories is extended, overhead charges are reduced, and a high load factor on the power lines is maintained. Therefore, even under conditions where production of synthetic iron would not of itself be economical, it might be profitable in conjunction with the making of steel, because of the possibility of reducing the cost of producing steel.

A large variety of steel and iron scrap can be used to make the same product, and many different products can be made from the same materials. As a rule, scrap is purchased locally, and the foundryman can buy and use what is at hand without shopping around for special materials. The production of synthetic iron in a steel foundry simplifies the purchase of steel melting scrap. For instance, the making of acid steel requires selected scrap, for which a higher price must be paid than for general scrap; but if, in addition to steel, synthetic iron is made, miscellaneous steel scrap may be purchased at a minimum price and the foundryman can do his own sorting, using the best scrap for acid steel.

Synthetic iron may be tested and adjusted for composition and temperature before it is poured, thus assuring castings of the desired composition. Moreover, if the pouring crew is not ready, the metal can be kept hot as long as necessary, whereas metal must be taken from the cupola when enough has been melted to pour.

Electric Iron Stronger

In the electric furnace a superior iron, having about twice the strength of ordinary cupola iron, can be made. Transverse strengths of 5000 to 6000 lb. on standard bars of synthetic gray iron have been repeatedly obtained, and tensile strengths above 40,000 lb. per sq. in. are common. One of the outstanding characteristics of electric furnace gray iron is its resistance to the impact of shock. These advantages in strength and toughness are due largely to the physical structure of the iron, which is fine grained and dense. The graphite exists in such small flakes that a piece of synthetic iron of the same graphitic carbon content as a piece of cupola iron will appear to contain less graphite. Although it looks whiter and harder than cupola iron, synthetic iron is soft and easily machined. A coarse-grained synthetic iron can be obtained only when the carbon and the silicon contents are exceptionally high. Ordinary synthetic iron is at least equivalent in strength to the so-called high-test irons and semi-steels of the cupola.

Virtually any kind of ferrous scrap can be used in the electric furnace, thus providing a means for industrial plants to utilize the scrap they produce instead of shipping it away at an economic loss. Besides steel scrap, which may be carburized to gray iron, gray iron borings and light scrap may be used profitably.

The production of synthetic cast iron in the electric furnace is advantageous in such places as large non-ferrous smelters and mills, where pig iron is expensive and ferrous scrap is usually available. Many ore-concentration plants consume a large tonnage of steel and iron balls and ball-mill liners for fine grinding, and satisfactory white cast iron for these purposes could be made economically at the plant.

A tough and hard white iron, such as may be produced in the electric furnace from steel scrap, will find useful application where resistance to shock and abrasion are required.

The detailed results of this investigation are given in Bureau of Mines Technical Paper 418, "Electric-Furnace Cast Iron," which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at a price of 10c.

Increasing Employment in Metal-Working Industries

Comparison of numbers on payrolls and amounts of payrolls in identical establishments show a healthy increase in February over January, according to figures of the United States Bureau of Labor Statistics. In 199 iron and steel plants the number on payrolls increased from 252,261 to 260,609, or 3.3 per cent. Meantime, the amount of the total week's payroll increased 11.9 per cent, from $7,430,652 in January to $8,312,582 in February. This indicates that the average pay envelope had about 8.5 per cent more in it in the latter month.

Similarly, for 950 establishments turning out foundry and machine shop products, the number on payrolls increased from 216,968 to 222,420, or 2.5 per cent. At the same time the amount of the week's payrolls increased by 6.9 per cent, from $6,218,129 to $6,647,302. Similar gains are reported in 148 establishments making machine tools, which show an advance of 2.6 per cent in employment and 6.4 per cent in the amount of payroll. Other metal-working establishments participated in the same improvement, with the exception of 37 plants making cast iron pipe, which show a reduction of 2.5 per cent in number of employees but an increase of 12 per cent in the amount of the payroll.

Schedule of the next instalments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***April 12****—Activity in Steel Consuming Industries:* ***April 19****—Position of Iron and Steel Producers;* ***April 26****—General Business Outlook.*

National Metal Trades Association Arranges Convention Program

The program for the thirtieth convention of the National Metal Trades Association, to be held at the Hotel Astor, New York, April 25 and 26, will deal with problems and methods relating to the metal trades industry in the fields of production and labor.

Features of the meeting will be the following addresses: "Industrial Budgeting," by Howard Coonley, president Walworth Co., Boston; "Rackets and Racketeering," or the practices employed by labor leaders, especially in Chicago, by Gordon L. Hostetter, executive secretary Chicago Employers' Association; a study of mechanization of industry and unemployment to be presented by Magnus W. Alexander, president National Industrial Conference Board; "The Government in Business," by Bernard J. Mullaney, vice-president People's Gas, Light & Coke Co., Chicago; "Business Profits," by Dr. Charles J. Bullock, director Harvard Economic Society, Cambridge, Mass.; "The Significance of the Present Situation to Change the Laws in Respect to Labor Combinations," by Walter Gordon Merritt, counsel for League of Industrial Rights.

At the banquet Wednesday evening, April 25, Charles Nagel, former Secretary of Labor and Commerce, will speak on "The Majesty of Law," and Dr. Samuel W. Grafflin, one time director industrial relations Ward Baking Co., New York, will also speak.

At the closing session George W. Seyler, Lunkenheimer Co., Cincinnati, will conduct a demonstration in foremen training and Floyd Darrow will relate "The Story of Chemistry," with a demonstration of dry ice.

Iron, Steel and Tin Workers Meet at Middletown, Ohio

The fifty-third annual convention of the Amalgamated Association of Iron, Steel and Tin Workers was opened April 3 at Middletown, Ohio. The principal business of the gathering is to formulate changes in wage scales and working conditions to be presented at a conference to be held some time next month between sheet, tin plate and bar iron manufacturers operating under an agreement with the association and its wage scale committee. There was no advance information as to what the demands of the men are going to be, since the recommendations of the wage scale committee must first be approved by the general membership as represented by delegates to the convention.

Steel Club of Cleveland Holds First Banquet

The Steel Club of Cleveland held its first annual banquet at the Hollenden Hotel, Cleveland, March 30. There were over 100 present including sales managers and other members of sales organizations of steel companies, purchasing agents and other representatives of consuming industries. J. G. Carruthers, general sales manager of the Otis Steel Co., is president of the club.

Waste Material Dealers Meet

The fifteenth annual convention and dinner of the National Association of Waste Material Dealers was held March 21 at the Hotel Astor, New York. At a meeting of the scrap iron division, under the chairmanship of H. R. De Groat, A. M. Wood & Co., Philadelphia, there was consideration of the problem of educating dealers to a better understanding of costs in handling materials. The metal division with George Birkenstein, S. Birkenstein & Sons, Chicago, presiding, devoted considerable discussion to a letter from the Chicago Non-Ferrous Metal Dealers' Association regarding trade practices.

Officers elected for the coming year were: President, Henry J. Lissberger, president Federated Metals Corporation, New York; first vice-president, Carlton B. Overton, Castle & Overton, Inc., New York; second vice-president, George Birkenstein, S. Birkenstein & Sons, Chicago; third vice-president, R. W. Phillips, E. I. du Pont de Nemours & Co., Wilmington, Del. Charles M. Haskins is the permanent secretary-treasurer of the association. As division heads, H. R. De Groat, A. M. Wood & Co., was reelected chairman of the scrap iron division and E. J. Jarvis, president Niagara Falls Smelting & Refining Corporation, Buffalo, was elected chairman of the metal division.

The dinner was attended by about 500 members and their guests. The retiring president, G. H. Rady, E. J. Keller Co., New York, was toastmaster. United States Senator Walter F. George of Georgia was the speaker.

Standard Steel Girder Rails

The Bureau of Foreign and Domestic Commerce has just published a pamphlet on industrial standards, No. 204, concerning standard specifications for the manufacture of open-hearth steel girder rails of the plain, grooved and guard types, using the text as adopted by the American Society for Testing Materials. The publication is printed in both English and Portuguese, the translation having been by Kenni Norris Bletz. Copies may be obtained for 5c. each from the superintendent of documents, Government Printing Office, Washington.

COMING MEETINGS

April

American Gear Manufacturers Association. April 19 to 21. Twelfth annual meeting, Hotel Seneca, Rochester, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. April 23, 24. Meeting of materials handling division, Benjamin Franklin Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Metal Trades Association. April 25, 26. Annual convention, Hotel Astor, New York. J. E. Nyhan, Peoples Gas Building, Chicago, secretary.

National Foreign Trade Council. April 25 to 27. Fifteenth annual convention, Rice Hotel, Houston, Tex. O. K. Davis, India House, New York, secretary.

American Welding Society. April 25 to 27. Annual meeting, Engineering Societies Building, New York. Miss M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Management Association. April 26, 27. Fourth financial executives' conference, Hotel Pennsylvania, New York. W. J. Donald, 20 Vesey Street, New York, managing director.

American Electrochemical Society. April 26 to 28. Spring meeting, Stratfield Hotel, Bridgeport, Conn. Colin G. Fink, Columbia University, New York, secretary.

May

Iron and Steel Institute. May 3 and 4. Annual meeting, House of Institution of Civil Engineers, London, England. George C. Lloyd, 28 Victoria Street, London, S. W. 1, England, secretary.

American Refractories Institute. May 8 and 9. Annual meeting, White Sulphur Springs, W. Va. Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, secretary.

American Foundrymen's Association. May 14-18. Annual meeting and exhibition, Commercial Museum, Philadelphia. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

American Iron and Steel Institute. May 25. Annual meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

National Association of Purchasing Agents. May 28 to 31. Thirteenth international convention and Inform-A-Show, Kansas City, Mo. George A. Reynard, 11 Park Place, New York, secretary.

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FABRICATION IN TRANSIT

Railroads and Fabricators Unite on Seeking Uniform Basis for Establishing Rates

TO prevent action which might be injurious to the steel fabricating industry and to obtain uniformity and avoid discrimination in fabrication-in-transit arrangements, H. N. Holdren, Pittsburgh, representing a large group of fabricators, early last December presented a tentative suggestion to the railroads as a basis upon which all future transit privileges might be negotiated.

Mr. Holdren's action was prompted by an investigation begun some months previously by the Interstate Commerce Commission with a view toward eliminating transit arrangements involving circuitous routes or back hauls and possible violations of the long-and-short-haul clause of the Interstate Commerce Act. It was said at that time, particularly in the East, that the carriers were considering the cancellation of all fabrication-in-transit rates on iron and steel articles in the United States. Corresponding rates were abolished in Canada some time ago, and some steel makers in this country were said to be willing to have such arrangements abolished in the United States. The fabrication-in-transit privilege makes it possible for mills located some distance from the fabricating shops to supply the steel as advantageously as, and in some cases more so than, a mill near the fabricating plant. This accounts for some rolling mill opposition to the plan and the desire of the fabricating companies to preserve it.

Lack of Uniformity in Rates

In Official Classification territory the fabrication-in-transit charge is 3c. per 100 lb., while in Western Classification territory it is 2c. per 100 lb. Many fabricators believe that there should be country-wide uniformity in fabrication-in-transit charges and that the privilege should apply on a definite list of articles fabricated from iron and steel. In some sections of the country it now applies on articles not specified in others, resulting in discrimination. Prior to the series of freight rate advances which began in 1914 there was a uniform charge of 1½c. per 100 lb., and, based upon the measure of the advances and upon one general reduction that has since taken place, the proper rate would now be 2c. per 100 lb. in all parts of the country.

Mr. Holdren made the following proposal:

"Subject to rules, regulations, conditions and charges prescribed in this tariff, carload shipments of iron and steel articles as designated in paragraph (b) below may originate at (here refer to points of origin), be forwarded to (here refer to transit points) for the purpose of bending, bolting, boring, countersinking, cutting, drilling, flanging, gagging, painting, planing, punching, reaming, riveting, sawing, shearing, straightening, tapping, threading or welding, and may be reshipped in carloads to (here refer to points of destination), when the outbound material from the fabrication point is to be further assembled into bridges, buildings, ships, tanks, towers or tunnels."

Carriers Desire Definite Policy

On March 13 in Pittsburgh the railroads responded with the first of what is expected to be a series of meetings at which steel fabricating companies will be given an opportunity to present their views on the subject. As a result of the growing tendency to create more and more manufacturing-in-transit rates, storage rates, etc., and regulations involving transit privileges, the railroads are of the opinion that they must declare a definite policy for future negotiations, and they saw in Mr. Holdren's proposal an opportunity to open the subject. At the Pittsburgh meeting representatives of the railroads in Official Classification territory, with L. E. Oliphant of the Central Freight Association as chairman, heard the Pittsburgh district manufacturers, fabricators and others.

At the Pittsburgh meeting Mr. Holdren made it clear that he would not oppose any reasonable proposition for fabrication-in-transit which included articles in addition to those enumerated in his proposition, as it was merely a tentative suggestion. However, he declared that the loss of the privilege on existing routes would be a serious loss to the fabricators and that restricting the routing to direct routes would result in a loss of business to both fabricators and carriers.

Plates for Navy Sold at 2.24c., Delivered Norfolk

WASHINGTON, April 3.—Submitting the lowest bid, 2.24c. per pound, delivered at Norfolk, Va., John T. Hill is expected to be awarded a contract for supplying 450 net tons of steel plates to be used as blister shell plating and blister shelf for the battleship Nevada. The steel will be made by the Central Iron & Steel Co., Harrisburg, Pa. Mr. Hill also was the lowest bidder at 3.53c. per pound, carlots, delivered at Occaquan, Va., on sheet steel for automobile license tags for the District of Columbia, the maker to be the Apollo Steel Co.

Advocates Eye Conservation in Industry

America must safeguard the eyes of its workers, for without sound vision industry is handicapped and reasonable attainment of human happiness made difficult, James J. Davis, secretary of the United States Department of Labor, declares in a statement made public by the Eye Sight Conservation Council of America, of whose board of councillors he is a member.

"Until recent years," Secretary Davis says, "care of the eyes was regarded largely as a question for the individual. Development of the physical sciences, and their application through engineering has, however, revealed eyesight as a problem of national concern.

"In industry and in education the need of organized eye conservation has been most insistently pressed, for it is in these spheres that untoward conditions have been most convincingly uncovered. It is now plain that a child without good eyes cannot be expected to make normal progress in school. It is equally plain that workers, whether in factory, office, field or mine, cannot meet the obligations of their tasks unless they can see with the ease and precision intended by nature.

"The economic and social losses resulting from defective eyesight are now beginning to be realized. Inquiries by governmental and public service bodies are tracing to poor eyesight an appreciable portion of industrial waste. Defective vision ranks well up among the contributing causes of accidents. Poor lighting, it has been shown, is a substantial factor in causing industrial injuries.

"Steps are being taken to remedy fundamentally bad conditions, and the results are most encouraging. Pennsylvania provides evidence that appropriate precautionary methods will cut down the number of eye accidents. In that State analysis by the bureau of statistics of the Department of Labor and Industry shows that for three years eye losses have been steadily decreasing in the metal and metal-products industries."

New Solenoid Brakes

Simplification features a complete new line of solenoid brakes offered by the General Electric Co. The line includes brakes for operation on alternating and direct current, and involves in its construction the use of a spring setting device—a new feature for alternating-current applications. The brakes are especially designed for severe service in connection with mill, crane and hoist motors.

The manufacturer claims smooth operation for making quick stops in either direction of rotation, with a dependable holding value. The brake mechanism is held in the "off" position by a coil and plunger; when power is applied to the motor, the coil is energized and the brake is released. When the power is shut off, the spring setting device forces the mechanism into the closed or braking position.

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This Issue in Brief

Employment is gaining in the metal trades. Number of workers on the payroll increased 2.5 per cent in representative firms operating machine shops and foundries. Gain in iron and steel industry was 3.3 per cent. —Page 955.

Many foundries and others could profitably install electric furnaces, bureau official thinks. Electric iron has twice the strength of ordinary cupola iron, and machines more easily. A wider variety of scrap can be used, and where pig iron is expensive and scrap is plentiful the electric furnace is advantageous.—Page 955.

Machinery export business continues to expand. February sales amounted to close to 36 million dollars, a gain of 21 per cent over February, 1927. Gain in first two months over the same period of last year was almost 13 per cent.—Page 989.

Sorters of non-ferrous scrap must have a wide knowledge of metals and commercial practices. Some 250 classifications must be made to get the maximum profit. Classifying is based on knowledge of source, observation of color and shape, and laboratory tests.—Page 954.

Powdered coal installation should have an auxiliary bunker between pulverizer and the burner, so that adjustment and repair of the pulverizer may be made without shutting down the whole equipment. The bunker should carry a supply sufficient to last the burner two or three hours.—Page 944.

Divides heat-treating furnace into three compartments, all heated from the same flame. The top chamber gets the first impact of the flame and the waste heat is passed down into the other two. The chambers are used progressively for preheating and heating.—Page 942.

Over two million tons of coke lost annually in the United States by wet quenching, engineer declares. This loss, representing 5 per cent of the production, is said to be largely saved by dry quenching.—Page 943.

Welding cuts fabricating cost of gas holder. A 300,000 cu. ft. capacity holder was made with welded lap joints, bolts at long intervals holding it together during welding.—Page 941.

New process of making pipe bends prevents buckling or thinning. Pipe is placed against a horn-shaped mandrel, then heated in a gas furnace until it becomes plastic, and pushed over the mandrel as fast as it is hot enough to work.—Page 933.

Steel houses of five rooms built in Germany for less than $2,500. Roof and side walls are made of steel plates with turned rims, so that they may be screwed together. They can be erected in three to four weeks.—Page 934.

Accident liability is twice as great on the street as in the shop, says electrical equipment manufacturer. Western Electric Co. statistics reveal that the automobile has made the factory relatively a far safer place than the highway.—Page 935.

Clean gas is the best possible form of fuel, says professor, because of its molecular construction. Clean oil comes next. Pulverizing largely overcomes the disabilities of coal as ordinarily fed into furnaces.—Page 944.

Danger lies in chromium-plating by rule-of-thumb methods. Slight variations of the chemicals in the solutions, or of any other factor relating to the deposition, create distinct variations in the properties of the plate.—Page 940.

Higher proportion of finished iron and steel exports is going to Pacific Coast. In 1926 the Coast took one-quarter, and in 1927 almost one-third. The Atlantic Coast accounted for 47.7 per cent in 1927 compared with 49.8 per cent in 1926.—Page 952.

If you want Japanese business, don't insist on payment f.a.s. American port, for English and German shippers make more attractive terms—payment on delivery to consumer—and so are favored. Personal representation in Japan is desirable if you wish to cultivate this market.—Page 954.

Damage to enameled parts is prevented by use of special trucks. Stove manufacturer uses a skeleton type of truck, with four corner uprights fixed to the truck floor. The operator mounts a tray on the floor of the truck, fills it with enameled parts, then adds other trays until a truckload is built up.—Page 930.

Tensile strength of cap screws is increased 30 per cent by new extrusion process, says screw manufacturer. As the wire is forced into the die, the portion to be threaded is reduced to the pitch diameter of the thread to be formed, and at the same time the heading operation is performed.—Page 937.

How manufacturers are meeting the small order problem. Among the methods employed are: Decreasing discounts, making a special charge, penalizing salesmen for small orders, and charging larger gross profits.—Page 963.

Gain of 3.2 per cent in March daily pig iron output, which was 103,215 tons. On April 1 there were 197 furnaces in blast, a gain of 10 during the month.—Page 964.

ESTABLISHED 1855

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Sales and Goods Movement as Gages

VARIOUS classes of statistics have indicated somewhat greater trade in the early part of this year than at the same time in other recent years, but the opinion has been rather widespread that such figures were not a gage of the actual strength of trade. In some lines there was more forward buying than in other years. The Steel Corporation's unfilled tonnage, for instance, increased for five months through February. The October, November and December increases were in line with precedent, while those of January and February contrasted with decreases in the first two months of both 1927 and 1926.

In the circumstances the freight car loadings are consulted with particular interest, since they show the physical movement of product, though by no means its value. Car loadings in the first 11 weeks of the respective years have been as follows:

1924	9,772,232
1925	9,938,159
1926	10,273,480
1927	10,551,127
1928	9,890,593

While this year has run the lowest in four, being merely above 1924, the 6.2 per cent decrease from a year ago must not be taken at face. Early in 1927 there was extra coal movement, consumers accumulating stocks against the expected bituminous strike. The stocks were fairly well held for months afterward, but since the holidays there has been much reduction of stock. Coal loadings, which in the first 11 weeks of 1927 were 2,383,399 cars, fell to 1,898,371 cars in the like period this year. Deducting coal, there was a decrease of only 2.1 per cent this year in loadings of all other commodities. Still, that was a decrease, when normally as the country grows there should be an increase.

If industry as a whole ran at a shade slower pace early this year than last, in some respects it has greater momentum at the present time than a year ago. The steel industry is better supplied with contracts, on which specifying has been at a very fair rate. Conservative feeling rules in nearly all quarters, but this may be laid to consideration of the stock market and the fact that this is a presidential year, rather than to a feeling that the actual state of trade at the present time is unfavorable.

Ban the Thin Roofing Sheet

FROM several quarters come reports that galvanized sheets lighter than No. 28 gage are being offered to the public for roofing purposes, despite the efforts of the Sheet Steel Trade Extension Committee and of other bodies to eliminate such sheets from the roofing category. One of the leaders of the movement against the sale of thin galvanized sheets even predicts that the work already done will be nullified unless drastic action is taken.

The original pronouncement of the Sheet Steel Trade Extension Committee, when the campaign for a better galvanized product was taking shape, recommended that "under no circumstances should galvanized sheets lighter than No. 28 gage be used for roofing purposes." "This same recommendation," the committee added, "is made by the Bureau of Standards, Department of Commerce, through its Division of Simplified Practice. Lighter gages are found to be unsatisfactory for roofing purposes. The material is too thin to provide the long life desired in a roof, particularly where climate is severe. When this very thin material is used for roofing in severe climates it frequently reflects discredit on sheet steel roofing in general."

While this declaration was nominally subscribed to by the associated sheet steel manufacturers, some apparently have had neither the foresight nor the courage to put into effect this program. Various makers are producing No. 29 and No. 30 gage galvanized sheets, and in some cases mills are selling No. 29 gage black sheets to galvanizers who themselves do the corrugating and galvanizing. Thus thin-gage galvanized roofing sheets are being offered today without let or hindrance, even though under an official ban of long standing. On the one hand he Sheet Steel Trade Extension Committee is aboring to extend present markets for sheet steel, vhile certain manufacturers and jobbers, on the ther hand, are defeating its aims by selling an nferior product to the public.

It is well known that in the past few years ompetition between different industries for the ame markets has steadily grown sharper. The heet steel industry has felt the pressure along with thers, meanwhile making an aggressive fight to ain new markets and to retain or regain old ones. n the effort to live down the poor performance f some galvanized roofs of other years the camaign of the trade extension committee has met its hief handicap. It is quite understandable, thereore, that those manufacturers who have conformed o the standards of the committee find ordinary anguage entirely unequal to the situation created y such makers as have gone back to the discredited ractice of four years ago.

The Over-Supply of Capital

APPARENTLY an anomaly in the economic situation is the abundant supply of capital at a ime when it is claimed that the recognized source f capital—earnings—has been drying up. If we an find an explanation for this anomaly or develop hat no anomaly exists, we shall have made an important step toward understanding a condition that onfuses many.

Two overflows of capital are visible—into the oreign field and into the stock market. As to oreign capital issues, the current Federal Reserve Bulletin reports them, exclusive of refunding operations, as follows:

1926	$1,052,000,000
1927	1,382,000,000
January, 1928	155,900,000

The amounts themselves are large, being nearly hree times for 1926 and more than double for 1927 he amount of our merchandise trade balance. Apart from that, there was a 30 per cent increase from 1926 to 1927, while January of this year was t a rate 35 per cent above the average rate of 1927, hough, of course, the single month of January ndicates little as to a general rate.

Then there are loans to stock brokers, running about four billions lately, an amount which many pine is "too high," but without suggesting who is really responsible for the desired application of a remedy. Analysis of the sources of the funds shows that it is not to any extent a case of the Federal Reserve banks themselves loaning, but New York banks are loaning their own funds, country banks are sending their funds to New York, and private individuals and corporations are endeavoring to earn something with the cash it is more or less necessary for them to carry.

Thus there is a large, and apparently growing, supply of capital over and above the demand for investment in domestic enterprises outside that of carrying securities in New York. We might say that supply is abnormally large or demand abnormally small, but it is safer to take only one step at a time and say that the relationship is abnormal. Reverting to first principles, the source of capital is earnings, and we have been accustomed in all the past to see earnings and the demand for capital move more or less together. If an industry was making money it used to expand. In these recent years, however, we have seen much making of money by reduction in cost without large capital expenditure. The automobile industry is an outstanding example.

Viewed in this light, the years since the war are one period, really important differences from year to year having been only in degree. We found ourselves with a commercial machine admittedly too large. Thereupon efforts of individuals and corporations to get along were directed to efficiency, expansion in volume of turnover and reduction in cost, and not to the large expansion of physical equipment and capital investment that used to go naturally with increase in volume of trade.

There is then no real anomaly in capital being abundant when earnings are diminishing. The condition is merely unusual or perhaps unprecedented, growing out of the state of affairs the war left us, calling for improvements in methods of doing the work more than for investing additional capital in tools. The consequences of this long period we must face. There is available capital for new and promising enterprises which we shall now do well to bring forth.

Prohibition Extends to "Nickel Silver"

SPORADIC thought has been given to devising systematic methods for naming new alloys. Some committees have been organized to study the problem. After canvassing the situation they usually come to the conclusion that nothing much can be done about it and lapse into inactivity. So every inventor chooses some word which strikes his fancy, and if the metal mixture is a commercial success technical literature is enriched by a new word while alloy nomenclature is thereby so much the more confused. Probably the real reason why nothing is done about it is the feeling that the question is quite academic—to those who use Muntz metal, Muntz is just as good a name for 60:40 brass as any other word which might be proposed by the innovators.

Geologists are somewhat more fortunate. By common consent the suffix "ite" denotes a mineral; and whenever a new one is discovered it can be named in a manner satisfactory to everybody. For example, if the discoverer, Mr. Gerstenheimer, wishes to perpetuate his fame he adds the standard suffix to his family name and we have the new mineral "Gerstite." Or Przemysl, the locality where the rare rock was found, may be chosen for root of the new term, thus: "Przemysite." Or perhaps the mineral has a peculiar and distinctive glitter, and it is fancied that some term describing its appearance will be more suitable than the two former possibilities. Very well; just call it "Glitterite." Any of these will do, so long as it appears on consultation with the alphabetical list in Dana's "Mineralogy" that the desired combination of letters has not already been preempted by some predecessor.

But alloy namers have no such simple rules.

In the first place there is no suffix which connotes the fact that the substance named is an alloy. In the second place metallurgists have no comprehensive standard list, giving the commonly accepted names. Thirdly, many alloys have more than one name. And lastly, there is the urge, drawn from commercial considerations, to camouflage a cheap composition with a name suggesting more noble properties.

This last consideration has brought on a situation which ceases to be academic. The Federal Trade Commission recently issued a "cease and desist" order against the use of the name nickel silver by certain jewelry manufacturers, on the complaint of others that the name is misleading and detrimental to silversmiths whose product actually contains silver. This gives rise to a very practical problem: What are the brass manufacturers who make rods, wire, plate and other shapes of copper-nickel and copper-nickel-zinc alloys going to call their product? As a matter of fact it already has been called at least fifty different names (many of them proprietary) like german silver, pack-fong, white copper, argentan and alpakka. The new name must avoid the trademarked terms, but is it to be derived from the name of the inventor or some other metallurgist, from the properties of the alloy, or from the composition?

We believe that the only systematic scheme of nomenclature must rest primarily upon chemical composition. The way is indicated by the Society of Automotive Engineers' system for steels. Steel 1010 is definite as to its essential composition. A 3½ per cent nickel steel 2335 also means a narrowly restricted composition from which definite physical properties may be expected. Likewise in non-ferrous alloys the term nichrome (were it not patented) approaches the ideal, for it is easy to say and indicates perfectly a member of a particular binary alloy system. It can be made more definite by saying "nichrome 80:20"—obviously denoting an 80 per cent nickel, 20 per cent chromium alloy.

Similar abbreviations could be made for the nickel-copper alloys with or without zinc or tin. All the words nickel, copper, zinc or tin are of Anglo-Saxon or German origin; consequently compounding the syllables into new words would not create any philological monstrosities.

For the purpose of eliciting discussion on the nickel silver question, we propose the term "coppernick 80:20". It is quite definite as to composition; it describes an alloy neatly. Would a manufacturer of german silver fail to recognize what its color and other physical properties would be? One could have as many kinds of coppernicks, ranging from 99:1 to 1:99, as would be found useful, just as we have many kinds of steels. Furthermore, the important ternary alloys containing zinc could be called zinc-coppernicks. Zinc-coppernick 17:65:18 is the American Brass Co.'s 18 per cent nickel silver alloy No. 719.

Admitted that these words sound highly artificial on first striking the ear. Nor do they trip lightly from the tongue. But the same was true of "Socony," "Uneeda" and "Prest-o-lite" when they were first invented, and it has not prevented their widespread and profitable use.

The Day of the Massive Rail

HEAVIER steel rails are coming more and more into use to meet conditions imposed by heavier and denser traffic. Rails of 100-pound section and over, rolled in 1927, were more than two-thirds (68.84 per cent) of the year's production of all rails. Only three times previously had the ratio passed one-half: In 1926 it was 61.12 per cent; in 1925, 58.76 per cent; in 1923, 50.47 per cent. In keeping with this rapidly growing proportion of the heavier sections, the decline of 12.78 per cent in total rail production last year was confined almost wholly to rails of under 100 pounds to the yard. The drop in the heavier bracket was only 1.66 per cent.

Recognizing the growing importance of the extra-heavy rail sections, the American Iron and Steel Institute has now made a separate grouping of those rails weighing 120 pounds or over. The total for 1927 is given as 617,524 tons, or 22.01 per cent of all the rails produced last year. This action recalls that of thirteen years ago when for the first time the 100-pound rails were segregated from the 85-pound and over classification, previously the heaviest reported. At that time this new group constituted 27.18 per cent of the year's tonnage.

IN its rejection recently of the nomination of John J. Esch for reappointment to the Interstate Commerce Commission the Senate gave an exhibition of politics but little removed from the aldermanic level. What was held against Mr. Esch was that he changed his vote in the long contested Lake cargo case and joined with the majority of the commission in favoring a reduction in coal rates from the Pittsburgh and eastern Ohio districts. Evidence showing changed economic conditions led to the reversal of the first order, which had been favorable to the West Virginia-Kentucky mines. But since this evaluation of economic changes caused a decision that was obnoxious to members of the Senate Committee on Interstate Commerce and their coal mining constituencies, senatorial "courtesy" was invoked for the punishment of the offending commissioner. This legislative coercion of the executive department may come back many times to plague its instigators. But retaliation is poor satisfaction for the injury done to an able public officer.

Truscon Steel Co. Takes Over Hydraulic Steel Co.

The sale of the East side plant of the Hydraulic Steel Co., Cleveland, to the Truscon Steel Co., Youngstown, for $1,000,000 was confirmed in the Federal Court in Cleveland, March 31. The court rejected a bid of $1,525,000 submitted by New York financial interests on the ground that this bid did not offer sufficient safety to creditors. The sale of the property concludes a receivership which began in October, 1923. It is stated that the creditors will receive 34 cents on the dollar.

EXTRA COST OF SMALL ORDERS

Effect of Hand-to-Mouth Buying on Distribution Expense Analyzed at Management Meeting

CONTROL of marketing costs was the topic of discussion during four of the six sessions of a conference held by the American Management Association, March 28 to 30, inclusive, at the Palmer House, Chicago. The remaining two sessions, under the auspices of the employees training group, were devoted to the training of salesmen. At a luncheon held on March 29 the effect of the airplane on marketing was reviewed.

An analysis of extra costs resulting from small orders was made by Dr. Leverett S. Lyon, Institute of Economics, in a paper entitled "Keeping Down the Extra Marketing Expenditures That Have Grown Out of Hand-to-Mouth Buying." In his search to determine whether the small order is really a problem and, if so, to what extent it is such, Doctor Lyon sent out a questionnaire to a number of manufacturers. Of 104 replies 79 stated that there has been a growth in the proportion of small orders, while 25 companies, including makers of spark plugs, floor sweepers, alarm clocks and iron foundry products, said that no such increase is apparent in their business.

Over 91 per cent of the companies that acknowledged an increase in the number of small orders felt that the cost of distribution had increased, whereas 9 per cent were of the contrary opinion. Of the 91 per cent, 75 per cent found an increase in the cost of securing orders. A large number of reporting manufacturers stated that the cost of securing orders is due largely to added traveling expenses of salesmen. In some instances this cost had been cut by substituting telephone calls for personal visits by salesmen.

On the subject of office cost the questionnaire was worded so that each manufacturer could take as a working basis what he considered an average large order for his company and for comparison an order one-fifth of that size. Averages of all the replies indicated that recording the small order costs 87 per cent as much as recording the large order, that billing costs 82 per cent as much, granting credit 97 per cent and collecting 102 per cent. In connection with this it was brought out that small orders more often come from doubtful customers, while large orders usually come from good risks.

Averages of replies on proportionate costs of packing, trucking and shipping indicated that the cost of packing the small order was 53 per cent of that of the large order, trucking 52 per cent, and shipping 55 per cent.

Doctor Lyon then applied these percentages as though they represented the products of one company which manufactured all of the lines from which replies had been received. He took as a basis of comparison a large order valued at $100 and a small order valued at $20. Taking a hypothetical office cost on the large order of $4, or 4 per cent of the value of the order, the office expense on the small order was $3.68, or 18 per cent of the value of the order. Assuming that handling charges on the $100 order were $3, or 3 per cent of the value of the order, it was shown that the handling charge on the small order would be $1.60, or 8 per cent of the value of the order.

Replies to the questionnaire indicated that manufacturers are using the following methods to meet the small order problem:

1. Decreasing discount or increasing price on small orders.
2. Special charge for handling small orders.
3. Offering or soliciting a more varied line.
4. Change in methods of sales force in solicitation.
5. Educating trade to desirability of larger orders.
6. Penalizing salesmen for small orders.
7. Deferred dating plans.
8. Refusal to handle small orders.
9. Charging larger gross profit.
10. Use of branches and warehouses.
11. Concentrating trade with jobbers and wholesalers,
12. New policies which aid small-order buying, such as extending discounts, carrying large stocks and offering contracts against which specifications can be issued as required.
13. Special cooperation with dealers, helping them to keep inventories as low as possible, thus assisting in making turnover that much more rapid.

Manufacturers need to know more about the part of gross profit that disappears in the cost of marketing in the opinion of Willard E. Freeland, president, Freeland & Warren, Inc., who delivered a paper on "Objectives and Essentials of Costing Marketing Activities." Mr. Freeland urged a closer study of individual customers to ascertain whether or not it is profitable to do business with them. He also recommended a study of those sales which can be obtained only at high cost. Further attention, he said, should be given to developing markets where sales costs are low rather than to press for business at high cost in territories already well covered.

At the luncheon meeting C. S. Ching, president American Management Association, stated that prosperity is measured by the production and consumption of goods. In late years manufacturers have made rapid strides in methods of production, but they have not yet learned that marketing is one of the most important of business problems. The result of greater output per person in manufacturing means that fewer people are on the payrolls of manufacturers. Unemployment at this time, he said, is not a result of recession of output but of a reduction in the number of people necessary per unit of production. He sounded a note of warning that unemployment may result in shaking public confidence in the efficacy of labor-saving equipment as a means of reducing costs. Open resistance to the further introduction of labor-saving machinery is not an impossibility.

Another New Record in Steel Furniture Orders

Orders for steel furniture in February are reported by the United States Department of Commerce at $3,295,861, compared with $3,248,165 in January. Both figures were new high records for this line. The reports came from 33 manufacturers. Shipments in February, at $2,908,527, showed an increase of about 7 per cent over January and made the largest total since March, 1927. With the further exception of December, 1926, the shipments were the largest in more than two years. Unfilled orders have been increasing markedly since Dec. 31, at which date they totaled $1,413,880. At the end of February the total was $2,389,306, which is much the largest figure in more than two years.

Steel shelving orders in February at $741,310 showed a drop of less than 4 per cent from January's record-breaking total. Shipments were $681,999, which is the highest amount since March, 1927. Unfilled orders at the end of February, $743,376, were the greatest since Oct. 31, 1926.

Heavy Steel Output by Weirton Company

The Weirton Steel Co., Weirton, W. Va., operated all 11 of its open-hearth furnaces last month and produced 103,576 gross tons of steel. This showing amply supports an estimate made earlier in the year by J. C. Williams, vice-president and general manager of the company, placing its annual capacity at 1,050,000 tons. The March output was at an annual rate of 1,242,912 tons. The company has more than doubled its capacity in three years, as in 1925 it stood at 570,000 tons annually.

Decline in Foundry Equipment Orders

Members of the Foundry Equipment Manufacturers' Association received orders in February amounting to 123.6 per cent of the average monthly shipments of 1922 to 1924. This is a reduction from January, when 132.7 per cent was reported, but otherwise it is the largest total since last June. Shipments are reported at 110.6 per cent and unfilled orders at 132.9 per cent of the base. The returns are from 18 companies, of which 11 during the base period showed individual sales of more than $10,000 a month, while the other seven were in the smaller group.

Moderate Gain in March Iron Output

Daily Rate Increased 3211 Tons or 3.2 Per Cent Over February, According to Actual Data—Net Gain of 10 Furnaces

RETURNS of actual production of pig iron from practically all furnaces show that the March output expanded more than 3 per cent over that of February. At 103,215 gross tons per day the March rate was 3.2 per cent or 3211 tons larger than the 100,004 tons per day for February. This compares with a gain in February over January of 8 per cent and of January over December of 6.4 per cent.

Total March pig iron output of 3,199,674 tons or 103,215 tons per day for the 31 days compares with 2,900,126 tons or 100,004 tons per day for the 29 days of February. The March production last year was 3,483,362 tons or 112,366 tons per day. As in the case of February, the March daily rate is the smallest for that month since March, 1922.

Net Gain of 10 Furnaces

Thirteen furnaces were blown in and three were blown out—a net gain of 10. This compares with a net gain of two in February and with 16 in January. Twelve of the 13 furnaces blown in were steel making, six belonging to the Steel Corporation and six to independent steel companies. Only one merchant stack was started. The three furnaces shut down were steel making—two Steel Corporation stacks and one independent steel company furnace.

Capacity Active on April 1

Operating rate of the 197 furnaces active on April 1 is estimated at 104,650 tons per day. This contrasts with the daily operating rate of 100,060 for the 187 furnaces blowing on March 1.

Manganese Alloy Output

Ferromanganese output in March was 27,912 tons, the largest since the 29,232 tons made last June. Only one company made spiegeleisen last month, but the total cannot be published.

Furnaces Blown In and Out

During March the following furnaces were blown in: One furnace at the Coatesville plant of the Bethlehem Steel Corporation in the Schuylkill Valley; one Carrie, one Duquesne and one Isabella furnace of the

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant* Iron	Total
March, 1927	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	March (31 days)	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)
New York and Mass.	216,224	204,744	203,715	199,726
Lehigh Valley	80,058	75,394	72,639	74,316
Schuylkill Valley	51,325	44,861	43,946	44,238
Lower Susq. and Lebanon Valleys	33,301	29,387	30,338	32,289
Pittsburgh district	639,693	597,543	582,497	523,875
Shenango Valley	101,946	90,179	77,023	58,982
Western Penna.	101,365	86,725	89,372	92,774
Maryland, Virginia and Kentucky	103,857	89,803	94,590	92,981
Wheeling district	133,764	118,108	108,188	114,030
Mahoning Valley	296,491	261,837	247,371	222,572
Central and Northern Ohio	330,176	294,427	313,697	295,179
Southern Ohio	25,729	24,773	32,480	32,413
Illinois and Indiana	715,439	639,763	608,771	537,892
Mich., Minn., Mo., Wis., Colo. and Utah	139,101	130,586	134,718	140,141
Alabama	223,314	207,108	224,132	227,775
Tennessee	7,891	4,888	6,284	6,572
Total	3,199,674	2,900,126	2,869,761	2,695,755

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	......
May	84,358	94,542	112,304	109,385	......
June	67,541	89,115	107,844	102,988	......
½ year	95,794	105,039	109,660	107,351	......
July	57,577	85,936	103,978	95,199	......
Aug.	60,875	87,241	103,241	95,073	......
Sept.	68,442	90,873	104,543	92,498	......
Oct.	79,907	97,528	107,553	89,810	......
Nov.	83,656	100,767	107,890	88,279	......
Dec.	95,539	104,853	99,712	86,960	......
Year	85,075	99,735	107,043	99,266	......

Coke Furnaces in Blast

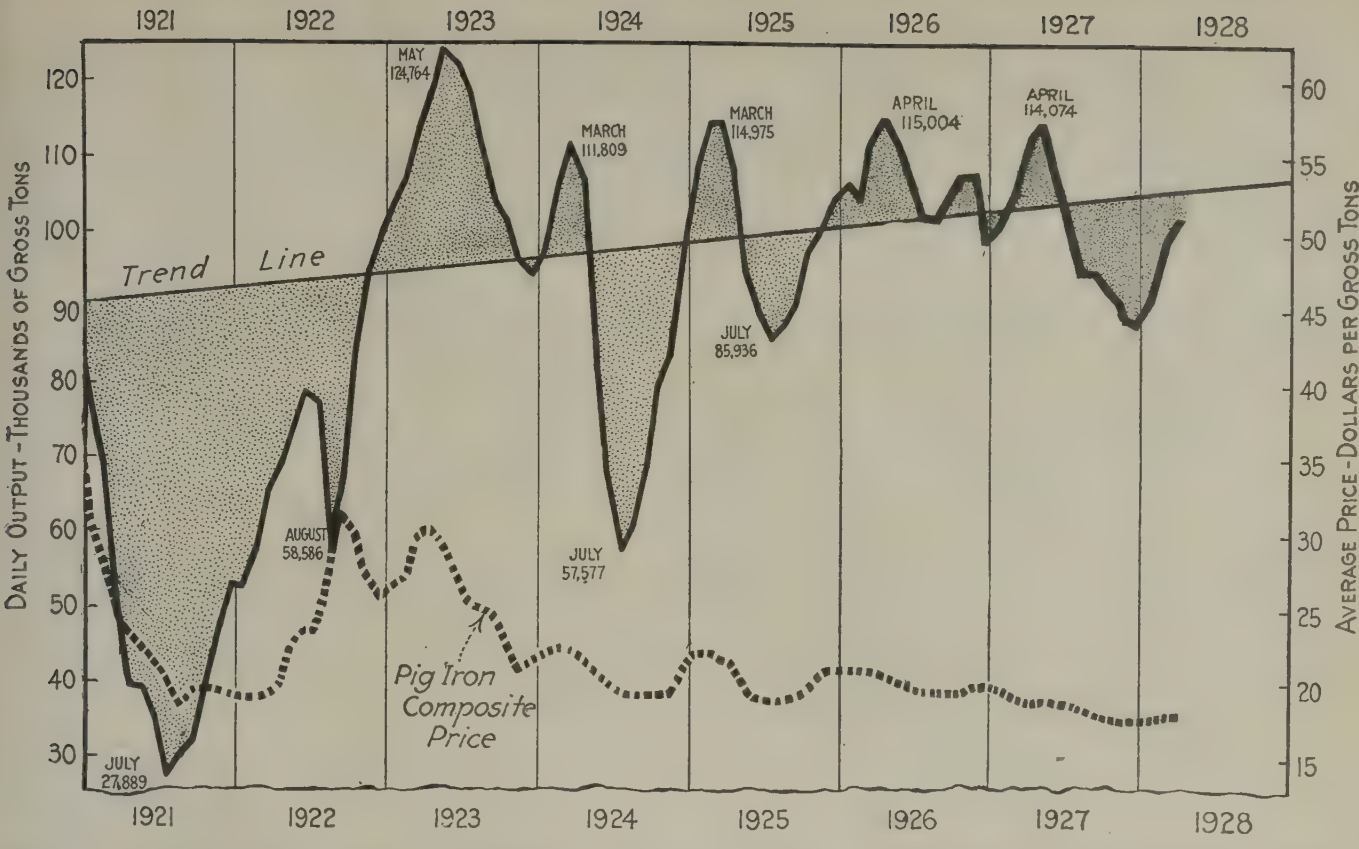
	April 1		March 1	
Furnaces	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	12	5,720	12	5,910
Other N. Y. and Mass.	3	1,230	3	1,150
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,600*	5	2,600*
Schuylkill Valley	5	1,820	4	1,545
Susquehanna Valley	2	1,015	2	945
Ferromanganese	1	60	1	65
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	35	21,560	33	20,550
Ferro. and Spiegel.	2	350	1	240
Shenango Valley	6	3,290	6	3,100
Western Pennsylvania	6	2,900	5	2,580
Ferromanganese	2	430	2	420
Maryland	6	3,045	5	2,500
Wheeling District	7	4,315	7	4,200
Ohio:				
Mahoning Valley	17	10,000	15	9,030
Central and Northern	18	10,300	17	9,830
Southern	3	830	3	865
Illinois and Indiana	35	23,070	35	22,270
Mich., Wis. and Minn.	6	2,745	6	2,770
Colo., Mo. and Utah	4	1,745	4	1,600*
The South:				
Virginia	1	215	1	225
Kentucky	1	380	1	370
Alabama	17	7,140	17	6,840
Ferromanganese	1	70	0	....
Tennessee	2	250	2	465
Total	197	104,650	187	100,060

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	....
May	3,481,428	3,390,940	....
June	3,235,309	3,089,651	....
½ year	19,848,461	19,430,678	....
July	3,223,338	2,951,160	....
Aug.	3,200,479	2,947,276	....
Sept.	3,136,293	2,774,949	....
Oct.	3,334,132	2,784,112	....
Nov.	3,236,707	2,648,376	....
Dec.	3,091,060	2,695,755	....
Year*	39,070,470	36,232,306	....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in March Was 3.2 Per Cent More Than in February; Composite Price Increases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Perry furnace in western Pennsylvania; one furnace at the Sparrows Point plant of the Bethlehem Steel Corporation in Maryland; two furnaces of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one furnace of the American Steel & Wire Co. and the United furnace of the Central Iron & Steel Corporation in northern Ohio; one Gary furnace in the Chicago district and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

During March the following furnaces were blown out or banked: One Carrie furnace of the Carnegie Steel Co. in the Pittsburgh district; one furnace of the American Rolling Mill Co. in central Ohio, and one Gary furnace in the Chicago district.

Possibly Active Furnaces Reduced

The Leesport Furnace of the Leesport Furnace & Foundry Co. in the Schuylkill Valley and the Lochiel furnace of the Central Iron & Steel Co. in the Lower Susquehanna Valley are being dismantled. This reduces the number of possibly active blast furnaces in the United States from 349 to 347.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1927		1928	
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb.	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar.	2,675,417	2,588,158	27,834	7,650	27,912	....
Apr.	2,637,919	....	24,735	12,907	....	....
May	2,619,078	....	28,734	9,788	....	....
June	2,343,409	....	29,232	10,535	....	....
½ year	14,876,355	....	166,939	55,411	....	....
July	2,163,101	....	26,394	9,350	....	....
Aug.	2,213,815	....	21,279	9,104	....	....
Sept.	2,090,200	....	20,675	6,037	....	....
Oct.	2,076,722	....	17,710	6,129	....	....
Nov.	1,938,043	....	17,851	6,521	....	....
Dec.	1,987,652	....	20,992	6,816	....	....
Year	27,345,888	....	291,840	99,368	....	....

*Includes output of merchant furnaces.
†Data not available.

No. 5 Aliquippa Furnace Made 30,287 Tons of Pig Iron in March

The performance of No. 2 Aliquippa furnace of the Jones & Laughlin Steel Corporation, which in the year ended Dec. 31, last, produced 285,148 tons of pig iron, or an average of slightly more than 781 tons daily is being considerably improved upon by No. 5 furnace of the same group. Since it was blown in on Aug. 1, 1927, this furnace has been averaging about 900 tons daily and last month produced 30,287 tons, a daily average of 977 tons. During the last 10 days of the month this furnace produced 10,381 tons, an average of 1038 tons daily, and twice during the month it produced more than 1100 in one day, making 1135 tons one day and 1185 tons on another.

The month's total production of the furnace, its daily average and the output of one day of 1185 tons, are all said to be American high records for a furnace running on ore, plus its own scrap. About two years ago, one of the Carrie furnaces of the Carnegie Steel Co., produced 1263 tons, but the burden contained a substantial amount of scrap other than that produced in the furnace. The Jones & Laughlin corporation will soon start rebuilding its No. 4 Aliquippa furnace and so change its lines to insure a daily output of 1200 tons of pig iron.

Decline in Freight Cars Installed and Ordered

Class I railroads in the first two months of this year installed 6032 freight cars, compared with 10,621 for the same period in 1927 and 12,817 for the corresponding months in 1926. On March 1 the railroads had 21,726 freight cars on order, compared with 29,395 on the same date last year and 50,947 on March 1, 1926.

Locomotives installed in the first two months of 1928 totaled 325, an increase of 20 compared with the corresponding period of last year, but a decrease of 41 compared with the same period in 1926. Locomotives on order March 1 totaled 171, compared with 276 on the same date last year.

Iron and Steel Markets

Heavy Specifying Steadies Market

Large Orders Against Expiring Steel Contracts Insure Continuance of Heavy Output—Net Gain of 10 Blast Furnaces in March —No Increase in Price Irregularities—Steel Pipe Advanced

HEAVY specifications against expiring steel contracts, a rate of production that is still on an ascending scale and a price situation that is holding its own, barring minor irregularities, mark the opening of the second quarter of the year.

Blast furnace returns for March collected by THE IRON AGE show a net gain of 10 stacks, of which nine were steel company furnaces. This reflects a sharp increase in steel works activity and lends support to the belief that ingot production for March exceeded the high record made in the same month last year. Merely assuming that the March rate was equal to that of February, output for the first quarter surpassed that of the same period last year by nearly 200,000 tons. Since the March rate actually gained, final returns for the quarter will show a total closely approaching, if not larger than, the record made in the first quarter of 1926.

Steel production in April, it is conceded, may recede from the March rate, but there are no indications of as sharp a decline as occurred in April, 1927. Shipping orders placed in the last week of March were large enough to insure a sustained output until the middle of the month. At no time during the first quarter, with its high rate of plant engagement, have producers been able to look much further ahead.

Unquestionably the large volume of specifications against contracts that expired March 31 has had a steadying effect on prices. In some cases buyers were successful in overspecifying their contracts and in other instances mills have continued to accept shipping orders, not choosing to enforce the cancellation clause, but as a rule producers added excess tonnage to second quarter contracts and canceled tonnage that remained unspecified at the end of the month.

Buying at second quarter prices has not yet reached important proportions, but since shipments against first quarter contracts will continue through most of this month, consumers do not find it necessary to place much additional tonnage at this time. There continue to be price irregularities in wire nails and some finishes of sheets, but they are no more numerous, and possibly fewer, than a week ago. Meanwhile, mills are showing more of a disposition to ignore price concessions, some of which emanate from middlemen and are possibly of a transient character. At any rate, the week has seen another postponement of serious tests of the price structure.

The only important new development in steel prices during the week was an advance in standard steel pipe. This took the form of a withdrawal of a preferential discount of 5 per cent which had been in effect since Oct. 1, 1927.

Among the leading consuming lines, the automobile industry, building construction and farm implement manufacturing continue to take steel at an undiminished rate. Reports indicate heavy sales by dealers in low-priced automobiles, but a less promising movement of some of the medium and high-priced cars. An expected increase in Ford production this quarter will, if it materializes, tend to counterbalance a possible decline in the output of other motor car builders. Automobile makers are still cautious in buying steel, committing themselves only for a few weeks ahead.

Structural lettings of 46,000 tons include 18,000 tons for a bridge across the Ohio River at Louisville, 7800 tons for a section of the New York subway and 4300 tons for a store building at Oakland, Cal. New projects call for 20,800 tons, of which 5000 tons is for a Pennsylvania Railroad bridge at Newark, N. J.

Railroad buying was featured by the purchase of 300 refrigerator cars by the North American Car Corporation and 260 ballast cars by the Canadian National. Inquiries include 500 flat and 50 gondola cars for the Southern Pacific and 500 tank cars for the North American Car Corporation.

The extent of the recent large buying of pig iron in the Central West is shown by the fact that second quarter sales at Chicago were larger than for any three-month period in several years. At Cleveland the market has resumed its recent activity with sales of 65,000 tons in the week. Other districts are less busy. Through arrangements now being perfected Buffalo iron will move by barge or by water and rail to New England and to points in the eastern Pennsylvania district at delivered prices low enough to prove serious competition for other Eastern producers.

Details of pig iron output in March show a total of 3,199,674 tons produced, or 103,215 tons per day, against 2,900,126 tons, or 100,004 tons in February. The daily rate was the smallest for any March since 1922. Reflecting a larger use of scrap in steel making and a poorer showing by merchant furnaces, pig iron production in the first three months of 1928, at 8,969,561 tons, was the smallest for any first quarter since 1922.

Quotations on 440,000 tons of Lake Superior ore for the Ford Motor Co. were identical with last year's prices, indicating their probable reestablishment for the coming season.

Sales of copper in March, estimated at 160,000 tons, were the second largest since the war. The record was over 220,000 tons in December, 1919.

Both of THE IRON AGE composite prices remain unchanged at last week's levels, that for pig iron at $17.67 a ton and that for finished steel at 2.357c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Apr. 3, 1928	Mar. 27, 1928	Mar. 6, 1928	Apr. 5, 1927
No. 2, fdy., Philadelphia..	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa...	19.50	19.50	19.50	20.75
Basic, Valley furnace.....	17.00	17.00	17.00	19.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill........	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	34.00
Forging billets, P'gh......	38.00	38.00	38.00	40.00
O.-h. billets, Phila........	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh.....	44.00	44.00	44.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12
Iron bars, Chicago.......	2.00	2.00	1.90	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.85	1.90
Steel bars, Chicago.......	2.00	2.00	1.95	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh...	1.85	1.85	1.85	1.85
Tank plates, Chicago.....	2.00	2.00	1.95	2.00
Tank plates, New York...	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	2.00	2.00	1.95	2.00
Beams, New York........	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Apr. 3, 1928 Cents	Mar. 27, 1928 Cents	Mar. 6, 1928 Cents	Apr. 5, 1927 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill.........	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv., No. 24, Chicago dist. mill.........	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh....	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill.........	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.00	$15.00	$14.75	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.75	13.25
Carwheels, Chicago	13.50	13.50	14.00	15.25
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot, Phila.....	15.00	15.00	15.00	16.50
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.00	12.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.60	$3.25
Foundry coke, prompt....	3.75	3.75	3.75	4.25

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York...	**14.30**	14.20	14.25	13.25
Electrolytic copper, refinery	**14.12½**	14.00	14.00	12.87½
Zinc, St. Louis..........	5.72½	5.72½	5.50	6.55
Zinc, New York..........	6.07½	6.07½	5.85	6.90
Lead, St. Louis..........	**5.95**	5.82½	5.75	7.00
Lead, New York.........	**6.10**	6.00	6.00	7.25
Tin (Straits), New York..	**53.50**	52.75	51.62½	69.75
Antimony (Asiatic), N. Y.	*9.50*	10.00	10.25	13.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steadier Price Situation on Steel Products —Flow of Orders Undiminished

PITTSBURGH, April 3.—The second quarter of the year opens with considerably less uncertainty as to prices than existed during most of the past month. Producers seem to have been a good deal more concerned than now appears to have been warranted over what would happen when the higher prices they have been seeking were tested. While the extreme advances have not been attained, and there have been a good many cases involving sizable tonnages where buyers will continue to enjoy the low prices of the first quarter for another month or so, it is equally clear that second quarter contracts will average higher in price than those for the quarter just ended.

Hot-rolled strip steel makers have yielded little of the advance they sought even to the largest tonnage buyers and much of the tonnage booked is at the full quotations. Makers of wire products seem more disposed to wait buyers out than to force the issue, feeling that the chances of success in getting present prices will be better when the real requirements are present. While admitting weakness in galvanized sheets and that it has been impossible to hold the market on tin mill black plate at 3c. base, sheet makers are firm on other finishes and insist that prices below regular quotations on black sheets are concessions rather than straight out cuts. Current shipments of plates, shapes and bars include much tonnage carrying a price of 1.80c., base Pittsburgh, but manufacturers generally ask 1.85c. on new business and there is no evidence that less is being done. An interesting price development of the week was the announcement made April 2 of a withdrawal of the preferential of 5 per cent that steel pipe makers have been giving on standard pipe since Oct. 1.

The steadier price situation is associated with the fact that the steel industry steps from the first into the second quarter with no appreciable letdown in the flow of orders, and while the prospect is that April will show a smaller production than March, which incidentally is believed to have beaten the record of the same month last year, evidence is lacking that there will be any such tapering in output as marked April last year. The last week of March produced enough business in the aggregate to insure sustained ingot production until about the middle of this month, which really is as far ahead as the producers could look at any time during the first quarter with its high rate of plant engagement.

It may be necessary to revise upward the potential steel making capacity of the country if the March performance of the Weirton Steel Co. is a criterion, and in pig iron if the output of one of the Jones & Laughlin Steel Corporation furnaces is a true measure of what modern blast furnaces can do.

The primary materials still are out of step with finished steel in point of sales and to a considerable extent in the matter of prices. Open-hearth grades of scrap are not plentiful and prices are firm, but this merely emphasizes a generally opposite condition in other grades. Pig iron producers believe they have seen their lowest prices, but the activity necessary to strengthen them is lacking. The fuel market is very dull and prices are soft.

Pig Iron.—One good sized sale of No. 3 foundry iron stands out in an otherwise quiet market. This sale, amounting to about 5000 tons, is reported to have been at slightly more than the regular price of $16.75, Valley furnace, but hardly establishes the market at a higher level in view of the fact that the sale was tied up with a coke deal. It develops positively that a recent large sale of basic and a smaller sale of Bessemer iron were by a steel company to another steel company and that the iron did not come from a Valley furnace. One good sized sale of Valley basic iron, from 2000 to 4000 tons, is noted at a price well under what has been nominally quoted for some time, but the transaction proves to have been substantially an inter-company deal and hardly is recognizable as establishing a lower general market. The seller says that iron would not have been sold at the price at which this lot was moved to other than the company which bought. Valley producers are taking a firmer stand on basic iron, as it develops that they have less reason to fear competition from Pittsburgh district steel companies which either are sold up or have no iron for sale. The Jones & Laughlin Steel Corporation added a furnace in the past week at its Aliquippa Works and now has all five there in production. W. P. Snyder & Co. make the March average prices of Valley basic and Bessemer iron $17 and $17.50, the same as in February.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—One sale of 200 tons of British ferromanganese for second quarter shipment is noted at the regular market price. Generally, consumers are covered through the first half of the year and new business is infrequent and for small lots. Specifications on contracts are active not only in that alloy, but in ferrosilicon and spiegeleisen. Tonnage releases in the latter are exceeding quotas and the use of it is much wider than in recent years.

Fluorspar.—Leading domestic producers have withdrawn all prices below $15 per net ton at mines for gravel spar analyzing 85 per cent calcium fluoride and not over 5 per cent silica and are expected to announce higher prices soon. All producers have a good deal of business on their books taken at $14.50.

Semi-Finished Steel.—Good operations by sheet, tin plate and strip manufacturers who buy their steel are reflected in a well sustained movement of billets, slabs and sheet bars, but there is little or no open market activity, as shipments are almost entirely on standing contracts between producers and consumers. The quoted prices are unchanged. The present price of wire rods is yet to come into full play, as consumers had until the end of March to enter specifications on first quarter contracts written at $40 and appear to have secured their requirements for this month at least.

Bars, Plates and Shapes.—The last week of March was a good one for local companies in specifications, with a good many buyers attempting to overspecify against expiring first quarter contracts. Some makers appear to have accepted the extra tonnage, but others either cancelled the amount beyond the quota or added it to second quarter contracts, carrying an advance of $1 a ton over first quarter contracts. The price situation is without change. Much of the contract tonnage moving from the mills this month will be at the first quarter price of 1.80c., base Pittsburgh, with a smaller amount at the second quarter price of 1.85c. Small lots of all three products have gone at 1.90c., base, but the prevailing contract tonnage price for this quarter is 1.85c. Considerable tonnage of plates will be required for the river barges lately closed and now pending, and 50,000 to 100,000 tons will be wanted for the Amarillo, Tex.-Kansas City gas pipe line, which is believed to be nearing the mills. Bolt and nut makers are taking bars very steadily, but demands from makers of cold-finished bars are not as heavy as they were earlier in the year. Structural steel lettings in this area still are moderate.

Rails and Track Supplies.—A heavy movement of standard-section rails and track supplies is noted against old contracts, but new business is light. Continued depression in the coal industry is limiting purchases of light-section rails and of small spikes.

Wire Products.—Prices announced as of Jan. 26, last, or $2.65, base, per keg, Pittsburgh, for nails and $2.50, base, per 100 lb. for plain wire, are still to be seriously tested. Buyers had until the end of last month to specify on first quarter contracts carrying prices $2 per ton lower and appear to have exercised the privilege in wire and to the extent of their needs in nails. Because they took heavy deliveries during the quarter just ended on nails bought at lower prices last December, and the movement into consumption has been rather light, some jobbers could not provide specifications on first quarter contracts at $2.55, base. In such cases there is an impasse on prices, with the mills insisting that the time has passed for specifications on $2.55 contracts and jobbers equally firm in demanding that the price be extended until they can lighten their stocks.

Tubular Goods.—The Youngstown Sheet & Tube Co. has announced, effective April 2, the withdrawal of the 5 per cent preferential which has been quoted since the fourth quarter of last year on standard steel pipe, making the price base and 5 per cent. The announcement says that the change also affects other classes of steel pipe, including line pipe, water well casing, etc. It is expected that similar action will be taken by other steel pipe producers. The market has been unsettled on standard pipe since Oct. 1 last, when the discounts were increased by an extra 5 per cent to bring quotations in line with actual selling prices and there have been a good many cases where the supplementary and preferential discounts amounted to three fives. Neither jobbers nor mills have made money and this step is said to have been prompted by a desire for stability on the part of both. There is a steady movement of stand-

THE IRON AGE Composite Prices

Finished Steel

April 3, 1928, 2.357c. a Lb.

One week ago	2.357c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

April 3, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.75
One year ago	19.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
.o.b. Pittsburgh mill	1.85c. to 1.90c.
.o.b. Chicago	2.00c.
el'd Philadelphia	2.17c. to 2.22c.
el'd New York	2.19c. to 2.24c.
el'd Cleveland	2.04c. to 2.09c.
.o.b. Cleveland	1.85c.
.o.b. Lackawanna	1.95c.
.o.b. Birmingham	2.05c. to 2.15c.
.i.f. Pacific ports	2.35c.
.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

.o.b. Pittsburgh mills	1.90c. to 2.00c.
.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

.o.b. mills east of Chicago district	1.75c.
.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

ommon iron, f.o.b. Chicago	2.00c.
efined iron, f.o.b. P'gh mills	2.75c.
ommon iron, del'd Philadelphia	2.12c.
ommon iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c. to 1.90c.
.o.b. Chicago	2.00c.
.o.b. Birmingham	2.05c. to 2.15c.
el'd Cleveland	2.04c. to 2.09c.
el'd Philadelphia	2.10c. to 2.15c.
.o.b. Coatesville	2.00c. to 2.05c.
.o.b. Sparrows Point	2.00c.
.o.b. Lackawanna	1.95c.
el'd New York	2.17½c. to 2.22½c.
.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c. to 1.90c.
.o.b. Chicago	2.00c.
.o.b. Birmingham	2.05c. to 2.15c.
.o.b. Lackawanna	1.95c.
.o.b. Bethlehem	2.00c.
el'd Cleveland	2.04c. to 2.09c.
el'd Philadelphia	2.12c. to 2.18c.
el'd New York	2.14½c. to 2.19½c.
.i.f. Pacific ports	2.35c.

ot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
arrower than 3 in., P'gh	2.20c. to 2.40c.
ider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
in. and wider, P'gh	*1.90c. to 2.00c.
arrower than 3 in., Chicago	2.30c. to 2.50c.
rom 3 to 6 in., Chicago	2.20c. to 2.30c.
in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
ars, f.o.b. Pittsburgh mills	2.20c.
ars, f.o.b. Chicago	2.20c.
ars, Cleveland	2.25c.
afting, ground, f.o.b. mill	*2.45c. to 2.90c.
rips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
rips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
rips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
rips, under 12 in.. 1 up to 3. tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

o jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
ire nails	$2.65
alvanized nails	4.65
alvanized staples	3.35
lished staples	3.10
ement coated nails	2.65
	Base Per 100 *Lb.*
right plain wire, No. 9 gage	$2.50
nnealed fence wire	2.65
pring wire	3.50
alv'd wire, No. 9	3.10
arbed wire, gal'd	3.35
arbed wire, painted	3.10

Chicago district mill and delivered Chicago ices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, ass., (wire) mill $3 a ton higher on production that plant; Duluth, Minn., mill $2 a ton gher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.94c. to 3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.74c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	7
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5, and on galvanized by 1½ points, with supplementary discount of 5. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	43
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	43
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ard pipe, with a few extra demands prompted by the news of higher prices, but in other classes of pipe business still is slow. In line pipe the Amarillo, Tex.-Kansas City gas line, requiring more than 100,000 tons, is believed to be the nearest the mills of the several projected lines.

Sheets.—No complaint is heard as to the rate at which business is flowing in, but there continues to be a lack of satisfaction over prices, notably on galvanized sheets, which are hard to sell at more than 3.65c., base Pittsburgh. No small part of the production of this grade is distributed through jobbers and, having had opportunity to stock up at low prices, they can now profitably compete with the mills at less than mill prices. On black sheets, the efforts of mills to establish 2.90c., base, is less seriously hampered and on blue annealed sheets deviations from quotations are rare.

Tin Plate.—Tin plate mill operations are holding their recent gains and there are sustained specifications on contracts. New business does not amount to much, as there are few important consumers that are not under contracts for the first half of the year. Condensed milk can sizes are moving especially well just now.

Cold-Finished Steel Bars and Shafting.—Important consumers are covered for second quarter at 2.20c., base Pittsburgh, but except for the writing of these commitments, the market lacks feature and with prices settled, buyers are specifying in strict accordance with known requirements.

Bolts, Nuts and Rivets.—Reference to a price of $2.75, base Pittsburgh, on large rivets in last week's report was an error. It should have read $2.90, to which almost all manufacturers advanced five weeks ago and which has been the basis of the great bulk of the business since closed. Small rivets are commonly quoted at 70 per cent off list. Bolt and nut business in March stepped up substantially from the February rate, which in turn ran better than January's. Railroads are releasing more tonnage than at the beginning of the year, and companies supplying the automotive industry are still doing well. Observance of quotations by makers is remarkably uniform.

Hot-Rolled Flats.—Recent price uncertainty appears to have disappeared, and fears by manufacturers that the advances could not be maintained have vanished before the fact that much second quarter business has been taken at 1.90c. for stock wider than 6 to 12-in., 2.10c. for 6 to 3-in. and 2.20c. for narrower than 3-in. Any deviations from these prices appear to have been on the very large tonnages of the motor car builders, who, however, are paying $2 to $3 per ton more for second quarter tonnage than on first quarter shipments. The market is steadier than it was even as recently as a week ago.

Cold-Rolled Strips.—This product has not had the test of large inquiries that have been out on hot-rolled strips. One explanation appears in the fact that large buyers were able to add to their first quarter purchases and they have not yet developed fresh requirements of size. On ordinary tonnages the market appears established at 3.15c., base, for lots of 1 to 3 tons, or 2.90c. for lots of 3 tons or more.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Coke and Coal.—It is hard to imagine a duller market than exists in spot coke and coal. Blast furnaces running on Connellsville coke are entirely covered against their requirements for this quarter and almost the only demand for spot furnace coke is from water gas producers. Demand for heating coke has dwindled on account of mild weather. Some good sized orders from the East for coke for water gas have gone to Eastern by-product coke companies, futher reducing the market for western Pennsylvania coke. Users of foundry coke are well covered by contracts and spot business is limited.

Old Material.—The market here holds its recent strength in heavy melting steel and compressed sheets. In the latter, the local production is light and it is necessary to go into other districts to secure them. One melter in this district uses nothing else, while another prefers them to the general run of offerings of heavy melting steel at equal prices. Dealers are short of heavy melting steel at several points in the district and are eagerly picking up offerings, particularly of railroad or equivalent steel, for which they are paying up to $15.50 and yet are not getting enough to meet the requirements of consumers. With yard stocks well reduced, it seems likely that the steel in April railroad lists will fetch that price and possibly more. The market is dull in the other grades. The April scrap list of the Norfolk & Western Railroad is exceptionally heavy, containing 14,334 gross tons. Other roads also have large April lists, but there is little doubt but that the open-hearth grades will be actively wanted and will sell high.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.00 to $15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.75 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	15.00 to 15.50
Industrial	14.50 to 15.00
Agricultural	14.00 to 14.50

D. A. Schulte Resigns as Arbitrator in Tutein-Hudson Valley Case

D. A. Schulte, who was selected by Charles M. Schwab, president American Iron and Steel Institute, as the third arbitrator in the case of E. Arthur Tutein, Inc., against the Hudson Valley Coke & Products Corporation, has resigned and another will be appointed in his place. A preliminary hearing had been held when Mr. Schulte decided he would not continue. The litigation comes under an arbitration clause in the contract which the Tutein company had for the sale of Hudson Valley coke and pig iron.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o,b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Ingot Output Remains High—Second Quarter Pig Iron Buying Heavy

CHICAGO, April 3.—Production of steel ingots in the Chicago district remains close to the level—93 to 95 per cent—reached in the early days of March. Revisions downward in operating schedules are scarcely worthy of note, and where they have been made they have occurred more frequently in light tonnage commodities such as wire products. The strength of the Chicago market lies principally in its uniformity. Irregularity in prices is no more pronounced than a week ago. Sales are in larger volume than shipments and specifications exceed production, both factors indicating that deliveries will become more extended. Forward contracting represents a larger portion of total sales than in a number of the preceding quarters, nevertheless the greater number of buyers will take steel only as they require it or in sufficient quantity to assure uninterrupted plant operations.

Compared with recent weeks the past seven days have not been up to par in structural awards. Some in the trade are of the belief that the advancing prices for steel were used to rush out a number of projects that normally would not be quite ready for the market. On this score it is not uncommon to find the opinion expressed that structural awards may be lean in the second quarter. The fact remains, however, that talked-of projects are of large aggregate tonnage and financial arrangements may determine whether they go ahead rather than prices of materials.

Pig Iron.—It is now definitely known that second quarter sales of Northern foundry iron were heavier than in any three-month period for several years. Buyers are now looking forward to piecing out tonnages that will be required near the end of this quarter to take the place of iron that is being shipped ahead of the original schedules. Third quarter inquiry is growing in importance and several contracts for that period have been placed. Shipments for March were the best since last August, and the first days of April show no slackening in the demand. Merchant iron output is steady, with two Iroquois, two Federal and the Zenith furnaces in blast. Occasional carloads of Southern iron are reaching Michigan on an all-rail freight rate from Birmingham. Some buyers in and close to Chicago are taking scattered carloads of high silicon iron that is shipped by rail from Cleveland. The freight rate from Cleveland to Chicago is $4.41. Silvery iron is active only in car lots. The opening of navigation is expected by some to bring about the movement of cargoes of Lake Erie iron into this district.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25		$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75		19.00
Malleable, not over 2.25 sil.		18.50
High phosphorus		18.50
Lake Superior charcoal, averaging sil. 1.50		27.04
Southern No. 2 fdy. (all rail)		22.01
Southern No. 2 (barge and rail)		21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to	29.00
Silvery, sil. 8 per cent		29.79
Bessemer ferrosilicon, 14 to 15 per cent		46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet. A carload and several less-than-carload lots of ferromanganese have been ordered. Specifications for ferrosilicon are heavy.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Bolts, Nuts and Rivets.—Contracting for the second quarter is practically completed, and it is evident that recent advances in prices have held. Specifications in the week are a shade heavier than for the average seven-day period in March.

Coke.—Shipments of by-product foundry coke are steady, following a slight upturn at the end of March. All ovens in this district are lighted. Prices are steady at $9, local ovens, and $9.50, delivered in the Chicago switching district.

Plates.—Car building programs are moving steadily as indicated by specifications for plates, shapes and bars that aggregate 30,000 tons. Railroad equipment buying is confined to 300 refrigerator cars by the North American Car Corporation. Fresh inquiry is slow. Railroads that have received bids on rolling stock appear to be in no hurry to place contracts. Tank builders in Chicago and in the Southwest are busy, and specifications from that source in the week total 4000 tons. Inquiry before the trade is heavy. Schedules at universal mills are satisfactory and deliveries on that commodity range from five to six weeks. Shipments of sheared plates can be had in three weeks. The bulk of new sales in plates is at 2c., Chicago, but contracts entered before the price advance and which were not specified in full are dragging over into April.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—It is reported that the Woolworth Building, State and Washington Streets, Chicago, for which steel already has been purchased for the first four floors, may be extended to the height originally intended, namely, 24 stories. The steel award for the Austin High School, Chicago, requiring 3500 tons, is delayed. About 650 tons will be needed for the approaches to the Crawford Avenue Bridge, Chicago. Structural mills in this district are well engaged, and deliveries are extending slightly as specifications exceed shipments by a small margin. Car builders, fabricating shops and bridges are taking the bulk of tonnage now being shipped from mills. New sales, which for the most part are being made at prevailing prices, namely, 2c., Chicago, are in small volume. Local fabricators are well supplied with work and they have better arranged schedules as a result of a more generous supply of small tonnage awards.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Mild steel bars are the most active of the heavy tonnage steel mill products. Specifications in the week were unusually heavy and sales were proportionately large in the aggregate. Fresh buying represents for the most part users' needs for 30 to 45 days, indicating little or no speculation and that stocks are not being allowed to accumulate in the hands of users. The bulk of new purchases are at 2c., Chicago, but much 1.90c. tonnage contracted for before the advance in prices, will be shipped in April. Mills are receiving orders from well diversified sources. The automobile trade, farm implement manufacturers and makers of cold drawn bars are the largest users. New sales in iron bars are the largest in many months and mill backlogs are heavier than at any time since the turn of the year. Prices on iron bars are steady at 2c., Chicago. The new base price and differentials on alloy steel bars are holding firmly. Local mills are engaged at close to capacity. Buyers' interest in rail steel bars is growing and new sales exceed production. Specifications fully equal shipments and deliveries have been extended to two to three weeks. The bed industry is holding the gain registered in early March, and farm implement manufacturers continue to issue heavy specifications. Prices for hard steel bars are firm at 1.85c., although much 1.80c. steel will be shipped in April against old contracts. Shipments of fence posts are heavy and mill stocks are rapidly being reduced.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Mill shipments are lighter and operations have been adjusted to the range of 70 to 75 per cent of capacity. The nail market continues dull, though such sales as are being made are at the full schedule. Shipments of this commodity probably represent not more than 30 per cent of mill capacity, which gives some idea of the overstocked condition of distributers. A sharp upturn in sales is reported in the Northwest, and improved road conditions in the Missouri River Valley are making distribution easier in the States that lie west of the Mississippi River. Wire products' shipments in March were the best so far this year and they were measurably heavier than in the third month of 1927. Railroad orders are steady but in small aggregate tonnage.

Reinforcing Bars.—The building program in this district continues to grow and concrete reinforcing bar awards are heavier. Shops that 10 days ago were facing a rapid shrinkage in order books are now booking tonnage at a rate that approximates shipments. The urge to take business is resulting in unsettlement of prices. Bars made from billet stock are now quoted 2.20c. to 2.55c., Chicago warehouses. Rail steel reinforcing bars bring 1.85c., mill, for the ordinary run of work and 1.95c. for bridges and culverts. These quotations are stable, but there is more inclination to take small orders without the usual extras.

Cold Rolled Strip.—Prices in this district are steady. Specifications are fully equal to production which stands at 75 per cent of capacity.

Rails and Track Supplies.—Chicago district rail mills are engaged at 90 per cent of capacity, and schedules indicate no lessening in that rate until about July 1. A Western railroad has ordered 4000 tons of standard-section rails. Purchases of light rails aggregate close to 100 tons. The Pennsylvania Railroad is now asking for its second quarter requirements of track supplies. Miscellaneous orders for track fastenings total 2000 tons. Accessory mills are operating close to 70 per cent of capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—This market may be characterized as steady. Prices are holding and deliveries are three weeks for the blue annealed product and two to three weeks for black and galvanized sheets. Business, which has been dull in the South, now gives some signs of improving, while orders from the Northwest are gradually becoming more numerous. Specifications are fully equal to production, so that hot mill schedules are of the same length as a week ago. New buying, which is not in large volume, is for immediate requirements. Stocks in the hands of buyers are small, and prompt shipment is requested on practically all orders.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cast Iron Pipe.—Contracts for cast iron pipe have been numerous, but fresh inquiry is dull. It is evident that prices are stronger at $29 to $31, Birmingham, for 6-in. and larger diameters. The American Cast Iron Pipe Co. has taken 1500 tons of centrifugal pipe for Akron, Ohio. On 2000 tons of 6 to 24-in. pipe at South Bend., Ind., the low bid, made by James B. Clow & Sons, was $29, Birmingham. The United States Cast Iron Pipe & Foundry Co. is reported to have taken 2000 tons at Detroit, 3200 tons at Chicago, 2000 tons at Evansville, Ind., and 1000 tons at Milwaukee. The low bid at Chicago was $30.80 and at Milwaukee $29.75, Birmingham. Waukegan, Ill., opened bids April 2 on 310 tons of 6 to 10-in. class B pipe.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.55c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Old Material.—The tendency in the Chicago scrap market continues toward dullness and lower prices, but this change is not as marked as a week ago. A consumer purchase of cast iron borings was made at 25c. below last week's quotation, but a producer sold 1000 tons at $10.25 per gross ton delivered, or 25c. above last week's price. Consumption of practically all grades is large and relatively steady, but supplies are fully adequate and strength is lacking. Users of heavy melting steel are busy, but they recently have built up stocks and therefore are somewhat independent as to quality and rate of deliveries. Steel mills have declined offers of heavy melting steel at $12.75, but dealers continue to pay $12.50 to $13 per gross ton, delivered, for steel that is to be shipped against old contracts. Railroad offerings include 50,000 tons by the Pennsylvania and a blank list by the Michigan Central.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
Forged. cast and rolled steel carwheels	14.50 to 15.00
Railroad tires, charging box size	15.50 to 16.00
Railroad leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	16.25 to 16.75
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.75 to 14.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	13.75 to 14.25
Cupola Grades:	
Steel rails less than 3 ft.	15.00 to 15.50
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	21.50 to 22.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling	5.25 to 5.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The Chicago district sales office of the American Rolling Mill Co., Middletown, Ohio, has been removed from the Peoples Gas Building, 122 South Michigan Boulevard, to the Straus Building, 310 South Michigan Boulevard.

In the rebuilding of No. 4 furnace of the Hanna Furnace Co., Buffalo, a Steinbart washer and mud catcher are to be installed by the Riter-Conley Co., Pittsburgh. The stoves and boilers are to be equipped with Steinbart burners, supplied by the American Heat Economy Bureau, Pittsburgh. Twelve of these burners will be required.

The Erie Foundry Co., Erie, Pa., now is operating day and night shifts as a result of increased activity in the demand for forging shop equipment.

Philadelphia

First Quarter Steel Contracts Carry Over Into April

PHILADELPHIA, April 2.—Shipments of steel on contracts in this district were larger last month than in either of the two preceding months. Many first quarter contracts on plates, shapes and bars were fully specified by the end of last week, but there was a sizable tonnage of uncompleted contracts, with no evident inclination on the part of some mills to take advantage of the cancellation clause. Sellers of bars and plates are maintaining 1.90c., Pittsburgh, for bars and 2.05c., Coatesville, or 2.15c., Philadelphia, for plates on new business, which is limited to small lots. The contract price for this quarter is $1 per ton less. Shapes have not reached the basis of 2.05c., Bethlehem, or 2.18c., Philadelphia, announced last month, so that both contracts for this quarter and new business are at 2c. per lb., Bethlehem, and there has been extension of old contracts at 1.95c., Bethlehem, or 2.08c., Philadelphia. The fabricated steel market is active, but chiefly on large projects. For the general run of small tonnage construction, prices continue low, despite recent advances in the mill price.

Pig Iron.—Furnaces are adhering to $20 per ton, base, and are booking little tonnage. While foundry consumers are reported quite busy, most of this activity is among the larger foundries. Occasional orders for delivery during the present quarter continue to be reported as going to Buffalo furnaces quoting on rail and water shipment. A New Jersey melter is understood to have bought 900 tons of foundry iron from Buffalo at a delivered price figuring back to slightly less than $16.50, base Buffalo. A total of 650 tons of foundry iron bought by the Consolidated Machine Tool Corporation, Rochester, N. Y., for its Hilles & Jones plant, Wilmington, Del., went to a large eastern Pennsylvania producer. Virginia cast iron pipe makers have recently closed on sizable tonnages of Virginia iron, one consumer contracting for about 10,000 tons and another for 3300 tons. There is a steady flow of business in small lots of low phosphorus iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces: $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Billets.—Prices are unchanged at $33 per ton, Pittsburgh, for rerolling billets and $38, Pittsburgh, for forging quality. There is a slightly better volume of inquiry and purchasing, but no evidence has appeared of an advance in prices.

Bars.—Very little new business is coming out, but specifications against contracts are fair. There have been some extensions of first quarter contracts, but meanwhile second quarter contracts are effective at 1.85c., Pittsburgh. On new business mills are asking 1.90c., Pittsburgh.

Shapes.—Current quotations of 2.05c., Bethlehem, or 2.18c., delivered Philadelphia, apply only on the smallest lots. Contracts for this quarter are at 2c., Bethlehem, or 2.13c., Philadelphia, and some old contracts at $1 a ton lower have been extended. Much of the pending tonnage of fabricated steel is included in large projects. The Pennsylvania Railroad bridge over Newark Bay requires 5000 tons, on which bids must be in April 26, and all bids are in on the 8000 tons of steel in the Tacony-Palmyra bridge. The Reading Railroad has announced that it will erect a $3,000,000 office and warehouse building on Broad Street. The Sun Shipbuilding Co., Chester, which received contract for four Reading Railroad barges, has placed about 400 tons of shapes with the leading interest. The American Brown Boveri Electric Corporation, Camden, N. J., placed about 400 tons of shapes for two barges with a large independent.

Plates.—New business is limited to small lots, and for such business 2.05c. per lb., Coatesville, or 2.15c., Philadelphia, is maintained. Contracts for the present quarter are at 2c., Coatesville, or 2.10c., Philadelphia. Prospective purchase by the Southern Pacific Co. of 33 locomotives may bring some plate business to this district. The Tacony-Palmyra Bridge includes about 3500 tons of plates, and there is a smaller tonnage of plates in the Newark Bay Bridge, which is up for bids. The Sun Shipbuilding Co., Chester, has closed on about 700 tons of plates for four Reading Railroad barges, and the American Brown Boveri Electric Corporation, Camden, N. J., has purchased about 700 tons for two Reading barges.

Old Material.—Prices are substantially unchanged. About 25,000 tons of No. 1 steel and blast furnace scrap recently purchased was for Sparrows Point, Md. A Harrisburg consumer has closed on a tonnage of cast borings at $10.50 per ton, delivered. Offers by an eastern Pennsylvania user of machine shop turnings of $10 per ton, delivered, are reported not to have been accepted by brokers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)		10.50
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	10.50 to	11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)	12.00 to	12.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	16.00 to	16.50
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)		11.00
Wrought iron and soft steel pipes and tubes (new specifications)		12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	15.00 to	15.50
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Sheets and Strips.—Mills are quoting 2.90c., Pittsburgh, on black, 3.75c. on galvanized and 2.10c. on blue annealed sheets. There are still occasional concessions of $1 to $2 a ton on black and galvanized sheets. While 2.10c., base Pittsburgh, is firm on blue annealed sheets and strip steel sheets, buyers are registering some objection to paying the current width differentials of 10c. extra for wider than 40-in. or narrower than 24 in. The cold-rolled strip steel market is rather unsteady at 2.90c. per lb., Pittsburgh, and concessions are reported obtainable, ranging up to $2 or more a ton.

Warehouse Business.—March was a good month with heavier shipments from stock than in either January or February. Prices are fairly firm and the quantity differentials are being maintained.

Imports.—In the week ended March 31, a total of 448 tons of pig iron arrived from India. Steel arrivals consisted of 40 tons of bands, 44 tons of bars and 335 tons of structural shapes from Belgium, 26 tons of bars and 44 tons of shapes from France and 55 tons of shapes from Germany.

Cleveland

Heavy Steel Specifications—Pig Iron Sales Make Large Gain

CLEVELAND, April 3.—Specifications against 1.80c. contracts for steel bars, plates and structural material that expired March 31 were fairly heavy and buyers did not allow much tonnage to be cancelled. In some cases contract tonnage has been carried over to the second quarter, but will take the 1.85c. price. Shipments against the 1.80c. material will extend well through April. Mills are getting a fair volume of small-lot orders at the 1.90c. Pittsburgh price from small consumers who do not place contracts, but most buyers are under contract at 1.85c. The Cleveland mill steel bar price of 1.90c., which never was much more than a nominal quotation, has disappeared, producers no longer asking above 1.85c., Cleveland.

Orders for steel from the automotive industry show no falling off, and as yet there is no indication of any slowing down by this industry. Reports indicate a continuance of heavy sales by dealers of low-priced automobiles, but some of the medium and high-priced cars are not moving so well. Automobile companies as a rule are buying steel only far enough ahead to take care of their requirements for a few weeks. Inquiry for structural steel in the building field is rather slow. The Akron, Canton & Youngstown Railroad has placed 6000 tons of standard rails with a Pittsburgh district mill.

Pig Iron.—The market took on new life the past week, during which Cleveland interests sold 65,000 tons of foundry and malleable iron, or as much as during the peak of the second quarter buying a few weeks ago. Much of the business came from Michigan and Indiana, although there was a fair amount of activity in Ohio. The increased buying seemed due to the fact that many foundries had about cleaned up on first quarter contracts and were ready to make commitments for the present quarter. While no third quarter sales are reported, shipments of some of the iron bought will extend into that quarter. Some round-lot purchases were made by automobile parts manufacturers, who look for a continuation of their present good business well into or through the present quarter. Considerable inquiry is pending. Prices remain well stabilized at $17 to $17.50, Lake furnace, for foundry and malleable iron. For Ohio delivery, Lake furnaces are unable to get above $17 and for shipment to highly competitive points $16.75 is still being quoted. In Michigan the $18 price is maintained. Silicon differentials are not being closely adhered to. March shipments were about equal to those in February and April is starting out with good shipping orders. Reports from Detroit indicate that the Ford Motor Co. is planning to place considerable business with jobbing foundries. It is expected that these will be supplied with pig iron from the Ford furnaces.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

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*Net base, including boxing and cutting to length.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Ore firms have made quotations on the inquiry for 440,000 tons of Lake Superior ore from the Ford Motor Co., Detroit, which asked that bids be submitted by today. It is known that some of the producers submitted last year's prices, and it is expected that the market will be established at these prices. The Ford business will probably be closed within a week. Last season's prices have been quoted on another round lot of ore, but the prospective buyer is withholding purchase until the season's prices are established.

Semi-Finished Steel.—The present price of $33, Cleveland and Youngstown, for sheet bars, large billets and slabs is expected to prevail through the second quarter, although not yet definitely placed in effect. The leading local producer is making April shipments subject to prices to be established. Specifications continue heavy.

Sheets.—The volume of business from the automotive industry continues heavy, but the demand from other sources is only moderate. Consumers generally are limiting purchases to early requirements and few have placed second quarter contracts. Price irregularities continue on black and galvanized sheets and in that respect the market shows little change from a week ago. On black sheets 2.90c., Valley mill, has become the more general quotation and this is evidently being shaded for attractive lots. On galvanized sheets 3.65c., Ohio mill, is rather commonly quoted. Blue annealed sheets are holding closely to the 2.10c., Pittsburgh base. Auto body sheets are moving in good volume at the regular 4.15c. Pittsburgh price.

Strip Steel.—Some small-lot sales of hot-rolled strip are being made at the regular price, but not much test of the market is expected before the end of the month. Mills have received heavy specifications against low-priced contracts, on which shipments will extend through April. Mills are meeting considerable resistance against present prices on cold-rolled strip. The regular quotations are holding fairly well on the business taken, which is only in small lots. However, buyers in some cases have been able to secure a 2.85c. price, or a concession of $1 a ton.

Reinforcing Bars.—New inquiry is light. Local mills are asking 1.85c., Cleveland, for billet steel bars, but competition is very keen. Rail steel bars are quoted at 1.75c., mill.

Alloy Steel.—The demand from the automotive industry continues heavy and the plant of the leading Ohio producer is running at capacity. Some contracts covering consumers' requirements have been placed for the second quarter. No deviation from the new 2.65c. base price is reported.

Coke.—One producer has reduced by-product foundry coke 50c. a ton to $6, Connellsville base. Connellsville foundry coke is inactive, with prices unchanged at $3.75 to $5.10. Heating coke is weaker, ranging from $2.59 to $2.75.

Bolts, Nuts and Rivets.—Bolt and nut business during March showed a slight gain over February. The recent 10 per cent advance on stove bolts brought out heavy specifications, and the $3 advance on large rivets also stimulated specifications against contracts that expired March 31. The majority of bolt and nut consumers have placed second quarter contracts. Cleveland jobbers have advanced prices 10 per cent to 60 per cent off list on machine and carriage bolts and nuts.

Old Material.—The American Steel & Wire Co., which has not been a buyer of scrap for its Cleveland steel plant for several years, bought about 8000 tons of heavy melting steel and compressed sheet scrap during the week. This purchase gave a little life to an otherwise lifeless market and will enable dealers to move scrap that has been backing up because of restricted shipments to other consumers. Dealers have considerable scrap for which they are trying to find an outlet. While the market does not have a firm tone, no concessions from ruling quotations are reported.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

New York

Pig Iron Competition Keener—Variations in Bids on Railroad Steel

NEW YORK, April 3.—With the opening of navigation on the State Barge Canal only about two weeks away, increasing interest is being shown in water transportation of pig iron. Buffalo shippers are taking steps to bring about an improvement of transshipment facilities both at Beacon, N. Y., and at Jersey City, N. J. Pig iron for New England delivery will, in most cases, be transferred from barge to freight car at Beacon. The freight rate to most New England points from Beacon is $2 a ton; the transfer charge is understood to be 28c., and the barge rate from Buffalo about $1.50. The combination rate, counting all charges, is expected to be at least $1 a ton below the all-rail rate. Pig iron sales for the week by local brokers totaled 10,000 tons, a gain of about 1000 tons over the previous week. Competition is keen and prices are responding to pressure. One good-sized recent purchase brought out prices of $16, Buffalo, for No. 2X and $16.50 for No. 1X. While no price lower than $16 has been reported on No. 2 plain, the aforementioned quotations indicate a willingness to waive silicon differentials. The Singer Mfg. Co. has bought 1500 tons of New York State iron for its St. Johns, Que., plant. The General Electric Co. has closed for about 2000 tons of various grades for delivery at Bayway, N. J., Schenectady, N. Y., and at its New England plants. The Malleable Iron Fittings Co., Branford, Conn., has placed orders against an inquiry for 800 to 1000 tons of malleable iron for barge shipment. Inquiries are more numerous, although many of them are small, indicating a disposition to buy conservatively. Virtually no third quarter demand is reported. The Worthington Pump & Machinery Corporation, New York, is in the market for 307 tons of Bessemer iron for Harrison, N. J., 80 tons of Bessemer for Holyoke, Mass., 450 tons of foundry for Elmwood Place, Ohio, and 400 tons of various grades for Buffalo. Deliveries over the next 10 weeks are called for. The American Locomotive Co., New York, is inquiring for 500 tons, and the New York Air Brake Co. wants 500 tons of charcoal for Watertown, N. Y. The International Motor Co., New York, is in the market for 125 tons of foundry for its New Brunswick, N. J., plant, and the Gifford-Wood Co., Hudson, N. Y., is asking for prices on 100 tons. A cargo of 3300 tons of Dutch iron is expected to arrive shortly at Bridgeport, Conn. This is said to be the first deep water shipment to that port. Part of the iron has been sold and the remainder will be stocked at the dock of the T. A. D. Jones Coal Corporation.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Specifications against expiring first quarter contracts for plates, shapes and bars were fairly heavy, but some consumers did not specify their full quotas and most of the mills insisted on cancella-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.35c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish. 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

tion of the unspecified portions. Shipments of bars at 1.80c., Pittsburgh, plates at 1.95c., Coatesville, and shapes at 1.95c., Bethlehem, on these contracts will extend through April. Somewhat similar conditions exist with respect to the low-priced contracts on sheets and strip steel, so the real test of second quarter prices on a number of products will not come until the latter part of this month or early in May. Quotations on plates, shapes and bars opened last week by the New York Central Railroad covering its second quarter requirements showed interesting variations. On plates, the Lukens Steel Co. quoted 1.85c., Newberry Junction; Alan Wood Iron & Steel Co., 2.18½c., Newberry Junction; Central Iron & Steel Co., 2.13½c., Newberry Junction; Bethlehem Steel Co., 1.90c., West Seneca; Youngstown Sheet & Tube Co., 1.90c., Youngstown; Otis Steel Co., 1.85c., Cleveland; Jones & Laughlin Steel Corporation, 1.90c., Youngstown; Illinois Steel Co., 2c., Chicago. On bars, bids were as follows: Carnegie Steel Co., 1.90c., Pittsburgh or Youngstown; Bethlehem, 1.90c., West Seneca; Bourne-Fuller Co., 1.90c., Cleveland; Donner Steel Co., 1.90c., Buffalo; Jones & Laughlin, Republic Iron & Steel Co. and Youngstown Sheet & Tube Co., all 1.90c., Youngstown; Pittsburgh Crucible Steel Co., 2.16½c., Buffalo; Corrigan, McKinney Steel Co., 1.85c., Cleveland; Illinois Steel Co., 2c., Chicago. On shapes bids were: Bethlehem, 1.90c., West Seneca; Carnegie, 2.03c., West Seneca; Jones & Laughlin and Republic, 1.90c., Youngstown; Eastern Steel Co., 2.08c., Newberry Junction; Illinois, 2c., Chicago. On forging billets Inland Steel Co. bid $35, Indiana Harbor; Bethlehem, $38, West Seneca; Alan Wood Iron & Steel Co., $42.80, Newberry Junction; Andrews Steel Co., $41.72, Columbus, Ohio; Illinois, $38, Chicago; Jones & Laughlin, $40.89, Youngstown; Pittsburgh Crucible, $41.53, Buffalo.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—The Truscon Steel Co. will furnish 500 tons of bars for a warehouse in Manhattan. No other large awards have been reported in the last week and the volume of small business has continued rather small. Pending work is showing more activity, but improvement is not as marked as is usually the case at this season. The 1.95c., Pittsburgh, mill price has not entirely disappeared but distributers generally are quoting 2c. on new business. Warehouse prices are unchanged.

Cast Iron Pipe.—Prices of Northern producers of bell and spigot pipe are at a level slightly below the delivered prices of Birmingham makers. Southern makers, quoting on a basis of $29 to $30 per ton, Birmingham, are unable in most cases to meet the competition of Northern producers, who quote from $36.25 to $37.25 per net ton, delivered New York. There is some small municipal business in the market. Troy, N. Y., has awarded 150 tons of water pipe and Albany, N. Y., 3000 tons of water pipe to B. Nicoll & Co. Middlebury, Vt., is reported to have placed about 600 tons of 10-in., and Somerset, Mass., has taken bids on about 100 tons. The city of New York is reported preparing an inquiry for about 5000 tons.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Effective April 2, warehouses in this district have adopted quantity differentials on plates, shapes, bars, diamond pattern floor plates, hoops, bands and blue annealed sheets. The differentials apply to the total tonnage of these products purchased at one time. On 250 to 3999 lb. the base price is applied; 4000 to 7999 lb. a deduction of 15c. per 100 lb.; 8000 to 14,999 lb., a 25c. per 100 lb. deduction, and on 15,000 lb. or more, a 40c. per 100 lb. deduction. On purchases of 249 lb. or less there is a 50c. extra charge on each order. Prices of the products affected by the new quantity differentials have been adjusted by an advance of 1c. per 100 lb. as a convenience in figuring charges. Warehouse prices of zinc sheets have been reduced 1c. per lb. in line with the recent mill reduction. Hot and cold rolled copper sheets have been advanced ¼c. per lb. Shipments from stock were better last month than in either January or February.

Coke.—There is a moderate volume of purchasing. Local by-product coke prices are unchanged, but the New England producer has reduced prices 50c. a ton, now quoting $11 per net ton, delivered in the New England district. An outstanding transaction in this district is the purchase of about 130,000 net tons of by-product coke from the local producer by the Public Service Corporation of New Jersey. Delivered prices on beehive foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, N. J., and $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—The general tendency of prices on all grades of scrap is downward. No. 1 heavy melting steel is unchanged, but yard grade is off about 25c. per ton, $10.50 to $10.75 per ton being paid on deliveries to eastern Pennsylvania consumers. Brokers are offering $10 per ton, delivered Harrisburg, Pa., for cast borings, and stove plate is being purchased at $11.50 per ton, delivered to a Phoenixville, Pa., user. Machine shop turnings are being bought at $10 per ton, delivered Phoenixville. The list of the Pennsylvania Railroad this month offers about 45,000 tons.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to	$10.85
Heavy melting steel (yard)	6.75 to	7.25
No. 1 heavy breakable cast	11.25 to	12.00
Stove plate (steel works)	8.00 to	8.50
Locomotive grate bars	8.00 to	8.50
Machine shop turnings	6.50 to	7.25
Short shoveling turnings	6.50 to	7.25
Cast borings (blast furnace or steel works)	6.25 to	7.25
Mixed borings and turnings	6.50 to	7.25
Steel car axles	15.50 to	16.00
Iron car axles	23.75 to	24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)		8.25
Forge fire	6.75 to	7.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought, long	8.50 to	9.00
Rails for rolling	10.00 to	10.50
Cast iron carwheels	10.75 to	11.25
Stove plate (foundry)	8.50 to	9.00
Malleable cast (railroad)		10.00
Cast borings (chemical)	11.00 to	11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to	$14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to	12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to	11.75

Reorganization of Canadian Steel Companies Planned

Information received at Toronto, Ont., from Halifax, N. S., is to the effect that a bill to incorporate the Dominion Steel & Coal Corporation, Ltd., has been prepared and will be introduced in the Provincial Legislature. The incorporators of the proposed new company, as named in the bill, are Sir Herbert Holt, J. H. Gundy, George A. Montgomery and C. B. McNaught, all members of the new coal and steel administration that recently gained control of the British Empire Steel Corporation.

The proposed share capital of the new company will be $65,000,000, divided as follows: 1,000,000 preference class "A" shares of $40 each and 1,000,000 common class "B" shares of $25 each. The plan of the new administration, as stated, is upon reorganization to do away with holding companies and to consolidate at least the greatest part of the operations of the British Empire Steel Corporation and its constituents and their subsidiaries under one big operating company, the incorporation of which is sought. In the course of time, it is proposed, the name and structure of the British Empire Steel Corporation will disappear, as will also the financial structure of most of its constituents and their subsidiaries, with some possible exceptions.

Over 50 members and non-members have enrolled for a 10 weeks' course in the metallography of steel, sponsored by the Indianapolis chapter of the American Society for Steel Treating. The course will consist of 10 lectures by Edward J. P. Fisher, research metallurgist of the Diamond Chain & Mfg. Co., Indianapolis, and treasurer of the chapter.

San Francisco

15,000 Tons of Line Pipe Placed—4300 Tons of Shapes for Store

SAN FRANCISCO, March 31 (*By Air Mail*).—Important developments in the Coast markets during the week included the placing of 4300 tons of structural shapes for the Capwell store in Oakland with the Judson-Pacific Co., the award of 13,387 tons of line pipe for the Pasotex Petroleum Co. to the National Tube Co. and a call for bids by the Santa Fe Railroad, San Francisco, on 700 tons of plates for a carfloat.

Construction activity is holding up well all along the Coast and a number of new projects, involving heavy expenditures, are about ready to come up for figures. Building activity in Los Angeles is ahead of last year.

Pig Iron.—Demand for foundry pig iron is spotty and both sales and inquiries are confined to small lots. Little improvement is noted in foundry operations in the southern part of the State due to the quiet conditions prevailing in the oil fields. No changes in prices are noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—The largest award of reinforcing bars of the week was 1050 tons to the United States Steel Products Co. for Government work at Cristobal. Awards this week totaled close to 2100 tons. Bookings for the first quarter, as reported each week in THE IRON AGE, totaled 13,432 tons. Bids will be opened next week on 5200 tons for a drainage improvement project in Los Angeles. The majority of both sales and inquiries are confined to small lots. In the San Francisco district 2.25c. on out-of-stock material appears to be the minimum, with some business going at 2.50c. and 2.60c.

Plates.—No plate awards of import were noted this week. Pending business totals over 10,500 tons. Prices continue firm at 2.30c., c.i.f.

Shapes.—The past week was active in the fabricated steel market. More than 6200 tons was placed, including the 4300 tons for the Capwell store in Oakland. The Llewellyn Iron Works took 400 tons for an apartment in Los Angeles and the Judson-Pacific Co. secured 400 tons for the Medical-Dental Building addition in San Francisco. Several bridge projects for the State of California are pending, totaling close to 2200 tons. Pending projects total 9000 tons. Prices on plain material are firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Cast iron pipe awards aggregated 1000 tons, bringing the total for the first quarter of the year to 21,000 tons. San Diego, Cal., placed 123 tons of 18-in. class C pipe with the United States Cast Iron Pipe & Foundry Co. Red Bluff, Cal., divided 100 tons between the Pacific States Cast Iron Pipe Co. and the Crane Co., the former securing the 6-in. class B and the latter the 10-in. centrifugal pipe. The United States Cast Iron Pipe & Foundry Co. also took 413 tons of 10 to 24-in. class 150 for Santa Ana, Cal. San Bernardino placed 406 tons of 6 and 8-in. class 250 pipe as follows: 135 tons of 6-in. with the Pacific States Cast Iron Pipe Co. and 271 tons of 8-in. with the American Cast Iron Pipe Co. Bids were opened on 181 tons of 6 and 8-in. class B for the improvement of Foothill Boulevard, Azusa, Cal. Bids will be opened next week on 127 tons of 6-in. class B for the improvement of Washington Street, Riverside, Cal. New inquiries include 210 tons of 6 and 8-in. class C for the improvement of Willow Street, San Diego, Cal., and 129 tons of 8 to 24-in. class B for a sewer project at San Bernardino, Cal. Prices are weak and $35 a ton delivered on 6-in. and larger prevails.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Standard Pipe.—The largest pipe tonnage placed this year was obtained by the National Tube Co. and involved 200 miles of 8⅝-in. line pipe of two weights, 25 and 28½ pounds, the tonnage amounting to 13,387 tons. This line is for the Pasotex Pipe Line Co., a subsidiary of the Pasotex Petroleum Corporation, the parent company of which is the Standard Oil Co. of California. Bids will be opened next week on 125 tons of 2 to 8-in. o. d. well casing or Matheson joint pipe for the Armona Public Utility District of Armona, Cal.

Youngstown

Steel Production Holds to 80 Per Cent Rate—Tin Plate Demands Heavy

YOUNGSTOWN, April 3.—Viewing the situation solely from the standpoint of volume of business, there is a goodly amount of satisfaction among steel manufacturers in this district, but from the price angle the outlook is less satisfactory. Local producers do not expect that earnings in the quarter just ended will show a gain over those for the last quarter of last year in keeping with the gain in business. While the average of invoice prices will be slightly higher, the principal source of increased revenue will be in the fuller engagement of productive capacity as compared with the last half of last year, with the consequent saving in production costs. Manufacturers are optimistic over the possibility of a continued good demand from the automotive industry. It is believed that some time in this quarter the Ford Motor Co. will get the production of its new model up to full expectations and there will be a demand for steel from that direction which will counterbalance any decline there may be in the demand from other motor car builders.

General operations of the district have slipped off somewhat from the high rate attained about the middle of March, but ingot production is averaging around 80 per cent of capacity, which is well above the average at this time last year, when the district was feeling the ebb from the extreme activity of March of last year. The Youngstown Sheet & Tube Co. is producing ingots at about 75 per cent of capacity, the Republic Iron & Steel Co., about 80 per cent, the Sharon Steel Hoop Co., between 75 and 80 per cent and the Trumbull Steel Co. at full physical capacity. The latter, which has had all eight of its open-hearth furnaces in production, took one off this week, but is replacing the lost production by purchases of cold ingots from the Republic Iron & Steel Co. Union of these companies has not yet been formally effected, but this will be accomplished shortly as it is understood that the legal matters pertaining to merger are almost completed.

Tin plate demands upon the mills of the district are heavy, particularly for the sizes used in the manufacture of condensed milk cans and for oil, paint, tobacco and dry foods. There is full engagement of the mills in the Shenango Valley, while the Trumbull Steel Co. also is enjoying almost full operation. Wire products, notably nails, are not doing particularly well. Jobbers took full advantage of the low prices of last December to load up on nails. Pipe business is more notable for its steadiness than volume; demand lacks urgency and it is only when the monthly check up takes place that makers realize they have been doing something. The Republic Iron & Steel Co. is shipping about 600 tons of 6-in. and 8-in. line pipe to the Lone Star Gas Co., Dallas, Tex.

Sheet mill activity still is high, but it is largely on low-priced business. J. D. Waddell, vice-president Empire Steel Corporation, the combination of six Ohio sheet companies, reports that 58 of the 60 mills of that company are in production. This explains a rather good movement of sheet bars from local producers, who, however, are insistent that the weakness prevailing in the Cleveland market has not extended to this district. Activity is lacking in pig iron, notably the steel-making grades, which producers in this and the Shenango Valley districts are unable to ship toward Pittsburgh on account of the competition provided by Pittsburgh district steel companies.

The Republic Iron & Steel Co. will resume shortly the manufacture of railroad spikes after having been out of that market for several years. Spike making machines have been installed at its Brown-Bonnell works and will be started on or about April 15. A complete range of sizes will be made. Both large and small spikes are quoted at $2.80, base, per 100 lb. mill, with carload lots the minimum mill shipment order. The Youngstown Sheet & Tube Co. is moving ahead steadily with its new $6,000,000 power plant at the Campbell works. At Sharon, Pa., the Sharon Steel Hoop Co. is making good progress on its new strip mill, the hot mills for which will be furnished by the Morgan Construction Co., Worcester, Mass., and the cold mills by the E. W. Bliss Co. The Carnegie Steel Co. is planning to transfer the manufacture of cotton ties and narrow strips from its Lower Union mills in this city to McDonald, where a new electrically-driven 16-stand 10-in. unit is to be installed.

The Erie Railroad has informed the Interstate Commerce Commission that it is not opposed to the extension of the Pittsburgh, Lisbon & Western Railroad, Pittsburgh Coal Co. subsidiary, which would connect Youngstown with the Ohio River. Other roads which would suffer a loss of business from the construction of this new line have not yet announced intentions as to their course. The steel industry is very much in doubt as to whether the new line will be built and is disposed to see the plan in more definite shape before committing itself to its support.

Birmingham

New Steel Business Develops Steadily—Pig Iron Sales at Even Rate

BIRMINGHAM, April 3.—Spot sales of pig iron for the past week were about equal to the recent weekly average. Foundry iron sales are still on a $16 base. Shipments during March showed a slight increase as compared with the two preceding months. There has been no change in the number of active furnaces during the past three weeks, 18 being in blast. Of this number, nine are on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—New business continues to develop at a steady rate. Inquiries are not heavy, but the volume is sufficient to indicate that a fair amount of business is in prospect. Structural steel fabricators and bar manufacturers have a comfortable amount of work ahead, and inquiries are developing at a fair rate. No changes have been made in open-hearth operations during the past several weeks. The Tennessee company is operating 13 or 14 and the Gulf States Steel Co. four.

Cast Iron Pipe.—New business of pressure pipe manufacturers during March was confined largely to small-lot orders from private consumers, but was large enough to keep plants operating at 75 to 80 per cent capacity. Inquiries indicate that municipal buying during April will be in satisfactory volume. Local plants are expected to share in the new contracts being placed by several cities in Michigan and Illinois. Prices are showing more firmness with the base still at $29 to $31 for 6 in. and larger.

Coke.—With foundry coke consumers' requirements for the second quarter largely covered, the demand has dropped somewhat and sales consist largely of spot orders. Some inquiries are being received on third quarter coke. Around 2000 tons of coke from this district is en route to the West coast by way of Pensacola, Fla. Both spot and contract quotations are unchanged from $5 base.

Old Material.—Consumers are showing very little interest in buying and the market remains quiet and below normal. Shipments are light. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	14.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.50
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

St. Louis

Pig Iron Sales Lighter—Some Grades of Scrap Off 25c. to 50c.

ST. LOUIS, April 3.—The pig iron market quieted down somewhat during the last week, sales of the St. Louis Gas & Coke Corporation totaling about 4500 tons, while a leading Southern interest sold about 850 tons, including one lot of 500 tons. The local maker's principal sale was 2000 tons, and there were two sales of 1000 tons each, one of the latter to an Evansville melter. Shipping orders against contracts are satisfactory to makers. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—The market for domestic grades is exceedingly quiet. Dealers are awaiting the announcement of new prices next week. Buying of foundry grades is light.

Finished Iron and Steel.—While railroads are issuing no important new inquiries, specifications for tie plates, bolts and spikes are well up to contracts and rails are being called for ahead of specified delivery dates. Orders for second quarter delivery of plates, shapes and bars are coming in, and specifications against contracts are satisfactory. Structural fabricators report business is quiet. Warehouse business is light.

Old Material.—Mills are using up stocks of scrap on hand or contracted, and in the absence of buying further weakness has developed. Dealers are buying from one another and from railroad lists only to cover contracts. Heavy melting steel, heavy shoveling steel, No. 2 railroad wrought are 25c. a ton off, and railroad springs, No. 1 machinery cast, railroad malleable, No. 1 railroad cast and stove plate are 50c. lower. Railroad lists include: Baltimore & Ohio, 14,829 tons; Pennsylvania, 4893 tons; Big Four lines, 1220 tons; Chicago,

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Indianapolis & Louisville, 587 tons; Missouri Pacific, 73 carloads; Frisco Lines, 7 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.00 to $11.50
No. 1 locomotive tires	12.25 to 12.75
Heavy shoveling steel	11.00 to 11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	13.50 to 14.00
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	7.00 to 7.50
Steel car axles	18.50 to 19.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.50 to 14.00
Railroad malleable	10.75 to 11.25
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Relaying rails. 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Canada

Pig Iron Sales Have Gained—Railroads to Buy Steel

TORONTO, ONT., April 3.—Business done in pig iron during March showed the highest monthly average this year, while for the first quarter the improvement in sales was 10 to 15 per cent compared with the first quarter of 1927. Advance contract placing was active during the past two weeks with the result that the majority of those melters who place contracts are now covered up to the end of June. One feature of advance buying is that higher tonnages are involved in second quarter orders. Pig iron prices are firm in the Toronto market, but shading continues in Montreal.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$24.50 to $25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Rails.—The Canadian Pacific and Canadian National have announced extensive track laying programs for this year. The Canadian Pacific intends to lay 247 miles of new track. The Canadian National Railways purpose to spend $19,000,000 on general betterments, which will include the purchase of 160,000 tons of new rails to cost upward of $9,000,000; upward of 7,000,000 tie plates will be purchased at a cost of $2,350,000, and 1,000,000 rail anchors costing $255,000 will be ordered. Rail mills at Sault Ste. Marie, Ont., and Sydney, N. S., are now running practically at capacity and will continue at this rate well into June. New business to be placed will supply sufficient business to keep these mills in operation practically through the year.

Structural Steel.—Structural steel sales show steady improvement. Some large tonnages are involved in proposed new structures in the leading cities of the Dominion. The Robert Simpson Co., Toronto, has announced a building program, for which upward of 5000 tons of steel will be required. It is estimated that 25,000 tons of structural steel will be required for Canadian Pacific and Canadian National bridge building operations for Ontario and Quebec.

Old Material.—Sales show improvement. During the past week or 10 days, second quarter buying was strongly featured in addition to a good demand on spot delivery account. While much of the new business is coming from Hamilton consumers, melters throughout Ontario are buying more extensively. Export demand for old material is improving steadily and large shipments are now being made to United States buyers. Prices continue firm but unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Cincinnati

Pig Iron Prices Weaken—Black Sheets and Nails Lower

CINCINNATI, April 3.—Severe competition between furnaces in northern and southern Ohio for second quarter pig iron business in this district has resulted in the shading of prices. On sizable inquiries Lake Erie producers are reported to have quoted $16.50, base Cleveland, with a silicon differential of 25c. a ton and in at least one instance the base price was under that figure. An Ironton maker in the past week sold 500 tons of high phosphorus iron to a Hamilton, Ohio, company at about 50c. less than the regular schedule of $19, base furnace. The seller, however, insists that this constituted a special transaction which does not disturb the price structure, which has stood at $19 for a number of months. Other outstanding sales have been 2000 tons of northern Ohio foundry to a melter in this territory, 500 tons of northern Ohio foundry iron to a Hamilton, Ohio, consumer, and 800 tons of malleable to a Kokomo, Ind., company. Inquiries are more numerous and include 3000 tons for an Ohio company, 1000 tons for a Louisville melter and 450 tons for the Laidlaw Works of the Worthington Pump & Machinery Corporation. Tennessee and Alabama irons are quoted at $16, base Birmingham, but sales north of the Ohio River have been unimportant.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material—Interest in the past week has centered largely in second quarter prices, which in certain directions are failing to stand up under test. Black sheets, which have been quoted consistently at 2.90c., base Pittsburgh, for a number of weeks, are being purchased by large consumers at $3 a ton under that figure, although manufacturers claim to be holding to the

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

regular schedule in accepting orders for small lots. Irregularities also have cropped out in common wire nails, which are being offered in the southern Ohio district by an Ironton, Ohio, mill at $2.55 per keg, base Ironton. While on the surface this appears to be a concession of only 10c. a keg, the reduction actually is more than that when figured on a Pittsburgh base because of the freight differential in favor of Ironton. Furthermore, at Ohio River points to which delivery can be made by barge from Ironton, jobbers and consumers are obtaining nails at a price equivalent to about $2.40, Pittsburgh. Aside from nails, the wire goods market has been fairly firm and bookings have been of moderate volume. The number of orders for fencing has been normal for this time of the year. Outstanding in structural steel has been the award to the McClintic-Marshall Co. of 18,000 tons by the Big Four Railroad for a bridge spanning the Ohio River at Louisville, Ky. This is the largest structural steel job placed in this district in many years. Bars, structural shapes and plates are quoted at 1.90c. to 2c., base Pittsburgh, and specifications against old contracts at lower prices have been heavy. New orders, however, have not been impressive. Sheet mills report that bookings have continued to be large and are well diversified, although automobile companies are the most important single factor from a buying standpoint. Automobile body sheets are steady at 4.15c., base Pittsburgh, galvanized at 3.75c. and blue annealed stock at 2.10c.

The Stacey Mfg. Co., Cincinnati, will receive this week the first barge load of structural steel to be shipped by water to a steel consumer in Cincinnati. The shipment, which is being made by the Carnegie Steel Co., consists of about 830 tons of material to be fabricated for a gas holder to be erected at Granite City, Ill. The new river rail terminal constructed by the Cincinnati River Rail Terminal Co. will be utilized for transferring the steel from barges to railroad cars for delivery to the Stacey plant.

Reinforcing Bars.—New billet bars are quoted at 1.90c. to 2c., base Pittsburgh, and rail steel stock at 1.80c. to 1.85c., base mill.

Warehouse Business.—Shipments out of local warehouses in the first quarter of 1928 were slightly less than in the corresponding period in 1927. Prices are firm and unchanged.

Coke.—Weakness has appeared in both by-product and beehive coke prices. Makers of by-product coke at Indianapolis, Ashland and Portsmouth have announced a reduction of 50c. a ton on foundry grades, effective April 1, the new quotation calling for $7 per net ton f.o.b. ovens, or $9.02, delivered Cincinnati. Domestic grades are now selling at $3.50, ovens, for walnut; $4.50 for egg, and $3 for No. 2 nut. This represents a drop of $1.50 a ton on walnut and $1 on egg. At Detroit by-product foundry coke remains at $8.50, Detroit ovens, for outside shipment and $9, delivered in Detroit, but egg and nut domestic coke have been cut to $5.50, Detroit ovens, for outside delivery and to $6, delivered in Detroit. Beehive foundry coke from the Wise County district is being sold at $4.50, ovens, with furnace coke bringing $3.75, but these prices are weak and concessions of 25c. a ton are likely to be made in the immediate future. In the New River district reports are current that at least one producer is quoting $6.50, ovens, a drop of 50c. a ton.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—There has been practically no change in the past week. Steel plants continue to release shipments on current contracts at a satisfactory rate, but forward buying is negligible. Prices are showing more stability, but because of the absence of transactions quotations in many items are regarded as nominal.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.50 to 12.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Buffalo

Lower Prices on Scrap Sales—Steel Demand Sustained

BUFFALO, April 3.—The pig iron market is very quiet. One company with a plant east of here and another in Buffalo is inquiring for 700 to 800 tons of foundry, malleable and Bessemer grades, but this is about the only inquiry aside from carload lots. The General Electric Co. is believed to have purchased the 2900 tons it inquired for from furnaces outside of this district. One maker continues to quote $17 for delivery in the district or outside, while the others are holding at $17 in the district. A small lot of 3.50 to 4 per cent silicon foundry was sold at $20.25, furnace.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Old Material.—Several sales of No. 1 heavy melting steel have been made at $15 and a considerable tonnage of No. 2 heavy melting steel has been sold at $13.25. Prices realized on this material are lower than the market has been recently. More buying within the near future is seen by the dealers in view of the continuity of mill operation around 80 per cent, and the comparative shortage of material in dealers' yards. Most of the shipments are going direct to the consumers from outside sources. There have been a few sales of No. 1 machinery cast around $15. This was strictly No. 1 grade.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	12.75 to 13.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.00 to 13.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.25 to 8.75
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.75 to 10.25
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Finished Iron and Steel.—Prices of bars, shapes and plates are holding firm and specifications have been excellent during the past few weeks, lending weight to the expectation that the second quarter will see some good business in these departments. The prevailing price is 1.95c. to 2c., depending on the nature and size of the tonnages. Sheets are firm at 2.90c. for black; 3.75c. for galvanized and 4.15c. for automobile body. A Buffalo maker has taken 900 tons of reinforcing bars for a Rochester, N. Y., high school and a 190-ton garage job for Rochester has been figured. Reinforcing bar makers report the closing of numerous smaller jobs, running about 50 tons each. Mill operations are averaging 80 to 85 per cent.

Boston

Foundry Coke Reduced 50c. a Ton —Low Pig Iron Prices

BOSTON, April 3.—Pig iron sales the past week approximated 7000 tons, of which 4500 tons was sold by the Mystic furnace. Included in the Mystic sales were 1000 tons of No. 2 plain, 1000 tons of No. 2X, 500 tons of No. 1X and smaller tonnages, not all for New England consumption, however. The company took all the General Electric Co. business with the exception of the low phosphorus iron. Some low prices were made during the week. The Universal Winding Co., Providence, R. I., bought several hundred tons of No. 2X at a reported price of $20.50 a ton, delivered, or $18.50 at furnace, and 400 tons Buffalo No. 1X on a water freight at $21.28, delivered, or $17, furnace. The No. 1X, on a $4.91 all-rail freight rate would have cost the consumer $21.91. Buffalo iron, figured on an all-rail rate, is still available at $16 a ton, furnace, for No. 2 plain and $16.50 for No. 2X.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East, Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Bars.—Mill representatives are securing more steel bar business, although the average consumer is buying in small lots. The only prospective reinforcing bar business of importance is 4000 tons for the New England Building, Boston, which probably will be closed within a week. Current buying is in 5 to 50-ton lots, mostly 5 to 25 tons, at 1.90c. to 1.95c. per lb., base Pittsburgh. The local out-of-stock price of 2.90c. per lb., base, is being shaded.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cold-Rolled Strip.—Orders for cold-rolled strip for second quarter shipment are coming in more freely, and mills in general are holding to 3.15c. per lb., base Pittsburgh. The American Steel & Wire Co., Worcester, Mass., quotes 3.30c. per lb., base, on lots of 1 to 3 tons.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. have reduced by-product foundry coke 50c. a ton to $11, delivered within a $3.10 freight rate zone. Specifications by foundries against first half contracts are more numerous than at any previous time this year, but individual tonnages are small. Domestic coke also has been reduced 50c. a ton to $8 a ton on cars at Everett ovens. The New England Coal & Coke Co. has also reduced retail domestic coke prices 50c. a ton.

Warehouse Business.—Business is only fair. Consumers continue to order material on a hand-to-mouth basis, and the weekly warehouse turnover of stock is smaller than it was a month ago. Competition for business remains keen, but prices hold firm owing to the attitude of steel mills. Warehouse stocks are broken and there is considerable buying from each other to complete orders.

Old Material.—Brokers report no difficulty in selling material, but some difficulty in securing scrap at prevailing prices. Weirton, W. Va., is taking quite a lot of New England scrap, and a fair tonnage was shipped to the Pittsburgh territory the past week. The Mystic Iron Works is still in the market for stove plate and miscellaneous material. The market for railroad wrought is easier, and offers of $9.10 for No. 1 heavy melting steel seem to have disappeared, $9 being the prevailing price. Slightly lower prices are noted on borings and turnings for steel plants, car axles and rails for rerolling, but in contrast there is a little firmer market for skeleton, forged flashings and chemical borings. Textile machinery cast continues to move slowly, but there was a fair turnover in No. 1 machinery cast the past week at slightly higher prices. Long bundled cotton ties are moving at $6 a ton on cars shipping point, and heavy cast at $11.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel		$9.00
Scrap T rails	$8.00 to	8.50
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	9.50 to	10.00
No. 1 yard wrought	7.50 to	8.00
Machine shop turnings	5.00 to	5.50
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.75 to	6.25
Forge flashings	6.25 to	6.75
Blast furnace borings and turnings	5.75 to	6.00
Forged scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.00 to	15.25
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.25
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	15.00 to	15.50
No. 2 machinery cast	13.00 to	13.50
Stove plate	9.50 to	10.00
Railroad malleable	13.00 to	13.50

Boilers and finishers in mid-Western puddle mills plan to abandon the sliding wage scale agreement which has been in effect 40 years. At the annual wage conference with manufacturers to be held in May at Middletown, Ohio, workers will submit a proposal that a flat rate system be adopted. Introduction of mechanical puddling devices, the dwindling number of puddlers and other changed conditions are responsible for the request.

A general conference of consumers, technicians, distributers and manufacturers interested in coated abrasive products will be held at the Department of Commerce, Washington, on April 11, to consider drafting a simplified practice recommendation for this commodity.

The Newton Steel Co. plans to install continuous rolling mills at its plant at Newton Falls, Trumbull County, Ohio.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Apr. 3	Apr. 2	Mar. 31	Mar. 30	Mar. 29	Mar. 28
Lake copper, New York	14.30	14.30	14.30	14.30	14.25	14.25
Electrolytic copper, N. Y.*	14.12½	14.12½	14.12½	14.12½	14.00	14.00
Straits tin, spot, N. Y.	53.50	53.75	....	53.87½	53.12½	53.00
Lead, New York	6.10	6.10	6.00	6.00	6.00	6.00
Lead, St. Louis	5.95	5.95	5.85	5.85	5.85	5.85
Zinc, New York	6.07½	6.05	6.00	6.00	6.05	6.07½
Zinc, St. Louis	5.72½	5.70	5.65	5.65	5.70	5.72½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, April 3.—Copper sales have been very heavy and prices have advanced. Purchases of tin have been fairly large, with quotations firm. Lead has been advanced and buying has been quite heavy. Demand for zinc is light and prices are steady.

Copper.—Purchases of copper, both for foreign and domestic consumption, were so heavy last week that the March total sales are probably second to the largest on record. Estimates place the amount which changed hands at 150,000 to 160,000 tons, with 60,000 to 70,000 tons of this sold for export. All the domestic business was done at 14.12½c., delivered in the Connecticut Valley. The price was then advanced by all producers to 14.25c., delivered, and since then the domestic market has been very quiet. Export business is still being done on the basis of 14.50c., c.i.f. European ports, which has been the official quotation of Copper Exporters, Inc., since early in December. Buying for foreign consumption continues heavy, the total for yesterday and today having been at least 6000 tons. The Lake copper market is quiet but firm at 14.30c., delivered.

Copper Averages.—The average price of Lake copper for the month of March, based on daily quotations in THE IRON AGE, was 14.24c. The average price of electrolytic copper was 13.90c., refinery, or 14.15c., delivered in the Connecticut Valley.

Tin.—Sales for the week ended Saturday, March 31, were 1100 to 1200 tons. There was some consumer buying, but most of it was business done between dealers. The principal buying was for April-May-June delivery, with other positions neglected. There is very little interest among the rank and file of consumers. Yesterday, Monday, the market was quiet, with about 150 tons sold, and today there has been very little activity, with spot Straits tin quoted at 53.50c., New York. Prices in London today were but little changed from those of a week ago, with spot standard quoted at £239 15s., future standard at £239 10s. and spot Straits at £243 15s. per ton, and the market easy. The Singapore price today was £244. Chief features of March statistics are the large shipments of Straits tin, 8005 tons, and small Banca shipments of only 513 tons. Deliveries into American consumption were unusually large at 7960 tons, with metal in stock and landing on March 31 at 2078 tons. The total visible supply on April 1 was 15,586 tons, a decrease of 2059 tons from that on March 1. Metal in sight for use in United States was 9707 tons.

Lead.—Partly because of the gradually strengthening market in the West and a fairly heavy demand from all quarters, lead has finally advanced. The American Smelting & Refining Co. yesterday raised its contract price from 6c. to 6.10c., New York, and in the West the metal sold as high as 5.95c., St. Louis, which is now regarded as the market in that district.

Zinc.—Buying of prime Western zinc is not active, but prices are turning stronger. This is due largely to the ore situation, which at present is the key to the market. It is believed by metal producers that the sellers of ore are sincere in restricting output. Statistics for last week indicate this, with both production and sales at the lowest point in some weeks. The price was unchanged at $38, Joplin. Slab zinc sold as low as 5.65c., St. Louis, last week, but, with the clearer knowledge of the ore situation, prices this week are firmer

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	55.00c. to 56.00c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper. casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.25c. to 12.75c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.75c.
Tin, bar	61.75c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.85c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	63.50c.
Solder, ½ and ½	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.00c. to 9.50c.
Zinc sheets, open	10.00c. to 10.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Quotations on lead full sheets and zinc sheets have not been revised since the reductions of Feb. 21 and March 26, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	8.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

at 5.72½c., St. Louis, or 6.07½c., New York, for April delivery, with premiums on futures.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The market is weaker and Chinese metal for all positions is quoted at 9.50c., New York, duty paid. This is due to lack of demand by consumers and eagerness to sell by dealers. This price is said to figure back to a level close to cost of production in China.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, April 3.—Sales are moderately active. Prices for copper are steady. Tin has advanced and lead and zinc have weakened. A fair volume of business is being done in old metals.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 55.50c.; lead, 5.95c.; zinc, 5.80c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

REINFORCING STEEL

Building in Boston Will Take 4000 Tons—Awards of 9000 Tons

Awards of concrete reinforcing bars, as reported to The Iron Age in the last week, amounted to 9000 tons. None of the lettings was of outstanding size. Included in the 6000 tons called for in new projects was a building at Boston requiring 4000 tons. Awards follow:

New York, 500 tons, warehouse, to Truscon Steel Co.

Rochester, N. Y., 900 tons, Benjamin Franklin High School, to a Buffalo maker.

Philadelphia, 800 tons, addition to Alden Park Manor, reported to Concrete Steel Co.

Harrisburg, Pa., 350 tons, Market Street subway, to McClintic-Marshall Co.

Pittsburgh, 100 tons, Stanley East Liberty Theater, to Carlem Engineering Co.

Quantico, Va., 600 tons, Marine barracks, to McClintic-Marshall Co.

Waycross, Ga., 125 tons, hotel building, to Connors Steel Co., Birmingham.

Shreveport, La., 700 tons, Market Street viaduct, to Laclede Steel Co.

Elyria, Ohio, 325 tons, to Bourne-Fuller Co.

Chicago, 1100 tons, Produce Market, to Joseph T. Ryerson & Son.

Chicago, 100 tons, addition to building for Sears, Roebuck & Co., to Joseph T. Ryerson & Son.

Chicago, 570 tons of rail steel bars, apartment building at 14 West Elm Street, to Calumet Steel Co.

St. Louis, 190 tons, metropolitan police gymnasium, to Laclede Steel Co.

Poplar Bluff, Mo., 110 tons, Court House, to Laclede Steel Co.

San Diego, 100 tons, pier foot of E Street, to unnamed jobber.

Long Beach, Cal., 115 tons, administration building for Board of Education, to unnamed jobbers.

Seattle, 100 tons, apartment building, Boren and Olive Streets, to Pacific Coast Steel Co.

Seattle, 100 tons, garage, Ninth and Virginia Streets, to Pacific Coast Steel Co.

San Francisco, 250 tons, factory, Tenth and Howard Streets, to unnamed jobber.

Oakland, Cal., 100 tons, garage, Hobart and Harrison Streets, to unnamed jobber.

Seattle, Wash., 225 tons, physics building, University of Washington, to Pacific Coast Steel Co.

Seattle, 190 tons, Fire Department headquarters, to Pacific Coast Steel Co.

Spokane, Wash., 123 tons, viaduct over Great Northern Railroad, to unnamed jobber.

Springfield, Ore., 150 tons, bridge over McKenzie River; general contract to Lindstrom & Feigeson.

Cristobal, Canal Zone, 1050 tons, Panama Canal, to United States Steel Products Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Boston, 4000 tons, New England Building.

Long Island City, N. Y., 290 tons, warehouse for Bayonne Steel Ceiling Co.

Philadelphia, 200 tons, deck for Tacony-Palmyra bridge; bids in.

Bocaratone, Fla., 500 tons, club house; bids being taken.

Chicago, 117 tons, building for Chicago Portrait Co.; N. Max Dunning, architect.

Chicago, tonnage being estimated, Northwest Side Y. M. C. A.; Perkins, Chatten & Hammerland, architects.

Chicago, tonnage being estimated, North-West Tower apartment building; Perkins, Chatten & Hammerland, architects.

Chicago, 200 tons, completion of Soldier Field Stadium; John Griffith & Son, general contractors.,

Stickney, Ill., tonnage not stated, sewer project.

Aurora, Ill., tonnage being estimated, sewer.

St. Louis, 250 tons, Mark Twain Hotel.

Phoenix, Ariz., 263 tons, highway work between Globe and Safford; bids April 5.

Sacramento, Cal., 212 tons, highway work near French Camp; bids opened.

RAILROAD EQUIPMENT

Inquiries for 1050 Freight Cars—300 Refrigerator and 260 Ballast Cars Purchased

The Southern Pacific has inquired for 500 flat cars and 50 gondolas and the North American Car Corporation will buy 500 tank cars. The latter company has purchased 300 refrigerator cars and the Canadian National has ordered 260 ballast cars. Included in the week's passenger equipment purchases are 69 miscellaneous items for the Canadian National. Details of the week's business follow:

North American Car Corporation has ordered 300 refrigerator cars from Pressed Steel Car Co. Company is also inquiring for 500 tank cars in addition to 300 poultry cars previously noted in these columns.

Norfolk & Western will rebuild 250 all-steel gondola cars at its Roanoke, Va., shops.

Canadian National has ordered 12 snow plows from Eastern Car Co. and 69 passenger train cars distributed as follows: Five cafe parlor cars, two buffet club cars and 30 colonist cars from Canadian Car & Foundry Co., and 12 baggage and 30 colonist cars from National Steel Car Corporation. This road has also ordered 60 ballast cars from Canadian Car & Foundry Co. and 200 ballast cars from Eastern Car Co.

Pond Creek Colliery Co. has ordered 60 mine cars from Hockensmith Wheel & Mine Car Co.

Ringling Brothers have ordered 65 all-steel circus cars of special construction from Warren Tank Car Co.

Southern Pacific will buy 500 flat cars and 50 gondola cars.

Chicago Rapid Transit Co. has revised its inquiry and is now asking for either 50 or 100 motor cars and 50 or 100 trailers.

FABRICATED STRUCTURAL STEEL

Bridge at Louisville Takes 18,000 Tons—Total Awards of 46,000 Tons

WITH a bridge across the Ohio River at Louisville requiring 18,000 tons and a section of the subway in New York taking 7800 tons, structural steel lettings amounted to 46,000 tons in the past week. About 20,800 tons is called for in new pending projects, the largest of which is a bridge at Newark, N. J., for the Pennsylvania Railroad. Awards follow:

WEST BOYLSTON, MASS., 130 tons, bridge, to Boston Bridge Works, Inc.

SPRINGFIELD, MASS., 550 tons, hotel, to Palmer Steel Co.

ALBANY, N. Y., 600 tons, office building, to Levering & Garrigues Co.

BOSTON, 125 tons, Working Boys' Home, to New England Structural Co.

NEW YORK, 2970 tons in the following awards as reported by Structural Steel Board of Trade: High school at Roslyn, L. I., to Lehigh Structural Steel Co.; Mansion Theater at Fifty-eighth Street and Lexington Avenue and new roof for Medical Center building at 168th Street and Broadway, to Taylor-Fichter Steel Construction Co.; alteration to building at 81 Fifth Avenue, service building at Sixth Avenue and Seventh Street, Brooklyn, and Oddfellows Temple at 105 East 106th Street, to George A. Just Co.

NEW YORK, 160 tons, alteration to residence at 15 East Eighty-fourth Street, to Fassler Iron Works.

NEW YORK, 7800 tons, section of subway, route 106, to McClintic-Marshall Co.

ROSELAND, N. J., 280 tons, switching station for Public Service Production Co., to Archibald Brady Co.

TRENTON, N. J., 120 tons, store and loft building for N. A. K. Bugbee Co., to American Bridge Co.

PHILADELPHIA, 490 tons, building for Terminal Title & Trust Co., to Bethlehem Fabricators, Inc.

PENNSYLVANIA RAILROAD, 470 tons; 245 tons for bridge at Baltimore to Fort Pitt Bridge Works, 125 tons for bridge at Akron, Ohio, to Bethlehem Steel Co., and 100 tons for bridge at Stoney Brook, Pa., to American Bridge Co.

NEW CASTLE, DEL., 200 tons, mill building, to Belmont Iron Works.

BALTIMORE, 550 tons, North Avenue market, to McClintic-Marshall Co.

WASHINGTON, 950 tons, administration building for Department of Agriculture, to McClintic-Marshall Co.

BUTLER, PA., 169 tons, residence for B. D. Phillips, to Jones & Laughlin Steel Corporation.

ECONOMY, PA., 300 tons, crane runway roof for Central Tube Co., to Jones & Laughlin Steel Corporation.

PITTSBURGH, 1025 tons, six steel barges for Union Barge Line, to American Bridge Co.

PITTSBURGH, 2200 tons, 10 covered barges for Carnegie Steel Co., to American Bridge Co.

CORAOPOLIS, PA., 600 tons, County bridge repairs, to American Bridge Co.

LOUISVILLE, KY., 18,000 tons, Big Four railroad bridge across Ohio River, to McClintic-Marshall Co.

NASHVILLE, TENN., 110 tons, sheet metal manufacturing plant, to McClintic-Marshall Co.

SHARONVILLE, OHIO, 525 tons, four subway structures for Big Four railroad, to McClintic-Marshall Co.

ARGO, ILL., 205 tons, building for Corn Products Co., to Gage Structural Steel Co., Chicago.

SANTA FE RAILROAD, 300 tons, bridges, to Kansas City Structural Steel Co.

MISSOURI-KANSAS-TEXAS RAILROAD, 300 tons, bridges, to Kansas City Structural Steel Co.

SOUTH CHICAGO, 380 tons, building for Federal Furnace Co., to Worden-Allen Co.

ROCK ISLAND, ILL., 500 tons, repairs to Rock Island Railroad bridge across Mississippi River, to Fort Pitt Bridge Works.

ST. LOUIS, 365 tons, metropolitan police gymnasium, to St. Louis Structural Steel Co.

KELLOGG, ORE., 280 tons, bridge over Umpqua River, to Clyde Catching, Reedsport, Ore.

OAKLAND, CAL., 4300 tons, Capewell store, to Judson-Pacific Co.

SAN FRANCISCO, 400 tons, addition to Medical-Dental Building, to Judson-Pacific Co.

SAN FRANCISCO, 140 tons, steel joists, Junior beams, apartment building, Stockton near California Street, to Judson-Pacific Co.

PITTSBURG, CAL., 125 tons, for Columbia Steel Co., to Pacific Coast Engineering Co.

LOS ANGELES, 400 tons, apartment building at 8225 Sunset Boulevard, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

MAINE CENTRAL RAILROAD, 275 tons, five bridges.

BANGOR & AROOSTOOK RAILROAD, 315 tons, bridge at Monticello, Me.

STATE OF VERMONT, 200 tons, three highway bridges.

BROOKLYN, 1000 tons, Tilden Theater.

NEW YORK CENTRAL RAILROAD, 1275 tons, baggage subway and bridge at South Bend, Ind.

NEWARK, N. J., 5000 tons, Newark Bay bridge for Pennsylvania Railroad; bids April 26.

STANDARD OIL CO. OF NEW JERSEY, 250 tons, 80,000-gal. tank at McCamey, Tex.

CENTRAL RAILROAD OF NEW JERSEY, 165 tons, bridge at Scranton, Pa.

CAMDEN, N. J., 250 tons, Catholic church and school.

PENNSYLVANIA RAILROAD, 115 tons, bridge at Cartersburg, Ind.

GLENDALE, PA., 300 tons, theater.

BALTIMORE & OHIO RAILROAD, 1800 tons, bridges.

SEABOARD AIR LINE RAILROAD, 120 tons, bridge at Calhoun Falls, S. C.

SOUTHERN RAILWAY, 700 tons; 500 tons for viaduct at Cloude, Tenn., and 200 tons for miscellaneous bridges.

ATLANTA, GA., 1000 tons, viaducts.

HUNTINGTON, W. VA., 200 tons, three barges for United States Engineers; Howard Shipyards & Dock Co., Jeffersonville, Ind., low bidder.

MEMPHIS, 3500 tons, 31 barges for Mississippi River Commission; Riter-Conley Co., low bidder.

DAYTON, OHIO, 500 tons, Dayton-Biltmore Hotel.

CHICAGO, 650 tons, approaches to Crawford Avenue bridge.

CHICAGO, 700 tons, warehouse for Illinois Central Railroad, temporarily postponed.

CHICAGO, 1200 tons, 15-story office building.

CHICAGO, 2000 tons, warehouse for Buick Motor Co.

CHICAGO, tonnage being estimated, four-story addition to Sheridan Trust & Savings Bank.

AURORA, ILL., 250 tons, public school; Rochester Bridge Co., Rochester, Ind., low bidder.

BESSEMER, MICH., 200 tons, interstate bridge between Iron County, Wis., and Gogebic County, Mich.; bids close April 19.

MARINETTE, WIS., 250 tons, two-leaf draw span between Menominee, Mich., and Marinette, Wis.; bids close April 10.

WAUSAU, WIS., 150 tons, Marshfield-Athens highway span; bids close April 5.

SACRAMENTO, CAL., 947 tons, bridge over San Joaquin River near Herndon; bids April 18.

SACRAMENTO, 606 tons, bridge over Sacramento River at Freeport; C. J. Nystedt, Stockton, low bidder on general contract.

SAN FRANCISCO, 700 tons, car float for Santa Fe; bids being received.

REEDSPORT, ORE., 530 tons, bridge over McKenzie River; general contract to Linstrom & Feigeson, Portland, Ore.

Employment in Ohio Better in February

February employment in the iron and steel industries of Ohio was 9 per cent greater than in January, and was the same as in February, 1927, according to the bureau of business research of Ohio State University. Twenty-five of the 42 reporting companies shared in the increase, 11 showed a decline and six indicated no change. The blast furnace group revealed a sharp decrease in workers, the number of employees being 26 per cent less than in January, and 47 per cent less than in February, 1927.

Steel works and rolling mills, on the other hand, had 8 per cent more men on their payrolls in February than in January and 2 per cent more than in the corresponding month last year. In this group 10 of the 14 reporting concerns participated in the improvement. February employment in 148 machinery companies averaged 2 per cent ahead of January, but 8 per cent less than in February, 1927. The betterment was shared by all cities except Dayton, while Cincinnati was the only city showing an increase from February, 1927. Within the machinery group the foundry and machine shop section, with 101 reporting firms, revealed an improvement of 5 per cent from January, while 12 machine tool companies showed an upward movement of 8 per cent.

PERSONAL

CHARLES STAMM

Charles Stamm, whose appointment as sales manager of the Empire Steel Corporation, Mansfield, Ohio, was announced in THE IRON AGE, March 1, started in the steel industry with the Carnahan Tin Plate & Sheet Co., Canton, Ohio, in 1903, as a tracer. Later he became weigh master. He was a shipping clerk at the Zanesville, Ohio, works of the American Rolling Mill Co. from 1905 to 1908, going from there to the Massillon Rolling Mill Co., where he was in charge of the finishing and some other departments from 1908 to 1914. From 1914 until his recent advancement he was employed by the Mansfield Sheet & Tin Plate Co., first as a finishing department superintendent, then as production manager and later as special representative.

Justin G. Smeby has been appointed welding engineer South Philadelphia Works, Westinghouse Electric & Mfg. Co. He was graduated in mechanical engineering from the University of North Dakota in 1922 and since has been attached to the South Philadelphia plant.

Dr. Edward E. Marbaker has been appointed to a fellowship recently established by the Whiting Corporation, Harvey, Ill., at the Mellon Institute of Industrial Research, University of Pittsburgh. The fellowship was established for the purpose of carrying on research on cast iron and the results will be published for the benefit of the foundry industry. Dr. Marbaker was graduated from the Towne Scientific School of the University of Pennsylvania in 1910 and four years later received his doctor's degree from the same university. He was first employed by the Westinghouse Lamp Co., Philadelphia, where he carried on original investigation of the platinum metals. He later became chief chemist for the company and had charge of its metallurgical laboratory. In 1917 he became associated with Alexander Brothers, Philadelphia, manufacturers of leather belting, as chief chemist and later as chief engineer. In 1920 and 1921 he was chief chemist for the Cleveland wire division of the National Lamp Works of the General Electric Co., specializing in problems incident to the manufacture of non-sag tungsten wire and molybdenum metals. Since 1921 he has been a fellow of the Mellon Institute, conducting various chemical and metallurgical work.

O. G. Simmons, of the National Tool Co., Cleveland, gave an address on the development of gears and the machinery required to manufacture them at the March meeting of the Tri-City chapter of the American Society for Steel Treating, held at the Chamber of Commerce, Davenport, Iowa.

W. J. Bruce, of Worcester, Mass., will have charge of the plant of the Bromwell Wire Goods Co. at Greensburg, Ind., which has recently been acquired and will be operated by the Cyclone Fence Co., Waukegan, Ill.

F. Baackes, Jr., has been appointed sales agent at Cincinnati for the American Steel & Wire Co., succeeding S. A. Felix, who has retired after 25 years of active service with that company. Mr. Felix started to work for the American Steel & Wire Co. in its St. Louis office. In 1915 he was transferred to the St. Paul, Minn., office and in 1918 took charge of the Cincinnati office.

H. B. Maguire, formerly assistant manager of the Detroit office of the American Steel & Wire Co., has been appointed assistant to D. A. Merriman, general manager of sales, 208 South LaSalle Street, Chicago.

Dwight Ruth has resigned as assistant treasurer of the Saranac Machine Co., Benton Harbor, Mich., to become associated with the Moulds Brass Foundry Co., of that city.

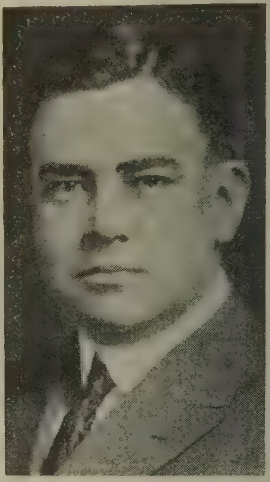
L. E. Gilmore, metallurgical engineer Crane Co., Chicago, will address the Chicago Foundrymen's Club at its monthly meeting at the City Club on April 5. His subject will be "Cupola and Air Furnace Practice."

Dr. Zay Jeffries, consulting metallurgist for the Aluminum Co. of America and General Electric Co., will address the New York Chapter American Society for Steel Treating, in the Merchants' Association auditorium, Woolworth Building, Monday, April 16, on "The Hardening of Steel."

W. H. Norrington, until recently general sales manager of the Robins Conveying Belt Co., New York, has been appointed representative in New York and vicinity of the C. O. Bartlett & Snow Co., Cleveland. His headquarters will be at 30 Church Street. Mr. Norrington was graduated from the engineering department of the University of Michigan, and then served two years in the manufacturing department of the Republic Rubber Co., Youngstown. He became associated with the Robins Conveying Belt Co. in 1914 and was made general sales manager in 1921.

W. H. Foster, whose election as chairman of the board of the General Fireproofing Co., Youngstown, was announced in THE IRON AGE last week, has been president of the company since 1912. He was at one time general sales manager of the Youngstown Sheet & Tube Co., later joining the Fireproofing company as secretary. George C. Brainard, who has succeeded Mr. Foster as president of the company, became associated with it in 1923 and was most recently vice-president in charge of operations. He attended Northwestern University, Evanston, Ill., and Cornell University, Ithaca, N. Y., and in 1913 became identified with the Hydraulic Steel Co., Cleveland. He served as factory manager of that company until 1920, with the exception of an interval during the war when he was on the staff of the Chief of Ordnance. From 1920 until 1923 he was vice-president of the Hydraulic company.

W. H. FOSTER



G. C. BRAINARD

Caleb Davies, Jr., has resigned as assistant general superintendent Republic Iron & Steel Co., Youngstown, Ohio, to become vice-president American Tar Products Co., Pittsburgh, a subsidiary of the Koppers Co.

David R. Sieber, for the past five years Pittsburgh district manager of sales for the General Refractories Co., Philadelphia, has been elected a vice-president of that company.

J. C. Gillette, works manager National Carbon Co., Cleveland, has been elected chairman of a plant engineers' division recently organized by the Cleveland Engineering Society. McRae Parker, chief engineer Cleveland Worsted Mills Co., has been named vice-chairman, and Paul H. Voth, equipment engineer Willard Storage Battery Co., recorder. These officers will serve until the annual meeting in May.

A. R. Hauschel, of Paris, France, has arrived in Racine, Wis., to assume his new duties as general foreign sales manager of the J. I. Case Threshing Machine Co. with headquarters at the main offices in Racine. Mr. Hauschel, a native of Alsace Lorraine, became associated with the Case company in 1900 and for several years he has been general European sales manager, with headquarters in Paris.

Bertram D. Quarrie has been elected president of the Oliver Iron & Steel Corporation, Pittsburgh, succeeding Henry Oliver, who assumes the newly created office of chairman of the board of directors. Except for a brief period spent in the chemical industry, the new head of the Oliver corporation has been actively identified with the iron and steel industry continuously since his graduation in 1903 from Case School of Applied Science, Cleveland. For 15 years he was with the American Steel & Wire Co., serving successively as assistant and then superintendent Central furnaces, Cleveland, and superintendent Newburgh works, leaving the latter position in 1922 to become general manager Otis Steel Co., Cleveland. For the past four years he has been vice-president Paper & Textile Machinery Co., Sandusky, Ohio. Before joining the American Steel & Wire Co., Mr. Quarrie was with the Cleveland Furnace Co., the Inland Steel Co., and the Grasselli Chemical Co.

B. D. QUARRIE

D. D. Francis, secretary-treasurer Marvel Carbureter Co., Flint, Mich., has been made president of the Wheeler-Schebler Carbureter Co., Indianapolis, following the purchase of the Indianapolis company by the Marvel organization.

A. P. Dowell has been appointed general superintendent of Plant No. 1, body division, Murray Corporation of America, Detroit. He has been associated with the manufacture of automobile bodies at Detroit for 19 years, having begun with the Briggs Mfg. Co., of which company he was later vice-president nad assistant general manager. For the last seven years he has been associated with the Fisher Body Corporation.

John G. Platt has been elected president of the Hunt-Spiller Mfg. Corporation, Boston, succeeding the late Walter B. Leach.

J. L. Spitzer is manager of a new brokerage department which has been established by L. Schiavone & Bonomo Brothers, Inc., Jersey City, to handle scrap iron and steel bought and sold in the Eastern district. The department will be operated separately from the company's activities as a dealer.

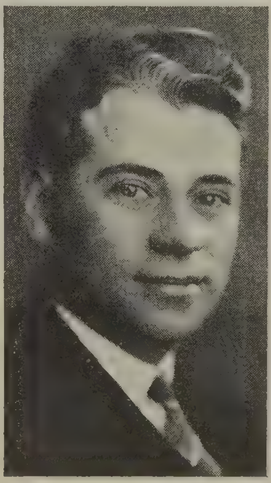
Clement J. Hardy, consulting engineer, Chicago, spoke on "New Foundries for Old" at the monthly meeting of the Wisconsin Gray Iron Research Group at the Republican House, Milwaukee, on April 4.

Robert K. Greaves has been appointed Detroit district manager in charge of sales of tool and special steel and metal cutting saws for Henry Disston & Sons, Inc., Tacony, Philadelphia. His headquarters will be at 620 East Hancock Street.

Dr. Arthur D. Little, president of Arthur D. Little, Inc., chemist and engineer, Cambridge, Mass., delivered the Aldred lecture at the Massachusetts Institute of Technology on March 23. His subject was "Chemical Industry."

William O. Lange has been elected secretary of the Phoenix Iron Co., Philadelphia, succeeding the late George Gerry White, who had filled the office for 58 years and who had been connected with the company for 71 years. Mr. Lange has been connected with the company for over 23 years and for the past two years has been general manager of sales.

H. L. McCauley, since 1924 assistant district sales manager at Milwaukee for the Inland Steel Co., Chicago, has been appointed district sales manager for the company in that city, succeeding C. M. Easterly who has resigned. Mr. McCauley became associated with the Inland company in 1920, serving in the order department before going to the Milwaukee office in 1924. Previously he had been associated with the American Sheet & Tin Plate Co. at Gary, Ind., Pittsburgh and Saltsburg, Pa. M. E. Gregg, who succeeds Mr. McCauley as assistant district manager at Milwaukee, has served in a similar capacity in the company's St. Paul, Minn., office since 1925. His previous business associations were with the Bethlehem Steel Co., the Lackawanna Steel Co., the Republic Iron & Steel Co. and the Basset-Presley Co.


H. L. MC CAULEY

M. E. GREGG

H. J. Hair, recently engineer in the railroad sales department of the Whiting Corporation, Harvey, Ill., has been appointed manager of railroad sales for the Watson-Stillman Co., 75 West Street, New York. He was graduated from Purdue University and served for a time as mechanical engineer for the Baltimore & Ohio Southwestern Railroad. Later he was Pittsburgh district manager for Manning, Maxwell & Moore, Inc.

J. A. Claussen, Rogers Brown & Crocker Brothers, New York, sailed from New York April 2 on a vacation trip to Havana, Cuba.

William J. Chapin, recently associated with the Peoples Gas, Light & Coke Co., Chicago, and the Peerless Heat Co., Pittsburgh, has been appointed engineer for heat resisting alloys manufactured by the Chicago Steel Foundry Co., Chicago.

OBITUARY

Col. William Henry Morgan, president Morgan Engineering Co., Alliance, Ohio, and a pioneer in the electric traveling crane industry, died at Union Memorial Hospital, Baltimore, March 29, following an operation. He was 63 years of age. Colonel Morgan was born in Pittston, Pa., June 1, 1865. His parents moved to Alliance in 1871 where in that year his father, Thomas R. Morgan, Sr., founded the Morgan Engineering Co. to manufacture steel mill and handling equipment. After attending the Alliance High School and Mount Union College, Alliance, Colonel Morgan went into the Morgan plant and, after the death of his father in 1897, became president of the company. In 1888 he designed one of the first electric traveling cranes built by the Morgan company and also developed considerable other equipment. After he became president, he continued to spend much of his time in the engineering department designing mill equipment. He was active in the company until about two years ago, when poor health compelled him to give up most of his business duties. He was a member of the American Iron and Steel Institute and of the (British) Iron and Steel Institute. He acquired the title of Colonel a number of years ago when he served on the staff of George K. Nash, governor of Ohio. He is survived by his widow and one son, William H. Morgan, Jr., the latter connected with the Morgan plant.

COL. W. H. MORGAN

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Charles S. Smith, for many years vice-president A. O. Smith Corporation, Milwaukee, maker of pressed steel automobile frames and oil well equipment, died, March 28 in Bermuda, aged 67 years. As a youth he became associated with his father and brother in the C. J. Smith & Sons Co., manufacturer of bicycle parts, the business later becoming the A. O. Smith Corporation.

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Albert A. Dowd, specialist in tool engineering, died in Detroit March 15, of pneumonia. At the time of his death he was connected with the Chrysler Corporation, and before that had been engaged in consulting work. He was born in North Granville, N. Y., Oct. 2, 1872. Among a number of other companies he had been employed by the Pratt & Whitney Co., Hartford, Conn., and the Bullard Machine Tool Co., Bridgeport, Conn. He was a contributor to The Iron Age and other publications and was author and co-author of a number of books on tool engineering and related subjects.

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David H. Darrin, president Automatic Switch Co., New York, died on March 29 at his home in New Rochelle, N. Y., aged 60 years. He was a life member of the American Society of Mechanical Engineers and a member of the Engineers' Club, New York.

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Dr. W. F. M. Goss, in 1914 president of the American Society of Mechanical Engineers and long dean of the schools of engineering of both Purdue University and of the University of Illinois, died at the Waldorf Astoria Hotel, New York, on March 23. He was born at Barnstable, Mass., in 1859 and attended the Massachusetts Institute of Technology. He established the course in mechanic arts at Purdue University. In 1907 he left Purdue to become dean of the College of Engineering and director of the School of Railway Engineering and Administration at the University of Illinois. He resigned from this position in 1917 to become president of the Railway Car Manufacturers Association, having held that position until his retirement in 1925. He was honored by the degree of Doctor of Engineering by the University of Illinois in 1904 and had received recognition from many other sources for his work in transportation and engineering.

RAIL PRODUCTION IN 1927

Falling Off from 1926 in All Sections, but Above 10-Year Average

STEEL rails produced in the United States in 1927 are reported by the American Iron and Steel Institute at 2,806,390 gross tons, a decline of 12.78 per cent from the 3,217,649 tons of 1926, but a gain of 8 per cent over the 10-year average (1917-1926) of 2,598,436 tons. The year's total was close to the 2,812,079-ton average of the three years 1924-1926. All sections participated in the decline from 1926, rails of 100 lb. and over recording the smallest loss—1.66 per cent. Those of under 50 lb. dropped 18 per cent; those of 50 to 84 lb., 33.4 per cent; those of 85 to 99 lb., 33.4 per cent.

More than two-thirds of all the rail tonnage in 1927 was of 100-lb. section or heavier. The ratio, 68.84 per cent, is the highest ever reached. Both 1926, with 61.12 per cent, and 1925, with 58.76 per cent, had previously held the high record in this respect. So pronounced has the preponderance of heavy rails become that the institute has this year started a new classification, separating the rails of 100 lb. and over into two weight groups. Rails weighing 120 lb. or more are now separately listed, at 617,524 tons, or 22.01 per cent of the total. This follows the action of 13 years ago, when the 100-lb. rails were separated for the first time from the previous heavy group, weighing 85 lb. and over. At that time the new heavy section contributed 27.18 per cent to the total year's tonnage.

Alloy-treated steel rails dropped in 1927 to 1265 tons, much the smallest amount in over 20 years. All but 77 tons was manganese—10 per cent and over. The maximum tonnage under this heading came in 1910, with 257,324 tons, nearly all of which was titanium-treated. Only one year since 1917, however, has seen over 6500 tons of alloy-treated rails produced. No electric steel rails have been made since 1923, and less than 650 tons, total, since 1913.

Rails rolled from ingots in 1927, either with or without reheating of blooms, totaled 2,719,431 tons. Of this amount all were open-hearth with the exception of a small fraction (0.058) of 1 per cent. This marks the highest open-hearth percentage ever reached, for Bessemer rails have never, heretofore, been below 0.35 per cent of the total of steel rails. In 1921 and all earlier years they were over 2.7 per cent.

Except for 1925, the 1927 tonnage of rails rerolled from old rails was the smallest since these figures were first reported separately, for the 1911 production. Compared with the 10 years, 1917-1926, when an average of 108,586 tons was so produced, the 86,959 tons of 1927 represents a drop of 19.9 per cent.

PRODUCTION OF STEEL RAILS IN THE UNITED STATES

(In Gross Tons)

Weight per yard:	1927	1926	1925
120 lb. and over	617,524	1,966,440	1,636,631
100 lb. to 119 lb.	1,314,424		
85 lb. to 99 lb.	539,445	797,662	765,371
50 lb. to 84 lb.	173,257	256,287	219,648
Under 50 lb.	161,740	197,260	163,607
Total	2,806,390	3,217,649	2,785,257
Percentage weighing 100 lb. and over	68.84	61.12	58.76
Included above:			
Open-hearth	2,717,865	3,107,992	2,691,823
Bessemer	1,566(a)	12,533	9,687
Rerolled from old rails	86,959(b)	97,124	83,747
Alloy-treated	1,265	4,216	4,009

(a) All under 50 lb. (b) All under 100 lb.; 80 per cent under 50 lb.

Machinery Exports at Higher Rates

Total in Two Months 13 Per Cent Ahead of 1927—Imports Larger in February

WASHINGTON, March 31.—Exports of machinery of all kinds in February were valued at $35,955,176, against $36,183,571 in January, a decline of $228,395. Based on working days, however, the average shipments in February exceeded those of January, the daily rates having been $1,438,207 and $1,391,676 respectively. For the two months ended with February the total was $71,218,747, compared with $63,031,507 for the corresponding period of last year, an increase of $8,187,240, or almost 13 per cent.

Power-driven metal-working tools to the number of 623, valued at $1,242,234, were exported in February, comparing with 686, valued at $1,315,771 in January, as listed in THE IRON AGE table. Total exports of industrial machinery, as classified by the division of statistics, Department of Commerce, amounted to $16,173,666 in February, against $16,202,582 in January and $13,762,055 in February of last year. For the two months ended with February, 1928, they were valued at $32,456,248, compared with $31,316,610 for the corresponding period of last year.

Exports of agricultural machinery in February were valued at $8,035,812, against $7,855,000 in January. For the two months ended with February they were valued at $15,890,503, against $10,118,660 for the corresponding period of last year.

Machinery imports, as listed in THE IRON AGE table, were valued at $1,714,648 in February, against $1,157,964 in January and $1,483,713 in February, 1927. For the two months ended with February they were valued at $2,918,848, against $3,123,990 for the corresponding period of last year. Imports of industrial, office and printing machinery in February were valued at $1,369,249, against $1,074,638 in January and $1,324,521 in February of last year. For the two months ended with February the values were $2,748,363 in 1927 and $2,443,887 in 1928.

River Shipments of Iron and Steel Products Rising

Increased use of the inland waterways for the transportation of iron and steel products continues to be indicated in the February report of the Pittsburgh office, United States Engineers, which covers the waterborne movement on the Ohio, Monongahela and Allegheny rivers in the Pittsburgh district. The shipments on the Monongahela River fell off somewhat last month from those of the previous month, but even so were almost two and one-half times those of February last year, while steel products carried on the Ohio were almost 18,000 tons greater than in January and very nearly triple those of February last year. The figures in net tons compare as follows:

	Allegheny	Monongahela	Ohio
February, 1928	385	73,360	87,635
January, 1928	330	78,069	69,750
February, 1927	—	29,529	29,211

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	February		Two Months Ended February	
	1928	1927	1928	1927
Locomotives	$80	$63	$206	$1,196
Other steam engines	28	53	98	338
Boilers	73	146	148	417
Accessories and parts	36	41	82	74
Automobile engines	952	1,098	1,697	1,776
Other internal combustion engines	467	355	1,099	902
Accessories and parts	210	353	466	697
Electric locomotives	114	50	488	67
Excavating machinery	655	306	1,192	631
Concrete mixers	56	84	127	194
Road making machinery	66	78	149	190
Elevators and elevator machinery	266	419	632	761
Mining and quarrying machinery	1,025	1,070	1,961	2,206
Oil well machinery	799	1,435	1,864	3,413
Pumps	506	444	1,134	1,039
Sheet and plate metal working machines	96	50	222	156
Machine tools*	1,315	773	2,714	1,554
Forging machinery	57	50	146	156
Other metal-working machinery and parts	433	285	881	637
Textile machinery	922	721	2,138	1,746
Sewing machines	718	725	1,386	1,498
Shoe machinery	133	101	302	174
Flour-mill and gristmill machinery	54	20	90	37
Sugar-mill machinery	1,112	285	1,295	450
Paper and pulp mill machinery	393	573	688	1,159
Sawmill machinery	70	59	137	138
Other woodworking machinery	106	80	317	194
Refrigerating and ice-making machinery	581	306	1,164	706
Air compressors	506	399	861	732
Typewriters	1,777	1,589	3,733	3,240
Power laundry machinery	73	178	132	258
Typesetting machines	308	204	770	528
Printing presses	462	613	859	1,084
Agricultural machinery and implements	8,036	5,487	15,891	10,119
All other machinery and parts	13,471	11,089	26,149	24,563
Total	$35,955	$29,584	$71,219	$63,032

*Principal details in another table.

Exports of Power-Driven Metal-Working Machinery

	February, 1928		January, 1928	
	No.	Value	No.	Value
Engine lathes	68	$141,578	66	$157,399
Turret lathers	30	89,649	26	82,136
Other lathes	53	54,515	57	155,744
Vertical boring mills and chucking machines	7	19,235	7	30,978
Thread-cutting and automatic screw machines	66	138,959	74	88,723
Knee and column type milling machines	24	65,420	30	69,761
Other milling machines	51	106,778	81	147,290
Gear-cutting machines	24	87,417	31	91,452
Vertical drilling machines	19	15,103	42	44,430
Radial drilling machines	13	20,388	18	31,519
Other drilling machines	56	37,398	42	76,167
Planers and shapers	36	78,846	40	62,459
External cylindrical grinding machines	98	257,637	77	166,151
Internal grinding machines	37	88,601	46	76,359
Metal-working tool-sharpening machines	41	40,710	49	35,203
Total	623	$1,242,234	686	$1,315,771

Imports of Machinery into the United States

(By Value)

	February		Two Months Ended February	
	1928	1927	1928	1927
Metal-working machine tools	$31,539	$31,743	$88,167	$65,313
Agricultural machinery and implements	544,200	535,083	946,715	871,127
Electrical machinery and apparatus	187,687	142,879	284,742	394,391
Other power-generating machinery	14,218	2,568	21,415	19,389
Other machinery	665,757	624,383	1,136,166	1,475,110
Automobiles and other vehicles, except agricultural	271,247	147,057	441,643	298,660
Total	$1,714,648	$1,483,713	$2,918,848	$3,123,990

Production of Pig Iron and Ferroalloys in the United States in 1927

OFFICIAL figures of the American Iron and Steel Institute show a total production of pig iron and ferroalloys in 1927 of 36,565,645 gross tons. Of this amount 35,858,232 tons was pig iron and 707,413 tons was ferroalloys. The latter is the largest figure in some years. Pig iron shows a reduction from the 38,698,417 tons of 1926 and is slightly below the 36,116,311 tons in 1925. Details are shown in the tables below, all figures being in gross tons.

PRODUCTION OF PIG IRON AND FERROALLOYS BY STATES, 1923-1927

States	1923	1924	1925	1926	1927
Massachusetts .	1,309	....	....	2,729,261	2,775,351
New York, New Jersey	2,951,810	2,013,673	2,187,733		
Pennsylvania ..	14,804,620	11,068,979	12,523,485	13,587,881	11,829,599
Maryland	529,606	558,420	705,377	805,373	855,566
Virginia	276,874	97,739	125,325	103,000	99,197
Alabama	2,797,190	2,773,825	2,836,023	2,953,294	2,782,993
West Virginia, Kentucky ...	702,454	568,031	651,983	516,094	699,514
Tennessee	250,982	137,991	110,232	110,146	133,785
Ohio	9,347,960	7,415,039	8,862,646	9,359,275	8,502,459
Illinois	3,839,063	2,600,864	3,604,255	3,659,974	3,588,595
Ind., Michigan	3,813,125	3,350,385	4,119,811	4,377,068	4,201,802
Wis., Minnesota	724,717	357,271	468,479	537,499	455,727
Missouri, Iowa, Colo., Utah, Washington .	321,436	463,573	505,217	633,864	641,057
Total	40,361,146	31,405,790	36,700,566	39,372,729	36,565,645
Pig iron.......	39,721,415	30,874,765	36,116,311	38,698,417	35,858,232
Ferroalloys ...	639,731	531,025	584,255	674,312	707,413

PRODUCTION OF PIG IRON BY STATES, 1926-1927, SHOWING INCREASE OR DECREASE

States	1927	Per Cent	1926	Per Cent	Increase	Per Cent
Pennsylvania ..	11,466,457	31.98	13,231,890	34.19	*1,765,433	*13.34
Ohio	8,407,243	23.45	9,261,405	23.93	*854,162	*9.22
Indiana, Mich..	4,199,517	11.71	4,377,068	11.31	*177,551	*4.06
Illinois	3,588,463	10.01	3,656,688	9.45	*68,225	*1.87
Alabama	2,758,387	7.69	2,933,796	7.58	*175,409	*5.98
Mass., New York	2,615,556	7.29	2,599,517	6.72	16,039	0.62
Maryland, Va..	941,501	2.63	881,561	2.28	59,940	6.80
W. Va., Ky. ...	697,184	1.94	513,994	1.33	183,190	35.64
Colorado, Utah.	613,627	1.71	608,834	1.57	4,793	0.79
Wis., Minn. ...	455,727	1.27	537,499	1.39	*81,772	*15.21
Tennessee	114,570	0.32	96,165	0.25	18,405	19.14
Total	35,858,232	100.00	38,698,417	100.00	*2,840,185	*7.34

*Decrease.

PRODUCTION OF COLD AND HOT AND WARM BLAST CHARCOAL PIG IRON, 1923-1927

Kinds of Pig Iron	1923	1924	1925	1926	1927
Cold blast	......	......	1,014	400	......
Hot and warm blast....	251,177	212,710	195,150	163,480	164,569
Total	251,177	212,710	196,164	163,880	164,569

PIG IRON AND FERROALLOYS MADE FOR SALE OR FOR USE OF MAKERS IN 1927

Pig Iron and Ferroalloys	For Sale	For Maker's Use	Total
Pig iron:			
Basic	1,821,977	17,535,087	19,357,064
Bessemer and low-phosphorus	602,944	8,502,971	9,105,915
Foundry	4,913,245	591,174	5,504,419
Malleable	1,563,334	136,249	1,699,583
Forge or mill................	68,515	76,017	144,532
White and mottled, direct castings, etc.	7,874	38,845	46,719
Total pig iron...........	8,977,889	26,880,343	35,858,232
Ferroalloys:			
Ferromanganese	103,683	189,943	293,626
Spiegeleisen	99,580	1,140	100,720
Ferrosilicon	278,277	....	278,277
All other ferroalloys..........	34,658	132	34,790
Total ferroalloys	516,198	191,215	707,413
Total pig iron and ferroalloys	9,494,087	27,071,558	36,565,645

HALF-YEARLY PRODUCTION OF PIG IRON AND FERROALLOYS ACCORDING TO FUEL USED

	Blast Furnaces*				Production of Pig Iron and Ferroalloys		
	In Blast June 30, 1927	Dec. 31, 1927			First Half of 1927	Second Half of 1927	Total
		In	Out	Total			
Coke pig iron...	186	162	168	330	19,117,018	16,576,645	35,693,663
Charcoal pig iron	7	7	6	13	85,052	79,517	164,569
Total pig iron.	193	169	174	343	19,202,070	16,656,162	35,858,232
Total ferroalloys	12	9	12	21	†365,484	†341,929	†707,413
Grand total.....	205	178	186	364	19,567,554	16,998,091	36,565,645

*Computed and rebuilding.

†Includes ferromanganese, spiegeleisen, ferrosilicon, and other ferroalloys made in blast furnaces or in electric furnaces.

PRODUCTION OF PIG IRON BY GRADES AND FERROALLOYS BY KINDS, 1926-1927, SHOWING INCREASE OR DECREASE

Grades of Pig Iron and Kinds of Ferroalloys	1927	Per Cent	1926	Per Cent	Increase	Per Cent
Pig iron:						
Basic	19,357,064	53.98	21,168,407	54.70	*1,811,343	*8.56
Bessemer and low-phos. ..	9,105,915	25.40	10,042,324	25.95	*936,409	*9.32
Foundry	5,504,419	15.35	5,506,968	14.23	*2,549	*0.05
Malleable ...	1,699,583	4.74	1,681,897	4.35	17,686	1.05
Forge	144,532	0.40	216,277	0.56	*71,745	*33.17
All other pig iron	46,719	0.13	82,544	0.21	*35,825	*43.40
Total pig iron	35,858,232	100.00	38,698,417	100.00	*2,840,185	*7.34
Ferroalloys:						
Ferromanganese	293,626	41.50	318,891	47.29	*25,265	*7.92
Spiegeleisen .	100,720	14.23	76,215	11.30	24,505	32.15
Ferrosilicon ..	278,277	39.33	245,605	36.43	32,672	13.30
All other ferroalloys..	34,790	4.94	33,601	4.98	1,189	3.54
Total ferroalloys ...	707,413	100.00	674,312	100.00	33,101	4.91
Grand total.	36,505,645	.....	39,372,729	.....	*2,807,084	*7.13

*Decrease.

PIG IRON MADE FOR SALE, BY GRADES, IN 1927

Grades	Basic	Bessemer and Low-Phosphorus	Foundry	Malleable	Forge	All Other Pig Iron	Total
Mass., N. Y., Maryland	143,709	151,664	966,774	244,583	3,072	....	1,509,802
Pa.	568,070	360,245	770,252	74,742	33,420	41	1,806,770
Va., W. Va., Ala., Ky., Tenn. ..	141,178	21,590	1,412,025	....	20,099	1,684	1,596,576
Ohio	547,517	19,692	814,094	560,964	11,924	....	1,954,191
Ind., Ill...	421,503	49,753	467,678	426,527	.....	4,446	1,369,907
Mich., Wis., Minn., Utah ...	......	......	482,422	256,518	.....	1,703	740,643
Total ..	1,821,977	602,944	4,913,245	1,563,334	68,515	7,874	8,977,889

METHODS BY WHICH PIG IRON AND FERROALLOYS WERE CAST OR DELIVERED IN 1927

States	Molten Condition	Sand Cast	Machine Cast	Chill Cast	Direct Castings	Total
Mass., N. Y., N. J., Md..	1,661,333	123,110	1,835,458	10,737	279	3,630,917
Pa.	8,330,397	104,317	3,117,045	274,075	3,765	11,829,599
Va., W. Va., Ala., Ky., Tenn.	1,740,899	1,022,941	711,512	232,811	7,326	3,715,489
Ohio	5,284,311	95,216	3,112,211	......	10,721	8,502,459
Ind., Ill., Mich., Wis., Minn., Ia., Colo., Utah	6,012,852	138,450	2,729,224	132	6,523	8,887,181
Total...	23,029,792	1,484,034	11,505,450	517,755	28,614	36,565,645

Machinery Markets and News of the Works

BUYING AT A GOOD RATE

Machine Tool Orders Show No Falling Off—First Quarter Sales Large

Toledo Plant for Making Shock Absorbers for Ford Automobiles One of the Heaviest Buyers

MACHINE tool buying continued through March at a good rate, and the total for the first quarter of the year runs fully 25 per cent ahead of the corresponding period in 1927, and some companies report a gain of fully 50 per cent. The volume of business pending gives promise that April buying will show little, if any, falling off.

One of the heaviest buyers is the Dana Mfg. Co., Toledo, Ohio, affiliated with the Spicer Mfg. Corporation, South Plainfield, N. J., which is equipping a plant for the manufacture of shock absorbers for Ford automobiles. A production of 6000 a day by July 1 is the schedule planned for. A considerable amount of equipment has been bought and more is under negotiation.

Buying on a large scale is an exception, however, and most of the current business is in single machines from companies in many different lines of manufacture. A fair amount of business is coming from the automobile industry.

Among the week's purchasers were the International Harvester Co. for its Rock Island, Ill., plant, the Allis-Chalmers Mfg. Co., Milwaukee, and the National Transit Pipe Co., Oil City, Pa. The latter bought a number of turret lathes. The Cleveland Board of Education will receive bids up to April 16 on nine woodworking machines.

The Union Pacific Railroad has issued a partial list of its machine tool requirements. The Santa Fe is tabulating bids received on recent inquiries, but it will be three or four weeks before the orders are placed.

Several large inquiries for locomotive cranes are pending. Dwight P. Robinson & Co., New York, are inquiring for 11 and also for seven steam shovels for export. The Amtorg Trading Corporation, New York, has taken bids on six crawl-tread cranes and 10 locomotive cranes for the Dneiper River hydroelectric project in Russia.

New York

NEW YORK, April 3.

MACHINE tool sellers in New York have closed one of the best three-month periods in years. Almost without exception, sales for the quarter have exceeded those for any similar period since 1923 and probably since 1920. At the end of March there had been no marked falling off in the volume as compared with February. January was in most instances the best month of the three. Prospects for a continued good business this month appear promising.

Among the week's sales were the following: A 16 x 60-in. lathe to Portsmouth Navy Yard; 16 x 36-in. lathe to an electric company in Ohio; five hand-production milling machines to a Cleveland company; 6-in. vertical shaper, two 7 x 32-in. bench lathes and a No. 3 universal milling machine to a motor car company; Pratt & Whitney No. 2 jig borer to an electrical manufacturer in New England; 6-in. vertical shaper to a Youngstown company; 13 x 30-in. lathe to a Syracuse, N. Y., manufacturer; 800-lb. Bement single-frame steam hammer to Department of Water and Power, Los Angeles; 7-in. United States grinder and 11-in. x 4-ft. Blount speed lathe to Pratt & Whitney Aircraft Corporation, Hartford, Conn.; Cincinnati high-speed tapping machine to a company in Indiana; 36-in. x 44-ft. Time-Saver lathe to a Connecticut company.

Kent Automatic Parking Garage, Inc., 350 Madison Avenue, New York, has begun work on a twenty-four-story service, repair and garage building, 50 x 200 ft., at 209-11 East Forty-third Street, to cost $1,300,000 with equipment. Jardine, Hill & Murdock, 347 Madison Avenue, are architects.

Bronx Gas & Electric Co., 43 Westchester Square, Bronx, New York, has plans for a two-story power substation, 64 x 188 ft., to cost approximately $110,000 with equipment. Thomas E. Murray, 55 Duane Street, New York, is engineer.

Guilderland Water District Commissioners, Guilderland, N. Y., are asking bids until April 11, for two 75-gal. per min., automatic electrically operated centrifugal pumps, with accessories, and one 50,000-gal. elevated steel tank. Arnold G. Chapman, 100 State Street, Albany, N. Y., is engineer.

New York Edison Co., Irving Place and Fifteenth Street, New York, has plans for installation of third unit of 160,000 kw. capacity, at its power plant at Fourteenth Street and East River. Other units will be provided for later, to comprise nine generating units in all, with gross rating of 1,250,000 kw. Present station has capacity of 120,000 kw. Ultimate project will cost more than $75,000,000.

P. B. Nichols, Depot Plaza, West Plains, N. Y., architect. has plans for a one-story shop for an automobile trade school at Dobbs Ferry, N. Y., to cost close to $40,000 with equipment.

A. Riegel & Sons, Inc., 2 Hamilton Avenue, White Plains. N. Y., has asked bids on general contract for a one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

United Hardware & Tool Corporation, 74 Reade Street, New York, has acquired the five-story and basement building at 50-52 Howard Street and will improve and occupy for a new distributing plant.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, have filed plans for a two-story automobile service, repair and garage building, 95 x 125 ft.. to cost close to $100,000 with equipment.

Noma Electric Corporation, 340 Hudson Street, New York, manufacturer of electric lighting specialties, is disposing of stock issue to total $2,150,000, a portion of the proceeds to be used for expansion.

Department of Public Works, Perth Amboy, N. J., J. V. Smith, commissioner, contemplates construction of an additional unit at municipal electric light and power plant.

Following recent acquisition of Eastwood Wire Mfg. Co., Joralemon Street, Belleville, N. J., manufacturer of brass wire screens, etc., by new interests, arrangements are being made for change of name to Eastwood Wire Corporation. New company plans expansion, to include production of new lines, including valve manufacture.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, has plans for a two-story power switching station at Metuchen, N. J., to cost in excess of $150,000 with equipment. A similar plant will be built at West Orange, N. J. Plans are also in progress for a two-story power substation at Princeton, N. J., to cost more than $80,000.

V. and R. Tedeschi, Newark, care of J. B. Accocella, 9 Clinton Street, Newark, architect, have filed plans for a two-story machine shop, 70 x 100 ft., to cost about $45,000 with equipment.

Lawrence Motor Car Co., 390 Halsey Street, Newark, has plans for a three-story service, repair and sales building on adjoining site, to cost $170,000 with equipment. Nadel & Fort, 32 Hill Street, are architects.

Hygienic Tube Co., 88 McWhorter Street, Newark, will soon begin superstructure for a one-story plant on Avenue L, 52 x 130 ft., for which general contract has been let to Abraham Axel, 114 Gruman Avenue, to cost $45,000 with equipment.

A. E. Sleight, Romaine Building, Paterson, N. J., architect, has asked bids on general contract for a two-story automobile service, repair and garage building, 215 x 250 ft., to cost about $180,000 with equipment.

Board of Education of South Orange, Parker Avenue, Maplewood, N. J., has approved plans for a one-story equipment maintenance and repair building, to cost about $70,000 with equipment. Guilbert & Betelle, 24 Branford Place, Newark, are architects.

H. B. Salmon Co., 357 Grafton Avenue, Newark, building materials and supplies, has plans for a three-story addition for storage and distribution, to cost $100,000 with mechanical handling equipment, etc. W. O. Bartlett, 738 Broad Street, is architect.

Leeds, Tozzer & Co., Inc., 75 West Street, New York, has been appointed distributer in railroad field of electric lift trucks and steel bound platforms manufactured by Stuebing Cowan Co., Cincinnati. Appointment also includes electric lines and steamship companies.

T. P. Steinmetz, former sales promotion manager of Commercial Investment Trust Corporation, automobile finance company, has formed Paul Murchison Co., Inc., 280 Broadway, New York, to act as sales representative and distributer in New York for several manufacturers of automotive products.

Fumaro Metal Spinning & Metal Specialty Co., 116 West Thirty-ninth Street, New York, has been incorporated to engage in spinning metal products. Company has plant at 215 Washington Street, Binghamton, N. Y., and is prepared to begin operation.

Atlas Mfg. Corporation, 1465 Broadway, New York has been formed to manufacture automobile accessories, particularly radiator ornaments. Part of work will be done under contract and part in company's own shop.

James Beggs & Co., 149 Church Street, New York, engines and boilers, grate bars, pumps and general boiler supplies, who some months ago announced their intention of discontinuing business, have changed their plans and are now prepared to take care of usual requirements in lines handled.

Conrad Foundry Co., Montgomery Street, Elizabeth, N. J., is again operating after being shut down for six months, owing to theft of aluminum, master patterns and core boxes

New England

BOSTON, April 2.

SALES are few and usually consist of one machine to a user. A horizontal boring machine to a Massachusetts shop was the most important transaction reported. There are still a sizable number of quotations outstanding which dealers hope to close soon. New England railroads offer the most promising field just now, but none has issued any real lists. Inquiries from Massachusetts manufacturers include a gear hobber and a 24-in. planer. New England machine tool builders collectively are fairly busy with orders received from other parts of the country. Makers of grinding equipment and high priced lathes are especially busy.

Small tool business has dropped, an indication that activity among metal working shops is less than was anticipated April 1. There is still a large surplus of machinists and other skilled help in New England.

Leominister Tool Co., 96 Mechanic Street, Leominster, Mass., has awarded contract for a one-story plant, 40 x 100 ft. Plans are private.

Work has started on a one-story, 30 x 135 ft. plant for Waterhouse Co., Tracy Street, Webster, Mass., bus and automobile bodies.

Gulf Refining Co., Barrington Parkway, East Providence, R. I., has started erection of a one-story garage and repair shop, 100 x 140 ft. W. J. K. Kennedy is manager.

Hopkins Mfg. Co., Allston district, Boston, laundry machinery, is moving to Philadelphia, where it will operate under name of Hopkins-Tull Co.

Hedstrom Union Co., 319 Main Street, Gardner, Mass., baby carriages, has plans for a four-story, 40 x 60-ft., and three-story, 60 x 130-ft. additions. G. Adolph Johnson, 16 Norwich Street, Worcester, Mass., is architect.

Conlon Mfg. Co., 42 Baldwin Street, Bridgeport, Conn., has been formed to manufacture shoe machinery. Company has purchased tools, patterns, plant machinery and equipment and will buy castings and other materials locally.

Furnace Improvement Co., 511 Westminster Street, Providence, has been appointed New England representative for National Flue Cleaner Co., Groveville, N. J., manufacturer of soot blowers for fire tube boilers.

G. L. Gray Sheet Metal Works, New Haven, Conn., will establish plant at 509 Grand Avenue, to specialize in production of blow piping, special fittings and kindred products.

Peerless Pressed Metal Co., 14 Electric Avenue, Brighton, Boston, has asked bids on general contract for a new one-story plant, 75 x 300 ft., at Watertown, Mass., to cost upward of $65,000 with equipment.

Fuller Brush Co., Hartford, Conn., is arranging for expansion in facilities for new lines of production, including manufacture of portable electrically-operated dish-washing machine.

Municipal Light Board, Chicopee, Mass., has awarded general contract to La France Construction Co., Holyoke, Mass. for one-story municipal service and repair shop, with garage facilities, to cost about $80,000 with equipment.

Frank B. Perry, Inc., 44 Franklin Street, Providence, R. I., architect, has plans for an eight-story automobile service, repair and garage terminal, to cost about $850,000 with equipment.

Northern Connecticut Power Co., Thompsonville, Conn., is said to have plans for a hydroelectric power plant at Windsor Locks, Conn., including construction of power dam and transmission lines, to cost in excess of $650,000. J. G. White Engineering Corporation, 43 Exchange Place, New York, is engineer.

New England Transportation Co., New Haven, Conn., has plans for a one-story repair shop, with garage facilities, at Danbury, Conn., to cost approximately $50,000 with equipment. W. T. Dorrance, Avon Street, New Haven, is architect.

Bryant Electric Co., Bridgeport, Conn., manufacturer of electrical equipment, has purchased local factory and business of Benco Mfg. Co., manufacturer of similar devices, and plans to increase line of production. R. A. Carson is vice-president and general manager of purchasing company.

Cleveland

CLEVELAND, April 2.

MACHINE tool sales were rather slow the past week. Total business taken during March was about the same as in February. Inquiry has come out for considerable equipment for a new plant being erected in Toledo by the Spicer Mfg. Corporation, South Plainfield, N. J., to be operated by a separate company known as the Dana Mfg. Co. This will include automatic screw machines and other types of tools. The National Transit Pipe Co., Oil City, Pa., has purchased four turret lathes from a Cleveland manufacturer and three or four similar machines from another source. There is not much activity in the Detroit market, as inquiry from the automotive industry is still light.

Cleveland Board of Education will receive bids April 16 for the following metal and wood-working equipment for the Alexander Hamilton Junior High School.

One 11-in. x 5-ft. lathe.
Two 2-wheel electric grinders.
One wood turning lathe, 7-ft. bed.
One wood turning lathe, 4-ft. bed.
One 12-in. hand jointer.
One 30-in. band saw.
One saw bench.
One portable sanding machine.

Acme Auto Radiator Co., 7707 Carnegie Avenue, Cleveland, is considering plans for a two-story addition, to cost in excess of $40,000 with equipment.

Butler Mfg. Co., 1812 East Twenty-fourth Street, Cleveland, manufacturer of street-sweeping machinery and parts, is completing arrangements for a one and two-story plant in Mogadore Valley section, Akron, Ohio, to cost approximately $100,000 with equipment. Bids have been asked on revised plans by Harpster & Billman, Flatiron Building, Akron, architects.

Firestone Tire & Rubber Co., Akron, plans construction of new two-story factory branch and distributing plant at Richmond, Va., to cost in excess of $200,000 with equipment.

The Crane Market

DEMAND for electric hoists has been quite large recently and several sizable lists have been closed. The Mergenthaler Linotype Co., Brooklyn, N. Y., has closed on 54, the Bethlehem Shipbuilding Co., Wilmington, Del., was reported last week to have closed on nine and the Campbell Soup Co., Camden, N. J., is about to place 25 half-ton electric hoists. In electric overhead cranes the New York Central Railroad is expected to issue an inquiry soon for a 100-ton crane for Harmon, N. Y. There is a fair volume of current inquiry. The locomotive crane market, with the addition of the list of Dwight P. Robinson & Co., New York, has an extraordinary number of large lists under quotation. There is an inquiry from the Amtorg Trading Corporation, 165 Broadway, New York, for six crawl-tread locomotive cranes and one 25-ton standard gage crane for Russia, on which the exporter is seeking shorter terms of payment from the Russian Government and a later inquiry of the same company for nine 40-ton locomotive cranes for the Dneiper River hydroelectric project. The list of Dwight P. Robinson & Co., originally for eight locomotive cranes and seven steam shovels for export has been increased to 11 locomotive cranes. The Carnegie Steel Co. is taking prices on four cranes to serve the new bar mill to be installed at McDonald works, McDonald, Ohio.

Among recent purchasers are:

Lukens Steel Co., Coatesville, Pa., 10-ton, 84-ft. 11½-in. span electric crane from Niles Crane Corporation.

Reading Railroad, Reading, Pa., two 225-ton and one 50-ton overhead traveling cranes from unnamed builder.

Todd Shipyards Corporation 25 Broadway, New York, two crawl-tread locomotive cranes with 100-ft. booms for steel erection from Western builder.

Mergenthaler Linotype Co., Brooklyn, N. Y., 52 1-ton and four 2-ton electric hoists from the American Engineering Co.

E. L. Phillips & Co., 50 Church Street, New York, 5-ton, single I-beam hand power crane for Long Island Lighting Co., from H. D. Conkey & Co.

International Harvester Co., Milwaukee, 5-ton Gantry crane from Whiting Corporation.

Sellers Mfg. Co., Chicago, 22-ton, 8-wheel locomotive crane from Orton Crane & Shovel Co.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated fiber boxes, etc., is reported planning a new mill at Kansas City, Mo., for its subsidiary, Kansas City Fibre Box Co., to cost more than $750,000 with machinery.

North American Mfg. Co., 8918 Frederick Avenue, Cleveland, manufacturer of oil burning equipment and devices, has awarded general contract to Philip Kirschner Co., 2725 Pittsburgh Avenue, for a one-story plant to cost about $35,000 with equipment.

Ohio Public Service Co., Hanna Building, Cleveland, will soon take bids for a one-story equipment storage and distributing plant at Elyria, Ohio, to cost approximately $80,000 with equipment. R. S. Silsbee, Elyria Savings & Trust Building, Elyria, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, is said to have plans under way for a one-story service and distributing and factory branch at Cleveland, to cost about $100,000 with equipment. Local offices are at 2905 Chester Avenue.

Philadelphia

PHILADELPHIA, April 2.

A THREE-STORY building, 18 x 120 ft., at 1327 Girard Avenue, has been purchased by National Airoil Burner Co., Ninth and Thompson Streets, Philadelphia, manufacturer of oil burners, etc., be used for expansion.

Richmond Machine Co., 3445 Richmond Street, Philadelphia, has awarded general contract to N. Hoffman, 1924 East Monmouth Street, for a one-story machine shop, to cost about $21,000 with equipment.

Sprout, Waldron & Co., Muncy, Pa., have been making inquiries for a grinding machine, about 30-in. swing, for installation at their plant.

Reading Co., Reading Terminal, Philadelphia, is arranging for establishment of motor bus lines in Schuylkill County to replace several short line steam railroads, with initial investment estimated at $1,000,000, to include construction of large multi-story service, repair and garage terminals at Doylestown and Pottsville, Pa. Similar plants will be built in other cities on route at a later date.

Board of Trustees, University of Delaware, Newark, Del., has plans for a new engineering building, to cost in excess of $150,000 with equipment. Charles Z. Klauder, Franklin Bank Building, Philadelphia, is architect.

Edward H. Reuss, Jr., Thirtieth and Race Streets, Philadelphia, manufacturer of pipe, heating equipment, etc., is taking bids on general contract for a one-story pipe-bending and fabricating plant, to cost about $150,000 with equipment. Philip H. Johnson, Widener Building, is architect.

State Board of Education, Trenton, N. J., is reported planning a one-story manual training and industrial school at Bordentown, N. J., to cost in excess of $175,000 with equipment. Charles N. Leathem, Jr., State Office Building, Trenton, is architect.

Viscose Co., Marcus Hook, Pa., is said to be contemplating a new mill at Meadville, Pa., for production of cellulose acetate, to cost more than $850,000 with machinery. Plant will include a steam power house, machine shop and other mechanical departments. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Board of Trustees, Lehigh University, Bethlehem, Pa., has awarded general contract to Irwin & Leighton, 1505 Race Street, Philadelphia, for a three-story mechanical and electrical building and laboratory, to be known as James Ward Packard Memorial, to cost $1,000,000 with equipment. Visscher & Burley, 51 East Forty-second Street, New York, are architects.

American Manganese Steel Co., New Castle, Del., has awarded general contract to John E. Healy & Son, 707 Tatnall Street, Wilmington, Del., for a one-story foundry addition, to cost $50,000 with equipment.

William H. Aretz, 5401 Rising Sun Avenue, Philadelphia, and associates have organized Kirby Iron Works to operate a plant at Lansdale, Pa., for production of ornamental iron specialties. Thornton L. Kirby, 1705 Champlost Avenue, Philadelphia, will be head.

Crane Co., 212 South Thirteenth Street, Philadelphia, manufacturer of pipe, valves, etc., with headquarters at 836 South Michigan Avenue, Chicago, is said to be planning a one-story factory branch and distributing plant at Norristown, Pa., to cost about $40,000.

Bellanca Aircraft Corporation, du Pont Building, Wilmington, Del., recently organized, has awarded general contract to John E. Healy & Son, 707 Tatnall Street, for initial unit of new airplane manufacturing plant near New Castle, Del., to cost in excess of $50,000. First building will be used largely for assembling.

E. R. Bitting, 1104 Hamilton Street, Allentown, Pa., architect, has plans for a three-story automobile service, repair and garage building, 60 x 120 ft., to cost more than $100,000 with equipment.

Sunbury School District, Sunbury, Pa., is considering installation of manual training equipment in new high school, to cost about $190,000, for which plans will be drawn by C. J. Lappley, Parkside Building, Harrisburg, Pa., architect.

Distribution of Peter Stubs' drill rod, files and tools in Philadelphia territory is now handled by James A. Stairs, 322 New Street, Philadelphia.

Chicago

CHICAGO, April 2.

INTEREST in railroad requirements of machine tools has been revived by a list which has been issued by the Union Pacific. The list is not complete and will be augmented at an early date. In the meantime, quotations made to the Santa Fe are being tabulated and it may be three or four weeks before orders are placed. Allis-Chalmers Mfg. Co., Milwaukee, has purchased several 30-in. and one 60-in. boring mills. An electrical appliance manufacturer in Chicago has ordered a 14-in. x 6-ft. engine lathe. International Harvester Co., has made extensive purchases for its Rock Island and two Chicago plants. Buying, although for the most part scattered, is in good volume, and fresh inquiry gives promise that April business will be satisfactory. There is an active demand for used machine tools.

Chicago Pump Co., 2386 Wolfram Street, Chicago, will erect a factory, 116 x 125 ft. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Western Architectural Iron Co., 211 West Schiller Street, Chicago, has filed plans for a one-story unit, 100 x 125 ft., to cost more than $60,000 with equipment.

Greenleaf-Greenwood Garage Corporation, 924 Ainslie Street, Chicago, Joseph Tennes, in charge, has plans for a four-story service, repair and garage building, to cost about $250,000 with equipment. Rissman & Hirschfield, 228 North La Salle Street, are architects.

Diamond Motor Parts Co., St. Cloud, Minn., has arranged for merger with Gill Mfg. Co., 8300 South Chicago Avenue, Chicago, manufacturer of piston rings, and Schleidler Mfg. Co., Milford, Mich., manufacturer of kindred products. Plants will be removed to St. Cloud where operations will be concentrated in future.

Iowa Public Service Co., Waterloo, Iowa, has arranged for bond issue of $1,500,000, a portion of proceeds to be used for expansion in power facilities and transmission lines, including purchase of a substantial interest in Sioux City Gas & Electric Co., Sioux City, Iowa. D. M. Stearns is president.

Noble J. Hursh, 2507 West Harrison Street, Chicago, operating a screw machine products plant, has acquired a one-story plant, 50 x 125 ft., at 4708 Armitage Avenue, for expansion.

Central Plumbing & Heating Supply Co., 731 North Wells Street, Chicago, will soon take bids on revised plans for a two-story plant, to cost about $100,000 with equipment; portion of structure will be used for storage and distributing service. Edmund Grossman, 139 North Clark Street, is architect. M. P. Kaplan is president.

Monighan Mfg. Corporation, Chicago, has been organized to take over and expand Monighan Machine Co., 931 North Kilpatrick Avenue, manufacturer of excavating machinery and parts, including dragline excavators. New company has arranged for stock issue to total $980,000, a portion of fund to be used for extensions and improvements.

Board of Education, Rochester, Minn., will take bids in April for new central steam power plant for high and central school buildings, to cost approximately $65,000. Ellerbe & Co., Endicott Building, St. Paul, Minn., are architects.

John Deere Tractor Co., Miles Street, Waterloo, Iowa, has awarded general contract to Jens Olesen & Son Construction Co., 1522 Lafayette Street, for a one-story addition, 120 x 120 ft., to cost about $40,000.

Kelly Mfg. Co., 131 South Fifth Avenue, Clinton, Iowa, is considering construction of new plant for manufacture of furniture to cost about $50,000 with equipment. A. H. Morrell, Weston Building, is architect.

Standard Oil Co., 910 South Michigan Avenue, Chicago, has filed plans for a one-story storage and distributing plant, 100 x 140 ft., to cost $110,000 with equipment.

Naylor-Hickey Corporation, 643 Washington Boulevard, Chicago, has been appointed representative in that district for National Flue Cleaner Co., Groveville, N. J., manufacturer of soot blowers for fire tube boilers.

Vergan-Schmidt Mfg. Co., Dubuque, Iowa, has been formed by a merger of Dubuque Tractor & Truck Co., Dubuque, and Vergan-Schmidt Co., Champaign, Ill., and will manfacture heavy construction handling equipment, garage tools and woodwork specialties. Equipment at Champaign is being transferred to Dubuque where operations will be concentrated.

Buffalo

BUFFALO, April 2.

BIDS will soon be asked by Great Lakes Portland Cement Co., Marine Bank Building, Buffalo, A. L. Beck, president, for new mill on Cuyahoga River, vicinity of Cleveland, to cost close to $1,000,000 with machinery. F. C. Fisk, Allentown, Pa., is company engineer.

Trico Products Co., 624 Ellicott Street, Buffalo, manufacturer of automobile accessories, has filed plans for an addition to cost upward of $175,000 with machinery.

Buffalo Flour Mills Corporation, Chamber of Commerce Building, Buffalo, plans rebuilding portion of mill destroyed by fire March 27, with loss reported at $200,000 including equipment.

Board of Contract and Supply, City Hall, Syracuse, N. Y., has plans under way for a two-story repair shop, with equipment, storage and distributing facilities for Water Supply Department, to cost approximately $80,000 with equipment. Nelson F. Pitts, Jr., City Hall, is city engineer.

Raymond A. Williams, 506 Delaware Avenue, Buffalo, and associates have organized Harmor & Co., with capital stock of $100,000, to establish and operate a local plant for manufacture of air compressors, parts, and others mechanical equipment.

Division of Standards and Purchase, Executive Department, Capitol Building, Albany, N. Y., is asking bids until April 19 for a pumping plant for Thomas Indian School, Iroquois, town of Collins, Erie County. Plans and specifications at office of school and office of chief engineer, Department of Public Works, Capitol Building, Albany.

Cyclone Fence Co., Waukegan, Ill., has established a branch distributing center and warehouse at 405 North Lowell Avenue, Syracuse, N. Y., with W. J. Murray in charge.

South Atlantic States

BALTIMORE, April 2.

WORK will begin by Bethlehem Shipbuilding Corporation, Key Highway, Baltimore, for new plant unit, with main one-story structure, 80 x 600 ft., for steel fabricating department; machine shops, forge and blacksmith shop, foundry, sheet metal-working shops, pipe shops, etc. Project will include a 7000-ton floating drydock and one-story power house. Entire program will cost about $2,000,000 with machinery. J. M. Willis is general manager.

City Council, Charlotte, N. C., has filed plans for one-story municipal automobile service, repair and garage building, 115 x 310 ft., to cost about $85,000 with equipment.

Southern Light & Power Co., Centreville, Md., has acquired plant and system of Millington Electric Light & Power Co., Millington, Md., and plans extensions and improvements, including transmission line construction.

Quartermaster Supply Officer, Washington, will receive bids until April 13 for one bench lathe, circular 94.

Virginia Cellulose Co., Inc., Hopewell, Va., has approved plans for one-story steam power house, to cost about $125,000 with equipment.

Virginia Electric & Power Co., Richmond, Va., has plans for new power house at Norfolk, Va., to cost $250,000 with equipment. Stone & Webster, Inc., 49 Federal Street, Boston, is engineer. Company is arranging for bond issue of $8,000,000 and preferred stock to total about $5,000,000, a considerable portion of proceeds to be used for expansion, including transmission line construction.

Board of District Commissioners, District Building, Washington, is asking bids until April 23 for metal-working machinery for public schools, including lathes, band saws, jointer, surfacers, grindstones, drill press, sanders, three electric glue heaters, drills, trimmers, etc.; until April 12 for six distributing transformers for McKinley Technical High School.

Newman Ice & Fuel Co., Raleigh, N. C., has authorized construction of one-story ice-manufacturing plant at Sanford, N. C., to cost about $35,000 with equipment.

Consolidated Electrical Appliances, Pratt and Concord Streets, Baltimore, has acquired for expansion factory heretofore held by Liberty Yeast Corporation.

Patapsco Power, Light & Mineral Co., Marriottsville, Md., recently organized, with capital of $100,000 by Wade H. D. Warfield, Sykesville, Md., and associates, is planning for development of feldspar and limestone properties at Marriottsville. A quarrying plant, grinding and pulverizing mill will be installed, to cost about $70,000.

Stoneform Corporation of America, Inc., 1253 Twenty-third Street, N. W., Washington, has acquired property at Loughborough, Md., as site for new plant for manufacture of fabricated stone, to cost about $45,000 with machinery. L. E. Harter is general manager.

General purchasing officer, Panama Canal, Washington, is asking bids until April 13 for 36,000 ft. wire rope, two power hacksaw machines, one steam hammer, five air motor hoists with trolley, 16 buffing and grinding machines, two arbor presses and other tools and equipment, Panama schedule 1868.

Kelly-Springfield Tire Co., Cumberland, Md., has taken out a permit for a one-story addition, to cost about $100,000 with equipment.

Central Atlantic Service Corporation, 20 Broad Street, New York, has concluded arrangements for purchase of plant and property of Hygienic Ice & Cold Storage Co., Pulaski, Va., and is said to be contemplating a new ice-manufacturing plant on site, to cost close to $100,000 with machinery.

Atmospheric Nitrogen Corporation, Hopewell, Va., will make extensions and improvements in plant to cost about $180,000. A gantry crane and other equipment will be installed.

Engineers Public Service Co., Richmond, Va., an interest of Stone & Webster, Inc., Boston, engineer, has arranged for preferred stock issue of $32,000,000, a portion of proceeds to be used for extensions and improvements in properties and transmission lines in Virginia, Louisiana, Texas, New Mexico, and other localities.

Greensboro Ice & Fuel Co., Banner Building, Greensboro, N. C., Robert H. Frazier, head, recently organized, has acquired property and is considering erection of a new ice-manufacturing plant, to cost more than $40,000 with equipment.

City Council, Charlotte, N. C., has awarded general contract to Southeastern Construction Co., 210 West Second Street, for one-story municipal service and repair shop, 100 x 300 ft., with garage facilities, to cost about $80,000 with equipment. C. C. Hook, Commercial Bank Building, is architect.

Detroit

DETROIT, April 2.

A NEW company, Michigan Power Shovel Co., is being formed by John Hursh, manager Michigan File Co., Lansing, Mich., and associates, to manufacture a small power shovel for use with tractors. Local building has been leased for parts manufacture and assembling.

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., has asked bids on general contract for a two and one-half story addition, to cost close to $900,000 with machinery. Billingham & Cobb, Pythian Building, are architects. Jacob Kindlebarger is president.

Accuralite Co., Muskegon, Mich., manufacturer of pistons, cam shafts, etc., is planning erection of new factory at Muskegon Heights to cost in excess of $60,000, and will remove to new location.

Detroit Gray Iron Foundry Co., Wight Street, Detroit, has filed plans for a new one-story foundry, 115 x 125 ft., to cost upward of $65,000 including equipment.

Michigan Rubber Co., Owosso, Mich., has begun erection of one-story plant unit, to cost close to $75,000 including equipment.

Hill-Curtiss Co., Pitcher Street, Kalamazoo, Mich., manufacturer of wood-working machinery and parts, will soon take bids on general contract for a one and two-story addition to cost about $35,000. Billingham & Cobb, Pythian Building, are architects.

Ward Mail Box Co., Buchanan, Mich., is arranging an expansion and improvement program for increase in output. A building has been leased from Ward Electric Refrigerator Co. and will be used primarily for manufacture of new products, including telephone equipment, suitable for use in apartment houses.

City Council, Northville, Mich., is said to be planning installation of pumping machinery and other equipment in connection with extensions in municipal waterworks. Wellington Roberts is city engineer.

Consolidated Electric Sign Co., Opalume Division, Battle Creek, Mich., will soon take bids on general contract for a two-story plant, to cost about $80,000 with equipment. It will replace a factory destroyed by fire. L. J. Sarvie, Jr., 65 East Main Street, is architect.

Consumers Power Co., Jackson, Mich., has plans for a hydroelectric power development in Mecosta-Newaygo district, to be known as Ox-Bow power station, to cost close to $10,000,000 with power dam and transmission lines. Initial plant will have a capacity of 35,000 hp.

Pittsburgh

PITTSBURGH, April 2.

MACHINE tool business has slumped in this district, and while March as a whole made a good showing compared with February and the same period last year, sales and inquiry have been falling off since about the middle of the month.

Pittsburgh Lamp & Artcraft, Inc., recently organized, has acquired property at Monongahela, Pa., for plant to manufacture metal lamps, art metal furniture and kindred products. C. A. Ross is president.

Ovens, power equipment, conveying and other machinery will be installed in three-story and basement addition, 88 x 130 ft., to plant of National Biscuit Co., 6145 Penn Avenue, Pittsburgh, to cost about $350,000. Headquarters are at 85 Ninth Avenue, New York; L. J. Wirsching, Jr., is company architect.

Sloan & Zook Producing Co., Fullerton, near Bradford, Pa., operating oil plants and properties, has arranged for a bond issue of $500,000 and preferred stock issue of $250,000, a portion of proceeds to be used for expansion and installation of additional equipment. Ralph E. Davis, Union Bank Building, Pittsburgh, is engineer.

Bids will be asked at once by Allegheny Metal Products Co., 1902 Brighton Road, Pittsburgh, for two-story plant, including machine shop, at Verona, Pa. P. C. Gasparin is head.

Board of Education, Lumberport, W. Va., is considering installation of manual training equipment in two-story high school, for which bids will be received on general contract April 26, to cost more than $175,000. S. W. Ford, Latstetter Building, Clarksburgh, W. Va., is architect.

Pittsburgh Heater Co., Pittsburgh, recently organized by R. B. Sattler, 338 Wabana Avenue, and associates, with capital stock of $60,000 and 40,000 shares common stock, no par value, contemplates operation of local plant for production of boilers, radiators, fittings, etc. R. E. Reuss, 1739 Chislett Street, Pittsburgh, is also interested in company.

Shenango Motor Co., New Castle, Pa., has plans for two-story service, repair and garage building, to cost about $130,000 with equipment. F. H. Foulk, Fairmont Cedar Building, Cleveland Heights, Ohio, is architect.

J. M. Carskadon, president Palace Furniture Co., Clarksburg, W. Va., is head of company being organized with capital stock of $150,000 to construct and operate a new furniture and cabinet plant, to cost more than $80,000 with equipment. Property has been acquired adjoining local plant of Fuel City Box & Lumber Co. and work will soon begin. William Rogers, head of last noted company, is interested in new organization.

Electrolux, Inc., Bessemer Building, Pittsburgh, manufacturer of vacuum cleaners, etc., is considering plans for one-story factory branch and distributing plant to cost about $35,000.

William K. Stamets, machine tools and machinery, has moved into larger quarters at 4026 Jenkins Arcade Building Pittsburgh.

McCoy-Brandt Machinery Co., Pittsburgh, has moved from 210 Penn Avenue to 50 Penn Avenue.

Indiana

INDIANAPOLIS, April 2.

WORK is being completed on new plant unit, 300 x 300 ft., by American Steel & Wire Co., Anderson, for manufacture of wire fabric, to cost more than $200,000 with equipment. Harry O'Connor is superintendent.

Richmond Fireproof Door Co., Richmond, is planning a one-story addition, to cost about $35,000 with equipment.

Bishop, Knowlton & Bishop, 312 North Meridian Street, Indianapolis, architects, have taken out permit for a three-story and basement automobile service, repair and garage building, 100 x 170 ft., to cost about $100,000 with equipment.

Sarl Stone Co., Bloomington, is considering plans for one-story mill, to cost approximately $85,000 with cutting, grinding, polishing and other equipment.

Board of Education, Princeton, contemplates installation of manual training department in two-story high school in Patoka Township to cost approximately $100,000. Sutton & Routt, Citizens' Bank Building, Vincennes, Ind., are architects.

Western Oil Co., Indianapolis, care of Bishop, Knowlton & Carson, 312 North Meridian Street, architects, has filed plans for a one-story repair shop, to cost about $45,000 with equipment.

Indiana General Service Co., Muncie, has closed contract with City Council, Anderson, for power supply and will build a 132,000-volt transmission line to that place. A power substation will be constructed near city limits. Anderson municipal power department will also build transmission lines and install switching equipment for service to local industries. Entire project is reported to cost more than $100,000.

Board of Works, City Hall, Indianapolis, plans installation of pumping machinery and other power equipment in connection with sewage disposal plant at Broad Ripple, to cost about $550,000. A. H. Moore, City Hall, is engineer; C. G. Hurd, Merchants' Bank Building, is architect.

Warner Gear Co., Muncie, Ind., will build a factory unit, 50 x 140 ft.

St. Louis

ST. LOUIS, April 2.

PLANS are being considered by Oklahoma City Brass Pipe Co., Oklahoma City, Okla., for a one-story foundry, to cost about $35,000 with equipment.

Modern Products Co., Tulsa, Okla., has approved plans for one-story foundry, machine shop and plating works, 90 x 350 ft., for manufacture of valves and kindred specialties, to cost upward of $90,000 with equipment.

B. & Y. Motor Co., 4517 Troost Street, Kansas City, Mo., is considering a new service, repair and garage building, to cost approximately $100,000 with equipment.

L. J. Kent Boiler & Sheet Iron Works, Inc., Springfield, Mo., is asking bids for excavations and foundations for its new plant; bids will soon be called for superstructure, one story, 80 x 160 ft., to cost about $40,000 with equipment.

Central Oklahoma Service Co., Oklahoma City, Okla., has arranged for bond issue of $1,000,000, a portion of fund to be used for additions and improvements, including transmission line construction. Company is operated by Southwest Utility Ice Co., Oklahoma City.

Great Plains Mill & Elevator Co., 223 East Randolph Street, Enid, Okla., is reported planning a new flour mill, to cost in excess of $450,000 with machinery.

Ovens, power equipment, conveying and other machinery will be installed in four-story and basement plant and distributing station, 100 x 300 ft., to be built by Great Atlantic & Pacific Tea Co., Graybar Building, New York, at St. Louis, to cost about $650,000 with equipment. Austin Co., Arcade Building, St. Louis, is engineer.

Waxide Paper Co., 404 Admiral Street, Kansas City, Mo., is considering a new one-story and basement plant at St. Louis, 150 x 275 ft., for manufacture of processed papers, to cost more than $200,000 with equipment.

Wirt Franklin Oil Co., Ardmore, Okla., plans addition to gasoline refinery, to cost more than $85,000 with equipment.

Jaden Mfg. Co., Hastings, Neb., manufacturer hardware specialties, has filed plans for one-story unit, 120 x 245 ft., to cost approximately $55,000 with equipment.

Curtiss-Robertson Airplane Mfg. Co., St. Louis, care of McDonald & Condie, 205 North Taylor Avenue, architects, has awarded general contract to J. S. Alberici, Boatmen's Bank Building, for a new plant at Anglum, near St. Louis, comprising three units, one story, 60 x 250 ft.; one story, 40 x 60 ft., and two stories, 40 x 60 ft., to cost about $80,000 with equipment.

Usona Mfg. Co., Chouteau Avenue, St. Louis, manufacturer of architectural and ornamental iron, has asked bids for one-story addition, 75 x 80 ft., to cost about $24,000.

Colonial Steel Co., Pittsburgh, has purchased property at 712 Cass Avenue, St. Louis, and has let contract to W. C. Harting Construction Co., St. Louis, for erection of office and warehouse for distribution in Middle West and Southwest for high speed, carbon, alloy and drill steels.

Mideke Supply Co., 100 East Main Street, Oklahoma City, has been appointed representative in Oklahoma City and vicinity of Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago, manufacturer of speed reducers, gear products and general transmission machinery.

Cincinnati

CINCINNATI, April 2.

PREDICTION made a week ago that machine tool sales in the first quarter this year will run about 25 per cent ahead of those in the same months of 1927 has been further borne out by developments in the past few days. In fact, a number of prominent companies assert that bookings have been at least 50 per cent ahead of those last year, but this percentage as it applies to the local industry as a whole has been cut in half by the experience of a group of builders which has not fared so well.

Considerable business is coming from automobile manufacturers and buyers in the general industrial field. Seldom, however, are customers purchasing more than one or two machines at a time, absence of individually large transactions being noticeable. Almost without exception companies interested in buying equipment are demanding either standard tools specially adapted to high production work or machines which are entirely of special design for the same purpose.

Plans have been authorized by Board of Trustees, Wilberforce University, Xenia, Ohio, for one-story power house to cost about $150,000 with equipment. Herbert B. Briggs, Hartman Hotel Building, Columbus, Ohio, is State architect in charge.

Columbus, Delaware & Marion Electric Co., Marion, Ohio, is said to have plans under way for rebuilding of car barn, shop and power house at Delaware, Ohio, destroyed by fire several months ago with loss of more than $70,000. G. B. Day is in charge.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until April 11, for springs, hub bushings, fuel cock assemblies, etc., circular 234; induction compasses and tachometers circular 285.

Acme Tool Co., 250 North Findlay Street, Dayton, Ohio, has awarded general contract to Hillsmith & Co., Dayton, for one-story machine shop, to cost about $25,000 with equipment.

Hibbler-Barnes Co., 710 East Tenth Street, Chattanooga, Tenn., building materials, is said to be arranging an expansion and improvement program to cost about $200,000, including installation of mechanical-handling and conveying equipment, etc.

United States Foil Co., Thirtieth Street and Grand Avenue, Louisville, has awarded general contract to J. E. Boswell & Co., 1107 East Broadway, for an addition, 112 x 200 ft., with adjoining structure, 100 x 200 ft., for storage and distribution to cost about $400,000 with equipment. Ossian P. Ward, Lincoln Bank Building, is architect.

Xenia Fertilizer Co., Xenia, Ohio, plans new two-story mill, 80 x 160 ft., to replace plant recently destroyed by fire, to cost about $55,000 with equipment. Grinding and mixing machinery, electrical and other power equipment, etc., will be installed.

Board of Trustees, Christ Hospital, Auburn Avenue, Cincinnati, has authorized plans for a new power house and mechanical laundry unit, to cost about $300,000 with equipment. Tietig & Lee, Merchants' Building, are architects.

Rendigs, Panzer & Martin, Southern Ohio Bank Building, Cincinnati, architects, have filed plans for a three-story automobile service, repair and garage building, to cost $150,000 with equipment.

B. J. Wehner Welding Co., Inc., 1725 Mellwood Avenue, Louisville, has been organized to conduct a general welding business, particularly in tanks and boilers. Company will engage in retubing and repairing upright and pressure boilers. Building has been rented and no additional equipment is needed at present.

Gulf States

BIRMINGHAM, April 2.

PLANS are being considered by Wackman Welded Ware Co., Victor and Seventieth Streets, St. Louis, for a one-story branch plant at Houston, Tex., largely for manufacture of steel drums for oil service, to cost $45,000 with machinery.

Texas Water Utilities Co., Cameron, Tex., operating waterworks, ice-manufacturing plants and other utilities, has arranged for a bond issue of $1,000,000, a portion of proceeds to be used for expansion and betterments.

Magnolia Gas Products Co., 506 South Medina Street, San Antonio, Tex., will erect a one-story plant for manufacture of industrial gases, to cost more than $50,000 with equipment.

Hygia Products Co., Houston, Tex., recently formed by D. C. Lingo, 4126 Polk Street, and associates, will build a one-story ice-manufacturing plant to cost about $30,000.

Big Lake Refining Co., Big Lake, Reagan County, Tex., care of Big Lake Chamber of Commerce, has plans for initial unit of oil refinery for output of 1000 bbl. per day. E. B. McKee, San Antonio, Tex., is one of heads of company, which was recently organized.

Holliday Life-Saving Headlight Co., Jackson, Miss., T. C. Holliday, Edwards Hotel Building, head, plans erection of one-story factory for manufacture of special automatic headlighting equipment, reported to cost about $25,000.

Syndicate Power Co., Abilene, Tex., operated by Middle West Utilities Co., 72 West Adams Street, Chicago, is completing plans for hydroelectric power project on Colorado River, vicinity of Abilene, to cost more than $500,000 with power dam and transmission system.

United Carbon Co., Charleston, W. Va., is considering construction of two new carbon black plants at Sanford and Stinnett, Tex., to cost in excess of $100,000 each, with air compressors, boilers and other power equipment. Work is in progress on a similar three-unit plant near Borger, Tex.

Benjamin Sibbitt, head of the Ben Sibbitt Iron & Foundry Co., Wichita, Kan., is at the head of a company being organized at Dallas, Tex., to construct and operate a plant on West Dallas Pike for production of gray iron castings. Initial unit will cost close to $40,000 and is scheduled for completion within three months. Charles Sibbitt, Dallas, formerly connected with Wichita company, will be an official of new organization.

Southwestern Irrigated Cotton Growers' Association, First National Bank Building, El Paso, Tex., Gowan Jones, president, plans construction of one-story cottonseed oil mill, to cost more than $100,000 with machinery.

R. B. George Machinery Co., Dallas, Tex., manufacturer and distributer of oil well machinery and road-building equipment, has work in progress on a one-story plant unit, 60 x 300 ft., to cost more than $80,000 with equipment.

Roman & Talbert, Mercedes, Tex., are considering construction of one-story general machine and repair shop, to cost about $40,000 with equipment.

General Motors Corporation, Detroit, is reported contemplating an assembling plant at Tampa, Fla., to be used largely for export trade to South America, to cost more than $200,000.

John H. Overton and John E. Thorsell, Alexandria, La., have plans for a one-story automobile service, repair and garage building, 195 x 215 ft., to cost about $70,000 with equipment.

Breckenridge Foundry & Supply Co., Mineral Wells, Tex., W. S. Slangerup, president, recently reorganized, is said to be contemplating removal of plant to Breckenridge, Tex., where capacity will be increased.

Southern Ice & Utilities Co., Santa Fe Building, Dallas, Tex., is arranging for a new ice-manufacturing plant, 130 x 275 ft., at Big Spring, Tex., to cost upward of $150,000 with equipment.

Birmingham Pressed Steel Co., First Avenue, Birmingham, is contemplating rebuilding plant unit at Pratt City, Ala., recently destroyed by fire with loss close to $27,000 with equipment.

Anniston Roller Covering Works, Anniston, Ala., manufacturer of textile mill equipment, is said to be planning extensions and installation of additional machinery.

Milwaukee

MILWAUKEE, April 2.

PROSPECTS for April business in machine tools are considered favorable in view of improvement of inquiry in the last ten days of March, and anticipated action on estimates that have been put forth in recent weeks. March trade, while hardly as large as a year ago, represented the best month's volume this year. Demand is urgent, most orders being for one or two machines, delivery of which is pressed. Numerous industrial projects that have been awaiting developments are now giving promise of a broader machine tool market.

Modine Mfg. Co., 1700 Racine Street, Racine, Wis., manufacturer of radiators and cooling systems, contemplates an additional investment of $100,000 in plant extensions and new equipment. Details have not been fully decided upon, but plans will be ready about May 1.

Ormsby Auto Equipment Co., 1116 Wells Street, Milwaukee, has placed general contract with S. M. Siesel Co., 160 Ogden Avenue, local, for construction of a $300,000 automotive sales, service and storage building, 121 x 134 ft., two stories and part basement.

Terminal Warehouse Co., 274 South Water Street, Milwaukee, has plans by W. Fred Dolke, consulting engineer, 1841 Asbury Avenue, Evanston, Ill., for a five-story cold storage warehouse, 160 x 440 ft., costing $1,000,000, and a five-story addition, 50 x 100 ft., to existing warehouse. New unit will contain about 1,000,000 cu. ft. of cold storage space. Fifth floor and roof are designed for automobile storage with a capacity of 950 cars.

Glancy Malleable Iron Corporation, Waukesha, Wis., is having survey made by A. A. Wickland, consulting engineer, 7 South Wabash Avenue, Chicago, of present and future needs of works additions and equipment. Project contemplates an investment of between $50,000 and $100,000. A. R. Glancy, president Oakland Motor Car. Co., Pontiac, Mich., is president.

Ernest Sader Co., Fremont, Wis., dealer in hardware, farm machinery and automobiles, will build a one-story addition, 42 x 80 ft., for service and repairs. Contracts for structure have been awarded and inquiry is being made for miscellaneous equipment.

Board of Education, Neenah, Wis., will close bids April 14 on revised plans for new $300,000 senior high and vocational training school, designed by John D. Chubb, architect, 109 North Dearborn Street, Chicago. Mrs. J. F. Gillingham is secretary.

Cliffs Power & Light Co., Ishpeming, Mich., subsidiary of Cleveland-Cliffs Iron Co., is doing preliminary work on construction of a new hydroelectric generating plant on Escanaba River, three miles northwest of Princeton, Mich., to cost about $500,000. Concrete dam will be 400 ft. long and 15 ft. high. Construction of power house will start about June 1. Inquiry will be made shortly for generating equipment. O. D. McClure is general manager.

Interstate Drop Forge Co., 1857 Twenty-seventh Street, Milwaukee, has started work on a one-story shop and office extension, 50 x 90 ft.

National Equipment Corporation, Wells Building, Milwaukee, has been organized to manufacture road building and construction equipment. Company has purchased property of T. L. Smith Co., builder of concrete mixers and pavers, which will be considerably enlarged. At present company has no plans for erection of new plants or buildings.

Pacific Coast

SAN FRANCISCO, March 28.

CONTRACT has been let by Pratt-Rymer Co., San Leandro, Cal., manufacturer of locks and hardware, to R. E. Nikirk, local, for a one-story factory, to cost about $17,000 with equipment. Additional plant units will be built later.

Pacific Fruit Express Co., 65 Market Street, San Francisco, has approved plans for new refrigerator car repair and reconditioning shops on 150-acre tract at Tucson, Ariz., recently acquired, to cost about $200,000 including equipment.

Methow-Pateros Growers' Association, Pateros, Wash., has authorized plans for a new cold storage and refrigerating plant, to cost about $100,000 with equipment.

West Lake Enginering Works, Seattle, has awarded general contract to J. C. Buchanan, 2017 Warren Avenue, for a one-story machine shop, 35 x 65 ft., to cost about $11,000 with equipment.

Clearwater-Hynes County Water District, Hynes, Cal., is planning early call for bids for pumping machinery and accessories and 100,000-gal. elevated steel tank and tower, for proposed waterworks. A bond issue of $160,000 is being arranged. Burns-McDonnell-Smith Engineering Co., Western Pacific Building, Los Angeles, is engineer.

Great Northern Railway Co., St. Paul, Minn., has plans for a new repair shop at Wenatchee, Wash., for electric locomotives, one story, 82 x 200 ft., to cost upward of $85,000 with equipment. A traveling crane will be installed. T. D. McMahon, Railroad Building, St. Paul, is company architect.

Barde Steel Co., 2709 Utah Street, Seattle, has awarded general contract to H. D. Stewart, 2702 First Avenue, South, for a one-story addition, 66 x 120 ft., to cost about $23,000.

Wenatchee Produce Co., Wenatchee, Wash., will build a one-story cold storage and refrigerating plant, 100 x 100 ft., to cost more than $100,000 with equipment.

Puget Sound Power & Light Co., Seattle, will make extensions in vicinity of Chehalis, Wash., with construction of transmission lines on several highways in Lewis County, for which franchise has been asked. Entire project will cost more than $75,000.

Western Oil & Refining Co., Martinez, Cal., has leased portion of tract of Petroleum Products Co., and will build a new storage and distributing plant, to cost about $350,000 with equipment.

Feenaughty Machinery Co., Portland, Ore., has been appointed distributer in Oregon, Washington and Idaho of products of Sidney Steel Scraper Co., Sidney, Ohio.

San Juan Pulp Mfg. Co., Bellingham, Wash., will double capacity of its local plant at a cost of $200,000.

Ulmer Machinery Corporation, Los Angeles, has purchased plant and business of Acme Pump Co., Los Angeles. Purchasing company formerly operated plants in Santa Ana and Porterville, Cal., but will now consolidate all manufacturing at Los Angeles.

Canada

TORONTO, April 2.

MARCH made a record for the year in increased busines in many lines, including machine tools and other equipment. The automotive industry was responsible for a large portion of the activity although during the past few days orders from this source have fallen off. Considerable buying is still being done for equipment for the mining fields of Manitoba, Ontario and Quebec. In addition to the regular flow of small orders from the railroads, the Canadian National Railways will require a large amount of equipment for its shops at Point St. Charles, Montreal. It will also spend $450,000 for power plants at this location.

Charles A. Smart, of Canadian International Corporation, Ltd., Westmount, Montreal, is taking out a charter at Fredericton, N. B., in name of Antimony Smelting & Refining Co., Ltd., of Lake George, York County, N. B. Engineers are working on plans for a power house and expect to start soon on development of company's property at Lake George. A refinery will also be built.

Hepworth Mfg. Co., Hepworth, Ont., will build a two-story addition to its furniture factory to cost about $50,000. Construction will start as soon as weather permits. Woodworking machinery and tools wil be required.

La Cie. d'Entreprises Publiques Ltd., 107 Mountain Hill, Quebec, has purchased power plant at St. Pierre les Becquets, Que., and proposes to build a station at a cost of $100,000.

Donnacona Paper Co., Donnacona, Que., will start work soon on a machine shop to cost $25,000. It will be two stories 40 x 40 ft.

Copp Clark Co., Ltd., 517 Wellington Street, West Toronto, will build an addition to cost $75,000. It will be four stories and basement, 60 x 74 ft. Wickson & Gregg, Temple Building, Toronto, are architects.

J. Ford Co., Portneuf Station, Que., manufacturer of roofing felt, etc., has awarded contract to Gauthier & Julien, for erection of a plant to cost $150,000.

Western Canada

Winnipeg Electric Co., Winnipeg Electric Chambers, Winnipeg, is having plans prepared for construction of a power plant at Seven Sisters Falls, Man., to cost $15,000,000. Work will include transmission line and 14-mile spur railroad.

City of Nelson, B. C., is contemplating construction of additional unit to power plant at Bonnington Falls, to cost $240,000. A by-law will be submitted to ratepayers.

International Electric Co., Stewart, B. C., contemplates erection of a 2000-hp., hydroelectric power plant to cost $300,000 in the Portland Canal District.

Hinde & Dauch Paper Co. of Canada, Ltd., Toronto, Ont., will start work soon on erection of a paper mill and box factory at Winnipeg, to cost $1,000,000.

Foreign

PLANS have been completed by Russian Soviet Government for an electric generating plant near Artemovsk, Konstantinovka district, for initial capacity of 3000 kw. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding project.

Spanish Council of Ministers, Madrid, Spain, has approved a program of railroad construction and improvement to cost 231,000,000 pesetas (about $39,250,000) for new lines, and 371,000,000 pesetas (about $63,000,000) for betterments, including rolling stock, shops, tools and equipment. Information at office of Bureau of Foreign and Domestic Commerce Washington, reference Spain No. 63476; also, at American Consulate, Madrid, E. D. Hester, assistant commercial attaché.

Stewart & Partners, London, England, have taken contract for construction of a beet sugar refinery at Brigg, Lincs., to cost more than $1,500,000 with machinery. Hallesche Mash-fb., Halle, Saxony, Germany, are engineers for the project.

Public Works Department Government of Persia, Teheran, is considering construction of a blast furnace, steel mill and iron foundry in Somnan district, where surveys have been in progress, to develop iron ore deposits. Entire project is estimated to cost $4,500,000. Plans are also under advisement for construction of aerial cableway from Shamshak, Elburn Range district to Teheran, for coal transportation. Information at office of American Consulate, Teheran, Orson N. Nielsen, consul.

Great Southern Railway Co., Buenos Aires, Argentine Republic, is arranging fund of $853,000 for improvements, including reconstruction of different portions of road, extensions in repair shops, tools, equipment, etc. Henry C. Evans is president.

J. A. M. Burgman, Nieuwe Gracht 83-85, Utrecht, Holland, is interested in securing an agency for hardware and plumbing supplies and for supplies sold to railroads.

Madagascar Government Railways (Chemins de Fer de Madagascar), Tananarive, Madagascar, has approved project for partial electrification of its line from Tananarive to East Coast, to cost close to $5,000,000, including a hydroelectric power development on Mangoro River. American Consulate, Tananarive, Paul D. Thompson, vice-consul, has information regarding the project.

NEW TRADE PUBLICATIONS

Air Filters.—Reed Air Filter Co., Inc., Louisville.. Bulletin 114, dealing with the company's Streamline self-cleaning air filter. Attached is a data and specification sheet for determining size and type needed.

Acetylene Generators.—Alexander Milburn Co., Baltimore. Bulletin B-200C, briefly describing acetylene generators for use with oxy-acetylene welding and cutting apparatus.

Recording Thermometers.—Bristol Co., Waterbury, Conn. Leaflet announcing new recording thermometer, with 4-in. chart, for use in cold storage rooms, electrical refrigerating units, and other places where large size thermometers are not required.

Pumping Equipment.—De Laval Steam Turbine Co., Trenton, N. J. Leaflet describing water works pumping equipment for City of Haverhill, Mass., for which company has installed two electrically driven centrifugal pumps with capacity of 7,000,000 gal. daily.

Hoists.—Union Mfg. Co., New Britain, Conn. Leaflet devoted to company's roller bearing, spur-geared hoist. Special features in construction and operation of hoist are itemized.

Excavating Machinery.—Osgood Co., Marion, Ohio. Bulletin 2707, covering company's line of gasoline and electric excavating machinery. Included are electric shovels, cranes, clamshells, draglines and backhoes.

Flood Lighting.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2106, describing various types of floodlight projectors for industrial units. Bulletin 2109 deals with floodlighting in general, and includes a number of interesting and novel installations.

Sheet Steel Products. — Superior Sheet Steel Co., Canton, Ohio. Booklet dealing with lead-sealed sheet steel products manufactured by company. Included are corrugated and other roofing and sidings, flat sheets and formed products, eaves trough, conductor pipe, accessories, etc.

Boiler Nozzles.—Lenape Hydraulic Pressing & Forging Co., Box 66, West Chester, Pa. Bulletin 2, devoted to forged steel boiler nozzles, includes tables of various working pressures. Of particular interest are illustrations of two 4-in. nozzles of the 250-lb. W. S. P. type under a severe test of 4500-lb. hydrostatic pressure.

Rotary Dryers.—Struthers-Wells Co., Warren, Pa. Bulletin devoted to company's line of rotary dryers, kilns and coolers of the steam heated, hot air, direct heat and indirect heat types.

Die Makers' Supplies.—Danly Machine Specialties, Inc., 2104 South Fifty-second Avenue, Chicago. Catalog of 50 pages describing all of company's products. In addition to the die sets, each of which is illustrated by a halftone and blue print, bushings, dowel pins, a line of socket head and fillister hand stripper bolts and flat, rounded and square springs have been added.

Drills.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin 81-O, providing illustrated description of company's auger drill for drilling very soft ore, coal, soft and broken rock, hardpan, etc., and Bulletin 81-Q, describing the L-3 and L-5 heavy rotator rock drills for medium heavy rock drilling work.

Developments in Steam Generation.—Combustion Engineering Corporation, 201 Madison Avenue, New York. Reprint of an address delivered before the Engineers' Society of Western Pennsylvania by George T. Ladd, president Ladd Watertube Boiler Co. There are eight pages, illustrated, giving a comprehensive survey of some modern achievements. High-pressure steam is discussed, as well as steam generating from dry quenching of coke.

Story of Combustion.—International Combustion Corporation, 201 Madison Avenue, New York. Reprint of an article by Donald Wilhelm, printed as institutional advertising in both *Review of Reviews* and *World's Work*. There are 10 pages illustrated, dealing with the modern problem of getting the most out of each pound of coal.

Soot Blower.—National Flue Cleaner Co., Groveville, N. J. Leaflet of four pages, illustrated, telling about advantages of blowing the tubes of horizontal return tubular boilers at frequent intervals.

Line-Starting Induction Motors.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1145 of four pages illustrates and describes induction motors not requiring current reducing devices for starting.

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THE IRON AGE

New York, April 12, 1928

ESTABLISHED 1855

VOL. 121, No. 15

New Method of Making Cast Pipe

Hand Labor Eliminated in McWane Mechanical Process—Unique Multiple-Lip Ladle Pours Metal—Conveyors and Cranes Handle Materials—Plant Scheduled Like a Rolling Mill

A SIGNIFICANT departure in pipe foundry practice is back of the recent announcement of the McWane Cast Iron Pipe Co. that the new mechanically operated unit of its Birmingham, Ala., foundries, which went into production on Jan. 1, 1928, was placed on a double shift basis March 1.

Essentially, the new process of making cast iron pipe at the McWane plant involves the substitution of mechanical equipment for hand labor. The same operations that were formerly used are still employed, but machines and mechanical devices, it is said, effect a far greater economy and rapidity of output than was ever possible with the old manual methods.

This new process embodies features of continuous operation and flexibility of output that have heretofore been unknown in the manufacture of cast iron pipe. It still retains, however, the former McWane features of casting pipe 4 in. and larger in 16-ft. lengths, horizontally, in green sand molds with green sand cores. This former method was based on a pat-

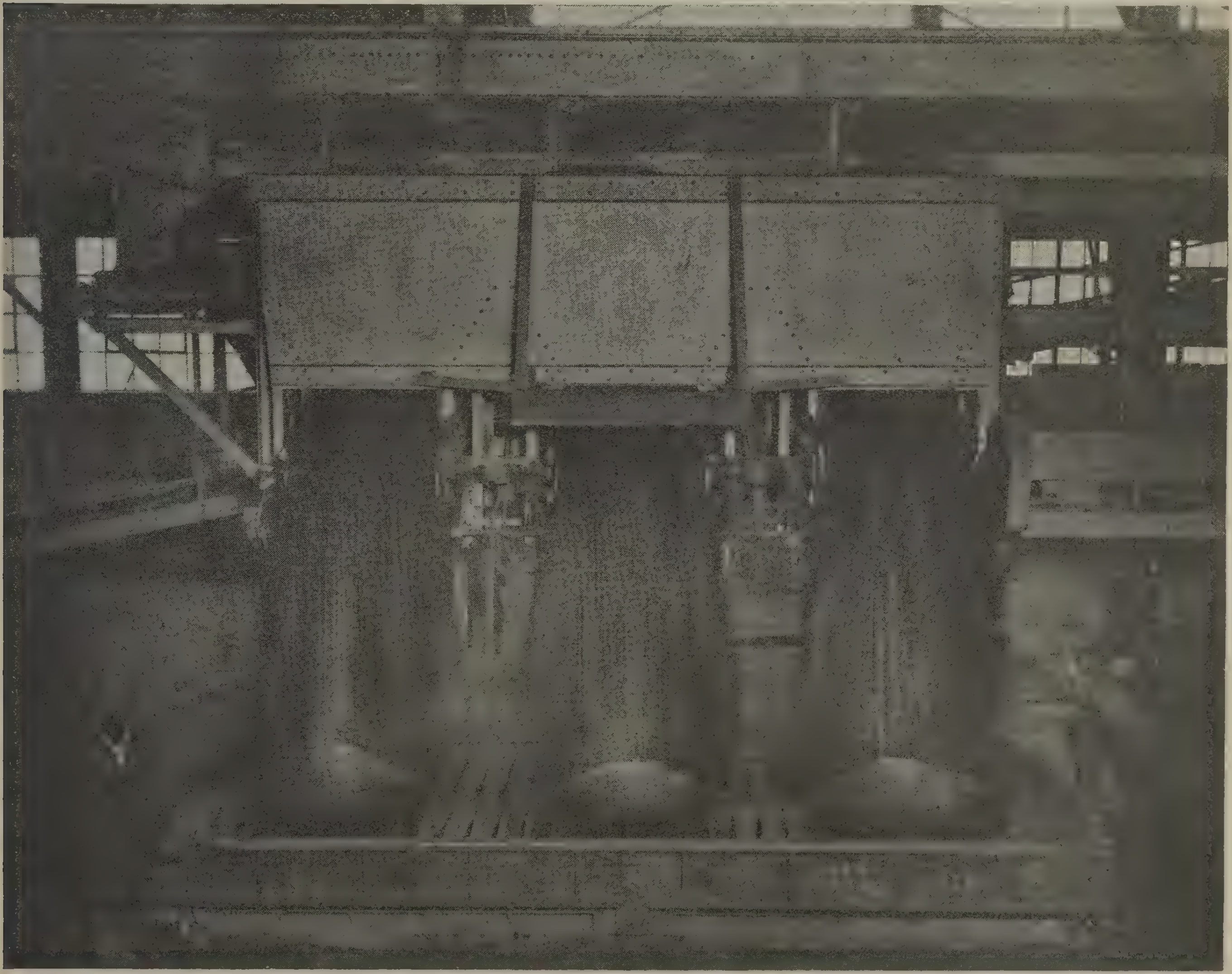

Fig. 1—*After the Pipe Mold Is Placed on a Special Jolt Ramming Machine, It Is Filled with Green Sand. Notice the belt conveyor supplying sand to the service bins*

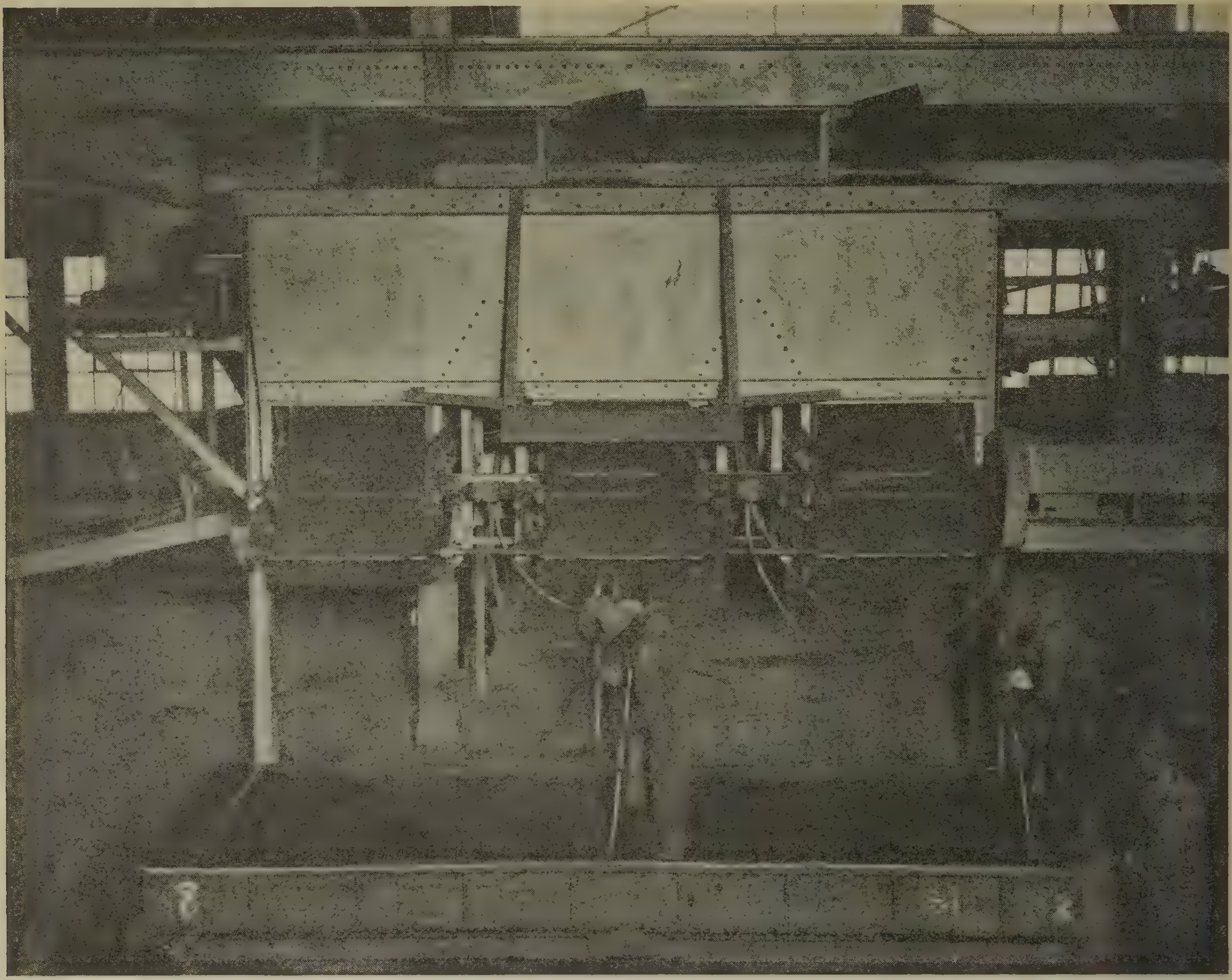

Fig. 2—When the Jolt Ramming Machine Has Finished Its Work, Ramming of the Mold Is Completed with Pneumatic Rammers. This shows four workmen at the mold, which, in this instance, held four 16-ft. lengths of 8-in. pipe

Fig. 3—Here Is Shown a Core Machine Making the Last Core of a Set of Four. When it is completed, the quartet will be picked up by an overhead crane and immediately set in a waiting flask

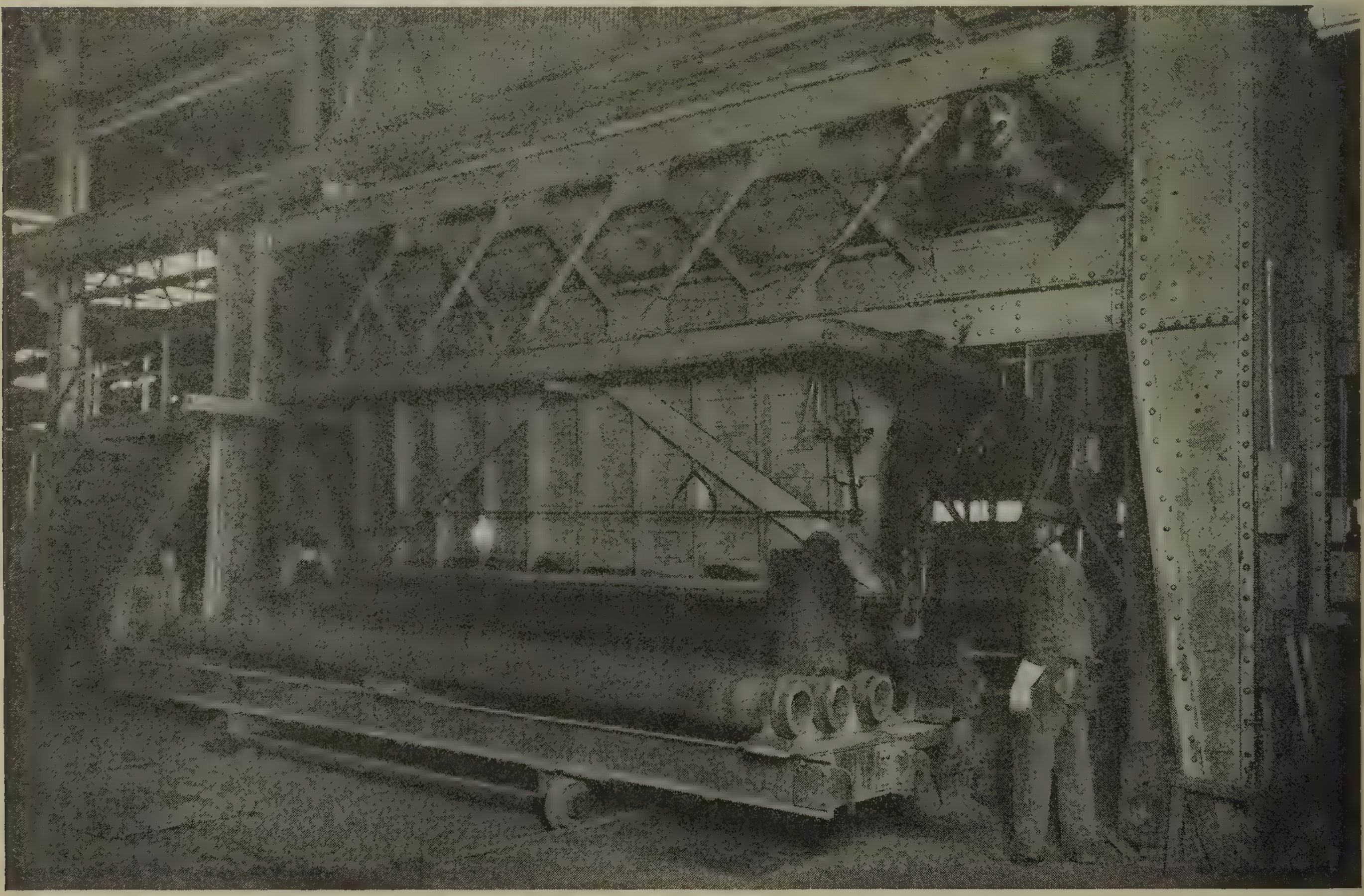

Fig. 4—The Method of Setting Cores Is Graphically Shown on the Left of This Photograph. Notice the two gages. These indicate to a nicety how the cores shall be adjusted in the flask to prevent sagging or floating before and as the molten iron enters the mold. On the right, a completed mold as it looks when ready to be transferred to the casting zone. In both instances a very good idea can be gained of the numerous gates which make it possible to pour two pipes in a few seconds, with the molten iron traveling a minimum distance from the ladle to its final resting place in the mold

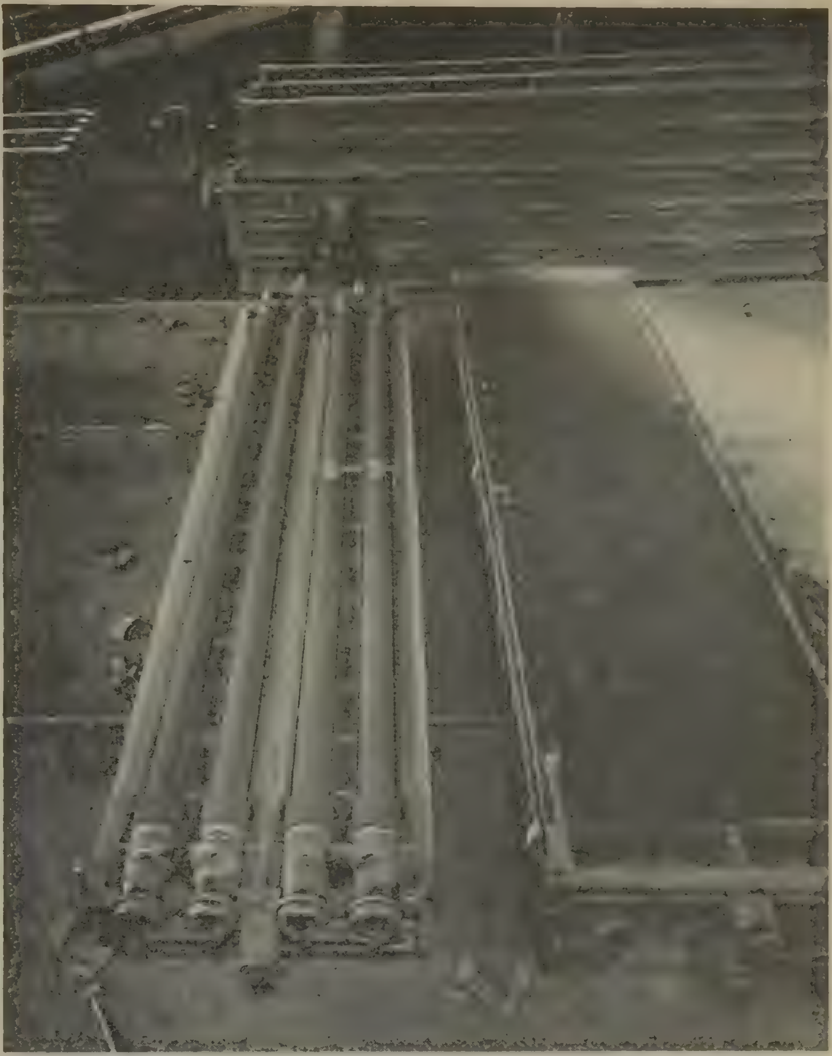

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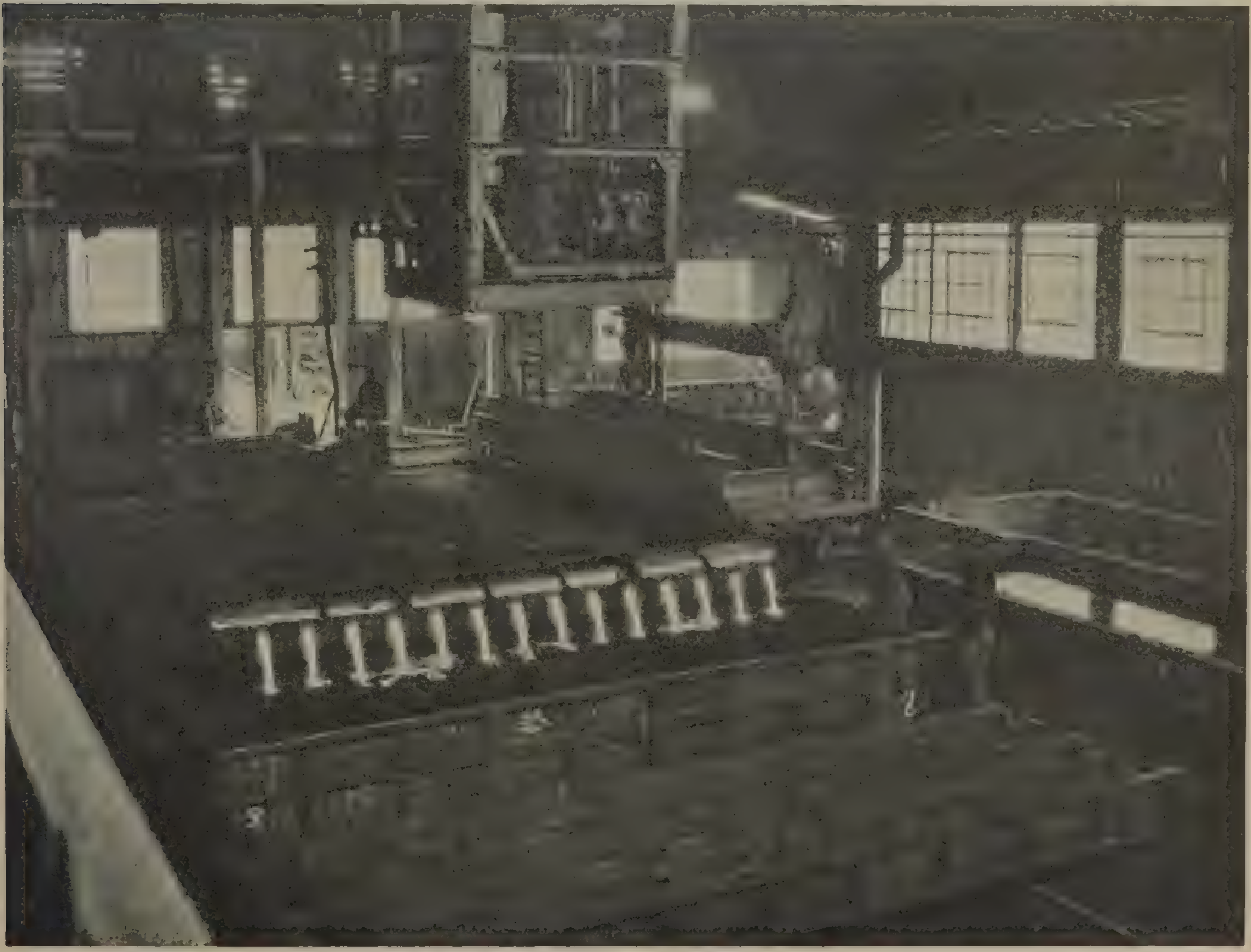
Fig. 5 (Below)—This Gives an Excellent View of One of the Large Multiple-Lip Ladles, Which Pours from 14 Spouts at Once. Two pipes are cast at the same time by this process. In the background, to the right, can be seen one of the shake-out machines



ented device for holding long cores central in a mold without chaplets.

Schedule Production Like a Rolling Mill

The layout of the new foundry unit is interesting mainly in that it permits continuous operation of all factors used in this mechanical process of making pipe. Instead of a certain number of molds being prepared and the molten iron subsequently poured into them, ramming, core-making and core-setting, pouring, shaking out, core bar pulling—and the return of the flasks, sand and core bars for immediate re-use—are simultaneous operations.

Perhaps the most outstanding feature of this new process is that, instead of a certain division of classes and sizes of pipe making equipment arbitrarily fixing the relative output of each day's work, the entire mechanical unit of the McWane plant runs on a given size, as in the case of a rolling mill. Thus orders—and not the proportion of plant equipment for given sizes of pipe—determine the scheduling of production.

Sand Handling All Done by Conveyors

Molding sand used in the McWane mechanical process is handled entirely by conveyor equipment. After the sand leaves the shake-out machines, it is carried to reconditioning equipment consisting of screen, pug mill, blender, storage bins and conditioner. Then a belt conveyor, which runs underground to the foundry, returns it to service bins above and behind jolt rammers.

When a mold is placed at a rammer, the sand is discharged directly into it. This is shown in Fig. 1. Then comes the jolt ramming operation, which is finished off with manual pneumatic rammers as shown in Fig. 2. Any surplus sand that may have been discharged on to the rammer from the service bin is shoveled on to floor gratings immediately in front of the rammer. From there it falls to a clean-up conveying system beneath the floor of the foundry and is, in this manner, restored to service.

The output of each mold is from one to six 16-ft. lengths of pipe, depending upon the pipe diameter. All the equipment in this unit of the McWane plant is designed to make pipe from 4 to 12 in. in diameter.

Molds and Cores Handled by Cranes

Overhead cranes play an important part in the McWane process. One of them handles the copes and drags to the assembling zone, where from one to six cores are set simultaneously. These cores are made by a special 16-ft. core machine, shown in Fig. 3.

Another such crane picks up the cores from the device upon which they have been placed by the core-making machine and sets them in the drags. This second crane, after the flasks are closed, carries them in completed form to the casting and shake-out zone.

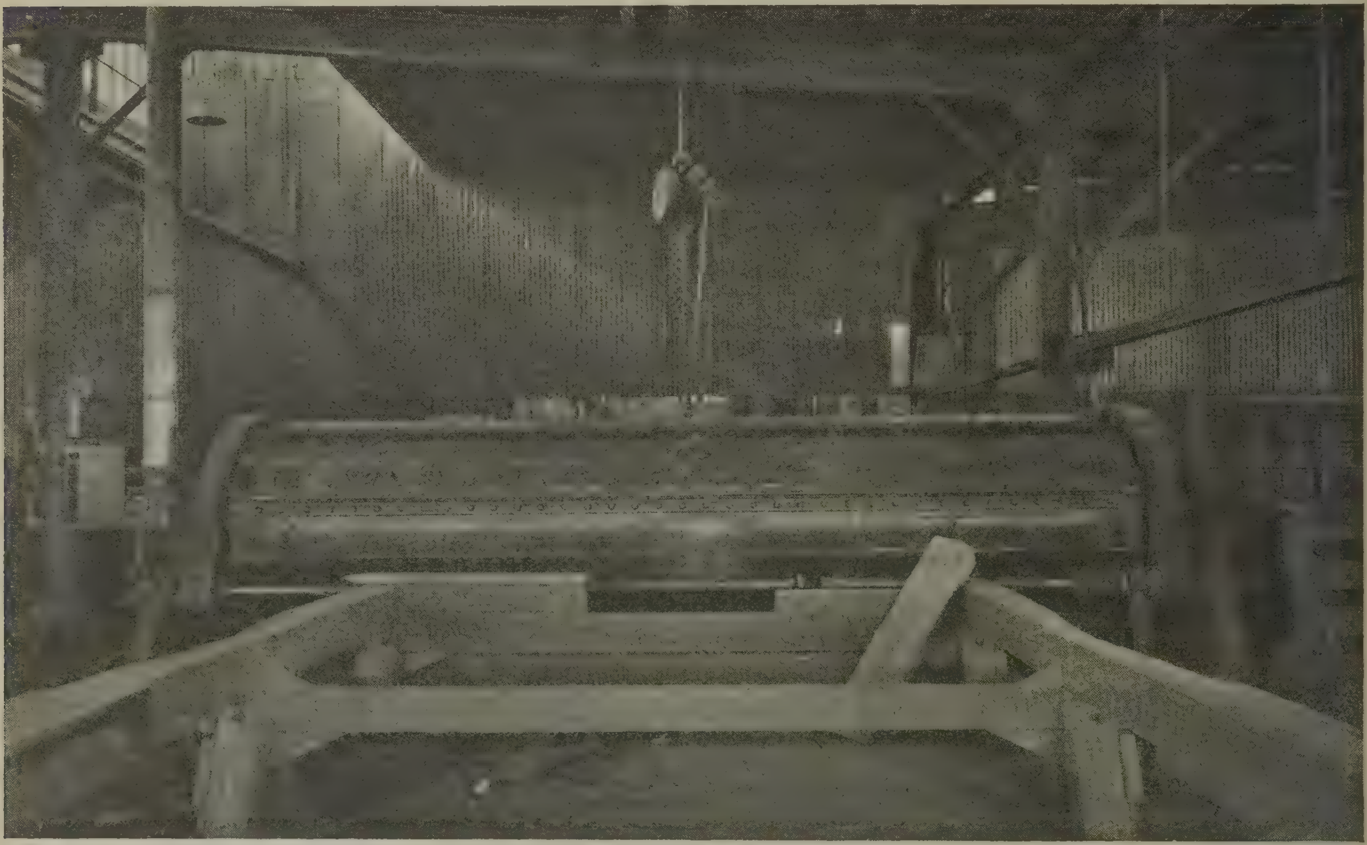


Fig. 6—Here Is Shown One of the Large Rattlers Which Is Included in the Finishing Process of the McWane Plant. This machine is capable of handling approximately 19 *6-in. diameter lengths of 16-ft. pipe*

Throughout the process, these cranes keep from one to six molds ahead of the pouring ladles.

Metal Poured by Multiple-Lip Ladles

Multiple-lip ladles, as shown in Fig. 5, are employed entirely. Each of these large ladles is equipped with 14 spouts and is capable of pouring two 6-in. or two 8-in. pipes at the same time. As previously stated, the number of lengths of pipe to a mold varies with the size being cast.

A third overhead crane handles the ladles and, when this job is completed, places the molds on a car which immediately carries them to a runway leading to the core bar pulling machine. Another duty of the third crane is to place the copes and drags on the shake-out machines. One of these machines can be seen in the background of Fig. 5.

Following the shake-out operation, the endless conveyor system recaptures the sand used in the molding and a smaller wall crane runs the flasks back to storage near the jolt rammers. Then the entire process is repeated.

After they have been removed from the molds, the lengths of pipe, with the core bars in them, are conveyed to the core bar pulling machine. This interesting device extracts the core bars in a few seconds, and the pipe is then rolled to the tumbling mills. Here it is rattled with small steel stars. One of the large rattlers, which is capable of handling 19 lengths of 16-ft. pipe, is shown in Fig. 6.

After leaving the rattlers, the pipe passes through the regular foundry routine of chipping, inspection, hydrostatic testing and, finally, coating—when required.

Thenceforth the pipe lengths pass either directly to the shipping yard or, if they are of special McWane types that are to be equipped with joints, they are diverted to the joint-making department for insertion of the pre-calked lead-and-jute joints. If for high-pressure gas or air service, the pipe is threaded, male and female, at the spigot and the bell ends respectively.

It should be borne in mind that the McWane pipe specifications are of the modern weights and thickness, which factors have been determined by subjecting the product, thus cast in green sand with green sand cores, to tensile and transverse tests and to tests to destruction.

In this manner the weights and dimensions in the various classes of pipe made by the new McWane process are fixed to guarantee the service requirements of older specifications, for both water and gas.

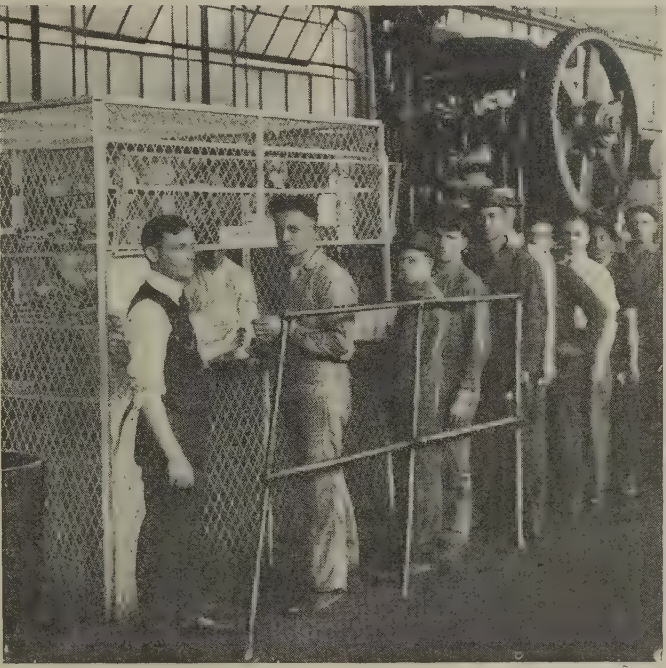
Canteens Placed at Handy Locations in Large Plant

Budd Body Factory Serves Five Million Orders Yearly at Five Cents Each—Everything From a Cup of Coffee to a Full Meal

BY R. W. BAREMORE

AN efficient yet highly specialized lunch system is functioning successfully at the Edward G. Budd Mfg. Co.'s automobile body plant in Philadelphia. Last year it supplied employees with over 5,000,000 food orders. Each one sold at 5c., the standard charge for everything served.

The method of dispensing food is perhaps best described as a canteen system. Distributed throughout the various plant buildings, in convenient locations, are 25 service stations or canteens, all of which are supplied from a central kitchen. As shown in the illustration, each is a wire cage, similar to the modern tool crib, about 6x12 ft. in area, equipped with shelves, counter, cash register and gas stoves. The latter are used only to keep foods hot. At these canteens 7000 persons may be served with one or more food orders in a very short space of time, easily, satisfactorily and economically.



Canteen Brings Lunch and Supper to the Men

At the noon hour the men line up at their respective stations, give their orders, pay for them and are quickly served. It is all done so rapidly that there is hardly any waiting, and the patrons obtain good, substantial food at a low price. Rapid service means that when the whistle blows the men do not need to make a wild dash for a good place in line; furthermore, they are able to take full advantage of their lunch hour for eating, rest or recreation.

This unit cafeteria plan has now proved its usefulness over several years at the Budd plant, and has been found to provide, among other things, the following distinct advantages:

1. It supplies good food at low prices, thus conserving and even improving the health of the workmen.
2. It uses with economy a limited amount of valuable floor space.
3. It gives quick service to all during one lunch hour, thus insuring proper rest and avoiding the necessity of staggering the working periods to prevent overcrowding a central lunch room.
4. It operates as a service department and as an aid to production, as well as a convenience to the employees.

None of these advantages could be obtained, however, were the system lacking in popularity among the employees. To insure this popularity the needs and desires of the patrons are closely studied, their tastes analyzed and their wants anticipated. With every food order priced at 5c. there is a wide variety from soup to ice-cream. A man can supplement the contents of his lunch box with a single order of hot soup or coffee, or, if he does not carry a "nose-bag," he can get a well balanced meal.

Since the Budd company's canteens sold over 5,000,000 orders last year, it stands to reason that the system must be highly thought of by the employees, else it would not be so well patronized.

A glance at the records of the commissary department shows that the canteens used 60 tons of bread last year, 18 tons of sugar, 60,000 qt. of cream, about 700,000 orders of pie, close to 80,000 gal. of coffee and 40,000 gal. of soup. Sandwiches, of course, lead all food orders, over a million having been sold during 1927.

The above figures apply only to lunches served in the shop. In addition to this, the Budd company maintains a restaurant for office employees, where some 50,000 meals are served annually.

For many years past, business organizations have found that it pays and pays well to provide luncheons for their employees, even when the actual food cost is considerably higher than the prices charged. Whether this end can be served by building a central cafeteria, by subsidizing a restaurant on neighboring ground or by installing a central kitchen and a number of canteens, such as described herein, is a matter to be determined by an analysis of the individual circumstances. Where the operations are spread over large floor areas, the canteen will usually be found to appeal to the workmen. It returns dividends in time saved, better health, and therefore better and more efficient production, and is a direct factor in preserving morale and good will.

At least this has been the result at the Budd plant. It has also been found that the curse has been taken from overtime or night work by the willingness to supply an appetizing supper at short notice. As a matter of fact, no service of this kind is refused, irrespective of the cost, if a corresponding benefit accrues to men and production management.

New Drive for Three-High Plate Mills

Driving Center Roll at High Speed Gives Large Torque with Increased Flywheel Stored Energy

BY MAJ. JOHNSTONE TAYLOR

A ROLLING mill slip drive designed and built by Duncan Stewart & Co., Glasgow, Scotland, is stated to possess several advantages. Its arrangement is shown in the accompanying diagram. It has been in existence for some time on two-high reversing plate mills, on both roughing and finishing stands, and is now being applied to three-high mills, where it would appear to have great possibilities.

It will be seen that the customary pinions and pinion housing have been eliminated. Their place is taken by a light nest of gears between the flywheel and the mill spindles. As the usual type of pinions may cost up to $20,000 on a 30-in. mill, the saving in first cost and in renewals is important. The torque is applied to the center roll, which hitherto has not been driven. By this method it is possible to speed up the flywheel about 30 per cent with the same rolling speed, resulting in a great increase of momentary mill power without increasing the size of the mill motor or the weight of the flywheel. In a recent installation an 80-ton flywheel proved of equivalent value to the previous 150-ton unit, due to the greater revolutions for the same rolling speed.

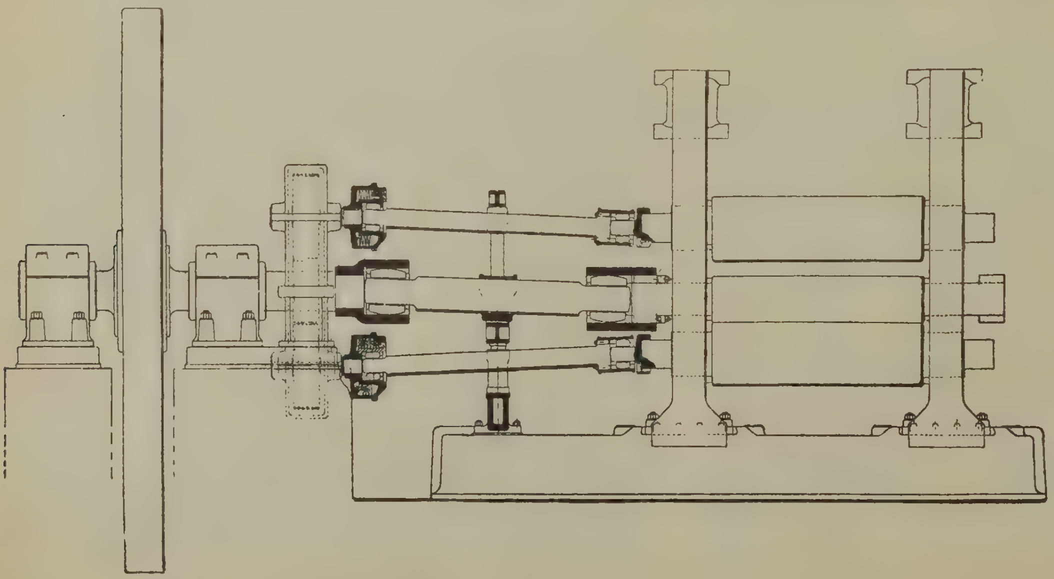
The addition to the plant involves but a new pair of machine-cut double helical gears and a new middle roll having larger necks and chocks. Thus for quite a small outlay an existing mill can be given something like 75 per cent increased mill torque. In addition, the end of the new middle roll can be made suitable for the universal coupling box of the driving spindle, while the top and bottom existing rolls can be made to take the new attachment.

In addition to there being 75 per cent added momentary power, the rolling power consumption is reduced well below the original amount, due to the smaller diameter of the middle roll. If there is to be no increased size of slabs, there may be no need for the increased diameter of roll necks, though the increase of power, as is known, rises more quickly than the increase of roll speed.

Only a mill provided with slip drive can make use of this method for operating a three-high mill. A positive connection between the upper and lower rolls when producing a finished plate is inadmissible. On the finishing stands of a reversing plate mill the upper roll is not driven, with the result that many rolls are broken, due to shock, though little damage is done to the plate; but if both were driven, thin plates would be torn to pieces.

With this new equipment every roll is driven and is under full control. The top and bottom rolls are each driven through a slip drive, which permits them to adapt themselves to the central driven roll speed. The result is a much more powerful machine, its total energy is increased, its speed drop is negligible, while the increased flywheel energy and reduced mill torque insure steady running by reason of the lessened demand from the flywheel.

The Cincinnati chapter of the American Society for Steel Treating held its monthly meeting April 5 at the Cincinnati Milling Machine Co.'s plant. After an inspection of the plant, the members listened to a short talk on "Austenite" by E. P. Stenger of the Queen City Steel Treating Co., and an informal presentation of electric methods of heat treating, normalizing, carburizing, hardening and drawing by H. Stanley Binns of the Cincinnati Milling Machine Co. A film showing methods of electric heating concluded the program.



AS the Torque of the Drive Is Applied to the Center Roll, Heretofore Not Driven, the Flywheel May Be Speeded Up 30 Per Cent, Giving Smoother Operation

Does Price Cutting Help the Buyer?

Destructive Competition Inimical to Interests of Purchaser and Seller Alike, Says Charles F. Abbott in Address to New England Purchasing Agents' Association

"DOES price cutting work out to the buyer's interest?" was the theme of an address delivered before the New England Purchasing Agents' Association at Boston on April 9 by Charles F. Abbott, executive director American Institute of Steel Construction, who has been speaking throughout the country to business organizations on the necessity of curbing price cutting as a means of securing adequate profits for industry.

"In the long run, buyer and seller alike will be adversely affected by any influence which undermines the stability of the other," said Mr. Abbott. "The best assurance for the consistent prosperity and progress of both, and of American business as a whole, lies in active cooperation to foster constructive influences and stamp out those, such as price cutting, which are responsible for destructive competition that menaces the welfare of all concerned.

"Formerly, in periods of active business, practically all organizations except the markedly inefficient could depend upon enjoying a share of the general prosperity. Today this situation does not hold. Considered from most angles, the last few years have been prosperous. Wages have been good, the purchasing power of the public has been at a high level, and the volume of sales has been satisfactory. Why, then, did we average 2000 business failures a month all through 1927? Why do we find adequate profits monopolized by a comparatively small number of organizations while the rank and file struggle along in a welter of red ink figures, passed dividends and complaints about profitless prosperity?

"Much of the responsibility for these situations," Mr. Abbott continued, "can be placed squarely upon the selfish desire to obtain all the business in sight. Business men seem to have lost all sense of proportion in a wild scramble to attain volume at any price. The idea seems to be to keep your competitor from getting any business at all. Greed for volume, without due attention to costs and profits, leads directly to price cutting. Price cutting leads directly to rancorous, cutthroat competition and to obliteration of all semblance of salesmanship.

Price Cutting a Vicious Circle

"In a number of our key industries there is actually severe depression due largely to the practice of slashing prices to meet the terms of competitors who are expert slashers themselves. The whole thing is a vicious circle, and, if the tendency continues at its present rate, it threatens to bring trade prostration of the worst kind.

"The aggregate net income of 385 important railroad, industrial and utility corporations was $2,467,000,000 in 1927 compared with $2,570,000,000 in 1926. The decline amounted to more than 4 per cent. Forty-one of the important industrial concerns reporting showed either a decrease of 50 per cent or more in net income as compared with 1926 or showed a deficit as compared with a net profit in 1926. In six out of the 10 industries listed, lower prices is given as one of the basic causes of the shrinkage.

"The predicament in which the seller finds himself as a result of inadequate prices is an exceedingly uncomfortable one, but is there any reason why the buyer should be particularly worried about the price-cutting activities of the organizations from which he buys? If these organizations want to commit suicide by supplying him with materials at less than cost, is there any reason why he should be concerned? Is there any reason why he should not take the fullest possible advantage of a buyer's market while such a market exists?

"The old-fashioned purchasing agent would have answered 'no' to both of these questions without the slightest hesitation. Practically his sole concern was with price. His tactics were limited to a question and a protest. The first question he put to the salesman invariably was 'What's your price?' The form of the protest was equally invariable: 'Too much. Go home and sharpen your pencil. Then come back and maybe we can talk business.'

"The Bell Telephone System was one of the first large organizations in the country to lift some of the emphasis from price and place it on those other factors where it belonged. Price remained important, but even more consideration was given to the twin elements of quality and service.

"The advantages of the shift quickly became so apparent that a number of other organizations fell into line. Their purchasing agents were lifted from their former positions as official hagglers, and were turned into purchasing engineers whose duties include the study of fundamental factors that control price movements and underlie the production of raw and semi-finished materials.

Many Purchases Made Solely on Price Basis

"Marked progress has been made in the right direction, but there is still plenty of room for more. Although a growing number of concerns are replacing the haggler with the purchasing engineer, there are innumerable organizations throughout the country where the haggler still reigns supreme and where the purchase is made almost solely upon a price basis.

"No one will attempt to condone the actions of the price-cutter. It must be admitted, however, that the buyer is frequently guilty of what might be called purchaser profiteering, in contrast to the seller profiteering that we experience when demand is abnormally high and supplies are short.

"Purchaser profiteering usually takes the form of jockeying one seller against another to force down the price. Each seller, in turn, is told that the buyer would like to give him the business, but that another bidder's price is lower. The bids are progressively forced down until the man who receives the contract obtains it only at a losing figure. As the practice continues over a period of months or years, all transactions are completed at losing prices and the industry involved is headed for the rocks.

"As you know, the National Association of Purchasing Agents has strongly condemned the subterfuge of pitting one seller against another. The seller is, of course, to blame for being too weak-kneed to look the order in the face and say 'no,' when he is fully aware that it will almost certainly entail a loss. Nevertheless, it is to the interest of the buyer to cooperate with him in eliminating this and other forms of the price cutting evil which at the present time is proving a heavy handicap to the prosperity of industry.

"In the first place, quality and service inevitably suffer when the price is cut below the line of a reasonable profit. The seller is almost irresistibly tempted to resort to substitute materials or inferior workmanship. Deliveries lag. The seller tries in every possible way to repair the mistake he made when he submitted a price based, not on a fair profit upon the transaction, but upon the vicious system of trying to beat out competition.

"The buyer does not receive what he ordered. He receives exactly what he pays for—no more and no less. In the end he pays a price much greater than one based upon cost plus a fair profit, while the seller makes another red entry that brings him nearer bankruptcy.

"Sometimes, it is true, the buyer escapes the penalty. Then it is the ultimate consumer who pays. But business of this kind is built on a foundation of sand. It can never be permanent. Quality, reputation, good will, and all the other business building assets must be thrown overboard for the sake of a quick sale on a price basis.

"The maintenance of his source of supply is another factor that makes a fair profit for the seller about as important for the buyer as for the seller himself. The wise buyer realizes that unless those who supply him with essential materials are able to make a reasonable profit they will either be forced out of business altogether, or will turn to the production of other materials in the manufacture of which they can employ their capital and brains to better advantage.

Sheet Steel Industry was Losing $8 a Ton

"About a year ago it was reported that the producers of sheet steel were losing an average of over $8 a ton on every ton of sheets turned out in their plants. Think of it! There is an industry, well established, with heavy investments in plant and machinery, and supplying an essential commodity. Business conditions were generally good throughout the country. The market for sheet steel was expanding. Yet the sheet mills were not only unable to operate at a profit; they were forced to operate at a loss. Price cutting was almost wholly responsible for this condition.

"A large part of the product of the sheet steel manufacturers is used in automobiles. The automobile industry is very nearly dependent upon the sheet steel industry. It is almost impossible to conceive of an automobile without a steel body. If the sheet steel industry were forced out of existence, or if its efficiency were materially reduced, the automobile manufacturers would suffer irreparable injury.

"The automobile manufacturers, however, did not hesitate to take advantage of opportunities to obtain quotations below the cost of production. This attitude, coupled with the weakness of the sheet people, resulted in utter price demoralization that shook the stability of the entire sheet steel industry. Fortunately, the automobile manufacturers appear to have realized the suicidal nature of their policy, and they have announced that they are willing to pay a fair price if they can be assured that the first price quoted will be the last.

"That incident in itself adds tremendous weight to the argument for the one-price policy as opposed to the horse-trading methods involved in price cutting.

Does Buyer Secure a Real Advantage from a Cut Price?

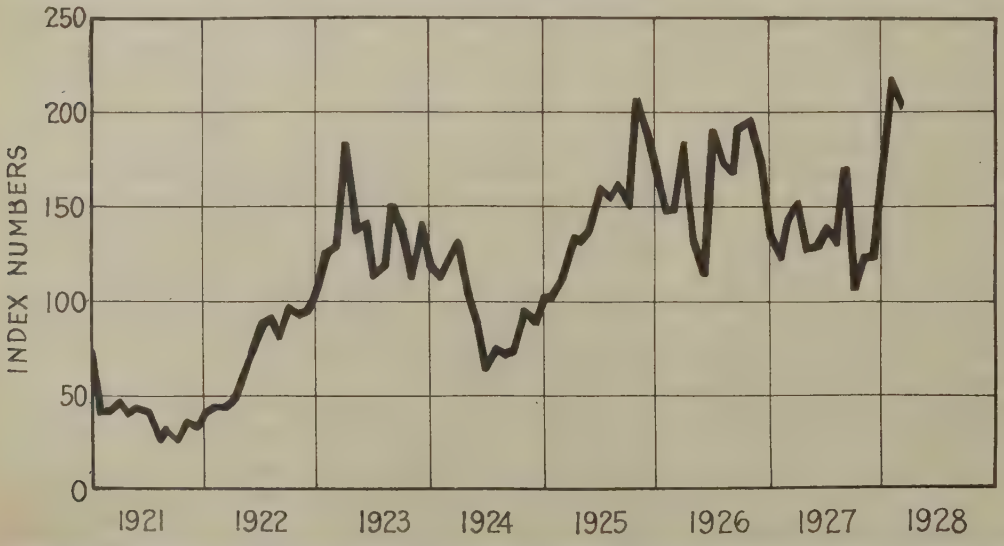
"All that I have said about the admitted disadvantages of price cutting, from both the buyer's and the seller's point of view, might be offset in the eyes of the buyer if, as a result of price cutting, he were able to secure materials at a lower cost than his competitor. There is no question but that the success of a concern is vitally affected by the price at which it is able to obtain raw or semi-finished materials.

"Before it is possible to prove that price cutting is thoroughly inimical to the interests of all concerned, it is necessary to show that the practice cannot give the buyer an advantage over his competitors. Such a demonstration is not difficult. It is even possible to show that in obtaining a price concession which may appear to afford such an advantage, the buyer has in reality handicapped himself in meeting competition.

"Granting that it is sometimes possible to keep a price concession a secret, it is nevertheless true that the salesman who offers one buyer a cut rate will offer his competitor the same cut whenever it is necessary to do so in order to obtain the business. Who profits then? Neither concern will possess any advantage over the other. But, you may say, each concern has a wider margin between its costs and its sales price.

"The trouble is that it seldom works out that way. One of the concerns in the industry is practically certain to use the cut price it has been able to obtain on materials to cut its own price. Other organizations will have to follow suit. Price cutting that started in an intermediate industry is transferred to the buyer's own industry. The final result is lowered prices for all.

"The buyer must recognize the essential nature of the function performed by the seller and the threat to the well-being of both buyer and seller which price cutting, with its constant seepage of profits, inevitably entails. The seller must recognize that if he expects the buyer to pay him a fair profit, he owes it to the buyer to cut his costs to the lowest possible level consistent with good quality and good service."



Monthly Index of Gross Orders for Machine Tools Shows Upward Trend

(Average Monthly Shipments 1922-23-24=100)

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From Data Compiled by National Machine Tool Builders Association

Intricate Spun-Sorbitic Castings

Produced in Great Britain by New Process—Have High Strength, Machinability and Wear Resistance—Useful for Engine Cylinders and Pistons of All Kinds

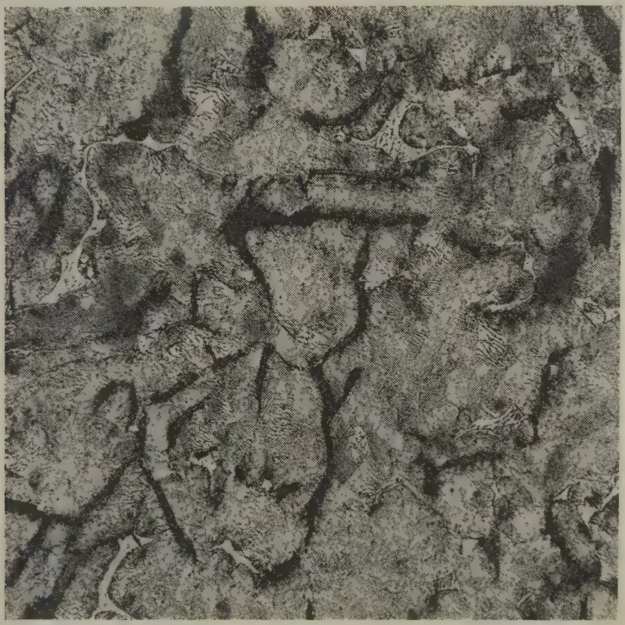
BY J. E. HURST*

DURING the past few years the centrifugal process has been extensively applied to the production of cylindrical castings in cast iron, such as piston ring drums, cylinder barrels for pump and motor engines, and sleeve valves. In Great Britain today approximately all the piston rings used in automobiles are produced from centrifugal castings.

Desirable Structure to Resist Wear

It is generally accepted by internal combustion engine designers that the best material to withstand the wear and heat conditions to which the cylinder liner is subjected has the lowest silicon and total carbon contents compatible with commercial machinability and soundness. In the ordinary centrifugal process the silicon must have fairly high values.

It has been established in connection with the lower-carbon alloys—steels—that the sorbitic condition is one which is highly resistant to wear. It is reasonable to expect that this structure will be accompanied by similar results in cast iron. If the tensile strength can be taken as an index of the resistance to wear of cast iron, it will be seen from the typical results quoted below for sorbitic iron that this conclusion is amply justified.



Structure of Spun-Sorbitic Casting, Magnified 200 *Diameters*

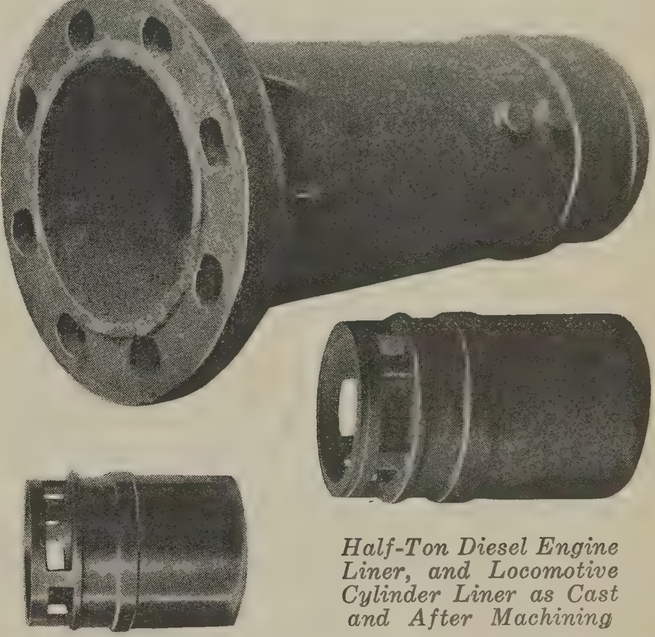
As is well known to metallurgists, the sorbitic structure is one of the intermediate structures between the hard unmachinable martensite which occurs in quenched iron-carbon alloys, and the pearlite which occurs in these alloys when slowly cooled.

The "spun-sorbitic" process, now in operation at Thorncliffe Ironworks, near Sheffield, England, is a special improvement (for which patents have been applied) in certain details of the Hurst-Ball centrifugal casting process, described in THE IRON AGE, June 11, 1925, page 1704. It is so devised that the cooling of the casting is under close control while rotating in the machine, and the result is that the combined carbon in the alloy is retained in the sorbitic condition. Such control of the cooling rate also enables us to adjust the silicon according to the mass, radial thickness and other chemical elements present, as would be done in sand casting, and permits equally low silicon contents.

A typical chemical composition, taken from a series of spun-sorbitic piston valve liners, is given below:

	Per Cent
Total carbon	3.00
Combined carbon	0.97
Graphite	2.03
Silicon	1.31
Manganese	0.42
Sulphur	0.11
Phosphorus	0.34

Two tensile strength determinations made after the manner laid down in the British Engineering Standards Association Specification No. 5004 are as follows:



Half-Ton Diesel Engine Liner, and Locomotive Cylinder Liner as Cast and After Machining

28.9 tons per sq. in. (64,800 lb. per sq. in.)
26.4 tons per sq. in. (59,200 lb. per sq. in.)

These test results are obtained from test rings machined from the actual castings, it being impossible to cast separate test bars by the centrifugal method. The above tests therefore represent the actual strength of the castings.

The microstructure illustrated demonstrates the sorbitic character of this material. It has been etched in picric acid and photographed at 200 diameters. Small areas of pearlite, with the laminations accurately focused, may be observed, but the bulk of the gray-toned ground mass is entirely too fine in structure to be resolved. It is definitely a sorbitic constituent.

Intricate Castings Made

One feature of the newly developed spun-sorbitic process is that larger and more intricate castings may be made. This extends the centrifugal casting process to the production of the larger cylinders required by heavy gas, oil and Diesel engines, piston valve liners for locomotive and steam engines operating on high degrees of superheat, and similar cylindrical castings of more intricate type. Typical examples of spun-sorbitic castings are illustrated. The view shows a cylinder liner weighing about half a ton for an internal combustion engine and a piston valve liner both before and after machining.

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*Newton, Chambers & Co., Ltd., Thorncliffe Ironworks, Sheffield, England.

These castings are of greater intricacy than the simple cylindrical forms hitherto produced. The heavy flange, with the cored-out waterway passages, the ribs, bosses and belts are clearly shown in the cylinder liner casting and the ports in the piston valve liners have all been produced by cores inserted in the rotating molds. These products have the characteristics of centrifugal castings, as ordinarily understood, being close in grain and free from internal defects, as well as being correct in microstructure and external form.

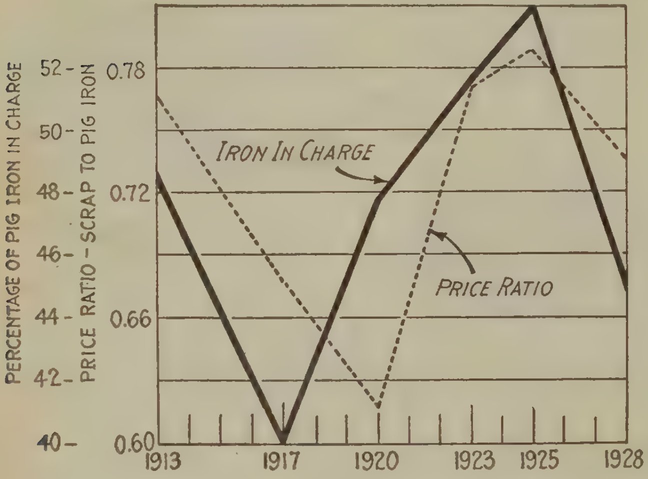
The rapid development in motor transport during recent years has been reflected in the greatly increased annual mileage done by automobile engines. This fact has drawn attention to the wear in the engine cylinders. It is realized that in the generally accepted monobloc cylinder design, the primary consideration in determining the character of the cast iron is the production of sound castings free from defects. The resistance to wear of the material is of secondary nature only. Under these circumstances increasing attention is being paid to the construction of automobile engine cylinders by inserting a previously machined cylinder barrel or liner into a water jacket casing. This is exactly the same method of cylinder construction as is adopted in the heavier internal combustion engine design. It allows the use of cylinder barrels of material specially designed to withstand the wear conditions, and this forms an additional application of the spun-sorbitic process of great promise.

Smaller Use of Pig Iron in Open-Hearth Furnaces

Charge Proportioning as Affected by Price Ratio Between Iron and Scrap Shows Close Watching of Markets

CALCULATIONS of the proportion of pig iron and of scrap used in open-hearth charges in the first quarter of 1928 indicate that the pig iron constituted under 45 per cent of the charge and scrap over 55 per cent. The fact that steel ingots in the first quarter of the year made a new high record in tonnage, whereas the output of pig iron was more than 10 per cent below a high record and was exceeded on nine previous occasions, suggested an inquiry into the situation. This study has covered the first quarters of six separate years—1928, 1925, 1923, 1920, 1917 and 1913.

Without going into details year by year, the figures for 1928 may be analyzed to show the method of approach. Total ingot output is placed at 12,644,000 tons. Of this amount, Bessemer steel accounted for 1,644,000 tons, open-hearth steel for 10,900,000 tons, and crucible and electric steel for about 100,000 tons. Steel-making iron in the quarter aggregated 7,018,000 tons. Of this the Bessemer converter absorbed 1,770,000 tons, on the basis of a 9 per cent loss in conversion, with 2 per cent of the ingot tonnage made up by use of scrap. This left 5,248,000 tons to be used in the open-hearth furnace. Castings have averaged recently 2.8 per cent of the total steel output. On this basis, 148,000 tons of the steel-making iron may be assigned to castings.



Close Parallelism Is Shown Between the Calculated Percentages of Pig Iron Used in Open-Hearth Furnaces and the Ratio of Scrap Prices to Those of Pig Iron

There is left for open-hearth steel ingots a total of 5,100,000 tons of steel-making iron. If we assume an 8 per cent conversion loss from this iron, most of which, of course, is a loss of weight through oxidation of metalloids, the amount of pig iron represented in the ingots was 4,692,000 tons.

Figuring a 2 per cent conversion loss on account of the scrap used in the open-hearth furnace, we find a total scrap consumption of 6,439,000 tons indicated. Adding this to the steel-making iron going into the ingots gives a total charge of 11,539,000 tons, of which 539,000 tons, or 4.7 per cent, represents the total loss in conversion. Of the total charge, pig iron represented a little under 45 per cent and scrap a little over 55 per cent.

Similar figures for the five other years' study show pig iron at a maximum in 1925, when the cost of scrap with relation to the cost of pig iron was considerably higher than in 1928, and a minimum in 1917, when the cost of scrap. with relation to pig iron, was considerably lower than in 1928. Other years showed varying percentages of pig iron used in the charge, as indicated in the diagram. Alongside the curve of iron in the charge is the curve of price ratios of the two commodities.

CHARACTERISTICS OF FIRST QUARTER-YEARS

	Open-Hearth Charge		*Prices of Components*		Price
	Pig Iron	Scrap	Pig Iron	Scrap	Ratio
1928	44.3%	55.7%	$18.59	$13.69	0.736
1925	54.1	45.9	23.35	18.42	0.789
1923	51.6	48.4	28.76	22.16	0.770
1920	47.7	52.3	41.42	25.54	0.617
1917	40.2	59.8	32.87	22.23	0.678
1913	48.5	51.5	17.45	13.39	0.767

In establishing the price ratio the average of heavy melting steel at Chicago, Pittsburgh and Philadelphia was placed against an average of three steel-making pig iron prices—Bessemer iron at Pittsburgh and basic iron at Valley furnace and in eastern Pennsylvania. The scrap average was $13.69 in 1928—the lowest in the entire list, except for the $13.39 in 1913. Similarly, the pig iron average of $18.59 in 1928 was lowest, with the exception of the $17.45 in 1913. The ratio between the two in 1928 was 0.736 (scrap price divided by pig iron price) which compares with a maximum of 0.789 in 1925 and a minimum of 0.617 in 1920. The table gives these ratios and prices, alongside the calculated percentages of pig iron and of scrap in the charges year by year.

Useful Copper Alloys, Old and New

High-Copper Brasses Needed to Resist Corrosion Cracking—Copper Hardened with Silicon and Manganese or Nickel Has Strength of Mild Steel—Copper-Nickel Alloys Favored for Quality Hardware

BY WILLIAM H. BASSETT*

PRACTICALLY every article made from sheet copper is made by mass production methods. Faulty material disturbs the orderly sequence of operations and, in addition, requires expensive inspection and unbearable rejection of finished product.

Rolled and Drawn Copper Requires Rigid Control of Ingot Metal

Modern electrolytic refineries have their methods so well under control that the product meets all requirements if properly fire-refined and cast. The "if" in this case is important. It is necessary that the melted cathodes should be saturated with oxide to dispose of sulphur and that the copper should then be poled to the proper pitch or set. Sometimes these operations are slighted; the result is that the rolling mill produces seamy or slivered sheets or strips.

The condition of the molds, their temperature, and the temperature of the metal are all important to good copper cakes, wedges or wire bars. Cracked and burned molds leave rough places and porous spots. Molds which are out of shape or cracked make shrinkage cracks which gap open when hot-rolled. Dampness means porosity. Drops of oil mean porous or honeycombed areas. Poor or irregular dressing means mold wash in the castings. Cold copper or slow pouring means cold sets.

"Low set" copper means high mill scrap and trouble in subsequent processing. It produces shrink holes, which change in the sheet mill to blisters and slivers. High oxygen may increase tensile strength to a slight degree, but it decreases toughness, perfection of surface and, to some extent, resistance to corrosion. Oxygen in copper is not in solid solution. The oxygen eutectic separates between the large bladed crystals and is the source of the dark or dull patterns on polished copper sheets. These matters were carefully and thoroughly worked out years ago, and the experience which has followed confirms the wisdom of the conclusions then arrived at.

High Copper Alloys Do Not Season-Crack or Dezincify

Yellow brass does not easily corrode, but when used in engineering work and exposed to outside atmosphere it has two bad habits: One is season or corrosion cracking, and the other is dezincification. Experience shows that brass which season-cracks also dezincifies in the presence of slowly acting corroding agents. The opposite statement, that brass which will not dezincify will not readily season-crack, is likewise true.

We have observed season-cracking under atmospheric corrosion at the seashore in brass containing 75 per cent copper, and we have also observed dezincification at the same composition. We have never observed either season-cracking or dezincification in brass containing 80 per cent copper and, consequently, are of the opinion that at 80 per cent copper brass is actually a solid solution of zinc in copper at all temperatures, and behaves in all respects as we believe a solid solution should. It is evidently best not to approach too nearly a saturated solid solution.

Perhaps under the extreme conditions of internal stress and corrosive attack, all metals are subject to the intercrystalline fracture which we know as season-cracking. Copper when extremely hard-drawn will not season-crack when attacked by mercurous nitrate or ammonia. But the effect of the corona discharge from high tension conductors on the atmosphere produces compounds which, if absorbed by moisture and held by fibrous material in long contact with very hard-drawn copper, may produce such cracking. Long exposure to moist ammonia salts may bring about cracking in 80:20 brass under severe internal stress. Conditions of this kind are so seldom met in actual service that, in spite of the misgivings of some engineers as to the reliability of alloys containing any zinc whatever, the low or red brasses are good engineering materials and safe under atmospheric or aqueous conditions.

Bronzes are somewhat less corrosion-resistant than the red brasses, and are more subject to the stress corrosion fracture.

The length of service to be expected from brass pipe has been questioned. Nearly always the pipe will outlast the building in which it is installed. In some districts the water supply is such that dezincification has been set up in the Muntz metal pipe (60:40) commonly supplied, and on this account a number of the manufacturers are supplying as standard an alloy containing 67 per cent copper. Red brass (85 per cent copper) is being used where the water supply is known to be particularly corrosive in character, and this alloy is advocated by some metallurgists, including the speaker, for a general purpose material, and is being used in increasing volume. We have recently heard of the use of compressed ammonia gas for testing water pipe installations. Red brass would stand it, but of course yellow brass cracked badly.

Various Forms of Hardened Copper

Several new copper alloys not subject to stress corrosion have recently been proposed and seem particularly adapted to new uses in engineering construction, since they have greater strength and rigidity than possessed by the older copper alloys.

I desire to speak particularly of the copper-silicon alloys. In 1905 E. S. Sperry proposed the use of copper-silicon alloys for springs and for other purposes for which the copper-tin bronzes were used, since silicon is about two and one-half times as effective as tin for strengthening copper. But no one succeeded in arriving at a practical alloy containing more than a small fraction of a per cent of silicon. "Silicon bronze" has been made for a considerable time, but this was merely copper-tin bronze fluxed or deoxidized with silicon, and generally contained only 1 or 2 per cent of tin.

On May 26, 1925, Charles B. Jacobs patented an alloy of silicon and manganese with copper. This alloy was called "everdur" and the formula is copper, 94.4 per cent; silicon, 4.5 per cent, and manganese, 1.1 per cent, when it is used for making castings. Copper, 96 per cent; silicon, 3 per cent, and manganese, 1 per cent, is the analysis when it is to be rolled or drawn.

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*Technical superintendent and metallurgist American Brass Co., Waterbury, Conn. This is a condensed version of an informal after-dinner talk at the Institute of Metals, Feb. 22, 1928.

It is particularly corrosion-resistant to hydrochloric acid and chlorides. It is readily cast in sand molds and takes the place of gun-metal and bronzes. It can be easily hot-rolled, cold-rolled or forged. It can be drawn, spun or worked the same as other ductile metals. Its physical properties in the wrought form are similar to those of mild steel, and it is an excellent engineering material. It makes excellent bolts and rivets and may be either hot or cold-headed.

Another silicon alloy is the hardened copper patented by Corson this year. It has the approximate formula: Copper, 95 per cent; nickel, 4 per cent; and silicon, 1 per cent. The nickel silicide is in solid solution in copper at and above 750 deg. C. The alloy may be readily hot-rolled or forged, and is ductile and easily wrought by cold-working when quenched from temperatures above 750 deg. C. When this silicide solid solution is heated to just below a red heat the nickel silicide is precipitated and the material becomes hard and strong, resembling mild steel. The reaction is similar to that used to harden aluminum in duralumin. The engineering uses for such material are evident.

Unfortunately both the alloys described have high electrical resistance and cannot be used as conductors for power lines. For low resistance and high strength we must continue to employ copper alloyed with cadmium. Copper with 1.25 per cent cadmium can be hot-rolled readily, but this is about the maximum alloy for hot-rolling. This material will make power cables with strength up to 80,000 lb. per sq. in. and with a conductivity 89 per cent that of pure copper. A small percentage of tin or zinc can be used in connection with cadmium in alloying copper, and in this way higher strengths can be obtained but, of course, with some sacrifice of conductivity. Copper with about 2 per cent cadmium as a maximum can be cold-rolled, but the metal is not sufficiently resilient to replace tin or silicon in spring bronze.

Copper-Nickel Alloys Used Increasingly for Hardware

Stronger alloys of copper suitable for engineering and architectural purposes include the copper-nickel alloys. Those carrying 18 to 20 per cent nickel and those carrying about 30 per cent nickel are particularly attractive where easily-worked corrosion-resisting white metal is desired. It is usual to add to these alloys a small amount of a third and, at times, a fourth element which goes into solid solution with the nickel and copper, and acts to deoxidize and desulphurize. They are very malleable and ductile, strong, and of great ornamental value.

These alloys are being used in increasing volume for plumbing and architectural purposes, both in castings and wrought forms as tubes, sheet and rods. They are much superior to plated metal, whatever the plating may be, for they do not have a surface which will wear off with use or change character with the combined action of moisture and scouring.

Urges Performance Standards for Electrical Products

To Supply User with Apparatus of Best Possible Qualities in Respect to Durability, Operating Cost, Etc.

ADOPTION of minimum standards of performance for electrical products, as the next logical step in the standardization program of the electrical industry, was recommended by W. S. Rugg, vice-president Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., who was the principal speaker at the second general session of the policies division, National Electrical Manufacturers Association, in Chicago recently.

"If electrical manufacturers in the United States are to maintain their place in the world market, and at the same time maintain a scale of wages which will permit our present or an advanced standard of living, this must be done through an increased attention to the costs of production and distribution. To achieve this, there must be a degree of standardization sufficient to maintain a given model, if the expensive machinery necessary for its production in quantity is to be justified," said Mr. Rugg. Successful standardization already accomplished by the industry on apparatus characteristics, such as capacity, speeds and dimensions, should be followed by establishment of quality levels of performance, in Mr. Rugg's opinion.

Regarding the minimum standard of performance as a direct means of achieving economy and efficiency of production, and, above all, of insuring the user of apparatus against unbalanced design and performance, and generally unsatisfactory service, Mr. Rugg described the ideal minimum standard as accomplishing a balance among:

1. Lowest cost of manufacturing and distribution.
2. Greatest adaptability to the purpose for which the apparatus is to be used.
3. Greatest durability, or length of life.
4. Lowest cost of maintenance.
5. Lowest cost of power for operating it.

Such standards should be developed to meet the interests of the major groups concerned. These are the manufacturer, the application engineer, the manufacturer of power and the user. The standards should be so adjusted as to require no immediate undue cost of redesign and retooling, and to permit a gradual raising of the standard as the producer's skill increases.

Minimum standards of performance should be especially advantageous in all lines of electrical apparatus which have been long enough established to have arrived at a more or less stable condition, said Mr. Rugg. "There could be no objection to devices having certain characteristics better than the minimum required standards. There should, however, be a penalty attached to devices in which any characteristic is below the minimum agreed standard."

Cooperative Efforts Urged

Adoption by the National Electrical Manufacturers Association of minimum standards of performance should be made "only after careful consultation with other branches of the industry," said Mr. Rugg, who added: "As time goes on, we will find that the process naturally accelerates by practice and acquaintance, and it would be but a short time when it would become more or less common practice.

"If the various members of the N. E. M. A. could come to a mutual agreement that after a certain date all bids, upon the apparatus for which a minimum standard had been adopted, would contain a statement that the apparatus bid upon conformed to the N. E. M. A. standard, I believe it would effectually bring all manufacturers into line. The salesman of a manufacturer who had adopted the standard would naturally call attention to this fact and would make it a selling argument. The salesman of a manufacturer who had not adopted it would, therefore, continually urge upon his manufacturing plant and engineers to get in line. In other words, a manufacturer who would not conform to this minimum standard would have to make excuses."

German High-Tonnage Furnaces

Details of Construction—Much Greater Weight Than in United States—Exceptional Control Methods

BY F. H. WILLCOX[*]

FURNACE construction in Germany is an inversion of ours, i. e., a brick stack with steel bands with cooling plates set in, and a steel plate bosh and tuyere jacket without plates, water cooled on the exterior. The whole structure is supported on heavy structural framework extending to the top platform. Even on American-type shells, such as we have adopted for our designs abroad, the Germans insist on heavy structural beams running vertically from top of column to top platform.

Their bells are usually smaller. Linings are 0.9 meter (35½ in.) thick in the inwall. They have our conventional type of stockline protection on the top, where they do not resort to metal tops. Inwall cooling is carried right up to the stockline wearing plates. As a rule they use a cast iron box on 3-ft. vertical centers, the plate having a 7-in. depth on the face and 9-in. horizontal spacing between plates. The end is open and the water under no pressure. The plate is about 20 in. in from the face of lining.

Tremendous quantities of water are used on the bosh, tuyere and hearth jacket, with a sort of pigs-in-clover puzzle run-off arrangement on the bottom underneath the operating floor, to prevent breakouts getting into the sewers. There is not infrequent evidence of breakout. Inwall batters are less than ours on the newer furnaces.

Boshes are higher than here, and do not usually go over 78 to 80 deg. angle, though one finds as high as 84 deg. However, the same hearth and bosh diameter seems to hold. It is as if one ran a 10-ft. 80-deg. bosh up to a 13-ft. 84-deg. bosh, the hearth and bosh diameter remaining say 20 ft. 6 in. and 24 ft. in each case. The opinion was frequently expressed that, for their material and rate of driving, it was better not to go beyond 78 deg. bosh angle or over 1300 deg. Fahr. blast temperature.

Large Furnaces Not Uncommon

Furnace sizes vary. Perhaps the best relative tonnage figure was a maintained average of 915 tons on a furnace of 16-ft. 5-in. hearth, 22-ft. 6-in. bosh, 14 ft. 9 in. high, 17-ft. stockline, having a height of 84 ft. and a cubic capacity of 22,300 cu. ft. This was on Swedish, minette and German ores, using eight large tuyeres and 1325-deg. blast. From there one may find increasingly larger hearths, up to the largest encountered during my trip, of 20 ft. 6 in. with a 24-ft. bosh and total cubic capacity of 33,000 cu. ft. on a height of 95 ft. This stack used Swedish magnetites, part nodulized, and was credited with 985 tons average production on about 2050 lb. coke. I might say that I am using American tons; the output is about 1002 metric tons.

Of the plants and operating furnaces seen, I would credit 10 with better than an 800-ton production rate. The remainder would average under 600 tons. I secured no published figures, but would believe the average rate per steel works furnace in the Ruhr to be some 100 or more tons less than a similar American figure of the Chicago-Pittsburgh districts.

High Outputs Being Made

Speaking now of high-tonnage furnaces, some remarkable rates are being maintained. For instance, one plant makes 930 tons a day on a 22,300-cu. ft. furnace, iron notch to within 2 ft. of closed bell. This is done without outside scrap on a yield of 54 per cent. The same size stack in 1914 made 550 tons. The wind volume is 120,000 cu. m. per hour, or 70,000 cu. ft. per minute, blown at 14 lb. pressure through eight tuyeres. A blast temperature of 1300 deg. Fahr. is carried.

Over a million tons had been produced on the lining, with an expectation of 1,500,000 tons. The coke rate of 2080 lb. seemed high, as did the top temperature of 650 or 700 deg. Fahr. But the rate of driving is such that the retention period of gas and stock is abnormally short, and, besides, the coarse burden of Swedish and minette ores would seem to give a restricted gas-to-ore contact factor.

Low-silicon Thomas iron is produced and the slag runs 34 to 35 per cent Si, 10 to 11 per cent Al_2O_3, 5 to 6 per cent MgO and 45 to 46 per cent CO, with sulphur of 1.5 to 2.0 per cent. The furnaces are cast six, seven and even eight times a day, dependent upon the mixer demands. Parts of casts are put into the sand beds, there being no pig casting machines at these plants. In a couple of plants the iron is run out in sheets, as we run into hot slag pits, and broken with a ball for open-hearth charging.

The blast pressure of say 14 lb. is not at all regular, though it moves within narrow limits, and is seemingly quite as much affected by blast volume as by furnace conditions. It was rare indeed to see evidence of hanging after cast. The volume of air delivery is not regular, as we consider it. The blowers seem to follow the furnace more than, as here, the furnace following the blowers. In fact, it is possible to see variations in blast volume of 10 per cent where the high-tonnage furnaces are driven by a group of old blowers, and I would consider a 6 or 7 per cent variation quite characteristic.

German tuyeres are huge affairs, seemingly as big as some of our coolers, and actually having a diameter of 8½ to 11½ in. Three plants were using Venturi tuyeres, with a diverging instead of converging nose. Inspections of cost sheets were quite convincing as to the change in practice effected, notably a decrease of nearly 2 lb. in blast pressure and an increase of 5 per cent in tonnage. They are said to give a week or so of rough practice when introduced, as may be imagined.

Use Much More Coke Than We Do

The foregoing description of practice is typical of those plants where 900 tons—and even 1000 tons—are being produced, and with furnaces up to 32,000 cu. ft. capacity. It always seemed to me that the coke rates were high and this was sometimes agreed to, but followed by the statement that it did not matter particularly, because there was use for all the gas. This is true enough, but it would seem a bit inconsistent with the use of high-efficiency stoves and gas engines and heat research.

One can find creditable records of coke consumption, and at one plant a low rate of 1750 lb., day in and day out, but it seems to me their coke rate is distinctly higher; for basic iron, I would say, easily 200 lb. a ton higher than ours. Three factors probably contribute: very intensive cooling of furnace walls, a somewhat coarse ore and limestone mix, together with refractory ores, and a rather inflexible charging system. Add to this a fast-driving rate, up to 78 lb. coke per cubic foot of furnace capacity (and higher in one or two instances).

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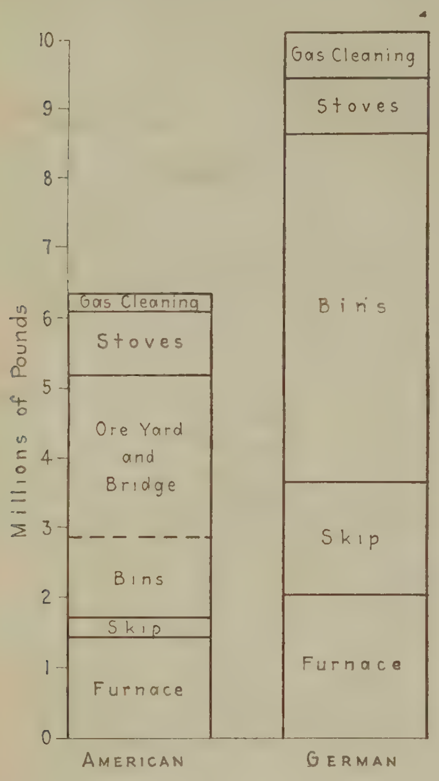
[*] Vice-president Freyn Engineering Co., Chicago. This concludes the article at page 803, THE IRON AGE, March 22, being an abstract of an address before the Eastern States Blast Furnace and Coke Oven Association.

In my opinion, it is a mistake to attribute the fast-driving rate of some of the Ruhr furnaces to a single cause—for instance, coke, sinter, slag, open charge, mixture of hematites and magnetites—just as it is a mistake to attribute all of our trouble to coke. Many use only 15 per cent sinter, and even less. One plant uses sinter as a major component and can use higher heat and gets lower coke consumption.

However, there are furnaces on our Eastern seaboard using from 40 per cent sinter, with foreign lump hematites and fine magnetites and hematites, up to 85 per cent sinter, which exceed anything that can be observed abroad on the same ore mixes. This applies to coke consumption, labor rate and cost above.

As to driving rate, you can observe here a rate of 3.4 tons per 100 cu. ft. as against 3.8 tons abroad.



GERMAN Blast Furnaces Are Much More Massive Than American. Only in the case of the stoves do the American weights exceed the German

However, the 3.4-ton rate is with a coke rate of 1700 lb., and the 3.8-ton rate with coke of 2000 lb. "There is more than one road to Rome," and industrial and economic conditions dictate the road to be taken. Germany has virtually reached her pre-war production rate of pig iron, replacing the Alsace-Lorraine tonnage formerly allotted to Germany.

Massive Construction in Europe

Speaking of European plants in general as against American, perhaps our plants do not have the elaborations and refinements that one finds abroad. But they are simpler, and less expensive to build, even though more sturdy in the furnace itself. A comparison of weight is given, both typical, I believe:

	American	German
Cubical contents	20,000 cu. ft.	21,200 cu. ft.
Weights:		
Furnace	1,340,000 lb.	2,012,000 lb.
Skip	260,000	1,580,000
Bins	950,000	5,000,000
Stoves	900,000	800,000
Gas cleaning	250,000	700,000
	3,700,000 lb.	10,092,000 lb.

To compare the bins being used as ore storage we should add the equivalent of an ore yard and bridge, but not including car dumper, as both are hand unloading propositions. This would add about an equivalent 2,300,000 lb. to the American weight, giving 6,000,000 lb., against 10,100,000 lb.

Cost Figures

As to operating costs, if we put raw materials on a parity, labor and supplies on a parity, the cost of a ton of pig iron is approximately $2.10 higher for a Ruhr-type plant than at a modern American plant, using the same materials and labor and material costs.

As to construction cost, the typical Ruhr District plant with its bins, heavy hoist and furnace, elaborate gas cleaning and gas engines, will cost approximately $26 per ton per year, as against $20 per ton per year here.

As to labor, taking a single-furnace plant, they will run 5 tons per man per day, as against our 6 tons per man per day. I am taking modern outfits in both cases and avoiding extremes, though using a 900-ton German base.

Furnace practice itself is, if anything, easier on men and supervision force there, due to physically better average coke and ore and a higher proportion of beneficiated fines and low-grade iron-bearing materials.

The present trend, not only at blast furnaces but in the steel works, is what they call "rationalization." It is another word for "Americanization," or, more properly, "Taylorization." Intensive study is given man-hours, industrial wastes, the number of men carrying 10,000 brick, unloading and loading materials, ultra-microscopic study of cost of above, etc. A considerable number of men of the Waermestelle are engaged in this stopwatch work. It is characteristic. They must be said to put in a broad, solid foundation.

Environment Dictates Many Conditions

From an economic point of view, an opinion on the fundamental conditions may serve to conclude. German furnace design differs strikingly from American. This has arisen from environment. Most works are held within definite limits, being inclosed by growth of cities; they have had to increase output in the existing units with existing equipment. This tendency has been strengthened by the growing invested capital per ton of steel or iron. German ore sources have changed within 10 years and include many inferior materials.

This has afforded an opportunity for development in design and practice with every advantage of modern research and control, which is unique, and has been effectively utilized. Ruhr coke is exceptionally good. Consequently German blast furnace has attained a rate of production, a degree of durability and a heavy type of construction that is, with exception of coke consumption, eminently gratifying and creditable.

Anti-Injunction Bill Condemned by James A. Emery

Denunciation of the anti-injunction bill, introduced in Congress by Senator Shipstead, as fundamentally and constitutionally wrong was voiced by James A. Emery, general counsel of the National Association of Manufacturers, at the twenty-second annual dinner meeting of the Indianapolis branch of the National Metal Trades Association at the Columbia Club April 2. Andrew J. Allen, local branch secretary, reviewed labor conditions in the metal trades of Indianapolis.

In an election conducted by referendum W. D. Hamerstadt, Rockwood Mfg. Co., was named president for the coming year; George P. Torrence, Link-Belt Co., vice-president, and L. M. Wainwright, Diamond Chain & Mfg. Co., treasurer. Fred Hoke, Holcomb & Hoke Mfg. Co.; O. B. Iles, International Machine Tool Co., and James H. Hooker, Sinker Davis Co., will serve for a two-year term on the executive committee. The eleventh district committee during the next 12 months will consist of Eugene Gruenewald, Ross Gear & Tool Co., Lafayette, chairman; John T. Wilkin, Connersville Blower Co., Connersville; D. O. Thomas, Muncie Products Division, General Motors Corporation, Muncie; R. P. Johnson, Warner Gear Co., Muncie; and Henry Langsenkamp, Langsenkamp-Wheeler Brass Works, Indianapolis.

During the afternoon preceding the meeting a State conference of Indiana manufacturers and business men was held at the Hotel Severin, Indianapolis, at which Mr. Emery discussed pertinent legislative matters.

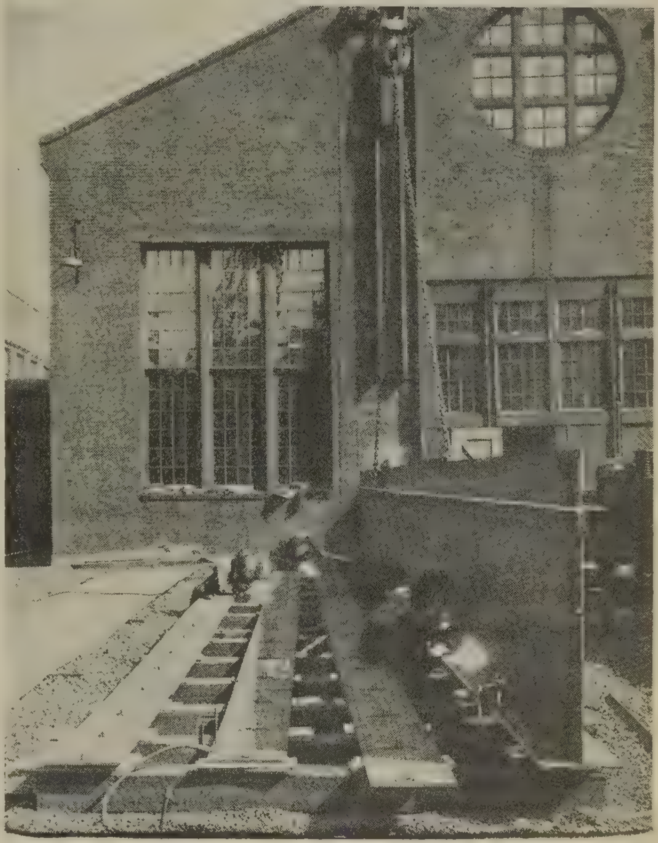
Railroad Bridge Made by Arc Welding

Skew Bridge for Heavy Freight Movement Built of Plates and Standard I-Beams Without Use of Rivets

BY A. G. BISSELL*

ARC WELDING has been used to repair several bridges, both highway and railroad, but the first all-welded bridge to carry rail traffic has just been completed. It is a single-span girder railroad bridge of the through type at Turtle Creek, Pa.

The two main girders used in this bridge are 4 ft. 9¼ in. deep and 53 ft. 9 in. long, and weigh about 11,600 lb. each. These girders were constructed outdoors at the plant of the Westinghouse Electric & Mfg. Co. at East Pittsburgh. Flanges are built up of three plates; the plate attached to the web is ⅝ in. thick by 1 ft. 2½ in. wide. To this plate, by means of a fillet weld along the edges, is attached a cover plate ½ in. thick, 1 ft. 3¼ in. wide and 38 ft. long, and a second cover plate ½ in. x 1 ft. 4 in. x 22 ft. is attached to the first cover plate. The longest plate is the narrowest, and by the methods of construction adopted the slight extra width of the underlying plates forms a little shelf for retaining the molten weld metal.



Building Main Girders. Small clips to aline web and flange removed after joint completed. Stiffener angles at top of web bolted on temporarily

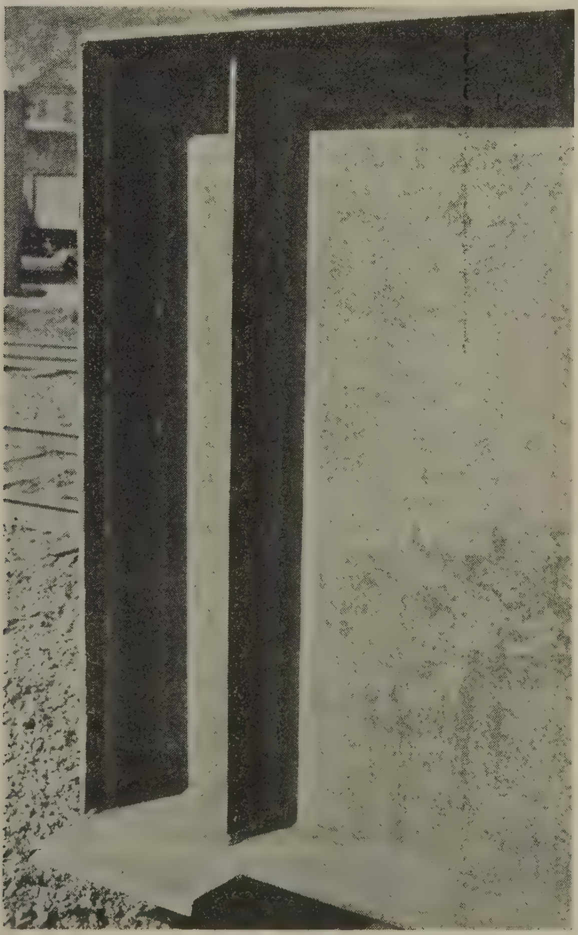
These cover plates were carefully assembled on some long timbers, and edge-welded continuously on both sides. Small angles were then attached along the center line to act as guides for the ⅜ x 54-in. web plate. When the web plate was securely attached to the flange plate, the small clip-angles were removed. The 6-in. angles shown bolted to the web plate were used to stiffen the web during this preliminary work and to make handling easier. They were removed, and the bolt holes were filled with weld metal. Web stiffeners in the form of ⅜ x 4-in. bars, 4 ft. 6 in. long, were then welded in place. Affixing these web-stiffeners before the second flange was attached made it possible to weld the joint between the stiffener and the first flange-plate in the "down-hand" position.

The second flange-plate also had small angles located on it, and the partially completed girder was picked up by a locomotive crane, turned over, and fitted between the angles on the flange, and then welded in place. The end is finished by a ⅜ x 14½-in. plate.

After the two girders were erected on the abutment walls, the floor system of I-beams was erected. Main cross beams rest on the lower flange of the girder, and a continuous weld was run clear around connecting them to the web plate. Stringers for carrying the rails are 18-in. I-beams, resting on the lower flanges of the cross beams. These members were lined up and tacked, then welded solid. To make these stringers continuous, a ¾ x 5 x 24-in. plate is passed through a slot cut in the web of the floor beam at the upper flange of the stringer. These plates are welded solidly to the upper flange of the stringers and to the web of the floor beam, giving a continuous stringer the full length of the bridge to carry the track ties. Three-inch angles are connected between the bottom flanges of the girder and the floor beam for diagonal bracing. Suitable sway bracing was made of plates and welded between top flanges of floor beams and main girders.

In the construction of this bridge, 1067 linear feet of ⅜-in. fillet wells and 501 linear feet of 5/16-in. fillet welds were used, requiring about 500 lb. of electrode material. Welding required 320 man-hours.

Tests were made on this bridge to determine the deflection and vibration by running a 185,000-lb. locomotive over it at various speeds.



Close-Up of Joints at End of Main Girder

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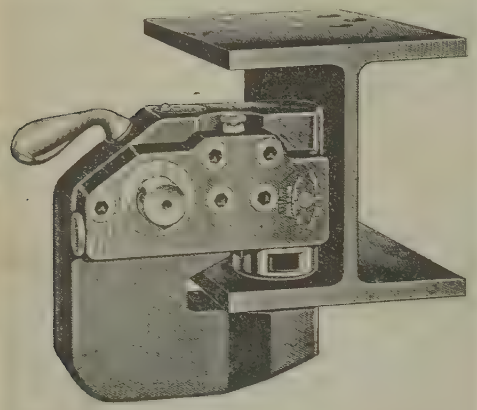
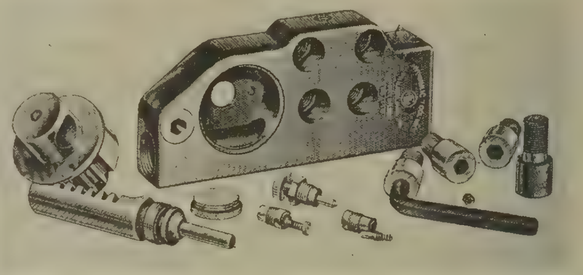
*Arc welding engineer, general engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

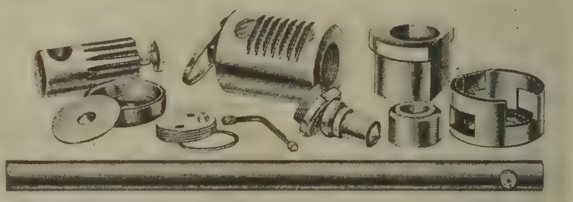
Hydraulic Unit Applied to Portable Punch

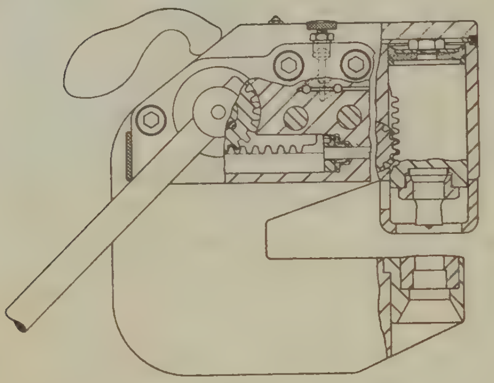
A new hydraulic unit of compact and simple design, one application of which is to the portable punch head here illustrated, has been brought out by the Hydraulic Tool Works, Philadelphia, with sales offices at 350 Madison Avenue, New York. Other applications of the unit include its use on a line of hydraulic jacks which feature light weight in comparison with the power generated, the 100-ton jack weighing approximately 90 lb. The pressure medium is oil, which serves also to lubricate all working parts.



Application of the Punch to an 8-In. H-Section Is Shown at Left. Parts that make up the pump body and the pressure cylinder mechanism are at right, and the assembled mechanism is at lower left







The arrangement of the punch head may be noted from the accompanying illustrations. It is made up of a frame, pump body assembly, pressure cylinder assembly, punch and die and pump handle. All parts are of special steel, heat-treated, and the use of this material, together with the rugged design and self-lubrication of the working parts, is claimed to provide unusual durability.

The type A tool, pictured herewith in operation on an 8-in. 50-lb. H-section, is designed to punch holes up to 13/16 in. in diameter, or a ¾ in. square hole, through a flange ⅝-in. thick. The throat is of a depth that permits punching a hole the center of which is 1½ in. from the web of an 8-in. H-section. The length of the tool is 8¾ in., the width 7 in., and the height 9¼ in. The weight is only 55 lb., which permits the punch to be applied to the work and operated by one man. The tool is operated by pressure at the end of the pump lever, and it is claimed that holes may be punched in less than one minute. The device may be mounted in a vise, or on the floor or bench; for the latter mounting a standard angle plate attachment can be furnished. Means are also provided for securing the tool to the flange of a column, in which position the tool is said to have been used to advantage. The handle shown at the top of the punch head facilitates lifting or other handling of the tool.

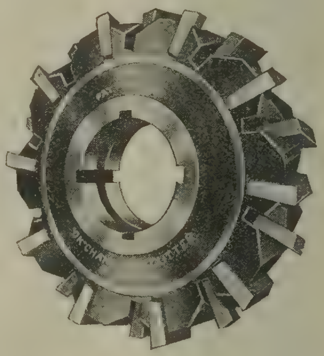
Standard punch and die equipment is employed. All parts are manufactured on an interchangeable basis, and spare working parts may be kept on hand for quick renewal on the job in case of damage. Accessibility of the interior mechanism facilitates replacement of parts when necessary. The valves and other parts contained in the pump body may be taken off the punch merely by removing the five screws shown in the illustration of the pump body parts. The pressure cylinder mechanism, also illustrated, is made up of the ram and its packing, the retracting key, the punch, die holder, stripper, and pump handle.

Fields for which these tools are offered include elevator installation work, structural steel erection, fabrication and erection of outdoor display signs, driving out of rivets and numerous general industrial applications. The hydraulic jacks, to be available later, employ the same type of hydraulic unit and will be offered for a wide variety of application, such as in scale and weighing departments of railroads, for removal of armature shafts on electric locomotive, for removing ingots from molds, etc.

Heavy-Duty Milling Cutters With Blades ¾ In. in Thickness

A heavier line of inserted blade slotting and facing milling cutters than heretofore manufactured by the company has been placed on the market by the O. K. Tool Co., Shelton, Conn. New blades ¾ in. in thickness have been developed, which, as in the previous sizes, are inserted into forged chrome-nickel steel, heat-treated, bodies.

The O. K. milling cutter blade, which is tapered and has a serrated back, fits into a corresponding slot in the body. The tapered surface locks the blade securely in the body, and the serrations permit the blade to be adjusted for wear. The blades are of drop-forged high-speed steel. Any of the standard designs of cutters are made, such as slotting cutters; side mills, either straight or angular; half side mills; face mills, etc. Suitable rake and spiral angle as well as adequate chip clearance are provided, according to conditions.



Tapered Surfaces Lock the Blade in the Body and the Serrations Permit Adjustment for Wear

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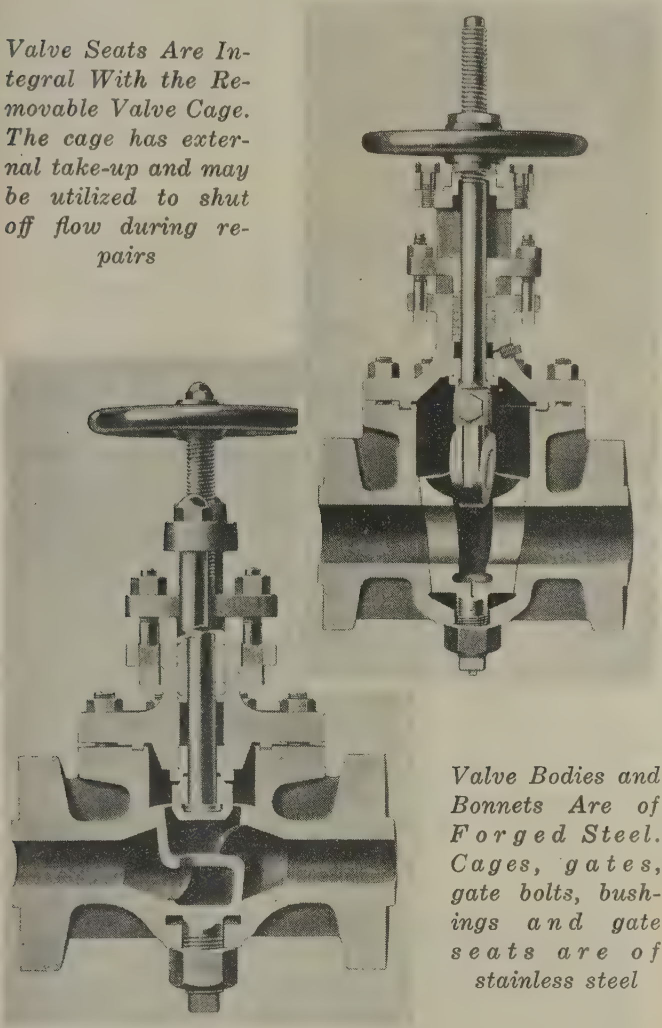
Production of electric power by public utility power plants in the United States was 6858 millions of kwhr. in February, according to the Geological Survey. This compares with 7261 in January and 7214 in December. The daily average in February was the highest ever reached. About 37 per cent of the total was produced by water-power.

Valves for High-Pressure and High-Temperature Requirements

Designed for high-pressure and high-temperature service, a new type of globe and gate valve has been brought out by the Wellman-Seaver-Morgan Co., Cleveland. The valve seats are an integral part of a slightly tapered removable valve cage. The valve cage itself has an external take-up adjustment to compensate for expansion or contraction and to prevent leakage between the walls of the cage and the main valve body. Another feature is that the valve cage may be utilized to shut off the flow through the valve while repairs or adjustments are being made, eliminating the necessity of taking the entire valve body out of the line.



Valve Seats Are Integral With the Removable Valve Cage. The cage has external take-up and may be utilized to shut off flow during repairs

Valve Bodies and Bonnets Are of Forged Steel. Cages, gates, gate bolts, bushings and gate seats are of stainless steel

When repairs are to be made the cage is rotated a quarter turn to prevent the passage of fluid through the valve, and to permit the removal of internal parts, if desired. When the valve has been repaired, the valve cage is restored to its normal position. The valve cage has guides corresponding with the slots in the wedge-type gate, which control the path of travel of the gate and prevent rubbing of the surfaces of the gate and seat.

The valve cage is of novel design in that exteriorly it is circular in cross-section, permitting it to be rotated into position or given a quarter turn to shut off the flow during repairs. The valve seats are flat, permitting closing the valves under high pressures and at the same time allowing the valves to be easily opened. The gate faces are removable and may be replaced when worn, or adjusted when desired.

The valve is so designed that the valve surfaces are released from the seat with a slight movement of the valve stem. This is because of the wedge shape with the center guides, which is said practically to eliminate any sliding action. This prevents both wear and the wedging of the valve faces against the valve seats, which would make it difficult to open the valve.

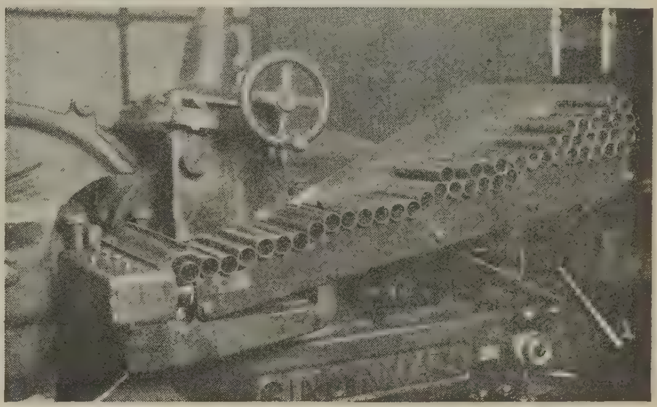
The one-piece valve bodies, as well as the bonnets, are forged steel. The cages, gates, gate bolts, stems, bushings and gate seats are of stainless steel. The gate valve is of the rising stem type and has a straight-way flow, there being no angles at the valve seats. The packing boxes are elevated and have long depth of packing, with a large air chamber below the packing. The body and cover flanges have tongued and grooved joints for soft steel corrugated gaskets. The globe valve has a body and bonnet with either inside screw or outside screw and yoke, and the removable cage construction allows full capacity openings through the valve.

The valves are made in both types to meet the most exacting requirements of the highest temperatures and pressures used in steam plants, oil refineries, pipe lines and in hydraulic air and gas lines. The Globe valve is made in ¾-in. to 3-in. sizes and the gate valve in 1-in. to 6-in. sizes, although larger sizes of the latter, up to 24-in., can be supplied.

Centerless Grinders Equipped with Automatic Feeding Devices

Description of two ingenious feeding devices for use in connection with centerless grinding machines were features of a paper on "Special Machinery for Mass Production," presented by H. L. Blood, chief of machine design division Western Electric Co., Chicago, at the machine shop practice meeting of the Chicago section of the American Society of Mechanical Engineers, held at the Hotel Morrison, Chicago, March 14.

One of the devices, shown herewith, was designed to feed automatically the steel tubes used for desk stand handles. The tubes are stacked on an inclined rack which has a series of steps that keep the tubes parallel as they roll down the incline and also has the effect of preventing any of the tubes from being carried along on top of others. The tubes roll one at a time on to a series of grooved rollers which are driven by power derived from one of the shafts of the grinder. As the weight of the tubes is not sufficient to provide the traction necessary for feeding them into the grinder, the rollers, which are of soft steel, are mounted on permanently magnetized studs. The frame which supports the studs is of bronze, and the studs are connected at the end opposite the rollers by a bar of soft steel. The studs are magnetized in such a way that alternate rollers are of different polarity. When a tube bridges the air gap between two adjacent rollers it completes the magnetic circuit, and the resulting traction between the tube and rollers is ample to feed the tube into the grinder.



In another attachment, devised for feeding tubes into centerless grinders, the tubes, which are of hard rubber, are laid in a V-shaped hopper. At the bottom of the hopper are two rubber-tired disks which revolve slowly and roll the tubes downward against one side of the hopper, dropping them one at a time upon a moving belt. The belt carries them into a nozzle, the inside of which is arranged so that streams of water impinge upon the tubes and carry them into the machine.

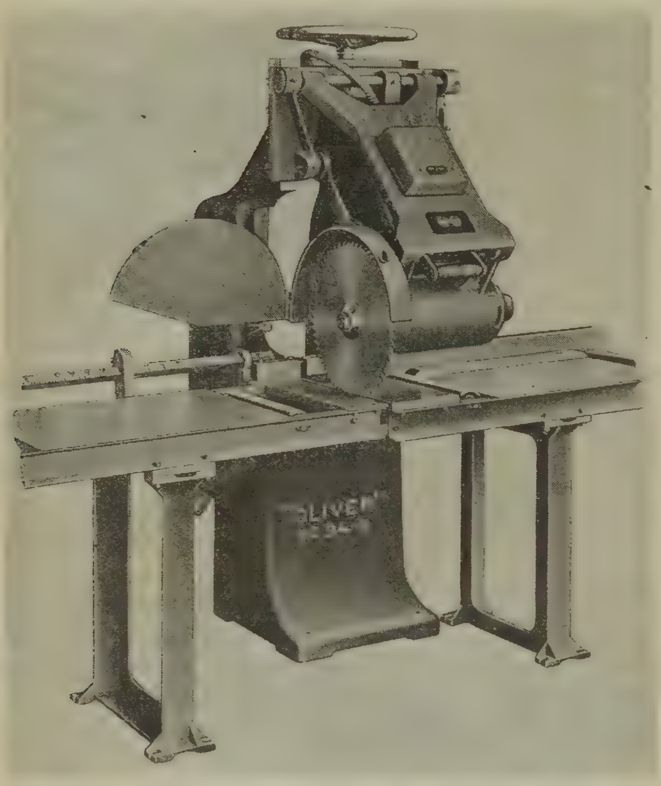
The second annual Indiana heat-treating conference will be conducted by Purdue University at Lafayette, May 10 and 11. The Indianapolis, Fort Wayne and Notre Dame chapters of the American Society for Steel Treating are cooperating with the university authorities in arranging the program for the conference.

Straight Line Cut-Off Saw of Compact Design

Compactness, ease of operation and accuracy are features emphasized by the Oliver Machinery Co., Grand Rapids, Mich., in connection with the straight line cut-off saw shown in the accompanying illustration.

The machine, designated as the No. 94-D Straitline, is self-contained, with the motor mounted directly on the saw arbor. The suspended link mechanism employed for the motor head is said to assure cutting to a straight line and to facilitate operation. Moving parts are light in weight and are arranged to require a minimum amount of movement. Saw tables 20 in. long, 31 in. high and of various lengths are available for use with the machine.

The complete units may be placed back to back, and two of the saws may be located so that the distance between the tables, faced in the opposite directions, is only 18 in. When placed against a wall the distance from the wall to the back edge of the cut-off table is only 18 in. The height of the machine overall is 5 ft. 8 in.



When Two Machines Are Placed Back to Back, the Distance Between Tables Is 18 In. In the unit shown the motor head is locked outwardly and the guard opened for changing the saw

Ball and roller bearings are employed in the suspended link mechanism and pressure-gun fittings are provided for lubricating all bearings. Neither springs nor counterweights are used. It is stated that the balance of the motor head and the design of the linkage returns the motor to its original position and locks it, and prevents rebound of the saw. The entire link mechanism is carried by a yoke with gibbed ways. Vertical adjustment of 3 in. by means of hand-wheel and screw is provided to compensate for wear of saws or for saws of different diameters.

A 5-hp. 3600-r.p.m. ball-bearing motor is mounted directly on the saw arbor. A fan on the motor shaft serves to circulate air and cool the motor. An automatic starter having magnetic contactor with low voltage protection and overload release and push button stop-and-start stations is mounted directly in front of the operator.

Safety features have been given thorough attention. When not in use the saw with its guard is housed inside of the main column. The saw is held back by a safety catch and is only released by a pull on the handle.

Circular saws, dado heads, or solid cutters from 10 to 18 in. in diameter, may be employed, and the machine will carry dado heads up to 2½ in. wide. The maximum thickness of cut by using an 18-in. diameter saw is 4½ in. Stock 2 in. in thickness and up to 20 in. in width can be cut. The automatic cut-off saw tables can be furnished either right- or left-hand. The standard table consists of two sections of 8 ft. each, built up of channels to which steel plates are riveted. Ball-bearing steel rollers are mounted between the steel plates, four rollers to each section. The rollers on the section of the table on which the boards are fed are set ¾ in. higher than the steel plates to enable the operator's hand to catch the boards underneath as well as at the top, assuring quick operation. The opening in the table just beyond the saw provides a chute for end cuttings and short stock to drop into a box below. An 8-ft. gage is provided, the gage being marked in inches and eighth-inches. It is fitted with four adjustable stops.

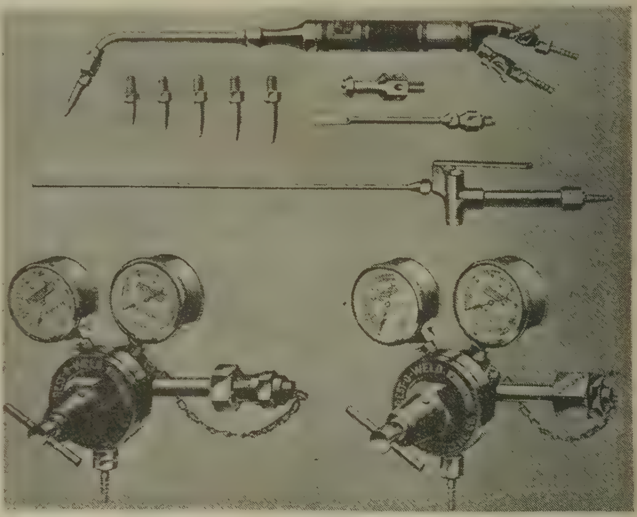
Three New Prest-O-Weld Outfits

Especially to meet the demand of repair shops and sheet-metal shops for inexpensive welding outfits, the Oxweld Acetylene Co., 30 East Forty-second Street, New York, has placed three new sets on the market.

Type W-102-A general purpose outfit, illustrated, is for a repair shop that is equipping itself for any of the modern oxy-acetylene applications—welding, carbon burning, heating and straightening, soldering, brazing, lead-burning and battery work, and radiator repairs. A full line of welding tips, together with a newly designed heating tip and a soldering tip consuming acetylene only, are included. The latter enables the operator to solder the leaves of a radiator in places that would be inaccessible with any other type of equipment.

Another set, called the W-101-A automobile repair outfit, is for the shop which has only an occasional welding job. One large-sized tip is included for frame-straightening or heating. Also an acetylene tip for minor heating and soldering is furnished.

Type W-102-B outfit is recommended for welding light and medium castings; it is also suitable for the sheet-metal shop. This outfit, which includes five welding tips, is adapted to production processes, because the light weight of the blow-pipe with its 3/16-in. hose does not tire the operator even on continuous work.



General Purpose Welding Set

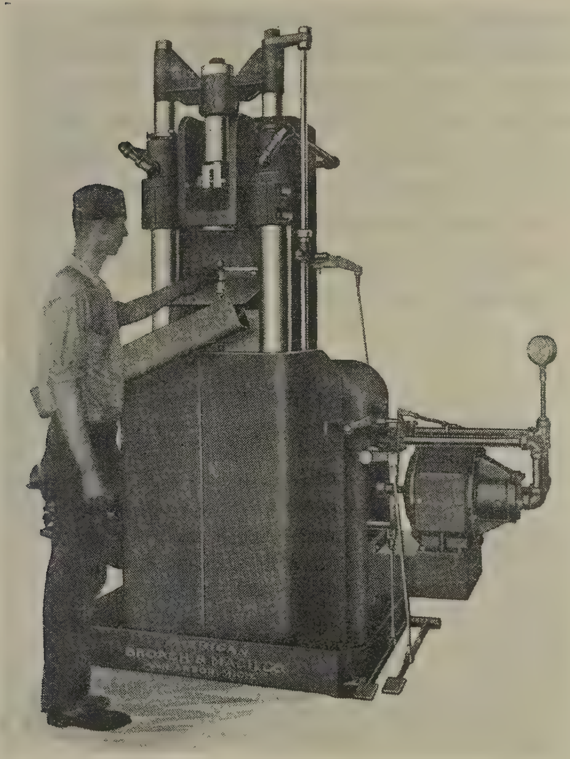
By the addition of a cutting attachment any of these blowpipes may be converted for use in cutting wrought iron or steel.

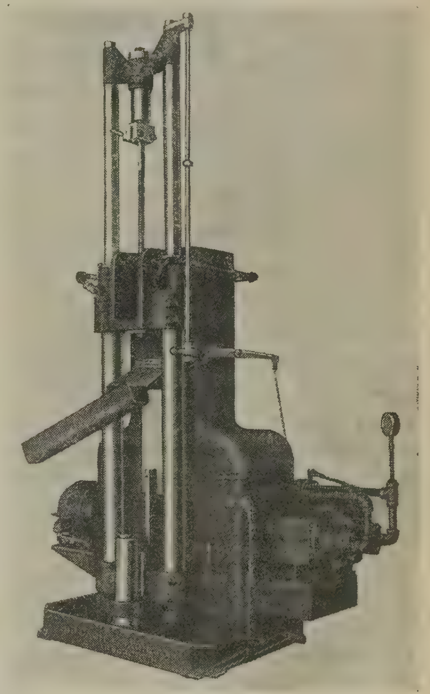
All rights to the gear chamfering machine formerly manufactured by the Peerless Machine Co., Muncie, Ind., have been acquired by the City Machine & Tool Works, Dayton, Ohio. The sale of this machine, as well as of the Bolender gear grinding chuck, also recently acquired by the company, will be under the direction of the City Machine & Tool Works and the National Broach Co., an affiliated organization.

Vertical Pull-Type Broaching Machine With Twin Hydraulic Cylinders

Increase in quantity and quality of work, and longer life of tools, are claimed for a new vertical hydraulic broaching machine of pull type, which has been made available by the American Broach & Machine Co., Ann Arbor, Mich.

The machine, designated at the V-50, is of the same capacity as the company's No. 3 horizontal broaching unit and full broaches similar in design to those on the horizontal machines are employed. Features emphasized include minimum floor space requirements, 4 by 6 ft., and semi-automatic operation, the duty of the attendant being merely to place the work on the end of the broach and operate the foot control pedals. The broach automatically connects with the pulling head, releases the work and returns to its starting position.





PULL Broaches Up to 50 In. in Length, and Similar in Design to Those on Horizontal Machines, Are Used. Placing of the work over the shank of the broach is pictured at the left, but the normal operating position is at the right-hand, adjacent to the control pedals. The view at the right shows the pulling rams in their upper position, after the work has been broached and ejected

Operation may be noted from the accompanying illustrations, one of which shows the machine with splash covers removed. The lower elevating cylinder carries an extending arm which, in turn, carries a soft brass bushing fitted loosely to the back pilot of the broach. As the operator slips the work over the shank of the broach and applies pressure on one of the foot pedals, the lower cylinder rises rapidly, pushing the broach into the automatic connecting bushing in the pulling head. Slight pressure on the other pedal then starts the pulling rams on the upward stroke, pulling the broach through the work. As soon as the tool has passed through the work, the work drops on the angular table and slides out of the chute into a tote box. The pull rams then reverse and when about 5 in. from the bottom position, automatically release the broach by means of a latch that trips the pull head. This permits the broach to drop back into the lower bushing or receptacle, ready for the next cycle of operations.

The second illustration shows the machine with the pulling rams in the upper position, the tool having passed through the work, the work has dropped off and the tool is ready to return to its starting position.

The machine operates by oil pressure. There are two cylinders and two rams, the pressure being applied to the full area of the piston. It is stated that leaks are prevented because there are no packing glands under pressure on the cutting stroke. On the return stroke very little oil is required to fill the cylinder, due to the fact that the pulling rams are 3½ in. in diameter and the bore of the cylinder is 4 in., which arrangement is said to permit high-speed return strokes up to 80 ft. per min. The twin cylinder construction, patents on which are pending, also permits comparatively low construction, the working height required being only 11½ ft.

In arranging the machine so that the operator does not handle the broach, but merely feeds the work and operates the foot pedals, marked increase in production is said to be possible. It is also stated that the broach, in hanging, centers itself, and the work, in being suspended in the same manner, finds its own center much better, and thus prevents troubles encountered in sagging of the broach and the weight of the work. This feature is claimed to result in a better grade of work and increased life of the broach.

The capacity of the machine is 12 tons and the maximum length of broach that can be used is 50 in. The cylinders are spaced 13 in. apart, which permits broaching of pieces up to 13 in. in diameter. Cutting speeds up to 30 ft. per min. are obtainable and return speeds up to 80 ft. per min. The operating pressure is set at 1000 lb. per sq. in. A 10-hp. 900 r.p.m. motor is employed.

The oil tank, of 50 gal. capacity, is in the upper part of the column, and relief valves, surge valves and piping are contained in the lower part of the column. Lubricating pump and piping are provided. The machine weighs 6400 lb.

Manual Alternating Current Motor Starter

A new manual across-the-line alternating current motor starter is being put out by the Cutler-Hammer Mfg. Co., Milwaukee. Designed to meet the need for an inexpensive manual starter, it includes overload cutouts giving complete motor protection; cadmium-plated, double-break, roller-type contacts; and a small safety, dustproof inclosing case.

By breaking the arc in two places the roller-type contacts are said to give several times the life of ordinary contacts. In addition, the contact rollers turn after each operation to present a new contact surface for the next operation. The thermal overload cutouts provide the necessary time interval to take care of starting current inrushes without shutting down the motor. The cover can be opened only when the starter is in the "off" position and all current carrying parts are "dead." Installation can be made without removing the panel from case. All parts are easily accessible for quick inspection.

The McClintic-Marshall Co. will remove its New York offices from 50 Church Street to the 12th floor, 39 Broadway, effective April 14.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Expansion of activity in chief consuming industries is noted, but demand is not insistent.

Car and locomotive buying in March dropped below the unusually low January level.

Automobile production is clearly expanding, but severe competition is apparent and retail sales are lagging.

Building volume continues large, but may slacken; residential building assures good demand for pipe and nails; structural sales are declining.

Some demand for tank plates in petroleum States may come, as storage of oil is becoming a problem.

Iron and steel exports have been only moderately active.

STEEL production in February, on an average daily basis and allowing for the merely seasonal variations, increased so slightly as almost to warrant the statement that it represented no greater annual rate than did the January output, and the March output also held about level. On the other hand, a large gain occurred in the activity of the chief iron and steel consuming industries. These facts lead to the conclusion that the February steel production was moderate compared with the potential requirements of consumers. It was above normal, but so was the rate of production, and presumably the steel requirements, of the building, automobile and general manufacturing industries.

Judging both by logic and by precedent, there is no reason to become bearish on the steel industry so long as its chief customers are doing so well. Nor is there reason to believe that there is any accumulation of total inventories of steel, including both the inventories of the steel makers and those of the consuming industries, so long as the composite demand line is so far above its usual relation with the steel production curve.

Index of Composite Demand Is High

IN February, the latest month for which complete data are available, considerable gains occurred in railroad freight traffic, building activity, automobile production, general manufacturing (other than automobile and steel production) and in exports. The composite activities in mining and oil declined a little, considering the season, and orders for machine tools decreased somewhat. Our estimate of agricultural purchasing power recovered slightly, but remains considerably below the high level attained last fall. The net result is a gain of about 5 per cent in the index of composite demand, which carries it to the highest level since September, 1926, and warrants the hope that the steel ingot output may continue around present levels for a month or two without proving to be excessive.

Two factors, however, serve to limit the probability that this hope will be gratified. In the first place, it will be remembered that February had an extra working day, which is sufficient to explain something like 4 per cent of the gain in the index of activity among the consuming industries. Preliminary indications are that the composite demand line will decline in March. In the second place, prices and profits have to be considered, and unfortunately neither in the steel industry, nor in most of the consuming industries, are these as strong as is the showing made by the physical volume. The natural result is a tendency toward hand-to-mouth operations.

Conditions in Specified Industries

As to the near future, the indications are on the whole favorable to a sustained high level of steel pro-

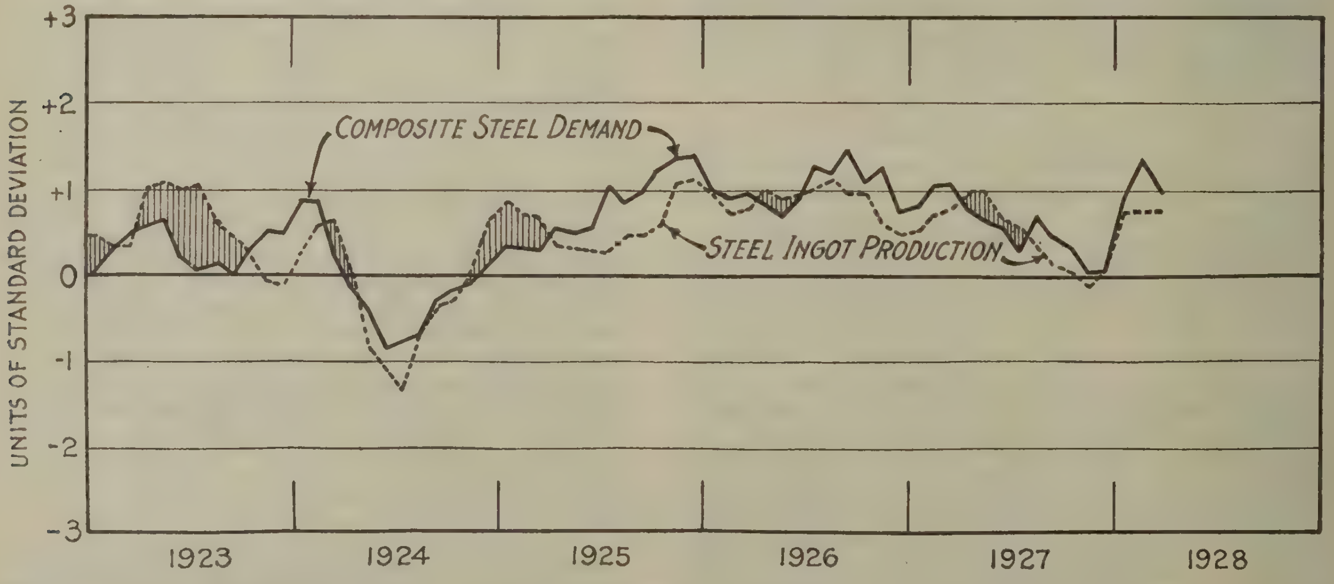


Fig. 1—Steel Production Carried Forward in February and March the High Level of January. But the curve of composite demand has been still higher. The outlook for the immediate future is encouraging

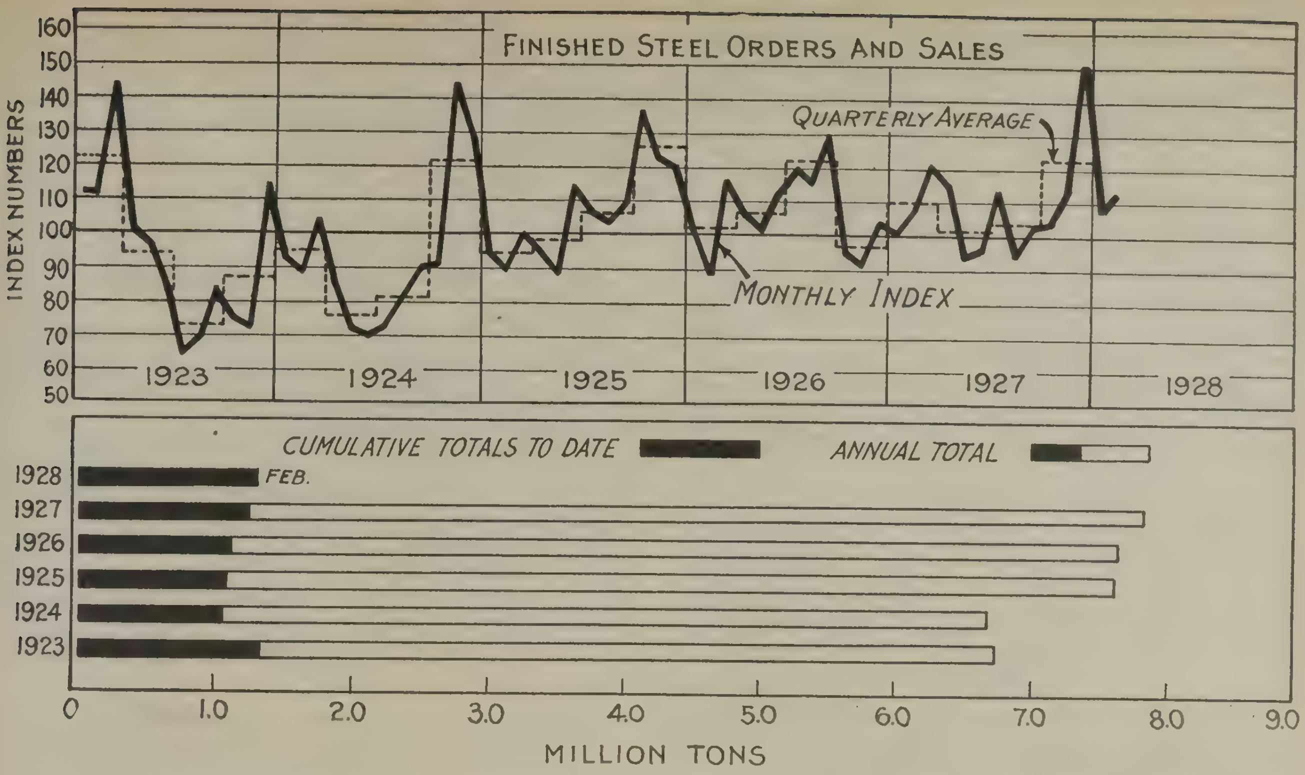


Fig. 2—Buying of Finished Steel Remains Greater Than It Has Been Since 1923. *March showed a loss from February. The peak of resultant production may follow shortly*

duction. The volume of freight traffic hauled by the *railroads* may be estimated for March and, while it is apparent that such traffic has failed to show the usual seasonal increase over the preceding month, this is not surprising, owing to the abnormal gain shown by a leap-year February. Except for February, the March freight traffic appears to have been the highest since last August, though it was of course much below a year ago. As further gains in the total volume of business are probable, the railroads should continue to furnish a fair demand for steel. February earnings showed improvement over recent months and the net operating income of Class I railroads was probably about equal to that of a year ago. Steel makers must remember, however, that this showing represented economies on the part of the railroads and that gross revenues were appreciably lower than last year.

Manufacturing industries, other than iron and steel and automobile production, showed an upward trend, according to the latest information. Judging by the most sensitive barometers, they are likely to continue upward for a few months. Machine tool orders, which are often barometric, declined in February and, as this is contrary to the usual seasonal trend, it is not a favorable indication, but the volume was still large and much above a year ago. March sales of machine tools are currently reported to compare favorably with the two preceding months.

Building activity in March showed a considerable recession from February—one that was so large as to make it practically certain that the index of composite activity for that month will show a decline. This suggests some diminution in the rate of demand for structural steel.

The February output of *motor cars and trucks* showed a recovery nearly to the level of a year ago. Retail sales of passenger cars were reported to be lagging, particularly in the case of high and medium-priced cars, and evidences of keen competition in the industry are not lacking. Estimates for March show little more than a seasonal gain in production. But a large volume of production continues, and heavy sales by the leading companies appear to have developed in March. It still seems probable that the automobile business will not reach a peak before April. A favorable indication is found in the fact that the manufacturers are proceeding cautiously and their large buying of steel is for current requirements.

In general, the *mining and oil industries* are dull and relatively inactive, our composite index continuing on about the same level as during the last seven months. Large coal consumers are drawing on stocks

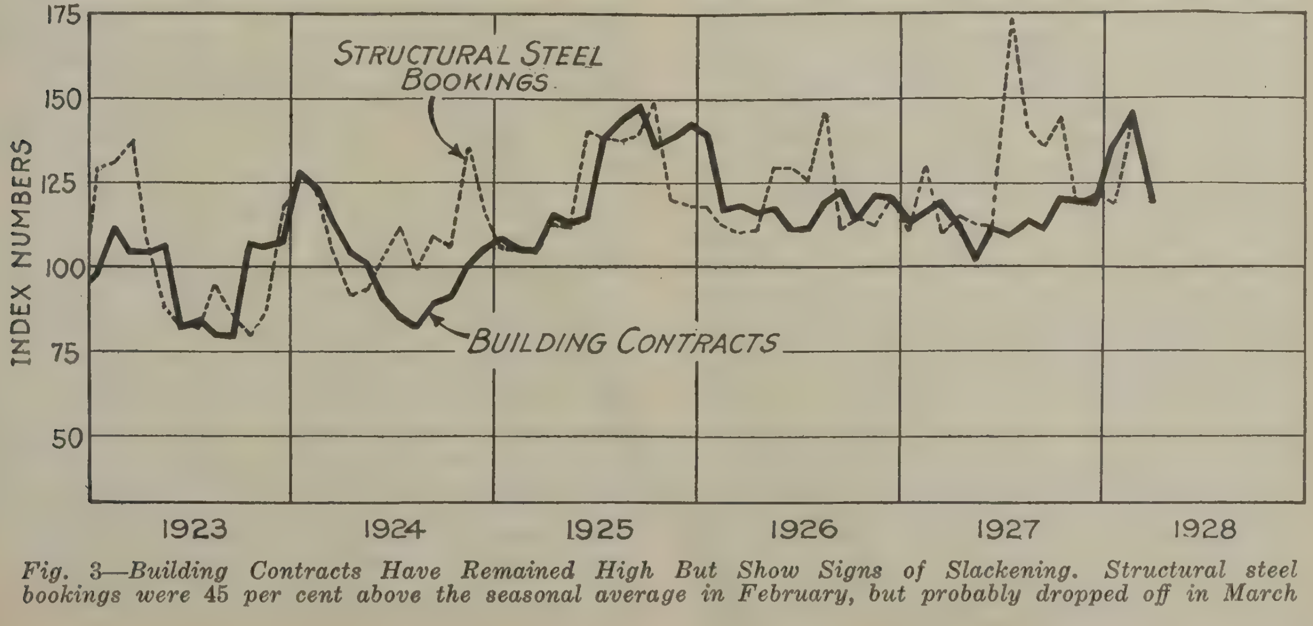


Fig. 3—Building Contracts Have Remained High But Show Signs of Slackening. Structural steel bookings were 45 *per cent above the seasonal average in February, but probably dropped off in March*

and that reduces current demand. Petroleum production has increased lately, in spite of the fact that drilling activity shows little change from the low level that it has kept for several months. The increase in production is not favorable, although it means some demand for storage tank material. Aside from the gasoline branch, the oil industry has not yet turned its corner. Copper production is fairly stable and, considering the season, was off a little in February.

Improvement has occurred during the past month in *farm prices*, which has tended to increase the purchasing power of farmers a little. But the bulk of the crops has now been marketed and the outlook for 1928, though of course highly uncertain at this early date, seems only fair. The farmers unquestionably have entered 1928 in a stronger economic position than they held a year ago and continued activity in agricultural machinery is to be expected.

Iron and steel *exports* declined less in February than usual, perhaps partly due to the extra day in that month, and to this extent made a good showing.

The strongest feature is the recovery of automobile production to levels above a year ago. As long as automobile, building and general manufacturing industries hold at present high levels the railroads must have a fair volume of traffic, and the demand for steel, as to quantity, will be well sustained at a high level.

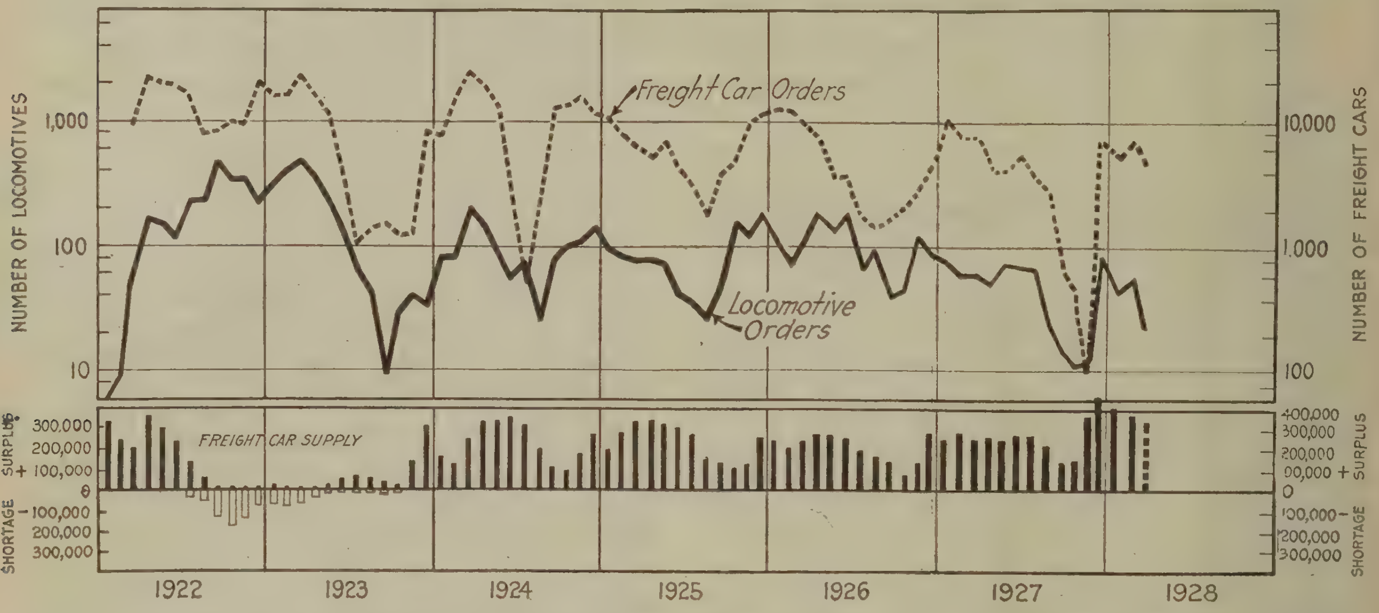


Fig. 4—Locomotive and Railroad Car Orders Have Dropped Below the Low January Levels. And the large surplus of cars does not indicate need for heavy purchases

Finished Steel Orders Remain Large

IN February, the orders for finished steel continued to hold their lead over other years since 1923. The total orders for sheets, structural steel, castings and fabricated plates in January and February were considerably ahead of the preceding four years. This was partly due to the fact that such orders increased in February. In that month the total was actually above any month since last July, with the single exception of December. This is a clear reflection of the large current activity in the steel consuming industries.

The largest items were found in steel sheets and structural steel, orders for which were large not only absolutely but in comparison with previous years. This fact emphasizes the present importance of the two industries, automobile production and building. In fact, it is noteworthy that such items of finished steel as fabricated steel plates and steel castings fell in February considerably behind a year ago.

A glance at the second chart will show that March is normally the month in which a seasonal peak in orders for finished steel is reached. It will be interesting to learn whether 1928 will show its third month maintaining the tradition. If it does, the first quarter of this year will have seen the largest orders for finished steel that have occurred in the first three months of any year since 1923. There seems little chance, however, that the volume will equal that of the 1923 period. Probably the chief question concerns the March business in structural steel, for the average weekly bookings reported currently appear to indicate a total considerably under that reached in January or February.

Slackening of Building Activity Impends

OUR seasonally adjusted indexes of building activity and automobile production came together in March at a point about 18 per cent above the average for 1921-1927. This compares favorably with a year ago, and tends to confirm the conclusion that steel production in March would be justified at last year's level. One cannot overlook the fact, however, that the *trends* in the two industries appear less favorable, and that the trend of building activity has an excellent reputation as a general business barometer. On the whole, these two industries show signs of slackening.

The square feet of floor space in building contracts rose in March to 88,090,000, which compares with 68,847,000 in February and 87,892,000 a year ago. This increase over February, however, is much less than usually occurs, and the adjusted index for March is only 118.6 against 144.1 in the preceding month. Moreover, the value of contemplated new construction dropped below February and below March, 1927. It is low in comparison with contracts awarded.

Bookings of structural steel rose in February and were approximately in the same position with reference to their average as were the building contracts. In that month, both were about 45 per cent above average, making due allowance for seasonal conditions. Probably the index will decline in March. This would conform to the trend of building contracts, and we note that the weekly average awards in March were only about 37,000 tons, against about 41,000 tons in February.

Railroad Purchases Small

AS shown in the fourth chart, railroad equipment orders have tapered off much as in each of the last two years, and in March were the lowest for the season found in recent years. Locomotive orders were particularly small. Domestic steam locomotive orders as reported by *Railway Age* were only 15, against 30 in February and 70 a year ago. Total foreign and domestic shipments of steam and electric locomotives numbered 70, but unfilled orders declined to only 178, which compares with 392 last year and 780 in 1926. Only 4470 freight car orders were reported, against 5896 in February and 5253 a year ago. With freight traffic failing to gain in March and a rather large surplus of freight cars reported by the railroads, the outlook for nearby equipment business is hardly fair.

European Markets Less Active

Britain Quiet During Easter Holidays—Belgian Mills Seek Orders—French Home Demand Good

(*By Cable*)

London, England, April 10.

PIG iron is quiet after the Easter holidays, but Cleveland makers are well sold and foundry and forge iron prices are strong. Hematite iron is dull and prices are maintained with difficulty. Foreign ore is quiet.

Finished steel is inactive, but domestic consumers are busy with existing contracts. Export demand for plates and shapes is still poor.

Tin plate was active up to the holiday period, and with mills in a strong position consumers have bought freely and makers are well sold on the basis of restricted output. Galvanized sheets are quiet and prices have an easy tendency. Black sheets are inactive.

Continental iron and steel is quiet and but little revival is anticipated until prices are more stable. The pig iron entente is maintaining prices at too high a level to permit of sales to the United Kingdom.

The European Rail Makers' Association has increased extras on Siemens-Martin rails by 2s. 6d. (61c.).

FRENCH EXPORTS SMALLER

Domestic Business Active and Semi-Finished Steel Scarce—Pig Iron Prices Firm

Paris, France, March 23.—The domestic iron and steel markets continue firm, but there is some weakness in export prices. The German export quota in the International Steel Cartel has been increased for the second quarter by 50,000 tons a month. The quota is now only 25,000, instead of 75,000, tons a month less than the German monthly average of exports in the second half of 1926. Apparently, in agreeing to this increase in German export tonnage, the French members believed that the present activity in the French domestic market would make up for any export losses to the French mills.

Export business has slackened, and buyers are evidently awaiting lower prices. Steel mills, however, are in most cases well booked with business. There is a scarcity of semi-finished material, and this may be one of the reasons Germany was permitted a higher export quota for this quarter. Exports have been smaller this year than in 1927. In January, shipments of ingots, blooms, billets and bars totaled 208,950 tons, compared with 233,445 tons in January, 1927.

Pig Iron.—At its March 15 meeting, the pig iron entente allotted 38,000 tons of phosphoric foundry and 35,000 tons of hematite to the domestic market for April. Previous domestic prices are being maintained, except on hematite iron delivered in the Ardennes, which has been reduced to 562.50 fr. ($17.10) per metric ton. An increase in export prices is expected, but the market is still unchanged at £3 2s. to £3 3s. ($15.10 to $15.34) per metric ton, f.o.b. Antwerp, for foundry iron and basic is quoted at £2 18s. to £2 18s. 6d. ($14.13 to $14.25) per ton.

Semi-Finished Material.—With little material available for prompt delivery, the selling syndicate has advanced semi-finished material and beams 20 to 30 fr. (79c. to $1.18) per ton, effective March 15. The new prices for the domestic market are: Ingots, 470 fr. ($18.47) per ton, instead of 450 fr. ($17.69); blooms, 535 fr. ($21.03) instead of 510 fr. ($20.04); billets, 565 fr. ($22.20) instead of 540 fr. ($21.22); and sheet bars, 600 fr. ($23.58) instead of 570 fr. ($22.40). Mills, in most cases, are booked for the next 90 days, and extended deliveries are offered. Basic Bessemer steel is particularly scarce, and some mills are resorting to open-hearth steel.

Finished Material.—Beams have been advanced 30 fr. ($1.18) per ton to 650 fr. ($25.55), f.o.b. works. For export, normal specifications range from £4 13s. 6d. to £4 14s. per ton (1.03c. to 1.04c. per lb.). Angles are quoted at £5 1s. 6d. to £5 2s. per ton (1.12c. to 1.13c. per lb.), f.o.b. Antwerp. There is a good volume of business in sheets, and on medium and heavy gages prices are firm. Quotations on light-gage sheets show some unsteadiness. On 1/16-in. black sheets, export prices

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 18s.		$4.39	
Bilbao Rubio ore*	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to £3 15½s.	18.27	to $18.39
East Coast mixed	3 10		17.05	
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18	to 0 18¼	4.39	to 4.45
Black sheets, Japanese specifications.	13 5	to 13 10	64.53	to 65.75
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	10 0	to 10 5	2.17	to 2.23
Galv. sheets, 24 gage	13 2½		2.85	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)		
Belgium	£3 3s.	$15.34
France	3 3	15.34
Luxemburg	3 3	15.34
Basic pig iron (nom.):		
Belgium	3 0	14.61
France	3 0	14.61
Luxemburg	3 0	14.61
Coke	0 18	4.39
Billets:		
Belgium	4 13	22.65
France	4 13	22.65
Merchant bars:		C. per Lb.
Belgium	5 4	1.15
France	5 4	1.15
Luxemburg	5 4	1.15
Joists (beams):		
Belgium	4 14½	1.04
France	4 14½	1.04
Luxemburg	4 14½	1.04
Angles:		
Belgium	5 5	1.16
⅛-in. plate:		
Belgium (a)	6 9	1.42
Germany (a)	6 9	1.42
5/16-in. ship plates:		
Belgium	6 5	1.33
Luxemburg	6 5	1.33
Sheets, heavy:		
Belgium	6 1	1.34
Germany	6 1	1.34

(a) Nominal.

range from £6 15s. to £6 15s. 6d. per ton (1.49c. to 1.50c. per lb.), and for 0.5 mm. the market is £10 10s. to £10 12s. 6d. per ton (2.32c. to 2.34c. per lb.), f.o.b. Antwerp. Exports of sheets in January totaled 28,466 metric tons, compared with 29,103 tons in January, 1927. Negotiations for the establishment of a sheet syndicate are being continued, and about the only obstacle to success seems to be selection of the proper person to head such a cartel.

STEEL CARTEL UNSATISFACTORY

Formation of Selling Syndicates Still Urged—Polish Membership Unsettled

(*Special Correspondence*)

BERLIN, GERMANY, March 24.—Recent reports, apparently from Paris, to the effect that French members of the International Steel Cartel are dissatisfied with its operation and wish to have it dissolved are not given much credence. In the past year and a half of the existence of the cartel, France has not exceeded the quota in any quarter and has received large refunds from the quarterly distribution. In addition, the French mills have been endeavoring to further the interests of the cartel by better internal organization. Lately, however, the trade press in France has been suggesting that French steel, as a result of increasing German competition, may be excluded from many foreign markets.

The cartel is undoubtedly in an unsatisfactory position. No solution has yet been found for the two principal problems that have faced the cartel since its formation. One is the entry of Poland with a quota satisfactory both to the Polish mills and other cartel members; the other is organization of international selling syndicates for different products.

At the recent cartel meeting in Paris it was agreed that Poland might have full protection in the Polish domestic market, but 300,000 tons per quarter was the maximum export quota offered, while Polish mills demanded 350,000 tons with a proviso that it was to be increased by 1 ton for every increase of 3 tons in domestic consumption. Membership was also made contingent upon Poland's reaching an agreement with Germany and the Central European members on exports to the Near East and on Polish membership in the European Rail Makers' Association.

It seems to be generally agreed that the steel cartel cannot become fully effective until the selling syndicates to control prices have been established. Now that the French have formed an entente to control sales of beams and semi-finished material, German mills contend that Belgium is the sole obstacle to this change. It is argued that Belgium sells for export at any price with the chief object of maintaining full works operations. This forces Germany to quote unprofitable export prices, at the same time maintaining a high rate of operation so as to reduce costs. As a result, penalties for overproduction must be paid each quarter.

The belief prevails in Germany that establishment of selling syndicates would aid in the maintenance of prices at a profitable level and, in addition, German domestic and export prices would show much less difference, which would eliminate the agitation against the German Steel Syndicate for maintaining such a high domestic market.

Belgian and Luxemburg Exports Smaller in January

WASHINGTON, April 9.—While the export trade of the combined Belgian and Luxemburg iron and steel industries in January was much smaller than in January of last year, it represented a considerable improvement over the total for December, according to a report received by the Department of Commerce from the commercial attaché in Brussels. The export trade of the month totaled 290,987 metric tons, compared with 346,466 tons in January, 1927. This tonnage consisted principally of billets and sheet bars, 51,646 tons, and sheets, 31,580 tons. Other large exports were structural shapes, hot-drawn rods and wire, blooms and scrap. The month's import trade aggregated 68,743 tons, compared with 50,907 tons in the same month of last year.

BELGIAN PRICES WEAKER

Mills Seeking More Tonnage Offer Concessions —Output Slightly Smaller

ANTWERP, BELGIUM, March 24.—Except for a moderate demand for beams and some semi-finished products, business is light. As a result, the market shows a slight tendency toward weakness, and, if desirable tonnages were offered, lower price levels would probably develop. Production apparently exceeds consumption, and delays in deliveries are growing shorter. Buyers are pressing for lower prices, and exporters are selling at less than the mills are now willing to accept in the belief that they will soon be able to purchase profitably. Makers, however, are resisting the pressure for lower prices, and concessions are not common.

Pig Iron.—Demand continues good, and prices are firm. Quotations on No. 3 phosphoric foundry iron are unchanged at $16.25 per metric ton, f.o.b. furnace, in the domestic market and at £3 3s. ($15.50) per ton, f.o.b. Antwerp, for export. Bessemer hematite is quoted at about $18 per ton at the furnace.

Semi-Finished Material.—Except for slabs, business has been small and some concessions in price have been made. Quotations are £4 3s. to £4 7s. ($20.35 to $21.30) per metric ton, f.o.b. Antwerp, on blooms and £4 9s. to £4 12s. 6d. ($21.80 to $22.70) per ton on billets. Sheet bars are about £4 14s. ($23) per ton, f.o.b. Antwerp.

Finished Material.—The tendency of the market seems to be downward, with only a small tonnage of transactions reported. A number of mills are seeking business and show willingness to make concessions. As a result, buyers are limiting their purchases in expectation of still lower prices. There seems to be a limit, however, to the concessions sellers are willing to offer. Steel bars are quoted at about £5 6s. per ton (1.17c. per lb.), but German exporters are reported to be offering bars at £5 5s. (1.16c. per lb.). Demand in general is smaller than a few weeks ago, and output has been curtailed somewhat. Beams are fairly firm as a result of better demand, so that prices are holding at about £4 15s. per ton (1.05c. per lb.). Hoop prices show some weakness, as production is still at a high level and demand is small. Hoops are quoted at about £6 per metric ton (1.32c. per lb.), f.o.b. Antwerp.

German Exports Larger and Imports Smaller in February

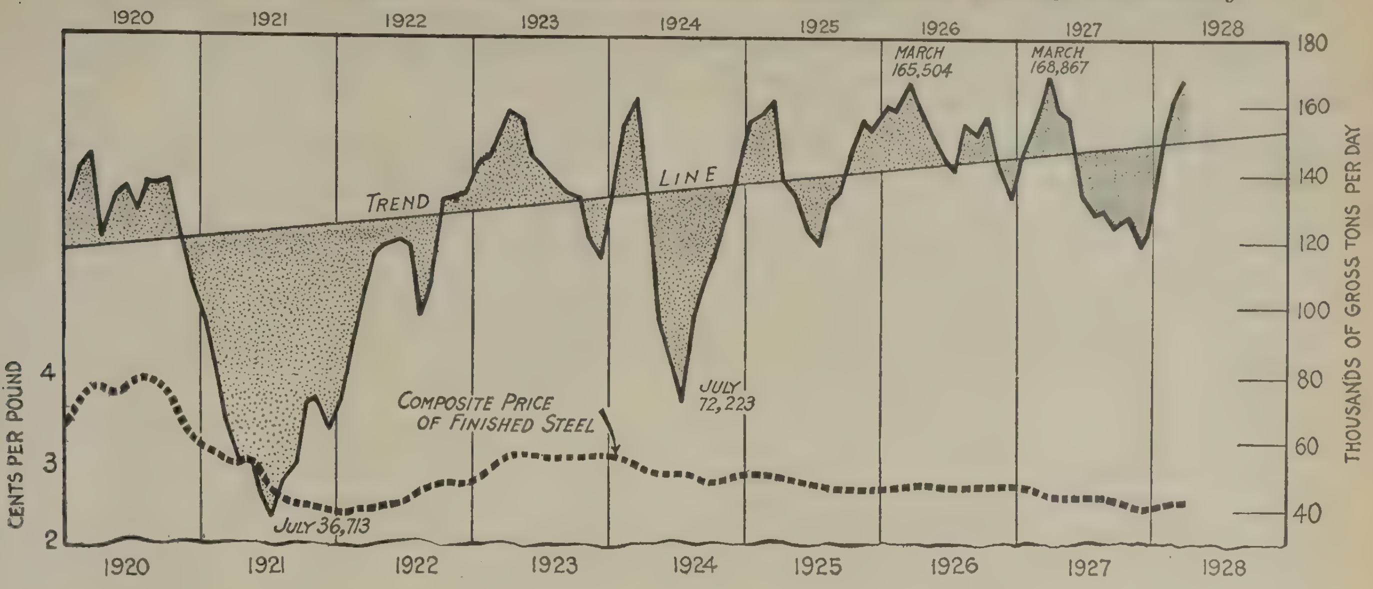
WASHINGTON, April 7.—Exports of iron and steel products from Germany increased to 350,924 metric tons in February, compared with 314,839 tons in January, a gain of 36,085 tons. Imports in February declined to 181,656 tons, compared with 202,469, a decrease of 20,813 tons, according to a radiogram received by the Department of Commerce from the commercial attaché at Berlin. In December there were increases in both exports and imports.

The principal increases in February exports were in rails, totaling 49,953 tons, compared with 33,611 tons in January; plain wire, 35,013 tons, compared with 21,959 tons in January; ingots and semi-finished steel, 39,602 tons, compared with 29,176 tons in January; jig iron and ferroalloys, 21,579 tons, compared with 13,879 tons; and cast iron pipe, 8750 tons, compared with 4215 tons. There was a reduction of 6878 tons in exports of castings and forgings, and a decline of 11,723 tons in exports of iron and steel bars, which totaled 71,922 tons in February, compared with 82,645 tons in January.

In the import movement 14 of 20 items showed reductions, the largest being a decrease of 8667 tons in ingots and semi-finished steel, which totaled 25,367 tons in February and 34,034 tons in January. Other notable reductions included rails and iron and steel bars. The principal tonnages in the February imports were in iron and steel bars and rods, ingots, pig iron and ferroalloys, hoops and bands and plain wire.

The Bratislava Cable Co., Bratislava, Czechoslovakia, has announced that it plans to erect approximately 300 steel dwellings near that city, according to a report from Vice-Consul Frank P. S. Glassey, Prague.

With the Largest Quarter's Ingot Production Ever Recorded, the March Tonnage Fell Less Than 1 Per Cent Below Last Year's High Record. Prices were slightly higher than in January and February



Ingot Production Makes New Record

First Quarter Well Ahead of Best Preceding Quarter—March Slightly Lower Than Last Year

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in March is calculated by the American Iron and Steel Institute at 4,507,520 gross tons. This is based on returns from companies which, in 1927, produced 94.68 per cent of the total. Except for March, 1927, it represents the largest month's output in the history of the industry. It compares with a revised figure of 4,045,304 tons in February and with 4,535,272 tons in March, 1927.

With 27 working days, the estimated output was 166,945 tons a day, the fifth month which has ever exceeded 160,000 tons a day. This compares with 161,812 tons a day in the preceding month and with 167,973 tons in March, 1927. The original estimate for March, 1927, in which crucible and electric steel ingots were included, was 168,867 tons a day, as shown on the diagram.

For the first quarter of the year the calculated output was 12,544,156 tons. This compares with 12,137,192 tons in the first quarter of 1927, which had one day less in February. It compares also with 12,385,878 tons in the first quarter of 1926—the previous high record—in which total the electric and crucible ingots were included. If we estimate roughly that these represented 100,000 tons for the quarter, it follows that the quarter just elapsed was nearly 260,000 tons greater in output than the previous first quarter record. Only one other first quarter, that of 1925 with 12,139,000 tons, had an output of over 12,000,000 tons.

Both open-hearth and Bessemer tonnage improved in March, compared with February, open-hearth tonnage going up 12 per cent and Bessemer tonnage 9 per cent. For the first quarter, open-hearth output showed a gain of 500,000 tons over the first quarter of 1927, this representing more than 5 per cent. Meantime, Bessemer tonnage declined 114,000 tons, or nearly 7 per cent, leaving a calculated total gain of 407,000 tons, or about 3.4 per cent.

Estimating production in March of electric and crucible steel ingots (no longer covered in the institute's monthly figures) at 1200 tons a day, the total March ingot output would appear to have been at the rate of about 168,100 tons for each working day. Details of the past 15 months are shown in the table.

Production of Steel Ingots*

(Gross Tons)

	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Months 1928	Open-Hearth	Bessemer		
Jan.	3,280,247	498,746	3,991,332	153,513
Feb.	3,308,728	521,366	4,045,304	161,812
March ..	3,700,411	567,309	4,507,520	166,945
3 Months	10,289,386	1,587,421	12,544,156	160,823
1927				
Jan.	3,042,133	545,596	3,789,874	145,764
Feb.	3,043,492	565,226	3,812,046	158,835
March ..	3,702,660	590,709	4,535,272	167,973
3 Months	9,788,285	1,701,531	12,137,192	157,626
April ...	3,341,750	565,440	4,127,335	158,744
May	3,273,593	557,785	4,047,251	155,663
June ...	2,823,107	486,053	3,495,609	134,446
July	2,596,349	436,883	3,204,135	128,165
Aug. ...	2,806,347	505,596	3,498,549	129,576
Sept. ...	2,622,977	471,548	3,268,881	125,726
Oct.	2,643,562	495,845	3,316,292	127,550
Nov. ...	2,478,627	481,599	3,127,015	120,270
Dec.	2,557,955	448,154	3,175,484	122,134
Total..	34,932,552	6,150,434	43,397,743	139,543

*Excluding crucible and electric steel ingots.

Smaller Production of Magnesite

Production of crude magnesite in the United States in 1927 is reported by the Bureau of Mines at 121,490 net tons, a drop of 12,000 tons from the 1926 total of 133,500 tons. Imports dropped also, from 196,318 tons in 1926 to 149,126 tons in 1927. As a result, the total available supply of the year at 270,616 tons showed a decided shrinkage from the supply of 1926, which was 329,818 tons, the largest total for some years.

Application of safeguards and other safety devices has enabled the Fulton Co., 732 Seventy-fifth Avenue, West Allis, Wis., to operate 580 days without an accident. The company manufactures automotive accessories and operates sixteen punch presses and other machinery rated as high risks. Its average payroll numbers 47 men.

Technical Program for British Steel Institute's Annual Meeting

For the annual meeting of the Iron and Steel Institute in London, May 3 and 4, the following technical papers have been scheduled for presentation:

Second Report on Heterogeneity of Steel Ingots, by a committee of the institute.

"Blast Furnace Data and their Correlation," by E. C. Evans and F. J. Bailey.

"The Influence of Nickel in Iron-Carbon-Silicon Alloys containing Phosphorus," by A. B. Everest and D. Hanson.

"A Study of the Resistance of Over-Stressed Wrought Irons and Carbon Steels to Salt Water Corrosion," by J. Newton Friend.

"A Comparison of the Most Important Methods Employed in the Cleaning of Blast Furnace Gas," by V. Harbord.

"Heat-Resisting Steels. Part II.—Mechanical Properties," by W. H. Hatfield.

"Blast Furnace Practice in Natal," by J. E. Holgate and R. R. F. Walton.

"The Properties of Nickel Steels with Special Reference to the Influence of Manganese," by J. A. Jones.

"Reactivity of Coke," by J. H. Jones, J. G. King and F. S. Sinnatt.

"The Recovery and Sinking-in or Piling-up of the Material in the Brinell Test and the Effects of these Factors on the Correlation of the Brinell with certain other Hardness Tests," by A. L. Norbury and T. Samuel.

"Twin-like Crystals in Annealed Alpha Iron," by H. O'Neill.

"The Effect of Silicon on Tungsten Magnet Steel," by J. Swan.

"Chromium Steel Rails," by T. Swinden and P. H. Johnson.

"The Fatigue Resisting Properties of 0.17 per cent Carbon Steel at Different Temperatures and at Different Mean Tensile Stresses," by H. J. Tapsell.

"The New Plant of the Appleby Iron Co., Ltd.," by T. Thomson.

"On the Structure of the Iron-Chromium-Carbon System," by A. Westgren, G. Phragmén and Tr. Negresco.

"The Rapid Normalizing of Overstrained Steel," by W. E. Woodward.

At the first session on May 3, Benjamin Talbot will be inducted into office as the new president and Charles M. Schwab, chairman of the board, Bethlehem Steel Corporation and president American Iron and Steel Institute, will be presented with the Bessemer Gold Medal.

Arrangements are being made to hold the autumn meeting at Bilbao, Spain, Sept. 25 to 27.

To Discuss Mechanization of Coal Mines

Mechanization of coal mines will be discussed at a meeting in Columbus, Ohio, April 21, under the auspices of the American Institute of Mining and Metallurgical Engineers, the National Coal Association, the American Society of Mechanical Engineers and the Southern Ohio Pig Iron and Coke Association. The program is under the supervision of Ralph H. Sweetser, American Rolling Mill Co., Columbus, and will consist of an inspection trip in the morning, a noon luncheon, an afternoon session at Ohio State University and dinner at the Faculty Club of the university.

A similar meeting under the same auspices will be held at Philadelphia on April 24 at which mechanization relating particularly to the mining of anthracite coal will be considered.

Testing Society to Study Use of Specifications in Market Quotations

As an outcome of a recommendation made by committee B-2 on non-ferrous metals and alloys of the American Society for Testing Materials, the executive committee has authorized the appointment of a special committee of the society "to study and promote the use of specifications covering copper alloys (in ingot form) as the basis of price quotations in the technical and trade journals." It is believed that the usefulness of A.S.T.M. specifications in all fields would be enhanced if they were more generally made the basis of market quotations and purchases. At the same time it is felt that efforts in this direction should for the present be confined to copper alloys in ingot form, where there apparently is particular need for greater definiteness in price quotations, and that it be extended into other fields only after some experience has been gained in this method of promoting the use of A.S.T.M. specifications.

Past-President Guilliam H. Clamer has accepted an invitation to become chairman of the proposed committee, which will consist of five producers of copper alloys, five consumers, and five representatives of technical and trade journals. Considerable interest has been shown by representatives of all three groups in the possibilities of this work, and it is planned if possible to organize the committee before the next annual meeting of the society.

Exhibit to Show Possibilities of Castings

As one means of assisting in the education of foundrymen to realize the possibilities of castings for engineering purposes, the American Foundrymen's Association is to sponsor a special exhibit at the Philadelphia convention May 14 to 18, showing examples of castings having the highest standards in engineering properties. Some of the possibilities of properties which it desires to emphasize are:

Strength
Machinability
Uniformity of grain structure
Hardness for special purposes
Corrosion resistance
Resistance to abrasion
Surface appearance of finish
Electrical

The exhibit of steel castings is being organized under the direction of the Steel Founders' Society of America; secretary W. J. Corbett, 511 Magee Building, Pittsburgh. The exhibit of malleable castings is being organized under the direction of the Malleable Iron Research Institute; secretary Robert E. Belt, Union Trust Building, Cleveland. The exhibit of gray iron castings is being organized under the direction of a committee of gray iron foundrymen; D. M. Avey, chairman, Penton Building, Cleveland. The exhibit of non-ferrous castings will be sponsored by a committee organized under the direction of W. M. Corse, secretary institute of metals division, A.I.M.M.E., 810 Eighteenth Street, Washington.

Any foundry organization making castings with exceptional values of the above properties, or of other engineering qualities, is invited to correspond with the committees mentioned above or with the secretary of the American Foundrymen's Association.

Foundrymen to Hold Apprentice Contests

The committee on apprentice contests of the American Foundrymen's Association, at a recent meeting, outlined rules and regulations to govern the annual national apprentice molding and pattern making contests, which will be held in connection with the 1928 meeting of the association at Philadelphia, May 14 to 18.

As in the past, local foundry associations and individual plants have been asked to cooperate by holding elimination contests, sending to the Philadelphia meeting the winning patterns and castings of the local contests. The entries sent to Philadelphia will be judged by a committee appointed by the association and prizes awarded to the makers of the best patterns and castings. The awards committee has set aside a sum of money to be used as prizes, which shall consist of a wrist watch, value $50, as first prize; of $25 as second prize and $10 as third prize for pattern making, iron molding and steel molding.

A bibliography on mechanical springs has been prepared by a research committee of the American Society of Mechanical Engineers. It covers some 600 references, which are indexed both by authors and chronologically, and a subject index is included.

NEW RAILROAD FAVORED

Line from Youngstown to Ohio River Approved by Shippers in Reply to Commerce Commission

WASHINGTON, April 10.—Reply was made public last Saturday by the Interstate Commerce Commission of its questionnaire regarding the proposed new line of the Pittsburgh, Lisbon & Western Railroad, controlled by the Montour Railroad, the latter's capital stock being owned by the Pittsburgh Coal Co. It is proposed to construct approximately 40 miles of new railroad. The existing line of the Pittsburgh, Lisbon & Western would be utilized in conjunction with the new construction to afford a through line from the Youngstown iron and steel manufacturing district to the Ohio River near Smiths Ferry, Pa., which is on the outskirts of East Liverpool, Ohio. About 13 miles would be constructed south of the present Lisbon line and 23 miles north of the present Lisbon line, and in conjunction with the 23-mile construction to Youngstown there would be a branch of about five miles to Struthers, Ohio, if the commission approves the project.

The answer to the questionnaire says that the traffic from Smiths Ferry is expected to be principally bituminous coal. The traffic from Youngstown to the Ohio River is expected to be principally iron and steel products. The shipment of bituminous coal from Smiths Ferry to Youngstown and beyond, the reply says, would be entirely ex-river coal. In its proposed location the line would be a north and south railroad, traversing Mahoning and Columbiana counties in Ohio and Beaver county, Pennsylvania, with a population of substantially 500,000 people. At Youngstown this carrier would provide a belt line on the west and south sides of the city, opening up an entirely new territory for manufacturing development.

The reply says that the proposal is expected to meet with substantial approval and support of the industries concerned in the utilization of the Ohio River waterway, which has been intensively developed for transportation purposes by the United States Government through the expenditure of large sums of money and in accordance with a policy of many years standing. The belief is expressed that the additional facilities would be well patronized by shippers of the Youngstown industrial district and by coal shippers along the canalized Ohio and tributary rivers. It is expected to haul 1,334,000 tons of coal the first year, 1,500,000 tons the second year, 1,667,000 tons the third year, 1,830,000 tons the fourth year, and 2,000,000 tons the fifth year at an averate rate of 60c. per ton for an average haul of 40 miles. The answer does not make an estimate of the steel tonnage it is expected to carry from the Youngstown district.

"The market for Youngstown's iron and steel in the South is now considerably hampered and restricted because of the necessity of shipment by rail lines, whereas the competitors of Youngstown are able to ship via river routes for all or a large part of the distance to destination at considerably less transportation cost," says the reply. "It is expected that the construction and operation of the proposed line will permit the shipment of Youngstown iron and steel products to the South with the necessity of but 40 miles of rail transportation, enabling the Youngstown iron and steel manufacturer to utilize beyond Smiths Ferry the cheaper river transportation which will then be available to him.

"Under such circumstances, it is expected that new business will be developed in the Youngstown district by the construction of the proposed new lines and the tonnage of iron and steel articles from Youngstown over the proposed new line will, therefore, be created business and will not be business diverted from existing railroads."

Construction of the new line would be begun promptly after the issue of the necessary authority of the commission, the answer says, and it is expected that the entire work would be completed within two years from the date authority is issued. The rails of the line would be 115 lb. per yd.

Department of Commerce Bulletin on French Machinery Industry

WASHINGTON, April 10.—The value of machinery made in France in 1926 is estimated at $130,000,000, which is three times that of 1913 figured on a gold basis, according to a report prepared by Assistant Trade Commissioner F. P. Waller, which has just been issued by the Industrial Machinery Division, Department of Commerce. In the case of machine tools, the value in 1926 was four times that of the pre-war year. The bulletin says the French machinery industry has advanced over its pre-war position largely because of four factors: (1) the country's increased capacity for iron and steel production resulting from the acquisition of Alsace-Lorraine, (2) the growth of French industries in general, (3) the depreciating exchange value of the franc, and (4) low labor costs.

The progress of the machinery industry in France, the bulletin points out, is strikingly reflected in its foreign trade. In 1926, imports on a quantity basis were 43 per cent less than in 1913, while exports had risen 268 per cent. Comparing the value of imports for the two periods, 1926 showed a drop from $35,000,000 in the pre-war year to less than $31,000,000 in 1926. French machinery exports in 1926 had a value of more than $20,000,000, compared with less than $7,000,000 in 1913. In 1927, the same favorable trend continued, the quantity of imports decreasing more than 18 per cent compared with 1926 and the quantity of exports rising 7 per cent.

Prior to the war, the bulletin says, Germany was by far France's most important supplier of industrial machinery, its share amounting to more than 46 per cent of total French imports in 1913. In that year the share of the United States was something under 6 per cent, total imports of American machinery being valued at around $3,000,000. In 1926, the value of French machinery imports from the United States had risen to $6,450,000 and its ratio of total imports to 18.4 per cent. During that year imports of German machinery into France had a value of $8,000,000, about 24 per cent of the total imports. The three chief suppliers of the French market in the order named were Germany, Great Britain and the United States. The bulletin points out as an interesting fact that while during the past few years the quantity of machinery imports from the United States has declined the value has risen, proving that French consumers are buying more special and high-class American machinery. Mr. Waller expresses the view that this trend will continue. While he states that the French are expanding their own machinery industry and furnishing the domestic market with increasing quantities of ordinary types of machines, the demand will grow for American high-production equipment, such as cannot be obtained from home manufacturers.

The publication is known as Trade Information Bulletin No. 543, "French Market for Industrial Machinery," and may be obtained for 10c. from any of district offices of the Department of Commerce, or from the Superintendent of Documents, Government Printing Office, Washington.

The Mystic Iron Works operated at full capacity throughout the year, says the 1927 report of the Massachusetts Gas Co., Boston. The designed capacity of the stack is 150,000 gross tons, and production was 175,244 gross tons. Notwithstanding unfavorable market conditions for pig iron, shipments totaled 74 per cent of furnace output. The New England Coal & Coke Co. produced 673,110 gross tons of fuel, contrasted with 534,450 in 1926. The Mystic Iron Works was furnished with 143,000 tons of coke. The battery of 55 Wilputte ovens, put in operation in December, 1926, ran throughout 1927, and 100 of the Otto Hoffman ovens were shut down permanently in April, 1927.

FLUORSPAR TONNAGE OFF

Drop of 13 Per Cent in 1927—Open-Hearth Furnaces Used Seven-Ninths of Total

WASHINGTON, April 7.—Showing a decline of 13 per cent both in quantity and value, fluorspar shipments from mines in the United States decreased to 112,546 net tons, valued at $2,034,728, in 1927, against 128,657 tons in 1926, according to a report issued by the Bureau of Mines. Shipments were made from Colorado, Illinois, Kentucky and New Mexico last year, with the last-named State the only one to record an increase.

Shipments to steel plants last year totaled 93,196 tons, valued at $1,523,915, an average of $16.35 a ton, f.o.b. shipping points. This compares with 105,614 tons, valued at $1,744,085, in 1926, an average of $16.51 a ton. Shipments to foundries amounted to 4533 tons, valued at $84,724, in 1927, an average of $18.69, compared with 6212 tons, valued at $121,453, in 1926, an average of $19.55. The general average value shipped to steel plants in 1927 from the Illinois-Kentucky district was $16.59 a ton and from the Colorado-New Mexico district $13.72 a ton. These values compare with $16.98 for the Illinois-Kentucky district and $12.69 for the Colorado district in 1926.

Total shipments from Kentucky mines in 1927 amounted to 57,495 tons, valued at $1,040,338, an average of $18.09, while shipments from Illinois mines totaled 46,006 tons, valued at $863,909, an average of $18.78. Shipments from Kentucky mines in 1926 amounted to 62,494 tons, valued at $1,167,129, an average value of $18.69, while shipments from Illinois mines that year aggregated 53,734 tons, valued at $1,012,879, an average value of $18.85.

According to reports of producers, the stocks of fluorspar at mines or at shipping points on Dec. 31, 1927, amounted to 21,208 tons of gravel spar, 1857 tons of lump and 385 tons of ground spar. In addition, there was in stock piles at the mines at the close of 1927 about 49,000 tons of crude spar, equivalent to about 29,000 tons of merchantable material. These stocks compare with 20,731 tons of "ready-to-ship" spar and 48,266 tons of crude spar on Dec. 31, 1926, making an increase of about 13 per cent in the stocks of merchantable spar and 2 per cent in crude spar over 1926.

Total imports in 1927 were 71,515 tons, a decrease of 5 per cent from the record year 1926, but the second largest ever recorded. The imports last year were equivalent to 64 per cent of the total shipments of domestic fluorspar and compared with 59 per cent in 1926. The United Kingdom, which has been the chief source of the imported fluorspar, supplied only 26 per cent in 1927, the 18,449 tons coming from that country showing a decrease of 37 per cent from 29,407 tons in 1926. Germany was the chief source of imports in 1927, supplying 31,829 tons, or 45 per cent of the total, and comparing with 20,465 tons in 1926.

The basic open-hearth furnaces, the largest users of fluorspar, consumed 138,000 tons in 1927 and had 85,000 tons in stock at the end of the year, as compared with 142,000 tons consumed and 70,000 tons in stock in 1926. Electric furnaces consumed 4700 tons and had 1200 tons in stock last year, against 4800 tons and 2000 tons respectively in 1926. Foundries consumed 3400 tons and had 1000 tons in stock in 1927, against 4335 tons and 1400 tons respectively in 1926. Other industries, combined, used 30,100 tons in 1927. The figures for the basic open-hearth furnaces include data for the 72 companies that make 99 per cent of the total basic open-hearth steel, and estimates for the other three companies.

Slight Recovery in Locomotive Shipments in March

WASHINGTON, April 7.—Seventy railroad locomotives were shipped from the principal manufacturing plants in March, against 59 in February and 137 in March of last year, according to reports received by the Department of Commerce. Of the March shipments 59 were for domestic use, 44 being steam and 15 electric locomotives. Of the 11 locomotives exported nine were steam and two electric. Unfilled orders at the end of March totaled 178 locomotives, of which 160 were for domestic use, 123 being steam and 37 electric. Foreign orders totaled 18 locomotives, 16 being steam and two electric.

Automotive Business Continues at a High Rate

Automotive Industries this week will say:

"Continuance of automotive business on an even keel is indicated for the second quarter of 1928, now two weeks gone. National Automobile Chamber of Commerce members during the first quarter went ahead of the same period in 1927 both in sales and in production, but the total number of passenger cars delivered at retail by the industry, including Ford, appears to have been slightly less during the first three months of this year than during the first three of last. Total passenger car production, however, including that of Ford, was nearly 5 per cent ahead of last year's first quarter.

"As a whole, there can be no question that 1928 is going along better than did 1927, and that the second quarter will continue to show similar favorable aspects. Ford is gradually getting into larger and larger production, as is generally known, but had not reached a sufficiently large volume at the end of March to come anywhere near meeting the accumulated or even the current demand for his products. Consequently, a better picture of the general progress of the industry is available for the moment from a consideration of performance of National Automobile Chamber of Commerce members, with Ford excluded, than from discussion of total 1928 figures as compared to 1927 totals.

"On this basis the sound foundation on which current optimism is based is revealed by the fact that first quarter passenger car production this year exceeded that of last by something like 26 per cent, while truck output for the same period was 19 per cent in excess of last year's first three months. Exact sales figures are not available, but partial data indicate that retail deliveries of cars built by National Automobile Chamber of Commerce members were somewhere between 15 and 20 per cent ahead of last year for the first quarter."

Increasing Shipments of Sheet-Metal Ware Reported

February shipments of galvanized sheet-metal ware, as reported to the Department of Commerce by 15 concerns comprising a large proportion of the industry, were 188,487 dozens, valued at $727,257, as compared with 184,993 dozens in January, valued at $691,348, and 201,830 dozens, valued at $735,878, in February of last year.

February shipments of enameled sheet-metal ware, as reported by 18 manufacturers comprising approximately 80 per cent of the industry, were 372,885 dozens, valued at $1,457,425, as compared with 319,871 dozens, valued at $1,093,329, in January, and 372,452 dozens, valued at $1,335,312, in February, 1927.

Wheeling Steel Corporation to Blow in a Riverside Furnace

The Wheeling Steel Corporation will soon blow in No. 2 blast furnace at Benwood, W. Va., the larger and more modern of the two furnaces acquired in its purchase of the Riverside Works, National Tube Co. One of the Steubenville furnaces is going out this week for relining.

Hot Blast, Powdered Coal in Cupolas

Phases of the Recent Advance of Science in the Foundry Considered at Ann Arbor Meeting—Sand Testing More Highly Developed

SOME present day foundry problems and recent developments in the industry, including the use of powdered coal for cupolas, also hot-blast cupolas and the testing of foundry sands, were discussed at a meeting of the Ann Arbor Division, Detroit Chapter of the American Society for Steel Treating, held April 3 in the East Engineering Building, Ann Arbor. The general subject of discussion was foundry control. Prof. William P. Wood of the University of Michigan was chairman of the meeting. Three speakers were on the program and general discussion followed their talks, which were of much interest.

"The greatest competition in industries is bound to come from new methods," declared Prof. A. E. White, director of engineering research, University of Michigan, who was called on to close the discussions. "The only way to meet conditions as they develop is to keep on your toes and bring out the best product that it is possible to produce."

Rapid Changes Affecting Steel Foundries

Doctor White pointed out that industries are in a state of transition due to the adoption of new methods. Rigid restrictions on steel castings have been proposed by the National Electric Light Association. Steel castings, he said, are facing competition with forge shops and with plants developing the manufacture of steel tubing in large diameters. Germany is now making steel tubing up to 24 in. in diameter and one mill has been erected in this country to make tubing of the same size. While visiting the plant of the A. O. Smith Corporation in Milwaukee recently he saw pipe 15 ft. in diameter with 2-in. wall thickness welded so perfectly that when broken none of the ruptures occurred in the electric welds. Steel foundries, he said, are facing the competition of fabricated parts made from forgings and by the use of the welding process. Automobile cylinder blocks in the future may be forgings instead of castings. He understood that one automobile company was doing experimental work in this direction at present.

Marked Progress in Sand Testing Devices

Much interest was shown in a discussion of the control of foundry sand by Prof. H. L. Campbell, University of Michigan. He emphasized the importance of testing and checking cores and core sands and declared that much attention is now being given to this part of foundry control. Some of the latest devices for testing foundry sands were shown and their operation described by the speaker.

Professor Campbell declared that great progress has been made in the control of processes in the foundry because of the application of science. Turning to materials used in the making of molds and cores he said that they must have high refractory properties and permeability and must provide a smooth surface to give a good finish on the casting. Foundry sand has certain characteristics that must be watched. Various devices have been developed to check foundry sand. One of the latest instruments is for measuring the green bond strength. The sand is packed in a sleeve and the cylindrical specimen thus made is put in an instrument that, operating under compression, registers the pressure required to break the sand. A machine for testing permeability in green sand mixtures was shown. With this air is forced through the specimen and a register indicates the time and pressure required for forcing a certain amount of air through. Smoothness of sand is tested for fine finish. However, finish of surface is determined largely by experiment.

A Late Method for Measuring Permeability

Dry sand cores have certain very definite requirements, Professor Campbell pointed out. The first is permeability. The entire core should be permeable to allow gases to escape freely. A method was developed recently by which that property can be easily determined. A standard specimen is prepared and placed in a mercury sealed cup. Then two leaders of air are passed through the core under standard pressure and the time required for forcing the given amount of air through the core is recorded.

Another important quality in cores is strength, as this must be enough to resist the buoyancy of the molten metal. Professor Campbell adopted a 1-in. x 1-in. x 8-in. standard core specimen to test strength. The core box is placed on a plate on which the core is made and baked. A hopper is placed on the core box. The formed core is subjected to a ramming action with ten blows. In this way uniform cores are produced. Then they are given a transverse test on a testing machine, the core being supported near the two ends and the load applied at the center.

Standard green sand specimens for testing strength are made in the form of a hemisphere. The specimen is placed under a cone and pointer device and the load falls on the specimen, the force required to fracture it being recorded. The speaker pointed out the necessity of finding the green bond sand strength in weak sand. Various core binders are used to produce green bond strength. He considered raw linseed oil the best core sand binder in use today. Where intricate cores are made, additional materials are used for binders such as flour, cornstarch and molasses.

The various methods of measuring the properties of cores have been developed in research laboratories, according to the speaker, and this core testing apparatus is now being used in about thirty foundries to safeguard their cores. Professor Campbell referred to the cylinder block of the Dodge automobile, which he described as simply an assembly of cores forming a dry sand mold. Research work is being conducted on various types of sand to determine which gives the best finish to castings.

Methods That Have Been Used Effectively in the Wilson Foundry

One factor in foundry operations that is not stressed as much as it should be is the human element, in the opinion of Fred Walls, chief metallurgist of the Wilson Foundry & Machine Co., Pontiac, Mich. While much foundry testing equipment has been developed, he holds that only 10 per cent of the foundry troubles are due to the material element, 90 per cent being on the human side. The technical college graduates that are now going into foundries will find a way of controlling the human element. The foundry, he said, has been greatly neglected from a techincal standpoint.

Mr. Walls explained the method of chart control of the cupola used in the Wilson foundry. A positive pressure blower is used and a constant stream of air is provided. The pressure, which is shown on a recording chart, indicates whether other conditions in the cupola are constant or varying. He had found this method very satisfactory.

Mr. Walls laid stress on the importance of checking weights of materials going into the cupola The practice at Pontiac is to make a test bar every hour. An analysis of this bar is completed within an hour, and thus a quick change can be made in the cupola mixture.

Fairly accurate cupola control can be secured by using optical pyrometers, declared John Grennan, foundry instructor in Michigan University, who was the last scheduled speaker. He said that thermocouples did not work so well in the foundry as in some other lines of work. He stressed the advantages of large ladles in pouring as an aid to uniformity in the metal.

Experience with Hot Blast and Powdered Coal

There has been little improvement in cupola operation until recently, said Mr. Grennan, and some of this is in the use of old methods that are now made to work. The hot blast has not been worked out until recently. The change to continuous operation and long blast has made the hot blast cupola desirable. The Griffin Wheel Co. has installed hot blast cupolas in practically all of its plants. The temperature of the blast is 400 deg. Fahr. and with the use of the hot blast the coke requirement for a ton of iron has been reduced from 262 to 192 lb.

Another important innovation referred to by Mr. Grennan is the use of powdered coal in the cupola. This has been developed in Germany, with a material cutting down of the carbon monoxide that passes from the stack, this being 12 to 15 per cent in an ordinary cupola operation. The result, he said, had been a 30 per cent saving in fuel cost. In the German powdered coal cupola the fuel is blown into the cupola at high velocity, being introduced through special small tuyeres located 6 in. or 7 in. above the regular cupola tuyeres.

The American Radiator Co. has operated powdered coal cupolas with even better results. The use of powdered coal, the speaker said, may revolutionize cupola practice.

Alloys for High-Strength Castings

In a general discussion following the talks Mr. Walls said that he believed that only the surface has been scratched in alloying cast iron. In his foundry castings containing molybdenum had shown tensile strength of 55,000 lb. per sq. in. and could be machined. The heat treatment properties of cast iron containing molybdenum are good. The corners of the castings do not chill much. In his opinion molybdenum in cast iron offers many possibilities, although one of the disadvantages of this alloy is its high cost.

The superheating of cast iron to increase its strength was a subject that has been discussed considerably, said Professor Campbell. Some authorities recommended the use of a large fore-hearth or ladle where oxides can be removed and the slag separated. The Ford Motor Co. is following this practice in a way in heating iron in a mixer after leaving the cupola.

Mr. Walls remarked that he liked to get iron out of the cupola as hot and as fast as possible. In the Wilson foundry they get iron up to a temperature of 2725 to 2750 deg. Fahr. and have made as much as 254 tons in one run. He declared that they get stronger and better iron with a gas pressure of 20 oz.

Carnegie Steel Co. Opens New Warehouse at Houston, Tex.

The Carnegie Steel Co. has completed and has in operation its new warehouse at Houston, Tex., which is located on the Houston Ship Channel. The site has a total acreage of 97.64 acres, of which 18 acres on the channel are developed for warehouse purposes. The main warehouse comprises eight parallel buildings or bays, totalling 650 ft. by 500 ft., all under one roof. It is of steel construction with galvanized, corrugated steel roof and siding, each bay being equipped with an overhead electric traveling crane. Natural light and ventilation are provided in the design of the building, and modern machinery equipment for cutting and performing other operations has been installed. In auxiliary buildings, located conveniently to the warehouse building are the offices, electric sub-station, store room, sanitary station, hospital room, oil house, engine house and garage. The warehouse is served by approximately 1½ miles of standard gage railroad trackage with connections to the Southern Pacific and Public Belt Railroads.

The engineering features were handled by the engineering department Carnegie Steel Co., Pittsburgh, working in conjunction with the warehouse management. R. J. Cummins was the consulting engineer on dock construction and M. J. Sullivan was the architect on the office and other auxiliary buildings. The warehouse is ideally located to receive shipments either by rail or water, as the Houston Ship Channel will take deep sea craft drawing up to 30 ft. of water, and there are connections to all trunk railroad lines entering Houston.

On the west side of the warehouse is a barge slip dredged to a depth of 10 ft. Over this operate three high speed traveling cranes, arranged to transfer materials from barges directly onto the warehouse floor or into railroad cars. These facilities enable the warehouse to receive consignments direct from the mills by water with one handling. Direct connection with the Southern Pacific lines and, through the Port Terminal Railroad, with all railroads entering Houston permit prompt delivery to all points in the territory served by the railroads. For quick and efficient local deliveries, a fleet of trucks is available.

Conforming to the long established policy of the United States Steel Corporation, relating to safety, sanitation and welfare, an attractive building has been provided so that each individual employee may profit by healthful surroundings. Each man has a locker for his private use, while in adjacent rooms are lavatory, shower baths and sanitary facilities of the most modern type. Immediate medical attention in case of sickness or accident is provided by an emergency hospital, constructed and equipped in the most up-to-date manner.

A well, 800 ft. deep, furnishes an abundant supply of pure drinking water. It is cooled by electrical refrigeration and is distributed by numerous fountains conveniently located throughout all the buildings. Power is supplied by Houston Light & Power Co. through a 12,000-volt transmission line to the substation, which contains three 250-kva. power transformers, three 50-kva. lighting transformers and two 500-kw. motor-generator sets.

Among the firms which did the construction and furnished the equipment are:

American Bridge Co., Pittsburgh—main warehouse, building steelwork, roof, siding, doors and windows.

Cleveland Crane & Engineering Co., Wickliffe, Ohio—main warehouse building cranes.

Brown Hoisting Machine Co., Cleveland—dock crane.

Chicago Bridge & Iron Works Co., Chicago—water tank.

Westinghouse Electric & Mfg. Co., Pittsburgh—electric equipment in sub-station.

Buffalo Scale Co., Buffalo—track scale.

United Engineering & Foundry Co., Pittsburgh—cold saw and tables.

General Motors Corporation, Detroit—trucks.

Clark Tructractor Co., Buchanan, Mich.—Tructractors.

Cyclone Fence Co., Waukegan, Ill.—fence and gates.

Suburban Electric Development Co., Pittsburgh—Frigidaire drinking water coolers.

Steel Transportation Requirements Expected to Be Higher This Quarter

WASHINGTON, April 10.—Iron and steel transportation requirements for the second quarter of the present year are estimated at 479,533 carloads, as against 467,359 carloads for the corresponding period of last year, according to reports received by the car service division of the American Railway Association from the 13 shippers' regional advisory boards throughout the United States. This estimated increase of 2.6 per cent is identical in percentage with the estimated increase of coal and coke loading, which is fixed at 2,545,375 cars, as against 2,481,637 cars during the second quarter of 1927. Requirements for castings, machinery and boilers are estimated at 59,977 cars, a decrease of 1.8 per cent from the 61,102 cars required during the second quarter of last year. Agricultural implements are estimated to require 42,458 cars, as against 38,530 cars, an increase of 10.2 per cent, while requirements for automobiles, trucks and parts are estimated at 312,777 cars, as against 242,566 cars, an increase of 28.9 per cent.

Total transportation requirements for 29 of the principal commodities in the second quarter of the present year are estimated at approximately 9,035,963 cars, an increase of about 323,250 cars, or 3.7 per cent, over the corresponding period of last year. The 10 regional bodies estimating an increase were the Atlantic States, Allegheny, Great Lakes, Northwestern, Central Western, Southeastern, Southwestern, Middle Western and Pacific Northwest boards. Those estimating a decrease were the Ohio Valley, the Trans-Missouri-Kansas and the New England boards. In addition to castings, machinery and boilers, decreased requirements were estimated for hay, straw, alfalfa, cotton, cottonseed and products, and citrus fruits.

Flexible Provision of Tariff Act Sustained

WASHINGTON, April 10.—A decision of the United States Supreme Court yesterday sustaining the constitutionality of the flexible provision of the tariff act is of great interest to the iron and steel industry. The holding means that action taken by the President in changing duties in the metals section under this provision is valid. No appeal, therefore, can be successfully made against changes in rates. The principal change in the duties in the metals section, so far as the iron and steel industry is concerned, relates to the increase of 50 per cent in the rate on pig iron. The decision also means that investigations and reports under way will be completed. Reports regarding changes in duties on fluorspar and manganese ore are among those expected shortly.

Two Continuous Reheating Furnaces to Serve New Bar Mill

The Timken Roller Bearing Co., Canton, Ohio, will install two continuous bloom-reheating furnaces to serve a new bar mill now under construction. These furnaces, to be furnished by the Rust Engineering Co., Pittsburgh, will each heat 40 gross tons of alloy blooms an hour, the blooms being 10 x 10 in. and 18 ft. in length.

Blooms will be charged in one end of the furnace and pushed throughout its length of 69 ft., being discharged by gravity to the roller table. The furnaces are of Rust triple-fired type, for which patents have been applied, utilizing a soaking chamber at the discharge end which is separate from the main portion of the heating furnace and is independently controlled as to temperature. This feature permits the condition of the steel being discharged to be uniform and independent of rate of firing and tonnage output.

The Rust refractory tile recuperator will be utilized on these furnaces, to deliver highly preheated air to the main furnace firing ports. The fuel will be natural gas.

Producto Machine Co. Takes Over Bilton Machine Tool Co.

The Producto Machine Co., 990 Housatonic Avenue, Bridgeport, Conn., has been organized and has purchased the entire assets of the Bilton Machine Tool Co., Bridgeport, from Homer Cummings, receiver of that company. The same organization which has operated through the receivership of the Bilton company is continuing with the Producto organization and financing has been provided to carry on the business without interruption. The Producto-matic milling machine will continue to be the company's principal product and cam millers, gear millers, Bristol hand millers, die sets, special cutters and gray iron castings will also be manufactured.

Officers of the company are William J. Grippin, chairman; N. M. Marsilius, president and general manager; Frederick Rhodes, first vice-president; E. A. Harper, vice-president in charge of Detroit sales; E. G. Rogers, vice-president in charge of foundry sales; A. J. Cummings, vice-president in charge of Eastern machinery sales; George H. Weber, secretary, treasurer and assistant general manager, and R. S. Lathe, assistant secretary and assistant treasurer.

National Bearing Metals and American Brake Shoe Propose Consolidation

Stockholders in the American Brake Shoe & Foundry Co., New York, and the National Bearing Metals Corporation, St. Louis, have been asked to ratify a proposed combination of the two companies. The plan calls for a mutual purchase of interest in each company by the other, but with both organizations retaining their identities. The Brake Shoe & Foundry company manufactures brake shoes for railroad cars and iron castings. Its plants are located at Norwood, Mass.; Mahwah, N. J.; Buffalo; Baltimore; Portsmouth, Va.; Chattanooga, Tenn.; Pittsburgh; New Richmond, Ohio; Chicago, Burnside and Melrose Park, Ill.; Minneapolis; Kansas City, Mo.; Houston, Tex., and Denver, Colo.

The National Bearing Metals Corporation was organized last June as a merger of the More-Jones Brass & Metal Co., St. Louis; the Keystone Bronze Co. and the Bronze Metal Co., Pittsburgh; the Brady Brass Co., Jersey City, N. J., and the Southern Brass Works, Portsmouth, Va. It manufactures brass and bronze products of all kinds.

Pittsburgh and Ohio Mills Oppose Cut in Chicago-New Orleans Freight Rate

PITTSBURGH, April 10.—A proposal of the Illinois Central Railroad to reduce the freight rate on iron and steel products moving from the Chicago district to New Orleans, for trans-shipment via the Panama Canal to Pacific Coast ports, from 55c. per 100 lb. to 31c., effective June 1, is vigorously opposed by Pittsburgh, Youngstown and Cleveland district steel companies. Traffic managers of the steel companies in these districts met here yesterday at the Chamber of Commerce, and it was decided that each representative present would immediately file a request in writing with the traffic executives of the trunk lines urging them to prevail upon the Illinois Central to withdraw its proposal. It was further decided that if this is not accomplished the carriers be asked to reduce the rates from Pittsburgh, Youngstown and Cleveland to Baltimore by a relative amount. On this basis, with a rate of 31c. from Chicago to New York, the Pittsburgh-New York rate would be 60 per cent thereof or 18½c. per 100 lb. With the usual differentials to Philadelphia and Baltimore of 2c. and 3c., respectively, the rates to those points from Pittsburgh would be 16½c. and 15½c., respectively.

The present rate from Pittsburgh to Baltimore, a distance of 311 miles, is 31c. per 100 lb. and applies on traffic for trans-shipment to Pacific Coast ports. The identical rate proposed by the Illinois Central from Chicago to New Orleans would apply on shipments for a distance of 912 miles, or approximately three times the Pittsburgh-Baltimore mileage.

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This Issue in Brief

Employees' lunchroom pays in improved morale, even if food is served at a loss. One large organization has canteens placed at handy locations through the plant. No order is over 5c., and 5,000,000 orders are served yearly.—Page 1003.

Buyer ultimately suffers when sellers indulge in price-cutting orgy. Selling below cost often induces skimping in quality and frequently results in bankruptcy, with consequent disruption in sources of supply.—Page 1005.

Activity of steel consuming industries is favorable to a sustained high level of steel production, Dr. Haney indicates. Index of composite steel demand is at the highest level since September, 1926.—Page 1018.

Powdered coal cupola saves 30 per cent of fuel cost. Fuel is blown into new German cupola at high velocity, being introduced through special small tuyeres 6 in. or 7 in. above the regular cupola tuyeres.—Page 1028.

Is there a tendency toward lessened emphasis on price? Yes, says trade association executive, pointing out that several large organizations have taken the lead in allowing the supplier a fair price, and giving more consideration to quality and service.—Page 1005.

Applies rolling mill slip drive to three-high plate mill. Customary pinions and pinion housing are eliminated, and in their place is a light nest of gears, between flywheel and mill spindles. Mill torque is increased about 75 per cent.—Page 1004.

Intricate cylindrical castings may now be made by centrifugal means. "Spun-sorbitic" process produces a casting highly resistant to wear, and therefore suitable for piston ring drums, cylinder barrels for pumps and motor engines, and sleeve valves. It may be used for automobile engine cylinders.—Page 1008.

Proportions of scrap and pig iron used in open-hearth charges change in parallel with price relation of scrap and iron. In first quarter of 1928 the average proportions were calculated to be 45 per cent pig iron to 55 per cent scrap, showing that more scrap and less pig iron is being used.—Page 1008.

New record in steel ingot output set in the first quarter. Production was 12,544,156 tons, 1.3 per cent above the previous quarterly record made in 1926. March output of 166,945 tons a day was within less than 1 per cent of the previous monthly record established in March, 1926.—Page 1023.

To protect the buyer as well as the seller, provide performance standards for electrical products, Westinghouse executive urges. Would bring about economy and efficiency in production and would insure the user against unsatisfactory service.—Page 1010.

American blast furnaces produce more iron per man and have lower coke consumption than German furnaces, engineer finds. Here the average daily output per man is 6 tons, and in Germany, 5 tons. Operating costs are relatively higher in Germany.—Page 1011.

Difficulties confront European steel cartel. Germans say Belgium sells for export at any price to obtain full works operation, forcing Germany to quote unprofitable export prices. Formation of selling syndicates to control prices is urged.—Page 1022.

No season-cracking in brass containing 80 per cent copper, declares metallurgist. But brass of 75 per cent copper, he says, will season-crack under atmospheric corrosion, and will also dezincify.—Page 1009.

Human element is accountable for 90 per cent of foundry troubles, says Wilson Foundry executive. Research in foundry materials is valuable, but the human side should not be neglected. He expects much from the technical college graduates now going into foundries.—Page 1027.

First welded railroad bridge is ready to carry traffic. Two main girders are nearly 54 ft. in length and 4 ft. 9¼ in. deep. Welding of the entire construction required 320 man-hours.—Page 1013.

Hand labor gives way to mechanical equipment in new method of making cast iron pipe. Multiple lip ladles, each with 14 spouts, can pour two 6-in. or two 8-in. pipes at the same time. Sand is handled entirely by conveyor equipment.—Page 1002.

Automobile output for first quarter was about 26 per cent above same period in 1927, and prospects for the second quarter are favorable.—Page 1026.

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The Proposed Zinc Cartel

IN 1927 there was a major decline in the price for spelter, and during the last nine months it has stood only a little above pre-war average. This has been satisfactory to users of the metal but very disagreeable to producers. The explanation of this condition, as indicated in an IRON AGE editorial of Jan. 26, is a sudden and huge increase in ore supply that began in 1926 as a consequence of the widespread application of the new process of selective flotation. At no time has the statistical position of the metal looked bad; the market has suffered from the incubus of a huge accumulation of ore stock which may be converted into metal.

The producing interests have been so unhappy in their situation that they have been giving much thought to amelioration of it by the regulation of production. In Europe especially has there been much conversation about the organization of a cartel. American participation in this has been desired, for it is the exportation of a relatively small quantity of American spelter that spills the beans in Europe. It has been rather hard to make Europe understand that American zinc production is derived mainly from such a multiplicity of small mines that any concert of action among them would be impossible, and that anyway our laws do not permit concert of action for any effect upon price. There is some doubt also regarding the British attitude. The present outlook is that the Continental producers at a meeting in May will try tentatively to do something alone.

One answer for the present predicament in zinc is *laissez faire*, just as it is for the similar situation in petroleum. In the long run low prices effect their own cure. There is, however, a broader social view in that the resources of mineral substances are by no means endless, and the reckless squandering of them now, with the consequent production of too low a price, may result in an inordinately high price later on. Dr. W. R. Ingalls, who is an authority in the zinc industry, expressed the opinion in an address last January that the present plethora of zinc ore will be but temporary and that the owners of zinc mines who are minded to hold them in reserve will reap larger profits by so doing. The administrations of some of the most important mining enterprises agree with this idea and have adopted such a policy.

This leads right up to the thought that the real trouble with the zinc industry is that it knows too little about itself. If the producers of zinc took the trouble to study their facts, cooperating for that purpose, their own intelligence would tend to restrain them from spendthrift behavior. The situation of copper could quickly be made as bad as that in zinc. Formerly copper producers used to emulate each other in making it so; but they have acquired a better economic perception, based on the ascertainment of facts.

In the course of time the zinc producers of the world will learn the same lesson, but this will require several years even if they begin now. In the meanwhile they want some speedy adjustment. Hence the hopes for a European cartel. Assuming the consummation of such a plan there will probably be no illusions among its participants. Rather there will be a spirit of curiosity to discover how it will work.

If zinc were more largely produced by concerns that smelt their own ore the chance of regulation would be better, but inasmuch as smelters buy the larger part of their ore supply their objective must be to better the price for metal while keeping the ore price low, which is not so easy. This leads back to the idea that the only real solution is to make an increasing proportion of ore producers averse to sacrificing their resources at little or no profit.

DESPITE the fact that pig iron production in the first quarter of 1928 had been exceeded by nine preceding first quarters, steel ingot production in the first quarter was the largest on record. Dependence on scrap in larger and larger proportions has accounted for this change in the ratio between the two great tonnage movements in the industry. It is estimated that open-hearth charges in the first quarter of this year were below

45 per cent in pig iron content, compared with considerably more than 50 per cent in a number of recent years. Study of the factors shows close accord between the price ratio of scrap against pig iron, on the one hand, and the operating ratio involving percentage of pig iron in the charge, on the other. For the most part, these curves (shown in another column) are almost parallel, as traced over a period of some fifteen years.

More Students, Not More Schools

NOT long ago the faculty at Purdue University decided to create a department of metallurgy, sensing a well defined demand for men trained in metallography, heat treatment, and physical metallurgy and believing that no institution in the immediate vicinity of Chicago (from which region the demand appeared to spring) is prepared to educate these specialists. Another piece of news is that one of the older eastern colleges is considering whether a languishing mining department cannot be rejuvenated by grafting on to it a course in metallurgical engineering.

Without doubting that there is a great need for educated men in the metal-working industries, it is very doubtful whether it would be advisable just now to establish more schools to teach metallurgists. Off-hand one would say that there is already a great over-expansion of capacity. Over-expansion in the educational industry is as harmful as over-expansion in any other line of production. Both mean high overhead and far from adequate return on the effort expended.

In order to verify the impression that the available facilities are by no means fully utilized, a personal letter was addressed to 22 men at colleges and universities known to have competent teachers and adequate equipment for the fundamentals of iron and steel metallurgy. Two of them did not answer; four of them replied that all instruction on metals was incidental to other degrees; and 16 of them gave statistics on upper class attendance. In all, these sixteen schools will graduate 81 metallurgical engineers specializing in iron and steel. One hundred and seven juniors are following along. This is just about enough to keep three faculties reasonably busy and happy, let alone sixteen!

These attendance figures would appear to indicate that the number of graduates will grow. It may also be argued that the growth of the American Society for Steel Treating indicates a demand for far more men than these 16 schools are actually preparing. Or, if we concede that there are 5000 engineers in charge of heat treating or other distinctively metallurgical work on the production of alloys and articles manufactured therefrom, it follows that these should be replaced in one generation, or at the rate of 250 per year. Furthermore, several professors say they have places offered for from two to four times as many graduates as are available.

Granted all this, the fact remains that the situation cannot be bettered by a further increase in educational plant when the existing capacity is working at only a 20 per cent rate. If the existing capacity is inadequate or antiquated, it should be scrapped and replaced; but it is safe to say that the new courses proposed will not be better than most of the ones now operating. This does not mean that the present facilities are the pink of perfection, but it is sure that what we now have cannot be improved materially as long as the classes are starved in attendance.

If this situation is to be changed it can be done by State universities campaigning among the high schools, or by manufacturers encouraging bright young men in their employ to take up the new profession in greater numbers. It is one college course where the attendance is not embarrassingly large, and leads to a type of work for which there is and will be for many years a steadily increasing demand. But it would be better to populate the metallurgical courses now existing, than to go about starting others.

Much More Pig Iron to the Stack

NEWS is not uncommon nowadays of particularly large production by individual blast furnaces. Daily outputs now and then run into four figures and a case of this sort, in which the furnace used no scrap but its own, was recorded in last week's IRON AGE, page 965.

A study of averages is prompted. No selection can be made that would cover periods of identical circumstances, but it would appear that in 20 years outputs per stack have fully doubled and in nine years they have increased by one-half. The two periods here taken for comparison with last month are March, 1908, and June, 1919.

There was record high pig iron production in October, 1907, the stock panic month. The following March production was less than half as great. Our report for that month showed a mean of 150½ stacks in blast, with a total daily production of 39,619 tons, or 263 tons per stack. Certainly it must be assumed that furnaces running at such a time were in the main the very best in the country.

After the war there was a great decline in production. In the following June, 1919, with a mean of 187½ furnaces in blast there was total daily production of 70,495 tons, or an average of 357 tons a stack. Again the furnaces in blast must be taken as very largely the pick of the industry.

Last month there was heavy production, but it was not a month of picked furnaces, production being 19 per cent above the low of 1927. There was a mean of 192 stacks in blast, with a total daily production of 103,215 tons, and an average of 538 tons per stack, making 51 per cent gain over June, 1919, and 104 per cent gain over March, 1908; yet with the advantage in favor of the previous periods, for then it was rather only the picked furnaces that were running.

Numerous influences have contributed to these increasing outputs. It is not a matter of iron ore, as the average content of Lake Superior iron ores as shipped has not varied materially. Gradual exhaustion of the richer ores has been met by increased beneficiation of lean ores.

It is substantially a matter of furnace lines and furnace practice. With the Duquesne blast furnaces of over 30 years ago there was ushered in a period of giving furnaces more air; but by 20 years ago that improvement was fairly well in vogue. A surprising increase occurred by widening hearths. The best furnaces themselves are somewhat larger, and with building of new stacks and abandonment of smaller furnaces the average size has increased. All along the line practice has improved. Coke consumption per ton of iron has gone down, but the typical furnace manager makes no special effort to save by-product coke, which on account of gas and by-products does not cost him much.

The plain prospect, therefore, is that the building of blast furnaces in future will be chiefly for replacement of less fit furnaces than by way of addition to the total number.

A Thought for the Ultra-Conservative

YOU have met the "way-back-when" executives —the men who fend off a new proposal by recalling and reminding you of things that happened in years gone by at such-and-such a place, and how the plan can't work because so-and-so then tried it and failed. We have lots of them now. There always have been lots of them.

There was a fair sprinkling of them at a British Iron and Steel Institute meeting in 1878, listening to the dean of British ironmasters read a paper describing large-scale but unsuccessful experiments in eliminating phosphorus from pig iron. Eminent authorities had agreed that phosphorus is almost entirely inert to oxygen at steel making temperatures. A respected Swedish metallurgist and teacher was saying, "It is well known that phosphorus must be removed from iron as a salt of phosphoric acid passing into the cinder and neither the Bessemer nor the refining hearth process admits of this."

Naturally the audience lifted its eyebrows with tolerant amusement, and doubtless the chairman was slightly embarrassed, when a young unknown (who later turned out to be a police clerk) arose in open meeting and remarked that he had been successful in slagging off phosphorus in a Bessemer converter.

The police clerk promptly sent a paper to the institute describing the method, but the then equivalent of the Meetings and Papers Committee contained a majority of "way-back-when" men; for this remarkable contribution was neither read nor discussed, nor published for nearly a year. By that time Sidney Thomas, his cousin Percy Gilchrist, and the friendly steel maker E. Windsor Richards, had worked out most of the problems of a basic refractory lining and the control of the bessemerizing operation. The Germans pounced upon the basic Bessemer as being the very thing for high-phosphorus Lorraine ores, and in 1926 this process (foolish and theoretically impossible in 1878) made about 16,000,000 tons of "Thomas" steel, throwing off as a by-product some 3,000,000 tons of phosphate slag for fertilizer.

Some artist should paint a picture of the Meetings and Papers Committee in 1878 sitting in deliberation upon this paper by Thomas and Gilchrist. It should be reproduced. It would make a wonderful gift for your "way-back-when" friend.

CORRESPONDENCE

"Wanted: Generals for America's Industrial Army"

To the Editor: This caption is quoted for the reason that it concisely puts a vital industrial need. Industrial leaders seem to be in a quandary as to how to create a more intelligent class of men within the ranks. They wonder how and where to get men who will measure up to a higher standard of leadership. All manner of methods are being suggested and many of them are being tried, but the problem is not yet solved.

It seems to me that the whole matter is too vague. Industry is calling for a higher standard of intelligence and leadership, but fails to answer the question, "What is the present standard and how was it established?"

The question might be raised whether industry is not establishing too high a standard—possibly a false standard—and expecting the college graduate to measure up to it. A successful man is prone to forget his earlier contact with industrial affairs and to lose sight of the fact that possibly he showed much less promise than many of the young college men of today whom he chooses to criticize or possibly condemn. This results in the often heard statement that industry needs men of higher intelligence, but that college graduates will not measure up to such requirements. If the young men graduating from our institutions of learning do not measure up to the needs of industry, then through what channel or by what process are we to secure men who can in any manner measure up to the standard being set?

Judging by the general trend of comment, the impression is fixed that industrial training cannot be imparted to the student mind except by industry itself. Without doubt this belief is based on the theory that intelligence follows in the wake of experience. Even in this advanced day, when seeking men for positions of responsibility, the antiquated inquiry is still made, "How much experience has he had in our particular line of work?"

Here is where industry and the college graduate cross swords. It must be granted that the college graduate has shown but little inclination to adapt himself to industrial pursuits or prior to graduation to give serious thought to what may be expected of him in such activities. In fact, it is hard to determine his state of mind, when with diploma in hand he steps out to face the world. It is quite evident, however, that his expectations are at marked variance with the offerings.

It is more than possible that the young graduates are attaching too much importance to the equipment they have acquired in college. Consequently they are not altogether free from blame for the present situation. Possibly they are expecting to be accepted on higher terms than it is possible to offer. This leads some of them to sacrifice their years of study and enter professional athletics; yet it must be admitted that the latter hold out tempting inducements to those especially skilled.

Here is the nut of the situation. Any industry will offer special inducements for special skill. Rightly or wrongly, industry attaches a lot of importance to working up from the ranks, thus acquiring the necessary skill to assume positions of responsibility. "From water boy to president" makes a great slogan; but the college graduate can't subscribe to such a policy, for the reason that he believes that his years of study and his higher mental attainments fit him to assume responsibilities on more favorable terms than are offered.

The college graduate rightly feels that his mental training should allow him to assume responsibilities of a higher order. I recall a man of ability and high intelligence who entered the employ of an industrial corporation when it was suffering from mismanagement. This man brought about economic results beyond expectations. One of the officers of the company in reviewing the accomplishments remarked: "The trouble with our company has been that it never had a practical boss until it got you." This official got the surprise of his life when the "boss" explained that he had never done work of this nature before. Here is a case in which good thinking solved industrial problems where experience failed.

Industry now puts a premium on "practical experience" because industry has been built to its present proportions on a foundation of experience, experience gained through rule of thumb activity, rather than intelligent planning by educated minds. It would appear that if our industrial position is to advance, it must have men who can grasp the details of its operation more quickly and more effectively. Time will not permit a commercial organization to take crude human material and train it to understand and handle a vast amount of detail. College graduates should provide the necessary recruits and doubtless would, if a clearer formulation of the requirements could be made.

James B. Orbison.

Springfield, Ohio.

SCRAP PRICES AVERAGE HIGHER

First Quarter 2 Per Cent Above Last Quarter of 1927 but Recent Trend Downward

AVERAGE prices of heavy melting steel scrap at Chicago, Pittsburgh and Philadelphia have been higher during the first months of 1928 than they were in the last three months of the preceding year. At a $13.69 average for the quarter, however, they were more than $1 below the $14.80 average of the first quarter of 1927. The high point of the recent quarter was reached in February. The March average of $13.65 is just $1 below the corresponding average of one year ago.

COMPOSITE PRICES ON IRON AND STEEL PRODUCTS

	(Per Gross Ton) Steel Scrap	Pig Iron	Finished Steel, Per Lb.
1925 average	*$17.12*	*$20.58*	*2.465c.*
January, 1926	16.97	21.79	2.447c.
February	15.50	21.77	2.428c.
March	15.83	21.65	2.433c.
April	15.27	20.96	2.439c.
May	14.35	20.69	2.416c.
June	14.40	20.00	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average	*15.48*	*20.42*	*2.439c.*
January, 1927	15.17	19.44	2.432c.
February	14.58	19.07	2.378c.
March	14.65	19.03	2.367c.
April	14.71	19.21	2.360c.
May	13.95	19.09	2.360c.
June	13.60	18.92	2.369c.
July	13.48	18.56	2.367c.
August	13.80	18.17	2.367c.
September	13.92	18.03	2.357c.
October	13.48	17.96	2.319c.
November	13.18	17.59	2.299c.
December	13.48	17.55	2.310c.
Year's average	*14.00*	*18.55*	*2.357c.*
January, 1928	13.70	17.63	2.318c.
February	13.71	17.73	2.361c.
March	13.65	17.73	2.362c.
Quarter's average	*13.69*	*17.70*	*2.347c.*

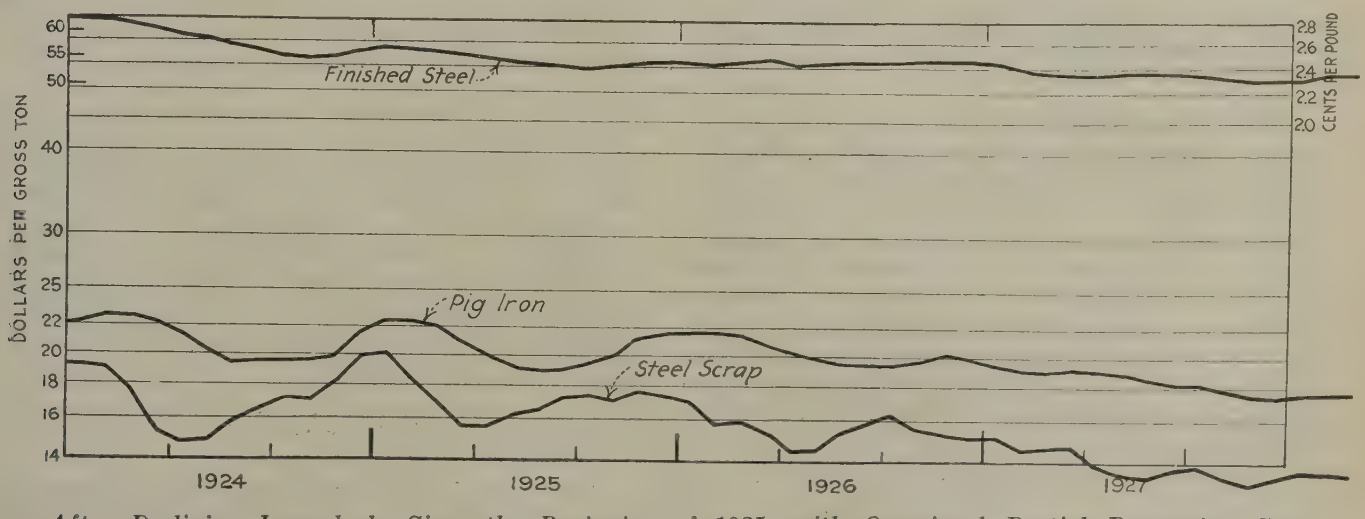
Meantime pig iron has shown a fair recovery from the low levels of November and December, having stood at a monthly average of $17.73 in both February and March, or 1 per cent above the December figure. For the quarter the average was $17.70 against $19.18 for the first quarter of 1927.

Finished steel has been subject to slight fluctuations only, since early 1927. For the recent quarter it has shown a distinct advance above the last quarter of the preceding year, however, having averaged 2.347c. a lb., against 2.309c. a lb. The recent figure is well below the average for the first quarter of 1927, which stood at 2.392c. a lb. February and March showed a good recovery from the low figure of November, as indicated in the table.

Comparative figures for a considerable number of months, covering steel scrap, pig iron and finished steel, are given in the table. The diagram carries the story of these changing prices over a period of more than four years.

Edgar Thomson Works Sets New Plant Records in Steel Production

Sixty-three daily, weekly and monthly plant production records were established during March by the Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa. Production of 132,894 gross tons of pig iron from seven blast furnaces bettered by almost 3000 tons the best previous seven-stack output of 129,943 tons made in May, 1927. From 16 open-hearth furnaces there was tapped last month 98,146 tons of steel, which compares with a previous record of 87,160 tons in October, 1920, from 14 furnaces. The blooming mill in March rolled 101,357 tons, comparing with a previous high mark of 95,414 tons in October, 1916, while the four rolling mills, Nos. 1 and 4 on sheet bars, and Nos. 2 and 3 on rails, turned out 98,004 tons against 91,114 tons in October, 1916, the previous record production for one month.



After Declining Irregularly Since the Beginning of 1925, *with Occasional Partial Recoveries, Scrap Prices Have Lately Been Slightly Higher. Pig iron and finished steel have fallen during the same period, but much less abruptly*

Iron and Steel Markets

Output Holds After Record Quarter

Mill Operations Continue at High Rate—Advance in Pipe Drives in Tonnage—Automobile Body Sheets Decline—Melting Scrap Price at Pittsburgh Up 50c.

FOLLOWING a record output in the first quarter, steel mills are maintaining operations at the high rate reached in March. Heavy specifications late last month, particularly in plates, shapes and bars, assure a good mill engagement through April. Meanwhile, with little buying of heavier rolled products at second quarter prices and no unusual pressure to sell, price tests are still deferred.

Such changes in steel prices as have occurred have been discordant. Weakness in lighter products, notably sheets, is balanced by greater strength in steel pipe. The advance of a week ago in pipe drove in a large tonnage at the previous prices, since jobbers were given a week in which to cover 30 to 60 days' requirements.

Unsettlement in the sheet market was brought about by a reduction of $3 a ton on automobile body sheets, bringing prices down to 4c. per lb., Pittsburgh, or the same level at which buyers bought for the first quarter. Weakness has extended to other finishes, particularly black sheets, which are now rather generally available at 2.80c., Pittsburgh, or $2 a ton below the last advance. Consumers expect the decline in automobile body sheets to result in a similar revision of quotations on strip steel fender stock, since prices of the two products usually move together.

Prices of primary materials remain substantially unchanged except on scrap. Heavy melting steel at Pittsburgh has advanced for the second time in three weeks and is now 75c. a ton above its low point in the first quarter. Melting scrap has also gone up 50c. at Cincinnati, but has declined 25c. at St. Louis.

A decline of 62,983 tons in March reduced the unfilled orders of the Steel Corporation to 4,335,206 tons, which, however, is much larger than the total of 3,553,140 tons, as of March 31, 1927. The reduction last month was surprisingly small in view of the high rate of production. Estimated ingot output for the entire industry in March, at 4,507,520 tons, was the second highest monthly production, falling short of the record made in March, 1927, by only 28,000 tons. Output for the first three months of this year was a quarterly record, surpassing the previous high mark, that of the first quarter of 1926, by 260,000 tons.

Steel production so far in April has held its own. Sheet mill operations, at 80 to 85 per cent of capacity, are about five points lower than in the last half of March. On the other hand, the week has seen the blowing in of two more steel works blast furnaces, one at Johnstown, Pa., and the other at Haselton, Ohio.

Unfilled orders are probably undergoing further reduction this month, since mills are so largely engaged in rolling steel specified at lower than current prices and most buyers are not yet ready to add to their commitments.

The automobile industry is taking more steel than in March, and it is predicted that the seasonal slowing down in motor car manufacture will come at least a month later than last year.

Railroad buying is again of sizable proportions. Of 17,000 tons of rails bought at Chicago, 13,800 represented a supplementary purchase by the Burlington. Bridge work awarded by the Chicago & North Western calls for 6000 tons of structural steel, and fully 50,000 tons of plates, shapes and bars will be rolled for 4450 freight cars placed by the Chicago, Milwaukee, St. Paul & Pacific.

Structural steel inquiries totaling 37,000 tons include 17,000 tons for an office building in New York. Contracts awarded require 32,000 tons of steel, the largest, 8000 tons, for a bridge over the Delaware River. Among reinforcing steel projects pending is sewer work at Stickney, Ill., requiring 5000 tons.

Tin plate prices for the second half will soon receive more active consideration, since in another week specifications against June quotas are due, winding up contract business for the first six months of the year. It is commonly expected that quotations will remain unchanged.

With the opening of navigation on the Great Lakes and on the New York State barge canal, increased water shipments of pig iron are being planned. At Milwaukee, 6000 tons has been sold for shipment by boat from Lake Erie furnaces. New England consumers will benefit by reduced rail-and-water rates from Buffalo, and at some points even the Everett, Mass., furnace will be somewhat at a disadvantage, considering the lower f.o.b. quotations at Buffalo.

Domestic gravel fluorspar has been advanced $1 a ton to $16 at mines.

THE IRON AGE composite price for finished steel has advanced to 2.362c. per lb. from 2.357c. The composite price for pig iron remains for the third week at $17.67 a gross ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Apr. 10, 1928	Apr. 3, 1928	Mar. 13, 1928	Apr. 12, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	20.75
Basic, Valley furnace	17.00	17.00	17.00	19.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	2.00	2.00	1.95	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	1.95	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	2.00	2.00	1.95	2.00
Beams, New York	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire,	Apr. 10, 1928	Apr. 3, 1928	Mar. 13, 1928	Apr. 12, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	*2.80*	2.85	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh.	3.65	3.65	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	**$15.50**	$15.00	$14.75	$16.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.75	13.25
Carwheels, Chicago	13.50	13.50	14.00	15.25
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	*14.00*	14.50	14.50	16.50
No. 1 RR. wrot. Phila	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.00	12.50
Coke, Connellsvile, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.25
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.30	14.30	14.25	13.12½
Electrolytic copper, refinery	14.12½	14.12½	14.00	12.75
Zinc, St. Louis	**5.75**	5.72½	5.65	6.40
Zinc, New York	**6.10**	6.07½	6.00	6.75
Lead, St. Louis	**6.00**	5.95	5.82½	7.00
Lead, New York	6.10	6.10	6.00	7.25
Tin (Straits), New York	*52.00*	53.50	50.12½	67.75
Antimony (Asiatic), N. Y.	**9.62½**	9.50	10.50	15.00

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Uncertainty Over Prices Clouds Otherwise Good Steel Situation—Sheets Weaken

PITTSBURGH, April 10.—The March rate of steel production is maintained, and in most finished products the tabulation discloses such free ordering against expiring first quarter contracts toward the close of last month that manufacturers are confident that this month will show little or no falling off in steel ingot output.

There is, however, fresh uncertainty about prices. This is because of the fact that producers have weakened again on automobile body sheets, which, having stood at 4.15c., base, for several weeks, are no longer quotable at more than 4c. on actual business. This break of $3 a ton, which appears to have developed not from pressure on the part of consumers, but from a desire for business by a few small producers, has not only shaken the sheet market, but the generally more confident feeling in all lines that began to be apparent a week or 10 days ago. If the automotive industry were less exacting as to quality, the large demands upon producers from that quarter might be some excuse for price concessions, but the common report is that motor car builders, while not now exerting pressure against prices, are unrelenting in rejections on the score of what steel manufacturers regard as slight imperfections.

Shipments of finished steel products are heavy, but as there has been a noticeable falling off in new business, there is no doubt that order books are being reduced. The principal outlet still is the automobile industry, with building and construction and agricultural implement manufacturers following in line. Tin plate continues to give a good account of itself, and the advance in merchant pipe appears to have stimulated business in that product. But the oil industry still is buying little, and the lack of railroad rolling stock business still is commented upon. Nails are making the poorest showing among wire products because of the heavy deliveries early in the year against low-priced orders taken in December.

Among the primary materials, interest centers in the steel works grades of scrap, which have advanced another 50c. a ton, and heavy melting steel now is 75c. a ton above its price of a month ago. This advance is not due so much to fresh consumer buying as to the insistence on deliveries against old orders in keeping with the high rate of steel production. Dealers, in trying to cover, have not only found supplies scant, but have been alarmed by the fact that the April scrap list of the Baltimore & Ohio Railroad went to a steel company not regularly a scrap buyer on a direct bid. Higher prices may be seen, but the more common belief is that the upswing is merely a flurry to be halted by lessened steel works' requirements with the approach of summer. Pig iron shows neither life nor strength and the same statement applies to coal and coke.

Pig Iron.—Additional purchases of pig iron by the company reported last week to have bought 5000 tons of No. 3 foundry have swelled its takings to 20,000 tons, about half of which was Bessemer iron. This grade sold at $17.50, Valley furnace, the price which has ruled for some time on smaller lots. At least 1000 tons more of this grade has been sold at the full price. The No. 3 foundry appears to have been sold at somewhat above the regular price of that grade. Nothing more than the usual carload lot business has been done in other grades of foundry or in malleable iron. Basic iron also has been inactive. Valley furnaces still are quoting basic at $17, but as there have been no sales, that quotation is merely nominal and is admittedly impossible to obtain in the Pittsburgh district. While local steel companies appear sold up or have no iron for sale, there are offerings by middlemen of Pittsburgh district steel company basic at delivered prices which are equivalent to about $16 at Valley furnaces. The Republic Iron & Steel Co. has put on its one idle Haselton blast furnace, and Bethlehem Steel Co. has added a furnace at its Cambria Works, Johnstown, Pa., making seven of the 10 furnaces at the latter plant active.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Steel works operations are holding well up to the March rate, and in consequence there is a sustained rate of specifications against contract tonnage of the commonly used ferroalloys. New business does not amount to much. Prices are unchanged.

Semi-Finished Steel.—There is a fairly good movement of billets, slabs and sheet bars, but it is largely on arrangements which have long been in force between producers and non-integrated manufacturers. Open market activity is limited. Some users of wire rods who failed to get in specifications against first quarter contracts before they expired have been obliged to pay the present price, but not much tonnage is involved.

Fluorspar.—One of the larger domestic producers has announced a price of $16 per net ton, f.o.b. mines, for gravel spar analyzing 85 per cent calcium fluoride and not over 5 per cent silica, effective April 9. About a week ago, several producers announced a withdrawal of prices of less than $15, and the advance by one producer, which will probably be followed by others, is not altogether an unexpected development. Most producers still have contracts taken at $14 to $14.50 to complete.

Bars, Plates and Shapes.—Heavy specifications in the last week of March against first quarter contracts appear to have supplied much of this month's requirements of these products, and in the past week new business has been rather light. The mills are well supplied with orders against which they can ship and also have written a good deal of second quarter contract business. There is no pressure to sell and no pressure on the part of buyers against prices; consequently, there is no talk of prices lower than 1.85c., base Pittsburgh, except in reference to current deliveries on late first quarter contract specifications.

Rails and Track Supplies.—The railroads are taking out rails and track supplies in good volume against old orders, and in the latter item seem more disposed to carry moderate stocks instead of ordering in strict accord with track-laying programs. Light-section rails still are very dull.

Wire Products.—Makers have been fairly successful in getting second quarter contracts signed at the full quotations, but specifications against them are light and will probably remain so during this month because of the fact that buyers took full advantage of the opportunity to specify late last month on first quarter commitments carrying lower prices. The market does not appear as well established as to prices on nails as on the other products, in spite of the fact that many jobbers have signed second quarter contracts at $2.65 per keg, base Pittsburgh. The heavy shipments of the first two months of the year have left jobbers with big stocks and in reducing them they are setting up considerable competition for the mills, some of which are adding to preferential customer lists in getting new business.

Tubular Goods.—The recent revision in prices of standard-weight and line pipe has had the effect of materially stimulating the demand. Jobbers were given one week in which to specify 30 or 60 days' requirements at the old prices. Reports about business in standard-weight pipe are much more cheerful than recently. There is a very fair business in line pipe in small lots, but the larger tonnage projects do not appear to be moving with much speed toward the mills. The new quotation on line pipe to jobbers is card less one point and three fives on sizes larger than 3½-in. outside diameter. On 3½-in. and smaller, the standard-weight pipe list applies with one point less discount on line couplings. On seamless oil well casing, the former discount of 20 per cent to jobbers has been revised to 10, 5 and 5 per cent. Demand for oil country goods still is slow, but in spite of the fact there is some talk of an upward revision of prices.

Sheets.—Prices have become somewhat unsettled as a result of the weakness that has developed in the Detroit district in automobile body sheets. One maker is reported to have made a quotation of 4c., base, on body sheets, a cut of $3 a ton, and it was necessary for others to follow to hold their accounts. The market on the common finishes is threatened by this development, as it rarely happens that black sheets can hold up in the face of weakness in the full finished stock, and galvanized sheets have been weak for some time, chiefly because jobbers were so heavily stocked with them at prices that permit a profitable resale at less than 3.75c. While sheet business has been good over the past week —and no small part of it outside of the body sheets has been at full prices—demand is not strong enough to sustain the recent rate of mill engagement and operations of between 80 and 85 per cent of capacity are about five points lower than in the last half of March.

Tin Plate.—Makers still report cheerfully about business and mill operations. In another week, specifications against June quotas are due, winding up first half contract business and bringing into the foreground probable prices on last half contracts. The common impression now is that there will be no change in prices. While makers have held that the first half price reduced

THE IRON AGE Composite Prices

Finished Steel

April 10, 1928, 2.362c. a Lb.

One week ago	2.357c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

April 10, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.75
One year ago	19.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.40c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.94c. to 2.99c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.74c. to 3.84c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	1
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

the margin of profit, it is believed this opinion was predicated on pig tin at a higher price than has prevailed. A remarkable feature of the present situation is the smallness of stock lists. Tin plate manufacturers have operated their mills with an eye to keeping production close to readily marketable stock.

Cold-Finished Steel Bars and Shafting.—Parts makers serving builders of the medium-priced motor cars are not ordering as freely as they did recently, but those which supply low-priced car builders are taking shipments freely and the total movement compares favorably with that of last month. Prices are steady at 2.20c., base Pittsburgh or Chicago.

Hot-Rolled Flats.—Strictly new business is light in comparison with that of the two previous weeks, but this reflects no contraction in consumption, but is due rather to the heavy releases on first quarter contracts, shipments against which are amply meeting consumers' needs. Makers were obliged to concede something on prices to large consumers in getting second quarter contracts, but on smaller business the full quotations appear to have prevailed.

Cold-Rolled Strips.—Important consumers still are meeting their requirements from shipments on first quarter contracts and new business is moderate. Prices are still irregular, but extensions or additions to first quarter contracts permitted by manufacturers cause some doubt as to the attainment of the prices announced Jan. 25, last. The drop in automobile body sheets will probably mean a revision of strip steel fender stock, since the two grades usually move together in price.

Bolts, Nuts and Rivets.—Buyers seem to have generally covered their needs for this month in late specifications against first quarter contracts and business so far this month has been rather light. Prices are well maintained.

Coke and Coal.—The market still is extremely dull. Little demand exists for spot furnace coke even for other than blast furnace use and producers who run production a little ahead of their orders find that the surplus is hard to move even at $2.65 per net ton at ovens. There is plenty of spot foundry coke. There is no Lake business to take the place of lighter demands for household coal, and the market is dull and weak. Since not much lump coal is being shipped, the production of slack grade is light and prices are somewhat higher on that grade.

Old Material.—This market has advanced again on the open-hearth grades, with heavy melting steel now quotable at $15.50 to $16, and compressed sheets not obtainable in quantity at under $15.50. The explanation is partly found in a scramble by dealers to cover short sales, induced by insistence of melters for shipments, and the fact that when these demands developed there were few dealers who had any large amounts of scrap in their yards. A contributory factor in the advance is that a steel company which has long been out of the commercial scrap market secured most of the scrap in the April list of the Baltimore & Ohio Railroad on a direct bid, paying $15.50, delivered. Assuming that this may be a permanent policy of the company which bought, dealers have scurried to cover and have paid as much as $15.25 for heavy melting steel for delivery on orders taken at $14.75 and even $15.50 for ordinary heavy melting steel. The heavy steel scrap in the Pennsylvania Railroad April list sold within a few cents of $16 per gross ton, delivered to two points in this district, with a little going to the Youngstown district. There is not much activity in other directions, but sentimentally the market is strengthened by firmness in the open-hearth grades.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.50 to $16.00
Scrap rails	15.00 to 15.50
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	15.50 to 16.00
Industrial	15.00 to 15.50
Agricultural	14.50 to 15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 to 62½ per cent off list
Machine bolts, per 100 count,	60 to 62½ per cent off list
Carriage bolts, per 100 count,	60 to 62½ per cent off list
Nuts, all styles, per 100 count,	60 to 62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Government Appeals Decision on Reinforcing Bar Duty

An appeal has been filed by the Government from the decision of Justice I. F. Fischer of the United States Customs Court, Second Division, that reinforcing bars are dutiable as construction material under paragraph 312 instead of as steel bars under paragraph 304 of the tariff act. As a result of Justice Fischer's decision, the duty on reinforcing bars would be reduced from 0.30c. per lb. to 0.20c. per lb.

Following the decision early in February, the Government had 60 days in which to file an appeal, but did not act until March 31. As 60 days more must elapse before action may be taken before the Customs Court of Appeals in Washington, final decision is not possible until after June 1. The Customs Court of Appeals generally adjourns about the middle of June so that unless action is taken soon after the expiration of the 60-day time limit, the case may carry over to next fall.

Newton Steel Co. Refunding Will Provide $1,000,000 for Improvements

Stockholders of the Newton Steel Co. have approved new financing, authorizing $4,000,000 6 per cent preferred stock to replace present 7 per cent preferred, which will be called at $110. Of the new authorization 22,500 shares of $100 par value stock will be issued at this time. After retiring the outstanding preferred, about $1,000,000 will be available for plant improvements.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00 to $16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Third Largest for Any Week This Year

CHICAGO, April 10.—Ingot output in this district in the first quarter was larger by a fair margin than in the corresponding period a year ago. The total for the month just closed, however, did not quite equal the record made in March, 1927.

The character of this market has not changed in the week unless it is a trifle stronger. Orders now on mill books, plus the tonnage which producers feel will come to them in the next two months, lead to the belief throughout the trade that a substantial volume of business is assured in the second quarter. Specifications for finished steel are the third largest for any week so far this year and they stand second to the best week of last year. Sales, not counting rails and track accessories, bulk large and are in excess of shipments. Long range buying is almost wholly absent, and this fact readily leads to the general belief that current orders are non-speculative and are for actual consumption. Steel mill backlogs average well up to the six weeks' mark, and deliveries on finished steel products range from four to six weeks.

Notwithstanding the favorable condition of order books, prices on bars, shapes and plates still show some variation, usually about $1 a ton. Some sellers, feeling that they must compete against shipments being made against old contracts taken at prices below 2c., are willing to take attractive business at 1.95c.

Pig Iron.—Shipments of Northern foundry iron continue to creep up, and the average so far in April shows a material improvement over that of March. New sales are large when consideration is given to the uniformity of purchases over the last four or five weeks. A large portion of this business is spot iron or tonnages that are needed to fill out the second quarter. Third quarter inquiry and sales are gaining in importance. It is reported that a mixed cargo of pig iron and finished steel left Buffalo by water for Chicago April 4. It is considered highly probable by many that shipments from Cleveland to Chicago soon will be made. Orders for iron to come by boat to Milwaukee are said to aggregate not less than 6000 tons. Two cargo vessels have already come to Milwaukee and Chicago from Detroit, showing that passage ways between the Lakes are now cleared of ice.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet in new sales, but specifications are heavy. Prices are steady.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Fluorspar.—Sales of this commodity are small, and prices are well established at $15, f.o.b. Illinois mines, for the 85 per cent grade. Shipping orders against recent contracts are of good size.

Bolts, Nuts and Rivets.—Specifications for these commodities are a trifle heavier. Automobile plants and manufacturers of farm machinery are the largest users. The railroads are taking normal quantities for this time of the year. Output for the industry as a whole is estimated at a shade under 70 per cent of capacity.

Coke.—Shipments of by-product foundry coke are large, being a shade heavier than in the closing week of March. Prices are firm at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Plates.—Over 50,000 tons of plates, shapes and bars will be required for the 4450 freight cars ordered this week by the Chicago, Milwaukee, St. Paul & Pacific from eight Western car shops. This business wipes out the last of the large inquiries that have been before the trade this year. There is still talk that the Illinois Central and the Rock Island will come into the market for freight car equipment, but there is no assurance that they will do so before the early summer months. Car builders are losing interest in the 500 cars, on which prices were asked some weeks ago by the Chicago & Eastern Illinois, as it is generally believed that these cars will be built in the railroad's own shops. Two oil producers in the Southwest have ordered a total of 3200 tons of plates. Fresh inquiry from this source is for 500 tons, bringing the total of unclosed business in tankage materials to 4500 tons. Recent car orders and requirements of local fabricators are adding sizable tonnages to local mill books, and deliveries now range from four to six weeks. Prices are steady at 2c., Chicago, though some sellers, in meeting competitors who are still delivering steel against contracts at 1.90c., are shading the local market at least $1 a ton. This concession is usually made on attractive tonnages when prompt delivery is not insisted upon.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Awards.—Notwithstanding that awards are normal for this time of the year and that shops are in a fair position in the matter of backlogs, there is still a scramble to take small fill-in orders, and the result is that such business is now bringing no better prices than fabricators have recently obtained on tonnages running well above 1000 tons each. Of special note this week is the award by the Chicago & North Western of 6000 tons of bridge work, of which 5400 tons went to the American Bridge Co. and 600 tons to the Clinton Bridge Works, Clinton, Iowa. Steel for the first 14 stories of the Palmolive-Peet Co. Building, Chicago, has been definitely awarded to the American Bridge Co. This was previously reported as having been taken by an unnamed bidder. The American Bridge Co. has also taken 1100 tons for the Chicago Motor Club Building. New projects include 3000 tons for a 24-story apartment building and 1000 tons for an office building at La Salle and Lake Streets, Chicago. New orders for structural material are in excess of shipments and deliveries have been pushed ahead to an average of five weeks.

Mill prices on plain material per lb.: 2.00c., base, Chicago

Bars.—A gage of activity among local manufacturers is clearly given by the current demand for soft steel bars. For the third week sales have topped shipments and specifications have come in at such a rate that deliveries have been extended a week. Forgers, whose business is largely tied in with the automobile trade, are unusually busy, but they are cautious in placing orders for only such quantities of steel as will cover their actual scheduled requirements. There is no indication of a change in the rate of demand by farm implement manufacturers, and automobile builders continue to operate at a pace that in many instances is ahead of a year ago. Because of longer deliveries on steel products and the outlook in the automotive field, parts makers are scheduling their May and early June steel requirements. This market is quotable at 2c., Chicago, though irregularities to the extent of $1 a ton are reported. Iron bar prices are steady at 2c. New business in iron bars is light, but specifications against old business are of fair size. New buying in alloy steel bars is more active and makers now have the heaviest orders since the first of the year. Specifications are large, affording production at full capacity of local mills. New orders for rail steel bars are at close range. Specifications continue to run ahead of shipments, but the margin is small and deliveries are satisfactory, the range being 10 days to two weeks. Barn equipment manufacturers remain busy, but the bed industry is settling to a slower pace. Prices of rail steel are steady at 1.85c., Chicago district mills.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Recession in orders noted a week ago has been checked and shipments from local wire mills represent about 72 per cent of capacity. Heavy rains in rural districts are putting roads in bad condition and thus are slowing distribution. A bright spot appears in the market, however, by a sharp upturn in demand from the Northwest, where the spring trade is now swinging into a better stride. There is also a better tone to the nail market. Over-expanded stocks in the hands of jobbers appear now to have been reduced to the point where new orders are being sent to mills. It is conceded by the trade that the peak of the spring demand is passed. Specifications for wire from the manufacturing trade are heavy. Prices for wire and wire products are given on page 1039.

Rails and Track Supplies.—New orders for standard-section rails total 17,000 tons. The bulk of this tonnage, or 13,800 tons, represents the secondary requirements of the Burlington, which awarded 7500 tons to the Illinois Steel Co., 3800 tons to the Inland Steel Co. and 2500 tons to the Colorado Fuel & Iron Co. Miscellaneous track accessory business totals 4000 tons, while inquiry now before the trade is for not less than 15,000 tons. Although local mills are heavily engaged, shipping schedules are well arranged and there is little or no complaint as to deliveries.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—This market is very quiet except in blue annealed sheets in the heavier gages. Demand for black and galvanized sheets is slack, and the none too heavy backlogs of local mills are rapidly being cut down. Prices in and close to Chicago are holding, but in outlying districts and in the Southwest concessions are being offered freely. Backlogs of blue annealed sheets average four weeks rolling, while in black and galvanized the average is less than two weeks.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Sheet Bars and Billets.—Prices are steady. New business is fully equal to shipments.

Hot-Rolled Strip.—Local mills are operating at capacity. New business is being taken at the full schedule.

Cast Iron Pipe.—Although this market is only moderately active, such business as has been taken clearly indicates that prices are strengthening. James B. Clow & Sons have taken 450 tons of 4 to 10-in. pipe for Oshkosh, Wis., at $29, Birmingham. Miscellaneous orders for carloads are being taken at $31. The only fresh inquiry of note comes from Oak Park, Ill., for 330 tons of 6 to 12-in. class B pipe. Public utilities have ordered a few scattered lots and several Western railroads are inquiring for carloads. Sellers have booked a fair tonnage from contractors. Several public projects are in the making.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.55c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Reinforcing Bars.—Fresh inquiry in this market bulks large, and includes 5000 tons of bars needed for a sewage project at Stickney, Ill., a suburb of Chicago. The Central Engineering Co. has ordered 400 tons of rail steel bars for Illinois State road work. Sellers of this commodity have submitted figures on 4000 tons of road work, of which fully 2000 tons may be closed in the coming week. Ground has been broken for the Edgewater Athletic Club, this being an old project which will take close to 1200 tons of bars. New estimates now being made on the Chicago *Daily News* Building may cut the reinforcing bar requirements to slightly less than 1000 tons. Prices for bars made of billet stock are irregular. Hard steel bars are strong at 1.85c., Chicago Heights mills. New awards and fresh inquiry are shown on page 1055.

Old Material.—The Chicago scrap market is lacking in interest. Brokers are busy filling old contracts and the larger consumers, having made heavy purchases, are now content to stay out of the market and let recent purchases care for immediate needs. A melter has bought 1000 tons of cast iron borings at $10 a gross ton, delivered, 25c. above recent quotations. Dealers are offering $9.75 for this grade. Early in the week forged wheels were sold to a user at $15.50 a gross ton, delivered, an advance of 50c. a ton. By the end of the week, however, prices had settled back to $15. The movement of scrap is heavy and railroad shipments are prompt. Country scrap is coming in at a more rapid rate and manufacturers scrap is being offered in large quantities.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.00 to 13.50
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	14.50 to 15.00
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	13.75 to 14.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.50 to 10.00
Short shöveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	13.75 to 14.25
Cupola Grades:	
Steel rails less than 3 ft.	15.00 to 15.50
Angle bars, steel	13.75 to 14.25
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	5.00 to 5.50
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Rogers Brown & Crocker Brothers, Inc., seller of pig iron, ferroalloys and coke, has moved its New York offices from the seventeenth to the thirteenth floor of the building at 21 East Fortieth Street.

Philadelphia

Sheet Prices Lower—Warehouses Establish Quantity Differentials on Sheets

PHILADELPHIA, April 9.—Black, galvanized and blue annealed sheet prices are weaker, and quotations range from 2c. to 2.10c., Pittsburgh, on blue annealed, 2.75c. to 2.90c. on black and 3.70c. to 3.75c. on galvanized. One maker has announced these reductions on blue annealed and black sheets and has reduced second quarter contracts accordingly. Plates and bars continue firm, but there is only a small volume of current buying at 1.90c. per lb., Pittsburgh, on bars and 2.05c., Coatesville, on plates. Shapes are quoted at 2c., Bethlehem, both on effective contracts and new business and uncompleted first quarter contracts have been rather generally extended through the present month.

Although new business is limited to small tonnages of plates, shapes and bars, mills are receiving a fair volume of specifications against contracts and operations continue at 60 to 65 per cent of capacity in this district. Bridge projects are the outstanding feature of the structural steel market. Prices for fabricated material are still at a low level.

Local warehouses have revised quotations on black and galvanized sheets and have established quantity differentials, extras being applied on orders for 10 to 50 bundles and on less than 10 bundles.

Pig Iron.—Foundry consumers in this district are reported to be melting more iron than in several weeks, but purchasing is still limited to carload lots. Prices, however, are being maintained at $20 per ton, base, for foundry iron. Low phosphorus is unchanged. The Washington Navy Yard will open bids April 14 on 357 tons of low phosphorus, and the Lorain Steel Co. is inquiring for about 1000 tons. The Brooklyn Navy Yard is in the market for 95 tons of No. 3 foundry iron. No sales of basic are reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Prices are firm and mills seem to be in a satisfactory position, with a steady flow of specifications against contracts. For current delivery, orders are small and 1.90c., Pittsburgh, is being maintained. Contract shipments are at 1.85c., Pittsburgh, or 2.17c., delivered Philadelphia. In some cases extensions of first quarter commitments have been granted, so that some tonnage is still moving at 1.80c., Pittsburgh.

Shapes.—Quotations on new business and shipments on second quarter contracts are at 2c., Bethlehem, or 2.13c., delivered Philadelphia, and some first quarter contracts at 1.95c., Bethlehem, or 2.08c., Philadelphia, have been extended through the present month. The New York Central Railroad has revived an inquiry for 10 steel barges to be constructed of 12-in. channels. The Tacony-Palmyra bridge has been awarded to the American Bridge Co.

Plates.—The market ranges from 2c. to 2.05c., Coatesville, or 2.10c. to 2.15c., delivered Philadelphia, with some uncompleted contracts carried over at 1.95c., Coatesville, or 2.05c., Philadelphia. Mills are fairly well booked with business, and some additional tonnage may be in prospect if Delaware River shipyards obtain the Pennsylvania Railroad contract for 10 steel barges and carfloats, including a tugboat hull.

Sheets.—Blue annealed and black sheet prices seem to be definitely lower, with most mills offering concessions from 2.90c., Pittsburgh, on black, and 2.10c., Pittsburgh, on blue annealed; one producer of both grades is quoting 2c., Pittsburgh, for blue annealed and 2.75c., Pittsburgh, for black, having reduced second quarter contract prices to the new bases. Galvanized sheets are nominally 3.75c. per lb., Pittsburgh, but concessions of $1 a ton are not uncommon.

Warehouse Business.—Effective April 9, jobbers in this district have established quantity differentials on black and galvanized sheets. Base prices have been revised to 3.75c. per lb. on black and 4.75c. on galvanized, the base price applying on purchases of 50 bundles or more, a bundle ranging from 140 to 150 lb., depending upon the gage and size. For 10 to 49 bundles there is an extra charge of ½c. per lb., and on orders for less than 10 bundles the extra is 1c. per lb. There is an additional charge of 1c. per lb., or 2c. per lb. over base for broken bundles.

Imports.—In the week ended April 7, 2000 tons of pig iron arrived at this port from the United Kingdom. Ore imports consisted of 226 tons of chrome ore from Portuguese Africa. Steel arrivals were 339 tons of shapes, 24 tons of steel bars, 51 tons of steel skelp and 5 tons of hoops from Belgium; 21 tons of shapes and 15 tons of steel bars from Germany and 22 tons of galvanized strip steel from the United Kingdom. Steel scrap arrivals totaled 107 tons, of which 85 tons were from Germany and 22 tons from the United Kingdom.

Old Material.—Prices of most grades show little change, but demand is light, and there is a downward trend to prices. On the Pennsylvania Railroad list of about 40,000 tons of material the heavy melting steel and rails, about 20,000 tons, are reported to have gone to a large Eastern broker, who bid for delivery at Midland, Pa. The Carnegie Steel Co., Pittsburgh, is reported to have taken about 9000 tons of No. 1 steel and old rails on the Baltimore & Ohio list at $15.35 per ton, delivered Munhall, Pa. A Harrisburg consumer has purchased a tonnage of stove plate at $12 per ton, delivered, and heavy breakable cast at $15.50 per ton, delivered. Specification pipe has been sold to a Columbia, Pa., user at $12 per ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)		10.50
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	10.50 to	11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)		12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	14.75 to	15.25
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

New York

Pig Iron Activity Subsides—Heavy Steel Pipe Specifications

NEW YORK, April 10.—Activity has subsided in the pig iron market, and new inquiries are confined mainly to relatively small tonnages. Sales by local brokers during the week totaled 7000 tons, a decline of about 3000 tons from the figure for the previous week. The Worthington Pump & Machinery Corporation, New York, has closed against its inquiry for 1250 tons for various plants. The American Locomotive Co., New York, has placed 500 tons of foundry for its Schenectady, N. Y., works. The General Electric Co. has entered the market for 400 tons of high silicon foundry for delivery at Schenectady during the current quarter. Prices are substantially unchanged. The Colonial Iron Co. furnace, Riddlesburg, Pa., was scheduled to go out for relining today. It has operated on the present lining for four years. The Danish steamer Kirsten Maersk, with a cargo of 3100 tons of Dutch iron, arrived at Bridgeport, Conn., April 7. The iron, which was consigned to Pilling & Co., New York, was unloaded at the T. A. D. Jones Coal Corporation docks. Part of the tonnage was sold prior to its arrival. The shipment is chiefly of interest because of the selection of Bridgeport as an unloading point, instead of Boston, New York or Philadelphia.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—The chief development of the week has been in connection with merchant pipe, on which all producers announced an advance on April 2 and 3. Distributers were given one week in which to specify at the former prices. Some mills gave the privilege of specifying 60 days' requirements, while others held to 30 days' supply. The result was that orders for pipe during the past week have been very large. In other steel products, except sheets, which have weakened in price, conditions are unchanged. Prices on plates, shapes and bars are holding at the second quarter contract levels, namely 1.85c., Pittsburgh, on bars, 2c., Coatesville, on plates and 2c., Bethlehem, on shapes. Quotations $1 higher remain in effect, but are applying mostly on small lots from consumers not covered by contract. Buying against second quarter prices has not yet taken place to any extent because of the large specifications in the last week of March on expiring first quarter contracts. Shipments against these specifications will keep most consumers well supplied this month at least. Demand for structural steel in this market is enlarged considerably by the inquiry for 17,000 tons for the Reynolds Building, Lexington Avenue and Forty-second Street. The Structural Steel Board of Trade of New York reports total March bookings by its members at 32,200 tons—8200 tons larger than February contracts, but 5800 tons less than the total for March, 1927.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—There is a good volume of purchasing of structural material, and other products are moderately active. Most jobbers report April business as large as March's and in some cases, should present activity continue to the end of the month, it will exceed that of last month. The new quantity differentials are being maintained.

Cast Iron Pipe.—Purchasing of bell and spigot pipe is light. Delivered prices of Northern foundries continue lower than Birmingham makers are willing to meet. The largest current inquiry in this district is 2700 tons of 4, 6, 8, 10, 12, 16 and 20-in. water pipe for New York City, bids on which will be opened April 17. New York City is also in the market for about 200 tons of high pressure pipe. Jersey City, N. J., has closed on 175 tons of 8-in. water pipe with the United States Cast Iron Pipe & Foundry Co.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—Lettings during the last week have been few and in small tonnages. Several hundred tons will be required in a number of road contracts in New Jersey, few of which have yet been placed. Distributers continue to quote 2c., Pittsburgh, on new business, but few projects large enough to test the price have come out recently. New York and Youngstown warehouse prices are unchanged.

Coke.—Buying of both foundry and furnace grades continues light. Connellsville furnace coke is quoted at about $2.75 per ton, Connellsville, for standard grade. Delivered prices on beehive foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

per net ton, Newark or Jersey City, N. J., and $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—Prices of most grades of scrap still show a downward tendency. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered eastern Pennsylvania, and a good tonnage is moving to the larger consumers. Stove plate is being purchased by brokers at $11.50 to $12 per ton, delivered, the lower quotation being for delivery to a Harrisburg consumer. Specification pipe has been purchased at $12 per ton, delivered Columbia, Pa., and brokers are offering $11.50 per ton for that delivery. The heavy melting steel and old rails on the Pennsylvania Railroad list, a total of close to 20,000 tons, are understood to have gone to Midland, Pa., at $15.96 per ton, delivered.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.00
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.50 to 16.00
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.75 to 8.25
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Cleveland

Auto Body Sheets Decline $3 a Ton—Other Grades Weaker

CLEVELAND, April 10.—Mills took a good volume of business the past week, although a lull after the heavy specifications of the previous week against expiring 1.80c. contracts for steel bars, plates and structural shapes would not have caused surprise. Mills have a large tonnage in orders entered at the end of the month that will be shipped at their convenience this month.

Orders received from the automotive industry indicate that it will take more steel this month than in March. Optimistic reports continue to come from the motor car manufacturers, and it is predicted that the seasonal slowing down in this industry this year will not start until a month later than last year. One manufacturer of medium-priced cars is curtailing shipping orders with a view of discontinuing its present line and bringing out new models.

Operations in industries outside of the automotive field show an upward trend. On current orders, the market is established at 1.85c., Pittsburgh, for bars, plates and structural material, at which most consumers have placed contracts. The 1.90c. price is maintained for small miscellaneous lots. Some inquiry for contracts is coming from very small-lot buyers who evidently hope to get advantage of the minimum price by making contracts. Local mills quote steel bars at 1.85c., Cleveland.

Attempts to get higher prices than prevailed last quarter for sheet bars and strip steel have met sharp resistance from the automotive industry in Detroit, and auto body sheets have declined $3 a ton to the first quarter price. Prices on cold-rolled strip to large buyers show a wavering tendency. The lull in structural steel lettings in this territory continues.

Pig Iron.—The market was fairly active the past week, although the sales of foundry iron by Cleveland interests, amounting to 26,000 tons, showed a sharp falling off from the previous week. Activity was well distributed among Ohio, Michigan and Indiana territories. Prices are holding fairly steady at recent quotations. The ruling Lake furnace price is $17, except for shipment to the more competitive points in southern Ohio, where Lake furnaces are quoting $16.75, with reports indicating that this price is being shaded. In Michigan the market is firm at $18. With the approach of Lake navigation, some activity is looked for in water shipments. The sale of a small tonnage of iron for shipment from Cleveland to Milwaukee is reported, and some inquiry has developed at Cleveland for boat shipment to Detroit. Last year producers were able to get a rate as low as $1.50 a ton for water shipment from Cleveland to Chicago, including handling charges at each end. Shipping orders indicate that shipments during April will show a slight gain over March. The automotive industry is taking as much iron as last month, but a slowing down in the demand from this source would not be surprising next month, as some of the automobile companies are not expected to keep up their present production schedules through May. The foundry melt outside of the automotive industry shows a slight gain. Conditions in the industries making various types of heating equipment are reported to show an improvement.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Iron ore producers are awaiting action of the Ford Motor Co. on their bids submitted April 3 for 440,000 tons of Lake Superior ore. Some other business will be closed as soon as prices are named. Nothing has developed to change the belief that last season's prices will be reestablished.

Iron Ore Stocks.—The dock balance of Lake Superior ore at Lake Erie ports April 1 was 5,568,098 tons, compared with 5,239,687 tons on the same date a year ago. Shipments from docks are light, amounting to 426,008 tons in March, compared with 830,826 tons during the same month last year.

Coke.—By-product foundry coke has been reduced 25c. a ton to $7.75, Painesville. This coke is now $8.76, delivered Cleveland, compared with $8.77 for Ashland coke, which was recently reduced 50c. a ton. Heating coke is weak, with a range of from $2.50 to $2.75. Connellsville foundry coke is unchanged at $3.75 to $5.10. By-product coke for domestic use is moving very slowly.

Semi-Finished Steel.—Specifications continue heavy against second quarter contracts, and while there are reports of concessions, the market appears to be holding closely to $33, Cleveland, for sheet bars, billets and slabs. The leading local producer is still operating at 100 per cent of capacity.

Wire Products.—Nails are moving somewhat better than recently and the $2.65 price appears firm in northern Ohio, but in the central and southern sections of the State $2.55 is still rather commonly quoted.

Reinforcing Bars.—A fair amount of new work is coming out in small lots, but no large lettings have been made recently. Prices on stock orders are irregular. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—Sales are fairly heavy and prices are well maintained. Galvanized sheets are moving rather slowly, but a seasonal demand is expected to stimulate orders shortly.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Sheets.—Auto body sheets have declined $3 a ton to 4c., Pittsburgh, or the same price at which consumers covered late in the year for the first quarter. Strong effort was made by some of the leading producers to maintain the 4.15c. price, at which a moderate amount of business had been placed recently by the automotive industry, but a price break developed in the Detroit market. Weakness has also appeared in blue annealed sheets, which had been holding rather firmly to 2.10c., Pittsburgh. On these a 2c. price has become rather common. Black sheets, which have been irregular for some time, have settled down to 2.75c. to 2.85c., Pittsburgh, and little effort is being made now to get 2.90c. Galvanized sheets are unchanged at 3.65c., Pittsburgh. Demand in this territory is not active but orders from the automotive industry in Michigan continue heavy.

Strip Steel.—Some contracts have been taken at $1 to $3 a ton above those at which larger consumers covered for the first quarter, but somewhat lower than current market quotations. Small lots are moving at regular prices. On cold-rolled strip, concessions of $3 a ton to 2.75c., Cleveland and Pittsburgh, for 3 tons and over have appeared in the Detroit territory, although some business is reported to have been placed by automobile manufacturers at regular prices. The reduction on auto body sheets is expected to have an effect on cold-rolled strip prices.

Bolts, Nuts and Rivets.—Bolt and nut specifications are fair, the volume being about the same as during last month. Orders are heavy from the automotive industry, but only fair from jobbers. Prices are firm. The demand for rivets shows some gain. All specifications for large rivets are now against the new $2.90 per 100 lb. contracts, or $3 a ton above the price that prevailed during the first quarter.

Fluorspar.—Leading producers on April 9 advanced gravel fluorspar $1 a ton to $16 at mines. This price will be quoted for the last half, although most large consumers are covered for that delivery. A few car lot sales were made during the week at $15.

Old Material.—The purchase of a round tonnage of heavy melting steel and compressed sheet scrap by the American Steel & Wire Co., reported last week, failed to add strength to the local market. No additional demand has developed from consumers, and dealers are not buying because they already have purchased considerable scrap which they cannot release for shipment. Steel making scrap has again begun to move by water from Detroit to Cleveland. These shipments are against a 20,000-ton contract placed by a Cleveland mill with a Detroit dealer late last year. Machine shop turnings have declined $1 a ton. As there is no local demand, an out-of-town market must be found for this grade.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.00 to 12.50
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

J. O. Henshaw, dealer in pig iron and coke, Boston, has removed his office from 79 Milk Street, to 540 Oliver Building, 141 Milk Street.

San Francisco

Building Permits in Coast Cities Gain—Lull in Demand for Steel

SAN FRANCISCO, April 6, (*By Air Mail*).—Little or no improvement in demand for steel products developed during the past week. Bookings were not heavy. The largest lettings involved 800 tons of plates for three lightships for the Government at Portland, placed with the Albina Marine Engine Works, 650 tons of reinforcing bars for Los Angeles, booked by the Blue Diamond Co., and 650 tons of structural shapes for school buildings at Glendale, Cal., taken by the Llewellyn Iron Works.

Building permits issued in the larger cities on the Coast during the past month were, on the whole, slightly in excess of the total for March, 1927. Portland permits numbered 970, with an estimated valuation of $2,907,880. At Seattle, permits aggregated $4,273,490, compared with $3,492,610 for the same period last year. During the first quarter permits set a new high record, being nearly $5,000,000 greater than the first quarter of last year. The totals were $11,092,815 as against $7,345,745.

Pig Iron.—Foundry operations continue at about the level that has prevailed during the past three or four months. Sales and inquiries for pig iron are confined to unimportant lots. A shipment of 850 tons of Indian iron will arrive on the Coast next week. Another lot of 1400 tons is due to arrive the latter part of this month or early in May. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Most reinforcing bar bookings call for lots ranging from 20 to 60 tons. Two hundred tons for the Stimson Building, Seattle, was placed with an unnamed interest. Other business included 120 tons for a bridge at Riverside, Cal., and 110 tons for a produce building in San Francisco. Pending business calls for more than 13,000 tons. Bids have been opened on 5200 tons for a drainage improvement project in Los Angeles. Out-of-stock prices in the bay district continue weak and 2.25c. is frequently quoted.

Plates.—In addition to the 800 tons for lightships at Portland, mentioned above, the Government has placed 250 tons for Mare Island and 500 tons for Mare Island and Puget Sound Navy Yards with unnamed Eastern interests. Demand generally is light. Siphons for the Yakima project in Washington for the United States Bureau of Reclamation call for 450 tons. Prices appear firm at 2.30c., c.i.f.

Shapes.—Structural shape bookings fell off this week, and the total, 850 tons, was smaller than for any week so far this year. The California Steel Co. took 200 tons for an office building at Reno, Nev. Bids were opened this week on 600 tons for a bridge over the Smith River, Del Norte County, Cal., and on 250 tons for a hangar at Oakland. The McClintic-Marshall Co. was low bidder on 150 tons for Los Angeles. Pending business exceeds 11,000 tons. Plain material remains firm at 2.35c., c.i.f.

Cast Iron Pipe.—A slight falling off in demand for cast iron pipe is reported. Awards this week totaled over 1000 tons. George H. Oswald, Los Angeles, took 181 tons of 6 and 8-in. class B for the improvement of Foothill Boulevard, Azusa, Cal. Aberdeen, Wash., placed 53 tons of Universal pipe with the Central Foundry Co. and 105 tons of 6 and 8-in. class 15 with the Pacific States Cast Iron Pipe Co., Vancouver, B. C., awarded 500 tons to the American Cast Iron Pipe Co., Astoria, Ore., placed about 100 tons of 6-in. class C with an unnamed interest. The Pan-Pacific Construction Co., Los Angeles, took 148 tons of 8 and 18-in. class B for the improvement of Hermosa Avenue, Her-

(*Concluded on page* 1055)

Boston

Prices on Reinforcing Bars and Structural Steel Shapes Are Easier

BOSTON, April 10.—Pig iron sales the past week were small. A fair tonnage of Alabama iron was sold notwithstanding its higher cost on a delivered basis. Buffalo No. 2 plain iron, on an all-rail freight rate basis, is still available at $16 a ton, furnace, regardless of the tonnage involved or date of delivery, and New York State furnaces and the Mystic Iron Works are endeavoring to meet that price. Interest centers in the new rail-and-water rates from the Buffalo district to New England to be put into effect by the New York, New Haven & Hartford Railroad on April 21. The water rate from Buffalo to Beacon, N. Y., is $1.50 per ton and there is a loading charge of 28c. per ton. The rail rate from Beacon to Brockton, Fall River, Milford, New Bedford, Newton Upper Falls, Somerset, Taunton, Walpole and Whitman, all in Massachusetts, is $2.50 a ton, and to all other New England consuming points $2, so that Buffalo iron will carry a freight rate of $3.78 to $4.28 a ton, instead of the prevailing all-rail rate of $4.91. The Champlain stacks can, it is understood, take advantage of the new water-and-rail rates, but the saving to most New England points will be small, if any. The new rates place the Mystic Iron Works at a disadvantage at most consuming points. To illustrate, the new Buffalo rate to Whitinsville, Mass., is $3.78, while the Mystic rate is $2, with a switching charge of $5 per car. In contrast, the Mystic rate to Westfield, Mass., is $2.39 per ton, while the new Buffalo rate is $3.78.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Cast Iron Pipe.—Boston has closed bids on 550 tons of 24-in. pipe. R. D. Wood & Co. were the low bidders, but no award has been made. Everett, Mass., has closed bids on 200 tons of pipe, on which the Warren Pipe & Foundry Co. was low bidder, but no award has been made. No award has been made by Winthrop, Mass., on 200 tons of 8-in. pipe, bids for which closed April 5, but Quincy, Mass., has awarded 300 tons of 4, 6, 8 and 14-in. pipe to the Warren Pipe & Foundry Co. Wellesley, Mass., closed bids April 9 on 200 tons of 6, 8 and 12-in. pipe. Current business is on a basis of $39.10 a ton, delivered common Boston freight rate points for 6 to 12-in. pipe and at $44.10 for 4-in. On large sizes, however, concessions are being made. The usual $5 differential is asked on class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Coke.—Connecticut foundries are ordering in by-product foundry coke more actively than a month ago, indicating an increase in the melt, but in other New England States there is little improvement. New England producers of this fuel quote $11 a ton, delivered within a $3.10 freight rate zone. A decided slump in demand for domestic by-product coke is reported. Domestic fuel sells on a basis of $8 a ton on cars at ovens, Everett, Mass.

Warehouse Business.—Warehouse business is spotty. Some concerns did a large business in March, but the showing by others was not as good. Current movement of iron and steel out of stock, in the aggregate, is only fair at best. Nails are in slightly better demand. Prices on all materials are firm and unchanged.

Cold-Rolled Strip.—Mill representatives report a noticeable letdown in bookings the last few days. The rollers are in a fairly comfortable position, however, previous second quarter bookings being substantial, and shipments on first quarter specifications extend into this month. The current quotation is 3.15c. per lb., base Pittsburgh. The Worcester, Mass., mill quotes 3.30c. per lb., base, on 1 to 3 ton lots.

Bars.—Current buying of reinforcing bars continues in small tonnages. Competition for business is keener and even small lots sold the past week at 1.85c. to 1.90c., per lb., base Pittsburgh, as compared with 1.90c. to 1.95c. two weeks ago.

Shapes and Plates.—Mill bookings of standard shapes have been comparatively small the past week. While 1.90c. per lb., base Pittsburgh, is openly quoted, some business has been placed at 1.85c. Fabricators report a slight improvement in prospective business, mostly in small individual tonnages. Plates are in moderate demand at 1.90c. per lb., base Pittsburgh.

Importations.—Local importations of pig iron in March totaled 558 tons, made up of 159 tons of Dutch and the rest of Indian. Importations in February, this year, were 1215 tons. So far in April, 110 tons of Dutch iron has been landed here. In addition, 7042 tons of ore from Tunis has been received this month by the Mystic Iron Works.

Old Material.—Most grades of old material are moving in limited quantities. The lighter materials, such as steel turnings and forge scrap, have a better call than heavy melting steel. A fair tonnage of heavy cast was purchased at $10.50 to $11 a ton on cars, shipping point, and quite a little No. 2 machinery cast was shipped to the Pittsburgh district. Scattered cars of forge flashings were taken at $7.25 a ton on cars, but $7 appears to be the average top quotation. Machine shop turnings are moving better and bringing about 50c. a ton more than a week ago. Steel mill borings, on the other hand, are about that much easier. The Mystic Iron Works is still taking in stove plate at $10 a ton, delivered. New England foundries continue to supply their cast requirements from local or nearby yards and still show a preference for No. 1 machinery cast to textile machinery cast.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel		$9.00
Scrap T rails	$8.50 to	8.75
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	9.50 to	10.00
No. 1 yard wrought	7.50 to	8.00
Machine shop turnings	5.50 to	6.00
Cast iron borings (steel works and rolling mill)	5.50 to	6.00
Bundled skeleton, long	5.75 to	6.25
Forge flashings	6.50 to	7.00
Blast furnace borings and turnings	5.75 to	6.00
Forged scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.00 to	15.25
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.00
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	15.00 to	15.50
No. 2 machinery cast	13.00 to	13.50
Stove plate	10.00 to	10.50
Railroad malleable	13.00 to	13.50

St. Louis

Steel Bookings Keep Granite City Mill Operating Full—Pig Iron Firmer

ST. LOUIS, April 10.—The pig iron market displayed increased activity this week, and prices are firmer largely because of the southern Illinois coal mine strike and the resultant possibility of higher prices for coal. The Granite City maker sold 12,000 tons, including 10,000 tons of basic to an East Side melter; 500 tons of foundry grades to a southern Illinois stove plant; 350 tons of foundry to an East Side melter, and 150 tons of foundry to a Kansas City company; also 250 tons of malleable to a Pacific Coast user and 150 tons of malleable to an Illinois melter. An inquiry is pending from a radiator company for 5000 tons of foundry iron, and there are several 300-ton inquiries.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Bookings for March by the Granite City Steel Co. were considerably in excess of production and shipments, although shipments were the largest for any month in the history of the company. The demand for tank plates is exceptionally heavy, and the company is in a very comfortable position with respect to unfilled tonnages of this item. Buying of black and blue annealed sheets and tin plate specifications have been sufficient to warrant 100 per cent operation of these mills. The demand for galvanized sheets continues to lag, and this department of the Granite City plant is operating 75 per cent of capacity, while the open-hearth department is at full capacity. The Missouri-Kansas-Texas and Wabash railroads have issued inquiries for second quarter requirements of plates, shapes and bars. The Missouri Pacific has asked for prices on 400 tons of plates, 200 tons blue annealed sheets, 10 tons black sheets, 75 tons locomotive jacket steel and 30 tons galvanized copper bearing sheets for second and third quarter requirements. Business with structural fabricators is dull. Warehouse business is fairly good in the St. Louis industrial district, but this is counteracted by a lack of orders from the oil fields.

Coke.—The leading by-product factor in the district has made new prices on domestic grades at $6.25 ovens for shipments out of town and $7.25 to dealers, and $10.50 to consumers delivered in St. Louis. The same factor's price for foundry coke is $9.75, delivered in St. Louis, and $9 ovens, for outside shipment. Buying is only fair.

Old Material.—The market for old material grows weaker, and prices again are off. Heavy shoveling and melting steel, No. 1 locomotive tires, No. 2 railroad wrought, No. 1 busheling and cast iron borings are 25c. a ton down; miscellaneous rails, railroad springs and machine shop turnings are 50c. lower, and steel car axles have declined $1. Mills are declining to buy until they have used up present stocks, and dealers are trading among themselves to take care of the few unfilled contracts. Railroad lists include: Louisville & Nashville, 14,135 tons; Santa Fe, 5860 tons; Wabash, 2305 tons; Missouri-Kansas-Texas, 2000 tons; Texas & Pacific, 570 tons; Kansas City Southern, 520 tons; Ann Arbor, 144 tons; Great Northern, 54 carloads; Chicago & Eastern Illinois, 20 carloads; Pullman Co., nine carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$10.75 to $11.25
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	10.75 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.00 to 12.50
Railroad springs	13.00 to 13.50
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	6.50 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.50 to 14.00
Railroad malleable	10.75 to 11.25
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Buffalo

Pig Iron Shipments Increase—Steel Operations Sustained

BUFFALO, April 10.—The General Electric Co. is in the market for 400 tons of foundry pig iron, an addition to the 2900 tons recently bought. A district consumer seeks 1000 tons of malleable, and a New York State consumer wants 500 tons of foundry. There is another inquiry of 700 to 800 tons of foundry. Several 100 to 300 ton lots of foundry and malleable have been taken by Buffalo furnaces at $17, base, for foundry and $17.50 for malleable. There has been a slight pickup in the melt, and shipments on orders are considerably better. The Hanna Furnace Co. has started tearing down the No. 4 Susquehanna stack preparatory to rebuilding it.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Most of the mills continue a high percentage of operation. The average is about 85 per cent. Bars, shapes and plates are strong at 1.95c. to 2c. Prices were increased 5 per cent on standard pipe during the week and specifications have been heavier. Bolt and nut prices show the same discounts for the second quarter as the first, and business is very good. An ice-skating rink, bids for which will be taken about April 20, will require 750 tons of structural steel. The reinforcing bar market has been devoid of important lettings.

Old Material.—Dealers report one of the quietest weeks in several months. New York Central, Erie,

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Michigan Central and Pennsylvania railroad lists have been closed, but little of the scrap came to Buffalo. The heavy melting steel received here brought close to $15. Shipments are going to plants steadily. One Buffalo consumer has a large tonnage of scrap in Detroit which will begin to come in as soon as navigation opens. Short rails, 3-ft. and under, have been sold in small lots, bringing $16.25 to $17.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	12.75 to 13.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.00 to 13.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.25 to 8.75
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.75 to 10.25
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Birmingham

Pig Iron Shipments Heavy—Steel Demand Holds Up Well

BIRMINGHAM, April 10.—The pig iron market continues to move along quietly, with merchant producers gradually increasing bookings. Spot buying is holding up to the average of the past few weeks. The melt increased during the past week and shipments were heavier than for any previous week this year. Foundry iron quotations are still on a $16 base. The Woodward Iron Co. blew out furnace No. 1 at Woodward on March 31 for relining. Seventeen furnaces are now in blast—eight on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Mills are finding a fairly steady demand, in line with market conditions of the past several weeks. No tonnage of any consequence is being booked by structural steel fabricators and concrete bar distriubuters. Open-hearth operations are the same, with the Tennessee company working 13 or 14 and the Gulf States Steel Co. four.

Cast Iron Pipe.—Pressure manufacturers report a good increase in tonnage during the past week. Makers in the district shared in a number of municipal orders, the larger ones being placed by Meridian, Miss., Kansas City, Mo., Evansville, Ind., Fort Wayne, Ind. and Milwaukee, Wis. Central Iron Foundry Co. was awarded 27,000 ft. of pipe by Tuscaloosa, Ala. Inquiries on municipal pipe indicate that a considerable portion of the usual spring tonnage is yet to be placed. Small order business continues to come in at a fair rate. Shipments have increased slightly. Base prices continue at $29 to $31.

Coke.—Practically all of the larger consumers have covered their second and third quarter requirements. A nominal amount of spot sales constitutes the only activity in the market. Shipments during the week showed a slight increase over the average for the past few weeks. No change has been made in prices.

Old Material.—There is no noticeable change in shipments or inquiries. Both continue at the low rate that has prevailed for the past several weeks. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	14.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.50
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Pacific Northwest

Business Slightly Less Active but Prices Except on Sheets Are Firm

SEATTLE, April 7 (*By Air Mail*).—Inquiries and orders for steel products have slowed down in the past week or 10 days, with the single exception of reinforcing bars, these being quite active with large orders in sight, two of which, totaling about 2500 tons, are scheduled to be placed this week. Prices, except on sheets, are firm, and on steel pipe are higher. Building permits in Seattle for March were over $4,000,000, a record month.

Pig Iron.—Sales are only in small lots. Some foreign iron continues to come into this market. Utah basic and No. 2 foundry are quoted at $24 to $25, Seattle.

Plates.—The contract for the building of the penstock at Cedar River, taking 1550 tons, has been placed with the Puget Sound Machinery Co., Seattle, but the plates are not ordered. The United States Reclamation Service is asking bids on 500 to 1500 tons for work at Ellensburg, Wash. Plates remain firm at 2.30c., Seattle.

Structural Shapes.—Not much new work is in sight. Bids will be opened on April 24 for 1050 tons for a bridge at Kettle Falls, Wash. Another bridge at Quetts River, Wash., will take 650 tons, but bids have not been invited. About 500 tons of bridge work has been placed with a Southern fabricator. Shapes are quoted at 2.35c., Seattle.

Track Materials.—The Pacific Coast Railroad, an interest of the Pacific Coast Co., Seattle, is asking bids on 175 to 200 tons of 75-lb. rails, to be used in laying tracks at its new cement plant.

Reinforcing Bars.—Inquiry is active, and considerable work is being placed. The Pacific Northwest Rolling Mills, Inc., Seattle, has taken 400 tons for the Bolker warehouse here and about 240 tons to go in the new Stimson Building. State work of about 250 tons has been placed. The largest job in sight is the material for the Bon Marche Building, bids on which are in, and which will take 1800 tons or more. Reinforcing bars are more stable now than for some time. Quotations range from 2.20c. to 3c., depending on size and desirability of the order. State work on the market calls for about 300 tons.

Sheets.—Demand is only fair and prices are weaker. Current quotations are: No. 24 black, 3.50c.; No. 24 galvanized, 4.25c.; No. 10 blue annealed, 2.65c., all Seattle.

Warehouse Business.—A leading jobber reports that March was the best month his company has had in some time, but also states that the immediate outlook is not so good. Prices are firm, with the exception of sheets, which are weaker.

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Tees, bar sizes	3.25c.
Reinforcing bars	3.00c.
Blue annealed sheets (No. 10)	3.90c.
Black sheets (No. 24)	4.90c.
Galvanized sheets (No. 24)	5.65c.
Structural rivets, ½-in. and larger	5.50c.

Detroit

Automobile Production This Month Continues At High Rate of March

DETROIT, April 10.—There is no indication of an early change in automobile production from the peak activity which has characterized the operations in this industry for the past two months. In fact, March figures have indicated new high marks for several of the automobile companies.

The Ford Motor Co. has recently announced a production of 2000 cars a day, with a schedule of 5000 per day to be reached by July 1. The Ford company shipped 25,720 model A cars in March. Approximately 50,000 of these units have been built to date. Ford now has 15 assembly plants in full operation, in addition to the three large plants in this area, namely, Fordson, Highland Park and Lincoln. The Detroit plants are working 97,565 employees—64,379 at Fordson, 28,221 at Highland Park, and 4965 at Lincoln. The increase in Ford production is calculated to more than make up for any falling off in other quarters of the medium-priced field in the next three months.

Hudson-Essex shipped 91,500 units during the first quarter of this year, or about 1500 more than the estimate 30 days ago. This figure compares very favorably with that for 1927, which was 74,000.

Packard set up a new record, with 4428 units shipped during March, compared with 3366 units for the same month a year ago.

Hupp Motor Car Co. also established a new record, with 8034 units for the month. This was more than 1000 units above the estimated production 30 days ago. It compares with 4942 units for the same month in 1927. March production brings the total for the first quarter to 16,862 units, as against 11,803 in 1927. The Hupp Motor Car Co. entered the present month with 4000 unfilled orders.

Chevrolet completed March with 133,657 units, compared with 107,900 units for the same month a year ago, bringing the total for the first quarter to 342,184, or practically 75,000 units ahead of the first quarter of last year. The schedule for the current month contemplates 132,000 units.

Graham-Paige turned out 7623 units in March, bringing the total for the first quarter to 13,139.

Dodge production during March amounted to 26,895 cars and trucks, bringing the total for the first quarter to 60,387, compared with 46,566 in the first three months of 1927. April schedule contemplates a substantial increase over that of March. Approximately 6000 men have been added to the force of the Dodge Brothers plants since Jan. 1. The total now numbers 24,124.

Reo Motor Car Co. added a March production of 3549 cars and trucks—a substantial increase over February production of 2467 units. The Reo company entered April with 5000 unfilled orders, and has set a schedule of 6000 units for the month.

Cadillac and LaSalle production for March amounted to 4500 units, an increase of 20 per cent over February figures. The total first quarter production exceeded by 37 per cent the figure for the corresponding period of 1927.

Employment in Detroit continues to increase, the total gain for the past week amounting to a little more than 1000, and bringing the total to date to nearly 370,000.

There has been no change in the price of automotive steel, the price structure remaining firm. Blue annealed sheets are quoted at 2.10c. to 2.20c. base, Pittsburgh. Auto body sheets are quoted at 4.15c., Pittsburgh. Likewise, there has been no fluctuation in the alloy steel bar list.

The steady increase in industrial production has kept industrial construction active. The small structural shops are carrying a good volume of work. Structural bars, plates and shapes are quoted at 1.90c., Pittsburgh, for small lots and at 1.85c. on contracts.

There has been no change in the market on old material during the past two weeks. Dealers have sufficient orders to cover current production, which is on the highest basis for the year. No sales involving large tonnage have been made. Melters seem to be buying very close to their actual requirements. Prices are the same as were quoted in the March 29 issue.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Canada

Outlook Continues Good for Steel—Railroad Expansion in Prospect

TORONTO, ONT., April 10.—The outlook in the iron and steel industry of Canada for the second quarter is bright. Canadian mills are experiencing one of the best years since the war. Most of the mills are running close to capacity. Robert Dodds, chairman board of directors and president Lake Superior Corporation, and a director of the Algoma Steel Corporation, Sault Ste. Marie, Ont., announced that the Algoma Steel Corporation is now in the best position it has enjoyed in a great many years; that the net earnings of the company are running approximately $500,000 ahead of the corresponding period last year and that all indications point to this figure being increased to around $1,000,000 by the end of June.

The improvement in the steel industry is not confined to the Algoma Steel Corporation. The Dominion Iron & Steel Co., Sydney, N. S., has large orders on hand for rails and various other iron and steel products. The Steel Co. of Canada, Ltd., Hamilton, Ont., is running practically at capacity, and as its products are more diversified than the two companies mentioned, it has been even more favored than the others in securing new business. The programs of the Canadian National Railways and the Canadian Pacific are expected to result in even greater improvement in the steel industry before the end of the year.

Pig Iron.—Following the active buying movement of the past two or three weeks, during which many melters covered for second quarter needs, foundry and malleable pig iron sales declined somewhat during the week. Spot sales are holding at a high level, orders ranging from 100 to 200 tons. The higher melt by foundries is reflected in a stronger demand for foundry and malleable iron, but the low prices prevailing in the United States, together with the strong competition in Canadian markets from that quarter, are holding quotations in this country at a low level.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil, 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$24.50 to $25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Rails.—Hon. C. A. Dunning, Minister of Railways and Canals, informed the Railway Committee of the House of Commons that charters for 3233 miles of railway in Canada were being applied for by companies other than the Canadian National and Canadian Pacific. The cost of this mileage he estimated at about $173,000,000. In addition there are applications before the Provincial legislatures which bring the total mileage up to approximately 4400 miles, with an estimated cost of $242,000,000. This does not include equipment, which would make the total proposed expenditure approximately $300,000,000.

Old Material.—While sales on spot account are holding well up to those of former weeks, business as a whole declined somewhat during the past few days.

Old material prices are firm but unchanged in Montreal and Toronto markets.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Cincinnati

Pig Iron Sales Exceed 10,000 Tons—Sheet Prices Weaker

CINCINNATI, April 10.—For the first time in several months, pig iron sales during the past week exceeded 10,000 tons. However, three orders made up a large part of the total, so that the buying is not indicative of widespread consumer interest. In fact, the absence of important inquiries is noticeable and gives little encouragement to dealers who have been expecting a pick-up in bookings. Lake Erie furnaces are reported to be making quotations in this district which range from $16.25 to $16.75, base Cleveland, with somewhat irregular observance of silicon differentials. In the South, both Alabama and Tennessee makers are asking $16, base Birmingham, but are getting little business north of the Ohio River. At Ironton, furnace interests claim to be holding to a base price of $19, but concessions of as much as $1 a ton have been made to obtain tempting orders. It can safely be said that Ironton companies are moving little iron, and even if quotations are shaded their market is still seriously circumscribed by competition from northern Ohio furnaces. Jackson County silvery iron is steady at $25, base furnace, for 8 per cent. The largest pig iron sale of the week was 4000 tons of Southern foundry. Hamilton Coke & Iron Co., Hamilton, Ohio, expects to blow in its new furnace the second week in May. This furnace will supply hot metal to the open-hearth furnaces of the American Rolling Mill Co. at its East Side Works in Middletown.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—With the opening of the second quarter, there has been somewhat of a let down in the number of orders placed by sheet consumers, and concessions are being made by certain mills to get business. In galvanized stock, for instance, 3.65c., base Pittsburgh, is rapidly becoming the basis for transactions, even though some producers are still nominally adhering to 3.75c. Irregular quotations prevail throughout the South, where competition for the roofing trade is intense. Black sheets are being sold to large customers at 2.80c. and in some cases at 2.75c., but mills still are insisting upon small users paying 2.90c. A leading producer in this district has reduced automobile body sheets to 4c., blue annealed to large buyers to 2c. and black to 2.75c. On the two latter grades $2 a ton higher is asked for the ordinary run of business. The American Rolling Mill Co. reports that its four units are continuing to operate at 100 per cent of capacity. With the coming of mild weather there has been a revival of activities in structural steel, although sizable jobs are scarce. Small fabricators, however, are well pleased with the amount of work which they are obtaining. Sales of bars have been only fair, but specifications against old contracts have been large. Bars, structural shapes and plates are quoted at 1.85c. to 1.90c., base Pittsburgh. Common wire nails are being sold at $2.55 per keg, base Ironton, with a barge rate to this city of 14c., thus making a delivered price in Cincinnati of $2.69. Several Eastern sellers are holding to $2.65 per keg, base Pittsburgh, but cannot get desirable orders at that figure.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Reinforcing Bars.—The Pollak Steel Co. will furnish 500 tons of rail steel bars for the Broadway garage, this city, and a like amount for the new building of the Young Men's Christian Association in Dayton, Ohio. Joseph T. Ryerson & Son Co., Inc., has been awarded 800 tons of new billet bars for the Dayton Biltmore Hotel, Dayton, while bids are being taken on 300 tons of bars for a municipal sewage plant at Dayton. New billet bars are selling at 1.85c. to 1.95c., base Pittsburgh, and rail steel stock at 1.80c. to 1.85c., base mill.

Warehouse Business.—Orders are being received at a moderate rate by local jobbers. Structural steel is in fairly good demand, while bars and tank plates also are active. Prices are unchanged.

Coke.—Specifications for by-product foundry coke from foundries affiliated with the automobile industry have fallen off, and shipments in April are likely to be considerably less than in March. On the other hand, sales of domestic coke have been greatly stimulated by the sharp decline in prices, with the result that dealers are taking advantage of the opportunity. A consumer in this district has taken 2000 tons of Wise County foundry coke for delivery in this quarter. However, the demand for beehive foundry and furnace coke from the Wise County and New River sections has been light.

Foundry coke prices per net ton, delivered Cincinnati: By-products coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel has advanced 50c. a ton, but other items have not changed. Steel plants in the district are operating at a high rate and are accepting a normal amount of material on current contracts. Blast furnace and foundry grades, on the other hand, are slow. Railroads are offering unusually large lists this month, the Southern having 9000 tons, Louisville & Nashville, 14,000; Chesapeake & Ohio, 9400, and Norfolk & Western, 16,400. Included in the total tonnages are approximately 14,000 tons of rails.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.50 to 12.00

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Apr. 10	Apr. 9	Apr. 5	Apr. 4
Lake copper, New York	14.30	14.30	14.30	14.30
Electrolytic copper, N. Y.*	14.12½	14.12½	14.12½	14.12½
Straits tin, spot, N. Y.	52.00	52.50	52.75	53.12½
Lead, New York	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00
Zinc, New York	6.10	6.10	6.10	6.10
Zinc, St. Louis	5.75	5.75	5.75	5.75

*Refinery quotation; delivered price ¼c. higher.

New York, April 10.—Market activities have been slowed up both here and abroad by the Easter holidays. There were no markets here or in London on April 6 and 7 and also none in London yesterday, April 9. The markets generally are quiet and prices are firm.

Copper.—Buying, both for foreign and domestic consumption, is very light following the holidays and it has been so during all of the last week. A small amount of electrolytic copper has been obtainable at a slight concession from the ruling quotation of 14.25c., delivered in the Connecticut Valley, but it is likely that nothing can be bought today under the price maintained by leading producers. The quotation of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f. usual European ports. Following the heavy buying in March, a quiet but firm market is anticipated for the immediate future. Lake copper is only moderately active but firm at 14.30c., delivered.

Tin.—With London closed part of the week, the market here has been much quieter and sales have been lighter. The total for the past week was about 700 tons, half of which was taken by consumers. The market generally is featureless. There is, however, one factor hanging over it. It is expected that, because shipments of Banca tin have been so small the past three months, the quantity accumulated will begin to come out this month and the question arises whether the market can take care of it. Prices both here and in London are down from a week ago because of lack of demand and to the Banca situation. In London spot standard today is quoted at £235 7s. 6d., future standard at £235 15s. and spot Straits at £239 7s. 6d. The Singapore price today was £240 5s. Spot Straits tin at New York today was quoted at 52c. in a weak market because of lack of demand. Arrivals thus far this month have been 2735 tons with 5120 tons reported afloat.

Lead.—Buying previous to the holidays was large, but yesterday and today the market has been fairly quiet. The quotation of the leading interest remains unchanged at 6.10c., New York, as its contract price. In the outside market some sales have been made in the East as high as 6.15c. The quotation at St. Louis is firm at 6c. Very little activity is reported from that district.

Zinc.—With consumers of prime Western zinc well covered for nearby needs and with producers not anxious to do business, the market is quiet and the quotation has been firm for the week at 5.75c., St. Louis, or 6.10c., New York. Ore at Joplin was unchanged at the close of last week at $38 per ton, with production still fairly low at about 9500 tons and sales larger than production at close to 11,000 tons. Distress metal, which was pressing on the market in March, is believed to have been practically all absorbed.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c. with the metal in the form of shot at 36c. and with electrolytic nickel at 37c. a lb.

Antimony.—Chinese metal for all positions is a little higher and is quoted at 9.62½c. to 9.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, April 10.—This market is quiet. Prices for tin are down while quotations on lead and zinc have

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c. to 55.50c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.00c.
Tin, bar	61.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.00c. to 9.50c.
Zinc sheets, open	10.00c. to 10.50c.

Non-Ferrous Rolled Products

Mill prices on copper sheets, copper wire and copper in rolls have been advanced ¼c. and are now quoted at 23c., 16c. and 22c., respectively. Bronze and brass products, lead full sheets and zinc sheets have not changed.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Zinc	8.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	16.00c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz and heavier	25.00c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

advanced. Prices for old metals are unchanged in a dull market.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 54c.; lead, 6.15c.; zinc, 5.85c.; in less-than-carload lots, antimony, 11.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

New York Office Building Will Require 17,000 Tons—Awards Decline to 32,000 Tons

AN office building in New York which will take 17,000 tons brought the total of new projects reported during the week to 37,200 tons. Lettings amounted to 32,000 tons, the largest being 8000 tons for a bridge across the Delaware River at Tacony, Pa., 6000 in bridges for the Chicago & North Western Railroad and 7000 tons for miscellaneous projects in New York. Awards follow:

BOSTON, 100 tons, post office garage to New England Structural Co.

LAWRENCE, MASS., 150 tons, highway bridge, to New England Structural Co.

NEW YORK, 13,500 tons reported to the Structural Steel Board of Trade; 7000 tons in the following awards not previously reported: National City Bank at Jamaica, L. I., factory building for Consolidated Safety Pin Co. at Bloomfield, N. J., and building for Starlight Amusement Park on 177th Street, to McClintic-Marshall Co.; office building at 666 Fifth Avenue, column cores for building at Canal and Hudson Streets, column cores for building at Varick and Dominick Streets and alteration for Borden Building at Hollis, L. I., to Levering & Garrigues Co.; tenement building at 148 East Fiftieth Street, to Hay Foundry & Iron Works; office building at Church and Worth Streets, to Harris Structural Steel Co., and loft building at Fifth Avenue and Twenty-ninth Street, to Post & McCord, Inc.

NEW YORK, 1065 tons, apartment building at Park Avenue and Eighty-third Street, to Easton Structural Steel Co.

NEW YORK, 200 tons, pier No. 34, North River, to McClintic-Marshall Co.

NEW YORK CENTRAL RAILROAD, 125 tons, bridge, to American Bridge Co.

ORANGE COUNTY, N. Y., 200 tons, State highway bridge, to American Bridge Co.

PENNSYLVANIA RAILROAD, 125 tons, bridge in Indiana, to American Bridge Co.

LOCK HAVEN, PA., 250 tons, high school, to Shippers Car Line Corporation.

WILLIAMSPORT, PA., 300 tons, Y. W. C. A., to McClintic-Marshall Co.

PHILADELPHIA 8000 tons, Tacony-Palmyra bridge, to American Bridge Co.

CAMDEN, N. J., 250 tons, plant for Campbell Soup Co., to McClintic-Marshall Co.

McKEES ROCKS, PA., 100 tons, church, to Pittsburgh-Des Moines Steel Co.

NEW CASTLE, PA., 400 tons, Shenango Motor Co. building, to Guibert Steel Co.

WILKENSBURG, PA., 500 tons, office building, to American Bridge Co.

OXFORD, OHIO, 100 tons, grandstand, to Pittsburgh-Des Moines Steel Co.

CANTON, OHIO, 200 tons, stripper building for Timken Roller Bearing Co., to McClintic-Marshall Co.

WILMINGTON, N. C., 2100 tons, bridge, to Vincennes Bridge Co.

DETROIT, 250 tons, building for Finsterwald Furniture Co., to Massillon Bridge & Structural Co.

STATE OF MICHIGAN, 300 tons, three highway bridges, to Massillon Bridge & Structural Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

CHICAGO, 260 tons, building for W. F. McLaughlin Co., to American Bridge Co.

CHICAGO & NORTH WESTERN RAILROAD, 6000 tons, bridges; 5400 tons, to American Bridge Co., and 600 tons, to Clinton Bridge Works, Clinton, Iowa.

CHICAGO, 1100 tons, building for Chicago Motor Club, to American Bridge Co.

CHICAGO, 4000 tons, building for Palmolive Peet Co., to American Bridge Co.; previously reported to unnamed bidder.

SAUKVILLE, WIS., 200 tons, State highway span over Milwaukee River, to Worden-Allen Co.

OGDEN, UTAH, 600 tons, train sheds, to Omaha Steel Works.

RENO, NEV., 200 tons, office building, to California Steel Co.

PORTLAND, ORE., 800 tons plates, three lightships for Government, to Albina Marine Engine Works.

GLENDALE, CAL., 650 tons, school buildings, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

FITCHBURG, MASS., 175 tons, theater.

LEOMINSTER, MASS., 150 tons, theater.

BOSTON, 200 tons, New York, New Haven & Hartford Railroad freight station.

BOSTON, 175 tons, theater on Hanover Street.

STATE OF NEW HAMPSHIRE, 500 tons, highway bridges.

NEW YORK, 17,000 tons, Reynolds office building at Lexington Avenue and Forty-second Street.

NEWARK, N. J., 1800 tons, bridge for Lehigh Valley Railroad.

NEW BRUNSWICK, N. J., 400 tons, arch centers for reinforced concrete bridge; bids in on general contract.

ALLENTOWN, PA., 280 tons, arch centers for reinforced concrete bridge; general contract to Seeds & Durham, Germantown, Pa.

WILMINGTON, DEL., 800 tons, highway bridge.

BALTIMORE, 400 tons, St. Mary's Seminary.

CHARLESTON, W. VA., 1700 tons, office building and bank.

WILMINGTON, N. C., 500 tons, electric station for Phoenix Utility Co.

BUFFALO, 750 tons, Buffalo Forum, ice skating rink; bids April 20.

CINCINNATI, 300 tons, St. Gregory's Seminary.

CLEVELAND, 1000 tons, Lake Shore Hotel.

PORTAGE, WIS., 350 tons, Wisconsin Street lift span over Government canal; bids about May 15, J. T. Henton, County highway commissioner.

CHICAGO, 250 tons, addition to Revell Building.

CHICAGO, 110 tons, power house for Chicago, Burlington & Quincy Railroad; American Bridge Co., low bidder.

CHICAGO, 3000 tons, 24-story apartment building.

CHICAGO, 1000 tons, office building at LaSalle and Lake Streets.

STATE OF ILLINOIS, 900 tons, highway bridges at Florence, Ingleside and Willow Springs.

NEW ORLEANS, 3100 tons, wharf sheds at Girod and Poydras Streets.

SAN DIEGO, CAL., 400 tons, seaplane hangar.

CRESCENT CITY, CAL., 600 tons, cantilever bridge.

HERMON, CAL., 900 tons, bridge.

OAKLAND, CAL., 350 tons, hangars for City Port Commission; Moore Drydock Co., low bidder.

LOS ANGELES, 150 tons for city work; McClintic-Marshall Co., low bidder.

Rolling mill machinery of the cluster type will be supplied by the E. W. Bliss Co., Brooklyn, to the Hirsch-Kupfer & Messingwerks, of Germany, in whose interest Messrs. Hirsch, Mata, Loewenstein and Seeger have been touring the United States, inspecting latest improvements in rolling mill equipment.

REINFORCING STEEL

New Projects Will Take 9300 Tons, With 5000 Tons in Illinois Sewer Job

WITH 5000 tons for a sewer project at Stickney, Ill., and 2000 tons for road work in the same State, about 9300 tons of reinforcing steel was added to pending work in the last week. Lettings amounted to 4300 tons, the largest of which was 1100 tons for road work in Illinois. Awards follow:

Cincinnati, 500 tons, Broadway Garage, to Pollak Steel Co.
Dayton, Ohio, 500 tons, Young Men's Christian Association building, to Pollak Steel Co.
State of Illinois, 1100 tons of rail steel bars for road work; 600 tons to Calumet Steel Co., 400 tons to Republic Iron & Steel Co., and 100 tons to Truscon Steel Co.
Chicago, 140 tons of rail steel bars, apartment building at 440 Barry Avenue, to Calumet Steel Co.
Chicago, 100 tons of rail steel bars, grain elevator, to Inland Steel Co.
Chicago, 200 tons of rail steel bars, office building at 30 West Washington Street, to Inland Steel Co.
Chicago, 100 tons of rail steel bars, apartment building at Deming and Geneva Streets, to Inland Steel Co.
Chicago, 190 tons, garage at Greenview and Greenwood Avenues, to unnamed bidder.
National City, Ill., 115 tons, additions to building at National Stock Yards, to Laclede Steel Co.
St. Louis, 250 tons, Mark Twain Hotel, to Laclede Steel Co.
Los Angeles, 663 tons, for city of Los Angeles, to Blue Diamond Co.
Riverside, Cal., 120 tons, Victoria Avenue bridge, to unnamed bidder.
San Francisco, 110 tons, Produce Building, to W. S. Wetenhall Co.
Seattle, Wash., 200 tons, Stimson Building, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Dayton, Ohio, 300 tons, municipal sewage plant.
Stickney, Ill., 5000 tons, sewer project.
Springfield, Ill., 2000 tons, State road work.
Aurora, Ill., 350 tons, reservoir.
Evanston, Ill., tonnage not stated, apartment building; Hall, Radcliff & Lawrence, architects.
Evanston, tonnage being estimated, Young Men's Christian Association building.
Los Angeles, 5257 tons, Drainage Improvement District No. 23; Will F. Peck, low bidder on general contract.
San Francisco, 212 tons, Kezar stadium; bids opened.
Seattle, Wash., 1000 tons, warehouse for Peck & Hills Furniture Co.; bids being taken.
Seattle, 420 tons, warehouse for William Volker; bids being taken.

Steel Corporation's Unfilled Orders Declined in March

Unfilled orders on the books of the United States Steel Corporation declined moderately in March. The total on March 31 was 4,335,206 tons, a decrease of 62,983 tons from the 4,398,189 tons on Feb. 29. In February there was a gain of 122,242 tons, the fifth month in succession. A year ago in March the unfilled orders were 3,553,140 tons. The following table gives the unfilled tonnage by months, commencing with January, 1926:

	1928	1927	1926
Jan. 31.......	4,275,947	3,800,177	4,882,739
Feb. 28.......	4.398,189	3,597,119	4,616,822
Mar. 31.......	4,335,206	3,553,140	4,379,935
April 30.......	....	3,456,132	3,867,976
May 31.......	....	3,050,941	3,649,250
June 30.......	....	3,053,246	3,478,642
July 31.......	....	3,142,014	3,602,522
Aug. 31.......	....	3,196,037	3,542,335
Sept. 30.......	....	3,148,113	3,593,509
Oct. 31.......	....	3,341,040	3,683,661
Nov. 30.......	....	3,454,444	3,807,447
Dec. 31.......	....	3,972,874	3,960,969

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

The Carnegie Steel Co. will add a 16-stand 10-in. electrically driven merchant mill to its McDonald, Ohio, group for rolling cotton ties and narrow strips. An identical mill is to be built by the Tennessee Coal, Iron & Railroad Co. at Fairfield, Ala.

RAILROAD EQUIPMENT

St. Paul Road Buys 4450 Freight Cars—Texas & Pacific Inquires for 20 Locomotives

PLACING of 4450 freight cars by the Chicago, Milwaukee, St. Paul & Pacific and of 600 steel underframes for refrigerator cars by the Pacific Fruit Express were the outstanding transactions of the railroad equipment market in the last week. The Texas & Pacific has inquired for 20 locomotives. Details of the week's business follow:

Chicago, Milwaukee, St. Paul & Pacific has placed orders for 4450 freight cars distributed as follows: 500 box cars with Pressed Steel Car Co.; 1250 box cars with Bettendorf Co.; 500 box cars with General American Car Co.; 250 box cars with Pacific Car & Foundry Co.; 500 hopper cars with Standard Steel Car Co.; 500 hopper cars with Pullman Car & Mfg. Corporation; 650 stock cars with Ryan Car Co., and 300 automobile cars with American Car & Foundry Co. With the 200 ore cars reported purchased last week, this road's original inquiry has been entirely acted upon.

Pacific Fruit Express has ordered 600 steel underframes for refrigerator cars from American Car & Foundry Co. to be used for building cars in its own shops.

Egyptian State Railways are inquiring for 320 low-side gondola cars of 10 tons' capacity.

Detroit, Toledo & Ironton will purchase two baggage mail and two passenger coaches.

Pennsylvania Railroad is considering reviving its inquiry for 300 passenger train refrigerator cars.

Atchison, Topeka & Santa Fe has ordered 15 locomotive tenders from Baldwin Locomotive Works.

Texas & Pacific has made inquiry for 15 2-10-4-type and five Mountain-type locomotives.

Dominion Coal Co. has ordered one Mogul-type and one Mikado-type locomotives from American Locomotive Co.

Akron, Canton & Youngstown has ordered two Mikado-type locomotives from Lima Locomotive Works, Inc.

San Francisco Iron and Steel Market

(*Concluded from page* 1047)

mosa Beach, Cal. Bids were opened on 127 tons of 6-in. class B for the improvement of Washington Street, Riverside, Cal. Los Angeles has opened bids on 234 tons of 24-in. class B pipe and Monrovia, Cal., will open bids on April 16 for 2764 tons of 4 to 16-in. class B and 20-in. class A pipe.

Standard Pipe.—H. G. Cult, Brighouse, B. C., took 510 tons of 4 and 6-in. seamless pipe for Brighouse, B. C. The Pacific Gas & Electric Co., San Francisco, placed 2600 tons of 8 to 36-in. standard pipe with an Eastern producer. Monrovia, Cal., will take bids on April 16 for 710 tons of 4 to 20-in. lapweld pipe dipped and wrapped. Bids have been opened on 125 tons of 2 to 8-in. pipe for Armona, Cal.

Rails.—The Seattle Municipal Railway is taking bids on 200 tons of 80 lb. rail. No other inquiries of importance are before the trade for figures at the moment.

Coke.—Demand for coke is spotty and few inquiries or sales of size are noted. Another shipment of English beehive and by-product coke is en route to the Coast and will arrive about May 6. This vessel has 4500 tons aboard and the bulk of the shipment will be distributed between Los Angeles and San Francisco foundries.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes............	3.15c.
Soft steel bars..........................	3.15c.
Small angles, 3/16-in. and over............	3.15c.
Small angles, under 3/16-in................	3.55c.
Small channels and tees, ¾-in. to 2¾-in..	3.75c.
Spring steel, ¼-in. and thicker..........	5.00c.
Black sheets (No. 24)....................	4.95c.
Blue annealed sheets (No. 10)............	3.90c.
Galvanized sheets (No. 24)...............	5.50c.
Structural rivets, ½-in. and larger......	5.65c.
Common wire nails, base per keg.........	$3.40
Cement coated nails, 100-lb. keg.........	3.40

PERSONAL

C. M. EASTERLY

Charles M. Easterly, whose resignation as vice-president of the Inland Steel Co. of Wisconsin, Milwaukee, and district manager of the Inland company at that city, was mentioned in THE IRON AGE last week, will now devote his entire time to the Capital City Culvert Co., Madison, Wis., of which he is president and majority stockholder. He will remove his headquarters to Madison. Mr. Easterly was district sales manager for the Inland Steel Co. for 18 years and previously represented the Berger Mfg. Co., Canton, Ohio, and the Stark Rolling Mill Co., also of Canton, now divisions of the Central Alloy Steel Corporation.

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O. W. Irwin has been appointed manager of the steel joist department of the Truscon Steel Co., Youngstown, succeeding John Bowditch, Jr., who has resigned to locate in Pittsburgh. Mr. Irwin has been in the sales department of the Truscon company for many years.

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Ralph N. Sourbeck, recently sales engineer with the Clarkson Coal & Dock Co., Cleveland, has become associated with the Cleveland Duplex Machinery Co., Inc., Cleveland, and will be in charge of its surplus machinery department. In his new capacity he will purchase and liquidate industrial plants and supervise the rebuilding of machine tools.

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Robert Weatherly, assistant sales manager of the Federal Abrasives Co., Birmingham, has been appointed sales manager of that company and other subsidiaries of the Federal Electrochemical Co., namely the Federal Phosphorus Co., the Federal Carbide Co. and the Southern Manganese Corporation. His headquarters will be at the Birmingham offices of these companies. S. D. Crenshaw, Jr., and H. P. Walmsley have been appointed assistant sales managers of the Federal Abrasives Co., and will maintain headquarters at Birmingham and Philadelphia, respectively.

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Charles E. Ahl, formerly with the Vesuvius Crucible Co., now is associated with J. B. Booth & Co., Pittsburgh. This company represents Hiram Swank's Sons, Johnstown, Pa., refractories manufacturers, in the Pittsburgh district, and Mr. Ahl will devote his time to the sale of its products.

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William C. Smith, manager of the Fulton, N. Y., plant of the McHenry-Millhouse Mfg. Co., has been elected a vice-president of the company and will continue in charge of the plant.

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Henry Sears Hoyt, of A. Milne & Co., 745 Washington Street, New York, steel and iron merchants, sailed for Havana, Cuba, on April 6 and will visit his firm's distributers in that country.

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F. P. Walsh has been appointed manager of the crane department, and R. H. Moore, manager of the foundry equipment department of the Whiting Corporation, Harvey, Ill.

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Edwin B. Peet, who was associated with the E. W. Bliss Co., Brooklyn, several years ago, has returned to that company and will devote himself principally to the sale of can making machinery and allied products.

Virgil Jordan, chief economist of the National Industrial Conference Board, New York, will be the principal speaker at the monthly luncheon and business meeting of the Credit Association of the Building Trades of New York at the Hotel McAlpin in that city on Tuesday, April 24.

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W. H. Graham is in charge of a district sales office which has been opened at 1 East Forty-second Street, New York, by the Graham Bolt & Nut Co., Pittsburgh. His territory will include metropolitan New York and New England.

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M. L. Northrup, New England manager of the Warren Foundry & Pipe Co., Phillipsburg, N. J., is back at his office in Boston, after an extended rest in Florida following an operation.

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A. H. McDougall, vice-president Whiting Corporation, Harvey, Ill., will speak at a meeting of the St. Louis District Foundrymen's Club at the Missouri Athletic Association on April 17, his subject being "Cupola Practice." H. R. Cutting, Carondelet Foundry Co., St. Louis, will lead a discussion of the work done recently at Pittsburgh toward the establishment of a research group on gray iron foundries.

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Tom D. Taylor, metallurgist Bliss & Laughlin Steel Corporation, Harvey, Ill., addressed the monthly meeting of the Indianapolis chapter of American Society for Steel Treating, April 9, on the subject of "Cold Drawn Steels."

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Joseph H. Jeffcott has recently become associated with the Vulcan Mold & Iron Co., Latrobe, Pa., in the sales and service department, taking the place of Thomas Windsor Evans, resigned. Mr. Jeffcott has been connected with the iron and steel industry for the past 20 years in both operating and sales capacities. His early experience was in the ingot mold foundry of the Bethlehem Steel Co., where he later was in charge of the Lower Works open-hearth department. He has also been connected with the Donner Steel Co., Buffalo, as open-hearth superintendent and more recently with the Jones & Laughlin Steel Corporation, Pittsburgh, at its Soho plant.

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D. E. McLaughlin, formerly vice-president, was elected president of the Pacific Coast Steel Co., San Francisco, at the annual meeting of stockholders. He succeeds the late Judge E. M. Wilson. William Pigott was named chairman of the board of directors, E. S. Houdlette and T. S. Clignan were elected vice-presidents and William Pigott, Jr., was reelected secretary-treasurer.

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C. B. S. Jackson, for the last six years superintendent of the Norton Iron Works, Ashland, Ky., has been appointed superintendent of the Texas Nail & Wire Mfg. Co., Galveston, Tex.

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Harry Woodhead has been appointed general manager of the Cleveland plant of the Truscon Steel Co., Youngstown, Ohio. This was formerly the East Side plant of the Hydraulic Pressed Steel Co. and will be known as the Hydraulic Pressed Steel Division of the Truscon Steel Co. Mr. Woodhead had been with the Hydraulic company for several months and was previously connected with the Midland Steel Products Co., Cleveland, and the A. O. Smith Corporation, Milwaukee.

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H. K. Ferguson, president H. K. Ferguson Co., Cleveland, has been elected president of the University Club of that city.

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Dudley V. Walker, sales agent Vulcan Iron Works, New Britain, Conn., has been made general manager of the Malleable Iron Works, New Britain, succeeding Frank Miller.

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Marcus Chase has resigned as manager of the Boston office of the Niles-Bement-Pond Co. He has been associated with the company for approximately 30 years.

M. S. Bradley, who has been with the company for 15 years, is acting manager. W. S. McCormick has resigned as manager of the Pittsburgh office of the Niles company, and P. C. McBeth is acting manager.

F. F. Harter has been appointed district sales manager for New York and eastern Pennsylvania of the Cyclops Steel Co., Titusville, Pa., and the Universal Steel Co., Bridgeville, Pa. His headquarters for the present will be at the office of the Cyclops company at Titusville.

O. W. Young, formerly in the western division sales office of the Hyatt Roller Bearing Co., Chicago, has been appointed chief engineer and will be located at the company's headquarters in Newark, N. J. He joined the Hyatt company in 1915 as sales engineer, serving in that capacity for several years. He then took charge of all engineering activities of the western division, and during the last two years was assistant manager in charge of sales to the tractor and agricultural equipment industry.

Philip Stremmel, who has been acting superintendent of the Granite City Steel Co., Granite City, Ill., has been made general superintendent.

George L. Meyer, Jr., for a number of years purchasing agent of the Stewart-Warner Speedometer Corporation, Chicago, has been put in charge of production and will retain supervision over purchases of the company.

Charles R. McGrail has been appointed metallurgist and chemist at the Sheffield Works of Fairbanks, Morse & Co., Three Rivers, Mich.

E. C. Smith, assistant general superintendent of the Central Alloy Steel Corporation, Massillon, Ohio, spoke before the Hartford, Conn., chapter of the American Society for Steel Treating on April 10, on the manufacture and application of high grade automotive alloy steels.

William S. McCormick, who resigned recently as Pittsburgh sales manager for the Niles Tools Works Co., Hamilton, Ohio, and the Pratt & Whitney Co., Hartford, Conn., is now Western sales representative for Leeds, Tozzer & Co., Inc., 75 West Street, New York.

H. W. Kent has resigned as president of the Todd Drydocks, Inc., Seattle, and will devote his time to private interests. He will continue as a director of the Todd company.

George T. Aitken has been appointed manager of industrial sales for the Peden Iron & Steel Co., Houston, Tex. He was formerly associated with Fairbanks, Morse & Co. at Indianapolis and previously had been sales manager of the Vonnegut Machinery Co., Indianapolis.

R. L. Rickwood, supervisor of design for the Cincinnati Bickford Tool Co., Cincinnati, has resigned to become mechanical superintendent of the Cincinnati Enquirer Building. He will be succeeded by Thomas Addison, formerly of the Cincinnati Planer Co.

H. C. White has been appointed works manager for the Western Harvester Co., Stockton, Cal. He had had charge of the plant when it was operated by the Holt Mfg. Co.

W. R. Bean, president Grindle Fuel Equipment Co., Harvey, Ill., will speak at the monthly meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, Monday evening, April 16. "Metallurgical Problems in the Malleable Iron Foundry" will be his subject.

J. W. Innes, recently superintendent of the Kelvinator Co. of Canada, Ltd., has been added to the Toronto sales staff of the Arthur Jackson Machine Tool Co., Toronto, and will cover the Hamilton and Niagara peninsula district in Ontario.

C. A. Wieselthier, purchasing agent for the St. Louis Gas & Coke Corporation, Granite City, Ill., has had his duties expanded to include the purchase of raw materials. Since 1921 raw materials purchases have been made in Chicago under the direction of F. R. Johnson.

President James A. Farrell of the United States Steel Corporation will make the closing address at the fifteenth National Foreign Trade Convention which will be held at Houston, Texas, on April 25, 26 and 27. His subject will be "Foreign Trade Progress." Another feature of the convention program will be an address by E. P. Thomas, president United States Steel Products Co., on "The Foreign Trade Outlook."

Robert Leroy Fatzinger, Carnegie Steel Co., Duquesne, Pa.; Charles B. Francis, Carnegie Steel Co., Pittsburgh; Frank Edward Goeckler, Midvale Co., Philadelphia, and George Thomas Motok, Carnegie Institute of Technology, Pittsburgh, will become members of the Iron and Steel Institute at the annual meeting in London, May 3.

OBITUARY

John Sommer, vice-president and a director and one of the founders of the Keystone Steel & Wire Co., Peoria, Ill., and president of the Mid-States Steel & Wire Co., Crawfordsville, Ind., died on April 7, aged 62 years. He was born at Morton, Ill., and spent his boyhood at that place and at Tremont, Ill. In 1889 he became associated with his father and brother in the manufacture of wire fence at Tremont. The business was removed to Peoria in 1895. In 1901 Mr. Sommer took up his residence at Tremonton, Utah, on account of ill health, where he remained until 1915. Since returning to Peoria he has been prominent in the management of the Keystone company and last year was active in the formation of the Mid-State Steel & Wire Co., organized by a merger of the Crawfordsville Wire & Nail Co., the Dwiggens Fence Co. and the Adrian Wire Fence Co. Two brothers, B. L. and W. H. Sommer are president, and vice-president and general superintendent, respectively, of the Keystone company.

Leroy Pardee Needham, district manager at Chicago for Wheelock, Lovejoy & Co., Inc., Cambridge, Mass., died on March 24 at the Wesley Hospital, Chicago, following an operation. He was born at Coatesville, Pa., in 1890 and was graduated in civil engineering from Pennsylvania State College in 1915. He became associated with Wheelock, Lovejoy & Co., at Cleveland in 1916 and was identified with the sales department of that branch until 1920 when he was made Chicago district manager. During the war he served as an inspector of steels in the Ordnance Department. He was a member of the American Society for Steel Treating.

Robert W. Freeland, works manager Hubbard Steel Foundry Co., East Chicago, Ind., died at Hammond, Ind., on April 5, of pneumonia. He was graduated from the Carnegie Institute of Technology in 1913 and immediately became associated with the American Steel Foundries, Chicago, as a special apprentice. In 1918 he became manager of the steel foundry of the Edgewater Steel Co., Verona, Pa., and in 1920 served as cost accountant of the Steel Founders' Society of America. He had been with the Hubbard company since 1921.

George E. Titcomb, vice-president McMyler Interstate Co., Bedford, Ohio, and for years prominently identified with the material handling equipment industry, died April 1. He was connected for a number of years with the Link-Belt Co., Chicago, and became chief engineer of that company. Later he became affiliated with the McMyler Interstate Co. as its Eastern sales manager in New York and in 1925 became its vice-president. He contributed to the successful development of bridge and gantry cranes, car dumpers and coal and ore handling equipment. He was a member of the American Society of Mechanical Engineers.

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MATT BRODIE, for the last 10 years manager of the Asiatic business of the Sullivan Machinery Co., Chicago, with headquarters at Tokio, Japan, died on March 25. He was graduated from the Massachusetts Institute of Technology in 1902 and became associated with the Sullivan company as manager of its Salt Lake City, Utah, office. He was then assigned to foreign duty and for eight years was located in Australia where he organized and conducted the company's Sydney office. In 1916 he was placed in charge of the company's interests in Russia, having left that country after the revolution to take over the company's Asiatic sales.

Wrought Iron Research Association Formed

PITTSBURGH, April 10.—The Wrought Iron Research Association came into existence at a meeting of representatives of the leading manufacturers of wrought iron from various parts of the country at the Duquesne Club here last week. The principal aim of the organization is to gather and disseminate information about wrought iron. The members of the association are the American-Swedo Iron Co., Philadelphia; the Burden Iron Co., Troy, N. Y.; A. M. Byers Co., Pittsburgh; the Cohoes Rolling Mill Co., Cohoes, N. Y.; the Ewald Iron Co., Louisville, Ky.; the Glasgow Iron Co., Philadelphia; the Highland Iron & Steel Co., Chicago; Hughes & Patterson, Philadelphia; the Logan Iron & Steel Co., Philadelphia; the Lockhart Iron & Steel Co., Pittsburgh; the Penn Iron & Steel Co., Creighton, Pa.; the Pittsburgh Forge & Iron Co., Pittsburgh; the Reading Iron Co., Reading, Pa., and the Ulster Iron Works, Dover, N. J.

The executive committee consists of George O. Boomer, vice-president Ewald Iron Co.; Frank W. Hamilton, president Ulster Iron Works; J. M. Gillespie, vice-president Lockhart Iron & Steel Co.; L. M. Johnston, vice-president A. M. Byers Co.; Snowden Samuel, secretary American-Swedo Iron Co.; L. E. Thomas, president Reading Iron Co., and William C. Wolfe, manager of sales Highland Iron & Steel Co. L. M. Johnston was elected president, and Snowden Samuel, secretary-treasurer of the association. Headquarters will be in Pittsburgh.

Study of Distribution Costs Suggested for Simonds Essays

"How Can the Costs of Distribution Be Reduced?" was chosen by 64 out of 138 economists and business men as the best subject for the Simonds prize essay competition for 1928. "To stimulate economic thinking and to increase general economic intelligence," Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., is offering prizes of $1,000 and $500 respectively for the best two essays on an economic subject.

To select a subject for the essays Mr. Simonds submitted a list of six tentative topics to 210 leading economists and business men, asking them to indicate their preference or to suggest some other subject. Of 138 replies received thus far, nearly one-half chose the subject of distribution costs. The next highest number of votes, 26, was cast for the topic, "Is Advertising Costing the Consumer Too Much?" Seventeen indicated a preference for "Can the Purchasing Power of the Dollar Be Stabilized?" Sixteen votes were divided among the three remaining topics, and 15 replies suggested other subjects.

Standard Trade Customs in Steel Foundry Industry

As a guide in governing the operations of its membership, the Steel Founders' Society of America, 511 Magee Building, Pittsburgh, has issued a list of standard trade customs. These are 20 in number and cover both internal and external matters. They form a notable collection of trade data, the definite acceptance and use of which should be of great value to the industry. The list follows:

1.—When purchasers ask for quotations they should give the actual or estimated rough weights of the castings upon which quotations are to be based.

2.—Unless otherwise arranged, quotations should be accepted and pattern equipment furnished to the foundry by the purchaser within 30 days from the date of such quotations.

3.—Unless otherwise specified, castings are sold as unmachined castings, f.o.b. the foundry. Terms of sale are net cash 30 days from date of invoice. No cash discounts are allowed.

4.—Pattern equipment should be in proper condition and of a type suitable for the economical production of castings of the quality, quantity and delivery required.

5.—Before patterns are made, the purchaser should submit blue prints to the foundry that is to make the castings, to obtain suggestions concerning the best method for constructing the pattern equipment.

6.—When the purchaser furnishes skeleton patterns, coreboxes, sweeps or conjunction patterns which increase the cost of production of castings, an extra charge will be made.

7.—Patterns should be painted in accordance with the following standard practice:

> Surfaces to be left unfinished are to be painted black.
> Surfaces to be machined are to be painted red.
> Seats of and for loose pieces are to be red stripes on a yellow background.
> Core prints and seats for loose core prints are to be painted yellow.
> Stop-offs are to be indicated by diagonal black stripes on a yellow base.

8.—Patterns, coreboxes and loose pieces thereof shall be properly marked for identification.

9.—Alterations and repairs on pattern equipment shall be paid for by the customer.

10.—The foundry shall not be responsible for loss of, or damage to pattern equipment when caused by fire or other causes beyond its control.

11.—The foundry shall not be expected to provide storage for patterns for which no orders have been received during a period of two years.

12.—All transportation charges on pattern equipment to and from the foundry shall be paid by the customer.

13.—Unless requested in writing, changes in orders will not be accepted by the foundry.

14.—To be effective, cancellation of orders must be mutually agreed to by the foundry and the customer.

15.—After the original order is in production the customer shall reimburse the foundry for castings made or for molds or cores discarded by the foundry due to cancellation, changes in orders or alterations in pattern equipment.

16.—The foundry shall not be liable for damages due to failure to make delivery of castings when such delay is caused by fire, strikes, accidents or other and additional causes beyond the foundry's control.

17.—Claims for errors in weight or in number of castings received shall be made by the customer within 10 days after the receipt of the castings.

18.—The foundry shall not be responsible for machine work or other expense incurred on castings which are later rejected as defective.

19.—The foundry has the right to replace castings rejected by the customer as defective.

20.—The foundry shall not be liable for any special, indirect or consequential damages whatsoever, in connection with any castings it furnishes.

To Add Normalizing Furnaces

The Newton Steel Co., Newton Falls, Ohio, has ordered from the Rust Engineering Co., Pittsburgh, two additional Kathner-type roller bottom sheet normalizing furnaces, 155 ft. long. These will be the same in practically all regards as the two furnaces recently completed, with the exception that one will be 84 in. wide instead of 72 in., which is the width of the other three. The Kathner-type shafts and disks will be supplied by the Duraloy Co. In the Kathner design of shaft, the entire alloy hub and disk is protected from cooling effect, since the water-cooled shaft upon which it is mounted is completely insulated.

Machinery Markets and News of the Works

MACHINERY BUYING FAIR

April Starts Out Less Actively Than March But Outlook Is Good

Almost Total Absence of Railroad Buying—Automobile Parts Manufacturer Seeks About 30 Used Tools

SALES records for March among machine tool builders were quite generally larger than those of either of the two preceding months this year, so that it would not be surprising if April sales were slightly below last month's. However, some manufacturers expect that the total for the month, based on the present outlook, will not be far from 85 to 90 per cent of the March totals. In the first week of April a few manufacturers bettered their March record for the same number of days.

Automobile manufacturers have to a considerable extent satisfied their needs of new equipment for the high production rate at which they are now engaged, but an outstanding inquiry from this field is for 30 or more used tools wanted by a Michigan maker of automobile parts. The Dana Mfg. Co., Toledo, Ohio, continues to buy for the manufacture of shock absorbers for Ford automobiles.

Railroad buying is conspicuously small; in fact, there is an almost total absence of important business in this field. The list of the Union Pacific, on which the Chicago trade has submitted quotations, totals in value about $200,000. The Rock Island is expected to come into the market shortly. Meanwhile, no action has been taken on the pending inquiries of the Santa Fe.

New York

New York, April 10.

THE first week of April has brought no falling off in orders for machine tools as compared with the average weekly sales in March. Considerable business is pending and, with the general improvement that has come in several lines of manufacture in the past month, the outlook is promising that orders will result this month. Railroad demand, particularly for heavy tools, remains conspicuously dull, but the general inquiry for light and medium-size tools leaves little to be desired. Prices of shapers have been advanced about 10 per cent.

Among the week's sales were the following: A hob and cutter grinder to a manufacturer in Wisconsin; Pratt & Whitney No. 2 jig borer to a Cleveland company; also a No. 2 jig borer to a Michigan company and another to a tool and die company in Detroit; 13-ft. deep-hole drilling machine to a Detroit automobile company; No. 0 Sigourney drill to a company in California; 7 x 32-in. bench lathe to a Brooklyn manufacturer; duplex hand centering machine to a Reading, Pa., company three 8-in. rotary surface grinders to a gear manufacturer in New York State; 16 x 60-in. lathe to a California company; 27-in. x 12-ft. Time-Saver lathe to a Detroit automobile manufacturer; 42-in. rotary planer to a company in San Francisco.

Robert Gair Co., Graybar Building, New York, manufacturer of folding paper boxes, boxboard products, etc., is disposing of stock issue of $10,000,000, portion of proceeds to be used for expansion and improvements. Work is under way on addition to branch plant at Chicago to cost in excess of $250,000.

Best Die Casting & Stamping Corporation, 19 Thompson Street, New York, has leased space at 33 Grand Street for expansion.

Board of Estimate, Municipal Building, New York, has approved an appropriation of $500,000 for a municipal airport on Barren Island, including hangars, shops, oil storage and distributing plants, etc. Project will be in charge of Department of Plant and Structures.

S. Robert Schwartz & Brother, 546 Broadway, New York, manufacturer of electric lighting equipment and appliances, has leased two floors in twelve-story building at 160 Varick Street for expansion and will move to new location.

Seelig & Finkelstein, 44 Court Street, Brooklyn, architects, have plans for an automobile service, repair and garage building, 95 x 105 ft., at Coney Island Avenue and Avenue P, to cost close to $100,000 with equipment.

Quartermaster Supply Officer, Brooklyn, is asking bids until April 19 for grates and forced draft equipment for two 100 hp. boilers; also for two CO_2 indicating and recording meters for boiler units, circular 176.

Union School District, Elmont, N. Y., H. E. Foster, president, is considering installation of manual training equipment in new central high school at Floral Park, N. Y., to cost about $850,000. Knappe & Morris, 171 Madison Avenue, New York, are architects.

American Gas & Electric Co., 30 Church Street, New York, is disposing of a bond issue of $50,000,000, a portion of fund to be used for expansion and improvements, including acquisition of additional utilities. Company operates light and power plants in Pennsylvania, West Virginia, Tennessee, Indiana and other states.

Officials of Radio Corporation of America, Inc., Woolworth Building, New York, have organized R.C.A. Photophone, Inc., to manufacture synchronizing motion picture machines and devices, for "talking" motion pictures in homes. Gen. James G. Harbord, president of parent company, will be chairman of board of new organization; David Sarnoff will be president.

Van Alstyne Motor Corporation, 1871 Broadway, New York, representative for Hupmobile, has leased three floors and basement in new building at 239-49 West Sixty-sixth Street for main service and repair department, with parts and equipment divisions, etc.

Bayonne Steel Ceiling Co., 223 West Nineteenth Street, New York, will take bids at once for two-story plant at Long Island City, to cost approximately $75,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect and engineer.

American Power & Light Co., a unit of Electric Bond & Share Co., 71 Broadway, New York, has purchased controlling interest in Montana Power Co., Butte, Mont., heretofore held by John D. Ryan, 25 Broadway, New York, for about $80,000,000. New owner will operate in conjunction with other properties in that district, including Washington Water Power Co., Spokane, Wash., lately secured. Extensions will be made in plants and transmission lines.

Portnow Lighting Fixture Co., New York, has leased building at 59 West Fourteenth Street for a new plant to manufacture electric lighting fixtures and devices.

Todd Shipyards Corporation, 25 Broadway, New York, will proceed with construction of new drydock with repair and shipbuilding facilities at Erie Basin, Brooklyn. It will be 715 ft. long and 113 ft. wide. Installation will include a main electrically-operated pumping plant with 600 hp. units, with hydraulically-operated sluice gates for drydock, etc. Entire project will cost about $2,000,000.

Bayonne Bolt & Nut Corporation, First Street and Trask Avenue, Bayonne, N. J., will rebuild portion of plant destroyed by fire April 5, with loss reported in excess of $200,000 including equipment.

Zucker Sons Co., 228 Broadway, Elizabeth, N. J., manufacturer of metal-polishing and plating materials, will remove its plant to 627 First Avenue, Roselle, N. J., where site was recently acquired. First unit is ready for occupancy and other units will be established later.

American Oil Co., American Building, Baltimore, is considering erection of new one-story oil storage and distributing plant at Bridgeton, N. J., to cost more than $50,000 with equipment. T. J. O'Connell is company engineer.

Board of Education, Roselle, N. J., is considering installation of manual training equipment in three-story and basement high school to cost $275,000. F. A. Elsasser, Falls Building, Union, N. J., is architect.

Ajax-Brand Lock Corporation, 25 Warren Street, New York, has been organized to manufacture locks and kindred products. Work is being done by contract at present, but company expects to establish its own plant during year.

Latham-Litho Printing Co., Woodside, N. Y., has filed plans for erection of a two-story, 115 x 186 ft. addition. Lockwood, Greene & Co., Inc., New York, is engineer.

George Swan & Co., Inc., 500 Kindland Road, Nutley, N. J., has been organized and is engaged in bending pipe and tubing and light manufacturing. It is in market for pipe and tubing and some small machinery. Company is building some special machines of its own design.

Plant of Bayonne Bolt Corporation, Bayonne, N. J., was almost completely destroyed by fire on April 5, loss amounting to from $350,000 to $400,000. Company proposes to rebuild as soon as insurance can be adjusted and financial negotiations completed. Offices are at 117 Liberty Street, New York.

New England

BOSTON, April 9.

FEW important New England industrial companies are buying or inquiring for machine tools. A Rhode Island plant has under consideration a $7,000 lathe; a Massachusetts shop is reported about to close on a similar tool; the Boston & Albany Railroad has inquiries out for a number of tools, but will probably buy one at a time; the Boston & Maine and New Haven railroads are expected to purchase several high-priced tools this year. The Maine Central is still negotiating on a large tool, and there are a few active inquiries from other users, but no indications are given as to the time of closing.

Current business is mostly the result of active solicitation by dealers. Buying involves the general line of standard equipment. The Boston Elevated Railway Co. is in the market for considerable wood-working machinery. New England machine tool builders, with few exceptions, are quite busy on orders booked in other sections of the country, largely from the automobile trade. There is quite a little buying of grab buckets, concrete mixers, steam shovels, road machinery and other equipment, including pneumatic tools, in New England.

Connecticut plants with orders from Ford Motor Co. are exceptionally busy. Moore Drop Forging Co., Springfield, Mass., also is rushed on such work and is operating day and night shifts.

Work has started on a three-story, 60 x 100 ft., addition for Franks Brothers, Chandler Street, Lawrence, Mass. Motors and miscellaneous equipment are required. Herman Petzold, 712 Bay State building, Lawrence, is architect.

Bids are in for a one-story, 65 x 68 ft. addition for Haskell Mfg. Co., Commerce Street, Pawtucket, R. I., requiring miscellaneous mechanical and electrical equipment. Warren B. Lewis, 10 Weybosset Street, Providence, is engineer.

Atlantic Precision Co., Malden, Mass., weight meters, has been reorganized as Atlantic Precision Instrument Co., with 2500 shares, of no par value. Robert F. Herrick, Jr., is president. Plans are in progress for enlarging manufacturing facilities.

Massachusetts Electric Co., 11 Margin Street, Lynn, Mass., has started general repairs made necessary by a recent fire.

Independent Lock Co., 78 Winter Street, Fitchburg, Mass., has started work on a two-story, 40 x 154 ft., addition.

Cleverdon, Varney & Pike, architects, 46 Cornhill, Boston, closed bids April 9 for alterations for plant of Elliott Addressing Machine Co., 143 Albany Street, Cambridge, Mass.

Svensson & Berggren Co., 127 West Brookline Street, Boston, printer, has plans for a four-story, 30 x 60 ft., office and light manufacturing plant. Motors and other equipment are required. Clifford Allbright, 308 Boylston Street, Boston, is architect.

G. E. Hoglund Co., Gardner, Mass., foundry, has reincorporated under name of Donlan Foundry Co., Inc. There will be no change in personnel.

Holyoke Water Power Co., Holyoke, Mass., has secured permission to proceed with hydroelectric power project on Connecticut River, near Holyoke, for a capacity of 40,000 hp., to cost in excess of $450,000 with transmission lines.

Atwater Mfg. Co., Plantsville, Conn., manufacturer of drop forgings, has awarded general contract to H. Wales Lines Co., Meriden, Conn., for a one-story addition to cost more than $20,000 with equipment.

Cambridge Gas Light Co., 354 Third Street, Cambridge, Mass., has plans for a one-story machine shop.

New England Power Association, Worcester, Mass., operating light and power properties in Massachusetts, New Hampshire, Vermont and Rhode Island, is disposing of a bond issue of $25,000,000, a portion of proceeds to be used for extensions and improvements. It is reported considering construction of a hydroelectric power plant on Conecticut River, vicinity of Barnet, Vt., with capacity of 50,000 hp., to cost more than $650,000 with equipment; extensions will be made in transmission lines in that district.

E. F. Sharples, New Haven, Conn., has acquired plant and property of Connecticut Valley Trap Rock Co., Inc., Hartford, Conn., at a public sale. New owner is said to be planning improvements.

American Chain Co., Inc., Bridgeport, Conn., has acquired the plant and business of Wright Mfg. Co., Lisbon, Ohio, manufacturer of high speed hoists, trolleys, etc., and will operate as a division. W. F. Wright will continue in charge of production; H. F. Wright will also continue to be identified with company.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, has filed plans for extensions and improvements in plant at Cambridge, to cost about $18,000. Stone & Webster, Inc., 49 Federal Street, is engineer and contractor.

Connecticut Electric Service Co., Hartford, Conn., operating light and power utilities, has work under way on hydroelectric power development on Rocky River, near New Milford, Conn., for capacity of 24,000 kw. Construction will also proceed on a transmission line from Montville to Meriden, Conn., about 40 miles.

St. Louis

ST. LOUIS, April 9.

BIDS have been asked on revised plans by Independent Plumbing & Heating Supply Co., 1119 Chestnut Street, St. Louis, for a two-story storage and distributing plant, 170 x 249 ft., with pipe cutting and fitting and other mechanical departments, to cost about $125,000 with equipment. D. R. Harrison, Ambassador Building, is architect.

American Car & Foundry Co., Syndicate Trust Building, St. Louis, contemplates an addition to plant on Dorcas Street to cost more than $200,000 with equipment. Headquarters are at 30 Church Street, New York.

Chickasha Cotton Oil Co., Chickasha, Okla., has arranged for a stock issue to total $4,750,000, a portion of proceeds to be used for expansion and improvements.

Midwest Oil Co., Third and Central Streets, Kansas City, Kan., contemplates a new oil storage and distributing plant, to cost more than $40,000 with equipment.

White River Power Co., Boyle Building, Little Rock, Ark., Charles Jacobson, head, has secured a permit for a hydroelectric power development on White River and its forks, vicinity of Cotter, Ark., with capacity of 165,000-hp. A transmission line will be built. Entire project will cost more than $1,500,000.

Gill & Jackson, Buder Building, St. Louis, architects, will proceed with erection of two-story and basement building, 100 x 108 ft., to be leased by B. F. Goodrich Co., Akron, Ohio, for a factory branch and distributing plant. It will cost about $100,000 with equipment.

Ira Varnell, head of Varnell Lumber Co., Hampton, Ark., plans construction of power house and system for local commercial service, to cost about $40,000 with equipment.

Industrial Gas Co., 801 Board of Trade Building, Kansas City, Mo., is planning for a natural gas plant and pipe lines in different parts of State. Company plans bond issue of $1,500,000, majority of proceeds to be used for project.

Baldwin Harvester Co., 432 South Wichita Street, Wichita, Kan., agricultural equipment, has plans for a one-story addition, 63 x 100 ft., portion of structure to be used for storage and distribution.

Jamieson & Spearl, Arcade Building, St. Louis, architects, have plans for a two-story automobile service, repair and garage building, to cost approximately $100,000 with equipment.

The Crane Market

THERE is but little new inquiry for electric overhead cranes, but the locomotive crane market is quite active. In addition to the cranes under inquiry by the Amtorg Trading Corporation and the list of seven 15-ton crawl tread locomotive cranes and six steam shovels from Dwight P. Robinson & Co., New York, for a contract at Buenos Aires, Argentina, there is a list of five 10-ton locomotive cranes, capable of 10 miles per hr. for the Boston & Maine Railroad.

Among recent purchases are:

Delaware, Lackawanna & Western Railroad, New York, 20-ton locomotive crane from the Browning Crane Co. and a 40-ton traveling gantry crane, reported purchased from the Whiting Corporation.

E. I. du Pont de Nemours & Co., Wilmington, Del., a 15-ton, 2-motor overhead crane reported purchased from the Niles Crane Corporation.

Nugent Sand Co., Muskegon, Mich., 25-ton steam-operated locomotive crane from the Orton Crane & Shovel Co.

Samuel Olson Co., Chicago, 3-ton, 3-motor, floor-operated crane from H. D. Conkey & Co.

St. Louis Contracting Co., St. Louis, 3-ton electric bridge crane from H. D. Conkey & Co.

J. S. Kirk & Co., Chicago, two 5-ton double-girder cranes from H. D. Conkey & Co.

International Harvester Co., Rockford, Ill., two 2-ton special underhung and two electric follow-up cranes from H. D. Conkey & Co.

Midwest Piping & Supply Co., 1452 South Second Street, St. Louis, manufacturer of pipe, pipe fittings, etc., has awarded general contract to James H. Bright Construction & Building Co., Arcade Building, for a one-story addition, 45 x 120 ft., to cost close to $50,000 with equipment. Klipstein & Rathman, Security Trust Building, are architects.

Paxton-Mitchell Co., 2614 Martha Street, Omaha, Neb., has filed plans for a one-story and basement foundry, 92 x 165 ft., for production of iron castings, to cost $50,000 with equipment.

Board of Education, Fullerton, Neb., is planning installation of manual training equipment in three-story and basement high and grade school to cost $150,000, for which bids are being asked on general contract until April 19. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

A. R. Pannell Machinery Co., Inc., 33 East Grand Avenue, Oklahoma City, Okla., dealer in heavy machinery and steam, oil and electric power plant equipment, is adding a stock of mill supplies.

Cleveland

CLEVELAND, April 9.

WHILE machine tool business is fair, April is not starting out quite as well as March. A Michigan manufacturer of automobile parts is in the market for 30 or more high-grade used tools for work on wheels and brakes for Ford automobiles. The requirements include turret lathes, punch presses, drilling and grinding machines. The Dana Mfg. Co., Toledo, has purchased milling and other machines for manufacturing shock absorbers for Ford cars and still has some equipment to place. Locally, single tools are in fair demand. Turret lathes continue to move well in single unit orders. Railroad inquiry is confined to single machines.

Plans are being arranged by White Chevrolet Co., South Third Street, Zanesville, Ohio, local representative for Chevrolet automobile, for five-story service, repair and garage building, to cost about $100,000 with equipment.

City Council, Akron, Ohio, has approved bond issue of $900,000 for a municipal airport, providing for purchase of 500-acre site in vicinity of Fulton Field, and construction of hangars, repair shops, oil storage and distributing plant, etc., for which plans will soon be drawn.

G. Schaefer Wagon Co., 4180 Lorain Avenue, Cleveland, has awarded general contract to G. A. Rutherford Co., 2725 Prospect Avenue, for rebuilding four-story automobile body and wagon plant recently destroyed by fire, to cost close to $135,000 with equipment. W. S. Longee, Marshall Building, is architect.

Federal Radiator & Boiler Co., Zanesville, Ohio, is said to have plans for a one-story plant at Licking View, to replace portion of works recently destroyed by fire, with loss close to $90,000 including equipment.

Heller Brothers Co., 879 Mount Prospect Avenue, Newark, N. J., manufacturer of files, rasps, tools, etc., will build a one-story plant, totaling about 35,000 sq. ft. floor space, at Newcomerstown, Ohio, vicinity of works of Rex File and Vixon Tool companies, subsidiaries. It will cost more than $75,000 with equipment. A portion of machinery will be removed from Newark plant.

Hercules Motors Corporation, Halliwell Place, S. E., Canton, Ohio, manufacturer of gasoline and oil engines, etc., is said to be completing plans for rebuilding one-story unit recently destroyed by fire, to cost about $55,000 with equipment.

Wright Mfg. Co., Lisbon, Ohio, manufacturer of hoists and trolleys, has sold its business and trade name to American Chain Co., Inc., Bridgeport, Conn. No changes in policies or sales organization are anticipated.

Gulf States

BIRMINGHAM, April 9.

PLANS are being arranged by Texas Utilities Co., Plainview, Tex., for a new super-power steam-operated electric generating plant for service in Panhandle and eastern New Mexico districts, to cost in excess of $400,000 with transmission lines.

Pasotex Pipe Line Co., El Paso, Tex., operated by Pasotex Petroleum Co., same city, subsidiary of Standard Oil Co. of California, 225 Bush Street, San Francisco, plans installation of electrically-operated pumping plant at Wink, Tex., and three booster stations, with Diesel engine and auxiliaries, in connection with proposed pipe line from El Paso to Wink. Line will have capacity of 17,000 bbl. daily and will cost in excess of $2,500,000.

Texas Gulf Sulphur Co., 41 East Forty-second Street, New York, has taken over properties at Boling Dome, Tex., and will install equipment for sulphur mining, including transportation facilities.

Southern Ornamental Iron Works, 2425 South Harwood Street, Dallas, Tex., has awarded a general contract to Churchill-Humphrey Co., Burt Building, for new one and two-story plant, 100 x 310 ft., at Arlington, Tex., to cost more than $70,000 with equipment.

Black Donald Graphite Co., Florence, Ala., is considering rebuilding of portion of mill recently destroyed by fire with loss reported at close to $65,000 including equipment.

Gulf Power Co., Pensacola, Fla., has arranged for bond issue of $2,500,000, a portion of fund to be used for expansion and improvements, including new transmission lines.

Clarence W. King, Giddens-Lane Building, Shreveport, La., architect, will soon take bids on general contract for a two-story automobile service, repair and garage building, 115 x 150 ft., to cost about $90,000 with equipment.

Notros Hangar Corporation, 3609 McKinney Avenue, Houston, Tex., Harry E. Weaver, president, recently organized, will operate a plant for manufacture of steel aircraft hangars and kindred equipment.

June Machinery Co., Waco, Tex., D. June, head, has plans for a one-story foundry at 208 South First Street, to cost about $21,000 with equipment.

Crawford's Auto Shop, Inc., 2227 North First Avenue, Birmingham, has completed plans for a two-story repair, service and garage building, 140 x 150 ft., to cost more than $70,000 with equipment. William L. Welton, American Trust Building, is architect.

H. L. Luckett and associates have acquired Corpus Christi Foundry & Machine Co., Corpus Christi, Tex. An expansion and improvement program will be carried out. Company will be reorganized as Luckett Foundry & Machine Co.

Dixie Gas & Fuel Co., Houston, Tex., operating natural gas properties, is said to be planning a bond issue of $25,000,000, a portion of proceeds to be used for expansion and improvements, including pipe line construction.

Roxanna Petroleum Corporation, Shell Building, St. Louis, is reported planning construction of a new oil refinery in vicinity of Houston, Tex., to cost in excess of $250,000 with equipment. A right-of-way has been secured from McCamey, Tex., for a 10-in. welded steel pipe line to refinery site. Plans have been approved for oil storage and distributing plant at McCamey, to cost more than $175,000.

Graybar Electric Co., Graybar Building, New York, electrical equipment and supplies, has leased a two-story building, 50 x 175 ft., to be erected at 1521 North First Avenue, Birmingham, to cost $40,000, for a new storage and distributing plant. Local headquarters are at 1529 North First Avenue. Charles M. McCauley, Jackson Building, is architect.

Harvey M. Mansfield, 3032 Spruce Street, Tampa, Fla., is at the head of a project to construct and operate a mill in this vicinity for pulp and kraft paper manufacture. Inquiries are being made for equipment.

Humble Oil & Refining Co., Houston, Tex., is reported planning a new pipe line from Pierce Junction, Tex., terminus of present line, to a point near Sugarland, Tex., to cost close to $100,000.

St. Tammany Parish School Board, Covington, La., is said to be planning installation of manual training equipment in a two-story high school addition to cost $135,000, for which bids will be asked on general contract early in May. William T. Nolan, Canal Bank Building, New Orleans, is architect.

Momsen, Dunegan & Ryan, El Paso, Tex., hardware products, have plans for a four-story storage and distributing plant, to cost $125,000 with equipment.

Philadelphia

PHILADELPHIA, April 9.

PLANS are being considered by Reading Coal & Iron Co., Reading Terminal, Philadelphia, for complete electrification of anthracite coal-mining properties at Hazleton, Wilkes-Barre and vicinity, including installation of motors, hoists, controls, etc. Negotiations are under way for central station service from Pennsylvania Power & Light Co., Allentown, Pa., which will build lines to different properties.

U. S. M. C. Garages, Inc., 1401-7 Locust Street, Philadelphia, has engaged M. A. Bernhardt, 127 South Eighteenth Street, architect, to prepare plans for a three-story addition to service, repair and garage building at Broad and Pine Streets, to cost $110,000 with equipment.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded contract to Sinclair & Grigg, 1518 Walnut Street, for a new coal pier, 900 ft. long, at Greenwich Point, and will install mechanical conveying, hoisting and kindred equipment. William H. Cookman is company architect.

Philadelphia Rural Transit Co., subsidiary of Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has secured garage and adjoining structures of Commercial Truck Co., now in receivership, totaling 110,000 sq. ft. floor space, and will remodel and equip for new motor bus service, repair and garage building. A complete maintenance division will be installed.

Allegheny Wagon & Truck Co., Inc., Philadelphia, recently organized, will take over and expand company of same name at 1733-37 North Front Street, specializing in manufacture and repair of motor trucks, wagons, etc., and motor truck bodies.

Electric Coil Winding Co., 2101 Federal Street, Camden, N. J., has awarded general contract to Charles B. Coe, 120 West Irving Avenue, Merchantville, N. J., for a one-story addition, 49 x 59 ft., to cost about $18,000 with equipment.

Audubon Wire Cloth Co., Audubon, N. J., has awarded contract to J. D. Lawrence, Westville, N. J., for a two-story and basement addition, 55 x 100 ft., to cost about $30,000 with equipment.

Board of Education, South Fayette Township, Sturgeon, Pa., P. H. Walker, president, is considering installation of manual training equipment in high school near Bridgeville, Pa., to cost $200,000. Laurie Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Metropolitan Edison Co., Reading, Pa., has secured permission to take over and consolidate 11 electric light and power companies in Adams, Chester, Dauphin, Berks, Lehigh and Lebanon Counties, for total consideration of $2,401,192. Extensions and improvements will be carried out, including transmission line construction. Purchasing company recently disposed of bond issue of $23,000,000, portion of fund to be used for expansion.

Gordon Nagle, Pottsville, Pa., has organized a company to construct and operate a local mill for fabricating light structural steel. A site, 150 x 300 ft., has been secured, and plant will soon be built.

Lancaster Advertising Poster Co., Lancaster, Pa., has awarded general contract to W. B. Aierstruck, 34 East Chestnut Street, for a one and two-story sign and electric display manufacturing plant, 50 x 150 ft., to cost more than $20,000 with equipment. H. Y. Shaub, 20 North Queen Street, is architect.

In connection with new three-story engineering building at University of Delaware, Newark, Del., Board of Trustees has authorized installation of following departments, for which equipment will be arranged at early date: Foundry forge shop, machine shops, electrical laboratory, woodworking shop, highway and test laboratory, blue-printing department, gas and steel laboratory, and experiment rooms. Structure will cost about $200,000. Charles Z. Klauder, Franklin Bank Building, Philadelphia, is architect.

General Cement Corporation has been organized to take over and consolidate Pennsylvania-Dixie Cement Corporation, Nazareth, Pa., and North American Cement Corporation, Albany, N. Y. First-noted company is now operating seven mills with gross output of 10,000,000 bbl. per annum, and other organization is running three mills with rating of 4,500,000 bbl. per year. Pennsylvania-Dixie company has recently concluded negotiations for purchase of plant and business of Pyramid Portland Cement Co., Valley Junction, near Des Moines, Iowa, and latter interest will be included in merger. Consolidated company will carry out general expansion and improvement program. All mills are scheduled to be continued in service.

American Machinery Corporation, 1120 Vine Street, Philadelphia, has been organized to succeed American Machinery Co., Inc., and to manufacture products formerly made by that company, American Fruit Machinery Co. and American Paring Machine Co. It will not build a plant, but will continue assembling machines at present location.

Hazard Wire Rope Co., Wilkes-Barre, Pa., has been licensed by American Cable Co., Inc., Chicago, to manufacture Tru-Lay Preformed wire rope and Tru-Loc Processed fitting.

Pittsburgh

PITTSBURGH, April 9.

DULLNESS which set in about the middle of last month in machine-tool sales continues, but inquiry still is fairly active and the majority of the trade reports sales so far this year as making a favorable comparison with the same period in 1927. Homestead Valve Mfg. Co., which will move from Homestead, Pa., to Stoops Ferry, Pa., is a possible buyer of a few tools to supplement those to be moved from the old to the new plant.

Homestead Valve Mfg. Co., Homestead, Pa., has acquired and will occupy former plant of Sewickley Electric & Mfg. Co., Stoops Ferry, Pa. Sewickley company grew out of John W. Semple & Co., Sewickley, manufacturers of time fuses. Purchase includes plant containing 50,000 sq. ft. of floor space, and 108 acres.

Contract has been let by Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, to C. W. & P. Construction Co., Akron, Ohio, for a two-story addition to plant at Barberton, Ohio, to cost about $50,000. J. F. Suppes, Akron Savings & Loan Building, Akron, is architect.

Cyclone Fence Co., Waukegan, Ill., manufacturer of iron and wire fencing, has secured property at 909 Behan Street, Pittsburgh, for a new factory branch and distributing plant. J. H. Laughlin will be branch manager.

J. & J. B. Milholland Co., 714 Fifth Avenue, Pittsburgh, manufacturer of engines, mine cages, etc., plans rebuilding portion of machine shop destroyed by fire April 4, with loss close to $35,000 including equipment.

Lawson Mfg. Co., Lexington Avenue and Thomas Boulevard, Pittsburgh, manufacturer of heaters and heating equipment, has awarded general contract to Donald Ranolla & Son, Cedarville Street, for a one-story addition, 50 x 275 ft., to cost about $50,000 with equipment. Bernard H. Prack, Martin Building, is architect and engineer.

Charleston-Dunbar Natural Gas Co., 1023 Quarrier Street, Charleston, W. Va., is considering an expansion and improvement program in pipe lines and properties to cost $100,000. John P. Chenoweth is representative.

Gellatly & Co., Inc., Oliver Building, Pittsburgh, manufacturer of mine equipment, has leased a factory on Grand Avenue, Neville Island district, for establishment of a new plant unit for increased output.

Charles G. Hanny and Walter H. Stifel, 1034 Murray Hill Avenue, Pittsburgh, have organized Charles G. Hanny & Co., with capital stock of $25,000, to establish and operate a plant for manufacture of light structural steel and ornamental iron products. A department for wire work will be provided.

Board of Education, Glassport, Pa., is considering installation of manual training equipment in three-story high school to cost about $180,000, for which bids are being asked on general contract. H. C. Clepper, Century Building, Pittsburgh, is architect.

Crystal Oil Works, Rouseville, near Oil City, Pa., are planning to rebuild portion of oil refinery destroyed by fire April 3, with loss close to $30,000 with equipment. Damaged section was used largely for wax and kindred production.

Detroit

DETROIT, April 9.

CONTRACT has been let by Chevrolet Motor Co., Flint, Mich., to H. G. Christman Co., Lansing, for a one-story plant unit at Bay City, Mich., to cost more than $400,000 with machinery. Wright & Nice, 4339 South Saginaw Street, Flint, are architects.

Board of Education, Muskegon, Mich., has approved plans for an addition to Hackley Manual Training School to cost in excess of $100,000. Frank F. Forster, Muskegon, is architect.

Detroit City Service Co., Lafayette Building, Detroit, will build a new two-story ice-manufacturing plant, to cost about $65,000 with equipment.

Arthur Corbeille, Ypsilanti, Mich., has plans for a one-story foundry for manufacture of iron castings, to cost about $22,000.

Board of Education, Battle Creek, Mich., is considering installation of manual training equipment in a new junior high school to cost close to $500,000. William B. Ittner, Board of Education Building, St. Louis, is architect.

Falcon Mfg. Co., Big Rapids, Mich., manufacturer of furniture, is planning to rebuild its No. 2 plant, recently partially destroyed by fire, with loss close to $50,000 with equipment.

White Co., East Seventy-ninth Street, Cleveland, manufacturer of motor trucks, is planning a one-story factory branch, service and repair station, 185 x 200 ft., at Detroit, to cost about $135,000 with equipment.

Motor Wheel Corporation, Lansing, has remodeled one of its plant units for production of wire wheels for automobiles, a new development for company, which heretofore has specialized in disk steel and wood wheels. It is proposed to increase wire wheel department later.

Electric Steel Castings Co., St. Joseph, Mich., recently organized, will operate a plant for production of small electric steel castings, weighing up to 45 and 50 lb. Operations will soon begin.

Mount Clemens Gas Co., Mount Clemens, Mich., is completing plans for an addition to its gas-generating plant, to cost close to $200,000 with equipment. It will also make extensions in lines to cost about $100,000. C. S. Holt is general manager.

King-Seeley Co., Ann Arbor, manufacturer of gasoline gages and kindred equipment, has awarded general contract to Townsend-Dailey Co., 213 West Michigan Avenue, Ypsilanti, Mich., for a five-story addition, 65 x 85 ft., to cost close to $100,000 with equipment.

Florin Mfg. Co., Carson City, Mich., has been organized to manufacture washing machines and furniture specialties and will erect factory immediately.

North-Moller Co., Jackson, Mich., has been awarded contract for an addition to plant of Sparks-Withington Co., Jackson, manufacturer of automobile horns and radio receiving sets. It will be two stories, 60 x 260 ft., with separate boiler house. Lockwood, Greene & Co., Inc., Cleveland, is engineer.

L. A. Young Industries, Detroit, has changed its name to L. A. Young Spring & Wire Corporation.

South Atlantic States

BALTIMORE, April 9.

RECENTLY organized Dixie Aircraft Corporation, care of I. L. Paisley, Frederick, Md., is said to be planning establishment of new plant in vicinity of Lynchburg, Va., for manufacture of all-metal monoplanes and parts. It is understood that motors will be secured from outside sources.

Common Council, Lexington, Va., is reported planning installation of municipal power plant, to cost upward of $25,000 with equipment.

Suburban Light & Power Co., Cambridge, Md., George W. Woolford, president, recently organized, has secured permission to construct power substations and transmission lines in portions of St. Mary's, Charles and Prince George's Counties, totaling 80 miles, to cost in excess of $125,000. Authority has been granted also for issuance of preferred stock to total $250,000 and 1000 shares common stock, no par value, proceeds to be used in part for expansion.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (closing date not specified) for refrigerating plant for Mare Island Navy Yard hospital, including motor-driven compressors, condensers, liquid receivers, expansion coils and accessories.

Superintendent, National Training School for Boys, Bladenburg Road, N. E., Washington, is asking bids until April 16 for material for complete 9-ft. high, chain link wire fence, No. 6 gage wire.

Blue Ridge Power Co., Manassas, Va., is planning installation of additional equipment at power plant, including water wheel, generator and accessories.

Board of City Commissioners, Kings Mountain, N. C., plans installation of pumping machinery and other power equipment in connection with extensions and improvements in municipal waterworks to cost $250,000. Carolina Engineering Co., Wilmington, N. C., is engineer.

Morocto Roofing Co., Rowlandsville, Md., manufacturer of roofing products, will rebuild portion of plant destroyed by fire April 5, with loss reported in excess of $350,000 including equipment.

Purchasing section, Bureau of Standards, Washington, is asking bids until April 27 for furnaces, pulverizers, burners and auxiliary equipment for new power plant.

Cocker Machine & Foundry Co., Gastonia, N. C., manufacturer of cotton mill machinery, castings, etc., plans construction of two one-story additions, 60 x 100 ft., and 40 x 60 ft. It is understood that standardized steel buildings will be selected.

Southeastern Power & Light Co., Birmingham, affiliated with Alabama Power Co., and other utilities, has purchased Edisto Public Service Co., Denmark, S. C., operating in 16 communities in that State. New owner plans expansion, including transmission line construction to connect with system in Georgia. Edisto company has work under way on a hydroelectric power project at Clarks Hill, on Savannah River, which will be completed by Southeastern company, to cost more than $5,000,000.

Common Council, Nashville, Ga., has sold municipal electric light and power plant to new interests, headed by Roger C. Bauman. Plans are under way for extensions and betterments, including installation of 350-hp. Diesel engine unit and other equipment. It is understood that Southeast Georgia Power Co. is interested in plant purchase.

Board of Education, Roanoke, Va., is considering installation of manual training equipment in three-story junior high school to cost about $150,000, for which superstructure will soon be started. H. M. Miller, Shenandoah Life Building, is architect; Charles S. Churchill, Liberty Trust Building, is consulting engineer.

Duke Power Co., Charlotte, N. C., has approved plans for first unit of new steam-operated electric power plant at River Bend on Catawba River, near Mount Holly, to be equipped for capacity of 150,000 hp. and to cost more than $2,000,000 with transmission lines. Station will be designed to use pulverized coal. Later plant will be enlarged with three other units for total rating of 600,000 hp., and ultimate cost of close to $10,000,000.

Buffalo

BUFFALO, April 9.

PROPERTY at 550 Abbott Road, Buffalo, has been leased by General Aircraft Corporation, recently organized, for a new plant for production of airplane parts and assembling. This plant will be temporary, it is said, pending selection of site for erection of new works. G. MacLean Gardner, formerly engineer for Fokker Aircraft Corporation, Hasbrouck Heights, N. J., will be general manager. It is reported that company is identified with General Motors Corporation, Detroit, and will become airplane production division of that organization. George H. Hannum, formerly president of Oakland Motor Car Co., Pontiac, Mich., is president of new company.

Morse Chain Co., Ithaca, N. Y., manufacturer of silent chain drives, etc., has disposed of a new bond issue of $2,000,000, a portion of proceeds to be used for general expansion.

American-La France & Foamite Industries, Inc., Elmira, N. Y., has been organized with capital stock of $100,000 by officials of American-La France Fire Engine Co., Elmira, manufacturer of motor-driven fire equipment, to take over and consolidate that company with other acquired interests in similar line of production, including Foamite-Childs Corporation, Utica, N. Y. An expansion program will be carried out.

Fairbanks Co., Glenwood Avenue, Binghamton, N. Y., and Broome and Lafayette Streets, New York, manufacturer of valves and other mechanical equipment, is reported to be arranging for a two-story plant unit, to cost about $125,000 with equipment, to replace its local works recently destroyed by fire.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing products, gypsum specialties, etc., has concluded arrangements for purchase of Beaver Board Companies, Inc., Beaver Road, Buffalo, manufacturer of wallboard products, and will operate as a division. Increased production is planned. Purchasing company has arranged for bond issue of $13,500,000, and common stock issue of 93,000 shares, no par value. George M. Brown is president of Certain-Teed company.

Afga-Ansco Mfg. Co., 23 Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, formed by recent merger of Ansco Photo Products, Inc., Afga Products, Inc., and Afga Raw Film Co., is planning an early call for bids on general contract for a two and three-story addition, to cost in excess of $500,000 with equipment. Otto S. Schlick, 136 Liberty Street, New York, is engineer.

Garlock Packing Co., Palmyra, N. Y., will erect power plant to replace old unit at its factory. Two 550-hp. boilers will take place of eight boilers now in use and two turbo generators will provide electric current. Sigmund Firestone, Rochester, N. Y., will supervise building.

Buffalo Foundry & Machine Co., Buffalo, has acquired entire assets of Chemical & Vacuum Machinery Co., local, and will supplement Buflocak and Buflokast lines of dryers and evaporators with several new types. Included will be spray film feed applicable to both vacuum and atmospheric drum dryers, new design of vacuum rotary dryer and other modifications of present types.

William Summerhays Sons Corporation, Rochester, N. Y., has moved its offices to warehouse at 614 Clinton Avenue South.

Chicago

Chicago, April 9.

In machine tool sales, March was not only the best month so far this year, but is also ahead of the corresponding period in 1927 and, with several dealers, the best month since 1920. This record has been made in the almost total absence of railroad buying. The Santa Fe list is dormant, but it is reported that the Rock Island will soon come into the market for machine tools. The Union Pacific list shows equipment worth $200,000 and subsidiary lines of that railroad are still to be heard from.

A forging plant in Chicago has taken a 30 x 30-in. x 8-ft. planer and an Illinois watch maker has purchased two 12-in. x 5-ft. lathes and a 14-in. x 6-ft. lathe. Tractor plants are active buyers.

General Electric Co., Milwaukee, is asking for prices on following list:

Two power hack saws.
One 28-in. shaper.
One No. 2 universal miller.
One 36-in. x 16-ft. lathe.
One 18-in. x 12-ft. lathe.
One 2-ft. radial drill.
One 3-ft. radial drill.
One 24-in. drill.
One floor grinder.
Several wood-working machines.

Wyckoff Drawn Steel Co., 2300 South Kedzie Avenue, Chicago, will build a warehouse, 50 x 150 ft., to cost $10,000. W. M. Wood, 208 South LaSalle Street, is architect.

Contract has been let by Glabman Brothers, Inc., 832 Maxwell Street, Chicago, manufacturer of furniture, to H. M. Lipman, 5079 West Monroe Street, for a new four-story and basement plant, 50 x 100 ft., to cost close to $150,000 including equipment. Dubin & Eisenberg, 14 West Washington Street, are architects.

Bassick Mfg. Co., 2638 North Crawford Avenue, Chicago, manufacturer of lubricating equipment and devices, subsidiary of Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, is planning an addition to increase capacity about 25 per cent, to cost $300,000 with machinery.

Greenleaf-Glenwood Garage Corporation, 924 Ainslie Avenue, Chicago, Samuel Wanig, head, has plans for a four-story service, repair and garage building to cost in excess of $200,000 with equipment. Rissman & Hirschfield, 228 North LaSalle Street, are architects.

Olson Mfg. Co., Albert Lea, Minn., manufacturer of farm equipment, is having plans completed for a one-story and basement addition, to cost close to $30,000 with equipment. Toltz, King & Day, Inc., Builders' Exchange, St. Paul, Minn., is architect.

Minnesota Power & Light Co., Duluth, Minn., is disposing of bond issue of $14,000,000, a portion of fund to be used for expansion and improvements, including transmission line construction.

Great Northern Railway Co., Railroad Building, St. Paul, Minn., has plans under way for a new engine house, with machine shop and other repair facilities, 90 x 250 ft., at Grand Forks, N. D., to cost in excess of $90,000 with equipment. T. D. McMahon is company architect.

Reiter Co., Elgin, Ill., manufacturer of water softeners and kindred equipment is reported planning a two-story addition to cost more than $40,000.

United States Engineer, Peoria, Ill., is asking bids until April 19, for one force pump, circular 24.

Southern Colorado Power Co., Fourth and Main Streets, Pueblo, Colo., is planning an expansion program, including transmission line construction, to cost close to $250,000. A new power line will be built from Penrose to Beaver Park.

Holly Sugar Corporation, Colorado Springs, Colo., operating beet sugar mills, has arranged for bond issue of $6,500,000, a portion of proceeds to be used for expansion and improvements. Plans are in progress for betterments in refinery at Torrington, Wyo., including installation of additional machinery, to cost $200,000.

Jefferson Ice Co., 1515 Bickerdike Avenue, Chicago, has plans for a one-story ice-manufacturing plant, to cost more than $45,000 with equipment. G. L. Lehl, 3810 Broadway, is engineer.

Allied Industrial Products Co., 120 North May Street, Chicago, manufacturer of grinding wheels, buffing equipment, etc., has awarded general contract to Freevoll & Smedberg, 5950 West Erie Street, for a three-story and basement plant unit, 40 x 105 ft., to cost close to $80,000 with equipment. Meyer & Cook, Tower Court, are architects.

M. A. Erickson, operating Rugby Light & Power Co., Rugby, N. D., plans extensions and improvements in steam-operated electric power house at Westhope, N. D., including installation of engines and other equipment.

National Wire Cloth & Iron Works, Inc., St. Paul, Minn., has been formed to manufacture wire cloth and do ornamental iron and wire work. Company has own plant and equipment and has been in operation since March 15.

Cincinnati

Cincinnati, April 9.

Reports from local machine-tool builders show considerable irregularity in sales. In the first week of April some manufacturers have bettered their March record, while others have suffered a decline. However, the consensus of opinion is that bookings this month will be from 85 to 90 per cent of those in March. Decreased buying by automobile makers is expected to account in large part for the anticipated inability to attain last month's volume of business during April. The McClintic-Marshall Co. of California, San Francisco, has purchased a 42-in. rotary planer, and Charles E. Larson & Co., Chicago, have bought a 1500-lb. single frame steam hammer.

Plans are being drawn by Star Foundry Co., Covington, Ky., manufacturer of gray iron castings, for a one-story addition, 60 x 62 ft., to cost about $25,000 with equipment. Howard McClorey, 211 East Fourth Street, Cincinnati, is architect.

Ferro Concrete Co., Third and Elm Street, Cincinnati, has taken contract for erection of nine-story automobile service, repair and garage building, 100 x 200 ft., to cost in excess of $850,000, with equipment.

Miami Development Co., Dayton, Ohio, O. E. Howland, Dayton Power & Light Co., treasurer, has acquired property on Eaker Street as site for a multi-story cold storage and refrigerating plant, to cost upward of $150,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until April 17 for 46,000 copper asbestos annular gaskets, 125,000 machine nuts, 500,000 brass grommets and 5000 Woodruff keys, circular 290; on April 23 for 1000 Liberty engine exhaust valves, circular 294, and on April 27 for one heavy-duty portable refueling unit, circular 293.

Post Sign Co., 514 Watauga Avenue, Knoxville, Tenn., Edward L. Hicks, head, plans erection of one-story sign and display manufacturing plant to cost about $18,000 with equipment.

Board of Education, Nashville, Tenn., is considering installation of manual training equipment in two-story junior high school for which general contract has just been let to Foster & Creighton Co., Bennie-Dillon Building, to cost $160,000.

Cincinnati Gas & Electric Co., Cincinnati, is arranging for bond issue of $35,000,000, a portion of proceeds to be used for extensions and betterments, including transmission line construction.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, will soon take bids for a two-story and basement factory branch and distributing plant, 100 x 100 ft., at Nashville, Tenn., to cost about $85,000 with equipment.

City Machine Tool Co., Third and June Streets, N. W., Dayton, Ohio, has awarded general contract for one-story addition to J. C. Gohn, Dayton.

Department of Public Service, Knoxville, Tenn., W. W. Mynatt, director, has received low bid on general contract from Emory Construction Co., Empire Building, for a one-story municipal service, repair and garage building, 50 x 300 ft., with capacity of 60 cars, to cost approximately $100,000 with equipment. A traveling crane will be installed. L. M. Dow, Brownlow Building, is architect.

Farnsworth-Evans Co., Cotton Exchange Building, Memphis, Tenn., plans construction of one-story unit, 269 x 1325 ft., to cotton compress plant in Holleywood district, to cost $350,000 with machinery. George Mahan, Jr., American Bank Building, is associate architect.

Webster Mfg. Co., Chicago, maker of elevating, conveying and power transmitting machinery, is moving its Cincinnati office from 1914 Union Central Building to 503 Chamber of Commerce Building. L. A. Scheck is in charge.

Indiana

INDIANAPOLIS, April 9.

A NEW company, Eaglesfield-Link Co., with capital stock of $40,000, has been formed by R. D. Eaglesfield, Brazil, and associates, to establish and operate a plant for manufacture of a patented molding machine, recently invented by Mr. Eaglesfield. Dick Link, Brazil, is also interested in organization.

Truck Engineering Co., East Pontiac Street, Fort Wayne, manufacturer of motor truck equipment, has awarded general contract to Buesching, Hagerman & Co., 402 East Superior Street, for a one-story, sawtooth roof type addition, 60 x 100 ft., to cost more than $60,000 with equipment. Guy Mahurin, Standard Building, is architect.

Montgomery Ward & Co., Chicago Avenue, Chicago, operating a mail-order business, will soon take bids for a one and three-story and basement storage and distributing plant at Evansville, 160 x 310 ft., and 180 x 190 ft., to cost approximately $300,000 with equipment. A. E. Neucks, Old National Bank Building, Evansville, is architect.

Martin-Parry Corporation, 1100 West Henry Street, Indianapolis, manufacturer of commercial automobile bodies, is reported planning a one-story addition to cost more than $30,000 with equipment. Headquarters are at York, Pa.

City Council, Fort Wayne, is said to have approved plans for extensions and improvements in municipal electric light and power plant, to cost in excess of $200,000 with equipment. Froehleich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is engineer, in charge.

Automotive Syndicate, Ltd., Indianapolis, recently organized, has leased a portion of former local plant of National Automobile Co., and will establish a factory for manufacture of patented steam-propelled buses, with capacity of about 40 passengers. A complete experimental plant will be installed for initial service. W. J. Parrish and D. McCall White head organization, last noted will be engineer for company. H. W. Alden, chairman of board, Timken-Detroit Axle Co., 200 Clark Avenue, Detroit, is said to be interested in new organization.

E. F. Miller, Farmers' Trust Building, Anderson, architect, will take bids at once on general contract for a two-story and basement automobile service, repair and garage building, 85 x 125 ft., at Logansport, to cost approximately $95,000 with equipment.

Milwaukee

MILWAUKEE, April 9.

ACTIVITY in the machine-tool market is well sustained by orders for one or two machines from diversified sources. A moderate aggregate is the result, and it enables tool builders to keep production at the previously established rate, which is higher than at this period last year. Replacement business predominates and there is a relatively good demand for milling machines with special tooling. Prospects are for improvement in industrial construction.

Board of Regents, University of Wisconsin, Madison, Wis., has instructed Arthur Peabody, State architect, to proceed with plans for a new mechanical engineering building costing $577,000. It will be first unit of a new group for College of Engineering. Other units will be built for electrical engineering, mining engineering, chemical engineering and material testing laboratory departments. Work on first unit is expected to start by June 1. M. E. McCaffrey is secretary of board. An appropriation of $88,500 for new boiler equipment for central heating plant has also been authorized. Specifications will be issued shortly.

Common Council, Waukesha, Wis., is about to call for bids for construction of a complete sewage disposal plant to cost $200,000, designed by Alvord, Burdick & Howson, consulting engineers, 8 South Dearborn Street, Chicago. T. C. Martin is city clerk.

Walter Gerlinger, 403 Sixty-sixth Street, Wauwatosa, suburb of Milwaukee, formerly of Gerlinger Electric Steel Casting Co., has incorporated as Walter Gerlinger, Inc., to deal in foundry supplies, including molding, core and sand blast sands, fire clay, fuel oil, etc.

Milwaukee Printing Co., 377 Florida Street, manufacturer of cartons, food and candy wrappers and advertising material, is starting work on a six-story addition, 86 x 132 ft., to cost $200,000 with equipment, motors, etc. A complete lithographing plant is being added. Architects are Tharinger & Bruecker, 774 Third Street, local.

Village of Randolph, Wis., has approved proposed expenditure of $58,000 for rebuilding and enlarging municipal electric light and power plant. New boilers, two new generators and an addition are contemplated. L. E. Williams is city clerk.

Parker Pen Co., Janesville, Wis., manufacturer of fountain pens and pencils, is starting construction work on a two-story addition costing about $35,000.

Allen-Bradley Co., 494 Reed Street, manufacturer of electric control devices, has let general contract to Henry Danischefsky, 1484 Humboldt Avenne, local, for erecting a furnace house and substation, 44 x 140 ft., one and two stories.

Hartland Engine & Machine Co., Hartland, Wis., has been organized with $50,000 capital stock to operate a machine shop and build and repair internal combustion engines. Principals are Alfred Hilton, Grove E. Palmer and J. H. Overbough. Details of company's plans have not been completed.

Pacific Coast

SAN FRANCISCO, April 4.

CONTRACT has been let by Emsco Press Forge Co., 5701 South Boyle Avenue, Vernon, Los Angeles, to Union Iron Works, local, for a one-story plant unit to cost about $20,000 with equipment.

Douglas Co., 2435 Wilshire Boulevard, Los Angeles, manufacturer of airplanes and parts, has plans for a one and two-story plant at Santa Monica, 240 x 375 ft., to cost $90,000, with equipment. L. B. Norman, 1323 Georgia Avenue, Santa Monica, is architect.

Merritt Concrete Products Co., San Jose, Cal., manufacturer of concrete pipe, etc., will build a new plant at Oakland, Cal., to cost about $50,000 with equipment. H. A. Weigand is engineer.

Crawford & Daherty, 934 East Seventeenth Street, Portland, manufacturers of iron castings, have awarded general contract to Parker & Banfield, East Seventeenth Street, for a one-story foundry to cost close to $21,000 with equipment.

S. Karpen & Brothers, 925 West Irvington Avenue, Los Angeles, manufacturers of furniture, with headquarters at 626 West Twenty-second Street, Chicago, has filed plans for a four-story plant at Huntington Park, to cost $160,000 with equipment.

Ford Motor Co., Detroit, has taken title to a tract near Port Richmond, vicinity of San Francisco, and is said to be contemplating construction of one-story assembling plant, to cost in excess of $400,000 with equipment.

California Consumers Co., Los Angeles, recently organized to take over and operate Los Angeles Ice & Cold Storage Co.; Pasadena Ice Co., Pasadena, Cal., and other properties in southern California, has arranged for bond issue of $3,750,000, a portion of fund to be used for acquisition of companies noted, and for expansion and betterments. A. E. Fitkin & Co., Inc., 165 Broadway, New York, operating public utility properties, is identified with new organization.

Southwestern Gas & Fuel Co., Banning, Cal., recently acquired by Pacific Lighting Corporation, San Francisco, is planning extensions and improvements to cost about $50,000.

Gate Ice Co., Mesa, Ariz., is planning early erection of one-story ice-manufacturing plant, to cost about $55,000 with equipment.

Board of Education, Hillsboro, Ore., is considering installation of manual training equipment in new union high school to cost close to $200,000. Marion Stokes, Chamber of Commerce Building, Portland, is architect.

Ryan Aeronautical Corporation, 412 Union Building, San Diego, Cal., is arranging for manufacture in United States of Siemens-Halske radial air-cooled airplane engines, formerly made only in Germany, and sold in this country as Ryan-Siemens engines. Company contemplates erection of plant for initial production of 1000 engines annually.

Offices and warehouse of Lally Co., San Francisco, pipe distributer, have been moved from 1123 Harrison Street to 1261 Howard Street.

Union Machinery & Supply Co., Seattle, has opened a branch at Portland with temporary headquarters at 68½ Fourth Street under management of Fred W. Rodolf. It will act as distributer for Massillon shovels and other construction equipment.

City of Elma, Wash., will purchase a new steel tank of 500,000 gal. capacity for water supply and an auxiliary Diesel pumping engine.

Canada

TORONTO, April 9.

SLOWING up of machine-tool sales was noted the past week, but this was probably due more to the approaching Easter holidays than to users dropping out of the market. The automotive industry is not buying as extensively as it was a couple of months ago, but sales of single tools for garages and repair plants continue at a high level. Business closed during March, in all lines, was the best month so far this year.

Ingersoll Machine Co., Ingersoll, Ont., is building an addition and will shortly be ready for installation of equipment.

General Metal Devices, Ltd., Oakville, Ont., recently organized with capital stock of $200,000, is completing arrangements for erection of a manufacturing plant covering an area of 18,000 sq. ft. Thomas Strachan is president of company; Edward Bamber, vice-president; Edward Stansbury and Albert McMurray, members of board.

Otto Higel Co., Ltd., King and Bathurst Streets, Toronto, is planning to build a factory at St. Hyacinthe, Que., to cost about $100,000, for manufacture of pianos, gramophone, piano actions, mechanisms, etc.

Bids are being received by B. Swartz, architect, 336 Dundas Street West, Toronto, for erection of a factory, to cost $20,000, for Queen City Furniture Co., 51 Vine Street. It will be two stories, 30 x 90 ft., steel and brick construction.

Barnes Top & Trimming Co., 137 Adelaide Street West, Toronto, will build a one-story factory, construction to be started about May 1.

W. Hughes, 216 Simcoe Street, has general contract for erection of one-story addition, 60 x 70 ft., to plant of White & Thomas, sheet metal products manufacturer, 210 Simcoe Street, Toronto.

Toms Contracting Co., Ltd., 245 St. Clair Avenue East, Toronto, has been awarded contract for an addition to local plant under construction for Dominion Boxboards, Ltd., to be one story and basement, 65 x 139 ft. J. L. Carey, 208 North Laramie Avenue, Chicago, is engineer.

R. Truax Son & Co., Walkerton, Ont., manufacturers of sash and doors, etc., will start work immediately on erection of a new two-story factory, 80 x 80 ft.

Wells & Gray, Ltd., Confederation Life Building, Toronto, has contract for construction of a new plant for Reid & Brown Structural Steel & Iron Works, Ltd., 63 Esplanade East, Toronto.

Western Canada

Canadian Forest Products Co., Ltd., Victoria, B. C., and Chicago, is having plans prepared for erection of a hydroelectric power plant on Nimkish River, British Columbia, to provide power for a pulp and paper mill on which construction will be started later.

Terminal Sheet Metal Works, 1043 Pender Street West, Vancouver, B. C., has awarded contract to B. Davidson, 1012 Broughton Street, for erection of a one-story plant, 71 x 120 ft.

Foreign

CONSTRUCTION of a tin smelting plant is contemplated by N. V. Hollandsche Metallurgische Bedrivjen, Arnhem, Netherlands, recently organized to cost more than $1,000,000 with machinery.

Municipal Council, Moscow, Russia, has appointed a special commission to develop plans and purchase equipment for an automobile manufacturing plant for light cars. Initial works will have capacity of 10,000 cars per annum. A fund of $20,000,000 is being arranged for entire project. Majority of machinery will be purchased in United States.

Standard Oil Co., 26 Broadway, New York, plans rebuilding portion of its refinery, and storage and distributing works at Regla, Cuba, destroyed by fire April 5, with loss reported in excess of $350,000 including equipment.

Mexico Northern Power Co., LaBoquilla, State of Chihuahua, Mexico, has secured permission to build an addition to its local hydroelectric generating plant. Project will include construction of an irrigation system in this district, with electrically-operated pumping stations. A fund of $1,500,000 has been arranged for expansion.

Ulen & Co., Inc., 120 Broadway, New York, subsidiary of American International Corporation, same address, has a contract from Government of Persia for construction of a railroad from Caspian Sea to Persian Gulf. It is estimated to cost $80,000,000, with station structures, shops, rolling stock, etc., and will require about six years for completion. J. G. White Engineering Corporation, 43 Exchange Place, New York, will be associated with enterprise.

Motor-Columbus Corporation for Electrical Enterprises, Zurich, Switzerland, operating electric power properties, is organizing a subsidiary to be known as Swiss-American Electric Co., with headquarters at Zurich. New company is arranging for financing and will dispose of a security issue in United States. It will secure an interest in Italo-Argentine Electric Co., Buenos Aires, Argentina, as well as other South American light and power properties, including Bahia Blanca Electric Co., operating in Argentina, and Compania Americana de Luz. An expansion program will be carried out for power plant construction and new transmission lines. New company will have total assets approximating $26,000,000 in properties.

Department of Public Works, Angora, Turkey, has approved plans for a new hydroelectric power plant with capacity of 100,000 hp., output to be used for Government nitrogen works.

New Trade Publications

Gas vs. Acetylene for Cutting. — International Acetylene Association, 30 East Forty-second Street, New York. Pamphlet of 24 pages, containing two addresses on this subject before a recent association meeting, one giving results of a precise laboratory study, the other citing experience at several shops where both systems of cutting have been in use.

Electric Switches and Containers.—Allen-Bradley Co., Milwaukee. A number of bulletins and price sheets covering a variety of starting and stopping switches and other like equipment for electric power use. Information and illustrations are in considerable detail.

Fuel Feed for Gas Producers.—Wellman-Seaver-Morgan Co., Cleveland. Bulletin 90 describes and illustrates a new type of fuel feed for mechanical gas producers. Passing of the fuel from the overhead bin to the producer is controlled by two bells which are lowered and raised alternately.

Centrifugal Pumps.—Aldrich Pump Co., Allentown, Pa. Data bulletin 70 of 16 pages illustrates and describes in considerable detail single-stage, double-suction centrifugal pumps rated from 20 to 14,000 gal. a minute. Speeds vary from 690 to 1750 r.p.m. Tables of particulars give clearances and other items in the design.

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THE IRON AGE

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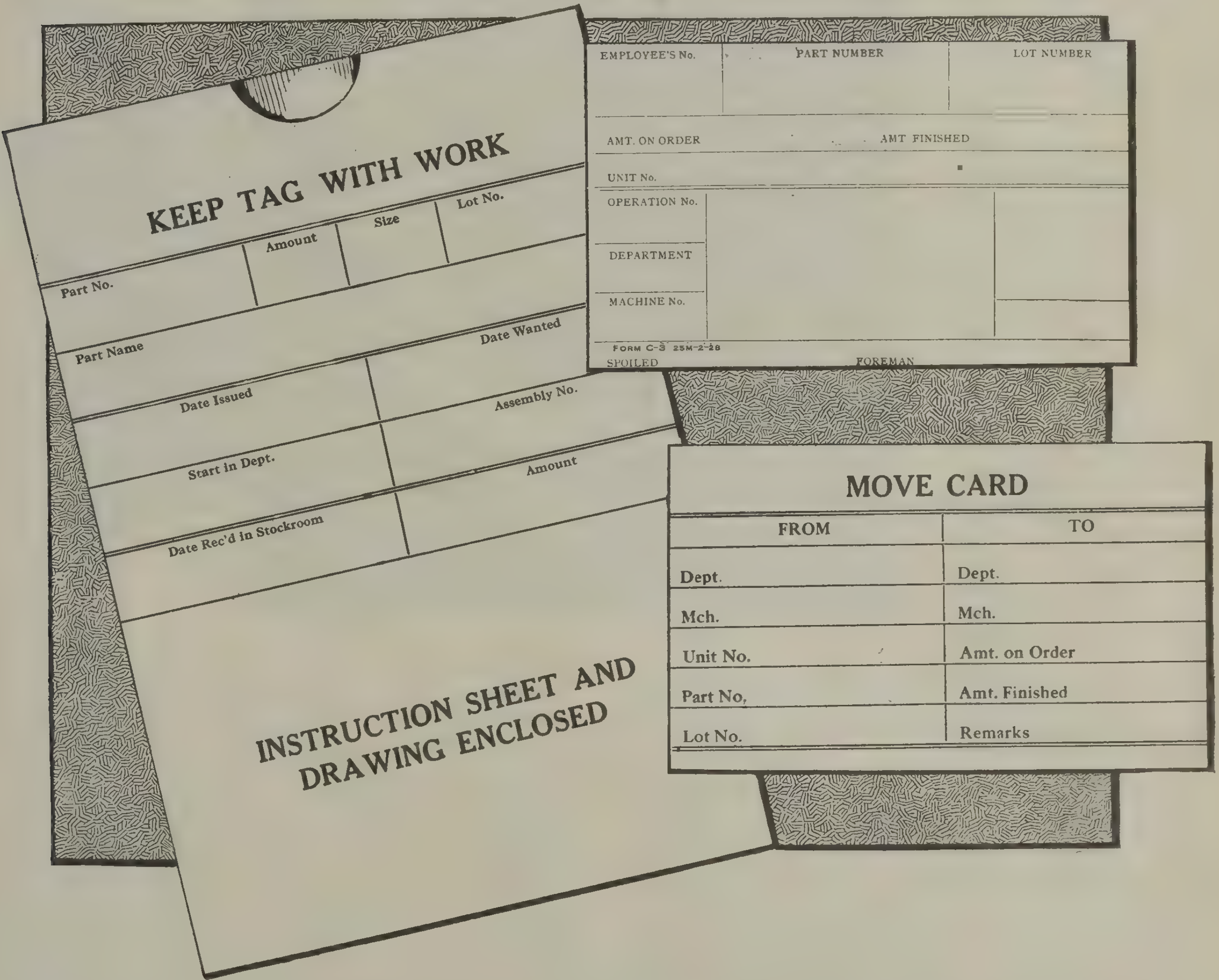
Mass Manufacture of Lathes

Production Control System, Routing and Mechanical Handling, and Special-Purpose Equipment Reduce Costs at Moderate-Sized Plant

BY BURNHAM FINNEY*

THAT methods of mass production successfully used by automobile makers and by other large industrial manufacturers can be adapted to the needs of the machine tool builder in achieving lower operating costs is indicated by the experience of the Monarch Machine Tool Co., Sidney, Ohio, manufacturer of engine lathes. To enumerate the ways and means by which this company has planned its activities along the lines of quantity output, however, would be telling only part of the story of how production economies and greater shop efficiency have been brought about, because the system for controlling production,



KEEP TAG WITH WORK

Part No. | Amount | Size | Lot No.

Part Name

Date Issued | Date Wanted

Start in Dept. | Assembly No.

Date Rec'd in Stockroom | Amount

INSTRUCTION SHEET AND DRAWING ENCLOSED

EMPLOYEE'S No. | PART NUMBER | LOT NUMBER

AMT. ON ORDER | AMT. FINISHED

UNIT No.

OPERATION No.

DEPARTMENT

MACHINE No.

FORM C-3 25M-2-28

SPOILED | FOREMAN

MOVE CARD

FROM	TO
Dept.	Dept.
Mch.	Mch.
Unit No.	Amt. on Order
Part No.	Amt. Finished
Lot No.	Remarks

(At Left) "Work Tag," Which Follows Parts Through Various Operations Until They Reach the Stockroom. In it are put the time cards of the men in the sub-assembly department who have worked on the order

(Upper Right) Time Card, Which Is Filled Out by Workmen and Put Inside the Envelop Known as the Work Tag

(Lower Right) This Card Is Made Out by Department Foremen When Material Is Ready to Be Moved Forward for the Next Operation

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*Resident editor of THE IRON AGE at Cincinnati.

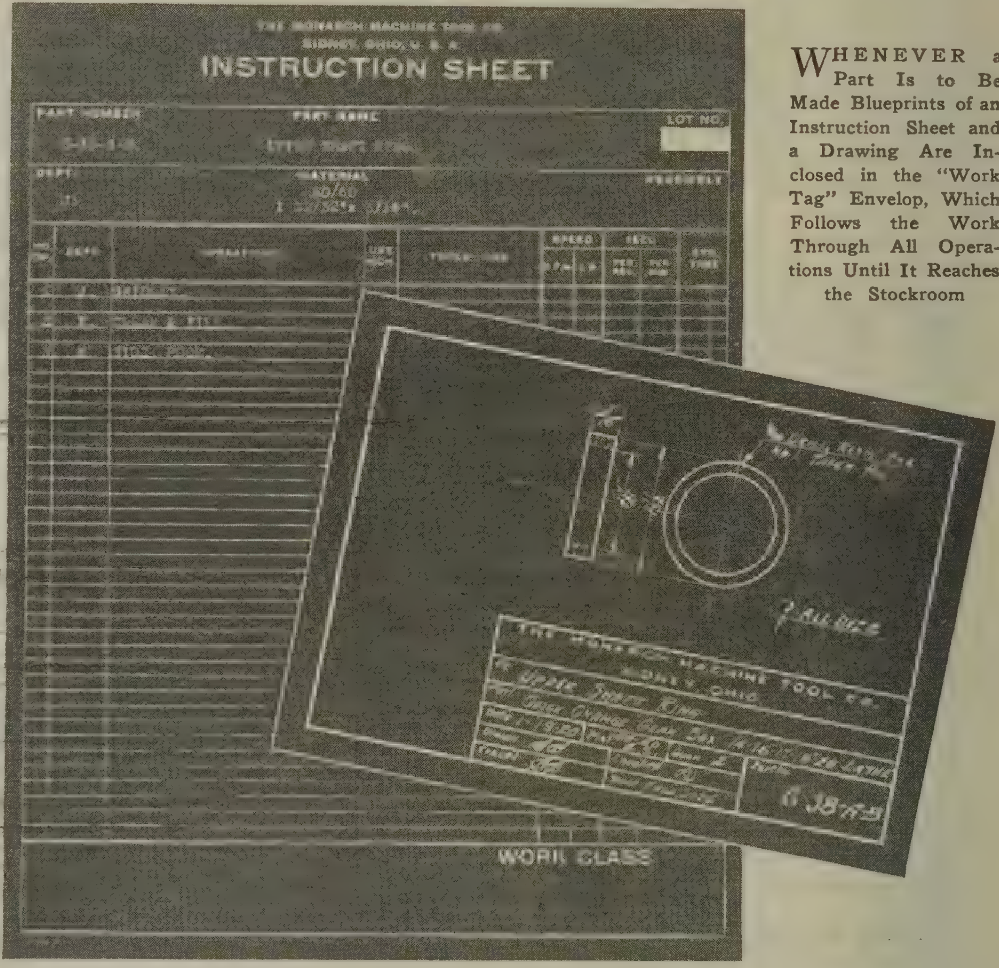
the manner in which inventories are determined and the process for handling materials are factors in the final calculation of results.

While the layout of the company's plant is not ideal so far as straight-line production is concerned, routing of work has been so arranged that no backtracking is necessary. The stockroom for finished parts might well be called the division line separating the machine shop and the sub-assembly departments from the final assembly department. Parts for Monarch engine lathes are made up in quantities, according to orders issued by the production department. For example, a number of gears are put through the shop at one time, with the result that the expense of changing set-ups is reduced to a low point.

Raw Material Needs Estimated on Basis of Pending Business

To have enough raw material on hand to meet requirements without accumulating a surplus is a problem which has been met successfully. Instead of basing its needs upon the amount of business done in the previous year or upon other data which might lead to erroneous conclusions, the sales department reports to the management the number of outstanding proposals which have been made by Monarch dealers. This is possible, because each dealer is obliged to send to the company a copy of each inquiry he receives and also a copy of his quotations to prospective buyers. The management knows from past experience that orders are likely to come from a certain percentage of the total inquiries. When this figure is arrived at, it is added to the number of orders on which work is being done, so that an intelligent conception is gained of the quantity of material which must be purchased.

Whenever an order is received by the company, a factory order form is filled out, copies going to the bookkeeper, the order department, the production department, the stock department, the cost department and the shipping department. Copies are also sent to the dealer and the customer.



THE MONARCH MACHINE TOOL CO.
SIDNEY, OHIO, U. S. A.
INSTRUCTION SHEET
LOT NO.
WORK CLASS

WHENEVER a Part Is to Be Made Blueprints of an Instruction Sheet and a Drawing Are Inclosed in the "Work Tag" Envelop, Which Follows the Work Through All Operations Until It Reaches the Stockroom

"Work Tag" Follows Parts Through All Operations

When the production department receives the order, it ascertains from its files whether the necessary parts to fill the order are in stock. If not, it prepares an instruction sheet containing the name of the part desired, the list of operations through which the part must go and the name of the department to which the part is sent for the first machining work. Attached to the instruction sheet is a blue print of the part. If an upper shaft ring for a quick change gear is needed, for example, the instruction sheet shows that the first operation is in Department J on a Gridley automatic, the second operation is cleaning and filing in Department W, from which the casting goes to the stockroom, known as Department X.

When the instruction sheet and the drawing are sent out from the production department they are inclosed in an envelope called a "work tag." On the exterior of the envelop is information concerning the name of the part, its number, the amount desired, the size, the date issued, the date wanted, the department in which the work starts, the date received in the stockroom and other pertinent data. The "work tag" follows the parts through their various operations until they reach the stockroom. Upon arrival at that point, the tag is returned to the production department, where it is filed.

"Move Card" Authorizes Transfer of Material to Next Department

When parts are ready to be sent from one department to another, the foreman fills out a red "move card" authorizing the transfer of the material to the next department listed on the instruction sheet. The "move card" is given to the shifter handling the material, who turns it over to the foreman of the department to which the parts are in process of delivery.

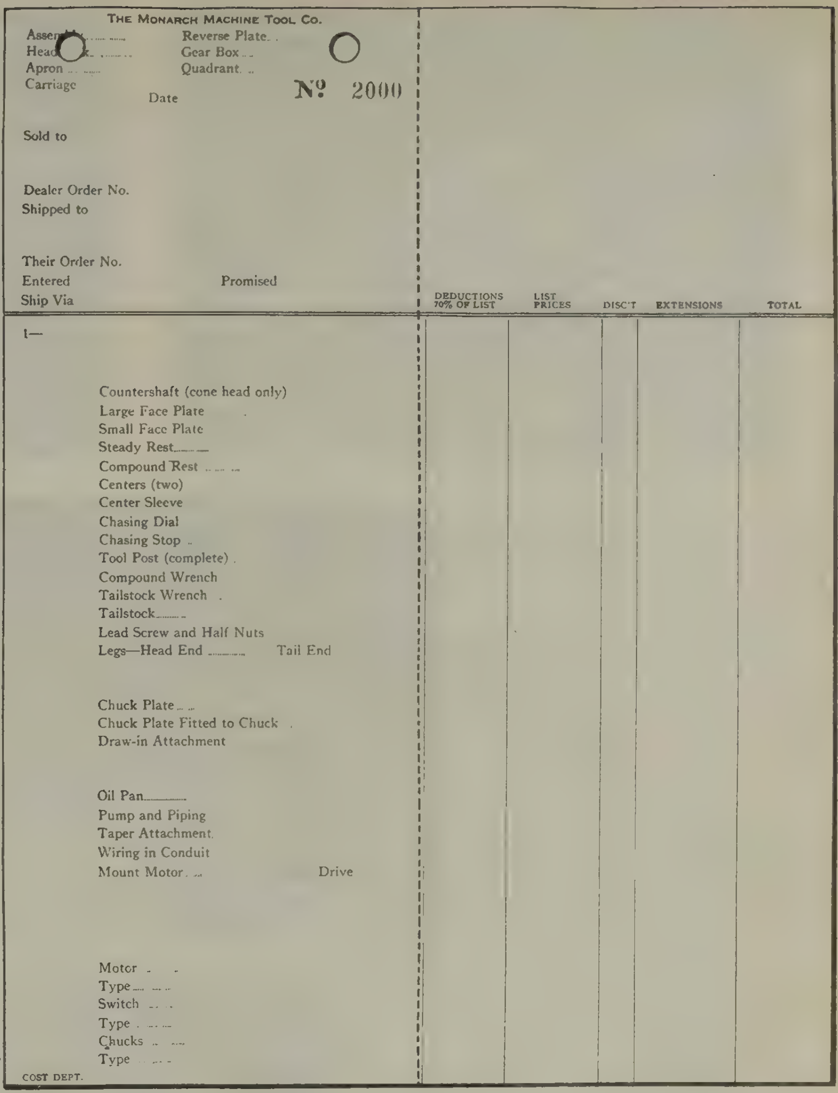
In case the assembly of certain parts is ordered, the production department makes out a work tag and sends it to the stockroom for finished parts. There it is placed with the parts which are to be assembled in the sub-assembly department and accompanies them through the assembling operations and back to the finished stockroom. As the work tag goes from one operation to the next, workmen put in it small time cards stating the amount of time spent on that particular job. After the work tag returns to the stockroom, it is dispatched to the production department, where it is filed. From the time cards contained in the work tag envelop the production department can quickly determine the labor cost in assembling any part.

Each operator in the machine shop is furnished with cards on which he registers the time spent on every job. The cards in each department are collected daily and are sent to the production department, which thereby has an accurate record of the work done by every employee.

Record Kept of Cost of All Sub-Assemblies

The production department keeps a record of the cost of all sub-assemblies, an assembly cost card being provided for that purpose. On one side of the card is a list of the operations through which the work has passed, the time spent by the workmen and the rate they received, from which is computed the labor cost, the burden and the burden cost. At the right side of the card is a summary of the costs of material, labor and burden, the total cost and the cost of each sub-assembled part. On the back of the card is detailed the cost of all materials going into sub-assemblies.

Through the comparatively simple record system just described the production department is able to control operations throughout the plant and to have detailed information regarding costs, the amount of finished parts and sub-assemblies on hand and the volume of work in process in the shop. Whenever the time expended on a specific operation is wanted, the department has in its files the time cards of the men who have worked on the job. If a time study is to be made of an operation performed on a new machine or by



THE MONARCH MACHINE TOOL CO.

Asse[illegible] Reverse Plate
Head[illegible]k Gear Box
Apron Quadrant
Carriage
Date
Nº 2000

Sold to

Dealer Order No.
Shipped to

Their Order No.
Entered Promised
Ship Via

DEDUCTIONS 70% OF LIST	LIST PRICES	DISC'T	EXTENSIONS	TOTAL

1—

Countershaft (cone head only)
Large Face Plate
Small Face Plate
Steady Rest
Compound Rest
Centers (two)
Center Sleeve
Chasing Dial
Chasing Stop
Tool Post (complete)
Compound Wrench
Tailstock Wrench
Tailstock
Lead Screw and Half Nuts
Legs—Head End Tail End

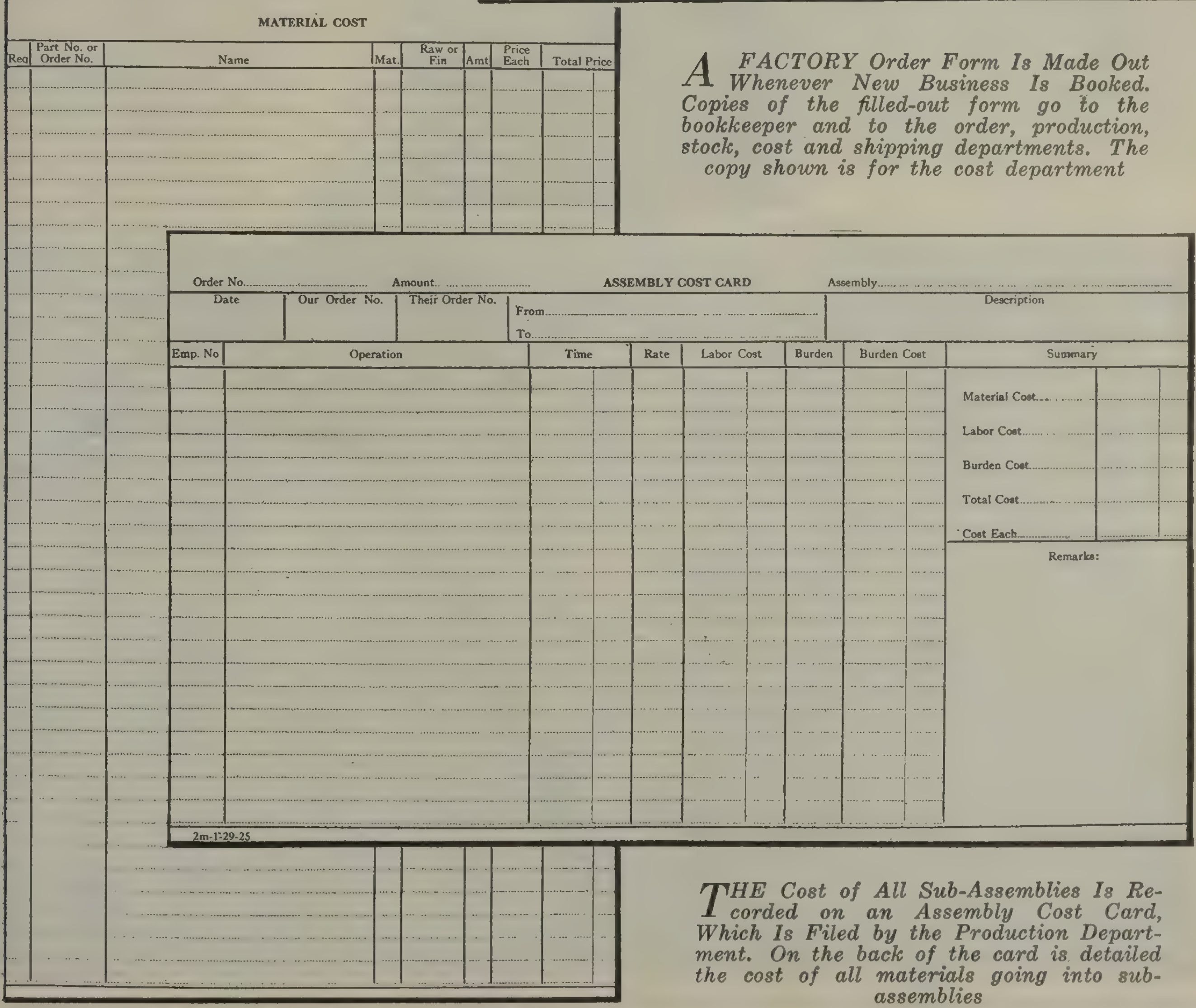
Chuck Plate
Chuck Plate Fitted to Chuck
Draw-in Attachment

Oil Pan
Pump and Piping
Taper Attachment
Wiring in Conduit
Mount Motor Drive

Motor
Type
Switch
Type
Chucks
Type

COST DEPT.

A FACTORY Order Form Is Made Out Whenever New Business Is Booked. Copies of the filled-out form go to the bookkeeper and to the order, production, stock, cost and shipping departments. The copy shown is for the cost department



MATERIAL COST

Req	Part No. or Order No.	Name	Mat.	Raw or Fin	Amt	Price Each	Total Price

Order No. Amount ASSEMBLY COST CARD Assembly

Date	Our Order No.	Their Order No.	From To	Description

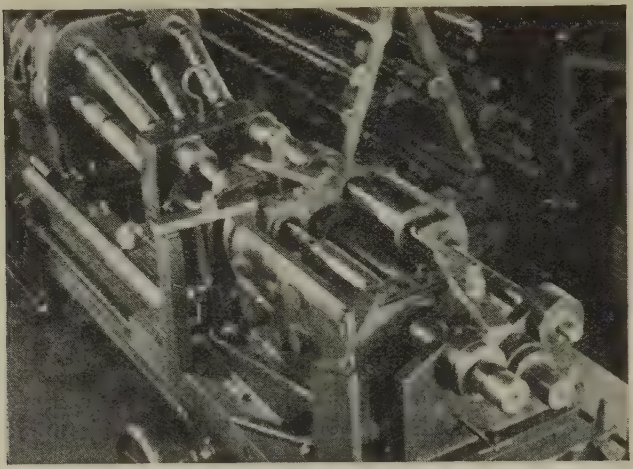
Emp. No	Operation	Time	Rate	Labor Cost	Burden	Burden Cost	Summary

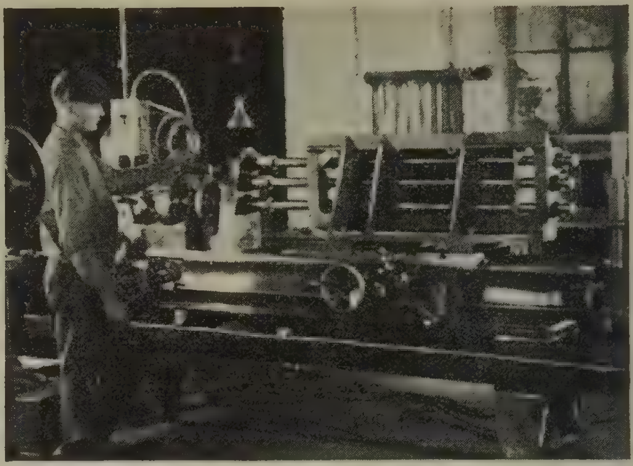
Material Cost
Labor Cost
Burden Cost
Total Cost
Cost Each

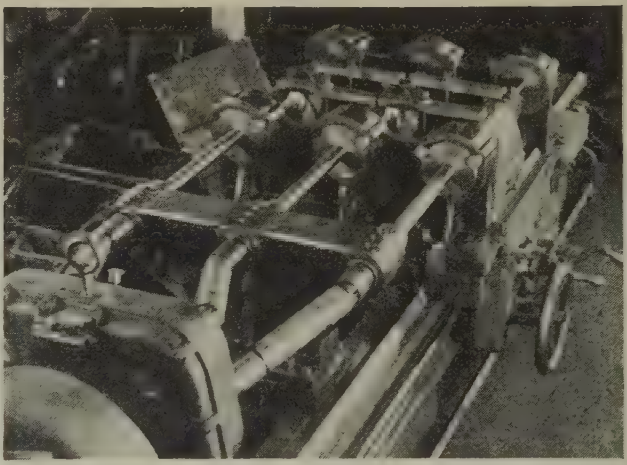
Remarks:

2m-1-29-25

THE Cost of All Sub-Assemblies Is Recorded on an Assembly Cost Card, Which Is Filed by the Production Department. On the back of the card is detailed the cost of all materials going into sub-assemblies



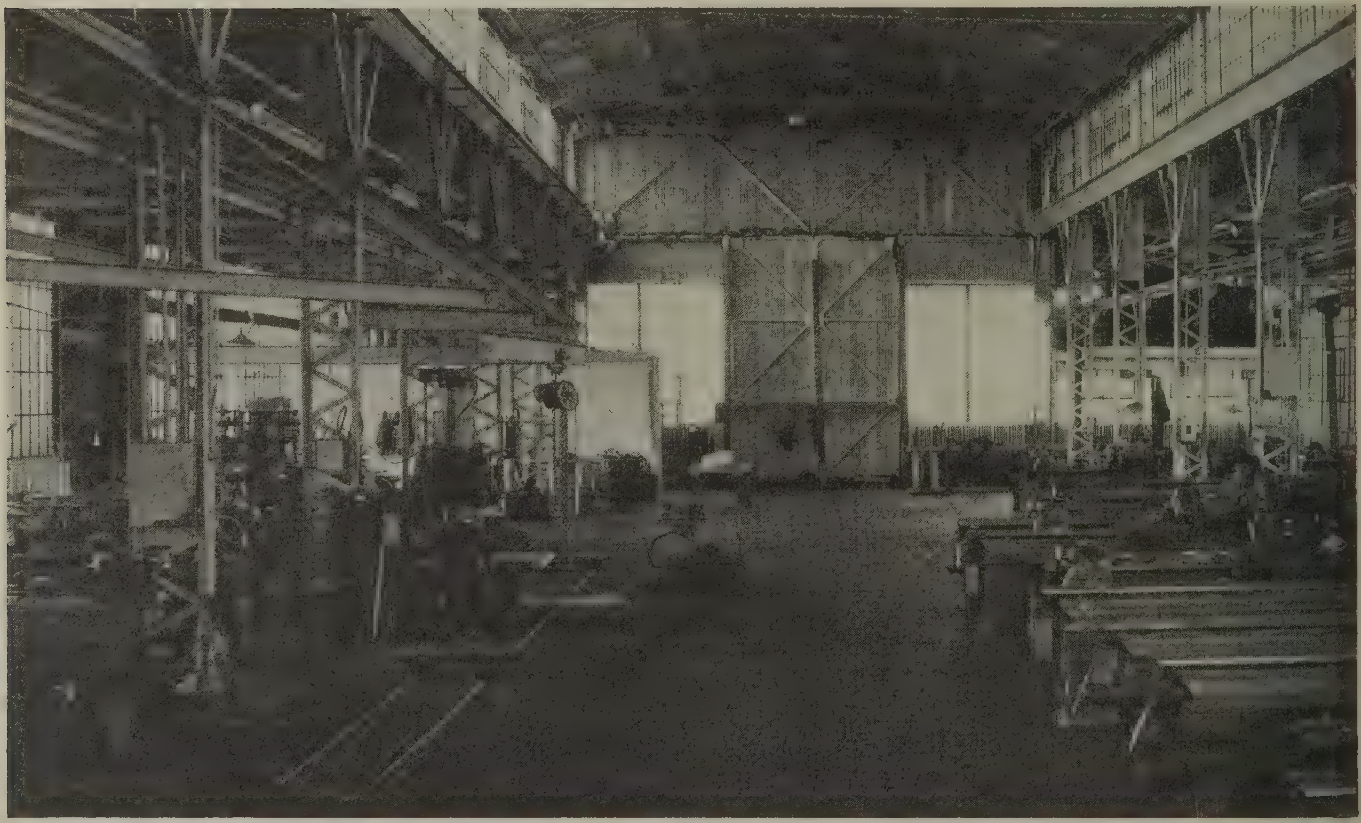




MULTIPLE Boring Is a Feature of the Machine Shop. At upper left, boring seven holes in a headstock at one time on a special boring machine. At upper right, simultaneous boring of 11 holes in a quick-change gear box in the time it takes to bore the largest hole. In upper center, boring three tailstocks at one time

MICROMETER Collars and Other Graduated and Numbered Parts Are Made with Roll Dies on Special Machines (in Lower Center)

Drilling Holes in Lathe Beds Is the Only Machining Operation in the Final Assembly Department (Below). The work is done on a radial drill, shown in the left background. Flat cars, 3 ft. square, on narrow-gage tracks are used to support the ends of a lathe bed when it is put into position for drilling



some other new method, it can be done without disturbing the normal routine of the shop.

Supervisory Committee and Conferences with Foremen Are Features of Management

Formerly it was the custom of the company to have two general superintendents in charge of the plant, but this arrangement resulted in an overlapping of duties which militated against attaining the greatest efficiency. The management, therefore, divided the responsibility by having one of the superintendents take charge of the machining division and the other the assembling division. To consider the formulation of new shop policies and to pass upon all matters of major importance relating to production there is a general supervisory committee consisting of the general manager, assistant general manager, chief engineer and the two superintendents.

Once a week each superintendent has a conference with each foreman under his supervision. In an intimate and informal way the two discuss the work of the men in the department and any other matters pertaining to operating efficiency. This plan puts squarely on the shoulders of the individual foreman his responsibility to the management. It also gives him a voice in discussing and deciding issues affecting his department and encourages him in developing initiative.

Monorail and Lift Trucks Facilitate Handling of Materials

Ample provision has been made in the plant for the mechanical handling of materials. From the receiving shed adjacent to the machine shop a monorail conveyor extends through the shop to the final assembly department. It is used principally to transport lathe beds, and is slightly inclined so that a workman pushing material suspended from it by a chain has an easy task.

For transporting small castings within and between various departments Stuebing-Cowan hand-lift trucks are utilized. Practically all castings, whether light or heavy, are kept on trucks which are stationed alongside the machine operators.

In the sub-assembly department a Louden overhead monorail system parallels the assembly lines, providing adequate means for moving materials. Serving the long bay occupied by the final assembly department is an electric overhead crane operated by rope controls from the floor. The runway of the crane extends over a railroad siding just outside the west end of the building and over the truck loading platform, which occupies a small space at the east end. Two workmen, with the aid of the crane, crate and load all of the lathes shipped by the company.

For drilling holes in the lathe beds, the only machining operation in the final assembly department, material is handled in an unusual manner. Small flat cars, about 3 ft. square, have been placed on a short narrow-gage track extending under and about 10 ft. on both sides of the drill. Whenever a lathe bed is put into position for drilling, each of the two ends rests on one of the cars, with the middle part of the lathe ready for the drilling operation.

To save time for workmen, the tool room, situated near the center of the shop, has windows on all four sides. Each workman has 10 metal checks. Whenever he applies for a tool, he deposits one of these checks, which is put on the rack from which the tool has been taken. Incidentally, the two men in charge of the tool room not only hand out small tools and jigs to the workmen, but also do all of the graduating on the graduating machines and do considerable tool and cutter grinding.

While parts are produced in quantities, care is exercised to make sure that the volume manufactured at any one time will not clog the stock room and will not require an inventory out of proportion to the normal amount of business obtained by the sales department. In fact, the number of parts put through on a shop order depends largely on what is the most economical set-up run for each part on each separate operation. Many parts for small-size lathes are run through in lots of 200, while some of the larger parts are put through in lots of only 25 or 50.

AMPLE Provision for Mechanical Handling of Materials Has Been Made in the Sub-Assembly Department. An overhead monorail system is suspended lengthwise of the assembly lines. Hand-lift platforms, which are transported within and between departments by lift trucks, are also used. One is shown in the foreground

Semi-steel lathe beds are rough-planed and rough-milled and are stored for a period of two months for air-seasoning. Over 1500 are being seasoned at all times. After the seasoning process, the beds are finish-planed. All castings are ground, chipped, cleaned and painted by an air-brush system before machining.

Quantity Machining Yields Economies

Among the factors which have been responsible in large part for reducing costs is the time saved by various machining operations. Lathe carriages are milled in a fraction of the time formerly required by planing, large lots being machined at each set-up. Quantity production of clutches is attained on a clutch milling machine which indexes automatically and is equipped with power rapid traverse between cuts.

Multiple tooling is achieved to a high degree in boring processes. Eleven holes are bored in a quick-change gearbox in the time that is necessary to bore the largest hole, while seven holes are bored in a headstock at one time on a special boring machine.

Lead screws, rough-chased and seasoned, are finish-chased on lathes fitted with precision screws. Micrometer collars and all other graduated and numbered parts are made with roll dies on special machines, and helical gears are cut by the hobbing process with ground hobs, roughing and finishing cuts being taken. High-carbon alloy steel gears used in Monarch lathes are given the same heat treatment as automobile transmission gears, are tested for hardness and are cleaned by sand blasting.

The final assembly department is divided into three units. The first of these is a small unit in which small junior lathes are assembled, the second is utilized for standard-pattern lathes ranging in size from 14 to 20 in., while heavy duty lathes, varying in size from 20 to 30 in., are assembled in the third. In addition, a special unit is maintained in which lathes intended for single-purpose work are assembled. Each unit is manned by a trained crew of specialists. Every assembling and alining operation is inspected, with 0.001 in. allowed as the limit of error. Experience has shown, however, that the average error is less than half of that amount.

From the assembly department the finished lathe passes to the final painting room where the last coat of lacquer enamel is sprayed on. The company is prepared to furnish lathes in any color which fits into the shop color scheme of its customers.

Each of the factors enumerated has contributed its share to the reduction of manufacturing costs and to increased efficiency of production. Considered as a whole, they have made possible the application to this moderate-sized plant of the methods usually associated with companies annually turning out thousands of units instead of 1000, the average number of engine lathes manufactured annually by the Monarch Machine Tool Co.

Overcoming the Tendency of Enameled Cast Iron Ware to Blister

Blisters on enameled cast iron ware may be traced either to faulty enamels and process of application or to the castings themselves is the conclusion reached by the metallurgical and ceramic divisions of the United States Bureau of Standards. Recently the bureau has been studying the latter type of blisters. Differences in the blistering tendencies of different sets of castings were clearly brought out by an enameling test which included a variety of firing treatments. Using this test it was found that not only do different irons have different blistering tendencies, but successive heats of the same iron may have different blistering tendencies. The main source of blisters from the irons used in this work was overcome by the removal of a thin surface layer of the castings, through either mechanical or chemical means.

Metal Traffic Through Sault Ste. Marie Canal

Figures of the 1927 commerce passing through the canal of Sault Ste. Marie have been issued by the Corps of Engineers of the United States Army. The total amount of east-bound iron ore is given as 49,963,131 net tons, all of which went through the United States canal. Pig iron shipped eastward through the canals aggregated 78,772 tons, of which 57,900 tons came through the American canal and 20,872 tons through the Canadian canal. Copper to the amount of 67,422 tons came eastward, of which 63,963 tons passed through the American canal.

West-bound iron ore aggregated 134,937 tons, more than 99 per cent of which went through the American canal. Manufactured iron and steel to the extent of 115,502 tons went westward through the canals, of which 82,240 tons traversed the American canal.

High-Pressure Steam Plant Described

Melvin D. Engle of the Edison Electric Illuminating Co. of Boston was the speaker on April 3 before a meeting of the Providence Engineering Society, Providence, R. I. He told of the first commercial use of 1200-lb. steam pressure anywhere in the world. His description was of the Edgar station of the Edison company, which contains, among other things, the largest single-barrel, single-flow, 1800 r.p.m., turbo-generator unit designed for 350 lb. pressure; the largest 1200-lb. pressure turbo-generator; the largest boiler feed pumps, as measured in power required; and the largest underfeed stokers of any plant in the world.

The speaker traced the great improvements of the past two decades in the design and operation of central station equipment. During this period cast iron has been replaced by steel in turbine shells; brass or bronze by steel, monel metal and stainless iron in turbine blades; heat-proof insulating material has been developed, and countless changes have been made in details and in methods of manufacture. Coal consumption has been cut virtually in half, and the use of equipment of large capacity has tended to hold down the capital charge per unit of installed capacity.

Improvement in Welding Electrodes

The Fusion Welding Corporation, which operates as the welding equipment and supply division of Chicago Steel & Wire Co., 103rd Street and Torrence Avenue, Chicago, has completed an engineering and research laboratory. Included are well equipped workrooms supplied with various forms of alternating and direct current for welding, as well as oxy-acetylene cutting and welding equipment, and apparatus for testing of welds. There is also a photographic darkroom equipped with the latest type of metallographic microscope. The laboratory has also been used for instructing select groups of engineers studying some special phases of welding. It is planned to establish full working exhibits, not only at the engineering laboratory in Chicago, but also at the company's offices in New York, Cleveland, Kansas City, Mo., and San Francisco.

Development work recently completed by the engineering department has produced two new mild steel welding electrodes, known as "blue streak" and "yellow jacket." "Blue streak" is a full flux coated electrode and is said to melt more rapidly than the fastest flowing bare wire and, at the same time, having excellent stability. It is especially suited to the welding of the medium and lighter gage plates and sheets. "Yellow jacket" is a surfaced electrode, and is designed to give extreme penetration when used with high current on heavy material. In the laboratory ½-in. mild steel plates have been successfully welded without beveling the edges at a rate of over 20 ft. per hr.

Mechanization of coal mines will be discussed at the April meeting of the Ohio section of the American Institute of Mining and Metallurgical Engineers, to be held in Columbus, April 21. Technical papers will be presented during afternoon sessions at the chapel of Ohio State University. Among the speakers will be J. W. Wilson, Link-Belt Co., Chicago, who will discuss modern coal cleaning methods. The Jeffrey Mfg. Co., Columbus, will present moving pictures of loading and conveying machinery. Registration will be at the plant of the International Derrick & Equipment Co.

Steels Made Under New Conditions

Results of German Tests with a High-Frequency Induction Furnace—Carbonless, Carbon and Alloy Steels Show Unusual Properties—Future Possibilities*

WORK in connection with a high-frequency furnace installation at the Kaiser Wilhelm Institute for Iron Research, Düsseldorf, Germany, during the winter of 1925-26 led to the conclusion that very strong circulation of the metal bath, a fundamental characteristic of the ironless induction furnace, would lead to new working conditions for the basic chemical reactions in producing steel.

The following are the results of a systematic investigation of the capabilities of the high-frequency furnace for producing steel, which demonstrate the improvement that this new type of furnace offers for making alloy steels.

Refining Accelerated in a High-Frequency Furnace

Acceleration of the speed of refining, due to the active bath movement, was observed in several experiments. A steel bath, under a normal refining slag, was brought from 0.14 per cent carbon to 0.03 per cent in 2 min. In another case, a low-carbon stainless steel was produced by adding ferrochrome of 4.8 per cent carbon and 64.9 per cent chromium to a carbon-free bath. Directly after the chrome addition, the melt contained 1.04 per cent carbon and 14.5 per cent chromium. After a refining period of 96 min., the carbon was reduced to 0.16 per cent and the chromium to 13.42 per cent.

A strong bath movement also presents some undesirable factors when melting solid material, due to a "settlement" that forms on the bottom of the furnace, which is constantly turned over with the continually renewed surface taking up oxygen from the furnace atmosphere. For this reason, it is preferable to use fluid charges when using an ironless induction furnace for steel work.

The effect of deoxidation in the strongly circulated bath was investigated by additions of manganese, silicon and aluminum in over-refined heats. The weight of the experimental heats was 40 kg. The additions of metallic manganese, silicon and aluminum were made after the heat was refined to 0.01 to 0.03 per cent carbon, under a lime-fluorspar slag or sand slag. The decrease of the various constituents was determined by continuous sampling, and is shown in Figs. 4 to 9.

In the basic-lined furnace, the silicon and aluminum content fell very quickly, while the manganese fell more slowly. On the other hand, in the acid furnace, the manganese and aluminum decreased rapidly, while the reduction in silicon was somewhat slower. It should be especially noted that the content was reduced to 0.01 per cent and less without the addition of any refining matter. We can conclude from the reduction curves that, as a result of the energetic bath movement, a very rapid reaction is obtained between oxygen combined with the iron and the deoxidizing constituents, and, at the same time, the resulting deoxidized products very rapidly and completely leave the bath and go into the slag—with proper slag procedure.

The following described experimental heats were made in a basic furnace lined with magnesite. After melting the charge, two phosphorus slags and finally one sulphur slag were built up.

Carbonless Steel Made in High-Frequency Furnace

A direct proof for the conclusions, made from the above washing-out experiments, is given by heats Nos. 69, 71 and 103 in Table I.

These are completely free of hot-shortness, although they contain only a very small amount of manganese and silicon with the very low-carbon content of 0.01 per cent. The heats Nos. 69, 71 and 103 were poured directly after the washing-out process without adding any further deoxidizing matter, in order to prove that this treatment would make them free of hot-shortness.

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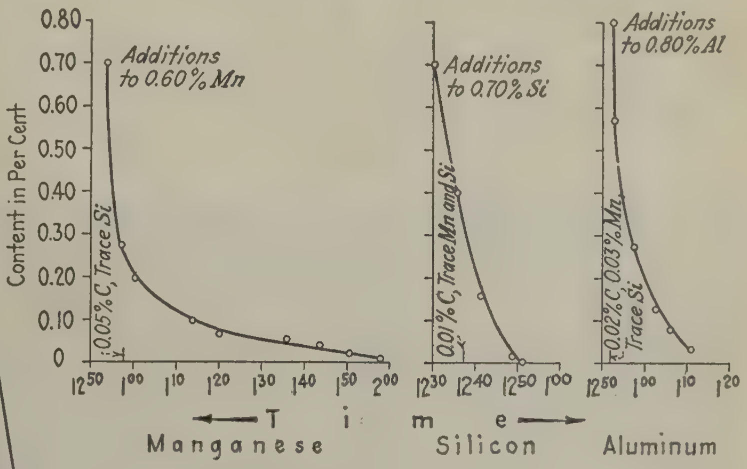
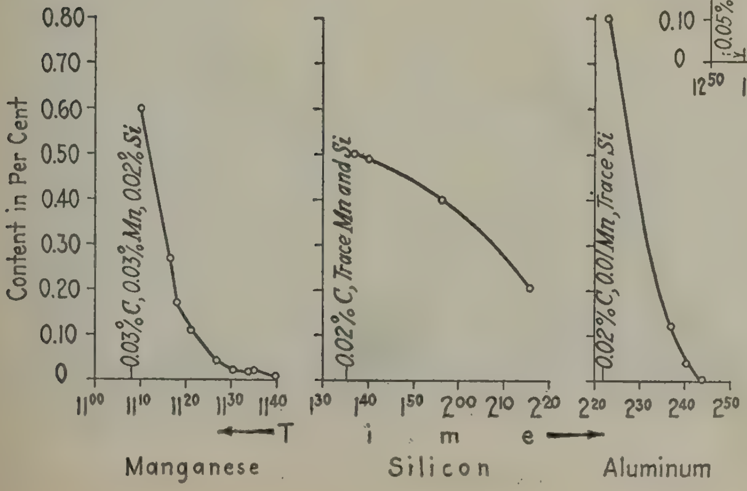
*Abstract of a paper by Franz Wever and Heinz Neuhauss in the *Proceedings* of the Kaiser Wilhelm Institute for Iron Research, Düsseldorf, Germany, Vol. VIII, No. 11. Prepared by William Adams, one of the engineers of the Ajax Metal Co., Philadelphia.



Figs. 4, 5 and 6 (Right).—Manganese, Silicon and Aluminum Separations in a Basic Furnace. Silicon and aluminum content fell rapidly



Figs. 7, 8 and 9 (Left).—Manganese, Silicon and Aluminum Separations in an Acid Furnace. Manganese and aluminum percentage decreased rapidly

Bars from these heats, bent at a dull red heat, were eminently satisfactory.

A billet from heat No. 103 was rolled into bars measuring 18 x 4.5 mm. Some of this was also rolled into sheet. Samples of this sheet, in 50 and 100 mm. widths, were cold rolled, 9 to 11 passes, with a speed of 30 meters per minute without heat treatment between the passes, and brought down to 0.2 mm. (90 per cent reduction in area).

Table I—Analysis of Carbonless Steels
(In Per Cent)

No. of Heats	C	Mn	Si	P	S	Cu	Al	Cr
69	0.01	0.17	0.15	0.015	0.033	0.10	0.01	....
71	0.01	0.13	0.15	0.014	0.017	0.09	0.02	....
103	0.01	0.14	0.22	0.010	0.010	0.05	...	....
95	0.01	0.46	0.22	0.005	0.017	...	...	....
99	0.02	0.49	0.22	0.006	0.013	...	...	12.67
105	0.01	0.52	0.23	0.010	0.012	...	...	12.22
102	0.16	0.43	0.09	0.008	0.049	...	...	13.42
106	0.15	0.44	0.17	0.010	0.020	...	...	13.20

A non-rusting chrome iron (rustless iron), containing very little carbon was also produced (Heat No. 99, Table I). This material was tested at the firm of Sack, Düsseldorf-Rath, after being forged from a 90-mm. square section to a 58-mm. round section. It was turned to 55 mm. diameter and then made into a tube in one operation. The tube, which measured 65 x 3.5 mm., did not show the smallest defect, inside or outside.

In order to verify these good results, heat No. 105, Table I, of the same analysis, was forged and rolled into a tube, 89 x 3½ mm., in two operations, by an automatic machine. The tube was perfectly smooth inside and outside and free from defects, although it had cooled to below 700 deg. at the last operation. After these excellent results from the carbon-free ferrochrome ingot No. 105, the heat No. 106, Table I, containing 0.15 per cent carbon, 13.2 per cent chromium and 0.44 per cent manganese, was given a rolling test. As previously described, this metal had been alloyed with hard ferrochrome and refined from 1.04 per cent carbon to its final content. The ingot, after being forged from a 90-mm. square section to an 88-mm. round section and turned to 75 mm., was readily rolled into a tube, 76 x 3 mm., in four operations on an automatic machine.

Carbon Steels Made in High-Frequency Furnace

Strong circulation in the ironless induction furnace has still greater advantages for producing higher carbon steels, because in this case the bath may be cleansed of any oxygen with carbon, to form carbon monoxide gas. The method of procedure is as follows: After removing the phosphor slag, pieces of carbon are laid on the bath, and, at the same time, a lime-fluorspar-carbon slag covers the bath surface. The bath movement then continually brings new metal particles in contact with the carbon so that any oxide in the bath is quickly and completely reduced. At the beginning of this process the bath boils considerably, but becomes very calm with increasing deoxidation. The following is a complete charging process:

Charging Process for Heat No. 97

Metal charge—40 kg. tube and sheet scrap, and Krupp soft iron.
8.15 o'clock—Power connected; meter reading 9418 kwhr.
9.55 o'clock—Charge melted; meter reading 9481 kwhr., lime and fluorspar charged.
10.10 o'clock—100 gm. hammer-scales.
10.15 o'clock—First phosphor slag removed; lime and fluorspar charged.
10.25 o'clock—100 gm. hammer-scales.
10.35 o'clock—Second phosphor slag completely removed.
10.36 o'clock—Sulphur slag charged.
(One part charcoal, by weight)
(One part fluorspar, by weight)
(Four parts lime, by weight)
10.40 o'clock—175 gm. carbon electrode material added; bath is turbulent.
10.56 o'clock—First test: 0.37 per cent C, 0.18 per cent Mn. Bath is less turbulent and hot; 153 gm. carbon electrode material added.
11.06 o'clock—Second test: 0.95 per cent C. Bath is very quiet; 70 gm. carbon electrode material added.
11.18 o'clock—Third test: 1.05 per cent C.
11.30 o'clock—60 gm. carbon electrode material added.
11.43 o'clock—58 gm. ferromanganese inserted. (75 per cent Mn., 6 per cent C).
11.46 o'clock—Charge poured in ladle; 7 gm. Al and 40 gm. FeSi (93 per cent Si) added.
Final analysis: 1.32 per cent C, 0.25 per cent Mn, 0.12 per cent Si, 0.013 P, 0.011 per cent S.

Table III—Summation of Repeated Hardening Results

No.	C	Mn	Si	P	S	As	Cu	Al	O_2	No. of hardenings to first level; heating in salt bath and quench in brine		
	Per Cent											
High-Frequency Steel:												
61	0.82	0.39	0.26	0.013	0.018	...	0.08	0.02	...	12	12	13
58	0.93	0.16	0.14	0.013	0.024	0.02	0.16	0.01	...	12	12	12
98	0.93	0.27	0.17	0.030	0.020	...	...	Trace	...	20	20	21
52	1.07	0.17	0.07	0.017	0.018	...	...	...	...	17	18	17
100	1.00	0.28	0.15	0.023	0.014	...	0.06	Trace	...	18	22	24
59	1.14	0.16	0.13	0.020	0.016	...	0.07	0.02	...	17	18	19
68	1.30	0.28	0.27	0.014	0.013	...	0.09	0.01	.033	27	27	27
96	1.30	0.26	0.18	0.017	0.009	...	...	Trace	...	28	28	29
97	1.32	0.25	0.12	0.013	0.011	...	...	Trace	...	29	31	32
Clay Crucible Steel:												
	1.11	0.64	0.26	0.026	0.032	...	0.10	Trace	...	17	19	19
	1.30	0.26	0.17	0.019	0.019	Trace	0.04	Trace	...	19	19	20
Graphite Crucible Steel:												
	0.94	0.34	0.19	0.010	0.038	.020	0.12	0.018	...	14	14	15
	1.19	0.38	0.22	0.016	0.040	.019	0.12	0.024	Sn	23	24	25
Electric Steel:												
	0.78	0.27	0.24	0.014	0.013	...	...	...	.039	9	10	10
	1.15	0.26	0.21	0.009	0.014	...	...	...	.039	25	25	26

Table IV—Bending Strength, Fracture Examination and Hardness of a Ball Bearing Steel with Various Hardenings

No.	Treatment, Oil, deg. C.	Outside Diameter, mm.	Wall Thickness, mm.	Length, mm.	Inside Diameter, mm.	Loading, kg.	Bending Strength, kg. per sq. mm.	Fracture	Hardness, 5/750	Rockwell, C
1	780	53.92	6.00	9.92	47.92	1430	183.7	Fine grain struc.	241	24.3
2	780	53.94	5.96	9.82	48.08	1630	214.8	Fine grain struc.	249	23.9
3	780	53.95	5.98	9.88	47.97	1470	191.2	Fine grain struc.	234	27.0
4	800	53.91	6.02	9.96	47.89	1780	226.0	Very fine	653	63.2
5	800	53.97	6.02	9.94	47.95	1660	211.8	Very fine	653	63.2
6	800	53.94	6.02	9.92	47.92	1830	233.5	Very fine	653	63.8
7	820	53.98	6.00	9.95	47.98	1150	147.3	Satiny	653	64.5
8	820	53.98	5.97	9.96	48.01	1520	196.5	Satiny	653	65.1
9	820	53.97	6.00	9.90	47.97	1340	172.8	Satiny	653	65.3
10	840	53.94	5.94	9.89	48.00	1170	154.0	Fine grain	653	66.7
11	840	53.95	5.96	9.93	47.99	1290	167.9	Fine grain	653	66.6
12	840	53.95	5.97	9.93	47.98	1100	143.1	Fine grain	653	66.4
13	860	53.98	5.96	9.95	48.02	1040	135.2	Fine grain	653	67.9
14	860	53.93	5.95	9.90	47.98	1040	136.1	Fine grain	653	67.7
15	860	53.95	5.98	9.88	47.97	980	127.3	Fine grain	653	66.9
16	880	53.97	6.00	9.96	47.97	1045	134.9	Partly overheated	653	68.2
17	880	53.96	5.98	9.98	47.98	1040	134.0	Partly overheated	653	66.9
18	880	53.96	5.97	9.97	47.99	1060	136.5	Partly overheated	653	66.7

Due to the tendency of the bath movement to pull the slag to the side walls, it was necessary to work with a comparatively thick slag covering. The temperature conditions in the small experimental furnace were also unfavorable for maintaining a white slag. In order that the results may be valued correctly, it should be borne in mind that in these experiments the bath was always over-refined after being melted down. As the heats No. 70 and No. 72 show, the over-refined metal may be brought back completely by deoxidation using a layer of carbon under a thick lime-fluorspar-carbon slag. In spite of the small manganese content (0.05 to 0.06 per cent), both heats were free of all hot-shortness. The carbon in the two heats was 1.14 and 0.84 per cent respectively, silicon, 0.23 and 0.19 per cent; phosphorus, 0.011 and 0.006 per cent, and sulphur, 0.005 and 0.007 per cent.

In order to arrive at some numerical expression for comparing the quality of the carbon steels melted with clay crucible, graphite crucible and electric steels, the Maurer repeating hardness test was used. A series of carbon steels of similar analyses were melted as outlined by the work of Maurer and Haufe (E. Maurer and W. Haufe, *Stahl und Eisen,* Vol. 44, 1926).

The test pieces measured 20 mm. square and 85 mm. long. They were notched in the middle of one side, the notch being 1.5 mm. wide and 3 mm. deep and perpendicular to the long axis. They were then hardened in brine to the first hardening level of 780 deg. C.

In order to test the sensitiveness of the steel against overheating, experiments were made with pieces hardened at temperatures between 760 and 950 deg. C. As a whole, the steels in Table III showed very little sensitiveness to overheating. In all pieces fractured, the fine grain lies inside of the hardened outer layer.

Tests on a Hard Alloy Steel

As an example for a hard alloy steel, a chrome ball bearing steel of the following analysis was melted:

(Heat No. 75) 1.18 per cent C., 0.46 Mn., 0.09 per cent Si., 1.45 per cent Cr., 0.02 per cent P, 0.012 S., 0.072 per cent O_2.

This was made into a tube, 55½ x 39 mm. Table IV shows the bending strength, fracture examination and hardness at various hardenings. The metallographic examination also showed a material free of all objections.

Similar Results Expected in Large Furnaces

The foregoing results of melting experiments up to the present time lead to the conclusion that the ironless induction furnace will play an important part in any further development of the electric alloy steels. These results are not to be attributed to a special working procedure attainable only in the laboratory, because we believe the main reason for the high excellence of the high-frequency steel is due to the fundamental improvement in the physical and chemical conditions brought about by the bath circulation.

These metallurgical fundamentals will remain the same in larger furnaces. Therefore, it is believed possible to transfer the results into large operations. The difficulty encountered when working with small furnaces due to the unfavorable relation of the working opening to the total top surface will be greatly improved with larger units.

Condenser Units with Self-Cleaning Surfaces

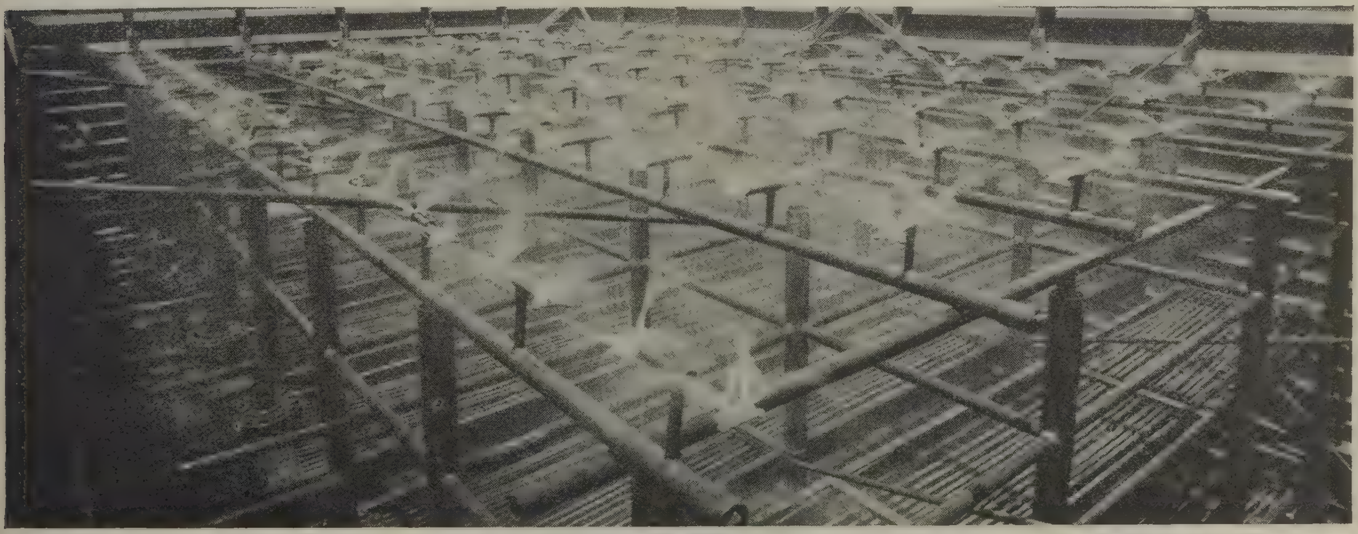
The Griscom-Russell Co., New York, has developed a new surface condenser or cooler unit, known as the G-R Bentube section. Essentially, each section consists of two cast iron headers fixed rigidly at proper distances apart by angle irons or other structural members. Between these headers are a series of admiralty metal tubes, somewhat too long for the intervening space. Each tube therefore possesses initially a slight bow, deviating from a straight line.

In operation the hot gas or liquid to be cooled enters the unit by one header, thence through the tubes to the other header, and from there to other Bentube units in series, or is returned to the main circulating system. Hot liquids inside the tubes cause them to expand in length, and increase the sidewise bow or curve. This change in curve with changing temperature is said to be sufficient to flake off any scale collecting on the outside of the tubes from the evaporation of the cooling water, which may therefore be quite hard or dirty.

Commercial Stocks of Industrial Coal Becoming Smaller

Estimates of the National Association of Purchasing Agents place the supply of coal in various industries at 26 days for steel mills, 36 days for by-product coke plants, 37 days for railroads, 51 days for electric and gas utility plants and 37 days for other industries. The total is given at 47,388,000 tons on March 1, compared with 50,595,000 tons Feb. 1. There has been a steady reduction since Oct. 1, when the total was 60,154,000 tons. Industrial consumption during February was placed at 36,301,000 tons, a drop of more than 3 per cent from the January total of 37,678,000 tons.

With only one more week of the coal year yet to hear from, estimates of the total production of the year ended March 31 include 480,000,000 tons of bituminous coal, compared with 600,000,000 tons a year ago. The figures are based on the latest reports from the United States Bureau of Mines. In anthracite, the coal year will show an output of about 78,700,000 tons, compared with nearly 92,000,000 tons last year.



Cooling Bed for Oil Vapors, Built of "Bentube" Sections

Chrome-Molybdenum Steel

SUCCESSFUL spanning of the Atlantic from East to West by the German-Irish flyers focuses attention on the importance of alloy steels in airplane construction. The steel described in this article made up the framework of the famous Lindbergh plane and of other planes which have made epoch-making flights in the last year.

BY J. B. JOHNSON*

THE survival of any alloy steel in the keen competition of commercial application depends upon the superior properties which the steel may have for performing any particular service. This is particularly true when it is used in aircraft construction. Aeronautical engineers are forced to conserve weight by the very nature of the conditions under which the airplane operates. Such conservation can be effected by using steels with a high strength-weight ratio and by designing members to utilize the material most economically. The former is obtained with heat-treated alloy steels and the latter by using shapes with a large moment of inertia, connected together by simple joints. A large moment of inertia is obtained by using hollow or built-up sections of thin material.

The most popular form of structural member is a seamless tube. Tubing of either circular or square cross-section can be readily adapted to the truss or bridge type of construction, which is almost universally used in modern aircraft. A carbon steel tube was used in the original airplanes and is still extensively used on the small commercial airplanes. With the increase in size of the airplane and the higher factors of safety demanded by the increase in horsepower of the engines, an alloy steel tubing is more economical of weight and more uniform in quality.

Three and one-half per cent nickel and nickel-chromium steels were utilized when the use of alloy tubing was confined to straight axles with a comparatively low ratio of diameter to wall thickness. These axles were heated during fabrication to develop a tensile strength of 200,000 lb. per sq. in., with a minimum elongation of 5 per cent, and were entirely satisfactory for the purpose.

With the more extended use of alloy steel tubing in the structure, however, it was found desirable to develop other alloys which could be more economically manufactured in very thin gages and large diameters, that is, with a large ratio of diameter to wall thickness, and which could be welded without a great reduction in tensile strength. Steel containing chromium and vanadium as the alloying elements could not be cold-drawn to the ratio desired without excessive waste, but the substitution of molybdenum for vanadium overcame this difficulty. Chrome-molybdenum steel is being used in the automotive industry for axles, torque tubes and other highly stressed parts, and its adaptation to aircraft use was a logical development.

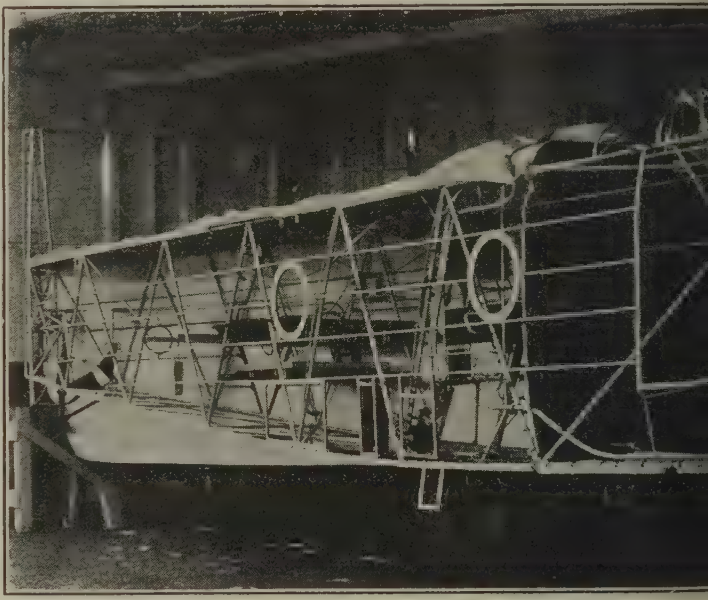


Fig. 1—Typical Assembly of Welded Truss

Chrome-molybdenum tubing is manufactured to any outside diameter and wall thickness which can be economically used in aircraft construction. The range of sizes is as extensive as for low-carbon tubing. The smallest size ordinarily used is ¼ in. in outside diameter by 0.028 in. in wall thickness. As the diameter increases, the ratio of diameter to wall thickness increases, and tubes over 2 in. in diameter with a wall thickness of 0.035 in. are commonly employed. The following analysis is called for in United States Army specifications and is used almost exclusively:

	Per Cent		Per Cent
Carbon	0.25-0.35	Chromium	0.80-1.10
Manganese	0.40-0.60	Molybdenum	0.15-0.25

This material has excellent weldability and has air-hardening properties in thin sections which are very desirable, since the tensile strength of a section close to the weld is not seriously affected.

Several tests have been reported by different investigators indicating that a tensile strength of 95,000

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*Chief of material branch War Department Air Corps, Dayton, Ohio.

in Airplane Construction

lb. per sq. in. can be obtained in this material after cooling from the welding heat. The following results obtained on plain butt welds were given in a recent paper prepared for the American Welding Society[*]:

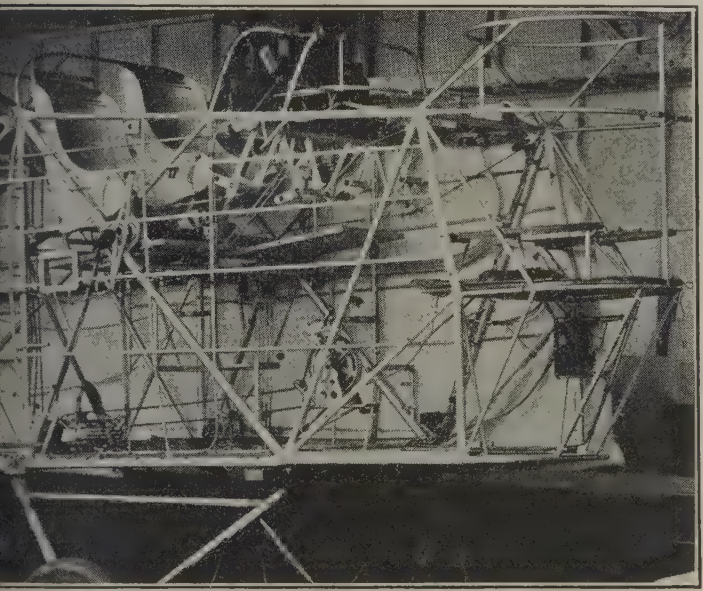
Chemical Composition:	Per Cent		Per Cent
Carbon	0.28-0.35	Chromium	0.90-1.00
Manganese	0.30-0.60	Molybdenum	0.15-0.25

Physical Properties:	Unwelded	Welded
Tensile strength, lb. per sq. in.	98,000	96,000
Yield point, lb. per sq. in.	75,000	72,000
Elongation in 2 in. per cent	12	7

The above results of the tensile test are the average of several obtained on specimens in the range of chemical composition indicated and varying in size from ¾ to 1¼ in. in outside diameter and 0.028 to 0.093 in. in wall thickness.

A unit stress of 80,000 lb. per sq. in. for the section close to the weld is commonly used in design in order to take care of any imperfections in the weld.

The chrome-molybdenum analysis gives excellent response to heat treatment. The normalized steel, which is material air-cooled from about 1625 deg. Fahr., has an ultimate tensile strength and elongation equivalent to that obtained by quenching in oil and tempering at 1200 deg. Fahr., but has a lower yield point. This air-hardening is a valuable asset in aircraft construction. The welded structures used for the body and control surfaces are impractical to heat treat by quenching on account of the size of the assemblies and the slenderness of the individual parts, which cause warping and twisting. By using a normalized or quenched and drawn steel with a tensile strength of 95,000 lb. per sq. in., it is possible to weld up these assemblies and retain this strength, due to the air-hardening properties of the chrome-molybdenum analysis.



Fuselage Structure of the Modern Airplane

This steel, in common with other structural alloy steels, will give a wide variation in tensile properties, dependent upon the tempering temperature after quenching. Aircraft parts that are quenched must be handled carefully to prevent damage, on account of the thin sections and the fairly sharp changes of section due to welded seams. Oil quenching is generally preferred to water quenching. Fig. 3 is a curve which has been extensively used by aircraft manufacturers as the basis of heat treatment of chrome-molybdenum steel.

One of the most important applications for tubing is in the fuselage structure. An excellent example of this type of construction is shown by the fuselage structure (Fig. 1), which represents a typical assembly of welded trusses. All of the tubes in this assembly are chrome-molybdenum steel, heat treated at the mill by normalizing or quenching to develop a minimum tensile strength of 95,000 lb. per sq. in., a yield point of 60,000 lb. per sq. in., and an elongation of 12 per cent. Fuselages of chrome-molybdenum tubing are built for the small airplane weighing 1500 lb. and the larger ones weighing 18,000 lb.

A type of joint commonly used is shown in Fig. 2. This is an excellent tension or compression joint, and a minimum strength of 95,000 lb. per sq. in. on the projected area of the tube is practically always attained by welders of only average ability. Welding can be performed by means of the oxy-acetylene flame or electric arc. Welding wire of low or medium-carbon steel gives excellent results.

Closely allied with the use of thin tubes for structural members is the use of sheet steel fittings fastening together various main and sub-assemblies. During the course of fabrication, sheet steel fittings are subjected to severe bending operations and are practically always welded or brazed. Material that will fabricate the best when subjected to these operations is the logical material for sheet metal fittings. The different types of alloy steels have been thoroughly tested to determine which give the best results. H. C. Knerr, in THE IRON AGE of Sept. 8, 1921, gave the results of a number of tests on 3.5 per cent nickel, nickel-chromium and chrome-vanadium sheet steel, and concluded that the chrome-vanadium was the best type. This was also the conclusion of other investigators, and chrome-

A Racing Plane with Chrome-Molybdenum Steel Fuselage Is Reproduced in Upper Left-Hand Corner of Opposite Page. The plane at the right is a transport airplane with fuselage and landing gear of the same steel

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[*] "Welding the Aircraft Structure," presented at fall meeting of the A. W. S. at Detroit, Sept. 20, 1927.

vanadium has been used quite extensively during the past few years.

Recent investigations of chrome-molybdenum sheet steel have indicated that this is even superior to the chrome-vanadium. It is more easily welded, and bending operations can be performed with greater ease. It is more plastic and does not tend to spring back when released from the jig. Normalized material can be bent 180 deg. over a radius equal to the thickness of the sheet without cracking. Annealing the material or quenching and tempering at 1200 to 1300 deg. Fahr. increases the workability and permits 180-deg. bends over a radius equal to one-half the thickness up to ⅜ in. in thickness. It has the added advantage that sheets and tubes, welded or brazed together, can be heat treated as a unit and corresponding physical properties will be developed in all parts of the assembly.

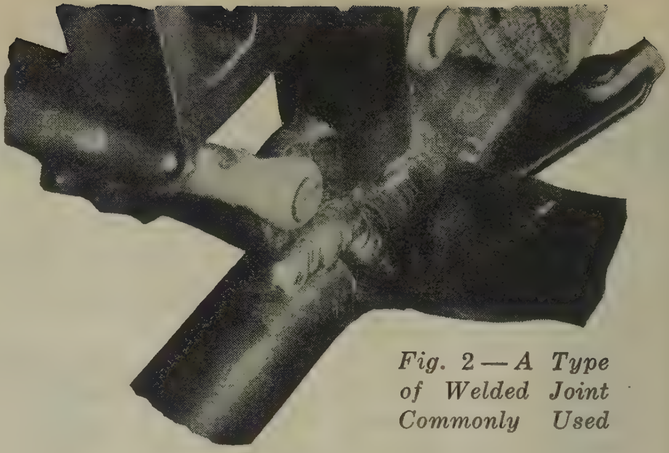


Fig. 2 — A Type of Welded Joint Commonly Used

Such an assembly is shown in Fig. 4. This is a fitting built up of chrome-molybdenum tubing and chrome-molybdenum sheets of identical analysis, heat treated after welding by quenching from 1625 deg. Fahr. in oil and tempering at 1000 deg. Fahr. to develop a minimum tensile strength of 125,000 lb. per sq. in. The tensile properties of the sheets and tubes are practically identical for the same heat treatment except for the elongation. Since the elongation is a function of the test specimen, the thinner sheets will not give so high a value as the heavier sheets for the same tempering temperature. This is indicated by the curve shown in Fig. 5. When the tests are made on a tube using the full cross-section for the test specimen, the results are higher than with the standard sheet metal test specimen. The sheet metal specimen used in obtaining the results shown in the curves is similar to the new specimen of the American Society for Testing Materials, with a gage length of 4 in. and a width of ½ in.

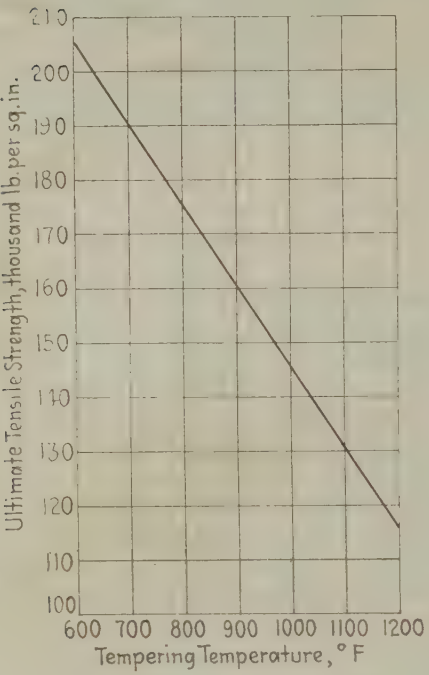
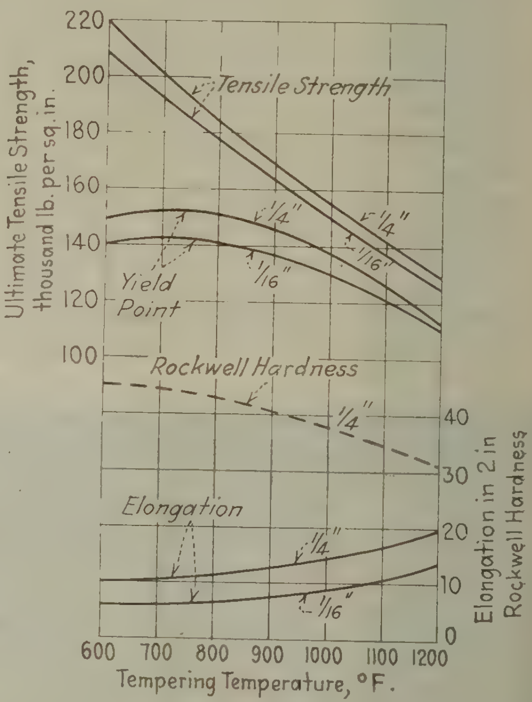


Fig. 3 (Left).—Curve Extensively Used by Aircraft Manufacturers as the Basis of Heat Treatment of Chrome-Molybdenum Steel Sheet and Tubing. Heat treatment: Heat to 1600 to 1625 deg. Fahr., quench in oil and reheat as indicated. The normalized steel has a tensile strength of about 95,000 lb. per sq. in. Chemical analysis: Carbon, 0.25 to 0.35; manganese, 0.40 to 0.60; chromium, 0.80 to 1.10; molybdenum, 0.15 to 0.25

Fig. 5.—Elongation Values for Thin Sheets Compared with Heavier Ones at the Same Tempering Temperature as Well as Other Properties of Chrome-Molybdenum Sheet Steel



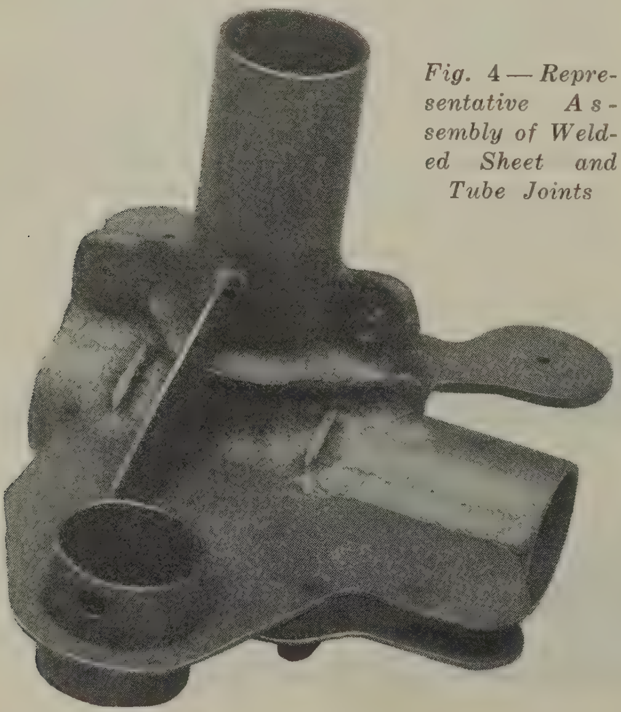


Fig. 4 — Representative Assembly of Welded Sheet and Tube Joints

The names of the subsidiary companies comprising the Continental Steel Corporation, Kokomo, Ind., will be dropped after July 1. These include the Kokomo Steel & Wire Co., Kokomo, the Chapman-Price Co., Indianapolis, and the Superior Sheet Steel Co., Canton, Ohio.

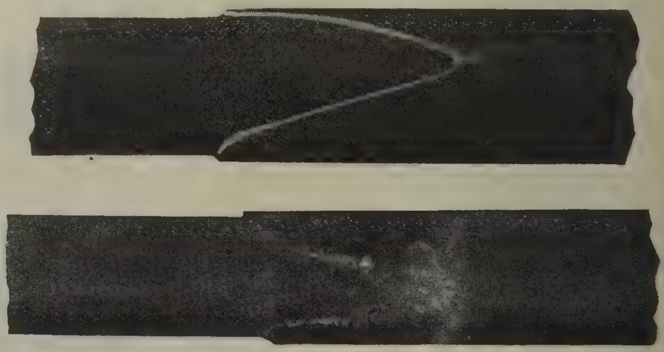


Fig. 6—Fish-Mouth Type Weld Used Extensively for Tension and Compression Joints in Chrome-Molybdenum Tubing

Conception of Safety Work Broadens

Questions of General Health of Employee Becoming Dominant —Mechanical Safeguards Only a Stop-Gap

BY C. B. AUEL*

WHEN accident prevention first began to receive systematic attention by industry, about 20 years ago, it was assumed naturally that it was almost wholly a problem of guarding tools and equipment. It was recognized that this would in some instances be a difficult thing to do. But it was further felt that, if this guarding could be successfully accomplished, the problem would be solved for all time.

After the lapse of a number of years, during which the guarding of tools and equipment had gone forward to a considerable extent, it was found that accidents continued. It began to be apparent that accidents happened on occasion at places other than the point of operation, where most accidents had, in the absence of statistics, been assumed to have happened. Many accidents occurred quite remote from the vicinity of tools or equipment.

And so today the guarding of tools and equipment, though important, may be set down as only one of a number of major safety precautions. The problem of accident prevention, instead of being comparatively simple, as at first believed, is commencing to be recognized as most complex. Some of the other major items involved in the work of accident prevention are:

- Minimum labor turnover
- Good health, involving physical examination, both on employment and at subsequent periods
- Contentment; absence of dissatisfaction and worry
- Cleanliness, plant and personal, and neatness
- Good lighting
- English language
- Carefulness

A safety program can hardly be mapped out with any degree of completeness without taking all of these, and even some others, into consideration. But their relative importance may shift in different industries, or may shift in practically all industries alike, depending on varying factors.

Some years ago the speaker placed "minimum labor turnover" as the greatest safety device that could be installed in any plant. But, with the growing tendency to interpret compensation laws more and more liberally and to make them more nearly all inclusive, as well as to increase the compensation paid, the item of health assumes larger and larger proportions. In time, if the tendency is continued, health will become the greatest phase of the accident prevention problem.

Good Health a Prime Requisite

From 50 to almost 80 per cent of children in school have physical defects. They are either excessively above or below weight, or have defective teeth or eyesight, or adenoids or seriously enlarged tonsils, etc. Nearly all of these defects lend themselves to correction if taken in time.

No one of intelligence would think of continuing a machine in operation for long after it was found to need repairs, and such repairs would be promptly made. But our most valuable machines of all, our young folks, we either do not inspect or else inspect in a haphazard manner. And we largely fail to make repairs, but are inclined to hope they may with time outgrow the need of repairs.

Physicians employed by the industries were originally used largely to administer "first-aid" to employees who became sick, as well as to take care of any who might meet with accident. This work was undertaken principally for humanitarian reasons. Naturally, however, it in turn led to occasional physical examination of employees. In due course, it came to be recognized that there were economic advantages in physical examination and that it could profitably be extended to applicants for employment, and be made to apply to all employees at periodic intervals.

Physical Examination Beneficial

Regardless of the causes which brought about physical examination, it is here to stay and to be developed and extended beyond the industries. Its effect will be greatly beneficial, and more and more far-reaching, with the passing of the years.

The industries want to see every worker who applies for a job obtain the one best suited to him. Where physical examination shows an individual lacking in certain respects, industry will, in the main, still endeavor to place him. Our company will hire a worker with defective eyesight, or continue one in our employ, if he will procure corrective glasses. In a case of defective teeth or of a hernia we may engage him if he will, within a specified time, have the defect corrected.

Investigation by us many years ago, as to the causes of accident, developed the supposed fact that about 25 per cent were due to carelessness. In seeking a remedy for this we found that carelessness was in many cases produced by something else—that it might be itself an effect and not a cause. Possible causes of carelessness include largely worry and ill health.

Good Vision a Corollary of Proper Lighting

Many accidents have been traced to poor eyesight, a corollary of ill health. Admitting this, it is but a step further to say that many accidents have been due to poor lighting, in producing the equivalent of poor vision. Some years ago the Travelers' Iusurance Co. prepared a chart of 95,000 accidents. This showed an increase in the short, dark days of winter and a decrease in the long, light days of summer. This has been confirmed by other investigators.

Illuminating engineers have in the past been much to blame for not impressing upon factory managers the value of good lighting and its comparative cheapness. Reference to early tables of lighting intensities for various kinds of work will generally show that, while they recommended anywhere from 10 to 20 foot-candles for drafting rooms, yet from 5 to 10 foot-candles were deemed liberal for manufacturing.

They seemed to overlook entirely the fact that many times the worker and the inspector had to make measurements as close as 0.001 in., reading the fine lines of verniers and micrometers. And they must obtain the figures from soiled, crumpled and more or less illegible blue prints.

We have found cases of defective eyesight—one in particular, with 40 per cent vision in one eye and 50 per cent in the other—yet the employee did not even know there was anything the matter. Much of this can be traced to the diseases of childhood.

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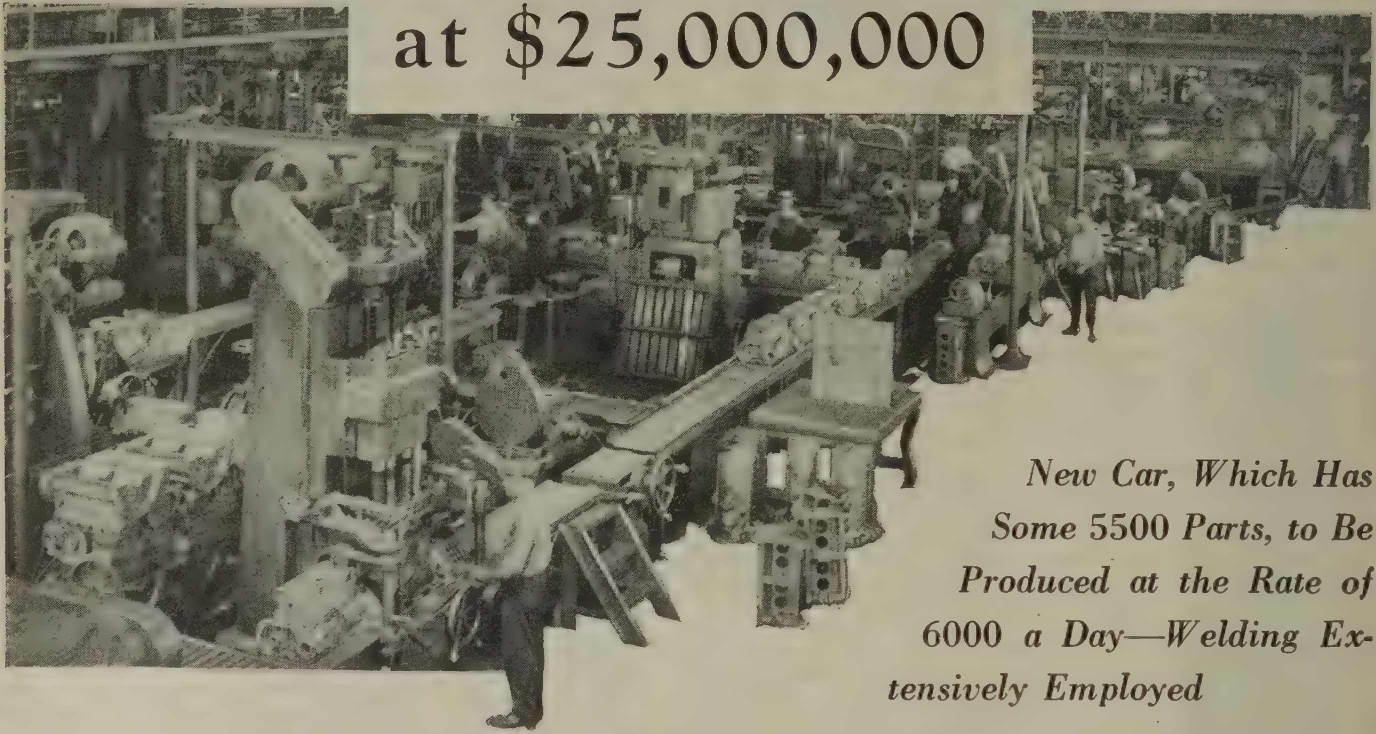
*Manager employees' service department Westinghouse Electric & Mfg. Co., East Pittsburgh. This is an abstract of an address before the recent Pennsylvania State Safety Congress, held in Philadelphia.

Ford Shop Changes Estimated at $25,000,000



New Car, Which Has Some 5500 Parts, to Be Produced at the Rate of 6000 a Day—Welding Extensively Employed

BY FAY LEONE FAUROTE*

TO those production men interested in the fabrication of metals, especially steel, the new Model A Ford furnishes a striking example of what can be done by electric welding, forging, upsetting, mass machining, extruding and grinding.

The car, which contains some 5500 parts; several hundred more than its predecessor, is now being made at the rate of 2000 a day and it is expected that this production will be increased to 4000 per day by June 1 and reach 5000 a day by July 1 of this year. A 6000 car per day rate is planned. When it is calculated that this production will demand the daily delivery to the process line of some 33,000,000 components it will be seen that the plants at Highland Park and Fordson, as well as several of the smaller Ford factories and branches outside of Detroit, will be a busy place this year.

It is estimated by Ford engineers that in the 19 previous years devoted to the manufacture of the Model T car (1908-1927) some $4,868,000,000 had been expended for materials and a total of $1,970,414,972 had been paid out in wages and salaries. During this period Ford production was the greatest in the industry. In 1921, at the height of his quantity manufacture of the Model T, the Ford company was making 56 per cent of all the cars produced in this country. Incidentally, one-eighth of the factory equipment is still engaged in making Model T parts so that the 10,000,000 cars which Ford statisticians estimate are still in use may be serviced. During the change-over period last year orders amounting to $10,000,000 per month were filled.

The fifteenth million Model T came off the assembly line on May 26, 1927, and production of the Model A began in the fall of the same year. The first Model A engine was completed on Oct. 20, 1927, and the car first publicly shown on Dec. 2, 1927. Production progressed slowly, however, due to the complete shop overhaul necessary and the fact that the quality of the new car demanded a slower pace at first in order that the inspection requirements might be carefully learned. Not only the parts but many of the machines and processes were entirely new and no one knew just what could be expected of the various production groups.

Then there were the usual "kinks" to be ironed out; not all the welders worked satisfactorily and many small alterations had to be made in machines and the sequence of operations. The six tool rooms at Fordson have been kept busy with new machine work, alterations of standard machines, conversions of others; in a word, the Ford shop over-haul was a Herculean task and cost a fortune.

Half of Machine Tool Equipment Rebuilt

Early figures placed the cost of the shop changes at $15,000,000 but it is safe now to estimate that the final cost will exceed $25,000,000. Fifty per cent of the machine tools had to be rebuilt. Gear-generating machines to the number of 166 were completely rebuilt at a cost of $3,000 each. This was made necessary by the production of the two gears in the Ford Model A rear axle. Some $4,000,000 more was spent for new machine tools; about $4,500,000 more went into the remodeling and altering of the tools on hand; 4500 new machine tools costing in the neighborhood of $4,000,000 were added for special Model A work; and new dies and fixtures, including a set for forming the new steel bodies, cost $5,000,000 more. For spinning the rear axle housing $120,000 went for spinning machines. Another $1,000,000 went for punch presses and other mechanical equipment of this nature. For making the new steel wheels which are assembled at Hamilton, Ohio, plant, machine alterations and new materials for this process cost another $600,000. Three hundred welding machines, many of them entirely rebuilt in Ford shops for the special Ford welding operations, were provided at costs ranging from $700 to $9,000 each. Milling machines of continuous drum type were purchased. For example, three of these units, Ingersolls, are used for machining the cylinder heads, each machine takes 16 blocks at a time, eight on each side. The production is 250 cylinder blocks every eight hours.

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*Mechanical engineer, New York, and co-author of "Ford Methods and the Ford Shops," published in 1915.

Less Than 1000 Machine Tools Scrapped in 20 Years

The machine tool register shows that there are some 53,000 machine tools in service in the Ford industries today. Less than 1000 actually have been scrapped during the last 20 years which speaks well for Ford adaptability. Nothing is thrown away if it can be utilized and even when it is discarded it is not wasted. Even scrap is melted and used again. Paper is remade, tool handles made into smaller sizes. Even water, oil, gas, oily waste, in fact almost everything, is made to yield its utmost in usefulness and profit. And the shops are kept spotlessly clean.

There are at present about 100,000 men employed in the Ford shops in and around Detroit; of these 8000 are skilled tool makers. This payroll may be increased to 125,000 when production has reached 6000 cars per day.

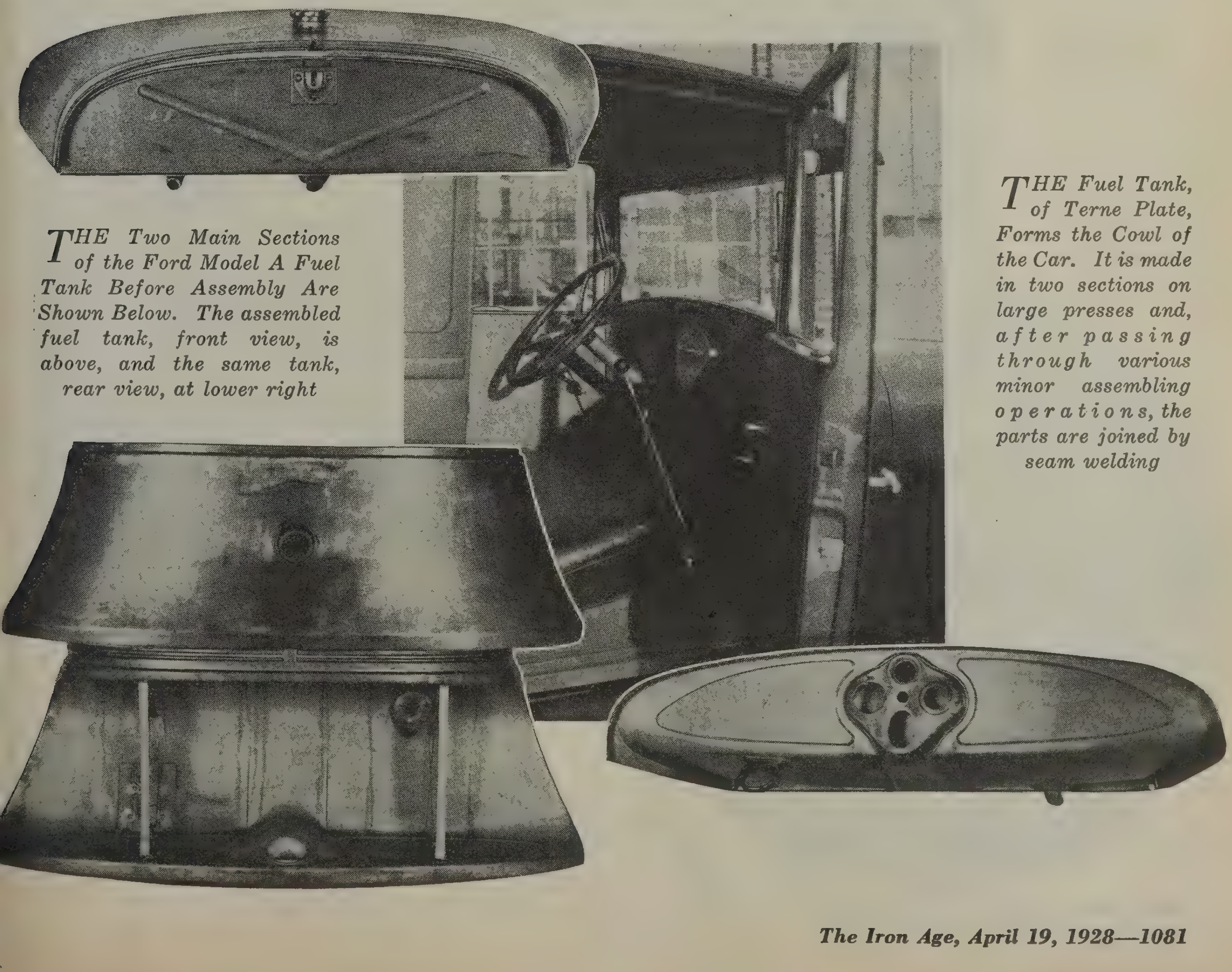
While Fordson, as the River Rouge plant is now called, is the center of greatest production activity, there is still going on at Highland Park a variety of processes and the manufacture of the steering gear, radiators, valves, ball and roller bearings, ignition equipment, rubber parts, wire, leather, some drop forgings, some of the glass manufacture, Fordensite, lead, storage batteries, textiles and some standard small parts. The lamps are coming from the Flat Rock plant. The main process lines and final assembly line are at Fordson, where is also the new Ford administration building, recently opened.

Unusual Number of Parts Electrically Welded

An examination of the main components of the new Ford car reveals extensive use of electric welding. In fact it may be said that this new Ford is a triumph for welding, forging and stamping processes; an almost all-steel car with an unusual number of all-steel *integral* parts, so built up. Thus, the rear axle housing, the fuel tank, the fan, the muffler, the steel-spoked wheels, the steering gear housing, the differential ring gear, the starter shaft, the crankcase or engine pan, the oil pump gear, spare tire carrier, battery support, generator pulley, brake shafts, windshield frame and other small parts owe much of their strength, light weight, uniformity and speed of fabrication to the Ford system of electric welding. The actual machines used and the manner in which these parts are made will be described in a later article of this series.

It has always been characteristic of Ford practice to make everything as fool-proof as possible. The car because of its world-wide use must be simple in construction and capable of being of service everywhere; so it has been carefully designed with that fact in mind. If it is possible to make several parts into *one* unit, Ford engineers have tried to do it. For example, the rear axle gear is butt-welded on to the shaft; it cannot come off. There are no keys or splines to become loose and drop out. So Ford parts have been assembled wherever possible "for good and all." This makes for reliability and permanence. Incidentally it will cut the service charges materially. Furthermore, Ford parts made in this way are lower priced. Punch presses, upsetting machines, bulldozers, electric furnaces—both for forging and heat treatment—the very wide use of welders, hot-metal spinning machines, two, three and four-way drilling machines, drum type continuous milling machines, special testing machines, scales, automatic inspection devices of all kinds, conveyors, slides, roller platforms and tables, moving chains, hoists, cranes of 5, 10 and 25-ton capacity, some 92 miles of interior plant railroad, scores of special Ford machines; these facilities make Ford production unique and allow it to proceed at a rate not dreamed of a few years ago.

One is always amazed when visiting Ford shops for the first time to see how closely all the machines are grouped and how little room seemingly is left for aisles and for the men to work in. After watching the



THE Two Main Sections of the Ford Model A Fuel Tank Before Assembly Are Shown Below. The assembled fuel tank, front view, is above, and the same tank, rear view, at lower right

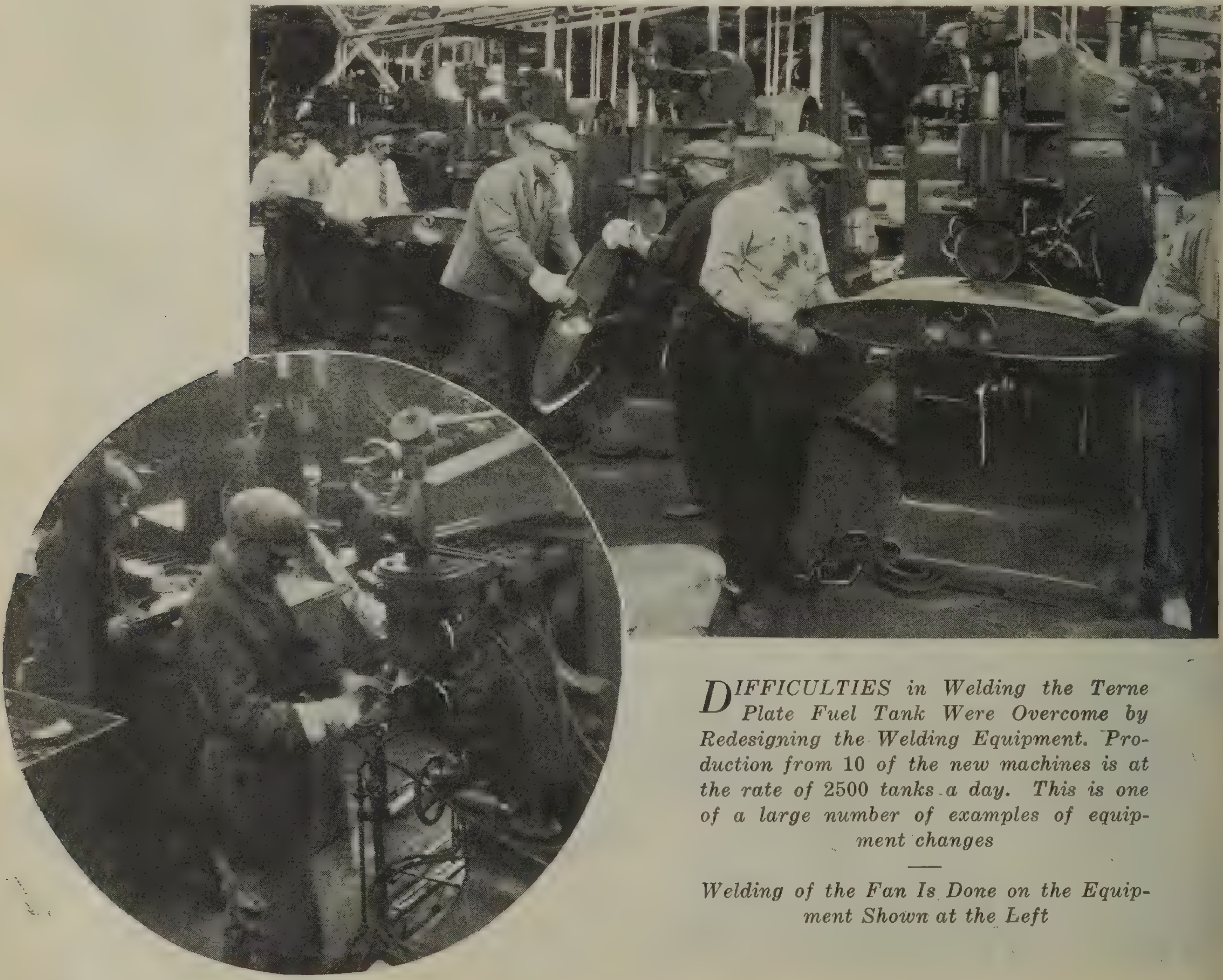
THE Fuel Tank, of Terne Plate, Forms the Cowl of the Car. It is made in two sections on large presses and, after passing through various minor assembling operations, the parts are joined by seam welding operations, however, it soon becomes evident that such close grouping makes for efficiency and speed of production. Where such conveyor systems are used the work is never left on the floor beside the machine but is at once thrown or hooked on to the conveyor. New parts come to the workman in the same way and a slight holdup at any point along the line soon makes itself manifest. So the production planning is simplified by adjusting the conveyor speeds so that just enough time is given to do a good job, no more and no less. In arranging the machinery for manufacture of the new car the usual Ford practice has been followed. Furnaces stand next to hammers, annealing ovens are directly in the process line. Everything needed to perform a series of operations is there. There is no trucking of material from stock room to machine and back, no storage of material until needed, no traversing the shop for tools and fixtures. Each machine is scheduled to do a certain thing at a given rate of production and each man is skilled and able to do his special job with his machine, tools, fixtures or jig without being compelled to move from his place for anything. Ford planning is complete and accurately dispatched to prevent shortages or overstocks at any point. The process lines in turn must be able to feed the main assembly at a specified rate of speed. Here again accurately-laid out operation and assembly sheets dictate a procession of parts which is quite unvarying.

Of course this smooth-running mechanical system has not been evolved over night. It is the result of years of Ford planning. Ford process lines are usually started in an experimental way and gradually speeded up as the men become accustomed to the work. Many of the best suggestions come from the men on the job. They see ways that operations may be eliminated or combined. The way is tried and if it is successful the process is changed. Thus the work goes on. So the process line and many of the smaller methods of assembly of the new car are not yet in "finished form"; in fact, it is never too late to change processes in the Ford industries if a new way is better or faster. All things are in a state of flux and every man in the Ford factory knows that what is best today may be discarded tomorrow when a better method or material is discovered. The tools, too, are forever being changed. So are the processes. The method of producing the piston pin by extrusion is a case in point. It is producing a better pin, the steel is gaining strength by the process. Ford tool designers attempt anything that will promise better quality or faster production.

Welding Equipment Redesigned

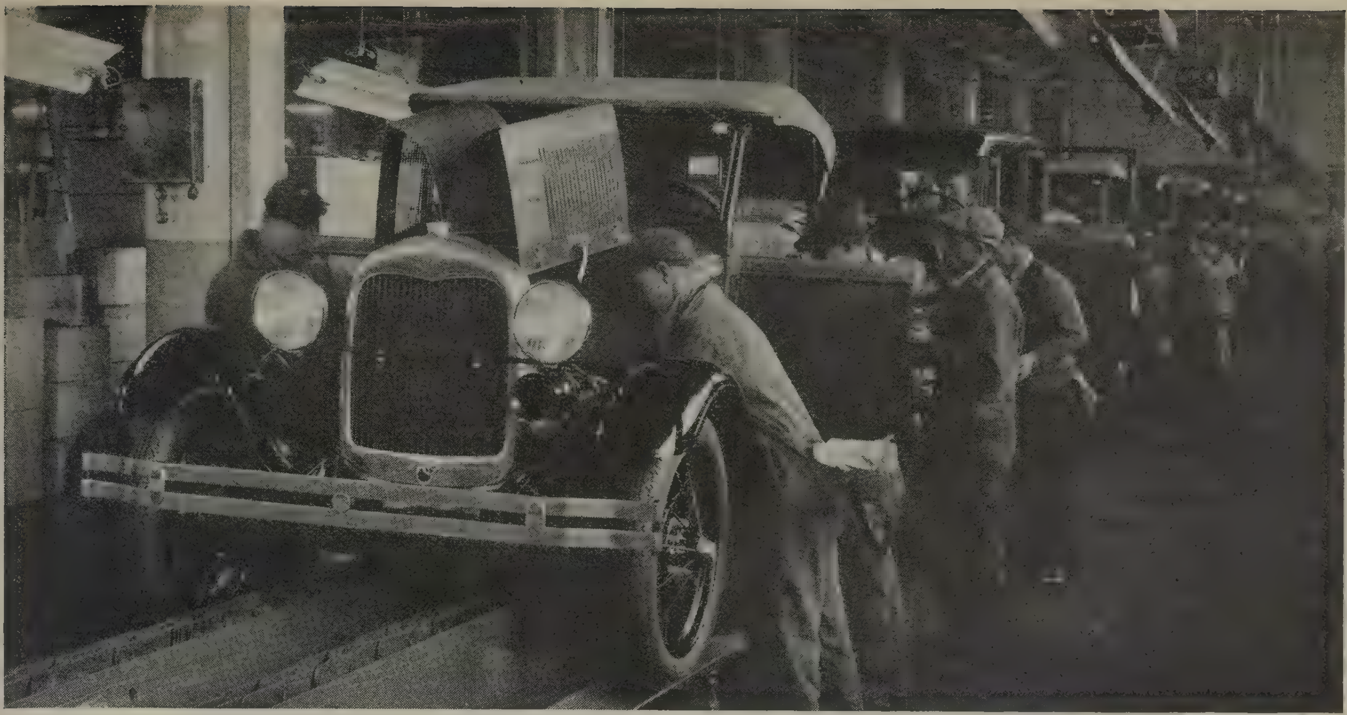
The complete redesigning and rebuilding of the electric welders used for welding the fuel tank saved the day for the production department when serious trouble in getting production in this department threatened. The tank, made of terne plate, forms the cowl of the car and is made of two main sections seam-welded to form an air-tight tank. The parts are formed on giant presses and after passing through various minor assembly operations are finally brought to the welders for junction.

When the actual work was started, however, the inspectors discovered that the welders were not doing a satisfactory job. The joints were not tight and the welders were skipping. Terne plate is, of course, difficult metal to weld; it is apt to burn in spots and in others not heat up evenly, one resulting in faulty metal and the other in no weld. Things looked serious for a time, until the Ford production engineers began to do some investigation work on their own account. They



DIFFICULTIES in Welding the Terne Plate Fuel Tank Were Overcome by Redesigning the Welding Equipment. Production from 10 of the new machines is at the rate of 2500 tanks a day. This is one of a large number of examples of equipment changes

Welding of the Fan Is Done on the Equipment Shown at the Left



End of the Final Assembly Line at Fordson. Conveyor speeds are adjusted so that just enough time is given for the particular operation

found that the standard welder bought for the work could not be made to do the job. So they decided to redesign and rebuild it. This they did. Now ten of these new Ford special welders are turning out 2500 fuel tanks per day.

This is what had to be done to make these welding machines work satisfactorily on the fuel tank job: The transformer was enlarged, the copper welding disk arms were shortened, Ford type electrodes, which are said to give superior current efficiency, were installed, the bearing in which the welding spindle was mounted was altered and mercury introduced, the shaft nickel-plated and baked, and a Ford type of interruptor cutting the current 360 times per minute as a minimum, thus preventing the burning of the stock under ordinary circumstances, was put in place of what was claimed to be a less efficient standard unit used for that purpose. This is just one example of hundreds of changes and alterations which have been made in machines, special and standard, so that they may function satisfactorily in the Ford shops.

The development of electric furnaces and their adaptation to Ford purposes is another story in itself.

Machine tools, special heads, unusual, made for just one purpose, special tools, jigs, fixtures, dies; there are hundreds of unique things to be found in the Ford shops. Each is assisting in advancing Ford production and incidentally contributing not a little to the universal advancement of the art of metal working—and the welfare of mankind.

Hacksaw Simplified Practice Recommendation Adopted

WASHINGTON, April 17.—Representing a reduction of approximately 75 per cent in variety a simplified practice recommendation for standard tungsten and carbon hacksaw blades was adopted at a general conference at the Department of Commerce under the auspices of the Division of Simplified Practice. The conference, held April 12, set July 1 as the date at which the recommendation shall become effective for new production and Jan. 1, 1929, as the date for clearing current stocks.

The recommendation follows:

Hand Hacksaw Blades, All Hard; Also Flexible Hacksaw Blades

Length (Inches)	Width (Inches)	Thickness (Inches)	Number of Teeth per Inch
8	7/16	0.025	18, 24, 32
10	½	0.025	14, 18, 24, 32
12	½	0.025	14, 18, 24, 32
12	9/16	0.025	14, 18, 24
Power Hack Saw Blades, All Hard			
12	⅝	0.032	14, 18
12	¾	0.032	14, 18
12	¾	0.049	10, 14
12	1	0.049	10, 14
14	¾	0.049	10, 14
14	1	0.049	10, 14
14	1	0.065	8, 10
17	1	0.049	10, 14
17	1	0.065	8, 10
18	1¼	0.065	8, 10
20	1¼	0.065	8, 10
24	1½	0.065	6, 10

The conference appointed the following standard committee: W. P. Jeffery, managing director Hack Saw Manufacturers Association, to represent the manufacturers; L. C. Puchta, National Supply and Machinery Distributers' Association, to represent the distributers; and F. S. Walters, American Society of Mechanical Engineers and the Westinghouse Electric & Mfg. Co., F. C. Nichols, Navy Department, and a representative to be appointed by the American Railway Association, to represent the organized users. The committee will make periodic re-surveys to determine the degree of adherence and to recommend revisions if conditions warrant.

Trumbull Steel Co. Broke Production Record in March

In March the Trumbull Steel Co. established new production and shipping records at its plant at Warren, Ohio. Last month the company shipped 55,720 tons of finished material and in a single day moved 4000 tons, requiring 126 railroad freight cars. Production was at the annual rate of 668,000 tons of finished materials. Previous to 1926, the company's high monthly shipment record was 41,000 tons. Production records were set up in March by the open-hearth department, blooming mill, hot strip mills, tin mills and cold rolled department. In March, 1928, Trumbull produced 21,941 tons more steel than in March, 1925, with an increase of only 100 in its working force in the steel plant. Steel tonnage per capita throughout the entire plant last month exceeded output per man in March, 1925, by 56½ per cent.

Trumbull is installing new wide cold strip mills of the latest design, which will be in operation in two months and will enable the company to produce highly finished wide strip steel for use in automobile bodies.

Bethlehem's New Pipe Mills

Sparrows Point Plant Turns Out Wide Range of Butt and Lap-Weld Product—Materials Move Minimum Distances

BY GEORGE A. RICHARDSON*

IN expanding the Maryland plant of Bethlehem Steel Co. to cover the widest possible range of products, the latest construction is the modern plant to manufacture butt and lap-welded pipe. Ground was broken for the new units over a year ago and the first of the butt mills came into operation last fall. At present two butt mills and two lap mills, with all auxiliary equipment, are in full operation. All sizes of pipe from ⅛ in. up to 16 in. in outside diameter, inclusive, can be made.

Sparrows Point is advantageously located on tidewater, with docking facilities for the largest ocean-going vessels. Raw materials can be economically brought in and finished product shipped to all parts of the world. In addition to water shipping facilities, three railroads are available for shipments to interior points.

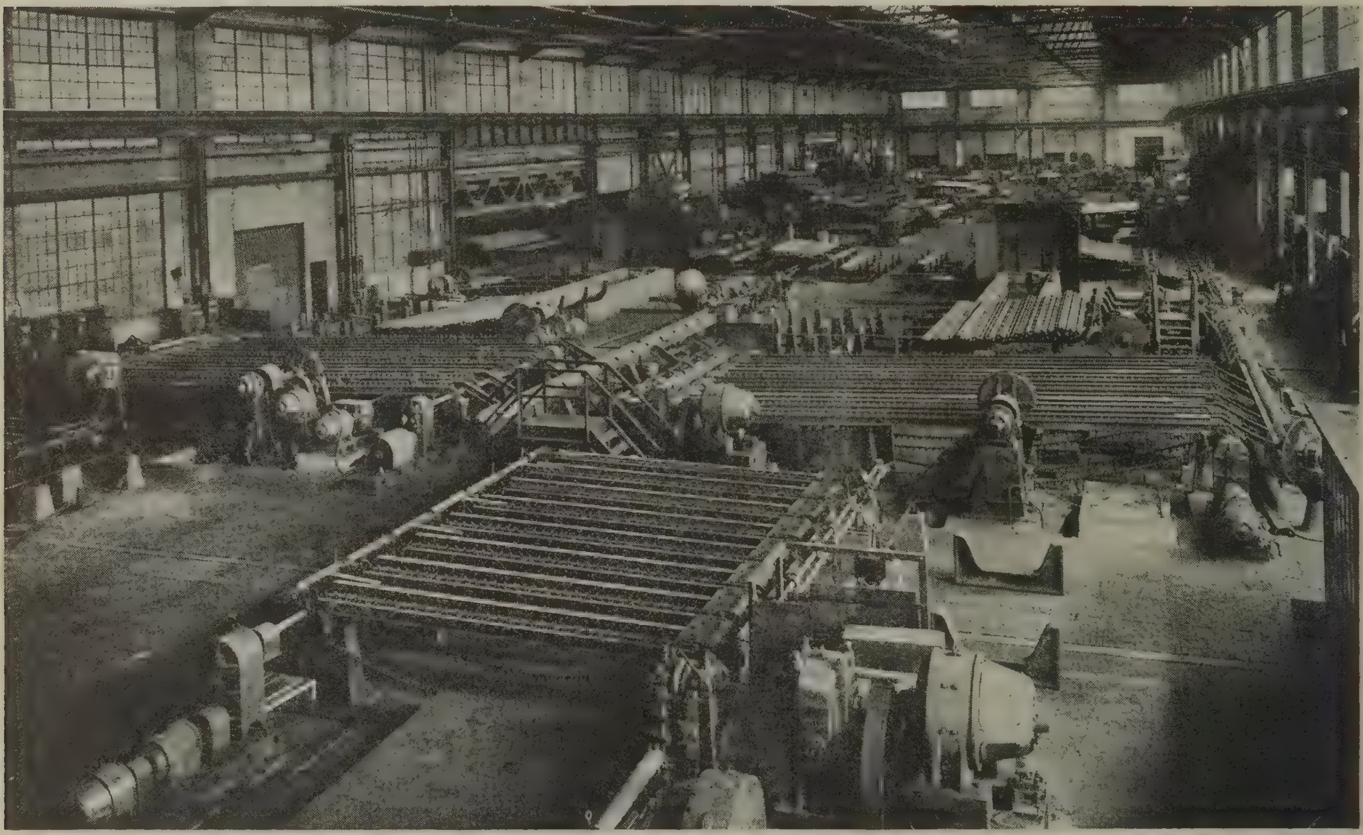
At Sparrows Point the same trains of mills which supply the skelp not only care for the requirements of the pipe mills, but also supply sheet bars for the tinplate and sheet mills, blooms for the rail mill, slabs for the plate mill and billets for the wire mill. The continuous mills where skelp is rolled are in separate units, housed in brick and steel-frame buildings. There is a billet-receiving crane-yard, skelp-loading crane-yard and a mill building 600 ft. long. In this building are housed the reheating furnaces, rolling mill, shears and other necessary machinery and equipment required to finish this product.

Adjacent to the skelp mill building are other continuous mills for rolling billets, sheet bar, wide skelp, etc. All of these are supplied from the blooming mill sections, which adjoin the entrance ends of the continuous mills. The new blooming and continuous mills are housed in a brick and steel-frame building about 1225 ft. long, which, together with the skelp mill building, makes a total length of 1825 ft. In the blooming mill section are the soaking pits, gas producers, 200-ton ingot strippers, etc., which are located at one end and form an integral part of the main units.

After soaking, the ingots are rolled in the blooming mills and thence through two sets of continuous mills, where the blooms are rolled down into the required sizes of skelp. The finished skelp is then transferred by rail to the pipe mills, a short distance away.

Four new pipe mills are housed in a structural-steel and brick building made up of seven units or bays. Five of these units parallel each other, running the long way of the building. These house respectively No. 1 and No. 2 butt mills, pipe galvanizing shop and machine shop, coupling department and No. 1 and No. 2 lap mills. Running at right angles to these units, and extending the entire width covered by all of the above buildings, are two buildings across the ends. That at one end is for skelp storage and at the opposite end for storage and shippings of finished products. A separate gas producer building is located adjacent to the pipe mill buildings.

This pipe mill layout is in a newly developed section



GENERAL View of No. 1 and No. 2 Butt Mills, Looking East Toward Warehouse. In immediate foreground are sizing rolls and the short cooling rack. The finishing department is beyond the two "shields"

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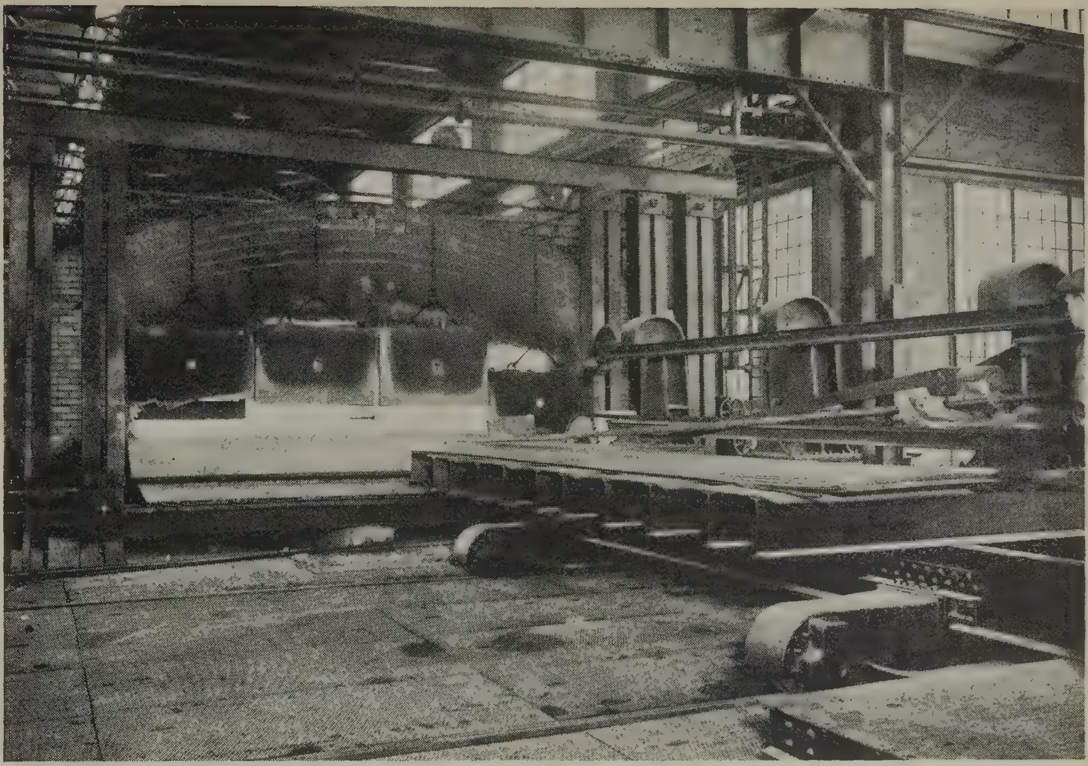
*Bethlehem Steel Co., South Bethlehem, Pa.



FLAT Skelp Charger in Operation at No. 1 Lap Mill. This furnace heats the steel only for scarfing and bending. Skelp is delivered to the charger by crane

of the plant, reached from the main part by a bridge across Humphrey's Creek, which does triple duty as a railroad, trucking and foot bridge. The first unit in this new section was the wire mill. The new pipe mills, located close by, are supplied with compressed air, water, fuel oil and steam by a power plant designed to take care of the requirements of both plants.

Operation of the gas producer unit is practically automatic. One floorman runs the entire floor, on which the seven gas producers are located. Coal is brought to the building by rail and dumped into track hoppers. From these it is lifted to the top of a tower by automatic skip hoists and dumped into two large storage bins. Two rotary crushers are provided for crushing the coal to the proper size for the producers.

Over each producer is an individual bin. A distributing crane, on which is carried a scale hopper, serves these bins, each load being weighed by the craneman, who is also weighmaster. In this way a fuel record is maintained showing consumption each day, week or month, or as required. The producers are hopper-fed.

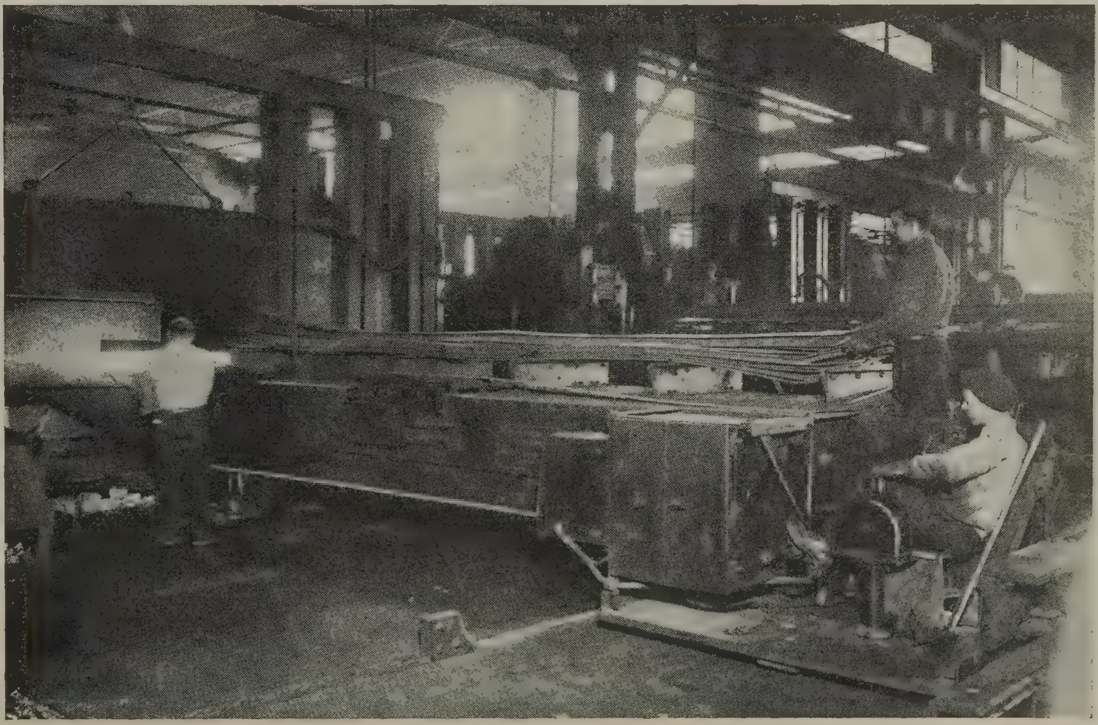
Each producer will gasify about 3500 lb. of coal an hour. A standard-gage ash-car track underneath, on ground level and connected to yard tracks, makes it possible to drop ashes and flue dust directly into the car without rehandling.

Gas leaves the producer at a temperature of 1200 to 1400 deg. Fahr., and passes to the heating furnaces through steel brick-lined overhead flues. Dust catchers, adjacent to each gas producer outlet and approximately every 50 ft. in these flues, make it possible to deliver clean producer gas to the furnaces.

Skelp is stored in a bay which extends across the entire front of the pipe mill buildings, as mentioned above. There is storage capacity of 50,000 to 60,000 tons of skelp—more than ample for the requirements of both butt and lap mills. Skelp is brought here from the skelp mills by rail. Two 10-ton cranes are used for unloading, storing and transferring skelp directly to the shears at charging end of furnaces.

From the time skelp enters the skelp storage, the flow of material is in one general direction until it leaves the mills or warehouse as pipe. By extending the chargers and clipping and bending shears into the skelp storage, it has been made possible to utilize the storage cranes for transferring material direct from storage to the racks in front of these machines.

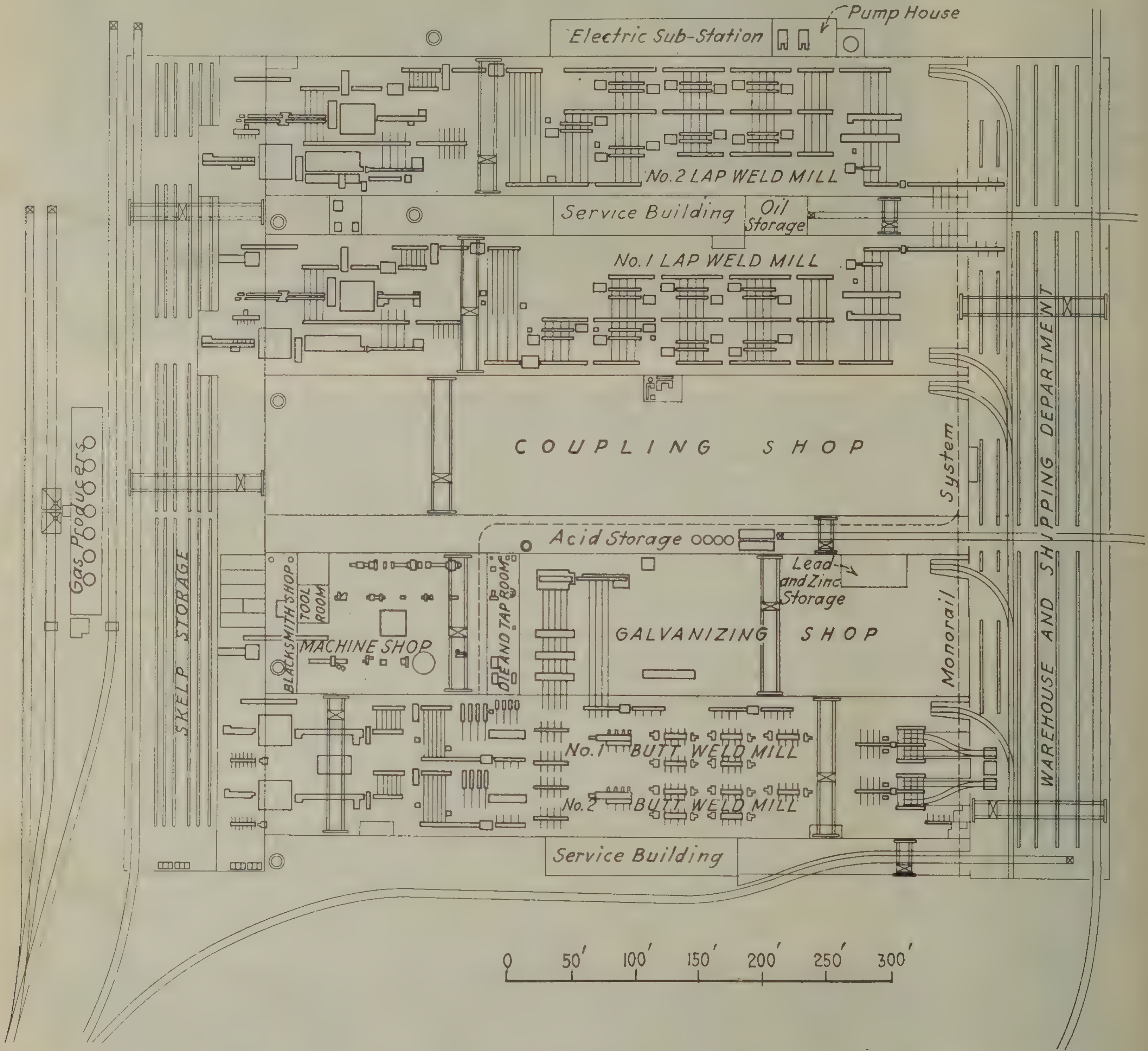
In the north bay are No. 1 and No. 2 butt-welding mills, with their auxiliary equipment. These two mills



Magnetic Charger of No. 2 Butt Mill Delivering Skelp into a Furnace 9 Ft. Wide. The charger can traverse the width of the furnace and takes its load from the clipping and bending shears are exact duplicates and were designed to manufacture all sizes of butt-welded pipe from ⅛ in. to 3 in. in diameter.

Skelp from the storage is transferred by crane to the clipping and bending shears. Here the ends are clipped and bent so that the piece will more easily enter the welding bells. From here it passes through the heating furnaces, welding, sizing, straightening, testing, threading, oiling, bundling, etc., emerging at the warehouse and shipping end as finished pipe.

Skelp heating furnaces having hearths 9 ft. wide are used. Into these skelp is charged by magnetic chargers, which travel not only over the entire width of the furnaces, but can be moved up to the clipping and bending shears for direct loading.


Electric Sub-Station
Pump House
No. 2 LAP WELD MILL
Service Building
Oil Storage
No. 1 LAP WELD MILL
COUPLING SHOP
Gas Producers
Acid Storage
Lead and Zinc Storage
BLACKSMITH SHOP
TOOL ROOM
MACHINE SHOP
DIE AND TAP ROOM
GALVANIZING SHOP
SKELP STORAGE
No. 1 BUTT WELD MILL
No. 2 BUTT WELD MILL
Service Building
Monorail System
WAREHOUSE AND SHIPPING DEPARTMENT
0
50'
100'
150'
200'
250'
300'

Steel Moves from Skelp Storage, at Left, in a Straight Line Across the Plant to the Warehouse and Shipping Platforms at Right

After being brought to welding temperature, the skelp is pulled out of the furnace, one piece at a time, and drawn through bells which are set by hand in a bell block or holder which is fixed on the end of the drawbench nearest the furnace. The tongs, caught by attachments located at intervals on the drawbench chain, pull the skelp through a bell of suitable size. The skelp is bent and welded in one operation, forming a pipe which is slightly oversize.

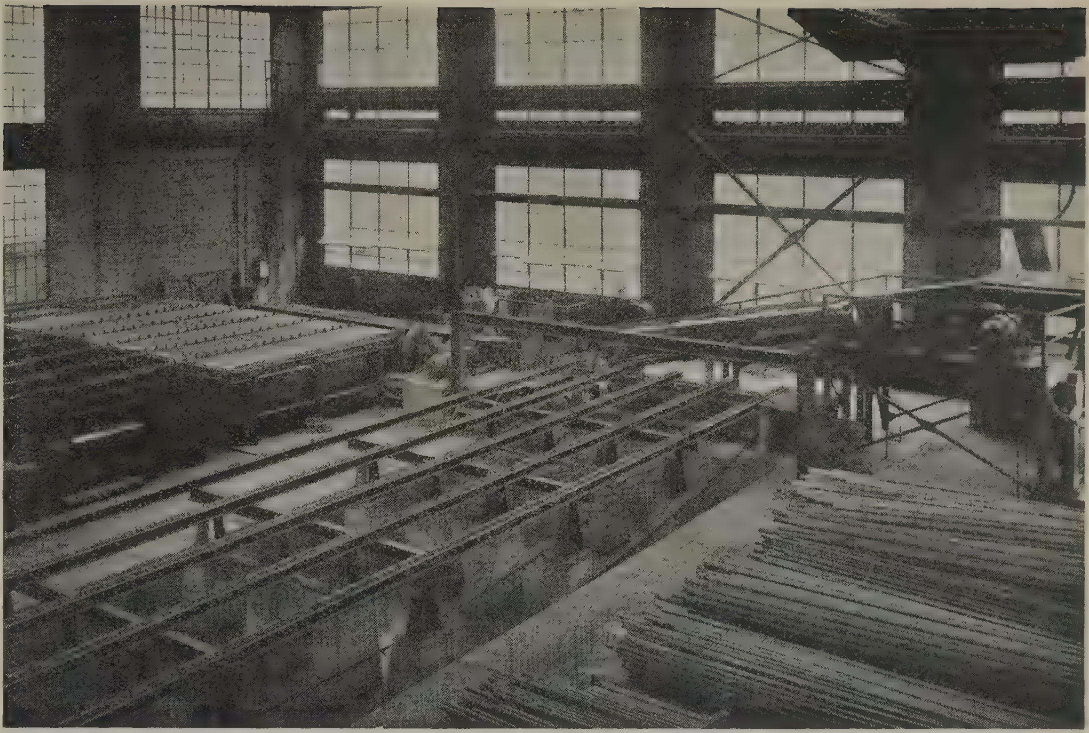
When the tongs are removed the pipe passes to the size-roll trough and through guides to the first sizing rolls; thence out on to a short cooling rack. The second sizing rolls reduce the pipe to the outside diameter required by standard specifications. From these the pipe passes on to a final cooling rack, on which it moves between two high-speed saws which cut off the end far enough back to remove defective welds. These saws are staggered, one end of the pipe being cut off at a time. After sawing, a reaming and facing machine puts the ends in good condition, ready for straightening, testing and threading operations.

From the cooling rack the pipe passes through automatic straightening machines of a type believed to be the most satisfactory yet developed. These remove all kinks or bends in the pipe and straighten it to meet requirements of the trade. At the same time, the outside surface is made smooth and practically all of the remaining scale is removed. The pipe, as turned out, is as nearly straight and "scale-free" as it is possible to produce.

Thorough inspection is given to each piece at the cooling racks and after every step in the finishing department. Surface defects, split ends, imperfect welding, lack of straightness, are among the causes for rejection by the inspector.

All pipe after straightening is subjected to hydraulic test. Two testing machines are provided for each of the butt mills and can handle any of the sizes made. These machines are of the quick-acting type, and are connected with a direct accumulator line at 750 lb. pressure. Four intensifiers give an added range of test pressures above and below 750 lb. as required for larger pipe and special pipe for ammonia plants, hydraulic work, etc. All defects in welds become apparent in the hydraulic test and pipe having such defects is scrapped.

After the hydraulic test, the pipe is ready for threading. Two large-size automatic six-spindle threading



GALVANIZING Department, Showing Drying Plate, Galvanizing Tank, Inclined Drawbench and Cooling Rack. The inclined bench permits excess spelter inside the pipe to drain back

machines handle all sizes of pipe from ⅛ in. to 2 in. in diameter. Pipe from 2½ in. to 3 in. in diameter is threaded on mill-type threading machines provided with an air grip. There are two machines to a threading bench, one at each end. The pipe is easily moved back and forth between the two machines on rollers set in the top of the threading bench, one end of the pipe being threaded at a time. From the threaders the pipe goes to the inspection table for final inspection.

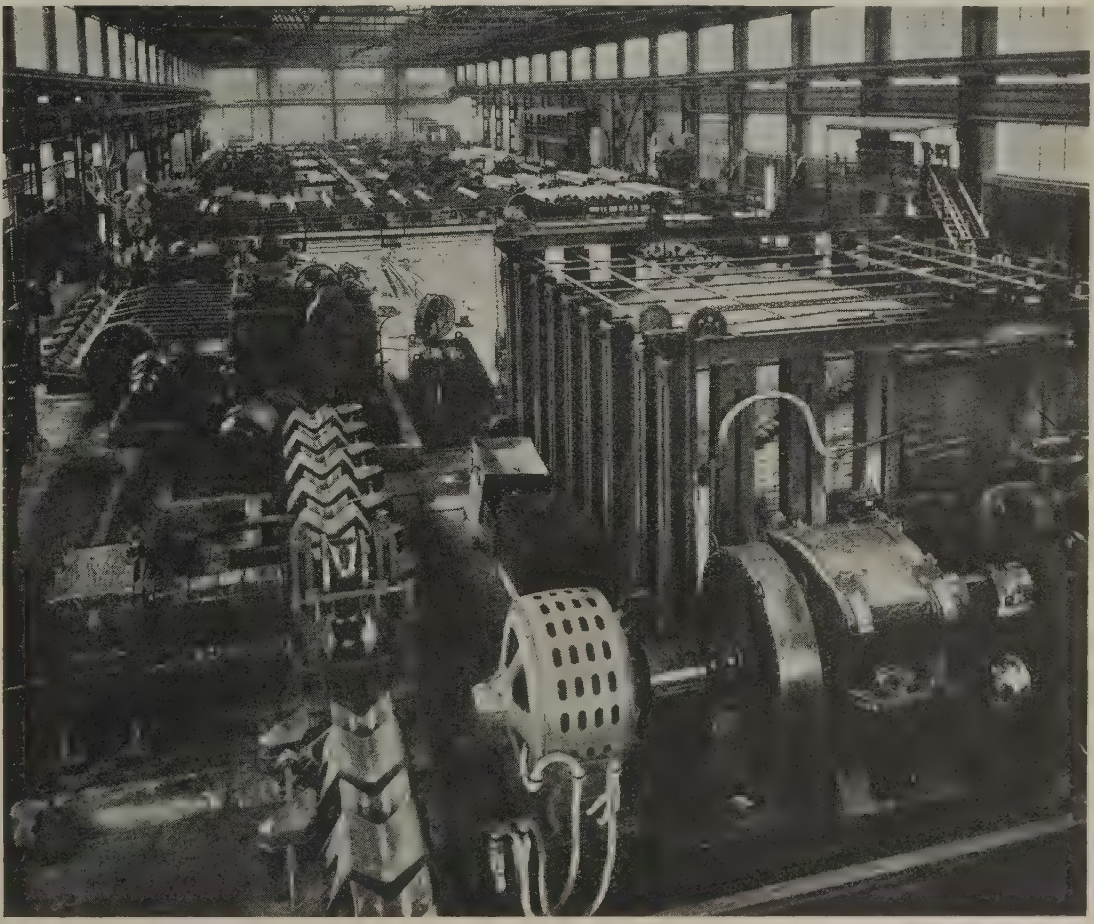
Pipe that passes the final examination goes to the coupling screwing-on machine, where each length is fitted with a coupling, and thence to the oiling machines. These are of the spray type and are readily adjustable so that the thickness of the protective coating can be varied to suit the requirements. The coating is applied to all black pipe and dries quickly and hard, thus to prevent rusting either in transit or in stock.

After the protective coating has been applied the pipe goes to the measuring table, where each length is measured and where sizes from ⅛ in. to 1½ in., inclusive, are bundled. In the case of bundled pipe, the total number of feet and inches is marked on a metal tag attached to the bundle. Pipe 2 in. and larger is not bundled, the length in feet and inches being stenciled on each piece.

Pipe from the measuring and bundling benches may be loaded directly into cars or sent to the warehouse. Small electric cars operated by third-rail contact are used to transfer material from the measuring and bundling benches direct to the warehouse.

Ample warehouse facilities are provided by a warehouse which extends across the delivery end of the five pipe mill building bays. This is served by two cranes and has capacity for storing about 25,000 tons of butt and lap-welded pipe.

Proper storing of the pipe is a factor in insuring the delivery of the product in good condition to the customer. The practice here is to place planks between



NO. 2 Lap Mill, Looking East Toward Warehouse, with Welding Furnace at Right. From the control platform, just off the extreme left of cut, one man controls all hot-mill operations. This mill makes pipe from 6 in. to 16 in. in diameter

layers of pipe. This keeps the pipe straight and eliminates the possibility of damage that is apt to occur in piling large lifts.

The galvanizing department occupies a part of the second building bay, which opens into the side of the butt-weld mill division. The equipment includes two sulphuric tubs, a rinsing tub, a muriatic acid tub, a drawing rack, waste-gas heated drying plates and a galvanizing pot, together with an inclined draw bench, cooling rack, etc.

Procedure up to and including the galvanizing operation represents standard practice. Pipe to be galvanized is deposited on a receiving rack which extends into the butt weld mill building and is served by the crane in this building. The pipe is delivered from the receiving rack into the sulphuric acid pickling tubs on top of large bronze sprocket chains hung in the various tubs. At given intervals these chains, which are operated by motor-driven sprockets, roll the pipe around in the bath. This insures thorough pickling and cleansing.

Each piece of pipe after galvanizing is wiped by being drawn through steel wipers, which insures a smooth finish and results in a satisfactory spangle. The drawbench, of the angle type, in inclined, to permit excess molten spelter to drain back from the interior of the galvanized pipe into the galvanizing pot. As the pipe is drawn up the incline to the top of the draw bench, each piece is applied against the nozzle of a compressed air line. The air blows the interior clean and gets rid of any excess spelter. From the draw bench the pipe goes to the cooling rack, where it is allowed to cool slowly, while it is being conveyed to the delivery end.

Galvanized pipe is not being dipped in water at the Maryland plant. The elimination of the water dip is one of those small refinements which aids in giving a better spangle finish and appearance. After cooling, the pipe is inspected, both inside and outside, and then goes to the threading machines. The subsequent handling of the galvanized pipe is the same as that of black pipe, except that there is no oiling of the surface.

Only a part of the second bay is occupied by the galvanizing department. Nearest the skelp storage a blacksmith shop is located in this bay. Then comes a completely equipped machine shop for taking care of all requirements of the pipe mills, and then the galvanizing shop. The aim was to locate the machine and blacksmith shops as centrally as possible.

Two building bays are given over to the lap mills. The No. 1 lap mill is capable of turning out all sizes of lap-welded pipe from 2 in. in diameter up to 8 in., inclusive. The No. 2 mill manufactures pipe from 6 in. to 16 in., inclusive. These two mills are practically the same, except for differences in size of equipment.

After being weighed, skelp from storage is handled by a crane directly on to a flat skelp loading rack. From there it is delivered on to a flat skelp-charger, which moves electrically across the face of the heating furnace. The furnace in this case is used only for heating the skelp for scarfing and bending.

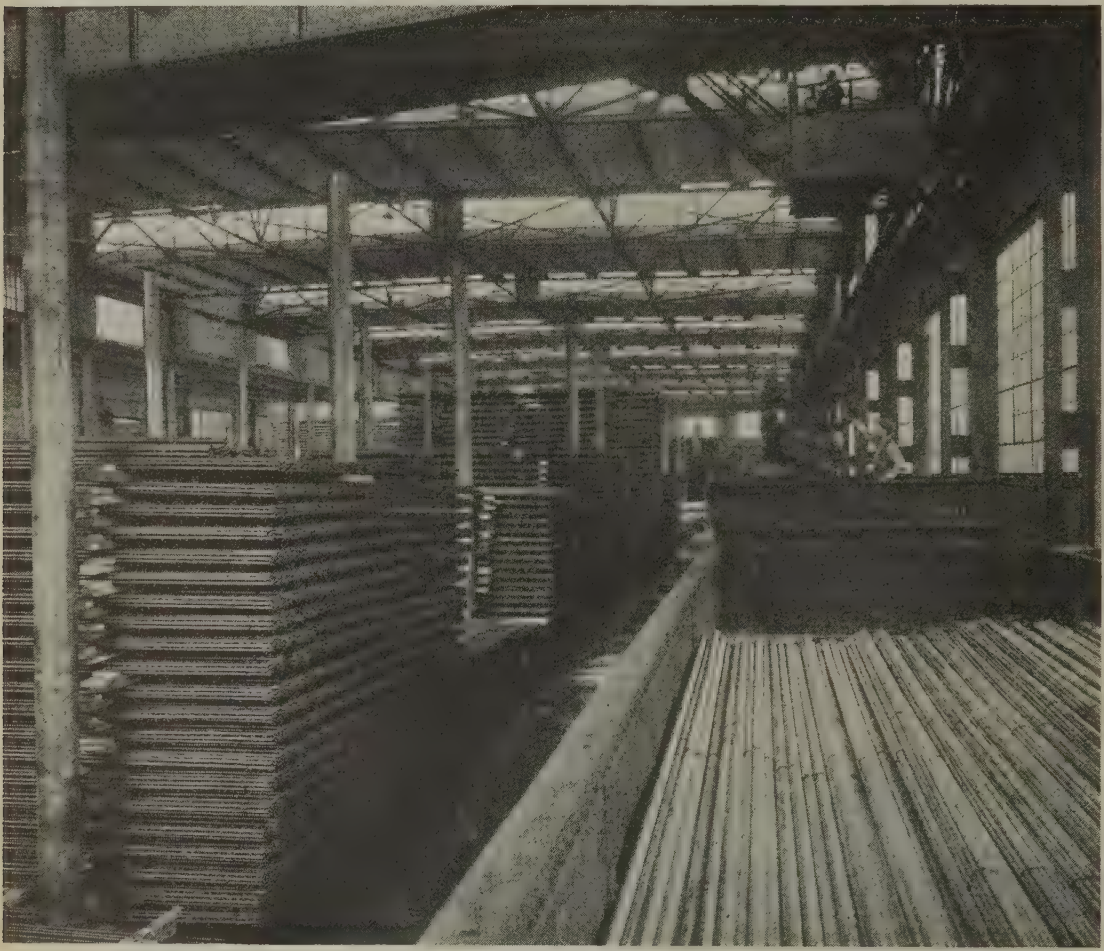
Skelp is pushed out from the furnace into electrically driven scarfing rolls so mounted that they can be moved across the face of the discharge side of the furnace from one side to the other. On leaving the scarfing rolls the skelp passes to the scarfing table and is pulled across by chain conveyors to the draw bench. From here, in turn, it is drawn through the bending dies and is bent into shape for welding.

Skids are used to transfer the bent skelp to the traveling bent-skelp chargers, which charge the heating zones of the welding furnaces of the two-gutter type. There are two welding positions, the skelp being moved from the heating zones to the gutters, which are located symmetrically on either side of the center line of the furnace.

Welding of the skelp is done by welding rolls driven by a 400-hp. electric motor. They can travel back and forth opposite the two welding troughs. The bars are controlled by a double bar puller.

Two sizing and two cross-roll straightening operations follow. Immediately after welding, the pipe passes through the first sizing rolls and then through cross rolls, which straighten it. From that point it passes the short cooling rack, which is operated at variable speed. This makes it possible to control the temperature of pipe entering the second sizing rolls, as at the butt mills. It then passes into the second sizing rolls and thence through the second cross rolls.

As with the butt-welded pipe, the temperature is reduced between the first and second sizing so that the second sizing operation is, to all practical intents and



WAREHOUSE. Note method of piling pipe for stock, with boards between lifts. This building is served by two overhead cranes and has storage capacity for about 25,000 tons of pipe purposes, done black hot, thus insuring correct size and round pipe. A cooling rack leading from the second cross rolls allows the pipe to cool down to normal temperature as it is being inspected. It is then weighed and conveyed to the cold pipe straighteners.

These are the only mills in the country where the cold straightening machines are in a direct line with the cooling racks, sizing rolls, etc. All pipe passes through the cold straighteners without any break in handling, from the time it leaves the furnace until it is delivered to the finishing department.

Pipe, after being straightened, goes to cutting-off machines. There are two pairs of these, of the mill type, using double tools. The crop ends are cut off, ends of pipe faced, reamed, chamfered and rounded up, thus insuring true and round ends for the threaders.

The threading machines, of conventional mill type, with a lead-screw to insure correct pitch, are used solely for threading. This is a decided advantage, as this practice saves wear and tear, ordinarily occasioned by using the threading machines for chamfering, etc. The machines thus are more like precision tools than is usually the case.

One unique feature of the lap weld mills is the use of driven roller conveyors for handling the pipe from operation to operation throughout the entire mill.

Each piece of pipe is inspected for surface defects, blisters, laminations, etc. The thread size is measured and checked for taper and pitch. After this inspection the pipe goes to the coupling screwing-on machine and thence to the hydraulic tester. Each piece of lap-welded pipe is tested with the coupling on it. After this hydraulic test comes another general checking inspection before delivery to the warehouse and shipping building.

Each piece of pipe is weighed separately and must weigh within allowed standard tolerances. The weight per foot, total weight and length are stenciled on each piece.

Oiling machines similar to those used at the butt mills oil the pipe as it is traveling through on a roller conveyor.

One striking feature in the lap weld mills is the control system. Every piece of equipment in the hot mill end is controlled by one man, located on an elevated platform behind which is the big control panel. A similar arrangement is in use in the finishing department.

Moves for Conference on Warehouse Distribution

Hardware Jobbers and Mill Supply Houses Asked to Join with Manufacturers in Applying Methods of Handling Bolts and Nuts to Wide Range of Commodities

THE plan evolved by the bolt, nut and rivet industry for the economical distribution of its products has worked out so well that its sponsors, under the leadership of Charles J. Graham, president of the Bolt, Nut and Rivet Manufacturers Association, Pittsburgh, believe that it can be applied to other products that are distributed either partly or entirely through hardware jobbing and mill supply channels. Accordingly, a national conference to discuss sales and distribution plans has been proposed in a pamphlet issued from Mr. Graham's office, and, if enough sentiment favorable to it is created, Mr. Graham will call such a meeting.

The basic principle of the distribution plan successfully applied by the bolt, nut and rivet manufacturers is the elimination of the manufacturer as the leading competitor of the distributer. With the province of the merchant or jobber clearly defined and freed from incursions by the manufacturer, it has been found that a degree of market stabilization has developed that was entirely lacking when manufacturers would take orders of a size that properly belong to, and could be more economically handled by, jobbers.

Asks Industries to Appoint Representatives to Confer with Jobbers' Chairmen

Mr. Graham says in the pamphlet: "The necessity for stabilization in all of our leading lines is more apparent today than ever before, and is a problem that is being studied not only by industrial executives, but by the Government itself.

"Stabilization to a point of producing reasonable profits in all lines is the essential requirement, if we are to maintain and perpetuate present labor conditions, both from the standpoint of employment and wages paid.

"The necessity for the continuance of present labor conditions and, if possible, an improvement in them, is now a well recognized fact, and is the very foundation of our present and future prosperity.

"The plan followed by the bolt, nut and rivet industry is applicable to all competitive lines and, should it be adopted by the leading industries, would create a condition in selling and distribution never before attained, and would become an automatic stabilizer of market conditions.

"It would be the largest factor in cost reduction of anything heretofore attempted, and would affect particularly the great overburden of American business, overhead expense, creating a saving in all departments from the point where actual manufacturing stops.

"In the development of this plan, the greatest organization ever put together in the distributing industry has been created, and is ready to function in all lines that are interested.

"A committee is now in existence in practically every important jobbing center in the country, consisting of a prominent jobbing executive as chairman and in its membership covering the outlying territory.

"The chairmen of these committees will all be invited to attend, and a majority of them have already signified their intention of doing so, should the meeting be called. Some jobbers not represented on the committees will also be invited, as well as the officers of all national jobbing and mill supply associations.

"To make the meeting thoroughly representative, and limit the number in attendance, it is suggested that each industry appoint five executives to represent the industry as a whole. This will be a very simple matter where industries have trade associations or other types of organization. Where such organizations do not exist it will be necessary for the appointments to be made by correspondence, or for one of the leading companies to call a meeting of its particular industry for the appointment of such a committee.

Products Covered by Distribution Plan

"By combining the suggestions of the 34 jobbers' chairmen, the following industries are being approached, to determine their attitude regarding such a meeting, and should the reaction be favorable, invitations will be extended to five executives representing each industry, appointed as heretofore suggested: Ammunition; bars, shapes and plates; builders' hardware; chain; chain hoists; cold-rolled steel, including shafting; composition roofing; conduit; copper and brass

(*Concluded on page* 1132)

Small Cloudburst Superhardening Machine

A method of superhardening by "cloudburst" was described by Edward G. Herbert in THE IRON AGE of Feb. 2, page 332. Mr. Herbert now sends a photograph of a laboratory machine designed to treat case-hardened disks up to 1¼ in. in diameter.

Intermittent Device for Superhardening Small Surfaces by Impact With a Cloud of Steel Balls

About 20,000 steel shot are placed in a cup-shaped hopper, which is elevated to a point near the top of a vertical shaft, so the slots there observed are immersed in the shot. The latter start passing through the slots, falling down the hollow shaft and striking the work beneath. A disk to be treated has been previously placed on top of a perforated piston, entrance being effected through the side door in a box-like stand. The piston is slid up the vertical shaft until the distance from slots to piston is correct, as indicated by a counterpoise and meter stick at the rear.

As explained in the previous article, the height is set so that the falling balls work-harden the surface without indenting it. It takes about half a minute for the balls to drain from the hopper; they are then collected in the pan at the bottom, reloaded into the cup-shaped hopper, and re-elevated. Meanwhile the disk being treated is sunk gradually, so the hardening can be progressive.

A disk tested in the machine possesses a highly reflecting surface with faint markings suggesting very fine ripples on a turbulent liquid. A soft spot will be covered with small pits, close together, like a badly corroded surface after cleaning off the rust.

Special Railroad Car for Transporting Long Beams

To avoid expensive blocking in shipping long steel beams that must be carried on two cars, the Carnegie Steel Co. has had a dozen gondola cars built measuring 65 ft. inside. This is about 25 ft. longer than standard for large cars of this type. Since stock lengths of 60 to 65 ft. are common for fabricating shops, it is estimated that the 65-ft. car will handle at least 80 per cent of the long lengths of steel now being ordered.

While the cars have been used mainly in shipping steel locally from one works to another of the Carnegie company, or to nearby fabricators, one of the cars was shipped some time ago to the Boston warehouse of the company and its behavior was carefully observed with regard to negotiation of curves and clearances.

As built, the car has a marked capacity of 140,000 lb. The tare weight averages about 67,000 lb. The car measures 68 ft. 9 in. over striking plates, 7 ft. 9 in. in width inside, 8 ft. 6 in. wide overall, while the trucks are 55 ft. 10 in. center to center. The height of sides is 3 ft. The trucks are of the standard four-wheel type, the same as would be used for a shorter car of the same capacity.

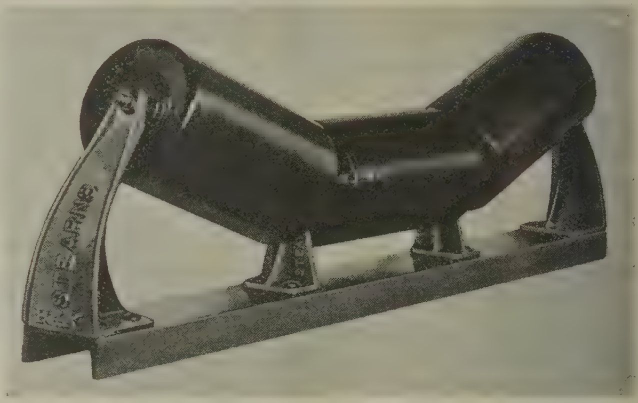
While the cars were built to negotiate curves of 200-ft. radius they have in fact been successfully operated over curves with a radius as low as 175 ft. The cost of the 65-ft. car is estimated at only slightly more than one-half that of two ordinary gondola cars. Maintenance and deterioration on one such long car will be considerably less than on two of the mill-type cars now used for taking double loads. The track space occupied by the long car is 30 per cent less than that of the double load. This will result in shortening trains of given tonnage and will increase yard capacity accordingly.

A principal factor in getting out the long cars was the desire to lessen the damage to goods in transport. There will be considerable elimination of dunnage, resulting in less dead weight to be hauled per ton of revenue traffic moved. Train resistance will be reduced, particularly around curves. General safety is much enhanced by the innovation.

Malleable Iron Brackets for Belt Conveyor Carrier

A new belt conveyor carrier has been put out by the Stearns Conveyor Co., Cleveland (subsidiary of Chain Belt Co., Milwaukee), for mounting pressed steel and chilled rim cast iron idler units. The supporting brackets are made of certified malleable iron. By redistribution of the metal, a much stronger bracket has been worked out than is possible in gray iron, with no considerable increase in the total amount of metal used.

The spacing between idlers is reduced to 5/16 in. on this new carrier. With this close spacing, there is little chance of the belt "creasing" and being worn accordingly. The new type of bracket has made it possible to secure this close spacing, and at the same time keep the idlers safely mounted and quickly and completely interchangeable. Any idler can be removed from the carrier without disturbing any of the others.



Close Spacing and Ease of Replacement Feature This New Idler for Belt Conveyors

Five sizes—18, 20, 24, 30 and 36 in.—are offered, with either Rex-Stearns pressed steel or chilled rim cast iron idlers. Both have one-piece pulley shell construction, Timken bearings, long-time lubrication and a positive grease seal, which serves the double purpose of keeping dust out of the idler and grease within it. The new idler is interchangeable with previous Stearns units.

Light-Weight Combination Cutting and Welding Torch

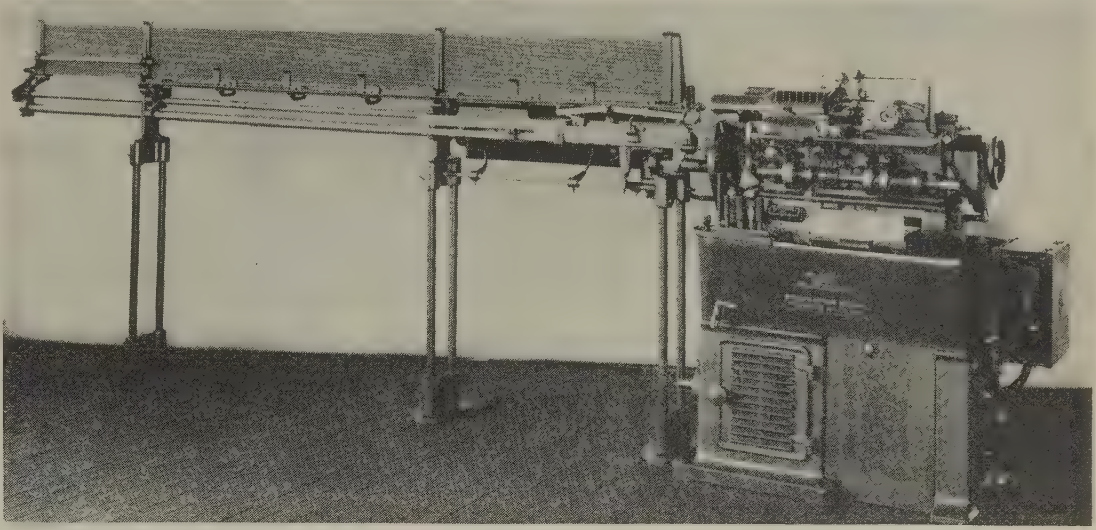
A new combination cutting and welding torch which weighs only 40 oz., and which may be used either for welding or cutting operations merely by interchanging the tips, has been added to the line of the Alexander Milburn Co., Baltimore.

This torch, designated as the type RI, incorporates the features of the company's model NI torch, which is also a two-purpose unit. Features include the use of two gas tubes, made of stainless steel, instead of three tubes, and the high-pressure cutting oxygen thumb button which remains in the open or closed position without sustained pressure from the thumb. The torch head and valves are of bronze forgings of high tensile strength. The tool is well balanced and its light weight is emphasized as adapting it for continuous operations.

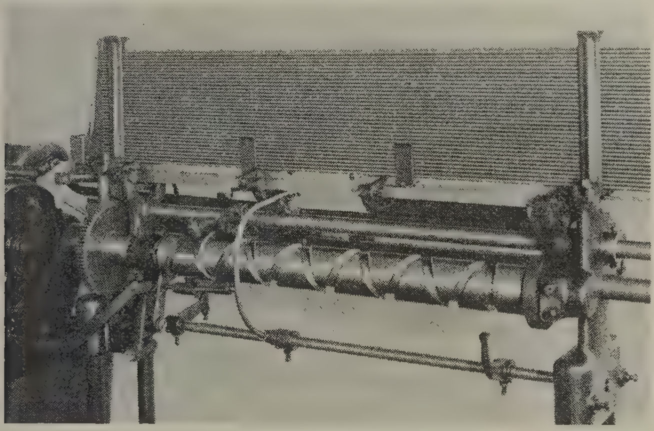
AUTOMATIC ROD MAGAZINE

Device for B&S Screw Machines Eliminates Time Lost in Waiting for Replenishment of Stock

An external stock feeding mechanism, known as the automatic rod magazine, has been made available by the Brown & Sharpe Mfg. Co., Providence, for use on its automatic screw machines in the No. 00 size, including the regular and high-speed units and the screw threading machines.



A New Rod Is Fed Automatically to the Machine as the Preceding Rod Is Used Up, Operation of the Magazine Being Actuated by the Screw Machine. The mechanism of the magazine is controlled by the barrel cam, below, which is mounted at the rear. When set in motion, the cam trips the magazine and drops a new rod into feeding position. A pusher then feeds the rod forward



This mechanism, designed to hold several rods, is located at the left end of the machine, as shown in the accompanying illustration, and is intended for use in place of the usual stock stands. The device is arranged so that a new rod is fed automatically into the working position as the preceding length of stock is exhausted. In addition to marked reduction of non-productive time, due to idleness of machines awaiting replenishment of stock, use of the device is emphasized as leaving the operator free to devote his entire time to the operation of the machine and the requirements of the work, as well as permitting one operator to attend to a greater number of machines.

The automatic rod mechanism is of simple design and is operated by the machine with which it is used. The mechanism is connected with the feeding arrangement of the machine in such a manner that when the end of the bar on which the machine is working passes a certain point, a ratchet is engaged which feeds a stop forward. This stop comes in contact with the starting lever of the machine at the instant the last piece is cut off, stopping the machine and at the same time engaging a clutch which delivers power to the rod magazine.

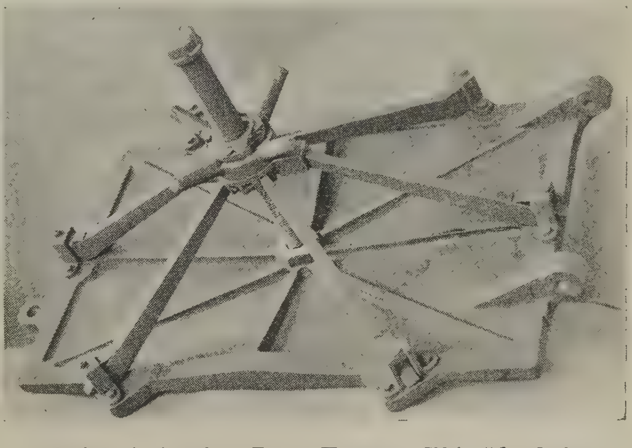
When the clutch of the magazine is engaged, a long barrel cam on the rear of the device is caused to rotate. The first movement of this cam trips the mechanism of the magazine and drops a rod into the feeding position. Continued rotation of the cam advances a pusher at the end of the mechanism, which comes in contact with the rod and feeds it forward through the feeding finger and chuck to the desired position. As the follower of the cam comes to the end of its travel the starting lever of the machine is thrown into engagement and the machine is set in operation. The follower then returns to its starting position and the clutch of the rod magazine is thrown out of engagement. Operation of the mechanism is correctly timed with relation to the automatic functioning of the machine.

The simplicity of the mechanism and its automatic operation permit unskilled labor to be used in loading the magazine, which can be filled at any time. There is no need for the machine to be stopped except when the tools need sharpening or attention to the work is required. The device is particularly advantageous for use in connection with the high-speed machines where the rapid rate of production requires more frequent replenishment of the stock. Patents, foreign and domestic, are pending.

Unusual Clamping Mechanism

A new type of manhole cover, designed by the United Filters Corporation, Hazleton, Pa., has an exceptional locking device. As illustrated, this is operated by screwing down on the capstan. The dogs are thus forced in under suitable clamps on the equipment to which the cover is attached. The result is said to be especially effective. The screw can be operated either by hand or by power control. It is patented.

One place in which this type of cover is being used is at the Calumet-Hecla mines. Here the ammonia stills must be opened frequently for removal of precipitated copper oxide. The ease of operation of this device fits it particularly for such conditions.



Quick-Adjusting Dogs Feature This Manhole Cover and Its Operation

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The Hopkins-Benedict Co., dealer in railroad supplies, has moved its Chicago office from 549 West Washington Street to 1529 Railway Exchange Building.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output (adjusted) was lower in March and may taper off from recent high levels.

Unfilled orders showed a small decrease in March but remain higher than for two years past; they are "rounding off" for a decline.

Pig iron production was slightly above normal by a smaller margin than ingot output; early price recovery is not expected.

Finished steel prices, still too low for a proper relation with their raw materials, show little signs of advancing to a better position.

CORRECT statistical treatment of the available figures places the facts concerning the steel situation in March as follows:

"Adjusted" Production Figures Show Decline

IN the first place, the average daily production of steel ingots increased only 3.2 per cent, although the usual seasonal gain is a little over 4 per cent. If we eliminate the usual seasonal increase, therefore, and allow for a slight factor of normal growth, we find a small net decrease in March production. This means that the output of steel ingots failed to show a normal gain. Our adjusted index for the month is 105.1 per cent of normal, and compares with 106.1 in February, 105.5 in January and 106.9 a year ago. In short, each of the three months in the first quarter of 1928 showed about the same annual rate of production and each was about 5 per cent above normal. Compared with a year ago, January showed a gain, February was about the same, while March was lower. The trend in the first quarter was about sidewise, with a very slight downturn in the last month.

In the second place, the unfilled orders of the Steel Corporation decreased 62,900 tons in March. Some decline in March is a usual and normal occurrence, the most common condition being a drop of about 1½ per cent from February. The decline last month was, if anything, a trifle less than normal. Our adjusted index of unfilled orders becomes 96.1 per cent of the average of the last five years, against 95.9 per cent in February, and 78.8 per cent in March, 1927. This is the highest index since March, 1926.

The most notable fact about the unfilled orders curve, however, is the way in which it has rounded off, during the last three months each increase in the adjusted index being less than in the preceding one. Usually such a development indicates that production and shipments are gaining on new orders.

Very close similarity may be seen between the recent situation and that which existed from February through June, 1923. This appears both as to unfilled orders and the production of steel ingots. From April through July, 1923, the production curve was practically level and from February to May the unfilled orders curve tapered off as it has been doing of late. Then came a recession. In recent years it has been usual to find that a flattening out or a decline in the adjusted curve of ingot production has been followed or attended by a declining trend in the unfilled orders. One point suggested by our analysis is that the failure of unfilled orders to increase in March, while production declined slightly (as adjusted), may be taken to indicate that new orders fell off.

Of course, the analogy between the 1923 period and the present is by no means perfect: Forward buying of steel is small; prices are lower. While it seems that the chart indicates some decline within a month or two, there is now apparent no basis for any such recession as came in August, 1923.

In the third place, the average price of finished steel has held fairly steady, in spite of the above-normal production and the apparent decline in demand as indicated by the tapering of unfilled orders. THE IRON AGE composite of finished steel prices averaged 2.361c. in March, against 2.360c. in February and 2.367c. a year ago. The March average is 93.5 per cent of the average of the last five years. At present writing a further slight increase appears, the composite standing at 2.362c. But the price level has been practically unchanged, and this action is analogous to the trend of prices between April and July, 1923. Unfilled orders are much lower than in the earlier period, but there has been heavy buying for current requirements. There

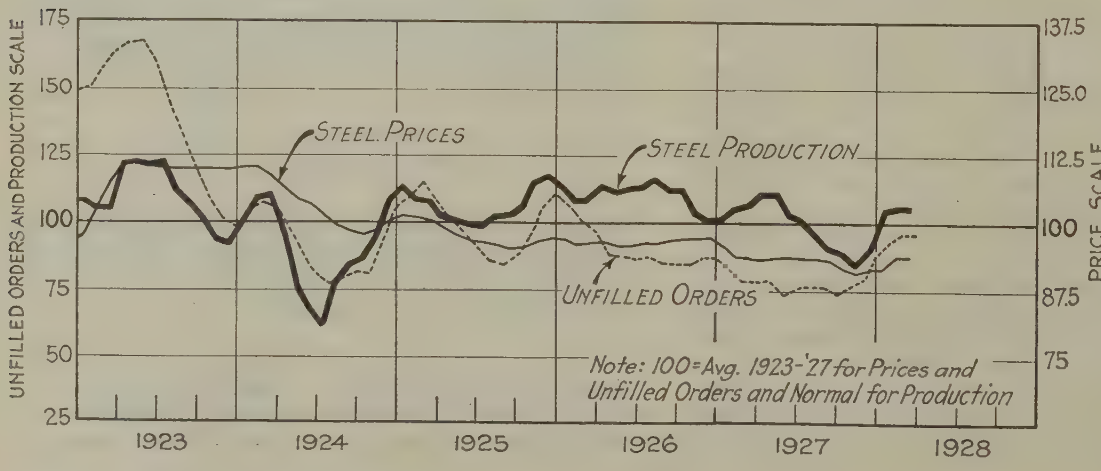
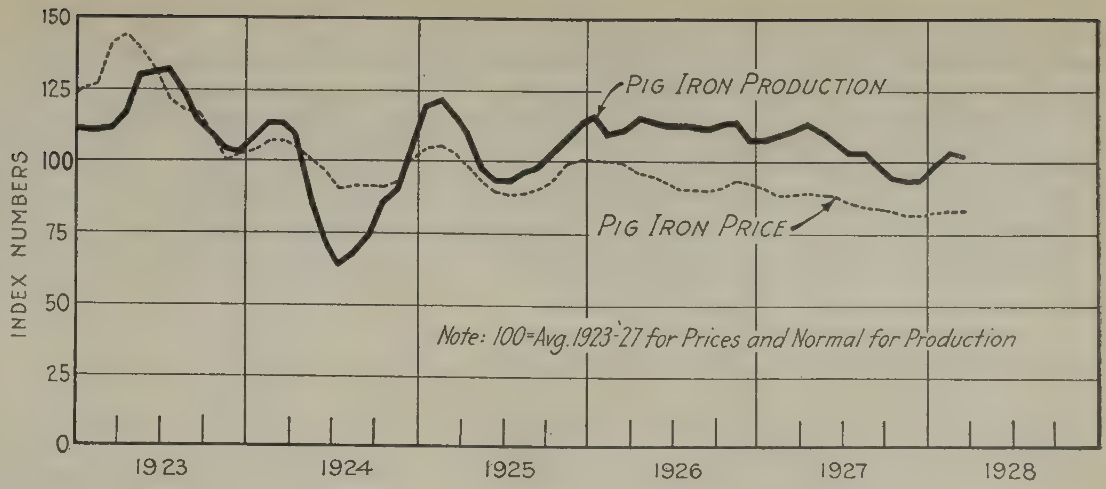


Fig. 1—Steel Production Increased by Less Than the Seasonal Amount. Prices have held fairly steady. Unfilled orders are rounding off, after substantial gains



Note: 100=Avg. 1923-27 for Prices and Normal for Production

Firmness in Pig Iron Prices Appears Logical with Pig Iron Output in March Only 2 Per Cent Above Normal (with All Adjustments Made)

seems to be no reason to expect much change in the average price of the chief items of finished steel during the next month or two as the somewhat larger volume of unfilled orders should help to maintain the market.

Little Change Indicated in Pig Iron Prices

PIG iron production figures, when subjected to careful statistical analysis, indicate a more considerable decline in March than was shown by the steel figures. Usually the pig iron output is about 5 per cent larger in March than in February. Last month there was actually an increase of only about 3.2 per cent. Accordingly, our adjusted index declined, being only 102 per cent of normal in comparison with 104.2 per cent in February and 111.8 per cent a year ago.

Pig iron production in March was 2 per cent above normal, while steel production was 5 per cent above. The ratio of the steel output to the pig iron output is a little above normal, which usually means greater strength in the pig iron market. Usually, too, this condition indicates a fairly sound general business situation. Incidentally, we find here a considerable difference between the situation in the middle of 1923 and the present, for in the earlier year the pig iron output was decidedly excessive in comparison with steel-making requirements.

As to pig iron prices, THE IRON AGE composite averaged $17.72 in March, which compares with $17.73 in February and with $19.04 a year ago. Pig iron prices were only 82.8 per cent of the average of the last five years, which is relatively much lower than the average of finished steel prices. At present writing pig iron prices average $17.67, or somewhat lower than the average for March.

Thus the markets for pig iron are rather weak, in spite of the relatively large volume of steel production. Analogy offers little assistance in this case. Perhaps the most similar situation is found in May, 1927, when pig iron prices were sagging; but the comparison is imperfect in that now the production of pig iron is considerably lower and the same may be said of prices. In May, 1927, too, the price of bituminous coal was on the decline, and was actually lower than in March, 1927, the *Coal Age* composite price having been $1.87 in the earlier period, against $1.92 last month. In view of the relatively small volume of pig iron production and the low price of fuel, it does not seem probable that the price will decline in the near future. Firmness would seem more logical. Not much change in either direction, however, is indicated.

Prices Less "Out of Joint" Than They Were

GENERAL price relations in the iron and steel industry seem quite uncertain. Basic materials such as coke, steel scrap and pig iron are at or near bottom levels and are "about right" in their relationship to one another. Heavy melting steel scrap might go lower, judged by precedent, and the temporary strength in some markets of late appears to be due chiefly to local shortages of some grades of old material. Billets also appear to be fairly low and likely to be maintained at present levels, though it would be logical to find some weakness in sheet bars.

Such items of finished steel as bars, nails and sheets are relatively low in comparison with the foregoing materials. Of the three items, nails are comparatively high and show a spread over billets and raw material which is nearly normal. The spread between bars and nails is fully normal. But bars are fairly low, though they have been much cheaper at certain periods in the

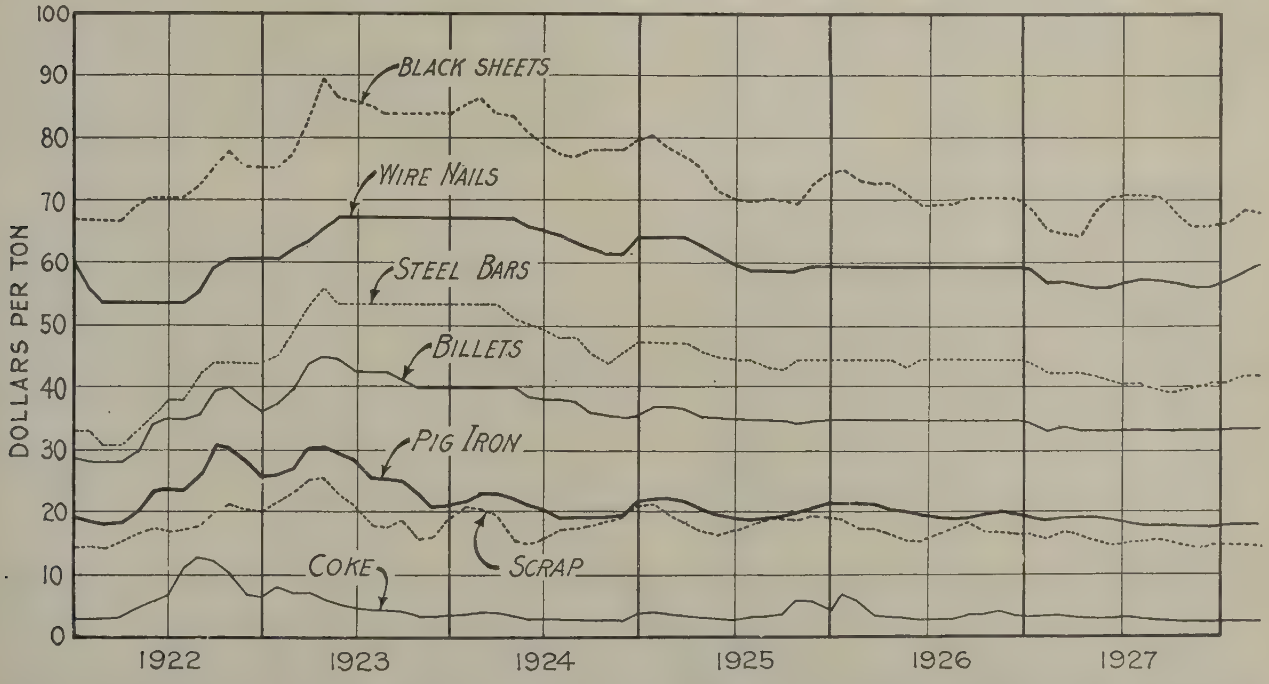


Fig. 3—Finished Steel Prices (in Particular, Sheets, Nails and Bars) Are Relatively Low, Compared with Semi-Finished and Raw Materials. Sheets have had their regular spring decline. Sustained improvement is not indicated

past. Sheets are very low, but may go still lower. Rarely indeed does the monthly average of sheet prices decline a little, as it did last month, without falling further. There has been a spring decline in sheet prices in each of the last five years. It seems difficult to escape the conclusion that the production of sheets must be somewhat excessive at present, in view of the weakness in this product while automobile production is gaining.

Concessions in the price of plates are reported, and the accuracy of such reports may be accepted, inasmuch as orders for railroad equipment are so backward.

On the whole, demand for steel appears to have slackened some last month, reflecting the indicated decline in our composite demand line (page 1018, April 12). The slackening of building activity cannot but affect the demand for steel unfavorably. At the same time, production is considerably above normal and probably a little above the usual relationship with the average activity of the chief consuming industries, though not much. The whole situation, therefore, does not seem to indicate the possibility of any considerable or sustained advance in steel prices.

MARCH SHEET SALES LARGE

Month's Total of Nearly 400,000 Tons by Independents Best Showing with One Exception Since September, 1926

March sales of independent sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers were 399,441 net tons and, excepting last December, when they amounted to more than 530,000 tons, they were the largest in any month since September, 1926. March sales were more than 133,000 tons greater than those of the month before and exceeded those for January by approximately 97,000 tons. Shipments were approximately 40,000 tons less than the sales, but there was no such increase in the unfilled orders. This item at the end of March was 675,196 tons, or about 8000 tons more than at the end of February.

In view of the fact that production last month is stated to have been 103 per cent of capacity, it appears that potential capacity ratings are too low. Production for several months is known to have been six or eight points in excess of the rate of mechanical operation. The reckoning of capacities appears to hang a little more heavily upon mechanical performance than upon what has been done in actual practice.

Figures for March with comparisons follow:

	March	February	January
Total No. of mills	721	718	720
Capacity for month	492,150	461,750	486,550
Per cent reporting	72.3	72.6	72.6
Sales	399,441	266,210	302,921
Production	366,127	330,565	316,541
Shipments	359,532	298,420	274,126
Unfilled orders	675,196	667,054	694,197
Unshipped orders	110,702	......	110,945
Unsold stocks	53,144	......	59,508
Percentages to Capacity			
Sales	112.4	79.5	85.7
Production	103.0	98.7	89.6
Shipments	101.1	89.1	77.6
Unfilled orders	189.9	199.2	196.5
Unshipped orders	31.1	......	31.4
Unsold stocks	15.0	......	16.8

Industrial Activity as Measured by Electric Power Consumption

Industrial activity in March, based upon electric energy consumption by about 3000 manufacturing plants, is estimated by *Electrical World* at 118.2, compared with 100 in the basic period 1923-1925. This shows a reduction from the 127.7 in February, but a gain over the 116.8 of March, 1927. The average for the first quarter is given as 121.4, compared with 116.3 for the first quarter of 1927. Reductions in March, compared with February, are reported in rolling mills and steel plants and in metal-working plants, these two constituting the metal industries group. Reductions are shown also in leather, textiles, lumber, automobiles, stone, clay and glass, paper and pulp, rubber, chemicals, foods and shipbuilding. Compared with a year ago, however, all of these groups, except shipbuilding, textiles and rolling mills and steel plants, showed gains.

British Iron and Steel Output in March Largest This Year

LONDON, ENGLAND, April 16 (*By Cable*).—Pig Iron output in March was 592,600 gross tons while that of steel was 793,300 tons, castings included. Both are the largest this year.

A comparison of the March production with February and January and with the monthly rate for previous years is shown in the following table in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly	855,000	638,600
1920—Average monthly	669,500	755,600
1922—Average monthly	408,500	490,100
1923—Average monthly	620,000	706,800
1924—Average monthly	609,900	685,100
1925—Average monthly	519,700	616,400
1926—Average monthly	203,500	296,700
1927—Average monthly	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300

Metal Statistics for 1928

The twenty-first annual edition of "Metal Statistics, 1928" has just been issued by the American Metal Market Co., 11 Cliff Street, New York. Various new tables have been added to the general assortment of statistical information on ferrous and non-ferrous metals that features previous issues of this handbook. One new table entitled "The Distribution of Steel in 1927" is adapted from the compilation in THE IRON AGE, Jan. 5, 1928, and gives the percentage of each class of steel passing into respective consuming lines. Including advertisements and indexes there are 552 pages.

Sales of Mechanical Stokers

Mechanical stokers to the number of 123, with a total rating of 43,425 hp., were sold in March, against 85 of 43,643 hp. in February, according to reports received by the Department of Commerce from 12 establishments. Of those sold in March, 31 of 5078 hp. were installed under fire-tube boilers and 92 of 38,347 hp. under water-tube boilers.

Except for February, the March rating was the highest reported since last August. It compares with 49,694 hp. in March, 1927.

Schedule of the next instalments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***April 26***—*General Business Outlook;* ***May 17***—*Activity in Steel Consuming Industries;* ***May 24***—*Position of Iron and Steel Producers.*

Continental Export Trade Smaller

British Hematite Competes in France—Swedish Miners' Strike Nearing End—About 200,000 Metal Workers Out in Germany

(*By Cable*)

LONDON, ENGLAND, April 16.

THE Cleveland pig iron market is still quiet and forward buying is restricted, but makers of foundry grades are fairly well booked with orders and are not pressing for sales.

Considerable competition between British and French pig iron is reported in French coastal districts. British makers are considering the possibility of increased sales to Europe in the near future, if labor troubles develop there.

There is improved export demand for hematite iron, but domestic buying is still slow, with makers maintaining a fairly firm attitude despite large stocks. Foreign ore prices are firm, although new business is small, most mines being well sold ahead. It is believed that the Swedish iron miners' strike is nearing termination.

Demand for finished steel is unsatisfactory, particularly for export, which is stagnant and there are no signs of an early revival. Purchasing of Continental material in this country is slow, but prices are steadier as a result of less insistent German offers and the well-booked condition of French plants.

Tin plate is firm as a result of good business and a more hopeful outlook. It is quite possible that makers may raise the minimum selling price to 18s. 3d. ($4.45), f.o.b. works port, at the Swansea, Wales, meeting, April 17. Meanwhile mills are well booked and contracts are reported to have been made for delivery to the end of the year.

Galvanized sheet prices are steady. Black sheets are quiet with some Japanese buying.

Central European wire rod mills are still outside the International Wire Rod Cartel, but have agreed to maintain prices at the cartel level. The reported desire of French mills to withdraw from the International Steel Cartel is strongly denied.

The Pont-a-Mousson works in France has secured an order for 2500 tons of cast iron pipe for Vienna, Austria. In Luxemburg the Acieries Reunies de Burbach-Eich-Dudelange has blown out a furnace at Esch for modernization.

The German labor situation is unsatisfactory. About 200,000 metal workers are now striking or locked out in Saxony.

FRENCH EXPORT PRICES WEAK

Trade Limited but Stocks in Foreign Markets Believed Low—Domestic Market Good

PARIS, FRANCE, April 6.—The export situation is rather confused, with buyers seeking lower prices and mills, on the strength of orders on their books, trying to maintain the present level. While there was a slight recession of prices at the end of March, bars and beams were the principal products affected and this was the result of German competition, which also appeared to a less extent on light-gage sheets. Export business is rather limited, but it is believed that there is a considerable volume of unsatisfied requirements in world markets, so that further recession in prices is not generally expected by producers.

Domestic business continues good, despite the slackening in export trade, and prices are firm. While the present satisfactory situation is attributed partly to the formation of a selling syndicate for semi-finished material and beams, replenishment of greatly depleted stocks has also been a factor.

Pig Iron.—Despite low British quotations the export market is still firm. Phosphoric foundry iron is being quoted at £3 4s. per ton ($15.59), f.o.b. Antwerp, for purchases of about 2500 tons. Prices on basic iron are somewhat depressed and range from £2 16s. to £2 17s. ($13.64 to $14.15) per ton, f.o.b. Antwerp. At a meeting, March 29, the Entente of French-Belgian-Luxemburg Pig Iron Producers agreed to maintain the present price level and fixed 16,000 tons as the total to be offered for May delivery to domestic users. Export prices quoted on foundry grade are: For Great Britain and overseas countries, £3 15s. 6d. ($18.39) per

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17s.	to £0 18s.	$4.15	to $4.39
Bilbao Rubio ore*..	1 2	to 1 2½	5.36	to 5.48
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to 18.39
East Coast mixed...	3 10		17.05	
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese ...	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18	to 0 18½	4.39	to 4.51
Black sheets, Japanese specifications.	13 5		64.53	
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates.......	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	9 15	to 10 0	2.12	to 2.17
Galv. sheets, 24 gage	13 2½	to 13 5	2.85	to 2.88
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a):		
Belgium	£3 3s.	$15.34
France	3 3	15.34
Luxemburg	3 3	15.34
Basic pig iron (nom.):		
Belgium	3 0	14.61
France	3 0	14.61
Luxemburg	3 0	14.61
Coke	0 18	4.39
Billets:		
Belgium	4 12	22.41
France	4 12	22.41
Merchant bars:		C. per Lb.
Belgium	5 5	1.16
France	5 5	1.16
Luxemburg	5 5	1.16
Joists (beams):		
Belgium	4 14½	1.04
France	4 14½	1.04
Luxemburg	4 14½	1.04
Angles:		
Belgium	5 2½	1.13
⅛-in. plate:		
Belgium (a)......	6 9	1.42
Germany (a).....	6 9	1.42
3/16-in. ship plate:		
Belgium	6 5	1.33
Luxemburg	6 5	1.33
Sheets, heavy:		
Belgium	6 1	1.34
Germany	6 1	1.34

(a) Nominal.

ton; for Holland, £3 7s. ($16.32) per ton, f.o.b. Dutch frontier; for Italy, £2 19s. 6d. ($14.50), f.o.b. Thionville; for Switzerland, 79.25 Swiss francs ($15.67) per ton, delivered Basle. On large tonnages concessions are made from these prices. Negotiations are being continued for a revival of the association of hematite iron producers, which expired March 31, and a decision is expected soon. Meanwhile price concessions have begun to appear, and the recent increase in freight rates has not always been added to delivered prices.

Semi-Finished Material.—The shortage of semi-finished steel has disappeared, but prices continue fairly firm at £4 2s. to £4 6s. ($19.97 to $20.94) per ton, f.o.b. Antwerp, for blooms and £4 9s. to £4 12s. ($21.68 to $22.40) per ton for billets. Sheet bars range from £4 13s. to £4 13s. 6d. ($22.65 to $22.77) per ton.

Finished Material.—The irregularity of quotations that was in evidence a few weeks ago has been eliminated, but concessions for export business are beginning to appear. In the domestic market open-hearth steel prices have been advanced from 755 fr. ($29.75) per ton to 830 fr. ($32.70) per ton for small rolled products and from 730 fr. ($28.76) to 805 fr. ($31.72) per ton for large rolled products. Steel bars have settled to about £5 4s. per ton (1.14c. per lb.), and normal specification beams are quoted at £4 13s. to £4 14s. per ton (1.02c. to 1.03c. per lb.). The European Rail Makers' Association at its recent meeting decided to maintain rails at £6 7s. 6d. ($31.05) per ton.

Japan Using German and Domestic Electrical Sheets

NEW YORK, April 17.—In the past, Japanese consumers of electrical steel sheets have obtained most of their requirements from the United States or Great Britain. Recently, however, these consumers report that German electrical steel sheets have been improving in quality, and the Shibaura Engineering Co. has just purchased a substantial tonnage of Bismarck motor sheets from the Thyssen mill of the Vereinigte Stahlwerke, Düsseldorf, Germany, at about $98 per ton, c.i.f. Yokohama. This reported improvement in the quality of German electrical sheets recalls similar improvement in the quality of German light-gage black sheets, reported about two years ago. Since then, Japanese consumers have been fairly steady consumers of the German product, which, however, is produced in only a small tonnage.

Another factor that may tend to reduce Japanese purchases of electrical steel sheets in the United States and Great Britain is the growing importance of the Imperial Steel Works in Japan. Since beginning the production of electrical steel sheets, the Government works has had its product tried by various engineering works in Japan, and the opinion of these consumers seems to be that the product has been so improved as to place it in competition with foreign material. The only defect in the steel reported by the users is its irregularity in thickness, but with this defect eliminated, they state, it would rate as a first class product in the international market. The Government works is still working to improve its product, and, according to recent reports from Japan, successful production of high-grade electrical steel sheets is expected in the near future.

The annual capacity of the Government works in electrical steel sheets is estimated at 3000 to 4000 tons, while the annual consumption of such sheets by Japanese consumers is placed at 10,000 tons or more.

Large Shipments of Electric Industrial Trucks in March

March shipments of electric industrial trucks and tractors are reported by the Department of Commerce at 131 units, compared with 119 (revised figure) in February and 112 in January. Except for June and February of last year, the March total is the greatest since October, 1926. Of the total 16 were for export, while 18 tractors and 97 of other types were on domestic order.

URGES FRENCH USE OF STEEL

Per Capita Consumption in France Lags Behind That of Other Producing Countries

Increased domestic consumption of metallurgical products made in France was urged in a speech made recently by Maurice Fould, director of the Forges & Acieries de Pompey, at the Union des Industries Metallurgiques et Minières, Paris, before an audience of prominent representatives of the siderurgical, fabricating and consuming industries. Increased consumption of steel in France was declared to be one of the most urgent problems of the French metallurgical industry, says a report received by the iron and steel division, Department of Commerce, Washington, from the office of the American trade commissioner in Paris.

Steel consumption in France, according to M. Fould, increased from 4,293,000 metric tons in 1913 to 6,086,000 tons in 1926, a gain of 40 per cent. During the same period, owing to the acquisition of the large Lorraine plants and to the construction of new equipment in war-damaged plants, production increased from 4,687,000 tons to 8,386,000 tons, an increase of 80 per cent, or twice as much as the gain of consumption.

M. Fould compared this consumption with that of other nations to show "where the remedy lies." The following figures were given as showing the classification in 1926 of the principal steel-producing countries according to the annual steel consumption per capita (in parenthesis the consumption before the war, pig iron included, stated in kilograms, each kilogram being 2.2 lb.): United States, 411 kg. (372); Belgium and Luxemburg, 313 kg. (190); Germany, 155 kg. (261); Great Britain (in 1925), 152 kg. (236); France, 149 kg. (151).

The annual excess of production over consumption per capita, said M. Fould, is as follows: Belgium and Luxemburg, 383 kg.; France, 66 kg.; Germany, 42 kg.; United States, 15 kg.; Great Britain, 13 kg.

In 1927, the report says, France was obliged to export 52 per cent of its steel production. As a result of the war France has become one of the large metallurgical countries and to remain such, it was pointed out, it is necessary to develop its interior consumption. If not, it was explained, it cannot hope that exportation will permit it to find steady outlets for more than one-half of its production.

M. Fould indicated means employed by the United States and in Germany to increase consumption of steel and especially emphasized the organization and action of the Propaganda Abteilung recently formed by the Stahlwerksverband at Düsseldorf. He asked the interested industries and trades to organize a propaganda office in France and called attention to the importance of capital which should be placed at the disposal of the organization. M. Richemond, president of the Union des Industries Metallurgiques et Minières, made a proposal, which was accepted, to constitute an intersyndical committee to study the best means to carry out the policy urged by M. Fould.

Germany Replacing Minette With Swedish Iron Ore

WASHINGTON, April 14.—In addition to the iron mines in the Sieg, Lahn and Dill districts, which annually supply German blast furnaces with some 7,000,000 metric tons of 50 per cent iron content, Germany also draws extensively on the deposits in Sweden, Lorraine and Newfoundland, and less extensively on those of northern France, Norway, Spain and North Africa, says a report received by the iron and steel division, Department of Commerce, from Thomas Butts, trade commissioner at Berlin.

The marked dependence of Germany on foreign ores, it is stated, becomes more apparent when it is understood that the pig iron produced from the domestic ores during 1927 constituted only a little more than a quarter of the total production. Prior to the war Germany drew heavily on the ore deposits of Lorraine and Luxemburg, taking from the former about 21,200,000 tons and from the latter about 7,400,000 tons annually, or more than enough to provide the ore for more than one half of the 10,000,000 tons of pig iron then being produced. Since the war, and especially during the past few years, Swedish ores have largely taken the place of those formerly secured in Lorraine, and in 1927 approximately 15,000,000 tons, with an iron content of nearly 65 per cent, was obtained from that source. It is probable that this figure will not be equalled in 1928, as the German ore reserves during 1927 were depleted, but have been since reconstituted.

If the present rate of pig iron production in Germany is maintained throughout 1928, it is calculated that about 1,000,000 tons of Swedish ore will be imported monthly, a volume sufficient to supply nearly three-fifths of the needs of the German industry. Minette ore from Lorraine, with an iron content of about 35 per cent, is being imported into Germany at the rate of approximately 2,500,000 to 3,000,000 tons annually, while Newfoundland is the source of an additional 1,000,000 tons annually.

Germany Recovers Old Place in Machine Tool Industry

Exports Last Year Exceeded Those of United States—More Than Half of Imports Came From This Country—Russia Best Export Customer

THE rapid recovery of the German metal-working machinery industry is the subject of a bulletin by Theodore Pilger, American trade commissioner, Berlin, just issued by the Bureau of Foreign and Domestic Commerce, Washington. Conditions since the war, according to the report, have tended to stimulate the industry in Germany, with the result that the Germans have 865 factories with 65,000 workers, contrasted with 378 plants in the United States with 36,000 employees. Moreover, Germany now claims 46 per cent of the world's trade in metal-working and other closely related types of machinery, compared with America's 36 per cent. An increase in German metal-working machinery exports from 34,000 metric tons valued at $12,700,000 in 1924 to 63,000 metric tons valued at $27,700,000 in 1927 shows the rapidity with which foreign outlets are being developed.

Germany Passes United States in Exports

Although the total value of metal-working machinery manufactured in the United States in 1927 was nearly three times the value of the German product, $175,592,488 compared with $68,000,000, the German export value was $27,700,000, compared with $25,400,000 in the case of the United States. In other words, German manufacturers exported from 33 to 40 per cent of their product while in the United States exports were only 12½ per cent of total production. A further comparison of the industry in the two countries is shown in the accompanying table, which has been derived from census returns.

German Industry Seriously Over-Capacitated

Germany's census of 1921 showed 501 factories engaged in making metal-working machinery, with 50,000 employees. By 1925 there were 865 factories, employing 65,000 persons, an increase of 73 per cent in number of factories and 30 per cent in number of employees. As Mr. Pilger points out, "the machinery industry has organization, friendly government assistance, factories, workmen, engineers and raw materials enough to make tremendous inroads into the world's machine tool markets. The great needs in the German machine tool line now are sales organization, salesmanship and markets.

"There are from 90 to 100 German manufacturers of lathes of all kinds. This number of factories is sufficient to pour out an enormous overproduction. The same thing is true in almost every other type of machine tool, and these factories compete so vigorously that there is no profit for anyone except the buyer. Price is the outstanding factor in sales argument."

German Imports from the United States

As was the case before the war, the United States continues to furnish Germany with more than half its total imports of metal-working machinery. These imports were valued at 3,765,000 gold marks in 1926 and amounted to 58.8 per cent of Germany's total imports of this kind of machinery. Switzerland, Great Britain and Austria followed in the order named, supplying 9 per cent, 6.8 per cent and 5.6 per cent respectively.

The most striking development in Germany's exports of metal-working machinery in 1927 was the establishment of credit guaranties to Russia which resulted in that country's taking 30.6 per cent of Germany's total exports last year. In the previous year Russia took only 4.6 per cent of the total, but in 1913 Russia was a large buyer, taking 18.8 per cent. In 1927 Great Britain was second in the list of Germany's customers, taking 7.8 per cent of total metal-working machinery exports. Italy, the Netherlands, Switzerland, Czechoslovakia, the United States and France followed in the order named.

German and United States Metal-Working Industries Compared

Item	Germany	United States
Number of factories	865	378
Salaried employees, proprietors and firm members	65,107	36,825
Number of horsepower	75,113	147,418
Horsepower per employee	1.15	4.4
Employees per plant	75	95
Value of product[1]	$68,000,000	$175,592,488
Value of product per workman[1]	$1,000	$4,770
Value exported:		
1913	$19,500,000	$16,097,000
1925[2]	$18,400,000	$22,036,800
1927[2]	$27,700,000	$25,400,000
Export ratio, 1925 (per cent)	33–40	12½

[1] Estimated for 1927.

[2] German export statistics for 1925 exclude "reparations in kind," while for 1927 these payments are included and accounted for 6.4 per cent of the total.

Czechoslovakian Steel Output Estimated at 1,500,000 Tons

WASHINGTON, April 14.—While Czechoslovakia is the only country among important steel producing nations that does not officially publish figures showing its total production, it has been indicated that the total output in 1927 was about 1,500,000 tons of steel ingots, says a report to the Department of Commerce from Prague. This is calculated from the fact that the Czechoslovak industry last year exceeded its quota of 1,429,000 metric tons in the Continental Steel Entente by about 70,000 tons. This figure also seems to be substantiated by the consumption of coke.

British Consider Marking Imported Bearings

WASHINGTON, April 14.—Applications have been received by the British Board of Trade for regulations requiring a mark of origin on ball and roller bearings and their parts, and on copper tubes and pumps (other than semi-rotary wing pumps) and their parts, according to the Board of Trade *Journal*, says a statement issued by the Department of Commerce. The same authority also says that applications have been received by the board to exempt specified cabinet furniture of metal from the order requiring a mark of origin, provided it is sold in a container indicating the origin by printing in a conspicuous manner.

MERCHANT MARINE URGED

Hearings Show American Ships Carry Less Than One-Third of Our Foreign Trade

WASHINGTON, April 17.—The vital importance of a first-class American merchant marine to the industries and people of this country perhaps was never better shown than during the recent hearings held before the House Committee on Merchant Marine and Fisheries. While great volumes of evidence have been presented on this perennial subject during the past three score years or more, that presented recently is held by those who have followed the subject to have been especially impressive. Legislation has been attempted ever since the Civil War to build up an American merchant marine and either has failed of passage or, if passed, has proved ineffective. One of the outstanding difficulties has been the general indifference to the subject, even by some who should be the most greatly concerned, including large industries that would be called upon to supply materials and would be benefited as exporters in American bottoms.

There now seems, however, to be greatly increased interest in the subject, and it was exhibited at the hearing before the House committee. The result has been the reporting out of a shipping bill which, significantly enough, has been unanimously approved by the committee.

As drawn, the measure carries features of the Jones bill passed by the Senate, but authorizes the sale of Government lines by a vote of five members of the Shipping Board instead of seven, as provided in the Senate bill.

Large Construction Loan Fund Proposed

Recognizing the necessity of Government aid to private shipping, the House measure increases the proportion that may be loaned for the construction of new ships from two-thirds to three-fourths of the construction costs, and reduces the rate of interest to the rate paid by the Government itself. The construction loan fund is increased from $125,000,000 to $250,000,000, making available a substantial sum of cheap money to shipbuilders. The bill also extends the term and increases the rates of mail pay, which will range from $1.50 to $12 per mile, depending upon speed and tonnage. The Postmaster-General is authorized to allow additional compensation for air mail from ship to shore and from shore to ship. This provision, it is believed, would insure the building and operation of six American four-day liners to ply between American and British and French ports, as proposed by the American Brown-Boveri Electric Corporation, New York. The ships, designed as airplane carriers, would be by far the fastest on the ocean, having a continuous speed of 33 knots per hour and a maximum of 35 knots per hour, about 9 knots faster than the present fastest liner.

Another important feature of the bill is a provision creating an insurance fund which the Shipping Board would use to insure any interest the Government may have in any vessel, through liens on loans, or otherwise. This feature has been pointed to as freeing American shipping from the necessity of turning to foreign marine insurance, heretofore a heavy handicap against the building of a privately-owned American fleet. Necessarily also the importance of a merchant marine as an arm of the national defense was taken into consideration.

Statistics were presented showing the millions of American money now paid out to foreign interests for passenger, freight and mail service. At the same time the utter depression of American shipyards and the vast loss to American industries which would supply the materials for ships, together with the loss suffered in the export trade by having to turn to the superior and faster foreign ships, were pointed out to the committee.

Edward C. Plummer, vice-chairman of the Shipping Board, pointed out that at the present time more than 5760 ships, of 26,000,000 gross tons, are employed in transporting the foreign commerce of the United States, and less than one-third of these ships are American vessels.

"The peculiar significance of that fact is this," said Mr. Plummer, "that, while our foreign competitors are continually blaming the United States for the overtonnaged condition of the world, it is to be noticed that during the very period they have been complaining of this overtonnage, they have been building and, of course, building the most modern and economical vessels that can be produced."

Many Industries Involved in Shipbuilding

Illustrated by many exhibits, a statement was presented to the committee by H. G. Smith, vice-president of the Bethlehem Shipbuilding Corporation and also vice-president of the National Council of American Shipbuilders, showing the condition of the shipbuilding industry in the United States and what it means to the country. One of the exhibits showed that 146 industries, covering every State in the Union, are involved in the building of a ship. The materials coming from these States, with the value of each, were cited and covered a wide range, including steel, machinery, cotton, lumber, textiles, petroleum, ore, paints, glassware, flax, linseed, etc.

It was pointed out that shipyards of the United States are virtually idle and that trained staffs have almost disappeared. It would require 10 years, Mr. Smith said, to build up the required staff of engineers, draftsmen, scientific men and mechanics, but like others he expressed confidence that this could be done and a first class privately-owned American merchant marine be established with the proper Government aid, despite higher costs of labor and other handicaps in this country.

Special Test of Imported Steel May Be Required

NEW YORK, April 17.—The use of imported structural steel in buildings erected in Greater New York is receiving serious consideration by the superintendents of buildings in the various boroughs. As a result of recent conferences it is understood that the city may require physical tests and chemical analyses of structural steel imported from European mills. Under this plan, a decision would be made, on the basis of material tested, as to whether the mill from which the steel originated was furnishing material of proper specifications. It is understood that May 21 has been tentatively set as the date before which such tests should be made by the importers, and the Columbia University testing laboratories are mentioned as the agency for carrying out such tests.

In the case of imported reinforcing bars, the Treasury Department, Washington, has announced its intention to appeal the recent decision of Justice I. F. Fischer, reported in THE IRON AGE, April 12, by which reinforcing bars would be dutiable at 20c. instead of 30c. per 100 lb. A brief has not yet been filed by the Government, so it is not yet known on what grounds the appeal is being made.

While New York importers of steel have submitted bids on several projects requiring substantial tonnages of bars, principally bridge construction, in most cases contracts are expected to go to American mills. Continental steel prices have declined slightly from the peak reached a few weeks ago, so that plain steel bars are quoted today at 1.73c. to 1.75c. per lb., base, duty paid, and shapes range from 1.63c. to 1.65c. per lb., base, duty paid, New York.

J. B. Booth & Co., 216 East Robinson Street, Pittsburgh, doing a warehouse business in iron and steel products, have added cold finished steel bars and shafting to their list of stock items. The product of the Columbia Steel & Shafting Co., Pittsburgh, is to be carried. Bars, plates, shapes, hoops, bands and welding wire are its other lines.

Foundrymen Announce Program

Many Subjects to Be Discussed at Sixteen Sessions at Convention in Philadelphia, May 14 to 18

THE program committee of the American Foundrymen's Association has prepared the following schedule of technical sessions for the thirty-second convention, to be held in Philadelphia, May 14 to 18:

MONDAY, MAY 14

Registration and committee meetings.

TUESDAY, MAY 15

9.30 a. m.—General Opening Meeting and Business Session; Chairman—President S. W. Utley.

11 a. m.—Non-ferrous Metals.

"Science in the Foundry," by E. F. Hess, Ohio Injector Co., Wadsworth, Ohio.

"Furnace Refractories for Brass Foundries," by H. M. St. John, Detroit Lubricator Co., Detroit.

"Risers, Their Need and Methods of Feeding," by R. R. Clarke, General Electric Co., Erie, Pa.

"The Effect of Melting and Pouring Conditions Upon the Quality of No. 12 Aluminum Alloy," by T. W. Bossert, Aluminum Co. of America, New Kensington, Pa.

11 a. m.—Steel Founding.

"Economies in Oxy-Acetylene Cutting for Riser Removing," by G. O. Carter, Linde Air Products Co., New York.

"Variables in Steel Foundry Practice," by F. A. Melmoth, Thomas Firth & Sons, Ltd., Sheffield, England. Annual exchange paper to be presented on behalf of the Institute of British Foundrymen.

"Interdependence of Operating and Sales Departments in the Success of a Foundry," by K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa.

"Reducing New Sand Consumption in a Steel Foundry," by H. A. Mason, Gould Coupler Co., Depew, N. Y.

11 a. m.—Cast Iron Founding—Cupola Developments.

"Theory of Cupola Operation in Relation to Practice," by R. B. Schaal, Roberts & Manders Stove Co., Hatboro, Pa.

"Automatic Blast Gate Control for Cupola Melting," by H. V. Crawford, General Electric Co., Schenectady, N. Y.

"Refractories for the Cupola," by C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio.

2.30 p. m.—Foundry Costs.

Report of committee on foundry costs.

"The Schedule Fallacy," by J. J. Ewens, George H. Smith Steel Casting Co., Milwaukee.

"Necessity for Creating a Castings Consciousness," by A. F. Jensen, Hanna Engineering Co., Chicago. Presented on behalf of the Foundry Equipment Manufacturers' Association.

WEDNESDAY, MAY 16

10 a. m.—Steel Metallurgy.

"General Characteristics of Alloy Steel Castings," by J. W. Frank, Chicago Steel Foundry Co., Chicago.

"Manganese Steel," by H. P. Evans and A. F. Burtt, Pettibone-Mulliken Co., Chicago.

"A Modern Plant for the Heat Treatment of Miscellaneous Steel Castings," by A. W. Lorenz, Bucyrus-Erie Co., Milwaukee.

"Research Laboratory of the American Steel Foundries," by W. C. Hamilton, American Steel Foundries, Indiana Harbor, Ind.

Report of committee on steel castings.

Report of committee on heat treatment of ferrous castings.

Report of A.F.A. representative on joint committee on investigation of the effects of phosphorus and sulphur in steel.

10 a. m.—Cast Iron

"Influences of Carbon and Silicon Variations in Cast Iron," by D. G. Anderson and G. R. Bessmer, Western Electric Co., Chicago.

"Some Recent Developments in Cupola Metal," by J. D. Miller, Cresson-Morris Co., Philadelphia.

"Temperature Measurements of Molten Cast Iron," by H. T. Wensel and W. F. Roeser, Bureau of Standards, Washington.

"Test Bar for Testing the Chill of Cast Iron with Medium and High Silicon Contents," by M. Dudouet, Ecole Superieure de Fonderie, Paris, France. Annual exchange paper of the French Foundry Technical Association.

"Heat Losses from a 75-Ton Hot Metal Car," by W. F. Roeser, Bureau of Standards, Washington.

10 a. m.—Malleable Iron.

"Reducing Scrap in the Malleable Foundry," by R. A. Greene, Ohio Brass Co., Mansfield, Ohio.

"Effects of Various Elements on Malleable Cast Iron," by L. E. Gilmore, Crane Co., Chicago.

"The Need for Research in the Foundry," by E. E. Griest, Chicago Railway Equipment Co., Chicago.

"Oxidation Phenomena During the Annealing of Malleable Cast Iron," by H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland.

"An Incentive Bonus Plan for Molders Based on Scrap Control," by R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

12.30 p. m.—Round Table Discussion on Brass Founding.

2.30 p. m.—Foundry Management.

"Basic Principles of Management in the Foundry," by J. D. Towne, Dayton, Ohio.

"Stabilizing Labor and Cutting Costs," by A. D. Lynch, Ohio Brass Co., Mansfield, Ohio.

"What Does the Buyer Expect for His Money?" by J. A. Marks, Packard Motor Car Co., Detroit.

"A Contribution to the Training of Labor and the Personnel of a Foundry," by A. Soupart, director of Musee Professional de l'Etat et des Ecoles Techniques de Morlanwetz, Belgium. Annual exchange paper of the Belgian Technical Foundry Association.

2.30 p. m.—Foundry Coke.

Round table discussion of the present status of coke specifications.

"Presentation of Review of Status of Coke Specifications," by W. A. Selvig, United States Bureau of Mines, Pittsburgh.

THURSDAY, MAY 17

10 a. m.—Apprentice Training.

"The American Boy in the Foundry," by F. J. McGrail, Sheffield Works, Fairbanks, Morse Co., Three Rivers, Mich.

Reports of apprentice training in various foundry centers. Reviewed by F. A. Lorenz, American Steel Foundries, Indiana Harbor, Ind., and L. V. Park, Park & Williams, Inc., Philadelphia.

Discussion of apprentice training.

10 a. m.—Cast Iron.

"Theory or Practice in the Gray Iron Foundry," by John Shaw, Southsea, England.

"On Research Problems of the Gray Iron Foundry," by J. W. Bolton, Lunkenheimer Co., Cincinnati.

Report of committee on gray iron.

12.30 p. m.—Malleable Iron Round Table Discussion.

Following a luncheon gathering, an informal discussion of shop problems of the malleable foundry will take place.

2.30 p. m.—Sand Control.

"Surface Conditions of Castings as Affected by Core Sand Mixtures," by H. L. Campbell, University of Michigan, Ann Arbor, Mich.

"Testing Molding Sands for Durability," by M. A. Blakey, International Harvester Co., Milwaukee.

"Sand Conservation and Control in a Gray Iron Jobbing Shop," by T. F. Kiley, Brown & Sharpe Mfg. Co., Providence, R. I.

"Sand Control in a Light Casting Shop," by W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J.

"A Compression Test of High Precision—The Colloid Nature of Natural Bond—The Effect of Heating on the Bond," by G. G. Brown, Ann Arbor, Mich., and C. C. DeWitt, Michigan College of Mines and Technology, Houghton, Mich.

Report of committees.

FRIDAY, MAY 18

10 a. m.—Materials Handling.

"Materials Handling and Its Relationship to Building Plans," by E. F. Scott, Austin Co., Cleveland.

"Determining Returns from Materials Handling Equipment," by J. J. Hartley, Link-Belt Co., Chicago.

"What Materials Handling Equipment Can Do for the Jobbing Foundry," by W. B. Marshall, Chain Belt Co., Milwaukee.

"Unloading Foundry Materials," by R. T. Turner, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

"How to Determine When Materials Handling Equipment Should Be Installed," by H. J. Dorus and C. S. Schroeder, Yale & Towne Mfg. Co., Stamford, Conn.

Course in Cupola Operation

AN innovation this year is a course on cupola operation. The schedule of the sessions is as follows:

Monday, May 14, 4 p. m.
Period 1—Principles Underlying Cupola Melting Process. Leader, Dr. Richard Moldenke.
Tuesday, May 15, 4 p. m.
Period 2—Cupola Construction Details. Leader, E. J. Lowry.
Wednesday, May 16, 4 p. m.
Period 3—Cupola Charging Practice. Leader, David McLain.
Thursday, May 17, 4 p. m.
Period 4—Cupola Improvements. Leader, H. W. Dietert.

European Exchange Papers

EXCHANGE papers are to be presented by representatives of three European associations with which the A. F. A. has exchange arrangements. F. A. Melmoth, manager of the steel foundry of Thomas Firth & Sons, Sheffield, England, will present the exchange paper of the Institute of British Foundrymen. His paper will be on variables in steel foundry practice.

M. Dudouet, of the Foundry High School of Paris, will present the exchange paper of the Association Technique de Fonderie, which is the technical foundry association of France. This paper will deal with test bars for determining the chill of cast irons with high and medium silicon contents.

A. Soupart, director of Musee Professional de l'Etat et des Ecoles Techniques de Morlanwetz, will present the exchange paper for the Belgian Technical Foundry Association. This paper will be a contribution to the training of labor and the personnel of a foundry.

Refractories Institute to Discuss Specifications

A feature of the annual meeting of the American Refractories Institute to be held at the Greenbrier, White Sulphur Springs, W. Va., May 8, will be the discussion of a selected list of specifications used by consumers in the purchase of refractories. An effort is being made to have a well-balanced attendance of consuming and producing interests. It is planned to discuss in detail the various phases of specifications and in a non-technical way to indicate their merits and faults.

A practical specification is one which ranges between the requirements for an ideal refractory and one which can be manufactured at a reasonable profit. It is believed that the discussion will be of considerable value to consumers in formulating more practical requirements and to manufacturers in obtaining ideas of the consumers as well as in learning more of the requirements of refractories in various furnace operations. This meeting is open to everyone interested in such specifications.

"Screening of Fire Clays" and "The Cause of Bulging in Hand-Made Shapes" are the topics of two of the papers to be presented.

Miss Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, is secretary of the institute.

Gear Manufacturers Meet at Rochester

In addition to progress reports and recommendations of the association's several standardization committees, a number of addresses have been arranged for the twelfth annual meeting of the American Gear Manufacturers Association, which will be held at the Seneca Hotel, Rochester, N. Y., April 19, 20 and 21. Luncheon and an inspection visit to the Gleason Works is also to be a feature.

"Gear Lubrication" will be discussed by G. A. Round, assistant chief engineer Vacuum Oil Co., and "Non-Metallic Materials—The Part They Will Play in the Future of the Gear Industry," by T. C. Roantree, Westinghouse Electric & Mfg. Co. "Nitration of Steel," by W. H. Phillips, Molybdenum Corporation of America. "Contact of Standard Worm Gears," by J. C. O'Brien, Pittsburgh Gear & Machine Co.; and "The Value of Research to the Present Day Manufacturer," by C. E. Skinner, assistant director of engineering, Westinghouse Electric & Mfg. Co., are among other addresses planned.

Dr. Dexter S. Kimball, dean of the College of Engineering, Cornell University, will speak at the informal banquet, to be held on the evening of April 20. E. J. Frost, president Frost Gear & Machine Co., will be the toastmaster and musical features will be furnished by talent from the Gleason Works.

American Gray Iron Institute to Meet in Philadelphia May 18

The American Gray Iron Institute, which was organized at a conference held in Pittsburgh, March 13, will hold a meeting in Philadelphia, Friday, May 18. This date, the last day of the American Foundrymen's Association's convention and exhibition, was chosen to avoid conflict with other activities and to permit the largest possible attendance of gray iron foundrymen.

The organization committee chosen at Pittsburgh held a meeting in Cleveland Tuesday, April 10, and set up a tentative plan of procedure for action at the Philadelphia meeting. The principles enunciated by the resolution adopted at Pittsburgh have been clarified and enlarged to include the purposes for which the American Gray Iron Institute was founded. These principles, which will be submitted to general discussion at Philadelphia, were published in THE IRON AGE March 15, p. 777.

The organization committee appointed at Pittsburgh includes the following gray iron foundrymen:

Walter L. Seelbach, chairman, Forest City-Walworth Run Foundries Co., Cleveland; A. E. Hageboeck, vice-chairman, Frank Foundries Corporation, Moline, Ill.; J. H. Bruce, Bowler Foundry Co., Cleveland; J. L. Carter, Barlow Foundry Co., Newark, N. J.; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; A. E. Clarke, Des Plaines Foundry Co., Des Plaines, Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Fred Erb, Erb-Joyce Foundry Co., Detroit; W. J. Grede, Liberty Foundry Co., Milwaukee; John Hartman, Atlas Foundry & Machinery Co., Tacoma, Wash.; B. H. Johnson, Cresson-Morris Co., Philadelphia; Angus Macdonald, Snead & Co., Jersey City, N. J.; Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

Of this number, 13 attended the meeting of the committee in Cleveland, April 10.

The meeting in Philadelphia on May 18 will be held in the convention hall of Philadelphia Commercial Museum and will be called to order by B. H. Johnson, temporary chairman, who presided at the Pittsburgh conference. A speaker of national prominence, familiar with the problems of group action upon commercial and industrial problems, has been engaged for this occasion.

American Welding Society Announces Annual Program

American Welding Society will hold its annual meeting in the Engineering Societies Building, 33 West Thirty-ninth Street, New York, on April 25, 26 and 27. Wednesday, April 25, will be given over to meetings of the standing committees on pressure vessels, structural steel and nomenclature.

On April 26, the morning session will discuss papers on "Welding of Corrosion-Resisting Alloys" by W. B. Miller of the Union Carbide & Carbon Research Laboratories and "Building Up Rail Ends by Electric Arc" by H. E. McKee, Electric Rail Weld Service Corporation. In the afternoon the matters of qualification of welders, inspection and supervision will be considered from many angles by a group of speakers. In the evening the annual dinner will be held.

Friday morning, April 27, M. L. Eckman, welding supervisor Ford Motor Co., Detroit, will describe "Welding the Ford Car." In the afternoon the American Bureau of Welding (the research group of the society) will hold its annual meeting.

Organize for World Engineering Congress at Tokio

For the world engineering congress to be held next year in Tokio, an American committee was formally organized in New York, March 22, and officers elected as follows:

Honorary chairman, Herbert Hoover; chairman, Elmer A. Sperry, New York; vice-chairman and chairman of the executive committee, John W. Lieb, New York; vice-chairman, C. E. Grunsky (Pacific Coast), San Francisco; C. E. Kettering (Middle West), Detroit; executive secretary, Maurice Holland; executive committee, Gano Dunn, George W. Fuller, Maurice Holland, Frank B. Jewett, John W. Lieb, John H. McGraw, Calvin Rice and W. E. Wickenden, New York; Donald C. Jackson, Cambridge, Mass.; O. C. Merrell, Washington; Charles F. Scott, New Haven, and Elmer A. Sperry, Brooklyn.

Employee Representation Is Gaining Rapidly Over Trade Unionism

That employee representation, as expressed in works councils and company unions, is rapidly assuming the activities of trade unionism in most of the large mass production manufacturing industries was emphasized by William M. Leiserson, professor of economics, Antioch College, Yellow Springs, Ohio, in an address before the Academy of Political Science at the Hotel Astor, New York, on April 11. Professor Leiserson went on to say that this evolution in labor relations is not coming about because company unions are necessarily better prepared or situated to handle the interests of the laborer, but because they have taken the initiative and have succeeded in accomplishing smoothly and satisfactorily what trade unions have not seemed able to do without friction and poor management.

The speaker explained further that industrial executives had not hesitated to seek out men scientifically trained in personnel relations to conduct their activities in employee representation work, while trade unions had failed in many cases to recognize the need for broadminded leadership. Until the unions realize the need for this sort of leadership, he pointed out, they will continue to fight a losing battle with the young but energetic competitor, employee representation.

"Industrial leaders, however," Professor Leiserson said, "are erring seriously if they believe that in creating company unions they have built up a passive and docile instrument for the handling of labor disputes. Employee representation does not deprive the workers of the right to strike, but on the other hand it does offer a more satisfactory means of arbitration than has been possible in the past with the majority of trade unions."

Features of Mechanical Engineers' Spring Meeting at Pittsburgh

The program of the spring meeting of the American Society of Mechanical Engineers, to be held at Pittsburgh, May 14 to 17, inclusive, includes the following papers:

Manufacture of Seamless Tubes, R. C. Stiefel and George A. Pugh, Aetna Standard Engineering Co., Ellwood City, Pa.

Some Common Delusions Concerning Depreciation, Ernest F. DuBrul, general manager National Machine Tool Builders Association, Cincinnati.

Ball Bearing Machine Tool Spindles, Thomas Barish.

A Material Handling and Transport Organization, C. A. Fike.

High-Pressure Steam Boilers, George A. Orrok, consulting engineer, New York.

The Flow of Heat Through Furnace Hearths, J. D. Keller.

Use of Pulverized Coal in Basic Open Hearth Furnaces, E. L. Herndon.

Combination Firing of Blast-Furnace Gas and Pulverized Coal, F. G. Cutler, chief Bureau of Steam Engineering, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

Locomotive and Freight Car Utilization, C. B. Peck.

Mechanical Properties of Aluminum Casting Alloys at Elevated Temperatures, R. L. Templin, C. Braglio and K. Marsh.

A Study of Tin-Base Bearing Metals, Part I. O. W. Ellis and G. B. Karelitz, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Training Minor Executives in a Rapidly Growing Organization, A. J. Beatty.

COMING MEETINGS

April

American Gear Manufacturers Association. April 19 to 21. Twelfth annual meeting, Hotel Seneca, Rochester, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. April 23, 24. Meeting of materials handling division, Benjamin Franklin Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Metal Trades Association. April 25, 26. Annual convention, Hotel Astor, New York. J. E. Nyhan, Peoples Gas Building, Chicago, secretary.

National Foreign Trade Council. April 25 to 27. Fifteenth annual convention, Rice Hotel, Houston, Tex. O. K. Davis, India House, New York, secretary.

American Welding Society. April 25 to 27. Annual meeting, Engineering Societies Building, New York. Miss M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Management Association. April 26, 27. Fourth financial executives' conference, Hotel Pennsylvania, New York. W. J. Donald, 20 Vesey Street, New York, managing director.

American Electrochemical Society. April 26 to 28. Spring meeting, Stratfield Hotel, Bridgeport, Conn. Colin G. Fink, Columbia University, New York, secretary.

May

Iron and Steel Institute. May 3 and 4. Annual meeting, House of Institution of Civil Engineers, London, England. George C. Lloyd, 28 Victoria Street, London, S. W. 1, England, secretary.

American Refractories Institute. May 8 and 9. Annual meeting, White Sulphur Springs, W. Va. Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, secretary.

American Society of Mechanical Engineers. May 14 to 17. Spring meeting, William Penn Hotel, Pittsburgh. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Foundrymen's Association. May 14 to 18. Annual meeting and exhibition, Commercial Museum, Philadelphia. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

Joint Machinery and Supply Convention. Joint meeting of Southern Supply and Machinery Dealers' Association, National Supply and Machinery Distributers' Association and American Supply and Machinery Manufacturers' Association. May 15 to 17. Nashville, Tenn. Alvin M. Smith, Smith Courteney Co., Richmond, Va., George Fernley, 505 Arch Street, Philadelphia, and F. D. Mitchell, 1819 Broadway, New York, secretaries.

American Steel and Heavy Hardware Association. May 22 to 24. Nineteenth annual convention, Copley-Plaza Hotel, Boston. Benjamin R. Sackett, 503 Arch Street, Philadelphia, secretary.

American Iron and Steel Institute. May 25. Annual meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

Recent Experiments on the Cause of Hardness in Steel

Doctor Jeffries Believes Hardness of Martensite Is Due to Extremely Fine Grain of Iron Crystals and Critical Dispersion of Carbide Particles Therein

AT a meeting of the New York chapter of the American Society for Steel Treating, Dr. Zay Jeffries, consulting engineer Aluminum Co. of America, described recent researches into the nature of martensite, and their application to the riddle of "Why does steel harden?"

When he and his associate, R. S. Archer, some years ago proposed the "slip interference" theory of hardening, some difficulty was experienced in explaining the great hardness of martensite in freshly quenched high-carbon steels. The general theory seemed to demand an aggregate of very fine crystals with random orientations, within which are dispersed many particles of a second harder substance acting as keys to prevent one portion of the individual crystalline grain from sliding past another (normal plastic deformation). However, everyone knew that martensite under the microscope showed a relatively coarse structure of needle-like, interlocking crystals.

Martensite Has Many Visual Aspects

Since then it has become more acceptable to describe martensite in terms of the general conditions existing within the steel rather than as a particular microscopic appearance. In other words, martensite is thought of as the early stages in the series of changes which transform austenite (the solid solution of carbon in gamma iron) to pearlite (a mixture of visible ferrite and cementite crystals). Since there are at least three methods of transformation, there are three possibilities as to the structure of martensite. Furthermore, since it is generally accepted that the iron in martensite is in the alpha or body-centered modification, it should be fruitful to study the condition of the ferrite in the three varieties by the X-ray method.

A large single crystal of austenite which formed in an iron runner and transformed slowly into lamellar pearlite showed no relation between the orientation of the mother crystal and the ferrite flakes. Another large crystal of austenitic manganese steel was annealed to harden it and produce martensite; again the ferrite crystals had random orientation. A high-carbon steel, having coarse-grained austenite by a long high anneal, was quenched so the transformation occurred at about 200 deg. C. into the usual acicular martensite. In the latter the X-ray pattern indicated that the ferrite might be controlled to an extent by the cleavage planes in the austenite. In the light of these studies, and those of Young in England on meteoric iron, Jeffries concludes that the ferrite in martensite is at random orientations, or at most parallel in only one crystalline plane so the third axial direction can be almost anything. This random orientation is a condition which makes for great slip interference, and therefore hardens the metal.

Martensite a Complex Aggregate of Fine Crystals

F. F. Lucas has secured micrographs of martensite needles which demonstrate that these have a very fine complex structure.

Doctor Jeffries next inquired how much of the hardening of martensite is due to the fine grain of the random ferrite crystals present, and what proportion is due to the presence of carbon.

A nickel-iron (19:81) alloy with 0.006 per cent carbon was prepared having a coarse grain. Its Rockwell hardness was diamond cone 18—i.e., soft. After remelting to 0.012 per cent carbon, and cooling to 200 deg. C. in the furnace the grain was refined enormously, and the hardness was C36. This increase of 18 points is ascribed to grain refinement during transformation. (This same experiment, in Doctor Jeffries' opinion, disposes of the theory that hardness of quenched carbon steel is due to internal strains set up by the expansion taking place when gamma iron transforms to alpha iron. The nickel-iron alloy expanded during the transformation, and at a low temperature where the metal would be cold-worked thereby, but the total increase in hardness is only 18 Rockwell units.) When the same alloy has 0.05 per cent carbon and is cooled from 500 deg. C., it has a cloudy microstructure and hardness of C45. It is obvious that the principal cause of hardness here is grain refinement, and a very little carbon is sufficient for this purpose.

In plain steels carbon must not only lower the transformation (which is done by the nickel in the above experiment) and obstruct grain growth in the transformed material (which is done by no more than 0.012 per cent carbon in the nickel-iron alloy), but must also harden the alloy by its own presence. In the first stage of the transformation, carbon probably exists in solid solution in the ferrite; later it forms growing crystals of cementite.

Iron-Carbon Solid Solution Not Very Hard

To evaluate the hardness which may be expected from a solid solution of carbon in ferrite, the speaker referred to Sykes' iron-molybdenum alloys. Pure ferrite has a Brinell hardness of 70; ferrite is saturated with 6 per cent molybdenum and its hardness is then 130. A super-saturated solid solution containing 22 per cent molybdenum is 215 hard, and the same, when heated 50 hr. at 600 deg. C., enabling a hard compound to precipitate, has a hardness of 530. Evidently, the added hardness due to the hard compound, properly dispersed, is much greater than that due to the atomic dispersion of the compound's constituents in solid solution.

In summary, Doctor Jeffries said that these tests, made in alloys where the individual effect is unmasked by other factors, indicated that the hardness of martensite is due to the following factors:

a. Random orientation of ferrite grains
b. Extremely small size of ferrite grain
c. Intrinsic hardness of carbon-iron solid solution
d. Added hardness due to carbide precipitate.

While he is as yet unable to give definite or even relative values to the four hardening factors, one would gather that item c. is least effective, and items b. and d. are most.

Age-Hardening of Quenched Steel

As a general check on the assumption that freshly formed martensite is a supersaturated solid solution of carbon in alpha iron, from which carbon is being precipitated in the form of cementite crystals, Doctor Jeffries remarked that this view of the nature of martensite placed it in the same category with more than 20 alloy systems, all of which show age-hardening effects and follow general laws of age hardening, and all of which are due to the break-down of a solid solution with the formation of a second substance within the alloy. W. P. Sykes is now studying quenched high-carbon steels and finds that they also show these age-hardening phenomena.

For instance, 1.23 per cent carbon steel quenched in iced alkali solution, has a hardness of C 64.9. After immersion in liquid oxygen this increased to C 66.2, with an increase in volume, indicating that the added hardness is due to the transformation of residual austenite. Either of these samples, when held at room temperature, increase in hardness with time; for instance, the oxygen-quenched sample in 5 hr. measures C 67.1; in 100 hr., C 68.3; in 800 hr., C 69.8. However, these increases in hardness are accompanied by a *contraction* in volume, showing that the added hardness is from a different cause than transformation of remaining traces of austenite. Study of hardness tests taken after aging at different temperatures shows them to possess the same mutual relationships as do similar data for duralumin, for instance, and indicate an essential similarity in action between martensite and the other age-hardening alloys. This agrees entirely with the requirements of the slip interference theory of hardening—namely, that the size of precipitated carbide in martensite may be too small on fresh quenching to give maximum hardness. This critical size and maximum hardness may, however, be attained after aging for the right time at the right temperature. Longer aging at that temperature causes a slight softening, as theory demands.

Lower Freight Rate on Tin Plate from San Francisco to Sacramento Denied

WASHINGTON, April 17.—In a decision made public last week, the Interstate Commerce Commission held that the proposal of the Western Pacific and other railroads to reduce from 18.5c. to 9c. per 100 lb. the rate on tin plate, in carloads, from San Francisco and other San Francisco Bay points to Sacramento, Cal., shipped by water from the Atlantic seaboard, is not justified. The schedules were ordered canceled. Protests against the proposed reduction were made by water carriers and others, while the United States Steel Products Co. supported the rail lines.

The report said that tin plate moves from the Atlantic seaboard by water through the Panama Canal to San Francisco, where it is transshipped to Sacramento, and that practically all of it is made into containers and exported by the Sacramento plant of the American Can Co. The plant, it was stated, will use about 250,000 net tons annually, of which a small portion moves all-rail from such manufacturing points as Gary, Ind., and Pittsburgh. The rate of the Sacramento Navigation Co. from San Francisco to Sacramento is 10.5c. per 100 lb. There is also a switching charge of 34c. per net ton at Sacramento, of which the boat line absorbs 15c., making a through charge of $2.29 per net ton to the plant of the American Can Co. According to the decision, the United States Steel Products Co. had said it was not satisfied with the water service, and that the business would be taken from the boat line and its own barge service established if the lower rail rate were not established.

Steel Co. of Canada Profits Off Slightly Last Year

Profits of the Steel Co. of Canada, Ltd., Hamilton, Ont., for the year ended Dec. 31, 1927, amounted to $11.64 a share on combined common and preferred stock, as compared with $12.38 in 1926, and $10.10 in 1925. Manufacturing profits for 1927 amounted to $3,166,280, compared with $3,247,606 in 1926 and after adding investment income and deducting depreciation, sinking fund requirement, bond interest, etc., the amount available for dividends was $2,095,373, as against $2,229,211 in the previous year.

Heavier Trackwork Production

March production of trackwork for T-rails of 60 lb. a yard and heavier is reported at 15,058 net tons by the American Iron and Steel Institute. This shows a considerable gain over the immediately preceding months and is the largest total since last May. It compares, however, with 19,216 tons in March, 1927, and with 19,756 tons in March, 1926.

Total production for the first quarter is given at 35,761 tons. This compares with 45,863 tons in the first quarter of last year and 51,161 tons in the first quarter of 1926. The current figure is the smallest for any quarter in more than two years, with the exception of the last quarter of 1927.

Steel Shippers and Users in Chicago District Object to Rise in L. C. L. Rates

WASHINGTON, April 17.—Manufacturers, dealers and consumers of iron and steel products in Illinois, Iowa and Wisconsin have filed a petition with the Interstate Commerce Commission asking for reconsideration and modification of its decision justifying the railroads in cancelling existing commodity rates on iron and steel products in less-than-carloads, and placing them on a full classification basis in Illinois Freight Association, Western Trunk Line and Central Freight Association territories.

The petition declares that the findings of the commission are not based upon the evidence in that the railroads made no effort to justify the proposed increases. Instead, it is contended, witnesses for the railroads upon cross-examination specifically stated that their testimony in justification of the proposed cancellation of commodity rates for less-than-carloads generally did not apply to the rates on iron and steel and for this reason, it is pointed out, the protestants did not introduce evidence in support of the present adjustment of rates.

Cement Production Undergoing Seasonal Expansion

Production of Portland cement in March is reported by the United States Bureau of Mines at 10,223,000 bbl. This represents a seasonal gain over the 8,797,000 bbl. of February. The output, however, is more than 10 per cent below that of last March, which was 11,450,000 bbl.

Shipments in March were 10,135,000 bbl., compared with 11,100,000 bbl. a year ago. Stocks at the end of March were 27,436,000 bbl., a slight gain over a month earlier and the heaviest in more than a year. This increase again is seasonal, as the stocks last year at the end of March were heavier than at any other time during the year. Shipments normally exceed production in each month from April to October inclusive.

Pittsburgh Steel Co. Completes Financing for Plant Betterments

Stockholders of the Pittsburgh Steel Co., Pittsburgh, last week approved a bond issue of $16,000,000, of which $11,000,000 has been issued and the remainder has been reserved in the treasury for later issuance in connection with the building of a by-product coke plant. From the proceeds of the bonds sold, $2,000,000 has been appropriated for plant improvements, which include general electrification of the Monessen plant, involving a new boiler plant to operate at 400 lb. per sq. in. steam pressure with 200 deg. superheat; partial electrification of mill drives at that plant, and changes in the automatic mills at the Allenport, Pa., works to make possible the rolling of hot finished tubes to 40 ft. lengths, as against 24 ft., the present maximum length. Additional heating furnace capacity also will be installed at this works. The remaining $9,000,000 will be used to refund existing indebtedness.

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This Issue in Brief

Outstanding quotations provide machinery builder with a yardstick for measuring raw material needs. He knows from experience about what proportion of quotations will be converted into orders, and is thus able to estimate closely his requirements.—Page 1068.

Shop policies are decided by supervisory committee. All important matters relating to production in machinery-building plant are passed on by board consisting of the general manager and his assistant, chief engineer and two superintendents.—Page 1071.

Eliminates time lost in replenishing screw machine stock by means of automatic rod magazine. A new rod is fed automatically into working position as the preceding length of stock is exhausted.—Page 1091.

What of iron and steel prices? Though finished steel prices are still too low for a proper relation with their raw materials, they show little indications of advancing to a better position, says Dr. Haney. Signs point to little change in pig iron prices. Pages 1092 and 1093.

"Standard" manufacturing procedure is unknown in Ford plant. All things are in a state of flux. Improvements are continually being made, and some of the best suggestions come from the men on the job. Discovery of a better method or material means its adoption.—Page 1082.

Improves appearance of galvanized pipe by eliminating water dip. A better spangle finish is thus obtained in the new Bethlehem pipe plant. Lap weld mills have driven roller conveyors throughout for handling the pipe from operation to operation.—Page 1088.

Air-hardening properties of chrome-molybdenum steel tubing and sheets make them preferred materials for airplane construction. Heat-treating by quenching is impracticable because of the size of the welded structures.—Page 1077.

Though minimum labor turnover is the greatest safety factor in any plant, health is increasingly important, says Westinghouse executive. Advocates regular physical examination of workers as a means of cutting the accident rate.—Page 1079.

Time lost in getting tools is cut by four-sided tool room in center of shop. Each worker has ten metal tool checks. He leaves a check when he takes a tool, and the check is placed on the rack from which the tool has been removed.—Page 1071.

Steels having unusual properties are produced by active bath movement in high-frequency induction furnace. A steel bath, under a normal refining slag, was brought from 0.14 per cent carbon to 0.03 per cent in 2 min. Another steel, with the very low-carbon content of 0.01 per cent, was found to be completely free of hot-shortness, although it contained only a very small amount of manganese and silicon.—Page 1073.

Illuminate your plant adequately if you want to keep down the accident rate. Investigation reveals that poor lighting and a poor safety record go hand in hand.—Page 1079.

In 20 years Ford has scrapped less than 2 per cent of his machine tools. He now has 53,000 in service, having scrapped less than 1000.—Page 1081.

Hardness of quenched carbon steel is not because of internal strains set up by expansion taking place when gamma iron transforms to alpha iron, Dr. Jeffries declares. Cites experiment as evidence of the untenability of theory.—Page 1102.

Drills lathe beds without removing them from conveying cars. Lathe manufacturer cuts production cost by mounting a lathe bed on two flat cars and drilling while on the cars.—Page 1071.

Ford believes in grouping machines closely. Though seemingly little room is left for aisles and for the movement of workmen, it is apparent that close grouping makes for efficiency and speed of production. —Page 1082.

Make the public steel-minded. The steel industry has suffered from lack of publicity. Markets have been lost to other products which have been aggressively promoted. Discovery and development of new markets in most cases has been left almost entirely to consumers. — Page 1106.

You don't have to produce in great quantities to profit by adoption of quantity production methods, machine tool builder proves. Though lathe manufacturer's annual output is only 1000 units, he has secured important economies by availing himself of the shortcuts the giant plants use.—Page 1067.

Simple record system enables production department to control operations throughout plant, providing detailed information regarding costs, volume of work in process, and quantity of parts on hand. Assembly cost card is the "heart" of system in use in machine shop. — Page 1069.

ESTABLISHED 1855

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More Publicity for Steel

THIRTEEN years ago, at the two 1915 meetings of the American Iron and Steel Institute, men both within and without the industry spoke of the value to be gained from a well executed campaign informing the American public about steel. But in the commotion and distraction of sending munitions and machinery (and later men) to warring Europe, the project never got under way, despite the ease with which it then might have been financed.

At the spring meeting in that year Edward M. Hagar, formerly head of the Steel Corporation's cement subsidiary and at that time president of the Hagar Cement Co., told of the handsome return his industry had received from its continuing publicity. Among other things he said that the steel men could spend $12,000,000 annually on promotional work before they would exceed the pro-rata expenditure of the cement men. Then he added significantly: "We manufacturers of cement have found by experience that we get back with interest all the money we spend in the educational campaign."

At the fall meeting of the institute in the same year George H. Jones, vice-president Inland Steel Co., returned to the subject. He made disparaging comparisons between his own industry on the one hand and the lumbermen, pineapple growers, and the manufacturers of composition roofing, as well as of tooth paste and chewing gum. He indicated several lines of approach whereby the great American consuming public could be encouraged to make greater use of steel, particularly sheets, shapes and wire products. Finally, at the banquet Ralph H. Sweetser, then president of Thomas Iron Co., gave the discussion a very practical turn by telling how in a well directed advertising campaign his company had been able to get a premium for so prosaic a thing as a certain brand of pig iron made in the Lehigh Valley.

In 1915, when Mr. Hagar made his proposal that the American Iron and Steel Institute and the cement manufacturers cooperate in a campaign of publicity to promote their common interests, the steel industry was just emerging from one of the periodic famines. It was indulging in much talk about better selling methods and better promotion work. But the intervening years have rolled along and the situation is still in many respects what it was then. Many salesmen are still executing contracts rather than marketing steel. Most producers are letting their customers find out the new uses for steel and the comparative value of iron or substitutes for specific purposes.

For examples: Automobile body makers have discovered the adaptability of sheet steel, not only for body covering, but for the stiffening structure underneath. Furniture builders have developed the commercial and artistic possibilities of steel desks, beds, chairs and tables. The petroleum and chemical industries found that a costly but durable steel barrel is cheaper than the perishable wooden ones. And only a fortnight ago THE IRON AGE told of a new company which plans to apply mass production methods to the manufacture of sanitary fixtures from sheet steel, its potential market representing the use of 300,000 tons a year of enameled and stainless steel sheets.

Only such developments as these coming from without have enabled the sheet steel makers to absorb the punishment administered by promoters of copper and substitute products, who have had a field day at the expense of galvanized metal.

Certain sections of the steel industry have attempted recently to place their products in a favorable light in the public prints. But the statement holds true that the industry generally—and its various units large and small—is the loser because for 13 years it has postponed the use of well-considered publicity; such publicity as on the one hand would reach the ordinary citizen and tell him about steel and on the other hand would show the manufacturing consumer of steel why he would do well to use more of it.

Mr. Hagar's and Mr. Jones's preachments of 13 years ago may well be revived and acted upon. Whether undertaken through the American Iron and Steel Institute or in their individual capacities, no more compelling or remunerative work lies before the steel producers of the country than that of making the American public steel minded. To that end our best wish for the industry is that it will not long delay making itself publicity minded.

Rubber Also Came Down

THE downfall of rubber, or rather the collapse of the British plan for restricting production in order to enhance the price of the commodity, excellently illustrates the futility of cartels; and likewise the absence of popular danger from concentrated production. Here was a cartel, practically speaking, that was not merely sanctioned by a government but was inspired and regulated by it. For a while it worked satisfactorily, but it stimulated outside production which eventually broke its back. This simple story is the whole.

A great corporation controlling 50 per cent or more of an output can never be greedy or exacting, for if it were it would invite new competition that would defeat its purpose. Nor can a 100 per cent cartel go any further; for it would contain its own seeds of dissolution, which would spring up in irresistible temptation to its own members. This has been written in the industrial history of the world ever since the Secretan syndicate in copper of 40 years ago, and no doubt we might go further back.

The only octopus that can have its own way is one that has a monopoly of an indispensable natural resource or a generic patent or something of those sorts; and even such will not have their own arbitrary way, even if they could, inasmuch as their intelligence teaches them that broad business at low price is better than strangulation by exorbitance.

Steel and Other Activity

THAT divergent views are entertained on the state of general trade at the present time compared with that of a year ago is not strange when one sees what contrasting showings the quantitative statistics make. With important or supposedly important indexes we have these divergences: that in three weeks debits to individual accounts at banks have run 12 per cent higher than a year previous, while with a similar three-week comparison, and counting out coal which has had a decline for reasons of its own, freight car loadings are off 1.5 per cent; also that while portland cement shipments in March were 9 per cent under those of the preceding March, steel production is now running above that of one year ago. If this month's rate proves to be the same as that of last month there is a gain of 5 per cent over last April.

There have been no price changes such as would help to explain money transfers materially exceeding those of a year ago, when apparently the physical volume of trade is running substantially the same. As to steel, it may be noted that prices are enough lower than those of a year ago to make it doubtful whether the money transfer for steel has been running altogether as large as that of a year ago despite the excess in tonnage.

In all the general appraisals of the state of trade, allowance needs to be made for the human element. Repeatedly in the past few years it has been observable that actual results in any given period, when finally measured by volume or by profits, have often made a better showing than would be expected from the things men were saying during the period. It seems to have become quite a habit to be conservative or ultra conservative in appraising trade conditions, in contrast with the habit before the war, when it was usual to disseminate sunshine talk and speak of "confidence" as the main support of trade.

Also, we shall have in the next few months a great deal of talk about trade based on political considerations, and in consequence the business man wishing to mind his own affairs will have to be more circumspect than ever.

Low Accident Rate in Larger Plants

INCREASING accident rates definitely follow increasing hours of work, according to figures gathered by the United States Bureau of Mines. Analyzing the accident rates in coke oven plants, it is found that, where beehive ovens have daily schedules of eight hours per worker, the injuries for each million man-hours in 1926 were 42. This rate was increased to 68 for those plants having 9-hour shifts.

Similar figures for by-product ovens on 8-hour shifts showed 23 accidents in 1926 for each million man-hours. For 12-hour shifts the accident rate went up to 31. In both cases corresponding figures for 1925 showed proportionately greater accidents where the longer day was worked.

Decreasing accident rates seem to go also with the larger plants. Thus, in 1926 there were 260 accidents for each thousand 300-day workers in plants having less than 50 employees. This figure was more than cut in half in plants with 50 up to 200 employees, where the rate was 115. Plants having 200 or more employees cut this latter rate in half again, showing an average of only 49 accidents for each thousand 300-day employees.

Apparently the large plants, with greater facilities for coping with accident conditions, have benefited markedly from the use of safety engineers and the education of their workmen by the activities of these specialists.

Improved Fuel Utilization

PRODUCTION of coal has increased little in recent years while results obtained from fuel have increased greatly, the increase being due partly to large increased production of petroleum and natural gas and partly to improved methods of utilizing fuels. Notions vary widely as to the relative importance of these two influences, but computations can be made giving some definite intimations. Thus, comparing 1916, a year of great activity, with 1927, a year of reasonably full activity, it is found that there was an increase of 25 per cent in the heat units involved in the three fuels as produced. There was an increase of less than 2 per cent in coal production in the same eleven years, while petroleum production tripled and natural gas production doubled approximately. Gas production has not been reported for 1927, but a safe estimate may be made.

Production in the two years has been as follows, bituminous and anthracite coal being in net tons, petroleum in barrels of 42 gallons and natural gas in thousands of cubic feet:

	1916	1927
Bituminous coal	502,519,682	519,762,000
Anthracite	87,578,493	80,650,000
Petroleum	300,767,158	903,800,000
Natural gas	753,170,253	1,400,000,000

Factors developed some time ago by the Bureau of Mines as to average heat involved are, in British thermal units, 13,100 per pound of bituminous coal, 13,600 per pound of anthracite, 6,000,000 per barrel of petroleum and 1075 per cubic foot of natural gas. Accordingly, the total heat units involved in 1916 production of fuels was approximately 18,140 trillion, this rising 25 per cent to 22,750 trillion for 1927. Bituminous coal gained 480, anthracite lost 180, petroleum gained 3620 and natural gas gained 690. Thus the great bulk of the increase in heat units in 11 years was furnished by petroleum. The service rendered by all fuels has greatly increased, as is now well understood, by reasons of various improvements in utilization.

The division of heat units in 1927 was approximately as follows:

	Per Cent
Bituminous coal	59.9
Anthracite	9.7
Petroleum	23.8
Natural gas	6.6

Probably in the long run petroleum may be regarded as temporarily high, but natural gas promises to increase, in view of the large gains since 1922 and the several large pipe line projects now under consideration, apparently with no doubt that the gas itself will be available.

World Steel Output Trends Upward

A SCRUTINY of steel production of ten countries in January shows that nine exceeded the average monthly rate of 1927. In only one, Great Britain, was there a decrease. The percentage changes in order, beginning with the country having the largest increase, were as follows:

Russia	+14.3
Canada	+11.4
United States	+10.3
France	+ 8.9
Germany	+ 8.0
Saar	+ 6.8
Luxemburg	+ 3.6
Belgium	+ 2.0
Poland	+ 0.7
Great Britain	—17.4

In the ten countries the net increase was 6.5 per cent, from 7,506,000 tons per month in 1927 to 7,994,000 tons in January. Outside the United States and Great Britain the increase was 7.8 per cent.

The United States has shown such a uniform seasonal swing in recent years that none of the early months of the year can be regarded as strictly typical of the year, March in particular being likely to be the high month. That is not the case with other countries. Last year March was the high month in Great Britain, the Saar and Poland alone. April was the high month in Canada, August in Germany and Belgium, and October in France and Luxemburg. Russia showed a steady increase during the year, with December the high month; while Italy, not included in the foregoing comparison, had January as the high month, with a steady decrease thereafter.

LAKE ORE PRICES NAMED

Schedule for 1928 Same as for Last Year—Established by Large Sale to Ford

CLEVELAND, April 17.—Lake Superior iron ore prices that prevailed last year were established for 1928 by round lot sales made by leading ore firms April 16 to the Ford Motor Co. The Ford inquiry was for 445,000 tons and it is understood that approximately that amount was purchased. The bulk, if not all, of the Ford business went to two producers. On the same day a steel interest made an open market purchase of 100,000 tons, and today several additional open market sales were made. Last year's prices had been quoted on these inquiries several days ago, but the placing of the business was held up awaiting other sales to establish prices.

The Lake shipping season will start about May 1, and it is expected that the 1928 ore movement will be about the same as last year. However, several steel companies have under consideration schedules calling for more ore than they took in 1927.

It had been the belief of the ore trade for some time that the 1927 prices would prevail this year. These prices were established in 1925 and there has been no change since that time, so that this will be the fourth year without a change in the price schedule. The reaffirmed prices for base grades of ore having 51.50 per cent iron, delivered lower Lake ports are per gross ton: Mesabi non-Bessemer, $4.25; Old Range non-Bessemer, $4.40; Mesabi Bessemer, $4.40; Old Range Bessemer, $4.55, and high phosphorus, $4.15.

For several years ore producers have complained that ore prices were too low to yield a fair return to the mining companies and during at least one year many of the mines made no profit. This year there was virtually no talk of getting higher prices. However, the producers were able to reestablish the old prices in spite of a sharp decline in pig iron prices. When ore prices were named last year basic pig iron was quoted at $19, Valley furnace, or $2 a ton higher than at present, and No. 2 foundry iron was $18.50, or $1.25 a ton above the present price. When the present ore prices were first named in 1925 both basic and foundry pig iron were quoted at $20.50, Valley furnace.

Passing upon a complaint of the Sinclair Wyoming Oil Co., the Interstate Commerce Commission in a recent decision ordered the carload rate on steel tank material from the Chicago district to Casper, Carey, Welch and Clayton, Wyo., reduced to 90c. from $1 per 100-lb., with an 80,000-lb. minimum. The rate of $1.24 from Pittsburgh was held to be reasonable. Reparation was awarded on the basis between the rates and higher rates which were assessed.

STEEL CORPORATION CHANGES

Lamont Elected to Directorate and Two New Vice-Presidents Appointed

Thomas W. Lamont, a partner in J. P. Morgan & Co., was elected a director of the United States Steel Corporation, to fill the vacancy on the board caused by the death of Elbert H. Gary, at the annual meeting of stockholders held at Hoboken, N. J., on April 16. George F. Baker, Eugene J. Buffington, James A. Farrell and J. Pierpont Morgan were reelected directors. Myron C. Taylor, recently elected chairman of the finance committee, presided at the meeting in the absence of J. P. Morgan, now chairman of the board, and President James A. Farrell and General Counsel Nathan L. Miller sat with him.

Changes in the corporation's by-laws were approved by the stockholders providing that the chairman of the board and the chairman of the finance committee shall not be executive officers but that the executive officers shall be under their control and that the president shall be the chief executive officer of the corporation. Another change in by-laws was voted increasing the membership of the finance committee from eight to nine. It was also decided that future meetings of stockholders shall be held at the executive offices, 71 Broadway, New York, rather than at the corporate offices at Hoboken.

New Vice-Presidents Will Have Charge of Operations and Marketing

The Board of Directors of the United States Steel Corporation April 17 elected Thomas W. Lamont as an alternate member of the finance committee.

The board also appointed, effective June 1, two additional vice-presidents: I. Lamont Hughes, who now is a vice-president of the Carnegie Steel Co., and E. P. Thomas, who now is president of the United States Steel Products Co. Mr. Hughes and Mr. Thomas, under the direction of President Farrell, will have supervision over the operations of the subsidiary companies in the following capacities: Mr. Hughes in respect to manufacturing operations of subsidiaries engaged in the production of iron and steel, and Mr. Thomas in respect to the marketing of iron and steel products of the subsidiaries.

The board also ratified the appointment of two additional assistants to the president, W. A. Forbes and Harold L. Hughes.

RATES ON MILEAGE BASIS

Examiner for Interstate Commerce Commission Recommends Change in L. C. L. Charges in Eastern Territory

WASHINGTON, April 17.—Shipments of iron and steel products in less-than-carload lots will be greatly affected by changes in rates proposed if the report to the Interstate Commerce Commission by Examiner Howard Hosmer if the so-called Eastern class rate investigation is sustained. The Hosmer report recommends a distance or mileage scale of rates in substantially the same manner as that recently put into effect in the South. Iron and steel carload rates were not involved in the Eastern class rate investigation, but are being considered in a separate investigation involving all of Official Classification territory.

Iron and steel products in less than carloads are generally rated fourth class, although from Pittsburgh and Johnstown, Pa., to certain points in Pennsylvania, New York and West Virginia there are less-than-carload commodity rates. Youngstown manufacturers, who have no such commodity rates, have objected to this difference in treatment.

The first class rates proposed by Examiner Hosmer are about 73 per cent of those prescribed for the South. Between points in northwestern Illinois, Zone C in Michigan, Zone B in New England, certain branch lines of the New York Central in New York and certain branch lines in Virginia, West Virginia and Kentucky and other points in Official Classification territory, rates approximately 10 per cent higher than the basic level are proposed. To and from certain lines of the Chesapeake & Ohio and Norfolk & Western a still higher basis is proposed. Within Zone A in New England the proposed basis is 5 per cent higher, and within Zone B 15 per cent higher, than the basic level. No specific basis is proposed for short lines. Reasonable groupings, according to the report, would be authorized. The report recommends that standard rail-Lake rates to and from Chicago be made 85 per cent of the all-rail rates and rail-Lakes-rail rates by way of Chicago 90 per cent of the all-rail rates, but recommends no other findings as to water-rail rates.

It is suggested that the number of classes be increased from eight to 23, evidently, it is said, with the idea that many articles now moving on commodity rates will ultimately move on class rates. According to a statement issued by Wilbur LaRoe, Jr., counsel for the Associated Industries of New York State and the Port of New York Authority, iron and steel producers along the Niagara frontier will be given the benefit of their relatively short distances to New England, "which will help them materially in their competition with Pittsburgh."

Bookings of Fabricated Structural Steel Continue High

WASHINGTON, April 17.—Orders for fabricated structural steel in March totaled 202,251 tons, or 69 per cent of the monthly capacity of the 193 reporting firms, with combined capacity of 292,160 tons, according to reports received by the Department of Commerce. This compares with February bookings of 212,068 tons, or 71 per cent of capacity of the 210 reporting firms, with aggregate capacity of 299,420 tons. Computed total bookings in March and February were 258,750 tons and 266,250 tons respectively. Shipments in March were computed at 236,250 tons, or 63 per cent of capacity, and were identical with those of February.

For the first quarter ended March 31 computed bookings were 735,000 tons, and represented 65 per cent of capacity, against 671,250 tons during the corresponding period of last year, when they represented 60 per cent of capacity. Shipments during the first quarter of the current year were computed at 682,500 tons, or 61 per cent of capacity, compared with 618,750 tons, or 55 per cent capacity, for the first quarter of 1927.

Greatly Increased Production of Steel Barrels in March

March production of steel barrels as reported by the Department of Commerce at 636,855, compared with 518,944 in February and 475,906 in January. The number manufactured in March is the greatest in more than two years. Shipments were even heavier, at 644,521—again the largest in more than two years. Stocks at the end of the month were 51,269.

Unfilled orders March 31 called for a total of 1,343,583 barrels, of which 304,043 were scheduled for delivery within 30 days. The higher rate of manufacture and shipments cut into the unfilled order volume, which declined about 75,000 during the month. The total is now lower than at the end of either February or January, but otherwise is the highest since July 31, 1927.

Iron and Steel Markets

Further Gain in Output at Chicago

Steel Production in Western District Now Over 95 Per Cent of Capacity—Operations Holding in Other Centers but with Backlogs Declining—Increased Weakness in Sheets

A SUSTAINED rate of steel production, following a record quarter, is a market feature, but more impressive still is a further increase in operations at Chicago. With specifications for finished steel running ahead of shipments, deliveries from Chicago mills are extending and ingot output has passed 95 per cent of capacity, with the blowing in of another steel works blast furnace an early possibility.

The average rate of plant operations in the remainder of the country is not that high, but it is holding its own. Reduced output in some finished products is largely offset by heavier production of others. However, in contrast with the situation at Chicago, shipments are heavier than bookings, and mill backlogs are being reduced. The decline in new business, of course, is not surprising at this juncture, since consumers and jobbers freely covered their requirements prior to the last price advances.

Whether the present pause in demand is merely temporary or presages a downturn in mill operations will depend on the flow of steel into consuming channels. Automobile output, although large, is no longer gaining. Makers of motor car parts have reduced their purchases of cold-finished bars, producers of which are now taking less hot-rolled steel. On the other hand, the Ford Motor Co. is steadily increasing its operations and is placing proportionately larger steel orders. Some mills serving the motor car industry are fully booked in automobile body sheets and hot-rolled strip steel until late in May.

Agricultural implement plants, which have been taking considerable steel, especially from Chicago mills, are planning a reduction in output as spring demand for their products tapers.

Railroad purchases of rails have been largely completed, but good mill operations are assured for the next six or eight weeks and a secondary buying movement of fair proportions is expected in May or June. Railroad orders for rolling stock are disappointingly small.

Construction activity is still unabated. Awards of structural steel for the week exceeded 35,000 tons, and lettings of concrete bars were particularly high, totaling nearly 17,000 tons. Better specifications for standard-weight pipe, doubtless stimulated by the recent price advance, have resulted in heavier production, notably in the Youngstown district.

Tin plate specifications for June shipment are large, reflecting a heavier stocking of cans by packers, and tin mills are maintaining operations at 90 per cent of capacity.

Mill prices, as a whole, still await a real test. Sheets, however, have shown further weakness, although price concessions are reported mainly in the Central West. On blue annealed sheets 2c., Pittsburgh, a cut of $2 a ton, has become a commoner quotation, while black sheets have been sold at 2.75c., Pittsburgh, or $3 a ton below the last advance. Metal furniture sheets, weaker in sympathy with black sheets, have been sold at a reduction of $2 a ton.

Sheet bookings, possibly because of the flexibility of prices, are holding up surprisingly well, although March sales by independent mills, at 399,441 net tons, were the largest, excepting last December, for any month since September, 1926.

Makers of wire nails are finding it difficult to book second quarter business at $2.65 per keg, Pittsburgh or Cleveland, and some of them continue to accept specifications on first quarter contracts carrying a price 10c. per keg lower.

The 35,000 tons of structural steel awarded during the week included 6000 tons for a bridge approach at St. Louis, 5000 tons for subways in New York and 4400 tons for a New York hotel. About 40,000 tons was added to work under negotiation, the largest project a bridge in South Carolina calling for 12,000 tons.

Orders for fabricated steel in March are computed at 258,750 tons, compared with 266,250 tons in February. Computed bookings for the first quarter were 735,000 tons, representing 65 per cent of capacity, as against 671,250 tons, or 60 per cent of capacity, in the corresponding period last year.

The Southern Pacific Railroad has doubled its recent inquiry for 500 flat cars and 50 gondolas. The Chicago, Rock Island & Pacific is in the market for 500 box car underframes, and the St. Louis-San Francisco is inquiring for 250 car bodies. Several railroads are soon to buy a total of about 100 passenger cars.

A cargo of Lake Erie pig iron will arrive at Chicago about May 1, and some of it has been sold at prices 50c. or 75c. below the prevailing quotations by Chicago furnaces. In other centers pig iron prices are fairly steady. A steel foundry company has a quotation on basic pig iron equivalent to $16 at Valley furnace, but makers of iron in the Valley are said not to have quoted on the business because of disadvantageous freight rates. The St. Louis market is fairly active, with sales of 11,000 tons, of which 5000 tons was to a radiator company.

Lake Superior iron ore prices of 1927 were reestablished for this year by sales of 445,000 tons to the Ford Motor Co.

Both of THE IRON AGE composite prices remain at last week's levels, that for pig iron at $17.67 a gross ton and that for finished steel at 2.362c. a lb. Finished steel is close to its position of one year ago, but pig iron is down more than $1.50 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Apr. 17, 1928	Apr. 10, 1928	Mar. 20, 1928	Apr. 19, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	20.75
Basic, Valley furnace	17.00	17.00	17.00	19.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:	Apr. 17, 1928	Apr. 10, 1928	Mar. 20, 1928	Apr. 19, 1927
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Apr. 17, 1928 Cents	Apr. 10, 1928 Cents	Mar. 20, 1928 Cents	Apr. 19, 1927 Cents
Sheets, black, No. 24, P'gh	2.80	2.80	2.90	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.10	2.10	2.10	2.15
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh.	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:	Apr. 17, 1928	Apr. 10, 1928	Mar. 20, 1928	Apr. 19, 1927
Heavy melting steel, P'gh.	$15.50	$15.50	$14.75	$16.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.50	12.50	13.00
Carwheels, Chicago	13.50	13.50	14.00	14.75
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.50	16.50
No. 1 RR. wrot. Phila.	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	**11.50**	11.00	11.00	12.25

Coke, Connellsvile, Per Net Ton at Oven:	Apr. 17, 1928	Apr. 10, 1928	Mar. 20, 1928	Apr. 19, 1927
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.15
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*14.25*	14.30	14.25	13.12½
Electrolytic copper, refinery	14.12½	14.12½	14.00	12.87½
Zinc, St. Louis	5.75	5.75	5.72½	6.37½
Zinc, New York	6.10	6.10	6.07½	6.72½
Lead, St. Louis	6.00	6.00	5.80	6.90
Lead, New York	6.10	6.10	6.00	7.15
Tin (Straits), New York	**52.75**	52.00	52.00	68.62½
Antimony (Asiatic), N. Y.	**10.25**	9.62½	10.25	15.50

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Production Is Holding to March Rate But New Business Is Lighter

PITTSBURGH, April 17.—Steel ingot production still is holding up to the March rate in this and nearby districts, but a distinct decrease in the amount of new business creates the fear that the peak has been reached, unless the lull is merely the result of the fact that consumers are liquidating extremely heavy takings of the latter part of March and the fore part of this month. Sheet sales appear to be holding up well, which is partly explained by the fact that prices are easy on most finishes, and June specifications for tin plate are heavy, but in other finished products the report is uniformly that new business is lighter than it has been.

The question now is as to the maintenance of consumption. The best demand for steel recently has been from the motor car builders, but the shipment of steel for use in automobiles being from four to six weeks in advance of actual fabrication, the production for that use is probably at its peak now. There is such keen competition among low-priced cars, the quality of which has been improved to such an extent as to bring them into competition with the medium-priced cars, that makers of the latter have been forced to make plans for the new season earlier than usual. The between-series period usually means that car builders will take only such raw material as they have on order to avoid building too many of the old cars to compete with the new ones.

There is no tangible evidence yet of improvement in the oil industry, which means so much to pipe manufacturers. Railroad rolling stock business is far from active in this area. Building construction still promises well, but the agricultural implement industry rarely operates as fully in the summer, its selling season, as in other times of the year.

Steel ingot production is still running at 80 to 85 per cent of capacity. The Carnegie Steel Co. has put on a blast furnace at its Clairton, Pa., works.

In the primary materials, interest still centers in heavy melting steel scrap, which continues to move up under dealer buying. There is no life to the pig iron market and the coal market is very dull.

Pig Iron.—The Pittsburgh-Valley pig iron market is purely retail in character. Large melters appear covered against their requirements for the next 30 to 60 days, and buying is entirely from the consumers who seldom buy ahead of their nearby requirements. Carload lot sales are the rule and these are not especially numerous, since the jobbing foundries in this area are operating at a low rate, while the steel foundries feel the lack of railroad buying and the sanitary ware and radiator companies are not as busy as they sometimes have been at this time of the year. The American Steel Foundries is reported to be in the market for 5000 tons of basic iron for its Alliance, Ohio, works and is said to have a quotation that figures back to about $16, Valley furnace, but evidence is lacking that any Valley furnaces have had the inquiry or have quoted. It is believed that an Ohio furnace having a freight rate of 50c. a ton to Alliance has merely given away its freight rate advantage to have produced the quotation named. Valley furnaces still call the market $17, furnace. At that price the demand is limited, however, to the immediate Valley district, since basic iron cannot be sold in the Pittsburgh district at a price that figures back to more than $16 at Valley furnaces because of offerings by Pittsburgh district steel companies. Recent prices on other grades of Valley iron also are holding.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Specifications against contracts for ferromanganese, ferrosilicon and spiegeleisen continue in good volume, but there is little new business.

Semi-Finished Steel.—Billets, slabs and sheet bars are moving well, in keeping with a fairly high rate of engagement of non-integrated tin plate, sheet and strip mill capacity. There is little or no open market activity in these forms, since leading consuming companies, as for some time past, are drawing against contracts or agreements that are flexible as to duration. Only occasional sales of wire rods are being made at the present mill schedule, because there were few users who did not take full advantage of the lower prices available late last year and in January. While second quarter contracts have been signed at the full price, mills generally are waiting for specifications.

Bars, Plates and Shapes.—Fresh demand for bars suffers from the fact that consumers and jobbers took out or ordered tonnages freely last month to escape the advance in prices, and shipments of most of the mills now are exceeding orders. There are fair-sized new orders for plates for river barges, and in structural lettings local shops lately have been doing rather well, the week's awards including 3500 tons for the extension of the strip mill building of the American Rolling Mill Co., Butler, Pa. There is no evidence that mills are doing less than 1.85c., base Pittsburgh, on these products, while the small lot price is 1.90c.

Rails and Track Supplies.—Railroads are specifying steadily for rails and track fastenings. New business does not amount to much. There is only a moderate call for light-section rails.

Wire Products.—Uncertainty still exists as to nail prices, because jobbers, as a result of heavy takings in the first quarter, have not found it necessary to buy many and thus provide a test of the price to which makers went Jan. 26, last. Difficulty has been encountered by some mills in getting signatures to second quarter contracts at $2.65, base, per keg, because others have continued to accept specifications on first quarter contracts priced 10c. per keg lower. Specifications for wire products in general have been lighter in the past week than in the week before, reflecting the fact that buyers have exhausted first quarter contracts and are well enough stocked to wait a while before ordering against higher priced commitments.

Tubular Goods.—Standard-weight pipe is making a good showing in point of shipments and mill operations, but there is still a lack of activity in oil country goods. Projected line pipe orders of size are slow in reaching the mills. Mechanical tubing, for which the automotive industry is an important outlet, stands out in an otherwise quiet tubing market.

Cold-Finished Steel Bars and Shafting.—Demands for screw stock bars are steady, but generally are for small lots. Detroit advices suggest that motor car production has reached the spring peak, and with several makers planning new models for earlier presentation than usual, parts makers are ordering in close accord with requirements. There are no intimations of less than 2.20c., base Pittsburgh.

Hot-Rolled Flats.—Makers have no complaint as to the volume of business, but are not satisfied with the prices they are getting; on large tonnage orders competition has been sharp, and the full quotations of 1.90c., 2.10c. and 2.20c., according to width, have been obtained only on small lot business.

Cold-Rolled Strips.—Large lot consumers still are drawing against old orders carrying 2.75c., base Pittsburgh, for lots of three tons or more, and such tonnage as is moving at higher prices is in small lots, which, while numerous, account for a relatively small part of the total.

Sheets.—Mill operations are holding at the recent rate, but seemingly business is sustained by willingness on the part of most makers to meet buyers' ideas on prices. In this immediate area—not a large sheet consuming territory—black sheets are holding well to the full quotation, but elsewhere concessions of $1 to $3 a ton are reported, 2.75c., base, being fairly common in Detroit and in some parts of the South. Metal furniture sheets have been sold on a black sheet base of 2.75c. Galvanized sheets are generally 3.65c., with higher prices more of an asking than a sales basis. Blue annealed sheets are well held. Automobile body sheets are 4c., base, and most makers have written down to that price business taken at higher figures.

Tin Plate.—Business reports still are favorable, and mill operations maintain the high rate attained a few weeks ago of 90 per cent or more of capacity. Specifications for June shipment are very heavy. Regardless of the outcome of the crops, packers are reflecting in their releases a desire to have an ample stock of tin plate for the opening of summer.

Bolts, Nuts and Rivets.—Orders have been light since the opening of the month, but this is looked upon as a natural sequence to the fact that buyers were liberal in their specifications toward the close of last month, notably for rivets, which went to higher prices on April 1.

Coke and Coal.—The market still is in the doldrums. A call for a strike issued by irregular union leaders for April 16 has failed to bring out miners employed in open shop operations. The possibility of business stimulation through demands for coal from the Lakes is at least temporarily suspended by the injunction recently granted by the Federal Court at Richmond

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THE IRON AGE Composite Prices

Finished Steel

April 17, 1928, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.364c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

April 17, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.75
One year ago	19.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.40c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	2.94c. to 2.99c.
No. 24, del'd Philadelphia	3.12c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.74c. to 3.84c.
No. 24, del'd Philadelphia	3.97c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	1
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	18
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

restraining the Interstate Commerce Commission from interfering with the plan of Southern roads to make a reduction of 20c. a ton on coal moving to the Lakes from Southern mines. There is almost no market for spot furnace coke from the blast furnaces, and the demand for other uses is limited. It is a buyers' market in that grade. Producers are also finding it hard to market spot foundry coke at quite as good prices as recently.

Old Material.—The scramble of dealers to cover short sales continues in heavy melting steel, and that grade has had a further advance within the week. Pressure of consumers for shipments against old orders has extended to the Youngstown district, where dealers have paid $16.08 to $16.15, delivered, for railroad steel, while as much as $16.50 has been paid by dealers for delivery at Steubenville, Ohio. The higher price also has been done on a sale to a Pittsburgh district mill that will take nothing but No. 1 railroad steel or its equivalent in industrial scrap. The competition of Youngstown dealers has forced local dealers to go as high as $15.75 for ordinary steel, but such material has been offered to the mills at $15.50. Heavy melting steel is quotable from $15.50 to $16.50, compared with $15.50 to $16 a week ago. Other grades are at the prices of a week ago and are not showing much activity.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$15.50 to	$16.50
Scrap rails	15.00 to	15.50
Compressed sheet steel	15.00 to	15.50
Bundled sheets, sides and ends	14.00 to	14.50
Cast iron carwheels	14.50 to	15.00
Sheet bar crops, ordinary	15.50 to	16.00
Heavy breakable cast	13.00 to	13.50
No. 2 railroad wrought	15.50 to	16.00
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings		10.50
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	16.50 to	17.00
Railroad coil and leaf springs	16.50 to	17.00
Rolled steel wheels	16.50 to	17.00
Low phosphorus billet and bloom ends	18.50 to	19.00
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	11.00 to	11.25
Short mixed borings and turnings	11.00 to	11.25
Cast iron borings	11.00 to	11.25
No. 2 busheling	10.50 to	11.00
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	15.50 to	16.00
Malleable Grades:		
Railroad	15.50 to	16.00
Industrial	15.00 to	15.50
Agricultural	14.50 to	15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count,	60 per cent off list
Carriage bolts, per 100 count,	60 per cent off list
Nuts, all styles, per 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Building Construction Volume Continues High

Construction contracts to the amount of $592,567,000 were awarded in March in the 37 States east of the Rocky Mountains, according to F. W. Dodge Corporation. This was the largest figure for any month since last June. It was, however, 5 per cent under the record of March, 1927. The total brings the aggregate for the first quarter to $1,485,067,000. This is 6 per cent above the first quarter of last year and is the highest first quarter on record.

Residential buildings accounted for 46 per cent of the total, with $275,192,000. Public works and utilities took $110,339,000; commercial buildings, $73,075,000; educational projects, $33,881,000.

In the Central West, including the area from eastern Indiana and southern Michigan to western Nebraska and Oklahoma, the March total was the highest for that month ever recorded. It amounted to $175,585,000. The Pittsburgh district, also, including western Pennsylvania, West Virginia, Ohio and Kentucky, showed a large gain in March, the total having been $76,499,000. Other districts reported March totals above February, but they were under the figures for March, 1927.

Wholesale Prices Slightly Lower

Commodity prices in March are reported by the United States Bureau of Labor Statistics at 96, compared with an average of 100 as the base in 1926. This shows a drop from 96.4 in February, but an increase over the 94.5 registered in March, 1927. Nearly all of the major groups participated in the decline, the only exceptions being building materials, which remain the same at 91, and metals and metal products, which increased from 98.3 in February to 98.4 in March.

Metals have been relatively stable for a long period, having registered 98.2 a year ago. In their component parts, however, there has been considerable change. Thus, the iron and steel group has declined from 97.4 a year ago to 95.2 in March. Non-ferrous metals have declined from 95.1 to 90.4 in the same period. Agricultural implements dropped from 99.4 to 98.8, and miscellaneous metal products from 99.5 to 97.9. Meantime, automobiles have advanced from 99.8 to 104.3, this advance more than compensating for the decline in the other items.

Trends in Industry

Employment in March showed a gain of nearly 3 per cent over February, according to the monthly labor barometer of the National Metal Trades Association. The improvement has been steady since a low point was reached in December. The March figure was about ½ per cent below that of a year ago.

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Construction volume in March is charted by the Associated General Contractors of America at a little higher level than in any recent preceding March. Using 100 as the 1913 base, March is given an index of 136, against 135 a year ago and 119 in 1926. The curves in 1926 and 1927 were similar, but with the latter higher in almost every month; 1928 has been ahead of the other two years, except in January.

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Total imports of industrial machinery into Chile in 1926 were valued at 120,490,244 pesos, of which 87,530,131 pesos represented the value of shipments from the United States, according to a report received by the Industrial Machinery Division, Department of Commerce, from Assistant Commercial Attaché Robert G. Glover, Santiago.

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On March 1 American shipyards were building, or had under contract to build, for private shipowners, 283 steel vessels of 179,502 gross tons, compared with 261 steel vessels of 184,945 tons on Feb. 1, according to the bureau of navigation, Department of Commerce.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores. Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.10 to 1.15
Gas slack, f.o.b. W. Pa. mines	1.15 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00 to $16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Exceed Shipments—Automobile Demands Heavy

CHICAGO, April 17.—A feature of this market is that the demand for plates, shapes and bars is well balanced and producers are enjoying the most favorable rolling schedules in a year. Specifications for finished steel exceed shipments, thus delaying deliveries and bringing to the fore the probability that another steel mill blast furnace may be lighted at an early date. Ingot output for the district now stands well above 95 per cent.

Railroad inquiries include 96 passenger cars for three roads, 250 car bodies for a Southwestern road and 500 freight car underframes for the Rock Island. Steel tonnage taken by automobile manufacturers was large in March, but several automobile plants did not swing into heavy production until that month was well along, and at the current rate of specifying steel consumption by that industry in April gives promise of exceeding that of March. The agricultural implement trade is finding a steady use for rolling mill products, but with the spring demand for farm machinery rapidly nearing an end it is not improbable that production schedules will be revised downward by the end of this month.

An encouraging note in the business situation here is that employment in metalworking industries is gaining. March figures now available show an increase of 5 per cent in the number of workers in iron and steel plants.

Pig Iron.—With 95 per cent of second quarter iron sold, buyers in this market are turning their attention to their needs in third quarter. Sales are smaller than a week ago, but a number of large inquiries are taking shape. Local producers are holding to $18.50 a ton and a strong effort is being made to maintain full differentials. A disturbing influence, however, is the fact that a cargo of Lake Erie iron will arrive here about May 1. Some of this has been sold at the full Chicago market prices, but the bulk of it carries prices from 50c. to 75c. a ton lower. Prices for silvery iron are weak and shading is not uncommon.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for ferrosilicon are heavy, as steel mills continue to produce close to capacity. Small lots of ferromanganese are being taken at $100, seaboard. Spiegeleisen is quiet, and prices quoted are $31 to $32, Hazard, Pa., for the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Bolts, Nuts and Rivets.—Specifications are steady but the outlook is not encouraging for the reason that farm implement manufacturers are planning an early reduction in output in accordance with a smaller sales volume, as the spring demand for machinery of this kind tapers. Fully 95 per cent of bolt, nut and rivet contracts submitted to buyers have been signed.

Coke.—Shipments of by-product foundry coke are steady and prices are firm.

Plates.—Interest is revived in several gas pipe lines that had previously come to the attention of the trade. It is reported that financial matters have been arranged for a pipe line from the Southwest fields to Kansas City, Mo. The project that was to extend to Omaha, Neb., is still alive. Two lots of 1000 tons each of tankage materials have been purchased. Fresh inquiry from the oil fields is lacking, but it has been the experience that new business for oil companies develops rapidly and does not often stay long on the pending list. Car shops are apparently holding in check some of the work that is now on their books; this is shown by the tardiness with which specifications are being entered at mills for steel that will be needed for several recent car orders. Railroad equipment orders for the week include 50 caboose car underframes for the Northern Pacific. Among fresh inquiries are 500 flat and 50 gondola cars for the Southern Pacific, these being in addition to a similar request for prices issued several weeks ago; also 50 passenger cars for two Eastern railroads with terminals at Chicago and 250 car bodies for the St. Louis-San Francisco. Chicago district plate mills are well engaged and prices in and near Chicago are steady at 2c.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—The outlook in the structural field is encouraging. For a few weeks fresh inquiry dropped considerably behind the present rate of shop operations as the result of a scramble to award tonnages ahead of recent advances in steel prices. The effects of this move appear to be wearing off, and once more fabricators are busily engaged in estimating a large number and a wide variety of projects. Notable among fresh inquiry is a highway bridge, requiring 2100 tons, at St. Joseph, Mo., and 1700 tons for a bridge for the Baltimore & Ohio Railroad in Chicago. Outstanding among awards is 3100 tons for wharf sheds at New Orleans and 1400 tons for a steel mill building at Kansas City, Mo. Although shops in this district are well engaged, there is still an urge to cut prices, possibly because of the uncertainty of the volume of business which may be expected in the future and not because of a lack of orders on books or of tonnage that may be reasonably expected to come to fabricators over the next five or six weeks. Prices for structural material are steady at 2c. in practically all parts of this territory, except along the eastern border, where 1.95c., Chicago, is being done occasionally to meet competition from mines east of here.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Specifications for mild steel bars continue to run ahead of shipments, and delivery dates have extended to well beyond four weeks and in some sizes to six weeks. Meanwhile, new buying, which is usually for 6 to 12 weeks' requirements, is fully equal to production. A feature of the market for this commodity is that the demand is widespread and orders on mill books are more diversified as to classification of consumers than at any recent time. Builders of road machinery are unusually busy and forgers are taking large quantities of soft steel bars. Prices on this grade are steady at 2c., Chicago. Alloy bar mills in this district are fully engaged, and in this commodity as in soft steel bars there is an ever widening circle of users. Prices at the new base and differentials are steady. Chicago mills are quoting 2c. on iron bars. No improvement in demand is noted. Backlogs in hard steel bars are slowly expanding. Specifications are in excess of production and deliveries are gradually extending, now being about two weeks on certain sizes. Mill output is being diverted to the general manufacturing trade, as stocks of fence post material and hard steel reinforcing bars are ample to meet immediate demands. Prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Muddy roads are still a market factor in several of the States west of the Mississippi River. This situation, however, is partly offset by a larger volume of business from the Northwest and a steady flow of orders from the South and the Central States east of the Mississippi Valley. Mill orders for nails are more numerous, which is not only a reflection of greater consumer demand, but also an indication that stocks in the hands of distributers are being reduced. New buying is at close range and approximately equal to shipments, which represent 70 per cent of wire mill capacity. The reduction in producers' stocks has been checked, and a portion of output is being used to round out and in some instances to expand stocks at mills. Specifications from the manufacturing trade are steady. Prices for wire and wire products are given on page 1113.

Rails and Track Supplies.—New business in standard-section rails is quiet. This is of little concern to local producers for the reason that mill schedules are well arranged for the next six to eight weeks. Furthermore, the secondary tonnage that already has been added to books has come earlier than usual and producers are expecting a fair buying movement in May and June. Several carloads of light rails have been purchased. Miscellaneous orders for track accessories total over 14,000 tons, and inquiry is for not less than 5000 tons. Operations in all track supply departments are steady and output is running a trifle ahead of the rate a year ago.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—Producers of this commodity are still working under the handicap of small orders and badly unbalanced books that do not afford schedules more than a week in advance. The Milwaukee hot mills were down most of last week, but have been producing since the first of this week. Output ranges from 70 to 75 per cent, which is a drop of 5 to 10 points in the last 10 days. The jobbing trade is quiet. Users of light gages are showing little interest in the market. Prices in and near Chicago are steady, but concessions are more common in nearly all outlying territory.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cast Iron Pipe.—This market in and near Chicago is quiet. To the east and at Milwaukee several sizable public lettings are soon to be made. Detroit opens bids April 20 on 6000 tons of 36-in., 1000 tons of 30-in. and 5000 tons of 24-in. class C pipe. Royal Oak, Mich., will buy 500 tons of 6 and 8-in. pipe on April 23, and St. Clair Shores, Mich., will open bids May 1 on 19 miles of 6 and 8-in. pipe. Milwaukee will receive tenders on 2800 tons of 24 and 48-in. plain pipe and 180 tons of lugged pipe. Chicago is in need of 200 tons of special fittings in sizes from 16 to 54-in. Prices are steady at $29 to $31, Birmingham, for diameters 6-in. and larger.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Reinforcing Bars.—Rail steel bar tonnages hold the center of interest in this market. Awards of Illinois State roadwork, all of which take this commodity, are numerous. Mills selling rail steel reinforcing bars direct are obtaining 1.85c. to 1.90c. on the ordinary run of work and 1.95c. on steel for bridges and culverts. The contract for the Chicago Daily News Building, calling for 1000 tons, is still open, but may be closed at any time. The Stickney, Ill., sewer project, 5000 tons, is active. Notable among fresh inquiries is 400 tons for a building for the Nu-Art Engraving Co., Chicago. Chicago warehouse prices for new billet reinforcing bars show some variation, with the minumum at 2.20c. a lb. Recent awards and new projects are shown on page 1128.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.55c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Old Material.—Whatever strength exists in this market is largely because of tightening of inspections and difficulty in getting scrap to meet the requirements of certain large users. Consumer purchases are small in the aggregate, but when sales are made it develops that prices are more stable than a week ago. Shipments against old contracts for heavy melting steel are large. New buying in this grade is of moderate size and confined to deliveries that are to be made to Gary mills. Stocks in the hands of buyers have been accumulating and, except in low phosphorus grades, there is little urge for melters to take the offerings of sellers. A check on the inflow of country scrap is following numerous rejections of material coming from rural districts. The Rock Island will sell 7200 tons of scrap material.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.00 to 13.50
Hydraulic compressed sheets	11.00 to 11.50
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	14.75 to 15.25
Railroad tires, charging box size	16.00 to 16.50
Railroad leaf springs, cut apart	16.00 to 16.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs	16.25 to 16.75
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	13.75 to 14.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	13.75 to 14.25
Cupola Grades:	
Steel rails less than 3 ft.	15.00 to 15.50
Angle bars, steel	13.75 to 14.25
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.75 to 14.25
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The New York office of the Standard Seamless Tube Co., Pittsburgh, has been consolidated with that of Spang Chalfant & Co., Inc., at 51 East Forty-second Street.

The Marks-Fiske-Zeiger Co., 126 South Artillery Avenue, Detroit, dealer in iron and steel products, has changed its name to the Federal Steel Corporation.

Philadelphia

Steel Shipments Fair—Pig Iron Continues Quiet but Firm

PHILADELPHIA, April 16.—Except for a fair volume of shipments on contracts, business is decidedly limited both in steel and pig iron. Consumers are evidently operating sufficiently well to use the tonnage for which they have contracted, but require little or nothing in addition. On the small lots of new steel business in the market, 1.90c., Pittsburgh, on bars and 2.05c., Coatesville, on plates are being obtained, while shapes bring 2.05c., Bethlehem, only on the smaller purchases, usually less than carload lots.

Blue annealed, black and galvanized sheet prices continue unsettled. There is apparently a range of about $2 a ton in quotations on these finishes.

Competition for fabricated steel projects is keen, but only a small tonnage of new business is reported in the market. The New York Central Railroad has awarded 10 steel barges to two builders and the Pennsylvania Railroad has 10 barges, floats and a tugboat hull still pending. About 300 tons of steel piling for a bridge at Allentown, Pa., went to the Bethlehem Steel Co.

Pig Iron.—Sales of pig iron consist mainly of carload lots to foundries. Eastern Pennsylvania furnaces are maintaining $20, base, on foundry grades. The Panama Canal Commission, Washington, is about to close on 100 tons of No. 2 plain. Eastern Pennsylvania producers of low phosphorus iron have sold a few carloads to western Pennsylvania consumers. Small tonnages of Indian and Dutch iron continue to appear on the market at about $20.25 per ton, duty paid.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. IX		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Prices are unchanged at $33 per ton, Pittsburgh, for rerolling billets and $38 per ton, Pittsburgh, for forging quality.

Bars.—There is a moderate demand for bars, but purchases are confined to small lots and specifications against contracts. On small tonnages of new business, 1.90c. per lb., Pittsburgh, or 2.22c., delivered Philadelphia, is obtained, while deliveries on contracts are at 1.85c., Pittsburgh, or 2.17c., Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

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*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Shapes.—Local structural steel projects consist chiefly of tonnages that have been pending for several weeks. Barges, floats and a tugboat hull for the Pennsylvania Railroad have not yet been awarded to a builder. Ten New York Central Railroad barges, which are to be constructed of 12-in. channels, about 300 tons or more to each barge, are to be built by the Dravo Contracting Co., Pittsburgh, and the Atlantic-Ellis Channel System, Inc., New York. On current small lot purchases of shapes, 2.05c., Bethlehem, 2.025c., Pottsville, or 2.17c. to 2.18c., delivered Philadelphia, are quoted. Deliveries on second quarter contracts are being made at 2c., Bethlehem, or 2.13c., Philadelphia, and there are still a few tonnages that have been carried over from the first quarter at $1 a ton less.

Plates.—Specifications against contracts at 2c., Coatesville, or 2.10c., delivered Philadelphia, are coming in freely, but new purchasing is limited. On new business, however, 2.05c., Coatesville, or 2.15c., delivered Philadelphia, seems to be generally maintained.

Sheets.—Eastern Pennsylvania mills have not generally followed the action of an Ohio mill in revising blue annealed sheets to 2c., base Pittsburgh, and black to 2.75c., Pittsburgh. While there is weakness in the market, 2.10c., base, is being quoted here on small tonnages of blue annealed sheets, so that prices are represented by a range of 2c. to 2.10c. per lb. Galvanized sheets are 3.65c. to 3.75c. per lb., Pittsburgh, while black sheets seem to be rather generally quoted at 2.75c. to 2.85c., Pittsburgh.

Warehouse Business.—Efforts to establish a quantity differential on black and galvanized sheets, reported a week ago, were not completely successful and local jobbers have adopted a substitute plan whereby three different base prices for sheets, depending upon the quantity purchased, will be quoted. For 50 bundles or more black sheets at 4c. per lb., base, and galvanized, 4.75c., base; for 10 to 49 bundles black sheets are 4.25c. and galvanized, 5.10c., base; and for one to nine bundles black sheets are 4.50c. and galvanized, 5.45c., base. There is a 25c. per 100 lb. extra for corrugated sheets.

Imports.—In the week ended April 14 a total of 8250 gross tons of ore arrived at this port, 6250 tons of iron ore from Algeria and 2000 tons of chrome ore from Portuguese Africa. Pig iron arrivals totaled 1055 tons, of which 649 tons was Indian and 406 tons Dutch iron. Steel arrivals consisted of 72 tons of structural shapes, 66 tons of hoops and bands and seven tons of steel bars from France and 369 tons of bars and 200 tons of structural shapes from Belgium.

Old Material.—Prices are unchanged. Buying by eastern Pennsylvania consumers is light. A Harrisburg mill has bought bundled sheets at $10.50 per ton, delivered, and yard grade of heavy melting steel at $11 per ton, delivered. A Phoenixville company, which has been offering $10 per ton, delivered, for machine shop turnings is now offering $10.50 per ton for a sizable tonnage. No. 1 heavy melting steel is unchanged at $13.50 to $14 per ton, delivered, and shipments are going to Bethlehem, Conshohocken and Coatesville.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)		10.50
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	10.50 to	11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)		12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	14.75 to	15.25
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

New York

Steel Shipments Heavy But New Demand Lessens—Pig Iron Quieter

NEW YORK, April 17.—Buying of pig iron is confined mainly to small lots for early delivery. The volume of this business is of fair proportions, bookings by local sellers having totaled 7500 tons for the week, or about 500 tons more than in the previous week. While there is virtually no interest in iron for third quarter delivery, shipments to foundries are increasing, indicating a gain in melt. The Chrome Steel Works, Carteret, N. J., has bought 1000 tons of low phosphorus, and the Lorain Steel Co., Johnstown, Pa., is expected to close in a day or two on a like tonnage. Pending business in foundry grades is light, probably totaling less than 1000 tons. A tentative inquiry is current, however, for 2000 to 3000 tons. Buffalo foundry iron is still available at $16 to $16.50, base furnace. Eastern Pennsylvania producers continue to quote $20, base furnace, for foundry, without obtaining much business. All of the Dutch iron recently unloaded at Bridgeport, Conn., has been sold.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Although shipments of steel to consumers in this district on specifications against contracts continue at an undiminished rate, the amount of new buying is extremely light. Most of the larger users have provided for their needs for all of this month and in not a few instances for most, if not all, of next month. With such wide coverage, there have been few tests of prices on those products which in other markets have shown weakness, notably sheets and cold-rolled strip steel. Black sheets are available at 2.80c. and 2.85c., Pittsburgh, while current sales of galvanized sheets are at 3.65c. to 3.75c., Pittsburgh. Blue annealed sheets are still holding to 2.10c. on a majority of transactions, notwithstanding that 2c., Pittsburgh, has been done in other districts on some of the larger sales. A few makers of cold-rolled strip have taken orders at 2.75c., Pittsburgh, for three tons or more, but other makers have succeeded in getting higher prices. In plates, shapes and bars the price situation is unchanged, except that the most recent advance of $1 a ton is not holding on lots of a carload or more, bars being obtainable at 1.85c., Pittsburgh; shapes at 2c., Bethlehem, and plates at 2c., Coatesville. The New York Central Railroad has distributed orders for a few thousand tons of steel on which bids were publicly taken a few weeks ago. The plate tonnage was divided among at least three mills on quotations of 1.85c., delivered Newberry Junction; 1.85c., Cleveland mill, and 1.90c., West Seneca, N. Y. Structural steel awards bulked large, but were made up of a few good-sized tonnages, among which were 5000 tons of subway work and 4400 tons for the Governor Clinton Hotel in New York. New bids will be asked for on 10,000 tons of fabricated steel for the Jackson Avenue subway in Long Island City. Projects pending include 12,000 tons for a bridge at Charleston, S. C., and 3000 tons for a bridge over Lake Champlain.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices of Northern makers of pressure pipe are slightly firmer, but have shown no tendency to advance. At the opening of bids today by the Department of Purchase, New York, on 2700 tons of water pipe, low bidders were the Warren Foundry & Pipe Co. on 1000 tons at $38.40 per net ton, delivered, the Donaldson Iron Co. on 1000 tons at $37.90 per net ton, delivered, and the United States Cast Iron Pipe & Foundry Co. on 700 tons at $38.25. White Plains, N. Y., has awarded 500 tons and Bloomfield, N. J., 100 tons of water pipe to the Warren Foundry & Pipe Co. An inquiry for a contract in Colombia specifies 20 kilometers of 24-in. water pipe (about 9000 tons).

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Although quantity differentials are now in effect on plates, shapes, bars, hoops, bands, diamond pattern plates and blue annealed sheets, the current volume of purchasing has not as yet provided much of a test. April business has been good and, although orders are small, the total for the month is expected to exceed that of March.

Coke.—Buying is in small volume. Prices of Connellsville coke are weak. Standard foundry is offered at $3.50 per ton, Connellsville, and standard furnace at $2.75 to $2.85 per ton, Connellsville. Delivered prices

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of special brands are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, N. J., and $10.06 to $10.29 per ton, New York or Brooklyn.

Ferroalloys.—Interest centers in the price which will prevail on contracts for ferromanganese for second half. This may develop in the near future. Thus far no alloy is reported to have been sold for that delivery. There is some talk that a higher price than the present quotation of $100, seaboard, may be announced. Specifications on present contracts, which cover requirements, are said to be expanding. New business in spiegeleisen is confined to small lots at prevailing quotations. Specifications on contracts for other ferroalloys are reported heavy.

Reinforcing Bars.—Parker & Graham, Inc., Paterson, N. J., has been awarded the contract for a highway bridge across the Raritan River at New Brunswick, N. J., which will require 1700 tons of concrete reinforcing bars. A considerable tonnage of bars is being placed for road work in New Jersey, mostly in small contracts. Road work is also becoming more active in Westchester County and lower New York State, but here as well as in New Jersey wire mesh is being used in considerable quantities. The Truscon Steel Co. will supply 400 tons of bars for a section of the New York subway. On another section in Long Island City, the original bids on the general contract have been rejected and the job will be readvertised. The 2c., Pittsburgh, mill price is being adhered to on the usual run of small jobs. Warehouse prices are unchanged.

Old Material.—All grades of scrap remain at last week's prices. Shipments to eastern Pennsylvania consumers are for the most part confined to No. 1 heavy melting steel, yard grade of heavy melting steel, machine shop turnings, borings and turnings, stove plate, locomotive grate bars and heavy breakable cast. Some specification pipe is moving to Lebanon and Columbia, Pa., consumers, brokers paying $12 and $12.50 per ton, delivered. While there is still pressure from buyers to obtain lower prices, the market seems to have reached bottom in that sellers are unwilling to enter into contracts at less than the current quotations.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to	$10.85
Heavy melting steel (yard)	6.75 to	7.25
No. 1 heavy breakable cast	11.25 to	12.00
Stove plate (steel works)	7.75 to	8.00
Locomotive grate bars	8.00 to	8.50
Machine shop turnings	6.50 to	7.25
Short shoveling turnings	6.50 to	7.25
Cast borings (blast furnace or steel works)	6.25 to	7.25
Mixed borings and turnings	6.50 to	7.25
Steel car axles	15.50 to	16.00
Iron car axles	23.75 to	24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.75 to	8.25
Forge fire	6.75 to	7.00
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought, long	8.50 to	9.00
Rails for rolling	10.00 to	10.50
Cast iron carwheels	10.75 to	11.25
Stove plate (foundry)	8.50 to	9.00
Malleable cast (railroad)		10.00
Cast borings (chemical)	11.00 to	11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to	$14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to	12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to	11.75

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Motor Industry Still Principal Steel Buyer—Ore Prices Named

CLEVELAND, April 17.—Orders and specifications for steel bars, plates and structural material are fairly plentiful, but they are for small tonnages. The same situation applies to sheets and to hot-rolled strip steel in this territory. Orders from the automotive industry continue heavy, particularly for auto body sheets and hot-rolled strip steel, and some of the mills are filled up on these two products until late in May. With the rather slow but steady increase in production by the Ford Motor Co., larger steel orders are coming from that company.

Prices are holding firm at 1.85c., Pittsburgh, for steel bars, plates and structural material and quite a few small lot miscellaneous orders are being taken at 1.90c. Local mills quote steel bars at 1.85c., Cleveland. Sheet prices are weak except on auto body sheets, which are holding at the recent decline, now generally in effect. There is also irregularity in wide strip steel.

Structural orders continue light, the largest of the week being 1200 tons, and not much new inquiry is coming out.

The announcement of the reestablishment of last year's ore prices for 1928 attracted less interest than usual because this was generally expected.

Pig Iron.—Sales decreased further the past week, the business taken by Cleveland interests totaling 17,000 tons, compared with 26,000 tons during the previous week. Much of the business was in small lots from consumers who are buying from hand to mouth or small foundries that are purchasing only enough iron to carry them through the second quarter. There is little new inquiry. Prices are well stabilized at the quotations that have prevailed for some time. Lake furnaces are adhering to $17 for No. 2 foundry and malleable iron, except for shipment to competitive points, principally in southern Ohio, where some irregularity exists. Lake furnaces are asking $16.75 for shipment to these competitive points, but this price is being shaded. In Michigan the market is firm at $18. Shipping orders show some gain from foundries outside of the automotive industry and automobile foundries are taking fully as much iron as last month. Most furnaces are shipping more iron than they are making.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—Mills are getting heavy specifications for auto body sheets from the Detroit territory, but new demand has slowed down somewhat, as consumers placed large orders last month against old contracts. Consumers in this territory are ordering small lots for immediate needs. Blue annealed sheets have settled down to 2c., Pittsburgh base, the regular 2.10c. price having virtually disappeared. Black sheet prices appear to be holding steadily at recent reductions, the common range being 2.75c. to 2.80c., Pittsburgh. Galvanized sheets are weak. These are quoted at 3.65c., Pittsburgh. Auto body sheets are holding at the recent $3 a ton price reduction to 4c. Metal furniture sheets, following black sheets downward, are $2 a ton lower.

Strip Steel.—Specifications against contracts for hot-rolled strip from the automotive industry are heavy, but new demand is moderate. Mills were able to close considerable tonnage at prices that prevailed during the first quarter and somewhat below current quotations. However, the market lacks strength, and there are reports of quotations only slightly above some of the low net prices at which first quarter business was taken. The demand for cold-rolled strip is not as heavy as for hot-rolled material. While large buyers have been able to contract at 3c., base Cleveland, or 2.75c. for three tons and over, the regular 3.15c. base is being maintained for small consumers. While there has been shading of $1 a ton on fender stock to 4.15c., this material is lower than auto body sheets when extras are added, and consequently has not declined with the latter, being generally quoted at 4.20c.

Iron Ore.—Ore prices that prevailed last year were reestablished by the sale of a round tonnage April 16, more complete details of which will be found in another column.

Semi-Finished Steel.—While not much new business is being placed, the demand is holding up to recent volume and the leading local producer continues to operate 13 out of 14 open-hearth furnaces. Quotations are unchanged at $33, Cleveland. Irregularity in forging billets is indicated by a car lot sale at $37.

Warehouse Business.—Sales show a slight gain over those in March. Some seasonal demand has developed from the building field. Sheets are moving slowly. Prices are being well maintained.

Cold-Finished Steel.—The Ford Motor Co. recently placed some business with parts makers in this territory that has resulted in an increase in specifications. Locally, the price is firm at 2.25c., Cleveland, but irregularities are reported in the Detroit territory.

Wire Products.—Nails are moving better than recently. The market is holding to $2.65 per keg in this territory, although lower prices are reported in southern Ohio.

Reinforcing Bars.—New inquiry is confined to small lots and the only award of any size during the week was for 100 tons. The price for stock shipment remains around 2.25c. Rail steel bars are quoted at 1.75c., mill.

Coke.—Coke shipments are fair, but there is little new demand. Prices are unchanged at $7.75, Painesville, for Ohio by-product foundry coke and $3.75 to $5.10, ovens, for Connellsville grades. There is still a range of from $2.50 to $2.75 on heating coke.

Bolts, Nuts and Rivets.—Bolts and nuts continue to move in good volume in specifications against contracts. While rivets are rather slow, they are more active than recently.

Old Material.—The firmer market situation that has developed in the Pittsburgh territory has not been reflected in any added strength in the Cleveland market. No new business is coming from the mills and, with shipments closely restricted, dealers have little tonnage to place against existing orders. Dealers are able to buy car lots of heavy melting steel at $13.50, or 25c. a ton under the more commonly quoted price. They are showing caution in buying scrap for future delivery, believing that if there is any reduction in mill operations in the early summer scrap prices may go lower.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.75 to	$14.00
No. 2 heavy melting steel	13.25 to	13.50
Compressed sheet steel	12.75 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	12.00 to	12.50
Machine shop turnings	8.00 to	8.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	14.00
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	10.00 to	10.25
Mixed borings and short turnings	10.00 to	10.25
No. 2 busheling	10.00 to	10.25
Cupola Grades		
No. 1 cast	16.50 to	17.00
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	18.00 to	18.50
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Company Activities and Commission Decisions

The Jones & Laughlin Steel Corporation on April 3 completed two years without a fatality at its South Side works, Pittsburgh. An average force of 5100 men worked approximately 30,000,000 man-hours in that period. The departments of the works located on the north bank of the Monongahela River, employing about 2000 men, have gone 90 days without a lost-time accident.

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Acme Steel Co., Chicago, reports that the sales for the first quarter of 1928 were approximately 32 per cent ahead of the same period last year, and were the largest in the history of the company. The company recently placed in operation a new electro-galvanizing sheet plant.

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The American Steel & Wire Co. has recently put in operation a new welded-fabric mill addition at its Anderson, Ind., plant.

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The Carnegie Steel Co. will rebuild and enlarge No. 2 stack at its Ohio Works, Youngstown. At completion the furnace will have a capacity of 800 tons daily and will be the largest of the group of six furnaces. The Pennsylvania Engineering Works, New Castle, Pa., will do the work.

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Two combined coke pushers, coal levelers and door extractors will be installed at the South Chicago plant of the Youngstown Sheet & Tube Co. by the Wellman-Seaver-Morgan Co., Cleveland, which has been awarded the contract by the Koppers Co., general contractor for the coke oven plant.

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The McClintic-Marshall Co. has removed its district sales office in Cincinnati from 624 Union Central Building to room 1208 in the same building.

In a proposed report to the Interstate Commerce Commission last week, R. J. Olentine, examiner, passing upon a complaint of the Denver Rock Drill Mfg. Co., Denver, Colo., held that rates and minima on plain bar steel, in carloads, from Syracuse, N. Y., and Milwaukee to Denver are not unreasonable.

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Dismissing a complaint of the Federated Metals Corporation, New York, the Interstate Commerce Commission, in a report made public last week, held that rates on brass and copper ingots, in carloads, from Pittsburgh, Chicago and St. Louis to points in Official Classification territory are not unreasonable. Commodity rates equivalent to sixth class are generally maintained from Chicago to Pittsburgh. From St. Louis fifth class rates apply with but few exceptions.

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Termination of the receivership of the Standard Stamping Co., 2000 North Broadway, St. Louis, in effect since July, 1926, will probably be accomplished, following an order by Federal Court, asking George W. Weigand and his sons, majority stockholders in the company, to purchase the stock of James L. Minnis, principal minority stockholder.

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The Federal Trade Commission has resumed the taking of testimony in the case of the Aluminum Co. of America in which certain contracts and agreements made by the company for the sale of sheet aluminum are questioned.

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Orders received by the General Electric Co., Schenectady, N. Y., for the first three months of the present year amounted to $79,925,840, compared with $77,550,581 for the corresponding quarter in 1927 and with $86,433,658 for the first quarter of 1926.

San Francisco

Reinforcing Steel Awards 7000 Tons —5200 Tons for Drainage Work

SAN FRANCISCO, April 14 (*By Air Mail*).—Among the more important awards this week were 5200 tons of bars for a drainage improvement project at Los Angeles and 376 tons for a factory for Johns-Manville Co. at Pittsburg, Cal. Demand generally is considered fair for this season of the year. Much new work is in sight.

Pig Iron.—Both sales and inquiries for foundry pig iron were limited to small lots for prompt shipment, and little or no improvement is noted in general demand for castings. Importations of foreign iron in January totaled close to 1400 tons, Los Angeles foundries taking 850 tons. The bulk of this material, 1047 tons, came from the British Indies. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

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*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards totaled close to 7000 tons. In addition to the tonnages mentioned above, 420 tons for a warehouse at Seattle and 240 tons for the Transportation Building in the same city were awarded. The largest pending project calls for 1220 tons for Drainage Improvement District No. 22 at Los Angeles, bids on which have been opened. January importations of foreign bars totaled 4322 tons, compared with 3675 tons for the same month last year. Of this total, 4041 tons came from Belgian producers, San Francisco taking 1749 tons and Portland 1496 tons.

Plates.—The Pittsburgh-Des Moines Steel Co. was low bidder on 445 tons for siphons for the Kittitas Canal project in Washington. The only other inquiry up for figures calls for 700 tons for a car float for the Santa Fe at San Francisco. Prices continue unchanged at 2.30c. c.i.f.

Shapes.—Fabricated awards this week totaled 1066 tons. The Moore Dry Dock Co. took 250 tons for hangars at Oakland and McClintic-Marshall Co. was awarded 150 tons for the city of Los Angeles. Considerable new work is being planned, and it is thought that most of it will come out for figures during the next 30 days. Pending business exceeds 10,000 tons. C. J. Nystedt of Stockton got the general contract for a bridge over the Sacramento River at Freeport, calling for 606 tons; the steel contract has not been let. Los Angeles is calling for bids on 685 tons of I-beams by April 23. Importation of foreign material during January totaled 1936 tons, as against 2674 tons in January, 1927. San Francisco took 1149 tons. More than 1800 tons came from Belgian mills. Domestic plain material is firm at 2.35c. c.i.f.; foreign shapes are quoted at about 1.50c., c.i.f., duty paid.

Cast Iron Pipe.—Demand for cast iron pipe has improved, but awards were not heavy this week. George Herz & Co., San Bernardino, took 129 tons of 8 to 24-in. class B pipe for San Bernardino, Cal. An unnamed interest took 526 tons of 4 to 8-in. class B pipe for the East Palo Alto Waterworks District, Redwood City, Cal. Bids will be opened next week on the largest tonnages of cast iron pipe ever to come up for figures on the Coast. The Wildcat and Sequoia aqueducts in Oakland will require respectively 17,440 and 13,250 tons of 50 to 60-in. class C pipe. B. Nicoll & Co. were low on 234 tons of 24-in. class B pipe for Los Angeles. Long Beach, Cal., will open bids on April 17 for 8744 tons of 4 to 30-in. class B pipe. Monrovia, Cal., opens bids on April 16 for 2764 tons of 4 to 20-in. classes A and B pipe. Imports of cast iron pipe for January totaled 1823 tons, as against 6013 tons for the same month last year. Seattle took the largest portion, or 965 tons. More than 1400 tons came from French makers. Prices now range from $35 to $36 a ton, delivered, on 6-in. and larger.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Standard Pipe.—E. W. Redman, Fresno, Cal., took 125 tons of 2 to 8-in. O. D. pipe for the Armona Public Utility District at Armona, Cal. The only pending inquiry of size involves 710 tons of 4 to 20-in. lapweld pipe for Monrovia, Cal., bids on which go in April 16. Pipe prices have advanced 5 per cent, reflecting the advance last week in the Eastern markets. Imports of tubular products in January aggregated 1089 tons, compared with 5117 tons in January, 1927. Of the total, Los Angeles took 850 tons.

Coke.—Sales and inquiries are confined to small lots. Prices on English beehive and by-product coke range from $16 to $17 a net ton on the former, delivered dock, and from $11.50 to $13 on the latter.

Youngstown

Losses in Bar Output Offset by Gains in Steel Pipe

YOUNGSTOWN, April 17.—Bar mill operations in this district have suffered a recession from the recent rate of activity because of the fact that makers of cold-finished steel bars and shafting drew very heavily against first quarter contracts last month and now are ordering sparingly. But such loss as this decline in new bar business has created in ingot production has been largely made good by a better demand for standard-weight pipe and a heavier operation of furnaces making that product. This is the reaction to the higher prices recently announced by steel pipe makers under the lead of the Youngstown Sheet & Tube Co. On consigned accounts, jobbers are protected in price changes for 60 days and jobbers who handle tubular goods on their own account had a period of grace within which they could order at the old prices, for delivery at convenience of the mill, the tonnage equivalent to what mill records showed was a month's supply. The advance took the shape of a withdrawal of a so-called preferential discount of 5 per cent; on retailers' carloads, the discount was card plus two fives, and now is card and 5 per cent. While oil country goods continue to sell slowly, there is a better tone to the pipe market as a result of the increased activity in standard-weight pipe and the prospect that with the revision in prices there will come a passing of the irregularity and uncertainty that for months has marked the secondary market.

Much disappointment is felt locally over the recent price developments in the sheet market, especially the drop in price of automobile body sheets, which up to the time that one or two small producers voluntarily receded, gave promise of holding firmly to 4.15c., base. There is no complaint over the volume of sheet orders, but prices are keenly competitive and maintenance of the prices named for this quarter is not regarded as now possible, since on black sheets 2.80c., base, Pittsburgh, is fairly common and even 2.75c., base, is being encountered in some districts. The decline in black sheets has brought no further weakening in galvanized sheets, which are holding rather well at 3.65c., base, which was quoted before there was any definite decline in black sheets. In the formulation of schedules a year ago with the change in base gages, there was a spread of 85c. per 100 lb. between black and galvanized sheets and today's prices of 2.80c. and 3.65c. are in the same alinement. There is some shading in blue annealed sheets, but generally, 2.10c. for stock narrower than 40 in. is holding well.

Tin plate mills in this area are all well occupied, and there is no complaint among strip makers as to the volume of business; there is not much satisfaction, however, over the prices at which strips, both hot- and cold-rolled, are moving. Good movement of wire, fence and fencing materials is noted, but it is generally on contracts written at less than is being asked on second quarter contracts. Nails still reflect in demand the fact that jobbers are heavily stocked as a result of large December purchases and liberal shipments over the first quarter of the year. Semi-finished steel is moving to non-integrated manufacturers steadily. There is no activity in pig iron, except for the purchases recently made by the A. M. Byers Co. of 10,000 tons of No. 3 foundry for its Girard, Ohio, works and a like amount of Bessemer iron for its Warren, Ohio, works. Scrap is firm, as the mills are demanding deliveries against old orders and the dealers are finding it necessary to go high to get enough tonnage to meet their obligations.

A good deal of new construction work is in process in the Youngstown district steel plants. The Carnegie Steel Co. is rebuilding its No. 2 blast furnace at its Ohio works, and when the work, which is being done by the Pennsylvania Engineering Works, New Castle, Pa., is completed the furnace will have a capacity of 1000 tons daily, making it the largest producing unit in the Valley districts. The Newton Steel Co., Newton Falls, Ohio, is making changes calculated to improve mill performance. The Trumbull Steel Co. has taken out a license under the patents of the Cold Metal Process Co., Youngstown, to install a mill for making strip tin plate.

Birmingham

Steel Market Continues Firm, but Pig Iron Demand Is Light

BIRMINGHAM, April 17.—The pig iron market continues to drift along, activity consisting of a fair number of spot sales in small lots. Producers have a good size tonnage of second quarter iron unsold. Stocks were increased during the last week when sales dropped below the average of recent weeks. The Tennessee company changed furnace No. 2 at Bessemer from basic to recarburizing iron on April 7 and furnace No. 6 at Ensley from recarburizing iron to foundry on April 11. Seventeen furnaces are in blast, nine of which are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—The market continues firm. More buyers are showing a tendency toward closing contracts. Inquiries are developing at a fair rate, and sales officials anticipate a satisfactory volume of business for the quarter. Structural steel fabricators and bar manufacturers report sales at a low rate during the past two weeks. A number of good projects are in prospect. The Tennessee company is now operating seven or eight open hearths at Ensley instead of eight or nine. Five are still in operation at Fairfield and the Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—Sales for the past week were light and showed a decided drop from the preceding week. A fair volume of small orders constitutes the only new business. Inquiries are being received from Southern and Northern municipalities, and buying is expected to improve within the next two weeks. Shipments are increasing gradually. Base prices remain at $29 to $31.

Coke.—A fair amount of activity is found in spot sales of carload lots. Forward buying has been at a standstill during the past two weeks. All important consumers are covered for the second quarter and most of them are covered for the third quarter. Quotations continue at the same base price of $5 for both spot and contract.

Old Material.—Sales of heavy melting steel and steel rails have shown a noticeable improvement during the past week, and inquiries are more numerous. New business in other lines continues small. No changes have occurred in prices.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	14.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.50
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

St. Louis

Pig Iron Buying Active—Steel Operations Continue at High Rate

ST. LOUIS, April 17.—Buying of pig iron continues active. The St. Louis Gas & Coke Co. sold about 10,000 tons, while a leading Southern interest disposed of 1000 tons. Prices are firm. Melters are beginning to inquire for prices on their third-quarter requirements, although makers have not yet opened their books for that period. Of the local maker's sales, 5000 tons was to a radiator company, 1000 tons to a northern Illinois stove foundry, 600 tons to an East St. Louis melter and 200 tons to a southern Illinois concern, all foundry iron, and 1000 tons of malleable iron to an Illinois consumer; all for second quarter shipment. The largest of the Southern maker's orders was for 350 tons to a stove plant. Most of the buying is by melters outside of St. Louis. Inquiries total about 2000 tons, including 1000 tons for a local concern.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of foundry coke is in fair volume, consumers in the district finding it convenient to order from local by-product ovens as they require supplies. Dealers have not begun to buy domestic grades.

Finished Iron and Steel.—The volume of business received during the week by the Granite City Steel Co. showed a slight falling off, but more orders calling for small quantities were received than for some time, which is regarded as indicating that purchasers do not desire to build up stocks of too great proportions. Galvanized sheets are not active, but specifications are coming in at a rate warranting operations of approximately 75 per cent of capacity of this department of the Granite City Steel Co.; all other departments are operating at 100 per cent, the backlog of orders indi-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb	50

cating a continuance of this rate for some time. Structural fabricators report that business is extremely dull. Reinforcing bar awards for the week totaled 465 tons, including 300 tons for an apartment house.

Old Material.—The market for old material continues weak. The only price change is a reduction of 50c. a ton on No. 1 machinery cast. Consumers are buying almost nothing, pending depletion of their stocks, and dealers are trading among themselves for the few unfilled orders on their books. Railroad lists: Southern Railway, 8700 tons; Chesapeake & Ohio, 9298 tons; International & Great Northern, 3260 tons; Chicago, Milwaukee & St. Paul, 1000 tons; Nickel Plate, 37 carloads, and Frisco Lines, 24 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$10.75 to $11.25
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	10.75 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.00 to 12.50
Railroad springs	13.00 to 13.50
Bundles sheets	8.75 to 9.25
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	6.50 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	10.75 to 11.25
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Canada

Pig Iron Weaker—Larger Demand for Structural Shapes and Bars

TORONTO, ONT., April 17.—Canadian industrial plants are in a fairly strong position with regard to orders booked, while prospective business is in sufficient volume to warrant optimism on the part of iron and steel interests. Canada's external trade in iron and steel and their products is also in a favorable position. In February, Canada exported 3217 tons of steel to the United States; and in January and February exports totaled 8214 tons, which compares with 9330 tons for the first two months of last year. February imports of iron and steel from the United States amounted to 76,160 tons, and in January and February imports from this source totaled 137,807 tons, which compares with 108,109 tons for the first two months of 1927.

Pig Iron.—A steady demand for foundry and malleable iron for prompt delivery continues. Most of the current sales are one or two cars, but some orders for 100 to 200 tons have been placed. There is one inquiry for 1000 tons. Some recent transactions have been put through at $23.10, a decline of 50c. a ton, while others have been booked at $23.60, Toronto. In the Montreal market most of the sales are made at $24.50.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$24.50 to $25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Demand grows for structural steel and reinforcing bars. Sales for the past week totaled close to 5000 tons for the Toronto and Montreal districts alone, while other large contracts are pending. For an extension of the Robert Simpson Co. store, Toronto, 2800 tons of structural steel and 1000 tons of reinforcing bars will be purchased; approximately 4000 tons of reinforcing bars and steel will be required for the new elevator for the Playfair interests to be erected in Toronto; 4000 tons of structural steel will be needed for the steel towers for the Detroit-Windsor international suspension bridge. While some contracts for steel have been placed for new bridges, there is 10,000 tons of bridge steel pending.

Old Material.—Following the active buying movement of the past month, during which time a number of consumers placed second quarter contracts, the demand has fallen off, and current sales are mostly in small tonnages for immediate needs of consumers. The price situation is unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Concessions on Large Sizes of Cast Iron Pipe—Steel Scrap Higher

BOSTON, April 17.—Pig iron sales in New England the past week were the smallest for any like period this year. The largest amount sold by any one stack was 500 tons and this was in small lots. Connecticut foundries are taking in iron on contract quite freely, and on the present basis of consumption many of them will be in the market for tonnages before long, but the outlook for business in other New England States is not particularly encouraging. No. 2 plain and No. 2X Buffalo iron is still available at $16 a ton, furnace, all-rail shipment, and New York State furnaces and the Mystic Iron Works are meeting the delivered price. Several hundred tons of Indian No. 2X iron was sold at $21.75 and $22 a ton, Boston, duty paid.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—Consumption of by-product foundry coke in Connecticut is increasing perceptibly, and there is also slight improvement in other New England States. New England foundry coke is still $11 a ton, delivered within a $3.10 freight rate zone. The Connecticut Coke Co., through coal dealers, is soliciting heating coke orders in Connecticut.

Shapes and Plates.—Fabricators are figuring some good-sized tonnages, which, with numerous small lots, give the market a more active appearance. Steel mill representatives quote 1.90c. per lb., base Pittsburgh, on standard shapes, but in the past week a mill took a round tonnage at 1.85c. Plate mills apparently are holding to 1.90c. per lb., base Pittsburgh, but no large tonnages to test prices have been in the market recently.

Cold-Rolled Strip.—New business is coming in slowly, current buying being on a hand-to-mouth basis. The American Steel & Wire Co. continues to quote 3.30c. per lb., base Worcester, Mass., for 1 to 3 ton lots.

Old Material.—No. 1 heavy melting steel is higher, $9.50 a ton on cars at shipping points for Pittsburgh district delivery and $9.25 for shipment to other Pennsylvania consuming points having been paid in several instances in the past week. Scrap T rails are doing better in price and quite a tonnage of relaying rails, including 600 tons shipped via the Panama Canal for a Pacific Coast lumber operation, have been sold at slightly better prices. Girder rails have been sold at $8.10 a ton on cars at shipping point, although $8 seems to be the average top price. Mixed borings and turnings were sold last week at $5.75, $6 and $6.25 on cars, whereas in the previous week nothing higher than $6 was reported. There is little demand for steel turnings except for blast furnace consumption, and prices have dropped. Bundled skeleton has been sold at prices ranging from $5.60 to $6.50 a ton on cars. The Mystic Iron Works continues to buy miscellaneous material, including pipe and stove plate, at $10 a ton, delivered. Machinery cast and textile cast in Boston is slow, but small yards outside of the city are selling quite a little tonnage direct to foundries.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.25 to	$9.50
Scrap T rails	8.50 to	9.00
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.25
No. 1 yard wrought	7.50 to	8.00
Machine shop turnings	5.50 to	5.75
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.75 to	6.25
Forge flashings	6.60 to	7.25
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.50
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.00
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	15.00 to	15.50
No. 2 machinery cast	13.00 to	13.50
Stove plate	10.00 to	10.50
Railroad malleable	13.00 to	13.50

Cast Iron Pipe.—Brockton, Mass., has purchased 550 tons of 24-in. pipe for its water department from R. D. Wood & Co. and 350 tons of 24-in. pipe for its sewerage commission from the Warren Foundry & Pipe Co. Wellesley, Mass., has bought 350 tons of 6, 8 and 12-in. pipe from the Warren Foundry & Pipe Co., and Quincy, Mass., bought 350 tons of 6 to 12-in. cement lined pipe from the same maker. Everett, Mass., has contracted with the Warren company for its 1928 pipe requirements; the amount is not specified, but it probably will be several hundred tons. Winthrop, Mass., has placed 200 tons of 8-in. pipe with a Boston jobber. The United States Cast Iron Pipe & Foundry Co. was the low bidder on 2600 tons of 12 and 18-in. pipe required by Attleboro, Mass., bids for which were opened last week; no award has been made. Competition for business in New England is keen, but a majority of sales of 6 to 12-in. pipe are at $39.10 a ton, delivered common Boston freight rate points. Concessions are being made on larger sizes, however. Small pipe remains at $44.10 a ton, delivered, as most foundries are well sold ahead. The usual $5 differential is asked on class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Recession in Demand for Steel Products—Pig Iron Sales About 2500 Tons

CINCINNATI, April 17.—Pig iron sales in the past week amounted to about 2500 tons, practically all of which consisted of lots ranging from 250 tons down to single carloads. That the market is likely to remain quiet during the remainder of the month is shown by the absence of inquiries. In fact, the only sizable pending transaction is 3500 tons of Northern and Southern foundry iron for a local consumer. Prices are unaltered, with southern Ohio foundry quoted at $19, base Ironton; Tennessee and Alabama iron, at $16, base Birmingham, and Jackson County silvery at $25, base furnace, for 8 per cent. Northern Ohio makers are reported to be asking a minimum of $16.50, base furnace.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Lessened demand for finished steel products, as reflected in the decreased volume of specifications and orders, is having an effect on prices of sheets and common wire nails. In the sheet market, several small mills have attempted to stimulate buying by reducing quotations from $2 to $3 a ton and as a defensive measure larger producers have been compelled to follow suit. The result has been that galvanized stock is selling rather generally at 3.65c., base Pittsburgh, as against the former price of 3.75c. Blue annealed sheets are selling at 2c., base Pittsburgh, to large users, with small consumers paying $2 a ton more, while automobile body sheets are quoted at 4c., base Pittsburgh. Black sheets range from 2.75c. to 2.85c., base Pittsburgh, with the intermediate price of 2.80c. quoted in many cases. Bookings of common wire nails have been only fair, and competition for second quarter business is intense. Some sales of nails have been made at $2.50 a keg, base Ironton, but a considerable proportion of the orders is being taken on the basis of $2.55 to $2.60, base Pittsburgh. There has been no perceptible improvement in structural steel, movement of which is lagging. Bars, structural shapes

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

and plates are quoted at 1.85c., base Pittsburgh, to contract users and at 1.90c. to small consumers. Sales of cold-rolled bars and strips have been holding up fairly well.

Reinforcing Bars.—New billet bars are quoted at 1.85c. to 1.90c., base Pittsburgh, and rail steel stock at 1.80c. to 1.85c., base mill.

Warehouse Business.—While several jobbers report that shipments out of warehouses are running about 15 per cent ahead of those in March, others have not participated in the increased volume of sales and therefore are somewhat disappointed at the total tonnage which they have booked since the first of the month. Prices are firm and unchanged.

Coke.—By-product foundry coke specifications continue to show a downward trend, although shipments are still in liberal volume. Several dealers report that sales of by-product domestic coke are larger than normal for April because of the low price in effect this month. Producers in this district are encountering competition in by-product foundry coke from Birmingham companies, which are naming delivered prices lower than those of companies at Indianapolis, Portsmouth and Ashland. This condition especially applies in southern Ohio and in southern Indiana.

Foundry coke prices per net ton, delivered Cincinnati: By-products coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Steel plants in this district are accepting contract shipments at a normal rate and also are buying small tonnages. However, they are willing to pay only the lowest prices. Many items on railroad lists which were closed last week are reported to have brought slightly less than in March. There is a fair demand for foundry grades, but blast furnace items are weak.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.50 to 12.00

Britain Supplies More Than Half of World's Tin Plate Exports

WASHINGTON, April 17.—Estimating that six-tenths of the tin plate entering export markets of the world is of British origin, three-tenths of American manufacture and the remaining tenth predominantly of German origin, with small amounts from other countries, the iron and steel division of the Department of Commerce, has prepared detailed figures showing the export movement of this product during 1927, 1926 and 1925. Shipments from Great Britain during those years were 472,029 gross tons, 375,041 tons and 511,355 tons; from the United States, 253,890 tons; 250,782 tons and 161,383 tons, and from Germany, 29,116 tons; 19,513 tons and 10,033 tons, respectively.

In 1926, exports of tin plate from Great Britain were placed at 65.6 per cent of the total output of that country as against 66.7 per cent in 1925. The German exportation represented 19.8 per cent of production in 1926 and 11.2 per cent in 1925. American exportations were 14.1 per cent of the total product made in 1926 and 9.7 per cent in 1925. Production of tin plate in Great Britain was declared to be 571,200 tons in 1926 and 766,600 tons in 1925; in the United States, 1,782,306 tons and 1,657,794 tons, and in Germany, 89,637 tons and 98,788 tons, respectively. In France production for 1926 was fixed at 63,132 tons and in India for that year the estimate was 34,400 tons.

Buffalo

Steel Plant Operations Continue at About 85 Per Cent

BUFFALO, April 17.—Pig iron inquiry and sales have been very light, though the foundry melt is rising and shipping directions are good. Prices continue firm in the district at $17 for No. 2 plain, 1.75 to 2.25 per cent silicon, and $17.50 for malleable. The Eastern Malleable Iron Co. is seeking 1500 to 2500 tons of malleable. Most of the remaining inquiry is for carload lots.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations continue at about 85 per cent for most of the plants. Bars, shapes and plates are firm. Sheet business is good, but prices are weaker. On especially desirable tonnage, black and galvanized sheets have been shaded $2 a ton. Considerable pipe business was taken following the notice of intention to increase the price and before the new price actually went into effect. Jobbers generally specified up to the limit of their allotment. Bolt and nut business is good. A local maker is running double turn and three shifts in some instances. The Rochester Gas & Electric Co. will erect a gas holder requiring 800 tons of reinforcing bars and a considerable tonnage of structural steel.

Old Material.—A reported purchase of 1000 tons of heavy melting steel is said to have been made at $14.75. Mills are consuming large quantities of material. A local consumer expects soon to receive shipment of hydraulic bundles and flashings purchased in Detroit. Two boats are loaded, ready for the opening of navigation. This scrap, about 30,000 tons, was purchased from consumers.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	12.75 to 13.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.00 to 13.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.25 to 8.75
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.75 to 10.25
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Apr. 17	Apr. 16	Apr. 14	Apr. 13	Apr. 12	Apr. 11
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.12½	14.12½	14.12½	14.12½	14.12½	14.12½
Straits tin, spot, N. Y.	52.75	52.00	....	51.62½	51.62½	52,00
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.10	6.07½	6.07½	6.07½	6.07½	6.07½
Zinc, St. Louis	5.75	5.72½	5.72½	5.72½	5.72½	5.72½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, April 17.—Tin is the only market that is at all active, and a good business has been done at slightly lower prices. Very little buying of copper is noted, but quotations are firm. Lead and zinc are also inactive at practically unchanged prices.

Copper.—Another week of very light business is recorded in electrolytic copper. There is almost no domestic demand, but there has been fair buying for export. Leading producers continue to maintain firmly quotations at 14.25c., delivered in the Connecticut Valley. From one or two sources less than carload lots can be bought at slight concessions; the lowest level reported is 14.17½c., delivered. It is believed that domestic consumers must still buy considerable metal for May and that foreign buyers must contract for considerable copper for both April and May. Because of this some expect another buying movement in the near future. Copper statistics for March are not particularly impressive, showing only a slight increase in refined stocks but a loss in output at the mine as compared with February's figures. Lake copper is not particularly active, but is steady at 14.25c., delivered. A good business has been done.

Tin.—Sales for the week ended Saturday, April 14, were between 1400 and 1500 tons, consisting principally of transactions among dealers, although some was bought by consumers, who are showing more interest. It is believed that the latter have considerable to buy for May and June. It is stated that supplies are none too plentiful. There was some pressure to sell prompt tin last week by dealers, with the result that it fell into strong hands, rendering the price for that delivery very firm, with some possibility of a premium developing. The principal interest now is in May delivery and a feature is the heavy consumption. About 400 tons changed hands yesterday, Monday, and today the market was moderately active in spot and nearby, with spot Straits tin quoted at 52.75c., New York. Prices in London today were about the same as those of a week ago, with spot standard quoted at £234 17s. 6d., future standard at £235 10s. and spot Straits at £239 7s. 6d. The Singapore price today was £237 15s. Arrivals thus far this month have been 4295 tons, with 5585 tons reported afloat.

Lead.—Demand is very light, which is to be expected after the heavy buying in March and early April. A fair business is being done each day, however. The leading interest continues to quote 6.10c., New York, as its contract price, and in the outside market the quotation is very firm at 6.10c., St. Louis.

Zinc.—Conditions and prices have changed little during the week. There is no anxiety on the part of producers to sell, and consumers are well covered for their nearby requirements of prime Western zinc. Quotations have been practically unchanged at 5.72½c., St. Louis, or 6.07½c., New York. Sales of ore last week at Joplin were the largest in a long time at close to 21,000 tons, with production approximating 10,000 tons. The price is unchanged at $38 per ton. Statistics for March showed that stocks of zinc increased only 239 tons over February's. Production and deliveries, however, were larger than in the preceding month, and there were more retorts active at the end of March.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c. to 55.50c.
Tin, bar	57.00c. to 58.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	59.00c.
Tin, bar	61.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed. Quotations on lead full sheets and zinc sheets have not been revised since the reductions of Feb. 21 and March 26 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Zinc	8.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	16.00c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Antimony.—Fairly heavy sales have been made lately, and the market is stronger, with Chinese metal for all positions quoted at 10.25c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, April 17.—Sales of non-ferrous metals in this district are in small volume. Prices are steady except for tin and zinc. Buyers are showing little interest in the old metal market.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 53.50c.; lead, 6.15c.; zinc, 5.90c.; in less-than-carload lots, antimony, 11.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Two Drainage Projects Take 10,250 Tons—Awards Total 16,700 Tons

A SEWER project at Stickney, Ill., taking 5000 tons, and a drainage improvement job at Los Angeles, calling for 5250 tons, brought the week's awards to 16,700 tons, one of the highest figures of the year. New pending work amounting to 5100 tons included 1000 tons for a factory building at Chicago and 1220 tons for another drainage improvement job at Los Angeles. Awards follow:

Boston, 600 tons, loft building, to Concrete Steel Co.

Westchester County, N. Y., 100 tons, road work; from Christopher Brothers, general contractors, to Concrete Steel Co.

New York, 400 tons, section of subway; from Corson Construction Co., general contractor, to Truscon Steel Co.

Oak Park, Ill., 200 tons of rail steel bars, Fair Oakes Garage, to unnamed bidder.

Cleveland, 100 tons, laboratory for Cleveland Clinic, to Patterson Leitch Co.

Chicago, 650 tons, office building at Van Buren Street and West Jackson Boulevard, to Kalman Steel Co.

Chicago, 100 tons, addition to Michael Reese Hospital, to Kalman Steel Co.

Chicago, 1500 tons, addition to Soldier Field, to Olney J. Dean & Co.

Chicago, 500 tons, Woolworth Building, to unnamed bidder.

Chicago, 130 tons of rail steel bars, Edgewater Hospital, to Calumet Steel Co.

Stickney, Ill., 5000 tons, extension to a former sewer contract, to Olney J. Dean & Co.

Milwaukee, 300 tons, building for Sears, Roebuck & Co., to American System of Reinforcing.

St. Louis, 300 tons, apartment house at 3745 Lindell Boulevard, to Laclede Steel Co.

St. Louis, 100 tons, apartment house at Delmar Boulevard and Westgate Avenue, to Missouri Rolling Mills Corporation.

San Francisco, 212 tons, paving work near French Camp, to unnamed bidder.

Berkeley, Cal., 100 tons, warehouse on Shattuck Avenue, to Gunn, Carle & Co.

Seattle, 420 tons, warehouse for William Volker & Co., to Northwest Steel Rolling Mills.

Seattle, 240 tons, Transportation Building, to Northwest Steel Rolling Mills.

Seattle, 100 tons, Fairview School, to Pacific Coast Steel Co.

Pullman, Wash., 100 tons, home economics building for Washington State University, to Pacific Coast Steel Co.

Walla Walla, Wash., 100 tons, sewage disposal plant, to Truscon Steel Co.

Eugene, Ore., 100 tons, machine shops for Southern Pacific Co., to Mercer Steel Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Phoenix, Ariz., 263 tons, paving work between Globe and Safford, to unnamed bidder.

Los Angeles, 5257 tons, Drainage Improvement District No. 23 to unnamed bidder; general contract to Will F. Peck, Los Angeles.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

New Brunswick, N. J., 1700 tons, highway bridge over Raritan River; general contract to Parker & Graham, Inc., Paterson, N. J.

Crown Point, N. Y., 450 tons of bars and 200 tons of mesh for Lake Champlain bridge.

Rochester, N. Y., 800 tons, gas holder for Rochester Gas & Electric Co.

Chicago, 1000 tons, factory building, Scott Joy, architect.

Chicago, 100 tons, warehouse for R. C. Wieboldt & Co.

Chicago, 200 tons, garage, Rissman & Herschfield, architects.

Chicago, 400 tons, building for Nu-Art Engraving Co., Austin Co., general contractor.

Aurora, Ill., 350 tons, reservoir, Cope & Fisher, Decatur, Ill., low bidders on general contract.

Chicago, 250 tons, Austin High School, Harvey A. Hanson Construction Co., general contractor.

Chicago, 500 tons, Sholem Temple.

Los Angeles, 1220 tons, Drainage Improvement District No. 22, Torson Construction Co., Long Beach, low bidder.

RAILROAD EQUIPMENT

Southern Pacific Inquires for 550 Additional Freight Cars—200 Phosphate Cars Bought

THE Southern Pacific has doubled its original inquiry for 500 flat cars and 50 gondolas. Other fresh inquiries include 500 steel box car underframes for the Chicago, Rock Island & Pacific and 250 bodies for the St. Louis-San Francisco. The Atlantic Coast Line has purchased 200 phosphate cars. Inquiries for more than 100 passenger cars by several railroads also featured the week's business, details of which follow:

Atlantic Coast Line has ordered 200 phosphate cars from Tennesse Coal, Iron & Railroad Co.

New York, New Haven & Hartford is inquiring for 50 to 100 steel underframes for passenger cars.

Western Maryland has placed orders for miscellaneous plates and shapes for reconditioning approximately 500 hopper cars.

Northern Pacific has ordered 50 caboose car underframes from Pacific Car & Foundry Co.

Standard Oil Co. of New Jersey has ordered six 50-ton steel box cars from Pressed Steel Car Co.

Baltimore & Ohio will purchase 10 combination baggage and mail cars.

Chicago, South Shore & South Bend will buy 15 motor cars and five trailers.

Chicago, Rock Island & Pacific will purchase 500 box car underframes for cars to be built in its Armourdale, Kan., shops.

Chicago & North Western has ordered five motor car bodies from Pullman Car & Mfg. Corporation.

Union Pacific has ordered four motor car bodies from Pullman Car & Mfg. Corporation.

St. Louis-San Francisco will purchase 250 car bodies.

Cleveland, Cincinnati, Chicago & St. Louis will buy 40 passenger cars.

Southern Pacific will purchase 500 flat cars and 50 gondola cars, in addition to like numbers on which prices were recently asked. This railroad is also in the market for 25 coaches, five compartment coaches, 10 baggage and 6 baggage-postal cars.

FABRICATED STRUCTURAL STEEL

Highway Bridge at Charleston, S. C., Will Take 12,000 Tons—Awards of 35,450 Tons

WITH a highway bridge over the Cooper River at Charleston, S. C., which will take 12,000 tons and a bridge across Lake Champlain at Crown Point, N. Y., requiring 3000 tons, new projects brought out during the week totaled 40,800 tons. Awards amounted to 35,450 tons, the largest 6000 tons for a bridge approach at St. Louis and 5000 tons for a section of the subway in New York. Awards follow:

South Boston, 200 tons, New York, New Haven & Hartford Railroad freight shed, to New England Structural Co.

Boston, 114 tons, bridge, Brighton district, Boston & Albany Railroad, to Boston Bridge Works, Inc.

Ayer, Mass., 850 tons, transmission towers for New England Power Construction Co., to American Bridge Co.

Bangor & Aroostook Railroad, 315 tons, bridge at Monticello, Me., to an unnamed fabricator.

New York, 5000 tons, section 2, route 109, of subway; from Rodgers & Hagerty, Inc., general contractor, to American Bridge Co.

New York, 4400 tons, Governor Clinton Hotel, Seventh Avenue and Thirty-first Street, to Hedden Iron Construction Co.

New York, 1000 tons, Waterside Tie Station for New York Edison Co., to Levering & Garrigues Co.

Liverpool, N. Y., 200 tons, high school, to Union Structural Steel Co.

Harrison, N. J., 950 tons, building for Otis Elevator Co., to Shoemaker Bridge Co.

Central Railroad of New Jersey, 160 tons, bridge at Scranton, Pa., to American Bridge Co.

Philadelphia, 150 tons, building for Philadelphia Electric Co., to Belmont Iron Works.

Hot Springs, Va., 450 tons, hotel, to American Bridge Co.

Southern Railway, 730 tons; 550 tons for viaduct at Clouds, Tenn., and 180 tons for miscellaneous bridges, to Virginia Bridge & Iron Co.

Buffalo, 155 tons Junior beams for Dupont Rayon Co. building, to Jones & Laughlin Steel Corporation.

Lock Haven, Pa., 150 tons Junior beams for Lock Haven High School, to Jones & Laughlin Steel Corporation.

Butler, Pa., 3500 tons, mill extension, American Rolling Mill Co., to McClintic-Marshall Co.

New Castle, Pa., 110 tons, Weingartner Realty Co. garage, to American Bridge Co.

Cleveland, 1200 tons, two bridges for Cleveland Union Terminals Co., to Fort Pitt Bridge Works.

Cleveland, 112 tons, Fairview Village high school, to Wellman-Seaver-Morgan Co.

Dayton, Ohio, 400 tons, Dayton-Biltmore Hotel, to American Bridge Co.

Newark, Ohio, 160 tons, Midland Theater, to Massillon Bridge & Structural Co.

Middletown, Ohio, 400 tons, gas producer building and extension to open-hearth building American Rolling Mill Co., to Jones & Laughlin Steel Corporation.

New Orleans, 3100 tons, wharf sheds, to Lukens Steel Co.

Appleton, Wis., 350 tons, building for Consolidated Water Power & Paper Co., to Wisconsin Bridge & Iron Co.

Wisconsin Rapids, Wis., 550 tons, digester house and warehouse for Consolidated Water Power & Paper Co., to Wisconsin Bridge & Iron Co.

Marinette, Wis., 200 tons, interstate bridge, to Wisconsin Bridge & Iron Co.

Chicago, 1100 tons, building for Chicago Motor Club, to Gage Structural Steel Co., local; previously reported to American Bridge Co.

Chicago, 100 tons, power plant for Chicago, Burlington & Quincy Railroad, to Midland Structural Steel Co., local.

Chicago, 275 tons, addition to Sheridan Trust & Savings Bank Building, to Worden-Allen Co.

Davenport, Iowa, 500 tons, Rock Island Railroad bridge, to Fort Pitt Bridge Works.

Des Moines, Iowa, 700 tons, court building, to Des Moines Steel Co.

St. Louis, 6000 tons, southern approach to Free Bridge, to American Bridge Co.

Kansas City, Mo., 1400 tons, building for Sheffield Steel Corporation, to Kansas City Structural Steel Co.

Oakland, Cal., 250 tons, hangars for Port Commission, to Moore Dry Dock Co.

Redwood City, Cal., 125 tons, theater, to Golden Gate Iron Works.

Pittsburg, Cal., 376 tons, factory for Johns-Manville Co., to Dyer Brothers.

Pittsburgh, 511 tons, National Biscuit Co. building, to Fort Pitt Bridge Works.

Los Angeles, 150 tons, structural steel for city work, to McClintic-Marshall Co.

San Diego, Cal., 165 tons, cotton warehouse, to National Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Boston, 400 tons, apartment house on Newbury Street.

Boston, 150 tons, Thompson Spa building on Summer Street.

Middletown, N. H., 227 tons, two bridges.

State of New Hampshire, 145 tons, bridges at Bethlehem, Lisbon and Wentworth.

Maine Central Railroad, 325 tons, bridges.

Crown Point, N. Y., 3000 tons, bridge over Lake Champlain from Crown Point to Chimney Point, Vt.; bids early in May.

State of New York, 200 tons, highway bridge.

Jamaica, N. Y., 400 tons, building for Cox Baking Co.

Rochester, N. Y., 1000 tons, Benjamin Franklin High School, to F. L. Heughes & Co.

State of New Jersey, 160 tons, highway bridge near Flemington.

West End, N. J., 900 tons, H. T. Parson residence; bids in.

Lehigh Valley Railroad, 950 tons, bridge at Newark, N. J.

Philadelphia 1400 tons, apartment building on Spruce Street; bids in.

Philadelphia, 1000 tons, building for Jefferson Medical College; bids in.

Sunbury, Pa., 1600 tons, bridge over Susquehanna River.

Baltimore & Ohio Railroad, 1900 tons, bridges.

Charleston, W. Va., 1800 tons, Kanawha Valley Bank; bids in.

Charleston, S. C., 12,000 tons, Cooper River bridge; bids in.

Newark, Del., 153 tons, engineering building for University of Delaware, general contractor Northeast Construction Co.

Philadelphia, 900 tons, apartment building at Fifteenth and Spruce Streets, general contractor Foundation Co.

Cleveland, 1200 tons, Lake Shore Hotel.

Cleveland, 350 tons, Y. M. C. A. technical schools.

Madison, Wis., 135 tons, overhead bridge on Janesville-Stoughton-Madison State trunk highway; bids close April 25.

State of Illinois, 900 tons, highway bridges; A. C. Wood, Rockford, Ill., low bidder on five bridges; Hansell-Elcock, Chicago, low bidder on one bridge, and Continental Bridge Co., Chicago, low bidder on two bridges.

Chicago, 2000 tons, reconstruction of Fine Arts Building, Jackson Park; Graham, Anderson, Probst & White, architects.

Chicago, 700 tons, building for Crane Co.; Graham, Anderson, Probst & White, architects.

Chicago, 1700 tons, bridge for Baltimore & Ohio.

Minneapolis, 1100 tons, office building for Northern States Power Co.

St. Joseph, Mo., 2100 tons, bridge across Missouri River.

Denver, Colo., 445 tons, siphons for Kittitas Canal project, Yakima, Wash.; Pittsburgh-Des Moines Steel Co., low bidder.

Shreveport, La., 300 tons, overhead crossing for Kansas City Southern Railroad.

New Orleans, 1000 tons, coffee sheds.

McGill, Nev., 600 tons, building at Kimberly mine.

Monterey, Mex., 370 tons, building for American Smelting & Refining Co.

Sacramento, Cal., 600 tons, bridge over Smith River, Del Norte County; Park Schramm Co., Portland, low bidder on general contract.

San Francisco, 100 tons, addition to store, 1041 Market Street; bids being taken.

Riverside, Cal., 300 tons, Riverside Drive crossing over Pacific Electric Co. tracks; bids being taken by Pacific Electric Co., Los Angeles.

Los Angeles, 685 tons, I beams for city; bids April 23.

Chehalis, Wash., 100 tons, bridge over Chehalis River for Grays Harbor County; Car Bjork, low bidder.

Olympia, Wash., 220 tons, bridge over McKenzie River near Coburg; bids April 20.

Kettle Falls, Wash., 1100 tons, bridge.

The Bank of Pittsburgh has been appointed receiver of the Consolidated Coke Co., Pittsburgh, upon petition of the National Transportation Co., to which the Coke company is indebted in the sum of $16,438. The Marine Trust Co., Buffalo, has entered suit against the company for payment of a note for $9,000. Assets of the company are given as $2,000,000, subject to mortgage indebtedness of $586,000, while accounts payable amount to $211,266. The receivership, it is believed, will obviate the possibility of forced liquidation of the company.

PERSONAL

H. D. Savage, for many years vice-president of the Combustion Engineering Corporation, 200 Madison Avenue, New York, has been elected president of the company, succeeding Joseph V. Santry, who has resigned. George T. Ladd, who has been prominently identified with the Combustion company and other subsidiaries of the International Combustion Engineering Corporation, has been elected vice-chairman of the board of the Combustion Engineering Corporation. Before entering the pulverized fuel field Mr. Savage was head of the Ashland Fire Brick Co., Ashland, Ky., and participated in the organization of and served as first president of the Refractory Manufacturers' Association. In 1914 he became president of the American Arch Co., and two years later, went with the Locomotive Pulverized Fuel Co. as vice-president. When the Combustion Engineering Corporation purchased the Lopulco Pulverized Fuel Systems in 1920, Mr. Savage became associated with the former company as directing head of the pulverized fuel division. He holds offices in a number of the other subsidiaries of the International company and is a member of numerous technical societies and clubs. Mr. Ladd, who is president of the Ladd Water Tube Boiler Co. and the Heine Boiler Co., has for many years been identified with the manufacture and installation of steam boilers.

H. D. SAVAGE

G. T. LADD

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James A. Farrell, president of the United States Steel Corporation, will sail Saturday on the Conte Grande for a stay of several weeks in Europe.

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H. B. Hazerodt has resigned as manager of the Detroit branch of the Black & Decker Mfg. Co., Towson, Md., and has been succeeded by J. H. Walker, who has been in the company's Detroit sales organization for the last five years. The company has just removed its offices and showroom in that city to 11501 Woodward Avenue. H. L. Balke is now associated with the company's Kansas City, Mo., branch, succeeding S. D. Shawgo in the territory around Omaha, Neb. G. F. Parr has taken the place of J. H. Hutton in the Buffalo territory and G. N. McCarthy has succeeded H. B. Austin in the same office, Mr. Austin having been transferred to Chicago. J. A. Murray is now associated with the Baltimore office, succeeding Curtiss Watts.

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J. E. Mullen, formerly assistant sales manager of the R. D. Nuttall Co., Pittsburgh, has been placed in charge of the company's commercial activities which are now being handled through the Westinghouse Electric & Mfg. Co., of which the Nuttall company is a subsidiary. Mr. Mullen's headquarters will be at the Nuttall plant, McCandless Avenue and Butler Street, Pittsburgh.

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M. S. Sternberg has been appointed general superintendent of the Hubbard Steel Foundry Co., East Chicago, Ind., succeeding the late Robert W. Freeland. H. A. Forsberg, formerly production engineer for that company, has been made assistant general superintendent.

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William C. Hays, formerly vice-president and a director of J. K. Larkin & Co., Inc., New York, has formed the Hays Steel & Wire Corporation, with offices and warehouse at Metropolitan and Woodward Avenues, Brooklyn. The company will distribute general steel products, including bars, shapes, bands, plates, nails, wire, sheets and bolts.

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Irving C. Bolton, treasurer Warner & Swasey Co., Cleveland, has been elected a director of the Cleveland Chamber of Commerce. Among the other new directors are L. R. Scafe, treasurer and general manager Fisher Body Ohio Corporation, and A. S. Rodgers, president White Sewing Machine Corporation.

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Walter E. Foster, who has been in the Bridgeport, Conn., office of the Reading Steel Casting Co., has been transferred to the Chicago office and made sales manager of the company.

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Edward P. Geary has been appointed district sales manager of a sales office recently opened at 375 Ellicott Square, Buffalo, by the Colonial Steel Co., Pittsburgh. L. O. Burrell and J. S. Smith are also associated with the office, the territory of which includes Erie, Pa., western New York State and Ontario, Canada.

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E. H. Gartrell was elected president and general manager of the Ashland Fire Brick Co., Ashland, Ky., at a recent meeting of directors. John Russell was named vice-president and E. M. Weinfurtner, secretary and treasurer.

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A. M. Branum, formerly in the Chicago office of the Jones & Laughlin Steel Corporation and for a time with Joseph T. Ryerson & Son, Inc., Chicago, has joined the Chicago sales organization of the Bethlehem Steel Co.

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Frederick A. Westphal, since 1922 assistant superintendent of the rod and wire department at the Aliquippa works, Jones & Laughlin Steel Corporation, Pittsburgh, resigned March 15 and has been appointed superintendent of the wire department now under construction by the Sheffield Steel Corporation, Kansas City, Mo. He was graduated from the United States Naval Academy in 1916 and soon became associated with the American Steel & Wire Co., first as foreman at its Worcester, Mass., plant and later as wire rope engineer in the New York office. With the exception of two years as a field artillery officer with the First Division, American Expeditionary Forces, he remained with the Steel & Wire company until his association with the Jones & Laughlin company in 1922.

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Arthur R. Adelberg, recently district sales manager at Philadelphia for the Cyclops Steel Co., Titusville, Pa., and the Universal Steel Co., Bridgeville, Pa., has resigned to become associated with the Duraloy Co., Pittsburgh. He will specialize in the sale of chrome iron and other noncorrosive and heat resisting castings and rolled products, with headquarters at the company's Eastern sales offices, 136 Liberty Street, New York.

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A. N. Bakhtiarov, chief engineer of the Yurt, or Soviet Southern Ore Trust, accompanied by other officials of the organization, has arrived in the United States to make a three months' study of American production methods and mining equipment.

Nelson G. Craig has been appointed district sales manager at Philadelphia, with offices at 1420 Walnut Street, of the Oliver Iron & Steel Corporation, Pittsburgh. He was formerly associated with the Rumsey Electric Co., Philadelphia.

Charles T. Scott, formerly associated with Briggs & Turivas, Inc., and the Republic Rolling Mill Corporation, Chicago, has organized the Scott Steel Co., 110 South Dearborn Street, Chicago, to deal in iron and steel.

Prof. Franz A. Kartak, since 1921 head of the department of electrical engineering, Marquette University, Milwaukee, has been appointed dean of the college of engineering. He succeeds Frank C. French, dean since 1924, who is returning to his former home at Lake City, Colo. Professor Kartak received his bachelor of science degree in electrical engineering at the University of Wisconsin in 1909, and the degree of electrical engineer at Wisconsin in 1911. He went to Marquette from the School of Engineering of Milwaukee. Prof. William D. Bliss, head of the Marquette mechanical engineering department, has resigned to accept a similar position at Texas Agricultural and Mechanical College, College Station, Tex. Professor Bliss became associated with Marquette University in 1914 and will remain until the close of the school year, assuming his new duties Sept. 1.

W. H. Bowden, Maytag Co., Newton, Iowa, spoke on April 16 at a meeting of the Quad-City Foundrymen's Association at the LeClaire Hotel, Moline, Ill.

Carl F. Scott, manager of building equipment sales, General Electric Co., Schenectady, N. Y., has been made assistant sales manager of the Gurney Elevator Co., New York. He is a graduate of Haverford College, Haverford, Pa., and has been with the General Electric Co. since 1908.

L. G. Bradley, well known in the machinery business in the Detroit district, has just returned from a trip to England as the American representative for the purchase of machinery of Alfred Herbert, Ltd., Coventry, England, and established offices in the Boyer Building, Detroit.

Thomas J. Bray, Jr., has been appointed assistant general superintendent Republic Iron & Steel Co., Youngstown, Ohio, succeeding Caleb Davies, Jr., who resigned recently to become vice-president American Tar Products Co., Pittsburgh.

T. J. Bray Resigns Republic Presidency

THOMAS J. BRAY

Thomas J. Bray, for 17 years president of the Republic Iron & Steel Co., Youngstown, has announced his resignation from that office and retirement from active business, effective May 1. On that date he will be 61 years of age and will have completed 41 years of active association with the steel industry. During his identification with the Republic company it has expanded from a producer of rolled iron products to one of the country's largest independent steel producers and since he has been chief executive, the company has built two blast furnaces, the entire open-hearth plant, the by-product coke ovens and the tube works.

Mr. Bray was born at Pittsburgh and attended the public schools in that city. His first work was as an apprentice in pattern making with the Lewis Foundry & Machine Co., Pittsburgh, at which he was engaged from 1883 until 1886. During the next four years he became chief draftsman of this company and was also identified with the Riverside Iron Works, Benwood, W. Va., later the Riverside works of the National Tube Co., a plant designed and built by his father and of which the elder Mr. Bray was for a time superintendent.

In 1890 the younger Mr. Bray left the Lewis company to enter Lehigh University, and four years later was graduated from that institution with the degree of mechanical engineer. Upon leaving college he went with the Ohio Steel Co., Youngstown, now the Ohio works of the Carnegie Steel Co., but severed that connection a few years later to become associated with McGill & Co., Pittsburgh. He was secretary and mechanical engineer of that company in 1901 when it became a part of the United Engineering & Foundry Co. and remained with the latter company for the next five years as chief engineer.

Upon going with the Republic company in 1906 he was assistant to the president and a short time later became vice-president in charge of operations. He was elected president of the company in April, 1911.

Mr. Bray is a member of the American Iron and Steel Institute, the (British) Iron and Steel Institute and the American Society of Mechanical Engineers. He is a director of the Dollar Savings & Trust Co., Youngstown, and of a number of other financial and industrial organizations.

Honor Edgar C. Felton

Edgar C. Felton was tendered a testimonial dinner at the University Club in New York, April 14, by fellow workers in the one-time Pennsylvania Steel Co., of which he was president when it became a part of the Bethlehem Steel Co. The dinner was in commemoration of his arriving at the age of 70 years and proved not only a personal tribute to Mr. Felton but an indication of the notable esprit de corps of the organization of which Mr. Felton was the head.

John C. Jay, who was vice-president and general manager of sales of the company when it was merged into the Bethlehem company, organized the dinner, which was attended by no less than 80 men, some of whom had come a considerable distance. R. W. Gillispie was toastmaster, and among those who spoke were W. H. Donner, now head of the Donner Steel Co.; Frederick W. Wood. formerly president of the Maryland Steel Co., which was a part of the Pennsylvania Steel property; J. V. W. Reynders, now a consulting engineer in New York; Frank A. Robbins, Jr., now general superintendent of the Steelton works of the Bethlehem Steel Co., as the Pennsylvania Steel plant is now known, and Charles S. Clark, who represented the company in Boston for many years. Among those present also were John B. Downes, formerly superintendent of the Steelton rail mill and now 80 years of age, and F. W. Cram, ex-president of the Bangor & Aroostook Railroad. The messages received included a cablegram from Thomas Blagden, Jr., from Sydney, Australia, where he represents the White Motor Co.

A huge birthday cake with 70 candles, carried in by four chefs, was a feature of the dinner. Mr. Felton was presented with a silver box in commemoration of the event.

The V. E. Montgomery Co., 408 First National Bank Building, Cincinnati, pig iron and coke dealer, has been appointed exclusive sales agent in the Central, North Central and Western States for the foundry and furnace beehive coke manufactured by the Wise Coal & Coke Co., Dorchester Junction, Va.

OBITUARY

Harmon W. Hendricks, president of Hendricks Brothers, Inc., 49 Cliff Street, New York, who died at his home in that city on March 31, had been identified with the manufacture of copper and sale of non-ferrous metals for more than 50 years. He was in his eighty-third year and was the last of three brothers to be associated with the firm which had conducted business in this country for 125 years. The company operates copper rolling mills at Soho, N. J., and also the Belleville Copper Rolling Mills, Belleville, N. J., which have been in continuous operation since 1813. The firm also conducts a jobbing business in non-ferrous products of all kinds.

Robert J. Hanna, treasurer Weirton Steel Co., Weirton, W. Va., died at the Homeopathic Hospital, Pittsburgh, April 9, following an operation. He was 45 years of age and had been identified with the Weirton company for nine years.

Robert C. Garrison, superintendent of the Salem, Ohio, works of the American Steel & Wire Co., died April 11, aged 52 years. He had been in poor health for several months. Mr. Garrison's first employment with the Steel & Wire company was as a timekeeper in one of its Cleveland plants. In 1917, after various promotions, he was made assistant superintendent of the Consolidated works, Cleveland, and in the following year, assistant superintendent of the H. P. Works, Cleveland. He was appointed superintendent of the Salem plant in 1924.

A. L. Broomall, manager renewal parts engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, died at his home in Wilkinsburg, Pa., April 10. He was 44 years old, and had been identified with the Westinghouse company since his graduation from Lehigh University in 1906.

George J. Smiley, sales manager in the Middle West for the Remington Arms Co., Inc., New York, died on April 12 at the Battle Creek Sanitarium, Battle Creek, Mich., following a week's illness. He was a brother of John B. Smiley, recently president of the Remington company.

William W. Sharp, district sales manager at Akron, Ohio, for the Pierce, Butler & Pierce Mfg. Corporation, New York, died on April 9 at the Cleveland Clinic Hospital, Cleveland, following an illness of six months. He was 39 years of age and was president and general manager of the Mill & Mine Supply Co. and the Akron Warehouse Co., both of Akron, until those companies were absorbed by the Pierce, Butler & Pierce organization in August, 1926.

John Penn Brock, general manager of the Lebanon, Pa., plant of the Bethlehem Steel Co., died suddenly in Rome, Italy, on April 9, aged 48 years. He entered the service of the Pennsylvania Steel Co. in 1903 and filled various positions at Steelton. On Feb. 1, 1907, he went with the American Iron & Steel Mfg. Co. at Lebanon, and became its vice-president and general manager. Upon the acquisition of the company in 1917 by the Bethlehem Steel Co., he was appointed to the position of general manager of this and all the steel producing properties in Lebanon and Cornwall which now constitute the Lebanon plant. He was graduated from Yale University in 1900.

Elmer E. Kiger, for some years steam engineer of the Lackawanna plant of the Bethlehem Steel Co., died suddenly April 5 at Hamburg, N. Y. He was graduated from Cornell University in 1898.

Henry W. King, for years prominently identified with the structural steel fabricating industry in Cleveland as president of the King Bridge Co., which discontinued fabricating work a few years ago, died at his home in Kirtland Hills Village, a Cleveland suburb, April 14, aged 65 years.

A. W. Grant, Jr., for the last 12 years associated with the Koppers Co., Pittsburgh, died on April 5 at the Sewickley Valley Hospital, aged 41 years. He was graduated from Virginia Polytechnic Institute in 1907 and received his mechanical engineering degree from Cornell University in 1909. For the next two years he was engaged in steam engineering work for the Baldwin Locomotive Works, Philadelphia, and eastern steel companies. Before going with the Koppers Co. he was associated for five years with the United Gas Improvement Co., Philadelphia.

Otis Williams, for some years associated with the Clark Machine Co., St. Johnsville, N. Y., died recently at St. Petersburg, Fla., aged 68 years. Before going with the Clark company he had been engaged in the manufacture of agricultural machinery.

R. J. Davis, formerly eastern operating manager of the American Bridge Co., with office in Philadelphia, died April 9, at his home in that city. He was 59 years of age and had been with the American Bridge Co. from 1902 until 1923, when he resigned to become manager of the structural steel shop of the New York Shipbuilding Corporation, Camden, N. J. He continued in that position under the American Brown Boveri Electric Corporation, the new owner of the shipyard, until the structural steel branch of the business was discontinued. For the past year Mr. Davis had been in failing health and had not been active.

Conference on Warehouse Distribution

(*Concluded from page* 1089)

pipe; copper sheets; electrical equipment; fence wire, poultry netting and reinforcing mesh; files; fire extinguishers; granite ware; hacksaw blades and saws, hand and crosscut saws; hoes and handled implements; horse nails; horse shoes; hose, rubber; insulating and plaster board; lawn mowers; lead pipe; leather belting; machine tools; manila rope; milling cutters; paint, linseed oil and white lead; pipe and tubing (iron and steel); plow goods (fitted plow lays, cultivator shovels, etc.); rubber belting, sandpaper, emery cloth and emery wheels; set and cap screws; shovels; silverware; small rivets; steel sheets, including galvanized and roofing products; stove bolts; taps and dies; tin plate; tools—mechanics' and machinists'; tool steel; twist drills and reamers; valves and fittings; vises; washers; wheel goods; window glass and glassware; wire fence; wire nails; wire rope; wire screen; wood and machine screws.

"The discussion will not be limited to the distribution plan of the bolt, nut and rivet industry, but will be open for any constructive suggestions pertaining to the selling and distribution problem.

"If the meeting is called and proves successful, consideration should be given by each industry to the appointment of one man as its representative on a national committee to carry on the work with the jobbers' chairmen.

"Should such a committee of manufacturers be appointed, there would be a condition whereby 34 jobbing executives and approximately 35 manufacturing executives would represent the leading industrial and jobbing interests of the United States, covering the hardware and mill supply lines.

"Should this proposal meet with the universal approval of our manufacturing interests, this meeting would bring together the most representative gathering of executives in the history of American business, and would create an opportunity to put squarely before the country as a whole the great importance to all classes, particularly to labor, of a movement having for its purpose the stabilization of industry."

Machinery Markets and News of the Works

DEMAND CONTINUES FAIR

Slight Recessions from March Volume in Some Quarters

Inquiries Are Still Numerous, However, and Outlook at Least for Remainder of This Month Is Good

UNFILLED orders of machine tool builders are in large volume, and the rate at which business is being received this month indicates that many of the machine tool plants will be working at present capacity until well toward the end of the first half of the year. While in certain sections of the country and in certain lines of tools there have been slight recessions in buying activity this month compared with March, the average seems to be holding up well.

The automotive industry is believed to have done the major part of its spring buying and no further activity of note in that field is expected before fall. Railroad buying is disappointingly small, and the principal signs of encouragement are renewed inquiries from the New York Central, which has bought very little this year, and the prospect that the Santa Fe will close next week on a list of considerable size.

In the East, inquiries have been more numerous and sales have been holding fairly close to the April level. The General Electric Co. has issued inquiries for 25 or 30 tools, and requests for prices on single machines come from all sections of the industrial field. New York sales offices are figuring on about 8 or 10 tools wanted by Dwight P. Robinson & Co. for export.

Tractor plants in the Middle West are among those whose machine tool needs figure prominently in the Chicago market. Fresh inquiry has grown in that territory, and while sales for the first half of April fell below those of the last half of March, the outlook is sufficiently promising to cause expectations of a larger volume during the remainder of the month.

The Cleveland and Cincinnati districts are experiencing a slight recession in buying, partly because of the fact that the automotive industry has satisfied its needs for the present. The Kelsey Wheel Co., Detroit, has bought a number of tools, including drilling machines and lathes. A Cleveland turret lathe manufacturer has sold seven machines for export.

The National Machine Tool Builders' Association reports that March business was better for its members than that of January. The March figures show an upward trend for the industry for the sixth consecutive month. That month's sales were again higher than in any month since May, 1920, and were at about the level reached in the summer of 1919.

New York

NEW YORK, April 17.

CONSIDERABLE inquiry for machine tools has come out in the past week, including 25 or 30 tools wanted by the General Electric Co. and a number for the New York Central Railroad. Scattered inquiry for single machines also is fairly large. Sales for the first half of April have run a little behind the same number of days in March, but the interest of buyers is still so keen that sellers entertain hope that the month will close with a total volume equal to that of last month. Dwight P. Robinson & Co., New York, are inquiring for eight or ten tools for export.

Among purchases by railroads in past week were the following: Boston & Maine, Nos. 10 and 20 Stanley drills; Chicago, Rock Island & Pacific, 36-in. Aurora drill; New York Central Railroad, two Ransom grinders and 24-in. Aurora drill. Cornell University has purchased a No. 111 Ransom drill.

Included in purchases by industrial users of tools was a list of second-hand machines by a Pittsburgh steel company. This list consisted of a 21-in. x 22-ft. LeBlond lathe, 30-in. x 45-ft. Pond lathe, 6-ft. Ridgeway radial drill, 24-in. Safety Emery Wheel Co. grinder, and 4 5/8-in. Bement horizontal boring mill. A company in Pennsylvania has purchased an extra heavy-duty, end-driven axle lathe; a Chicago manufacturer, 1500-lb. single frame Niles steam hammer; an Indiana company, 14-in. Pratt & Whitney vertical surface grinder; a Chicago manufacturer, duplex hand centering machine; a foundry in Chicago, rebuilt 6 x 14-in. Pratt & Whitney thread milling machine; a Chicago forging maker, two No. 3 Pratt & Whitney die sinkers; a Baden company, 13 x 30-in. Pratt & Whitney lathe; a Cincinnati machine tool builder, 13 x 30-in. and 16 x 60-in. Pratt & Whitney lathes; an Eastern electric manufacturer, 12-in. vertical shaper; a Bridgeport, Conn., company two No. 11 multiple spindle drills; a Philadelphia electric company, 13 x 36-in. lathe; a New York company, 20-in. Niles-Acme shaper for shipment to Louisville, Ky.; a Pittsburgh company, Williams 2-in. single-spindle bolt machine for installation in West Virginia.

Newburgh Public Service Corporation, Newburgh, N. Y., is said to be planning to rebuild motor bus service, repair and garage building, destroyed by fire March 31, with loss in excess of $125,000.

W. C. Winters, 2772 Fulton Street, Brooklyn, architect, has plans for a one-story automobile service, repair and garage building, 50 x 300 ft., at Flushing, L. I., to cost about $100,000 with equipment.

Board of Education, Glen Cove, L. I., plans installation of manual training equipment in new high school to cost close to $1,000,000. William J. Beardsley, 49 Market Street, Poughkeepsie, N. Y., is architect.

R. H. Macy & Co., Broadway and Thirty-fourth Street, New York, has plans for a two-story automobile service, repair and garage building for company trucks and cars, to cost more than $110,000 with equipment. R. D. Kohn, 56 West Forty-fifth Street, is architect.

New Jersey Zinc Co., 160 Front Street, New York, has work under way on an addition to its plant at Aquashicola, near Palmerton, Pa., for metal slab production, to cost more than $100,000 with equipment.

American Gas & Electric Co., 30 Church Street, New York, is arranging an appropriation of about $46,000,000 for expansion and betterments in light and power utilities in different parts of the country. Approximately $17,000,000 will be used for completion of addition to steam-operated generating plant at Philo, Ohio, operated by Ohio Power Co., Canton, Ohio, an affiliated organization; a fund of $12,000,000 will be used for new steam-electric generating plant near Pennsville, N. J., for Atlantic City Electric Co., Atlantic City, N. J., another subsidiary, and for service at Wilmington, Del. About $7,000,000 will be expended for steel tower and other transmission lines, including 132,000-volt line from Philo to Fostoria, Ohio; and $4,000,000 will be employed for new power substations and distributing facilities in different localities.

Hinsdale Iron Works, Inc., 1058-64 Rockaway Avenue, Brooklyn, has taken out a permit for a one-story addition, 60 x 100 ft., to cost close to $20,000 with equipment. C. A. Levitt, 2995 Bedford Avenue, is architect.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has completed plans for two one-story equipment storage and distributing buildings, 35 x 136 ft., with repair facilities, to cost about $55,000. Thomas E. Murray, Inc., 55 Duane Street, is engineer.

Board of Education, Great Neck, L. I., plans installation of manual training equipment in new junior and senior high school to cost $750,000, for which bids have been asked on general contract. Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., are architects.

Beam-O-Lite Sign Co., New York, has leased space in building at 135-9 West Twenty-sixth Street for manufacture of display signs. Initial production will be given over largely to assembling.

General Electric Supply Corporation, 190 Sixth Avenue, New York, a subsidiary of General Electric Co., Schenectady, has leased seven-story building at 585-91 Abingdon Square, totaling 125,000 sq. ft. floor space, for new equipment storage and distributing plant. Present works will be removed to new location.

Ovens, power equipment, conveying and other machinery will be installed in two-story plant to be erected by Cox Baking Co., Van Wyck Avenue, Jamaica, L. I., 50 x 300 ft., to cost about $100,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Calumet & Arizona Mining Co., New Cornelia Copper Co., and Phelps Dodge Corporation, 99 John Street, New York, have completed agreement to acquire an interest in Nichols Copper Co., Laurel Hill, L. I., and will use electrolytic refining plant of that company for a large portion of combined output from mines. Nichols company, in association with other interests noted, plans construction of new copper refinery in Texas, or other southwestern locality, to cost close to $3,500,000 with machinery. Site is being selected.

John Nordmeyer, 260-2 Tenth Avenue, Paterson, N. J., has plans for a one-story machine shop to cost about $18,000 with equipment.

Roepke Pan Machine Corporation, 161 Ogden Street, Newark, manufacturer of machinery, plans new one-story plant, 125 x 125 ft., at Newton Falls, Ohio, and will remove present plant to new location. Temporary quarters will be occupied at Newton Falls pending completion of new plant.

Forstner Chain Corporation, 646 Nye Avenue, Irvington, N. J., manufacturer of watch chains, metal novelties, etc., has awarded general contract to W. J. MacEvoy Construction Co., 85 Academy Street, Newark, for a three-story addition, 60 x 120 ft., to cost about $75,000 with equipment. Edward C. Epple, 9 Clinton Street, Newark, is architect.

Queens Borough Gas & Electric Co., Rockaway district, Queens Borough, New York, has arranged for bond issue of $4,000,000, a portion of proceeds to be used for extensions and improvements, including transmission line and power station construction.

Doehler Die Casting Co., Brooklyn, has removed its executive offices to 386 Fourth Avenue, New York.

Radworth Mfg. Corporation, 302 Park Avenue, Brooklyn, has been formed to make bell ringing transformers, conduit fittings and porcelain bushings. Company has its own shop and machinery and equipment have been purchased.

Doerfler-Hofstetter Mfg. Co., Inc., manufacturer of dies and tools, has started operations in its plant at 24 Scott Street, Newark.

St. Louis

St. Louis, April 16.

REVISED plans are being drawn by Imperial Casket Co., 1415 St. Louis Avenue, Kansas City, Mo., for a two-story plant to cost $45,000 with equipment. W. J. Koch, Mutual Building, is architect.

Chevrolet Motor Co., Flint, Mich., has acquired about 30 acres at Kansas City, Mo., and is reported planning a new assembling plant to cost more than $350,000 with equipment.

Usona Mfg. Co., 3510 Chouteau Avenue, St. Louis, manufacturer of architectural and ornamental iron products, has awarded general contract to Gillespie & Daly, International Life Building, for a one-story addition, 75 x 80 ft., to cost approximately $24,000 with equipment.

Atlas Tool & Mfg. Co., 5707 Manchester Avenue, St. Louis, is said to be planning a one-story addition, to cost close to $40,000 with equipment.

Arkansas Portland Cement Co., affiliated with Oklahoma Portland Cement Co., Ada, Okla., is arranging for early erection of new mill near Shaal, Ark., to cost in excess of $1,000,000 with machinery.

Associated Motor Terminals Co., St. Louis, is contemplating erection of a six-story service, repair and garage building, 88 x 130 ft., to cost close to $300,000 with equipment.

Colonial Steel Co., 928 Main Street, St. Louis, has awarded general contract to W. C. Harting Construction Co., International Life Building, for a one-story storage and distributing plant, 50 x 85 ft., to cost about $28,000 with equipment.

Benson Motor Co., Community Building, North Kansas City, Mo., has work under way on a one-story and basement service and repair building, to cost close to $50,000 with equipment. John C. Lawrence, Commercial Building, is architect.

U. & I. Boiler & Machine Works, Inc., Tonkawa, Okla., recently organized by G. W. Larabee, Tonkawa, and associates, plans early operation of a local plant, including boiler and tank shop. J. W. Duncan, Tonkawa, is also interested in company.

Cities Service Co., Wichita, Kan., has authorized immediate construction of pipe line from Wichita to Kansas City, Mo., for natural gas service, about 130 miles, to cost in excess of $400,000. Headquarters are at 60 Wall Street, New York.

W. H. Owen Motor Co., 1618 Tower Grove Avenue, St. Louis, is completing plans for a one-story service, repair and garage building, 85 x 200 ft., to cost about $70,000 with equipment. Nolte & Nauman, Fullerton Building, are architects.

Ford Motor Co., Detroit, is planning a two-story factory branch and distributing plant, 100 x 140 ft., at Apache, Okla., to cost about $120,000 with equipment.

City Council, Perryville, Mo., plans installation of centrifugal pumping machinery, 75,000-gal. elevated steel tank and auxiliary equipment, in connection with municipal waterworks. A bond issue of $125,000 is being arranged. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has work under way on addition to steam-operated power plant at Harrah, Okla., to increase capacity by 30,000 kw.

New England

Boston, April 16.

THE machine tool market continues dull. The largest order closed the past week was for a 250-lb. pneumatic hammer to a Utica, N. Y., shop, and another hammer of the same type to an Indiana firm. Dealers continue to receive inquiries, mostly for single machines and small ones, but orders are slow in being placed. Where expensive tools have been under negotiation prospects for buying are apparently as far away as they were one or more months ago. There is still need for new metal working equipment throughout New England, but replacement programs are not being actively put forth. In contrast with dealers, the majority of New England machine tool makers are fairly busy with orders received from other sections of the country.

Small tools are still selling slowly, users ordering only in small lots.

B. L. and F. S. Ashmun, Bridgeport, Conn., have acquired Armstrong Mfg. Co., that city, manufacturer of chucks and dies.

Carl J. Malmfeldt, 15 Lewis Street, Hartford, Conn., architect, will close bids next week on a two-story and basement trade school for that city, 76 x 256 ft., with two wings, 41 x 51 ft.

W. N. Craw Novelty Co., Norwalk, Conn., toys and novelties, has reincorporated with a capital stock of $250,000, and will add equipment for manufacture of new products.

Keeler & Lang, Inc., recently organized, manufacturer of paints, varnishes and oils, has purchased Matthews & Willard plant, Scovill Mfg. Co., Waterbury, Conn., and will install motors, paint mixing, grinding, conveying and other equipment.

Bassick Co., Newark, N. J., a subsidiary of Stewart-Warner Co., Chicago, has purchased plant of Columbia Phonograph Co., Bridgeport, Conn., and will consolidate manufacture of automobile accessories at latter plant.

City Council, Springfield, Mass., has authorized an appropriation of $234,000 for new pumping plant for sewage system, and will soon call for bids for equipment. City engineer is in charge.

The Crane Market

INQUIRY for locomotive cranes continues good, but the overhead crane field is rather inactive. The Amtorg Trading Corporation is reported to have closed on both its lists of cranes for Russia. Still pending is the list of cranes and steam shovels inquired for by Dwight P. Robinson & Co., New York, for use in Argentina and the five 10-ton locomotive cranes for the Boston & Maine Railroad. New inquiry for overhead cranes is light, but there is a substantial volume of old inquiry still in the market. Electric hoists and chain blocks are in good demand and some sizable sales both in the domestic and export markets are reported. The Lehigh Coal & Navigation Co., Philadelphia, is reported about to close on a 10-ton, 20-ft. span, single I-beam, hand power crane.

Among recent purchases are:

Amtorg Trading Corporation, 165 Broadway, New York, six 15-ton, kerosene-driven crawl-tread locomotive cranes for Russia from two American makers; nine 50-ton standard locomotive cranes for Russia from Industrial Brownhoist Corporation.

Standard Traprock Corporation, 26 Cortlandt Street, New York, 40-ton, 4-motor floor controlled overhead crane from unnamed builder.

Boston & Maine Railroad, 5-ton, overhead traveling crane from unnamed builder.

Silverstone & Ervin, Bridgeport, Conn., 5-ton, 9-ft. 6-in. span, 2-motor overhead crane for city of Bridgeport from Box Crane & Hoist Corporation.

Pittsburgh Plate Glass Co., for Ford City, Pa., works, four 20-ton cranes from Cleveland Crane & Engineering Co., and two 5-ton cranes from Alliance Machine Co.

Spang, Chalfant & Co., Inc., for Economy, Pa., works, bloom charger from Alliance Machine Co.

Chicago, Burlington & Quincy, Chicago, 3-motor, 5-ton, 54-ft. span gantry crane from Whiting Corporation.

National Packaging Machinery Co., 172 Green Street, Jamaica Plain, Boston, has purchased three-story and basement mill at Newton, Mass., with tract of six acres. Purchasing company will remodel and remove to new location.

Townsend Motor Car Co., Derby Street, Salem, Mass., has awarded general contract to Pitman & Brown, 11 Washington Street, for one-story addition to service and repair department, 70 x 200 ft., to cost close to $75,000 with equipment.

R. Hight Rines, Portland, Me., has awarded contract to Morton C. Tuttle Co., Boston, for a two-story garage, 90 x 150 ft., to cost $90,000. Webster & Libby, Portland, Me., are architects.

Whiting Body Works, Westboro, Mass., has leased a portion of factory on Milk Street for manufacture and repair of automobile bodies.

United States Gypsum Co., 300 West Adams Street, Chicago, has plans under way for initial units of plant at Charlestown, Boston, for manufacture of building blocks and other cast gypsum products. Entire project is reported to cost in excess of $1,000,000 with equipment.

Blackstone Valley Gas & Electric Co., Pawtucket, R. I., is completing plans for a four-story and basement addition, 20 x 152 ft., to its No. 1 steam-operated electric generating plant, to cost about $125,000.

New England Telephone & Telegraph Co., 50 Oliver Street, Boston, has leased a building at Somerville, Mass., for service and repair shop, with garage facilities, for company automobiles and trucks.

New England Public Service Co., 131 State Street, Boston, operating Tilton Electric Light & Power Co., Middlebury Electric Co., Windsor Electric Light Co., and other light and power utilities, has arranged for a preferred stock issue of $4,387,500, a portion of proceeds to be used for expansion and improvements.

General Electric Welding Co., 206 Hunts Avenue, Pawtucket, R. I., has been organized to engage in electric welding, particularly for automotive manufacturers and large machine and railroad shops. Building and equipment have been purchased, but company is in market for steel tank plates and structural shapes.

Cleveland

CLEVELAND, April 16.

MACHINE-TOOL dealers and manufacturers are doing a fair volume of business in single machines and some report a gain over March. The inquiry situation is spotty, new inquiries having increased with some and fallen off with others. The Kelsey Wheel Co., Detroit, is buying some equipment, including several drilling machines and lathes. Not much business is coming from Michigan automobile manufacturers. Tire manufacturers in Akron who recently have been buying a moderate amount of new machine tool equipment now seem well supplied and the market is dull in that city. Foreign business shows more life. A Cleveland turret lathe manufacturer booked export orders for seven machines the past week.

Bids have been asked on general contract by Acme Auto Radiator Co., 7707 Carnegie Avenue, Cleveland, for a one-story addition, 40 x 175 ft., to cost about $60,000 with equipment. T. C. Cerny, 4025 East Fifty-second Street, is architect.

Department of Public Service, City Hall, Cleveland, has plans for a one-story pumping plant and filtration works in Nottingham district, for municipal water system, to cost in excess of $300,000 with equipment. A. L. Quayle, City Hall, is city engineer.

Willys-Overland Co., Toledo, Ohio, has acquired a tract of 20 acres in Laguna-Maywood industrial district, Los Angeles, as site for a new automobile assembling plant. Initial units are reported to cost close to $1,000,000 and are scheduled to be ready for service in August.

Standard Electric Stove Co., 1720 North Twelfth Street, Toledo, is considering a new plant unit to cost upward of $100,000 with equipment.

Industrial Rayon Co., Ninety-eighth Street and Walford Avenue, Cleveland, plans construction of a steam power plant and machine shop at new mill at Covington, Va. Entire project is reported to cost more than $2,000,000.

Ironton Mfg. Co., Ironton, Ohio, manufacturer of metal roofing, siding, etc., has acquired property near Front and Mulberry Streets, and is said to be planning an addition.

American Steel Abrasives Co., Galion, Ohio, maker of steel shot and eversharp steel grit, is erecting a two-story addition, 40 x 80 ft., which will nearly double its capacity.

Gulf States

BIRMINGHAM, April 16.

PLANS have been filed by Alamo Iron Works, Corpus Christi, Tex., for a one-story addition, 20 x 150 ft., to cost about $23,000.

Atchison, Topeka & Santa Fe Railway Co., Galveston, Tex., has plans for a one-story power house at its shops at Cleburne, Tex., to cost more than $80,000 with equipment. Frank Merritt is chief engineer.

Texas Airplane Corporation, R. F. D. No. 1, San Antonio. C. W. Payne, secretary, is planning erection of one-story works, 22 x 100 ft., for assembling and repair of aircraft.

Houston Gas Securities Co., Houston, Tex., operating Houston Gas & Fuel Co., and Houston Gulf Gas Co., has acquired Southern Gas Co., operating natural gas properties in vicinity of Laredo, Tex., and will consolidate with system. New owner is considering extensions and improvements, including pipe line construction.

Clarence W. King, Giddens-Lane Building, Shreveport, La., architect, will soon begin work on new automobile service, repair and garage building, to cost about $85,000 with equipment.

Texas Gulf Power Co., Fort Worth, Tex., has acquired light and power plant, and waterworks at Strawn, Tex. Plans are under way for expansion in power station and installation of additional machinery. Extensions will be made in transmission lines.

Town Council, Rolling Fork, Miss., is asking bids until May 1 for equipment for municipal power plant, including one Diesel oil engine, 120 to 180 hp., direct-connected to generating unit, with capacity of 90 to 140 kva., with exciter, switchboard, instruments and auxiliary equipment.

Humble Oil & Refining Co., Houston, Tex., is reported planning an addition to its refinery at Ingleside, Tex., for sulphuric acid recovery. Humble Pipe Line Co., affiliated organization, has acquired right-of-way from Aransas Pass to Harbor Island, vicinity Fort Aransas, Tex., and will construct new pipe line.

Crystal Ice & Fuel Co., Clarksdale, Miss., is planning construction of one-story ice-manufacturing plant at Yazoo City, Miss., to cost about $50,000 with equipment.

McGough Motor Co., 206 Dexter Avenue, Montgomery, Ala., is completing plans for a two-story service, repair and garage building, 104 x 200 ft., to cost close to $85,000 with equipment. Okel & Cooper, Bell Building, are architects.

Ouachita Natural Gas Co., Shreveport, Tex., B. D. Hunter, president, has authorized construction of pipe line from Alto, Richland Parish, to Sterlington and Sarepta, Webster Parish, to cost more than $3,000,000 with booster stations, etc. At last noted place, connection will be made with natural gas system of Magnolia Gas Co.

Federal Electric Co., 8700 South State Street, Chicago, manufacturer of electric signs, etc., is reported considering establishment of new factory branch at Dallas, Tex., for manufacture of Neon illuminated displays, to cost more than $30,000 with equipment.

Water Works Commission, Phenix City, Ala., is asking bids until April 26 for pumping station, water purification plant and auxiliary equipment for a municipal waterworks. Warren E. Darrow, Columbus, Ga., is engineer.

Joseph Finger, Keystone Building, Houston, Tex., architect, has asked bids on general contract for a two-story automobile service, repair and garage building, 125 x 125 ft., to cost close to $200,000 with equipment.

American Service Co., Houston, Tex., operating ice-manufacturing and cold storage plants, is disposing of a note issue of $3,150,000, a portion of fund to be used for expansion and improvements.

Spears & Co., El Paso, Tex., are considering rebuilding portion of cottonseed oil mill recently destroyed by fire, with loss more than $35,000 including equipment.

West Texas Utilities Co., Quanah, Tex., has begun work on first unit of new steam-operated electric power plant at Lake Pauline, near Quanah, and will soon proceed with other units with capacity of 60,000 hp. Four new transmission lines will be built. Entire project will cost in excess of $500,000 with equipment.

Philadelphia

PHILADELPHIA, April 16.

BIDS have been asked by Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, on general contract for a one-story motor bus repair shop, 282 x 406 ft., comprising machine shop, overhauling and reconditioning department, parts division and other mechanical departments, to cost in excess of $250,000 with equipment.

Pyramid Motor Freight Corporation, Hancock and Columbia Streets, Philadelphia, has awarded general contract to John I. Dillon, 1804 North Front Street, for a one-story machine shop for motor truck repairs and reconditioning, to cost about $17,000 with equipment.

Domenick Leberi & Son, 1137 South Broad Street, Philadelphia, operating a general iron works, have filed plans for a new one and two-story works, 60 x 112 ft., and 20 x 60 ft., to cost close to $24,000 with equipment.

Department of Public Works, Bureau of Water, City Hall, Philadelphia, is asking bids until April 26 for motor-driven pumping equipment and auxiliaries for Belmont pumping plant, contract No. 916; and for electrical equipment, switchboards, etc., for same station, contract No. 917.

Roller Bearing Co. of America, Inc., 141 Frelinghuysen Avenue, Newark, N. J., has arranged for purchase of former plant of Mercer Motor Car Co., Whitehead Road, Trenton, N. J., comprising 11 acres and factory buildings totaling 175,000 sq. ft. floor space, for production of roller bearings for automobiles and industrial equipment. Present works will be removed to new location. David H. Litter and Alan Jones head purchasing company.

Eastern Shore Public Utilities Corporation, Salisbury, Md., is negotiating for purchase of municipal electric light and power plant at Dover, Del., and plans expansion in that district, including transmission line construction.

Board of Education, Royersford, Pa., is considering installation of manual training equipment in two-story high school to cost $135,000, for which plans are being drawn by Hasness & Albright, 213 Walnut Street, Harrisburg, Pa., architects.

A State charter has been secured by Reading Airplane Co., Reading, Pa., with capital stock of $20,000, and work will soon begin on plant for production of aircraft and parts, with repair division. Company was formed recently by Allen K. Owen, 21 South Eleventh Street, who will be treasurer of organization; and Lloyd A. Gass, 115 Jefferson Street, Hyde Park, Pa.

Leon H. Brendlinger, 1130 Windsor Street, Reading, Pa., formerly connected with William Remppis Co., Reading, manufacturer of ornamental iron and steel products, is organizing a company to construct and operate a plant at Mount Carmel, Pa., for similar line of production, including iron fencing, fire escapes, etc. Property has been secured and work on initial unit will soon begin. R. J. Best and H. C. Ebinger, Reading, are also interested in new company.

Harrisburg Airport Corporation, Harrisburg, Pa., care of F. Brewster Wickersham, Harrisburg, attorney, now being formed by local interests with capital stock of $25,000, plans early establishment of airport on property now being acquired, to include hangars, repair shops for planes and motors, oil storage and distributing works, etc. Frank A. Robbins, Jr., Chamber of Commerce, is interested in project.

Philadelphia Suburban Counties Gas & Electric Co., Philadelphia, will make extensions in transmission lines for connection of plant on Barbados Island, Norristown, Pa., with Conowingo hydroelectric power project of Philadelphia Electric Co. A power substation and switching station will be installed at Bridgeport, Pa. Day & Zimmermann, Inc., Sixteenth and Walnut Streets, Philadelphia, is engineer.

Pittsburgh

PITTSBURGH, April 16.

ONE machine tool dealer has booked three vertical shapers, but in general orders have been for single tools which, so far this month, have not been as numerous as during the first eight or ten weeks of the year.

Plans have been approved by Baltimore & Ohio Railroad Co., Baltimore, for extensions and improvements in engine house and locomotive repair shops at New Castle, Pa., to cost about $150,000 including equipment.

Shenango Motor Co., Washington Street, New Castle, Pa., has awarded general contract to Paul Esposito, 782 Franklin Street, Woodlawn, Pa., for a two-story service, repair and garage building, to cost $180,000 with equipment. F. H. Foulk, Fairmount Cedar Building, Cleveland Heights, Ohio, is architect.

Gauley Power Co., Charleston, W. Va., has applied for permission to construct and operate a hydroelectric generating plant on Gauley River, Fayette County, with initial capacity of 60,000 hp. A transmission line will be built. Entire project is reported to cost more than $600,000.

Board of Education, Woodlawn, Pa., contemplates installation of manual training equipment in an addition to high school to cost about $125,000. Carlisle & Sharrer, Martin Building, Pittsburgh, are architects.

Penn-Ohio Edison Co., Sharon, Pa., is completing arrangements for a merger with Northern Ohio Power Co., and plans expansion and improvements, including transmission line construction.

American Metal Co., Ltd., American Zinc & Chemical Co., Langeloth Coal Co., and Clymac Molybdenum Co., all of Pittsburgh, have removed their offices to 2010 Clark Building.

Address of Lewis Foundry & Machine Co., formerly at 1514 Farmers Bank Building, Pittsburgh, is now P. O. Box 1591, Pittsburgh.

Trico Fuse Mfg. Co., Milwaukee, has removed its Pittsburgh office to larger quarters at 405 Penn Avenue. William A. Bittner is in charge.

Detroit

DETROIT, April 16.

PLANS are being prepared by Board of Trustees, Michigan School for the Blind, Lansing, for one-story power house, to cost about $100,000 with equipment. Installation will include two 175-hp. boilers, automatic stokers, coal and ash-handling equipment, etc.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, has awarded general contract without competition to Krieghoff Co., French Road, for one-story addition to foundry, to cost about $60,000 with equipment. Christian W. Brandt, Francis Palms Building, is architect.

Hupp Motor Car Corporation, 3641 East Milwaukee Street, Detroit, has purchased for expansion plant of Huebner Lumber & Mfg. Co., consisting of close to four acres and factory buildings.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has awarded general contract to W. J. Kauffman, 10610 Shoemaker Avenue, for a three-story addition, 30 x 130 ft., to cost upward of $60,000 with equipment.

Monroe Auto Equipment Co., Monroe, Mich., is completing plans for a one-story addition, to cost more than $150,000 with equipment.

Sears, Roebuck & Co., Arthington and Homan Avenues, Chicago, will proceed with a new multi-story storage and distributing plant at Detroit, to cost close to $500,000 with equipment. Company will also build similar unit in western part of city, to cost approximately $550,000 with equipment.

Graham-Paige Motor Corporation, West Warren Street, Detroit, has plans for a one-story service, repair and garage building at Sault Ste. Marie, Mich., to be occupied under lease by Wynn Auto Sales Co., Sault Ste. Marie, local representatives, to cost close to $45,000.

Grand Rapids Gas Light Co., Grand Rapids, Mich., plans rebuilding booster pumping station destroyed by fire April 7, with loss in excess of $100,000 including equipment.

Commonwealth Brass Co., 6781 Commonwealth Avenue, Detroit, has awarded general contract to Grant Powers, 4847 Whitfield Avenue, for a two-story addition, to cost close to $35,000 including equipment. Burrowes & Eurich, 415 Brainard Street, are architects.

Board of Education, Ecorse, Mich., is said to be planning installation of manual training equipment in new two-story high school to cost upward of $175,000, for which superstructure will soon begin. Joseph G. Kastler, Detroit Savings Bank Building, Detroit, is architect.

Electric Sprayit Co., Inc., formerly at Detroit, is now located at 320 East Colfax Street, South Bend, Ind.

South Atlantic States

Baltimore, April 16.

BIDS are being asked by C. Hoffberger & Co., 530-48 East Monument Street, Baltimore, operating ice and cold storage plants, for a new eleven-story cold storage and refrigerating plant, to cost $900,000 with machinery. J. H. Wickersham, Appel Building, Lancaster, Pa., is engineer. J. H. Hoffberger is president.

Disappearing Screen Co., Inc., Berkeley, Cal., has leased building at 264 Colvin Street, Baltimore, for an Eastern works for manufacture of patented screens and kindred products.

Board of District Commissioners, District Building, Washington, is asking bids until April 25 for three vertical type, motor-driven pumping units for sewage system, including shafting, couplings, bearings, automatic controls and starting equipment; until April 21, for 1000 water meters.

G. N. Ray, 1219 Connecticut Avenue, N. W., Washington, architect, will soon take bids for a four-story automobile service, repair and garage building, to cost about $250,000 with equipment.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has authorized increase in capital stock from 1,450,000 to 1,500,000 shares, no par value, a portion of proceeds to be used for expansion, including acquisition of Mount Washington Electric Light & Power Co., Patapsco Electric & Mfg. Co., and other light and power utilities, with extensions in transmission lines and power facilities.

Roanoke River Power Co., Richmond, Va., is arranging for early construction of hydroelectric power plant on Roanoke River, taking lands in Mecklenburg County, Va., and Warren, Vance and Granville Counties, N. C. Station will have initial capacity of 70,000 hp.; a 60-mile transmission line will be built to Danville, Va., for connection with system of Appalachian Power Co., which is interested in project. It will cost in excess of $1,000,000.

Burge & Stevens, Marietta Building, Atlanta, Ga., architects, will soon take bids on general contract for a five-story automobile service, repair and garage building, 88 x 135 ft., to cost close to $300,000 with equipment.

Water and Light Department, Thomasville, Ga., D. R. Pringle, superintendent, is asking bids until May 7 for one 2000-kw. steam turbine, with generator and accessories; and for one 4500 sq. ft. condenser, with auxiliaries, for municipal light plant.

Fogle Furniture Co., Winston-Salem, N. C., has plans for a new three-story factory, 64 x 145 ft., to cost more than $40,000 with equipment. F. A. Fogle is president.

General purchasing officer, Panama Canal, Washington, is asking bids until May 2 for 22,000 ft. wire rope; 10,000 ft. plow steel wire rope; 5000 ft. cast steel wire rope; 70,000 lb. wire nails; drills, stocks and dies, reamers, vises, wrenches, tinners' snips, and other tools and equipment, Panama schedule 1872; until April 27 for trench pumps, chain blocks, pipe pushing jack, etc., Panama schedule 1870.

Lindsay-McMillan Co., 93 South Water Street, Milwaukee, manufacturer of refined oils, etc., has purchased five acres at Savannah, Ga., as site for new plant for production of heavy core oils. Initial units will be one-story and will cost upward of $60,000 with equipment.

Clinchfield Sand & Feldspar Corporation, Hearst Tower Building, Baltimore, is arranging for early construction of feldspar crushing, grinding and pulverizing mill in vicinity of Brookneal, Va. A portion of equipment will be secured from a plant at Charlotte, N. C., and additional machinery acquired. Company will operate feldspar quarries at Moneta, Va., for raw material supply.

East Coast Utilities Co., Richmond, Va., operating Northwest Carolina Utilities, Inc., Hermitage Ice & Storage, Inc., Virginia East Coast Utilities, Inc., and other power and light utilities, ice plants and water systems, is arranging an expansion and improvement program to cost about $1,000,000.

Buffalo

Buffalo, April 16.

CONTRACT has been let by Trico Products Co., 624 Ellicott Street, Buffalo, manufacturer of automobile accessories, to J. W. Cowper Co., Fidelity Building, for a new plant unit to cost $200,000 with equipment.

New York Air Brake Co., Watertown, N. Y., has arranged for increase in capital from 300,000 to 500,000 shares of stock, no par value, a considerable portion of proceeds to be used for development of new products.

King Mfg. Co., 254 Rano Street, Buffalo, manufacturer of radio equipment, is planning for expansion in output; manufacture of cabinet sets will be decreased and output concentrated on metal-encased sets.

Rochester Auto Inn, Inc., care of Steele & Stone Co., National Bank of Rochester, Rochester, N. Y., has awarded general contract to Turner Construction Co., Buffalo for a six-story service, repair and garage building, to cost about $225,000 with equipment. Gordon & Kaelber, Sibley Block, are associate architects.

Stockholders of Savage Arms Corporation, Utica, N. Y., have authorized formation of a subsidiary to take over and expand electrical household equipment division for increase in manufacture of electric washing machines, etc. J. Stevens Arms Co., Chicopee Falls, Mass., a subsidiary, will be continued as heretofore, and production of firearms and sporting weapons will be concentrated at that plant.

Continental Can Co., Syracuse, N. Y., is said to be planning early call for bids on general contract for new multistory plant at Chicago, to cost in excess of $500,000 with equipment. Francisco & Jacobus, 360 North Michigan Avenue, Chicago, are architects and engineers.

Taylor Brothers Aircraft Co., 42 Allen Street, Rochester, N. Y., has been organized to make airplanes and airplane equipment, particularly two and four-place monoplanes. Equipment and materials have been purchased.

Chicago

Chicago, April 16.

FROM the standpoint of actual orders, the week just closed has not been satisfactory to machine tool dealers. Volume of sales has fallen for the first two weeks in April below that of the last 14 days in March. However, new inquiry has grown and propositions on which quotations have been made are numerous, so there is some promise that order books will be swelled during the remainder of the month. Many of the new requests for prices come from tractor plants at Chicago and Peoria, Ill., and Waterloo, Iowa.

The railroad field is none too promising. The Santa Fe, which is asking for revised figures on a number of items, has not started to buy against its list. The Burlington is taking prices on a 6-ft. radial and a 20-in. drill. A forging plant has purchased a 32-in. shaper. The general contract for the Austin High School, Chicago, has been signed and this project will now go ahead.

Bliss & Laughlin, Inc., Harvey, Ill., manufacturer of turned shaftings and cold drawn and cold rolled steel has purchased for expansion plant and property of Hotchkiss, Blue & Co., adjoining. Property consists of five acres, two of which are improved with buildings.

Bids will soon be asked by Chicago Pump Co., 2336 Wolfram Street, Chicago, for a one-story addition to cost about $35,000 with equipment. Alfred S. Alschuler, 20 West Jackson Boulevard, is architect.

Rapid Roller Co., 812 West Austin Avenue, Chicago, manufacturer of printing rollers, etc., has awarded general contract to G. L. Arquette, 180 North Michigan Avenue, for a three-story plant unit, 100 x 125 ft., to cost in excess of $200,000 with equipment.

John Deere Co., Moline, Ill., manufacturer of agricultural equipment, will soon begin work on one-story foundry, to cost more than $35,000 with equipment.

Iowa Public Service Co., Waterloo, Iowa, is disposing of a preferred stock issue of $500,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

City Council, Aitkin, Minn., is planning extensions and improvements in municipal electric light and power plant, including installation of additional equipment. Extensions will be made in transmission lines.

Kremer Motor Co., 1518 Hennepin Avenue, Minneapolis, Minn., will soon take bids on general contract for a one-story service, repair and garage building, 150 x 155 ft., to cost about $110,000 with equipment. P. E. Crosier, New York Life Building, is architect.

Super-Power Co. of Illinois, 72 West Adams Street, Chicago, affiliated with Commonwealth Edison Co., Illinois Power & Light Corporation and other utilities, is disposing of a bond issue of $10,000,000, a portion of proceeds to be used for power plant construction and transmission lines. Work is now under way on new generating plant at Powerton, Ill.

Wyoming-Mystic Iceless Refrigerator Co., Cheyenne, Wyo., is planning erection of new plant, reported to cost in excess of $35,000 with equipment.

Lyons Metal Products, Inc., Aurora, Ill., has been organized as step in probable consolidation of Lyons Metallic Mfg. Co., Aurora; Durant Co., Chicago, and Fred Medart Mfg. Co., St. Louis. New company will manufacture steel lockers, office furniture and store fixtures. General offices will probably be maintained at Aurora.

Gunite Corporation, Rockford, Ill., has been organized to manufacture gunite and other alloys and metals. Company at present occupies part of plant of Rockford Malleable Iron Works where manufacture has been started.

Harrington-Seaberg Co., Moline, Ill., manufacturer of police, fire alarm and traffic signal equipment and electric flashers, has let contract to Axel Carlson Construction Co., local, for four-story factory, 62 x 135 ft., to cost $75,000. Another unit, 94 x 135 ft., will be erected later.

Joseph L. Lieberman Iron Co., Chicago, has removed its offices to 604 Lake Michigan Building, 180 North Michigan Avenue.

Cincinnati

CINCINNATI, April 16.

VOLUME of machine tool sales the first half of April was only slightly less than that in the last two weeks of March, so that bookings this month are expected to be well maintained even though the total business probably will show a mild recession from the high level of the previous 60 days. Purchases by automobile companies are sporadic and inquiries from the Detroit district are indicative of a slowing down in buying. This trend however, is seasonal and should not cause undue apprehension. In fact, the bulk of the new machinery needed by the automotive industry during the first half of 1928 has been purchased and buying on a large scale is not anticipated until fall.

Most of the business placed with local builders has come from manufacturers in many different lines, the average order calling for one or two tools. The Santa Fe is reported to be ready to close in the next week for equipment on its recent list, while one or two carriers in the Southwest are inquiring for individual tools. The American Mond Nickel Co., Hyde, Pa., has closed for a heavy end-driven axle lathe.

Board of Education, Hamilton, Ohio, is considering installation of manual training equipment in a new two-story junior high school to cost $500,000, for which plans will be drawn by F. J. Mueller, Rentschler Building, architect.

City Council, Columbus, Ohio, will carry out expansion and improvement program for municipal light and power plant and system to cost $525,000. Work will include installation of 7500-kw. steam-electric power unit, with condensers, boilers and auxiliary equipment; automatic power substation on Nicholas Street, extensions in transmission lines and distributing system.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until April 27 for 73 propeller assemblies and 62 solid aluminum alloy blades, circular 300.

Victor Chemical Works, Inc., 343 South Dearborn Street, Chicago, has acquired 10 acres at West Nashville, Tenn., as site for new plant for production of phosphoric acid, etc., initial unit to cost in excess of $1,000,000 with equipment.

S. H. McKay, Nashville, Tenn., city clerk, is asking bids until April 24 for two high-lift and two low-lift pumping units for municipal waterworks, with capacity of 10,000,000 gal. per day in pairs, with auxiliary apparatus. W. W. Southgate is engineer.

Ducktown Copper & Iron Co., Ducktown, Tenn., is considering rebuilding machine shop and wood-working plant at local Mary mines, recently destroyed by fire, with loss close to $25,000 with equipment.

City Council, Union City, Tenn., is planning extensions and improvements in municipal power plant, including installation of 1000-kw. steam turbine-electric unit and accessories. A special election has been called May 10 to approve bonds.

Board of County Supervisors, Springfield, Ohio, will receive bids until April 30 for a gravel crushing plant, including power unit of at least 50-hp. capacity; also for portable bin of not less than 15 yd. capacity. Former bids were recently rejected. W. H. Sieverling, county surveyor, is in charge.

Board of Shelby County Commissioners, Memphis, Tenn., E. W. Hale, chairman, has plans for a new County workhouse at Mullins Station, near Memphis, to include a one-story machine and repair shop, one-story forge shop, one-story automobile service and repair building for motor trucks, and canning plant. Entire project will cost $400,000. Hanker & Cairns, Court Square Building, are architects.

Board of Education, Newark, Ohio, has asked bids on general contract for a new manual arts school, to cost more than $100,000 with equipment. Vernon Redding & Associates, Walpark Building, Mansfield, Ohio, are architects.

Columbus Structural Steel Co., Columbus, Ohio, is now structural department of International Derrick & Equipment Co., Columbus.

Milwaukee

MILWAUKEE, April 16.

MACHINE-TOOL demand is maintaining the relatively satisfactory rate of March, and with new inquiry most makers are expecting a favorable volume during the current month. Orders being booked are at least offsetting deliveries and production schedules are kept fairly even. Automotive industries, while not buying heavily or in lots, are furnishing a fair quantity of business, although at this time each year the bulk of requirements usually has been filled, except for replacements and unexpected needs.

George J. Meyer Mfg. Co., 598 Clinton Street, Milwaukee, has acquired buildings and real estate of Worthington Pump & Machinery Corporation, Cudahy, for about $250,000. Meyer company, which manufactures machinery for brewers, bottlers and dairy plants, has not indicated what disposition it intends to make of property, which consists of 27 acres and buildings aggregating 500,000 sq. ft. Worthington plant, formerly known as Power & Mining Machinery Co., was abandoned about four years ago, when equipment was purchased by Allis-Chalmers Mfg. Co.

Badger Meter Mfg. Co., 841 Thirtieth Street, Milwaukee, manufacturer of water meters, is taking bids through Martin Tullgren & Sons, architects, 20 Prospect Avenue, local, for erection of an extension, 60 x 120 ft., to be used as foundry addition and carpenter shop. A light crane is included in equipment for which inquiry is being made. An investment of $50,000 is planned.

Racine Screw Works, Racine, Wis., whose plant at Fifteenth and Clark Streets was destroyed by fire Feb. 25, is preparing to begin active production, following completion of reorganization. Jerome J. Ritter is retiring. Albert O. Falkenrath will continue as president, with other officers to be chosen from new interests entering corporation. A factory building probably will be leased or purchased. Complete new equipment, consisting largely of automatic screw machines, will be acquired.

Delta Mfg. Co., 658 Third Street, Milwaukee, manufacturer of metal specialties, is awarding contracts for erection of a new shop, 40 x 90 ft., costing about $35,000. Architect is F. F. Drolshagen, 82 East Wisconsin Avenue, local.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., is starting erection on a work shop, garage and storage building, 50 x 60 ft., two stories, at Berlin, Wis. Kramp Construction Co., Berlin, is general contractor, and architects are Balch & Lippert, Madison.

Kenosha Brick Co., Route 3, Kenosha, Wis., is preparing to erect new dry kilns, kiln sheds and other facilities for developing a new clay depository near Kenosha. Investment will be about $75,000.

Board of Industrial Education, Manitowoc, Wis., is taking steps toward establishment of a vocational training school to cost $250,000, as recommended by Wisconsin State Board. Work is expected to start next fall. Otto H. Senglaub is president, and A. L. Nimz, director.

Common council, Waukesha, Wis., has approved plans by Alvord, Burdick & Howson, engineers, 8 South Dearborn Street, Chicago, for new sewage disposal plant and has authorized bond issue of $190,000 to cover cost. Bids on plant and equipment will be requested shortly. Morgan R. Butler is mayor.

B & B Mfg. Co., Racine, Wis., has been incorporated with $30,000 capital stock to manufacture tools, dies, jigs, fixtures, etc., and is establishing local plant at DeKoven Avenue and Chicago & North Western tracks. Principals are Clem S. Bonin and Ernest C. Bruce.

Madison-Kipp Corporation, Madison, Wis., has purchased mechanical force feed lubricator division of Detroit Lubricator Co., Detroit. Latter company will continue manufacture of hydrostatic type lubricators and locomotive force feed lubricators. Equipment involved in purchase will be removed to Madison where new line will be handled.

Husky Wrench Co., Milwaukee, maker of automotive and industrial tools, has completed arrangement with J. H. Williams & Co., Buffalo, whereby combination wrench sets composed of Williams Superrenches and Husky socket wrenches will be offered to trade. Combination has been arranged only for selling purposes and will not affect management of either company.

Pacific Coast

SAN FRANCISCO, April 11.

NEGOTIATIONS are under way by Continental Can Co., 155 Montgomery Street, San Francisco, for property at Sacramento, Cal., as site for new plant to cost in excess of $500,000 with equipment. Headquarters are at 1 Pershing Square, New York. Project will be carried out in conjunction with canning plant of California Co-Operative Producers, Inc., foot of Fourteenth Street, Oakland, Cal., at same location, to cost approximately $300,000 with machinery.

Dahlstrom Metallic Door Co., 3350 East Slauson Avenue, Los Angeles, has awarded general contract to William P. Neil Co., 4814 Loma Vista Avenue, for a one-story addition.

Floco Motors Corporation, Los Angeles, recently organized by Frank L. Odenbrite, 138 West Seventeenth Street, and associates, with capital stock of $1,000,000, is planning erection of new works for manufacture of automobiles. Property is being secured near city. Initial unit will be one story, 100 x 150 ft., and will be supplemented with other buildings.

Officials of Pacific Lumber Co., Scotia, Cal., are completing plans for construction of a pulp and paper mill near its redwood lumber mills, to utilize waste from that plant for raw material supply. Initial plant is reported to cost in excess of $900,000 with machinery. Application has been made to use water in this section for power supply.

Hofius-Ferris Equipment Co., Spokane, Wash., manufacturer of mechanical equipment, has filed plans for a new plant, consisting of main unit, one story, 90 x 180 ft., with machine shop, 35 x 80 ft., office building and warehouse, to cost close to $45,000. An overhead traveling crane will be installed.

Great Northern Railway Co., Hilyard, Wash., is planning to rebuild portion of local locomotive repair shops destroyed by fire April 2, with loss reported in excess of $80,000 with equipment. Headquarters are at St. Paul, Minn.

Pacific Power & Light Co., Portland, is planning extensions and improvements in power substations and transmission lines in Lewiston-Clarkson, Idaho, district, to cost approximately $90,000.

Brunswick-Balke-Collender Co., Los Angeles, manufacturer of talking machines and parts, billiard tables, etc., has asked bids on general contract for a one-story plant, 177 x 320 ft., to cost approximately $100,000 with equipment. A boiler plant will be built. Headquarters are at 623 South Wabash Avenue, Chicago. John P. Kempel and Walter E. Erkes, Bank of Italy Building, Los Angeles, are architects.

Board of County Supervisors, Hall of Records, Los Angeles, has filed plans for a new repair and maintenance shop for road and other equipment to cost $50,000.

Cyclone Fence Co., Waukegan, Ill., subsidiary of United States Steel Corporation, has purchased Standard Fence Co., Oakland, Cal., and Northwest Fence & Wire Works, Portland, Ore. These two companies have heretofore been Pacific Coast agents of Cyclone Fence Co.

Walworth Oregon Co., M. L. Kline Co., Bowles Co., and Peerless Pacific Co., all of Portland, Ore. have merged and will operate under name of Consolidated Supply Co.

Republic Supply Co. of California, Los Angeles, has purchased Associated Supply Co., local distributer of oil well supplies, particularly products of Youngstown Sheet & Tube Co. Business of two companies will be consolidated and Republic company will act as distributer in California for tubular goods made by Youngstown company.

Barde Steel Co., Seattle, will erect three two-story warehouses, 37 x 120, 32 x 120 and 67 x 120 ft., respectively.

Balzer Machinery, Portland, has been appointed representative in that territory for Gardner-Denver Co., maker of portable air compressors and rock drills. Latter company was recently formed by merger of Gardner Governor Co., Quincy, Ill., and Denver Rock Drill Co., Denver.

Seattle office of Crouse-Hinds Co., maker of electrical equipment, has been closed, and business will hereafter be handled through its San Francisco office.

Franklin Iron Works Co., Inc., Mount Vernon, Wash., has changed its name to Franklin Steel & Machinery Co.

Indiana

INDIANAPOLIS, April 16.

PROPERTY of Davis Motor Car Co., Richmond, has been acquired by Automotive Corporation of America, Inc., lately organized, which will take over and expand plant. Production of motor cars will be continued and in addition new owner will provide facilities for manufacture of four-wheel jacking and parking device, parkmobile attachments and other accessory equipment. W. E. Byrd is president of purchasing company.

Indiana Refining Co., Lawrenceville, Ill., has plans under way for a two-story oil storage and distributing plant at Fort Wayne, to cost about $55,000 with equipment. A similar plant will be constructed at Terre Haute, Ind., to cost close to a like amount.

Board of Trustees, Indiana University, Bloomington, has plans for steam power plant, to cost $140,000 with equipment. C. R. Ammerman, Continental Bank Building, Indianapolis, is engineer, and bids will be asked from last-noted office.

Belden Mfg. Co., 2300 Western Avenue, Chicago, manufacturer of electric wires, cables, etc., is having plans drawn for second unit at new plant at Richmond, to cost more than $60,000 with equipment. J. W. Muller, First National Bank Building, Richmond, is architect.

Glenn Locomotive Co., recently formed by John S. Glenn, Sr., Cincinnati, and associates, with capital stock of $200,000, has taken over portion of plant of Interstate Car & Foundry Co., 3823 Massachusetts Avenue, Indianapolis, for repair and reconditioning of locomotives. Boiler shop, machine shops, forge and blacksmith shop, pipe shop, wood-working shop and other departments will be operated. A plant formerly operated at Cincinnati will be discontinued.

International Harvester Co., 606 South Michigan Avenue, Chicago, is reported planning a factory branch and distributing plant at Fort Wayne, to cost in excess of $350,000 with equipment.

Hare Motor Sales Co., 210 West Fourth Street, Bloomington, has asked bids on general contract for two-story service, repair and sales building, to cost $70,000 with equipment.

Foreign

BIDS are being asked by State Electricity Commission, 22-32 William Street, Melbourne, Australia, until Sept. 3, for switchgear for Yallourn power scheme, comprising 120,000-volt switchgear equipment for Richmond Terminal station, specification No. 28/20; and 135,000-volt switchgear for Yallourn power station extension, specification No. 28/21. Specifications available at offices of Bureau of Foreign and Domestic Commerce, Custom House, New York, and 33 South Clark Street, Chicago.

Electric Power Corporation (Elektrowerke Aktiengesellschaft), Berlin, Germany, is disposing of a bond issue of $5,000,000 in United States, a portion of fund to be used for extensions and improvements, including completion of

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new steam-operated electric power plant stations with capacity of 80,000 kw. and transmission line construction.

Plans are being arranged for a new cellulose and paper mill in vicinity of Ussuri Station, Siberia, to be operated under direction of Russian Soviet Government. Plant is estimated to cost close to $5,000,000 with machinery. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding project.

Municipal Council, Johannesburg, South Africa, has authorized fund of £510,000 (about $2,448,000) for a municipal electric light and power plant, with initial output of 39,000 kw. American Consulate, C. H. Hall, Jr., Johannesburg, has information regarding project.

Soviet Southern Ore Trust, operating in Yurt mining district, Russia, has an appropriation of $9,000,000 for capital construction during 1928, and will increase plants for production of iron ore and manganese. Representatives of Trust, headed by A. N. Bakhtiarov, chief engineer, are now on a visit to United States to investigate methods of production and mining machinery. Purchases of equipment will be made through Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Russian Soviet Government, and delegation Trust will make headquarters at that office.

A company in Norway is planning construction of new plant for production of nitrate of lime, ammonia, soda and kindred products, including sulphuric acid. Large expenditure will be made for machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Norway No. 272193; also, at American Consulate, Oslo, Norway, Louis G. Dreyfus, Jr., consul general.

Canada

TORONTO, April 16.

MACHINE tool sales throughout the Dominion are being maintained at a good level. Sales for the week ranged from one to two tools to an order and were in fairly large volume. Present purchases are mostly for replacement, although there is also some buying for automobile repair shops and garages and for other small shop installation. The Canadian National Railways, which will start work soon on additions to its shops at Point St. Charles, will require a large number of tools, as well as equipment for an electric plant there.

The Steel Co. of Canada, Ltd., Hamilton, Ont., will make further extensions to its plant for which tools and general equipment will be purchased later in the year. Small tool sales have shown considerable improvement since the first of the year.

Bids are being received by T. T. Irving, regional chief engineer, Canadian National Railways, New Union Station, Toronto, for addition to shops at Point St. Charles, Montreal.

Chrysler Corporation of Canada, Ltd., Box 249, Windsor, Ont., has started work on an addition to its plant which is expected to be completed by May 15. It will be two stories, 100 x 400 ft.

T. Strachan, president of General Metal Devises, Ltd., Oakville, Ont., is calling for bids for erection of a plant, 60 x 300 ft. Company will manufacture electrical fixtures, etc.

International Nickel Co., Sudbury, Ont., in connection with its building and development program, has awarded contract to Fraser Brace & Co., for construction of its entire surface plant, on which work will be started immediately.

Plant of Canadian Edge Tool Co., Galt, Ont., was destroyed by fire following an explosion. It was recently acquired by Rae Machine Co., Hamilton, Ont.

Plant of Canada Brass Co., Merrickville, Ont., was totally destroyed by fire with loss of $30,000.

Shawinigan Engineering Co., Ltd., Shawinigan Falls, Que., is contemplating construction of a power plant at Shawinigan Falls to cost $30,000.

McEachren Construction Co., 244 Ridout Street, London, Ont., has contract for erection of a $35,000 addition to plant of Empire Brass Mfg. Co., Ltd., Dundas Street East, London. Architects are Watt & Blackwell, Bank of Toronto Chambers, London. Building will be two stories and basement, 40 x 60 ft.

Western Canada

Cork Province Mines, Ltd., has awarded contract to Bartholomew, Montgomery & Co., engineers, Vancouver, B. C., for installation of a hydroelectric plant to cost $60,000, to take care of increased mine and mill requirements. Construction work will be started immediately. Contract also includes erection of a substation adjoining mill.

City Council, Prince Albert, B. C., plans addition to power house to cost $100,000. Installation will include new turbine, mechanical overhead feeds and two new boilers.

Bids will be received until May 8 by S. E. O'Brien, secretary, Department of Public Works, for one 4-ton electric traveling crane for Assembly Wharf at Port Alberni, B. C. Tenders can be secured at office of district engineer, Post Office Building, Victoria, B. C., and at Post Offices, Vancouver and Port Alberni, B. C.

Winnipeg Electric Co., Winnipeg, Man., will erect a terminal station to cost approximately $750,000 to take care of production of Seven Sisters Falls development. It will have a capacity of 50,000 hp., with provision for doubling that amount.

NEW TRADE PUBLICATIONS

Pneumatic Coal Separators.—American Coal Cleaning Corporation, Welch, W. Va. Bulletin 28 of 12 pages illustrates and describes pneumatic coal separators operating under the Sutton, Steele and Steele patents. The process is described in some detail, with a number of drawings and photographic reproductions. The company is distributing also a pamphlet on the cleaning of coal, with special reference to pneumatic separation, which has been reprinted from the Journal of the Society of Chemical Industry (Great Britain).

Compensated Draft.—Hagan Corporation, Pittsburgh. Bulletin 104 of 12 pages is devoted to the Hagan system of automatic control of forced-draft stoker-fired boilers. It is illustrated with line drawings showing methods of control, and giving curves and chart diagrams indicating practice.

Speed Recorder.—Esterline-Angus Co., Indianapolis. Four-page folder illustrating and describing a speed recorder for steam turbine use. Annotated chart shows the use of the recorder.

Eye Comfort.—Curtis Lighting, Inc., 1119 West Jackson Boulevard, Chicago. Loose-leaf folder of several pages devoted to the subjects of shadows, lights and settings of lights to avoid shadows, and the general subject of guarding against eye-strain from improperly installed lighting equipment.

Pulverizing Machinery.—Abbé Engineering Co., 30 Church Street, New York. Bulletin 23, describing pulverizing, grinding and mixing machinery manufactured by company. Included are jar, laboratory, pebble, ball, tube and attrition mills, rotary cutters, crushers, and disintegrators.

Refractory Materials.—Laclede-Christy Clay Products Co., 1711 Ambassador Building, St. Louis. Leaflet dealing briefly with Laclede fire bricks for various refractory purposes.

Wrenches.—Husky Wrench Co., Milwaukee. Catalog 28, listing the Husky line of interchangeable socket wrenches and soft tap hammers.

Refractory Guns.—Quigley Furnace Specialties Co., Inc., 26 Cortlandt Street, New York. Bulletin 301, dealing with Bitumen guns, an adaptation of the Quigley refractory gun, for shooting hot or cold materials as a protective coating on metal, concrete, stone, brick, wood, cork or other surfaces.

Cranes and Shovels.—Universal Power Shovel Co., Detroit. Bulletin 6, an engineering, sales and service manual, describing the construction and uses of the Wilford line of shovels, trench hoes, clamshells, cranes, draglines and backfillers.

Industrial Fencing.—Cyclone Fence Co., Waukegan, Ill. Catalog 101, 64 pages, describing with many illustrations the uses of various types of industrial, municipal and residential fences manufactured by the company.

Transmission Machinery.—Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago. Catalog 68, 192 pages, listing the various types of friction clutches and transmission machinery manufactured by the company's A. Plamondon division.

Oil Burners and Preheaters.—Alexander Milburn Co., 1416 West Baltimore Street, Baltimore. Bulletin B-200D, devoted to the company's type A oil burner and preheater. Burner is of atomizing type utilizing cheap grades of fuel and requires no preheating.

Boiler Furnaces.—Erie City Iron Works, Erie, Pa. Leaflet briefly describing the Vortex furnace for applying pulverized coal to small boiler furnaces and "Some Fundamentals of Water Cooled Furnace Design," by Prof. W. J. Wohlenberg, a paper designed to provide understanding of the use of principal types of water cooled furnaces.

THE IRON AGE

ESTABLISHED 1855 New York, April 26, 1928 VOL. 121, No. 17

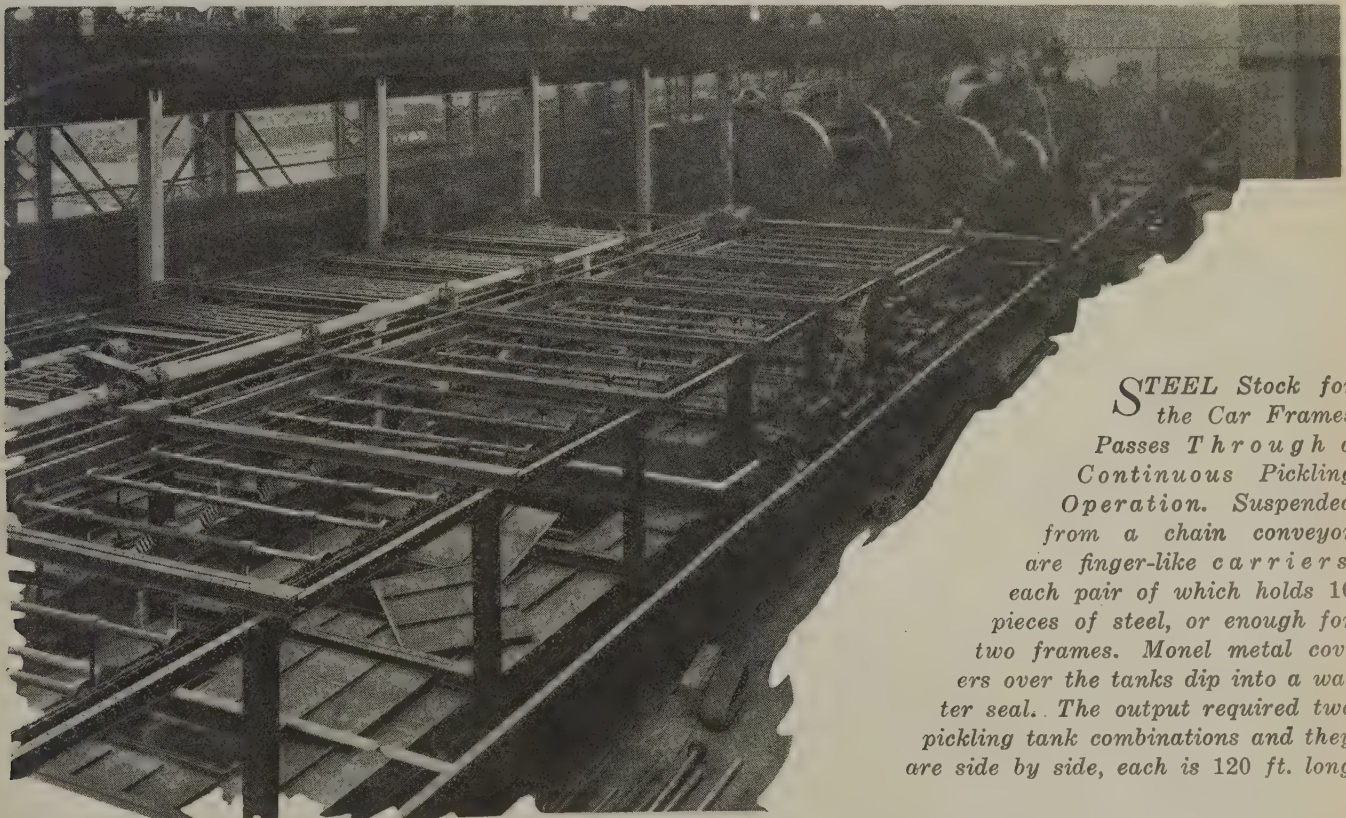
Making the Ford Motor Car Frame

Continuous Pickling Tanks, Through Which Steel Stock Passes, One Feature of Plant—Swivel Carrier for Holding Frames in Riveting Operations

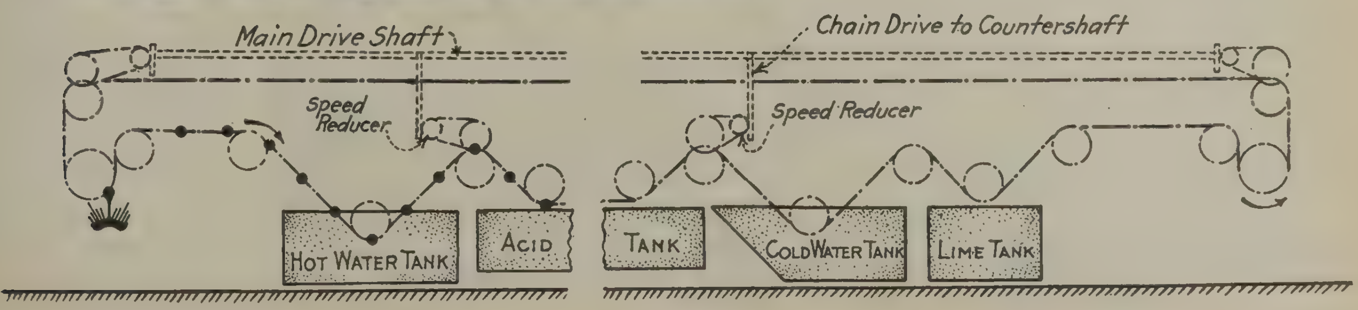
BY FAY LEONE FAUROTE*

IN one end of the Steel Building at Fordson is one of the most interesting and typically Ford process lines to be found in the whole plant. It is the frame fabrication and assembly line. All operations necessary to form and finish this important component are carried on in a continuous process and when the frames arrive at the end they are painted and ready for assembly. Even the pickling and liming tanks form a part of this sequence and the washing and drying likewise.

A service crane delivers the stock direct from the Ford mill cut to size for the five main sections of the frame; the two side members, right and left; the three cross members, front, center and rear. The main sections are made of No. 9 U. S. gage hot rolled open-hearth steel, "type L," pickled and limed and held to a thickness of between 0.140 and 0.160 in. The steel



STEEL Stock for the Car Frames Passes Through a Continuous Pickling Operation. Suspended from a chain conveyor are finger-like carriers, each pair of which holds 10 pieces of steel, or enough for two frames. Monel metal covers over the tanks dip into a water seal. The output required two pickling tank combinations and they are side by side, each is 120 ft. long



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*Mechanical engineer, New York, and co-author of "Ford Methods and the Ford Shops," published in 1915. On page 1080, of THE IRON AGE of April 19, the author discussed the $25,000,000 changes required to produce the new Ford model.

In the Background Is the Group of Large Presses, at the Discharging End of the Pickling Tanks, for Forming the Side Members. The steel for the cross members is brought by an underground conveyor to the triple row of presses more prominent in the picture

has an elastic limit of 42,000 lb. per sq. in. minimum, and is capable of being elongated in the transverse direction to form various parts of the frame lugs, attachments and the like. The Brinell hardness is held to 131 minimum.

At the head of the process line are two pickling tanks, Ford designed and built (see drawing and photographs) through which a chain conveyor moves. This chain has finger-like carriers suspended from it at regular distances. Each carrier is capable of holding ten sheets of steel and each batch as loaded contains both side members and cross members. Due to the fact that there are two tanks and two main process lines in operation side by side, stock comes through at the other end in proper proportions for assembly and spares. Steel in process first goes into a hot water tank, 10 ft. x 14 ft. 8½ in. x 4 ft. 3¼ in., which is lead lined and has a capacity of 4750 gal. Here it is washed preparatory to pickling.

The acid tank, in which it is next immersed, is 56 ft. long, 12 ft. wide and 2 ft. 9 in. deep. It is constructed of two thick timber sheetings with a continuous lamination extending over the bottom, ends, and sides of 2 in. mastic cement. The whole tank is bolted together longitudinally, transversely, and vertically, through ends, sides and bottom with 1 in. alcumite or aluminum bronze acid-resisting bolts and lined throughout with ¼ in. sheet lead. A 2-in. channel runs entirely around the top which is kept filled with running water. Into this is immersed the bottom edge of a Monel metal gas-tight hood which covers entirely all parts of the equipment emitting acid vapors.

The acid tank requires approximately 4¼ tons of sulphuric acid for each charge. The actual working capacity of the acid tank is 56 ft. x 2 ft. 6 in. x 12 ft., equaling 12,600 gal.

At the other end is a cold water tank and a liming tank used for neutralizing the acid. The former is a lead-lined tank 11 ft. 3 in. x 4 ft. 3 in. x 12 ft., and holds 4300 gal. The lime tank is 6 ft. 6 in. x 12 ft. x 4 ft. 3 in. and holds 2400 gal.

The whole tank construction is 120 ft. long and 18 ft. 6 in. wide; the equipment is electrically driven and has a capacity of 2000 frames each 8 hr.

When the conveyors are running 2 ft. 8 in. per minute the duration of immersion of the steel stock is 20 min. Five hundred plates are in process at one time, or approximately 7½ tons of steel.

As soon as the metal emerges from the pickling and liming and final washing, the side members, one right and one left, are coated for forming and fed to the first two of six large Bliss, Hamilton and Toledo presses, which blank and form them. The cross members, meanwhile, pass by an underground conveyor to a triple row of presses farther down the line where they are blanked and formed. Now the parts are again ready for a thorough washing which is given to them just before they are put on the conveyor. Under the balcony (see view of presses in frame department) is a sub-assembly. This work is done on small Ferracute presses.

The components now ascend by conveyor to the upper floor, which is really a mezzanine balcony. Here they begin the assembly proper. Knurled rivets are used to hold the parts together, and as they reach the first stage the frame is mounted on a swivel carrier which allows the frame to move from press to press as the assembly riveting requires. The carrier is very flexible and allows the frame to be shifted about in an easy manner, turned up and down as the numerous riveting operations demand.

Finally the assembled frame reaches the inspection table, a metal platform, opposite the head of the line but at some distance to the right and on the upper floor. Here the inspectors test the frame for squareness and quality of workmanship. It is then hung back on the conveyor, passed around an intervening wall and into a washing, drying and painting corridor. This work is done in transit, the fumes from enameling liquid being carried out through a chimney conduit above. The frame emerges finished and almost dry, the latter process being entirely completed before the frame reaches its railroad car destination on the other side of the shop. Here it is packed for transportation to the assembly lines elsewhere.

Typical operations on the left hand side member for a left hand control car are:

1. Pickling consists of washing in hot water, pickling in sulphuric acid, rinsing in cold water and neutralizing in lime water. Production: 400 per hour.

2. After being oiled, by passing over an oiling roller, it is inserted in a No. 14 Bliss press, with a capacity for blanking 250 an hour.

3. A No. 96½-H Hamilton press then pierces all holes at the rate of 240 members per hour after which a No. 16815¼ Hamilton press channel-forms the sides and front ends (240 an hour).

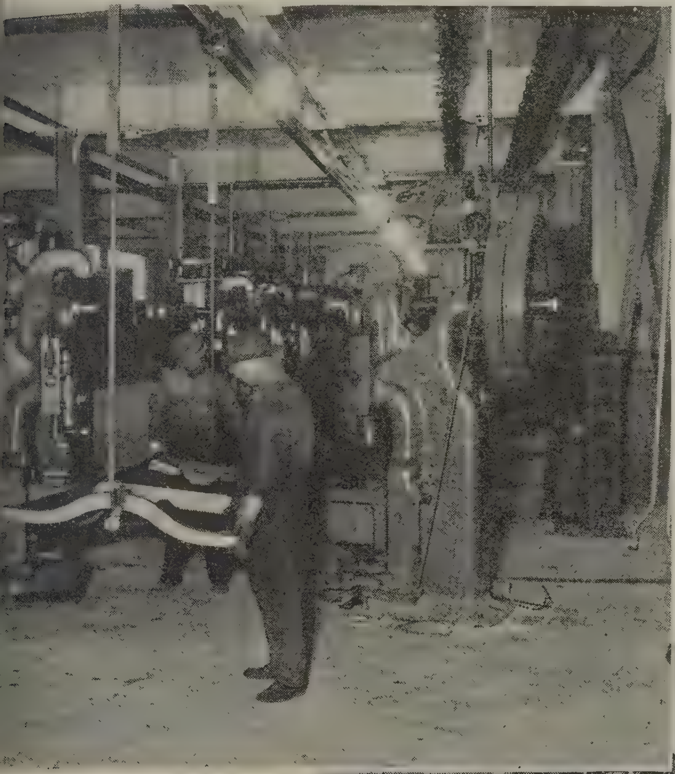
4. A No. 20 Cincinnati drill press then countersinks three holes, a PA-3 Ferracute press folds the rear end lugs, these last two operations taking place at the rate of 300 per hour.

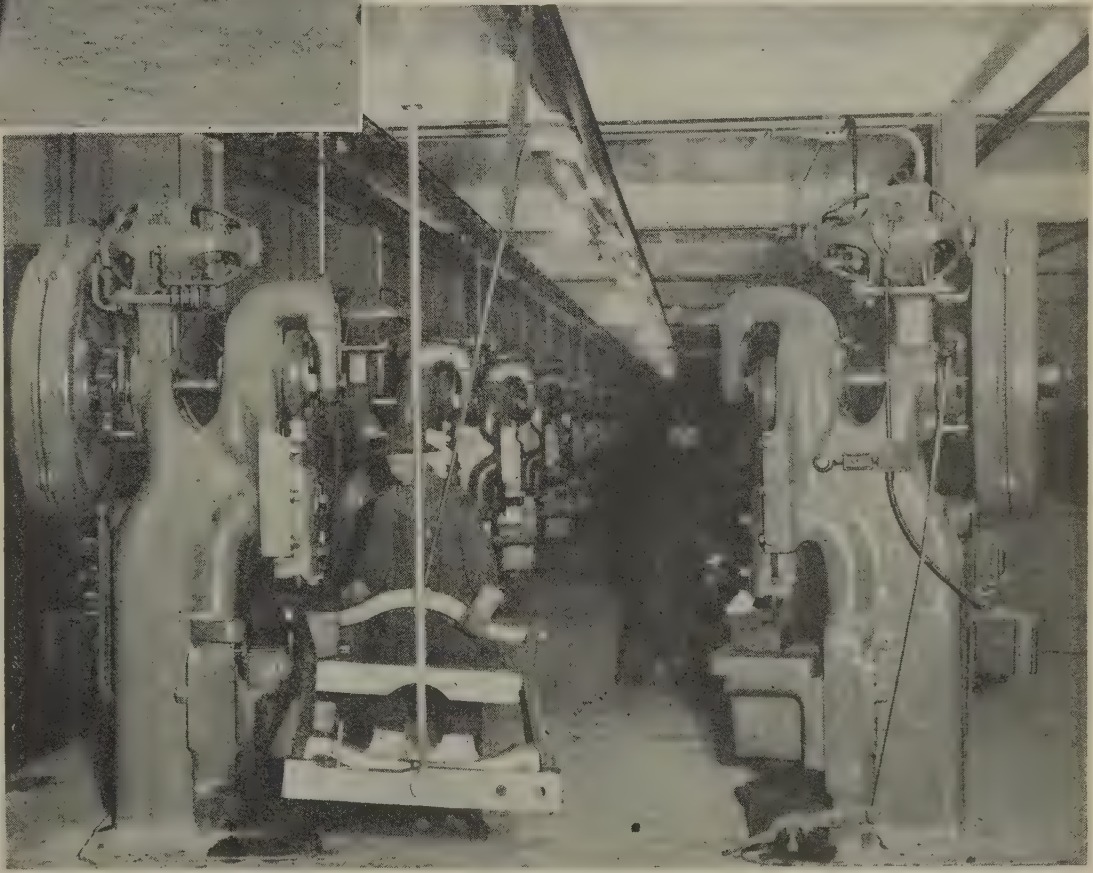
In the meantime, on through the process line, similar operations have taken place on the companion side member, and on the three cross members.

Intensive Safety Work Decreases Accidents

At the fifth annual safety engineering conference of the Western Pennsylvania Safety Council, held at Pittsburgh Chamber of Commerce April 19, it was brought out that fatal accidents have continued to show an appreciable decrease in all industries represented at the conference, but speakers were unanimous in declaring that this desirable development does not justify any relaxation in safety work. Indeed, the more common opinion was that cooperative effort on the part of the State, the employer and the workman to make work even safer is just as essential today as it was when safety work started in an organized way.

The Pennsylvania State Department of Labor and Industry was represented by H. D. Immel, director of the bureau of inspection. Speakers included Earl F. Blank, safety director and G. H. McClain, safety engineer Jones & Laughlin Steel Corporation, Pittsburgh; J. A. Oartel, chief of safety bureau Carnegie Steel Co., Pittsburgh; S. F. McKee, assistant to president Pressed Steel Car Co., Pittsburgh; W. G. Helsel, works manager Standard Steel Car Co., Butler, Pa.; W. F. Dittmer, supervisor of safety Westinghouse Electric & Mfg. Co., East Pittsburgh; J. A. Northwood, safety engineer Cambria works, Bethlehem Steel Co., Johnstown, Pa.; W. E. Megraw, safety director H. H. Robertson Co., Ambridge, Pa., and E. F. Harris, superintendent of employment and safety Mesta Machine Co., West Homestead, Pa. P. F. Fenlon, safety director Duquesne works, Carnegie Steel Co., presided at the morning session; John T. Ryan, vice-president Mine Safety Appliance Co., Pittsburgh, in the afternoon; and W. H. Boyce, commercial manager Pittsburgh Railways Co. presided at the banquet in the evening, which concluded the conference. There was a registration of more than 200.





An Unusually Flexible Swiveling Carrier Facilitates Riveting as the Frame Is Moved from Press to Press

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The Picture Above, Extending on Both Pages, Shows the Metal Platform at the End of the Line for Testing the Frame for Squareness and Quality

Casting Radiators Continuously

Rotating Annular Rings Used for Molding and Pouring—Handling Labor Much Reduced—Hydraulic Assembly on Revolving Tables

BY J. B. NEALEY*

HEATING by direct radiation is accomplished through the use of radiators. Hot water, steam and vapor are utilized and, until recently, radiators of different designs were ordinarily used for hot water and steam. Radiators are now almost entirely in one type for all three mediums. The Richmond Radiator Co., Uniontown, Pa., puts out a full line, known in the trade as Richmond tube radiators and wall radiators.

As radiators are made almost exclusively of cast iron, the foundry occupies a proportionately large part of any plant given over to their production. The Richmond foundry occupies a space 172 x 200 ft. It has a large volume of output in proportion to its working force and to the space utilized. This is due to the speeding up of production by the use of a continuous molding machine which eliminates all unnecessary handling, reduces labor to a minimum and keeps the men working at an unusually high rate of speed.

The machine consists of two large annular rings set close together, one for molding and the other for pouring. The first is made up of two big cast iron rings, joined together to form a circular frame about 15 ft. in diameter. This frame is set on rollers and is rotated by a motor. Molding machines are mounted on this frame at intervals and when rotated each molding machine passes successive workmen, each performing some operation until the flask is made up. The flask is then transferred to the pouring ring, where the pouring and shake-out take place.

The place each workman occupies around the ring is called a station and the operations, in sequence, are as follows:

1. Pattern is mounted on molding machine.
2. Pattern cleaned by brush and compressed air.
3. Chaplets set in to hold core.
4. Flask set on molding machine.
5. Flask filled with sand from overhead conveyor.
6. Sand rammed with automatic rammer.
7. Excess sand cleaned off.

The flask is then made up and is ready for pouring, and at the last station is lifted by air hoist and transferred to the pouring circle.

The pouring circle is similar in construction to the one described, except that it is flat to receive the flasks and is 25 ft. in diameter. The increased size is to give a sufficient cooling period between pouring and shake-out. The stations and operations as here performed follow:

1. Cores set in mold.
2. Flasks stacked three high.
3. Metal poured.
4. Castings shaken out.

The castings are shaken out over a grid, and the sand drops through on to a belt conveyor, which removes it to a bucket elevator. The latter elevates it to overhead storage bins into which it drops, passing through revivifiers as it does so. The castings are hooked on to another belt conveyor and taken to the

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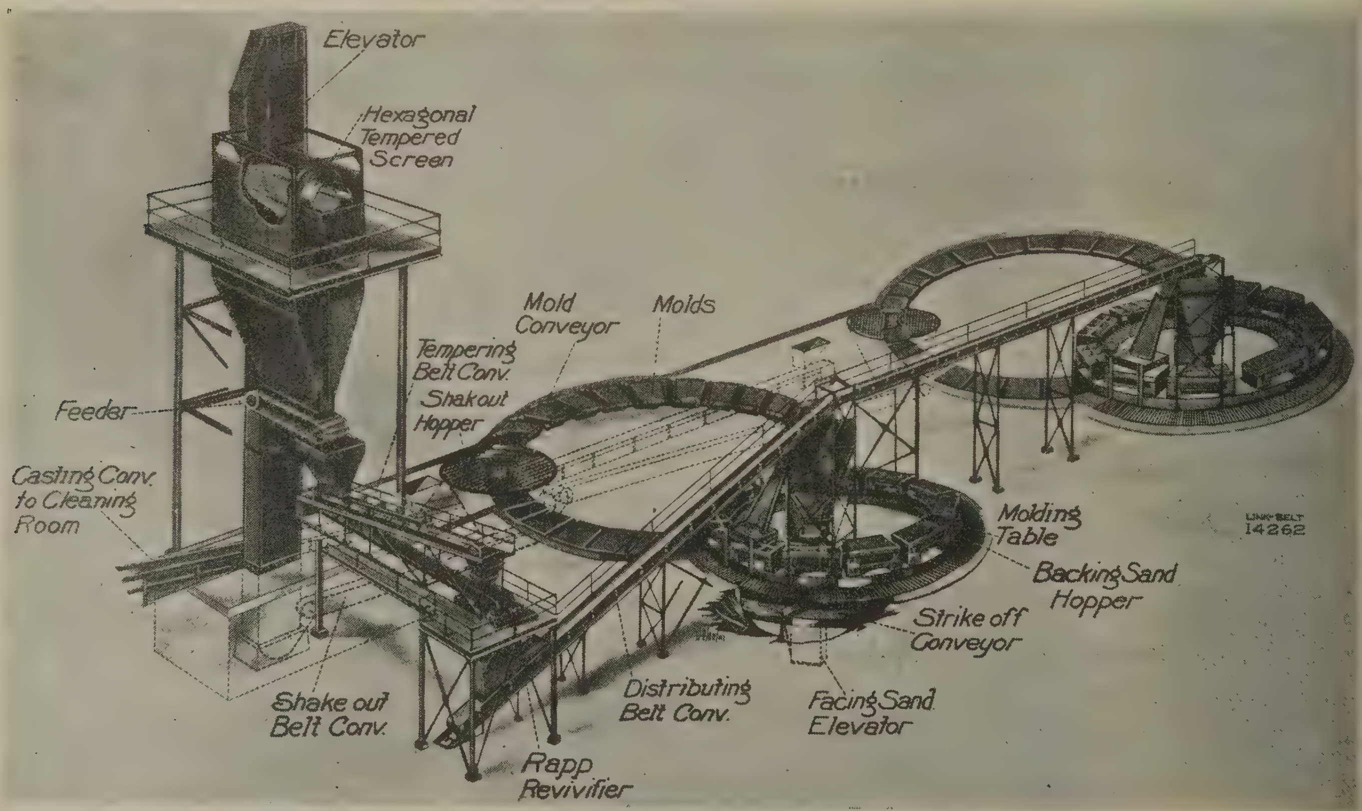

General Layout of Equipment for Making Radiators Continuously

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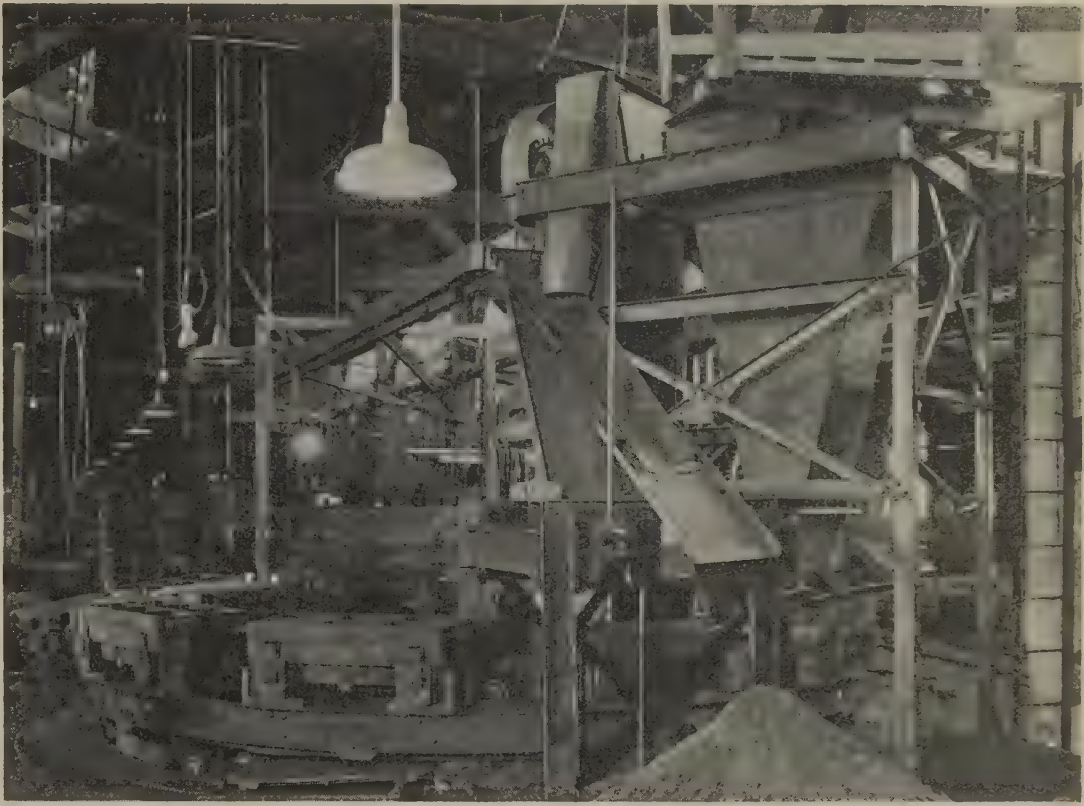

A Mold Conveyor (Above) 30 Ft. in Diameter, with Sand Preparing Unit in the Background

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A 15-Ft. Molding Table (Right), Distributing Belt Conveyor Delivering into a Hopper Flask and an Elevator Handling Strike-Off Sand from Circular Strike-Off Table Directly Underneath

—

Assembling Complete Radiators (Below) in a Four-Station Machine

cleaning room. The flasks are returned to the molding crew.

The system of core making, baking and handling is designed to give the greatest production with a minimum of time and labor. The core ovens are arranged in a single row, and the core making department parallels this on one side, in a space 50 x 100 ft., while the core storage occupies a similar position on the other side, with a space 50 x 186 ft. The cores are made and run into the oven from one side and when baked are run out the other side into the storage room, where there is space for 2,000,000 ft. of radiation.

Mechanical Handling Features Core Room

All cores are stacked on racks as made up and the racks are placed on cars which are run into the ovens. A system of tracks is laid out for the cars to run on. Four sets of tracks run into the core making room and between these are the core makers' benches. As fast as the racks are filled up they are lifted on to the cars by means of hoists on overhead monorail tracks. This monorail system serves also to bring in sand from another building. Tracks parallel the ovens on the front and in the rear, both running the entire length of the line. The loaded cars can be run on to the first line from the core making rooms and charged therefrom into any oven. When discharged on to the other side they can be run along the track to any one of eight cross tracks which run out into the cooling and storage rooms.

The core department and the foundry are served with connecting monorail systems and the cores, after being unloaded and stacked, are placed in baskets suspended from the monorail and delivered to the molders.

The core ovens are each 10 ft. wide, 8 ft. high and 14 ft. deep from entrance to rear. They are heated with gas burned in two or three long pipe burners, running from front to back, and located close to the bottom. Each oven holds a single rack which contains from 150 to 450 cores, according to size. A temperature of 400 deg. Fahr. is maintained and the baking periods range from 2 to 3 hr., according to core mixtures, size, etc. Each oven has a recording pyrometer for temperature control.

Revolving Brushes Clean Castings as They Pass on Conveyor

The cleaning room, 50 x 100 ft., is equipped with brushing machines for cleaning the castings. These machines consist of two sets of revolving wire brushes with a traveling conveyor just below. The radiator sections are placed on the conveyor and are taken automatically under and in contact with the brushes. They are then turned over and passed through a second time.

The machine, test and assembly building is 100 x 205 ft. The sections are stacked on skids and handled from one operation to another with high-lift trucks. They are first set between two clamps with water hose and filled with water, a pressure of 120 lb. being put on in order to detect any leaks.

A battery of 12 reaming machines next receives the sections, and the port holes are reamed out. The port in one side of the leg section is then threaded, when they are ready for assembly.

Completed radiators are made up of a number of sections ranging from two to 60, the latter being for long halls in public buildings. They are put together in a hydraulic assembly machine consisting of four tables in the form of a cross. Enough sections for a unit are put on the first table, with a leg section at each end. Malleable iron push nipples are placed between adjacent sections, fitting into the ports.

The table is then revolved to the second and then to the third station, where the unit is elevated about 2 ft. and forced together in a horizontal press. This makes the joints watertight and as strong as the casting itself. Revolved to the last station, long bolts are put in and the nuts tightened, which completes the assembly.

The radiators are then set up on the testing floor, filled with water and tested for leaks at 100 lb. pressure.

Zinc Institute Elects New Officers—To Study New Uses

R. M. Roosevelt of New York, vice-president of the Eagle-Picher Lead Co., was elected president of the American Zinc Institute, which held its annual convention at Hotel Statler, St. Louis, April 17, 18 and 19. Other officers elected are as follows: Vice-presidents, Jesse G. Starr of Joplin, Mo., president Quenton Smelter Co.; Percy B. Butler, Joplin, manager Barnsdall Zinc Co., and John A. McCarthy, Anaconda Copper Co., New York; secretary, Stephen S. Tuthill, New York, and treasurer, Howard I. Young, vice-president American Zinc, Lead & Smelting Co., East St. Louis, Ill. Edgar L. Newhouse, chairman of the board American Smelting & Refining Co., New York, was elected a director, to succeed Alex J. McCay, resigned.

The report of Secretary Tuthill for the year ended April 1, showed production of 1,332,200 metric tons of zinc, while consumption was 1,319,700 metric tons, a surplus output of 12,500 tons. He pointed out that in the three months ended March 31, 1928, the world's stock of refined zinc had increased 6800 tons. Mr. Tuthill said:

"It is necessary to concede that production is continuing slightly to outstrip the world's consumption of zinc and we have often encountered an obstinacy in the trade to accept unpalatable facts. The average gain in world consumption in the last four years has been 90,000 tons annually. Assuming this to be a normal yearly increase in consumption, it would mean that the world would call for a production of not less than 1,750,000 tons by 1932."

One of the means proposed to promote the further uses of zinc was an alliance with the Sheet Steel Trade Extension Committee, and it was decided to raise a substantial fund for research work to help determine the quantity of zinc most desirable for zinc coating. F. C. Wallower, chairman of the zinc-coated products committee, will have charge of the fund.

The by-laws of the institute were changed so that its work may be carried on by the executive committee, without waiting for action by the institute or its directors. The executive committee is composed of President Roosevelt, ex-officio chairman; A. P. Cobb, president of the New Jersey Zinc Co., New York; William Zimmer, vice-president of the American Metal Co., New York; J. A. McCarthy, Anaconda Copper Co., of New York, and Percy B. Butler, manager of the Barnsdall Zinc Co., Joplin, Mo. The two alternates to the executive committee are E. H. Wolff, president of the New Chicago Mines Corporation, Joplin, and William A. Ogg, president of the American Zinc, Lead & Smelting Co., Boston.

The will of the late Oberlin Smith, founder and for many years president of the Ferracute Machine Co., Bridgeton, N. J., and in 1890 president of the American Society of Mechanical Engineers, provides for a bequest of $1,000 to the United Engineering Society.

Gear Manufacturers Make Second Visit to Rochester

ALTHOUGH fewer than usual new technical standards were proposed for adoption, there was much of technical and general interest for those attending the convention of the American Gear Manufacturers Association, held at the Seneca Hotel, Rochester, N. Y., April 19, 20, and 21. This meeting, the twelfth annual, is the second held in Rochester, the previous visit having been in October, 1921.

Membership in this association includes many able technical men and executives, and the vigorous interchange of views at these meetings must work for individual and group progress, bearing fruit in increasingly better service to users of the industry's products.

Among the features of the meeting was the presentation of comprehensive data relating to non-metallic materials for gears and the adoption of standard nomenclature for bevel gears. A paper on the contact of standard worm gears was well received, and an illuminating contribution was an address on the value of research to the present day manufacturer. Progress reports and discussion of the future work of the association's several standardization committees, including the metallurgical, formed a large share of the deliberations, as heretofore.

An outstanding event was luncheon and inspection of the Gleason Works, Rochester. The informal banquet, augmented by delegations from the Gleason Works and other companies, was unusually well attended.

Election of officers resulted in the choice of A. F. Cooke, vice-president Gears & Forgings, Inc., Cleveland, as president, to succeed E. J. Frost, president Frost Gear & Forge Co., Jackson, Mich., who has held that office since May, 1925. B. F. Waterman, engineer Brown & Sharpe Mfg. Co., Providence, was elected first vice-president and E. W. Miller, chief engineer Fellows Gear Shaper Co., Springfield, Vt., was chosen as second vice-president. W. G. Jones, president W. A. Jones Foundry & Machine Co., Chicago, was elected treasurer to succeed C. F. Goedke, Chicago district sales manager Gears & Forgings, Inc. T. W. Owen, with headquarters at 3608 Euclid Avenue, Cleveland, continues as secretary of the association.

Balloting for four new members of the association's executive committee resulted in the selection of E. J. Frost; E. W. Miller; F. B. Drake, Johnson Gear Co., Berkeley, Cal.; and P. L. Tenney, general manager Muncie Products Division, General Motors Corporation, Muncie, Ind

The next meeting of the association will be held in Buffalo early in October.

Urges Better Facilities as Means of Meeting Competition

USE of up-to-date equipment, efficient coordination of shop processes and the elimination of waste within individual shops, were advocated by President E. J. Frost, in his address opening the convention, as an avenue to lower costs and the better meeting of competition.

As a text or key thought for his message, Mr. Frost quoted the following:

> When a business firm attempts to mold its entire policy to meet the prices of its competitor, that business is entering a labyrinth, the center of which is the chamber of despair. Highest quality never can be given nor obtained at the lowest prices. If a price can be sacrificed, quality must be sacrificed. If quality is sacrificed, society is not truly served.

"While this is true," he said, "it is equally true that progress is going on all about us and we must, if we are to continue in business, at least try to fit into the picture as it is, although this may differ radically from what we would like to have it.

"After we have been in business for a number of years, some of us, I fear, lose our pep so that we are content to try to whittle along with more or less antiquated equipment and growl at the fellow who provides himself with up-to-date machinery and tools, and who, as a logical consequence, is able to make more attractive prices and still have a satisfactory profit.

"It is not safe for us to forget that general development is bound to come and that the constant cheapening of all commodities has a tendency to broaden sales and make for quantity production, a 'round robin' more or less desirable.

"It is well for us to bear in mind, both as an industry organization and as individual members of the association, the responsibility that must be ours in this, the most wonderful age of progress and material achievement the world has ever seen. We must bear our share in the general program of reduction of costs to the consumer, so long as such reductions can be legitimate and be accomplished through increased efficiency of men, methods and machines.

Larger Production by Eliminating Waste

"Quality must not be sacrificed for quantity, but a larger product must be obtained through better education of our producers, through elimination of wastes that are common in almost all shops, and through creating an active interest on the part of the workmen so that will make each man feel that he is not a mere routine worker, but that he is a definite unit in a coordinated whole. The office should also bear its share of the program by buying satisfactory materials at right prices, by seeing that the materials are in the shop on time, that jobs are started in their proper sequence, and by giving maximum care to the selection of the most efficient machine tools and small tools, furnaces and other equipment.

"Good will and peace of mind among workmen are wonderful assets in any manufacturing plant," he said in another part. "These things have to be cultivated, if not actually earned by the management through relationships that are founded on mutual understanding and a working adaptation of the Golden Rule. As Charles M. Schwab put it: 'Today, cooperative action is essential as a means of advancing the interests of any industry. The day of the individualist, when personal interest overshadowed all other motives, has passed. It has been forcibly demonstrated that individual prosperity depends absolutely upon the success of the industry; that no individual can permanently prosper at his industry's expense."

Bevel Gear Nomenclature Adopted as Recommended Practice

REPORTS submitted by the several subcommittees of the association's general standardization committee, which is headed by B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, formed a large share of the deliberations of the meeting, as heretofore.

An outstanding committee accomplishment brought before the meeting was the bevel gear nomenclature submitted by F. E. McMullen, Gleason Works, chairman of the bevel and spiral bevel gear committee, which worked in conjunction with the nomenclature committee, headed by D. T. Hamilton, Fellows Gear Shaper Co. The suggested nomenclature, which was presented in printed data sheet form, covers 89 items. Definitions, formulas and illustrations are arranged as shown in the accompanying reproduction of one of the pages, but only those terms that have a dimensional value are symbolized. The report was accepted by the association as a suggested standard for future design, and the large amount of work of the committees involved was recognized by a vote of thanks.

A. F. COOKE, President-Elect of the American Gear Manufacturers Association, Is Vice-President of Gears & Forgings, Inc., Cleveland. Mr. Cooke was for many years vice-president of the Fawcus Machine Co., Pittsburgh, which recently merged with other companies to form Gears & Forgings, Inc.

Nomenclature for herringbone gears is being worked upon jointly by the nomenclature committee and the herringbone committee, the acting chairman of which is A. A. Ross, engineer, metal gear department, General Electric Co., Lynn, Mass.

Metallurgical Committee Considers Adding New Steels

Proposed revision of A. G. M. A. recommended practice for forged and rolled alloy steels for gears has been submitted to the membership by the metallurgical committee, the chairman of which is C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Canada. The revision consists of changes to make the standard conform to the style of the A. S. T. M.

It was pointed out by Mr. Hamilton that his committee is not attempting to make standards, but that its task is the selection of suitable steels and other materials for gears, and the excluding of unsuitable materials.

A questionnaire is to be submitted to the membership regarding the desirability of adding the S. A. E. 2512 high manganese, high-sulphur type of steel to the association's list. The questionnaire will also ask opinion as to whether S. A. E. 3140 steel, not now on the list, should be included, and whether S. A. E. Nos. 2345 and 6145 steels, now included, should be omitted because the S. A. E. Nos. 2350 and 6150 are also in the association's list of recommended steels for gear uses. It is felt that the specifying of these closely similar steels may not be desirable.

Addition of a qualifying footnote to the association's recommended practice for keyways in holes in gears, to show how it differs from the A. S. M. E. and A. E. S. C. standard, was proposed by R. B. Zerfey, engineer Tool Steel Gear & Pinion Co., Cincinnati, chairman of the keyway committee, and accepted by the association. The inclusion of a keyway for holes 5/16 in. to 7/16 in., inclusive, and extending the diameter of holes from 6 to 13 in., not now part of the A. S. M. E. standard, is being discussed by the sectional committee.

Work to be completed by the committee includes material for keys, in conjunction with the metallurgical committee and review of existing spline shaft standards for purpose of recommending tolerances and limits. In connection with the latter, it was suggested by Mr. Zerfey that the S. A. E. spline shaft standards be printed by the library committee and followed as closely as possible. The standards for Woodruff keys, proposed as American standard by the A. S. M. E. and the A. E. S. C. were also recommended for printing in form of A. G. M. A. data sheets.

Certain changes in terms and symbols, suggested by the nomenclature committee, have been made in the full depth tooth recommended practice, for both 14½-deg. and 20-deg. pressure angle, prepared by the tooth form committee, the chairman of which is H. J. Eberhardt, secretary Newark Gear Cutting Machine Co., Newark, N. J. The standards, adopted a year ago by the association, are ready for printing.

Progress was reported by the spur gear committee, headed by J. L. Williamson, engineer Fellows Gear Shaper Co., which is carrying on an extensive investigation relating to the horsepower of steel pinions. Expression of opinion relating to the advisability of working on standards for backlash for automotive transmission gearing was requested by Mr. Williamson. It was voted that because requirements depend on engine characteristics, no attempt be made to standardize this item.

The sprocket committee, with C. O. Bartlett, professor of machine design, Purdue University, Lafayette, Ind., chairman, is working on standards for roller chains having heavier side bars, and to be known as the extra heavy series.

Working on Preferred Pitches for Non-Metallic Gears

Work on recommendations for preferred pitches for non-metallic gear materials, undertaken by the non-metallic gearing committee, with T. C. Roantree, Westinghouse Electric & Mfg. Co., East Pittsburgh, chairman, is making progress. Difficulties were said to have been encountered in that general practice has shown there had been no general relationship established between diametral pitches, face widths, pitch line velocities and horsepower ratings. A plan is being considered whereby the arbitrary selection of a certain range of face widths, based on general practice, will be established for certain groups of horsepower ratings and with these, a table of preferred pitches can be more readily prepared.

Printed data sheets listing the horsepower ratings per inch of face of laminated phenolic or rawhide spur pinions of 1 to 12, 18 and 50 Dp, pitch line velocities ranging from 100 to 3000 ft. per min., and teeth ranging from 12 to 60, have been issued by the library committee, the chairman of which is E. J. Noble, chief engineer Horsburgh & Scott Co., Cleveland.

Gives New Data on Strength of Non-Metallic Pinions

Interesting data relating to a recent series of tests on the strength of gear teeth, made on the Lewis machine at the Massachusetts Institute of Technology, were given by Earle Buckingham, associate professor of engineering standards and measurements, of the M. I. T. Professor Buckingham's remarks were of the nature of a progress report, submitted in place of E. W. Miller, chief engineer, Fellows Gear Shaper Co., Springfield, Vt., who is the A. G. M. A. representative on the A. S. M. E. special research committee on gears.

Two series of tests on the Lewis machine have been completed since the association's last meeting. One of these was a load test of a 60-tooth, 10 pitch, non-metallic pinion with a 160-tooth cast iron gear, the gears and pinions being loaded to the point where they failed.

It was found that the actual loads required to break the teeth of the non-metallic pinion were from 15 to 22½ times the A. G. M. A. safe load rating for that particular combination. This markedly higher safety factor was attributed to the fact that because of the elasticity of the non-metallic material under load, two or three teeth are in mesh and share the load. The contact of these three teeth was at the tip, near the pitch line and near the root, respectively. The gears were of 14½-deg. composite tooth form.

It was pointed out that with the non-metallic gears, somewhat the same condition is obtained as in the screw thread, i.e., in that the strength is not directly proportional to pitch. The length of contact must be taken into account in figuring the strength.

Noise in Gears Due to Inaccuracy

In reply to a question relating to the difference in noise between a 20-deg. pressure angle and a 14½-deg. angle gear, Professor Buckingham said that it is difficult to say whether it is due to pressure angle or inaccuracy. Inaccuracies, he stated, will develop more noise than any other factor in tooth design. Wear tests have not been attempted, but in this he also is of the belief that accuracy is a fundamental factor. Further in regard to noise, it was pointed out that in the non-metallic material, which is very elastic, the error would have to be relatively great to interfere with the effect of having several teeth sharing the load, deformation of 1/64 in. being possible, which is much beyond the probable errors. With the metallic gear, with only one tooth in contact, the difference in noise of operation between a gear having inaccuracy of 0.002 in. and another having 0.003 in. was very noticeable.

Another interesting deduction from the non-metallic gear tests is that reduction in strength of gears due to inertia loads follows the same curve as obtained from the safe working stresses formula at different speeds of the A. G. M. A.

Discusses the Future of Non-Metallic Gearing Material

SOMETHING of the history and use of laminated phenolic gearing material was outlined by T. C. Roantree, Westinghouse Electric & Mfg. Co., East Pittsburgh, in a paper on "Non-Metallic Materials, the Part They Will Play in the Future of Gear Materials," presented at the second general session of the A. G. M. A. annual meeting.

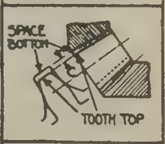
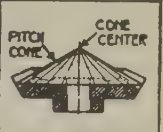
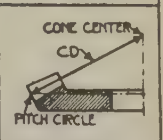
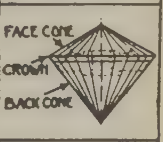
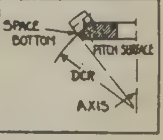
This laminated phenolic product, a self-retaining material, was first used as a gearing material about 14 years ago. Early applications were experimental but as time went on the product underwent gradual changes, and it is now possible, said Mr. Roantree, to manufacture non-metallic gearing material that is unusually uniform in structure and with high tooth-carrying capacity. The material is said to be successfully used not only for spur gears, but for bevel, worm and herringbone gears, including herringbone of the Sykes tooth form. Quietness of operation is an outstanding feature of gears of this material, and to the reduction in noise was attributed, in many cases, the substitution of the non-metallic material for the satisfactorily performing metal gear. Another feature was said to be reducing of vibration, this being due to the resilient property of the material, which functions upon the meshing of its teeth with those of the metal mating gear.

It was stated that from recent tests it has been concluded that the tooth strength of the non-metallic material did not decrease as rapidly as in metals, when the pitch line velocity of the gear was increased. This element was said to be sufficient to change the Barth equation in the Lewis formula from $\frac{600}{600+V}$ to $\frac{150}{200+V} + 0.25$. This change, in addition to establishing an added value, was said to rank the material as essentially a high-speed product because of its ability to function more satisfactorily in the higher ranges than several of the metals used for gears, unless the metals have been heat treated.

The non-metallic material was also said to have advantages in conditions where the atmosphere is laden with dust particles, such as in cement mills, foundries, etc., in which applications the grinding action that develops when these particles fall upon the revolving gear teeth is relieved. The surface of the non-metallic material is less hard and more flexible than the metal and thereby decreases the abrasive action; the lesser particles may also imbed themselves. Gears of the laminated phenolic material can be used in an atmosphere filled with acid fumes; and may in some cases even be submitted to occasional splashes of the acid solution. They are said to have been used to advantage in pickling, galvanizing and plating operations.

Used for pinions, the non-metallic material is said to result in less wear on the metal gears with which the pinions mesh. This preservation of the tooth surfaces of the large metal gear was stressed as prolonging the life of the gear, and, in many cases, justifying replacement of a metal pinion with one of non-metallic material.

It was estimated that 3,000,000 gears of this material will be used in the automotive industry during 1928. During the three-year period prior to 1928 the use of this material has trebled, said Mr. Roantree.

No.	Term	Symbol	Definition	Formula	Illustration
30	Clearance	C	is the shortest distance between the top of a tooth and the bottom of its mating space.	$C = \frac{\text{Constant}}{DP}$	
31	Cone Center		is the apex of the pitch cone.		
32	Cone Distance	CD	is the shortest distance from the cone center to any point on the pitch circle.	$CD = \frac{\frac{1}{2}PD}{SIN.VP1}$	
33	Crown		is the circle formed by the intersection of the face cone and the back cone extended.		
37	Dedendum Circle Radius	DCR	is the distance perpendicular to the pitch surface from the bottom of the tooth space to the axis of the gear.	$DCR = BCR - D$	

Bevel Gear Nomenclature, in the Form Shown Above, Was Adopted by the A. G. M. A. As a Suggested Standard for Future Design

Presents Analysis of Worm Gear Contact

A paper on the "Contact of Standard Worms," by J. C. O'Brien, Pittsburgh Gear & Machine Co., Pittsburgh, presented at the closing session of the meeting, was received with interest. It was pointed out that the theory of the subject has been ably presented by other writers, but that in general, worms of special design or of unusual proportions were selected for analysis. While these special worms may have illustrated particular features of theory which the writers desired to emphasize, the procedure also leaves open to individual interpretation, the application of their various theories to the "common garden variety" of worms.

For his analysis, Mr. O'Brien used worms selected from the range of sizes recommended by the A. G. M. A. worm gear committee, selecting the sizes which he believes show average conditions of contact.

The construction and use of Rockwell dilatometers for the Volcrit method of heat treatment were described and illustrated by means of lantern slides and moving pictures, by S. P. Rockwell, Stanley P. Rockwell Co., Hartford, Conn., at evening session.

Lubrication of automobile transmissions and rear axles was dealt with in an address by G. A. Round, assistant chief engineer, Vacuum Oil Co., in an address on "Gear Lubrication." One of the biggest problems of the lubrication manufacturer, he said, is leakage; good gears are made and then put in cases that won't hold the oil. The factor of space in transmission cases, for the oil to get rid of its air, was stressed as of importance, most leaking in transmission being due to increase of oil level.

In rear axles leakage was stressed as even more serious because its oil often gets on to the brake surfaces. There is little increase in level due to foaming of the lubricant, but peculiarities of design increase the liability to leakage. In regard to lubricant circulation, it was said that the rear axle presents a real problem.

Mr. Round's paper gave evidence of much scientific research into the problems under discussion. Some of the instruments devised for making gear shifting measurements were described and illustrated by lantern slides. Data were given on the life of lubricants and the amount of foreign material in them, and in this connection it was said that it was found that at 200 deg. Fahr. a good lubricant will normally increase in viscosity at the rate of 5 per cent in 1000 miles. The importance of making provision in transmissions and rear axles for drainage of oil was emphasized.

Research Essential to Present Day Manufacturers

A CONVINCING case for "The Value of Research to the Present Day Manufacturer" was made by C. E. Skinner, assistant director of engineering Westinghouse Electric & Mfg. Co., in an address at the first general session, April 20. Intelligently directed and applied, research is not only of value to the manufacturer but is essential to his very existence, he said.

Prior to the Great War we had in the United States quite a number of industrial research laboratories, some of them already operating in a very large way, said Mr. Skinner, but the growth of industrial research has been very rapid since the war.

The fact that in the beginning of the industrial research era the newer industries were largely the ones which established and operated extensive research programs, was attributed to these newer industries, in being founded largely on the results of fundamental scientific research, found it necessary to continue research for further development and for the control of their materials and processes. As an example, he pointed to the electrical industry, which is hardly a half century old and yet within which may be found some of the oldest and most extensive industrial research laboratories in the country. Modern chemical and electrochemical industries demand constant attention from the scientist and technician, said Mr. Skinner, because the very foundations of these industries are laid in scientific research.

The enormous strides which have been made in those industries which have carried out definite research programs, has no doubt had much to do with the present day sympathetic attitude of almost every industry in the country to the question, he continued. The larger manufacturers are, in the main, carrying on programs of research within their own organizations, while many smaller companies have a nucleus of research workers or have combined in cooperative research programs. In some other countries, notably Great Britain, industrial research is fostered by the state.

Recent census figures were said to indicate that there are upward of 1000 industrial research laboratories in the United States, and upward of 10,000 trained research workers, aided by a small army of assistants, glass blowers, mechanics, etc. Statistics giving the annual expenditure in this country for industrial research are not available but was said to run into many millions of dollars, a number of individual laborataries having a budget of a million or more dollars a year. These were pointed out as very impressive figures and as constituting in themselves a very definite answer to the question as to whether research is of value to manufacturers.

It has become almost a trite saying, said Mr. Skinner in another part, that the results of fundamental research provide us with the scientific curiosity of yesterday, which becomes the basis of industrial investigation and development of today, and the household necessity of tomorrow.

Scientific Curiosity of Yesterday, a Household Necessity of Tomorrow

General functions more or less common to the work of all industrial research laboratories were outlined. It was stated that as a rule the principal function of such a laboratory is to develop new and useful products and processes for the industry it serves. In some cases its main function may be in cooperating with customers, to develop new uses for products already established. It may be established for the main purpose of improving manufacturing processes, or aiding the development of new devices and applications based on some outstanding invention which provides the main product of the manufacturers served. Most industrial laboratories find that an inevitable part of their work consists in curing and anticipating troubles either with the product, the processes involved or in the application of the product.

Recent surveys were said to indicate that the notable advances in industry as the result of research now come mainly from the well-organized industrial research laboratories.

Advertising Based on Sales Research

Advertising plans adopted a year ago to broaden the electrical markets of the Westinghouse Electric & Mfg. Co., East Pittsburgh, were outlined in an address by J. C. McQuiston, publicity director of the Westinghouse company.

The plan involves the use and coordination of technical and trade papers, to reach the industries, and of newspapers, to reach communities. The plan was based on sales research. The fields for the various products of the company were studied comprehensively and advertising planned accordingly.

Large Attendance at Banquet

Augmented by a large delegation from the Gleason Works, which had earlier in the day been hosts to members of the A. G. M. A., and by guests from other companies, the informal banquet, held on the evening of April 20, was marked by an unusually large attendance.

Dr. Dexter S. Kimball, dean of the college of engineering Cornell University, was the chief speaker, and E. J. Frost, president of the association, was toastmaster. A brief address was made by James E. Gleason, president Gleason Works, and the new officers were introduced by F. W. Sinram, president Gears & Forgings, Inc., Cleveland, and honorary president of the association. An elaborate vaudeville entertainment, furnished by talent from the Gleason Works, was one of the features of the evening. Songs by J. L. William-

(*Concluded on page* 1192)

Design of Galvanizing Furnaces

Economical Operation Demands Furnace Setting Which Protects Pot from Direct Impact of Flame—Hot Spots Produce Much Dross

BY MILTON EPSTEIN*

IN choosing an industrial furnace a plant manager carefully considers a large number of factors, since he wants the product of this furnace made at a minimum cost consistent with high quality. Most articles require heat in their making. This heat is available from a number of sources—electricity, gas or oil, or the crude fuels may be used to generate it. Sometimes an apparently more expensive fuel such as electricity may be the most economical, due to features of control and cleanliness. In other operations it has been found that superior equipment can be designed for but one fuel, and this of course would limit the choice of the buyer.

Galvanizing or zinc coating is an industrial heating process that can be successfully conducted with nearly all of the fuels that are available. Furnaces have been built and operated using electricity, gas, oil or coke. The choice of any of these fuels depends on the local conditions.

It will probably be of value to those in the galvanizing industry to present some data obtained over a period of years at a single plant where coke, gas and oil have been used in the production of hot galvanized metalware. It is the object to present this data in a disinterested manner, and it should be borne in mind in interpreting it that fuel conditions and prices differ in various territories.

It is well known that during the process of coating iron with zinc there is formed a material known as dross. This is an alloy of zinc and iron analyzing about 95 per cent zinc. Dross is heavier than the molten zinc (spelter), and therefore sinks to the bottom of the pot.

Published data show that the formation of dross increases very rapidly with the increase in temperature. Dross will form more than three times as fast at a temperature of 860 deg. Fahr. as it will at 820 deg. At higher temperatures the rate increases greatly, as shown in the table.

The dross, in sinking to the bottom of the pot, has a tendency to prevent the transmission of heat into the

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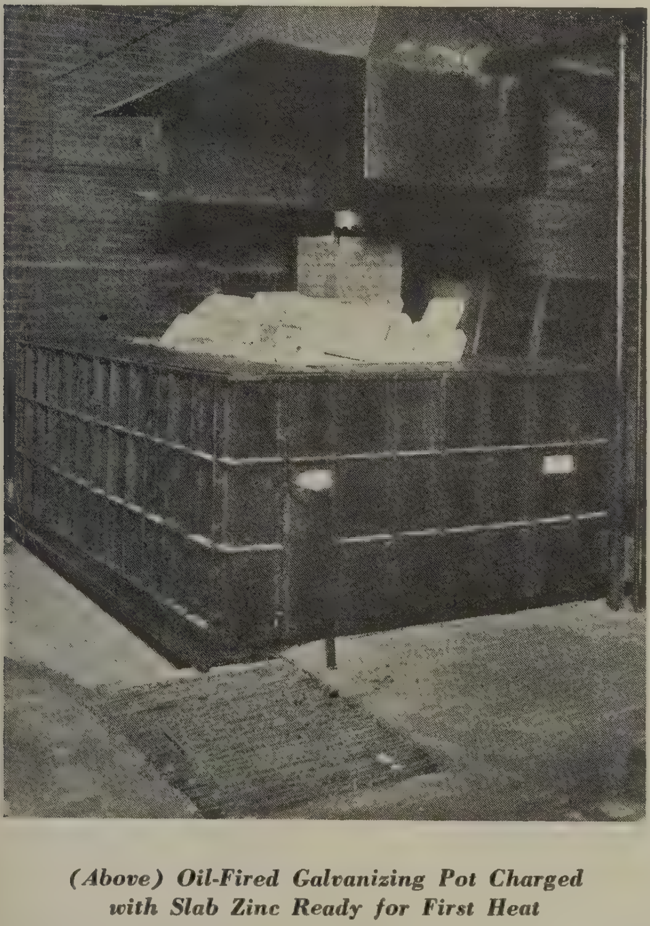
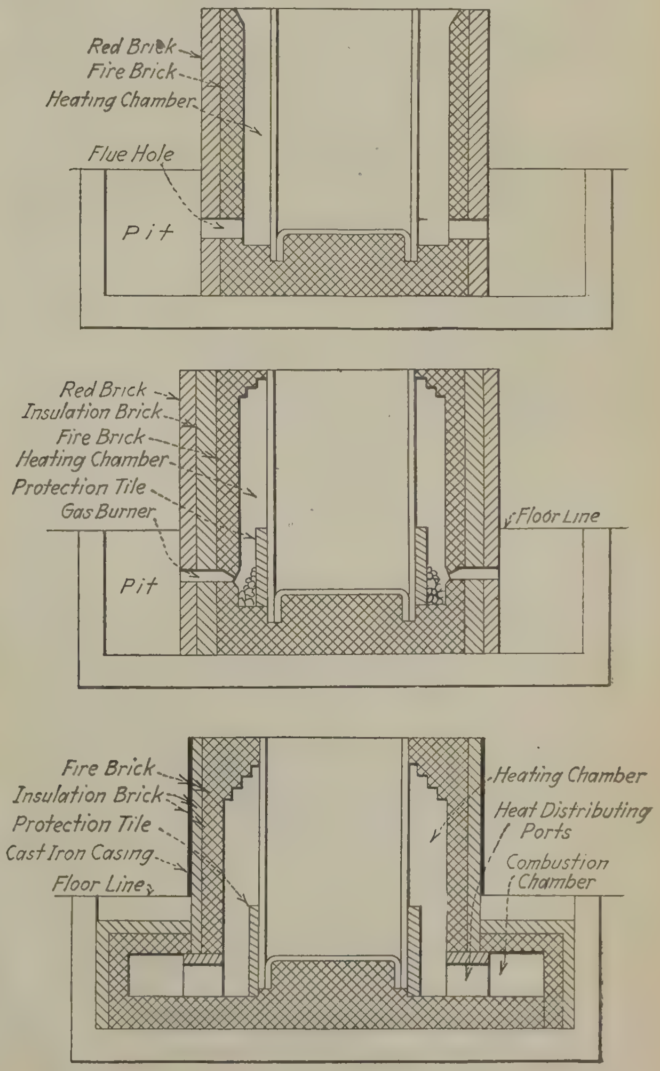
*Industrial Engineering & Equipment Co., St. Louis.



(Above) Oil-Fired Galvanizing Pot Charged with Slab Zinc Ready for First Heat


Red Brick
Fire Brick
Heating Chamber
Flue Hole
Pit
Red Brick
Insulation Brick
Fire Brick
Heating Chamber
Protection Tile
Gas Burner
Floor Line
Pit
Fire Brick
Insulation Brick
Protection Tile
Cast Iron Casing
Floor Line
Heating Chamber
Heat Distributing Ports
Combustion Chamber

(At Right) Comparative Cross-Sections of Conventional Furnaces Using Respectively Coke, Gas and Oil

Corrosion of Low-Carbon Steel by Hot Zinc (C. Diegel)

(Loss in Grams per Hour per Square Meter)

Steel	450 deg. C. (842 deg. Fahr).	475 deg.C. (889 deg. Fahr.)	490 deg. C. (914 deg. Fahr.)	500 deg.C. (932 deg. Fahr.)	524 deg. C. (977 deg. Fahr.)
0.11 per cent carbon	22.0	27.8	30.6	89.0	347.6
0.10 per cent carbon	21.6	27.8	31.0	134.9	339.0
0.11 per cent carbon	22.3	27.8	32.6	289.3	379.7
0.12 per cent carbon	24.7	26.9	32.2	282.7	804.6
Average	22.6	27 6	31.6	199.0	467.7

melted zinc and causes the container to run hotter than it should. From these facts it can be seen that the design of a successful galvanizing furnace should be such that the outside temperature of the pot is kept as low as possible, and that little or no heat should be transferred into the pot below the dross line.

A study of the sketches showing typical furnace designs for gas, oil and coke brings out the following facts:

The usual design for coke furnaces used in metalware plants gives no protection to the pot. The coke is piled into the combustion chamber, and in order to obtain a sufficient temperature to produce the proper tonnage the heat must be transferred directly into the pot at every available surface. Higher temperatures are thus produced in the combustion chamber, and it has been found that pots fired with coke do not last very long and much greater amounts of dross are produced. As regards this point, it is almost an axiom that high dross formation is the concomitant of low pot life. The zinc combines with the iron of the pot to form galvanizing dross, and the pot is eaten through from the inside, this being the normal manner in which it springs a leak.

Although there are a number of designs of gas-fired furnaces being used throughout the country, one that has found favor introduces a mixture of gas and air through burners located at or near the bottom of the pot; these flames blow into refractory beds, which cause immediate and complete combustion of the gas. The sides of the pot are protected with refractory tile, and this superior construction results in longer pot life. On tests it has been shown that pot life is more than doubled and dross is reduced 30 or 40 per cent.

The latest designs of oil-fired furnaces remove the high-temperature zones even farther from the pot. Oil is fired into combustion chambers located parallel to the length of the pot and about 15 or 18 in. away. Here it is completely consumed, and the hot gases pass through flues, pierced through the side of the combustion chambers and so arranged that an even distribution of heat is obtained throughout the length of the pot. Refractory tiles protect the pot, and are arranged to be of such a height that the normal dross line will always be covered. With these conditions a minimum of heat is transmitted into the pot below the dross line.

Tests taken on gas and coke-fired galvanizing pots operated side by side over a period of months show the following comparison:

Production conditions:
Pot operated 16 hr. and held at melting point 8 hr.
Average weight of black steel galvanized in each pot: 7460 lb.

Costs:		Coke-Fired Pot		Gas-Fired Pot
Fuel	700 lb.	$3.50	8900 cu. ft.	$6.00
Power		——		0.60
Dross		7.35		4.91
Pot		1.16		0.50
Labor for drossing		1.48		0.74

Cost of dross represents the difference between the cost of the metallic zinc absorbed in the dross and the market value of the dross for resmelting. The fuel figures represent average daily figures taken over a month of 25 operating days.

Oil-fired furnaces installed at this same plant at a later date were studied carefully, and these figures were obtained:

Production conditions:
Pot operated 16 hr. and held at melting point 8 hr.
Weight of black steel galvanized in each pot: 9100 lb.

Costs:		Oil-Fired Pot		Gas-Fired Pot
Fuel	52 gal.	$3.12	10,500 cu. ft.	$7.03
Power		0.40		0.60

Exact production figures regarding the amount of dross formed, pot life and labor for drossing are not available, but it has been found that there is not much variation between the gas and oil furnaces on these costs.

In summarizing the results of these three fuels, the table at bottom of page will set forth the relative value of the various features involved.

American Rolling Mill Co. to Spend $2,000,000 at Butler, Pa.

The American Rolling Mill Co. has made a definite start upon a program of plant improvement at its Butler, Pa., works, for which there will be an expenditure somewhat in excess of $2,000,000. Contract for the structural steel for the new buildings, amounting to 3500 tons, recently was awarded to the McClintic-Marshall Co. The expenditures for new equipment will be for operations beyond the hot mills, in annealing, pickling and cold-rolling. The system of cold-finishing now in successful use at the company's Ashland, Ky., works is to be largely duplicated.

Study Course on Heat Treatment with Gas Fuel

An intensive course of instruction on metallurgy, with particular attention to heating processes wherein gas-fired furnaces are used, will be given at Massachusetts Institute of Technology, June 18 to 28, under sponsorship of the New England Gas Association and the American Gas Association.

This will be the seventh annual study course given under the auspices of these associations. Students will be housed in a school dormitory, and will use the institute's metallurgical and gas laboratories for solving assigned problems. Professors Wilkes, Williams and Homerburg will lecture on combustion, metallurgy and metallography respectively. Furnace engineers will also discuss modern furnaces and competitive fuels. Details concerning registration, fees and other matters can be obtained from Robert L. Gifford, 231 Main Street, Pawtucket, R. I.

The eighteenth annual convention of the German Foundrymen's Association will be held in Berlin, May 5 and 6. An interesting program of technical papers on gray iron, cast steel, malleable iron, and other foundry subjects has been arranged.

Comparison of Gas, Coke and Oil for Galvanizing under Similar Conditions

	Cost of fuel Gas=1.0	Dross Formation Gas=1.0	Pot Life Gas=1.0	Regulation	Cost of fuel and calorific value
Coke	0.57	1.49	0.4	Poor	$10 per ton
Gas	1.0	1.0	1.0	Good	600 B.t.u. $0.674 per 1000 cu. ft.
Oil	0.45	1.0	1.0	Good	140,000 B.t.u. 6c. per gal.

Steel Consumers' Earnings Analyzed

Profits of Automotive Industry Led Steel Consuming Groups in 1927, Though Farm Implement, Electrical Machinery and Office Equipment Makers Gained

LED by record earnings in the automotive industry, particularly by the General Motors Corporation, 114 companies in the iron and steel consuming groups had profits in 1927 which exceeded in the total the earnings for 1926. These companies last year reported net profits of $665,109,000, a return of 15.3 per cent on a total stockholders' investment of $4,356,152,000, the stockholders' investment being taken as the sum of the common and preferred stock and total surplus. In 1926 these same companies earned $648,841,000 on a stockholders' investment of $4,004,040,000, a return of 16.2 per cent. Although 1927 was a year of slightly higher net profits, increased liabilities, especially in the surplus columns of some of the highly prosperous companies, made the per cent return slightly lower.

But the picture of earnings in 1927 by the principal steel consuming industries cannot be drawn true when grand totals only are examined. More than half, or $336,752,000, of the total for the 11 chief consuming groups examined must be credited to the automotive industry, which registered a return of 24.9 per cent on a stockholders' investment of $1,352,300,000. In 1926 this same group, made up of 24 manufacturers of automobiles, trucks and airplanes, had profits of $299,215,000, a return of 26.1 per cent on the considerably lower stockholders' investment of $1,141,439,000. These figures, however, do not take into consideration the rather sharp decrease in the surplus of the Ford Motor Co. during 1927 and they do include the record earnings of $239,265,000 reported last year by the General Motors Corporation, a return in this case of 37.7 per cent on a stockholders' value of $634,257,000 and an increase of 35.4 per cent over the $176,699,000 earned in 1926.

The automotive industry as a whole did not fare nearly so well in 1927 as in the preceding year. Not including the Ford and General Motors organizations, the 23 companies analyzed had net profits last year of $97,487,000, a return of 13.6 per cent on a stockholders' investment of $718,043,000, as compared with profits of $122,516,000 in the preceding year and a return of 18.7 per cent on an investment of $654,423,000. Last year's decline under 1926 amounted to 20.4 per cent, a figure which is changed to an increase when the General Motors profits are included.

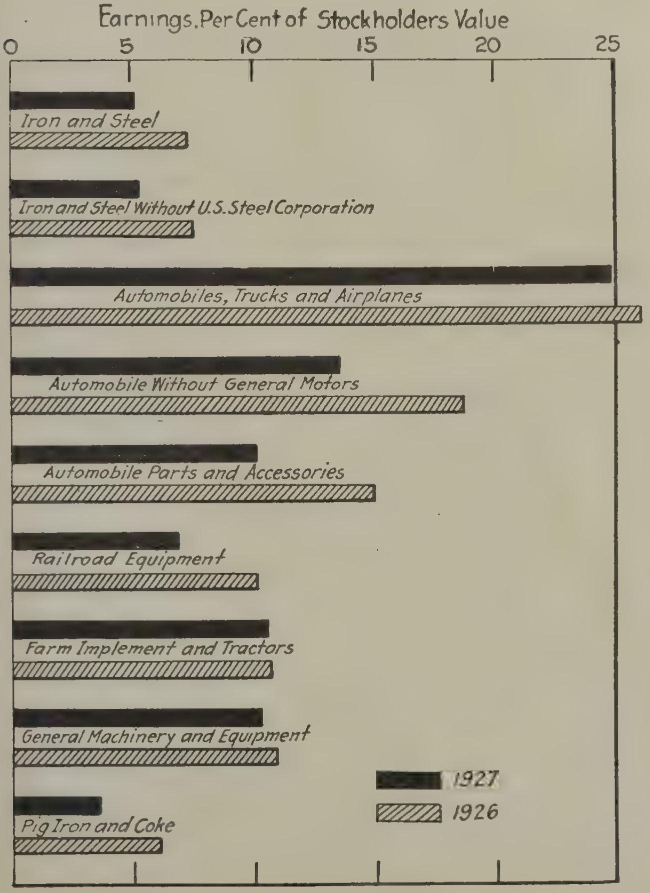
Of the 24 companies included in this analysis, 15 made poorer showings in 1927 than in 1926, seven reporting deficits. No deficits appeared as a result of 1926 operations. Two of the nine companies reporting higher earnings in 1927 were manufacturers of airplanes. The Willys-Overland Co., the Hudson Motor Car Co. and the Reo Motor Car Co. also had much better returns than in 1926.

Iron and Steel Industry Again at Bottom

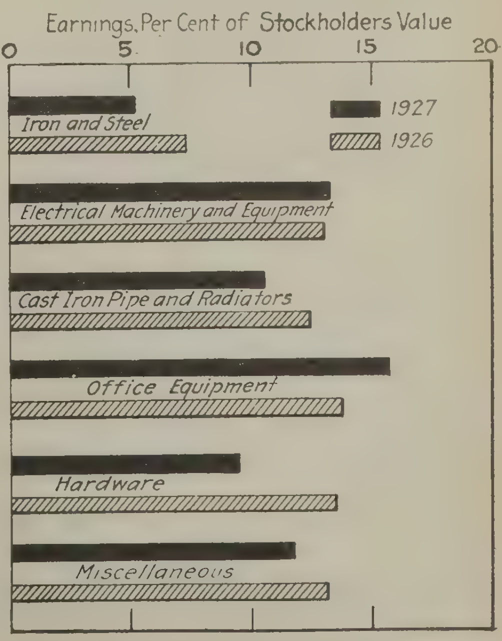
If 1927 was a poor year for the automotive group when considered without its most spectacular member, it was less profitable for the steel industry and even worse for a group of four companies whose chief products are pig iron and coke. A group of 23 steel making companies, with an ingot capacity of more than 85 per cent of the entire industry, had net earnings of only $157,656,000, a return of 5.2 per cent on a total stockholders' investment of $3,017,644,000, and the investment is nearly three-fourths as large as the investment in the combined consuming groups. In the preceding year the return was 7.3 per cent, the decline in net profits having been 25.2 per cent.

As the accompanying table shows the variation in earnings for the two years was about the same either with or without the Steel Corporation. However, the return of independent companies was slightly higher than that of the leading interest in both years in direct contrast to the experience of the automotive industry.

The analysis of a group of four producers of merchant pig iron and coke may be considered as fairly representative of that industry, which has suffered seriously since the war period. These companies earned only $3,246,000 on a stockholders' investment of $88,873,000 in 1927, a return of 3.6 per cent. In 1926



STOCKHOLDERS' Value Is Taken as Sum of Common and Preferred Stock and Surplus, and Earnings Are Net for Common and Preferred Stock After All Deduction for Interest, Taxes, Depreciation and Depletion



the same companies had profits of $5,016,000, or a return of 6.1 per cent on an investment of aproximately $82,048,000.

Farm Implement Makers Did Better

The farm implement, electrical machinery and office equipment groups all reported slightly better profits in 1927 than in 1926. Of the seven makers of farm implements and tractors making up this group, only one reported lower profits in 1927 than in 1926, and the gain in the group as a whole was 6.6 per cent. The International Harvester Co., which accounted for about half the profits of this industry, fared no better comparatively than the smaller companies.

Comparison of Earnings of 10 Important Iron and Steel Consuming Groups With Iron and Steel Makers

(In Thousands of Dollars)

Classification	No. of Companies	1927 Total Stockholders' Investment	1927 Net Profits	1927 Per Cent Earnings to Stockholders' Investment	1926 Total Stockholders' Investment	1926 Net Profits	1926 Per Cent Earnings to Stockholders' Investment	Per Cent Gain or Loss in 1927
Iron and Steel	23	$3,017,644	$157,656	5.2	$2,877,002	$210,842	7.3	—25.2
Without Steel Corporation	22	1,325,558	69,759	5.3	1,246,555	94,175	7.5	—25.9
Pig Iron and Coke	4	88,873	3,246	3.6	82,048	5,016	6.1	—35.3
Automobiles, Trucks and Airplanes	24	1,352,300	336,752	24.9	1,141,439	299,215	26.1	+12.9
Without General Motors	23	718,043	97,487	13.6	654,423	122,516	18.7	—20.4
Automobile Parts and Accessories	15	193,615	19,521	10.1	194,276	29,300	15.0	—33.4
Railroad Equipment	13	486,697	33,293	6.8	433,013	43,834	10.1	—20.0
Farm Implements and Tractors	7	418,045	44,408	10.6	390,773	41,662	10.7	+ 6.6
General Machinery and Equipment	15	341,832	35,284	10.3	339,854	36,877	10.9	— 4.4
Electrical Machinery and Equipment	7	670,896	89,161	13.3	635,035	83,167	13.1	+ 7.2
Cast Iron Pipe and Radiators	9	212,017	22,386	10.5	208,024	26,058	12.5	—14.1
Office Equipment	8	160,544	25,297	15.7	164,577	22,601	13.7	+11.9
Hardware	7	98,100	9,213	9.4	98,866	13,539	13.5	—31.9
Miscellaneous	9	422,106	49,794	11.8	398,183	52,588	13.2	— 5.3
Total	141	$7,462,669	$826,011	11.1	$6,963,090	$864,699	12.4	— 4.5
Total Steel Consuming Companies	114	4,356,152	665,109	15.3	4,004,040	648,841	16.2	+ 2.5

In the electrical machinery and equipment classification, although the group as a whole registered an increase in profits of 7.2 per cent over 1926, the gain was made entirely by the three larger interests, the General Electric Co., the Westinghouse Electric & Mfg. Co. and the Western Electric Co., Inc. Four smaller companies reported sharp declines.

The office equipment makers, however, reported well distributed gains. Seven of the eight companies analyzed had higher profits in 1927 than in 1926 and the decrease in the case of the General Fireproofing Co. was very slight. The eight companies had a return of 15.7 per cent on total stockholders' investment in 1927, as compared with 13.7 per cent in 1926, the gain in profits having been 11.9 per cent.

Automotive Parts and Accessories Declined

The most pronounced reductions in profits were shown by the automotive parts and accessories makers, the hardware group and the manufacturers of railroad equipment. Only four of the 15 companies included in the automotive parts group had better returns in 1927 than in the preceding year and in the case of one of these companies the gain was only in the form of a smaller deficit. The decrease in the industry as a whole amounted to 33.4 per cent.

A group of six companies the principal products of which are hardware, firearms and kindred products registered a decline in earnings last year of 31.9 per cent. This decrease was general, ranging from 16 to 72 per cent, and the return on stockholders' investment for the group was 9.4 per cent in 1927, as compared with 13.5 per cent in the preceding year.

Railroad equipment makers' profits declined 20 per cent, the J. G. Brill Co., the General American Tank Car Corporation and the Pressed Steel Car Co. having been the only companies of the 13 included in the group which made better showings last year than in 1926. Especially sharp declines were reported by the locomotive makers.

Manufacturers of machinery and equipment as a group reported only slightly lower profits in 1927, the decline having been 4.4 per cent. Gains and losses were general, distributed among the 15 companies included in the group. Machine tool makers, as in the previous year, had small profits.

A considerable decline, 14.9 per cent, was shown by the makers of cast iron pipe, radiators and kindred products, while a group of nine miscellaneous consumers of iron and steel reported a decline of 5.3 per cent in net earnings. Included in this group were the American Can Co., the American Safety Razor Corporation, the Continental Can Co., Inc., the Crane Co., the Gillette Safety Razor Co., the Oil Well Supply Co., the Standard Sanitary Mfg. Co., the Walworth Co. and the White Sewing Machine Corporation.

Study of Stresses in Joints of Big Diameter Pipe

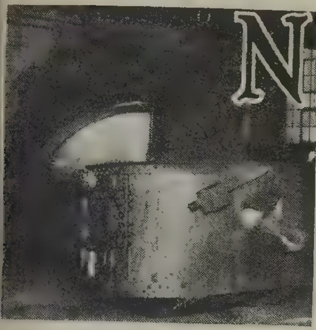
In this issue is a series of pictures showing methods used to manufacture large diameter water pipe on the Pacific Coast. The Mokelumne pipe line, for which the pipe was made, was designed to have girth seams welded in the field, and some 5 miles of the pipe was made for butt joints. Considerable difficulty was experienced in the first field joints made, and contraction cracks opened up in many of them. The cause of this phenomenon (which does not appear in long pipe lines of smaller diameter) was obscure and its discussion raised several contentious opinions.

In view of the added fact that a water famine impended, the chief engineer of the project, A. P. Davis, ordered that the remainder of the pipe be manufactured for riveted girth seams. At his request Prof. L. T. Jones and Prof. W. S. Weeks of the University of California made a careful study of the stresses existing in the welded portion of the pipe. The results and conclusions are contained in the University of California *Publications in Engineering*, Vol. II, No. 9, which may be obtained from the University Press, Berkeley, Cal., for $1. It may be concluded from the report that the troubles with the girth seams were due to a failure to follow proper and well understood welding practices. A procedure control is outlined by which "a 65-in. pipe line can be either electrically or acetylene-welded without fear of breakage."

Life of Heat-Resisting Alloy Castings

As Much Dependent on Design and Foundry Practice As on Composition

BY DAVID EVANS*



NOTWITHSTANDING the great reliance placed on chemical analyses of heat-resisting alloys, many users and some producers are questioning today whether composition is as vital a criterion as has been supposed. The impression is rapidly gaining ground that foundry practice and control are equally as important as the mixture of metals from which heat-resisting alloy castings are made.

Patents cover a considerable range in the percentage of the various elements entering into these alloys. In these claims and specifications it is found, for example, that nickel content varies from 3 per cent to 60 per cent.

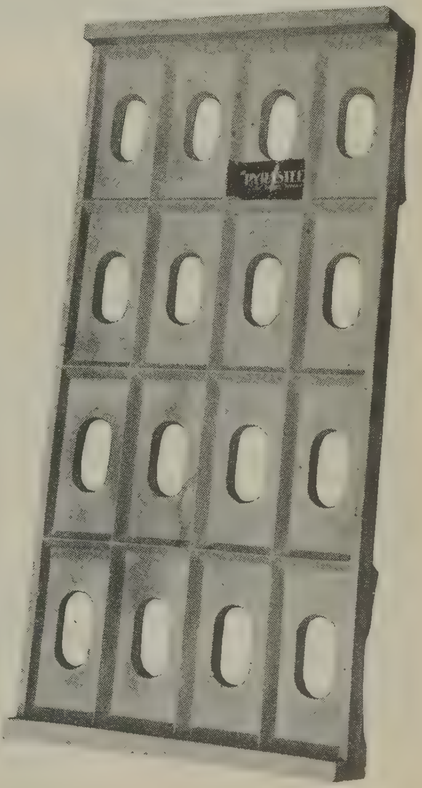
A recent investigation outlines a series of chemical analyses of heat-resisting alloy steel carburizing boxes, all of which were similar in design and were used in the same furnace under identical conditions. The nickel content of all these boxes was close to 60 per cent. In service these boxes showed a life in the furnace varying from 75 hr. for the poorest box to 7000 hr. for the best box. This indicated that there was a great difference in the actual physical characteristics of these boxes, and that the life was dependent in great measure on such characteristics and not alone on the chemical analysis of the material.

To all appearances one of these boxes failed because it was poured at an improper temperature. Another failed because of incorrect design. Failure of the others was apparently a matter of grain growth due to segregation. The experience with these boxes leads to the conclusion that, no matter what the formula may be, the best heat-resisting alloy steel cannot be produced without properly solving the age-old problems of design, molding, drying, venting, melting and pouring. It is not so much a question of seeking revolutionary changes in foundry practice as the careful painstaking adaptation of the principles of good foundry methods.

Selection of materials is the first step in good foundry practice. A good heat-resisting alloy must be non-oxidized metal throughout. This means that the foundryman cannot expect to get good uniform results using returned and scrapped alloy—and the same holds true if he buys miscellaneous alloy scrap on the market or attempts to use old heat-resisting alloy steel boxes which have been in service. It is advantageous in making such alloys to charge and melt rapidly. Pouring temperatures for the alloy are generally slightly higher than temperatures for ordinary steel. If temperatures are high enough, it is possible to cast heat-resisting alloys in thin sections.

In addition to a good formula and proper foundry practice, there is a third important element, namely, the proper design of alloy steel parts. Cases are not infrequent in which a simple change of design of a part increases its life several fold. The accompanying illustration shows a good example of the importance of design. This grid was formerly a corrugated solid plate with a half flange on each end. When loaded with heavy forgings and charged into an oil-fired furnace of the pusher type, the corrugated pans warped and some developed cracks which rendered them unfit for service. The design was changed so that the grid has a full flange at both ends. Numerous holes, 2 in. x 4 in., permit the rapid absorption of heat through all parts of the forging, and a minimum amount of material is in contact with the grid. The advantages gained from the new design were a lighter casting, freedom from distortion, a quicker heating operation and the substitution of material at about half the price of the alloy formerly used.

Experience leads one to believe that, somewhere in the maze of formulæ, there must be a combination of elements that is well-balanced. This analysis, when properly assembled in an electric furnace and made into castings of proper design, carefully molded with material selected for that particular purpose, must result in a better heat-resisting alloy. A producer of heat-resisting alloy steel must guard against segregation.



Grid, Formerly a Solid Corrugated Plate, Redesigned to Increase Life and Efficiency, by Providing Holes and Full Flanges at Each End

It is not sufficient that the foundryman produce a satisfactory commodity part of the time. It is essential that he turn out dependable heat-resisting alloys day in and day out under all sorts of conditions. This requires a careful study of the mixture, strict grading of raw materials, accurate and painstaking control of foundry practice, and experience in the design of heat-resisting alloy castings.

The nineteenth annual convention of the American Steel and Heavy Hardware Association will be held at the Copley-Plaza Hotel, Boston, May 22, 23 and 24.

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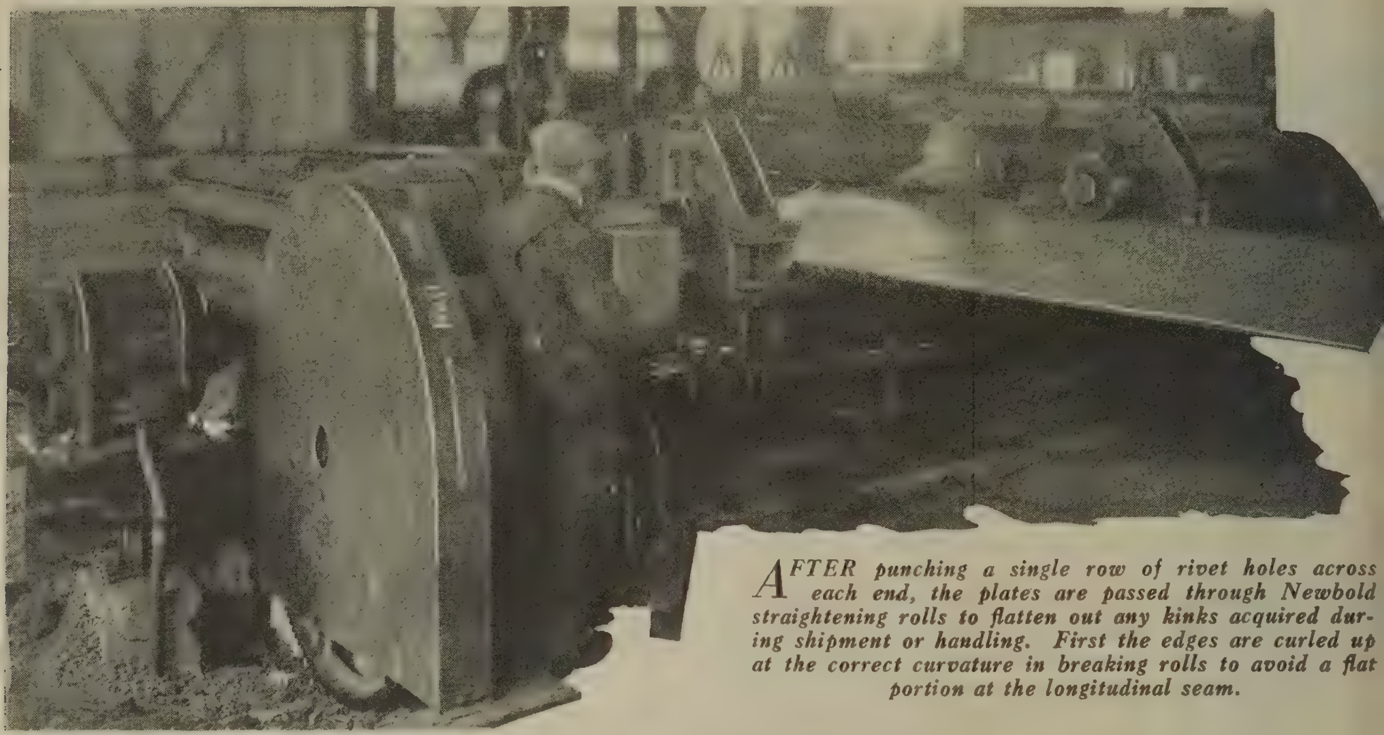
*Chicago Steel Foundry, Chicago.

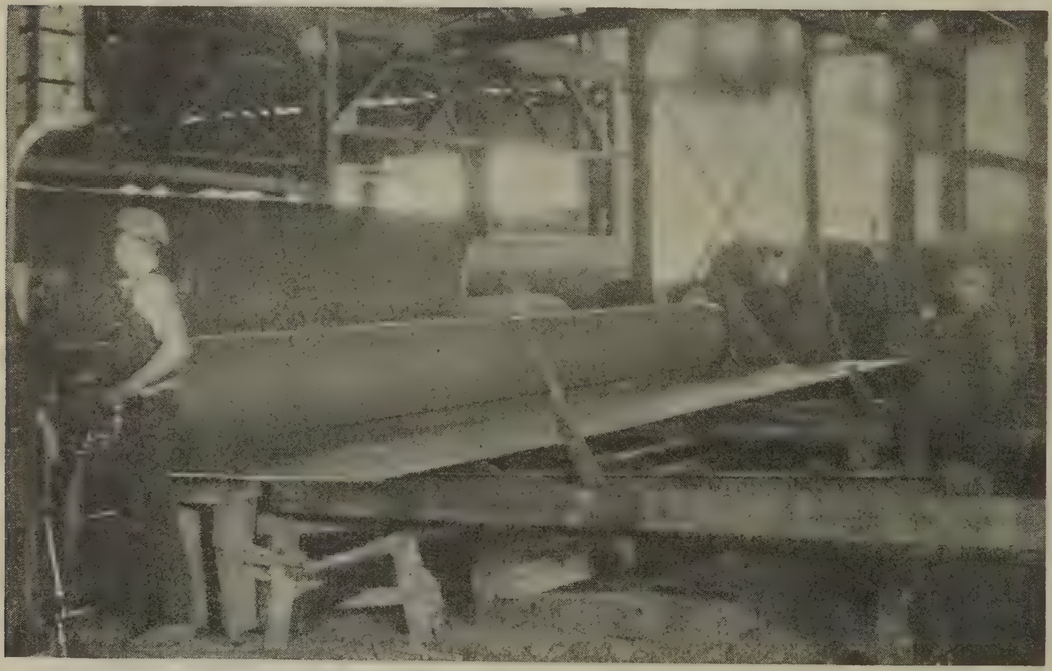
Water Pipe, Five Tons per Se

WATER for irrigation or city consumption is frequently carried long distances in the Western States. Piping for this purpose is so bulky it must be manufactured near the line.

A noteworthy example is an aqueduct bringing water from the Mokelumne River to Berkeley and other cities on the eastern shore of San Francisco Bay. For about 80 miles water passes through a welded pressure pipe, 65 in. in diameter, made of



AFTER punching a single row of rivet holes across each end, the plates are passed through Newbold straightening rolls to flatten out any kinks acquired during shipment or handling. First the edges are curled up at the correct curvature in breaking rolls to avoid a flat portion at the longitudinal seam.



THEN powerful bending rolls with 30-ft. throat form the plate into a long half-cylinder.

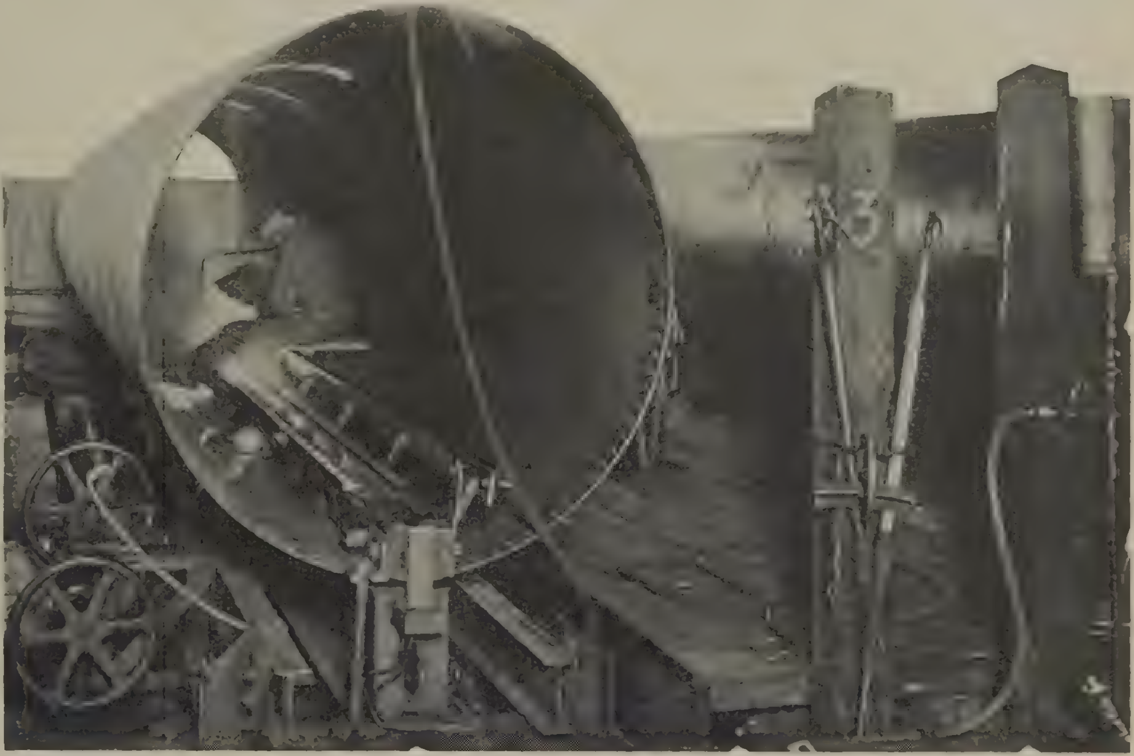
TO assemble one pipe length, a half-cylinder is dropped into a cradle between horizontal I-beams, its mate is inverted above, and the two are "tack welded" with a few short hand-made welds.

CARNEGIE LIBRARY OF ATLANTA

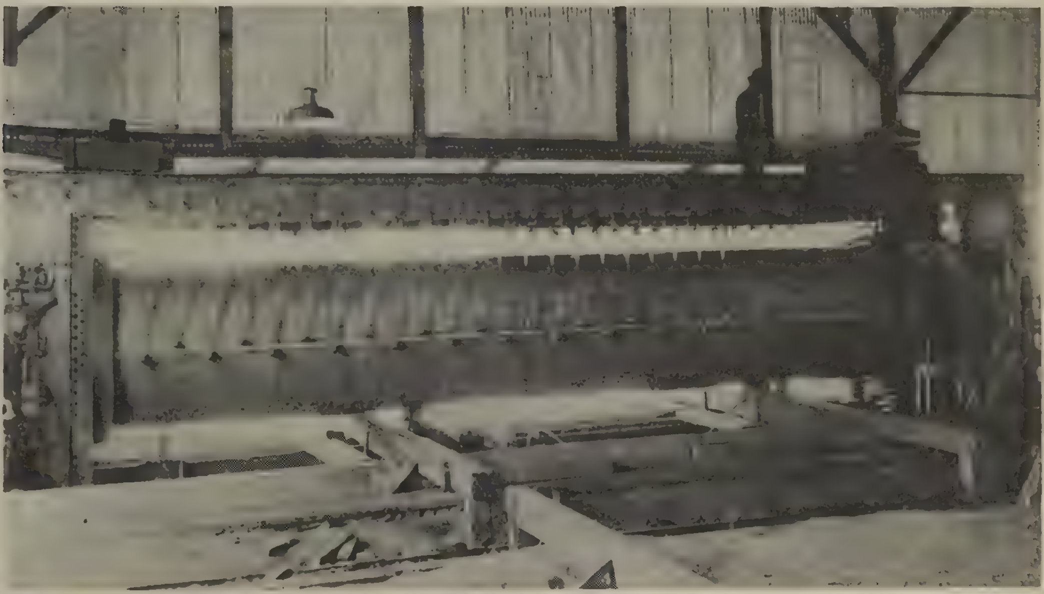
on, Fabricated in California

plates up to ½ in. thick. Nearly 75,000 tons of steel was shipped from the Carnegie Steel Co. for this project.

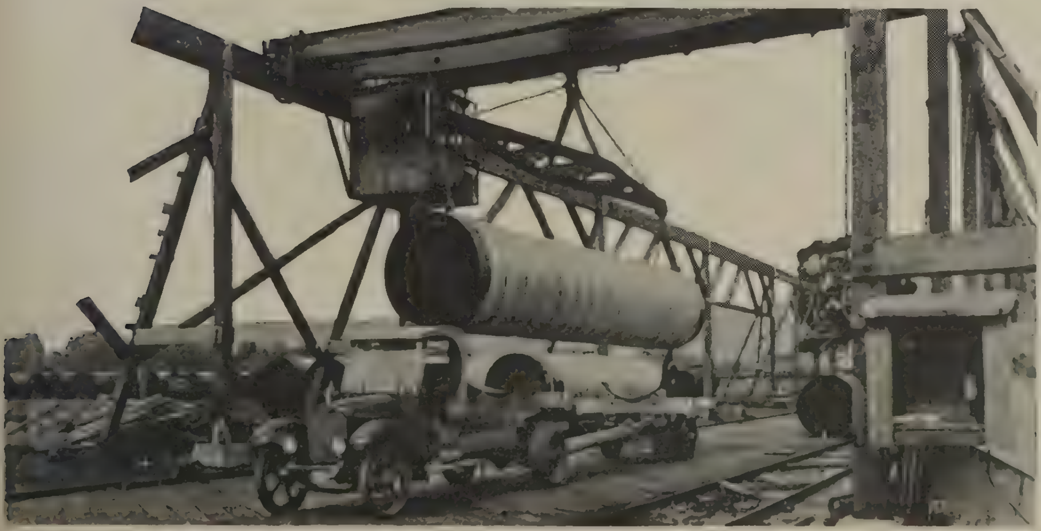
The pipe was made during 1926 for the East Bay Municipal Utility District by the Steel Tank & Pipe Co. of Berkeley, Cal. The welding equipment was furnished by the Lincoln Electric Co., Cleveland, through whose courtesy these pictures were secured. The welding operations in making the pipe are described in the captions below.



LONGITUDINAL seams are made by a battery of eight Lincoln automatic welders. The heat of the carbon arc melts clear through the abutting edges as well as a strip of reinforcing metal covering the joint. One passage of the carriage, and the work is done. Then the hold-down clamps are relieved, the pipe is rotated 180 deg., and the opposite longitudinal seam is made in the same manner.



PIPE sections are taken endwise from the welding machines by overhead trolleys, then rolled along skidways to test. While carrying hydrostatic pressure sufficient to stress the metal to 22,000 lb. per sq. in. each joint is struck vigorously with a series of hammers.



AFTER the pipe has been rust-proofed with tar and wrapped with canvas, it is transferred from the storage dock to 5-ton truck trailers. The trucks deliver the pipe to the line, where caterpillar cranes swing each section into the trench.

Automatic Gear Cutter Made Heavier and Capacity Increased

The Brown & Sharpe Mfg. Co., Providence, has redesigned its No. 13 automatic gear cutting machine to provide for easier handling and increase in productive capacity. The machine is adapted for cutting spur and bevel gears, clutches, segments and similar work, and is intended for jobbing shop use as well as for production operations.

The machine has been made heavier throughout and the capacity increased to 4 diametral pitch in cast iron and 5 diametral pitch in steel. It is of the motor-in-the-base type and when motor driven, the motor is entirely inclosed in a compartment cast in the base of the machine. Cooling air is circulated about the motor through louvers at front and rear of the compartment. Adjustment of the pre-stretched driving chain is made by movement of the plate on which the motor is mounted. The cutter slide, of rigid construction and with the counterweight arrangement integral with the machine, has a maximum travel of 5½ in. and a minimum of ½ in., which adapts the machine for work requiring short strokes.

Convenience of Set-Up Adapts the Machine for Jobbing Shops as Well as for Production Operations

The oiling system has been simplified to enable the operator to lubricate all parts of the machine conveniently. The weight of the redesigned unit is approximately 4000 lb.

Electric Glue Pot

A compact electric glue pot, arranged so it may be carried to the job, is being put out by the Black & Decker Mfg. Co., Towson, Md. The glue is maintained at a constant temperature of 150 deg. Fahr., for smooth, tight joints. The heating element is a nichrome ribbon, with mica plates and thermostatic control. The element is tightly sealed with asbestos to eliminate fire hazards, short circuits, etc.

The Heating Element of the Glue Pot, Which Is Portable, Is a Nichrome Ribbon

The glue container, of 2 qt. capacity, is cast aluminum, machined to fit a gray iron receptacle, thereby conserving heat. The sides of the pot are sloped to minimize spillage, and a heavy iron wiper across the center of the glue container prevents waste from drippage. The pot is made for either 110 or 220 volts alternating current.

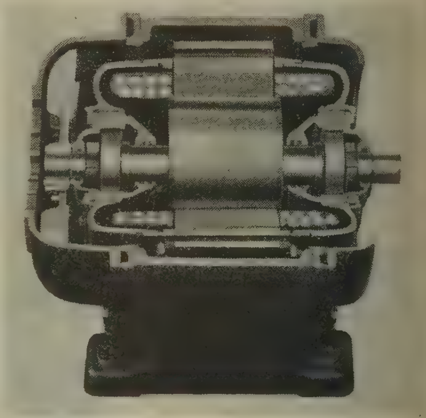
Totally Inclosed Electric Motor

A new type of completely inclosed, ventilated motor, with a 40-deg. rating, has been brought out by the American Electric Motor Co., Cedarburg, Wis., which company recently became a subsidiary of the Splitdorf-Bethlehem Electrical Co. An unusual test was made to demonstrate how effectively dust is excluded from the windings of this motor. A glass case was filled with a mixture of sand, iron filings and sawdust until the motor was half covered. An external fan on the motor churned this mixture, filling the air with it and completely surrounding the motor with thick dust. For two weeks the motor was run under these adverse conditions. When the motor was opened the windings were so clean, it is said, that a permanent magnet brushed over them showed no trace of filings. Nor had any sand or sawdust penetrated the cover.

Inclosing hoods hermetically seal the winding. The hoods are telescoped into a ring fastened to the stator laminations, the surfaces of which are machined.

Cooling of this Type P-K motor is unusual in that air is driven through, as well as over, the stator laminations. The stator core is perforated, thereby making it possible to remove the heat at the point where it originates. Air in the inclosed portion is agitated by malleable cast fans shrunk on the motor shaft.

The ball bearing is of the cage type. Either inclosing hood of the motor can be removed without disturbing the bearings, which remains on its shaft inclosed in its cage. No dust or grit can get into the bearing; nor can any grease escape, as felt washers are imbedded in the cap to keep it in.


Inclosing Hoods Hermetically Seal the Winding. The hoods are telescoped into a ring fastened to the stator laminations

The stator is removable. Should it be damaged it can be replaced in a few minutes. The rotor is of the usual construction with the exception of its winding. The end rings are electrically welded to the bars, forming an indestructible one-piece squirrel cage of uniform material.

Separation of coal and coal by-products from their attendant impurities by means of the Sutton, Steele & Steele pneumatic process is outlined in a booklet issued by the American Coal Cleaning Corporation, Welch, W. Va. The feeder and other elements of the equipment are described and illustrated, and a typical flow sheet and installations of the dry treating plants are included. In this process, which depends primarily upon the difference in specific gravity or density between the particles of material to be separated, only one operation is required. When inert bands are encountered the product is crushed to release them for the pneumatic process, and only the inert material is discharged as refuse. The dust generated is said to be recovered at small cost.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. Retail trade gained in March and was above normal.

2. Automobile production and sales are in large volume.

3. Farm purchasing power recovered in February (possibly due in part to the extra day in that month).

4. Exports recovered in March.

5. Commodity prices are quite stable and a little higher.

6. Some improvement in the oil industry.

7. Continued strong financial position of most leading companies.

8. Light mercantile inventories.

Unfavorable Factors

1. The P-V line declines for the second month.
2. Building activity declined in March.
3. Decline in new business and unfilled orders in the steel industry.
4. Freight traffic failed to show the normal seasonal gain in March, indicating the limited business expansion.
5. Employment has shown only a small seasonal recovery.
6. Severe competition and narrow profits.
7. Large gold exports, increased rediscounts at the Reserve banks, high loan-deposit ratio, excessive brokers' loans.
8. Tightening money markets.
9. Winter wheat condition poor.
10. Possibilities of political unsettlement.
11. Rather heavy stocks of manufactured commodities in first hands.

CLEARLY a majority of the more significant factors that affect or indicate the general trend of business are unfavorable. Downturns in the P-V line, building activity and unfilled steel orders warrant a forecast that, to say the least, the general recovery in business will not reach anything approaching boom proportions, and that a little setback is probable before mid-year. Business, however, should be fair-to-good throughout the spring. Sustained retail trade, a firm general level of commodity prices and the improbability of any severe advance in money rates appear to be the most favorable aspects of the situation. It may be said, too, that an absence of inflation in business and a generally moderate expansion of industrial production are the rule. Thus, nothing but a pause in the recovery or a slight recession is indicated at present.

Barometer Continues to Point Downward

OUR P-V line (a ratio of commodity prices to the physical volume of trade) declined in February and March. This indicates that production in early 1928 has been stepped up more rapidly than requirements and that the ratio of demand to supply has declined. It indicates that the general condition of market demand is not sufficiently strong to support much further expansion in physical volume without price weakness developing. This is a condition that usually results in slackening business. The P-V line forecasts at least a minor setback some time between May and August.

As readers of this department of THE IRON AGE will know, it is our theory that steel production is so closely related to the general business situation that the forecasts of the P-V line apply to it. Accordingly, some decline in steel production within a few months, and one which probably will be greater than usual for the season, may be anticipated. We have nothing but precedent to go by in attempting to say when such a decline may come, and precedent allows considerable leeway, the lag having ranged from three to nine months. The present situation in some respects resembles 1923, but some similarity may be found also in the early part of 1924.

Perhaps the outcome will be somewhat between these two earlier periods. In other words, the adjusted

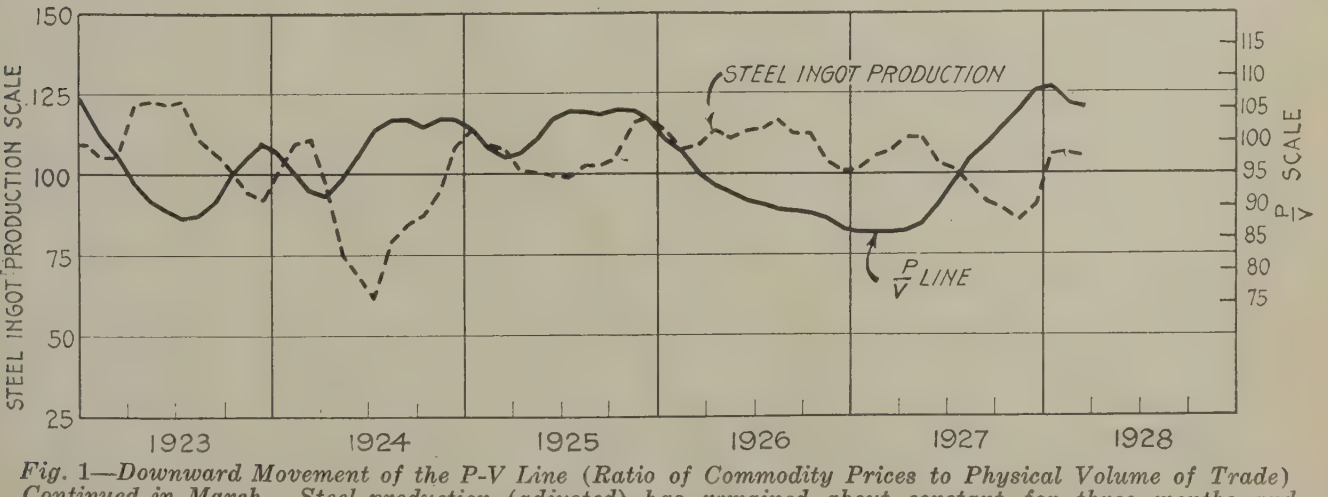


Fig. 1—Downward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Continued in March. Steel production (adjusted) has remained about constant for three months and heavy tonnages may be expected for several months

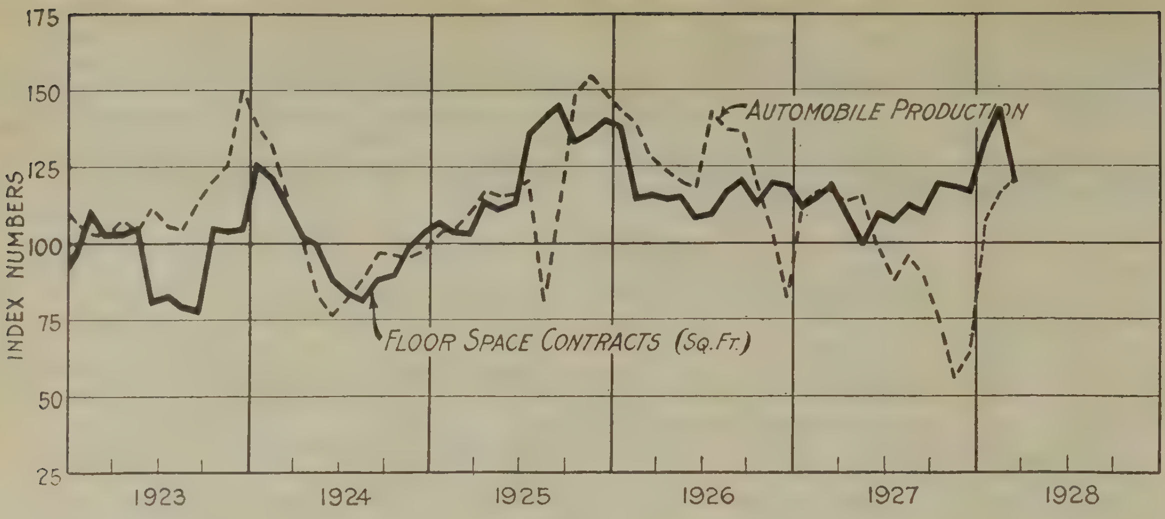


Fig. 2 — Building Activity Moved Downward in March. Improvement in the automobile demand for steel should proceed through the spring

steel production curve may rise in April, but not so much as in April, 1923. It may then hold up in May, with relatively little change in either direction, and then slump about mid-year. All we can say with much certainty is that there will probably be some recession in steel production by August, which will carry it below normal.

Scrap prices impress us as being in a highly uncertain position, the recent strength apparently being unusually speculative. The main trend of the price of heavy melting steel scrap at Pittsburgh was slightly downward through March, and it is doubtful if a sustained upturn has begun. At best, scrap prices are still too low to suggest a strong position.

It is particularly important, in judging the general outlook for business, to note the trend of the two industries that have been the leaders in our post-war prosperity. These industries—building and automobile—are also among the chief consumers of steel.

Opposing Indications Shown by Building and Automobiles

BUILDING activity (Fig. 2) showed a declining trend in March, and this is one of the most unfavorable developments affecting general business. Nearly always, so sharp a reaction as occurred last month marks a reversal of trend, and a downtrend in building activity nearly always anticipates a decline in business. The floor space in building contracts awarded during March amounted to 88,090,000 sq. ft., which compares with 87,892,000 sq. ft. in March, 1927, and is an increase over February. This increase, however, is much less than usual and our adjusted index for the month is only 118.6, against 144.1 in February. In each case the average for 1921-1927 equals 100.

Thus there was a sharp decline in the true trend of construction, and the March index shows the lowest annual rate of building found in any month since last November. The value of contemplated new construction as reported by the F. W. Dodge Corporation also declined in March and is relatively low compared with the volume of building contracts. The value of contracts awarded in March was 5 per cent below a year ago, while contemplated new work was 26 per cent lower. A similar sharp decline is shown by the building permits, which decreased in March, although usually they show a considerable gain in that month.

Automobile production increased a little more than usual in March. It is estimated that the total output of cars and trucks was 435,000, which compares with 417,700 a year ago, but is much below the 456,800 produced in March, 1926. Sales of General Motors cars made a new high record in March, and, as April is a peak month in this business, a further increase is probable. Not all companies, of course, are doing so well.

In fact, there are some less favorable indications concerning the automobile business. In the first place, the curve of automobile production shown in the accompanying chart looks much as though rounding off for a decline; the March increase was not large, considering the season, and current reports indicate that the expansion of automobile production has been checked. Insofar as this development may prevent over-production, it is good; but it may be an indication of a limited demand. In the second place, Ford production is gradually expanding and that probably means increased competition in the low-priced field. Finally, it is to be noted that the inventories of General Motors dealers have become quite large. Probably they are not excessive in view of the increased volume of sales, but they are the largest since early 1924.

On the whole, conditions as shown in the second

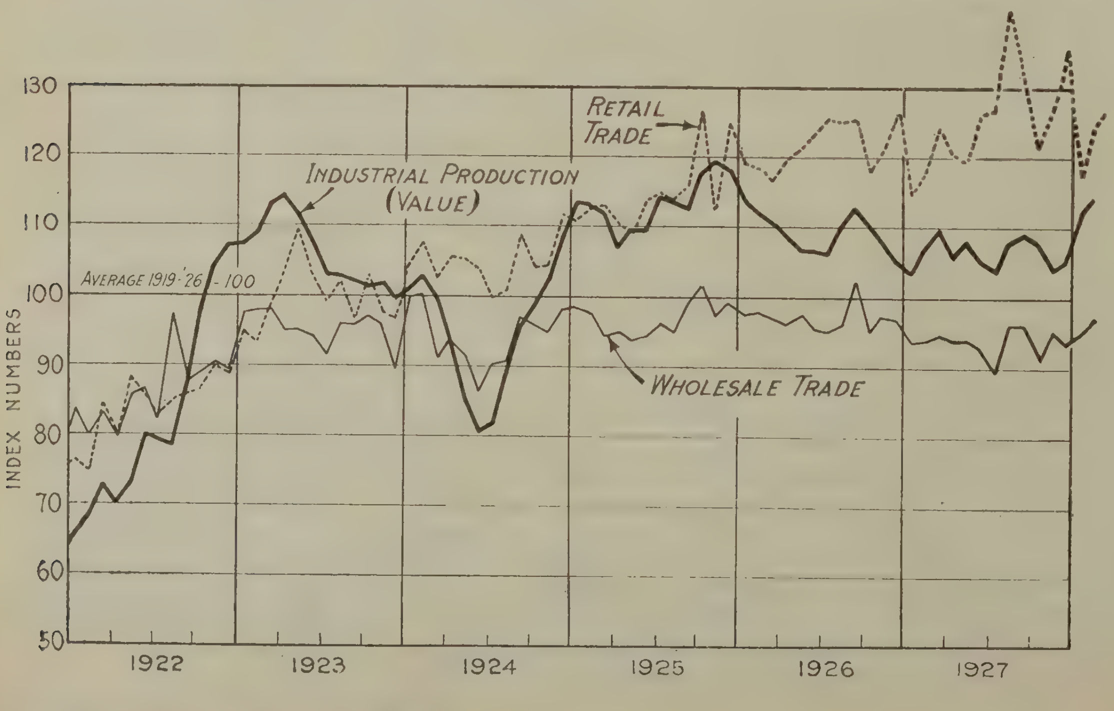


Fig. 3 — Favorable Indications Are Seen from the Relations of Retail Trade, Wholesale Trade and Industrial Output. Retail trade continues to show improved buying sentiment. Wholesale business remains slow, while industrial production is well in line with retail sales

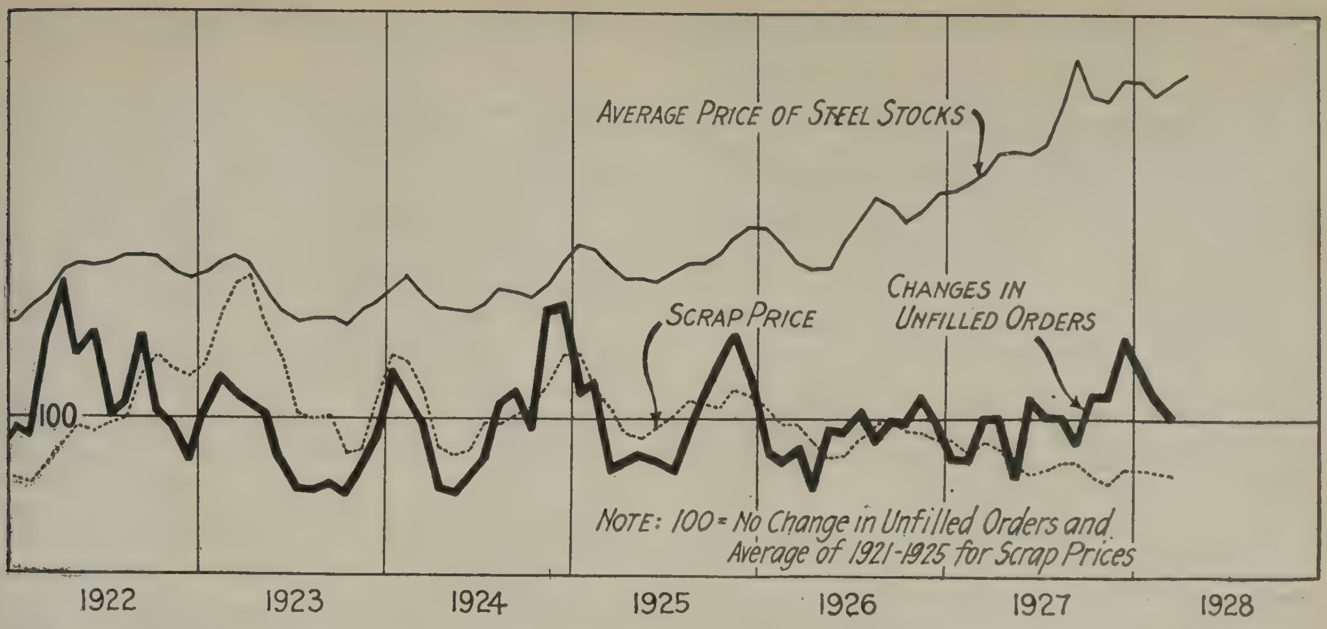


Fig. 4—All Three Indexes Point to Lower Operating Conditions. Unfilled orders declined in January; stock prices, though advancing recently, are irregular and scrap prices are weak

chart are not such as to suggest that the recent recovery in business will go very far or last very long.

Retail Trade Absorbs All the Goods Made

OUR third chart has two values: In the first place, it shows the trends of three fundamentally important business indexes; in the second place, it provides some basis for comparing the levels of these indexes, for the purpose of determining whether or not a maladjustment exists. Each curve is adjusted so as to eliminate the merely seasonal variations.

Apparently the general trend was upward in February and March. Retail trade gained more than usual for the season in both months, and in March was somewhat above the average of the last two years. Probably it may be said that retail sales averaged between 3 per cent and 4 per cent above normal. Wholesale trade showed a more than seasonal expansion in February, the latest month for which data are available, though it was not up to the average of the last two years and can be called normal only if we assume a prolonged general downward trend to characterize this branch of trade.

As to the total value of the industrial production of the country, estimated by using the Bradstreet index of commodity prices, we find it rising in February to the highest point since the beginning of 1926. Of course, such estimates are rough. But it is clear that, after a long, irregular decline between November, 1925, and the end of 1927, the value output of the country has made a good recovery.

As to the relative levels of these branches of industry and trade, it need only be noted that the level of retail trade is so high in comparison with the estimated total value of production that no general overproduction is indicated.

Decline in Unfilled Orders Significant

UNFILLED orders of the Steel Corporation, which (properly interpreted) are an excellent business barometer, declined in March, and there is reason to believe that this decline represents a decrease in new business. At least, this is indicated by the fact that the rate of change in the unfilled orders has shown a declining trend since last December, each successive increase being smaller—as is the way with unfilled orders when new orders are falling behind.

Meanwhile, after declining in January and February, the average price of a group of steel stocks recovered in March and early April, running counter to the trend of the unfilled orders barometer as shown in the chart. At this writing, the average retains a considerable part of the recovery. Such divergences are rare. During the past year and a half, however, speculation has been carried to great lengths, first as a result of very low money rates, and then under the influence of a speculative fever generated by the spectacle of the general advance in security prices. Under such circumstances a normal performance is hardly to be expected.

But the yields on representative securities have fallen below the cost of borrowing money, and signs are appearing that the speculative fever has nearly reached a crisis. As this is written the Boston and Chicago reserve banks have raised their discount rates, and brokers' loans as reported by the member banks of the Reserve System have crossed the four-billion-dollar mark. Time money has risen to 5 per cent. It is difficult, therefore, to see how the normal tendency of steel stocks to reflect a decline in the volume of new steel business can be counteracted much longer.

Steel Electrical Engineers Form Welding Committee

In order to meet the welding problems that develop in steel plants, the Association of Iron and Steel Electrical Engineers has organized a national welding committee, under the chairmanship of A. G. Place, Youngstown Sheet & Tube Co., Youngstown, Ohio. This committee held its first public conference in Cleveland, April 20, attended by about 200 men from northern Ohio centers. Inspection trips were arranged to the plants of the Cleveland Crane & Engineering Co. and the Lincoln Electric Co. These companies also tendered a dinner to the visitors.

In the evening, J. C. Lincoln spoke on "Arc Welding Is Selling Steel." He reviewed the growth of the industry and enumerated the fields in which welding is used. Welding, he declared, should be regarded as a new tool that is of great assistance to manufacturers. In welding many duplicate parts the use of the automatic arc welder will tend further to reduce manufacturing costs as compared with hand welding. In his opinion, welding offers a very important field for young men who are turning their attention to engineering.

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*Schedule of the next instalments of the **Business Analysis and Forecast**, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: **May 17**—Activity in Steel Consuming Industries; **May 24**—Position of Iron and Steel Producers; **May 31**—General Business Outlook.*

FABRICATED STRUCTURAL STEEL

Awards of 26,400 Tons With 12,000 Tons for Bridge at Charleston, S. C.

FALLING considerably below the average of recent weeks, awards amounted to 26,400 tons. Included was a highway bridge at Charleston, S. C., which took 12,000 tons. New projects calling for 21,800 tons included 8000 tons for a highway bridge in Missouri. Awards follow:

Boston, 440 tons, mercantile building, on Kneeland Street, to New England Structural Co.

Littleton, N. H., 227 tons, bridge, to American Bridge Works.

State of New Hampshire, 145 tons, three bridges, at Bethlehem, Lisbon and Wentworth, to American Bridge Works.

Bangor & Aroostook Railroad, 300 tons, bridge at Monticello, Me., to Bethlehem Steel Co.

New York, New Haven & Hartford Railroad, 675 tons; freight house, 175 tons, to New England Structural Co.; inspection shed, 500 tons, to American Bridge Co.

Bridgeport, Conn., 150 tons, high school, to American Bridge Co.

Westchester County, N. Y., 150 tons, highway bridge for Westchester County Park Commission, to unnamed fabricator.

Philadelphia, 225 tons, Frankford Nurse's Home, to Montgomery Iron & Steel Co.

Seaboard Airline Railway, 125 tons, bridge, to Virginia Bridge & Iron Co.

Charleston, S. C., 12,000 tons, Cooper River bridge; 8000 tons to McClintic-Marshall Co., and 4000 tons to Virginia Bridge & Iron Co.

Birmingham, 2000 tons, Warrior steam plant of Alabama Power Co., to Nashville Bridge Co.

Birmingham, 100 tons, No. 1 city furnace of Sloss-Sheffield Steel & Iron Co., to Ingalls Iron Works Co.

Pittsburgh, 300 tons, two barges for American Tar Products Co., to Jones & Laughlin Steel Corporation.

State of Michigan, 200 tons, highway bridge, to Massillon Bridge & Structural Co.

Chicago, 250 tons, temporary building for Chicago Board of Trade, to Wendnagel & Co., local.

Highland Park, Ill., 100 tons, building for Bowman Dairy Co., to Midland Structural Steel Co., Chicago.

Minneapolis, 1500 tons, building for University of Minnesota, to unnamed bidder.

Milwaukee, 400 tons, garage, to Wagner Architectural Iron Works, local.

St. Joseph, Mo., 1500 tons, St. Joseph Bridge across Missouri River, to Missouri Valley Bridge & Iron Co.

St. Joseph, 480 tons, approaches to St. Joseph Bridge across Missouri River, to St. Joseph Structural Steel Co.

St. Joseph, 2100 tons, highway bridge, to Mount Vernon Bridge Co., Mount Vernon, Ohio.

Freeport, Cal., 606 tons, bridge over Sacramento River, to Moore Drydock Co.

Los Angeles, 570 tons, church on Wilshire Boulevard, to Union Iron Works.

Los Angeles, 240 tons, sheds for city, to McClintic-Marshall Co.

Glendale, Cal., 400 tons, Masonic Temple, to Baker Iron Works.

San Diego, 400 tons, hangar for Government, to McClintic-Marshall Co.

Ontario, Cal., 307 tons plates, 16 and 18-in. welded pipe, to Los Angeles Mfg. Co.

San Francisco, 100 tons, store at 1041 Market Street, to Golden Gate Iron Works.

San Francisco, 145 tons, apartment building, Twentieth Avenue and Irving Street, to McClintic-Marshall Co.

San Andreas, Cal., 130 tons, train runway addition, Calaveras Cement Co., to McClintic-Marshall Co.

Oakville, Wash., 135 tons, bridge over Chehalis River, to Pacific Car & Foundry Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Vermont, 1300 tons, 13 bridges.

Boston, 1000 tons, furniture building.

Albany, N. Y., 1000 tons, St. Peters Hospital.

State of New York, 275 tons, highway bridges.

State of New Jersey, 125 tons, highway bridge.

State of New Jersey, 160 tons, highway bridge over Lehigh Valley Railroad; Smith & Fenstermacher, Allentown, general contractors.

Asbury Park, N. J., 500 tons, casino.

Philadelphia, 950 tons, apartment building at Fifteenth and Spruce Streets; Foundation Co., New York, general contractor.

Wilkes-Barre, Pa., 700 tons, savings bank.

Baltimore, 500 tons, cold storage warehouse.

State of Ohio, 300 tons, highway bridges.

New York Central Railroad, 400 tons, passenger station at South Bend, Ind.

Chicago, tonnage being estimated, Hyde Park State Bank Building; Merrick Construction Co., general contractor.

Chicago, 200 tons, Ogden National Bank Building.

Chicago, 2500 tons, garage, corner of Lake and Dearborn Streets; David T. Merredith, architect.

Chicago, 650 tons, approach to Crawford Avenue bridge; Underground Construction Co., low bidder on general contract.

Kenosha, Wis., 300 tons, Nash Theater.

Milwaukee, tonnage not stated, building for Northwest Mutual Life Insurance Co.

Milwaukee, tonnage being estimated, First Wisconsin National Bank Building.

Milwaukee, tonnage not stated, building for Milwaukee Gas & Light Co.

State of Missouri, 8000 tons, highway bridge.

Olympia, 650 tons, bridge over Queets River; bids May 8.

Los Angeles, 250 tons, apartment building, Kenmore Street and Wilshire Boulevard; bids being taken.

Los Angeles, 470 tons, apartment building, 5930 Franklin Street; bids being taken.

Los Angeles, 158 tons, hotel, Eighth and Lake Streets; bids being taken.

Los Angeles, 166 tons, city market Ninth and San Pedro Streets; bids being taken.

Los Angeles, 235 tons, store in Hollywood; bids being taken.

Long Beach, Cal., 680 tons, store, Fourth and Pine Streets; bids being taken.

Watsonville, Cal., 100 tons, cold storage plant; bids being taken.

Oakland, Cal., 380 tons, warehouse for Port Commission, foot of Fourteenth Street; bids being taken.

Sacramento, 947 tons, bridge over San Joaquin River at Herndon; C. Peterson, Fresno, low bidder.

San Francisco, 650 tons, plates, dredger and two scows for State Harbor Commission; bids May 9.

Report Opposes Revision of Pig Iron Rates from Granite City

WASHINGTON, April 24.—Declaring that the evidence is "wholly incompetent to prove the allegations," Attorney-Examiner Alfred G. Hagerty, in a report made public yesterday, recommended that the Interstate Commerce Commission dismiss the complaint of the St. Louis Gas & Coke Corporation which charged that rates on pig from Granite City, Ill., to Central, Western Trunk Line and Illinois territories are unreasonable and prejudicial.

The examiner held, moreover, that the level of the pig iron rates from Granite City into Western Trunk Line territory, although now slightly lower than the pig iron rates concurrently maintained in Central territory, might reasonably be as high, or slightly higher than the latter rates. He also declared that neither the scope of the case nor the evidence would permit the entry of an affirmative order prescribing a new adjustment based upon a rigid distance scale, such as suggested by the complainant.

Steel and Iron Capacities

The American Iron and Steel Institute announces that the survey of capacities which is made annually by the institute has now been completed and shows the following results:

Annual Capacities as of Dec. 31, 1927

Pig iron	49,808,320 gross tons
Steel ingots	59,435,766 gross tons
Steel castings	2,029,334 gross tons

Steel Pipe Price Protection Limited to 30 Days

YOUNGSTOWN, April 24.—While it has happened in the past that steel pipe makers have given jobbers handling consigned stocks 60-day protection on the occasion of price changes, the coverage on the change announced effective April 2 has been limited to 30 days on both consigned and direct jobbing accounts.

Caswell & Starke, Inc., brokers in tin and lead, will move May 1 to 17 State Street, New York, from offices at 99 John Street which the firm has occupied for 25 years.

National Association of Foremen to Meet at Canton

The fifth annual convention of the National Association of Foremen will be held in Canton, Ohio, Friday and Saturday, May 25 and 26. Plans have been made for visits to the Massillon, Ohio, plant of the Central Alloy Steel Corporation; the plant of the Hoover Co., manufacturer of electric cleaners, at North Canton; the Pennsylvania Railroad shops, and the plant of the Timken Roller Bearing Co. in Canton. The trade and vocational McKinley High School, Canton, will be opened to visiting foremen.

Speakers for the first day include F. A. Seiberling, president Seiberling Rubber Co. and founder of the Goodyear Tire & Rubber Co., who will speak on the "Requisites of the Foremen of Tomorrow"; A. B. Segur, consulting engineer, Chicago, whose topic will be "Conservation of Man Power through Motion Analysis," and W. Chattin Wetherill, University of Pennsylvania, who will talk on "Industrial Waste." After the close of the day's meeting there will be a banquet and entertainment, after which the meeting will be reconvened for the introduction of the new officers and an address by H. W. Hoover, president Hoover Co.

The speakers for the second day will be J. C. Wright, director of the Federal Board for Vocational Education, whose subject will be "Foremen Conferences," and Robert H. Spahr of the United States Chamber of Commerce, whose topic will be "The Foreman as an Executive."

Flat Rolled Steel Association's Headquarters in Cleveland

The National Association of Flat Rolled Steel Manufacturers, the combination of the National Association of Sheet and Tin Plate Manufacturers, the Cold-Rolled Strip Steel Institute and the Hot-Rolled Strip Steel Institute, will be located in the Terminal Tower Building, Cleveland, on or about May 1. The sheet and cold-rolled strip associations at present are in Pittsburgh and headquarters of the hot-rolled strip association has been at Canton, Ohio.

Arrangements are being made for a meeting of executives of the three industries to be held at White Sulphur Springs, W. Va., during the week of June 3. The work of making plans for the White Sulphur Springs meeting inaugurated by the National Association of Sheet and Tin Plate Manufacturers before the merger has been taken over by the new combined organization and executives of the three branches of the industry will be asked to attend.

Columbus-McKinnon Chain Co. Acquires Chisholm-Moore Hoist Division

The Columbus-McKinnon Chain Co., Tonawanda, N. Y., manufacturer of electric welded chain, tire chains and kindred products, has acquired control of the hoist division of the Chisholm-Moore Mfg. Co., Cleveland, manufacturer of chain hoists and trolleys, traveling cranes, electric hoists, track systems and malleable iron castings. There will be no change in the general offices or personnel of the Chisholm-Moore organization.

Gains in Both Imports and Exports of Iron and Steel in March

Washington, April 24.—Exports of iron and steel products in March aggregated 221,935 gross tons, an increase of 36,020 tons, or 19.4 per cent over February, while imports were 74,127 tons, a gain of 26,500 tons, or 55.6 per cent over the previous month, according to preliminary figures of the iron and steel division, Department of Commerce.

For the first quarter, exports amounted to 613,616 tons, as compared with 553,451 tons for the corresponding period of 1927, an increase of 1.9 per cent. Imports during the three months ended with March of the current year totaled 180,391 tons, as against 174,679 tons for the corresponding period of last year, a gain of 3.3 per cent. The principal products exported during March were scrap, 26,510 tons; boiler tubes and welded pipe, 23,214 tons, and tin plate, 22,755 tons. The chief imports were structural shapes, 17,131 tons; pig iron, 16,155 tons; steel bars, 9991 tons, and cast iron pipe, 6280 tons. Belgium led in imports of structural shapes; the United Kingdom in pig iron, and France in cast iron pipe.

Predict Increase in Iron and Steel Car Loadings in Second Quarter

Freight car requirements for loading iron and steel, based upon reports of trade conditions furnished by commodity committees of the shippers advisory boards to the American Railway Association, are estimated at 479,533 for the second quarter of 1928. This is an increase of 2.6 per cent over actual car loadings in the corresponding quarter last year. Car requirements for castings, machinery and boilers are estimated at 59,977, a decrease of 1.8 per cent over actual loadings in this classification in the second quarter last year.

Fabricated Steel Plate Orders Decline —Steel Furniture Shipments Up

Washington, April 24.—New orders for fabricated steel plate in March, based on reports received by the Department of Commerce from 51 firms, totaled 45,071 tons, or 56.4 per cent of capacity, as compared with 49,820 tons, or 62.4 per cent in February, and 55,407 tons, or 68.9 per cent in March, 1927.

March shipments of steel furniture stock goods, as reported to the Department by 33 manufacturers, were $3,169,351, as compared with $2,908,527 in February, and $3,080,931 in March, 1927. March shipments of shelving compiled from the reports of 15 companies, were $831,607, as compared with $681,999 in February and $690,783 a year ago.

Krupp Co. to Build New Blast Furnace and Use No Mixer

Reliable reports are to the effect that the Krupp Co. is to build a 750-ton blast furnace at its plant at Essen, Germany. This will be the first blast furnace to be erected at that plant. It is understood that no pig iron mixer will be used, but that instead the hot metal from the furnace will be transferred to a large tilting open-hearth furnace where preliminary refining will take place preparatory to the steel being finished in smaller steel refining furnaces, either open-hearth or electric.

McMyler-Interstate Co in Friendly Receivership

The McMyler Interstate Co., Bedford, Ohio, maker of locomotive cranes, steam shovels and other handling equipment, was placed in the hands of receivers April 23 on the application of a stockholder, who brought friendly action to protect the company. The petition stated that, while the assets far exceed the liabilities, the company has $2,000,000 in debts, and some of the creditors have refused to grant extensions, and the company has been unable to secure additional financing.

Hearing on Construction of Youngstown-Ohio River Connecting Line Cancelled

Washington, April 24.—Hearing on the application of the Pittsburgh, Lisbon & Western Railroad for authority to construct extensions of its line in Beaver County, Pa., and in Columbiana and Mahoning counties, Ohio, which had been set for April 26, before Examiner T. F. Sullivan of the Interstate Commerce Commission, has been cancelled. The cancellation was due to the fact that Examiner Sullivan was not prepared to proceed with the hearings at the time named.

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This Issue in Brief

Business may suffer a little set-back before midyear, says Iron Age forecaster. However, conditions should be fair-to-good throughout the spring.—Page 1159.

High safety factor of non-metallic gears is attributed to elasticity, which permits two or three teeth to mesh and share the load. Actual strength, it is said, is not exactly proportional to the pitch. The length of contact must be taken into account.—Page 1149.

Galvanized furnaces should not be heated below the dross line, engineer declares, for the dross prevents the transmission of heat into the melted zinc, and causes the pot to overheat. Temperature should be carefully regulated, as the percentage of dross increases rapidly with increase in temperature, and furthermore high heat reduces pot life.—Page 1152.

Ford converts steel stock into finished car frames in one continuous process. Even the pickling and liming tanks are in sequence.—Page 1141.

Buyers of steel made considerably higher profits than producers. In 1927 the steel producers earned only 5.2 per cent profit on stockholders' investment, while manufacturers of automobiles, machinery, electrical equipment, hardware and other major products made of steel averaged 15.3 per cent.—Page 1153.

No manufacturer should evade his responsibility of reducing the cost to the consumer. But reductions must be accomplished by increased efficiency of men, methods and machines, and not by sacrificing quality, says association head—Page 1147.

Is reduced working hours the economic solution of the unemployment problem? No, says editorial writer, suggesting that modern mechanization is tending toward a sharper classification of labor. The superior group consists of those retained when improved mechanization releases a certain number of workers. The latter ought to accept employment in measure of their ability and according to opportunity.—Page 1166.

Noisy gears wear most quickly, says engineer. Inaccuracies, he believes, will develop more noise than any other factor in gear design.—Page 1149.

Reduces cost of radiator castings by making molds on a revolving annular ring. The flask is carried from one workman to another, each performing an operation. The finished mold is then transferred to another revolving ring, where the pouring and shake-out take place.—Page 1144.

Before blaming your competitor for cutting prices unfairly, find out if he is able to make a satisfactory profit by the use of up-to-date equipment. Some manufacturers, says gear association head, worry along with antiquated equipment and growl about price-cutting, without attempting to introduce economies into their own plants.—Page 1147.

Increases export sales 80 per cent by providing for direct representation. Machinery builder finds sales to Great Britain mount when agent is replaced by direct representative.—Page 1200.

Price weakness will develop if output increases, Dr. Haney indicates. Demand is not sufficiently strong to support further expansion, he declares. Ratio of demand to supply has already declined, owing to stepping up production more rapidly than requirements have warranted.—Page 1159.

March automotive vehicle output crosses the 400,000 mark. The number of units produced was 412,825, an increase of 27 per cent over February, and the best month since May, 1926.—Page 1196.

Employee lunch rooms are increasing in number. In 1916 less than 50 per cent of the 430 firms investigated by Washington had restaurant facilities; in 1928 about 70 per cent were so equipped. In the same period the number giving workers paid vacations increased from 16 to 133.—Page 1197.

Cleans castings automatically by conveying them under revolving wire brushes. The castings are then turned over and passed through a second time.—Page 1146.

Does a brand name help increase sales? German steel makers think so, for they are trying to revive the former practice of selling under brand names, believing that it will help in promoting export trade. —Page 1200.

You can't tell from its composition how long the carburizing box will last. Of a lot of carburizing boxes of the same composition and design, and used under the same conditions, one lasted 75 hr. and another 7000 hr. An important factor is foundry practice and control in making the casting.—Page 1155.

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High Wages or Low or Both

HENRY FORD, that attractive personality who is now visiting Great Britain and who in foreign eyes symbolizes American mass production, prosperity, etc., has made some remarks that have set his hearers agog. One of these was to the effect that the trouble with British industry is that it does not pay sufficiently high wages. This was, of course, immediately and approvingly seized upon by the British labor leaders.

Mr. Ford once set the pace by increasing wages in his factory. The results were good. We are bound to infer from his recent remarks that he has never analyzed why they were good. Nevertheless he has become a prophet. It may be that one road toward arriving at the degree of prophet is to tell people what they like to hear, and being accidentally or occasionally right. We are unaware that this thought has been philosophically examined.

Mr. Ford's idea of wages is obviously an expansion of the old wage fund conception that there is somewhere a reservoir out of which flows the means for meeting a payroll. Let the disbursers be liberal and the workers will be happy. They will buy automobiles, radios and such things and the manufacturers thereof will be happy.

This is the universal hypothesis of labor unionism. On the face of things the only difference between Henry Ford and John L. Lewis is that the former would disburse high wages voluntarily while the latter would exact them.

Such a program does not make the farmers happy. Wherefore they appeal for bonuses, price-fixing, etc., to be paid by the manufacturers through taxation.

All of this is obviously the antithesis of the economic principle, that was evident in all primitive life, but has become obscured in the modern complexity, that workers get what they earn. The few remaining prospectors, of the type familiar to Bret Harte, who wash gold from river sands, are quite conscious of this fundamental principle.

Engineers engaged in a certain industry tell us that they are improving its practice so that in a given operation they will cause one man to make 10 units of production instead of four at present; and that they will pay that man a higher wage in dollars so that it will be commensurate with his responsibility, although his expenditure of muscular power will be much less and indeed insignificant.

In an industry in Great Britain one plant continues to operate with equipment of about three-quarters of a century ago, making an annual output of about one hundredth of a modern American unit. The answer to this paradox is that the owner of the little antique and his few men work together in the old-fashioned way, sharing the proceeds and being content so long as they afford modest food, shelter and clothing. They are the analogues of the few men in the world who still obtain a precarious living by washing gold from river sands. After all, such persons are fortunate in comparison with those who are attached to overmanned industries and can neither get work in them nor know what else to do with themselves.

When the capitalist, like Mr. Ford, raises wages he does not bestow them upon his employees, but he merely makes an advance, as a banker might, to enable them to earn more, and that he fully expects they will do, attracting to himself the best of workers. The engineer who modernizes plant, and while increasing the remuneration of individual workers reduces the required number of them, does something similar. Probably this is what Mr. Ford has vaguely in mind in his oft-repeated remarks; and he is really finding fault with management for not increasing production. Anyhow, that is not at all the thing that labor leaders understand him to mean.

High wages result from increased mechanization enabling workers to earn more and this is the proof of the economic theory, for otherwise an industry, or a country, would quickly become insolvent. Improved mechanization releases a certain number of workers and they cannot get high wages, or any wages, unless they earn them. The increasing unemployment in the United States, of which lately we have been hearing more, is clearly an outcome of this natural economic operation. It is, however, a sound economic theory that no country can have too much production. The problem, therefore, is to get expurged workers into new and needful production. This may not be immediately manageable at high wage scales.

We may venture the suggestion that modern mechanization tends toward a differentiation among labor or a sharper classification, which may be expressed in wages, i.e., in earnings. Well mechanized operations keep the superior workers and eliminate the inferior, who are relegated to earning what they can. The latter ought to accept employment in measure of their ability and according to opportunity. This is quite contrary to the popular idea that the solution of the unemployment problem is a general five-day week, or six-hour day, or both. That would be an equalizing, or leveling, process and a negation of the principle of maximum production.

Scholars or Dilettantes?

ONE of the paradoxes of college education, particularly among liberal arts students, is a lack of faith in scholarship. "Grinds" are looked at askance, and often more emphasis is put on extra-curricular activities than on classroom work. Too frequently parents send their children to college to acquire poise and finish and to advance the social fortunes of the family. The students themselves are likely to place great store in the value of making contacts with "important" personages, whether they be athletic heroes or scions of distinguished families. Classroom work is not looked upon as an end in itself, but as a means to an end.

With a smattering of books, some training in the social graces and the cultivation of the "best" people, many an undergraduate believes he will make the greatest progress on the road to success. Unfortunately "pull" is sometimes effective in making the first business connection following graduation. Moreover, the business man himself does not believe that a college can teach a boy business; consequently, he rarely selects applicants on the basis of their scholastic grades.

Faulty teaching has also contributed to the rise of dilettante education. In their study atmosphere, instructors can easily grow too soft to interpret life accurately or properly to relate theory to fact. The very word "academic" sets them apart from real life.

Whatever may have been the reason for it, the belief that scholarship is no index of subsequent success in life has been exploded. Addressing himself to the question, "Does Business Want Scholars?", Walter S. Gifford, president of the American Telephone & Telegraph Co., answers, "Yes." In the May number of *Harper's Magazine* Mr. Gifford presents results of a survey of college men in the employ of his company which shows clearly that the salaries of graduates in both arts and engineering courses are in close correlation with their scholastic standings. "While I do not believe that success in life can be rated by income," adds Mr. Gifford, "I do believe that as between one man and another working in the same business organization, success and salary—while not the same thing—will, generally speaking, parallel each other."

Business is a hard master; but if it has no room for dilettantes, it offers ample rewards for those who have learned how to work.

Automobile Supply and Demand

MUCH attention is being paid to current automobile production, with short range comparisons; but for information of value as to the future we must look to long range comparisons. The course has been disturbed by the disappearance of Ford production at the end of last May, with a partial restoration recently and the assurance that Ford cars will be coming out in larger volume at the time of year when other production is decreasing.

Before making the longer range comparison, it may be noted that the Department of Commerce report which came out this week puts the March production of cars and trucks in the United States at 412,825. Adding 9724 for Canada, the month's total is 422,549, showing a gain over the preceding March. February had a gain while January had not. First quarter production, cars and trucks, United States and Canada, has been as follows in six years:

1923	917,975
1924	1,114,136
1925	936,035
1926	1,164,885
1927	995,414
1928	998,723

It is commonly considered a good showing for automobile demand that output was more in this last quarter than in the same quarter of last year, seeing that Ford was a heavy producer in the first three months of 1927 and did almost nothing in this last quarter. But when one sees that the average of four and five years ago was a trifle above last quarter's showing he will want to look more deeply and broadly into the matter. This can be done by comparing production in twelve month periods through March. Such a comparison must stand, for the twelvemonth period just ended, the full force of the Ford defection from the producing ranks. If no great loss is shown we have reason to doubt the theory that at just about this time output is much short of supplying the public's desire for new cars. The following table shows the total production in the twelvemonth periods through March:

Car and Truck Production, United States and Canada.

Twelve months through March:	
1924	4,362,854
1925	3,558,063
1926	4,655,943
1927	4,333,881
1928	4,577,121

The short range view would be that the figures for the past two twelvemonth periods prove the case, for here is a gain of nearly 250,000 despite the almost complete absence of Ford. But we cannot imagine that it was in the past twelve months that the public was acquiring its great taste for automobiles. Why did production in the twelve months through March, 1927, show a large decrease from the corresponding period one year before and actually a decrease from the period three years before? The figures suggest that large gains in automobile production disappeared quite a while ago. When there was no room a year ago for claiming that a deficiency in supply existed, why had production been as light as it was during the preceding twelve months?

To supplement the argument we have this remarkable showing, that the production in the last twenty-four months has been 8,911,002, against 8,214,006 in the preceding twenty-four months, or 9 per cent gain. That is, the long range figures fail to show a steady increase and they also fail to show any recent deficiency in supply.

Only the Coal Strikers Left

REALLY nothing is left of the bituminous coal strike but the strikers. This is a fitting time to review the matter, when coal production statistics for the first two weeks of the second year of the strike are available. The daily rate of bituminous coal production was 1,256,000 net tons for the first week of this month and 1,236,000 tons for the second week. The fortnight's rate is the lowest for any fortnight since the 1922 strike, and is 8 per cent under the rate in the first fortnight of the 1927 strike, a year ago.

By no means is that decrease a suggestion of increasing effectiveness of the strike. If production was below consumption it was merely because consumers were drawing upon old stocks, unlikely to become valuable but in danger of spontaneous combustion as warm weather approaches.

Non-union mines in fact have had increased difficulty in finding markets, and prices already thoroughly shaken out have been showing further weakness. Only slack has advanced and slack ordinarily moves in the opposite direction from coal prices in general. In the Pittsburgh district there is a condition of much lump coal being on track, but no slack, because production of lump is light.

Prior to April 1, 1927, the trade fully expected a considerable amount of striking in non-union territory, but did not expect really interesting conditions to develop until three months or more had elapsed. As April and May passed without the United Mine Workers accomplishing anything important, Mr. Lewis was given credit in many quarters for strategy. His "masterly inactivity" was thought perhaps calculated to make coal scarce by allowing consumers to be lulled into such a sense of security that they would promptly consume much of the record high stocks of April 1, 1927, some 75,000,000 tons. But coal never did become scarce, and it was inability, not strategy, that kept the United Mine Workers from interfering with non-union production. Now there is still more inability.

What is left of the coal strike is the strikers. It is the strikers, not the strike, that arouses public interest. In other strikes the public became interested because coal got scarce. It is eminently proper that the public should be interested, also the United States Senate, but it has been easy to see that the interest takes the form of wishing the matter to be settled by the apparently easy route of putting the strikers back in their old jobs. The line of thought, or emotion, is that simply of getting the strikers out of the way. As long as there are strikers there will be interest, and very rightly, but when the interest merely takes the form of encouraging the strikers to remain strikers an error is committed, and a grievous injustice is done to the strikers themselves.

Did anyone really believe that the Senate investigation would lead to government relief of the situation? Coal miners are notable for the length of time they can prolong their strikes; but the Senate has a somewhat similar record for delay in action on subjects in which some of its members profess an interest.

The important public matter today is not the strike, which has faded out as an issue, but the strikers, who should be encouraged to get into employment. Thus far the public has been encouraging them to continue in the occupation of being strikers.

Sheet Association Secretary Defends Production Ratings

In view of the fact that the March report of the National Association of Sheet and Tin Plate Manufacturers showed production of sheets for that month to have been 103 per cent of capacity, the question has arisen whether the mill ratings revised last September are not again too low. Walter W. Lower, secretary-treasurer of the association, under whose supervision the report is compiled, does not think they are. Mr. Lower says that capacity is figured on an annual basis and, as experience has shown that suspensions for one cause or another mean an average loss of two weeks per mill per year, 50 weeks per year constitute 100 per cent operations and the reports of the association are based upon that premise.

The ordinary operation of sheet and jobbing mill is 16 turns per week, three for each of the first five days of the week and one on Saturday. Some mills are operated two turns on Saturdays, which makes it possible for production to exceed estimated capacity and there is also room for variation from the rated mill capacity in the kind of material that is rolled. If any considerable number of mills is engaged for a fair length of time on heavy gage material, the production, expressed in tons, rises and, conversely, it goes well below ratings if much light gage steel is produced in any one month. The capacity per month is based upon the number of turns it is possible to operate. Mills are not operated on Sundays and in the sheet association compilation, the Saturday operation is figured as one turn. In March there were four Sundays and five Saturdays and the reckoning was 71 working turns; in February, 67 working turns were figured and in January 70 turns. This month has five Sundays and four Saturdays, which means there will be only the same number of turns as in February.

Mr. Lower says the mill ratings are high enough, figured on an annual basis and making allowance for the fact that efficiency is higher in periods of cool weather than when the outside temperatures are high. Assuming March and July, both 31-day months, to have the same number of possible working turns, he says the production will be greater in March than in July. In short, the answer to a production of 103 per cent of capacity with an operation of 94 per cent of the mills is not that the mill ratings are low, but that ratings are figured from average performance for 50 weeks per year and 16 turns per week.

MATERIALS HANDLING

Meeting in Philadelphia Devotes Day to Foundry Practice and Plant Visits

MORE than 100 members and guests of the American Society of Mechanical Engineers were present at the opening session in Philadelphia, April 23, of the first "national materials-handling meeting," at the Benjamin Franklin Hotel. The two days are to cover the broad features of the subject, with special reference, the first day, to handling in foundries and, the second day, to interior and exterior handling in a wide variety of plants.

Following the morning session on Monday the party divided, for plant inspection, into five groups. These covered (1) Sears-Roebuck & Co., where luncheon was served, and the Atwater Kent Mfg. Co.; (2) Port Richmond coal piers and grain elevators of the Reading Railroad; (3) Curtis Publishing Co. and Victor Talking Machine Co., the latter across the Delaware River, in Camden; (4) United States Cast Iron Pipe Co., Burlington, N. J., where the deLavaud process of casting pipe centrifugally was seen; (5) terminals of the Pennsylvania and the Baltimore & Ohio railroads for handling perishable products and fruit—said to be the largest of the kind in the world.

System in Newark Foundry

At the morning session F. D. Campbell, chief engineer Eastern Steel Castings Co., told of a materials-handling system which his company has put in, to handle sand, molds, flasks, etc., in a plant the nature of the business of which is necessarily largely of a jobbing foundry nature. He reminded his hearers, also, that continuous pouring cannot exist in the ordinary steel foundry, as the metal is ready to pour only at stated intervals, some hours apart. An abstract of this paper will appear in an early issue of THE IRON AGE.

In response to questions from the floor, Mr. Campbell said that the limiting tonnage, below which it would not pay to install such a system would be one thing for sand, but quite a different thing for molds and flasks. The sand distribution system is necessarily an expensive one and small plants could not make it pay; the decision would have to be fitted individually to each case.

As to flasks and molds, however, a small equipment can be installed and tried out and, as experience demonstrates its value, additions can be made as needed. It can start with a small section of roller conveyor and expand as required, or as the needs are demonstrated. A modest investment will supply enough equipment with which to experiment.

Precision bearings are practically necessary for power-driven conveyors, but are too costly for gravity systems. This is particularly true when we consider the rapid changes being made in plants and consequent scrapping of equipment long before it wears out.

As to floor space occupied by the conveyors installed at Newark—this was saved by getting rid of unsightly piles of sand, flasks and materials, and, in addition, the process was speeded up to a marked degree and present capacity is much greater than that before. As the system is rarely at rest, many times as many pieces can be put through as could formerly be made.

About 200 tons of sand is in the system, some 10 tons being used to the ton of castings. This means a cycle of about 2½ hr., enough to restore used sand to proper temperature for re-use.

No defectives are experienced which can be traced to the roller conveyors. No attempt is made to work to thousandths of an inch, but the humps of sixteenths of an inch are rigidly eliminated.

In presenting his paper on "Materials-Handling Features of the de Lavaud Process of Casting Pipe Centrifugally," H. A. Hoffer, eastern sales manager United States Cast Iron Pipe & Foundry Co., showed a large number of lantern slides. About 4,000,000 lengths of de Lavaud pipe are now in use in the United States, the number of users being placed at 1670.

Speaking at the dinner, in the ballroom of the Benjamin Franklin Hotel, Charles D. Young, general purchasing agent Pennsylvania Railroad, Philadelphia, discussed procurement and its relation to inventory. He outlined four elements as the outstanding ones in this connection: Quality, price, time and place.

He made a plea against the piling up of unneeded reports and the compilation of little-used statistics. Signatures of several executives on papers of small moment came in for condemnation as evidencing either (1) perfunctory signing without examination or (2) examining minute details when they should have been doing important work.

Marked Progress of German Industries

Edward J. Mehren, vice-president McGraw-Hill Co., spoke on the strides which Germany is making toward rehabilitation. He pointed out that it is to materials handling that the United States will have to look in holding its own in the commercial struggle of the next quarter-century. Germany is applying scientific management, standardization of materials and simplification of varieties in a program of what they call "rationalization of industry." Industrial research in which a large portion of the time and money is diverted into "pure science," in hopes of developing something commercially valuable, is a second potential threat. In one large establishment the laboratory has 300 men—200 working on definite industrial problems and 100 scouting the broad fields of science for what can be found therein. Germany has become independent of Chilean nitrates, making her own from the air, with a surplus for export. Also the newly developed method of liquefaction of coal, going into commercial production this year, will cut down or abolish Germany's heavy imports of petroleum.

Thirdly, Germany's growing realization of the importance of good employee-employer relations is a strong factor in her improved condition. It is just being learned there that good wages mean good purchasing power.

Doctor Duisberg, head of the "Dye Trust," told Mr. Mehren that the United States might maintain its supremacy for another 20 years, "if your young people learn to work."

Music was furnished, after the addresses, by a 12-piece orchestra and a 14-voice glee club, both consisting of members of the Philadelphia Engineers' Club. To close the evening, the famous slow-motion pictures of Baron C. Shiba, head of the Aeronautical Society of Japan, were shown. Beginning at 2100 pictures a second (the ordinary motion picture is at 16 a second), the pictures shown advanced to 3430, then to 12,000, and finally to the maximum of 20,000 pictures a second. Most of the views were of air currents in contact with airplane wings or propellers. The fastest ones showed a bullet piercing an incandescent bulb. The bullet seemed to meander along and the bulb to crumble gradually into impalpable dust, which hovered long in view without falling to the floor.

Veeder Mfg. Co. and Root Co. Will Probably Be Consolidated

Purchase of the Veeder Mfg. Co., Hartford, Conn., manufacturer of counting and adding machines and devices, by Paine, Webber & Co., New York investment bankers, and recommendation by the directors of the Root Co., Bristol, Conn., maker of a line of counting and adding devices similar to the Veeder company and also hardware products, that the Root organization also be sold to the same bankers indicates a probable consolidation of the two companies. Curtis H. Veeder, founder of the Veeder company, and David J. Post are the principal owners of the Hartford company, and John T. Chidsey is president and general manager of the Root Co. The latter will probably head the consolidation.

Iron and Steel Markets

Crest of Production Passed

Steel Output Tapers as Pressure for Deliveries Recedes—Prices of Lighter Products Show Further Weakness—Mixed Tendencies in Scrap

PRESSURE for steel deliveries is growing less insistent, and production is commencing to recede from the high rate of March, when some mills had to work extra turns. Steel Corporation subsidiaries continue to operate at 90 per cent of capacity, but in the Greater Pittsburgh district average output for all mills has declined to 80 per cent from a recent maximum of 85 per cent.

The volume of specifications shows a natural shrinkage following the heavy releases prior to the last price advances. The extent to which specifying at that time covered consumers' requirements in this quarter is not yet clear, but there are indications that many buyers are protected until July 1. These commitments are the main support of present mill operations, but meanwhile backlogs are being reduced, and there is growing concern over new business, which, as yet, is of small proportions. At Chicago, where the recent buying movement lasted longer than elsewhere, new bookings have dropped to 50 per cent of shipments for the first time in many weeks. Shipping orders, however, continue to equal mill output, so that the operating rate in the Chicago district remains above 95 per cent.

Competition for new business has already become a major factor in the sheet market, causing a rather general abandonment of the prices announced for this quarter. Blue annealed sheets have declined $2 a ton to 2c., Pittsburgh, and width differentials have been waived. Black sheets are more generally quoted at 2.75c., Pittsburgh, a drop of $3 a ton from the last advance. On wide hot-rolled strip 1.85c., Pittsburgh, a decline of $1 a ton, is an increasingly common quotation.

Irregularity in wire nail prices is due primarily to the willingness of some mills to accept additional specifications against first quarter contracts carrying a price 10c. per keg lower than the second quarter quotation.

In plates, shapes and bars also there is a less effective effort to establish the last advance. For some time 1.90c., Pittsburgh, was obtainable on orders not covered by contracts, but recently mills have been accepting such business at 1.85c. Leading producers, however, have not given up their purpose to raise the market to 1.90c., and say that they will adhere rigidly to that figure on third quarter contracts.

Tin plate specifications for July shipment are due in the next three weeks, and during that period the price for the last half of the year will probably be announced. It is commonly expected that the present quotation of $5.25 per base box, Pittsburgh, will be reaffirmed.

Automobile manufacture, which remains a leading outlet for current steel production, shows no signs of a seasonal recession. The steady increase in Ford operations is expected to offset curtailment by other motor car builders. Adoption by the Ford company of a plan under which it will supply steel bars to forge shops with which it has placed contracts is expected to have a far reaching effect on the steel industry.

Railroad buying is featured by purchases of 31 locomotives, of which 20 were placed by the Texas & Pacific, and orders for 220 passenger train cars, of which 120 will be built for the New York Central. Builders of freight equipment have few definite inquiries before them, but liberal purchases in July or August, possibly totaling 30,000 to 40,000 cars, are said to be in prospect.

Bridge construction continues to bulk large in structural steel lettings. The Cooper River bridge at Charleston, S. C., taking 12,000 tons, has been awarded to two fabricators, while a highway bridge in Missouri, now being figured, calls for 8000 tons.

Basic pig iron, which is quoted by producers in the Valleys at $17, furnace, has been sold at $17, delivered, to an Ohio consumer, but apparently not by a Valley maker. Deducting the freight rate from Valley furnaces to the point of delivery, the f.o.b. furnace quotation, on this basis, would have been $15.87, which is lower than the average price for Valley basic for any month since November, 1915.

New England and other Eastern delivered prices on pig iron probably will be lower because of drastic reductions in rail freight rates from the Troy, N. Y., furnace to New England points and through the completion of arrangements for more widespread delivery of iron from Buffalo by barge or barge and rail. The New England rate cuts place Troy shipments on a mileage basis, with savings to consumers ranging from 41c. to $1.13 a ton.

The scrap market shows conflicting movements, with a decline of 25c. a ton on heavy melting steel at Pittsburgh and an advance of 50c. a ton on the same grade at Chicago and at St. Louis. In eastern Pennsylvania, prices on heavy melting steel have remained stationary for months. These divergences emphasize the fact that scrap is more largely influenced by purely local conditions than at any time in years, and definite price trends are no longer in evidence over any considerable period.

Welsh tin plate mills have reached a record for unfilled orders, with heavy buying even from France, but otherwise the British steel market is quiet.

THE IRON AGE composite price for finished steel has dropped to 2.355c. a lb., from 2.362c. last week. The pig iron composite price remains at $17.67 a gross ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Apr. 24, 1928	Apr. 17, 1928	Mar. 27, 1928	Apr. 26, 1927
No. 2 fdy., Philadelphia...	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti....	19.69	19.69	19.69	21.69
No. 2, Birmingham........	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*...	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa....	19.50	19.50	19.50	20.75
Basic, Valley furnace......	17.00	17.00	17.00	19.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*.......	18.50	18.50	18.50	20.00
Malleable, Valley..........	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh....	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago....	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$43.00	$43.00	$43.00	$43.00
Light rails at mill.........	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	34.00
Forging billets, P'gh......	38.00	38.00	38.00	40.00
O.-h. billets, Phila.........	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh.....	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.12	2.12	2.12	2.12
Iron bars, Chicago........	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh.....	1.85	1.85	1.85	1.85
Steel bars, Chicago.......	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh...	1.85	1.85	1.85	1.85
Tank plates, Chicago......	2.00	2.00	2.00	2.00
Tank plates, New York....	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh........	1.85	1.85	1.85	1.80
Beams, Chicago..........	2.00	2.00	2.00	2.00
Beams, New York........	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Apr. 24, 1928 Cents	Apr. 17, 1928 Cents	Mar. 27, 1928 Cents	Apr. 26, 1927 Cents
Sheets, black, No. 24, P'gh	*2.75*	2.80	2.85	2.70
Sheets, black, No. 24, Chicago dist. mill.........	*2.85*	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh.	3.65	3.65	3.65	3.60
Sheets, galv. No. 24, Chicago dist. mill.........	*3.70*	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	*2.00*	2.10	2.10	2.15
Sheets, blue, 9 & 10, Chicago dist. mill.........	*2.15*	2.20	2.20	2.35
Wire nails, Pittsburgh....	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh...	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill..........	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$15.25*	$15.50	$15.00	$16.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	**13.00**	12.50	12.50	13.00
Carwheels, Chicago.......	13.50	13.50	13.50	14.75
Carwheels, Philadelphia...	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh.....	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia...	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.50	16.50
No. 1 RR. wrot. Phila.....	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	11.50	11.50	11.00	12.25

Coke, Connellsvile, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.60	$3.15
Foundry coke, prompt....	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.20	13.25
Electrolytic copper, refinery	14.12½	14.12½	14.00	12.87½
Zinc, St. Louis...........	**5.82½**	5.75	5.72½	6,10
Zinc, New York..........	**6.17½**	6.10	6.07½	6.45
Lead, St. Louis..........	6.00	6.00	5.82½	6.57½
Lead, New York..........	6.10	6.10	6.00	6.87½
Tin (Straits), New York..	*52.62½*	52.75	52.75	66.75
Antimony (Asiatic), N. Y.	*10.12½*	10.25	10.00	14.75

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*The average switching charge for delivery in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Demand Less Urgent—Lighter Products Weaken in Price

PITTSBURGH, April 24.—Whatever recession in steel output has occurred is merely a reflection of the fact that there is not the urgency as to deliveries of last month, when it was necessary for manufacturers of a number of finished products to work extra turns to accommodate delivery demands, which meant extra requirements of crude steel. New demands for finished steel products are lighter than they were 30 days ago, but that is regarded as a natural sequence to a period of heavy deliveries. Having anticipated their needs slightly on account of price considerations, buyers now are digesting their extra takings.

It usually happens that when new demand decreases there is some increase in desire on the part of the mills for orders sufficient to sustain an economical plant operation, and the present is no exception. It is this tendency which accounts for the price uncertainty that is seen in the lighter forms of steel. With blue annealed sheets definitely lower, all grades of sheets have now worked off from the levels to which they were advanced earlier in the year. Strip makers appear to have retained the advances they made around the end of last January on small-lot business, but have not been so successful on large tonnages. There is uncertainty in wire products' prices, but on account of generous treatment of contract buyers, the test of the higher prices still is deferred.

Between business specified late last month and scattering orders since received, most steel companies are able to maintain a fairly satisfactory operating rate. The most marked change that has taken place is that greater dependence is placed on current orders than was true a few weeks ago. The demand at no time this year has got out of the hand-to-mouth category, but in the past week or two, the range has shortened from about two weeks' to one week's requirements. The Youngstown district is not quite so busy as it was recently. The Carnegie Steel Co. recently took off one of its Edgar Thomson blast furnaces, but the average rate of ingot output for the greater Pittsburgh district still is at least 80 per cent of capacity.

It is pretty generally believed that the automotive industry has reached the limit of its steel takings and that there will be no further increase in purchases from that direction in the next few weeks. An ebbing is likely thereafter, as preparation for new models gets under way. The Ford Motor Co. seems to be gaining headway in production, and reports suggest that the May schedule of the Chevrolet Motor Co. is the largest in the company's history. The steel industry, however, regards some recession as likely in the motor car output, and would view the outlook more complacently if some other consuming industries showed signs of making good any slack that may develop in the use of steel for automobiles.

Dealers are taking a calmer view of the scrap market, and the price of heavy melting steel, which advances more because of dealer alarm than mill buying, has weakened.

Pig Iron.—Except for a fresh demonstration that Valley basic iron is merely nominal at $17, furnace, it has been an uneventful week in the Pittsburgh-Valley market. The American Steel Foundries is reported to have closed for 3000 to 5000 tons of basic at $17, delivered Alliance, Ohio. As the freight rate to that point from Youngstown is $1.13 per ton and $1.26 from the Shenango Valley, the Alliance figure would mean a price at what are regarded as the Valley furnaces of $15.74 to $15.87. Valley furnaces cannot ship into the Pittsburgh district and get a higher furnace price than $16 on account of competition from more favorably located Pittsburgh district furnaces. But Valley furnaces continue to quote $17, and there is no evidence that they have gone under that price, seemingly being content to hold their surplus rather than sell for less. The iron to go to Alliance, it is believed here, will be shipped from either Canton or Massillon, which points have a freight rate to destination of $1.01, making the furnace base $16. Small lots of Bessemer, malleable and foundry iron continue to move steadily at unchanged prices, but the market is very dull and it is a rarity for consumers to inquire for iron, most sales being developed by solicitation. The Carnegie Steel Co. recently took off one of its Edgar Thomson stacks.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—The leading producer of spiegeleisen is taking last half business at the same prices as on first half contracts, or from $30 to $32, furnace, for 19 to 21 per cent material, according to the size of the order. There is a heavy movement of this alloy. Consumers are ordering out ferromanganese and ferrosilicon on contract purchases very steadily. New business amounts to little. Prices are unchanged.

Fluorspar.—Leading domestic producers are quoting gravel spar guaranteed to run 85 per cent calcium fluoride and not more than 5 per cent silica at $16 per net ton at mines, but have not been able to get much business at that price because so many users have coverage at from $1.50 to $2 a ton less.

Semi-Finished Steel.—Billets, slabs and sheet bars are moving well, in keeping with a well sustained operation of strip, tin and sheet mills. There is little or no open market activity, however. Makers are not having much success in getting either specifications or orders for wire rods at $44, base Pittsburgh. Most users still have tonnage due at lower prices, and seemingly only a few manufacturers canceled tonnage that was not specified by the end of March.

Bars, Plates and Shapes.—New business in these products is growing lighter, yet there is enough, when the specifications of late last month are included, to keep mill operations well up to the March rate. Shipments, however, are exceeding incoming orders and the prospect is for some slowing down in mill activities. Structural mills are well employed, but bar mill operations suffer from the fact that large users have fairly sizable stocks, and plate mill operations reflect light railroad car orders and only moderate activity in the sizes of pipe in which plates are used. Much of the tonnage moving is priced at 1.80c., base Pittsburgh, but on new business there is no evidence that less than 1.85c. is being done, and on small lots 1.90c. is fairly frequent. Fabricated steel prices are said to be irregular.

Rails and Track Supplies.—There continues to be a good movement of standard-section rails and of track supplies on old orders, but not much new business is coming in. Light-section rails are dull.

Wire Products.—Some manufacturers canceled orders for nails on first quarter contracts that were not specified by the end of March, but others did not, with the result that the effort to establish the market at $2.65, base, per keg, Pittsburgh, has not been successful. It is difficult to get either orders or specifications at that price, while some of the mills are willing to accept specifications against first quarter contracts carrying a price 10c. per keg less. The regular prices on other wire products have not yet come into play because manufacturers were so liberal about accepting specifications late last month on expiring first quarter contracts.

Tubular Goods.—The stimulation given the demand for standard-weight pipe by the price advance of April 2 still is felt in the movement from the mills, but there is not much activity in other kinds of pipe. A fairly good movement to the California fields of oil country pipe, almost all seamless, is noted, but demands from other producing districts are moderate. Mechanical tubing still is going well, but boiler tubes are in fair demand only.

Sheets.—Business holds up well; seemingly, the explanation is that producers are not so stiff about prices as to create resistance on the part of buyers. Blue annealed sheets have swung lower, in keeping with the recent weakening of other finishes and probably also because of increased price competition from hot-rolled strips, which lately have shown little real strength. There is no longer much recognition or observance of the width differentials on blue annealed sheets, which now are quoted at 2c. to 2.10c., base, regardless of width. Black sheets take a range of 2.75c. to 2.90c., but there is not much business at the top figure and the lower price is said to apply only on large tonnages or on finishes where extras are sufficient to permit a low base price. Galvanized sheets are fairly steady at 3.65c. to 3.75c. The American Sheet & Tin Plate Co. is operating its sheet mills at more than 80 per cent of capacity, with independents running about 10 points higher.

Tin Plate.—Specifications for July shipments of tin plate are due in the next three weeks and during that period the price to rule for the last half of the year probably will be announced. The common expectation is that the present price of $5.25, per base box, Pittsburgh, will be reaffirmed. Mills are well supplied with orders, and mill operations hold at 90 per cent or more of capacity. The Wheeling Steel Corporation, Weirton Steel Co. and the Jones & Laughlin Steel Corporation have all of their tin mills in operation, and the American Sheet & Tin Plate Co. is running at 92 per cent of capacity.

THE IRON AGE Composite Prices

Finished Steel

April 24, 1928, 2.355c. a Lb.

One week ago	2.362c.
One month ago	2.357c.
One year ago	2.339c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

April 24, 1928, $17.67 a Gross Ton

One week ago	$17.67
One month ago	17.67
One year ago	19.21
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

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Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	*1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.40c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 3.00c.
No. 24, del'd Cleveland	2.94c. to 2.99c.
No. 24, del'd Philadelphia	3.07c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.85c.
No. 24, del'd Cleveland	3.74c. to 3.84c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per 100 Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
	Chrome Nickel Vanadium	4.15
	Carbon Vanadium	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb
Spikes, $\frac{9}{16}$ in. and larger	$2.8
Spikes, ½ in. and smaller	2.8
Spikes, boat and barge	3.0
Tie plates, steel	2.1
Angle bars	2.7
Track bolts, to steam railroads	$3.80 to 4.0
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off lis

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	48½	2	23	1
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	28	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pip are increased on black by one point, with sup plementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5% On iron pipe, both black and galvanized, th above discounts are increased to jobbers by on point with supplementary discounts of 5 an 2½%.

Note.—Chicago district mills have a base tw points less than the above discounts. Chicag delivered base is 2½ points less. Freight i figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from th point producing the lowest price to destination

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra ar given on lap welded steel tubes and 2 tens t 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Cold-Finished Steel Bars and Shafting.—Not much change is noted in the general demand; while some of the motor car builders are ordering less freely for parts, the Ford Motor Co. is expanding its production and taking enough additional steel to offset largely the loss of tonnage in other directions. The price is firm at 2.20c., base Pittsburgh.

Hot-Rolled Flats.—Business still is good, but will not show as large volume for this month as last, either in production or shipments. March was a heavy production and shipment month, and a good many manufacturers worked mills extra turns to meet delivery demands. Pressure for supplies is less this month and extra mill turns have been cut off. On the general run of business, the ruling prices are 1.90c., 2.10c. and 2.20c., according to width, but large tonnage buyers have received preferential treatment.

Cold-Rolled Strips.—The market shows steadiness at 2.75c. for 3 tons or more of a size to large-lot buyers, and at 2.90c. for smaller users. Business is good, but demands are not quite as urgent as they were in March.

Bolts, Nuts and Rivets.—Consumers and jobbers are fairly well stocked and this month's specifications do not make as good a showing as last month's. Prices are well held.

Coke and Coal.—The market lacks activity and fresh features. Spot furnace coke is almost unsalable to pig iron producers, as those who are operating are covered by contracts and getting full shipments against them. There is almost no demand for coke for heating and only a limited market for beehive oven furnace coke for water gas making, because of cheaper supplies of by-product oven coke. Spot foundry coke also is slow, since so many users have contract supplies to draw upon. Slack coal is scarce because there is so little demand for lump coal and not much screening of coal is being done. The coal industry is interested in the freight rate situation as applying to Lake shipments, and while there is some talk that Northern roads will reestablish the 45c. differential through another cut in their rates, it is not generally accepted, as it would mean a freight rate war.

Old Material.—The market has stopped advancing on heavy melting steel, and while supplies still are scant, there is not as much pressure on the part of mills for deliveries as there was recently. Dealers who were alarmed over the reentrance of the Carnegie Steel Co. into the market and its purchase on direct bid of the Baltimore & Ohio steel and rails, take a calmer view of the situation. Dealers who paid $16 or more, Youngstown, for railroad steel now are trying to find buyers for it at that price, and may be obliged to sell it for less, since one road is demanding shipping instructions. Ordinary heavy melting steel has been sold to a Pittsburgh district melter at $15.25 and more is offered at that price, while $16 is as high as has been paid by any consumer for No. 1 railroad steel. The report that $16.50 was paid by dealers for No. 1 railroad steel, delivered Steubenville, Ohio, proves to be erroneous, and the company operating the steel plant there advises that $15.50 is the highest paid for that grade. Machine shop turnings are easy and blast furnace grades are freely offered. Compressed sheet scrap is scarce.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.25 to $16.00
Scrap rails	15.00 to 15.25
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	16.00 to 16.25
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.25 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	15.50 to 16.00
Industrial	15.00 to 15.50
Agricultural	14.50 to 15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Pig Iron Freight Rates from Troy to New England Reduced

A decision of the Interstate Commerce Commission (Ref. 18387) places freight rates on pig iron from Troy, N. Y., to New England points on a mileage basis and results in general reductions ranging from 41c. to $1.13 per ton. The decision is retroactive. Action was brought by the Hudson Valley Coke & Products Co., Troy, in conjunction with the Manufacturers' Association of Connecticut.

The new rates, which will become effective on or about May 8, apply to rates from Troy to all points on the New York, New Haven & Hartford, Central New England and Central of Vermont railroads. The following are the new rates: 125 miles and less, $2.65 per ton; 126 to 160 miles, $2.85; 161 to 200 miles, $3.05; 201 to 240 miles, $3.25.

The Central Public Service Corporation has awarded a contract for the construction of a battery of 21 Becker-type combination coke ovens at Rockford, Ill., to the Koppers Construction Co., Pittsburgh. The installation will have a daily gas capacity of approximately 3,500,000 cu. ft. Auxiliaries will include two Koppers gas producers, a by-product plant for production of ammonium sulphate and a coal and coke handling plant.

Orders for 1245 steel boilers were placed in March with 72 manufacturers, according to a report of the Department of Commerce. The rating aggregated 1,334,128 sq. ft. of heating surface. This is the largest total of the year, comparing with 986 boilers and 1,165,225 sq. ft. in February. The current figure, however, is lower than that of a year ago, when orders covered 1413 boilers and 1,492,240 sq. ft.

Fort Wayne Rolling Mill Corporation, Fort Wayne, Ind., manufacturer of iron and steel bars and bands, small angles, channels and shapes, which has been in receivership, has been purchased by Joslyn Mfg. & Supply Co., Chicago.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross
*Common soft, base	$
Screw stock	$5.00 per ton over

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*Chicago mill base is $45. Cleveland base, $44.

Prices of Raw Material

Ores

Lake Superior Ores. Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.10 to 1.15
Gas slack, f.o.b. W. Pa. mines	1.15 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$1
No. 2 lump, Illinois and Kentucky mines	$2
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$1
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$3

Fire Clay

Per 1000 f.o.b. W

	First Quality	Second Qu
Pennsylvania	$43.00 to $46.00	$35.00 to $3
Maryland	43.00 to 46.00	35.00 to 3
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 3
Kentucky	43.00 to 46.00	35.00 to 3
Missouri	43.00 to 46.00	35.00 to 3
Illinois	43.00 to 46.00	35.00 to 3
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. W
Pennsylvania	$4
Chicago	5
Birmingham	5
Silica clay, per ton	$8.50 to 1

Magnesite Brick

	Per Net
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$6
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	4

Chrome Brick

	Per Net
Standard size	$4

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off
F.o.b. Pittsburgh	70 and 10 t
F.o.b. Cleveland	70 and 10 t
F.o.b. Chicago	70 and 10 t

Cap and Set Screws

(Freight allowed up to but not exceeding per 100 lb. on lots of 200 lb. or more)

	Per Cent Off
Milled cap screws	80, 10 an
Milled standard set screws, case hardened	80 an
Milled headless set screws, cut thread	
Upset hex. head cap screws, U.S.S. thread	85 a
Upset hex. cap screws, S.A.E. thread	85 a
Upset set screws	80, 10 an
Milled studs	70 a

Chicago

Consumers Buy More Cautiously—Prices of Some Steel Products Weaken

CHICAGO, April 24.—Greater caution in buying is indicated in several directions, and this, together with further unsteadiness in prices, tends to change the outlook in the Chicago steel market. Producers of plates and bars east of here are naming low prices to the south and east in territory that is normally conceded to Chicago mills because of freight rate advantages. The check in buying is shown by the fact that for the first time in many weeks new sales total not more than 50 per cent of shipments from steel plants. Two large consuming interests, the automobile and farm implement industries, do not appear to have assurance of the present high rate of output beyond the middle of May, and are curbing their purchases accordingly.

Notwithstanding the falling off in new buying, specifications against outstanding contracts are equal to mill output, which is holding to the high level of a week ago. No. 11 blast furnace at Gary, Ind., was put in blast on Saturday and No. 5, which is in need of repairs, was blown out last Wednesday. Steel mills are not putting any pig iron on the ground.

The railroad equipment market is sluggish so far as large orders are concerned. The Southern Pacific car purchase was of fair size, and the orders of the New York Central and the Pullman Co. for passenger equipment also were of importance, but even so the buying of rolling stock is well below what steel mills and car building companies have reasonably expected it might be.

Pig Iron.—A melter in Wisconsin has closed for 15,000 tons of Northern foundry iron with Chicago producers. A feature of this market is the sharp upturn in spot purchases, which have been unusually numerous. The price for Chicago district iron is unchanged at $18.50, base, per gross ton. Production is steady, and shipments are gradually growing heavier, causing sellers to expect that April deliveries will top those in March. Further evidence of weakness in silvery iron prices is indicated by business that is being taken at 25c. to 50c. below the quoted market. Carload orders for charcoal iron are being taken at $24, furnace.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is moderately active in small lots. Orders for ferromanganese are being taken at $100, seaboard, and spiegeleisen is steady at $31 to $32, Hazard, Pa., for the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Bolts, Nuts and Rivets.—Specifications dropped perceptibly early in the week, but in the last few days have recovered to the rate of early April. Release orders for these commodities in the three and a half weeks of April compare favorably with the corresponding period in March. Large quantities of small rivets are being specified in this district.

Coke.—Shipments of by-product foundry coke indicate that the melt of iron in this district is steady. Prices are firm at $9, local ovens, and at $9.50, delivered in the Chicago switching district.

Plates.—New business in plates to Western mills totals 4500 tons, the bulk of which is for delivery to Southwestern oil storage tank manufacturers. Competition for such business is unusually keen, and Chicago prices are not being maintained on orders for delivery in that territory. Producers are feeling the pinch of Eastern competition to the east of Chicago, and there is some unsteadiness in the price structure in that direction. Universal mills are well engaged and deliveries are not far from 30 days. Buyers can have sheared plates in two to three weeks. Car shops in this district are operating close to 70 per cent of capacity, and at this rate business on order books provides for about eight weeks' work. The absence of sizable inquiry, or prospects of large new business coming before the trade, is causing no little concern for the reason that about 90 days is needed from the time that inquiries are made until actual shop work begins. Specifications against the recent Chicago, Milwaukee, St. Paul & Pacific orders are now reaching mills in fair size. Among new car orders are 250 automobile and 175 tank cars for the Southern Pacific and 120 passenger cars for the New York Central. Twenty-five of the latter will be constructed by the Pullman Car & Mfg. Corporation. The North American Car Corporation will buy 50 express refrigerator cars.

Mill prices on plates per lb.: 2.00c., base Chicago.

Bands.—This commodity is in good demand, and orders placed this week total 3000 tons. Hot-strip mills are engaged at close to capacity.

Structural Material.—This is another week of comparative dullness in new structural business. Specifications coming to mills are of good size, and shops, especially those handling large work, are busy, but the problem of obtaining sufficient small orders to fill out shop schedules is serious. The attitude throughout the trade seems to be to get small orders at almost any price, and the result is that a few hundred tons of fabricated steel can be bought at pound prices no higher than several thousand tons would have been purchased for a month ago. Structural mills are well engaged, but new business falls well short of shipments, and backlogs are being reduced at a rapid rate. The Mount Vernon Bridge Co. has taken 2000 tons for a highway bridge at St. Joseph, Mo. A farm implement manufacturer expects to ask for prices next week on 2500 tons for a plant addition. Three new office buildings are being projected at Milwaukee.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Wire Products.—The last week has witnessed a drop in demand for wire and wire products. The change is not of large proportions, but it more or less marks the passing of the peak of the spring trade. Distributers in the South continue to order from mills in sizable quantities and larger shipments are being made to the Northwest. Throughout the Middle States and territory west of the Mississippi River users' requirements are lighter. Orders for nails continue spotty and small in the aggregate. In and near Chicago, prices are moderately steady at $2.75, base, per keg. At St. Louis, a highly competitive territory, $2.50 has been done in 100-keg lots. Specifications for wire from the manufacturing trade are steady. Mill output has been cut to 70 per cent of capacity. Stocks in the hands of producers are again well rounded and they are of ample size to care for the late spring trade.

Bars.—Users of mild steel bars continue to send in liberal specifications, with the result that bar mills are scheduled to the end of May. New buying is dragging. Here and there is evidence that production in some automobile plants has reached, if not passed, the seasonal peak. Farm implement manufacturers, now scheduled close to the end of next month, are showing some hesitation in making commitments beyond that time. Cold-drawn steel producers in this district continue to receive liberal specifications. As a general thing, prices for soft steel bars in and near Chicago are holding at 2c. This is also true to the north, but east of here Cleveland and Pittsburgh producers are cutting into the Chicago territory with delivered prices that are lower, by about $2 a ton, than quotations by Chicago mills. Demand for alloy steel bars is steady, and mills are engaged close to capacity. Prices are firm and differentials are holding. The iron bar market is quiet. Rail steel bar prices are steady at 1.85c. per lb., local mills. Specifications are slightly ahead of production, and new business is of sufficient size to maintain backlogs. Mill rollings are being diverted to products other than stock material for the manufacture of fence posts, because producers are anxious to reduce stocks on hand. Barn equipment manufacturers are now the largest single users of hard steel bars. Operations in bed making plants have been curtailed.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Reinforcing Bars.—Fresh inquiry bulks large and is keeping estimating departments well engaged. Notable among new requests for prices are 900 tons for the approach to the Crawford Avenue bridge and 500 tons for an 18-story apartment building, both in Chicago. Old inquiry is of such size that ordinarily it would signify a heavy spring demand, but it is so slow in developing into actual orders that dealers are inclined to consider much of it as dead. Prices show further evidence of weakness. As low as 2.15c. has been done on large tonnages of billet steel reinforcing bars out of Chicago warehouses. The spread in prices between heavy and light tonnage quotations is narrower than in the early spring. Prices for the rail steel commodity are 1.85c. to 1.95c., Chicago Heights.

Rails and Track Supplies.—Several small railroads have entered the market for 1928 requirements, and as a result mill order books have been enlarged by 3000 tons of standard-section rails. Inquiry is dull. Chicago mills have taken 10,000 tons of second quarter accessory business from the Pennsylvania Railroad. A Northern railroad will soon come in the market for 2000 kegs of spikes. Steel tie plates are steady at $43 a net ton. Light rail business is of car lot proportions. Chicago district rail mills are engaged at 90 per cent of capacity, and in some instances deliveries expected by railroads have not been made.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—This market is uncommonly dull for this season of the year. Public lettings and fresh inquiry are light. Contractors, in many instances still busy on putting pipe in the ground that was ordered last fall and in the winter, are not actively concerned with making additional purchases. Rains and unseasonable weather are in part accountable for the backwardness of pipe laying. A few scattered orders have been entered from public utilities and the railroads. The American Cast Iron Pipe Co. has taken 200 tons for White Fish Bay, Wis. Dearborn, Mich., took bids April 24 on a round tonnage. Deliveries are improved, now averaging 30 to 45 days.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c. to 2.40c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Sheets.—Prices in Chicago and to the north are holding, but in the southern and eastern sections of the Chicago territory concessions of $3 a ton are being made. Taking this district as a whole, mill prices are 2.85c. to 3c. for black, 3.70c. to 3.85c. for galvanized, and 2.15c. to 2.30c. for blue annealed. Mill backlogs are small, and current purchases assure operations for only a week in advance on all grades, except blue annealed sheets in the heavier gages. It is the common belief that the use of sheets has changed little over the past few weeks, but buyers, having recently bought heavily, are now intent on reducing supplies on hand. Sales by jobbers are brisk, but here again stocks are large and mills are now benefiting little by the larger business enjoyed by distributers.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.90c. to 3.05c.; No. 24 galvanized, 3.75c. to 3.90c.; No. 10 blue annealed, 2.20c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Old Material.—A steel mill purchase of 15,000 tons of heavy melting steel at $13.50 a gross ton, delivered, has served as a stimulant to the local scrap market. This advance of 50c. a ton in the heavy tonnage grade has brought about similar advances in many other grades. Reports that a cargo of heavy melting steel will be shipped from Chicago to a Lake Erie port cannot be confirmed. The cast iron boring market is quiet from the viewpoint of new purchases by consumers, but dealers are busy covering old contracts. Shipments of this grade are still coming here by rail from points in the East. Purchases and acceptances by steel foundries indicate that they are well engaged. Prices obtained by the Rock Island were high, but this list is a poor gage in the local market because of the extent of free delivery territory served by that railroad.

Prices delivered consumers' yards, Chicago:

Per Gross Ton		
Basic Open-Hearth Grades:		
Heavy melting steel	$13.00 to	$13.50
Shoveling steel	13.00 to	13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to	14.00
Hydraulic compressed sheets	11.50 to	12.00
Drop forge flashings	9.50 to	10.00
Forged, cast and rolled steel carwheels	15.00 to	15.50
Railroad tires, charging box size	16.25 to	16.75
Railroad leaf springs, cut apart	16.25 to	16.75
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.00 to	14.50
Coil springs	17.00 to	17.50
Electric Furnace Grades:		
Axle turnings	13.00 to	13.50
Low phosphorus punchings	14.00 to	14.50
Low phosphorus plate, 12 in. and under	14.25 to	14.75
Blast Furnace Grades:		
Axle turnings	10.00 to	10.50
Cast iron borings	9.25 to	9.75
Short shoveling turnings	9.25 to	9.75
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	14.00 to	14.50
Rerolling rails	14.00 to	14.50
Cupola Grades:		
Steel rails less than 3 ft.	15.00 to	15.50
Angle bars, steel	14.25 to	14.75
Cast iron carwheels	13.50 to	14.00
Malleable Grades:		
Railroad	13.00 to	13.50
Agricultural	12.00 to	12.50
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angles and splice bars	14.00 to	14.50
Iron arch bars and transoms	19.00 to	19.50
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	10.00 to	10.50
No. 2 busheling	5.75 to	6.25
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.00 to	14.50
No. 1 railroad cast	12.75 to	13.25
No. 1 agricultural cast	12.50 to	13.00
Stove plate	11.25 to	11.75
Grate bars	11.25 to	11.75
Brake shoes	11.00 to	11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Sheet Prices Irregular—Plates, Shapes and Bars Sold at Contract Prices

PHILADELPHIA, April 23.—New business is confined to small lots both in pig iron and steel. Although the quotation for current purchases of plates, shapes and bars is still nominally $1 a ton higher than the second quarter contract prices of 1.85c., Pittsburgh, on bars, 2c., Bethlehem, on shapes and 2c., Coatesville, on plates, the lower quotation is not unusual, even on the smaller tonnages. Shipments on contracts are proceeding at a fair rate. Operations among eastern Pennsylvania mills range from about 60 per cent of capacity for the smaller producers to as high as 80 per cent by the leading independent.

Sheets still show decided irregularity in price. Eastern Pennsylvania mills are quoting 2.10c., Pittsburgh, on blue annealed, and 2.80c., Pittsburgh, on black sheets and are obtaining these prices on much of the current business, which is confined to small lots. Automobile body builders, however, have been able to buy sheets at concessions of $1 to $2 per ton, as has been the case in other districts.

Pig Iron.—Buying of foundry iron is limited to occasional carloads. The price of $20, base, is being firmly maintained. In some quarters there seems to be doubt that this basis would hold on a good-sized tonnage, but at present there is nothing under consideration to test the market. A small lot of high-silicon malleable was recently closed for third quarter delivery. About 6000 tons of basic is reported to have been purchased by a steel company in this district. Low phosphorus is quiet and prices are unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.50 to	20.00
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to	24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Orders are slightly larger than for several months. Prices continue at $33 per ton, Pittsburgh, for rerolling billets and $38 per ton, Pittsburgh, for forging quality.

Bars.—Although 1.90c., Pittsburgh, is still quotable for small lots for prompt shipment, 1.85c., Pittsburgh, or 2.17c., delivered Philadelphia, which is the second quarter contract price, is being done on current purchases. Shipments on contracts are satisfactory, but new business is not of much consequence. Reinforced concrete projects, principally bridge construction, in this district are keeping stocks of reinforcing bars moving.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Plates.—Small purchases of plates are at 2.05c., Coatesville, or 2.15c., delivered Philadelphia, but quotations of 2c., Coatesville, or 2.10c., Philadelphia, are reported to be obtainable on desirable new business. About 4000 tons of plates will be required for the Pennsylvania Railroad hulls, consisting of seven car floats and one steam lighter, awarded to American Brown Boveri Electric Corporation, Camden, N. J., and two tugboat hulls placed with the Pusey & Jones Co., Wilmington, Del. The Baldwin Locomotive Works has recently booked 16 locomotives; five from the Texas & Pacific; eight from a Western road and three from the Southern Pacific.

Shapes.—On new business and contracts 2c., Bethlehem, or 2.13c., delivered Philadelphia, represents the current market, and a few first quarter contracts at 1.95c., Bethlehem, or 2.08c., Philadelphia, are still in effect. The producer at Pencoyd is reported to be making shipments entirely on a delivered basis. The United Engineering Co. is the contractor on a new 23-story apartment building at Rittenhouse Square, estimated to require about 2000 tons of steel.

Sheets.—Blue annealed sheets are quotable at 2c. to 2.10c., Pittsburgh, black sheets at 2.75c. to 2.90c., and galvanized at 3.60c. to 3.75c. Eastern Pennsylvania mills are endeavoring to maintain the market at the former level, and on much of the small current purchasing seem to have succeeded, except in the case of automobile body builders, who have been successful in covering at the lower quotations.

Imports.—In the week ended April 21, a total of 7645 gross tons of pig iron arrived at this port, of which 7497 tons was from the United Kingdom and 148 tons from Sweden. Steel arrivals consisted of 12 tons of galvanized strip steel and 10 tons of scrap from the United Kingdom and 28 tons of iron bars from Sweden.

Warehouse Business.—There is a fair volume of buying from stock, but orders are still rather small. The new bases on black and galvanized sheets, which are applied as quantity differentials, have thus far been successfully maintained by jobbers in this district.

Old Material—For the second week prices of all grades of scrap have continued unchanged despite the absence of important buying by consumers. A mill using machine shop turnings has paid $10.50 per ton for a few small lots, following several weeks of offers to buy at $10 per ton, delivered. No. 1 heavy melting steel is moving to Bethlehem, Steelton and Conshohocken and yard grade to Pottsville and Phoenixville, Pa.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)		10.50
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	10.50 to	11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)		12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	14.75 to	15.25
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

The Chicago office of the Reading Iron Co., Reading, Pa., will be removed from 449 Conway Building to 1714 Engineering Building, 205 West Wacker Drive, effective May 1. R. A. Griffin is district sales representative.

New York

Steel Prices Easier as Business Lessens—Pig Iron Sales Fair

NEW YORK, April 24.—Pig iron buyers are showing little interest in their third quarter requirements, but purchases for current needs are in fair volume. Bookings of local sellers totaled about 9500 tons, or 2000 tons more than in the previous week. The Eastern Malleable Iron Co., Naugatuck, Conn., has closed for 2500 tons for water-and-rail shipment to its various plants. The first barge shipment of pig iron from Buffalo this season is expected to arrive in New York harbor May 7. It is likely that shipments by barge will be heavier than heretofore, because all producers are trying to reduce delivered prices through savings in freight. One important Buffalo producer is reported to have leased a storage yard at Jersey City, N. J., from which iron delivered by barge will be distributed to small consumers. Other furnaces are contemplating similar action. The Lorain Steel Co., Johnstown, Pa., has placed 1000 tons of low phosphorus with a domestic furnace. Competition from sellers of English hematite is becoming more severe, however, being felt as far west as the Chicago district. A recent sale of English hematite to the Falk Corporation, Milwaukee, Wis., totaled 1500 tons. The United States Cast Iron Pipe & Foundry Co., Burlington, N. J., has placed 2000 tons of low-silicon iron with an eastern New York furnace. The Farrell-Birmingham Co., Ansonia, Conn., has closed for 300 tons of No. 2X, and the Brooklyn Navy Yard has bought 100 tons of No. 3 foundry. Buffalo foundry iron continues to be quoted at $16 to $16.50, base furnace. Dutch foundry iron is a more important market factor, being offered at $20.50 to $21, duty paid, New York, for No. 1X and lower silicon grades.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—A marked increase in the volume of small jobs placed in the last week brought out a fair aggregate tonnage, but few sizable contracts have either been placed or brought out for bids in the immediate district. A bridge at Charleston, S. C., will require 500 tons of bars. Distributers are quoting 2c., Pittsburgh mill, and the price seems to be holding except in cases where severe foreign competition is met. The Youngstown warehouse price is unchanged at 2.20c., or 2.57½c., on cars at New York, and out of New York warehouse the general quotations are 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Finished Steel.—A further contraction in steel buying affecting not only new business but specifications against contracts, together with a more strongly marked tendency toward price concessions, are the market's chief developments. Weakness in prices is most marked on sheets, the minimum quotations on black and galvanized representing a drop of $3 a ton from those named for second quarter, while on blue annealed the decline is $2. Black sheets have been sold at 2.75c. to 2.90c., Pittsburgh, but 2.85c. and 2.90c. are obtainable only on small lots; galvanized sheets are now 3.60c. to 3.75c., attractive business usually bringing out quotations of either 3.60c. or 3.65c.; on blue annealed stock the range is 2c. to 2.10c. On plates, shapes and bars there has been no definite change in prices, but competition for business has virtually swept aside the maximum prices originally named as the second quarter contracting schedule. That advance carried steel bars, for example, to 1.90c., Pittsburgh, and for some time 1.90c. was obtainable on all orders not covered by contracts. In the past week or two, however, some mills have been accepting such miscellaneous orders at 1.85c., Pittsburgh. Likewise, on plates and shapes, on which Eastern mill basing prevails in this market, current orders are being taken at 2c., Coatesville, Pa., for plates, and at 2c., Bethlehem, Pa., for shapes, or their equivalents. Railroad equipment buying in the East looks somewhat more promising. The Erie is inquiring for 35 locomotives and probably will come into the market soon for 1000 freight cars. The New York Central has divided orders for 120 passenger cars. A bridge at Charleston, S. C., requiring 12,000 tons, will be fabricated by the McClintic-Marshall Co. and the Virginia Bridge & Iron Co.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—There is very little municipal business, but private company inquiries specify some sizable tonnages of pressure pipe. A South American project

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

reported last week as requiring about 9000 tons is understood to be only in the preliminary stages. Both Northern and Southern makers are maintaining prices, and concessions even on large tonnages are less common. An inquiry from a local contractor in New Jersey calls for about 5000 tons of water pipe. Kearny, N. J., opened bids Tuesday on 50 tons of water pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Coke.—There is only moderate activity in small lots of foundry grade. Prices are substantially the same as for several weeks. Standard furnace is quoted at about $2.75 per ton, Connellsville. Delivered prices of special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, N. J., and $10.06 to $10.29 per ton, New York or Brooklyn.

Warehouse Business.—Buying is slightly more active than earlier in the month, but individual orders are small. Most jobbers in this district are adhering to the new quantity differentials, which seem to be operating satisfactorily. On the basis of present business, April is expected to be a better month than March.

Old Material.—Buying by eastern Pennsylvania consumers is small, so that present activity in the scrap market is limited to shipments on contracts. Only a small tonnage of specification pipe is moving to consumers at Lebanon and Columbia, Pa., many yards seeming to prefer to cut their pipe small for shipment as yard steel. Stove plate is being shipped to a steel mill consumer at Phoenixville, Pa.; for shipments to foundry users brokers are paying about $10.50 per ton, delivered, on freight rates of $2.02 and $1.89 per ton. No. 1 heavy melting steel is quiet at $13.50 per ton, delivered to eastern Pennsylvania.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.00
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.25 to 15.75
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.75 to 8.25
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Cleveland

Weakness in Sheets, Strips and Nails—Steel Buying Smaller in Volume

CLEVELAND, OHIO, April 24.—The volume of specifications for steel bars, plates and structural material is not holding up this month to that in March, which is evidently because of the fact that consumers' needs are being taken care of by shipments against specifications on expiring contracts that poured in on the mills late last month. Specifications against second quarter contracts are moderate, and not much new business is coming out. New business is confined to small lots.

The automotive industry remains the backbone of steel consumption. This industry is as yet showing no evidence of a seasonal slowing down, although one car builder is curtailing production to bring out new models. It is believed that whatever check in output some of the motor car builders make in the next few weeks will be offset by the increase in production by the Ford Motor Co., which is slowly stepping up. An interesting development in the Ford industry, which will have a far-reaching effect on the steel industry, is a plan adopted by that company to supply steel bars in some sizes to manufacturers with which it has placed contracts for forgings. A precedent for this policy was adopted by the Ford company a few years ago, when it supplied pig iron to foundries with which it placed contracts for castings. The Ford company is now shipping steel bars to makers of its forgings in Cleveland and other cities and it is stated that the company will supply forging bars for its car parts to shops as far away as Boston.

Inquiry for steel in the building field continues light. Prices are holding steady at 1.85c., Pittsburgh, for steel bars, plates and structural material, and mills are able to get 1.90c. for small lots. Cleveland mills quote steel bars at 1.85c., Cleveland.

Pig Iron.—Activity increased in some sections the past week, during which Cleveland interests sold 20,000 tons of foundry and malleable iron. Much of the business came from Michigan and Indiana. Sales by furnaces in Cleveland were very light. Considerable of the buying was in small lots by foundries that purchase iron only as needed. The Lake furnace market in this territory is well stabilized at $17, furnace, but prices continue irregular in the more competitive sections of southern Ohio and Indiana, where some of the Lake furnaces quote $16.50. In Michigan the market is steady at $18, furnace. The American Steel Foundries has purchased 3000 to 5000 tons of basic iron for its Alliance, Ohio, plant at a delivered price of $17, or slightly lower, or at a price that figures back to less than $16, Valley furnace. Shipping orders from the motor car industry continue heavy. Business with jobbing foundries is still rather slow.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—The demand is well sustained from the automotive industry, although specifications for auto body sheets are not quite as heavy as recently. Ohio mills generally are keeping up production, although one company has made a slight curtailment. New business is rather light in this territory, and buying is confined to early requirements. Black sheets appear well stabilized at the recently reduced price level of 2.75c. to 2.80c., Pittsburgh. Blue annealed sheets are commonly quoted at 2c., Pittsburgh. However, a price of 2.05c., Valley, has appeared on this grade for Cleveland delivery, equivalent to 1.95c., Pittsburgh, and the established 10c. per 100 lb. differential on sheets wider than 40 in. is not always being maintained. Weakness in galvanized sheets, for which the demand is very light, is more pronounced than recently. On this grade, quotations as low as 3.60c., Valley, have appeared, although 3.65c., Pittsburgh, is still the commonly quoted price.

Strip Steel.—There is not much new demand for hot-rolled strip, as mills are still making shipments against 1.75c. contracts, specifications for which were taken late in March. The hot-rolled strip market has a weak tone. On wide strip, 1.85c., Pittsburgh, is rather a common quotation, and the automotive industry evidently is able to place round lots at a lower price. Cold-rolled strip has generally settled down to 3c., base Cleveland, or 2.75c. for 3 tons and over, although some of the mills are getting $1 to $2 a ton more from small-lot buyers.

Wire Products.—Nails appear to be holding to $2.65, base Cleveland, in northern Ohio, but there is very little new demand. In central and southern Ohio $2.55 is commonly quoted.

Reinforcing Bars.—The Cleveland Union Terminals Co. is inquiring for a round lot, the tonnage not being specified, for three buildings recently placed with steel fabricators and for foundation work. Otherwise, the market is dull. Rail steel bars are unchanged at 1.75c., mill.

Semi-Finished Steel.—Sheet bars and slabs continue to move in good volume. The leading local producer is still operating at 100 per cent of capacity. Consumers are following a hand-to-mouth policy in ordering in small lots for a few days' requirements. No deviation from the regular $33 Cleveland price is reported.

Fluorspar.—Efforts of producers to establish the gravel fluorspar market at $16, mines, or an advance of $1 a ton, seem to have been successful. A Pittsburgh district consumer has purchased 500 tons at that price, and several car lot sales were made at the same figure.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair from the automotive and other consuming interests and from jobbers. The volume of business this month will be about the same as that in March. The industry is operating at about 70 per cent of capacity. Prices are firm. While the demand for rivets is only moderate, they are moving slightly better than recently. New orders for large rivets are against $3 per 100 lb. contracts.

Old Material.—The market shows a weaker tone because of the absence of a local demand. Scrap is coming into the market faster than the mills can take it, and dealers having old orders are able to buy small lots at concessions from recent prices. On No. 1 heavy melting steel $13.50 has become sufficiently common to become a recognized market price. Blast furnace grades show a decided weakness, small-lot sales being made at $9.25. May scrap lists have been issued by the Buick and Chevrolet motor car companies, and these show substantial reductions from the April lists. The Buick list amounts to 3500 tons and the Chevrolet list 2400 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.50 to $13.75
No. 2 heavy melting steel	12.75 to 13.00
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Iron Ore.—Several sales were made during the week, following the reestablishment of last year's prices, and a consumer in the Buffalo territory has come into the market for its requirements for the year, aggregating 200,000 tons, part of which will probably be covered in a trade deal, as this consumer is also a mine owner. Shipping schedules for the season prepared by consumers having long term contracts average about the same as last year. Ice conditions still prevent an opening of the ore shipping season, and it is not expected shipments will start before May 10. The consumption of Lake ore during March amounted to 4,808,075 tons, a gain of 413,144 tons, compared with February. In March last year the amount consumed was 5,031,196 tons. Ore on hand at furnaces April 1 amounted to 18,690,656 tons, and the amount at furnaces and on Lake Erie docks on that date was 24,258,754 tons, compared with 24,808,525 tons on the same date a year ago. There were 167 furnaces in blast using Lake ore March 31, an increase of eight for the month. Central district furnaces during March consumed 2,320,561 tons, a gain of 184,877 tons over February; Lake front furnaces used 2,289,103 tons, an increase of 204,447 tons; all-rail furnaces consumed 123,564 tons, an increase of 7957 tons, and Eastern furnaces melted 74,847 tons, an increase of 15,863 tons.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

STEEL COMPANY EARNINGS

Steel Corporation's for First Quarter Were $2.11 Per Share of Common Stock

Earnings of the United States Steel Corporation for the first quarter of 1928 were at the rate of $2.11 per share of common stock, after providing for the preferred stock dividend, and compare with $1.05 a share of common stock for the last quarter of 1927 and $2.81 for the first quarter of last year. Against a deficit of $4,963,499, after declaring the usual dividends, for the fourth quarter of 1927, the quarter just ended gave a surplus of $2,573,541. The following tables show also the earnings of recent years:

EARNINGS IN RECENT YEARS

Quarters	1928	1927	1926	1925	1924
1st	$40,934,032	$45,584,725	$45,061,285	$39,882,992	$50,075,445
2nd	....	46,040,460	47,814,105	40,624,220	41,381,039
3rd	....	41,373,831	52,626,826	42,400,419	30,718,415
4th	....	31,247,529	53,502,525	42,630,840	30,939,912

EARNINGS FOR FIRST QUARTER

	Earnings Before Charging Interest on the Subsidiary Cos.' Bonds Outstanding	Less: Interest on the Subsidiary Cos.' Bonds Outstanding	Balance of Earnings
Jan., 1928	$12,550,979	$651,430	$11,899,549
Feb., 1928	14,230,930	649,593	13,581,337
Mar., 1928	16,102,147	649,001	15,453,146
	$42,884,056	$1,950,024	

Total earnings after deducting all expenses incident to operations, also taxes and interest on bonds of the subsidiary companies		$40,934,032
Less, charges and allowances for depletion, depreciation and amortization, applied as follows:		
To depletion and depreciation reserves of subsidiary companies	$12,202,966	
To sinking funds on U. S. Steel Corporation bonds	2,823,927	
		15,026,893
Net income		$25,907,139
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding	$4,097,848	
Premium on bonds redeemed	477,420	
		4,575,268
Balance		$21,331,871
Dividends:		
Preferred, 1¾ per cent	$6,304,919	
Common, 1¾ per cent	12,453,411	
		18,758,330
Surplus for the quarter		$2,573,541

J. & L. and Republic Earnings Also Gain

Net income of the Jones & Laughlin Steel Corporation in the first quarter amounted to $2,903,457, compared with $1,397,123 in the preceding quarter and with $3,658,724 in the first quarter of 1927. Dividend disbursements in the 1928 quarter were $1,741,206, leaving an addition to surplus of $1,162,251.

The Republic Iron & Steel Co. net profits in the first quarter totaled $487,332, after all charges including bond interest. This compares with $483,854 in the preceding quarter and with $1,044,421 in the first quarter of 1927. After dividend requirements of $737,500 the deficit in the quarter just ended amounted to $250,168.

San Francisco

Pending Cast Iron Pipe Business 44,000 Tons—Structural Steel Active

SAN FRANCISCO, April 21 (*By Air Mail*).—Structural steel bookings this week again lead other steel products, and considerable new work has come out for figures. Interest was centered in the opening of bids for the Wildcat and Sequoia aqueducts in Oakland for the East Bay Municipal Utility District, requiring 8000 tons of plates. Included among the larger awards were 1220 tons of reinforcing bars for a sewer project in Los Angeles, 606 tons of structural shapes for a Freeport, Cal., bridge placed with the Moore Dry Dock Co. and 400 tons for a hangar at San Diego, taken by the McClintic-Marshall Co.

Pig Iron.—Quiet conditions continue in the foundry trade, and as a result sales and inquiries for pig iron have not been numerous. Another shipment of Indian iron totaling 850 tons has arrived on the Coast. Most of this shipment was unloaded at San Francisco, the rest going to Portland and Seattle. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Distributers of out-of-stock reinforcing steel bars report an increase in the number of projects coming up for figures, but the tonnages are small. Awards this week exceeded 1600 tons. Gunn, Carle & Co. took 100 tons for a store for the Santa Fe at Richmond. Prices are still low in the San Francisco district, and 2.25c. continues to be quoted. Merchant bar demand is limited to unimportant lots.

Plates.—Bids were opened on April 20 for 8000 tons for the Wildcat and Sequoia aqueducts in Oakland, but no award was made. The Los Angeles Mfg. Co. took 307 tons for a welded pipe line at Ontario, Cal., and the Western Pipe & Steel Co. booked 100 tons of 60-in. pipe for the Sacramento filtration plant. Bids will be opened on May 9 for a dredger and two steel scows for the State Harbor Commission at San Francisco, calling for 650 tons. Prices are firm at 2.30c. c.i.f.

Shapes.—The structural steel market continues active. Awards this week were in excess of 2400 tons. Important lettings included 570 tons for a church in Los Angeles, taken by the Union Iron Works, and 400 tons for the Masonic Temple at Glendale, Cal., booked by Baker Iron Works. Bids were opened on 947 tons for a bridge at Herndon, Cal., and the Park-Schramm Co., Portland, took the general contract for the Smith River bridge in Del Norte County, Cal. Pending business exceeds 8000 tons. Fabricated and erected prices both in the Los Angeles and San Francisco districts are low; less than $75 a ton erected has been quoted. Plain domestic material is firm at 2.35c. c.i.f.

Cast Iron Pipe.—Activity in the cast iron pipe market is pronounced and more than 44,000 tons is now up for figures or pending. Only 275 tons was placed this week, Robert McNair, Oakland, taking that amount of 2 to 10-in. class 150 pipe for Livingston, Cal. Bids were opened on April 20 for 17,440 tons and 13,250 tons of 50 to 60-in. class C pipe for the Wildcat and Sequoia aqueducts in Oakland for the East Bay Municipal Utility District. Alternate bids were also received on riveted steel pipe. Bids were opened on 2264 tons of 4 to 20-in. classes A and B pipe for Monrovia, Cal. The United States Cast Iron Pipe & Foundry Co. was low bidder on 8744 tons of 4 to 30-in. class B pipe for Long Beach, Cal. Camas, Wash., will open bids on April 30 for 152 tons of 2 to 8-in. class B. Bids will be opened on May 7 for 1799 tons of 30 and 36-in. class B pipe for the Venice Outfall sewer in Los Angeles. The Thomas Haverty Co., Los Angeles, was low bidder on 111 tons of 6 and 12-in. class B pipe for a sewer in Long Beach, Cal. Prices on 6-in. and larger remain around $35 to $36 a ton, delivered.

Steel Pipe.—Only one important project is up for figures at present. Monrovia, Cal., opened bids this week on 710 tons of 4 to 20-in. lapweld pipe, but no award has been made.

Track Material.—The Pacific Coast Railroad, a subsidiary of the Pacific Coast Cement Co., Seattle, is asking for quotations on 200 tons of 75-lb. rail.

Coke.—Demand for foundry coke, because of quiet conditions in the foundry trade, is limited to small lots. Another shipment of English beehive and by-product coke, totaling 4500 tons, is scheduled to arrive on the Coast early next month.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Birmingham

Steel Market Firm—Pig Iron Sales Mostly Small Lots

BIRMINGHAM, April 24.—Pig iron buyers are still confining their orders to lots of 100 to 300 tons. Most of the consumers have covered their requirements for May, but tonnage booked for June is light. Two of the merchant producers report sales close to their make during April, while the third has piled some iron during the past two weeks. Foundry iron quotations remain on a $16 base. The Tennessee company changed furnace No. 5 at Ensley from basic to foundry on April 15. Seventeen furnaces continue in blast. Of this number 10 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Bookings and inquiries show no change from the level of the past several weeks. The market has a firm tone. Demand for structural steel and reinforcing bars is fair, but new business so far this month has been light. The Nashville Bridge Co. is beginning the fabrication of a 2000-ton order for the Warrior steam plant of the Alabama Power Co. The Ingalls Iron Works Co. has an order for 100 tons for the new No. 1 city furnace of the Sloss-Sheffield Steel & Iron Co. The Tennessee company is now working four open hearths at Fairfield; seven are being operated at Ensley. The Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—Demand has improved and prices are firmer at $29 to $31, base. No large sales were reported during the past week, but small-lot sales increased. Shipments have been sufficient to keep stocks on yards at about the same level for the past several weeks.

Coke.—Foundry coke is moving in fairly satisfactory volume. All new business is for prompt shipment. Both spot and contract quotations are unchanged from a $5 base.

Old Material.—A firmer market in a few lines continued through the past week. Sales were slightly larger. Prices have not been affected.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	14.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.50
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Cincinnati

Pig Iron Sales Small—Further Weakness in Sheets and Nails

CINCINNATI, April 24.—Pig iron sales in the past week have been the smallest this year, and the almost total absence of inquiries reflects the lack of interest among buyers. The foundry melt in this district is reported to have declined somewhat, so that melters are taking only a moderate amount of iron on current contracts. Furthermore, there is no factor in the price situation which would give the impression that there is likely to be an advance in the near future, and under the circumstances there is no incentive for forward purchasing. Quotations are virtually unchanged, with southern Ohio foundry bringing $19, base furnace; Tennessee and Alabama iron, $16, base Birmingham, and northern Ohio foundry, $16.50 to $17, base furnace.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	$20.89
So. Ohio malleable..............	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25...	19.69
Alabama fdy., sil. 2.25 to 2.75...	20.19
Tennessee fdy., sil. 1.75 to 2.25..	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The slackening pace at which mills are booking second quarter tonnages has contributed largely to the creation of an unsatisfactory price situation. In an endeavor to keep order books well filled, some producers have made concessions, especially on sheets and on common wire nails. In the past week blue annealed stock has been offered to automobile manufacturers at 1.90c., base Pittsburgh, a drop of $2 a ton from the previous low level and of $4 a ton from the schedule which recently prevailed. Only large users entitled to preferential treatment, however, have obtained 1.90c.; 2c. to 2.10c. is representative of the general market. Demand for black sheets is fair, with prices ranging from 2.75c. to 2.90c., base Pittsburgh. For galvanized sheets buyers are paying from 3.65c. to 3.75c., base Pittsburgh. Automobile body sheets are firm at 4c., base Pittsburgh, and specifications from the Detroit district have been sustained at a high rate this month. Increased orders for electrical sheets are noted. A nearby sheet maker is operating all of its units at full capacity and has a backlog sufficient to insure a continuation of production on the present scale for about three weeks. Considerable unevenness exists in common wire nails, because of the current practice of an Ironton, Ohio, mill of quoting $2.50 per keg at Ironton, plus a low water haul rate to Ohio River points. Even to customers whose plants cannot be reached by river, irregular quotations have been made. The amount of business placed in bars, structural shapes and plates has been only fair at best, and these heavy products are bringing 1.85c., base Pittsburgh, on contract tonnages and 1.90c. for small orders.

Reinforcing Bars.—The Pollak Steel Co. will supply 800 tons of rail steel bars for the State Hospital at Toledo, Ohio, and 220 tons for the Central Catholic High School in that city. New billet bars are firm at 1.85c. to 1.90c., base Pittsburgh; and rail steel bars at 1.80c. to 1.85c., base mill.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes............	3.40c.
Bars, soft steel or iron..................	3.30c.
New billet reinforcing bars..............	3.15c.
Rail steel reinforcing bars..............	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons......	3.85c.
Squares	4.35c.
Black sheets (No. 24)..................	4.05c.
Galvanized sheets (No. 24)............	4.90c.
Blue annealed sheets (No. 10)..........	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb..........	$3.00
Common wire nails, base per keg..........	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb......................	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in......	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in..........	19.00
4-in.	39.00

Warehouse Business.—Several important jobbers declare that bookings continue to lag somewhat, with the result that shipments this month will be little better than those in March. Bars, structural shapes and plates are leading in volume of sales. Prices are steady and unchanged.

Coke.—Shipments of by-product foundry coke in the first 21 days of April showed a decrease of approximately 25 per cent from those in March, and this ratio probably will be maintained during the remainder of the month. Now that foundries supplying the automobile industry have reduced their volume of specifications, bookings of foundry coke in the next month are expected to continue at about the present rate or slightly lower. The Hamilton Coke & Iron Co., Hamilton, Ohio, fired its by-product ovens last week. This company has 45 new Koppers ovens with an annual capacity of approximately 292,000 net tons. About 183,000 will be required for the company's blast furnace, which will begin operating some time in May. The company has begun the marketing of its egg size domestic coke at $6, delivered in Cincinnati. Since the freight rate to this city is $1.26 a ton, this figures $4.74 at Hamilton. The quotation of $6, delivered, however, also applies on all tonnages destined for points having a freight rate less than $1.39. For shipment to consuming points with a freight rate above $1.39 the delivered price is $6.50. This schedule, as applied to Cincinnati, is 64c. a ton less than the delivered price from Ashland.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The volume of scrap moving into district steel plants on current contracts is fairly good, but forward buying is practically at a standstill. Foundries are purchasing material only in small lots. Prices are firm and unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel............	$11.50 to $12.00
Scrap rails for melting.........	11.75 to 12.25
Loose sheet clippings...........	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels............	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.50 to 12.00

Canada

Production of Pig Iron and Steel Shows Marked Gain

TORONTO, ONT., April 24.—Production of pig iron in Canada in March was 78,390 gross tons, an increase of 22 per cent over the 64,691 tons produced in February and 4 per cent above the 75,637 tons reported for March, 1927. For the three months ended with March pig iron production amounted to 208,087 tons, a gain of 17 per cent over the 178,049 tons reported for the first quarter of 1927. Production of steel ingots and castings for the first quarter totaled 301,373 tons, an increase of 32 per cent over the 221,552 tons produced in the corresponding period last year.

Pig Iron.—Advance contract placing is no longer a feature of the pig iron market, but spot sales are holding at a satisfactory level, both as to numbers and tonnages. Releases against contract are responsible for a large movement of foundry and malleable iron. It is expected that within the next two or three weeks spot sales will become greater in tonnages as direct water shipments will soon be possible from blast furnaces to consuming points in Ontario and Quebec. While a spread is quoted on both Toronto and Montreal iron prices, most of the orders going through are at the low level.

Prices per gross ton:

Delivered Toronto

No. 1 foundry, sil. 2.25 to 2.75	$23.10 to	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to	23.60
Malleable	23.10 to	23.60

Delivered Montreal

No. 1 foundry, sil. 2.25 to 2.75	$24.50 to	$25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to	25.00
Malleable	24.50 to	25.00
Basic		24.00

Imported Iron at Montreal Warehouse

Summerlee	33.50
Carron	33.00

Old Material.—Advance buying has practically stopped, and current demand is confined to small tonnages for the immediate needs of consumers. Most consumers are carrying light stocks. Prices are unchanged.

Dealers' buying prices:

Per Gross Ton

	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Buffalo

Pig Iron Inquiry Moderate—Steel Operations Sustained

BUFFALO, April 24.—Pig iron inquiry is quiet, but shipping directions are good. One inquiry before the market is for 500 tons of No. 2 plain. An Erie, Pa., user is inquiring for 500 to 1000 tons of No. 2X for third quarter delivery. Most of the furnaces have taken orders ranging from 100 to 300 tons of foundry and malleable. An order was placed by a central New York user for 600 tons of foundry. Numerous carload lots for prompt delivery have been placed. The price of $17 for No. 2 plain continues to hold in the Buffalo district, and one maker who had been quoting $16 to $16.50 for New England delivery, has sold iron in small tonnage for that territory at $17, though the lower prices have not been withdrawn. Twelve of the 18 blast furnaces in this district are blowing.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25		$17.00
No. 2 foundry, sil. 2.25 to 2.75		17.50
No. 1X foundry, sil. 2.75 to 3.25		18.50
Malleable, sil. up to 2.25		17.50
Basic	$16.50 to	17.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—Heavier orders for bars and shapes have been taken by Buffalo mills following an improved inquiry. Prices are firm. Automobile body and black sheet inquiry is fair. Bolt and nut business continues good, with railroad and automobile companies specifying freely. Wire business is considerably better. Two reinforcing bar contracts totaling about 350 tons were placed. Erie County intends to let a number of bridges and other work requiring about 500 tons of reinforcing bars. In warehouse business April has been the best month this year. Mill operation is about 85 to 90 per cent.

Old Material.—New buying has been very light during the week, but dealers have outstanding orders and are endeavoring to fill them, though scrap has been almost entirely cleared out of yards. Dealers are offering $14.75 freely against one order of heavy melting steel, strictly No. 1 grade. A sale of No. 2 steel, about 1000 tons, at around $13 is reported. Mill operation is very good and large quantities of scrap are being consumed. Specialties are quiet and stove plate shows a little strengthening with $13.50 to $13.75 the market.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$15.00
No. 2 heavy melting steel	12.75 to	13.25
Scrap rails	13.75 to	14.25
Hydraulic compressed sheets	13.00 to	13.50
Hand bundled sheets	9.00 to	9.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.50 to	12.75
Machine shop turnings	8.25 to	8.75
Acid Open-Hearth Grades		
Railroad knuckles and couplers	15.50 to	16.00
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
Low phosphorus billet and bloom ends	17.00 to	17.50
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.75 to	10.25
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades		
Steel car axles	17.00 to	17.50
Iron axles	22.00 to	23.00
No. 1 railroad wrought	12.50 to	13.00
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.50 to	13.75
Locomotive grate bars	12.00 to	12.50
Steel rails, 3 ft. and under	16.50 to	17.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Railroad	15.00 to	15.25
Agricultural	15.00 to	15.25
Industrial	15.00 to	15.25

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Pacific Northwest

Structural Business Fairly Active—Other Steel Lines Quiet

SEATTLE, April 21 (*By Air Mail*).—Generally quiet conditions prevail in the local steel trade, but prices are fairly strong. Jobbers say that orders in the first half of April were larger than in March, but the trade is buying only for nearby needs. Seattle is breaking all former records in building, and demand for building materials is active. The outlook for larger steel business is regarded as encouraging, as some large jobs are being figured that will likely be placed in the next few months.

Pig Iron.—Sales are in small lots only. Considerable quantities of foreign iron continue to come into the local market. Utah foundry and basic are $24 to $25 per gross ton, Seattle delivery.

Structural Material.—The Northwest Pulp & Paper Co. has placed the contract for its new plant at Astoria, Ore., the Austin Co. getting the contract for the buildings, and bids will be asked for shortly for the steel, about 1550 tons. On May 8, bids will be asked for for the Queets River bridge in Washington, about 500 tons. Other prospective work includes 600 tons for the Smith River bridge, 200 tons for a school at

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Tees, bar sizes	3.25c.
Reinforcing bars	3.00c.
Blue annealed sheets (No. 10)	3.90c.
Black sheets (No. 24)	4.90c.
Galvanized sheets (No. 24)	5.65c.
Structural rivets, ½-in. and larger	5.50c.

Cherry, Wash., and 800 to 1000 tons for the local Spokane Street bridge, bids to be asked for within 30 days. The Hofius Steel & Equipment Co. has taken 155 tons for motor sheds for the Great Northern at Appletree, Wash. Shapes are held firmly at 2.35c., Seattle delivery.

Plates.—It is expected 1500 tons of plates for the penstock at Cedar River will be placed within a week. Not much new work is in sight. Plates are 2.30c., Seattle.

Reinforcing Bars.—Considerable State work is being placed, about 500 tons in the past week. The two largest jobs in the market are 1800 tons for the Bon Marche store and 300 tons for the local Stimson Building. Prices remain firm, ranging from 2.20c. to 3c., depending on the order.

Railroad Spikes.—The Pacific Coast Forge Co. has taken an order for 3000 kegs of ⅝ x 6-in. spikes to be used in replacing about 78 miles of trackage between Kintyre and Bowden, Mont. Standard size spikes are held at $3 per 200-lb. keg, c.i.f. Seattle.

Sheets.—A slight betterment in demand for galvanized sheets is noted, but prices on all grades are inclined to weakness. Pacific Coast mills have an advantage over Eastern mills in the matter of freights into Seattle, and are taking a good part of the business offered. Asking prices, which are not firmly held, are: No. 24 galvanized, 4.25c.; No. 24 black, 3.50c.; and No. 10 blue annealed, 2.65c., Seattle.

St. Louis

Pig Iron Sales 6500 Tons—Heavy Melting Steel Up 50c.

ST. LOUIS, April 24.—Sales of pig iron continue large. The market is firm, and melters seem to feel that if there is any change in prices, which have remained stationary since last October, it will be upward. The St. Louis Gas & Coke Corporation sold about 5000 tons during the last week, including 2000 tons to a car manufacturer, 500 tons to a St. Louis melter and 350 tons to an elevator manufacturer. The leading Southern maker sold 1500 tons, of which 500 tons was the largest order, for April, May and June delivery. Business for third quarter is being taken at prevailing prices. A heating appliance manufacturer is in the market for a round tonnage.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Western mills are being crowded by railroads for deliveries of track accessories, and specifications for rails are heavier than mill capacities. However, new business from the railroads is light. Warehouse business is showing some improvement, the volume being about 10 per cent ahead of this period last year, buying in the St. Louis industrial district compensating for decreases in other sections of the trade territory. Business with structural fabricators is extremely light.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material.—An East Side mill bought a large tonnage of heavy melting and heavy shoveling steel, the first purchase of consequence in several months. The business was distributed among several dealers, who immediately advanced their prices on these items 50c. a ton to stimulate shipments from the country. Otherwise, the old material market is virtually dead, with prices unchanged. Railroad lists include: Chicago & Alton, 1250 tons; Mobile & Ohio, 38 carloads; Missouri Pacific, 30 carloads, and Frisco Lines, 4 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.25 to $11.75
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.00 to 12.50
Railroad springs	13.00 to 13.50
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	6.50 to 7.00
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	10.75 to 11.25
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Boston

Further Cut in Pig Iron Freight Rates in Effect Next Month

BOSTON, April 24.—Effective May 8, the Boston & Albany Railroad will reduce freight rates on pig iron from Troy, N. Y., to competitive New England points on the New York, New Haven & Hartford Railroad in amounts ranging from 41c. to $1.13 per ton. The new rates will give the Troy furnace a further advantage over the Buffalo district. Under the new rates, Troy iron can be landed at Providence, R. I., for $3.05 a ton, contrasted with the present rate of $3.66, while Buffalo district iron delivered there by barge carries a rate of $3.78. The new rate from Troy to Florence, Mass., will be $1.13 a ton less than now. No move has been made by the railroads to permit the Mystic Iron Works to meet the new Buffalo barge and Boston & Albany rail rates, but it is intimated something is in prospect. It is apparent that New England foundries are to enjoy lower freight rates than they have had in years. The Mystic Iron Works in the last week sold 2500 tons of iron, all but 350 tons for New England delivery in third quarter. Other stacks did much less, yet aggregate sales of higher priced irons such as Alabama and western Pennsylvania and Susquehanna were quite satisfactory. Such irons were bought for mixture purposes. Buffalo district iron is still available at $16 to $16.50 a ton, base furnace, via all-rail shipment, and competitive irons figure on practically the same delivered basis. No open inquiries of importance are reported, but there is quiet sounding out the market for third quarter delivery, particularly by some of the largest Connecticut foundries, and one large tonnage probably will be placed within a fortnight.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—The upward swing in by-product foundry coke consumption apparently has been checked, New England oven records show. Consumption by so-called specialty foundries is about normal, but by jobbing foundries as a whole is below normal.

Cast Iron Pipe.—Middleboro, Vt., has placed with a local contractor a two mile, 12-in. pipe line. The contractor, according to report, will be permitted to use sand spun pipe, which R. D. Wood & Co. will supply. Bids close May 8 for a two mile, 10-in. pipe line at Bloomfield, Conn. Chicopee, Mass., has placed privately 5400 ft. of pipe. East Bridgewater, Mass., will close bids April 30 on 100 tons of 6-in. pipe. Salem, Mass., closed bids April 24 on 100 tons of 6 and 8-in. pipe. The market for 4-in. pipe appears steady at $44.10 a ton, delivered common Boston freight rate points, and 6 to 12-in. at $39.10, but quotations on larger pipe are being shaded. The usual $5 differential is asked on class A and gas pipe.

Importations.—Receipts of foreign pig iron during the first half of April amounted to 809 tons—110 tons of Dutch iron and 699 tons of Indian. In the first half of March, importations were 119 tons, while in the first half of April, last year, they were 110 tons. Imports of ore in the first half of April were 14,218 tons.

Warehouse Business.—The number of orders passing through warehouses each day is increasing gradually, and individual orders call for larger amounts of material. An improvement in the small ironworking industry has materially helped warehouse sales. Prices are generally firm. Warehouses show a tendency to reduce stocks.

Reinforcing Material.—The American Steel & Wire Co. has sold 1000 tons of mesh and the Concrete Steel Co. 300 tons for road work in Connecticut at $80 a ton. An additional 400 tons will be placed shortly. New Hampshire will soon place 300 tons. Concrete bar sales continue in 5 to 50-ton lots. Competition is keen and prices irregular. The out-of-stock price of 2.90c. per lb., base, is only occasionally obtained. As low as 2.50c. was quoted in the past week.

Old Material.—Activity centers largely in No. 2 melting steel, scrap rails and textile machinery cast. Most of the steel is for Weirton, W. Va., and Boston dock delivery, the latter at $7.50 to $7.75 a ton on dock. A boat will load 5000 tons of steel and scrap rails May 26 for Danzig, and in June another boat will take an equal tonnage, bringing 1928 exports to that port to 15,000 tons. Textile cast is being delivered in Pennsylvania at $14 to $14.50 a ton, for which dealers pay $11 to $11.50 on cars shipping point. Quite a tonnage of No. 2 machinery cast was sold at $10 a ton on cars shipping point last week for Pennsylvania delivery, while the Mystic Iron Works continues to purchase sheared pipe and stove plate at $10 a ton, delivered. No. 1 machinery cast is in limited supply and somewhat better demand from New England foundries.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.25 to $9.50
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.25
No. 1 yard wrought	7.50 to 8.00
Machine shop turnings	5.50 to 5.75
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.75 to 6.25
Forge flashings	6.60 to 7.25
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Detroit

High Production Continues in Michigan Automobile Plants

DETROIT, April 24.—Increases in production in the automotive industry characterize the situation in this area. The General Motors Corporation broke records in March in dealer sales and consumer sales, the former 197,821 cars against 161,910 for March, 1927. March sales to consumers totaled 183,706 units, compared with 146,275 for March, 1927.

The Reo Motor Car Co. is running at the highest rate in the company's history. Production on April 16 developed a new "high" of 285 units. Daily production at the present time is practically 300 units.

Production of the Ford Motor Co. is estimated at 50,000 units for the present month, with approximately 80,000 for the coming month.

The Hupp Motor Car Corporation made a record of 347 cars on April 16. For the first 16 days of the current month 4016 units were shipped, which is approximately the same as the entire April shipment for 1927. Present indications are that the March record of 8034 units will be exceeded this month.

The estimated production of the Paige-Detroit Motor Car Co. for the current month is 7600, practically on the same level as March, but greatly in advance of that of April, 1927, which was only 2838.

The Olds Motor Works reached a total of 9142 units in March, this figure being 800 units ahead of the month's schedule. April production will run approximately 10,500 units.

First quarter production for Cadillac and LaSalle of the General Motors group will run approximately 10,884 units. March shipments were 4526 units, surpassing the largest previous month in the company's history. Unfilled orders for this group of cars is running about 33 1-3 per cent above the high mark for 1927.

Production of the Willys-Overland Co. for the week of April 9 amounted to 7400 units. Although the Willys-Overland Co. had been operating on a 5½-day week, the entire organization now is working on a 6-day week with night shifts.

Pig iron shipments are going forward at a higher rate than last month and promise to about equal those of March, 1927, which was the highest shipping month of last year. There have been no changes in prices on scrap in this district during past two weeks.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Apr. 24	Apr. 23	Apr. 21	Apr. 20	Apr. 19	Apr. 18
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.12½	14.12½	14.12½	14.12½	14.12½	14.12½
Straits tin, spot, N. Y.	52.62½	51.75	....	52.00	52.00	52.37½
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.17½	6.15	6.12½	6.12½	6.10	6.10
Zinc, St. Louis	5.82½	5.80	5.77½	5.77½	5.75	5.75

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, April 24.—There is no marked activity in any of the markets. Prices in most of them are holding firm. Demand for copper is exceedingly light and prices are unchanged. The tin market has been quite active, but demand for lead and zinc is only moderate. Zinc prices have been tending higher.

Copper.—Domestic consumers are buying almost no copper, and there has been hardly enough business to establish a market. Large producers are adhering firmly to 14.25c., delivered in the Connecticut Valley, but at least one custom smelter is now and then selling small lots as low as 14.17½c. to 14.20c., delivered. Sales for foreign consumption have been fairly good the past week, estimated at over 1000 tons a day. Just when another buying movement will start is uncertain. Some expect it shortly and others feel that it may be several weeks. Much depends upon the extent to which domestic as well as foreign buyers are covered, as well as upon the rate of consumption, which at present is exceedingly heavy. Mills are being pushed very hard for deliveries. Lake copper is only moderately active, but steady at 14.25c., delivered.

Tin.—About 1600 tons changed hands the past week, most of it in trading among dealers. Interest centers in May-June delivery, with little business being done in forward positions. Yesterday about 300 tons changed hands, consumers taking a small portion, and today the market was quiet, with spot Straits tin quoted at 52.62½c. New York. Prices in London today are a little lower than a week ago, with spot standard quoted at £233 10s., future standard at £233 7s. 6d. and spot Straits at £238 10s. per ton. The Singapore price today was £235 5s. Arrivals thus far this month have been 5910 tons and 6045 tons are reported afloat. The amount of tin in sight for May, with probable stocks, indicates that supplies are none too large. Because this is the most active consuming period, some feel that a stringency in supplies may develop in May and perhaps in June, particularly if consumers come into the market. They will have received in March and April about 15,000 tons. The volume of shipments from the Straits and other sources will also affect the June position.

Lead.—Moderate activity pervades the market, principally for prompt and May delivery. Thus far there is very little interest in June, and producers are not quoting freely for that position. Prices are firm and unchanged, that of the leading interest still being 6.10c., New York, as its contract price. In the outside market the metal is selling at 6c., St. Louis, with now and then a few sales as low as 5.97½c.

Zinc.—Prices for prime Western zinc are gradually working higher, and today quotations are firm at 5.82½c., St. Louis, or 6.17½c., New York. Inquiry is a little better this week, but consumer buying has been by no means large. Higher prices in London and the sentimental effect of the possible formation of a zinc cartel among foreign countries to regulate production are producing a better tone. The ore situation at Joplin is also believed to be clearing up and sales there are continuing at $38, whereas $40 had been predicted as the minimum. Production of ore last week was about 10,000 tons and sales amounted to about the same.

Nickel.—Quotations are unchanged at 35c. for wholesale lots of ingot nickel, at 36c. for shot nickel, and at 37c. per lb. for electrolytic nickel.

Antimony.—This market is quiet, with Chinese metal for all positions quoted at 10c. to 10.25c. per lb., New York, duty paid.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.00c. to 55.00c.
Tin, bar	56.50c. to 57.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc slab	6.75 to 7.25c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.00c.
Tin, bar	60.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	62.00c.
Solder, ½ and ½	33.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Bronze, brass and copper products at mill are unchanged in price and there has been no revision in quotations on lead full sheets and zinc sheets since the reductions of Feb. 21 and March 26 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Zinc	8.50c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	16.00c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, April 24.—Sales are more numerous and represent a fair volume of business for the week. Prices are stronger, with advances in tin and zinc. The old metal market is moderately active.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 55c.; lead, 6.15c.; zinc, 6c.; in less-than-carload lots, antimony, 11.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

New Projects Will Take 5500 Tons—Awards of 4300 Tons

Awards of concrete reinforcing bars, as reported to The Iron Age during the week amounted to only 4300 tons, the largest being 800 tons for a hospital at Toledo, Ohio. New projects totaled 5500 tons and included 1500 tons for a furniture building at Boston. Awards follow:

White Plains, N. Y., 250 tons, Westchester County building, to Carroll-McCreary Co., Inc.

Brooklyn, 200 tons, telephone building on Avenue U, to Carroll-McCreary Co., Inc.

Buffalo, 180 tons, addition to plant of Trico Products, Inc., to a local maker.

Rochester, N. Y., 170 tons, Auto Inns, Inc., garage, to a Buffalo maker.

Brownsville, Pa., 150 tons, passenger station for Monongahela Railroad, to Fort Pitt Bridge Works.

Wilkinsburg, Pa., 120 tons, telephone exchange, to Carlen Engineering Co.

Pittsburgh, Pa., 220 tons, Koppers Building, to McClintic-Marshall Co.

Davidson, N. C., 120 tons, Davidson College, to Connors Steel Co., Birmingham.

Toledo, Ohio, 800 tons, State hospital, to Pollak Steel Co.

Toledo, 220 tons, Central Catholic High School, to Pollak Steel Co.

Chicago, 130 tons of rail steel bars, hospital at Ashland Avenue and Maypole Street, to Inland Steel Co.

Chicago, 100 tons, building for Peoples Gas, Light & Coke Co., to Concrete Engineering Co.

Chicago, 170 tons, building for the Bassick Mfg. Co., to Barton Spiderweb System.

Chicago, 185 tons of rail steel bars, garage on Greenview Avenue, to Calumet Steel Co.

State of Illinois, 100 tons of rail steel bars, road work, to Calumet Steel Co.

Milwaukee, 290 tons, Safety Building, to Concrete Steel Co.

St. Joseph, Mo., 361 tons, bridge across Missouri River, to Missouri Valley Bridge & Iron Co.

Olympia, Wash., 100 tons, paving State road No. 1, Whatcom County, to Northwest Steel Rolling Mills.

New Westminster, B. C., 100 tons, grain elevator, to Northwest Steel Rolling Mills.

Richmond, Cal., 100 tons, store for Santa Fe railroad, to Gunn, Carle & Co.

San Francisco, 100 tons, Taylor School, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

State of Vermont, 1000 tons, Lake Champlain bridge.

Boston, 1500 tons, furniture building.

Boston, 100 tons, Faulkner Hospital, Jamaica Plain district.

Charleston, S. C., 500 tons, Cooper River bridge; Foundation Co., general contractor on parts requiring bars.

Chicago, 900 tons, Crawford Avenue bridge approach for Sanitary District trustees.

Chicago, 150 tons, Zoological Gardens.

Chicago, 150 tons, building for General Tire & Rubber Co.

Chicago, tonnage not stated, garage at State and Eleventh Streets; Fox & Fox, architects.

Chicago, 100 tons, building for Crane Co.

Chicago, 500 tons, 18-story apartment building; Levy & Klein, architects.

State of Illinois, 200 tons of rail steel, road work, to Calumet Steel Co.

St. Louis, 600 tons; apartment building in Webster Groves, 250 tons; apartment building at 4630 Lindell Boulevard, 250 tons, and factory building for Waxite Paper Co., 100 tons.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

RAILROAD EQUIPMENT

Inquiries for 86 Locomotives and Purchases of 31—Large Passenger Car Orders

Purchase of 20 locomotives by the Texas & Pacific and inquiries for 25 for the Canadian Pacific, 35 for the Erie and 25 electric locomotives for the Cleveland Union Terminals Co. have featured the railroad equipment market this week. Orders were also placed for 120 passenger train cars by the New York Central and 100 sleeping cars by the Pullman Co. The Erie is soon expected to enter the market for 1000 box cars. Details of the week's business follow:

New York Central has placed orders for 120 passenger cars, distributed as follows: 14 passenger, six dining and five horse cars with Pullman Car & Mfg. Corporation; five passenger coaches with Pressed Steel Car Co.; 20 baggage and 14 horse cars with American Car & Foundry Co.; 10 multiple-unit, 10 baggage, three baggage and mail and three passenger and baggage coaches with Standard Steel Car Co., and 30 milk cars with Merchants' Dispatch, Inc.

Illinois Central has ordered 10 motor-passenger cars and 10 trailers for suburban service from Pullman Car & Mfg. Corporation.

Chicago, Rock Island & Pacific is in the market for five horse express cars.

Cudahy Packing Co. has purchased 100 steel underframes for refrigerator cars from Pullman Car & Mfg. Corporation.

Pacific Fruit Express has placed 400 steel underframes for refrigerator cars with Pacific Car & Foundry Co.

Erie Railroad is inquiring for 35 2-8-2-type locomotives and is soon expected to enter the market for 1000 steel box cars, five oil cars and 25 coaches.

Chicago, Milwaukee, St. Paul & Pacific is inquiring for five flat cars.

Barrett Co. has made inquiry for 100 10,000-gal. insulated tank cars.

Canadian Pacific is inquiring for 25 Mikado-type locomotives.

Southern Pacific has ordered three Pacific-type locomotives from Baldwin Locomotive Works.

Texas & Pacific has ordered five Mountain-type locomotives from Baldwin Locomotive Works and 15 2-10-4-type from Lima Locomotive Works, Inc.

Chicago, St. Paul, Minneapolis & Omaha has ordered eight switching locomotives from Baldwin Locomotive Works.

Southern Pacific has ordered 250 automobile cars from Tennessee Coal, Iron & Railroad Co. and 175 tank cars from General American Tank Car Co.

North American Car Corporation will buy 50 express refrigerator cars.

Pullman Co. has ordered 100 sleeping cars from Pullman Car & Mfg. Corporation.

Dominion Coal Co. will buy one locomotive.

Cleveland Union Terminals Co. is in the market for 25 150-ton electric locomotives.

PERSONAL

Robert M. Keeney, for the past five years general superintendent Pittsburgh Crucible Steel Co., Pittsburgh, has been elected president, succeeding F. B. Hufnagel, who since his election as president of the Crucible Steel Co. of America two years ago, has held both offices. Mr. Keeney brings to his new office an experience of more than 20 years in operating capacities. He prepared for college at Phillips Academy, Exeter, Mass., and was graduated from Cornell University in 1907. He entered the employ of the Illinois Steel Co. in its South Chicago open-hearth department in the fall of the same year, and later, following a connection of about a year with the New York State Steel Co., Buffalo, now the Donner Steel Co., he went with the Jones & Laughlin Steel Corporation at its Aliquippa works. He was with this company from 1913 until 1917, when he resigned to become assistant general superintendent Whitaker-Glessner Co., Portsmouth, Ohio. He was next general superintendent of the Central Iron & Steel Co., Harrisburg, Pa. He joined the Pittsburgh Crucible company on Jan. 1, 1923, and for the past two years has been vice-president and a director. He also has been elected a vice-president of the parent company. A. L. Sonnhalter, assistant general superintendent, has been appointed general superintendent. He has been identified with the company since October, 1922, and received his college education at Notre Dame and Ohio State Universities. W. W. Williams, for the past five years general manager of sales, Pittsburgh Crucible company, has been elected vice-president.

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Eugene G. Grace, president Bethlehem Steel Corporation, entertained at the Metropolitan Club, New York, April 18, in his capacity as president of the board of trustees of Lehigh University, fellow trustees and alumni of the university.

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J. H. Edmonds has been appointed general manager of the Lebanon, Pa., plant of the Bethlehem Steel Corporation, succeeding the late John Penn Brock. Mr. Edmonds was assistant general manager, and he is succeeded in that position by J. A. Kinney.

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W. H. Post, for several years in the Cleveland district sales office of the Timken Roller Bearing Co., Canton, Ohio, has been appointed manager of the company's Pittsburgh branch sales office.

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J. H. James has been appointed purchasing agent of the Pittsburgh & Lake Erie and Lake Erie & Eastern railroads, succeeding C. M. Yohe, who was recently made assistant to the president of the New York Central Lines, with headquarters at Pittsburgh.

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Joseph T. Ryerson, president Joseph T. Ryerson & Son, Inc., Chicago, has been elected president of the Industrial Club in that city.

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B. J. Minnier, formerly resident manager at Watertown, N. Y., of the New York Air Brake Co., is now serving as general manager of the Orange, Mass., plant of the Home Sewing Machine Co. William T. Kennedy, who was also formerly with the Air Brake company, has become associated with the Sewing Machine company, as assistant superintendent of its foundry department.

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S. S. French, manager of the Berger division, Central Alloy Steel Corporation, Massillon, Ohio, has been elected a director of that company to succeed C. E. Stuart, who resigned the presidency last year.

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Leon R. German has been elected president of the Peerless Motor Car Corporation, Cleveland. He had been vice-president and general manager.

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Eric Zachau, for several years works manager of the Shaw Crane division of the Shaw Crane-Putnam Machine Co., Muskegon Heights, Mich., a unit of Manning, Maxwell & Moore, Inc., New York, has been appointed to the newly created position of the general manager of the Shaw Crane division. In his new capacity Mr. Zachau will have general supervision of the entire Muskegon Heights plant. He has been succeeded as works manager by W. O. Williams.

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John S. Oursler Succeeds I. L. Hughes as Vice-President of Carnegie Steel Co.

I. Lamont Hughes who, as announced in The Iron Age last week, has been elected vice-president of the United States Steel Corporation with supervision over manufacturing operations of iron and steel making subsidiary companies, has been associated with the Carnegie Steel Co. for 30 years, most recently as vice-president in charge of Youngstown district and Ohio Valley plants of the company. Following graduation from high school at North Braddock, Pa., in 1894, he was employed by the Edgar Thomson works of the Carnegie company, remaining in that plant until 1901, when he was placed in charge of the engineering department of the Union Steel Co., Donora, Pa. In 1905 he went to Youngstown as master mechanic in the bar mills of the Carnegie company and was subsequently advanced to assistant superintendent and later to superintendent of bar mills. In 1916 he was made assistant general superintendent of the entire Youngstown district. In June of that year he went to Ojibway, Ont., as general superintendent in charge of the Steel Corporation's Canadian steel plant project. In 1918 he was transferred to the office of general superintendent in charge of operations being carried on at Neville Island in the construction of an ordnance plant. When this project was abandoned at the end of the war, Mr. Hughes was made president of the Lorain Steel Co., Johnstown, Pa., and on Jan. 1, 1920, he was made general superintendent of all operations of the Carnegie Steel Co. in the Youngstown district. He later was promoted to vice-president in charge of Youngstown district and Ohio Valley plants of the company. He will remain a director of the Carnegie company.

I. L. HUGHES

John S. Oursler, who has been appointed vice-president of the Carnegie company to succeed Mr. Hughes, has been general superintendent of the Homestead works since the abandonment by the Government of the project to construct an ordnance plant at Neville Island during the war, and since that time has carried through a large reconstruction program covering a period of nearly five years. He was born at Wheatland, Pa., March 3, 1868, was first employed by the Spearman Iron Co., Sharpsville, Pa. Soon afterward he went to the Carnegie company as a foreman at Edith furnace, North Side, Pittsburgh. Successively he became superintendent Mingo furnaces, Mingo Junction, Ohio; superintendent Ohio works furnaces, Youngstown; superintendent New Castle furnaces, New Castle, Pa.; assistant general superintendent New Castle works; general superintendent New Castle works, and general superintendent New Castle district, which included works at Farrell and Sharon, Pa. He held this position until 1918, when he was selected to supervise the building of the Neville Island ordnance plant.

Ralph H. Watson, assistant general superintendent at Homestead, succeeds Mr. Oursler as general superintendent. He went to the Carnegie Steel Co. as a metallurgist's assistant in March, 1902, and has been successively metallurgist, second assistant general superintendent, superintendent of the open-hearth furnaces, and assistant general superintendent, Homestead works. He was born Jan. 7, 1878, at Harvey, New Brunswick, and attended the public schools there. He later removed to Massachusetts where he was graduated from the Lawrence Scientific School, Harvard University. He was first employed in the Bessemer department at the Sparrows Point, Md., plant of the Maryland Steel Co.

J. S. OURSLER

R. H. WATSON

Ernest L. Becker, formerly advertising manager for the Andrews Steel Co. and the Newport Rolling Mill Co., Newport, Ky., is now associated with the H. W. Roos Co., Inc., 2036 Dana Avenue, Cincinnati, manufacturer of adjustable building props, as assistant to H. W. Roos, president of the company.

Duncan P. Forbes, secretary of Ramey-Bassett & Co., Rockford, Ill., is president of the Gunite Corporation, Rockford, recently organized to succeed the Gunite division of the Rockford Malleable Iron Works and manufacture a special gun iron alloy for use in machine parts, locomotive wearing parts and certain automotive purposes. John A. Forbes is secretary and treasurer of the new company.

W. G. Owen, recently sales manager of the Haws Refractories Co., Johnstown, Pa., has joined the sales organization of the General Refractories Co., Philadelphia, and will have charge of the Philadelphia territory. He succeeds L. Tschirky, who will devote his time to general sales promotion work and sales development of the company's specialty products.

Dr. Charles R. Gow, consulting engineer, Boston, has been appointed to a chair of humanics at the Massachusetts Institute of Technology, Cambridge, which has recently been founded by William E. Nickerson, vice-president Gillette Safety Razor Co. The course which will be offered for the first time next fall is designed to give systematic preparation for meeting problems of human relationship in business and industry.

Marcus Chase, sales manager of the Niles-Bement-Pond Co. of New England and for 17 years in charge of the company's Boston office, has retired from active service and will be succeeded by M. S. Bradley, who has been assistant to Mr. Chase for nearly 15 years. Mr. Chase has been continuously associated with the Niles company for 29 years.

T. C. Sternblad has been made vice-president and general manager of Henry Pels & Co., New York, representative in the United States for the German company of the same name which manufactures punching and shearing machines, presses, etc. Henry Pels, who has been elected president of the New York company, will remain in the Berlin office.

W. G. Abel, associated for 20 years with the Bruce MacBeth Engine Co., Cleveland, has joined the engineering department of the Texas Nail & Wire Mfg. Co., Galveston, Tex., and will serve as master mechanic.

A. W. Schneider, works manager, and P. W. McIntyre, vice-president of the Reed-Prentice Corporation, Worcester, Mass., have been elected directors of that company.

Kenneth Grant, formerly identified with the Machinists Supply Co., Chicago, has joined the sales organization of the Foote Brothers Gear & Machine Co., Chicago. His territory will include southern Wisconsin, northern Illinois and eastern Iowa, with headquarters at present at the company's general offices in Chicago.

Dennis A. Merriman, who last January was made general manager of sales and a director of the American Steel & Wire Co., Chicago, has been elected vice-president of the company, continuing as general manager of sales.

Eugene A. Weaver, for several years associated with the Surface Combustion Co., Toledo, Ohio, has been appointed Boston district manager of the company, succeeding L. B. Crossman, who has become identified with the Boston Consolidated Gas Co., in charge of industrial and other commercial activities.

Elmer T. McCleary New Republic Head —Harry T. Gilbert Made Vice-President

Elmer T. McCleary, who has been elected president of the Republic Iron & Steel Co., Youngstown, succeeding Thomas J. Bray, has been associated with the Youngstown Sheet & Tube Co. for 22 years, most recently as vice-president in charge of operations. Born of a family of iron makers at Pine Grove Furnace, Cumberland County, Pa., he attended the public schools of Harrisburg and Pennsylvania State College, having been graduated as a metallurgist from the latter institution in 1901. He began his career with the Diamond State Steel Co., Wilmington, Del., but later went to Youngstown as metallurgist at the Ohio works, Carnegie Steel Co. In 1906 when the Youngstown Sheet & Tube Co. began to build its blast furnaces and steel plant he went with the company as chief chemist. He later became superintendent of blast furnaces, superintendent of the steel department, assistant general superintendent, and in 1923 when the Sheet & Tube company acquired the Steel & Tube Co. of America and

E. T. MC CLEARY

H. T. GILBERT

the Brier Hill Steel Co., he was appointed district manager of the Youngstown district properties. He became assistant vice-president in 1924 and vice-president in January, 1926.

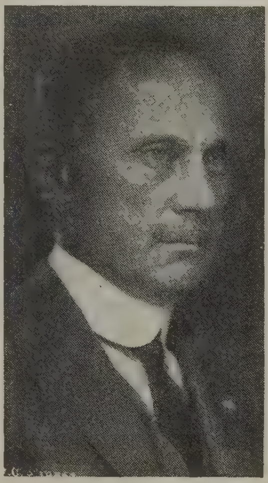
With W. C. Reilly, senior vice-president in charge of operations for the Youngstown company, Mr. McCleary managed the properties of the company during the war and was one of a committee of three named by the Government to determine steel requirements in the shell section of the ordnance department. He took an active part in the merging of the properties of the enlarged Sheet & Tube company in 1923, which experience will be particularly valuable in the consolidation of the Republic and Trumbull properties.

Harry T. Gilbert, new vice-president in charge of sales for the Republic company, comes from the Sharon Steel Hoop Co., Sharon, Pa., with which he has been identified since 1906. For two years he was manager of sales with headquarters at Sharon, and for the next 11 years Chicago district manager of sales. He then returned to Sharon to become executive vice-president of the company, the position he relinquishes to take up his new duties. Mr. Gilbert's connection with the iron and steel industry goes back to 1894 when, following a brief connection with the Denver offices of the Denver & Rio Grande Railroad, he entered the employ of W. W. Bierce & Co., at that time New Orleans representatives of the Illinois Steel Co. He remained with that firm for 10 years, and for about a year before joining the Sharon company was one of the firm of Foust & Gilbert, Birmingham, which did a brokerage business in pig iron, coke and steel.

John U. Anderson, who has been secretary and treasurer of the Trumbull Steel Co., has been elected treasurer of the Republic company, and John T. Harrington, president of the Trumbull company, and Messrs. McCleary and Gilbert have been made members of the board of directors. John A. Topping, chairman, and H. L. Rownd, vice-president, have been reelected.

A new executive committee has been appointed consisting of Messrs. Topping and McCleary, Harry W. Croft, George M. Humphrey and Cyrus S. Eaton.

OBITUARY


G. W. NIEDRINGHAUS

George W. Niedringhaus, chairman of the board of the National Enameling & Stamping Co., Granite City, Ill., and for many years prominent in the industrial development of the St. Louis district, died suddenly at his home in the latter city on April 19. He was born at St. Louis, May 28, 1864, and attended Smith Academy, now a part of Washington University, St. Louis, and the Williston, Mass., Seminary. When 19 years of age he became associated with his father and uncle, William F. and Frederick G. Neidringhaus, in the St. Louis Stamping Co. which they had founded in 1857 to manufacture tin and sheet steel and which had been incorporated in 1866. The plant was removed to Granite City a few years later, the town having derived its name from the granite ware in which the company was specializing at that time. The company later became the National Enameling & Stamping Co. and George W. Neidringhaus had been active in its management until his death. He was also one of the founders of the Commonwealth Steel Co., the American Steel Foundries, and the St. Louis Coke & Chemical Co., all of which have plants at Granite City. At the time of his death he was also chairman of the Granite City Steel Co., recently established steel making subsidiary of the Enameling & Stamping Co.; chairman of the Granite City National Bank; president of the W. F. Neidringhaus Investment Co., a trust estate created by his father; president of the St. Louis & Eastern Belt Line Railroad; president of the Granite City Gas Light & Fuel Co., and a director of the Missouri Pacific Railroad. A son, Hayward, is general manager of the National Enameling & Stamping Co.

William Robert Quinn, Pacific Coast representative of the Combustion Engineering Corporation, New York, died suddenly at the Hotel Manger, New York, on April 12. He was president of the Quinn Oil Burner & Torch Co. until that organization was purchased by the Combination Engineering Corporation in 1922, when he became manager of the fuel oil burning department of the latter company.

James J. Wood, since 1885 consulting engineer for the Thomson-Houston Electric Co., West Lynn, Mass., and the General Electric Co., died on April 20 at Asheville, N. C., where he had gone to recuperate from a recent illness. He was born in Ireland and came to this country with his family when 11 years of age, settling in Brooklyn. He was graduated from the Brooklyn Polytechnic Institute in 1878 and before becoming associated with the Thomson-Houston company he was superintendent and chief engineer of the Brady Mfg. Co., Brooklyn, and a partner in the Fuller-Wood Co. He was prominent in the development of the series arc dynamo and was also active in the development of oil engines.

George P. Bullard, for many years prominently identified with New England steel interests, died suddenly at a Boston hotel on April 17. He was born at West Medway, Mass., June 25, 1857, and went to Boston at the age of 17, where he became a clerk in the hardware firm of A. J. Wilkinson & Co. He then went with Bacon & Co., dealers in iron and steel, and was made a partner in 1886. Later he was New England representative of the Jones & Laughlin Steel Co. In 1891 he founded the Eastern Expanded Metal Co., and afterward the Eastern Concrete Construction Co., both of which companies later were merged with the Penn Metal Co., of which Mr. Bullard was president.

John Challoner, president-treasurer Wilkin-Challoner Co., Oshkosh, Wis., manufacturer of woodworking machinery and tools, died April 18, aged 72 years. The industry was established at Omro, Wis., in 1860 by his father, George Challoner, and was re-established in Oshkosh in 1887.

Charles W. Leavitt, until his retirement in 1904 head of C. W. Leavitt & Co., 30 Church Street, New York, importers and selling agents of ore, metals and alloys, died on April 22 at his home, Meadow Farm, Hartsdale, N. Y., aged 57 years. He had been associated with his father in the founding of the firm bearing their name.

Leon T. Buckwalter, purchasing agent at the Camden, N. J., plant of the American Brown Boveri Electric Corporation, died on April 20 at his home at Merchantsville, N. J., aged 44 years.

John M. Glenn, for 30 years secretary of the Illinois Manufacturers' Association, died April 22, at Hot Springs, Ark.

Gear Manufacturers Make Second Visit to Rochester

(*Concluded from page* 1150)

son, engineer Fellows Gear Shaper Co., also contributed to the success of the occasion.

Doctor Kimball's address, which centered on decoration and proportion in machines and other manufactured goods, was well received. He talked from lantern slides, which pictured the three stages in the development of machines, these three stages being termed the stage of utility, the stage of decoration and the stage of beauty of purpose, the latter usually being entirely devoid of the decorative element. Many examples, some amusing, of machines and other products in all three stages, were shown.

Gear Makers Find Much of Interest at Gleason Works

THE entire afternoon of April 20 was devoted to visiting the plant of the Gleason Works, which was characterized by President Frost, in his opening address, as "one of the great industries connected with the gear makers' art." All departments of the works were open for inspection, and a large number availed themselves of the opportunity of seeing something of the equipment and efficient methods of this plant.

Luncheon was served to the visitors in the plant dining room, in which about 650 persons are accommodated at noon every day. Following luncheon, James E. Gleason, president of the company, in a brief address, called attention to some of the new developments in progress, and something of the object and status of them. Small prints showing the layout of all departments and the route through the plant were provided for each visitor, and a typewritten booklet, prepared for the occasion, described the features of particular interest en route. In addition, a guide was provided for each group of four or five visitors. This "engineering" of the sight-seeing tour, although unnoticed perhaps by most of the visitors, undoubtedly permitted seeing the plant in less time than otherwise, and with less than the usual expenditure of energy.

The Gleason plant covers 22 acres, and most of the 300,000 sq. ft. of floor space occupied is on the ground floor. This permits of excellent lighting conditions, which is one of several noteworthy features of this plant. The working force at present numbers more than 1000.

Among the equipment in the spur gear department, the first to be visited, was a machine for grinding the teeth in straight and spiral bevel gears. Much experimental work has been done on this process and while gears can be ground with accurate profile and bearing, it is said that they are not as quiet as finish cut lapped gears, the grinding process having no distinct commercial advantage as yet. Another machine of interest, for hobbing spiral bevel gears, is an experimental undertaking in line with the company's policy of trying out all possible methods for finishing bevel gears. Of note also was a multiple-spindle continuous spiral gear rougher arranged to produce at the rate of 1300 gears in 24 hr.

In the bevel gear cutting department, 12-in. bevel gear generators of new design were in operation. Features of these machines include quicker set-up, more rapid production, and decreased maintenance cost due to improved lubrication. One of these machines was equipped with an oversize spindle for pinions with large shanks. A special stock dividing gage is being designed and by means of this device stopping of the machine at a specific point will not be required.

Hypoid and spiral generators of 15-in. size are equipped with a new 3 to 1 ratio reverse, which is said to permit a saving of approximately 10 per cent in machine time over the previous reversing mechanism. The new device may be incorporated on machines now in service. The spiral gear roughers have variable feed cams which permit gears to be roughed considerably faster than with the previous type of cam that gives infeed at a constant rate.

Features of the heat-treating department include a hardening furnace of the conveyor type, and electric high-speed tool hardening furnaces of the pusher type. In the latter, which provides two stages of heat, the tools first run through the preheating stage, then through the high-heat stage, and finally are quenched. The tools drop into a tank of oil and the gas that forms passes up into the high-heat section of the furnace, forming a neutral atmosphere and protecting the tools from the air.

Spray painting and other finishing of machines built by the company were explained in detail and the equipment and methods used, and the care exercised, is a story in itself. The various machining departments were visited, as well as tool rooms, assembly and testing departments and the foundry. The large number of standard machine tools and other equipment of recent design, the extensive use of individual motor drive and the safeguarding of all machinery were impressive general features. That engineering of a high order was responsible for the general arrangement and methods of this plant was the impression carried away by visitors, and the inspection trip was obviously thoroughly enjoyed.

Machine Tool Dealers to Meet in May

The Associated Machine Tool Dealers will hold their annual spring meeting at Granville, Ohio, May 23 to 25, inclusive. The organization, which was established "for the promotion of better merchandising methods and closer cooperation with our manufacturer," has the following executive committee: President, J. R. Porter, Marshall & Huschart Machinery Co., Chicago; vice-president, Tyler W. Carlisle, Strong, Carlisle & Hammond Co. Cleveland; secretary E. P. Essley, E. L. Essley Machinery Co., Chicago; treasurer, George H. Cherrington, Brown & Zortman Machinery Co., Pittsburgh; and Charles T. Bush, Charles A. Strelinger Co., Detroit; G. E. Merryweather, Motch & Merryweather Machinery Co., Cleveland; W. F. McCarthy, Henry Prentiss & Co., New York; W. J. Radcliffe, E. A. Kinsey Co., Cincinnati; E. P. Ridings, Syracuse Supply Co., Syracuse; J. R. Vandyck, Vandyck-Churchill Co., New York; and J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis.

Much Welding Used in New Yale Library

Fifteen miles of steel columns will be electrically welded to form the book stacks of the $7,000,000 Sterling Memorial Library being built at Yale University. The book tower will consist of 18 stories, a total of 130 ft. high, and will provide space for 4,000,000 books. Eighty thousand feet of steel columns will be needed to construct it.

Arc welding will be employed. The channels carrying the book shelves and the walkways are 5 in. deep.

G. D. Fish, Westinghouse Electric & Mfg. Co., is consulting engineer on welding.

Canadian Automobile Production Declines

March production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, totaled 7478 passenger cars and 2246 trucks, compared with 10,315 passenger cars and 2189 trucks in the previous month and 19,723 passenger cars and 3527 trucks in March, 1927.

Alphabetical and numerical lists of United States Government Master Specifications, as promulgated by the Federal Specifications Board up to Jan. 1, are covered in Circular 319 of the Bureau of Standards, which has just been issued. The pamphlet is of 20 pages and lists several hundred items.

ASK FOR WAGE INCREASES

Amalgamated Iron, Steel and Tin Workers Present New Scale to Mills

A DEMAND that will be made upon steel manufacturers operating under agreement with the Amalgamated Association of Iron, Steel and Tin Workers at the annual wage conference to be held next month, probably at Atlantic City, is a restoration in the 1928-29 tin mill scale of the preamble in the 1922-23 wage schedule. Since the 1923-24 scale year, tin mill crew wages have been based upon the actual average invoiced selling prices of Nos. 26, 27 and 28-gage plain sheet steel as disclosed in the bi-monthly examination of sales records of signatory companies. It is now proposed to base the tin mill crew wages on the price per 100 lb., f.o.b. mill, of coke tin plate prime sheets, starting with a base price of $3.50 per 100 lb.

The preamble to the present tin mill scale reads:

> It is agreed that when the actual average invoiced selling price of 26, 27 and 28-gage plain sheet steel f.o.b. mill is $2.15 per 100 lb., the tonnage rate shall be as below (wages per unit of 1000 lb. for each member of mill crew and according to gage) with 1½ per cent increase for each member of the crew for each 5c. per 100 lb. advance above the said $2.15 selling price and 1½ per cent decrease for each member of the crew for each 5c. per 100 lb. decline in the selling price to $1.80 selling price per 100 lb.

It is now proposed to go back to the 1922-23 preamble reading:

> It is agreed that when the actual average invoiced selling price of a box of 100 lb. of coke tin plate prime sheets is selling at $3.50 f.o.b. mill that the tonnage rate shall be as below (base wage scale) with 1 per cent increase for each member of the crew on each 5c. advance in the price per box and 1 per cent decrease on each 5c. decrease down to $3.20 selling price.

The last bi-monthly settlement disclosed an average price of $3 per 100 lb. for Nos. 26, 27 and 28-gage sheets and, on a basis of 1½ per cent for each 5c. per 100 lb. over $2.15, the scale for this period is 25½ per cent above the base wage rates, which incidentally are not vitally different from those in the 1922-23 scale. Comparing the present market quotation of $5.25 per base box for tin plate, and the proposed base of $3.50, there is a difference of $1.75, which divided by five would produce 35, which would be the percentage of the advance in wages over base. In short, the demand is for a 10 point increase in the wage scale.

Bar iron manufacturers are to be asked to sign a boiling scale calling for 25c. per gross ton advance for each card point (5c. per 100 lb.) advance from the base price, or $7 per gross ton on bar iron at 1c. per lb. The present scale calls for $7 per gross ton for boiling iron selling at 1c. per lb. and advances 22½c. per ton for each advance of 5c. per 100 lb. in the sales price to and including 1.40c. per lb. bar iron. From 1.45c. up, the present boiling rate advances 25c. per ton for each 5c. per 100 lb. in the sales price. The demand for $1.50 a ton extra for boiling in July, August and September, which was asked a year ago and refused, is repeated in the demands formulated at the recent convention at Middletown, Ohio, which also include a demand for 15 per cent increase in the busheling, knobbling and piling on boards scales, and a 10 per cent increase for muck or puddle mill, bar, 12-in. and guide mill, 10-in. hoop and cotton tie mill crew scales. There is also a demand for a guarantee of not less than $5 per day for roughers and catchers on bar and 12-in. mills and that crews be paid the same as millwrights while changing rolls. The pipe or skelp mill scale of the past year appears to be satisfactory to the men, who are asking no change.

Demands in connection with the sheet and jobbing mill scales generally are of minor character, but in the double mill-loose rolling scale the men want 10 per cent advance for working steel under 24 in., and 40 in. or more in width. Tin mill crews are not in favor of daylight saving time, as a resolution favoring United States Government standard time as the work time was passed and will be presented to the manufacturers. An increase of 10 per cent is asked for tin mill screw boys and pair heaters and an extra of 15 per cent for heaters, doublers and screw boys when iron is finished in 10 sheets under the 4-part system. Another demand is that catchers on 3-part system tin mills be given an increase of 5 per cent on all gages from No. 16 to No. 38. There is only one demand for change in the tin house scale, the catcher on combination terne oil finish plates to be paid $6.27 on large plates, instead of $5.83, and $7.04 on small plates, instead of $6.49. A number of other minor changes also are demanded.

To Install Coke-Handling System

A contract has been awarded by the Woodward Iron Co., Woodward, Ala., to the Semet-Solvay Engineering Corporation, New York, to construct a complete new Semet-Solvay coke-handling system, including wharf, screening and loading plant. The new equipment is planned to take care of the entire output of 230 ovens, estimated at up to 2500 tons of coke daily.

Run-of-oven coke will be discharged on an inclined coke wharf 160 ft. long. The coke will be delivered to a 42-in. belt conveyor and carried to grizzly screens of proper size for the production of furnace and foundry coke. A conveyor will deposit the coke in cars.

A by-pass at the screens will permit loading of run-of-oven coke direct, if desired. Shaking screens will handle the rejects from the furnace and foundry screens. Domestic and furnace sizes will be produced at this point and braize separated and sent to the boiler plant. It is planned to have the new plant ready for service this summer.

German Works Experiments with New Open-Hearth Process

HAMBURG, GERMANY, April 10.—Production of steel by a new process, said to be an improvement in open-hearth practice, continues at an experimental stage in the plant of the Stahlwerke Hoesch, Dortmund. In September, 1927, a small plant was established at Dortmund, with a furnace producing about 200 kg. daily. Savings by this process are estimated at 18 to 20 per cent, but no details are given.

Having found the new process practical on an experimental scale, another plant with a capacity of about 30 metric tons a month has been equipped. Should further experiments in this larger plant prove the process to be as practical as now indicated, it is planned to reequip the entire plant of the company for this production method. The company states that, contrary to many reports, the process is not based on direct production of steel from the ore, but constitutes an important improvement in open-hearth practice.

Steel Framed Dwellings Described in Brochure

The Steel Frame House Co., Pittsburgh, a subsidiary of McClintic-Marshall Co., has issued a handsome brochure describing "Steel Framing for Dwellings," a modern method of house construction. Designed especially for architects, although easily understandable by the home owner, the text cites the important advantages of steel over wood for studding, joists and rafters. Architect's perspectives, floor plans, and framing details are also shown for typical houses, ranging from a small bungalow to a pretentious English-type dwelling. Finally some large drawings show how the studding adapts itself equally well to various exterior and interior finishes such as masonry, brick, stucco or timber.

In a recent four-page folder issued by the Louden Machinery Co., Fairfield, Iowa, and devoted to the monorail system of handling materials, two or three quotations are made from articles on materials handling which have appeared during recent months in THE IRON AGE. The folder is illustrated, being devoted largely to the foundry industry. There are, however, other things in it, including dipping tanks for metal culverts and handling equipment in a nickel plating plant.

BOOK REVIEWS

Pearlitic Cast Iron (Perlitguss). By Dip. Ing. G. Meyersberg. Pages 111, 6 x 9 in. booklet, 92 illustrations, published by Julius Springer, Berlin. Price, 7.50 reichsmarks.

This work is a compilation of a number of articles previously published in the technical magazines of Germany, France and the United States dealing with pearlitic cast iron and is an excellent review of the present status of this development. Cast iron is of such importance in the economics of structures that any improvement in its physical properties is of interest, and the development of pearlitic cast iron bids fair to be an improvement of a major order.

The work includes a detailed description of the properties which may be expected of pearlitic cast iron and the uses to which the material may be put. The physical metallurgy involved is thoroughly expounded. The appendix includes basic German patents for the production of pearlitic cast iron. This is the only information in the pamphlet which would indicate how castings of this material are made, and the book suffers decidedly from the omission of data on methods of production. A bibliography is appended, which covers German, English and French literature.

Various special applications of pearlitic cast iron are cited: The properties show an improvement over those of the usual gray cast iron of 78 per cent in bending strength, 65 per cent in the elongation on bending, 92 per cent in tensile strength, 28 per cent in Brinell hardness, 94 per cent in dynamic bend strength and a life 14.7 times as long in the repeated shock test.

Growth of cast iron under repeated heatings is discussed in great detail, and minimum growth is claimed for pearlitic cast iron. The permeability to liquids and the electrical resistance are discussed.

A. B. K.

Logic of Modern Physics. By P. W. Bridgman, professor of mathematics and natural history in Harvard University. Pages, 226, 5½ x 8½ in. Published by the Macmillan Co., New York. Price, $2.50.

To read this book one should have a bowing acquaintance with recently discovered physical facts such as radioactivity, recently proposed theories such as that the atom consists of an assemblage of electricity particles, and recently formulated generalizations such as Einstein's principle of relativity. The book is essentially a critique of the deductive methods whereby physicists' ideas concerning these things have been reached.

Professor Bridgman believes that physical concepts have precision only when they are closely related to operations which can be performed by the human experimenter. To illustrate this point, consider temperature. Atmospheric temperatures are relatively measured by automatic physiological reactions in the human organism. To measure it quantitatively, instruments must reach equilibrium with the object whose temperature is measured. Essentially temperature is a statistical effect of the motion of a large number of atoms. When attempting to define what is meant by the "temperature" of an atom, the expression is found to have no meaning, because we have no measuring instrument of that order of size; furthermore, it takes many atoms to give a statistical average.

Similar analysis of many fundamental mechanical, electrical and optical concepts indicates that as the velocity increases, or distance or time gets either very big or very small, these concepts entirely lose the significance they possess for such dimensions as the human investigator can actually handle; "they have become blurred, fused together and fewer in number." Mathematical formulae may fit the conditions of experience with precision, but there is no warrant in extrapolating them to dimensions of almost infinite interstellar space or of the almost infinitesimal atom.

The discussion on light is interesting because of its relationship to the newer physics of relativity. Professor Bridgman thinks that Einstein may be supplanted by some future physicist who rejects the view that light is a moving thing, and sticks close to the fact that nowhere is there any experimental evidence for the inclusion of a third element (the ether) between the source of the light and the sink. This future physicist would probably hold that the velocity of light is infinite. (As a matter of fact the concept "velocity" derived from finite speeds of ponderable bodies loses meaning when applied to the almost infinite speed of a something which may not be a thing. "Infinite velocity of light" merely means that a distant clock is set on zero at the instant it receives a light signal flashed from a second clock at its zero.) Many interesting possibilities of such a line of thought are indicated by the author.

His stand that most of the deductions of the newer physics have no meaning in operational terms may appear to be destructive criticism, but what it amounts to is that, when considering either the infinitely large or infinitely small, the concepts of everyday experience lose their meaning. With this always in mind, the physical investigator will be led to invent new concepts corresponding with the experimentally independent things discoverable at these extreme magnitudes, rather than try to translate these discoveries in terms of mechanical, thermal, electrical and optical relations of everyday experience. This will make for greater progress in real understanding.

E. E. T.

Automobile Industry: Its Economic and Commercial Development. By Ralph C. Epstein. Pages 412, 6 x 9 in., illustrated. Published by A. W. Shaw Co., Chicago, 1928. Price $4.

Much ground outside the mere growth of the automobile industry is covered in this book. It goes into the question of profits, of the falling by the wayside of numerous companies which could not stand the pace set by their competitors, and many other topics throwing a definite light on the economic features governing the development of the industry. It traces the story over a period of something more than three decades, from the time, in 1895, when there were just four automobiles made in the United States.

Early struggles in design to produce a car which would stand the wear and tear of uneven roads, and the earliest efforts leading up to the present well established mass production, are traced by the author. He goes also into the growth of the market, devoting two chapters to this topic, the first covering the growth from 1903 to 1916, and the second the subsequent decade. In this he shows the influence and change of varying price ranges at various times, all being worked out on approved statistical bases. As recently as 1907 there were more sales of medium-priced cars than of the low-priced class. The change in favor of the low-priced units from that date on, however, was rapid, and in 1916 they outnumbered the medium-priced units ten to one.

Concentration and combination of plants and the influence of manufacturers' associations are given a chapter. It is pointed out that in 1903 the largest plant in the industry—the Olds Motor Works—made 3922 cars. "Today the average annual (arithmetic mean) production per factory is 81,000 cars, while several of the larger factories make nearly as many vehicles daily as did the Olds works in an entire year." In this chapter is covered also the famous case of the Selden patent and the litigation, covering several years, between the association of licensed manufacturers under this patent and the outsiders.

"Market Stabilization and Industrial Maturity" is the title of the last chapter. Replacement needs, it is estimated by the author, will shortly be 3,000,000 or more cars a year. This replacement figure for 1926 is estimated at 1,900,000. The question of the used car market is taken up and the relation plotted between the number of automobiles produced and the average annual income of persons gainfully employed in the United States. Exports as a factor in market stabilization are discussed. These have been increasing rapidly, until in the second quarter of 1927 they reached an annual rate of almost 500,000 cars. Marketing policy as to prices, design, finish and general sales effort is given considerable space.

Tables and references in the rear of the volume, giving citations of original sources of information, make a valuable portion of the work, particularly for the student or anyone undertaking research. These features cover more than 100 pages, to which is appended a thoroughgoing index of more than 20 pages additional. All in all, the data in the book cover a surprisingly wide range of information on many subjects not ordinarily found. Correspondingly is the value of the book as a reference work enhanced.

Socrates Spars with an Advertising Agent

Those six galleys of olive oil that just came in must be sold. Zeus-ikin, Athenian merchant, consults Tauros, advertising agent, about a publicity campaign. The methods Tauros uses in attempting to "land the account" form the basis of Mr. Gundlach's satire. (Old Sox on Trumpeting. By E. T. Gundlach. Pages, 362, 4½ x 7½ in., profusely illustrated. Published by Consolidated Book Publishers, Inc., 537 South Dearborn Street, Chicago. Price, $2.)

Old Sox, philosopher, and his disciples neatly puncture Tauros's claims, one by one. But, alas, they are too thorough, for Zeus-ikin, who was at first greatly awed by Tauros's apparent familiarity with the "mass mind," runs to the other extreme and decides that anyone can write advertising. So he will prepare his own!

The author, himself an advertising agent, calls his book "a plea in burlesque form for sane, simple, selling messages in lieu of poetic piffle and artfulness." He wields a wicked battle-axe against those who believe that certain products, perhaps perfumes, are better advertised with incensed words in an arty atmosphere.

Market research undertaken to "prove" something draws Old Sox's most scorching fire. Tauros conducts an investigation to decide whether Zeus-ikin should advertise. To no one's surprise, the answer is yes. The philosopher wonders whether anyone who will gain or lose by the outcome can investigate fairly. "I never investigate anything with a view to *finding* a 'proof' of any theory," says Aristoteles, Old Sox's disciple.

The assembled members of the Tauros agency are aghast at the philosopher's suggestion that a picture of a jug of olive oil would provide the best illustration for the advertising. They favor a painting of an olive tree, about which "twelve beautiful maidens are dancing," but Zeus-ikin hastily rejects it, in the fear it will give his fellow Athenians the impression that he is advertising slaves for sale.

Mr. Gundlach has written an interesting book, and one which contains much of value for those versed in advertising and advertising agency methods. It should not be handed to the layman, however, without a cautioning word to the effect that it presents only part of a picture. Mr. Gundlach is dogmatic, and has no fondness for the qualifying ifs, ands, and buts. His book would be stronger it it were fairer. A. H. D.

The 1928 Standard Steel and Metal Directory, published by the Atlas Publishing Co., 150 Lafayette Street, New York, is now ready for distribution. It contains listings of manufacturers of ferrous and nonferrous metals and metal products, including rolling merchants in iron and steel and other metals, and a classification of dealers in old metals. The new edition contains more than 1000 pages.

New Books Received

This Economic World and How It May Be Improved. By Thomas Nixon Carver and Hugh W. Lester. Pages, 432, 6¼ x 9¼ in., illustrated. Published by A. W. Shaw Co., Chicago. Price, $4.

Modern Aircraft. By Victor W. Pagé. Pages 855, 6½ x 9½ in., illustrated. Published by Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $5.

Mechanical World Year Book, 1928. Pages 348, 4 x 6½ in., illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

Mechanical World Electrical Pocket Book, 1928. Pages 338, 4¼ x 6¼ in., illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

Kartelle und Staat. By O. H. Lehnich. Pages 314, 6¼ x 9¼ in. Published by Reimar Hobbing, 17 Grossbeerenstrasse, Berlin S. W. 61, Germany. Price, 14m.

Perlitguss. By G. Meyersberg. Pages 112, 6 x 9 in., illustrated. Published by Julius Springer, Linkstrasse 23, Berlin W. 9, Germany. Price, 7.50m.

Werkstoff Handbuch Stahl und Eisen. Issued by Verein Deutscher Eisenhüttenleute. Pages 330, 6¾ x 8¾ in., illustrated, loose leaf. Published by Stahleisen, Düsseldorf, Germany. Price, 24m.

Werkstoff Handbuch Nichteisenmetalle. Issued by Deutschen Gesellschaft für Metallkunde im Verein Deutscher Ingenieure. Pages 370, 6¾ x 8¾ in., illustrated. Published by Beuth Verlag, Dresdener Strasse 97, Berlin S. 14, Germany. Price, 24m.

Wirtschaftlichste Isolierstärke bei Wärme- und Kälteschutzanlagen und Wärmeabgabe Isolierter Rohre bei Unterbrochener Betriebsweise. By I. S. Cammerer. Pages 90, 6 x 8¼ in., illustrated. Published by Industrieverlag von Hernhaussen, Wilhelmstrasse 8, Berlin S. W. 48, Germany, Price, 6m.

Principles of Metallography. By R. S. Williams and V. O. Homerberg. Pages 259, 5½ x 8¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $3.

Protective Metallic Coatings. By Henry S. Rawdon. Pages 277, 6¼ x 9¼ in., illustrated. Published by Chemical Catalog Co., Inc., 419 Fourth Avenue, New York. Price, $5.50.

Mineral Resources of the United States, 1924. Two volumes. By Frank J. Katz. Vol. I, Metals, pages 589; Vol. II, Non-metals, pages 728, 6 x 9¼ in. Published by the Government Printing Office, Washington. Price, $1 a volume.

Transactions of the American Foundrymen's Association. Vol. XXXV, 1927. Edited by Robert E. Kennedy. Pages 484, 6 x 9¼ in., illustrated. Published by the American Foundrymen's Association, 140 South Dearborn Street, Chicago.

Transactions of the American Institute of Mining and Metallurgical Engineers. Vol. LXXV. Pages 928, 6 x 9 in., illustrated. Published by the American Institute of Mining and Metallurgical Engineers, 29 West Thirty-ninth Street, New York.

American Society for Testing Materials. Standards 1927, Part I, Metals. Pages 871, 6 x 9 in., illustrated. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia.

American Society for Testing Materials. Standards 1927, Part II, Non-metals. Pages 1000, 6 x 9 in., illustrated. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia.

"How to Lay Steel Roofing" is the title of 28-page booklet issued by the Sheet Steel Trade Extension Committee, Pittsburgh. Having learned by a market survey that about 70 per cent of the farmers using steel roofing apply the roof themselves the booklet is designed to illustrate the major steps in the application of steel roofs. Another larger booklet, entitled "Steel Roofing—Its Use and Application," is intended for more limited circulation and deals exhaustively with the general merits of this type of roofing for all types of farm building. A further publication dealing with the laying of steel tile and shingles is in the course of preparation.

COMMERCIAL STEEL CASTINGS

Orders Lower in March, but Production Was Best in 11 Months

WASHINGTON, April 24.—Orders for commercial steel casting in March aggregated 81,834 net tons, or 57 per cent of shop capacity, according to reports received by the Department of Commerce from the principal manufacturers. This compares with 90,244 tons, representing 62 per cent of capacity, in February. Production in March totaled 92,193 tons, or 64 per cent of capacity, against 86,806 tons, or 60 per cent of capacity, in February. March production was the highest for any month since last April. It compares with 102,836 tons in March, 1927.

Of the March orders, 30,956 tons was for railroad specialties, being 46 per cent of this kind of capacity, compared with 41,096 tons, or 61 per cent of such capacity, in February. Orders for miscellaneous castings in March amounted to 50,878 tons, or 66 per cent of this class of capacity, against 49,148 tons, or 63 per cent, in February.

Orders for commercial castings during the first quarter aggregated 263,147 tons, or 61 per cent of capacity, against 292,503 tons, or 68 per cent of capacity, during the first quarter of last year. Castings for railroad specialties during the first three months of 1928 totaled 113,328 tons, or 56 per cent of this class of capacity, against 129,496 tons, or 65 per cent of such capacity, for the corresponding period of last year. Orders for miscellaneous castings totaled 149,819 tons, or 64 per cent of this kind of capacity, during the first quarter of the current year, against 163,007 tons, or 70 per cent of capacity, during the corresponding quarter of 1927.

Of the March output 38,417 tons was for railroad specialties, being 57 per cent of this kind of capacity, against 37,719 tons, or 56 per cent of capacity, in February. Production of miscellaneous castings in March was 53,776 tons, or 69 per cent of this kind of capacity, compared with 49,087 tons, or 63 per cent, in February.

Production during the first three months of 1928 totaled 253,078 tons, or 58 per cent of capacity, against 278,837 tons, or 64 per cent of capacity, during the first quarter of last year. Of the output during the first quarter 104,850 tons was for railroad specialties, being 52 per cent of this kind of capacity, against 110,591 tons, or 55 per cent of such capacity, during the first quarter of last year. Production of miscellaneous castings during the first quarter aggregated 148,228 tons, or 63 per cent of this class of capacity, against 168,246 tons, or 72 per cent, during the corresponding period of last year.

Large Increase in Production of Automobiles in March

WASHINGTON, April 23.—Production of motor vehicles in the United States in March totaled 412,825, an increase of more than 27 per cent over February, when the output was 323,514, according to reports to the Department of Commerce. Production of passenger cars in March amounted to 371,408, a gain of more than 27 per cent over the February output of 290,831, while production of trucks in March was 41,417 as against 32,683, an increase of more than 26 per cent. The figures are based on reports received from 160 manufacturers, 49 making passenger cars and 129 making trucks, while 18 make both passenger cars and trucks.

For the first quarter, total production of motor vehicles was 968,032, against 938,133 for the corresponding period of last year. Of the production during the first quarter 867,782 were passenger cars and 100,250 were trucks, compared with 809,732 and 128,401 respectively for the first quarter of 1927. In 1926 the first quarter production totaled 1,108,194 units, of which 990,523 were passenger cars and 117,671 were trucks.

March production was more than that of March, 1927, when 394,443 vehicles were turned out. The increase was wholly in passenger cars—371,408, against 345,911 a year ago—for trucks showed a drop of nearly 15 per cent, from 48,532 to 41,417.

Foundry Equipment Orders Increase

Net orders of members of the Foundry Equipment Manufacturers Association in March are reported at 138.6, compared with a base of 100 represented by the average monthly shipments in 1922 to 1924. The March figure is the highest in more than a year, comparing with 123.6 in February and 132.7 in January and with 131.1 in March, 1927. January and February, 1927, and December, 1926, were exceedingly high months, registering from 180 to 198. Since that time, however, no month has exceeded the record of last month.

Shipments are placed at 147.9 and unfilled orders at 127.1, again on the basis of average monthly shipments. Nineteen firms reported in March, against 18 in the two preceding months.

Steel barrels shipped by members of the Steel Barrel Manufacturers' Association numbered 356,619 in March. Unfilled orders at the end of the month called for 483,481. The business of the month is reported at $1,034,309. Productive capacity was used during the month to the extent of 55 per cent.

Employment in Ohio Reached High Level in March

Employment in the manufacturing industries of Ohio during March reached the highest level since November, 1926, according to the monthly employment bulletin issued by the Bureau of Business Research of Ohio State University. With an average month in 1923 taken as 100, the index for March stood at 103. In the iron and steel group the number of employees was 5 per cent greater than in February and 3 per cent greater than in March, 1927. Of the 15 steel works and rolling mills reporting to the bureau, 12 showed increases over the February rate. Among foundries and machine shops March employment was 3 per cent higher than in February, but was 13 per cent less than in March, 1927. Companies in the machinery group stated that employment in the first quarter was 7 per cent less than in the same period last year, although March records showed a small increase over February.

Production of Coke in United States

Production of by-product coke in the United States is reported by the Bureau of Mines for March at 4,064,940 net tons. This shows an increase over February's 3,723,147 tons that was equivalent to a little more than the difference in length of month. The daily averages are given as 131,127 tons for March and 128,384 tons for February. The recent figure is well above that for March, 1927, which stood at 3,879,655 tons, or 125,150 tons a day.

Beehive coke output has dropped off almost one-half from March 1927, being reported for the latest month at 449,000 tons compared with 890,000 tons a year earlier. The amount in February was 390,000 tons. Total coke production has been about one-fourth greater than pig iron output, as is shown in the subjoined table:

	Pig Iron, Gross Tons	Total Coke		Ratio Coke to Pig Iron
		Net Tons	Gross Tons	
March, 1927.....	3,483,362	4,769,655	4,258,620	1.223
February, 1928..	2,900,126	4,113,147	3,672,452	1.266
March, 1928.....	3,199,674	4,513,940	4,030,304	1.260

Total apparent consumption of babbitt metal in March was 4,927,634 lb., compared with 4,470,368 lb. in February, according to reports received by the Department of Commerce from 31 firms. Consumption for the quarter was 14,326,519 lb., compared with 16,518,289 lb. last year and 17,745,953 lb. in 1926.

LESS COKE MADE IN 1927

Decline Over 10 Per Cent from 1926—More Than 86 Per Cent of Output Was By-Product

WASHINGTON, April 24.—Preliminary reports received by the Bureau of Mines place the total production of coke in 1927 at 50,925,000 net tons, a decrease of 10.4 per cent from 1926. The decrease was in part due to the fact that in 1926 coke was in demand to meet the deficit in anthracite coal caused by the miners' strike, while in 1927 there was an abundant supply of anthracite. The chief cause of the decrease in coke production, however, was the diminished activity of blast furnaces, the output of pig iron having declined 7.3 per cent below the level of 1926.

Most of the decrease in coke production was borne by the beehive branch of the industry, which, the bureau pointed out, is assuming more and more the position of an auxiliary, called upon to furnish only the surplus requirements of the metallurgical industry which cannot be met by the by-product ovens. Thus the total output of beehive coke fell from 12,488,951 tons in 1926 to 7,004,000 tons in 1927, a decline of 44 per cent. The output of by-product coke was 43,921,000 tons, a decrease of only 1 per cent under 1926, when the production was 44,376,586 tons.

A table presented by the bureau showing the production of coke for the period 1913-1927, inclusive, gives a vivid picture of the swing in the position of beehive and by-product output. In 1913 coke production totaled 46,299,530 tons, of which 33,584,830 tons, or 72.5 per cent, was beehive and 12,714,700 tons, or 27.5 per cent, was by-product coke. In 1927, of the estimated total production of 50,925,000 tons, 43,921,000 tons, or 86.2 per cent, was by-product and 7,004,000 tons, or 13.8 per cent, beehive coke.

Pennsylvania, the largest producer of both kinds of coke, has, since 1924, produced more by-product coke than beehive. The output of its by-product ovens in 1927 was 11,329,000 tons. As a producer of by-product coke Ohio ranks second, with 7,129,000 tons in 1927. Indiana was third, Alabama fourth, New York fifth and Illinois sixth.

Three new by-product plants started operations during 1927. In April the Central Alloy Steel Corporation put into blast its new plant at Massillon, Ohio. In July the West Boston Gas Co. began making coke at Framingham, Mass., and in December the Consumers' Gas Co. put into operation a new plant at Flint, Mich. In addition, there were more than 660 new ovens installed and fired at existing plants. At the close of 1927 there were approximately 300 new ovens under construction, 131 of these at two new plants.

The bureau report said that, with the addition of 753 new ovens during 1927, the potential coking capacity of by-product plants at the close of the year, at 100 per cent operation and with all conditions favorable, amounted to about 56,600,000 tons. If all of the ovens now under construction are put into operation during 1928, as contemplated, the coke plants will be capable of turning out, at 100 per cent operation, more than 58,000,000 tons. At this rate the plants in existence have a coal-carbonizing capacity of 81,000,000 tons of bituminous coal, which will be increased to 83,400,000 tons through the addition of new ovens.

Production of by-product ovens at blast furnaces in 1927 totaled 34,065,000 tons, against 34,715,000 tons in 1926 and 31,494,000 tons in 1925, there having been 43 batteries of ovens each year at the furnaces. The percentages of the by-product output at these ovens, compared with the total output for each year, were 77.6, 78.2 and 78.9 respectively.

Preliminary estimates of the amount of by-products obtained in 1927 are as follows: Tar, 523,000,000 gal.; ammonia, sulphate equivalent of all forms, 1,366,000,000 lb.; gas, 698,000,000,000 cu. ft.; crude light oil, 163,000,000 gal. Allowing for imports and exports, the indicated consumption of coke in 1927 was 50,287,000 tons. Of this amount about 37,335,000 tons, or 74.2 per cent, was consumed in blast furnaces.

British Steel Imports Decline, Exports Gain

WASHINGTON, April 24.—Increasing more than 29 per cent, exports of iron and steel from Great Britain in March totaled 409,297 tons, compared with 317,036 tons in February. At the same time imports showed a decrease of 8 per cent in March, declining to 269,526 tons from 292,918 tons in February, according to a cablegram from London received by the iron and steel division, Department of Commerce. The incoming movement in March showed a marked change from that for the first two months, which showed a rising tendency. The outgoing movement was the heaviest for any month since May, 1927, when exports aggregated 422,426 tons.

Production of both pig iron and steel ingots also increased during March, the former amounting to 592,600 tons, an increase of 41,800 tons over February, and the steel ingot output totaling 793,300 tons, a gain of 28,900 tons over February. At the end of the month two more blast furnaces were blown in, bringing the total in operation to 150. There was a decrease of one in the number of open-hearth furnaces in operation, the number making steel at the end of the month being 277.

Declining Shipbuilding in United States

Merchant ships under construction at the end of March are reported by Lloyd's Register of Shipping as totaling 2,893,251 tons, compared with 3,118,721 tons at the end of December. Practically half the total, or 1,440,842 tons, was being built in Great Britain and Ireland, and only 56,049 tons in the United States. The United States total represents a shrinkage from 97,370 tons on Dec. 31. The returns show the United States in tenth position in amount of tonnage under construction, being exceeded not only by Great Britain and Ireland, but also by Germany, Italy, the Netherlands, France, Denmark, Russia, Japan and Sweden, whose totals ranked in that order. Only in Denmark, Russia and Japan has there been an increase in the amount of construction under way as compared with the end of 1927.

A Measure of the Increasing Attention Being Paid to Safety in Industry

Industrial personnel work has been studied by the United States Bureau of Labor Statistics, a recent report being covered in Bulletin 458 of that bureau. This supplements a similar study made 10 years ago, covering information from about the same number of companies—430. As many of the companies are identical with those in the earlier study, there is afforded an opportunity to observe the lines along which development has taken place in the past 10 years.

In the 1916 study, 375 plants reported some provision for treating sick and injured employees, but 110 of them had nothing more than first-aid equipment. In the present study, only 34 have the limited first-aid equipment, while 373 have a dispensary or emergency hospital, with one or more treatment rooms. In the earlier study, only 171 establishments employed physicians and 181 had trained nurses. In the present survey 311 companies employed full-time or part-time physicians and 332 had trained nurses.

As a sidelight on benefits to employees, it is reported that 133 now give paid vacations to the wage earners, against only 16 such companies in 1916. The usual vacation for employees working on hourly rates is one week each year. Companies having restaurant facilities have increased from less than 50 per cent to about 70 per cent of the total number surveyed. The lunch service is regarded generally by employers as an important factor in maintaining the health and efficiency of the working force.

British Trade Shows Improvement

Large Part of Pig Iron Exports Goes to United States—Tin Plate Mills Have Record Orders—European Prices Unsettled

(*By Cable*)

LONDON, ENGLAND, April 23.

NEW demand for Cleveland foundry and forge iron is dull, partly because of budget uncertainties, but makers are operating on a restricted scale and surplus stocks are not accumulating.

Business in hematite has improved, mainly with Italy and Germany, but stocks are still heavy. As low as £3 8½s. ($16.56) per ton has recently been accepted for East Coast mixed numbers, but makers are now more rigidly maintaining £3 10s. ($17.05) minimum. Foreign ore is quiet as a result of the well-sold condition of mines and the undertone of the market is firm. The peace move in the Swedish miners' strike has not succeeded.

The finished iron and steel market is subdued, with very little new buying and export interest especially quiet. Prospects of business from Australia are poor. Indian demand is fair, but Indian producers are securing the bulk of such trade. British industry lacks animation as a result of the failure of shipyards to secure sufficient new contracts.

The tin plate situation is vastly improved. Restriction of production has been cancelled and there will be no further suspensions after May 28, except for the usual August holiday. There have been very large bookings and the Welsh mills have reached a record for unfilled orders. All markets are heavy buyers of tin plate, including France, where the import duty was recently reduced. The official selling price is unaltered, but actual selling prices are 18s. 3d. to 18s. 6d. ($4.45 to $4.51) per base box, f.o.b. works port.

Galvanized sheets are no better and large exports are accounted for by certain works being unable to sell through the ordinary Indian merchant channels so that they are consigning direct to Bombay and other Indian ports. Prices are £13 (2.82c. per lb.), f.o.b., and higher for No. 24 gage. The lighter gages have been reduced 10s. ($2.44) because of the slackness of demand.

There is only a moderate demand for black sheets, but makers are apparently in a comfortable position. Japanese inquiry for thin gages is fair.

March exports of pig iron were 41,507 gross tons, of which 13,122 tons went to the United States. Total exports of iron and steel were 409,292 tons.

The Continental steel market is variable, but fairly steady. Little substantial demand is in sight, but French mills are extremely well booked although German sellers are seeking orders.

In France "Rombas" is building a new blast furnace and the Forges et Acieries de L'Est is preparing to construct a third furnace at L'Ouvroil. In Germany, the Vereinigte Stahlwerke A. G. is blowing out a furnace at the Dortmunder Union. The Saxon metal workers' strike, involving 200,000 men, is still unsettled. A German consortium has secured the contract for preliminary work on the new Persian railroad.

Indian steel works are reported agitating for a 50 per cent increase in the supplementary import duties, applicable to non-British products.

BRITISH BUSINESS IMPROVED

Semi-Finished Mills Book More Tonnage—Finishing Mills Need Orders—Tin Plate Active

LONDON, ENGLAND, April 12.—Trading in iron and steel has been affected by the Easter holidays just ended, and, as most works have remained closed for the better part of the week, it will be several more days before normal conditions prevail. Meanwhile the outlook continues uncertain in some branches of the industry, but brighter in others. Cleveland pig iron makers are in a strong position. Domestic demand is heavy, and furnaces have substantial orders on hand. Production has been increased by the blowing in of another blast furnace at the Skinningrove plant of Pease & Partners, Ltd., Darlington, increasing the number of active Northeast furnaces to 38, and it is reported that still another one may be blown in soon.

Export trade in Cleveland iron is recovering, but only slowly, as Continental makers secured a firm foot-

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17s.	to £0 18s.	$4.15	to $4.39
Bilbao Rubio ore*..	1 2	to 1 2½	5.36	to 5.48
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to 18.39
East Coast mixed...	3 10		17.05	
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese ...	13 10		65.75	
Ferromanganese export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh.......	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18¼	to 0 18½	4.45	to 4.51
Black sheets, Japanese specifications.	13 5		64.53	
			C. per Lb.	
Ship plates..........	7 12½	to 8 2½	1.66	to 1.77
Boiler plates........	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 0	to 13 5	2.82	to 2.88
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a):				
Belgium	£3 3s.		$15.34	
France	3 3		15.34	
Luxemburg	3 3		15.34	
Basic pig iron (nom):				
Belgium	2 9½	to £3 1s.	12.06	to $14.85
France	2 9½	to 3 1	12.06	to 14.85
Luxemburg	2 9½	to 3 1	12.06	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 11½	to 4 12½	22.29	to 22.53
France	4 11½	to 4 12½	22.29	to 22.53
Merchant bars:			C. per Lb.	
Belgium	5 5	to 5 6	1.16	to 1.17
France	5 5	to 5 6	1.16	to 1.17
Luxemburg	5 5	to 5 6	1.16	to 1.17
Joists (beams):				
Belgium	4 14	to 4 15	1.04	to 1.05
France	4 14	to 4 15	1.04	to 1.05
Luxemburg	4 14	to 4 15	1.04	to 1.05
Angles:				
Belgium	5 2½		1.13	
⅛-in. plate:				
Belgium (a)	6 8	to 6 10	1.41	to 1.43
Germany (a)	6 8	to 6 10	1.41	to 1.43
3/16-in. ship plate:				
Belgium	6 4	to 6 4½	1.32	to 1.33
Luxemburg	6 4	to 6 4½	1.32	to 1.33
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

hold during and since the coal strike of 1926, but the higher cost of foreign iron is beginning to make itself felt.

In hematite iron the situation is less satisfactory than with Cleveland makers. There are still heavy stocks to be liquidated, in spite of fair buying, and demand from the steel plants is not brisk. Prices of hematite are unchanged, but it is probable that a substantial order would bring a concession.

In semi-finished material British makers are once more booking a fair tonnage of orders. The increase in the cost of Continental steel since the beginning of the year has considerably lessened the margin in values, and the Welsh tin plate mills in particular are returning to the use of the British product. Sheet rollers, however, are still inclined to rely on foreign steel.

The position of the mills producing finished products is generally unsatisfactory. Mills rolling heavy material are seeking orders, plate producers in particular finding export orders scarce. Shipbuilding, structural and engineering requirements are moderately heavy. Nevertheless, capacity for production of heavy materials is well in excess of demand. In the lighter branches there is some activity, but all mills need more tonnage. An exception is the tin plate industry, which is in a flourishing condition. With the agreement on restriction of output and minimum prices in effect and consumers' demands heavy, most mills are assured of work for a number of months, and some assert that they have the largest order books on record.

RUSSIAN OUTPUT LARGER

Iron and Steel Still Less Than Pre-War, but Agricultural Machinery Greater

MOSCOW, RUSSIA, April 4.—Active measures are being taken by the government to increase the output of coal, heavy iron and steel and machinery in the Soviet Union. The head of the metal board has been instructed to draft a revised five-year production program, calling for an increase over the existing schedule. Vigorous measures are being taken to reduce imports of such foreign made metal products as are not directly needed for production purposes in Russia. Iron, steel and machinery, however, are to be admitted in larger quantities.

In the last completed fiscal year, imports of metal goods of all kinds totaled 378,900 metric tons, compared with 298,600 tons in 1925-1926 and 175,800 tons in 1924-1925. The increase was almost entirely in products classified as "instruments of production."

The report for 1926-1927 states that the output of all sorts of agricultural machinery and tools in Russia, with the exception of sowing and threshing machinery, exceeded the 1913 production. Production of plows was 1,066,000, compared with 768,500 in 1913; harvesting machines, 174,000, compared with 111,000 in 1913, and scythes, 3,700,000, compared with 78,000 in 1913. As a result of this increase in output, the value of agricultural machinery imports was only 26,380,700 rubles in 1926-1927, compared with 47,805,300 rubles in the previous year.

There has been a slight decline in the prices of metal products in Russia. The general wholesale price index, based on 100 in 1913, is 185, but the index number for metal products is only 168.

Production schedules in heavy iron and steel are again threatened by a shortage of coal. Production in the Donetz coal fields has lately reached 95 to 96 per cent of capacity, and the total output has been about 15 per cent greater than in the early months of 1927. The program for coke production has not been fulfilled.

Production of iron and steel has been higher since the beginning of the fiscal year, October, 1927, than in the same period of the fiscal year 1926-1927. In February of this year output of pig iron was 12 per cent greater than a year ago, steel ingot production was 21 per cent greater, and output of rolled products, 19 per cent greater. In the fiscal year 1926-1927 production totaled 2,946,900 metric tons of pig iron, 3,533,000 tons of steel ingots and 2,687,100 tons of rolled products. In the fiscal year beginning with October, 1927, monthly production in metric tons has been as follows:

	Pig Iron	Steel Ingots	Rolled Products
October, 1927.......	261,200	330,800	270,900
November	252,000	335,800	258,700
December	257,900	357,000	275,800
January, 1928......	276,700	353,000	281,000
February	263,200	345,500	274,100

GERMAN MARKET QUIETER

Domestic Demand Smaller but Exports Increase —Last Year Brought Small Profits

BERLIN, GERMANY, April 7.—The general industrial situation is improved, but the domestic iron and steel markets are decidedly weaker. Pressure to increase export business is succeeding, and the export surplus of only 101,000 metric tons in January increased to 150,000 tons in February, exceeding the average monthly surplus of 1927, which was 137,000 tons. There has been a considerable increase in exports of pig iron, semi-finished material and rails, and imports of these products have declined.

Inactivity in the domestic market has been caused partly by a decline in buying by the Railroads Corporation and dullness in the building industry. The railroads complain that finances do not permit of heavy purchases for expansion and improvement. As a result of higher wages and payment of the reparations levy, expenditures this year will exceed those of 1927 by about 575,000,000m. To partially offset this outlay, the Railroads Corporation has proposed an increase in freight rates and passenger fares, which would bring in an additional 25,000,000m. a year, but there has been general protest against such a move.

No serious decline in iron and steel production is expected in the second quarter, although there may be some slight curtailment. Production showed great advances in 1927 and the record rate of output reached then was not expected to be permanently maintained. Recently the Vereinigte Stahlwerke, Düsseldorf, blew out one of its Dortmund Union blast furnaces and plans blowing out another in Ruhrort.

The greatest market activity at present is in steel bars. Demand for semi-finished material has declined, and structural steel bookings are unsatisfactory. Buying of heavy-gage sheets is fair, but below the high level of recent months. Demand for medium and light-gage sheets continues to decline, and mills are unable to obtain the scheduled quotations of 155m. ($37.06) per metric tone for medium-gage and 165m. ($39.45) for light-gage sheets. Bands and steel tubes are quiet, with prices weak. In all these products, however, export business is better than domestic business. In some quarters the opinion is expressed that the steel industry is suffering from the large orders placed at the beginning of the year, when a strike or lockout in the steel mills was in prospect. Others believe that the effects of a normal decline of business activity are being experienced.

Machine tool buying has declined, but makers are still fairly well occupied with orders. Export trade with eastern Europe has been temporarily checked by disagreements with Russia and the slow progress being made in negotiations for a German-Polish trade agreement. There has been no improvement in business among railroad car builders. The Solingen cutlery makers report business satisfactory, with 1200 metric tons exported in January and February and total exports for 1927 estimated at 7500 tons, compared with 6600 tons in 1926. British and Italian consumers are buying heavily.

Friedrich Krupp A. G., Essen, has acquired 43 per cent of the stock of the Norddeutsche Heutte from the Vereinigte Stahlwerke and intends eventually to acquire a 60 per cent interest.

Annual reports for the fiscal year 1926-1927 of steel corporations, most of which are also coal corporations, show considerable increases in output and sales, but only moderate profits. A net profit of 5,980,000m. was reported by the Gutehoffnungshütte A. G., 4,750,000m. by the Hoesch Iron & Steel Co., 6,560,000m. by the

Kloeckner A. G., 13,040,000m. by the Friedrich Krupp A. G., 520,000m. by the Vereinigte Oberschlesische works, and 50,540,000m. by the Vereinigte Stahlwerke. Dividends paid ranged from 5 to 8 per cent.

MACHINERY TO BRITAIN

Heavier Exports to United Kingdom in 1927—American Machine Tools Favored

WASHINGTON, April 24.—American makers of machinery benefited from increased imports into Great Britain in 1927. British imports of machinery in 1927 totaled 101,639 tons, valued at £15,901,428, as against 80,433 tons, valued at £12,782,879, in 1926, according to a report received by the industrial machinery division, Department of Commerce, from William M. Park, trade commissioner in London. One importer and distributer of American machinery is quoted as saying that the increase in his business in 1927 was 50 per cent over that of 1926.

With respect to machine tools only, a similar increase in imports is noted. Total imports of machine tools into Great Britain have risen from £770,738 in 1925 to £927,293 in 1926 and £1,180,370 in 1927. The substantial increase in the value of imports in 1927 compared with 1926 took place despite a decline in weight from 7890 tons to 7678 tons. Imports of machine tools from the United States exceeded those of other countries in value in 1927, amounting to 3275 tons, valued at £744,440, against 3510 tons, valued at £318,886, for Germany. In 1926, American machine tool imports exceeded those of Germany both in volume and value, amounting to 3760 tons, valued at £590,200, compared with 3559 tons, valued at £267,253, imported from Germany. The figures reflect a situation in which American tools, because of their high quality, find a ready market in competition with tools of other countries, despite the fact that the latter are considerably cheaper. The average value per ton of machine tools imported from the United States last year was £227, as compared with only £90 for German equipment and £131 for machines from other countries.

A leading distributer of American machine tools and equipment is reported as saying that his best sales have been in high-production tools, such as milling machines, hydraulic-feed grinding machines, crankshaft lathes, balancing machines and honers. Smaller American machines are said to be barely holding their own. This company also stated that American tools are being copied by British makers, and in such cases the British-made machines are being sold at much lower prices than the American equipment, thus developing a type of competition similar to that which has been experienced from Germany.

Another firm handling American tools attributes its success to the fact that it no longer works through agents, but makes sales direct, and has its own demonstrator and service expert, who was trained in American works. Whereas previously, when operating through agents, the firm's sales volume was approximately $100,000 per year, it has now been able to increase sales to approximately $180,000 through direct selling. This company also complains of difficulty through having its machines copied by British makers and sold at much lower prices, but is of the opinion that this practice could be overcome through taking out patents in Great Britain. Such a procedure would necessitate manufacture in the British Isles, and not only this firm, but several other important ones, advocate having the heavy base castings made in England, thereby saving the bulk of the freight charges and complying with the patent law requirements.

The good market for machine tools in Great Britain is attributed to a few industries. As in the United States, the automobile industry in Great Britain, says the report, is the principal consumer of machine tools and shop equipment. This, it is pointed out, will be fully understood when it is remembered that there are in that country manufacturers of 66 makes of passenger cars and 46 makes of trucks. In addition to these British manufacturers, several leading American, French and Italian companies have assembly plants in Great Britain, in which a large quantity of machine tools is used. Closely allied with the automobile industry is the motorcycle and pedalcycle industry, which is a large consumer of machine tools and has grown rapidly during the past few years.

The electrical industry, making radio equipment and other lines, has undertaken a considerable amount of factory expansion and new building, thus offering opportunities to machine tool distributers. Shipbuilding, likewise, has largely recovered from the effects of the 1926 industrial disputes. The manufacturers of textile machinery and railroad shop equipment have been only moderately active but give promise of improvement.

The report calls attention to the fact that the British market offers the widest foreign field for American precision and high-production tools. As for the so-called "bread and butter" types of machinery and tools, there is declared to be too much competition at low prices from English makers and importers of German lines to make the market attractive to American producers. As industrial conditions of the country improve the demand for machine tools and shop equipment will undoubtedly increase, the report says, and, while British and German competition may be expected to grow, it is predicted American machinery and tools will hold their own.

Careful inquiry is said to confirm the general belief that no import duty will be levied against machine tools.

Practically all importers of American machinery and machine tools complain of the high post-war ocean freight rates, which has caused some producers of American equipment to manufacture heavy base castings in Great Britain.

Imports of Machine Tools into the United Kingdom by Countries of Origin

Country of Origin	1925		1926		1927	
	Tons	Value	Tons	Value	Tons	Value
Germany ..	2,114	£207,386	3,559	£267,253	3,510	£318,886
United States	2,091	476,837	3,760	590,200	3,275	744,440
Others	803	86,515	571	69,840	893	117,044
Total	5,008	£770,738	7,890	£927,293	7,678	£1,180,370

German Small Tool Makers Use Higher-Carbon Steel

HAMBURG, GERMANY, April 10.—There is a growing demand from German small tool makers for steel of 1.10 to 1.40 per cent carbon content for the manufacture of axes. In the past, axe makers used steel containing 0.3 to 0.7 per cent carbon, but it was found that the higher carbon was necessary for axes for cutting hard wood. Prices of the higher-carbin steel are considered high, and, despite the duty of 25m. ($6) per metric ton, there seems to be an opportunity for producers in other countries to supply some of the steel required. No offers by American producers of high-carbon steel are as yet reported to have been made to tool makers.

Germany to Revive Use of Brand Names on Steel

HAMBURG, GERMANY, April 10.—Steel mills are trying to revive the former practice of selling brands, in the belief that it will aid in promoting export trade. Brands were rather general during the nineteenth century, but just prior to the war brand names had been dropped except on alloy and special steels. Producers believe that sales of ordinary steel will increase under brand names and apparently intend to apply brands to structural shapes, bars, sheets and similar materials.

New German Wire Nail Machine

HAMBURG, GERMANY, April 10.—At the Leipzig fair J. A. Wickschtrom, Düsseldorf, exhibited a newly developed wire nail machine. The machine is designed to produce two nails from one wire with each turn of a wheel. Although it does not operate at so high a speed as machines producing one nail to each turn of the wheel, the maker claims that production is about 50 per cent greater.

Machinery Markets and News of the Works

ROCK ISLAND INQUIRY

Western Railroad Comes into Market for List of Machine Tools

General Business in April Holding Up Fairly Well, but May Not Equal That of Last Month

THE Chicago, Rock Island & Pacific Railroad has inquired in the Chicago market for a list of machine tools, including 15 floor grinders. The Union Pacific has bought a number of machines listed on a recent inquiry, but generally railroad buying is light.

Machine tool buying so far this month has continued at a good rate, but indications are that the total may not equal that of last month. Some in the Cincinnati trade estimate that it will not run more than 75 per cent of the March sales. Operations among machine tool plants are holding up well on orders in hand.

In the automotive field buying has dropped off, but there have been some orders from makers of automobile parts who have entered into contracts with the Ford Motor Co. The Dana Mfg. Co., Toledo, Ohio, which is making shock absorbers for Ford cars, has added to its recent purchases of shop equipment.

Agricultural implement manufacturers, who have been a main support of the Chicago market, have satisfied most of their requirements for spring manufacturing, and there is a lessened demand from that source.

New York

New York, April 24.

A GENERAL improvement in machine tool purchases and inquiry compared with the volume of business earlier in the month leads sellers to believe that April business will equal or slightly exceed that of March. There is a substantial number of inquiries for one or two tools each, in addition to the lists that have been issued. The inquiry of Dwight P. Robinson & Co., New York, for about eight machines for export to Argentina, including a pipe threading machine, two engine lathes, a combination punch and shear, a hack saw and a bolt threading machine, is not expected to be closed for several weeks. General Electric Co. has purchased about five tools, but has not yet taken action on the list of equipment for various service stations. The Wright Aeronautical Corporation continues the most active of the aircraft builders and has closed on about 10 tools in the past week, including one turret lathe, two multicut lathes, two drills, two internal grinders and four automatic screw machines. The Fairchild-Kaminez Engine Co., Farmingdale, L. I., expects to cover its machinery requirements at the beginning of each quarter and will probably make some small purchases about the end of June. A manufacturer in this district has closed on four large radial drills, mounted on wheels. The Standard Oil Co. of New Jersey is reported preparing an inquiry for a few machine tools.

Among recent purchases are a 12-in. vertical shaper by a company in Massachusetts; No. 3 Pratt & Whitney die sinker by a Chicago company; No. 3A Pratt & Whitney die sinker by a forging company in Indiana; 13 x 30-in. and 16 x 60-in. Pratt & Whitney lathes by a Chicago manufacturer; three 8-in. rotary surface grinders by a Toledo, Ohio, company; 14-in. vertical shaper by an engineering company in Detroit; 3-spindle Sigourney drill by a Detroit manufacturer; 13 x 30-in. and 16 x 60-in. Pratt & Whitney lathe by a New Jersey company; No. 3 universal bench milling machine by a southern New Jersey manufacturer; No. 2 jig boring machine by a tube mill near Philadelphia; two 7 x 32-in. bench lathes by a company in Camden, N. J.; one 13 x 30-in. lathe by a Pittsburgh company; 4-spindle drum-type Niles milling machine by a Detroit motor manufacturer; 1500-lb. Niles single-frame steam hammer by a Chicago company; 5-ft. Ridgeway plain radial drill by a Pennsylvania coal company; 2-in. bolt machine by a West Virginia company; used 18-in. x 10-ft. Lodge & Shipley lathe by a machinery company in Cincinnati. Railroad purchases of tools have included a 53-in. tire mold mill by the Texas & Pacific and a 36-in. Niles-Acme shaper by the Chicago, Burlington & Quincy.

Contract has been let by Interstate Plumbing Supply Co., 733 Broadway, Albany, N. Y., to D. Anderson, 25 Market Street, Poughkeepsie, N. Y., for a two-story mechanical and distributing plant at Poughkeepsie, with pipe shop, fitting department, etc., to cost approximately $80,000 with equipment.

Kern & Klemm Co., 254 West Forty-first Street, New York, recently organized by George Kern, Jr., and Hans Klemm, plan establishment and operation of a local plant for manufacture of airplanes and parts. Mr. Klemm is head of a company which is manufacturing aircraft at a factory at Sindelingen, near Stuttgart, Germany.

New York, New Haven & Hartford Railroad Co., Grand Central Terminal, New York, has filed plans for a one-story electric inspection and operating shop, 106 x 375 ft., to cost $180,000 with equipment.

L. Pisciotta, 563 East Tremont Avenue, New York, architect, has plans for a two-story automobile service, repair and garage building, 100 x 120 ft., to cost close to $100,000 with equipment.

Johns-Manville, Inc., Madison Avenue and Forty-first Street, New York, manufacturer of power plant equipment, building products, etc., plans construction of new plant at Richmond, Cal., consisting of two one-story units, each 100 x 500 ft., to cost close to $1,000,000 with machinery. San Francisco offices of company are at 159 New Montgomery Street. H. J. Brunner, Sharon Building, San Francisco, is engineer.

In connection with expansion and improvement program to cost $26,403,000, Erie Railroad Co., 50 Church Street, New York, plans enlargement of locomotive and car repair shops at different points, with installation of considerable new machinery, including extensions in yards and shop facilities at Port Jervis, N. Y., Hornell, N. Y., and Meadville, Pa.

Superintendent of Lighthouses, Staten Island, N. Y., is asking bids until May 3 for 600 steel cylinders, each with capacity of 180 cu. ft.; and 200 steel cylinders, each 88-cu. ft. capacity, proposal 26831.

William C. Sommerfeld, 31 Union Square, New York, architect, has plans for a two-story automobile service, repair and garage building, 100 x 200 ft., to cost $100,000 with equipment.

Warner-Quinlan Co., 26 Beaver Street, New York, has begun enlargements and improvements in its petroleum refinery at Warners, N. J., to include installation of machinery for increase in capacity from 6000 to 12,000 bbl. of crude oil per day. Company is disposing of preferred stock issue of $1,000,000, a considerable portion of fund to be used for expansion. W. W. McFarland is president.

Ovens, power equipment, conveying and other machinery Will be installed in addition to be built to baking plant of Cushman's Sons, Inc., White Plains, N. Y., to cost in excess of $90,000. Headquarters are at 1819 Broadway, New York.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has awarded general contract without competition to James Stewart & Co., 17 East Forty-second Street, for a one and two-story addition to plant at Harrison, N. J., 250 x 450 ft., to cost in excess of $400,000 with equipment.

Berlinger & Kaufman, 66 Fifth Avenue, New York, architects, have plans for a one-story automobile service, repair and garage building, 100 x 200 ft., at Woodside, L. I., to cost $100,000 with equipment.

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans installation of manual training equipment in new John Adams High School at Woodhaven, Queens, to cost $2,500,000, in which amount an appropriation has been approved.

Temlock, Reinbach & Wortman, Inc., New York, operating an iron and sheet metal works, has removed from 767 Tenth Avenue to 607 East Fifteenth Street, where increased facilities will be provided.

Board of Education, Union City, N. J., plans installation of manual training equipment in addition to high school on Morris Avenue, to cost $200,000. Frederick A. Elsasser, 845 Broad Street, Newark, is architect.

Wright Aeronautical Corporation, Lewis Street, Paterson, N. J., is arranging an expansion and improvement to cost about $3,000,000. Work will include a four-story addition for general production, one-story assembling works and improvements in present four-story structure, with installation of additional machinery. Structures are scheduled for completion in fall.

Board of Education, New Milford, N. J., plans installation of manual training equipment in new high school to cost $400,000, for which plans are being drawn by Ernest Sibley, Bluff Road, Palisade, N. J., architect.

Joseph L. Steinan, 46 West Forty-sixth Street, New York, architect, has filed plans for a six-story automobile service, repair and garage building to cost about $200,000 with equipment.

Consolidated Products Co., New York, dealer in used chemical machinery, has removed its offices to sixteenth floor, 15 Park Row.

Copper Radiator Sales Corporation, Imperial Building, Schenectady, N. Y., has been organized to distribute Sage tubular-fin radiators made entirely of copper. At present radiators are being built by G. & O. Mfg. Co., New Haven, Conn., and enclosures by Hart & Cooley Co., New Britain, Conn.

Safety Cable Co., division of General Cable Corporation, 114 Liberty Street, New York, is now located at 420 Lexington Avenue, New York.

Northern Tool Co., Inc., Nelson Building, Utica, N. Y., has been sold to Wilbur R. Ralph. Company manufactures a patent water gage and valves and does a machinery jobbing business. It is planned to enlarge the business.

Wagner Electric Corporation, St. Louis, has removed its New York sales office from 50 Church Street to suite 1110, 30 Church Street. Company's service station remains at 321 West Fifty-fourth Street.

Latendorf Conveying Corporation has moved from Jersey City to its new plant at 55 Oak Street, Bayonne, N. J. General offices, formerly at 90 West Street, New York, have also been removed to Bayonne.

St. Louis

ST. LOUIS, April 23.

BIDS will be asked soon by Century Electric Co., 1806 Pine Street, St. Louis, manufacturer of fans, motors, etc., for a one-story foundry to cost upward of $150,000 with equipment. Klipstein & Rathmann, Security Building, are architects.

Normandy Consolidated School District, Vinita Park, Mo., has plans for two-story vocational school to cost $120,000. William B. Ittner, Inc., 911 Locust Street, St. Louis, is architect.

Lion Oil & Refining Co., Exchange Bank Building, El Dorado, Ark, is contemplating an addition to oil refinery, including still house and other buildings, to cost more than $70,000 with equipment.

United Cold Storage Co., Third and Cherry Streets, Kansas City, Mo., is considering a new cold storage and refrigerating plant, to cost more than $750,000 with equipment.

Pague Mfg. Co., Twentieth Street and Southwest Boulevard, Kansas City, Mo., manufacturer of cans, pails, etc., is planning new one-story factory, to cost more than $40,000 with equipment. F. L. Woodward is general manager.

Capital Garage, Inc., 1025 Wyandotte Street, Kansas City, Mo., Harry Rubin, president, will soon begin erection of seven-story and basement service, repair and garage building, 125 x 130 ft., with foundations for three additional floors later, to cost more than $250,000 with equipment. C. A. Smith, Finance Building, is architect.

Southwestern General Electric Supply Co., 1 West Grand Street, Oklahoma City, Okla., electrical equipment and supplies, has leased a two-story building to be erected at Walker and California Streets, for a new storage and distributing plant, to cost $90,000 with equipment.

Board of Education, Junction City, Kan., plans installation of manual training equipment in new high school to cost $150,000, for which plans will be prepared by Felt, Durham & Kreihn, 300 West Forty-seventh Street, Kansas City, Mo., architects.

John C. Lawrence, Commercial Building, Fairmount, Mo., architect, has plans for a one-story automobile service, repair and garage building, 115 x 125 ft., to cost about $90,000 with equipment.

Southwestern Light & Power Co., Braniff Building, Oklahoma City, Okla., has acquired municipal light and power plant at Erick, Okla., and will make extensions and improvements in that district, including transmission line construction.

Ovens, power equipment, conveying and other machinery will be installed in new two-story and basement plant to be erected at Oklahoma City, Okla., by General Baking Co., Orear-Leslie Building, Kansas City, Mo., to cost upward of $125,000 with equipment. Archer & Gloyd, Pioneer Trust Building, Kansas City, are architects.

Nebraska State Board of Control, State House, Lincoln, Neb., plans one-story equipment repair and mechanical building at Omaha, Neb., to cost about $60,000. L. A. Daly, Peters Trust Building, Omaha, is architect.

Smoke Abater Equipment Co., 909 Grand Avenue, Kansas City, Mo., has been organized to manufacture a device for utilizing waste gases in coal burning. Company purchases castings under contract and owns its own patterns. No additional materials or equipment will be purchased at present.

New England

BOSTON, April 23.

MACHINE tool inquiries continue in moderate volume, but actual sales are few, and consist mostly of single tools of relatively small monetary value. There are enough prospective orders in hand to make an active market should a buying movement really start. New England tool makers generally are fairly busy with orders from the West and South and for export, but there are some with few orders on their books and operating on part time.

Among New England States, Massachusetts and Connecticut show signs of industrial improvement, particularly in relation to metal-working plants. In Connecticut there is an actual scarcity of skilled operators in the metal-working trades, and although there is a surplus in Massachusetts, it is much smaller than it was two or three months ago. In Maine, machine shops are working on part time. In Rhode Island, the machinery trades contribute to unemployment. Conditions in New Hampshire and Vermont are about the same as a month ago, spotty, with part time in most shops and foundries.

United States Gypsum Co., Chicago, has awarded contract for design and construction of new plant in Charlestown district, Boston, to Morton C. Tuttle Co., of that city. It will consist of several units for production of complete line of Gypsum company products for distribution in Eastern territory. Raw materials will be brought by boat from Canadian mines of company and apparatus for unloading will be installed. Construction has been started and it is expected to have plant in production in eight months. Total cost is estimated at about $2,000,000.

Work has been started by Pittsfield Oil Co., 105 Deering Street, Pittsfield, Mass., on a one-story repair shop, 44 by 29 ft.

J. C. and J. H. Stevens, 477 Congress Street, Portland, Me., architects close bids May 7 on shops, garage and other improvements for Portland and Water District, 16 Casco Street.

N. R. Willard, 402 Massachusetts Avenue, Arlington, Mass., architect, is taking bids on a two-story, 68 x 90 ft., manufacturing and storage plant for Cambridge Salvage &

The Crane Market

INQUIRY for overhead traveling cranes continues rather limited and only a small volume of sales is reported. The locomotive crane field, however, is still quite active. The list of five locomotive cranes from the Boston & Maine Railroad closed last week and the list of Dwight P. Robinson & Co. for export to Argentina is still pending. There are a number of inquiries for single locomotive cranes both new and used.

Among recent purchases are:

Day & Zimmerman, Inc., Philadelphia, 15-ton crawl-tread locomotive crane from Browning Crane Co.

Erie Railroad, New York, 30-ton, 65-ft. span, 4-motor traveling gantry crane from Toledo Crane Co.

Otis Elevator Co., Yonkers, N. Y., 15-ton hand power crane from middle western builder.

H. H. Wiggin Lumber Co., Boston, reported to have closed on electric gantry crane.

Black Clawson Co., paper mill machinery, Hamilton, Ohio, 20-ton, 54-ft. span overhead crane with 5-ton auxiliary from Niles Crane Corporation.

Missouri Rolling Mill Corporation, St. Louis, 5-ton, 80-ft. span electric traveling crane from Niles Crane Corporation.

Atwell, Gustin & Morris, New York, 7½-ton motor truck crane from Browning Crane Co.

Boston & Maine Railroad, Boston, five 15-ton locomotive cranes from Link-Belt Co.

Koppers Construction Co., Pittsburgh, two ¾-cu. yd. bucket handling, 56-ft. span cranes, one each for Brooklyn and Philadelphia plants, from Cleveland Crane & Engineering Co.

Reuter Brothers, Chicago, 5-ton, 3-motor, electric crane from an unnamed bidder.

Supply Co., 91 Broadway, that city. Handling equipment is required.

American Gill Screw Co., Euclora Street, Providence, R. I., will start work at once on a one-story, 40 x 82 ft., addition.

Bids closed last week for a one-story mill construction and a three-story and basement, 75 x 105 ft., addition for Collyer Insulated Wire Co., North Main Street, Pawtucket, R. I. Monahan & Meikle, Main Street, Pawtucket, are architects.

Work has been started on a two-story, 40 x 1000-ft. automobile repair shop for Karl A. Karjalainen, 23 Greenwood Avenue, Wollaston district, Quincy, Mass. R. B. Whitten, 101 Tremont Street, Boston, is architect.

W. C. St. Jacques has purchased property of Cape Cod Ship Building Co., at Wareham, Mass., part of which has been occupied by Hayden Cranberry Machinery Co. It is understood alterations will be made for manufacturing purposes. Details are lacking.

Boston & Maine Railroad Co. is to move most of its metal-working equipment at Fitchburg car repair shop to Concord, N. H. and Billerica, Mass., shops. Carwheel work will be continued at Fitchburg.

Atlantic & Pacific Fish Co. has placed orders for three steel fishing trawlers from Bath Iron Works, Bath, Me. Fairbanks Morse Co. will furnish Diesel propulsion and auxiliary equipment at a cost of $100,000.

Philip H. Duprey, Worcester, Mass., has purchased a local five-story manufacturing plant and several smaller structures with 85,098 ft. of land which will be developed for Worcester Lunch Car Co.

Paine, Webber & Co., Boston, bankers, have purchased Veeder Mfg. Co., Hartford, Conn., counting machines and measuring devices, and Root Co., Bristol, Conn., counting and adding devices and hardware specialties. It is planned to consolidate companies and to increase manufacturing facilities.

Boston Ice Co., 110 State Street, Boston, subsidiary of American Ice Co., Philadelphia, is completing plans for one-story ice-manufacturing plant at Dorchester, to cost about $150,000 with equipment. C. L. Weir, 41 East Forty-second Street, New York, engineer for Knickerbocker Ice Co., affiliated organization, is in charge. Parent company has begun work on a similar plant in Cambridge district.

Brown Co., Berlin, N. H., operating paper and pulp mills, and hydroelectric power plants, is disposing of preferred stock issue to total $10,000,000, a portion of proceeds to be used for expansion. H. J. Brown is president.

Collyer Insulated Wire Co., 249 North Main Street, Pawtucket, R. I., manufacturer of electric wire and cables, has plans for a three-story addition, 83 x 108 ft., to cost approximately $100,000 with equipment. Monahan & Miekle, 255 Main Street, are architects.

American Radiator Co., 40 West Fortieth Street, New York, has taken over property at East Springfield, Mass., totaling 10,000 sq. ft., for a new factory branch and distributing plant.

Robert Gair Co., 420 Lexington Avenue, New York, manufacturer of paper boxes and containers, has begun work on a power house at Montville, Conn., to cost about $45,000 with equipment.

Hedstrom Union Co., Gardner, Mass., manufacturer of infant and juvenile vehicles, parts, etc., is having plans drawn for a three and four-story addition, 60 x 132 ft., and 40 x 60 ft., to cost close to $135,000 with equipment. G. A. Johnson, 16 Norwich Street, Worcester, Mass., is architect.

Lynn Gas & Electric Co., Lynn, Mass., has awarded general contract Turner Construction Co., 178 Tremont Street, Boston, for steam power plant, to cost in excess of $400,000 with equipment. Stone & Webster, Inc., 49 Federal Street, Boston, is consulting engineer.

New Home Needle Co., Orange, Mass., recently organized with capital of 1000 shares of stock, no par value, by Leslie M. Dill, 100 Milk Street, Boston, and associates, is said to be planning early operation of local plant.

R. H. Mangan and Frederick Whitaker, co-partners in Mangan Co., 45 Richmond Street, Providence, have purchased the factory of the Metallic Co., 150 Chestnut Street, Providence, and will operate it under name of F. Whitaker & Co. Company will manufacture church metalware, using sheet brass and small amounts of precious metals.

Public Service Co. of New Hampshire, Nashua, plans construction of two new power transmission lines, from Goffstown to Nashua, and from Hillsborough to Henniker.

Gulf States

BIRMINGHAM, April 23.

FIFTEEN acres has been acquired by Beaumont Export & Import Co., Beaumont, Tex., in Vanwormer industrial section, for construction of lumber mill with electrically-operated machinery, to cost about $80,000.

Roberts & Grentner Properties, Inc., Seybold Building, Miami, Fla., will erect a cold storage and refrigerating plant, to cost about $400,000 with equipment. Brewer & Co., Twenty-fifth Avenue, are architects and engineers.

Shell Pipe Line Co., Shell Building, St. Louis, is said to be planning a new pumping station at Westbrook, near Colorado, Tex., to cost more than $45,000 with equipment.

Fort Worth Well Machinery & Supply Co., 63 Jennings Street, Fort Worth, Tex., A. H. Herdman, president, manufacturer of oilwell equipment and supplies, has acquired plant and property of Fort Worth Drilling Tool Co., 2301 South Main Street, manufacturer of similar equipment. Plans are under way for expansion.

Stamford & Western Gas Co., Stamford, Tex., recently formed under Delaware laws to construct and operate a natural gas pipe line and system, is disposing of bond issue of $1,100,000, a portion of proceeds to be used for pipe line and other construction. System will extend from point near Wichita Falls, Tex., to Stamford, Rotan, Hardeman, Tex., and vicinity.

Swift & Co., Chicago, meat packer, have acquired plant of Florida Cotton Oil Co., Jacksonville, Fla., and adjoining property. Plans are under way for expansion, including new vegetable oil mill; a one-story cottonseed oil mill is planned for later date. Expansion will cost more than $175,000 with equipment.

Abilene Plumbing Supply Co., Inc., Abilene, Tex., will erect a one-story storage and distributing plant, 50 x 100 ft., at Midland, Tex., with pipe shop and other divisions.

Texas Power & Light Co., Dallas, Tex., has acquired plant and property of Corsicana Power & Light Co., Corsicana, Tex., and plans expansion and improvements, including transmission line construction.

Beaumont Independent School District, Beaumont, Tex., plans installation of manual training equipment in three-story and basement high school, for which plans will soon be drawn. A bond issue of $900,000 has been approved for structure; also a fund of $240,000 has been authorized for new unit at present high school. M. E. Moore is superintendent of schools.

Board of Public Works, Dallas, Tex., plans installation of pumping station and water purification plant in connection with extensions and betterments in municipal waterworks, to cost more than $1,000,000. Fuller & McClintock, 170 Broadway, New York, are engineers.

Texas-Louisiana Power Co., Fort Worth, Tex., is said to be planning construction of steam-operated electric power house near Yoakum, Tex., to cost about $150,000 with equipment.

Breckenridge Foundry & Supply Co., Breckenridge, Tex., recently organized by L. S. Pelphrey, Breckenridge, and associates, plans early operation of local plant. C. A. Davis, Breckenridge, is also interested in company.

E-Z Opener Bag Co., Decatur, Ill., will soon take bids for new one-story plant, 280 x 600 ft., at Tuscaloosa, Ala., for manufacture of special paper bags and containers, to cost more than $750,000 with equipment. William E. Spink, Pere Marquette Building, New Orleans, is architect.

United Salt Co., Houston, Tex., care of B. V. Christie & Co., Dallas, is arranging for sale of stock to total about $500,000, proceeds to be used for a new plant near Houston for production of sulphurized salt blocks for cattle.

Pure Oil Co., Esperson Building, Houston, Tex., is said to be planning extensions and improvements in refinery in Smith Bluffs section, with additional equipment.

Texas Signal Co., 917 Kirby Building, Dallas, Tex., has been formed to manufacture, distribute and lease automotive safety and advertising devices, including tail-lights for automobiles and other vehicles. It contemplates establishment of plants at Milwaukee and Chicago, and will be in market for materials and equipment from time to time.

Philadelphia

PHILADELPHIA, April 23.

PLANS have been filed by Nice Ball Bearing Co., Thirtieth Street and Nicetown Avenue, Philadelphia, for a one-story addition on Henry Street, to cost about $150,000 with equipment. William R. Sauter, Otis Building, is engineer.

Nevin Bus System, 1903 Market Street, Philadelphia, is reported to be planning a motor bus service, repair and terminal building, to cost in excess of $150,000 with equipment.

Belgrade Wagon Works, Inc., Belgrade and Cambria Streets, Philadelphia, manufacturer of automobile bodies, etc., has awarded general contract to Delrite Contracting Co., 1532 East Berks Street, for a one-story shop.

Paul J. Gramigna, head of Paul Gramigna & Sons, 129 Walnut, Philadelphia, ship chandlers, has acquired plant of Pioneer Iron Works, Second and Chancellor Streets, for expansion. Joseph R. Williams, formerly head of Pioneer company, has organized Pioneer Marine Repairs, Inc., and will operate a main works at Hancock and Naudain Streets.

Conveying and elevating equipment, unloading and other apparatus will be installed in four-story and basement storage and distributing plant, 50 x 235 ft., to be erected by Frankford Grocery Co., Unity and Penn Streets, Philadelphia, to cost close to $200,000. W. E. S. Dyer, Land Title Building, is architect and engineer.

Hemphill & Co., Pawtucket, R. I., manufacturer of knitting machinery and parts, has leased factory at 2625-29 North Lawrence Street, Philadelphia, for a new factory branch and assembling plant.

Goldfine Brothers, 350 North Second Street, Philadelphia, operating a trucking business, have filed plans for a two-story motor truck service, repair and garage building, 75 x 200 ft., to cost about $130,000 with equipment.

Acme Coppersmithing & Machinery Co., 1024 Ridge Avenue, Philadelphia, will make extensions and improvements in plant at Berks and Hancock Streets, to cost more than $30,000.

Trenton Potteries Co., North Clinton Avenue, Trenton, N. J., manufacturer of sanitary ware, is arranging an expansion and improvement program to cost about $400,000, including installation of tunnel kiln, kiln cars, and other equipment.

Samuel M. Langston Co., Sixth and Jefferson Streets, Camden, N. J., manufacturer of paper-box making machinery, has awarded general contract to Fearn & Voegtlin, 223 North Forty-first Street, for a one-story addition, 40 x 100 ft., to cost close to $40,000 with equipment. Lackey & Hettel, 5 Hudson Avenue, are architects.

Linde Air Products Co., 30 East Forty-second Street, New York, has awarded a general contract to F. H. Clement & Co., Bethlehem, Pa., for a one-story plant at Allentown, Pa., to cost about $100,000 with equipment.

Department of Property and Supplies, Harrisburg, Pa., will receive bids on May 8 for engineering and laboratory supplies for fiscal year beginning June 1, Schedule D.

H. M. Fredericks Co., Lock Haven, Pa., operating an electrical equipment works for armature rewinding, etc., has approved plans for a one-story addition, 60 x 65 ft., to cost about $18,000 with equipment.

Harrisburg Light & Power Co., Harrisburg, Pa., has approved an appropriation of $2,600,000 for an expansion and improvement program, including additions to power stations, transmission lines, etc.

Officials of Pennsylvania Power & Light Co., Allentown, Pa., are organizing five subsidiary light and power companies to operate in Columbia County, and plans early construction of transmission lines and power stations.

Fire, April 15, destroyed coal breaker and colliery plant of Archbald Coal Co., Archbald, near Scranton, Pa., known as Whip-Poor-Will Colliery, with loss in excess of $125,000 including equipment.

Pittsburgh

PITTSBURGH, April 23.

THE Westinghouse Electric & Mfg. Co., has begun to close against its regular quarterly list, but machine tool business otherwise runs to occasional single tool purchases and repair items. The trade draws encouragement chiefly from the fact that inquiry is fairly active and the possibility that several steel plant betterments may bring out orders for machine tools. The Pittsburgh Steel Co. has appropriated $2,000,000 for a plant and a like sum or more is to be expended at the Butler works of the American Rolling Mill Co. The American Bridge Co. is planning to convert its foundry at Ambridge, Pa., into a beam shop and may buy some equipment aside from that brought from other plants. The Weirton Steel Co. still is making plant changes.

Alexander Laughlin & Co., Pittsburgh, are taking prices for estimating purposes on considerable equipment wanted in connection with the rehabilitation of a steel company for which the firm is consulting engineer. Purchase by the Pennsylvania Railroad of the site of the Mackintosh-Hemphill Co., at the foot of Twelfth Street, Pittsburgh, probably means erection of another plant, either at Wooster, Ohio, or Aspinwall, Pa., where the company has vacant property, but definite plans have not yet been developed.

Plans have been filed by Union Safety Appliance Co., Pittsburgh, manufacturer of mining equipment, for a new plant to cost close to $100,000 with machinery.

Beaver Valley Water Co., 1006 Seventh Avenue, Beaver Falls, Pa., will soon take bids on general contract for a one and two-story shop, with automobile service and garage facilities, to cost more than $65,000. J. E. Martsolf, 512 Third Avenue, New Brighton, Pa., is consulting architect.

Board of Education, Masontown, Pa., is said to be planning installation of manual training equipment in two-story senior and junior high school to cost about $120,000. H. W. Altman, Fayette Title & Trust Building, Uniontown, Pa., is architect.

Pennsylvania Railroad Co., Pennsylvania Station, Pittsburgh, has approved plans for produce yards, freight terminal, shop facilities and other mechanical buildings between Eleventh and Twenty-fourth Streets, to cost $5,500,000.

City Council, Martinsburg, W. Va., in cooperation with Chamber of Commerce, is said to be planning installation of municipal electric light and power plant. P. W. Leiter is member of committee in charge.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, gases, welding apparatus, etc., is said to have plans for new works at Charleston, W. Va., to cost more than $500,000 with equipment. It is understood that Stone & Webster, Inc., Boston, engineer will be in charge of project.

Viscose Co., of America, Inc., Marcus Hook, Pa., plans construction of power plant, machine shop and other units in connection with rayon mill at Meadville, Pa. Entire project will cost more than $2,000,000. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

United Motors Service Corporation, 5114 Liberty Avenue, Pittsburgh, subsidiary of General Motors Corporation, Detroit, has leased building at 418 Roup Street, totaling 10,000 sq. ft. of floor space, for a branch service, repair and sales building.

Board of Education, Parkersburg, W. Va., is considering installation of manual training equipment in new junior high school to cost more than $200,000. Warne, Tucker, Silling & Hutcheson, Masonic Temple, Charleston, W. Va., are architects.

Ellwood Safety Appliance Co., Ellwood City, Pa., has been organized to manufacture safety appliances and kindred equipment, but for the present will specialize in protection of workmen's feet. Major operations will be done under contract. Equipment and materials have been purchased.

Chicago

CHICAGO, April 23.

AN inquiry for a small list of tools by the Rock Island is the only encouraging feature in this market. The machines needed by this railroad include 15 floor grinders with 12 x 3 x 1¾-in. wheels, a duplex wheel grinder 3 x 12 x 1-in., a 2½-in. universal turret screw machine, an 18-in. selective-head engine lathe and a 20-in. engine lathe. The Santa Fe list is dormant but the Union Pacific has closed for several of its pending items. The Louisville & Nashville has purchased a driving wheel lathe. A forge company in Chicago has ordered a 22-in. x 12-ft. engine lathe and a local tobacco company has placed a 16-in. lathe.

Orders are in no larger volume than in the first week of April when they dropped suddenly following the lessened demand by farm implement and tractor manufacturers. The Dallas Brass & Copper Co., Chicago, has ordered a scrap compressor from Galland-Henning Mfg. Co., Milwaukee.

Illinois Copper & Wire Co., 217 Maplewood Avenue, Chicago, will build a one-story factory addition, 48 x 100 ft. to cost $15,000.

By-Products Coke Corporation, 310 South Michigan Avenue, Chicago, will build a two-story brick boiler house, 52 x 111 ft., to cost $155,000. Sargent & Lundy, 140 South Michigan Avenue, are architects.

Chicago, Burlington & Quincy Railroad, 547 West Jackson Boulevard, Chicago, will build a power house, 49 x 62 ft., to cost $100,000.

Bridges & Turivas, dealers in iron and steel scrap, will move their office May 1 from 10 South La Salle Street, Chicago, to 139th Street and Seeley Avenue, Blue Island, Ill.

King Machine Works, 506 Evans Street, Peoria, Ill., formerly King Light & Machine Works, manufacturer of tools, dies and special light machinery, is building a $40,000 addition to its plant.

Dubin & Eisenberg, 14 West Washington Street, Chicago, architects, will soon take bids on general contract for a two-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

Badger Auto Enclosure Co., 3733 Lincoln Avenue, Chicago, has leased one-story building, 75 x 100 ft. at Catalpa Street and Broadway, for new plant for increased production.

Crane Co., Chicago, is having plans drawn for an addition to plant on South Kedzie Avenue, three-stories, 80 x 500 ft., to cost more than $450,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

City Council, Benson, Minn., is considering installation of municipal electric light and power plant to cost $163,000. Arthur L. Mullergren, Gates Building, Kansas City, Mo., is engineer.

Public Service Co. of Colorado, Gas and Electric Building, Denver, will soon take bids for a two-story equipment storage and distributing plant, with repair department, and service and garage unit, 270 x 280 ft., to cost more than $250,000 with equipment.

Board of Education, Great Falls, Mont., plans installation of manual training equipment in three-story and basement high school to cost $900,000, for which bids will be asked on general contract in June. Bird & Van Teylingen, Great Falls, are architects; Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., are associate architects.

Cooper Mfg. Co., Marshalltown, Iowa, manufacturer of automobile parts and equipment, is reported planning a branch factory at Cedar Rapids, Iowa, to cost approximately $50,000.

Northwestern Light & Power Co., Cherokee, Iowa, plans extensions and betterments in steam-operated electric power plant at Peterson, Iowa, including installation of 600-hp. Diesel engine unit and auxiliaries.

J. W. Hoodwin Co., 2949 West Van Buren Street, Chicago, manufacturer of advertising novelties, has plans for a four-story factory, 75 x 100 ft., to replace structure recently destroyed by fire, to cost close to $100,000 with equipment. David Saul Klafter, 64 West Randolph Street, is architect.

Board of Education, Fairmont, Minn., contemplates installation of manual training equipment in a three-story high and grade school to cost $300,000, for which bids will be asked soon on general contract. G. Pass & Son, Eckle Building, Mankato, Minn., are architects.

Northern States Power Co., Minot, N. D., has plans for extensions and improvements in steam-operated electric power plant, with installation of additional equipment, to cost $80,000.

Fox & Fox, 38 South Dearborn Street, Chicago, architects, have asked bids on general contract for a five-story automobile service, repair and garage building, to cost in excess of $400,000 with equipment.

Cincinnati

CINCINNATI, April 23.

DEMAND for machine tools, indicated by sales the past week, has tapered slightly and April is likely to close with bookings not much more than about 75 per cent of those in March. A few plants are having a very prosperous month from the standpoint of orders, but the majority of companies which reported a large volume of business last month have not done so well during April. However, operations in the larger machine tool shops in this district are being maintained at a fairly good rate on account of the accumulation of orders in the last 60 days, and little change is contemplated in the immediate future. Manufacturers of electrical tools state that sales have been holding up well, particularly in the automotive industry.

Columbia Machine Tool Co., Hamilton, Ohio, has acquired business of Midwest Locomotive Works, Spring Grove Avenue and Alabama Street, Cincinnati, which will be removed to Hamilton.

Procter & Gamble Co., Cincinnati, soap manufacturer, will begin immediately erection of a plant at Baltimore, Md., to cost approximately $4,000,000 including machinery.

Bids will soon be asked by Board of Directors, Battelle Memorial Institute, Columbus, Ohio, through Otto C. Darst, 150 East Broad Street, architect, for two research buildings, each three stories and basement, 60 x 150 ft., with machine shops, laboratories, electric crane, etc., to cost approximately $500,000 including machinery.

A company is being organized by Cincinnati interests under direction of John B. Hollister, Cincinnati, attorney, with capital of $500,000, to construct and operate a plant for manufacture of all-metal airplanes. Initial works will include parts and assembling departments. Hulbert Taft. F. H. and William H. Chatfield, and James Coombe, all of Cincinnati, will head new organization.

Frampton Electrical Co., Dayton, Ohio, manufacturer of electrical equipment, is planning to rebuild plant destroyed by fire April 13, with loss estimated at more than $100,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until April 30 for aircraft supplies, including yoke assemblies, rack assemblies, bomb hoist assemblies, shackle assemblies and handle assemblies, circular 302; and for 36 mount assemblies, circular 303.

Dayton Power & Light Co., Dayton, Ohio, subsidiary of Columbia Gas & Electric Co., Cincinnati, is planning an expansion program to cost close to $2,000,000, including addition to power plant, extensions in transmission lines, power substations and extensions in gas system.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has purchased Memphis Oxygen Co., Memphis, Tenn., manufacturer of industrial oxygen, gases, etc., and will continue operations as a subsidiary. Plans are under way for expansion.

Officials of Memphis Power & Light Co., Memphis, Tenn., are planning organization of Memphis Natural Gas Co., to construct and operate pipe line and compressor plants. Initial pipe line will be built from Louisiana oil fields to Memphis and vicinity, and is reported to cost about $4,000,000.

Diamond Ice Co., 717 Cooper Street, Knoxville, Tenn., will erect a new plant to cost close to $150,000 with equipment.

Edward J. Bosler, Tyler Hotel, Louisville, is at head of project to construct and operate a three-story and basement automobile service, repair and garage building, to cost more than $300,000 with equipment.

Cleveland

CLEVELAND, April 23.

DEMAND for machine tools continues moderate. The placing of parts orders by the Ford Motor Co. is bringing out some machinery business and that is about the only activity in the automotive field at present. The Dana Mfg. Co., Toledo, is still buying machinery for its new plant under construction to make shock absorbers and during the week purchased several drilling and broaching machines and some toolroom equipment. A Detroit company is in the market for a number of tools to be used in making pumps for Ford cars. The National Malleable & Steel Castings Co., Cleveland, purchased a 42-in. vertical boring mill for its Sharon plant.

Plans are being drawn for one-story addition to plant of United States Air Compressor Co., 5300 Harvard Avenue, Cleveland, 140 x 150 ft., to cost about $65,000 with equipment. G. S. Rider Co., Century Building, is architect and engineer.

American Vitrified Products Co., Toronto, Ohio, will rebuild portion of Plant No. 14 destroyed by fire April 18, with loss reported at close to $200,000 with equipment.

Wilson Mfg. Co., Niles, Ohio, manufacturer of wire goods, will rebuild portion of plant destroyed by fire April 15, with loss reported at $25,000 including equipment. Western Reserve Lumber Co., will also rebuild mill on adjoining site destroyed by same fire.

Vermont Marble Co., 9508 Quincy Street, Cleveland, has asked bids on general contract for a new mill for cutting, grinding, polishing, etc., one story, 80 x 280 ft., with two-story office, 40 x 100 ft., to cost about $125,000 with equipment. H. K. Ferguson Co., Hanna Building, is engineer. Headquarters are at Proctor, Vt.

Pennsylvania-Ohio Edison Co., Youngstown, Ohio, is arranging for an increase in common stock to 2,000,000 shares, no par value, a portion of fund to be used for expansion, including purchase of controlling interest in Northern Ohio Power Co., Canton, Ohio, with extensions in transmission lines.

Board of Education, Cleveland, has plans for one-story foundry for vocational instruction, to cost about $40,000 with equipment. G. M. Hopkinson, Auditorium Building, is architect.

Wellman-Seaver-Morgan Co., Cleveland, has appointed following sales distributers for its new Supertest gate and globe valves: Acme Well Supply Co., 136 Liberty Street, and Eastern Steam Specialty Co., 270 Lafayette Street, New York; Basil S. Burgess, Coal Exchange Building, Huntington, W. Va.; Walter G. Heacock, Detroit; Steam Equipment Mfg. Co., Pittsburgh; R. George Ward, 809 Harrison Building, Philadelphia.

Ohio Adsign Corporation, 2014 East 105th Street, Cleveland, has been organized to manufacture electric signs for interior use. Company does its own assembling and is in the market for electrical materials from time to time.

Buffalo

BUFFALO, April 23.

ARRANGEMENTS have been made by McQuay-Norris Co., Cooper Avenue, St. Louis, manufacturer of piston rings, etc., for purchase of King Quality Products, Inc., 254 Rano Street, Buffalo, manufacturer of nuts, bolts, automotive parts and kindred specialties, a subsidiary of King Mfg. Co., same address, manufacturer of radio apparatus. Purchasing company will remove acquired interest to St. Louis, where production will be concentrated. King company will use available space for manufacture of additional products kindred to radio equipment. E. E. Eckler, formerly manager Rock Island Mfg. Co., Rock Island, Ill., has been elected vice-president and general manager of King Mfg. Co.

International Oxygen Co., 795 Frelinghuysen Avenue, Newark, N. J., manufacturer of industrial oxygen, welding apparatus, etc., has awarded general contract to Kellogg Structural Steel Co., 31 Stone Street, Buffalo, for new two-story plant at Buffalo, to cost more than $75,000 with equipment.

Rochester Gas & Electric Co., Rochester, N. Y., will make extensions and improvements in steam-operated electric power plant, including installation of 5000 kw. turbo-generator unit and accessory equipment.

Rochester Wire Fence Co., Inc., Rochester, recently organized by Howard S. Thomas, 38 Berkshire Street, and associates, with capital of $10,000, plans operation of local factory for manufacture of wire fencing, posts, and kindred products.

Cortland Traction Co., Cortland, N. Y., has secured permission to furnish light and power service at Cortlandville, Preble, Homer and vicinity, and plans installation of equipment, including transmission lines.

Camillus School District No. 2, Warners, N. Y., is said to be planning installation of manual training equipment in a high school unit to cost $110,000, to replace structure recently destroyed by fire. C. W. Clark, Cortland, N. Y., is architect.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing products, etc., is planning increased production at plant of Beaver Board Companies, Inc., Beaver Road, Buffalo, specializing in manufacture of wallboard products.

International Milling Co., 120 Childs Street, Buffalo, has plans for an addition to cost $100,000 with conveying, unloading and other equipment.

Houser Elevator Co., Syracuse, N. Y., is preparing to remove to Manlius, N. Y., and will occupy former plant of E. U. Scoville Co., which is being remodeled. Company will maintain a factory service station at Syracuse.

Indiana

INDIANAPOLIS, April 23.

PLANS have been authorized by City Council, Kendallville, for an addition to municipal electric light and power plant, to cost upward of $50,000. Froelich & Emory, Toledo Trust Building, Toledo, Ohio, are engineers.

Bucyrus Co., West Decker Road, Evansville, manufacturer of dredging machinery and other heavy equipment, has awarded general contract to International Steel & Iron Co., Edgar Avenue, for a one-story and basement addition, 65 x 180 ft., to cost about $60,000 with equipment. Headquarters are at South Milwaukee, Wis.

Eaglesfield-Link Co., Brazil, recently organized by R. D. Eaglesfield, Brazil, and associates, is said to have plans for a one-story factory for manufacture of molding machines and parts, to cost about $30,000 with equipment.

Board of Education, Sharpsville, is said to be planning installation of manual training equipment in a two-story high school to cost $140,000, to replace a structure recently destroyed by fire. Elmer Dunlap & Co., Kokomo, are architects.

Electric & Mfg. Co., Kendallville, has plans for new one-story factory for manufacture of automatic electric water heaters and parts, to cost about $40,000 including equipment.

Board of Education, South Bend, plans installation of manual training equipment in new Madison junior high school, two stories and basement, to cost $600,000 with equipment. Revised plans are being prepared by Austin & Shambleau, 111 North Fayette Street, architects.

Atlas Plywood Co., Bloomington, will build a new one-story plant to cost about $80,000 with equipment. Headquarters are at 31 St. James Avenue, Boston.

Ovens, power equipment and other apparatus will be installed in addition to plant of Omar Baking Co., East Sixteenth Street, Indianapolis, to cost $60,000 including improvements in present bakery. W. E. Long Co., 155 North Clark Street, Chicago, is architect.

Pierce Governor Co., Anderson, Ind., is finishing an addition, 50 x 75 ft., which will practically double its plant capacity.

Lucey Slicing Machine Corporation, 334 East Colfax Avenue, South Bend, has been formed to take over Lucey Slicing Machine Co. and will manufacture electric meat slicing machines. It has contracted with General Electric Co. for ⅛ and 1/16-hp. motors and will purchase castings locally. Monel metal in sheets and bars, bronze gears, silent chain drives, sprockets, etc., will be purchased from time to time.

Detroit

DETROIT, April 23.

BOARD OF EDUCATION, Muskegon, Mich., has plans for extensions and improvements in Hackley Manual Training School to cost $70,000. F. Forster, Lyman Block, is architect.

Grand Rapids Gas & Electric Co., Grand Rapids, Mich., plans rebuilding portion of power house recently destroyed by fire, with loss reported at close to $150,000 including equipment.

Pontiac Sheet Metal & Roofing Co., Pontiac, Mich., recently organized, will occupy a new local building for production of general line of sheet metal products. It is a subsidiary of Glendon A. Richards Co., Grand Rapids, Mich., and is affiliated with Flint Cornice & Roofing Co., Flint, Mich., and Michigan Sheet Metal Works, Lansing.

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., has awarded general contract to O. F. Miller Construction Co., Pratt Building, for two and one-half story addition, to cost about $900,000 with machinery. Billingham & Cobb, Pythian Building, are architects. Jacob Kindlebarger is president.

Durant Motors, Inc., Lansing, Mich., has awarded general contract to H. G. Christman Co., Stevens Building, Detroit, for additions to local plant, to cost $700,000 with equipment. Headquarters are at 250 West Fifty seventh Street, New York.

Officials of Rich Steel Products Co., Battle Creek, Mich., have reorganized with incorporation of new company of same name capitalized at $2,500,000. Increased output will be carried out. George R. Rich will continue with company in official capacity.

Chevrolet Motor Car Co., Detroit, has awarded general contract to Everett Winters Co., 1651 East Grand Boulevard, for one-story addition to local plant, 400 x 800 ft. Albert Kahn, Inc., Marquette Building, is architect.

Florin Mfg. Co., Carson City, Mich., recently organized, has authorized plans for one-story factory for manufacture of a patented washing machine, including parts and assembling departments. Murt D. Smith, formerly of Portland, Mich., will be manager.

Consumers' Power Co., Jackson, Mich., is planning extensions in gas system, in connection with general expansion program, to cost more than $200,000.

AC Spark Plug Co., Flint, Mich., has completed plans for a three-story addition, to cost more than $50,000 with equipment. Wright & Nice, South Saginaw Street, are architects.

Pennsylvania Salt Mfg. Co., Widener Building, Philadelphia, will build an addition to plant at Wyandotte, Mich., to cost upward of $75,000 with equipment. C. M. Matson will be supervising engineer in charge.

Zima Sign Co., 9117 Joseph Campeau Avenue, Detroit, manufacturer of electric signs and displays, is planning installation of sheet metal working equipment.

Marvel Carbureter Co., Flint, Mich., has purchased Wheeler-Schebler Carbureter Co., Indianapolis.

Huron Gray Iron Foundry, Ypsilanti, Mich., is building new plant at 824 Railroad Street, Ypsilanti, which will be ready for occupancy May 1. Arthur A. Corbeill is president and general manager.

Milwaukee

MILWAUKEE, April. 23.

A MODERATE run of orders for one or two machines is reported by most shops, sources being widely diversified, with no single line of industry predominating. Acquisition of new equipment is limited to urgent needs, and replacement business probably accounts for the major share of orders. Employment conditions are improving, with the metal-working industries showing the best absorption and building trades ranked second.

Atlas Engineering Co., 3038 Galena Street, Milwaukee, has completed purchase of Topp-Stewart Tractor Co., Clintonville, Wis., manufacturer of quadruple drive tractors, and on May 1 moves its Milwaukee operation to Clintonville, manufacturing its line of conveyors, loaders and bucket elevators, and continuing production of Topp-Stewart tractors under Atlas trade name. Plans are being drawn for a one-story addition, 25 x 199 ft. for manufacturing and storage. Atlas company some time ago sold its plaster and mortar mixer business to Chain Belt Co., Milwaukee, retaining its conveyor manufacturing business. A sales office and warehouse will be continued in the old quarters in Milwaukee, in charge of H. W. Zimmermann, president. C. W. Zimmermann is vice-president, D. J. Rohrer, Clintonville, treasurer and Arthur Nickel, secretary.

George J. Meyer Mfg. Co., 598 Clinton Street, Milwaukee, manufacturer of bottling machinery, on April 21 took possession of property of Worthington Pump & Machinery Corporation in Cudahy, and besides moving equipment of present plant to newly acquired works, will install considerable additional machinery to effect an increase of 100 per cent in capacity.

Great Lakes Coal & Dock Co., Minneapolis, Minn., has engaged Roland C. Buck, consulting engineer, Superior, Wis., to design a new screening plant at its Superior docks, to cost about $50,000. Contracts are expected to be let about May 15 or June 1.

Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, will invest about $75,000 in construction and equipment of a distributing plant, warehouse, garage and work shop at Wisconsin Rapids, Wis., to be under supervision of H. E. Bruce, district manager, 2 Copeland Avenue, LaCrosse, Wis. R. N. Allen, company architect, is completing plans.

Edward Boehmer, Mayville, Wis., has placed general contract with Immel Construction Co., Dana Building, Fond du Lac, Wis., for erection of a brick and steel automotive building, to cost $40,000 with shop and other equipment.

Unit Corporation of America, Milwaukee, representing the recent consolidation of Obenberger Forge Co. and Dallmann Machine & Mfg. Co., both of Milwaukee, has acquired plant and business of Fuller & Sons Co., Kalamazoo, Mich., manufacturer of automotive gears and transmissions. Negotiations are about completed for purchase of a Wisconsin company manufacturing gasoline engines, forming a complete manufacturing unit producing motors, transmissions and differentials for automotive industry. W. H. Schmidt is president.

Pacific Coast

SAN FRANCISCO, April 18.

PLANS are being drawn for a new plant for Pacific Mfg. Co., Santa Clara, Cal., manufacturer of sash, doors and other millwork products, one story, 385 x 486 ft., to cost about $220,000 with equipment. Machinery will be electrically operated. A boiler plant will also be built. Hamm, Grant & Bruner, Inc., Ferguson Building, Los Angeles, is architect.

Board of Education, Phoenix, Ariz., is considering installation of manual training equipment in new high school unit, for which appropriation of $300,000 has been arranged. Lescher & Mahoney, First National Bank of Arizona Building, are architects.

International Harvester Co., San Francisco, has leased a two-story factory, 100 x 140 ft., to be erected at Fifteenth Street and Potrero Avenue, to cost about $50,000, for a new factory branch and distributing plant. Headquarters are at 606 South Michigan Avenue, Chicago.

Great Western Power Co., 530 Bush Street, San Francisco, has acquired plant and property of Quincy Electric Light & Power Co., Quincy, Cal., and plans expansion in that section, including transmission line construction.

Gate City Co., Mesa, Ariz., has approved plans for one-story ice-manufacturing plant, to cost about $45,000 with machinery.

Escalante Light & Power Co., Escalante, Utah, is considering plans for one-story steam-operated electric light and power house, to cost close to $50,000 with equipment. Local franchise has been asked.

Adcox Auto & Aviation School, Portland, care of Claussen & Claussen, Macleay Building, architects, will build two-story plant, 100 x 100 ft., to cost approximately $45,000.

City Council, Eugene, Ore., will ask bids in May for municipal hydroelectric power development in connection with Leaburg power project, including power plant, power dam, penstocks, etc. Station will have capacity of 210,000 hp. Project will cost $1,500,000, including transmission lines and power substations. Stevens & Koon, Spalding Building, Portland, are architects and engineers.

Atchison, Topeka & Santa Fe Railroad Co., Los Angeles, and 80 East Jackson Boulevard, Chicago, is reported contemplating a new ice-manufacturing and refrigerator car re-icing plant at Ashfork, Ariz., to cost more than $750,000 with machinery.

A. Pratt, care of Wolfe & Higgins, Realty Building, San Jose, Cal., architects, has plans for a one and two-story machine shop to cost about $23,000 with equipment.

Grays Harbor Railway & Light Co., Aberdeen, Wash., has plans for an addition to steam-operated electric generating plant, to cost about $1,200,000 with transmission lines.

W. R. Voorhees & Co., San Francisco and Seattle, are now representing Billings & Spencer Co., Hartford, Conn., manufacturer of wrenches, hammers, pliers, clamps, special forgings and machinery, in Montana, Colorado, Wyoming, Idaho, Utah, Nevada, Washington, Oregon, California, Arizona, New Mexico, and El Paso, Tex.

South Atlantic States

BALTIMORE, April 23.

PLANS are being completed by General Elevator Co., Bush and Ridgely Streets, Baltimore, manufacturer of passenger and freight elevators, for one-story addition, 22 x 140 ft., to cost more than $45,000 with equipment. W. S. Austin, Maryland Trust Building, is consulting engineer.

Hill & Tibbitts, 301 Fourteenth Street, N. W., Washington, local representative for Ford automobile, is considering a new three-story service, repair and garage building, to cost $200,000 with equipment.

Intercontinent Gas Corporation, 11 Broadway, New York,

M. W. Ditto, representative, has leased 50 acres at Lowmoor, Va., and plans construction of industrial gas plant to cost more than $5,000,000. Pipe lines will be built to Covington, Clifton Forge, Va., and vicinity. Company is affiliated in enterprise with Shenandoah Gas & Utilities Co., recently chartered under Virginia laws. Joseph M. Ligon is president of last noted company.

United States Engineer, Savannah, Ga., is asking bids until May 14 for one centrifugal dredging pump and spare parts, circular 123.

F. S. Royster Guano Co., Royster Building, Norfolk, Va., has plans for a one-story fertilizer manufacturing plant at Wilmington, N. C., to cost more than $60,000 with equipment. J. N. Waddell is company engineer in charge of erection.

Carolina Cement Co., Raleigh, N. C., R. C. Clark, secretary, is reported planning a new mill in vicinity of New Bern, N. C., to cost more than $1,500,000 with machinery. A power house and machine shop are proposed.

Signal Corps, Baltimore, is asking bids until May 16 for two 150-ft. steel radio towers, including hoisting winch, etc., circular 1.

Officials of Copeland Products, Inc., 630 Lycaste Avenue, Detroit, manufacturer of electric refrigerating equipment, have organized Copeland-Silica Gel Corporation in cooperation with officers of Davison Chemical Co., Garrett Building, Baltimore, with capital of 90,000 shares of stock, no par value, to manufacture refrigerators for domestic and commercial use, with silica gel method of refrigeration, controlled by Davison company. It is purposed to develop the Detroit works for new manufacture. George W. Mason and Edwin H. Brown of Copeland company are at head of new organization.

General purchasing officer, Panama Canal, Washington, is asking bids until May 14 for wire rope and cable, chain, magnet wire, motors, bolts, pipe fittings, metal valves and other mechanical products, Panama circular 1874.

Valley Springs School District, Asheville, N. C., is reported planning installation of manual training equipment in new high school, for which fund of $100,000 has been arranged. Ronald Green, County architect, is in charge.

Makepeace Mill Work Co., Sanford, N. C., has awarded general contract to Jewell-Riddle Co., Sanford, for new one-story mill, 60 x 150 ft., to cost upward of $40,000 with equipment. It will replace a works recently destroyed by fire.

Columbus Electric & Power Co., Columbus, Ga., has applied for permission to proceed with hydroelectric power development on Chattahoochee River in Troup and Heard Counties, with two generating stations near Maple Creek and Harrison Island. Plants will have rated output of about 40,000 kw., and will cost upward of $1,000,000 with transmission system.

City Council, Norfolk, Va., is completing plans for a municipal automobile service and repair building, to cost close to $80,000 with equipment.

Oil Seed Crushing Corporation, Baltimore, recently organized, has acquired local mill of Maryland Vegetable Oil Co., Fifteenth Street and Seventh Avenue, and is reported planning operation. M. C. Jones, Gettysburg, Pa., heads organization.

Canada

TORONTO, April 23.

MACHINE tool sales fell off the past week and were confined to single tools for replacement needs. At present only a small amount of business is coming from the automotive industry. The Chrysler Corporation of Canada, Windsor, Ont., has not fully completed its buying for an addition now under construction. While current demand is limited, a large volume of business is in prospect which is expected to stimulate sales during the next six weeks.

W. J. Fraser, 12 Sylvan Avenue, Toronto, is inquiring for a milling machine, small universal or bench type.

Service Stations, Ltd., which recently took over plant of John Woods, Ltd., Toronto, contemplates erection of an addition to its works on Coxwell Avenue, and has secured 2½ acre site. Company will manufacture gasoline pumps, air compressors, automatic lifts, lubricating outfits, steel drums, etc.

Lake Simcoe Ice Co., 102 Dupont Street, Toronto, will build a three and four-story addition to its plant, 48 x 138 ft., to cost $80,000.

St. Maurice Valley Corporation, Cap de la Madeleine, Que., is having plans prepared by its engineer, C. H. Jette, for a two-story machine shop, 40 x 100 ft., to cost $25,000.

Taylor Electric Co., 526 Adelaide Street, London, will build an addition, one story, 70 x 150 ft., to cost $40,000, for which tenders are now being received. Watt & Blackwell, Bank of Toronto Building, are architects.

C. D. Howe & Co., engineers, Whalen Building, Port Arthur, Ont., will call for bids about May 16 for construction of superstructure of a 1,000,000 bu. reinforced concrete grain elevator at Toronto, for James Playfair & Associates, Ltd., Midland, Ont. E. G. M. Cape & Co., 10 Cathcart Street, Montreal, have contract for excavating and piling.

Chrysler Corporation of Canada, Ltd., Windsor, Ont., has let general contract to Border Construction Co., and the steel work to Trussed Concrete Steel Co. of Canada, Ltd., for erection of an addition to cost $200,000. Pennington & Boyd are architects.

Ingersoll Machine Co., Ingersoll, Ont., has started work on an addition, 40 x 110 ft., for which it will require machinery and tools.

Chats Falls Power Co., Ottawa, Ont., plans installation of a hydroelectric power development station on Ottawa River to cost approximately $2,500,000. Plans have been filed with Department of Public Works, Ottawa.

Cowie & Drury Interests of Montreal, have awarded contract to W. F. Bedwin & Co., Ltd., general contractor, Halifax, N. S., for excavation and laying of foundations for a cold storage plant at Halifax, to cost $1,600,000. Actual construction work will be started within the next few weeks. When completed it will include two seven-story, reinforced concrete cold storage warehouses; a power house and ice-making plant; a one-story warehouse and a 900-ft. dock. Plans have been prepared by F. W. Cowie, consulting engineer.

Western Canada

Construction work on the first unit of proposed elevator at New Westminster, B. C., for Pacific Coast Terminals, Ltd., will be started early in May, according to Valentine Quinn, organizer. Estimated cost is approximately $1,000,000. Some contracts have been awarded.

Montreal Engineering Co., Regina, Sask., is contemplating construction of a power plant at Estevan, Sask., to cost $250,000.

R. Russell Symington, vice-president and managing director of Western Steel Products, Ltd., Winnipeg, and associates, have obtained control of company from former owners. Enlargements are contemplated and it is understood that production at plant at Winnipeg, Regina, Saskatoon, Edmonton and Calgary will be extended.

Foreign

PLANS are being arranged by Commissariat of Transportation, Russian Soviet Government, Petrograd, for a mechanical coaling station at Sukhum, to be used in connection with coal-mining developments in Tkvarchelsk district, to cost more than $500,000. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding project.

American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has received an inquiry (L-3666) from a local company desiring to get in touch with American manufacturers of automatic nailing machinery; also an inquiry (P-3668) from a concern in Paris interested in American-made all-steel thermos flasks; and an inquiry (B-3665) from a concern near Paris desiring to get in touch with American manufacturers of machines for sharpening safety razor blades.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for generating and other power equipment for Government naval station, Guantanamo Bay, Cuba, including two 250-kw. Diesel engine-generator sets, with starting equipment, etc.; motor-generator sets, centrifugal oil purifiers, water-softening equipment; motor-driven centrifugal pumps; motors for existing air compressors, ammonia compressors, etc., specification 5356.

Yale & Towne Mfg. Co., 9 East Fortieth Street, New York, manufacturer of builders' hardware, locks, hoists, etc., with main plant at Stamford, Conn., has arranged for purchase of Damm & Ladwig Co., Velbert, Germany, manufacturer of kindred products, and control of its affiliated companies, and will operate as a foreign subsidiary. Expansion in production will be arranged. Purchasing company has authorized a stock issue to total about $1,000,000, portion of proceeds to be used for acquisition and extensions.

A company in England is planning early construction of a beet-sugar refinery near Bridgewater, to cost close to $1,800,000, of which more than $500,000 will be expended for machinery. American Consulate, London, William L. Cooper, commercial attaché, has information regarding project.

Philadelphia Chamber of Commerce, Twelfth and Walnut Streets, Philadelphia, has received an inquiry from a company in France desiring to get in touch with American manufacturers of automobile parts and accessories.

CARNEGIE LIBRARY OF ATLANTA

THE IRON AGE

New York, May 3, 1928

ESTABLISHED 1855 VOL. 121, No. 18

Anneal Each Heat Independently

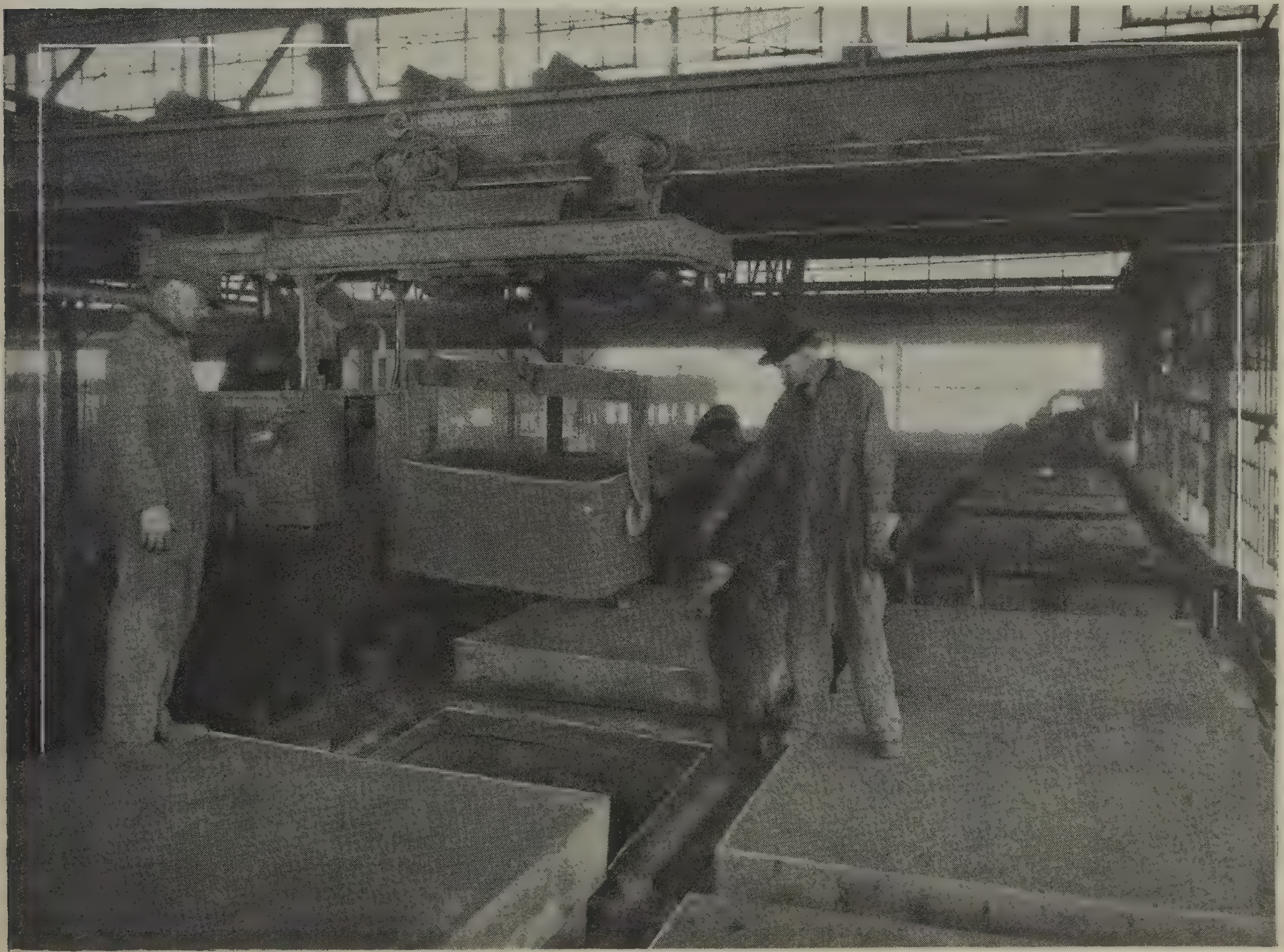
Close Control Features New Practice in Malleable Plant—Ovens Charged Through the Top—Handling Devices Save Labor Costs

BY BURNHAM FINNEY*

ANNEALING malleable castings in mixed heats—a long-established practice—has been abandoned by the Southern Malleable Iron Co., East St. Louis, Ill., which has installed a system of single-heat annealing. By strict adherence to definite heat-treating schedules the company has never had an anneal run under 98.5 per cent, nor has it produced over-annealed castings.

Since malleable castings should show some combined carbon as evidence that they have not been over-annealed, the percentage of anneal is determined by the amount of combined carbon in the malleable test bar. By close control of the temperature during the annealing process, the normal maximum of 2.7 per cent of combined carbon has been reduced to an average trace of as little as 0.03 per cent.

The annealing cycle for the castings from each heat is scheduled after an analysis of the iron has been made. Consequently, the heat treatment is made to vary according to the requirements necessary to produce a perfect anneal. Obviously, castings from two



Annealing Pots Are Lowered into the Ovens by Crane, the Tops of the Ovens Being Removable heats that differ from each other as much as 0.05 per cent cannot be placed in the same annealing oven.

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*Resident editor at Cincinnati for THE IRON AGE.

Annealing practice at this plant calls for a maximum temperature of 1720 deg. Fahr., which is reached at a uniform rate of increase in 36 hr. This temperature is held for a specified time, then is gradually reduced to a determined temperature known as intermediate and later is decreased to a temperature known as equilibrium. These decreases are never more than 10 deg. an hour and often are only 6 deg. The period covered by this process ranges from 48 to 100 hr.

By means of its mix and its single-heat annealing practice the company has found, from numerous tests, that, with three times the amount of sulphur ordinarily considered as a deterrent, the tensile strength of the castings is as good as that of iron in which the sulphur content is low, and in some cases better. In putting into effect the new method, which specifies that only the castings from a single heat be placed in an annealing oven, the company has constructed ovens which differ materially in design from those used in most malleable foundries.

Ovens Are Charged From Above

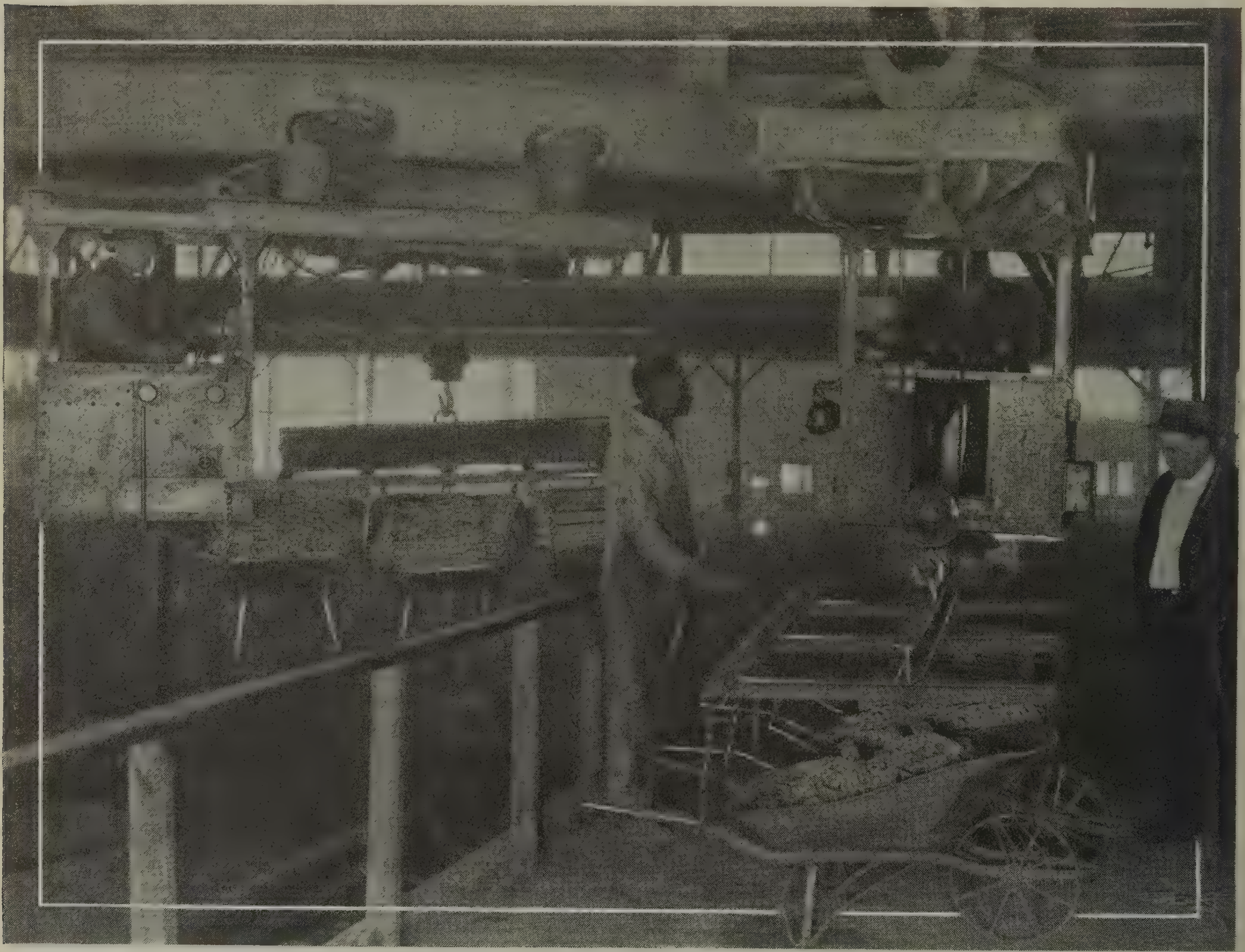
Annealing ovens are built in batteries of 12, each oven being 5 ft. wide, 6 ft. deep and 7 ft. high. Since they rest on a foundation 2 ft. below the floor level, their height above the floor is only 5 ft. The interior walls of each oven are lined with fire brick, and they are covered by an insulating material on the outside. The exterior consists of a steel jacket. The top, made of insulating material, is removable, having holes in the four corners to accommodate hooks. This design makes it possible to attach a chain of four hooks from an overhead crane, and lift the top off the oven, whenever annealing pots are to be put in or taken out. Thus the top, instead of the customary door at the front of the oven, serves this purpose.

Each oven holds eight annealing pots, the capacity of each of which is 1200 to 1500 lb. The design of the ovens is such that the pots can be arranged in two vertical rows, the pots being handled by crane. All ovens are gas-fired and are controlled by pyrometers. It is the duty of one man constantly to watch the temperature of the ovens and to take readings every 30 min. The pyrometric equipment is housed in a small wooden structure at the end of the row of ovens. A portable check pyrometer, which is calibrated once a week, is used to test the pyrometers.

Eighteen test bars are made from each heat, so that customers can obtain test bars on every heat, if called for within six months of its date. Adoption of this plan has eliminated the possibility of dispute regarding the analysis of the iron. Furthermore, every casting of a size has two test lugs. One is broken off in the foundry immediately after the annealing cycle is completed, while the other forms a sample for the use of customers.

Iron is melted in a 20-ton oil-fired air furnace, which has a waste-heat boiler attached. At the head of the boiler is a suction fan. When the damper of the furnace is opened and the fan is turned on, the hot gases going to the furnace stack are drawn up through the boiler. This boiler furnishes steam for the operation of a steam air compressor, which supplies 500 cu. ft. of air a minute. The air from the compressor carries a pressure of 100 lb. and is used for molding, sand blasting and sand riddling.

On either side of the furnace stack there are large openings, just above the channel, where hot gases pass to the boiler. The cold air that is introduced, mixing with the hot gases in the stack, modifies the tempera-



A Special Carrier Suspended from an Overhead Crane Has Three Hooks and Six Rings. One hook is attached to the wheel of a wheelbarrow and two rings are slipped over the two handles. In this manner the carrier is capable of holding three wheelbarrows loaded with castings. The photograph shows the castings ready to be dumped on a platform over the tumbling mills

Hard Iron Department—Compact Arrangement Minimizes the Handling of Castings

ture to such an extent that the upper part of the stack is never hot enough to glaze the brick, thereby materially increasing the life of the lining.

The melting time of an 18-ton heat is considerably less than that of the average coal-fired furnace, because of greater efficiency in combustion. The experience of the company with oil instead of coal as fuel for the furnace has proved that better control is achieved and time and labor are saved. These items over a long period of time mount to impressive figures from the standpoint of costs. Two men operate the furnace, as against four or five in the case of a coal-burning furnace. Incidentally, the first heat of the day comes off at 10 a.m. and the second at 4 p.m.

Treatment of Castings After a Heat

Within 30 min. after a heat is poured, all of the castings are broken off the gates, and the sprues and castings are in wheelbarrows placed under a monorail conveyor. From an electrically-operated overhead crane is suspended a special carrier having three hooks and six rings, which picks up the wheelbarrows. One hook is attached to the wheel of the barrow and two rings are slipped over the two handles. In this manner the carrier takes three wheelbarrows loaded with castings, transports them to a platform in the hard iron department and dumps them. The carrier then returns the three empty wheelbarrows to the molding floor. Since wheelbarrows are standard equipment and replacement parts can be purchased in quantities at a low price, this form of container has been given preference over others.

Compactly arranged so that the handling of castings is minimized, the hard iron department has some interesting features. From the platform, which is 8 ft. in height, the castings are dumped into a chute leading directly to the tumbling mills located below and just to one side of the platform. The castings pass into the mills through a hinged door, which is opened and held in position by a small carrier attached to an overhead monorail. The mills are operated by an electric chain drive under the platform.

From the mills the castings are dropped on to tables where they are inspected. Any defective castings are put into wheelbarrows under the tables, while the others are chipped by workmen, who place them on tables immediately behind them, ready for grinding. After the castings are ground, they are again inspected and are counted and weighed. On each casting is the molder's mark, so that it is possible to ascertain the number of castings that each molder produces. The number and weight are recorded on a ticket, from which the molder's pay is computed. One copy of the ticket goes to the office and the other to the molder. In this way each molder knows every day exactly what he has earned on the last heat accounted for, which is usually the third day after the iron is cast. Disputes regarding the amount of work done are thus greatly reduced.

After inspection the castings are placed in annealing pots ready for the annealing operation. Only in case of small castings is packing used, and then only to hold the castings straight for annealing purposes. Castings are not pickled because a rust is set up under the scale which causes the scale to drop off. Moreover, an oxidizing condition is created which may continue indefinitely.

In many foundries silicon and carbon are considered the two most important factors in annealing. Here, however, all elements are regarded as having a direct bearing on the way castings are to be annealed.

When the annealing operation has been completed, a test bar taken from one of the annealing pots is broken. From the appearance of the fracture is determined further progress of the castings. If the anneal has been satisfactory, the castings are dumped from the pots on to the floor, where they are picked up by a magnet and taken to an elevated platform the same height as that in the hard iron department. From the platform they pass to the malleable mills or to the sand blast room, after which operation they are assorted. Stove plate castings go to the straightener to be straightened either by hand or by drop hammer. At this point they pass a final inspection, during which only the surface is examined, and are packed ready for shipment to customers.

Charges Made Up Mechanically

Materials used in making up charges for the melting furnace are handled mechanically. Pig iron is taken by magnet attached to an overhead crane from

Patented Special Vent Board Which Eliminates Possibility of Rats and Pin-Holes in Castings. The device consists of a backing device with a number of venting pins or wires

the receiving bin to bins in the charging department. Here pig iron, sprues and other scrap are picked up by the magnet and are dropped into charging buckets, which are weighed and are carried on a monorail by a bridge crane to the furnace. By following this procedure a crane operator and three other men make up two 18-ton heats daily. Equipment includes a number of buckets in which charges are prepared considerably ahead of the time when they are needed. As a result the average time required to charge the furnace with 18 tons of materials is only 30 min.

For mechanical handling of materials the foundry is served by a monorail crane system on which are operated three hoists with cabs. The operator of the first cab has charge of the east end of the foundry, and it is his duty to transport pig iron from the receiving bins to the charging department and sand to the molding floor. In addition, he makes up the charges and takes them to the melting furnace, bringing back to the charging department wheelbarrows filled with sprues. The operator of the second cab "cleans the floors," distributes sand to the molding floors and carries core racks from the core room to the core setters. The third operator is responsible for transporting castings from the molding floor to the tumbling mills and for loading and unloading the annealing ovens.

Special Vent Board Features Molding

In the molding department air-operated portable molding machines are used. The gangways between the rows of molding floors are made of concrete for the convenient transportation of the machines. Sand is tested for moisture and for bond, and every casting is faced with a special facing sand, the preparation and testing of which are in charge of one man. All molds have perforated metal bottom-boards to permit the gas to escape through the bottom of the mold. In addition, every molder has a patented special vent board, the application of which eliminates rats and pin-holes in the castings.

This device comprises a board or other backing device, which may or may not be a part of the flask, with a number of venting pins or wires. Made of case-hardened steel, the pins or wires are of varying lengths and are so arranged that the vent holes which they produce are of the proper depth to permit the steam and gas to escape from the mold, all vent holes terminating approximately the same distance from the cavity, even though it may be irregular in shape. When a mold is made on a molding machine the venting pins or wires may be attached to, and movable with, a part of the molding machine. Of paramount importance in connection with the process is the fact that the venting pins or wires are distributed on the board or other backing member to which they are secured so as to produce a configuration corresponding to the shape of the cavity in the mold.

If desired, the venting pins or wires can be attached to the board or other backing member so that they can be individually removed. By this arrangement certain of the pins or wires can be located at various angles to avoid such conditions of the mold as blows. In this case the angularly-arranged pins or wires can be individually removed from the board before it is withdrawn from the mold.

All molders wear white duck pants and the foremen of the molding floors are in white union-alls. When pouring iron, the molders are required to don canvas leggings. The clothing is laundered weekly by the company and at its expense.

Avoiding Excessive Handling of Cores

In the core room large racks are placed immediately behind the core makers. The green sand cores are put on the racks which, after being filled, are picked up by lift trucks and placed in gas-fired core ovens, of which there are four. When the cores are properly baked, the racks are removed from the ovens by lift trucks and are put under the crane runway, where they are picked up by monorail hoists and are carried to various parts of the molding floor. After the cores have been taken from the racks by the core setters, the empty racks are returned by the monorail hoists to the core room, where they are again placed behind the core makers, to be refilled. By following this method, the company has avoided unnecessary handling of cores by the workmen. An exception is made in the case of cores to be delivered to nearby parts of the molding floor, transportation being by means of stretchers instead of racks, carried by air hoists.

The entire foundry consists of a large area without partitions. This arrangement is advantageous in giving supervising officials an opportunity to see in a moment what is going on in any part of the plant. Furthermore, the absence of partitions conserves floor space and thereby cuts down plant investment.

Can Make Own Power in Emergency

Unless some adequate provision is made for meeting emergencies, companies depending upon outside sources for power are likely to experience much difficulty and considerable loss in case of a breakdown. Anticipating such a situation, the company has established adjoining its foundry a small power house equipped with a Diesel engine (manufactured by the Busch-Sulzer Brothers Diesel Engine Co., St. Louis) and an 85-kw. generator set. This electrical unit is for use in completing a heat in case trouble develops in the outside power line. In fact, the value of this reserve unit has already been proved, for on several occasions work would have had to be suspended if the emergency equipment had not been available.

The Southern Malleable Iron Co. is the only manufacturer of malleable iron using the single-heat annealing ovens described. V. S. Durbin, manager, states that the company's method of determining the percentage of anneal or the amount of combined carbon not only is new, but also is probably the only accurate way of finding out the percentage of the anneal. The value, he says, lies in the fact that practically no losses have been incurred in the form of defective castings, and that the quality of the castings has been above the average. In connection with the new practice of making malleable iron, the company has a number of patents pending.

Continuous Furnace to Heat 50 Tons of Billets an Hour

The continuous furnace to serve the continuous mill being built for the Timken Roller Bearing Co., Canton, Ohio, by the Mesta Machine Co. will be furnished by the Rust Engineering Co., Pittsburgh. The heating hearth will be 33 ft. wide by 51 ft. in length. The furnace will have an output of 50 gross tons of billets an hour, varying in size from 2 x 2 in. to 5 x 5 in., and 30 ft. in length. To give this high tonnage, billets will be charged in the side, pushed the length of the heating hearth and discharged from the opposite side of the furnace directly into the first stand of the continuous mill. The fuel to be used will be natural gas. Combustion control and draft regulation equipment will be furnished by the American Heat Economy Bureau, Pittsburgh.

Electric Steel Staybolts Tested in Locomotive Service

To test out staybolts made of electric steel, in comparison with those made of charcoal iron, the Atlantic Coast Line Railroad fitted one side of the fire box of engine 921 with the one type of staybolt and the other side of the same fire box with the other type. This installation was made in May, 1922, the staybolts of both types being the product of the Old Dominion Iron & Steel Works, Richmond, Va. Periodical reports made by the general superintendent of motive power of the railroad have shown how these different types of staybolts have stood up in service. In the table are listed the number of bolts which had to be removed up to various dates, the latest being Jan. 31, 1928.

Removed Prior To	Charcoal Iron	Electric Steel	Ratio
Jan. 1, 1925.......	32	11	2.9
July 1, 1927.......	51	15	3.4
Jan. 31, 1928......	65	16	4.1

Core Room—Large Racks, Which Are Lifted by a Jack-Lift Truck, Are Placed Immediately Behind the Core Makers

Sandless Foundry Makes Progress

Plant of Holley Carburetor Co., Detroit, Has Developed Long-Life Mold Production Successfully—Large Output Obtained in Relatively Small Space With Unskilled Labor

BY HARRY KIMBER*

THE adoption of the long-life or permanent mold by the Holley Carburetor Co., Detroit, was the subject of a paper read by Dr. Richard Moldenke before the 1923 convention of the American Foundrymen's Association in Cleveland and published in THE IRON AGE *of May 3, 1923, page 1251. In the following article written for* THE IRON AGE *the author, a member of the Holley organization, describes the results which have been achieved by the use of the long-life mold and the improvements which have been developed in practice and in the design of the machines used.—EDITOR.*

THE Holley Carburetor Co. of Detroit was one of the first of the automobile carburetor manufacturers to produce carburetors having cast iron bodies. Great difficulties were experienced in securing sand castings that were impervious to gasoline and commercially machinable, because of extremes in cross-section in these 2-lb. castings. Malleable iron castings and box annealed semi-steel castings were tried with fair success, but were not comparable with gray iron when price, machinability and appearance were considered.

The demand for this particular carbureter increased steadily, while fewer foundries were available that could produce satisfactory castings, until only one foundry remained as a dependable source of supply.

The management decided that the permanent or long-life mold was a possible way out of this uncomfortable situation, and experimental work began in 1922. They knew that an unprotected cast iron mold was impractical; so an intensive search was soon under way to find a suitable protection for such a mold. Many coatings were tried before the satisfactory combination was discovered. This refractory coating, which is cheap, easy to prepare, easy to apply and permanent, made the Holley long-life mold a definite success. Production was begun at once on the abovementioned carbureter casting, and when it was finally discontinued over 7,000,000 castings had been produced in Holley molds in a little over two years.

Adopted by Ford Motor Co. and Others

Henry Ford became interested in this mold and the automatic machine which was developed to carry it. The Ford Motor Co. now has nine of these machines in its foundry, producing hundreds of thousands of small gray iron castings for the Model A car and pistons for the Fordson tractor. Thousands of cast iron pistons were also made for the Model T car by this process. The carbureter body for the Model A is now being produced in large quantities on these machines in the Holley Carburetor Co.'s new sandless foundry.

The production possibilities of this machine were soon recognized by manufacturers and foundrymen both in this country and in Europe, and many of them now are using the machines in their own foundries. The Delco Remy Corporation, a subsidiary of the General Motors Corporation, is completing plans for the erection of a new 100-ton sandless foundry at Anderson, Ind.

Castings ranging from 6 oz. to 25 lb., thick and thin, and with and without cores, are now being produced in large quantities in the Holley molding machines.

The Holley foundry is a two-story steel and concrete building, having the core room and the molding department on the second floor, and the annealing, cleaning and inspection on the ground floor. A balcony, 12 ft. wide, extends over the entire length of the core room. All of the core sand is mixed on this balcony and delivered to the coremakers' benches by means of hoppers. All high-production cores are made on core-blowing machines, and every core used is treated with a core wash.

There is one No. 6 Whiting cupola lined to 46 in. in operation. The building was designed, however, for two cupolas and mechanical charging.

The molding department, which is 48 x 84 ft., contains eight automatic 12-headed rotating machines and eight No. 3 single-headed machines, which are manually operated. The molten iron is delivered to these machines with 300-lb. bull ladles, which travel on an overhead monorail. The hand ladles are suspended in pairs from a specially designed mast in such a manner that one ladle may be filled from the bull ladles while the operator is filling molds with the other. In this way the operator always has a hand ladle full of iron ready for him when the one that he is using becomes empty.

Automatic Turntable Carries 12 Molds

The automatic machine consists of a turntable carrying 12 molds. It rotates intermittently with an indexing time of approximately 3 sec. The operator at the knockout position starts the machine to rotating, but it stops automatically by means of a trip switch. The molds are poured while the machine is stationary.

The mold is first cleaned by a blast of compressed air and is then re-coated with a fresh coating of lamp black for every casting. This is accomplished with a specially designed cleaner and acetylene burner. After passing this burner, the cores are put in place by an operator and the table continues to rotate until the mold arrives at the pouring station. When the pouring, which takes from 5 to 7 sec., is completed, the operator pushes a button and the next mold moves round to the pouring station. The mold that is full of iron continues around to a certain point, where it opens, and the casting, which has set but is still red hot, is ejected. This casting drops into a hopper in the floor on to an inclined chute which delivers it to a continuous pusher-type, gas-fired annealing furnace on the first floor beneath. It enters directly into the furnace at a temperature of approximately 1000 deg. Fahr. and is rapidly brought

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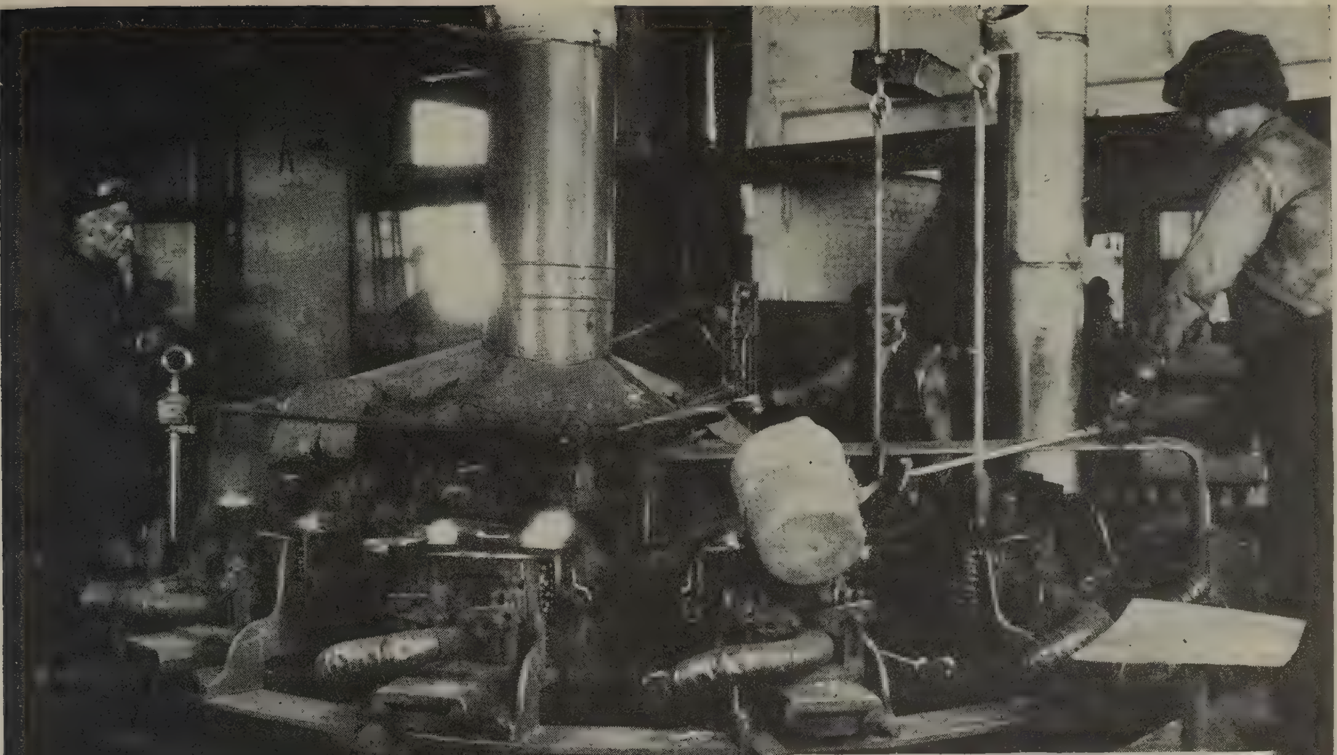
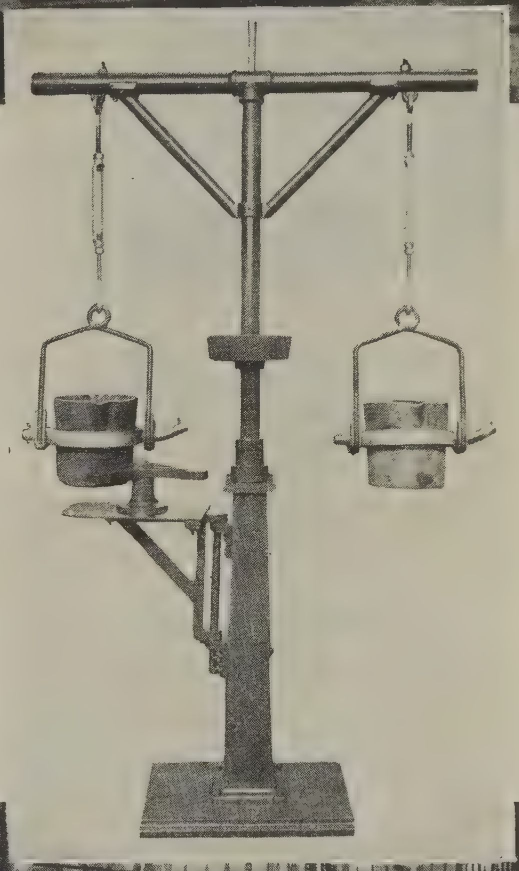
*Holley Carburetor Co., Detroit.

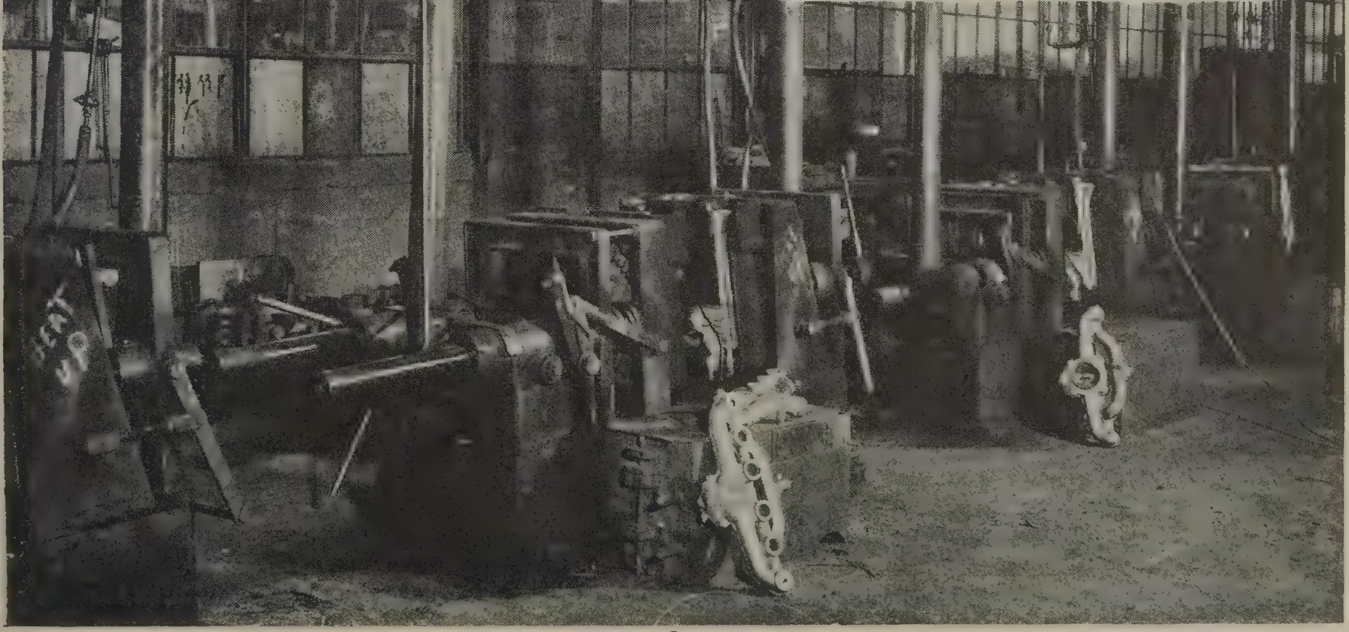


POURING Molds on a 12-Headed Holley Molding Machine (Above). The machine carries 12 permanent molds and rotates intermittently with an indexing time of about 3 sec. On one of these molding turntables 7500 1¼-lb. castings are being produced in 8 hr. The curved pipes shown carry air to the molds to control the temperature. The blower is arranged so that heated air is blown on the molds in cold weather, while air is drawn over them and exhausted out of the building in hot weather

Molds Are Poured from Hand Ladles Suspended from a Mast and So Arranged That One Ladle Is Being Filled from a Bull Ladle While Molds Are Being Filled with the Other Ladle (Right)

Some of the Larger Castings, Such as Tractor Manifolds, Are Made on a Single-Headed Manually Operated Machine (Below)





up to 1600 deg. Fahr. It is held at this temperature for 20 min. and is allowed 1 hr. to cool to 900 deg. Fahr., when it leaves the furnace to be tumbled, snagged and sand blasted. After the final inspection it is ready for shipment.

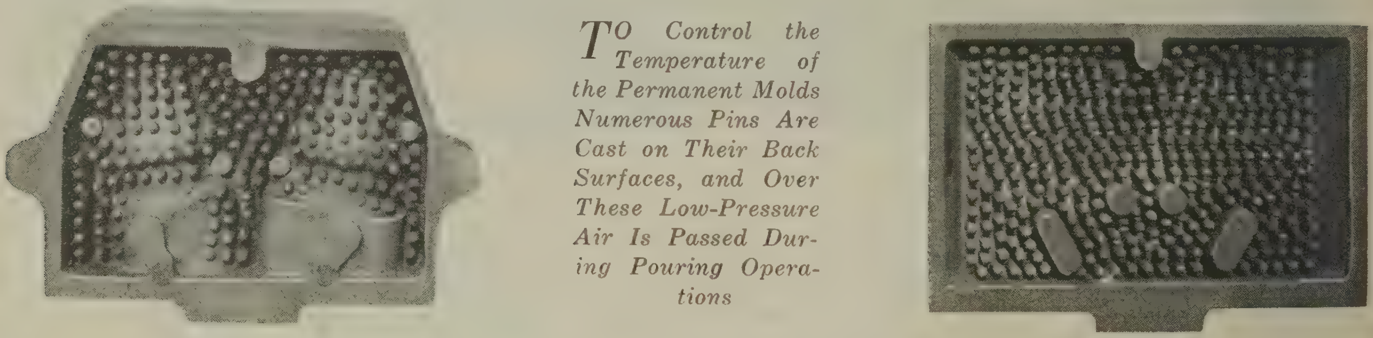
One Machine Produces 7500 Plain Castings Per 8-Hr. Day

One of these automatic 12-headed machines is producing 7500 1¼-lb. castings (without cores) while another is producing 4000 4¼-lb. cored castings in 8 hr., with an average scrap loss of considerably below 10 per cent. The molds in both cases are designed for two castings.

The No. 3 manually operated machines are used in the Holley foundry for the production of the Ford tractor manifold, with the intake and exhaust cast together. One operator produces 200 of these 22-lb. castings in 8 hr. with two machines. He cleans and soots the mold and sets two cores for each casting. One pourer services four machines.

This means that two operators and one pourer produce approximately 5 tons of cored castings in 8 hr. These castings are quite bulky, and therefore occupy considerable floor space in a sand foundry. The four machines occupy an area of 200 sq. ft. of floor space.

The cost of these 12-headed and the hand-operated machines compares very favorably with the cost of sand-handling and pattern equipment and completely eliminates the mold and sand conveyors which are a necessity in the modern high-production sand foundry.



To Control the Temperature of the Permanent Molds Numerous Pins Are Cast on Their Back Surfaces, and Over These Low-Pressure Air Is Passed During Pouring Operations

Improvements Made in Recent Machines

A number of machines have been designed and built during the last five years, and with each succeeding design, an improvement has been made. Water and oil as cooling mediums were experimented with, but air was finally selected because of its safety, efficiency and the simplicity of its application.

The rotating 12-headed machine has recently been redesigned and is now under construction. It is a decided improvement over the machines now in service.

The molds now in use are cast in dry sand molds with the same iron as that used for the castings. These molds have a multiplicity of pins cast on the back, and, when mounted on the machine, low-pressure air is passed over these pins at the rate of 100 to 200 cu. ft. per min. The volume of air is regulated so that the temperature of the mold remains within a certain range. One of the pictures shows the pipes that carry this air to the molds. The blower is overhead along the wall of the building, and is arranged so that the air blows on the molds in cold weather, and is drawn over them and exhausted out of the building in hot weather. This takes care of the heating and ventilating of the foundry very satisfactorily.

A series of tests with molds cast of various alloy irons is now in progress but will not be completed for some time. However, with proper control of the cooling system, ordinary gray iron molds have an average life of 15,000 castings on the automatic machines.

The molds are cast to size and require very little machining. After the machine work is completed, they are heated to about 500 deg. Fahr., and the refractory coating is applied to the face of the mold with a soft brush. As previously stated, this coating is permanent, but it does wear off in places where there is only a slight draft and in the sprue. These spots are touched up at the end of the day's run while the molds are still hot. Care of the molds is a most important, though simple, task.

At the beginning of the day the molds are heated with gas to a temperature of 500 deg. Fahr. before the first castings are poured. From then on the pouring is continuous throughout the day, except when the crew is out to lunch.

Cupola Practice Follows General Production Foundry Methods

The cupola practice, therefore, is the same as in that of any other production foundry. The first iron is tapped at 7.30 a. m., and the melting is continuous until 4 p. m., when the bottom is dropped. The tuyeres are cleaned out twice during this period, and the slag hole is kept open from 10 a. m. until the bottom is dropped in the afternoon. The blast pressure is 12 oz. No mixing ladle is used, but the cupola bottom is designed to hold about 3 tons of molten iron. This enables the cupola tender to supply the traveling bull ladles at all times. The charging is done by hand and every charge is weighed.

The charge is as follows:

Pig iron	500 lb.
Scrap	500 lb.
Limestone	75 lb.
Coke	150 lb.

The analysis of the resulting cast iron is as follows:

	Per Cent
Total carbon	3.50
Silicon	2.50
Sulphur	0.090
Phosphorus	0.330
Manganese	0.55

No alloys or special fluxes are used at any time. The slag is greenish gray in color, indicating proper melting conditions in the cupola.

Production has not been interrupted because of cupola trouble in more than two years, a record of which the management is very proud. The average daily melt is 45 tons for 8½ hr. Between 11 a. m. and 12.30 p. m. the wind is off for a part of the time while the various machine crews are taking their half hour for lunch.

Test bars are poured off four times a day; at 9.30 and 11.30 a. m., and at 2 and 4 p. m. These bars are Brinelled and analyzed daily.

To determine the effect that the Holley mold has upon cast iron, American Society for Testing Materials standard test bars were cast in both green sand and a Holley mold from the same ladle. Those cast in the Holley molds were given the regulation annealing. Some of each of these bars were sent to several different testing laboratories, and their reports were almost identical. In every case and in every test the sand castings were inferior. A summary of these tests follows:

Type of Test	Sand	Holley
Brinell No.	184	179
Transverse strength in lb. (12-in. centers)	3,083	5,024
Tensile strength (standard A.S.T.M. 8-in. bar), lb. per sq. in.	20,970	26,980
Impact on Olsen machine, ft.-lb.	37	67

Formation of Large Graphite Flakes Prevented

When one stops to consider, this great difference in physical properties is to be expected. The rapid rate of cooling produces a very fine grain structure and prevents the formation of large graphite flakes. Carbon has an atomic number of 12 as compared with 56 for iron. In other words, a unit weight of carbon will occupy almost five times the space of the same unit weight of iron. This means that an enormous pressure is generated within the casting itself when the graphite begins to separate out at the instant of solidification. This also prevents the formation of large crystals and graphite flakes and eliminates internal shrinks. The subsequent annealing relieves all casting strains, and, as a final result, the finished product has qualities which enable the machine shop to increase production from 10 to 20 per cent. It is this saving, added to the saving in producing the castings, which has justified the Holley Carburetor Co. in spending the time and money in the development of this process.

The outstanding features of the Holley process are a very large production in a relatively small space with unskilled labor. The resulting castings are stronger, easier to machine, freer from blow holes, shrinks and sand, and cost less to produce than sand castings.

In general, the Holley process lends itself to the modern trend toward mass production.

Materials Handling by a Variety of Methods

Engineers Discuss Cost Saving Features of Special Shipping Containers—Pneumatic Systems

HANDLING of materials by transportation entities occupied the attention of the Philadelphia meeting of the Materials-Handling Division of the American Society of Mechanical Engineers at the morning session of April 24. Three papers were scheduled, of which only two were delivered. The paper "Store-Door Delivery of Freight by Motor Trucks," by F. J. Scarr of the Scarr Transportation Service, New York, was deferred because of Mr. Scarr's illness. Two papers read included "Modern Handling Methods in Railroad Transportation," by G. C. Woodruff, assistant freight traffic manager New York Central Railroad, and "Materials Handling on Steamship Piers at Home and Abroad," by Willard C. Brinton, president Terminal Engineering Co., New York. Mr. Brinton's paper was illustrated by lantern slides, which he discussed at some length as they were shown.

Two sessions in the afternoon were devoted respectively to interior handling and to bulk handling (coal, ore, ashes, etc.). "Modern Handling in Enameling Work," by Edwin P. Smith, will appear in an early issue of THE IRON AGE. "Pneumatic Handling of Materials," by Harry S. Parks, follows, in abstract.

Pneumatic Handling of Materials

LANTERN slides featured the presentation of a paper by Mr. Parks, who is engineer of the Holly Pneumatic Systems, New York. The paper traced something of the history of the development of the pneumatic method, before going into the details of the Holly system. The author defined pneumatic conveying as a system "of a high-velocity stream in which the material conveyed is suspended."

Generally speaking, Mr. Parks was not inclined to place a limit on the distance material could be transported by this means. Practically, however, the systems are usually not over 350 to 400 ft. in length unless there is a booster inserted. Occasionally, however, a line as much as 800 ft. long is used. The vacuum system consists of a suction nozzle, a pipe line, a recipient, a discharging device which extracts the material from the air stream without breaking the vacuum. Suitable apparatus must be provided for cleaning from the air stream all finely divided material and thus preventing it from carrying over into the vacuum equipment.

Advantages of the System

Such a system of handling is not only extremely flexible, but makes possible a wide variety of combinations. Among the particular advantages of pneumatic conveying may be enumerated labor saving, dustless operation, low upkeep in maintenance costs, and ease of installation. There are no shovelers or other manual laborers. One man can handle all the material direct, without intermediate handling. Being nothing but a pipe line, a pneumatic conveyor can bridge gaps resulting from the plant layout.

There is no dust in pneumatic handling. It thus eliminates unhealthful working conditions and prevents a great amount of waste and spoiled material. In many cases it ends a serious fire hazard. Where handling combustible materials, however, pneumatic systems must be adequately protected by suitable grounding against static sparks.

As there are few moving parts in the system, maintenance costs are reduced to a minimum. As the material is suspended in the center of the channel of flow, it does not come in contact with the conveying line, except at the elbows or turns. Here the wear is confined and replacement of worn elbows is provided for in the design. Even then the wear is not serious, except in handling abrasive substances.

Ease of installation is promoted by the fact that a pneumatic conveying system is almost wholly a pipe-fitting job. The principal equipment is easily located and takes little floor space. The conveying lines can be laid out over or under roadways, up the side of a building, or through it, or wherever required.

Heating Automobile, Furniture Sheets by Continuous Pack Method

Continuous pack heating of sheets is to be done in a new furnace now under construction at the plant of the Newton Steel Co., Newton Falls, Ohio. The Rust Engineering Co., Pittsburgh, is making the installation, which, it is expected, will be completed and in operation in about six weeks. Continuous pack heating of tin plate gages of sheets has been practised, but this will be the first application of the method to sheets, and in this case to automobile body and metal furniture sheets, the principal tonnage of the Newton company. The new furnace is 5 ft. wide and approximately 47 ft. long inside, and will have an output of 30 tons a shift. The packs are carried through the chamber on Kathner-type disk rolls, manufactured by the Duraloy Co., Pittsburgh. Producer gas is the fuel. Preheated air is to be supplied by an alloy metal recuperator.

HOWARD EVANS
Treasurer, 1896-1900

W. S. MOSHER, SR.
Vice-President, 1896-1900

I. W. FRANK
Vice-President, 1897-1898

A. I. FINDLEY
Vice-President, 1902

Living Founders of A. F. A.

Some of the men who became officers after assisting in organizing the American Foundrymen's Association
(See article on page 1265*)*

JESSE JONES
Director, 1926 to 1928

S. D. SLEETH
Vice-President, 1901

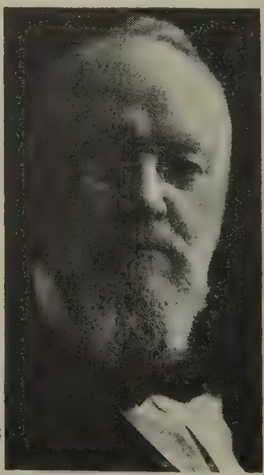
STANLEY G. FLAGG
President, 1907-1908

1896-1928

S. T. JOHNSTON
Vice-President, 1908 and 1927-28

JOHN A. PENTON
Secretary, 1896-1899,
Vice-President, 1900

WALTER WOOD
Vice-President from 1909 to 1916



A. W. WALKER
President, 1902-1903

American Foundrymen's Association to Meet in Philadelphia, May 14

THE American Foundrymen's Association will hold its convention and exposition of foundry equipment and supplies in Philadelphia during the week of May 14. The exhibits will be in the Commercial Museum, where will be assembled many new and improved machines for the modernization of the foundry and also the time-tried equipment developed in recent years.

This will be the first exposition of the American Foundrymen's Association since that held in Detroit in September, 1926, and in the interim progress has been made in many lines associated with improvement in foundry practice.

A feature of this issue of THE IRON AGE is the presentation on pages which follow of installations of equipment that have brought up the standard of foundry work, or have increased production and reduced costs. Illustrations of some of the new equipment to be exhibited at Philadelphia are also to be found in this issue.

List of Exhibitors and Products They Will Show

A

Abrasive Co., Philadelphia. Booth Nos. 136, 138.
Demonstration of snagging wheels, including the Red Center Borolon Bakelite, Borolon Vitrified, Electrolon Bakelite and the K Bond Electrolon. Representatives attending: Samuel M. Hershey, L. R. Burnes, E. M. Wilkinson, J. F. Fischer, R. A. Shaffer, W. A. Ruppel, I. R. Blair.

Adams Co., Dubuque, Iowa, Booth No. 181.
Adams jolt squeezers, pneumatic sand riddle, cherry snap flasks, cherry slip flasks, steel jackets, steel bands, vibrators, rappers, sprue cutters, etc., steel bottom plates. Representatives attending: Waldo Adams, Lester Demkier, W. J. Spensley, John Cameron.

Air Reduction Sales Co., New York. Booth Nos. 489-491.
Airco 99.5 per cent oxygen, Airco acetylene, Airco National Carbide and Airco Davis-Bournonville apparatus for oxyacetylene welding and cutting; Argon, Neon, Helium and other rare atmospheric gases; demonstrations with hand welding and cutting outfits, and the Radiagraph and Oxygraph, motor driven machines for oxyacetylene cutting. Representatives attending: W. W. Barnes, W. H. Eliason, H. B. Hand, J. F. High, C. D. Trout, W. L. Humphreys, F. Judelsohn, C. S. Peters, H. L. Rogers, R. F. Helmkamp, and G. Van Alstyne.

Ajax Electrothermic Corporation, Trenton, N. J. Booth No. 484.
A 3 kv.-a. Ajax-Northrup high frequency induction furnace melting steel, copper, etc., and a model of a 500 lb. high frequency furnace for steel melting. Representatives attending: G. H. Clamer, president and general manager; Dr. E. F. Northrup, vice-president and technical adviser; Dudley Willcox, secretary and treasurer; R. N. Blakeslee, F. T. Chesnut.

Ajax Metal Co., Philadelphia. Booth Nos. 481, 482, 483, 484.
Brass and bronze ingot metals, also castings produced by customers from these ingots; Ajax process babbitt metals; Ajax-Wyatt electric furnace; types of Ajax-Northrup electric furnace and accessories. Representatives attending: G. H. Clamer, president and general manager; W. J. Coane, first vice-president and general sales manager; Frank M. Willeson, Zeno D. Barns, A. MacDougall, J. Millson Graham, S. E. McClure, J. C. Brightbill, R. J. Keeley, J. R. Wyatt, Henry Gieseke, William Adam, Dr. Edwin F. Northrup, Dudley Wilcox, R. N. Blakeslee.

Albany Sand & Supply Co., Albany, N. Y. Booth No. 344.
Foundry sand.

Alloys and Products, Inc., New York. Booth No. 291.
Deoxidizers, densifiers, hardeners, technical alloys, rich alloys and special alloys in ingot, shot and lump form. Representatives attending: Henry Hecht, president; Charles Vickers, Adam J. Hecht, Frank J. McCaul, Gilbert T. Mason, John A. Fletcher, William J. Bullock, Charles J. Harney, E. E. Berliner.

Alpha-Lux Co., Inc., New York. Booth No. 2.

American Boron Products Co., Inc., Buffalo. Booth No. 216.
Boronic alloys. Representatives attending: J. B. Mendenhall, W. A. Sharp, R. E. Molley.

American Brake Shoe & Foundry Co., Chicago. Booth No. 8.

American Engineering Co., Philadelphia. Booth Nos. 105, 107, 109.
A 220-volt, d.c., 1-ton plain trolley hoist with foundry control; a 220-volt, 3-phase, 60 cycle, a.c., 2-ton hoist with 2-speed control, cage controlled, with fully inclosed motor driven trolley and 2-speed squirrel cage motors on both hoist and trolley; new pressed steel ¼-ton hoist recently added to the Lo-Hed line in three types; with plain trolley, with bolt suspension, with hook suspension; other Lo-Hed monorail hoists and a stationary hoist. Representatives attending: R. H. McGredy, J. M. Combs, George L. Drake, W. A. Hummel.

American Foundry Equipment Co., Mishawaka, Ind. Block Q.
Complete line of foundry equipment, including sand-cutting machines, flasks, sand-blast equipment, rod straighteners and shears, core machines, tumbling barrels, dust arresters and incidental equipment. Also a new tumbling barrel and the new American Preparator, a sand preparing machine.

American MonoRail Co., Cleveland. Booth Nos. 334, 336.
Overhead MonoRail conveying equipment. Consisting of overhead MonoRail tracks, trolleys, switches, cranes, chain hoists, electric hoists. Representatives attending: L. E. Gaston, J. W. Clokey, F. C. Harris, J. P. Lawrence, H. M. Miller, B. D. Jeffs.

American Saw Mill Machinery Co., Hackettstown, N. J. Booth No. 195.

American Steel Abrasives Co., Galion, Ohio. Booth No. 299.
Samples of American "Eversharp" steel grit, and American standardized steel shot; metallic abrasives for use in blasting equipment for the cleaning of castings, forgings, heat treated parts, etc. Representatives attending: L. A. Cline, president and treasurer; S. D. Layton, vice-president and general manager; Ira T. Armstrong.

American Vent Wax Co., Lockport, N. Y. Booth No. 210.
Vent wax. Representative attending: N. L. Nankey.

Ames Shovel & Tool Co., Boston. Booth No. 289.
Shovels. Representatives attending: N. E. Brooks, Maynard Swift.

Arcade Mfg. Co., Freeport, Ill. Booth Nos. 383 to 387.
Power moderns—jolt, rollover, squeezer, pattern draw; hand moderns—rollover, squeezer, pattern draw; jolt stripper, air stripper, jolt squeezer, jolt squeezer (heap straddler), core machines, pouring devices. Representatives attending: L. L. Munn, vice-president and general manager; B. C. Trueblood, treasurer; Mentor Wheat, sales manager; Henry Tscherning, V. S. Firestone, August Christen, R. E. Turnbull, Herman Kasten, G. D. Wolfley, Herman Meyers, William Herman.

Asbury Graphite Mills, Asbury, N. J. Booth No. 81.

G. H. Clamer
Ajax Metal Co.,
Philadelphia.
Chairman,
General Committee

W. J. Rice
Ajax Metal Co.,
Philadelphia.
Secretary,
General Committee

Laird U. Park
Park & Williams, Inc.,
Philadelphia.
Chairman,
Reception Committee

Austin Co., Cleveland. Booth Nos. 83, 84.
The Austin method as applied to the development and construction of complete foundries shown by means of models, photographs, plans and reports. Use of labor-saving devices and material-handling equipment also will be featured. Representatives attending: G. A. Bryant, vice-president and sales manager; H. E. Stitt, O. D. Conover, J. C. Childs, Charles E. Covell, E. F. Scott.

Automatic Transportation Co., Buffalo. Booth Nos. 315, 317.

Axmann Sand-Throwing Machine Co., Cleveland. Booth Nos. 72, 74.
Axmann sand-throwing machines in operation, conditioning sand, filling overhead sand bins, conveying sand from one location to another, etc. Representatives attending: S. L. Dryfoos, vice-president and general manager; Eric Wisbrun, C. M. Holcomb, E. J. Welter, M. A. Beltaire, Jr.

Ayers Mineral Co., Zanesville, Ohio. Booth No. 257.

B

The Baker-Raulang Co., Cleveland. Booth No. 312.
Baker electric locomotive-type crane, 3000-lb. capacity at a 7 ft. radius; Baker electric hy-lift truck, 60-in. lift, 6000-lb. capacity; Baker series D 3-ton elevating truck, special foundry type. Representatives attending: H. B. Greig, C. H. Remde, D. L. Darnell, H. W. Faunt Le Roy, S. M. Conant, Nathaniel Platt, H. C. Sherer.

C. O. Bartlett & Snow Co., Cleveland. Booth Nos. 401, 403, 466, 468.
Continuous sand blender, pug mill, conditioner, elevator, conveyor parts, photographs of installations of continuous molding and pouring equipment, moving picture of large production foundry operation. Representatives attending: H. L. McKinnon, secretary; H. C. Orr, M. E. First, W. W. Dodge, W. H. Norrington, Oliver S. Kelly, C. W. Ross.

H. L. Baumgardner Corporation, Chicago. Booth Nos. 405, 470.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth No. 201.
Optical and scientific instruments, photomicrographic apparatus and microscopes, toolmaker's microscope, optical index device for dividing head, diamond tools, thread profile gage, magnifiers and readers, etc. Representatives attending: I. L. Nixon, J. A. Scheick, E. H. Anthes.

Beardsley & Piper Co., Chicago. Booth Nos. 407, 409, 411, 413, 415, 472, 474, 478, 480.
Sandslingers.

Berkshire Mfg. Co., Cleveland. Booth No. 450.
Molding machines and vibrators, jolt squeezers, plain squeezers, pattern draw machines, aluminum flasks. Representatives attending: Guy L. Cameron, H. F. Henriques.

Bethlehem Steel Co., Bethlehem, Pa. Booth Nos. 239, 292.
Automobile engine block, carbureter casting, electric refrigeration cylinder casting, a number of small intricate die castings, and other castings, all made with Mayari pig iron. Representatives attending: Messrs. MacDonald, Fisher and Pritchard, and representatives from Bethlehem district offices in Boston, New York, Philadelphia, Pittsburgh and Baltimore.

Biax Flexible Shaft Co., New York. Booth No. 370.

Black Diamond Saw & Machine Works, Natick, Mass. Booth No. 179.

Black & Decker Mfg. Co., Towson, Md. Booth Nos. 27, 29.

Blaw-Knox Co., Pittsburgh. Booth No. 93.
Blaw-Knox clamshell buckets, steel grating and open flooring, air preheaters, standard steel buildings, Tracyfiers (steam purifiers). Representatives attending: E. L. Harrington and J. W. Hemmerle.

Bloomsbury Graphite Co., Bloomsbury, N. J. Booth No. 241.
Foundry facings, Ceylon plumbago, plumbago blacking, Ceylon silver lead, plumbago core wash; all grades Ceylon graphite. Representatives attending: Edwin R. Wolverton, vice-president and general manager; M. F. Murphy.

Botfield Refractories Co., Philadelphia. Booth No. 430.
Adamant fire brick cement, brick, Adachrome, Adachrome-fines, Adapatch. Representatives attending: W. B. Smith, S. C. Lott, Ires Prosser, J. J. Sweeney.

Box Crane & Hoist Corporation, Philadelphia. Booth Nos. 96, 98.
Type "C" heavy duty standardized crane trolley 10-ton capacity; type "BR" hand operated crane trolley; load lifter electric hoist; type "L" electric hoist for alternating current operation and equipped with foundry control; type "L" electric hoist combined with motor operated trolley for running on I-beam track. Representatives attending: George A. Mitchell, secretary and sales manager; Arthur E. Hogrebe, C. Henry Schramm, Harold W. Noble, Myles W. Jones.

Bradley Washfountain Co., Milwaukee. Booth No. 112.
One 54-in. type "D" (foot-controlled) white marmorite circular Bradley washfountain. Representative attending: Alec Hicks.

Brown Instrument Co., Philadelphia. Booth No. 259.
Temperature measuring equipment for core drying; indicating and recording pyrometers for annealing malleable castings, etc.; cupola thermocouple assembly for recording molten iron temperatures; quick temperature reading of non-ferrous molten metal temperatures; equipment for economically controlling galvanizing temperatures; Brown electric flow meters to be shown for first time to the foundry field. Representatives attending: R. P. Brown, president; G. W. Keller, sales manager; J. P. Goheen, secretary; L. M. Morley, Mr. Lukens, Mr. Knoblauch.

Buckeye Portable Tool Co., Dayton, Ohio. Booth No. 395.
Complete line of portable tools, including drills, grinders, sanders, screw drivers, nut setters, etc. Representatives attending: W. R. Gummere, H. O. Gummere, G. A. Barden.

C

Campbell-Hausfeld Co., Harrison, Ohio. Booth Nos. 311, 313.

Carborundum Company, Niagara Falls, N. Y. Booth Nos. 267 to 273.
Abrasive division: A complete line of snagging wheels for the foundry trade, including Carborundum and Aloxite wheels and high-speed wheels in Redmanol and rubber bonds. Representatives attending: S. F. Courter, general sales manager; W. J. Griffith, G. T. Kretschmar, E. C. Maguire, H. L. Henszey. Refractories division: Small core oven with part of one side and front removed to show method of applying Carboradiant chambers; model of malleable iron annealing furnace; sectional Carborundum lid and lining for brass melting pit furnaces; sample jars of Carborundum No. 3 cement and Firefrax cements Nos. 1 and 2. Representatives attend-

C. F. Hopkins
Ajax Metal Co.,
Philadelphia.
Member
Reception Committee

R. B. Schaal
Roberts & Mander
Stove Co.,
Hatboro, Pa.
Member
Reception Committee

G. H. Rausch
Whitehead Metal
Products Co.,
Philadelphia.
Member Plant Visitation Committee

ing: C. E. Hawke, general sales manager; J. G. Fritzinger, J. A. King, F. W. Miller, E. W. Woodruff, S. A. Fenno. Globar division: A small pot type non-ferrous melting furnace; display of a high temperature furnace showing Globar heating elements and terminals in actual operation. Representatives attending: H. N. Shaw, Arnold Pfau, Jr.

Carr Fastener Co., Dot Lubrication Division, Cambridge, Mass. Booth No. 167.
Industrial lubrication devices for bearings of machinery used in foundry industry; Dot guns and nipples, Dot-O-Matic pressure cups, electric lubricator, Dot lubricant; also Dot lubrication as standard equipment on the Sandslinger exhibited by Beardsley & Piper Co., on Simpson mixer manufactured by National Engineering Co., and on sand blast mill of W. W. Sly Mfg. Co. Representatives attending: Louis H. Hein, C. L. Hall, P. K. Niven.

Chicago Crucible Co., Chicago. Booth No. 207.
Graphite crucibles and refractories; special refractory shapes. Representatives attending: W. MacFadden, vice-president; T. W. Jones, Barney Bernbaum, J. K. Moses, Frank P. Maujean, Leo A. Behrendt.

Chicago Pneumatic Tool Co., New York. Booth Nos. 30 to 36.
An air compressor, chipping hammers, sand rammers, riveting hammers, air grinders, pneumatic drills, pneumatic wood-borers and air hoists; also Hicycle electric grinders, drills, reamers, nut runners and a Hicycle frequency changer. Representatives attending: A. E. Goodhue, Huvane, T. P. Harris, Eissler, Estergreen, P. J. Christy, H. G. Barbee, L. J. Walker, A. C. Andresen, Straub, A. M. Brown.

Chisholm-Moore Mfg. Co., Cleveland. Booth No. 363.
"C-M" electric hoist; Cyclone high-speed, spur-geared chain hoist; new improved ball bearing Model "K" I-beam trolleys, overhead traveling cranes, cupola charging equipment. Representatives attending: J. R. Mears, sales manager; F. F. Seaman, W. H. Morgan, E. S. Ludlow, G. L. Hunt.

Clark Tructractor Co., Battle Creek, Mich. Booth No. 53.
Clarktor sand digger exhibited for the first time. Representatives attending: R. J. Burrows, president; E. W. Clark, vice-president; D. D. Burnside, A. S. Rampell.

Clearfield Machine Co., Clearfield, Pa. Booth Nos. 393, 395.
Machine for mixing, tempering, and bonding foundry sand. Representatives attending: P. B. Reed, general manager; J. M. Gallaher, W. E. McMurray, C. D. Johnson.

Cleveland Electric Tramrail Division, Cleveland. Booth Nos. 22 to 26.
A working exhibition of Tramrail equipment especially adapted to foundry uses, consisting of necessary crane runway with a standard Tramrail underslung type crane of 28 ft. span, and a track system of Tramrail showing operation of a number of types of Tramrail carriers, including a push-button pouring device, a turntable pouring device operated and controlled from the operator's cab; a rack carrier for use in conveying flasks about the foundry.

Cleveland Flux Co., Cleveland. Booth Nos. 418, 419.

Cleveland Pneumatic Tool Co., Cleveland. Booth Nos. 432, 434.

Clipper Belt Lacer Co., Grand Rapids, Mich. Booth No. 420.
Clipper belt lacers, fasteners, cutters, with safety feature connecting pins; also the new Clipper speed lacer which will lace both ends of an 8-in. belt in 1½ min. Representative attending: Carl P. Field.

B. H. Johnson
Cresson-Morris Co.,
Philadelphia.
Chairman, Plant
Visitation Committee

T. H. Addie
American Manganese
Bronze Co.,
Philadelphia.
Chairman, Golf
Committee

Harry J. Winters
J. S. McCormick Co.,
Philadelphia.
Member, Plant Visitation Committee

J. D. Miller
Cresson-Morris Co.,
Philadelphia.
Member, Plant Visitation Committee

J. B. Greenstreet
Olney Foundry Co.,
Philadelphia.
Member, Plant Visitation Committee

Charles M. Holcomb
Foundry Equipment
Co.,
Philadelphia.
Member, Plant Visitation Committee

Thomas E. Coale Lumber Co., Elizabeth, N. J. Booth No. 488.

Combined Supply & Equipment Co., Buffalo. Booth No. 265.
Angle Stem and Double Angle chaplets. Representatives attending: Stephen LeViness, Jr., E. E. LeViness.

Corn Products Refining Co., New York. Booth No. 260.
Corebinders, Kordek and Mogul. Representatives attending: S. B. Krantz, R. H. DeWaters, H. A. Crown, F. G. Faller, Jr., A. H. Kreischer, P. J. Dapkus, William T. Maguire, J. M. Millikan, H. C. Knubbe.

D

Dayton Oil Co., Dayton, Ohio. Booth No. 229.
Core oils and cores of all kinds. Representatives attending: D. S. Hopping, Geo. A. Storer.

Debevoise-Anderson Co., New York. Booth No. 233.
Pig iron, coke, nichrome, etc. Representatives attending: Nils Anderson, president; Paul Brooks, vice-president; A. Rhodes, W. K. Callow.

Decatur Milling Co., Decatur, Ill. Booth No. 209.

Deister Concentrator Co., Fort Wayne, Ind. Booth No. 116.
Mobile type Leahy foundry screen for preparation of sand on the foundry floor. Representatives attending: Don A. Weber, general manager; N. A. Rhune, chief engineer.

William Demmler & Brothers, Kewanee, Ill. Booth Nos. 458 to 462.

Detroit Electric Furnace Co., Detroit. Booth Nos. 451, 453.
A type LFA, 350-lb. Detroit electric furnace in operation; also a display of castings and products of Detroit electric furnaces in the brass, bronze and gray iron industries. Representatives attending: Edward L. Crosby, president and general manager; A. E. Rhoads, vice-president; L. C. Wilson, L. B. Barker, F. A. Herrmann.

De Walt Products Co., Leola, Pa. Booth No. 191.
De Walt "Wonder-Worker" woodworking machines, tools and equipment. Representatives attending: W. Ross Stevens, sales and advertising executive; T. E. Brown and E. L. Duncan of Duncan-Brown Co., Inc., Westville, N. J.

Diamond Clamp & Flask Co., Richmond, Ind. Booth No. 310.
Diamond snap flasks, steel jackets, bands, core plates, bottom plates, core boxes, wedges, clamps and flask fittings. Representatives attending: F. J. Gartside, treasurer and president; E. A. Kinley.

Dietert, Harry W., Detroit. Booth No. 301.
Foundry sand control machines, consisting of permeability machine, sand rammer, strength machine (Shear bond—complete for green and dry bond of molding sand and cores); moisture indicator, water meters, oven, balance, laboratory Simpson mixer. Representatives attending: H. W. Dietert, Arthur Nearon.

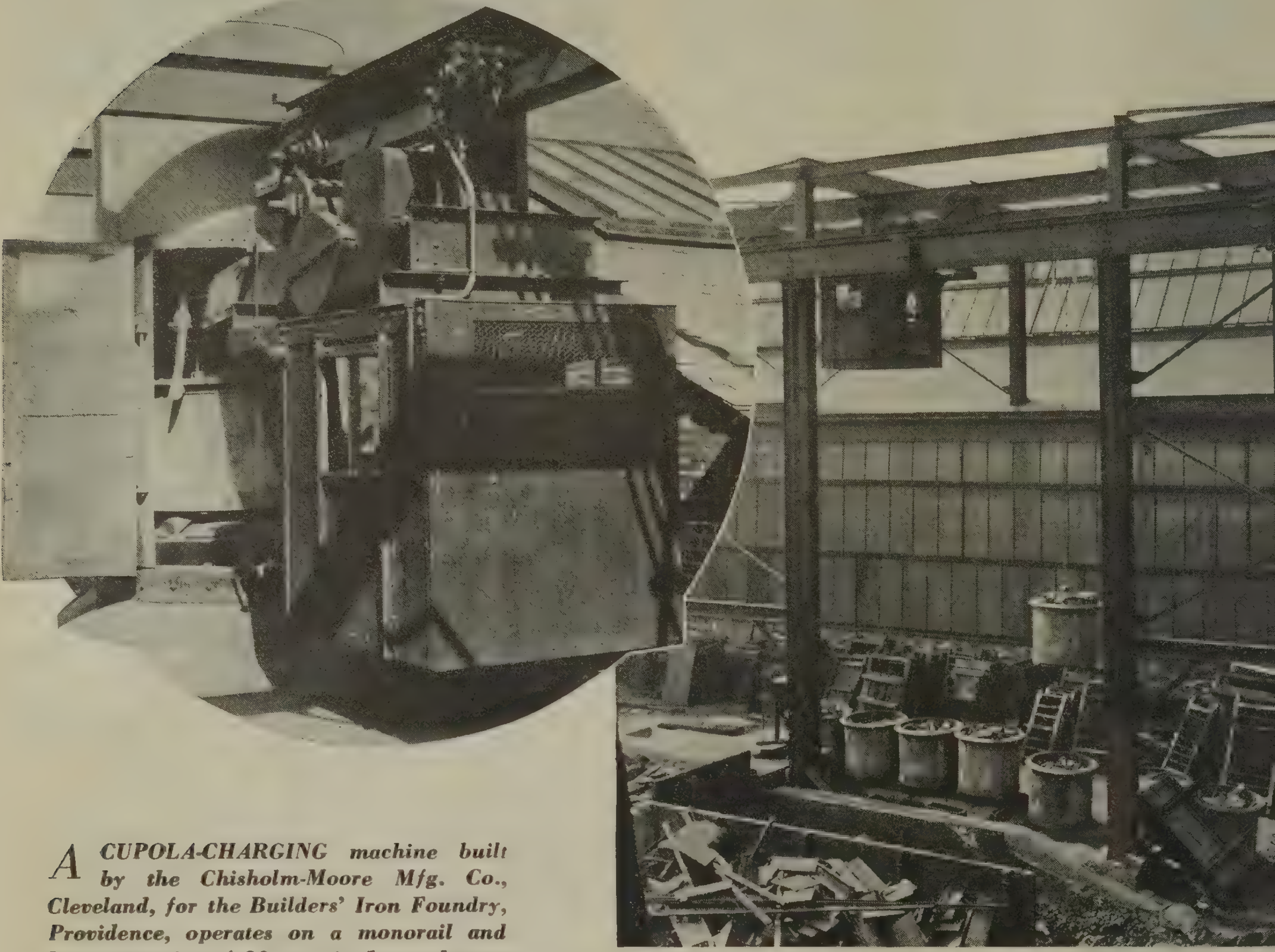
Joseph Dixon Crucible Co., Jersey City, N. J. Booth No. 270.

E

Eastern Clay Products, Inc., Buffalo. Booth No. 284.
Samples of Revivo bond, a clay binder. Representatives attending: S. H. Cleland, vice-president; C. B. Schureman, G. H. Barnes, R. S. Holland, N. J. Dunbeck, R. L. Cleland.

(*Continued on page* 1226)

Cupola-Charging Machine Takes Charge from Yard



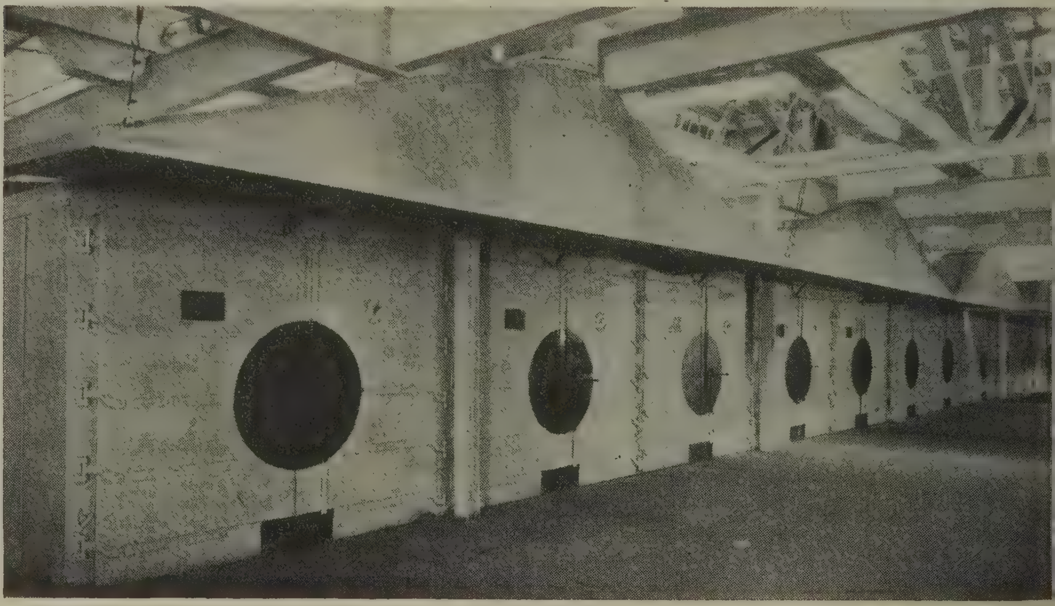
A CUPOLA-CHARGING machine built by the Chisholm-Moore Mfg. Co., Cleveland, for the Builders' Iron Foundry, Providence, operates on a monorail and has a capacity of 90 tons in 1-ton charges in an 8-hr. day. It handles the charge from the make-up scales on the ground into the cupola. Coke and limestone are handled separately from the pig iron and scrap.

One man operates the charger, while two men on the ground make up the charges.

The yard picture shows buckets of metal passing across the scale on a gravity conveyor. The charger picks them up at this point and deposits the material on the center line of the cupola, as shown in the other illustration.

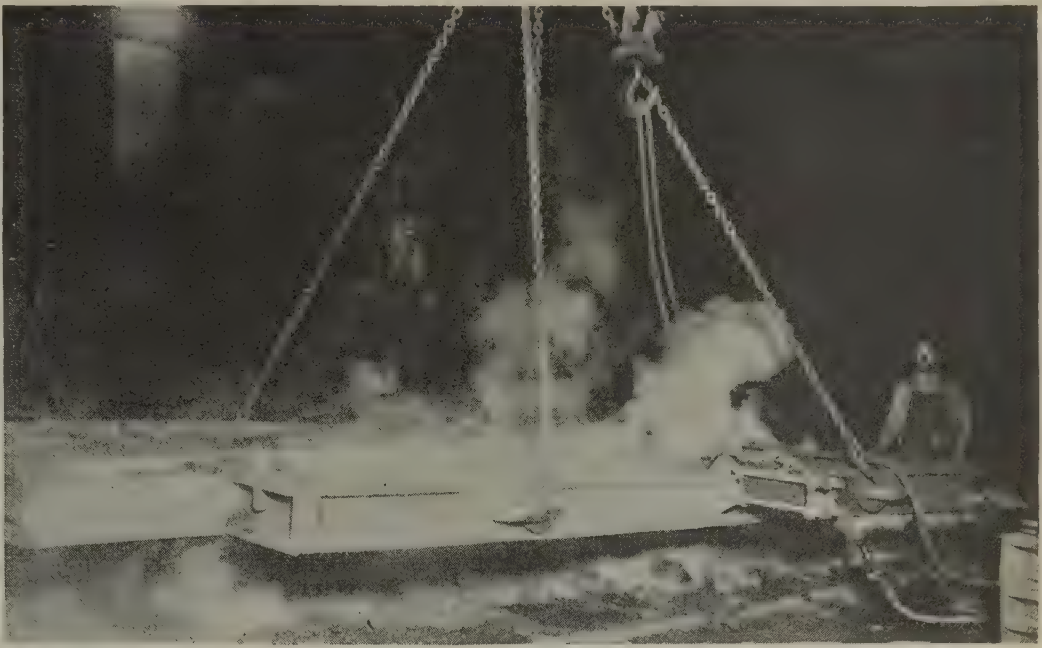
Extensive Core Baking Installation

A ROW of 11 rack-type core ovens was installed in the plant of the American Radiator Co., Gloucester, N. J., by the Swartwout Co., Cleveland. The door of each oven carries a clock face for designating the time for removing cores. Oil fuel is used, the firing aisle being at the rear, where valves and control apparatus are accessible. The doors of the ovens have five hinges each



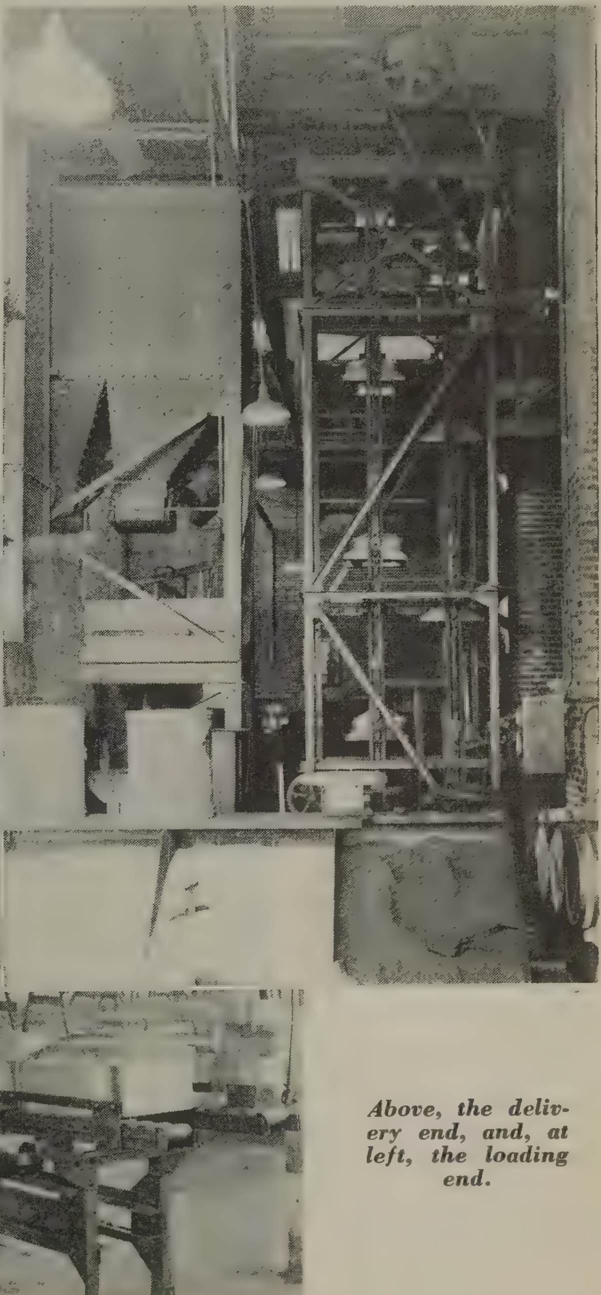
Flask Rapper Shakes Out Cope in Seven Minutes

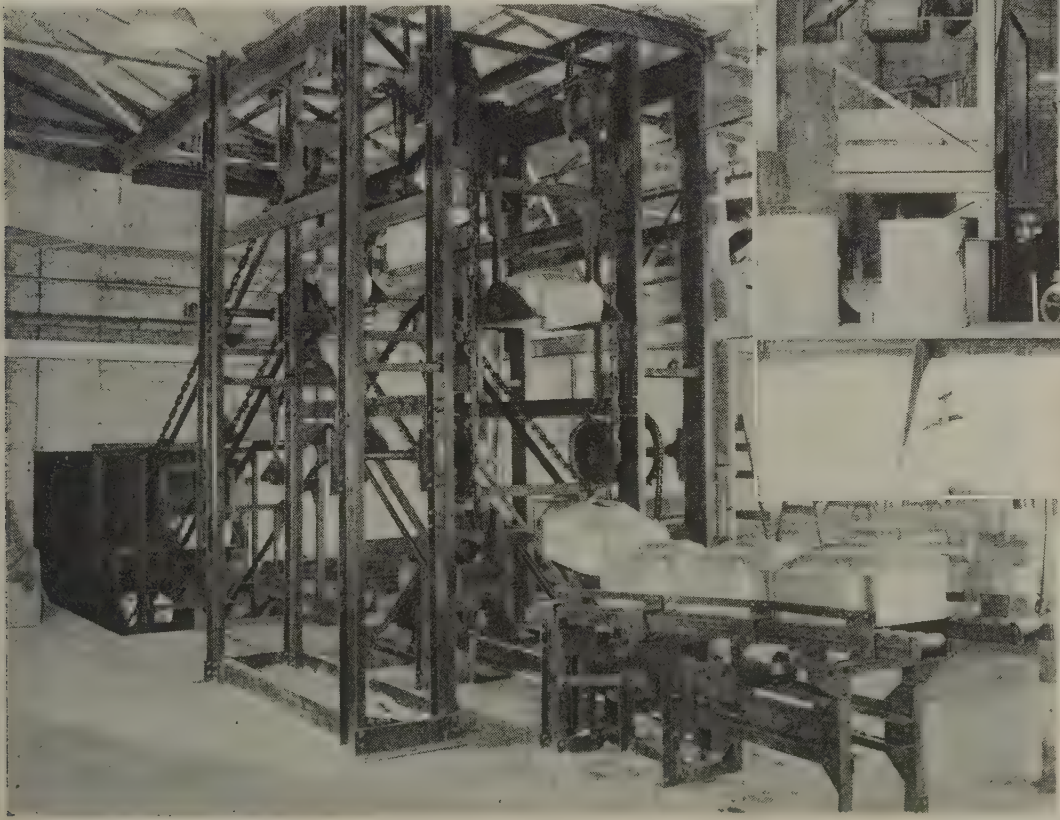
A 5-in. Branford flask rapper which has been installed by the Malleable Iron Fittings Co., Branford, Conn., in the plant of the Farrel Foundry & Machine Co., Ansonia, Conn., shakes out a cope 10-ft., 6in. x 20-ft., 12 in. in 7 min.—an operation that formerly took six men ½ hr. This cope, with 18-in. gaggers and 12-in. wood soldiers, was rammed with green sand by pneumatic sand rammers.



Automatic Transfer of Castings to Machine Shop

THE loading station and the delivery end of an automatic conveyor equipment for the Maytag Co., Newton, Iowa, was designed by H. M. Lane Co., Detroit, and built by R. W. McIlvaine Co., Chicago. The aluminum foundry is separated from the machine shop and assembly by the iron foundry. A tunnel was constructed under the iron foundry, and the conveyor equipment shown was installed for carrying the thin aluminum tubs, or boxes of aluminum castings, from the short roller conveyor in the aluminum finishing department, down through the tunnel, and then up to a gravity carrier line delivering to the machine shop.

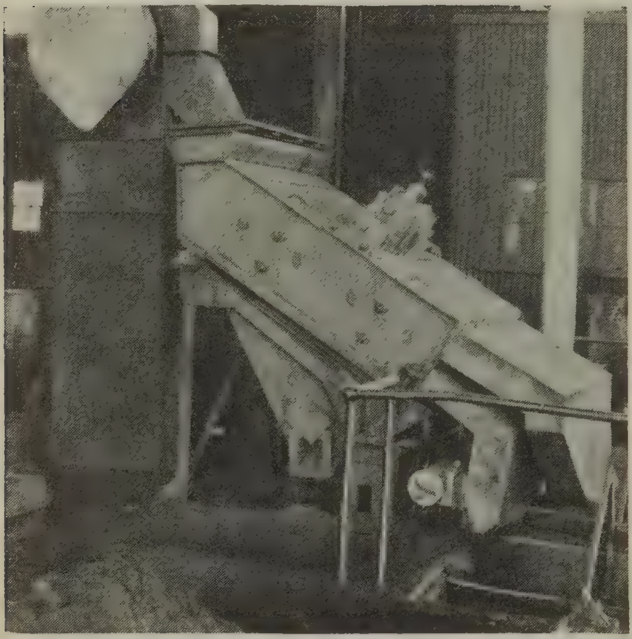




Above, the delivery end, and, at left, the loading end.

Conveying Equipment Eliminates Third Man at Harvester Plant

THE labor of one man was saved at the plant of the Western Harvester Co., Stockton, Cal., by equipment consisting of a Louden 36-ft., 10-in. transfer crane of 2000-lb. capacity equipped with trolley and 1-ton Shepard electric hoist and 50 ft. of Reelite. The crane is pushed by one man, who also handles the flasks. A second man "sands and fills."

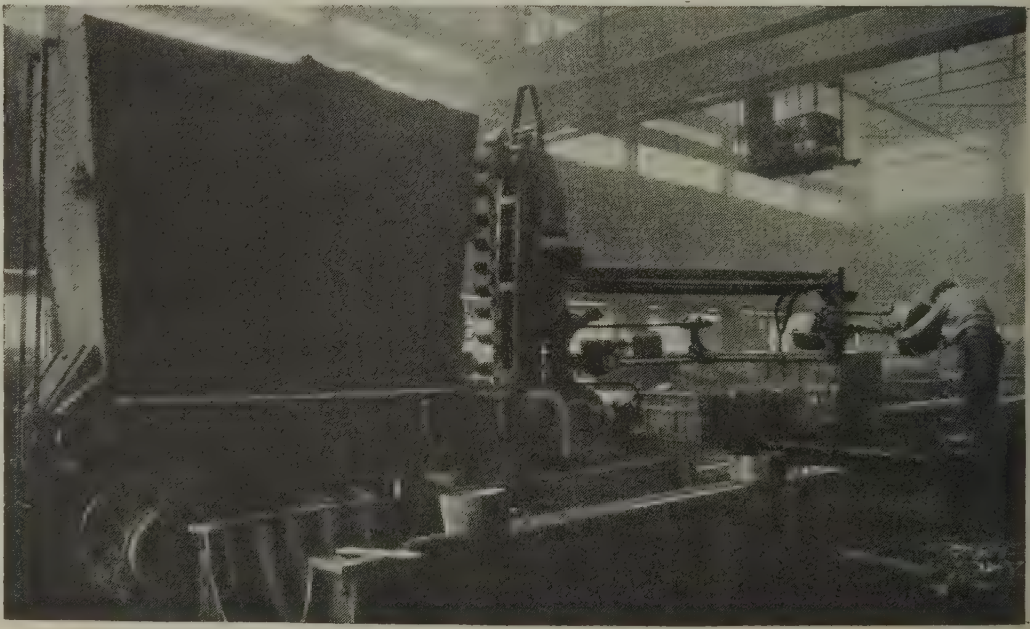


Sand Screening Outfit

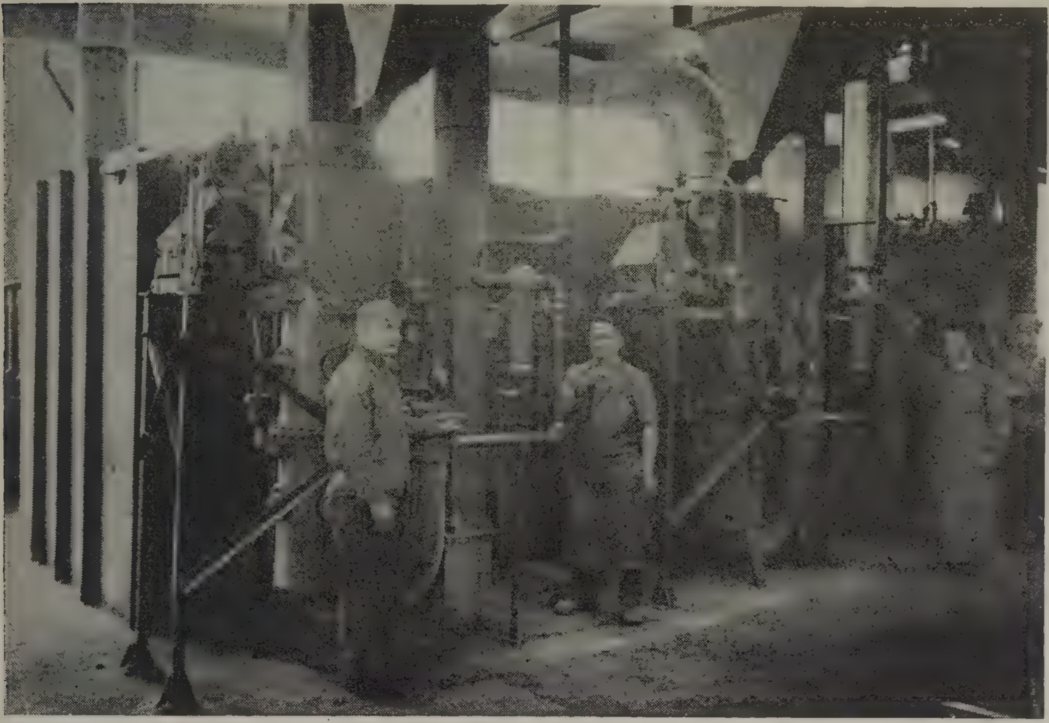
INSTALLED by the W. S. Tyler Co., Cleveland, in the plant of the Crucible Steel Castings Co., Cleveland, is a small bucket elevator and the Tyler company's Hum-mer screen, used for the preparation of foundry sand. Sand is fed by hand shoveling into a hopper of the elevator placed level with the floor line. A 2-in. grating prevents large pieces of scrap or lumps from entering. Right and left hand discharge spouts deliver the reclaimed sand and oversize into different buckets and a special hopper placed underneath the apparatus collects the fines. The reclaimed sand is taken by an overhead crane to a Simpson mixer for the final preparation. The unit handles 5 tons of sand hourly.

Motive-Type Sandslinger on Jobbing Type of Work

A MOTIVE type Sandslinger in the plant of the Bartlett-Hayward Co., Baltimore, is used in the making of pipes and fittings. The work comes under the jobbing classification. On two typical jobs there were savings of $6.09 per hour on a simple job and $4.65 per hour under unfavorable conditions.



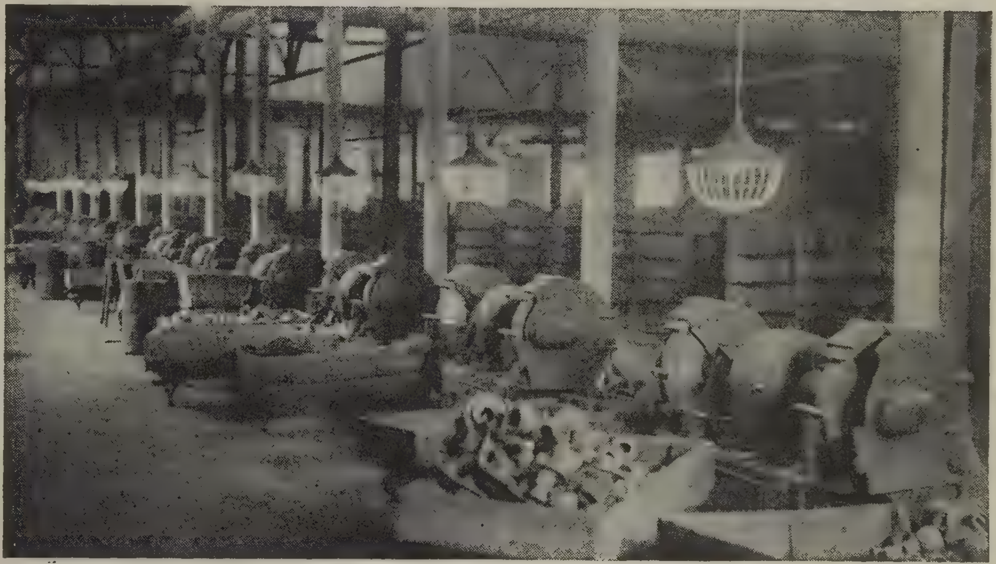
Continuous Automatic Sandblast Tanks for Uninterrupted Production



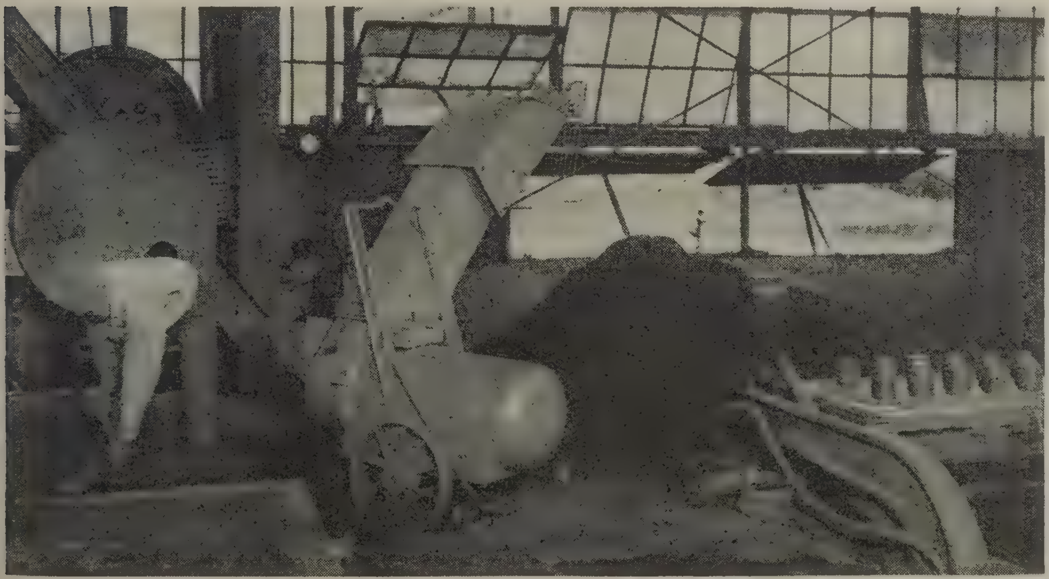
IN its new department for the manufacture of electric refrigerators, the General Electric Co., Schenectady, N. Y., has installed a battery of six continuous sandblast tanks. Five supply abrasive to five Slyblast turntable rooms and one to a positive pressure rotary table. The continuous tank does away with the waiting for a sandblast tank to refill as when one or two tanks are used. The equipment was furnished by the W. W. Sly Mfg. Co., Cleveland.

Stand Grinders in Malleable Foundry

THE large battery of stand grinders shown in the accompanying illustration is in the foundry of the Benton Harbor Malleable Industries, Benton Harbor, Mich. The machines were furnished by the Marschke Mfg. Co., Indianapolis, the grinder division of the Black & Decker Mfg. Co.



Sand Thrower Conditions and Returns Sand in One Operation



THE Axmann sand thrower is shown in operation at the plant of the McMyler-Interstate Co., Cleveland. One man now shovels the sand into the sand thrower, which conditions it and returns it to the molding station in one operation. The machine is made by the Axmann Sand-Throwing Machine Co., Cleveland.

Eastern Steel Castings, Newark, N. J. Booth Nos. 365, 367. Various sizes of a precision type of sandproof, ball-bearing, roller conveyor for green sand mold transportation, and other foundry uses; also a variety of electric steel castings of intricate design, including a new proprietary product, a cast steel automotive wheel, made in green sand entirely without cores. Representatives attending: W. D. Sargent, president; E. F. Miltenberger, vice-president; H. S. Otto, F. D. Campbell, A. L. Bussman, M. C. Renshaw, M. R. Wolfe, C. Rampolla, G. Nelson, F. Paffrath, W. Cadwallader, O. D. Fedderman, S. McClure, F. Sieder.

D. A. Ebinger Sanitary Mfg. Co., Columbus, Ohio. Booth No. 122.
Sanitary toilet and wash room. Representative attending: Mr. Evans.

Edison Storage Battery Co., Orange, N. J. Booth Nos. 9, 10. Edison steel-alkaline storage batteries. Representatives attending: G. E. Stringfellow, J. F. Coakley, J. K. Mahaffey, L. R. Lindsley, W. M. Taylor.

Electric Storage Battery Co., Philadelphia. Booth No. 421. Exide Ironclad batteries for propelling electric industrial trucks and tractors. Representatives attending: William Van C. Brandt, W. C. Hooven, J. L. MacBurney, W. W. MacCallum, E. C. Kline.

Electro Refractories Corporation, Buffalo. Booth No. 228. Tercod crucibles, Buffalo patch cement, Kellogg refractories. Representatives attending: L. U. Milward, president; C. A. Asher, Grant S. Diamond, Tom W. Campbell.

Elwell-Parker Electric Co., Cleveland. Booth No. 448. Tructors (lift or self-loading type); tiering and self-unloading type; oven charger; heavy-duty crane. Representatives attending: F. B. Neely, W. G. O'Brien, R. F. Crawford.

F

Fanner Mfg. Co., Cleveland. Booth No. 253. Foundry chaplets and hard tumbling stars. Representatives attending: J. R. Raible, president; C. G. Raible, vice-president; C. E. Ireland, P. D. McDonnell, E. Durant, S. H. Gibson, F. W. Beck.

Federal Foundry Supply Co., Cleveland. Booth Nos. 359, 361. Sand testing equipment for the laboratory, such as bond strength determining apparatus; permeability determining apparatus equipment for making screen analysis. Representatives attending: Ralph Ditty, president; L. H. Heyl, general manager; T. H. Terry, O. E. Peterson, Walter Gerlinger, Geo. H. Donoghue, Elmer Ditty, Geo. A. Fuller, T. J. Brown.

Fisher Governor Co., Marshalltown, Iowa. Booth No. 438. Reducing valves and pressure regulators, steam governors, etc., featuring Fisher type 78 combination air regulator for controlling air pressures in connection with sand blast operation.

Foundry Equipment Co., Cleveland. Booth Nos. 75, 76. Coleman rolling drawer core oven, Coleman portable rack-type core oven, Coleman continuous core oven, etc. Representatives attending: C. A. Barnett, general manager; H. W. Steindorf, M. A. Beltaire, Jr., E. J. Welter, C. M. Holcomb.

Foundry Manganese Co., Philadelphia. Booth No. 155.

Fowler & Union Horsenail Co., Buffalo. Booth No. 224. Moldochil nail. Representative attending: Charles A. Reamer.

General Electric Co., Schenectady, N. Y. Booth Nos. 375, 377, 379, 381.
Welding equipment, motors and control, and a foundry cupola blowing equipment. T. H. Reeves in charge.

Minor T. Dean
Keystone Coal & Coke Co.,
Philadelphia.
Member,
Reception Committee

John M. Robb, Jr.
Park & Williams, Inc.,
Philadelphia.
Member,
Reception Committee

W. G. Summers
Phoenix Iron Co.,
Philadelphia.
Treasurer,
Finance Committee

J. A. Davies
Westinghouse Electric & Mfg. Co.,
Philadelphia.
Chairman,
Hotel Committee

J. A. Martin
Westinghouse Electric & Mfg. Co.,
Philadelphia.
Member,
Hotel Committee

Frederick M. Devlin
Philadelphia Hardware & Malleable Iron Works,
Philadelphia.
Chairman, Entertainment Committee

G

Girard Smelting & Refining Co., Philadelphia. Booth No. 261. Brass and bronze ingots, brass and bronze castings, pig and cake lead, babbitt and solder metal. Representatives attending: Louis Schwab, Albert Katz, George Sall.

Globe Steel Abrasive Co., Mansfield, Ohio. Booth No. 45. Globe cornered steel grit and Globe H. C. chilled shot. Representative attending: C. H. McConnell, manager.

Great Lakes Foundry Sand Co., Detroit. Booth No. 277. Molding, core, and sand blast sands, fire clays, mill stars, coke, limestone. Representatives attending: William J. Muhlitner, vice-president and general manager; John D. Cronenweth, president; James G. Mendenhall, secretary; Neil I. McArthur, H. P. Mackinnon, P. E. Giberson, John E. Lambrix.

Great Western Mfg. Co., Leavenworth, Kan. Booth No. 114. Type HL Combs gyratory laboratory sifter; type V Combs gyratory foundry riddle; new type V-5 Combs gyratory foundry riddle. Representative attending: Charles F. Murphy.

Grindle Fuel Equipment Co., Harvey, Ill. Booth Nos. 319, 372. No. 30 Grindle multi-stage unit pulverizer; No. 3 impact pulverizer with air separation for firing malleable iron annealing ovens; No. 1 pulverized coal burner. Representatives attending: W. R. Bean, D. J. Reese, J. E. Charles, C. R. Taylor, M. F. Becker.

H

Hayward Co., New York. Booth Nos. 47, 49. Hayward electric motor clam shell bucket, air-operated clam shell bucket, automatic take-up reel, air-operated orange peel bucket. Representatives attending: H. S. Atkinson, H. C. Ryder, C. S. Sargent.

Herman Pneumatic Machine Co., Pittsburgh. Booth Nos. 338, 340, 342.
Rapid production type 1000-lb. capacity jarr independent rollover and pattern drawing machines. Representatives attending: Thomas Kaveny, president; Thomas Kaveny, Jr.; A. G. Doyle, vice-president; R. F. Ringle, I. J. Oesterling, R. Harris, C. W. Miller, R. P. Morgan, C. S. McMath, W. W. Hughes, Robert M. Porteous, L. L. Johnston, Joseph Gibson, Clarence Short, T. A. Renkenberger, Alfred Herman.

Hill & Griffith Co., Cincinnati. Booth No. 222.
Representatives attending: John Hill, Bruce Hill, F. W. Weissmann, William Oberhelman, C. L. Gysin, Matt Geier.

Holley Permanent Mold Machine, Inc., Detroit. Booth Nos. 461, 463.
Permanent molding of gray iron castings. Representative attending: H. P. Kimber.

Hynson, Westcott & Dunning, Baltimore. Booth No. 286, 288. Mercurochrome. Representatives attending: W. Rodney Burton, Nathaniel Nicolai, L. C. Shepherd.

I

Illinois Clay Products Co., Joliet, Ill. Booth No. 221. Fire clay, fire clay flour, castings from rebonded sand, etc. Representatives attending: O. L. Jones, president; A. S. Nichols, sales manager; Howard Blackwell, Lee Everett.

Illinois Testing Laboratories, Inc., Chicago. Booth No. 263.

Independent Pneumatic Tool Co., Chicago. Booth No. 464. Chipping and riveting hammers, air hoists, grinders, sand rammers, electric nut and screw drivers and tappers

Ralph Belleville
Joseph Dixon Crucible Co.,
Philadelphia.
Chairman, Ladies' Entertainment Committee

Earl S. Sparks
Metal Manufacturers Association of Philadelphia.
Chairman,
Publicity Committee

John Morris Combs
Combs Advertising Agency,
Philadelphia.
Member,
Publicity Committee

and moisture separators; also new rotary grinders and sanders. Representatives attending: R. T. Scott, vice-president; A. Anderson, A. L. Schuhl, H. F. White, H. F. Charbono, W. E. Doughtery, H. F. Nivison, J. A. Hill.

Indiana Consumers Gas & By-Products Co., Terre Haute, Ind., and Chicago. Booth Nos. 230, 232.
Foundry coke. Representatives attending: Leon Stern, general manager of sales; Lewis D. McClaren, Lloyd E. Davis, John Molony.

Industrial Minerals Co., Columbus, Ohio. Booth Nos. 244, 246.
Foundry sands and castings. Representatives attending: W. G. Edwards, Ed. R. Williams, H. N. Rose.

Ingersoll-Rand Co., New York. Booth Nos. 128, 130, 132, 134.
Pneumatic tools and electric-driven air compressor, air motor hoists, sand rammers (floor and bench types), core breakers, chipping hammers, portable grinders, drills, riveters, safety-first air saws, pneumatic tool accessories.

International Molding Machine Co., Chicago. Booth Nos. 347, 349, 351, 353, 400, 402, 404, 406.
Jolt squeezers, post jolt squeezers, jolt squeeze strip machines, jolt hand stripping machines, jolt power stripping machines, jolt power lifting machines, plain stripping machines, jolt ramming power turnover power draw machines, jolt ramming power turnover foot draw machines, jolt ramming hand turnover foot draw machines, core turnover draw machines. Representatives attending: Edward A. Pridmore, president; Harold E. Pridmore, Lawrence D. Pridmore, W. W. Miller, Carl Levahn, E. G. Borgnis, Hugh Gallagher, M. J. Monahan, W. J. Rowley, Luke S. Shannon, W. J. Briggs.

International Nickel Co., New York. Booth No. 416.
Typical industrial applications of nickel cast iron and other nickel alloys. Representatives attending: F. S. Jordan, R. A. Wheeler, E. J. Bothwell, A. J. Wadhams, T. H. Wickenden, J. S. Vanick, F. B. Coyle, D. M. Houston, T. J. Wood.

J

Jeffrey Mfg. Co., Columbus, Ohio. Booth No. 357.
Conveying equipment.

Johnston & Jennings Co., Cleveland. Booth Nos. 440, 442, 444.
New type jolt rollover draw machine with air clamp and equalizer; new design jolt squeeze machine; also jolt squeeze pattern draw machine, and portable type jolt squeeze machine. Representatives attending: T. J. Calhoun, vice-president; J. L. Battenfeld, R. W. Gramling.

K

Charles C. Kawin Co., Chicago. Booth No. 212.

Keller Mechanical Engineering Corporation, Brooklyn. Booth No. 165.
Keller BK flexible shaft grinders and the KELLocatER. Representatives attending: Paul C. Renno, Henry Schreiber.

Spencer Kellogg & Sons, Inc., Buffalo. Booth Nos. 145, 200.
Core oils, cores made of same, finished castings. Representatives attending: W. L. Goetz, V. A. Acer, E. G. Allen, E. J. Felt, D. J. Healy, E. A. Medbery, H. J. Strassberger, J. N. Yaeger.

Keystone Coal & Coke Co., Greensburg, Pa. Booth No. 238.
Keystone selected foundry coke. Representatives attending: F. B. Miller, W. F. Elwood, S. J. Stump, M. T. Dean, J. M. O'Brien, R. E. Diehl, F. H. Pharaoh, H. Geisel, Jr.

Keystone Lubricating Co., Philadelphia. Booth Nos. 151, 153.
Foundry equipment fitted with the Keystone safety lubricating system; new Keystone pneumatic safety lubricator; various Keystone lubricants. Representatives attending: H. A. Buzby, president; G. W. Hall, T. B. Little, J. R. Lawrence, C. T. Moyer, F. D. Street.

Kling Bros. Engineering Works, Chicago. Booth No. 68.
New high-speed double-end heavy duty grinder. Representatives attending: P. E. Kling, H. J. Aagaard.

Knefler-Bates Mfg. Co., Indianapolis. Booth No. 290.
K-B core binder. Representatives attending: Ernest Knefler, president; Geo. B. Hill, sales manager; Herbert J. Bever, John A. Green.

H. W. Knight & Son, Seneca Falls, N. Y. Booth No. 3.
White metal and brass pattern letters and figures and foundry trademarks. Representative attending: H. D. Knight.

Kramer & Co., H., Chicago. Booth No. 274.
Ingot brass and bronze, brass and bronze castings. Representatives attending: I. Kaden, vice-president; L. Chapman, sales manager; William Romanoff, S. M. Marks, George H. Grone.

L

William Laidlaw, Inc., Belmont, N. Y. Booth No. 428.

Lancaster Coal & Sand Co., Lancaster, Ohio. Booth No. 223.
Indian red molding sand and Flex-Spar bond. Representatives attending: T. E. Hummell, president; D. L. Hansberger, secretary and treasurer; E. L. Smitherman.

H. M. Lane Co., Detroit. Booth No. 208.
Drawings and photographs of foundries and equipment. Representatives attending: H. M. Lane and G. Pitt.

Lava Crucible Co. of Pittsburgh, Pittsburgh. Booth No. 280.

Leeds & Northrup Co., Philadelphia. Booth No. 417.
L & N potentiometer pyrometers for automatic control, for automatic recording and control, for automatic recording only and for indicating temperatures. These are the powerful, motor-driven type of pyrometers operating on the potentiometer principle or on the resistance principle. Also optical and portable instruments. Representatives attending: Henry Brewer, E. B. Estabrook, Oscar Brewer, E. C. Wood.

Lehigh Safety Shoe Co., Allentown, Pa. Booth No. 5.
Safety shoes for every department of industry. Representatives attending: Charles Clauser, John Clauser.

Linde Air Products Co., New York. Booth Nos. 281, 283.
A complete line of Oxweld acetylene welding and cutting equipment, showing by actual examples the application of the acetylene process in the foundry industry. Representatives attending: E. B. Farwell, W. E. Mittenmeyer, R. W. Boggs.

Lindsay McMillan Co., Milwaukee. Booth No. 307.
Rosinal and its various uses in foundry practice; also an interesting display of the different items used in the manufacture of Rosinal. Representatives attending: W. R. Pate, vice-president; J. A. Gitzen, M. A. Pollard, A. E. Welch.

Link-Belt Co., Chicago. Booth Nos. 90, 92.
An operating mold conveyor, speed reducers, belt conveyor idlers, vibrating shakeout riddle, elevating machinery and drive chain; also photographs of Link-Belt foundry installations. Representatives attending: E. L. Berry, W. C. Carter, J. J. Hartley, R. J. Heisserman, A. H. Moore, G. L. Morehead, George O'Connor, Norman Smith, H. L. Strube, M. Tholen.

(*Continued on page* 1232)

Walter L. Kalbach
Philadelphia.
Chairman, Transportation Committee

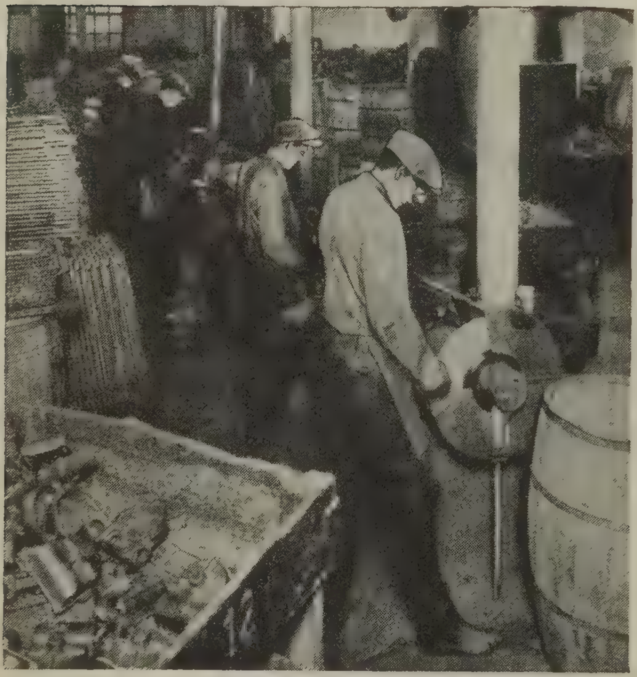
A. P. Lee
William Sellers & Co.,
Philadelphia.
Member, Transportation Committee

H. L. Henszey
Carborundum Co.,
Philadelphia.
Member, Transportation Committee

Reduce Mold Drying Time Nearly 50 Per Cent

TWO large Coleman mold drying ovens, which have been installed in one of the plants of the Worthington Pump & Machinery Corporation by the Foundry Equipment Co., Cleveland, have reduced drying time nearly 50 per cent, it is claimed, with a corresponding saving in fuel. The ovens are 16 ft. wide, 30 ft. long and 10 ft. high. Molds, it is emphasized, require no patching or secondary heating.

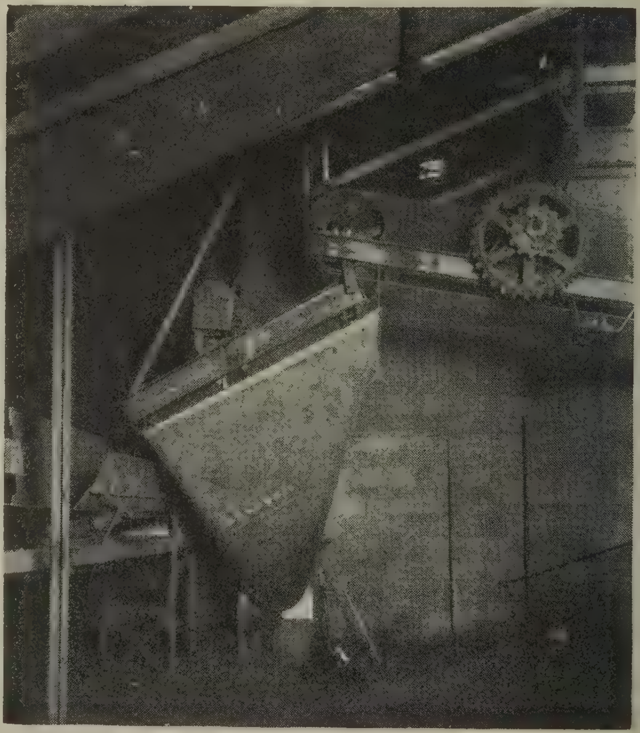
Grinder Maintains Surface Speed as Diameter Is Reduced



A MULTI-SPEED grinder, which is one of an installation by the United States Electrical Tool Co., Cincinnati, at the plant of the Peerless Foundry Co., Cincinnati, can be adjusted to maintain a high surface speed as the diameter of the wheel is reduced. The original wheel is 24 x 4 x 2¼ in. and the speed at this size and down to 19 in. is 900 r.p.m., no load, with a periphery maximum of 5700 ft. per min. and a minimum of 4500 ft. At this point the speed is changed to 1200 r.p.m. by adjusting the wheel guard to gain accessibility to the wheel and the maximum is then 6600 ft. per min. The wheel is carried at this speed down to 14-in. diameter when another adjustment is made and thence down to 10-in. diameter at which point the wheel has approximately 4700 ft. speed. Thus a surface speed above 4500 ft. per min. is maintained from a 24-in. to a 10-in. diameter without changing. The guards are arranged to prevent running a large wheel at an unsafe speed.

Vibratory Screen Handles 90 Tons of Sand Per Hour

ONE of the large foundries in Detroit has installed equipment which handles foundry sand at the rate of 90 tons per hr. The equipment includes a Leahy No-blind vibrating screen, 3 x 6 ft., motor driven, manufactured by the Deister Concentrator Co., Fort Wayne, Ind. The sand drops from a belt conveyor to the vibrating screen, which has clear openings of ⅝ in., the finer sand dropping into a hopper below and through a hole in the bottom to the floor, while the coarser particles are directed to the left as indicated.



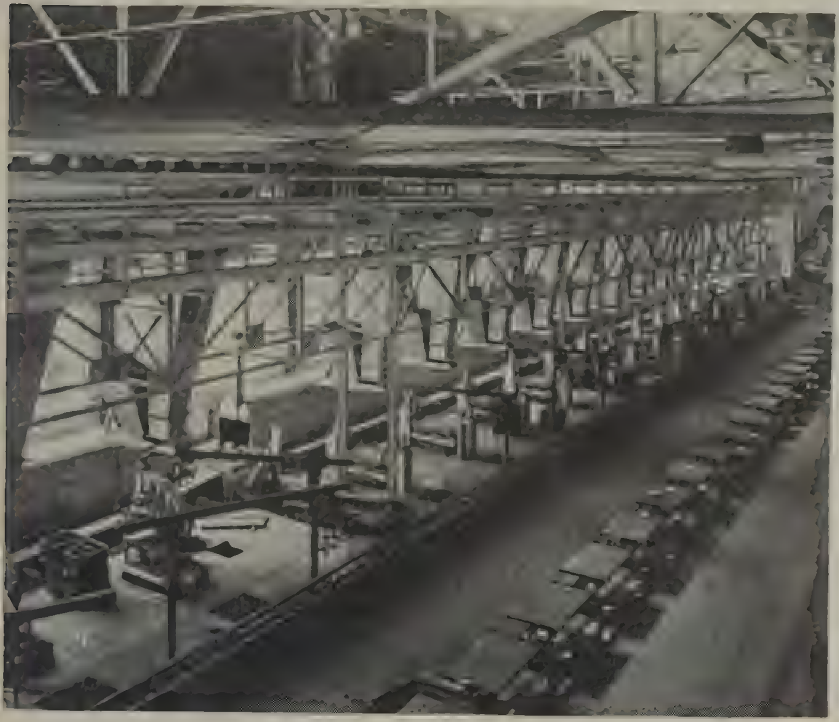
Molding Units in the Buick Foundry

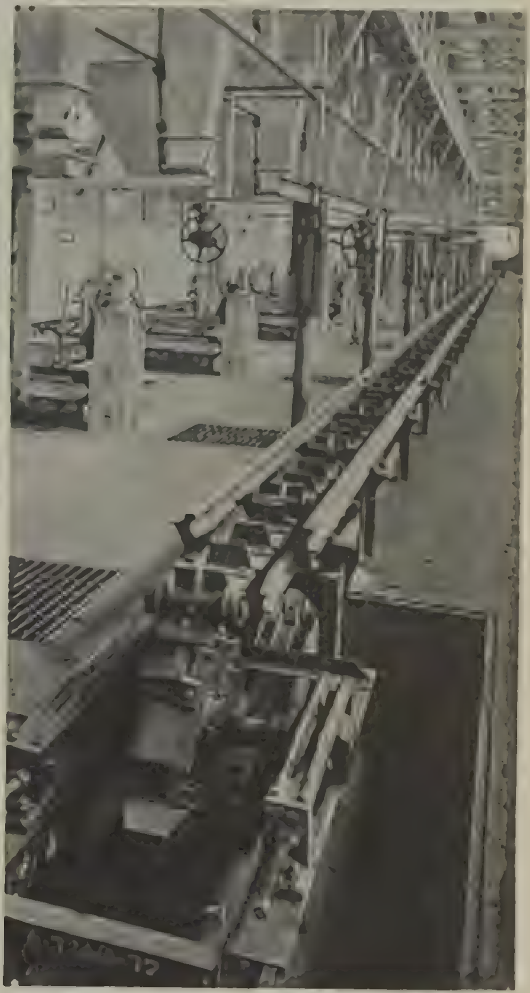
SIX molding units designed, built and installed by the C. O. Bartlett & Snow Co., Cleveland, are included in the Buick foundry at Flint, Mich. General description of the foundry and its component parts was given at pages 643 of THE IRON AGE of Sept. 8, 1927; 1217 of Nov. 3; 1363 and 1372 of Nov. 17; 1582 of Dec. 8, and 1784 of Dec. 29.

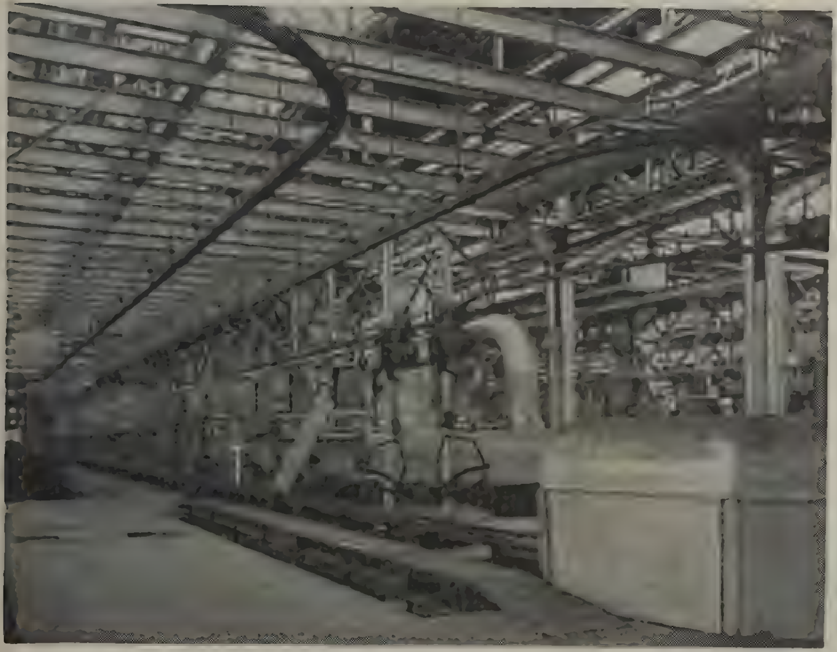
Some of the features not covered specifically in the descriptions previously printed are shown in the three photographs on this page. The upper left picture gives a general view of part of one of the molding units, including the mold conveyor, facing and molding sand hoppers, return conveyor for flasks, overhead belt conveyor for sand and, in the background, the hooded mold cooling conveyor depended upon to keep the foundry measurably free from fumes and heat.

The picture at the right shows the sprocket wheel drive and conveyor construction of the molding conveyor running alongside the molding machines. This is a detail of the general view. Into the gratings in the steel plate floor alongside the conveyor is disposed the sand spilled in handling, to keep the floor clean.

The picture at the lower left shows the pouring end of a molding unit. In the foreground is a moving walkway from which metal is poured into the molds just before they enter the hooded cooling conveyor. The conveyor makes a complete 180-deg. turn at this point, that portion showing in the background being an extension of the portion in the right foreground. Two of the ladle carriers appear above the pouring platform.



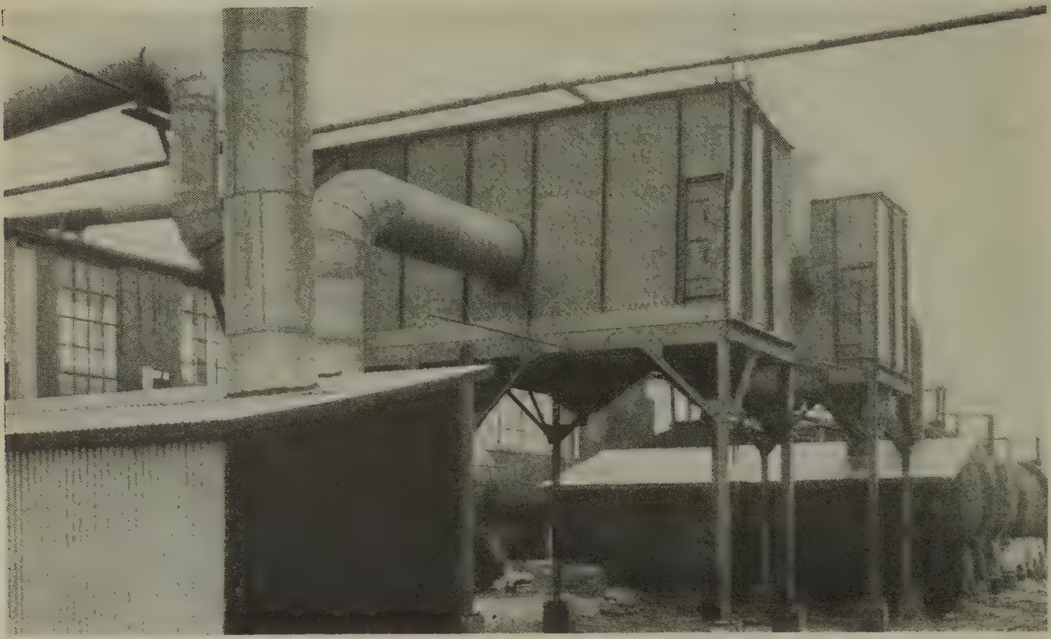




MOLDING UNITS OF THE BUICK FOUNDRY AT FLINT, MICH.

Publication No. 204 in a series of translations of industrial standard specifications contains the English text and a Portuguese translation of the standard specifications for the manufacture of open-hearth steel girder rails, A.S.T.M. standard A2-27. This series is issued by the United States Department of Commerce, and the publication cited may be obtained from the Superintendent of Documents, Washington, D. C., for 5c.

Filter Equipment for Dust from Grinders and Tumblers

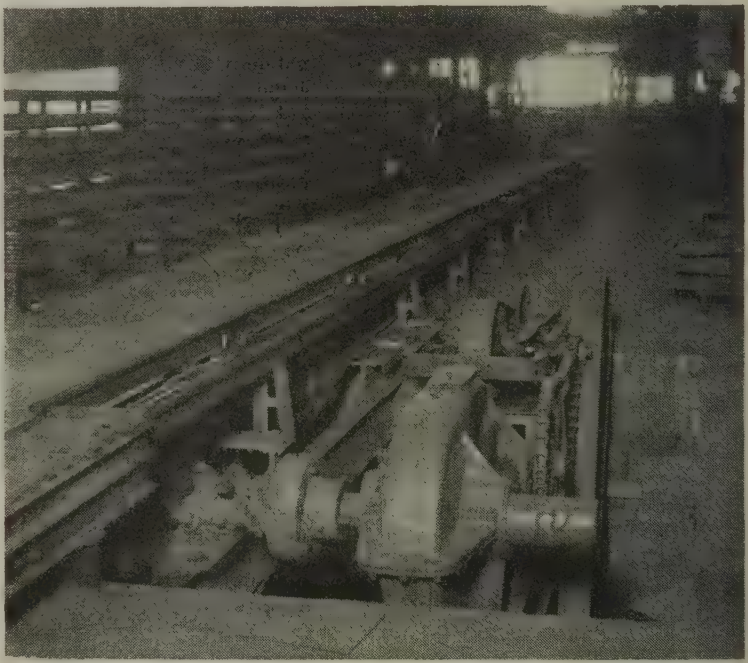


THE Glancy Malleable Corporation, Waukesha, Wis., recently installed dust filter equipment, which was built by the Whiting Corporation, Harvey, Ill. The equipment consists of one 17-ft. filter with a 5-ft. settling chamber, providing exhaust for grinders, and one 8-ft. filter for exhausting the tumbling barrels.

Slide-Rail Conveyor for Handling Molds

MOLDS are carried along the slide rails by means of dogs. The driving mechanism is a heavy Falk speed reducer with 6-in. low-speed shaft. Variable speeds from 2½ to 7½ ft. a min. may be obtained.

Designed especially for handling heavy molds, the slide-rail conveyor is of massive construction. It is mounted on a steel base made of 9-in. channels set flush with the floor. On these are fastened the cast steel brackets carrying the rails. These rails are 50 lb. a yard on the load side and 20 lb. a yard on the return side. The equipment was installed by the Jeffrey Mfg. Co., Columbus, Ohio. Each attachment or pusher link of the chain has a 4-wheel truck, these being spaced on 6-ft. centers. The trucks are not lubricated, but heavy oil is placed on the slide rails.

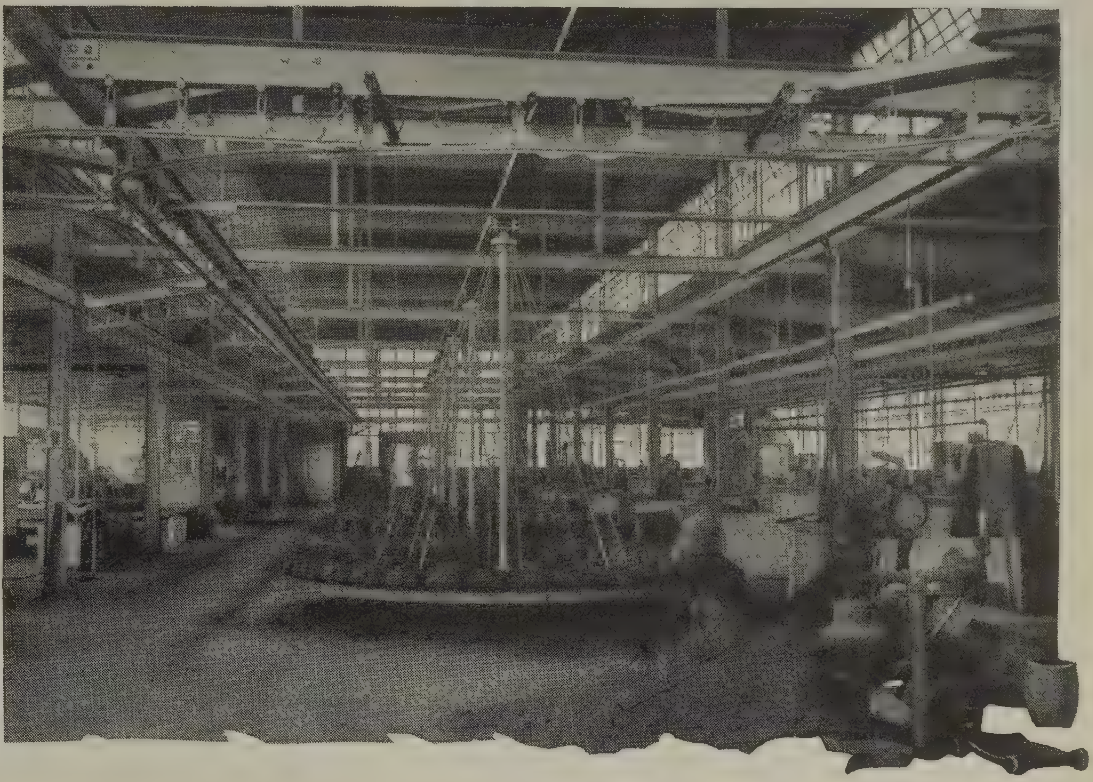


Sand Digger for Transferring Sand to Molding Floor

THE Clarktor sand digger as used at the plant of the Lakey Foundry & Machine Co., Muskegon, Mich., to transfer sand from the sand storage bins to the molding floor. The machine, which is manufactured by the Clark Tructractor Co., Battle Creek, Mich., is shown with the scoop driven into the sand pile.

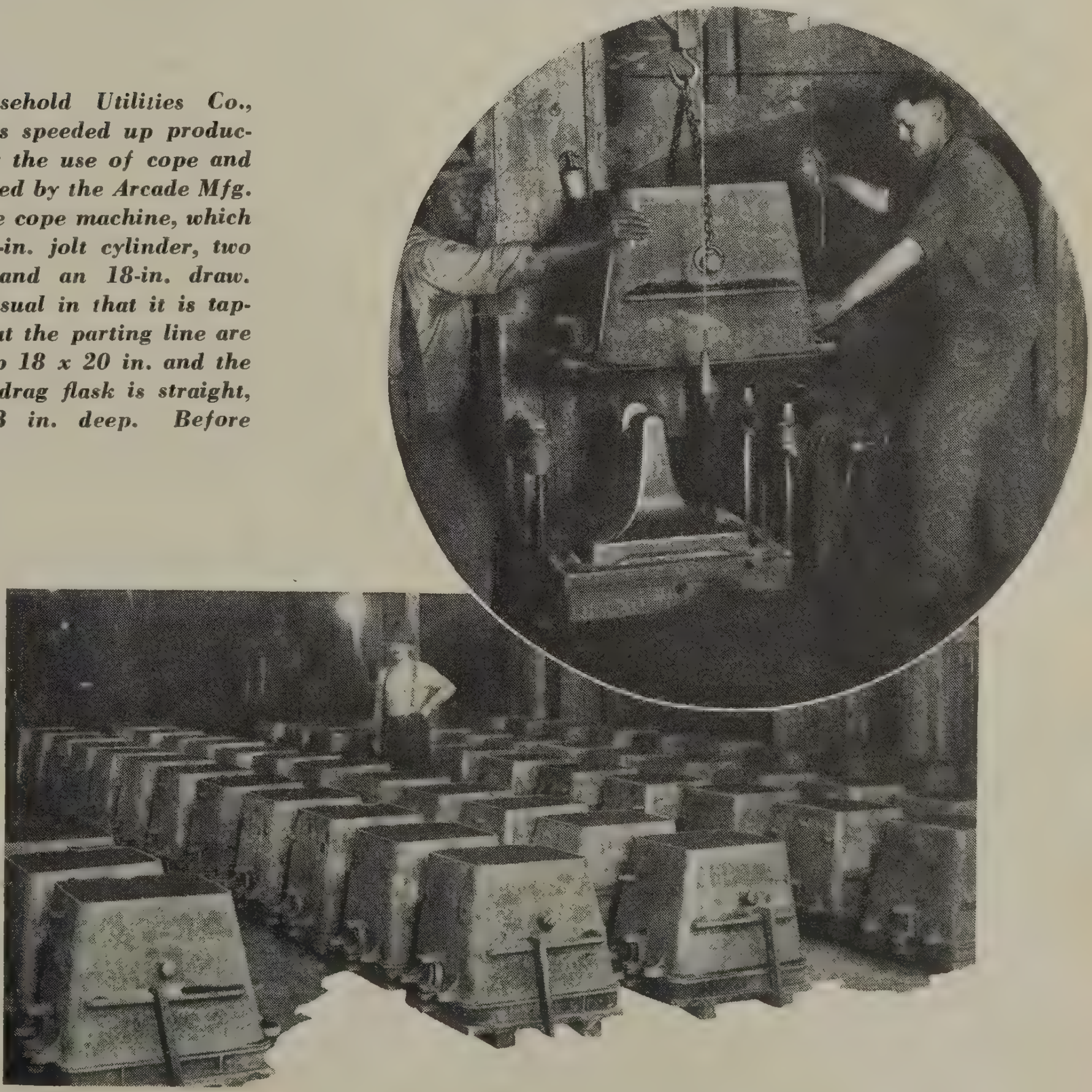
Monorail Track for Serving Mold Turntables

AT the Metric Metal Works, Erie, Pa., a Louden monorail track serves the mold turntables. The metal is poured into molds directly from a ladle on the track. A second parallel track was installed for the return of ladles to the furnaces.



Cope Molding Machine with Tapered Cope Flask

THE Electric Household Utilities Co., Waukegan, Ill., has speeded up production in its foundry by the use of cope and drag machines furnished by the Arcade Mfg. Co., Freeport, Ill. The cope machine, which is illustrated, has a 7-in. jolt cylinder, two 5-in. strip cylinders and an 18-in. draw. The cope flask is unusual in that it is tapered; the dimensions at the parting line are 22 x 25 in., at the top 18 x 20 in. and the depth is 21 in. The drag flask is straight, 22 x 25 in., and 3 in. deep. Before installing these machines the company's production of an ironer base casting was 12 per day for two men, or a total of 96 per day for the 16 men employed at this work; the new equipment, it is stated, has shown a maximum production of 110 castings in one day with five men working.



M. R. Taggart
Paxson-Taggart, Inc., Philadelphia.
Member, Plant Visitation Committee

R. T. Covington
Bartlett-Hayward Co., Baltimore.
Member, Plant Visitation Committee

J. A. Strecker
Cochrane Corporation, Philadelphia.
Member, Plant Visitation Committee

Louden Machinery Co., Fairfield, Iowa. Booth Nos. 148 to 154. Double bead and super-track monorail systems; electric hoists; electric ladle pouring device; transfer cranes. Representatives attending: R. B. Louden, president; R. Bruce Louden, secretary; Roy Louden, advertising manager; L. F. Berthold, sales manager; P. M. Hassler, H. L. Stetser, P. L. McCain, E. H. Seelbach, W. H. Eldridge, Philip Kinzel.

Lowe Mfg. Co., Detroit. Booth No. 436. Electric sifting machines. Representative attending: R. G. Lowe.

Lupton's Sons Co., David, Philadelphia. Booth No. 236. Pond continuous windows, Pond operating device, Lupton pivoted windows, Lupton skylights, Pond roof designs tives attending: Clarke P. Pond, George N. Hingston, including Pond truss and Pond A-frames. Representa- J. W. Kauffman.

M

McCormick Co., J. S., Pittsburgh. Booth Nos. 158, 160, 162. Foundry facings, supplies and equipment. Representatives attending: J. S. McCormick, president; H. T. Herr, Jr., vice-president; Frank J. Buerger, secretary; H. D. Fowler, C. C. Bumbaugh, Harry J. Winters, James W. Early.

R. W. McIlvaine Co., Chicago. Booth No. 237.

Macleod Co., Cincinnati. Booth No. 39. New type sand blast hose machine, cupola lighter and skin dryer, pressure type sprayer, steel swab, brass swab. Representative attending: James Lauder.

Maehler Co., Paul, Chicago. Booth Nos. 61, 63. Rack type oven in operation with Universal gas heater and temperature control equipment; Universal heaters and blowers and control equipment for core ovens. Representatives attending: A. E. Maehler, R. C. Schwarz, H. R. Fox, H. M. White.

Malleable Iron Fittings Co., Branford, Conn. Booth Nos. 31, 33. Branford flask rapper vibrators, pot rapper vibrators, dual purpose vibrators, long stroke vibrators, regular vibrators, knee valves, hand valves, sprayers and other foundry accessories. Representatives attending: George B. Pickop, Raymond F. Wright, Thorwald F. Hammer, George Agnew, Oscar Montelius, Lincoln Fitzpatrick.

Manhattan Rubber Mfg. Co., Passaic, N. J. Booth No. 70. Grinding wheels and machines. Display in conjunction with that of Kling Brothers Engineering Works of Chicago. Includes Kling heavy-duty grinder stand and Manhattan swing-frame grinders such as are generally used in steel foundries. Manhattan rubber bonded wheels mounted on machines and both in operation to show actual performance. Representatives attending: N. Clif Hilton, W. H. Steinberg, W. F. Bechtel.

Marschke Mfg. Co., Indianapolis. Booth Nos. 102, 104, 106, 108. Complete line of motor driven grinders in stand and swing frame, for both standard vitrified speeds and high-speed bakelite wheels. Representatives attending: W. A. Marschke, Luke M. Boyd, J. A. Fairfield, W. T. Johnston.

Martin-Rosebury Corporation, New York. Booth No. 82.

Mathews Conveyor Co., Ellwood City, Pa. Booth No. 15. Mathews heavy duty foundry roller conveyor and pallet conveyors shown handling castings, molds, etc.; also overhead chain-operated trolley conveyor. Representatives attending: F. E. Moore, president; J. H. Hough, sales manager; F. A. Francois, H. F. Davis, O. P. Hicks, E. F. Smith, F. W. Achuff, C. E. Achuff.

Mathieson Alkali Works, Inc., New York. Booth No. 7. Purite (Fused soda ash). Representatives attending: G. S. Evans, R. G. Kendrick, W. D. Marshall, J. R. Schmertz.

Mercury Mfg. Co., Chicago. Booth Nos. 330, 332. Mercury electric industrial tractors, Mercury gasoline industrial tractors, Mercury industrial trailers for foundry use. Representatives attending: Conrad Hibbeler, C. H. Clare, A. L. Wood, Charles Keiper, P. W. Cyphers, L. J. Kline.

Milwaukee Foundry Equipment Co., Milwaukee. Booth No. 17. Moving pictures showing molding equipment in operation in various foundries. Representatives attending: E. J. Byerlein, general manager; H. E. Fellows, L. E. Gregory, C. J. Jurack, J. E. Lambrix, T. J. Magnuson, J. H. Morton, M. F. Byrne.

Monarch Engineering & Mfg. Co., Baltimore. Booth Nos. 485, 486, 487. No. 92 Simplex furnace complete with oscillating device; double chamber furnace No. 1; revolving core oven; Acme core oven, coal, coke, oil or gas fired; 250-lb. iron pot tilting aluminum furnace; No. 60 tilting oil-fired furnace; No. 40 stationary gas-fired furnace on legs; new No. 60 stationary preheated air furnace; 250-lb. capacity tilting reverberatory furnace, etc. Representatives attending: Harry D. Harvey, James V. Martin, William H. Raber, Mack C. Losinski, Wilford Wilkins, Harold L. Harvey, William Chenowith.

Mt. Jewett Fire Clay Co., Mt. Jewett, Pa. Booth No. 214. Blended fire clay for bonding iron foundry and steel foundry molding sands; ground fire clay for general purpose use in foundries; Waldak treated clay, a refractory cement. Representatives attending: Edward M. O'Neill, general manager; A. F. Shaffer, sales manager.

N

National Engineering Co., Chicago. Booth Nos. 37, 110. No. 3, 8-ft. dia. pan, Simpson intensive sand mixer with speed reducer, motor base and couplings, including motor; also No. 0, 3-ft. pan, Simpson mixers with motor and worm gear reducer for demonstrating the blending action of the Simpson mixer. Representatives attending: H. S. Simpson, president; A. G. J. Rapp, Barney Castor, W. A. Kellogg, H. N. Schreuder, W. C. Edgar, C. D. Hollins.

National Pulverizing Co., Millville, N. J. Booth No. 305. Sand blast sand, dry sands, ground silica or mold wash. Representatives attending: Wilbert Bivins, president; A. S. Carman, treasurer; F. M. Wheat.

National Smelting Co., Cleveland. Booth No. 285.

New Haven Sand Blast Co., New Haven, Conn. Booth Nos. 137, 139, 141, 143, 190, 192, 194, 196. Barrels, dust arrestor, rooms, tumbling mill, cabinet. Representatives attending: D. S. Sammis, C. E. Billings, G. C. Fatscher, S. S. Parsons, Robert Wisely, L. Thompson.

New Jersey Silica Sand Co., Millville, N. J. Booth No. 247. Molding sands, sand blast sands, silica flour or mold wash, special blended sands. Representatives attending: Burdette Tomlin, president; Clarence R. Wolf, secretary-treasurer; Jack Hallard.

Niagara Falls Smelting & Refining Corporation, Buffalo. Booth No. 218. Special non-ferrous alloys; unusual castings made with Falls Brand alloys. Representatives attending: Ernest G. Jarvis, Raymond Hunter, George B. Michie, Samuel Frankel.

Nicholls Co., Inc., William H., Brooklyn. Booth Nos. 69, 71, 140, 142. Molding machines. Representatives attending: William H. Nicholls, president; Fred W. Dixon, Dominic Petrocelli, G. Anderson, L. R. Schocken.

Northern Engineering Works, Detroit. Booth Nos. 369, 371. Standart-ized crane trolley; Hi-Lift electric hoist. Representatives attending: Henry W. Standart, H. C. Rood, S. E. Schneider.

Norton Co., Worcester, Mass., Booth Nos. 443 to 449. Grinding machines and grinding wheels.

O

Obermayer Co., S., Chicago. Booth Nos. 38, 40, 42. Foundry facing, foundry equipment, refractory and facing gun, molding equipment, etc. Representatives attending: Theodore Kauffmann, president; S. T. Johnston, vice-president; E. D. Frohman, vice-president; J. L. Cummings, F. Flynn, W. R. Cummings, W. C. Samuels.

Oiless Core Binder Co., Cleveland. Booth No. 272. Oiless core binder together with two new products, Oiless core-mold wash and core paste; also a few cores, dry sand molds and difficult castings showing results as actually produced in the foundry. Representatives attending: J. H. Bruce, president; J. A. Hamilton, vice-president; H. A. Baker, secretary-treasurer; H. B. Fischer, sales manager.

Oliver Machinery Co., Grand Rapids, Mich. Booth Nos. 129 to 133 and 182 to 186.
Woodworking machines including: No. 94-D Straitline cut-off saw; No. 94-T metal table for operating with saw; No. 199-D motor arbor single surface planer; No. 34-E disk and spindle sander; No. 116-D motor arbor band saw; No. 51-B motor head speed lathe; No. 25-B motor head pattern makers' lathe; No. 72-D motor arbor vertical single spindle boring machine; No. 88-D tilting motor arbor miter saw; No. 12-AD motor arbor pattern shop jointer; No. 144-D motor arbor 6-in. jointer; No. 585 oilstone tool grinder; No. 462 electric band saw brazer; No. 190-D motor-driven self-contained inside edge and scroll sander; No. 191 7-in. tilting arbor saw bench; No. 192 18-in. direct motor band saw; No. 182 direct motor disk sander; No. 181 motor-driven spindle sander. Representatives attending: A. S. Kurkjian, general sales manager; Arthur Blake, Charles A. Ginter, J. R. Duthie, J. E. McLauchlen, C. R. Crosley.

Tinius Olsen Testing Machine Co., Philadelphia. Booth No. 197.
Several transverse testing machines for testing the standard transverse foundry bar, both of indicating and recording type; Herbert pendulum hardness tester with various attachments; motor-driven production type Brinell hardness tester; Olsen-Boyd automatic testing machine for testing foundry cores; Honda sharpness tester, special extensometers and recording instruments. Representatives attending: T. Y. Olsen, R. B. Lewis, Jacob Lundgren, B. D. Lewis.

Osborn Mfg. Co., Cleveland. Booth Nos. 425 to 439.
Improvements in sand treating and sand and mold handling equipment; also a squeezer machine making molds continuously. Representatives attending: F. G. Smith, president and general manager; H. R. Atwater, vice-president; E. S. Carman, secretary and chief engineer; M. W. Zeman, E. T. Doddridge, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, H. B. Klar, G. G. Adam, R. C. Miller, R. W. Hisey, P. F. Smith, J. D. Wise, R. F. Lincoln.

Ottawa Silica Co., Ottawa, Ill. Booth No. 275.
Flint shot sand and Diamond sand blast sand. Representatives attending: E. O. Schneider, sales manager; Edward H. Stehman, sand blast engineer.

Albert T. Otto & Son, New York. Booth Nos. 19 to 23.

P

Pangborn Corporation, Hagerstown, Md. Booth No. Block E.
Sand-blast room, barrel and table equipment, dust arresters, and protective clothing; sand-blast abrasives and supplies. Representatives attending: Thomas W. Pangborn, president; John C. Pangborn, vice-president; H. D. Gates, sales manager; W. C. Lytle, J. J. Carr, C. T. Bird, L. W. Wagner, Wm. T. Randall, Fred E. Wolf, Jesse J. Bowen, E. C. Gilmour, George A. Cooley, B. R. Artz, Charles A. Boultman, L. L. Stouffer, M. I. Dorfan, P. J. Potter, Foster J. Hull, William A. Rosenberger, E. J. Dunbeck.

Patent Cereals Co., Geneva, N. Y. Booth No. 303.
Rex core and facing binder. Representatives attending: A. N. Duncan, T. K. Fahy.

Paxson-Taggart Co., Philadelphia. Booth No. 293.
Foundry equipment and supplies.

Pennsylvania Foundry Supply Co., Philadelphia. Booth No. 300.
Foundry supplies.

Pettinos, Charles, New York. Booth No. 252.
Various kinds of molding sand, core sand, plumbago, various foundry facings, core blacking, dry sand blacking, ingot mold blacking, etc. Representatives attending: Charles Pettinos, W. T. Bennett, J. Howard Bing, Marshall M. Houskeeper, Walter H. Laros, Walter J. Meighan, Martin Meiss.

Pettinos, George F., Philadelphia. Booth No. 254.
Foundry sands, foundry facings, foundry supplies. Representatives attending: George F. Pettinos, George A. Doughter, B. M. Bird, James H. Hatten, T. H. Walker, F. H. Goodfellow, Miss A. M. Kunkle, D. S. Yeomans, J. R. Cooney, E. G. Stratton, George F. Pettinos, Jr.

Pittsburgh Electric Furnace Corporation, Pittsburgh. Booth Nos. 461, 463, 465, 469.
Small 'Lectromelt furnace pouring iron for castings to be made in Holley Carburetor Co. permanent molds; joint exhibit Pittsburgh Electric Furnace Corporation and Holley Carburetor Co. Representatives attending: W. B. Wallis, president; W. E. Lewis, R. D. Thomas, Alexander Haigh, Presley Hamilton, W. H. Payne, W. L. Kammerer.

C. E. Schley
Pennsylvania Bronze & Brass Co., Philadelphia. Member, Plant Visitation Committee

W. B. Coleman
W. B. Coleman & Co., Philadelphia. Member, Plant Visitation Committee

R. B. Van Norman
Cleveland Pneumatic Tool Co., Philadelphia. Member, Plant Visitation Committee

Port Crescent Sand & Fuel Co., Detroit. Booth No. 278.

Portage Silica Co., Youngstown. Booth No. 306.
Samples of Portage steel molding, core and sand blast sands; samples of Portage silica conglomerate in its natural state. Representatives attending: E. E. Klooz, C. F. Eberhart, Lee R. Farrell.

Precision Grinding Wheel Co., Philadelphia. Booth No. 175.
Grinding wheels.

Production Equipment Co., Cleveland. Booth Nos. 124, 126.
Cleveland sandcutters. Representatives attending: L. P. Orr, H. E. Johnson, L. Vergith.

Pulmosan Safety Equipment Corporation, Brooklyn. Booth No. 296.
Safety equipment including dust respirators, sand blast hoods, helmets, acid hoods, first-aid equipment, safety shoes, paint spray respirators, goggles, asbestos equipment, gas masks. Representatives attending: Frederick Wahlert, president; William H. Wahlert, secretary.

Pyrometer Instrument Co., New York. Booth No. 248.
Optical, insertion and radiation pyrometers. Representative attending: F. Heidorn.

R

Cyrus Rapoport, New York. Booth No. 424.

Reading Chain & Block Corporation, Reading, Pa. Booth No. 59.
Chain hoists, electric hoists, I-beam trolleys, traveling cranes, mono-rail systems. Representatives attending: F. H. Howard, Fred A. Howard, Philip K. Howard, Lloyd W. Lutz, E. I. Huff, H. A. White.

Charles Reines, Brooklyn. Booth No. 287.

Robeson Process Co., New York. Booth No. 215.
Glutrin and Goulac core sand binders. Representatives attending: Gordon I. Lindsay, president; B. W. Bullen, secretary; T. J. Ryan, T. J. O'Hara, J. A. Smith.

William C. Robinson & Son Co., Baltimore. Booth No. 314.

Rogers Brown & Crocker Bros., Inc., New York. Booth No. 220.
Pig iron, coke, ferroalloys, molding sand fire clay, etc. Representatives attending: C. H. Newcomb, George R. Sullivan, W. J. Gallana, L. H. Hoskins, L. H. Miller, L. Tierney, C. E. Trommer, J. A. Claussen, C. A. Reed, H. W. Fernald, Thomas A. Wilson, Harwood Wilson, F. W. Bauer, Grant B. McLaughlin, J. R. Morehead.

Rohrbacher Shoe Co., Boston. Booth No. 295.
Safety shoes for foundry workers.

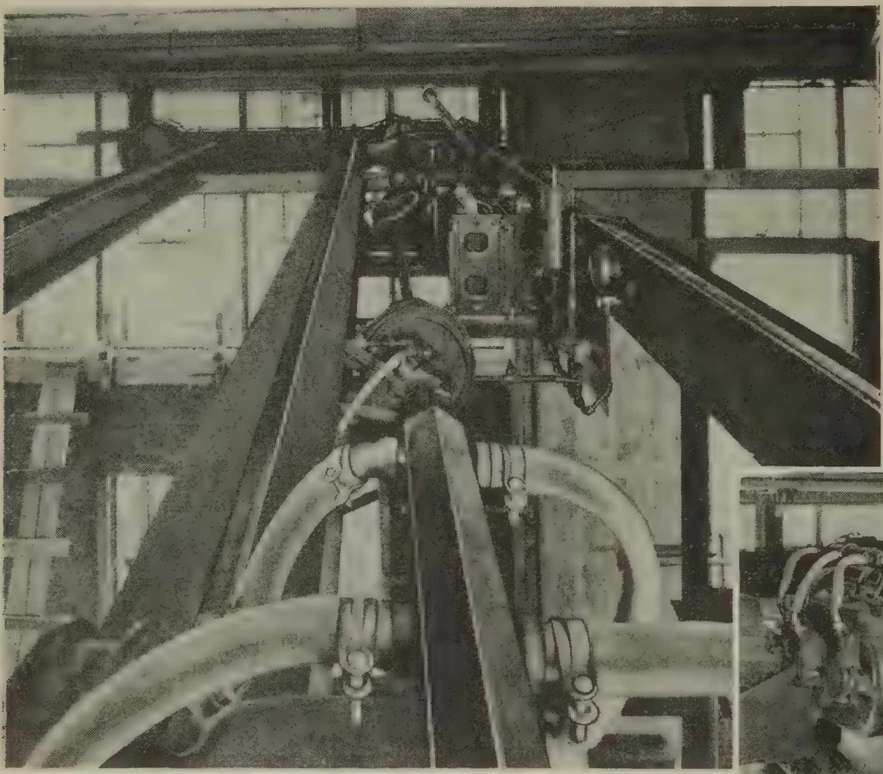
Rotor Air Tool Co., Cleveland. Booth No. 51.
D-1 Rotor grinder with vitrified wheels; D-1 high production model, running 5400 r.p.m., with rubber bonded and bakelite wheels, on both cast iron and steel; Rotor sander finishing welds, with cup wheel, also sanding welds and automobile body parts, with Carborundum disk; D-3 grinder with vitrified wheel; D-3 high production model with rubber bonded and Bakelite wheels; new E-5 drill, 29/32 and 1¼ in. capacity; new E-7 drill, 1¼ in. heavy duty and 2 in., both drills rigged up for reaming demonstrations as well as drilling; new quick-as-a-wink buffing wheel, shown on type D-1 Rotor buffer; new type of buffing wheel utilizing straight strips of abrasive and giving flat contact. Representatives attending: H. P. Bailey, president; K. L. Pohlman, vice-president; F. R. Moore, G. O. Singer, L. K. Berry.

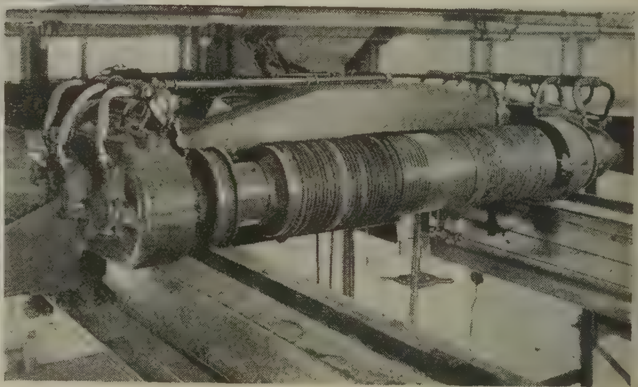
(Continued on page 1238)

Forced Lubrication System on Overhead Crane

ONE foundry using five overhead electric traveling cranes found it possible to dispense with one of them, through improvement in operation of the other four from controlled lubrication. Elimination of delays and repairs is reported responsible for this result. The lubricating devices were installed by the Keystone Lubricating Co., Philadelphia. Two illustrations show how this equipment was put in. One is a general view of the lubricator installation on the bridge, while the other shows the installation on the trolley.

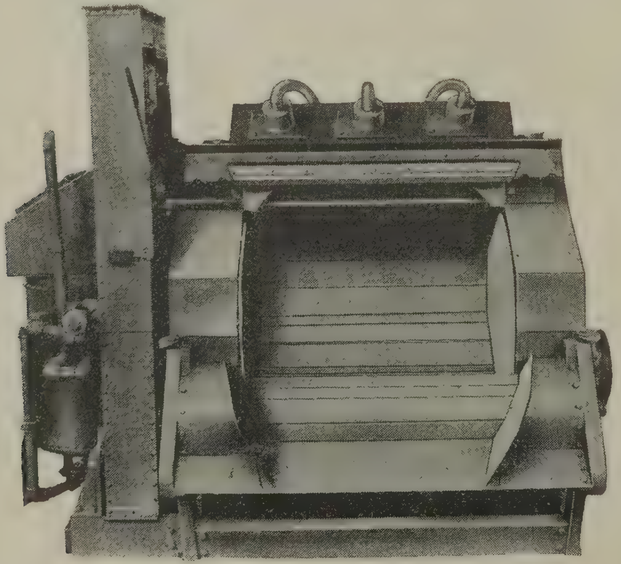
In the trolley view the hand wheel shown below the rope drum may be reached by the operator from his cab. The gage is hidden behind the drum in this view. Connections from manifolds are shown in both views; the gage and lubricator appear near the center of the general view. The truck wheels are designed for oil waste lubrication by capillary feed from below the journal. The grease line enters through the top of the bearing, the grease being discharged directly on top of journal. The wool waste is left in the box, acting as a wiper to collect and reapply the grease to the journal.

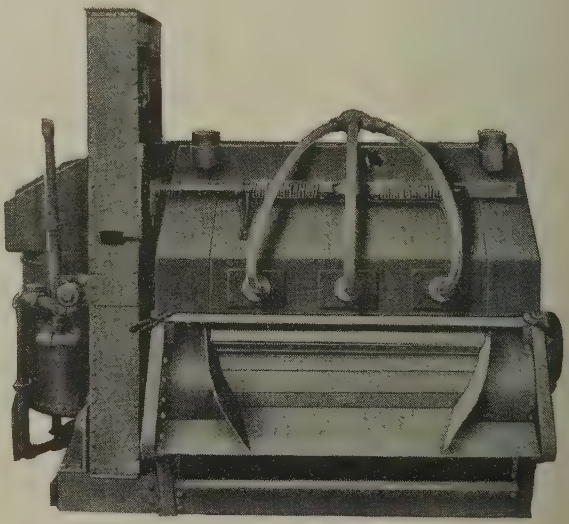




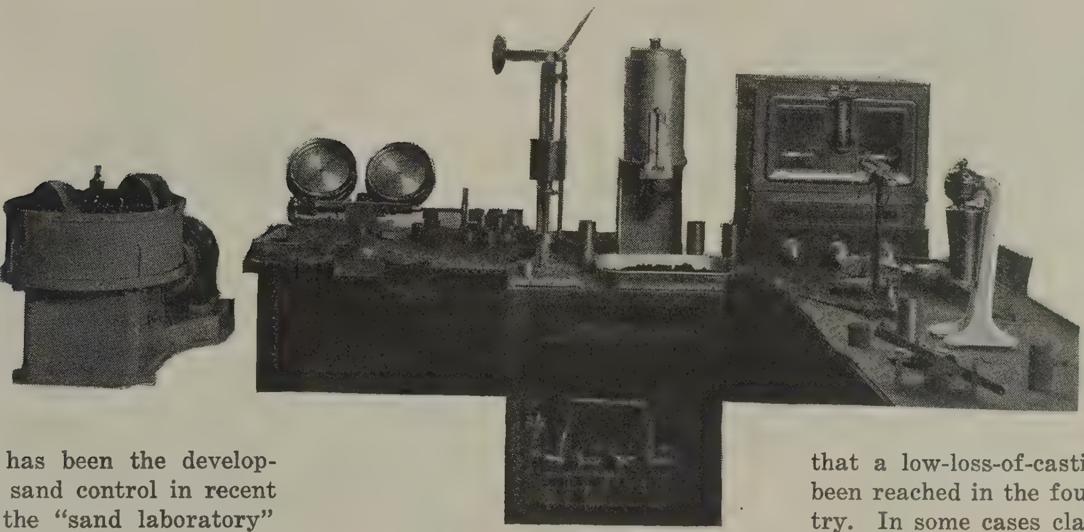
Quick Loading in New Blasting-Tumbling Application

REDUCTION of cleaning costs in the foundry is the purpose of a new application of the blasting-tumbling idea which has been made by the American Foundry Equipment Co., Mishawaka, Ind. The device consists of an incased apron conveyor that travels from front to back. It will take 2000 lb. or more of castings, which are continuously cascaded into position in front of the three blast nozzles. At the conclusion of the operation the conveyor travel is reversed and the load is fed onto an unloading belt or convenient receptacle. Features claimed for the device are quick loading, large capacity, easy inspection, reduced cleaning time, automatic unloading and elimination of dead areas.





Sand Laboratory Has Come to Stay



SO rapid has been the development of sand control in recent years that the "sand laboratory" now takes its place beside the chemical and physical laboratories in many modern foundries. One of the outstanding achievements of the technical work of the American Foundrymen's Association in recent years has been the gradual development of methods of testing and of apparatus to control sand mixtures and the selection of sands. The picture here reproduced is representative of the modern sand laboratory as furnished by Harry W. Dietert, Detroit.

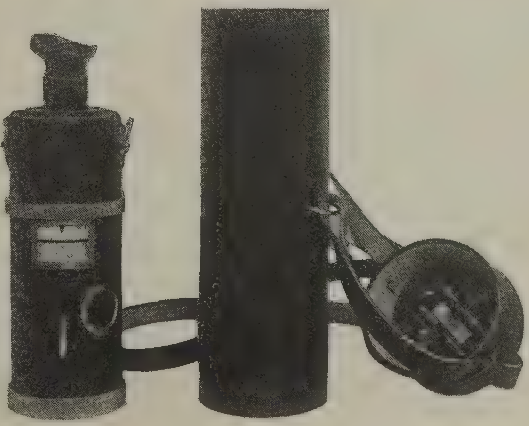
By the intelligent use of a sand laboratory it is generally conceded that a low-loss-of-casting era has been reached in the foundry industry. In some cases claims of a 50 per cent reduction in losses are recorded. One foundry goes on record to the effect that its losses in castings are now around 5 per cent as against 15 per cent before sand control by means of a sand laboratory was introduced. Evidently the sand laboratory has come to stay.

Trucks for Various Foundry Uses

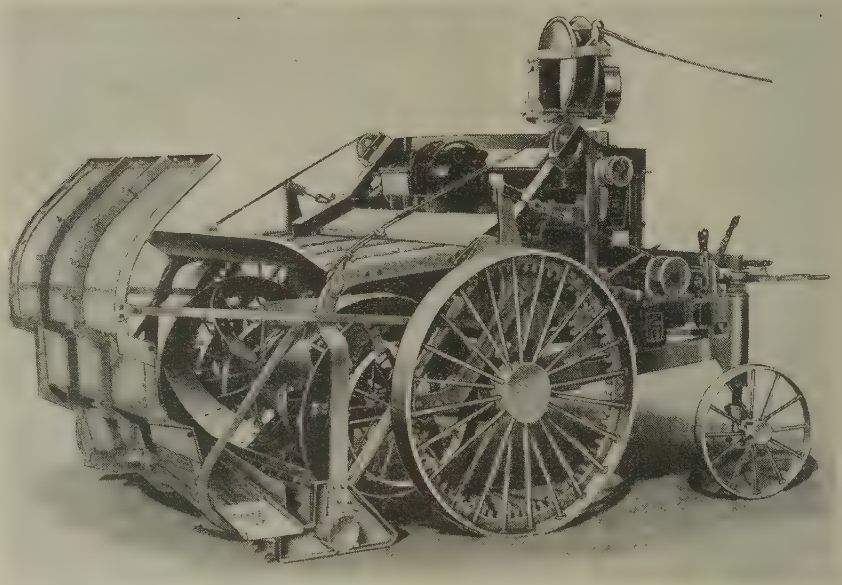
INDUSTRIAL trucks have been adapted for a number of purposes in the foundry. The illustration shows a Baker charging truck for charging castings into a malleable annealing oven. This truck has four-wheel steer for flexibility and is rated at from 4000 to 8000 lb. A similar type of truck equipped with a swivel crane and magnet has been successfully utilized in handling bagged castings, doing the work of seven or eight men. An elevating truck, equipped with duplex compensation suspension to eliminate jars in starting and stopping, is designed for handling fragile cores without breakage. These trucks are built by the Baker-Raulang Co., Cleveland.

Simplified Optical Pyrometer

THE Pyrometer Instrument Co., New York, recently brought out a simplified optical pyrometer which combines lightness of weight (3 lb.) with other convenient features. Its overall dimensions are only 4 x 9 in. It is provided with a standard lamp which can be checked at the moment desired. The cylindrical casing contains the optical system, comprising adjustable objective, reflecting prisms, monochromatic red glass and adjustable eyepiece; the electrical system, comprising standard lamp, ammeter, rheostat, dry battery and press switch, and the diffusor and temperature scale. A flashlight battery suffices for the operation of the instrument. The light intensity of the hot body under observation is compared with that of a small electric lamp.

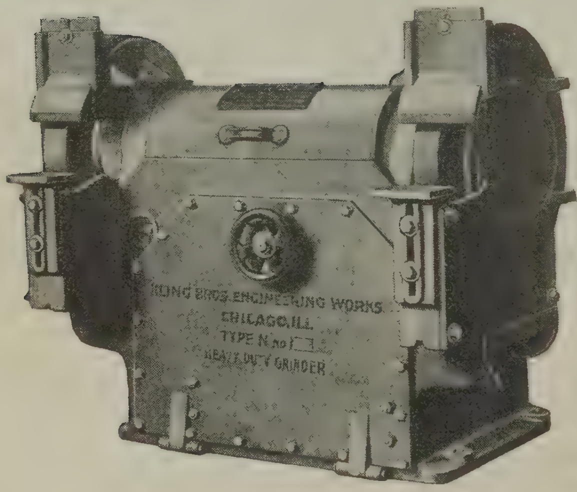


Sand Preparator Screens, Aerates, Cuts and Piles



AFTER six years of experiments and tests, the American Foundry Equipment Co., Mishawaka, Ind., has placed on the market the American Preparator, a sand preparation machine. The Preparator screens, aerates, cuts and piles sand. The cutter blades throw the sand through a screen, and aeration takes place as the sand falls to the floor.

High-Speed Heavy-Duty Grinder



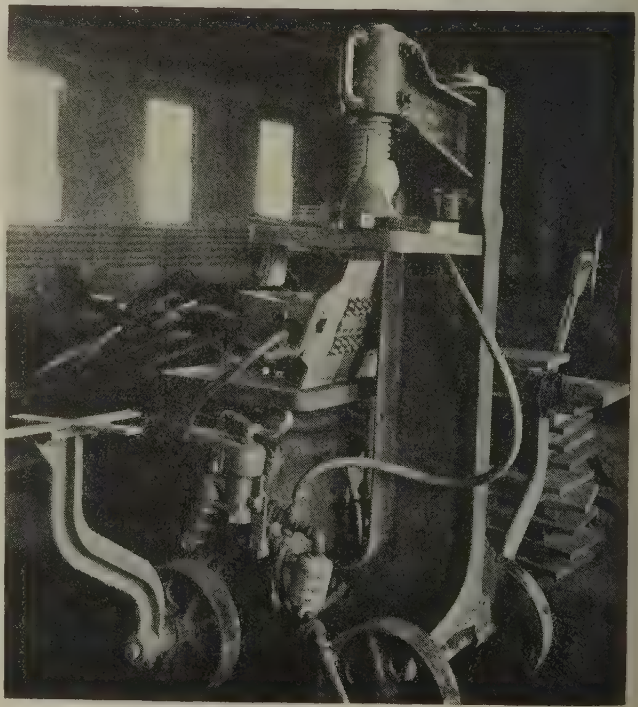
A HIGH-SPEED heavy-duty grinder built by the Kling Brothers Engineering Works, Chicago, is designed for grinding gray iron, malleable and steel castings and iron and steel forgings and for the job work of snagging and rough grinding.

Fitted with 24-in. wheels, the machine is 59 in. long, 38 in. wide and 49 in. high. It weighs about 3700 lb. and has a 15-hp. ball-bearing motor at 1800 r.p.m. The wheels are 3 in. thick and run at a constant peripheral speed of 8500 ft. a minute. As the chucks upon which they are mounted require a 12-in. bore, they allow for grinding to a 14-in. diameter. This gives a minimum of stub loss and maximum grinding service.

Compressed Air Separator Drains Out Water

THE illustration shows a ⅜-in. Gast compressed air separator furnished by the Smith-Monroe Co., South Bend, Ind., installed on a molding machine to eliminate the troubles sometimes experienced from condensation of the water content of the air. Moisture in the air sometimes causes the vibrator to congeal and stick. The separator is relied upon to avoid this and at the same time to provide dry, clean air for the air gun. It is drained by a small air cock which is opened periodically by the operator.

As it is important that moisture be excluded from the air on sand blast equipment, particularly where steel abrasives are employed, this same device is designed for such use. Here a larger size is designed to effect entire removal of the entrained moisture. It is fitted in this case with an air trap, to drain it automatically. For this service a 2-in. separator is customarily used.

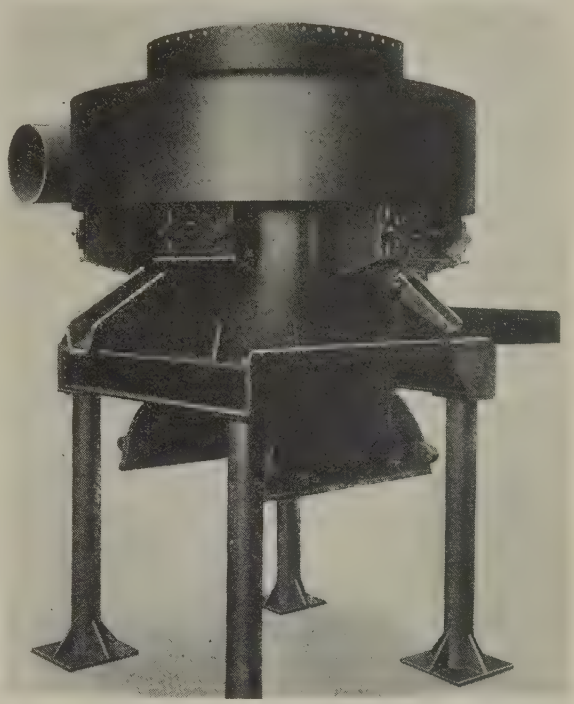


New Model B Whiting Cupola

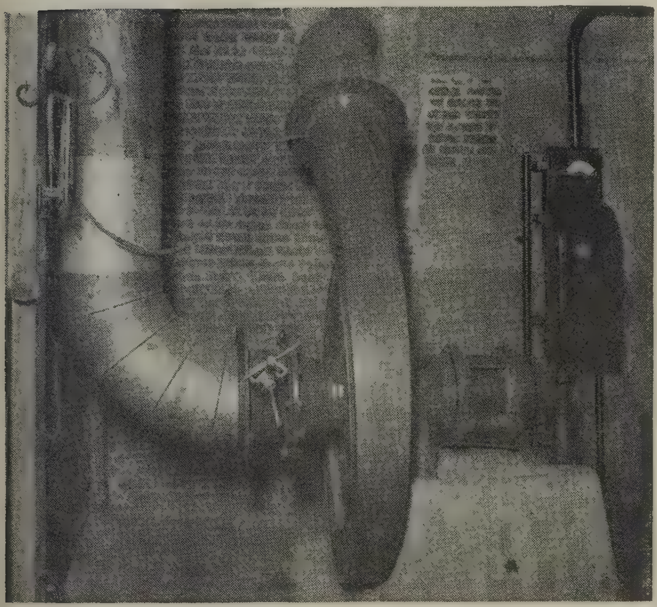
A NEW foundry cupola, model B, is being introduced by the Whiting Corporation, Harvey, Ill. One of the improvements is a heavy structural bottom plate fabricated from boiler plate and structural shapes, to do away with the cracking and distortion sometimes experienced with cast iron plates, and, of course, to prevent leaks in the windbox resulting from the distortion. The model B has straight cylindrical columns of wrought steel, which are filled with concrete when installed. This also helps to overcome the danger of cracking when they are exposed to the heat of the drop and cooling water is thrown on them.

The company for the safety opening has provided a fusible lead plate of some size, tightly clamped in a vertical position so that it will not become covered with coke, etc. The safety channel is merely a depression in one tuyere, 2-in. deep, leading to the safety spout.

The windbox is placed above the tuyere boxes or elbows, to eliminate the possibility of iron and slag flowing into the wind chamber, and the joints of the windbox are welded. The windbox and tuyere elbows are relatively larger than usual.



New Cupola Blowing Equipment



THE General Electric Co., Schenectady, N. Y., has brought out a cupola blowing equipment of a new type rated 2800 cu. ft. of air at 1-lb. pressure, at 3500 r.p.m. It is designed to insure the supply of a constant weight of air to the cupola, irrespective of atmospheric conditions and the resistance through the cupola. Instead of operating the cupola by supplying a constant volume of air, or air at a constant pressure, it supplies a constant weight of air or oxygen. The idea is that a definite weight of oxygen is required to burn a certain weight of coke.

The equipment can be used with either hand or automatic control, and can be set to give the desired weight of oxygen to meet varying operating conditions. The weight is not controlled by variable speed, but by opening and closing the blast gate.

Modifications Add to Flexibility of Elevating Truck

ATTACHMENT of underslung forks for picking up heavy flasks has adapted the elevating platform truck shown for work which cannot readily be done by man power. The truck, which is built by the Yale & Towne Mfg. Co., Stamford, Conn., may also be modified by the attachment of extended arms or rams on the platform for the handling of very heavy castings, such as boiler sections. The flexibility of the truck is designed to speed up the flow of materials in process and the lifting features often enable the saving of considerable space in storing foundry products.

Royer Foundry & Machine Co., Wilkes-Barre, Pa. Booth Nos. 471, 473, 475, 477, 479.
Royer sand separator and blender. Representatives attending: G. F. Royer, president; John Lloyd, vice-president; S. B. Davies, treasurer.

Ruemelin Mfg. Co., Minneapolis, Minn. Booth No. 455.
Sand blast guns, sand blast generators, sand blast cabinets, exhaust fans. Representatives attending: Richard Ruemelin, president; Harold Flitz.

S

Safety Equipment Service Co., Cleveland. Booth No. 204.
Super-Drednaut line of goggles, Dr. Woos respirator, Kleanair respirator, Safety Service shoes, Keyfel leggin, spring knee leggin, asbestos gloves, asbestos and F. P. suits, Adjusto ladder shoes, various other safety devices and appliances. Representative attending: B. W. Nutt.

Sager Glove Co., Chicago. Booth No. 250.

Semet-Solvay Co., New York. Booth No. 328.
Semet-Solvay foundry coke. Representatives attending: E. J. Burnes, D. S. MacEachern, D. H. Putnam, E. J. Rowe, W. S. Shelow, R. H. Watson, Samuel Weiss, J. M. Woods, A. F. Stengel.

Service Caster & Truck Co., Albion, Mich. Booth No. 366.

Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. Booth Nos. 12 to 16.
Electric cranes and hoists.

Shevlin, Carpenter & Clarke Co., Minneapolis, Minn. Booth No. 11.
Lumber for foundry and pattern shop. Representatives attending: N. H. Morgan and H. A. Habeck.

Simons Paint Spray Brush Co., Dayton, Ohio. Booth No. 43.
Mechanical method of painting interiors of foundries and other manufacturing plants by the use of a spray gun outfit operated by compressed air. Spray can also be adapted to painting of castings.

W. W. Sly Mfg. Co., Cleveland. Booth Nos. 346, 348, 350, 352, 354, 356, 358, 360.
Slyblast room, positive pressure rotary table, Nos. 00 2 and 4 tilted mills, tumbling mill, dust arrester, sand reclaiming system. Representatives attending: S. C. Vessy, president; George A. Boesger, chief engineer; F. A. Ebeling, sales manager; L. B. Brewster, C. P. Guion, M. T. Mortensen, D. L. Harris, W. L. Kammerer, R. W. Hasselle.

Werner G. Smith Co., Cleveland. Booth Nos. 255, 308.
Samples of Linoil and other core oils and specimen cores. Representatives attending: Werner G. Smith, president; N. A. Boyle, treasurer; Milton S. Finley, vice-president; Frank H. Dodge, Dr. F. S. Havens, George H. Graham, I. R. Gerteis, L. P. Robinson, L. F. Ferster, Wallace Alexander, William Rayel, George Furman, Thomas Procter, M. M. Werckman, John M. Glass, A. S. Coulter.

THE IRON AGE will occupy Booth No. 1 at the exposition of the American Foundrymen's Association in Philadelphia the week of May 14. Representatives of the editorial, advertising and subscription departments in attendance.

Smith-Monroe Co., South Bend, Ind. Booth No. 177.
Gast compressed air separators. Representatives attending: R. O. Monroe, A. F. Squier.

Smith Oil & Refining Co., Rockford, Ill. Booth No. 235.
Core oil and liquid rosin. Representatives attending: Omer S. Smith, Stanton K. Smith, Frank C. Maley.

Spencer Turbine Co., Hartford, Conn. Booth No. 391.
Spencer turbo-compressors for supplying air for foundry cupolas, oil and gas burning industrial furnaces, etc. Representatives attending: S. E. Phillips, F. A. Wright, O. J. Dingee, F. D. Bailey.

Springfield Facing Co., Springfield, Mass., and Newark, N. J. Booth No. 41.
Foundry facings and supplies. Representatives attending: L. S. Brown,president; H. E. Beckman, general manager; H. Z. Dingee, vice-president; William Lawson, Frank Kumer, Harold Hamlen, F. P. Bullion.

Standard Sand & Machine Co., Cleveland. Booth No. 67.
Exhibiting latest model core and facing sand mixer, equipped with motor and speed reducer, Timken bearings and hexagonal screen. Representative attending: Harry E. Boughton, vice-president and general manager.

Sterling Wheelbarrow Co., Milwaukee. Booth Nos. 324, 326.
Foundry flasks, trucks, shop boxes, wheelbarrows, casters, wheels and other foundry specialties. Representatives attending: H. H. Baker, secretary; R. F. Jordan, assistant sales director; G. H. Lambkin, J. M. Dickson, H. J. Felsburg, L. P. Robinson, J. A. Patterson, J. J. Coyne, O. E. Steep.

Frederic B. Stevens, Inc., Detroit. Booth No. 91.
A general display of foundry facing, foundry supplies and foundry equipment; also a working model of the Auto-Plate. Representatives attending: Frederic B. Stevens, president; W. H. Joseph Cluff, vice-president; John M. Mayers, secretary; Lewis H. Kirby, treasurer, and branch managers.

Stoney Foundry Engineering & Equipment Co., Cleveland. Booth Nos. 452, 454, 456.
Shakeout bail, vibrators, core knockout machine (standard "B" type), knockout machine (bench type), core grinding machine, ladles, hose clamps and fittings. Representatives attending: E. S. Cohen, L. J. Reinhard, G. A. Scott.

Sugar Pine Exhibits, San Francisco. Booth Nos. 77, 78.
Lumber for foundry uses.

Sullivan Machinery Co., Chicago. Booth Nos. 457, 459.
A Sullivan angle compound compressor in operation to supply other exhibitors with compressed air; a Sullivan class WG-6 12 x 10 straight line single-stage, belt-driven compressor; a new Sullivan two-cylinder vertical compressor, type WL-22, direct connected to a 25 hp. motor, all mounted on a self-contained base; two Sullivan portable hoists suitable for car pulling, light hauling, and miscellaneous industrial jobs. Representatives attending: Howard C. Sargent, E. F. Pie, L. R. Chadwick, Oscar R. Cundy, and Robert H. Moth.

Superior Sizing Co., Inc., Lockport, N. Y. Booth Nos. 240, 242.
Core oils and parting. Representatives attending: R. M. Snell, E. J. Johnstone, F. A. Roehlk, C. E. Schaad, J. E. Kershaw, Harry Knight, Joseph M. Remmes.

Swan-Finch Oil Corporation, New York. Booth No. 297.
Core oils specialist. Representatives attending: Nelson V. Joyce, vice-president; H. F. Moncrieff, J. W. Closterman, Jesse Jones, T. L. Brennan, G. S. Robinson.

Swartwout Co., Cleveland. Booth Nos. 18, 20.
Ovens (core baking and mold drying). Representatives attending: C. F. Mayer, C. J. Pimsner, H. A. Bogardus.

T

Tabor Mfg. Co., Philadelphia. Booth Nos. 54 to 66.
Complete line of foundry molding machines, including several new types never before exhibited. Representatives attending: Wilfred Lewis, president; F. R. Wallace, vice-president; Robert M. Maull, secretary and treasurer; J. T. Ramsden, R. H. Wiensner, Philip J. Shire, James H. Coleman, Harry W. Impey, John Pfendner, William E. Sewell, Thomas L. Sumner, John A. Rathbone, E. A. Platt.

Titgen-Eastwood Co., Philadelphia. Booth No. 316.
Cupolas and sand blast equipment. Representatives attending: Harry W. Titgen, A. B. Eastwood, William Dunbar, Christian Gunther.

Tinoa Petroleum Co., Philadelphia. Booth No. 364.

Tottenville Copper Co., Tottenville, N. Y. Booth No. 149.

Truscon Steel Co., Youngstown. Booth Nos. 412, 414.
Alloy steel flasks for a large variety of jobs; also foundry accessories such as gaggers, flat bands, pouring jackets, bottom boards, core plates and core racks; various types of steel platforms for handling sand, castings and other materials with greater efficiency. Information regarding Truscon industrial buildings available. Representatives attending: N. C. Ferreri, G. E. Madden, A. W. Ferguson, F. J. Vlaskamp, A. L. Abrahams.

Twentieth Century Woodworker, Philadelphia. Booth No. 120.

W. S. Tyler Co., Cleveland. Booth Nos. 171, 173.
Hum-mer electric screen for reclaiming and screening foundry sand; Ro-Tap testing sieve shaker; Tyler standard screen scale testing sieves, and samples of wire cloth in various metals, meshes and weaves suitable for foundry use. Representatives attending: N. E. Kile, M. D. Pugh, D. V. Vigneron.

U

United Compound Co., Buffalo. Booth No. 206.

United States Electrical Tool Co., Cincinnati. Booth Nos. 183, 185, 187, 189.
Electric drills, drill stands, electric blower, disk sander, high-cycle drills and grinders, multispeed grinders, light and heavy-duty grinders, combination disk grinder, motor-in-the-base selective speed buffers. Representatives attending: H. N. Kelsey, W. B. DaSilva, W. R. Dorsey, C. G. Cresswell, M. A. Weidmayer, G. M. Lawrence, G. E. Smith.

United States Graphite Co., Saginaw, Mich. Booth No. 226.
Complete line of Mexican graphite foundry facings and core washes and other graphite products. Representatives attending: J. J. Edmiston, O. R. Miller.

V

Vesuvius Crucible Co., Swissvale, Pa. Booth No. 245.

W

Wadsworth Core Machine & Equipment Co., Akron, Ohio. Booth No. 219.
Core making machines, core cutting-off and coning machines, core testing machines, steel core plates, steel bottom plates. Representatives attending: George H. Wadsworth, M. C. Sammons.

White & Brother, Inc., Philadelphia. Booth No. 227. Ingot brass, casting copper, lead, solder, babbitt metal. Representatives attending: Clarence B. White, Harry A. White, John T. Fegley, Raymond Hunter, Frank Ogden, Frank Krug, Irving G. Smith.

Whitehead Brothers Co., New York. Booth No. 144. Molding sands and foundry supplies. Representatives attending: A. J. Miller, J. H. Whitehead, V. L. Whitehead, Jr., C. E. Andrews, R. L. Carpenter, H. J. Gerrard, R. J. Hashagan, T. F. Hogan, A. J. Miller, Jr., B. D. Fuller, A. J. McBride, A. Y. Gregory, F. B. Clarke.

Whiting Corporation, Harvey, Ill. Booth Nos. 321 to 327, 374 to 380. New style steel plate tumbling mill equipped with our positive door clamp, combination clutch and brake and motor for operation; cloth screen dust filter; helical worm-geared crane ladle, new style, with ball thrust bearings; new model "B" Whiting cupola; 5-ton electric crane trolley in operation; photographs, drawings, etc., of cranes and foundry equipment. Representatives attending: J. H. Whiting, chairman; T. S. Hammond, president; A. H. McDougall, vice-president; M. J. Evans, sales manager; R. E. Prussing, vice-president; R. H. Moore, F. P. Walsh, J. R. Bates, H. E. Reynolds, S. R. Vanderbeck, M. F. Beetham.

Wilbraham Green Blower Co., Pottstown, Pa. Booth No. 373.

G. H. Williams Co., Erie, Pa. Booth No. 163. Miniature model crane operating miniature bucket. Representatives attending: W. C. Swalley, acting general manager; T. D. Harter, assistant general manager.

J. E. Williams Shoe Co., Spring City, Pa. Booth No. 234. Patented safety shoes, in Congress and lace styles. Representatives attending: James E. Williams, George S. Peterman.

E. J. Woodison Co., Detroit. Booth No. 57. Foundry supplies, core room and molding machines. Representatives attending: E. J. Woodison, president; J. C. Woodison, vice-president; C. D. Yahne, treasurer; G. A. Burman, W. J. Wark, R. S. Hoffman, L. A. Dawson, B. E. Beldin, F. W. Blanchette, R. G. Fritts, F. W. Shortsleeves.

T. B. Wood's Sons Co., Chambersburg, Pa. Booth No. 146. Equipment for the Wood system of molding, comprising the Peerless aluminum tapered slip flask, the Peerless cherry wood tapered slip flask, and the automatic adjustable slip jacket in various sizes adapted to a wide range of work. Representatives attending: T. B. Wood, superintendent; W. H. Fisher, vice-president and secretary; Charles M. Wood, Victor Leisher, George W. Leisher, A. H. Slothour.

Y

Yale & Towne Mfg. Co., Stamford, Conn. Booth Nos. 318, 320. Chain blocks, electric hoists, overhead cranes, electric industrial trucks, tractors and trailers. Representatives attending: H. J. Fuller, R. B. Kite, M. G. Peck, George Sherrill, W. T. S. Quicke.

Young Brothers Co., Detroit. Booth Nos. 79, 80. Full size power conveyor oven in operation; an operating model of an overhead horizontal conveyor type core oven; laboratory oven; photographs of installations. Representatives attending: C. G. Lisch, V. A. Fox, T. P. McVicker, G. I. Thatcher, G. H. Walsh, P. A. Meyer.

Z

Zanesville Sand Co., Zanesville, Ohio. Booth No. 147.

Officers and Directors for 1928-1929

S. T. JOHNSTON
Incoming President

S. W. UTLEY
Outgoing President

FRED ERB
Incoming Vice-President

C. E. HOYT
Secretary-Treasurer

New Directors for Three Years

L. W. OLSON

P. J. KRENTZ

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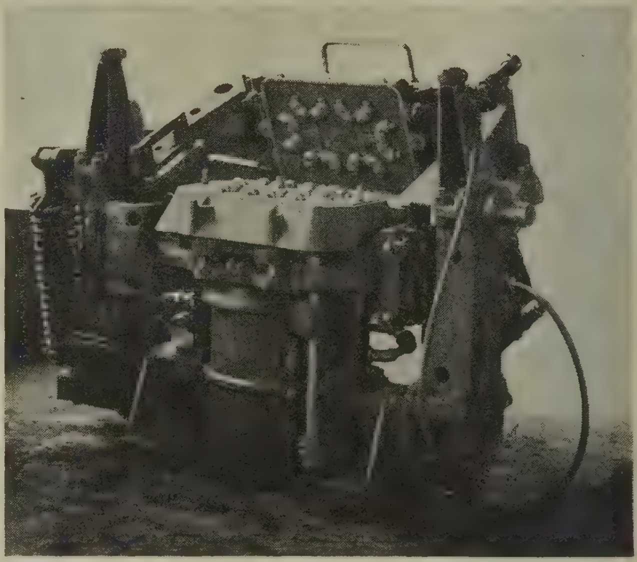
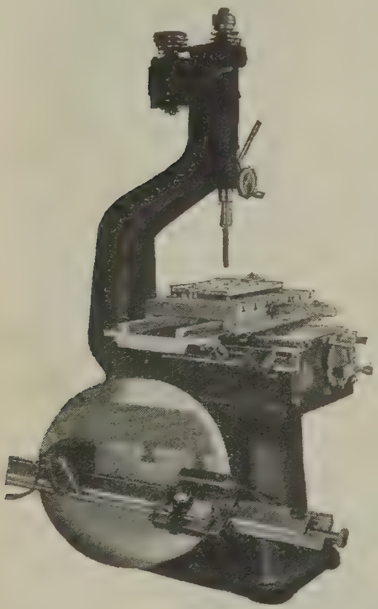
Multiple Molding Machine Has Power-Operated Head

THE power-operated head in the new multiple molding machine brought out by the Tabor Mfg. Co., Philadelphia, relieves the operator of a tedious operation and further simplicity in operation is achieved by the arrangement of the guides so that the two heads are guided in all directions and may be readily adjusted. The drawing speed and vibration operation are automatic. A special type of swinging yoke is used and alinement between the upper and lower head while squeezing is insured.



Self-Contained Layout Table

FOLLOWING the introduction last year of the Kellocater layout table, the Keller Mechanical Engineering Corporation, Brooklyn, encountered a demand for a complete self-contained unit with overarm, spindle and base, and accordingly has developed such a machine. The overarm is equipped with a hardened and ground spindle and with a No. 1 Morse taper hole for drills up to ½ in The vertical motion of the spindle is equipped with hand screw feed, capable of boring a hole up to 2 in. Eight spindle speeds are provided, ranging from 175 to 3500 r.p.m., four speeds being through back gears and four through open belt.



Air-Tool Grinding Cuts Time

BY substituting air-tool grinding for hand filing, the V & O Press Co., Hudson, N. Y., has cut the time to one-third of that formerly taken in grinding the small radii of a fly-wheel web. The work at the V & O plant is now done by a 2¼-in. diameter cone shaped wheel furnished by the Rotor Air Tool Co., Cleveland.

Air-Driven Portable Grinder

A PORTABLE grinder now made by the Buckeye Portable Tool Co., Dayton, Ohio, is air driven and operates on a rotary principle, emphasized as reducing vibration to a minimum and providing a smooth running constant source of power. The high-speed grinder is within the safety code rating, attaining a surface speed of 8000 to 9000 ft. per min. The grinder may also be procured in ratings from 4800 to 6200 r.p.m. Bakelite, rubber or other elastic bonded wheels are used, and the tool is made in a number of models, sizes and speeds for various classes of work.

Present Status of Pearlitic Iron

What It Actually Is—Separate Foundry Needed to Produce It—Advantages and Disadvantages Involved—Similar to High-Test Irons

BY DR. RICHARD MOLDENKE*

CONSIDERABLE attention has been directed recently to a class of cast iron exhibiting a pearlitic microstructure. Pearlite, it will be remembered, is a grouping of alternate layers of pure iron—called ferrite in micrometallurgical parlance—and iron carbide, similarly called cementite. The microscopically small particles of hard cementite, separated from each other by equally small particles of soft iron, together with what graphite may be there, present a metal which seems to wear better than when made up of either component, and it can also be more readily machined. Since much of the newly developed "high-test" cast iron, with the astonishingly high strength values, exhibits the same pearlitic microstructure, though produced under entirely different conditions, a discussion of the present status of so-called pearlitic cast iron is appropriate at this time.

Pearlitic Iron Falls in Low-Silicon Ranges

In contrast with the new high-test cast irons, those irons designated particularly as pearlitic fall within the low-silicon ranges. The reason for this is connected with the slow rate at which the molten metal is allowed to cool in setting. In the production of cast iron the rate of cooling the molten metal is most important, and this rate is fastest when pouring it into iron molds, which chill the metal. A slower rate of cooling is had with the green sand mold, where the damp sand lowers the metal temperature rather rapidly in the case of thin castings. Dry sand molds cool the iron still more slowly than green sand molds; but the slowest rate of the entire series exists when sand molds are not only dried, but are actually brought up to an almost incipient red heat.

It will be readily appreciated that a cast iron of the ordinary silicon range stipulated for, say, machinery castings, will chill but very little in an iron mold at room temperature, will be reasonably fine-grained in green sand, a little coarser in dry sand, but will be soft and coarse grained to the extent of practical uselessness when made in a highly heated sand mold. Hence, castings thus produced must be quite low in silicon to be acceptable, apart from their pearlitic microstructure.

Silicon Content and Mold Temperature Chief Factors Involved

Coming down to practical considerations, the two chief factors to be considered are the silicon content of the molten iron and the sand mold temperature, for these have the greatest effect upon the amount and condition of the graphite formed. Where a gray iron only is demanded, the range of each factor is necessarily large, for one can begin with either a green sand or dry sand mold at room temperature and the highest point on the silicon range involved and go successively up to an almost red hot mold with the silicon down to 0.50 per cent, and always have a gray iron casting. But only the upper end of mold temperatures with the lower end of the silicons will give a gray iron casting with the desired pearlitic structure.

The idea of using hot molds with lower-range silicon mixtures is not a new one with foundrymen, though they were probably not aware of the specially good structures attained. Professor Lanz and Director Sipp of Germany, however, went into this matter thoroughly and constructed tables of correlated compositions and mold temperatures, giving recommended combinations for the several metal-section conditions found in light and medium castings—for heavy work does not seem to be so readily controlled. These correlations are covered by the patents granted in the industrial countries, other combinations of composition and mold temperature, as well as the pearlitic character of the metal itself, being without the range of a patent monopoly.

It is further understood that considerable in the way of expert practical manipulation is required to get satisfactory results. This will be appreciated by foundrymen experienced in low-silicon work, for the volume reduction in the setting of such metal—perhaps twice that of high-silicon irons—means extraordinary attention to the gating of the molds, the design of the castings and more particularly the cupola melting operation, which is that of making cupola-malleable cast iron. The chances for oxidation, unless small charges, a high bed and plenty of intermediate coke are used, are such that larger-section castings often show up large internal shrinkages because of either improper gating or, more likely, on account of a serious reduction in the time interval between pouring and setting temperatures, which cut off the proper feeding of the mold in spite of what should be an extension of the rate of cooling by reason of the highly heated sand.

Advantages and Disadvantages of Pearlitic Iron

There remains, then, but to contrast the advantages and disadvantages of making pearlitic cast iron. These are as follows: When highly superheated in melting and not oxidized, with gating and risers properly placed, the iron is fairly fine grained and dense. It is strong, and has excellent wearing qualities. The disadvantages are that it is not easy to produce without much experience with low-silicon cupola mixtures. Extra care is required with pattern equipment, gates and risers. It is necessary to install mold-heating ovens allowing high-temperature operation and flexibility of operation for pouring off.

But most serious is the fact that no sane foundryman will want a low-silicon operation side by side with his ordinary mixtures in the same building. Sooner or later iron will get into the wrong molds, the sprues will be mixed, and confusion will result, with large scrap piles. Hence pearlitic cast iron should only be made with a separate melting installation and in a special building.

Highly super-heated cast iron mixtures, supercooled before pouring off, with not too long a rate of cooling to give large graphite crystals, yield remarkable high-test iron castings, exhibiting much of the pearlitic structure, but the outlook for low-silicon pearlitic cast iron is not very bright if a special foundry has to be provided. Nevertheless, there is no reason why this kind of iron may not be made a specialty by foundries looking for new markets for their output.

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*Consulting foundry engineer, Watchung, N. J.

Welding Chrome Irons and Steels

Must Prepare a Clean Joint, Use a Proper Flux and a Strictly Neutral Flame of Minimum Dimensions, Ending with a Properly Adjusted Heat Treatment

INFORMATION on welding chrome irons and steels is given in the April issue of *Oxy-Acetylene Tips*, the monthly publication of the Linde Air Products Co., New York. This company is closely associated with Electro Metallurgical Co. and the Union Carbide & Carbon Research Laboratories, which have been responsible for many advances in high-chromium alloys.

For the purposes of discussion, commercial high-chromium alloys may be classified as follows:

	Name	Carbon, Per Cent	Chromium, Per Cent	Nickel, Per Cent	Silicon, Per Cent
Group I	Rustless chromium irons	less than 0.12	12 to 18	....	0.3 to 1.2
Group II	Stainless chromium steels	over 0.30	11 to 17	....	....
Group III	Rustless chrome-nickel irons	less than 0.17	17 to 25	7 to 9	....
Group IV	Chrome-nickel-silicon alloys				
	Class I	....	17 to 19	24 to 26	2.5 to 3
	Class II	....	25 to 27	20 to 22	2 to 3
	Class III	....	7 to 9	20 to 22	1 to 2
Group V	Extra high chromium irons	less than 0.30	25 to 30	....	....
Group VI	Castings	higher	....	....	....

Under proper conditions, and with proper procedure, all these can be welded with the oxy-acetylene flame. Difficulties in making a sound, clean joint increase as the chromium content increases, as a result of the formation of infusible oxides, consisting chiefly of chromium oxide together with smaller amounts of iron oxide, manganese oxide and silica. Ordinary fluxes for welding or brazing are therefore unsatisfactory. Fluxes must be sufficiently fireproof to protect adequately the molten metal and hot metal adjacent to the weld from oxidation, and must be correctly compounded to dissolve the refractory chromium oxide with ease. A specially designed flux, known as "Cromaloy Flux," is recommended.

Rustless chromium irons of Group I are used chiefly as sheet metal, and as such are frequently welded into vats, tanks and container linings. Up to 16 gage, welds are usually made between upstanding flanged edges, turned 1/16 in. high. The sheet is carefully cleaned of scale and dirt along the edge, and painted *top and bottom* with a water paste of cromaloy flux. Then the joint is assembled with clamps and the upstanding edges are melted together in the usual way.

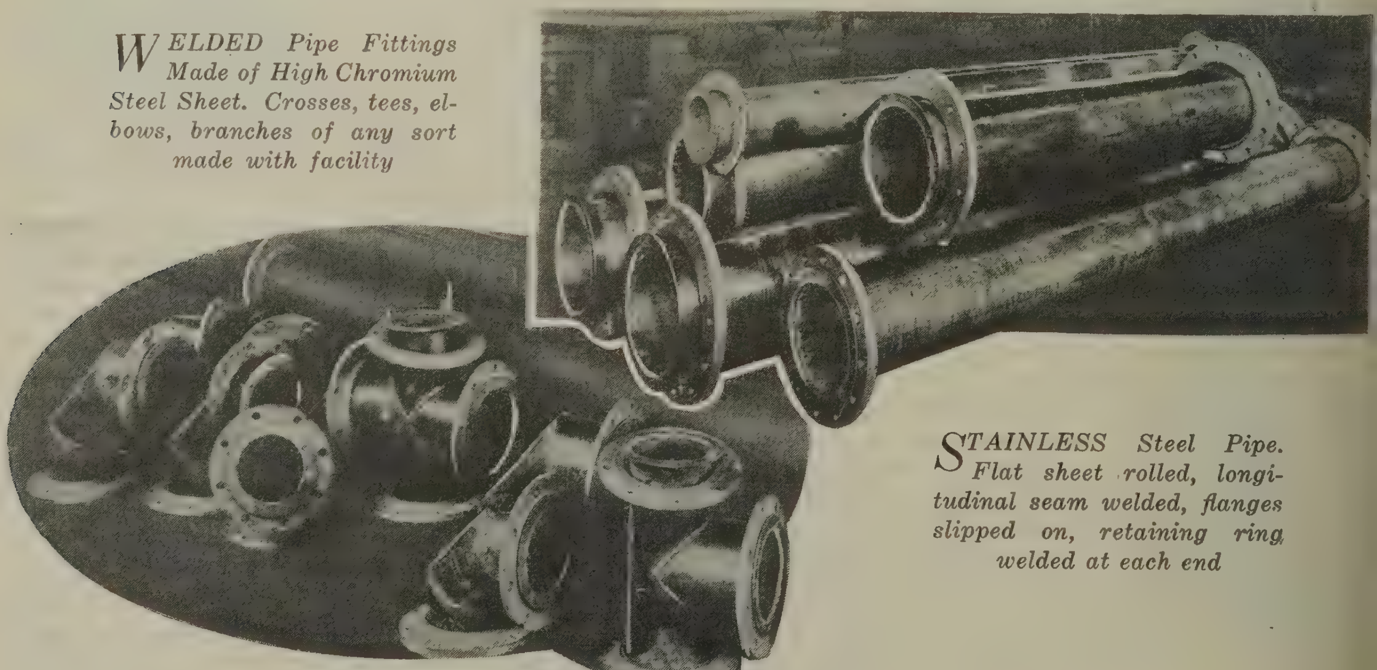
A most important detail of correct practice is to use a neutral flame just large enough to insure proper fusion, since too large a tip causes the molten metal to boil and results in porous welds. An excess of acetylene will cause an increase in the carbon content of the metal in the weld, lowering its resistance to corrosion. It will also increase the hardness and lower the ductility of the weld metal. An excess of oxygen results in dirty metal and porous welds, because of the excessive formation of infusible oxide.

With the aid of rods of the same composition as the base metal, good butt welds can be obtained in metal 1/16 to ⅛ in. thick, without beveling. Flux should be applied to the line of the weld on both the top and bottom surfaces of the sheet. This prevents oxidation on the under side and allows good fusion and union to take place under the protecting film of slag. Without the use of flux, it will be impossible to obtain complete fusion at the bottom of the seam. The rod should be clean and painted with a thin coating of the flux.

In making welds in heavier gages, the plate is beveled and the faces of the bevel are coated with the flux. The welding should be carried through to completion rapidly and, if possible, should be of the single vee type.

Heat Treatment of Welded Joints

As a result of the high temperature attained during welding, the structure of rustless iron is changed within the weld metal and in adjacent portions of the sheet. Rustless irons, particularly those containing 12 to 14 per cent chromium, are subject to air-hardening, and require annealing to soften and toughen the metal at the joint. Best results are obtained by heating the



WELDED Pipe Fittings Made of High Chromium Steel Sheet. Crosses, tees, elbows, branches of any sort made with facility

STAINLESS Steel Pipe. Flat sheet rolled, longitudinal seam welded, flanges slipped on, retaining ring welded at each end welded part in a furnace at a temperature between 650 and 700 deg. C. for a half hour, and allowing it to cool slowly, either in the furnace or in warm, quiet air. The blowpipe is often utilized for applying the heat in cases where it is not possible to employ furnaces. Great care must then be exercised to heat the metal no more than the maximum temperature given. The benefit to be derived from blowpipe annealing will depend on the care used in controlling the temperature and time of heating. Usually about 3 min. within the above temperature range will have some softening effect, but a longer time is to be preferred. The temperature may be judged by touching the hot metal with a piece of pure aluminum wire (melting point 658 deg. C.). A tiny liquid drop of aluminum should remain. A dull red heat just discernible to a keen eye is about 700 deg. C., the top limit for annealing.

Recuperator of High-Chromium Steel before Assembly

Tensile tests show the results obtained from welds in 18-gage rustless iron:

Condition	Yield Point, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Per Cent Elongation in 2 In. Over Weld	Remarks
Unwelded	53,000	78,200	36.0	Per cent elongation over fracture
As welded	32,400	43,700	4.0	Broke in sheet near weld
Blowpipe annealed	55,350	76,400	6.5	Broke in weld
Furnace annealed	45,400	72,900	7.6	Broke in sheet and edges of weld

The higher silicon content found in some of the commercial grades facilitates welding. Higher chromium rustless irons have less tendency to air-harden but are more subject to grain growth in the weld and base metal adjacent. Excessive grain growth results in a brittle condition, which can be remedied, particularly on light gages, by annealing at 650 to 700 deg. C. for 3 min. and air-cooling.

After furnace annealing, welds in 16-gage material will stand considerable bending without fracture.

Cutlery Steels Infrequently Welded

Stainless chromium steels of Group II are used for cutlery and heat-treated machine parts, and are therefore seldom welded. Procedure as outlined above will make a joint which is extremely hard and brittle, due to its air-hardened condition. Furnace annealing at 750 to 800 deg. C., followed by very slow cooling, is necessary to make the weld machinable. A second suitable heat treatment is then required to restore stainless properties to the entire part.

Rustless Chrome-Nickel Irons Give Ductile Welds

Alloy irons of Group III containing chromium and nickel are not subject to the brittleness encountered in the former types of alloys after being exposed to the heat of the welding blowpipe. They do not air-harden, and weld metal cooled either rapidly or slowly is malleable and ductile and therefore requires no heat treatment. Whenever the welding of high-chromium alloys must be considered, the use of alloys of this group is recommended both on account of the easy weldability and of the superior physical properties of a weld completed without heat-treating or annealing. Best results are obtained with the use of cromaloy flux. Welds in 18-gage sheet will have a yield point of 50,000 to 60,000 lb. per sq. in., an ultimate strength of 65,000 to 70,000 lb. per sq. in., with about 15 per cent elongation in 2 in. over the weld. Blowpipe annealing or any simple annealing does not improve the quality of welds in this material and is not recommended.

Alloys of Group IV have been developed to meet special industrial demands. They are all easily welded, but joints in thicker gages or sections must be made in such a way as to reduce residual or internal stresses to a minimum, because most of the alloys are red short. No subsequent heat treatment is necessary or recommended.

Extra High Chromium Induces Brittleness

Alloys of Group V are characterized by great resistance to oxidation and chemical corrosion. On account of their high chromium content they present some difficulty in welding when ¼ in. or more thick, because of the formation of infusible oxides or slag. The use of flux will help prevent oxide formation if painted along the clean edges of the seam and on the welding rod. Flange welds in thin material are easily made.

Welding Upstanding Seam at Corner of Tank

When subjected to the heat of welding, these alloys undergo considerable grain growth with resulting brittleness. This condition cannot be removed by annealing.

Much the best results are obtained by using flux and a strictly neutral flame. Welds may, however, be made in the metal with an excess acetylene flame without the use of flux, bearing in mind the fact that the welds will be hard, brittle, high in carbon and less resistant to chemical corrosion than the plate. This method of welding, however, suffices for annealing boxes which are not to be treated very roughly.

Castings Should Be Welded Hot

Several grades of high-chromium castings are sold, some containing appreciable amounts of nickel or silicon or both. Castings, as a rule, contain considerably more carbon than the rolled products. For welding castings containing high carbon and designed for wear resistance, it is preferable to preheat to a good red heat to avoid cracking. Cooling should be relatively slow; after this the entire casting may require further heat treatment to produce the necessary hardness. Welding rods of the same composition as the base metal should be used. An excess acetylene flame aids in welding and is permissible for castings which already have a high carbon content. For thin-walled castings, however, it is best to use a neutral flame and cromaloy flux. When using an excess acetylene flame, flux should also be used, since it facilitates fusion and assists in removing oxide and sand spots in defective castings.

Qualifications for Welders

American Welding Society in Annual Meeting Holds Symposium on Acceptance Tests for Workmen—Standardization for Code Purposes to Follow Detailed Study

TESTS whereby the skill of welders can be appraised before entrusting them with important work was the theme of the principal session of an American Welding Society meeting in New York last week.

Testing workmen is more than a mere mechanical operation, as pointed out by G. A. Caldwell, vice-president and general superintendent Mississippi Valley Structural Steel Co., St. Louis. In his opinion, character is the most essential qualification for a welder, and this can be appraised only by contact with the man. Hence his organization prefers to train its own welders, selecting those shop men of more than average ability who desire to become welders and who look upon welding as a skilled trade that will lift them above the humdrum routine. In most shops using welding the situation would be met in the same manner: by selecting a promising apprentice, having him work as helper to the best qualified journeyman, then using him for minor details where utmost quality is unnecessary, gradually increasing his skill by constant instruction and frequently breaking test welds and studying the results. Only as the force of welders increases is a supervisor necessary, together with more definite acceptance or appraisal tests before employing self-styled welders.

Welds Appraised by Bending Tests

E. E. Shanor, vice-president Petroleum Iron Works Co., Sharon, Pa., agreed with Mr. Caldwell that apprenticeship is the best way to train welders—in his plant principally for production of large diameter pipe by automatic machines rather than hand welding structural steel. At Sharon the apprentice is given roustabout jobs for two months, to become acquainted with the plant and to test his mettle. Then he becomes a fitter's helper. After learning the essentials of joint assembly, he spends some time behind a pneumatic caulking or chipping hammer and another period as a helper on the testing machine (for each pipe section gets a hydraulic test). Meanwhile he is encouraged to try his hand at welding test pieces, and from then on his progress is about as sketched by Mr. Caldwell. In Mr. Shanor's organization a further step is taken after the man becomes a reasonably proficient hand welder, namely, he becomes a helper on a row of automatic machines, and finally a machine operator. Much information must be given him either through books or by word of mouth about the functions of the various electrical auxiliaries. The greatest aid to improvement is thought to be a broken practice weld, studied for blowholes, inclusions and adhesions. When butt welds can be consistently bent 180 deg. around a pin five times the thickness of the plate, the welder is regarded as proficient by the Petroleum Iron Works Co.

Standard Acceptance Tests Not Yet Formulated

Speaking for the committee on qualification of welders, H. H. Moss, Linde Air Products Co., New York, said that it is proving difficult to prepare specifications on the subject, because the requirements for various types of production work are not only different for different classes of structures, but even in shops doing the same type of work the practices are not uniform. The committee has made a special study of pipe welding, of which a great deal is being done. All pipe welding is not alike; the welding ability required for joints on long lines for oil, gas, water or low-pressure steam is quite different from corresponding requirements of a worker on pumping station specials, high-pressure air, steam or hydraulic lines, or refrigerating systems. A proficient workman on rolling joints of the first classification should not, in Mr. Moss's opinion, be rated by the same tests which would seek out a man of far greater general ability for the second. In view of the many kinds of welding encountered in pumping station work—butt welds in all kinds of positions, double and single-vee welds in extra heavy metal, fillet welds on branches and the joining of steel castings to wrought pipe—the committee was undecided on the number and variety of tests for ability which should be specified.

Work on the qualifications of pipe welders, structural steel welders and pressure vessel welders is well under way, however, and must be pushed to conclusion so as to enable the society to cooperate with various code-formulating bodies now considering the matter. These regulations, when written, would have the effect of imposing upon industry certain tests, licensing or qualifications for the workman. This would doubtless work temporary hardship on many workmen and employers. The former can usually improve in skill readily. Manufacturers will also profit from a higher grade of welding through added neatness of the work, a higher reputation for dependability and an economic saving through the use of less metal and a 100 per cent joint.

Simplicity Desirable

C. E. Loos, American Bridge Co., Ambridge, Pa., made a plea for simplicity in testing. In his opinion it is unnecessary to test the welder in every style of joint he would be called upon to make. In the structural field nearly all the joints are lap joints with fillet welds. In training, a welder makes such joints in great number, in plates of various thickness and arranged in various positions. He splits these apart and studies them for penetration, fusion, dimension, grain size, soundness and freedom from slag. But to determine a workman's all-around ability, simple vee butt welds, pulled in tension, bent in a vise, sawed across and pickled in strong acid, are all that are necessary. These give a numerical rating to the welder. Mr. Loos also believes that important welds should be marked with a hammer stamp for identification, in order to spot the qualified but unconscientious workmen.

Important Studies on Pressure Vessels and Structural Steel

TWO research committees are sponsoring important investigations. One, under the chairmanship of E. H. Ewertz, past president, is arranging to have constructed

(*Concluded on page* 1293)

Opposes Anti-Injunction Bill

National Metal Trades Association Goes on Record Against Legislation to Curb Power of Federal Courts—Harold C. Smith, Illinois Tool Works, Chicago, Elected President

THE National Metal Trades Association at its thirtieth annual convention at the Hotel Astor, New York, April 25 and 26, went on record in opposition to anti-injunction legislation pending in Congress which would curb the power of the Federal courts in labor disputes. A bill introduced by Senator Shipstead of Minnesota which would have this effect was attacked by speakers at the convention, and the resolutions committee was supported in its recommendation that the association go on record as follows:

> Be it resolved, that the National Metal Trades Association, in convention assembled, having confidence in the rights of the individual as constitutionally provided, and feeling that the present efforts to limit these rights and to restrict the functions of our Federal courts are not truly representative of American ideals, urges that the existing equity power of the Federal court should be continued.

Attack Limiting of Protective Functions of Courts

Discussing the Shipstead and other similar legislation, President Paul T. Norton stated that this bill, if adopted, would limit the protective functions of equity courts to tangible property only. "In effect," he said, "it would remove the protection and a large part of the value of copyrights, patents and good will, and also the protection of the rights to employ or to be employed."

"As the law now stands," he went on, "members of the trade unions are adequately protected in their right to organize. Those who do not wish organization are protected in their right not to organize. The law does not forbid the expansion of legitimate business or intelligent management of the same. It does restrain such combinations as would restrict interstate trade or enter into forbidden practices by competition. Our association has taken an active part in developing a widespread opposition to the repeal of the anti-trust laws and similar legislation, and it is essential in the combatting of such measures that association members communicate with their legislative representatives."

Oppose Reversal of Judicial Decisions

In an address on "The Significance of the Present Efforts to Change the Laws in Respect to Labor Combinations," Walter G. Merritt, counsel of the League for Industrial Rights, New York, pointed out that the present agitation for amending or passing new laws governing labor relations is aimed at a reversal of judicial decisions upon which the prosperity of our present industrial structure is founded. "The public as a whole," he said, "does not sympathize with this movement, and Great Britain has just paid dearly for her experimentation along the same lines."

Mr. Merritt favored the continuance of the anti-trust laws, stating that their repeal would likely lead to Government interference in business, thus destroying the basis of industrial liberty, founded on unrestrained competition.

Light was thrown on interference with business by the Government by Bernard J. Mullaney, vice-president Peoples Gas, Light & Coke Co., Chicago. He pointed out that the Government had engaged in many lines of business in direct competition with a large number of private enterprises throughout the country and that further expansion along these lines might seriously hinder the development of free competition and individual enterprise.

Association Members Find Business Better

THAT business conditions in the metals industry are considerably better than they were six months ago, that in most cases they are just as good or better than was true one year ago, and that the upward trend will probably continue, were points brought out in the annual address of the president, Paul D. Norton. As has been customary in the past, a questionnaire on business conditions was sent to the entire association membership and the results tabulated in an effort to obtain an index of business activity.

Reporting on the present state of business, 37 members or 8½ per cent found conditions excellent; 173 or 39½ per cent, good; 186 or 42 per cent, fair, and 43 or 10 per cent, poor. "It is curious to note," Mr. Norton said, "that the same percentage of members reporting poor business last year reported poor business this year, while the number reporting conditions good or excellent increased by 2 per cent over last year."

In answer to the question, "How does business compare with six months ago?" 226 of 430 companies reply-

Harold C. Smith Named President

HAROLD C. Smith of the Illinois Tool Works, Chicago, was elected president, succeeding Paul T. Norton of the Case Crane & Kilbourne Jacobs Co., Columbus, Ohio. J. G. Benedict, Landis Machine Co., Waynesboro, Pa., was elected first vice-president and Jacob D. Cox, Jr., Cleveland Twist Drill Co., Cleveland, became second vice-president. J. W. O'Leary of Arthur J. O'Leary & Son Co., Chicago, continues as treasurer. Councilors for two years were named as follows: J. H. Van Alstyne, Otis Elevator Co., New York; H. C. Beaver, Rolls-Royce Co. of America, Inc., Springfield, Mass.; R. J. Russell, Century Electric Co., St. Louis; Theodore Trecker, Kearney & Trecker Corporation, Milwaukee; Paul T. Norton, Case Crane & Kilbourne Jacobs Co.

The growth of the association in its thirty years of existence has been steady, and it now has a membership of 1100 manufacturing plants employing about 1,000,000 metal workers. The increase in membership in the past ten years has been 35 per cent.

ing reported an improvement, the average increase being 35.1 per cent. Conditions were found to be essentially the same by 122 companies, while 82 reported a decrease, the decline amounting to 24.8 per cent. Comparing conditions with one year ago, 181 companies reported improvement, 124 considered conditions about the same, and 122 noticed a decline. It was pointed out that the replies to these questions and a comparison with the replies made to a similar questionnaire last year indicate that there has been a material gain both in the amount of business transacted and in the number of shops enjoying favorable business.

Upward Trend Expected to Continue

That conditions may be expected to improve during the year was brought out in the answers to the question, "What is the outlook for the next six months?" Of the 397 companies replying to this question, 25, or 6 per cent, reported the outlook excellent; 218, or 52.4 per cent, good; 136, or 37.3 per cent, fair, and 18, or 4.3 per cent, poor.

Although 273 out of 427 companies reporting on the availability of labor had experienced no scarcity, lack of skilled machinists and specialists was noted by a number of companies. Fourteen companies reported a scarcity of highly skilled all-round mechanics, four reported a lack of highly skilled specialists, 88 lacked skilled machinists, 41 lacked skilled specialists and seven had difficulty in securing semi-skilled machinists, machine operators and specialists.

To overcome shortage of skilled labor, 281 companies stated that they were carrying on training activities ranging from the training of machinists only to the training of all classes of employees. Apprenticeship training activities were reported by 63 companies, while 24 mentioned foremanship training, although the question asked related specifically to shop labor.

Are Industrial Profits Constantly Increasing?

THAT the average profits of established industrial enterprises have been gradually increasing over the last half-century was suggested by Dr. Charles J. Bullock, director Harvard Economic Society, Cambridge, Mass. Basing his deductions upon a wide investigation of corporate income tax returns, Doctor Bullock stated that he doubted the soundness of the rather frequent statement that 40 per cent of the industrial corporations in the United States are operating without profit, and that, on the other hand, he believed the rate of return on capital invested in industry at the present time is 4 or 5 per cent higher on the average than it was 50 years ago.

An investigation of companies that fail to report profits, he pointed out, usually reveals the fact that a number no longer exist and still remain on the income tax lists. Others are sales organizations for non-resident companies whose profits are included in the returns of the parent companies. In other cases profits are paid to partners and officers in the form of salaries.

Six Per Cent Was a Good Return in 1880

Reviewing industrial evolution over the last quarter-century, Doctor Bullock stated that in the period following the Civil War and up until 1897, 6 per cent was a good average return on capital invested in standard lines of business that were forced to meet the full force of competition. Early in this period, inventory losses often absorbed profits for two or three succeeding years, but the average over a longer period was usually about 6 per cent.

In the period from 1898 until the beginning of the recent war, the speaker went on to explain, profits were somewhat higher, owing to a rising trend of commodity prices and to the gradual introduction of efficiency in business. The average return on capital invested in manufacturing staple lines in this period was slightly over 8 per cent. During those years modern accounting was introduced and other practices were begun which have had widespread use and benefits recently.

Eliminating the war period as a time of great abnormality in all lines of business, Doctor Bullock characterized the last five or six years as a period marked by the greatest industrial accomplishment the country has ever known. During this time, he placed the average profit at about 10.5 per cent. Thus, over a long period of years the profits of American industry have been tending upward, and in spite of the recent years of adjustment, the speaker felt the much talked of "profitless prosperity" is both non-existent and uneconomically improbable.

Unemployment Exaggerated — Not Due to Mechanization

ESTIMATES made during the earlier part of this year of the number of unemployed were characterized as being "possibly interesting from the standpoint of theory but largely valueless and even detrimental to business as far as any practical purpose was concerned," in an address by Magnus W. Alexander, president National Industrial Conference Board, New York. "The widespread publication of some obviously exaggerated estimates," he declared, "have not helped to strengthen business confidence, and their deterrent effect on trade necessarily has not helped the general situation.

"A 'shrinkage' in employment," Mr. Alexander continued, "in only one or two fields of economic activity, like manufacturing and railroad transportation, over a period of two or more years in the past, which constitutes the basis for all estimates because it is the only related information available, is utterly irrelevant and inadequate for any calculation of the total number of unemployed at any given time. This is principally because it cannot account for employment in other fields of activity about which we have no data, but which include more than half of all those working for wages or salaries. While the number of workers required to turn out a certain amount of production has been relatively declining for years, there is also evidence that the number of workers engaged in distribution, trade and service has been constantly increasing, relatively and absolutely."

Mechanization Allows for Readjustment

"The increasing use of labor-saving machinery in productive industry," the speaker declared, "may cause a temporary unemployment, but this so-called mechanization of industry is a relatively slow process, slow enough usually to allow for readjustment. Where temporary unemployment does ensue for some, the necessary readjustment may, and often will, cause temporary individual hardship. In its permanent and fundamental effect, however, progressive development in industry by way of mechanization has been, and is, a blessing in disguise in that it leads to an increase in our national prosperity, an increase of employment in new and correlative fields of industry, higher wages, lower living costs and higher standards of living as well as a greater margin for savings for the masses.

"If such unemployment as existed during the last winter had been largely technological in character, as is claimed by some—that is, if it had been largely due to the increased use of labor-saving machinery and power—then why did we hear practically nothing of unemployment in 1925, when from 1923 to 1925 there was not only a relative, but even an absolute shrinkage in employment in manufacturing and a great increase in the mechanization of this industry? Mass production by a highly mechanized industry was widely hailed as a chief contributing factor to our national post-war prosperity, but suddenly was viewed by some as causing unemployment and hence was pronounced a menace to prosperity. Yet it is significant that this latter view was not voiced until after data had been published in 1927 showing that according to the 1925 census of manufactures a decline in manufacturing employment had taken place from 1923 to 1925."

Employment Now Increasing

"As far as manufacturing activity is concerned, developments since winter point toward increasing employment from now on, the decline in fact having come to a stop with the beginning of the present year. Since December, 1927, employment in manufacturing has been upward, and in February of this year was higher than at any time since July, 1927, and more than 3 per cent greater than in November, 1927, according to reports made to the National Industrial Conference Board, by about 2000 manufacturing establishments throughout the country employing about 1,000,000 persons.

"The Conference Board's index for total man-hours worked in manufacturing for February was 79.3 as against 77 in January, and the highest since last June, when it was 79.8. The average number of hours worked per week per wage earner has risen from 47.9 in January to 48 in February, the slight change in number of hours per worker reflecting the fact that the greater increase in total man-hours worked was due mostly to increase in employment. Average weekly earnings show a slight increasing tendency and in February of this year were at the same level as in February two years ago. Great stability is shown by the average hourly earnings per worker, which principally reflect wage rates paid and which during the two years February, 1926, to February, 1928, have fluctuated over a range of less than 3 per cent of those prevailing in February, 1926. This stability of average hourly earnings shows that such unemployment as has existed has not exerted any great pressure on wage rates, in contrast with the effect of unemployment in 1921 and at other times during the past.

"While these data do not throw any comprehensive light on employment in other occupations, such evidence as is available reveals an increasing tendency of employment in non-industrial fields, particularly in those created by the distribution and servicing of the products of new industries, like the automobile and radio industries. Changed living standards also are absorbing unusually large numbers into hotel and restaurant service. There has as yet been no evidence produced of anything more than a temporary, perhaps somewhat more than seasonal, amount of unemployment. The growing menace of so-called 'technological unemployment' which, it is said, is bound to grow with the mechanization of industry, is as yet an economic myth."

Wage Incentives for Foremen Commended

WAGE incentives for foremen were comprehensively dealt with in two papers, one by H. W. De Bruin, works manager of the Jeffrey Mfg. Co., Columbus, Ohio, who has come up from the ranks, and the other by G. Heding of the Morkrum-Kleinschmidt Corporation, Chicago.

Mr. De Bruin said that in approaching the subject three viewpoints present themselves: 1. Opportunity for advancement; 2. Continuous employment; 3. An opportunity to share in the financial success of the company. Mr. De Bruin said that all of the foremen in the Jeffrey plant are developed from the ranks. Once a man has become a foreman an effort is made to make him feel that his work is important and that his efforts are appreciated; to obtain the best results the company encourages constructive thinking by its foremen and, after a certain preliminary training, it allows him unlimited authority in the conduct of his department. "Thus placing responsibility in your foreman," he said, "you will soon see a great change in him, in his department and in the men under him. He will look at his problem in a different light, and you will broaden his viewpoint and make him a better man for your company. He will be ready for advancement when the time comes."

"The foreman should be coached and trained so that he may realize that continuous employment depends upon the successful management of his duties," Mr. De Bruin said. "His alertness in improved methods of production and reductions in costs will enable the management to increase volume and insure continuous employment. In times of depression there should be some method whereby the foreman may be assured of steady work. This is management's problem and we should accept that responsibility and do our best."

Foremen Should Share in Employer's Success

As to wage incentives, Mr. De Bruin said: "We feel it is desirable and even necessary for the best interests of the company that those who are in position to make a direct contribution to the success of the business share in that success. Any plan of incentive should include those and only those items in which the individual may be expected to exercise some control. It is therefore not advisable to pay the foreman a bonus just because those under him are increasing production on account of some wage incentive. It is very difficult to base a foreman's bonus on tangible results, but unless this is done the results at best will be disappointing and will cause a great deal of dissatisfaction. To be effective, a bonus plan should give opportunity to increase earnings from 10 to 40 per cent. It should be figured and paid often enough so that the foreman will not forget it or lose interest in it. It should be understood that it is not a part of the basic wage, but is a special reward for actually achieving results. It should affect waste, increase in production, reduction in investment, reduce costs and foster cooperation between foreman and management. It should be so simple that the foreman can easily understand the results.

"It should be possible for the foreman to earn a bonus, even in the case of decreasing volume, if the efficiency of his department is increasing. It should be thoroughly understood that the bonus does not remove the possibility of an increase in the basic pay. Foremen should understand that their basic pay depends upon their value to the company reflected in the following: Ability and desire to work, willingness to cooperate, reduction in cost, elimination of waste, maintenance of quality.

Foremen Training and Wage Incentive Go Hand in Hand

"It has been said that the foreman is the spark plug of the industrial machine; if he is not working properly, the machine cannot run smoothly. It is certainly true that the foreman can make or break the spirit of the machine operator or the men under him more quickly than any one else in the organization. In fact, the whole policy of a concern toward its manuufacturing force is largely interpreted or misinterpreted by its foremen.

"Reduction of the percentage of non-productive labor is not well known to the foreman, and, in fact, in some plants little attention is paid to it. Nevertheless, it has a tremendous bearing on the profits of the company.

"It requires considerable explanation and teaching to make the foremen realize what the non-productive labor is and how it can be controlled. The non-productive hours should be maintained in proper proportion to the productive hours at all times. When the foremen are properly trained and have the opportunity to share in the results of better management, they will

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Foundry Congress at Barcelona

High Spots of International Meeting, Which Included Exposition of Equipment and Products

(*Special Correspondence*)

THE International Congress of Foundrymen, the annual meeting of European foundry associations, was opened on the morning of April 11 at Barcelona, Spain, as was also the exposition of foundry equipment and products connected with it. The affair was a rather brilliant one, the Crown, the interested ministries, the Province of Catalonia, the city of Barcelona and the Spanish foundrymen being represented by their high dignitaries, some of whom appeared in uniform, brilliantly decorated with orders and attended by a military guard at attention flanking the speakers' platform. The hall was in the palace Victoria Eugenia, one of the buildings now being erected for the Barcelona Exposition in 1929, of superb construction on classic lines and for permanency. The exhibition, therefore, had an ideal housing.

The customary speeches of welcome were given by the hosts, with replies from the representatives of the foundry interests and associations of Great Britain, France, Germany, the United States, Italy, Czechoslovakia, Belgium and Holland. The session was then adjourned, and the exhibition was officially inspected. This, while not very large, nevertheless indicated the growing importance of the foundries of Spain, for many of its important plants displayed fine examples of their work for inspection and study.

Only a few molding machines, and these German, were in evidence. One exhibit attracted special attention in that a combination machine for sifting, tempering, pan-grinding and aerating floor sand for re-use was seen in operation. Among the many castings of automobile cylinders, steel castings for frogs and switches, malleable castings as good as we have them in the United States, and particularly arc castings of cast iron, bronze and aluminum, there were some sections of 2-in. cast iron spiral pipe for chemical purposes showing three convolutions, with about a 3-ft. diameter for the coil and some very good core work to give uniform thickness throughout.

The afternoon of the day was spent in visits to the Hispano-Suiza automobile works, inspecting its shops and foundries, and to the Government foundries for making castings for land and sea purposes.

The first business session convened on April 12, in the morning, and was taken up entirely in reading the following papers:

"Molding Sand Tests," by D. José Cañameras.
"The Cupola Heat Balance," by J. Ferrer Figueras
"Determining the Humidity of Molding Sands by Their Electric Conductivity," by Dr. V. Ferer.
"Molding and Pouring a Locomotive Cylinder," by J. Salgado.
"Foundry Molding Sands," by G. Masson and H. Compere.
"Microscopic Study on the Influence of Phosphorus on Annealed Cast Iron," by Richard Bazant.
"Note on a New Test Piece for Cast Steel for Light Work," by G. Lely.
"Present-Day Cast Iron and Its Improvement," by Dr. Richard Moldenke.
"Nickel in Cast Iron," by Dr. Arthur Everest.

Most of these were discussed, some at great length. As a rule, the discussion drifted back to cupola practice and kindred shop subjects. About 250 members of the congress attended the meetings, the total registration exceeding 320 before the close of the week.

The second session, on the morning of April 13, took up the following papers:

"Three Communications Connected with the Study of Molding Sands," by Dr. V. Prever.
"Improving Our Methods for Diminishing the Cost of the Cupola Returns," by Leon Thomas.
"Study of Present-Day High-Test Cast Iron, and Furnace Control in Making It," by Dr. O. Langenohl.
"Production of Modern High-Test Cast Iron," by Amador G. Soto.
"The Revival of Cast Iron," by M. Jaime Coll.
"Test Pieces for Non-Ferrous Metals," by I. Sans Dernis.

In the afternoon, visits were made to the steel casting plant of La Compañía para la Fabricación de Contradores, where a 5-ton electric furnace heat of steel was poured into mine car wheels, and the heat treatment of manganese steel frogs and switches made in the establishment was observed. Afterward there was a visit to the Fábrika Sert, where gas meters are made in quantity.

In the evening there was a brilliant reception to the members of the congress and their ladies in the Palace of Deputies, the Governor of the Province of Catalonia receiving. This will be long remembered by those who attended, the great palace being of beautiful architectural design, with frescoes depicting historical occurrences, stately rooms with paneled walls and ceilings, and gold and color everywhere. The Governor, who is a Spanish grandee and the essence of courtliness, conducted the guests through all the chambers and gave a final collation. At noon there had been a special luncheon for the prominent visitors and foundrymen of Spain at the Ritz, which also proved a delightful function.

The third business session, and the closing of the congress, was enlivened during the reading of the second paper by a heavy detonation in the exhibition. A reservoir for compressed air had suddenly blown up and gone through the roof, smashing a large skylight. Fortunately no one was near and only one man was injured by the flying glass. It seems that this reservoir had been poorly welded and the whole bottom came off suddenly, the rest of the tank going straight upward. The following papers were read:

"The Control of Foundry Products," by Professor Portevin.
"Testing Cast Iron," by A. Plana.
"The Use of Cast Iron in Railroad Construction," by J. Manuel Lacleta.
"Study of the Relation of Tensile to Flexure Tests on Cast Iron," by J. Serrat Y Monastre.
"Observations on Iron Bars Embedded in Cast Iron," by Professor Dresden and D. Stoffel.
"Criticism of Methods for Determining Carbon in Iron Products," by Llamas del Toro.
"A Study of Foundry Technical Terminology," by J. M. España in collaboration with A. de Sequeria.
"A Laboratory for a Small Foundry," by F. Cuesta.
"The Fundamental Properties of Brass," by M. F. Ladreda.
"Proposed Classification of Analyses and Tests of Cast Iron," by M. Serrano.

The customary thanks and expressions of felicitations were interchanged, and the International Congress of Foundrymen then adjourned, London being the city selected for next year.

In the early afternoon the banquet was held, which proved another brilliant affair. Lieut. Col. Don César Serrano presided and the Governor was guest of honor. The speeches indicated the best of international feeling among foundrymen, and much may be expected from this annual interchange of technical foundry information. The following morning the party of 52 foundrymen and their ladies started on a tour through Spain to extend as far south as Seville.

Placing Marketing Costs on Sound Basis

Selling Does Not Receive Attention Given to Production—13-Month Calendar and Unemployment Also Considered at Management Meeting

THE costing of marketing activities, operation of the 13-month work calendar and the unemployment situation were among the topics considered at a meeting of the financial executives' division of the American Management Association, held at the Hotel Pennsylvania, New York, April 26 and 27.

Of particular interest was a discussion of the now widely used distribution methods in the manufacturing industries, which were characterized by J. P. Jordan, of Stevenson, Harrison & Jordan, New York, consultants on business problems, as being unnecessarily expensive, and, in most cases, lacking in the careful analysis and equitable proportioning of costs which are usually found in production activities.

Marketing Functions Classified

In suggesting a sound method for the proper costing of marketing activities, Mr. Jordan stated that the principal functions should first be classified roughly into the following groups: Market research, or an investigation of where and in what volume goods may be sold; sales promotion or the use of demonstrations and other methods of interesting the public in a product; advertising and publicity; warehousing and shipping; statistical work; sales engineering or definite technical assistance in the use or consumption of a product, and direct selling activities in the various branches. The speaker pointed out that these classifications are not arbitrary, but may be generally adhered to in the marketing of any nationally consumed line of goods.

In costing these various functions Mr. Jordan declared that as many as possible should be charged directly to the branch office in which the activity is carried on and a complete profit and loss statement prepared for each district. As the result of this the direct cost of selling may be obtained and also the expenses of headquarters expended in market research, national advertising, etc., may be arrived at. Similarly the cost of sales made may be deduced and finally the unit cost of sale for each item. Further division may be made to indicate the cost of sales for each product and in this manner specialties and established staples may be classified as to cost of marketing.

It is usually necessary, the speaker went on to explain, to have a standard sales cost for each item, for, as is true in the steel industry, the cost of manufacture varies in different seasons of the year, depending upon the rate of operation. This enables the management to arrive at a definite trading margin below which no company should be willing to take orders even at the risk of losing business.

Proportioning General Expense to Branches

Proportioning of general sales expenses to individual branch offices was characterized by the speaker as one of the most difficult problems in marketing and one of the reasons for allocating as much of the distribution expenses as possible directly to the branches. The general expenses, he said, cannot be prorated on the basis of sales, for one office may be selling very heavily and yet not be deriving as much benefit from national advertising, market research, etc., as another branch whose sales have become unusually light. National advertising, he pointed out, may usually be charged to the total volume of goods advertised. For expenses in general, Mr. Jordan expressed himself as in favor of prorating on the basis of orders, values and quantities sold, the allocation necessarily being adjusted to meet unusual conditions and figured on a definite basis without guesswork or estimating.

J. T. MacBain, Union Carbide & Carbon Corporation, New York, suggested a comparison of branch offices with the different departments in the plant and thus allocating expenses, but Mr. Jordan pointed out that plant departments are not called upon to meet competitive conditions and other problems which confront the distributing departments.

What Is Accomplished

With the organization of marketing activities as outlined by Mr. Jordan, it is possible to obtain a monthly record of costs of sales offices and branches, a complete record of sales at each branch and gross profits by branches, the sales of each product and class of products, the cost per unit of branch selling expense, the ratio of all sales to branch office sales and the unit selling cost of each product. With the aid of these figures the management is able to allocate sales to individual office, to make use of a definite sales quota plan, to budget the various branch expense accounts, to compare the actual results of sales and expenses to quotas and budgets, to prepare charts showing compliance with quotas and budgets, to institute a fair and equitable bonus plan and to discover what lines are not profitable.

Results of 13-Month Work Period

ADVANTAGES and disadvantages of the 13-month work calendar, as based upon the experience of some 40 companies now using the plan, were outlined in a report by M. B. Folsom, assistant to the chairman Eastman Kodak Co., Rochester, N. Y. As the result of a questionnaire sent to about 70 companies in the United States now using the 13-month calendar in one form or another, Mr. Folsom learned that two companies had been using the simplified calendar for 30 years or more. Ten introduced it in the period from 1911 to 1916; 12, during the next five years, and 15 after 1922. The extra day at the end of the year is sometimes inserted at the end of each thirteenth period, while some companies find it more convenient to add an extra week to the last period every six years. Nearly all the companies using the plan base all their internal records upon it, but in most cases statements to the trade are sent upon the customary dates in the old calendar and accounts payable are paid in the same way. Many companies, however, have made arrangements with banks, vendors and companies supplying light, power, etc., to render statements upon the desired dates in the new calendar. Books are usually closed at the end of the periods, this having led to one disadvantage on account of the unevenness of quarters. To eliminate this inconvenience, a few companies have discarded the practice of quarterly closings, and others have been able to secure all desired results by the use of cumulative closings for comparative purposes.

Advantages and Disadvantages

A large percentage of the companies replying to Mr. Folsom's questionnaire reported little or no difficulty in introducing the new calendar, and listed its principal advantages as the facilitating of comparisons of business, plant operations, etc.; elimination of split payrolls; assistance in budgeting; ending of month at end of week; fixed number of days in month and flexibility of accounts.

The disadvantages of the system, most of which arise on account of the use of two different calendars at the same time, would be largely eliminated by the general adoption of the calendar, according to Mr. Folsom, and also to a consensus of opinion of the companies now using the 13-month plan.

Representatives of several companies operating 13-month work calendars told of their experiences with the introduction and use of the new system and all reported complete satisfaction. L. J. Stewart, comptroller Western Clock Co., LaSalle, Ill., stated that his company had used the simplified calendar for more than 30 years and mentioned most of the advantages listed above as having been derived from its use.

Paul H. Wilson, secretary Graton & Knight Co., Worcester, Mass., said that his company had introduced the 13-month calendar simultaneously with a new accounting system in 1918 and that the results had been very satisfactory. He pointed out that a few inconveniences were met in the first year or two on account of the difficulty of making comparisons with the previous years, but that such disadvantages were automatically overcome as the plan continued in use.

World-Wide Movement to Introduce New Calendar

At the close of the session the plans now under way to secure world-wide adoption of the 13-month calendar were outlined. It was pointed out that the League of Nations at a recent meeting had asked all the Governments of the world to appoint committees to obtain the trend of public opinion in the various countries regarding calendar revision. After the results of the work of these committees have been accumulated a World Congress will be called to compare results, and if favorable to the new plan, to arrange for its universal adoption. It was predicted by some exponents of the revised calendar that present progress indicates its general adoption on Jan. 1, 1933.

Unemployment Analyzed

AN analysis of the present unemployment situation by Dr. H. W. Moorhouse, president Brookmire Economic Service, Inc., New York, was the feature of the luncheon meeting on Friday. Dr. Moorhouse estimated the number of persons unemployed through lack of economic activity as of March, 1928, at 2,632,000. Although this figure is considerably higher than the 1,466,000 of unemployed which he estimated for 1927, it is considerably below the 3,653,000 who were forced into idleness in 1921. He saw no immediate economic danger in the situation and stated that conditions had probably improved somewhat since March, when the last estimate was available.

Dr. Moorhouse derived the above figures by assuming a number of years over a period of the last 19 as periods of full employment owing to the high level of business activity. These years were 1910, 1912, 1917, 1920, 1923 and 1926. The percentage of total population employed was computed for these years and percentages for intervening years interpolated on a straight line and used for computing full employment for intervening years. Actual employment for each year was computed from data taken from a number of official and unofficial sources, and according to the speaker, enough actual figures were obtained to secure a definite index of activity. Unemployment was taken as the difference between the probable maximum employment and actual employment during the year. It does not allow for numbers idle during years of exceptionally high business activity.

Adjustment Is Principal Cause

Dr. Moorhouse pointed out that, although it is true that a certain number of workers were annually thrown out of employment on account of the so-called mechanization of industry, economic adjustment invariably followed which enabled these persons to find a livelihood in other lines of work. The fact that this adjustment usually followed slightly behind the actual mechanical progress of industry, he declared, would account for a certain normal unemployment, an average of 874,000, or 2 per cent, as computed over a 19-year period. A more basic reason, however, for such periods of unemployment as we are now passing through is the business cycle, and so long as the business cycle exists the number of unemployed will fluctuate with it.

Although it is possible to alleviate unemployment to a slight extent by stimulating activity on public works and other projects, Dr. Moorhouse stated that he did not believe this would ever lead to any definite solution of the problem. When appropriations have been made and plans prepared it will be impossible to await a period of unemployment before undertaking a project and likewise work of this sort cannot be created indefinitely at such times.

ORES BECOMING LEANER

Iron Content in 1927 at Lowest Point in 10 Years; Moisture Was High

LAKE SUPERIOR ore decreased in average iron content over 0.5 per cent last year, being 51.19 per cent iron, natural, as compared with 51.75 per cent in 1927. This is the lowest in the past 10 years, as shown in an annual report of the Lake Superior Iron Ore Association, containing tables of ore analyses of all grades and for all ranges and including also the content of phosphorus, silica, manganese and moisture. The highest iron content in the 10-year period was 52.07 per cent, in 1921, which was a very poor tonnage year and during which shipments were more generally confined to the richer grades of ore.

The moisture content increased last year to 11.31 per cent from 10.78 per cent in 1926, and with the exception of 1919 was the largest in the 10-year period. This may have been in part due to the fact that less ore was washed last year than during the preceding year, the percentage of moisture being less in washed than in unwashed ore.

While the percentage of silicious ore was virtually the same as during the previous year, more silicious ore running high in silica was shipped last year than in 1926. The iron content of silicious ore dropped 2.50 per cent to 37.29 per cent, and the silicon content of this ore increased nearly 5 per cent, or from 33.58 per cent to 38.35 per cent. This evidently explains an increase of 0.25 per cent to 8.60 per cent in the average silicon content of all ores. The phosphorus content increased from 0.101 per cent to 0.105 per cent and manganese from 0.80 per cent to 0.84 per cent.

Bessemer ore last year had an average iron content of 54.67 per cent, compared with 55.16 per cent in 1926. Low-phosphorus non-Bessemer ore, comprising over 61 per cent of the total ore shipped, declined in iron content from 51.39 per cent in 1926 to 51.03 per cent last year. In the Mesabi district low-phosphorus non-Bessemer decreased in iron content from 50.94 per cent to 50.40 per cent. High phosphorus non-Bessemer decreased from 51.11 per cent to 50.86 per cent. Manganese ore was the only grade to show a gain in iron content, increasing from 42.64 per cent in 1926 to 42.81 per cent last year.

Taking the ore by ranges, the iron content of that mined on the Mesabi range was 51.47 per cent last year, compared with 52.16 per cent in 1926. On the Gogebic range there was a decline from 52.97 per cent to 52.30 per cent, on the Marquette range a decrease from 50.07 per cent to 49.40 per cent, and on the Cuyuna range from 43.53 per cent to 43.05 per cent. The Menominee range showed an increase from 50.30 per cent to 50.52 per cent, and the Vermilion range an increase of from 58.22 per cent to 58.47 per cent.

Commercial Aviation in the United States

Express and passenger air routes in the United States are placed at 7265 miles in a statement prepared by David Gregg, research engineer AC Sparkplug Co., Flint, Mich. Mail routes measure 7763 miles, and the total length of commercial air routes is 12,627 miles. On these routes 3264 planes are operating, with 3584 pilots licensed. Last year 2011 new commercial planes and 365 military and naval planes were built, a gain of 98.4 per cent over the 1926 output. The largest production by any company was 454 units.

By June 30 air mail planes will be flying 25,000 miles daily. With 80 station stops, these planes will be serving trade areas which include a population of over 62,000,000 persons.

Electrochemists Hold Spring Meeting

Electric Annealing and Melting of Non-Ferrous Products Reviewed—Refractories for Electric Brass Furnaces—New Officers

WITH a registered attendance of about 275 members and guests, the fifty-third meeting of the American Electrochemical Society at the Stratfield Hotel, Bridgeport, Conn., last week, April 26, 27 and 28, was one of the largest the society has held. A variety of subjects, covered by the presentation and discussion of over 30 papers, attracted electrochemists and metallurgists from many industries and localities. One day's sessions were devoted to industrial electric heating, another to a symposium on the chemical production of electricity, at which 18 papers covered the technical and theoretical problems of batteries of all kinds, and a third to the electrodeposition of metals. Besides these there was a round table luncheon on "Refractories for Electric Brass Melting."

Electric Annealing of Non-Ferrous Products

The session on industrial electric heating was held jointly with the National Electric Light Association. Unfortunately there were only two papers in this field finally offered at this session, others originally provided for not being available. The two papers presented dealt with recent important developments in the non-ferrous industry—one the electric annealing of non-ferrous metals and the other, the melting of nickel-silver in high-frequency furnaces.

Taking as his subject "Annealing of Non-Ferrous Metals in the Electric Furnace," Robert M. Keeney, industrial heating engineer Connecticut Light & Power Co., Waterbury, Conn., presented a picture of the latest developments in this field, particularly in Connecticut, where the manufacture of non-ferrous products is a leading industry. For annealing such products the author stated that there are now 27 electric furnaces and annealing machines in that State with an installed capacity of 5865 kw., distributed among 15 plants. These furnaces are used for the annealing of brass condenser tubes, seamless brass tubing, brass shells, brass eyelets, aluminum tubing, nickel-silver stampings and for the bright annealing of copper tubing.

Little progress has been made, says Mr. Keeney, in the application of electric heating to the breaking-down operations of the brass rolling mill, but it is proceeding rapidly on the lighter products which require more finishing. For this class of work the electric furnace has proved more economical than oil or gas, in many cases resulting in an annual return of 50 per cent on the investment. The failure to apply them in rolling mills is due, says the author, to failure to consider economies in over-all cost which electric annealing may produce.

The author discusses the various types of furnaces suited to brass, copper and nickel-silver products. For annealing brass tubing two methods are used: Passing an electric current through it, an adaptation of the Snead machine, and the use of the muffle furnace. For bright annealing of copper tubing the electric water-sealed furnace has proved satisfactory.

Discussion

Discussing this paper, E. W. Beardsley, furnace engineer American Brass Co., Waterbury, Conn., said: "The question is asked, why have no Connecticut manufacturers installed electric furnaces for the rolling and drawing of brass, copper and nickel-silver into sheets, heavy tubing and wire? It is suggested that the answer lies in a failure to investigate the advantages to be gained. This seems to be a common belief among electric furnace salesmen and other engineers who are not acquainted with the manufacturers' conditions. Connecticut manufacturers have installed electric furnaces for the annealing of non-ferrous products other than small tubing. There are various reasons why they have not gone further in that direction. To begin with, I know of no such manufacturer who can buy electric energy for 1c. per kwhr., including demand charges.

"Mention is made of the economy of the recuperative type of furnace. In one case, careful consideration of such a furnace developed the fact that, out of six plants where, theoretically, it might be profitably used, there were only two locations in which it would be a physical possibility to install a furnace of such length, without prohibitive expense in changing existing equipment. Another drawback to the general adoption of the recuperative type of furnace in brass mills, as well as some other seemingly valuable devices, is the mistaken idea regarding the value of an automatically maintained uniform furnace temperature. A steel mill runs all day, commonly, on a product of uniform character requiring a uniform heat treatment. In a brass mill the character of the work varies greatly in the course of a day. One lot requires a certain temperature. The following lot may require 100 deg., or more, above or below that.

"The accurate control or determination of temperature in the electric furnace is of great advantage for some of the most rigid requirements in the finished product and the saving of rejected output. The duplicating of savings made elsewhere is dependent upon a comparison of the previous practices as well as other factors. Failure to install electric annealing furnaces may, therefore, be due in no small measure to the fact of careful overall consideration rather than to lack of it."

In reply, Mr. Keeney said that the small user cannot get 1c. power, but the large one can so adjust his power consumption as to obtain power at that price on his furnace. While it is true that the recuperative furnace is hard to adapt in brass rolling mills, there are other simpler ones which can be used. It is always best to consult the power company before installing any furnace.

High-Frequency Melting of Sterling Silver

Operating data obtained from melting sterling silver in Ajax-Northrup high-frequency furnaces at the plant of the Handy & Harman Co., Bridgeport, are given in a paper, "Melting Sterling Silver in High-Frequency Furnaces," by Robert H. Leach, manager of research and development of that company. The performance of both the oscillator and motor generator types is discussed, as well as the relative efficiency of the air-cooled and water-cooled coil when used with the generator type. Costs, as compared with the operation of oil-fired furnaces, are also summarized. These are said to compare favorably with the type of oil-fired furnaces previously used, with the principal advantages as follows: Accurate control of temperature and uniform heating, prevention of metal losses, reduction in the amount of metal absorbed in the furnace, and improved working conditions.

Answering a question as to whether there is not in such furnaces considerable churning of the hot metal so as to cause absorption of gases, Mr. Leach said that there is churning in the motor generator types, but the metal made in these stands the very highest tests.

Over 80 sat down at a round table luncheon Friday, April 27, presided over by Dr. B. D. Saklatwalla, vice-president Vanadium Corporation of America. A very interesting discussion on "Refractories for Electric Brass Furnace" followed. Representatives of many of the electric furnace builders and users were present, as well as producers of refractories and electrodes.

These round table discussions, which originated with the society, are regarded as occasions on which anyone can speak his mind freely without being quoted. Many phases of this important problem were brought up. It is apparent that a satisfactory solution has not yet been reached and that there is much room for improvement in finding a refractory suitable as to life and efficiency, particularly for copper and red brass melting furnaces.

Paul J. Kruesi, Elected President of the American Electrochemical Society for 1928-1929, *Is President of the Southern Ferro Alloys Co., Chattanooga, Tenn.*

The relative merits of various refractories were freely discussed, such as fused magnesite and carborundum, and considerable difference of opinion was expressed. The question as to whether a lining should be put in a furnace by ramming in the refractory or by the use of blocks of material suitably cemented together took up considerable time. There were arguments for and against both. There was considerable free discussion of new refractory materials. The interchange of opinion on the life of refractories developed from the experience of users was illuminating.

New Officers

At the annual business meeting, the following officers were announced as elected:

President for one year: Paul J. Kruesi, president Southern Ferro Alloys Co., Chattanooga, Tenn.

Secretary for one year: Dr. Colin G. Fink, Columbia University.

Treasurer for one year: Acheson Smith, Acheson Graphite Co., Niagara Falls, N. Y.

Vice-presidents for three years: Dr. F. C. Frary, director of research Aluminum Co. of America, New Kensington, Pa.; F. N. Speller, metallurgical engineer National Tube Co., Pittsburgh; Dr. Alfred Stansfield, professor of metallurgy McGill University, Montreal, Canada.

Managers for three years: Dr. F. M. Becket, vice-president Union Carbide & Carbon Co., New York; L. E. Saunders, manager abrasive plants, Norton Co., Worcester, Mass.; S. Skowronski, research chemist Raritan Copper Works, Perth Amboy, N. J.

It was announced that the late Dr. Carl Hering of Philadelphia, one of the founders of the society, left it a substantial sum of money, the amount not to be known for a year or so.

Future Conventions

The fall convention is to be held at Charleston, W. Va., Sept. 20, 21 and 22. The "Chemistry and Metallurgy of Nickel" will be the subject of one symposium, and there will be a group of papers on "Chemical Reactions at 1000 Deg. C. and Above."

It was decided by the board of directors that the spring meeting next year, upon invitation by the University of Toronto, will be held at Toronto, Canada, May 27, 28 and 29.

Plant Visitations

Several plants threw open their doors to those attending the convention. Among these were: Bridgeport Brass Co.; General Electric Co.; Remington Arms Co.; Holmes & Edwards Silver Co.; American Tube & Stamping Co.; Handy & Harman, and Connecticut Light & Power Co.

Japanese Railroads Buy 60,000 Tons of Rails from Domestic Mill

WASHINGTON, April 30.—An order for 60,000 tons of 100-lb. rails has been placed by the Japanese Imperial Government Railways with the Yawata Steel Works, covering requirements for the coming half year in connection with a rail replacement program, according to a report received by the Department of Commerce from Tokio. The rails will be laid on the electrified portion of the government railroads, some parts of the Tokaido line and a portion of the Sanyo line.

In addition to the replacement of 75-lb. rails with 100-lb. rails, 65-lb. rails will be replaced with 75-lb. rails. The use of light rails and a narrow gage have always seriously restricted speed and carrying capacity, the report says, and in some quarters this replacement is considered as preliminary to a general movement for widening gages, although this would require an extensive relocation of many parts of the main lines.

Steel Plants Have Larger Forces and Bigger Payrolls

WASHINGTON, April 28.—Employment in iron and steel plants increased 1.9 per cent and the payroll 2.1 per cent in March when compared with February, according to the Bureau of Labor Statistics, Department of Labor. The number of employees in 200 plants was 262,853 in March, against 258,060 in February, while the respective weekly payrolls were $8,394,777 and $8,225,173. Employment in the machine tool industry increased 2.2 per cent in March; in cast iron pipe foundries, 3.7 per cent, and in plants making foundry and machine shop products, 1.6 per cent.

When compared with March of last year employment in iron and steel plants showed a decline of 6.3 per cent, while the decrease in the payroll was 5.8 per cent. Cast iron pipe plants showed declines of 13.9 and 14.9 per cent; machine tools, 6.3 and 0.9 per cent; foundry and machine shop products, 9.7 and 10.7 per cent.

Employment in manufacturing industries in general increased 0.7 per cent in March when compared with February, and payroll totals increased 1.3 per cent. Employment in March stood at a higher level than at any time since October, 1927, while payroll totals were greater than at any time since June, 1927, with the single exception of October, when they were the same as in March. The bureau's weighted index of employment for March was 86.1 per cent.

New Continuous Sheet Mill Projected in Germany

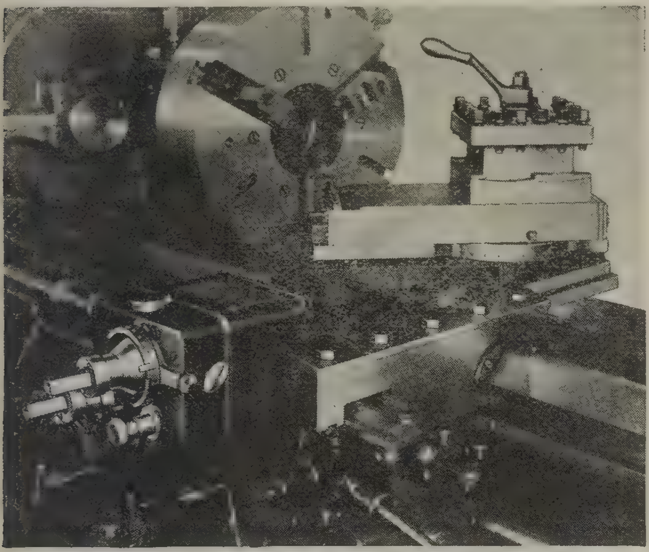
HAMBURG, GERMANY, April 15.—Since the return of engineers who visited steel mills in the United States, the Hoesch Steel Works, Dortmund, is understood to be preparing to introduce the continuous rolling of sheets. This will be the second mill in Germany to produce sheets by the continuous method. The United Steel Works is operating a small mill on an experimental basis, with the intention of increasing capacity in the near future.

The Hoesch works has started the construction of a large cold-rolling mill at Stockheide, where a new development will be utilized. Thin-gage sheets, it is understood, will be electroplated with aluminum at a low cost and offered in competition with tin plate. It is believed that the price will be below that on tin plate. Patents for this process are controlled by the Wickeder Eisen und Stahlwerke, a subsidiary of the Hoesch works, and the plant is being constructed by the Grusonwerke, a subsidiary of the Friedrich Krupp A. G. at Essen.

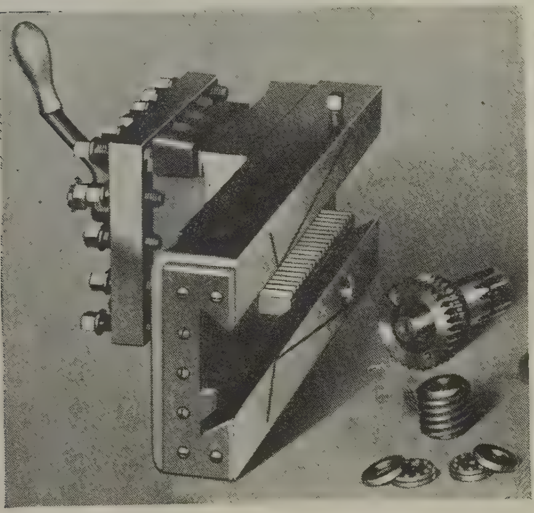
COMPOUND CROSS-SLIDE

Device for Warner & Swasey Lathes Permits Steep-Angle and General-Purpose Work

FOR turning bevel gear blanks and other parts having steep tapers, as well as for heavy-duty general purpose work, the Warner & Swasey Co., Cleveland, has brought out the new compound cross-slide shown in the accompanying illustrations. The device can be furnished for the company's new Nos. 3-A and 4-A turret lathes.



The Full Stroke and Swing Capacity of the Lathe Is Not Affected by the Compound Slide. Arrangement of the bottom of the slide may be noted from the view below



In addition to strength and rigidity for angle and heavy general purpose work the device is designed so that the full stroke and swing capacity of the turret lathe is not affected by the compound attachment. Other features include ease of operation and quick setting to any angle; powerful feed mechanism; wide range of operation; and thorough lubrication.

The compound cross-slide is of massive construction. The square turret, which carries the cutters, is made from a solid forging. The company's patented lock bolt is used so that it is not necessary to lift the turret from its seat for indexing. A swivel plate, made from a steel casting, is held securely to its base by four bolts in order to give maximum rigidity for the heaviest cuts and forming when used either as a compound or for regular straight cutting work. The cross-slide is held to its base by a square lock construction and to this is attributed unusual rigidity of the cross-slide, swivel plate and square turret, even when the slide has traveled to the extreme end of its stroke and somewhat overhangs the base.

The new cross-slide may be used as a straight turning and facing slide, as well as a compound slide, and is securely held and locked in place by four bolts, two on either side of the slide. By locating the four binding nuts underneath the swivel base rather than above, the graduated dial on the compound base has been made narrower than usual, thus minimizing overhang of the cutters and preventing interference with the chuck jaws. Angles can be faced or turned up to the full swing capacity of the Nos. 3-A and 4-A turret lathes and the swivel plate can be rotated through 360 deg., the full swing stroke of the slide being 8 in. It is also possible to use the standard taper attachment with this compound cross slide.

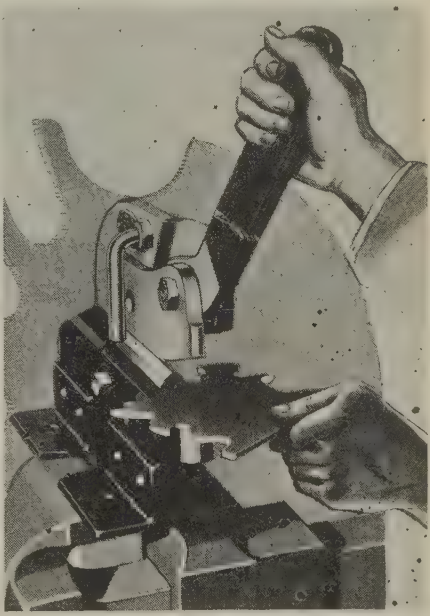
Both the cross and compound slides have power feed, and the arrangement is such that it is impossible to engage both of these at the same time. Graduated dials are large and are proportioned to assure quick and accurate setting of the clips. The power feed knock-off is operated in the same manner as that on the company's standard cross-slide. The feed mechanism is of the worm and worm gear type, the worm gear being of large proportions and mounted directly on a hardened and ground feed pinion shaft, which has a bearing both above and below the worm gear. Ball thrust bearings mounted on both sides of the feed worm are submerged in a bath of oil. It is pointed out that with the rack and pinion construction it is possible for the pinion to run entirely off its rack at either end of its stroke, thus providing a safety feature.

A large hinged oil cup at the front of the cross-slide provides a central oiling station. A wick, feeding from an oil well, lubricates the pinion feed shaft, the worm and worm gear running in a bath of oil. Wipers are used to protect the dovetail beneath the compound from grit and dirt.

Forming cuts 1/32 in. deep, cutting a chip ½ in. wide in 30 carbon steel, are said to have been taken over an extended period and under actual operating conditions without any signs of wear in the feed mechanism.

Hand-Operated Shear and Nibbler

A hand-operated slitting shear and nibbler for use in pattern shops and tool rooms, in making templets and gages, has been placed on the market by the National Machine Tool Co., Racine, Wis. The capacity of the shear and nibbler is for ⅛-in. flat stock. Provision is also made for rod cutting, the capacity of the rod cutter being for material up to 5/16 in. in diameter.



The Capacity Is for Shearing or Nibbling Flat Stock ⅓ In. and Less in Thickness. Rods Up to 5/16 in. may also be cut

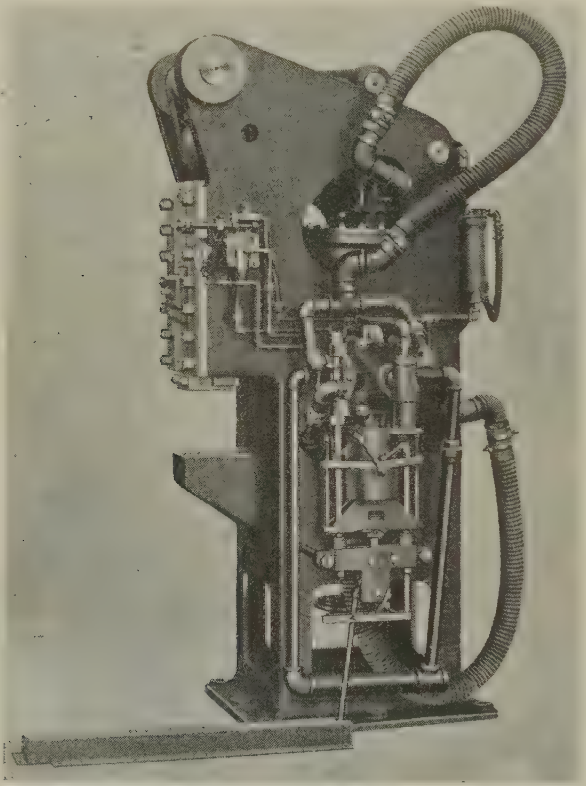
The machine may be mounted in a vise or on a bench. The clamping device consists of a taper latch which will adjust itself to the vise and which may be swung out of the way when bench mounting is desired. Shear blades are of tool steel and are arranged for convenient removal for sharpening. Special blades for cutting intricate shapes are obtainable, and extra upper and lower shear blades and die bushings of standard design can be furnished. The weight of the machine is 13 lb.

High-Speed Pneumatic Press for Coining, Punching and Other Operations

A high-speed pneumatic press for coining, squeezing, forming, upsetting, shallow-drawing, extrusion and punching operations has been made available by the Hanna Engineering Works, 1765 Elston Avenue, Chicago.

The arrangement of the machine may be noted from the accompanying illustration. An air cylinder piston unit actuates the ram through a toggle and lever mechanism such as employed on the company's compression riveters. The toggles are designed to close the gap between the dies with little air consumption, while the lever exerts uniform tonnage on the dies through a considerable portion of ram strokes regardless of variation in thickness of work. The stroke of the die or ram may be set for a wide range of lengths by adjusting a handwheel at the base of press and the pressure exerted between dies may be set for any amount from 20 per cent of the full press rating by adjusting a pilot valve regulating spring. The pressure for which the machine is set is indicated directly on a gage which is visible to the operator at all times.

High speed of 30 to 40 cycles a minute is attributed to a number of features, including the use of shock absorbing cushions at both extremes of piston stroke, air counterbalance and automatic reverse from down stroke to up stroke. The foot trip pedal for starting each stroke cycle requires movement of only 1 in. of the operator's heel, who, in operating the machine, stands naturally with his weight on both feet. The machine is arranged so that only one die stroke cycle will result from each depression of foot trip pedal, even if the pedal is held down. The pedal is guarded against accidental depression. An adjustment is provided to simplify die setting and eliminate shims less than ¼ in. thick. This adjustment, together with the stroke adjustment, is emphasized as minimizing air consumption. The return stroke is accomplished at less than one-tenth the air consumption of full tonnage working stroke. The press illustrated is rated as exerting 150 tons between the dies, at 100 lb. air pressure.



From 30 to 40 Stroke Cycles Per Min. Are Obtainable. The pressure for which the machine is set may be read from a gage

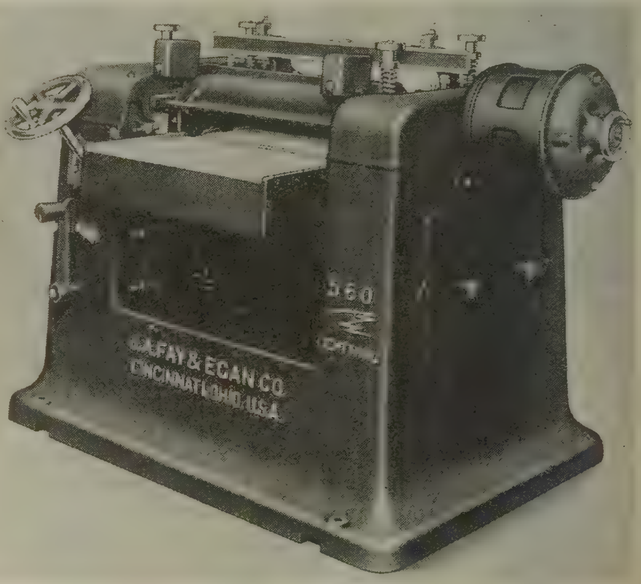
The eighteenth annual May lecture to the Institute of Metals (London), will be delivered by Prof. Cecil H. Desch on "The Chemical Properties of Crystals" at the Institution of Mechanical Engineers, Westminster, S.W.1, London, on Tuesday, May 8.

Two-Speed Single-Cylinder Surfacer for Work Up to 24-In. Wide

A general utility single-cylinder surfacer with a capacity for stock up to 24 in. wide and 8 in. thick has been added to the line of the J. A. Fay & Egan Co., Cincinnati. The machine, designated as the Safety Sealed No. 560, features full electric drive, ball bearings and the arrangement for two-speed operation.

The frame is a one-piece "safety sealed" cabinet with lines free from recesses which accumulate dirt. It incloses all the feed driving parts and removable plates are provided so that gears and working parts may be accessible. Covers are also furnished to prevent entrance of shavings into the raising screw gears or accumulating in lower part of frame. The table, also a one-piece casting, is accurately fitted in the frame and has long ways with gibs for taking up wear.

The feed consists of four rolls, all driven. The upper feed-in roll is fluted. The drive is from the cylinder by means of combination wedge contact link belt, through cut steel gears having true rolling contact. Pressure is maintained by automatic graduated spring levers. Pressure bars are provided before and after the cylinder, acting close to the cutters, and with the close centers of the rolls enable the producing of smooth work on short stock. For feeding a number of pieces, varying up to ⅛ in. in thickness, through the machine at one time, a flexible sectional feed roll and sectional chipbreaker are available. Two rates of feed, 18 and 30 ft. per min., are obtained by means of hardened sliding clutch gears, feed changes being made by a lever at the front of the column.



Two-Speed Gear Shift, Push Button Start and Stop, and Use of Ball Bearings Are Features

For motor drive, a 5-hp. 3600-r.p.m. motor is employed. The machine can also be arranged for belt drive. The floor space occupied is 44 x 65 in.

Switch Throws Motors Across the Line

A new magnetic switch, suitable for throwing squirrel-cage motors directly across the line, or for use as a primary switch for a wound-rotor motor the secondary of which is handled by a drum controller, has been introduced by the General Electric Co. It consists of a triple-pole, restricted-blowout type, magnetically-operated contactor, with normally open interlock, and two hand-reset, temperature overload relays, all mounted on a molded base and inclosed in a drawn-shell, steel case. It is designed for use on standard voltages and frequencies. Maximum ratings are from 50 hp. on three-wire 220-volt circuits to 125 hp. at 550 or 600 volts.

The Hanna Furnace Co., Cleveland, has placed a contract with the W. B. Pollock Co., Youngstown, Ohio, for the rebuilding of one of its Buffalo blast furnaces, including the construction of a new furnace stack.

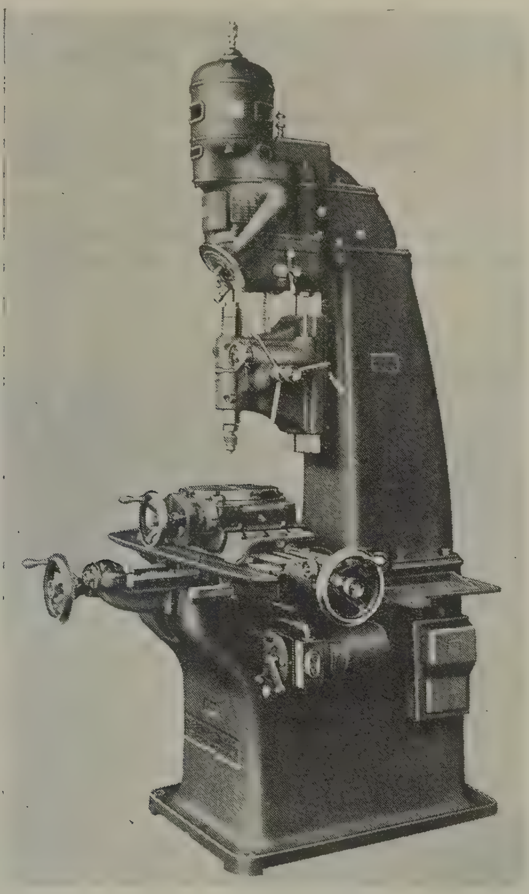
SMALL JIG BORER

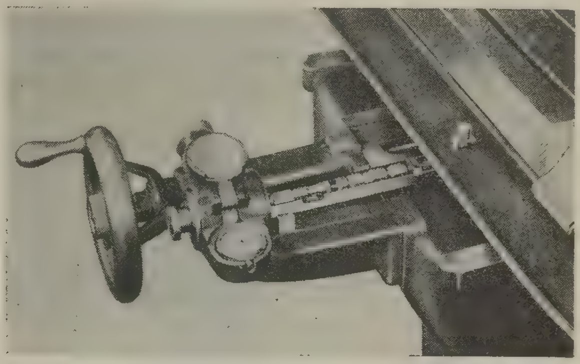
Simplicity of Operation and Wide Range Are Features of Precision Machine

SAVINGS in cost of making jigs and in general precision boring are claimed for the small jig borer here illustrated, which is being marketed by the Pratt & Whitney Co., Hartford. The machine, which is designated as the No. 1 or No. 1A, according to its capacity, is of the same fundamental principle as the company's No. 2 jig borer, previously announced, but is of new design throughout.

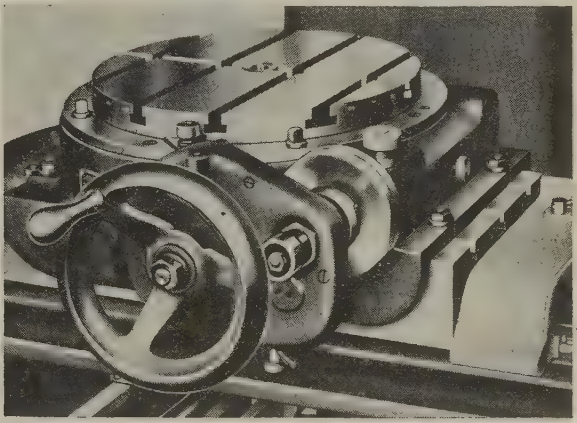
Like the larger machine the new jig borer is in effect a combination of a precision vertical boring mill of single-column type and an accurately built measuring machine for locating the work. The single column construction is emphasized as providing the necessary rigidity for precision boring and at the same time giving full accessibility for setting up without interfering with the light on the work.

The No. 1 and the No. 1A machines are identical except for the difference in the distance between the table surface and the spindle nose, which is 4½ in. greater in the No. 1A machine. A vertical variable-speed motor, built into the machine at the top of the column, is arranged to drive the spindle either directly or through sliding back gears. Shifting from one speed range to the other may be simply accomplished. The shifting lever has a circular motion and operates a spiral cam which engages and disengages the clutches which, in turn, connect the back gears or the direct drive. A complete turn of this lever makes the change from low to high speed or vice versa without stopping the motor. The four motor speeds and the back gears give a total of eight spindle speeds ranging from 132 to 1800 r.p.m., which adapts the machine for drilling and reaming as well as boring.





The No. 1A Jig Borer Is at Left. A close-up view of the indexing circular table is below, and detailed view of one of the measuring slides, as the operator sees it, is above.



The spindle quill construction is used, the quill being carried in a heavy spindle head. The spindle head is mounted on a single slide with broad bearing surfaces and with a gibbed narrow guide to maintain accurate vertical alinement. It is balanced by means of counterweights inside the column and is moved vertically by rack and pinion operated by the large handwheel on the side of the head. Binder bolts on either side provide for locking the head in position.

There is a double worm and clutch device by means of which power feed to the spindle quill, either up or down, is available. A large spoked handwheel at the right-hand side of the head operates a rack and pinion hand rapid traverse to the spindle quill. The round knob at the center of this handwheel serves to engage either one or the other of the two worms giving the up or the down power feed, and also provides a neutral position. A small handwheel on the front of the head is used for slow motion hand feeding of the spindle quill. Power for the quill feed, taken from the motor that drives the spindle, is transmitted through back gears which provide for two power feeds of 0.002 and 0.005 in. per spindle revolution. These back gears are engaged by a small lever on the side of the column and can be shifted while the machine is in motion.

The spindle is mounted in large bronze bearings inside the quill and has a ball thrust bearing at its lower end. The quill has a 4 in. travel in addition to the travel of the spindle head on the column face. This permits the boring of the deepest holes for which the machine is designed without the necessity of resetting the head. Graduations on the face of the quill permit boring to a definite depth. The spindle nose is recessed for collets and is threaded for a collet closing ring.

The measuring instruments and the general arrangement of the work table and slides is the same as in the company's larger jig borer. The work table is traversed in two directions by screws operated by handwheels, and each slide is equipped with a complete measuring device. Slow motion is provided for close positioning. The traversing screws have no connection with the measuring instruments, and errors in the screws, wear or backlash do not affect the accuracy of positioning. The measuring device consists of end measures for even inches, an inside micrometer for fractions of an inch and a ten thousandth dial indicator for determining the final exact accuracy. There is a small adjustable slide attached to the table through a binder which determines the zero position for any one job. With this zero position determined and registered on the dial indicator the table can be moved any desired amount and located exactly by means of the end measures and inside micrometers. The dial indicators show the position of the table relative to the zero position and indicate instantly any minute change that may occur in the location of the table. Thus they form a continual check on the accuracy of the job.

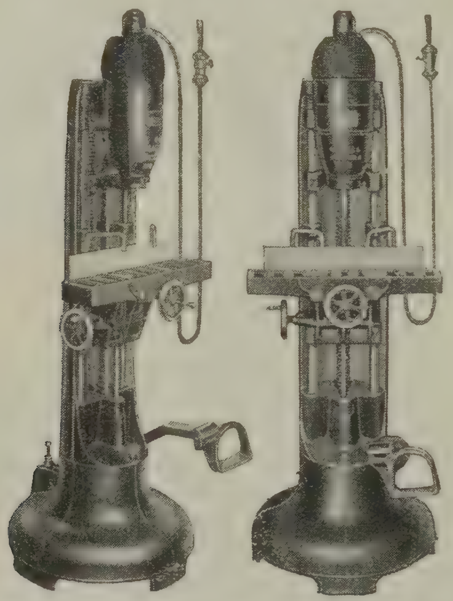
In addition to simplicity and its being readily understood by all mechanics, this method of measuring is said to have the advantage of using the same instruments and the same set-up as the tool maker must use to check the finished job on a surface plate.

Controls are simple and are grouped to facilitate operation. The net weight of the No. 1 jig borer is 2650 lb. and of the No. 1A, 2800 lb. Floor space occupied by the machines is 58½ in. by 59 in. The table working surface is 9¾ by 18 in. and the table longitudinal and transverse travels are 18 and 10 in., respectively. In the No. 1 machine the minimum and maximum distance from the table top to the spindle end are 1¾ in. and 10¾ in. and in the No. 1A machine these distances are 6¼ and 15¾ in. In both machines the spindle head travel on the column is 5 in. and the spindle quill travel 4 in. The distance from the center of the spindle to the face of the column is 9¼ in.

Extra equipment includes a new rotary table for extremely accurate indexing, this table being offered for use in boring circular jigs and drill plates which are most easily laid out by using polar dimensions, i.e., angle and distance from center. It is available for use on other types of machines also. The table has a scraped surface 12 in. in diameter and is arranged for clamping to the regular rectangular table of the jig borer.

New Electric Hollow-Chisel Mortiser

Simplicity is a feature of a new portable electric hollow-chisel mortiser of ½-in. capacity which has been brought out by J. D. Wallace & Co., 134 South California Avenue, Chicago. All attachments and adjustments not required in ordinary work have been omitted and casters have been provided in the base to facilitate moving the machine from one location in the shop to another.



The Capacity of the Mortiser Is For Holes Up to ½ In. Square and 17/32 In. in Diameter. Casters are provided in the base of the machine

The machine is driven by a special General Electric vertical motor, which operates at constant speed under the maximum load, and is kept cool by air drawn through a screen at the top. The air is forced downward by a fan on the armature shaft and, in addition to cooling the motor, serves also to cool the chisel and bit and blow away the chips. The chisel holder is built into the lower motor end-flange, which entirely incloses the bit chuck mounted on the motor shaft. The operating speed is 3450 r.p.m., which is said to be suitable for all work falling within the capacity of the machine, square holes of ¼, ⅜ and ½ in., or round holes up to 17/32 in. in diameter. The motor is entirely inclosed and dustproof. Seepage of oil from the bearing down into the motor, causing trouble in the armature, is avoided by the use of an oil slinger on the armature shaft, just below the ball bearing. Oil dripping from the bearing is caught by this slinger and thrown into an annular chamber which conducts it away from the motor.

Depression of the motor head of the machine for mortising is by means of the foot treadle. The latter has an iron stirrup which hangs vertically and is turned outward to accommodate the foot of the operator as he stands in a natural position. The head may be adjusted for any lower position desired by means of a set screw in the rear of the base, and is automatically carried back to the upper position by an adjustable tension spring. The table of the machine slides on accurately machined rods and is adjusted vertically and horizontally by means of conveniently located handwheels. Means are provided to maintain alinement at all times and to take up any play which may develop in the slide rod bearings. A steel fence and two hold-down rods are fastened to the rear of the table. The maximum distance from the center of chisel to the fence is 3 in.

Compressed Air Hoist on Side of Building

IN the illustration is shown a compressed air hoist with "turbin-air" motor made by the Sullivan Machinery Co., Chicago. This equipment is fastened to the side of a foundry building and is used for hoisting pattern skids for shipping machines from one level to another. The machine weighs 345 lb. It will lift one ton on a direct single line or will pull a 50-ton freight car on a level track.

Pattern Skids and Other Pieces Are Hoisted from One Floor to Another

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Reports from 1500 employers in Illinois, employing 363,944 workers, indicate that employment in March gained 0.7 per cent. The gain in car and locomotive shops was 16.2 per cent; in iron and steel, 5 per cent; in automobile accessories, 8.1 per cent; in electrical apparatus, 5.5 per cent, and in farm implements, 1.4 per cent. Foundry reports were somewhat more optimistic, especially from larger units. In spite of these increases there were 5.4 per cent fewer people employed in Illinois metal establishments at this time than in March, 1927.

Foreign Trade Outlook Favorable

Increasing World Production Begets More Consumption—Expansion, Rather Than Curtailment, of American Trade Best Way to Aid European Recovery

BY JAMES A. FARRELL*

ONE of the indications of the accelerating pace of world commerce that many of our traders have felt in their own business is the stiffening competition they are encountering in some of the so-called neutral markets. But we are meeting it, and it justifies a certain optimism on our part that our sales are expanding just as rapidly, in many cases a little more rapidly, than those of our competitors.

There is a specially significant phase of last year's trade figures. It is that, although total values of raw material imports, both into the United States and into other industrial nations, were smaller than in 1926, volume of such imports was generally larger. That means, of course, increasing production. That definitely indicates continuation for some time, at least, of the stiffer competition just referred to, for the immediate effect of expanding industrial activity is naturally more active sales effort.

Competition Most Severe in a Narrow Market

The ultimate effect, however, is a more cheerful subject of contemplation. For out of increased production and sale comes inevitably increased consumption. It is in the narrow market that competition is most severely felt. As the market broadens that severity decreases. But markets can broaden only as their producers go ahead, as the margin for accumulation develops, in a word, as prosperity manifests itself.

It is only natural that Europe, which suffered most from the war, should be slowest in gathering headway for recovery. In our eagerness to get ahead we must not be impatient at Europe's lower rate of progress. Americans have already been vastly helpful in many ways, which is both appropriate and creditable.

But continuation of that course need not involve us in any departure from sound economic method or egitimate business endeavor. It is not necessary for us to relax our efforts in any market in order to speed up European recovery. We shall be better able to keep up, and even expand, our present course of helpfulness by going on with the forward movement of our trade, than we should be by restricting our efforts for the purpose of giving wider scope to European activities. Curtailment of our enterprise for such a purpose would not only prove detrimental to us, it would not benefit Europe. She will complete her recovery and regain prosperity by hard work, not on doles.

One Country Thrives as Other Lands Thrive

For in this modern world of highly developed transportation and communication national isolation is no onger possible. Conditions in one country react upon he others, and it is as our prosperity is maintained hat the best result in Europe will be achieved.

During nearly 1800 years of the Christian era the truggle with conditions of living made only little more than negligible advance. Transportation by sea mproved. Ships were larger, stauncher, faster and more skilfully handled. But transportation by land was of the same general character as in the days of the Romans, and roads were seldom as good as those the Romans made.

The nineteenth century gave us the railroad, the steamship and the telegraph.

The twentieth century has already given us the automobile, the airplane and the radio.

With these six agencies of transportation and communication the world has made more advance in the last century and a quarter than in all previous recorded time. Yet we are hardly more than over the threshold.

These six things have given new meaning to our life and our work. They have helped us the better to visualize the true relationship that we in this country bear to those in any other land. No longer is it possible for human life anywhere within the range of these six agencies of advance to go on as it did a hundred years ago in the simple routine of ordinary existence.

Now it is gradually coming into the active consciousness of all men everywhere that there is something of both give and take in the mere fact of the existence of numbers of other men elsewhere. The labor, the products and the service of one people constantly ameliorate the life of all other peoples, and all are coming to realize it.

Inasmuch as an important part of the program of this convention deals with the trade relations between the United States and our Latin American neighbors, it will not be out of place for me to say something as to the views of business men generally in the United States, with whom I frequently come in contact, concerning the republics to the south of us.

Trade Demands a Stable and Self-Contained Latin America

We have only one desire for them. We wish them peace, unbroken and undisturbed, from any source, either of international aggression or civil contention. We desire to see them all and always strong, stable and self-contained, for that is the best assurance of uninterrupted tranquillity. We want to have them go their own way, to work out their own destiny, with peaceful purpose and by peaceful methods, and we should be happy indeed if there might never arise any situation that demanded other resort.

That, I am confident, is the hope and wish of American business for all of Latin America. And I am very sure that American business will be found uniformly and unfailingly glad to be of any possible help to make that hope effective in realization.

But I should not have stated this position fully if I were to fail to add one thing in explanation of this attitude. It is the frank admission that our primary motive is intensely practical. In desiring to see all of Latin America always stable, strong and peaceful, we are not actuated by idealism or altruism. Both are strong and high motives. But ours is, after all, an even stronger reliance upon that basic human desire, which has been chiefly responsible for all world advance, the primal urge to better our own circumstances of life.

For we know that peace is the best condition for trade and prosperity. Therefore, we want Latin America peaceful. We know that trade is the chief agency of prosperity. We seek prosperity for ourselves, and we seek it through trading with Latin America. Therefore, we want Latin America to increase in prosperity, so that out of her increase in trade we may derive a share.

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*President United States Steel Corporation and chairman ational Foreign Trade Council. Abstract of an address by r. Farrell read before fifteenth convention of National oreign Trade Council, held at Houston, Tex., April 25 to 27.

We who are producers and traders in the United States have very much in common with the peoples of Latin America, as for that matter we have with the other peoples of the world. We have learned from experience and observation that trade begets trade. We have noted that if two nations merely trade with each other that trade is often neither as profitable nor as beneficial as if the same exchange occurred through other countries as well. We know that it is not a mere coincidence that those nations which display the greatest industrial activity in competition with us are at the same time the heaviest purchasers of our products, manufactured as well as crude. It is production that gives buying power, and it is buying power that consumes.

So we wish for Latin America and for all the world peace, strength, stability and prosperity. So will their trade grow and thrive. So will ours advance. So will foreign trade progress.

BUILDING OUTLOOK GOOD

Increased Construction the Result, Not Cause, of Better Business Conditions—No Signs of Boom

"THE general level of building activity that has prevailed during the past three years probably represents the new standard or normal level for the industry in this country, and there is no reason to expect any material recession from this level in the future," said Virgil Jordan, chief economist of the National Industrial Conference Board, New York, in a recent address before the Credit Association of the Building Trades of New York.

"The immediate outlook for building," Mr. Jordan said, "depends chiefly upon general business and credit conditions in the next few months, and in these respects there is nothing to worry about, even though money may be temporarily tighter and business a little hesitant during the summer. It is far more reasonable to expect that after the stock market has had some of its speculative enthusiasm knocked out of it, easier money and rising prices will stimulate speculation in commodity markets and lead to a rapid and general expansion of business which will carry building along with it to still higher levels next year.

"In the building industry as in all other fields of business, it is high time that we throw overboard some of our traditional ideas of what is normal and proper and recognize that we live on a radically different plane of public demand and industrial accomplishment than before the war.

"Economists and statisticians like to fit all the ups and downs of business into regular cycles and to make its development conform over long periods to a smooth curve of growth. These formulas may be true enough as a historical record of our brief past, but there is no reason to suppose that we are chained to them for the future. Business is no mere machine following purely mechanical laws; it is determined fundamentally by changes in human psychology, but these the statistician has no means of taking into account.

"This is particularly true in its application to the building industry. During the past five years statisticians have been wrangling about the length of time before the war-time 'shortage' in building will be made up and the probable return to some 'normal' of building activity. Invariably these calculations have been upset by the facts, because the future growth of any fundamental type of consumption demand, such as building, cannot be measured by any purely statistical means.

"The deficit in building during the war has very little, if anything, to do with the level of building activity in the past few years or at the present time. The level of building, like that of industrial and trade activity, is not determined by what happened in the past but by the way we feel and the things we want now and in the future. The demand for building depends not merely on the growth of population nor even upon the size of the existing population, but upon the current ideas, habits and customs of the public in respect to building accommodations and services and upon their general purchasing power or effective demand for such services.

"It is far more accurate, therefore, to say that the level of building activity today depends upon general business conditions and national prosperity than to say, as we used to, that business activity and prosperity depend upon the amount of building that is done. Vast as the building industry is, our business activity has grown more rapidly in extent and variety, so that business is relatively less affected by building construction than the building industry is by business, and the relation between the tail and the dog has become more normal.

"Instead of talking about building shortages as a result of the war or about the building 'boom' during the past three years, we should rather consider that throughout the entire past the United States has been underbuilt from the point of view of current standards of living.

"So far as the question of disposable capital for building purposes goes, there is no ground for fearing any stringency in the long run. The constant flow of capital abroad and the outburst of speculation in the security markets all testify to the fact that even now the United States is saving a larger part of its national income than it should and is investing it in ways far more questionable than even the most speculative forms of building investment can be considered to be. Changes in our financial system and banking conditions at home and abroad are releasing increasing credit resources, which can be drawn upon for building purposes. If they are not used for such purposes they will be used for other types of speculation and investment far less sound from an economic or social point of view."

Milton Mfg. Co. Reorganized; W. W. Wilson New President

The Milton Mfg. Co., Milton, Pa., manufacturer of iron bars, bolts, nuts, rivets, etc., which was recently discharged from receivership, has been reorganized with a new board of directors and the following officers have been elected by the board: W. W. Wilson, president; R. W. Krise, vice-president; Harry W. Chamberlin, secretary; O. S. Stamm, treasurer. Mr. Wilson, the new president, was one of the receivers of the company. The following executive committee was also named: Mr. Wilson, Mr. Chamberlin, N. Thompson Marsh, James B. Graham and Seth T. McCormick, Jr.

The stockholders elected the following board of directors: William P. Beeber, president First National Bank, Williamsport, Pa.; William Cawley, vice-president Peoples Savings & Dime Bank & Trust Co., Scranton, Pa.; Harry W. Chamberlin, president Milton National Bank, Milton, Pa.; Chauncey P. Colwell, Cassatt & Co., Philadelphia; William C. Dickerman, vice-president American Car & Foundry Co., New York; James B. Graham, president Lycoming Trust Co., Williamsport, Pa.; Raymond W. Krise, vice-president Milton Mfg. Co.; N. Thompson Marsh, president Milton Trust & Safe Deposit Co., Milton; Seth T. McCormick, Jr., Williamsport, Pa.; Arthur Peck, Harper & Turner, Philadelphia; Vandling D. Rose, Scranton, Pa.; W. Walter Wilson, president First National Bank, Milton.

Current manufacturing problems, such as labor conservation, excessive competition, overproduction and shrinking profits, will be discussed at the sixteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington, May 7 to 11.

Neville Island Blast Furnace to Be Operated by Sharpsville Furnace Co.

The Sharpsville Furnace Co., with offices in the Oliver Building, Pittsburgh, and operating a merchant blast furnace at Sharpsville, Pa., has purchased from the United States Steel Corporation the Neville furnace, on Neville Island, Pittsburgh. This furnace, owned by the American Steel & Wire Co., long has been under lease to the Carnegie Steel Co. It has not been operated much since it was relined in 1925 and when last in blast was used in making ferromanganese. Included in the purchase is a considerable area of land, which will be utilized as a site for a by-product coke plant and cement works. A coke plant on this location will have the advantage of low freight waterborne coal. The Sharpsville company some years ago considered the building of a by-product coke plant at Sharpsville, but abandoned the idea because of high freight rates on coal and the lack of an adequate market for the gas.

Close relations exist between the owners of the Sharpsville Furnace Co. and those in control of the Koppers Co., and the latter will build the by-product coke plant, the coke from which will go to the Neville and Sharpsville furnaces, while the gas is to be used in burning cement.

An interesting phase of the deal is the fact that it means a merchant blast furnace for Pittsburgh and probably a further limiting of the movement of merchant iron from the Valley furnaces to the Pittsburgh district, since the freight charges from Neville Island to representative Pittsburgh district consuming points are 63c. to $1.13 per gross ton, compared with $1.76 from Valley furnaces. For some time, Valley furnaces have not been able to get into the Pittsburgh district with basic iron on account of more favorable freight rates to consuming destinations enjoyed by Pittsburgh district steel companies having surplus iron production. The Neville furnace will make Bessemer and foundry grades as well as basic iron and having a rated capacity of 600 tons a day is bound to be a factor in the Pittsburgh merchant iron market.

The Neville furnace was built in 1900-01 and blown in July 3, 1901. It was last relined in 1925 and having had little use since is said to be in condition for immediate resumption. The other furnace of the Sharpsville company was originally built in 1847 and was rebuilt and enlarged in 1923; it has a rated capacity of 400 tons a day.

Czechoslovakian Works Refuse to Pay Cartel Fines

WASHINGTON, April 30.—The Skoda Steel Works and the Poldi Steel Works of Czechoslovakia are reported to have refused to pay a share of the overproduction fines assessed against the Central European Steel Cartel by the International Steel Cartel for exceeding their quotas during the past year, according to a report received by the Department of Commerce from Prague.

Both companies have produced considerably more steel than the tonnages assigned them under the cartel agreement, it is stated, but, as they use practically all of their steel production for further manufacture in their own plants, their production, although statistically included in the Czechoslovakian national quota, is claimed by them to be exempt from the provisions of the cartel agreement. The Central European Steel Cartel applies to ingots, shapes, bars and plates. In determining the capacity of Czechoslovakian steel plants, the Skoda and Poldi works were included in spite of the fact that they produce almost none of this material. It is pointed out that they have been considered as part of the cartel, although they were never actually members.

As a result of their refusal to pay fines, the report says, it is assumed that Czechoslovakia's steel quota will be reduced by the amount of the allotments assigned to those plants. A further reason advanced for the action of the Skoda and Poldi companies is that they prefer not to make public their steel production figures as is required by members of the cartel.

German Wire Mills Establish Experimental Plant

HAMBURG, GERMANY, April 15.—German wire mills have established an experimental plant through the wire makers' association. Under the registered name of "Weka," the plant, owned in common by the members of the association, will make a wide range of wire products, including nails, barbed and fencing wire, both plain and galvanized. Experiments will be made to improve the quality of the product, to reduce labor costs, to better manufacturing methods, distribution, etc.

This is the first plant of this type to be established in Germany, and all results will be for the use of numerous small wire mills, which make up the membership of the association.

Purchasing Agents to Meet in Kansas City

Preliminary announcement has been made of the thirteenth annual convention and Inform-a-Show to be held in Kansas City, May 28 to 31, by the National Association of Purchasing Agents. The sessions and the exhibition will be held in the American Royal Building. The arrangements will be such that those attending the sessions will pass through the exhibit to reach the meeting rooms. G. A. Renard, 11 Park Place, New York, is secretary-treasurer.

Market for Road Machinery in Czechoslovakia

An American export house recently established an agency in Prague, Czechoslovakia, to represent 14 American manufacturers of road-building and construction machinery, according to a report received by the Department of Commerce, Washington, from the assistant trade commissioner at Prague. The report says that larger American units, such as steam-rollers or large power shovels, find no market in Czechoslovakia, but that prospects for specialized American equipment have improved.

Industrial Stocks of Coal Slowly Decreasing

Stocks of coal on hand in industries of the United States and Canada are estimated as of April 1 by the National Association of Purchasing Agents at 45,744,000 net tons. This compares with 47,388,000 tons on March 1. There has been a slow decline from the 60,154,000 tons on Oct. 1 last. Industrial consumption in March is estimated at 38,268,000 tons—the largest for any month in a year. It compares with 36,301,000 tons in February.

The supply of coal in industry is estimated at 24 days for steel mills, 36 days for by-product coke plants, 38 days for railroads, 57 days for electric and gas utilities, and 36 days for other industries.

Germany Seeks Newfoundland Ore

HAMBURG, GERMANY, April 15.—As a result of a protracted strike at the Swedish iron mines, shipments to Germany have decreased from 1,000,000 tons of iron ore a month to about 345,000 tons in March. A further decrease for April is expected, as stocks of ore at Narwik and other Swedish ports are almost gone.

The reduction in the available Swedish supply of iron ore has influenced a few steel makers in Germany to seek to contract for almost the entire output of Newfoundland mines. Newfoundland ores have a lower iron content than the Swedish, but their higher silicon and phosphorus content make them quite suitable for use in Bessemer steel production and their smaller manganese content is an advantage. The steel makers in question hope to be able to secure from 85 to 90 per cent of the Newfoundland exports of iron ore this year.

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This Issue in Brief

Eliminates defective castings by "single-heat" annealing. Annealing cycle of malleable castings is based on an anlysis of the iron in each heat. Close control of temperature has reduced average combined carbon to 0.03 per cent.—Page 1209.

Doubts whether pearlitic iron castings will be produced to any great extent in this country. To avoid confusion, pearlitic castings must be produced in separate building, which would necessitate providing new capacity, Dr. Moldenke says.—Page 1241.

When you weld high-chromium alloys be sure the joint is clean. The flame should be strictly neutral and of minimum dimensions. Rustless irons require annealing after welding, to soften and toughen the metal at the joints. But rustless chrome-nickel irons, being non-air-hardening, need not be annealed.—Page 1242.

Business in metal trades shows improvement over last year. Forty-eight per cent of National Metal Trades Association members report business as "excellent" or "good," while 52 per cent find it "fair" or "poor."—Page 1246.

Reduces process inventory more than 50 per cent by paying foremen a bonus based on work in process. If the foreman succeeds in keeping the work in process in his department within the limit of the budget he gets a bonus of 10 per cent of his salary.—Page 1289.

Unemployment due to mechanization is as yet an economic myth, says chief of Industrial Conference Board. Mechanization of industry is a relatively slow process, and usually allows sufficient time for readjustment. Slack is taken up by non-industrial occupations.—Page 1246.

Pay your foremen a bonus and increase your profits. One manufacturer bases foremen's bonus on relation of actual operating expense to shipments. Another calculates it on bonuses earned by the men in the foreman's department. — Page 1289.

American manufacturers of machinery, iron and steel are increasingly successful in foreign markets. March shipments of machinery were highest in seven years, and iron and steel were largest in four years.—Pages 1294 and 1296.

Eliminates rats and pin holes in castings by using a special vent board. Venting pins of varying heights pierce the mold, allowing steam and gas to escape. The pins are so fixed that they conform to the configuration of the cavity.—Page 1212.

Permanent mold process produces gray iron castings as heavy as 25 lb. Castings with and without cores are made by the Holley sandless process. Pouring is done on an automatic turntable carrying 12 molds.—Page 1214.

No cupola trouble in more than two years. Holley foundry follows usual cupola practice in production foundry. No alloys or special fluxes are used.—Page 1216.

Profits from manufacturing are steadily increasing, says economist. Average profit has risen from 6 per cent in 1880 to 10.5 per cent in last six years. He doubts that 40 per cent of industrial corporations are non-profit-making, declaring that defunct corporations are included in income tax lists.—Page 1246.

Expert manipulation is necessary to get satisfactory results in making pearlitic iron castings. Silicon content must be low and molds must be hot. Extra care is required with pattern equipment, gates and risers.—Page 1241.

"Accident proneness" and low intelligence do not always go together. Though investigations have revealed that a material percentage of workers has a high accident liability rate, as yet no test has been devised which will enable an employer to detect those workers.—Page 1264.

Get best results by developing their own welders. Shop men of good character and more than average ability are put through a period of training. Apprentice is considered to have "graduated" when he can make butt welds which can be consistently bent 180 deg. around a pin five times the thickness of the plate.—Page 1244.

Believes profits can be estimated a year in advance. Walworth Co. is able to forecast its financial, labor and material requirements by means of a budget, and now believes that profits and the trend of prices can be reliably plotted in advance.—Page 1290.

American manufacturers should not relax their efforts toward building export business, says James A. Farrell. For that would delay rather than hasten the recovery of Europe. Tremendous strides made in transportation and communication facilities portend a great growth in world trade.—Page 1257.

ESTABLISHED 1855

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Business and Economic Outlook

AT the end of the first third of 1928 we are able to get a fair comparison with the forecasts offered on the eve of the new year. These appear to have been generally sound and it looks like 1928 turning out about as expected. Much of the recession in business that came in the latter part of 1927 has been recovered. Automobile manufacturing has revived. Transactions in the stock market have swelled to unparalleled volume. About the only thing unexpected has been a large degree of unemployment, and that has been rather an awakening to a realization of it than a sudden development. The political issue that will be in the forefront this year is not one calculated to upset business.

Thus general conditions remain about the same: Steadily increasing population. Great activity in the creation of consumption goods. Profitless prosperity in all of the old over-equipped industries, wherein there is consequently intense competition. Great profits in new industries that furnish what the people want and that have not yet become over-equipped. Plethora of means for doing new things, both financial and material. Low interest rate. Low rate of yield from investments. The outlook is that all of these conditions will continue about the same.

Such excesses as there are in the stock market will of course be corrected. The gamblers who buy things with the hope that they will go up 10 or 20 points in a day or two will receive a shock. This may not be very far ahead. When the yield of securities, actual or prospective or both, falls below the interest rate it is bad business to borrow money to buy stocks. Such a correction will not spell a general or major decline.

Many stocks have not risen at all. Some have declined. It has been a selective market, truly reflecting the difference between great industrial profits and profitless prosperity.

Stocks of goods have not accumulated. There is no such thing as frozen credits in sight. Loans on securities are high, but that is a kind of credit that never freezes. We have not locked up capital in enterprises that have been unfruitful or mistaken. We are increasing our claims upon European industry.

Our most dangerous symptom is political, as evidenced by desires of Congress for a Muscle Shoals adventure, a Boulder Dam favor to local interests, a recklessly planned Mississippi River flood control, a price-fixing farmer relief bill, and a rejection of the well-considered Treasury plan for tax reduction. President Coolidge alone stands in the way of such perpetrations. It is not surprising that he is tired of politicians winning their way to Congress under the gonfalon of Coolidge prosperity and then contemptuously disregarding his leadership. It is a bad symptom that politicians should want to do such things. With a president of less intelligence and courage, with perhaps a revival of the policy of harassing business, bad times might readily be produced. The association between economics and politics is always close.

Indexes That Do Not Index

THAT the many "indexes" of business conditions need to be interpreted with care is emphasized by the data regularly published on the use of electricity. One journal collects statistics of electrical consumption from about 3000 large manufacturing plants in various industries, scattered throughout the nation, and derives a curve which is taken to indicate general business activity in the United States. The data are also segregated for various industries. We quote from the comment on the steel industry.

> The rate of operations in the rolling mills and steel plants was quite significant, standing at 6.8 per cent under February. . . . A decreased rate of operations was normal during March, but the drop this year was more than was to be expected.

While we do not doubt that the plants canvassed actually have used less electricity in March than in February for the last few years, it is a mistake to conclude that the peak of winter operations in the steel industry is reached in February, for statistics of both pig iron and ingot production show that the peaks were reached in March or April in 1924, 1925, 1926 and 1927. As for 1928, rather than the 6.8 per cent decrease reported above, the real tonnage is as follows (daily rates):

	Pig Iron, Gross Tons	Steel Ingots, Gross Tons
February, 1928....	100,004	161,812
March, 1928.......	103,215	166,945
Increase	3.2 per cent	3.2 per cent

The question will naturally be asked how far the discrepancy between a supposed 6.8 per cent reduction and an actual 3.2 per cent increase is due to the fact that the nights were getting shorter and the electric light bill was getting smaller.

What Is Yankee Ingenuity?

A UNIQUE problem faces the Worcester Polytechnic Institute. Henry J. Fuller, of the institute's class of 1895, has endowed a scholarship, the deed of gift specifying that it shall be awarded to the entering freshman who has exhibited the greatest amount of "Yankee ingenuity." It is a worth while scholarship, for it will be enough to pay college tuition and other fees for the course and give the recipient an additional sum for other expenses. But what is "Yankee ingenuity," and what test shall be given the applicants to determine which is most worthy of the award?

The institute authorities were puzzled and decided to seek counsel among engineers and executives. A group of 50 such men was selected and each was requested to submit a definition of "Yankee ingenuity" and to suggest a basis upon which candidates for the scholarship should be judged. The answers will be turned over to the committee entrusted with the award, consisting of Frederick H. Payne, president of the Greenfield Tap & Die Co., Edmund C. Mayo, president of the Gorham Mfg. Co., and Ralph E. Thompson, vice-president of the Gillette Safety Razor Co. Here are some of the definitions or excerpts from definitions as submitted to the institute:

Owen D. Young, chairman of the board of the General Electric Co., sends this as the best reply received from the members of his staff to whom he submitted the question:

> Ingenuity, according to modern usage, suggests an inventive power which is at once nimble and effective; a readiness in apprehending or devising new and effective means for the accomplishment of any given purpose.

Dr. Michael Pupin of Columbia University:

> Performance of an old stunt in a new and remarkably simplified way.

John F. Stevens, past president of American Society of Civil Engineers:

> It is merely the application of good, old-fashioned common sense to the ordinary affairs of life and the most important factor in the correct solution.

Joseph W. Powell, formerly president of the United States Shipping Board Emergency Fleet Corporation:

> It is closely allied to common or "horse" sense. A boy with common sense will find the simplest and the quickest way of accomplishing his purpose with the least expenditure of time and energy.

Henry D. Sharpe, treasurer of the Brown & Sharpe Mfg. Co., and Prof. A. D. Meade of Brown University got together on the question and evolved "gumption" as the answer.

Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co:

> Yankee ingenuity is that quality of mind which enables the possessor to grasp a problem and to solve it in a manner at once simple, direct and practical as well as frequently surprising. Imagination, wit and common sense applied to the solution of problems mechanical or otherwise. The knack of solving difficulties.

George A. Perry, mechanical engineer of the Jones & Lamson Machine Co:

> I suppose that Yankee ingenuity is, after all, just plain ingenuity, or, we might say, the quintessence of ingenuity. Probably a good definition of ingenuity is cleverness and originality in designing something or in making something to fit the needs from the material one has.

Frederick W. Shibley, vice-president of the Bankers Trust Co., New York:

> Yankee ingenuity implies the inherent ability of solving a knotty problem in a simple and ingenious way, of accomplishing a difficult mechanical job without employing the customary tools. It implies cleverness rather than trained skill.

Frederick H. Payne, of the committee:

> Ability to succeed under trying circumstances. (As a method of award he suggests the careful selection of a list of boys to whom a set of questions would be submitted. The boy who is finally selected must be full of ambition.)

Steel Earnings and Tonnage

INCREASE in earnings of steel companies in the March quarter, over the December quarter, were due almost entirely to an increased volume of shipments, and that fact should be emphasized. It is true the producers were all seeking higher prices, having begun to announce advances in November of last year; but substantial results did not accrue even in March. It has always taken time for market advances to work out in actual invoices and the recent period has been no exception.

From the December to the March quarter the Steel Corporation's earnings increased 31 per cent, and such estimates as can be made would indicate that its shipments increased by more than 31 per cent. If so, there would be no inference that invoice prices on identical products decreased at any point.

The Bethlehem Steel Corporation makes a definite statement to the effect that its average billing prices rose 34 cents a ton, and presumably the computation was made by comparing identical materials. Bethlehem's net earnings, after interest, depletion, depreciation and federal taxes, increased by 43 per cent, but that is not comparable with the Steel Corporation's increase, which is before interest (except subsidiary company interest), depletion and depreciation.

First quarter earnings of the steel industry were not even fair despite the increase; and that is not all, seeing that the increase was due to tonnage, for first quarters normally run above the average in tonnage. In the past three years first quarter steel production has been 10 per cent above the year average and 14 per cent above the average of the other three quarters.

Fully integrated steel companies have not been averaging earnings much above $10 per gross ton, before payment of interest and allowances for depletion and depreciation. In no year since the war has even the United States Steel Corporation averaged as much as $15, with a computation based on assigning all its earnings to the steel products it ships, making no allowance for earnings otherwise accruing.

Various styles are followed in computing or estimating earnings per ton of steel shipped. It is manifestly unfair to consider a dollar earned when there must still be deducted from it an allowance for depreciation, let alone depletion. That is very strongly the case with the steel industry as now conducted, for there is energetic competition in the making of improvements calculated to reduce cost. Depreciation is not an allowance to maintain the *status quo* of the equipment. The design wears out as well as the physical entity, and facilities must be maintained up to the general state of the industry, which is constantly advancing. Earnings have not really been made until all such depreciation has been allowed.

On that basis the integrated steel companies have not been earning more than about $10 per gross ton if as much. The Steel Corporation's depletion and depreciation reserves of subsidiary companies last year amounted to $3.64 per ton of steel products shipped.

French Primacy in Steel Exports

IT was the common judgment that France could not take a position in world trade in iron and steel at all commensurate with the primacy in iron ore resources given her by the Versailles treaty. It was said, and the record bears it out, that the French steel makers had shown no such capacity for developing outer markets as had put their British and German competitors in command of so large a share of this trade. The statistics of the first few years after the war further supported the legend. But the past few years have witnessed a steady gain in French exports. In 1926 they were not far behind those of Germany and 1927 was signalized by the advance of France, for the first time in history, to the position of leadership in the iron and steel trade of the world.

The compilation of the National Federation of Iron and Steel Manufacturers, London, gives the total of iron and steel exports from France in 1927 as 5,602,500 tons, or nearly a million tons above that for the nearest competitor, Belgium-Luxemburg, and nearly 1,500,000 tons more than France exported in 1926. Thus there is a complete recasting of the positions of the six nations which do most of the world's international trade in iron and steel. Before the war Germany was first and Great Britain second, their exports being 6,207,600 tons and 4,969,200 tons respectively in 1913. France, with a total of only 619,200 tons in that year, has climbed from the bottom of the ladder, and with her advance to first place last year, Germany is further displaced by Belgium-Luxemburg. Thus the order, after France, becomes: Belgium-Luxemburg, 4,606,900 tons; Germany 4,230,300 tons; Great Britain, 4,199,700 tons; United States, 1,942,700 tons.

It is noteworthy that France has not made headway against Germany, Great Britain and the United States in the Orient or in South America or Africa. Her gains have been largely in exports to Great Britain, Germany and Belgium, which together take over 60 per cent of French steel exports, the largest item being steel in semi-finished form.

Detecting Accident Proneness

MANUFACTURERS who have studied the accident record of their employees seem to agree that "accident proneness" is a definite mental characteristic of a material percentage of the workers. It is believed, moreover, that this tendency to make industrial occupation more hazardous to one individual than to another is not always heedlessness and carelessness, but in many cases is a form of temperamental instability associated with other traits in an employee. Among these latter are the habit of "reporting sick," under the urge of hypochondria or with the intention to malinger, and inefficiency as an industrial unit. In other words, the kind of man who is not mindful of known hazard and whose brain is slow to react in unexpected danger is also apt to remain away from work unnecessarily, and when at work produces below the standard for his task.

This mental combination has been given much attention by the British Industrial Fatigue Research Board. The investigators of the board are seeking a means of sifting out these undesirables from those seeking employment. Experiments on groups of workers have included tests of reasoning ability, which seemed to show that the man of high intelligence may meet with accidents as readily as the man of low intelligence. Capacity to coordinate was shown to be a factor of large importance.

A series of three tests demonstrated that those who failed to pass them satisfactorily had an accident rate 50 per cent higher than those who passed. Yet the board in a recent report frankly admits that tests so far devised are inadequate and impracticable for everyday use. The hope is expressed, however, that eventually a formula will be worked out enabling employers to separate between the safe man and the unsafe.

With the experience at hand, it would be difficult to convince those who conduct employment offices of American industrial plants, and others having intimate contact with the average run of shop workers, that any cut and dried mental examination could be effectively applied to applicants, with their widely ranging intelligence, different nationalities, and all varieties of temperament from the ultra-phlegmatic to the emotional. Dependence on compulsory physical examination is now very general, and it has proved invaluable as a preventive of accidents, because it insures that no person be put to work where the nature of the job couples with a physical weakness that increases the hazard. Employment managers greatly desire to find an equally reliable psychological test which would show the absence or presence of temperamental instability, meaning thereby inherited or acquired tendencies affecting a person's emotional reactions in a way that would make him more liable to accident. Those closest to labor are skeptical that any such test can be worked out.

Moderate Gain in April Iron Output

Estimates, Collected by Wire, Make the Daily Rate 2815 Tons or 2.6 Per Cent More Than March—Net Loss of One Furnace

WITH nearly all producers estimating the April pig iron output, data gathered by wire on May 1 show that the month's production made a gain over that of April amounting to 2815 tons per day or 2.6 per cent. The output of coke pig iron last month was approximately 3,180,900 gross tons, or 106,030 tons per day for the 30 days. This compares with an actual production in March of 3,199,674 tons, or 103,215 tons per day. This increase of 2.6 per cent in April contrasts with one of 3.2 per cent in March and with one of 8 per cent in February.

According to these preliminary returns there were six furnaces blown in and seven shut down—a net loss of one furnace for the month. The number operating on May 1 was 196, as against 197 on April 1. The Steel Corporation blew in three furnaces and shut down two during April, while independent steel companies put in two furnaces and shut down three. One merchant furnace was blown in and two were blown out in April. There was therefore no loss or gain in steel-making furnaces, but a net loss of one merchant furnace.

Actual data for the April pig iron production will be published in THE IRON AGE, May 10. The table gives the estimated production by districts for April and the actual output for the three preceding months.

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	Feb. (29 days)	Jan. (31 days)
New York and Mass.	208,346	216,224	204,744	203,715
Lehigh Valley	77,950	80,058	75,394	72,639
Schuylkill Valley....	59,651	51,325	44,861	43,946
Lower Susq. and Lebanon Valleys..	31,581	33,301	29,387	30,338
Pittsburgh district...	663,370	639,693	597,543	582,497
Shenango Valley....	100,537	101,946	90,179	77,023
Western Penna.	116,261	101,365	86,725	89,372
Maryland, Virginia and Kentucky.....	102,634	103,857	89,803	94,590
Wheeling district....	115,104	133,764	118,108	108,188
Mahoning Valley....	308,883	296,491	261,837	247,371
Central and Northern Ohio	336,423	330,176	294,427	313,697
Southern Ohio	25,430	25,729	24,773	32,480
Illinois and Indiana.	693,118	715,439	639,763	608,771
Mich., Minn., Mo., Wis., Colo. and Utah	133,812	139,101	130,586	134,718
Alabama	199,342	223,314	207,108	224,132
Tennessee	8,458	7,891	4,888	6,284
Total	3,180,900	3,199,674	2,900.126	2,869,761

Personalities in Organizing Meeting of the American Foundrymen's Association

IN meeting again in Philadelphia (May 14-18), interest in personalities of the American Foundrymen's Association is aroused, particularly in respect to those who took part in the momentous convention which was held in Philadelphia in 1896, May 12, 13 and 14, and out of which immediately came the American Foundrymen's Association. That the situation was ripe for a national institution of the sort was proved by the several hundred foundry executives who attended that 1896 meeting from widely scattered sections of the country. The foundry industry had already assumed large proportions, as outlined by the presiding officer, Francis Schumann, of Philadelphia, who became the association's first president. There were nearly 4000 separate establishments, said he, "with an aggregate capital invested of about $115,000,000, employing about 120,000 persons, whose annual wages amount to nearly $63,000,000. Some 2,600,000 tons of castings are produced annually, requiring some 430,000 tons of coal and coke. The total annual disbursements for material and labor amount to $114,000,000."

Of the participants in the first convention, there are now thirteen living who have served the association in an official capacity. Portraits of eleven of these are reproduced on page 1218, those missing from the group being Robert Taylor, Pittsburgh, and John W. Burr, Brooklyn.

Howard Evans represented J. W. Paxson & Co. at the organizing meeting, served as temporary secretary and then was elected treasurer, which post he kept until 1900. He had been for some years before 1896, as he was for many years after, the main motive power of the Foundrymen's Association, Philadelphia.

W. S. Mosher, Mosher Foundry & Machine Co., Dallas, Tex., was one of the eight vice-presidents elected at the Philadelphia meeting, he representing the Southwestern States.

I. W. Frank, then representing the Frank Kneeland Machine Co., Pittsburgh, and later long the head of the United Engineering & Foundry Co., was elected to the vice-presidency of the association in 1897.

A. I. Findley, in 1896 editor of *Iron Trade Review* and since 1905 editor of THE IRON AGE, was elected a vice-president in 1902.

Jesse Jones, now a director of the association, and long identified with the Westinghouse Electric & Mfg. Co., was with the William Cramp & Son Ship & Engine Building Co., Philadelphia, at the time of the organizing meeting.

S. D. Sleeth, now living at Cambridge Springs, Pa., was of the Westinghouse Air Brake Co., then with headquarters at Pittsburgh.

Stanley G. Flagg, the eleventh president of the association, and engaged throughout the 32 years since the association began in the business of Stanley G. Flagg & Co., was chairman of the committee which nominated the first slate of officers.

S. T. Johnston was with the Whiting Foundry & Equipment Co. in the association's early days, though for years has been synonymous with the S. Obermayer Co., Chicago and Cincinnati.

John A. Penton attended the first meeting as the publisher of *Foundry*, of Detroit. He was the association's first secretary and worked prodigiously for the association's expansion.

Walter Wood was in 1896, as he is still, the dominating factor in R. D. Wood & Co., Philadelphia.

A. W. Walker, then as now of the Walker & Pratt Mfg. Co., Boston, was the association's sixth president.

Robert Taylor, who came to the first meeting for Taylor, Wilson & Co., Ltd., Pittsburgh, and now lives in that city, was the vice-president elected then to represent the Middle States.

John W. Burr, who later became a vice-president, was at the Philadelphia convention for the Burr, Houston Co., Brooklyn.

Iron and Steel Markets

Volume of Consumption Holds

Short-Range Orders Make Mill Scheduling More Uncertain But Total Demand Keeps Up Surprisingly Well—Prices Weaker—Pig Iron Output Gains

THE sustained volume of demand, in view of developments in prices and production, is the most impressive feature of the steel market. Steel ingot output in the first third of the year probably established a new four-month record; finished steel prices are no longer advancing and in some lines are weakening, and buying is increasingly cautious. Individual tonnages placed are growing smaller, and at Pittsburgh some mills are dependent on day-to-day releases to complete their rolling schedules.

Yet the total volume of orders and specifications keeps up surprisingly well, supporting mill operations at a virtually unchanged rate. In spite of the fact that buying is at much shorter range, it is estimated that daily releases for rolling at Pittsburgh district mills are within 5 per cent of the average for the first three months of the year.

Much of this steel represents past commitments, and, while strictly new orders are on a diminishing scale, the amount of tonnage on which deliveries are asked—a better gage of consumption—shows little change. In the East, steel sales in April, including specifications against contracts, ran considerably ahead of the March tonnage. At Chicago there has been a recovery in new business and aggregate daily bookings are almost on a par with shipments. Ingot output in the Chicago district remains at 95 per cent of capacity, and in the Greater Pittsburgh district, at 80 per cent.

Pig iron production in April, estimated from telegraphic returns to THE IRON AGE, was 3,180,900 tons, or 106,030 tons per day, compared with 3,199,674 tons, or 103,215 tons daily, in March. The gain in the daily rate was 2815 tons, or 2.6 per cent. In both 1926 and 1927 April output of pig iron was at the highest rate of the year, coming one month later than peak production of steel, and it is likely that this year will follow that precedent.

While this relationship between pig iron and steel production appears to have been maintained, pig iron contrasts sharply with steel in aggregate output. Steel furnaces have been breaking records, but the daily rate of pig iron production last month was the smallest for any April since 1922, in that respect repeating the performance of January, February and March. This decline indicates a larger use of scrap in open-hearth charges.

The automobile industry is placing large specifications for bars, sheets and strip steel for May shipment, and it is believed that the seasonal slowing down in motor car manufacture will come at least a month later than last year. Two leading automobile builders are reducing production, one of them for a change in models, but the very slowness with which the Ford organization is getting geared up for large-scale output points to a compensating gain in its operations when other companies are expected to curtail.

The seasonal decline in farm equipment production also promises to be less marked than ordinarily. Tractor plants have such large back orders that they will probably not reduce operations at all. Early demand for harvesting machinery is unusually heavy.

In railroad equipment, the inquiries of the Erie for 1000 freight cars and 35 passenger cars, together with the fact that this road will repair 2485 cars in its own shops, comprise the most important activity.

Sheet prices have shown further weakness, and are now back to the low levels of last year. As is frequently the case in a soft market, Valley producers, in some instances, are quoting prices f.o.b. mill that are as low or lower than ruling market quotations on a Pittsburgh base. Galvanized sheets have declined to 3.60c., or $3 a ton below the last advance.

Hot-rolled strip has also given ground. On material 6 to 12 in. wide 1.80c., Pittsburgh, a reduction of $2 a ton, has become a fairly representative price, while 3 to 6-in. strip is selling at 2.05c., Pittsburgh, a cut of $1 a ton. Fender stock, affected by the reduction in automobile body sheets, is now quoted at 4.10c. to 4.15c., as compared with a recent price of 4.20c. At Chicago, prices on hot strip in narrow widths have been marked down $2 a ton.

Wire nails are being more freely sold at $2.55 per keg, Pittsburgh or Cleveland, a drop of $2 a ton.

English low phosphorus pig iron will soon penetrate to points as far inland as Chicago, the iron to come on boats built in England of a size to go through the Welland Canal. About 1000 tons of the English iron has been sold at Milwaukee, and it is being offered in Chicago and other Lake consuming centers at $26, delivered, duty paid. Except for a decline of 50c. a ton on Valley basic iron, prices for pig iron in principal producing districts remain steady. The change in the Valley brings basic to the lowest figure since November, 1915.

The British iron and steel trade, according to cabled reports, is agog over proposals looking to large scale amalgamation under the auspices of a new finance company of Great Britain and the United States.

A reduction in Valley basic iron has caused THE IRON AGE composite price for pig iron to decline to $17.59 from $17.67 last week. The finished steel composite price remains at 2.355c. for a second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 1, 1928	Apr. 24, 1928	Apr. 3, 1928	May 3, 1927
No. 2, fdy., Philadelphia..	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace.....	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti.....	19.69	19.69	19.69	21.69
No. 2, Birmingham.......	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa...	19.50	19.50	19.50	20.75
Basic, Valley furnace.....	*16.50*	16.50	17.00	18.50
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*.......	18.50	18.50	18.50	20.00
Malleable, Valley.........	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh....	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	100.00	100.00	100.00	95.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$43.00	$43.00	$43.00	$43.00
Light rails at mill........	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	34.00
Forging billets, P'gh......	38.00	38.00	38.00	39.00
O.-h. billets, Phila.......	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh....	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12
Iron bars, Chicago........	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.85	1.85
Steel bars, Chicago.......	2.00	2.00	2.00	2.00
Steel bars, New York.....	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh..	1.85	1.85	1.85	1.85
Tank plates, Chicago......	2.00	2.00	2.00	2.00
Tank plates, New York....	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh........	1.85	1.85	1.85	1.80
Beams, Chicago..........	2.00	2.00	2.00	2.00
Beams, New York........	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh....	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 1, 1928 Cents	Apr. 24, 1928 Cents	Apr. 3, 1928 Cents	May 3, 1927 Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.85	2.70
Sheets, black, No. 24, Chicago dist. mill.........	2.85	2.85	3.00	2.95
Sheets, galv., No. 24, P'gh	*3.60*	3.65	3.65	3.60
Sheets, galv. No. 24, Chicago dist. mill.........	3.70	3.70	3.85	3.85
Sheets, blue, 9 & 10, P'gh.	2.00	2.00	2.10	2.15
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.15	2.15	2.20	2.35
Wire nails, Pittsburgh...	*2.55*	2.65	2.65	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill.........	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.25	$15.25	$15.00	$15.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	13.00	13.00	12.50	12.75
Carwheels, Chicago	13.50	13.50	13.50	14.25
Carwheels, Philadelphia ..	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh....	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia...	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.50	16.50
No. 1 RR. wrot, Phila....	15.00	15.00	15.00	16.50
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	11.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.60	$3.00
Foundry coke, prompt.....	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.30	13.12½
Electrolytic copper, refinery	*14.00*	14.12½	14.12½	12.75
Zinc, St. Louis...........	**5.85**	5.82½	5.72½	6.12½
Zinc, New York..........	**6.20**	6.17½	6.07½	6.47½
Lead, St. Louis..........	6.00	6.00	5.95	6.40
Lead, New York.........	6.10	6.10	6.10	6.75
Tin (Straits), New York..	*51.12½*	52.62½	53.50	67.00
Antimony (Asiatic), N. Y.	**10.50**	10.12½	9.50	13.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Volume Continues Fairly High, But Prices Lack Strength

PITTSBURGH, May 1.—Viewed strictly from the standpoint of volume of business, the steel market still is making a good showing. There is a constant flow of small orders, and while there is doubt each day as to mill schedules, the business necessary to complete them usually is in before the day is over. Demand for steel is not tapering off as rapidly as might be assumed from some observations. Indeed, if the volume of ordering was about 5 per cent greater than it is, steel purchases now would make a favorable comparison with those of the first three months of the year. In most finished products mills have orders sufficient to maintain rolling operations for at least another month.

Ingot production usually moves up or down in advance of changes in the rate of rolling mill engagement. That is the case now, as there continues to be some tapering in ingot output in the face of sustained activity of finishing mills. In this and nearby districts ingot output is barely 80 per cent of capacity, but except for bar and strip mills there has been little decline as yet in rolling mill operations.

The price situation is a source of discontent among producers and even that is not as bad as it might have been if the steel trade had made no effort to advance the market in the early part of the year. Even if prices recede to the low levels of late last year, and that appears to be the tendency, steel manufacturers at least have had some benefit from the difference between quoted and invoice prices, to say nothing of the savings that have been effected through relatively full engagement of capacity. There is little strength in steel prices, and in most products the explanation seems to be in the fact that steel makers do not seem to be guided by known consumption in gaging production.

Few believe that the automotive industry will continue to take as much steel in the next 90 days as in the past four months, and the attitude of the railroads toward purchases is illustrated by the fact that one large Eastern system in April ordered about 20 per cent in value of its purchases of the same month last year. No strong hopes are held of a recovery in the oil industry.

Valley basic iron is down 50c. a ton from its recent nominal level. Scrap prices are more inclined to go down than up. Continued depression is noted in coal and coke.

Pig Iron.—The Valley basic iron market is definitely lower. It develops that on the recent sale of this grade to the American Steel Foundries for its Alliance, Ohio, plant that, while the iron was sold by a furnace outside the Valley having a lower freight rate to Alliance than any of the Valley furnaces, there was a quotation from at least one of the latter of $16.50, furnace. Furthermore, this price still is available, and in light of recent developments the lower price became effective more than a week ago. The price of Valley basic iron in the "Comparison of Prices" table under date of April 24 therefore should have read $16.50 instead of $17. A definite offer of iron by a producer establishes a price quite as fully as a transaction at a stated price. The pig iron market as a whole presents little of interest. Consumers under contract are not much concerned about additional supplies, because they are not using iron as freely as they had expected to and the buying is entirely from the spot tonnage buyers, who are paying recent prices on foundry, malleable and Bessemer grades. The Claire furnace of the Reliance Coke & Furnace Co. was blown in May 1 following a five months' period of inactivity. W. P. Snyder & Co. make the April average prices of Valley Bessemer and basic iron $17.50 and $16.70 respectively, compared with $17.50 and $17 respectively in March.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Bolts, Nuts and Rivets.—The market in these products is more remarkable for its firmness than its activity. Rivets still reflect in demand the liberal specifications in advance of the higher prices effective April 1.

Ferroalloys.—Shipments on contracts reflect a little less urgency, in keeping with slightly lower steel works operations, but there has not been much decline in the volume. There has been some talk of an advance of $5 a ton for ferromanganese on last half contracts, but doubt is expressed that steel market conditions will support higher prices in this or any of the other primary materials.

Semi-Finished Steel.—Makers of billets, slabs and sheet bars still report a good movement to regular customers at unchanged prices. Open market activity is practically nil. Tin mills are well engaged, but a decline in sheet and strip mill operations points to some tapering off in the demand for steel for those mills. Users of wire rods are too well supplied or have sufficient tonnage still due them on old orders to be much interested in fresh supplies at present prices.

Alloy Steel Bars.—Makers comment favorably on the fact that for the first time in several years the market shows some stability and that this is the first quarter in a long time in which they have not had to take business at less than the prices of the previous quarter. The movement to the motor car builders is good, but is not expanding as it was six or eight weeks ago.

Bars, Plates and Shapes.—Buying and specifying are at extremely short range, but aside from the worry over mill schedules, manufacturers still find the volume of business fairly satisfactory. What is wanted is usually wanted promptly, and there are instances where promises of delivery of bars in a week have not been good enough to meet the requirement. The mills still have much structural steel to ship, but are less well provided with backlogs in plates, which is the quietest of the three lines, owing to the light demand for railroad cars and for large diameter pipe. Mills here have not been able to do better than 1.85c., base, except for very small lots or otherwise undesirable specifications. But except for tonnage moving on old contracts less than 1.85c. is not being done. Fabricated steel inquiry is not especially active, and few of the shops in this area have as much business as could be handled.

Rails and Track Supplies.—Current business is very quiet and the movement from the mills, though good, is at the expense of order books. Small spikes are especially slow and light-section rails drag, owing to the unfavorable coal situation. Prices are steady.

Wire Products.—Not much complaint is heard as to the movement of wire products from the mills, but it is chiefly against old and low-priced contracts, because of the large specifications accepted on first quarter contracts. There are not enough new requirements to seriously test present prices, and irregularity and weakness in some districts are the result of efforts by manufacturers to win orders from buyers already well supplied or covered.

Tubular Goods.—Fairly good movement of standard-weight pipe hardly makes up for a very light demand for oil country goods, and total pipe mill operations are not more than 60 per cent of capacity. There is much talk of large gas pipe line orders, but they do not appear to be working toward the mills. The best movement in tubing is to the automobile builders.

Sheets.—Business as a whole is quieter than it has been, and in some quarters this is ascribed to the weakness of prices, a condition that usually makes buyers timid. Black sheets are definitely as low as 2.75c., base, and while some mills still hold to 2.90c., there has not been much recent business at more than 2.85c., and contracts are being revised to the new level. There is still a quotation of 3.75c., base, on galvanized, but with some makers taking business at 3.60c. and even less on preferential accounts the higher price becomes more of an asking than a sales basis. The market on all grades is back to the low levels of last year and it is doubtful if the mills have profited at all from the advances that have been announced, since they were well filled up when the advances were made and by contract price revisions they now lose any advantage they may have had through bookings at the higher prices. It is said that sheet consumption averages between 75 and 80 per cent of productive capacity, but as mill scheduling seemingly does not recognize such limitations, recurrent price weakness is easily understood.

Tin Plate.—Demand for tin plate holds up well, and the American Sheet & Tin Plate Co. found it necessary last week to put on additional mills to get tonnage out as fast as it is required. Its operations last week were 94 per cent of capacity, against 92 per cent the week before. Several of the independent makers still are operating full.

Cold-Finished Steel Bars and Shafting.—Orders are coming in steadily and business is regarded as satisfactory, although the individual releases are for smaller tonnages than they were recently. Prices are firm at 2.20c., base Pittsburgh.

Hot-Rolled Flats.—Prices appear to be more steadily maintained on the narrow than on wide stock. The

THE IRON AGE Composite Prices

Finished Steel

May 1, 1928, 2.355c. a Lb.

One week ago	2.355c.
One month ago	2.357c.
One year ago	2.339c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 1, 1928, $17.59 a Gross Ton

One week ago	$17.67
One month ago	17.67
One year ago	19.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.05c. to 2.10c.
6 in. and wider, P'gh	*1.80c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 3.00c.
No. 24, del'd Cleveland	2.84c. to 2.94c.
No. 24, del'd Philadelphia	3.07c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.85c.
No. 24, del'd Cleveland	3.64c. to 3.84c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	1
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

latter usually is in competition with other flat products, and the present is no exception. Some consumers take both wide and narrow stock and usually find some mills willing to make an average price that is below the regular market on the narrow widths. The outside prices quoted refer chiefly to small lots of high carbon steel.

Cold-Rolled Strips.—Tonnage buyers are not finding it hard to get accommodation at 2.75c. for lots of 3 tons or more and 2.90c. is chiefly a price to small buyers.

Warehouse Business.—Demand is somewhat sporadic, but sales are averaging fairly large, although most merchants find them to be running a little behind those at this time last year. The weakness in mill prices of sheets has led to an abandonment of resale quotations predicated on 2.90c., base, for black and 3.75c., base, for galvanized. The regular price schedule is well maintained on cold-finished steel bars, spikes and bolts, nuts and rivets, but warehouses find it hard to get full quotations on nails owing to jobber competition.

Coke and Coal.—The market continues dull and easy, except in slack coal, which is not being produced very heavily on account of a limited demand for screened coal and is bringing good prices because of its scarcity. A Valley blast furnace which resumed today is running on by-product oven coke furnished by a Youngstown district steel company. The market for beehive oven furnace coke is very limited, and such demand as there is comes from other than pig iron producers. Prices are weak at last week's levels. Spot foundry coke goes at as low as $3.50 per net ton at ovens for machine-pushed coke, but hand-drawn coke still is bringing $3.75 to $4.25 for good brands, and as much as $4.75 for the so-called premium brands. The coal market is very slow, and the prospect of improvement is dimmed by uncertainty as to whether the Southern or Northern fields are to get the bulk of the Lake business. Southern shippers are in doubt about the permanence of the rate reduction and are inserting in contracts a clause which provides for the payment of the extra 20c. a ton by buyers in case the Supreme Court upsets the lower court's decision.

Old Material.—Interest in the market still centers around heavy melting steel, which in recent weeks has fluctuated more widely in price than other grades of scrap. One good-sized sale into consumption was made in the week at about $15.75, but on small lots melters generally are not offering more than $15.25 and are getting some material at that price, although $15.50 has been paid by dealers having short orders at $16. The ruling price at most points of delivery in the district is $15.25. Nervousness among dealers has subsided, and lower prices seem likely on the railroad scrap lists this month. This month's Baltimore & Ohio list has 17,860 tons, and the Pennsylvania Railroad list has more than double that amount. Compressed sheet scrap still is scarce, with dealers offering $15 on short orders, but mills are not able to buy under $15.50.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
No. 1 heavy melting steel	$15.25 to $15.75
Scrap rails	15.00 to 15.25
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.25 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	15.50 to 16.00
Industrial	15.00 to 15.50
Agricultural	14.50 to 15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Result of Operation of New Blast Furnace

After something more than a year's operation, results for six recent months on the Betty furnace of the Central Alloy Steel Corporation have been tabulated by Freyn Engineering Co., Chicago, designer of the furnace. Over that period the average daily production of iron has been 725 gross tons.

For each ton of iron the charge has included an average of 3372 lb. of ore, 396 lb. of scrap and 405 lb. of sinter. The yield on the entire charge is reported at 52.01 per cent. Coke was 1752 lb. gross and 1734 lb. net, per ton of iron. The blast was at an average rate of 45,000 cu. ft. a minute. Five-eighths of the ore charged came from the Mesabi Range, the remainder being Old Range ore.

About 1050 lb. of slag was made for each ton of iron, and 867 lb. of limestone was used. Lime in the slag averaged 40.98 per cent, with silica 37.18 per cent and alumina 12.63 per cent.

Blast temperature is carried usually at 1200 deg. Fahr., being regulated by Leeds-Northrup heat control. It can be run up to 1700 deg. if required. Stoves are changed every 2 hr., being on gas 6 hr. and on blast 2 hr. The upper limit on exit temperature is set at 600 deg., at which point gas is shut off.

As the big bell is interlocked with two stock-line recorders, the height of stock in the furnace is gaged every time the bell is lowered.

Three mixer-type Treadwell ladles, 150 tons each, are used to carry the iron to the steel plant. These require relining after handling about 50,000 tons. As there is no mixer at the steel plant, off-heats and surplus iron above open-hearth requirements are poured in the pig machine.

Nicholas & Miller, McCormick Building, Chicago, dealers in pig iron and ferroalloys, have been appointed Chicago sales representatives, succeeding David Evans, for the products of the Sloss-Sheffield Steel & Iron Co., Birmingham.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.15 to 1.20
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.35

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Volume Holds Though Orders Are Smaller—Ingot Output at 95 Per Cent

CHICAGO, May 1.—Although steel buyers are showing greater caution and are ordering in smaller quantities to keep stocks at a point close to immediate needs, the total volume is again running into a large tonnage. Sales and specifications in the last few days have made a sharp recovery, and purchases have been only a shade under shipments. However, most of the current orders are for lots smaller than were being ordered a month or so ago.

In production, this district continues to give account of itself, the average rate of operation at the beginning of May being 95 per cent of ingot capacity. Some mills are sufficiently well scheduled so that deliveries in less than four to six weeks are not being promised. The leading producer has 20 blast furnaces in operation, and the total number of active furnaces in the district is 28 out of 36. A merchant furnace was blown out on April 26.

A continued high rate of activity among some of the manufacturing lines which draw heavily upon Chicago steel mills for materials is indicated by latest reports. Road machinery and excavating equipment manufacturers are busy, tractor plants are behind on orders, assuring capacity production for some time to come, and an unusually early start in the demand for harvesting machinery promises to hold farm machinery production above the seasonal drop that is generally expected by the end of May. In addition to the demands from these sources, the production of standard-section rails is steady and large, while the same holds true of track supplies, makers finding it difficult to meet the shipping requirements in the latter products.

Pig Iron.—Plans are under way to blow out a merchant stack in the next 10 days. This unit is in need of repairs and improvements will be made while it is down. For several months local producers have held production below shipments, affording an opportunity to liquidate stocks. The fact that this stack is going out does not reflect a lower melt, because stocks will be drawn on more liberally to meet the demand, which is steady. More interest is being shown in third quarter iron, and a fair portion of current buying is for delivery overlapping the second and third quarters. A Milwaukee user is in the market for 1500 tons of Northern foundry iron. A melter in this district will take 700 tons of 14 per cent silvery iron. Northern iron is steady at $18.50 per gross ton, Chicago. The first cargo of Buffalo iron to come by water is expected by the end of next week. No change is noted in the silvery iron market.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging. sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet except for occasional inquiries for small lots for immediate delivery. Prices are steady.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Demand for plate mill products in this district is steady, and prices in and near Chicago are unchanged at 2c. Although car building shops are not engaged at capacity, specifications issued by them reach mills in a fairly uniform flow, helping toward more satisfactory rolling schedules in view of the fact that many small consumers are buying at extremely close range and in small lots. The outlook for new business in railroad cars is not promising for the immediate future, but it is reported that several sizable inquiries are in the making. The Rock Island has ordered 500 underframes from the Pennsylvania Car Co. for delivery at its Armourdale, Kan., shops. The only other purchase of note was 250 underframes by the St. Louis-San Francisco from the Virginia Bridge & Iron Co. There is little new inquiry. For several weeks oil storage tank makers have held out of the market and there is nothing in sight from them at this time. Reports are current that consumption of petroleum and its by-products is catching up with output, thus bringing to the fore the impression in some directions that new tank construction has already passed the peak. Specifications for plates, bolstered by a substantial flow of business from the general manufacturing trade, are about equal to shipments.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—This market is quiet in the immediate Chicago territory. Local fabricators are now being offered an opportunity to bid on a number of small tonnage jobs, which, if placed, will round out shop schedules. No change is noted in prices for fabricated steel, the general level being somewhere near the low point of the year. It is reported that the Foshay Tower Building, Minneapolis, Minn., requiring 2000 tons, has been awarded to the Minneapolis Steel & Machinery Co. The Rochester Bridge Co. has taken 3500 tons for additions to several of the Deere & Co. plants. Optimism prevails in Milwaukee, where it is reported that the largest building program in 10 years is getting under way. Close to 6000 tons will be required for a court house in that city.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Reversing market tendencies of a week ago, sales in mild steel bars have turned up sharply, the total for the week being a shade higher than shipments in the same period. The demand is well diversified as to classification of consumers. It is noticeable, however, that buyers are using greater caution in placing orders, and it is evident that there is an undercurrent of doubt as to consumptive requirements in the near future. Specifications from agricultural machinery manufacturers are steady. Tractor plants report that there will be no seasonal letdown in production for the reason that they cannot hope to catch up with back orders. A note of encouragement comes from harvesting machinery builders, who find an unusually large and early demand for their products. Mild steel bar prices are steady at 2c., Chicago. Producers of iron bars have the largest backlogs in over a year. Shipments are a trifle heavier and prices are firm at 2c., Chicago. Although there has been some readjustment of production in several automobile manufacturing plants, the general level of steel demand by that industry has changed but little and alloy bar mills report an undiminished volume of specifications and steady output. New orders and specifications for hard steel bars are a shade heavier than production, but the margin is not wide enough so that the hours of double-turn operations of the Chicago Heights mills can be lengthened. April hard steel bar shipments topped those in March, and producers continue to reduce stocks on hand. Barn equipment manufacturers have satisfied the bulk of spring customers, and operations are pointing downward in that industry. Prices of rail steel bars are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Little change is noted in the wire market. Jobbers in the Northwest report an active business, and shipments for the first four months of 1928 are equal to the first eight months of last year. Orders from the South are in good volume, but there is a decided slackening in the jobbing trade in the central Mississippi River Valley. Mill shipments of nails are small. Nails are quoted $2.75, base, per keg in Chicago, while in outlying district $2.50 is still a common quotation. Mill output stands between 65 and 70 per cent of capacity.

Rails and Track Supplies.—From the viewpoint of new business, this market is quiet. Several small Western railroads are now inquiring for standard-section rails, the total being close to 4000 tons. Mill bookings in track supplies total 3500 tons, but fresh inquiry in these commodities is lacking. Sales of light rails are in carload lots. Rail mills in this district are operating at 90 per cent of capacity, and accessory units are producing on a proportionate basis.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—Disturbances in prices noted a week ago are still troubling the sheet market in practically all outlying territory. Competitors in districts eastward are freely taking business at lower prices than have been quoted by local producers, and there is now the added intimation that cold-rolled strip will offer keener competition to producers of blue annealed sheets. Local mills are operating on a hand-to-mouth basis, and output will not average above 70 per cent of capacity. Orders on hand at mills afford schedules that often are not more than four days in advance. Orders from the Northwest are disappointingly small. Buyers, realizing that sales pressure is being exerted by producers, are inclined to await changes in prices that may come. Individual orders are small and for prompt shipment.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.90c. to 3.05c.; No. 24 galvanized, 3.75c. to 3.90c.; No. 10 blue annealed, 2.20c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cold-Rolled Strip.—Specifications for this commodity are equal to production and prices are steady.

Hot-Rolled Strip.—Demand for hot-rolled strip eased off late last week, but has more recently improved somewhat. Prices in the narrow widths have dropped to lower levels. Quotations are as follows: Narrower than 3-in., 2.30c. to 2.40c. per lb., base; 3 to 6-in. wide, 2.10c. to 2.20c.

Cast Iron Pipe.—Demand for cast iron pipe is sluggish in this district. The general feeling in the trade is that preparatory plans for pipe-laying programs are not as far advanced as is usually the case at this time of the year. Public utilities are taking only small quantities, and the railroads and contractors are buying little. It is reported that Detroit has taken no action on its recent inquiry. The low bid entered there is on 3000 tons of foreign-made pipe, and the price is about $1 per ton below that of the nearest bid by an American pipe manufacturer. Royal Oak, Mich., has awarded 200 tons of 6-in. pipe to the Detroit Lead & Pipe Co. at $36.42, delivered. The freight from Birmingham is $7.92. The National Cast Iron Pipe Co. has taken 200 tons of cast iron pipe for Kirkland, Ill.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $36.20 to $39.20; 4-in., $40.20 to $43.20; Class A and gas pipe, $4 extra.

Reinforcing Bars.—Large tonnage awards of hard steel and billet steel bars are about equal. For many weeks the rail steel commodity has led by a comfortable margin. Close to 500 tons of soft steel reinforcing bars have been purchased for the Woolworth Building, Chicago, and 400 tons of rail steel bars have been taken for a local engraving plant. Evidence is at hand that awards may soon run heavier. Outdoor construction weather is now more favorable and buyers are offered the additional inducement that prices are at the low point of the spring months. Shop operations are holding steady, principally because of a good run of contracts for less than 100 tons each. Recent awards and fresh inquiry are shown on page 1284.

Coke.—Shipments of this commodity in April were a trifle heavier than in March, confirming the finding of pig iron producers that the melt of foundry iron in this district is slowly expanding. All ovens are lighted. The price is steady at $9.50, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—Specifications are being issued at a steady rate. Shipments in April were about equal to those in March, and bolt, nut and rivet manufacturers have held operations at a uniform rate. Prices for small rivets are steady at 70 and 10 to 70 per cent off list.

Old Material.—Prices in the Chicago scrap market are holding at the recent advances. Shipments of heavy melting steel are steady and consumption seems to be well balanced with production. The Gary mills are consistent buyers in small tonnages. The bulk of this grade that is moving to that point is in long pieces and prepared only so that it is ready for shearing at the mill. Dealers are getting $12.50 to $12.75 per gross ton, delivered, for heavy melting steel of that kind. The freight rate from Chicago to Gary is $1. Mill inspections are rigid and fully 50 per cent of the heavy melting steel that is gathered from miscellaneous yards is being rejected. There is a fair demand for specialties.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.75 to 17.25
Railroad leaf springs, cut apart	16.75 to 17.25
Acid Open-Hearth Grades:	
Steel couplers and knckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.00 to 14.50
Cupola Grades:	
Steel rails less than 3 ft.	15.00 to 15.50
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c. to 2.40c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Philadelphia

Bids of 1.85c. and 1.90c., Mill, on Plates, Shapes and Bars for Railroad

PHILADELPHIA, May 1.—Although eastern Pennsylvania mills shipped more steel in April than in any of the preceding months this year, the amount of new business booked in the past month was exceedingly small. Most of the current orders for plates, shapes and bars are almost of warehouse proportions. On such small lots the usual quotations are 2.05c., Coatesville, for plates; 2.05c., Bethlehem, for shapes, and 1.90c., Pittsburgh, for bars, but on more desirable orders $1 a ton lower is freely quoted. Quotations on shapes are quite generally on the basis of 2c., Bethlehem, even on small lots.

Opening of bids April 26 by the Pennsylvania Railroad for its second quarter requirements, consisting of 15,000 tons of plates, shapes and bars and smaller tonnages of blue annealed sheets and other products, brought out prices of 1.85c. to 1.90c., f.o.b. mill, on plates, shapes and bars. On blue annealed sheet 2.10c., Eastern mill, was quoted.

Pig Iron.—Foundries are taking full shipments against contracts, but there is almost no new business. Furnaces are maintaining $20, base. It is conceded, however, that should a fair-sized tonnage be offered, it might bring out a slight recession in price. Only occasional sales of low phosphorus are reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—The market is quiet and prices unchanged at $33, Pittsburgh, for rerolling billets and $38 per ton, Pittsburgh, for forging quality.

Bars.—A fair tonnage is moving on contracts, but new buying is decidedly limited. For new business, quotations range from 1.85c. to 1.90c. per lb., Pittsburgh, or 2.17c. to 2.22c., delivered Philadelphia, the higher price applying only on small lots for prompt shipment. On the Pennsylvania Railroad list of second quarter requirements totaling several thousand tons, 1.85c., f.o.b. mill, was quoted by the Bethlehem Steel Co., Donner Steel Co., Republic Iron & Steel Co. and Youngstown Sheet & Tube Co. Pittsburgh district mills quoted 1.90c., base mill, and Chicago mills, 2c., base mill.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Plates.—New business is limited to small lots of plates not much larger than usually go to warehouses. Quotations range from 2c. to 2.05c. per lb., Coatesville, or 2.10c. to 2.15c., delivered Philadelphia. On the Pennsylvania Railroad opening of bids on second quarter requirements for Altoona, which included about 10,000 tons of plates, quotations were 1.85c. per lb., f.o.b. mill, by eastern Pennsylvania producers; 1.90c.. mill, by Pittsburgh district mills and 2c., mill, by Chicago producers. The Baldwin Locomotive Works has booked 10 more locomotives for the Southern Pacific Co., bringing the total of purchases by this railroad to 13 locomotives.

Shapes.—Quotations seem to have settled to 2c., Bethlehem, or 2.13c., delivered Philadelphia, which is the price at which deliveries are being made on second quarter contracts. On the Pennsylvania Railroad opening of bids for second quarter requirements, two eastern Pennsylvania mills quoted 2.005c. per lb., delivered Altoona, and a third 1.80c., f.o.b. mill. Pittsburgh mills bid 1.90c. per lb., mill, and Chicago producers 2c., mill. Not many projected buildings are reported for this district.

Sheets.—Prices are decidedly unsteady. Consumers of blue annealed sheets are pressing for downward revision of prices on their 2.10c. contracts. Current quotations are 2.05c., Pittsburgh, on general business, and in the case of automobile body builders, 2c., Pittsburgh. On the Pennsylvania Railroad second quarter requirements, eastern Pennsylvania mills quoted 2.10c., f.o.b. mill. Black sheets are quiet, with quotations of 2.75c. per lb., Pittsburgh, and galvanized sheets range from 3.60c. to 3.70c., Pittsburgh, the bulk of current business being done at the lower level.

Warehouse Business.—Prices continue firm, although business is only fair. Quantity differentials on steel bars and bar sized shapes and the recently adopted quantity bases for black and galvanized sheets are being extended to the entire Philadelphia district, instead of being confined to sales in Philadelphia and Camden.

Imports.—In the week ended April 28 ore arrivals totaled 235 tons, of which 200 tons was chrome ore from Turkey and 35 tons was manganese ore from Germany. Pig iron arrivals consisted of 749 tons from India and 51 tons from Italy. Steel imports were as follows: France, 502 tons of blooms; Germany, 58 tons of structural shapes; Belgium, 136 tons of structural shapes, 85 tons of bands and 10 tons of iron bars.

Old Material.—Prices of all grades are substantially unchanged, but only a small total of business is being transacted with eastern Pennsylvania consumers. One mill in this district, which recently tried to buy machine shop turnings at $10 per ton, delivered, later purchased some small tonnages at $10.50 and $10.75 per ton, and brokers are now asking $11 per ton, delivered, for a substantial tonnage. A consumer of specification pipe at Columbia, Pa., recently bought at $12 per ton, delivered, and about a week ago closed on a small lot of pipe at $12.50 per ton, delivered. No. 1 heavy melting steel is quiet and prices are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50 to 10.75
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	10.50 to 11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling	14.75 to 15.25
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

New York

Weakness in Plates, Sheets and Strips—Pig Iron Sales 7500 Tons

New York, May 1.—With competition keen and with no improvement in prices in sight, pig iron producers are giving increased attention to the use of waterways. Pig iron shipments by barge canal from Buffalo totaled 25,000 to 30,000 tons in 1927, and it is expected that this amount can be doubled this year. During the spring, when there is a heavy movement of grain through the State canal, barge rates are usually rather firm, but producers expect to obtain more attractive rates during the summer lull in canal traffic. One important Buffalo interest is reported to be negotiating for storage space for barge iron at Jersey City, N. J. At present, public docks with fixed handling charges are used for transferring iron from barge to car for shipment to inland points in New Jersey. Melters are showing little interest in pig iron for third quarter delivery, but inquiries for that period are expected late this month and in June. Current sales are made up largely of relatively small tonnages for fill-in purposes. Total bookings of local sellers, at about 7500 tons, fell 2000 tons short of sales for the previous week. The Crane Co., Bridgeport, Conn., is inquiring for 1000 tons of foundry, the Worthington Pump & Machinery Corporation wants 275 tons for Harrison, N. J., and the Moore Brothers Co., Elizabeth, N. J., is in the market for 100 tons of No. 3 foundry. The E. & G. Brooke Iron Co. expects to blow out its furnace at Birdsboro, Pa., this week for relining. The Standish, N. Y., stack of the Chateaugay Ore & Iron Co. will also probably go out in the current week.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—The Truscon Steel Co. will furnish 500 tons of bars for a section of the subway in Queens and 480 tons for a loft building in Manhattan. A bridge over the Raritan River at New Brunswick, N. J., requiring 2400 tons, is expected to be closed this week; foreign steel has been a strong competitor, but the job will probably go to a distributer of domestic bars. Except for these fairly large projects, the market is not active and the first four months of the year have not been equal in business to the like period in 1927 for most companies. Prices are unchanged, with a strengthening tendency on small projects.

Finished Steel.—Steel sales, including specifications against contracts, by local offices during April ran considerably ahead of the March tonnage, but the amount of new business was small, and some mills are now in the position of seeking tonnage for prompt delivery to round out rolling schedules. This has tended toward further weakness in prices, notwithstanding the generally high average of mill operations. Weakness has become more general in sheets, and has also extended to new business in plates and hot-rolled and cold-rolled strip steel. Wire nails are not strong, but there has been very little business to test prices. The plate price has weakened to the extent of at least $1 a ton on orders of a carload or more, sales having been made at 2.12½c. per lb., delivered New York district, or 1.95c., Coatesville, the freight rate from Coatesville being 17½c. per 100 lb. For Pittsburgh mills, this price is equivalent to 1.80½c. at that point. An Eastern mill has quoted a railroad 1.85c., delivered Cleveland, on plates. Hot-rolled strip steel in widths of 6 in. or more is quite generally obtainable at 1.85c., Pittsburgh or Cleveland, while cold-rolled strip steel is now on a base price of 3c., Pittsburgh or Cleveland, for lots under 3 tons, making the larger lot price 2.75c. Sheet prices have settled to 2.75c. or 2.80c. for black, with an occasional report of 2.70c.; the range on galvanized is 3.60c. to 3.65c. and on blue annealed 2c. to 2.10c., Pittsburgh base. Structural steel lettings include two jobs of fair size—5500 tons for a Pennsylvania Railroad bridge over Newark Bay, taken by the Bethlehem Steel Co., and 4800 tons for additional work in connection with the Hudson River bridge, awarded to the McClintic-Marshal Co. In railroad equipment, the inquiries of the Erie for 1000 freight cars and 35 passenger cars comprise the only prospective business of size.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Although there is only a moderate volume of activity in pressure pipe, there is a generally firmer tone to prices, and Birmingham foundries have advanced their quotations to $31 to $32 per ton, base, Birmingham, which apparently eliminates them from competition in the North, as nearby makers are quoting on a basis of $37.60 to $38.60 per net ton, delivered New York. The Department of Purchase, New York, will open bids May 10 on a total of 2754 tons of pipe and fittings, of which 1025 tons is 12-in., 1490 tons,

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

8-in. and 130 tons, 6-in. pipe and 109 tons is fittings. Contractors' bids were opened today by the Department of Water Supply, Gas and Electricity, New York, on 810 tons of 6, 12 and 20-in. pipe. The General Fire Extinguisher Co., Providence, R. I., is inquiring for about 4000 tons of small-sized pipe. East Bridgewater, Mass., has opened bids on about 100 tons of 6-in. water pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—The past month compared favorably with March in the volume of business taken by most warehouses in this district. On plates, shapes and bars, however, mills are reported to be appearing as competitors for small tonnages, on which they offer fairly prompt deliveries. The quantity differentials recently adopted are being maintained, except for the 50c. charge on each order of 249 lb. or less, which has been dropped. Higher quotations on black and galvanized sheets, which have prevailed for several weeks in the local New Jersey market have been eliminated and jobbers are quoting the lower price of 4c. per lb., base, for black sheets and 4.70c. per lb., base, for galvanized sheets. Occasionally concessions are reported from this level, and galvanized sheets have been offered at several dollars a ton less.

Coke.—Buying is still limited. Prices are unchanged. Standard furnace grade is quoted at about $2.75 per ton, Connellsville. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, N. J., and from $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—Except for a few grades of scrap, which are slightly lower on dealers' offers, the market is unchanged. Brokers with contracts in eastern Pennsylvania are unwilling to pay more than $15.50 per ton for steel car axles. A Bound Brook, N. J., consumer of chemical borings has purchased at $13.25 per ton, delivered on a $2 per ton freight rate from New York. Machine shop turnings are quoted at $10 to $10.25 per ton, delivered eastern Pennsylvania. Specification pipe prices range from $11.50 to $12 per ton, delivered to users at Lebanon and Columbia, Pa. No. 1 heavy melting steel continues inactive, with purchases by brokers at $13.50 per ton, delivered, eastern Pennsylvania.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.00
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.75 to 8.25
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 8.75
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

May Steel Specifications for Automobile Industry Heavy—Sheets Weaker

CLEVELAND, May 1.—Specifications for steel bars, plates and structural material were light the past week, April ending differently in that respect from March, which closed with a rush of orders against expiring first quarter contracts. Not much new business is being placed, most buyers being under contract. April business declined fully 25 per cent compared with the previous month. This, however, is not indicative of any falling off in consumption, but it is because buyers are now using up steel ordered in March, which is apparently being consumed at the recent rate. With heavy shipments against old orders, many consumers are not specifying full monthly quotas against second quarter contracts. Some of the mills report that these specifications in April were only 75 per cent of the buyers' quotas. In spite of the falling off, April specifications ran ahead of the same month last year.

Specifications from the automotive industry for steel sheets and strip steel for May shipment are heavy, and it is expected that the seasonal slowing down of this industry will not materialize until a month later than last year, although two leading car builders are reducing production, one for a change of models. Little new inquiry is coming from the building field for fabricated steel. The Nickel Plate Railroad has exercised its option to take 6000 tons of rails in addition to its recent definite purchase for its 1928 requirements. The additional tonnage will be divided among the four mills that took the original orders.

On steel bars, plates and structural material, the market is firm at 1.85c., only less than car lots going at 1.90c. Cleveland mills quote steel bars at 1.85c., mill.

Pig Iron.—Third quarter buying has started in a limited way at the prevailing second quarter Lake furnace prices. One producer made a few sales for the quarter during the week and others appear willing to sell for that delivery at current prices, although none has started to solicit orders. Sales by Cleveland interests the past week aggregated 21,000 tons, or about the same as during the previous week. An Erie, Pa., foundry purchased 1000 tons, mostly for the third quarter. Some sellers report an increase in sales for early shipment. Prices on foundry and malleable grades show no change. Local furnaces quote $16.75 to $17 for outside shipment, but still seem willing to go to $16.50 in highly competitive territories. In Michigan the market is steady at $18. On the recent inquiry for a round lot of basic iron for shipment to Alliance, Ohio, a Valley producer quoted $16.50, and that is now regarded as the top of the market for basic. A northern Ohio foundry has purchased 500 tons of low phosphorus iron from a Valley producer at $26.50 and higher quotations on that grade have disappeared. English low phosphorus iron is being offered at $26, delivered Chicago, and other Lake ports to be shipped as ballast in boats for the new Welland canal that are being built in England for the Great Lakes trade. Pig iron shipments by Cleveland interests held up in good volume during April, being about the same as in March, and some of the automobile foundries have issued specifications for as much iron in May as during April. However, shipments to some industries outside of the automotive field are slow, some of the foundries not yet having taken all their first quarter iron.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	16.50
Standard low phos., Valley furnace	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—Mills supplying the automotive industry continue to get good specifications from that source, but the demand from other consumers is light, and the eagerness of some mills to take orders has led to further weakening in prices of about $2 a ton, except on auto body sheets, which are holding firm at 4c., Pittsburgh. With keener competition, the Valley district has again become a rather common basing point. On black sheets, 2.75c., Pittsburgh, is commonly quoted, but this has been shaded to 2.75c., Valley, and there are reports of a 2.70c., Valley, price. On blue annealed sheets, 1.90c., Pittsburgh, and 2c., Valley mill, are being named. However, some mills are holding firmly to 2c., Pittsburgh. Galvanized sheets have weakened to 3.55c., Valley, ranging from that price to 3.65c., Pittsburgh.

Strip Steel.—Mills are still getting a good volume of orders for hot-rolled strip and some have fair backlogs. However, prices are weak. Fairly representative quotations are 1.80c., Pittsburgh, for material 6-in. to 12-in. wide, and 2.05c. on 3-in. to 6-in. strip. On wider material competition of blue annealed sheets is causing price irregularities. Cold-rolled strip is 2.75c., Cleveland, for 3 tons and over. The reduction on auto body sheets has affected fender stock, which is now quoted at 4.10c. to 4.15c., compared with the recent 4.20c. price.

Wire Products.—Mills continue to quote nails at $2.65 per keg, Cleveland, for this immediate territory, but not much business is being placed at that price. In central and southern Ohio, $2.55 is commonly quoted by more than one producer. Plain wire is firm at 2.50c. per lb., Cleveland.

Warehouse Business.—Steel bars, plates and structural material are moving in fair volume, and prices are firm. The demand for galvanized sheets is below the seasonal average. Prices are somewhat irregular, being shaded $1 to $2 a ton.

Semi-Finished Steel. — Specifications are keeping close to recent volume, but there is very little new business. Prices are steady at $33, Cleveland, for sheet bars, billets and slabs.

Reinforcing Bars.—New demand is dull for this season of the year. Work for which the Cleveland Union Terminals Co. has an inquiry out will require 2500 tons. This was reported last week as an unstated tonnage. Rail steel bars are unchanged at 1.75c., mill.

Old Material.—Activity is still confined to small-lot purchases by dealers against old orders. Mills continue to restrict shipments. Prices show neither an upward nor downward tendency. Small lots of heavy melting steel are moving at the quoted prices. While some blast furnace scrap has been sold at $9.25, most of the business is going at $9.50. Considerable scrap is being shipped from Detroit to Cleveland by boat, and it is understood that much of the scrap recently offered by the Michigan automobile companies for May shipment will go to Pittsburgh district mills.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.50 to $13.75
No. 2 heavy melting steel	12.75 to 13.00
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Iron Ore.—A steel interest in the Buffalo territory has arranged for 1928 requirements by the purchase of a round block of ore at the regular market price and by a trade deal on the terms of which it will exchange ore from its own mines for other grades. Something over 200,000 tons was involved in the transaction, the greater part being covered by the exchange arrangement. The market does not show much activity, although a few small-lot sales are reported. Some of the open market buyers are covering only for three or four months' requirements and expect to come in the market again during the latter part of the season. Ore shipments will probably start late this week.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair, but the volume of April business fell slightly below that of March. Rivet specifications last month also fell below those of March, this being accounted for by large orders placed late in March against first quarter contracts carrying a lower price than now prevailing.

Coke.—Foundry grades are in fair demand. The April prices of $7.75, Painesville, and $6, Connellsville, for Ashland coke for by-product foundry grades have been re-established for May. Connellsville foundry coke is unchanged at $3.75 to $5.10, ovens.

LESS AUSTRIAN MAGNESITE

Exports in 1927 Were 21 Per Cent Below 1913 —Half Goes to United States

EXPORTS of burned magnesite from Austria decreased to 97,000 metric tons in 1927, against 123,000 tons in 1913, according to a report received by the Department of Commerce, Washington, from John Hurley, consul at Vienna. The drop in exports of this important trade item of Austria, which contributes more than $4,000,000 toward that country's large trade deficit, is attributed to developments that took place during the war. Some of the nations to which this supply was no longer accessible introduced the use of substitutes, and a few succeeded in discovering workable deposits within their own territory. Although sales to the United States declined during the past year, it is still the most important market for Austrian magnesite.

Working at full capacity, the report says, the Austrian industry is able to furnish 70 per cent of an estimated world requirement of 300,000 tons of burned magnesite, Austria having been given 74 per cent of the deposits belonging to the dual monarchy and Czechoslovakia the remainder. More than 90 per cent of the burned magnesite and magnesite manufactures produced in Austria during recent years has been exported, and the industry is much less dependent on economic conditions at home than in its most important foreign markets.

The increase of the American import duty on magnesite in 1922 affected sales, and the English coal strike in 1926, which caused reduced iron and steel operations, had an unfavorable effect on exports to Great Britain. On the other hand, the German industrial boom in 1927 is declared to have been responsible to a considerable extent for the increased output of magnesite in Austria that year. In 1927 the production of raw magnesite amounted to 356,000 tons, as compared with 237,000 in 1926 and 290,000 tons in 1925. The output of dead burned magnesite in 1927 totaled 125,000 tons. Of the 59,886 tons of dead burned magnesite exported during the first nine months of 1927, the United States took 28,517 tons; Germany, 11,542; and Great Britain, 7786 tons.

It is the policy to quote higher prices in the domestic market and for exports to Germany and Spain, which are more or less dependent on the Austrian and Czechoslovakian product, than on business with the United States and Great Britain, in consideration of the competition of American producers. Present prices of dead burned magnesite to the most important markets, at the plant in Styria, range from $14.38 a metric ton for the United States to $18.50 for the domestic market.

Use of the word "steel" as a brand or label for tools made entirely or partly of metals other than steel is prohibited in a recent stipulation agreement between the Federal Trade Commission and a seller of hardware. The company, according to the commission, agreed to discontinue use of the word "steel" in its advertising.

San Francisco

Award of 8000 Tons of Steel for Aqueducts Expected Soon

SAN FRANCISCO, April 28 (*By Air Mail*).—Interest is centered in the aqueducts for the East Bay Municipal Utility District at Oakland, calling for more than 8000 tons of plates, and an award is expected within the next week or 10 days. Demand generally has eased off somewhat and bookings this week were by no means heavy.

Pig Iron.—Movement of foundry iron continues light. Little or no improvement is noticed in the rate of foundry operations. A shipment of Indian iron, about 1400 tons, is due next week. Part of this will be unloaded at Los Angeles and the rest will be taken by bay district users. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to	$26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to	26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to	25.00
**German foundry, sil. 2.75 to 3.25		24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Out-of-stock prices on reinforcing steel bars in the San Francisco district are exceptionally low, and lower than 2c. has recently been quoted. When it is considered that plates and shapes are holding firm at 2.30c. to 2.35c., c.i.f. respectively, the extent of the weakness in bar prices is clearly seen. Only one or two projects calling for more than 100 tons were reported placed this week, the bulk of the current business involving small lots. The largest new industry calls for 155 tons for piers for the West Waterway bridge in Seattle.

Plates.—Twohy Brothers & Shea, Inc., was low bidder on the Wildcat and Sequoia aqueducts combined on the basis of electrically welded steel pipe. The Lock Joint Pipe Co., Ampere, N. J., was low bidder on the Wildcat aqueduct for steel lined concrete pipe. Bids were taken also on class C cast iron pipe. The Steel Tank & Pipe Co., bidding through Twohy Brothers & Shea, Inc., was low on the fabrication of the steel pipe. The Pacific Car & Foundry Co., Seattle, was awarded 1500 tons of plates and shapes for 250 underframes for the Chicago, Milwaukee, St. Paul & Pacific Railroad. Exclusive of the Oakland aqueducts, pending business is confined to one or two projects. Tacoma has come into the market for 115 tons of 48-in. riveted pipe.

Shapes.—Although about 8000 tons of structural material is up for figures or pending, only four awards of importance have been made in the week. The Moore Dry Dock Co. took 100 tons for the mine of Clinton West Co. at Bodie, Cal. The Union Iron Works booked 160 tons for a hotel in Los Angeles and the Portland Bridge Co. took 220 tons for a bridge at Coburg, Ore. The California Steel Co. was low bidder on 380 tons for a warehouse for the Oakland Port Commission, at about $97 a ton erected.

Cast Iron Pipe.—Inquiries for cast iron pipe were limited to one or two projects. Livingston, Cal., has come into the market again for 364 tons of 2 to 10-in. class B or 150, having rescinded the contract recently awarded to Robert McNair of Oakland. Bids will be opened May 14. The United States Cast Iron Pipe & Foundry Co. booked 8744 tons of 4 to 30-in. centrifugal pipe for Long Beach, Cal. Oak Harbor, Wash., placed with unnamed interest 132 tons of 4 and 6-in. class B pipe. Bert Noble of San Diego took 210 tons of 6 and 8-in. class C for San Diego. An unnamed company took 127 tons of 6-in. class B for Riverside, Cal. Prices continue around $35 to $36 a ton, delivered, on 6-in. class B and larger.

Standard Pipe.—Movement of standard pipe and oil country goods, with few exceptions, is limited to unimportant orders. The Kelly Pipe & Machinery Co., Los Angeles, was awarded 155 tons of 4 to 6-in. steel casing for the Rialto, Cal. The Steel Plate Construction Co., Portland, took 100 tons of 1¼-in. galvanized pipe for a refrigerator cooling plant for the Terminal Ice & Cold Storage Co., Salem, Ore. No action has yet been taken on the 700 tons of 4 to 20-in. lapwelded pipe for Monrovia, Cal.

Coke.—This market reflects the quiet condition noted in the foundry pig iron market. Both sales and inquiries are confined to unimportant lots.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Birmingham

Pig Iron Sales in Small Lots—Finished Steel Firm

BIRMINGHAM, May 1.—Sales of pig iron are confined almost entirely to small lots, which is in line with conditions for the past several weeks. Previous bookings are largely responsible for the lack of activity at present. Two of the merchant producers in the district report shipments in good volume and close to make, while the third has found shipments light since the early part of April. Foundry iron sales are still on a $16 base. The number of active furnaces has not changed during the past three weeks, 17 being in blast. Of this number, 10 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—The market developed a slightly firmer tone during the past week. New business continues to come in at a steady rate, and the outlook for the next few weeks is considered by sales officials to be fair. New business with structural steel and reinforcing bar manufacturers is still light. The Southern Steel Works Co. has an order for 200 tons for the Crawford Auto Shop. Open-hearth operations have not changed during the past week. The Tennessee company has seven in operation at Ensley and four at Fairfield, while the Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—New business with the pressure pipe manufacturers is moderate, consisting chiefly of small orders. Several good-sized projects are pending, and orders will probably be placed within the next two or three weeks. Prices are firmer, with the base still at $29 to $31.

Coke.—Spot sales of foundry coke are holding up to a fair average. Shipments are going forward in good volume. Quotations remain at $5.

Old Material.—Demand in some lines is considerably stronger, but prices are unchanged. More No. 1 machinery cast was sold last week than in some time. Steel scrap trading is fair. Sales in other lines continue low.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to	$10.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	8.00 to	8.50
Cast iron borings		8.00
Stove plate		14.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.50
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Canada

Foundry and Malleable Pig Iron in Good Demand—Structural Steel Active

TORONTO, ONT., May 1.—A steady demand for foundry and malleable pig iron continues to feature business in the Canadian markets. Spot sales are mostly in small lots, but the total volume is satisfactory. Shipping orders against contracts are responsible for a good movement of iron from furnaces. Consumption of pig iron in this country shows considerable gain over that of a year ago, but production has not kept pace. This is chiefly because of increased competition from United States and British sources of production, which has affected the Canadian market, especially as most of this imported iron is selling at prices under Canadian quotations, despite the fact that the latter have been reduced in order to meet the competition. Canadian prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Finished Steel.—Structural steel and reinforcing bar sales continue to show improvement, and at the present time are among the most active of the various lines of iron and steel materials. The Dominion Bridge Co. and the McGregor & McIntyre Structural Steel Co. shared a contract for 2800 tons of structural and 1000 tons of reinforcing bars for the Robert Simpson Co. addition in Toronto. Proposed bridge construction is having a stimulating effect in structural and reinforcing steel. Two or three International bridges are proposed which will involve the use of upward of 25,000 tons of steel. About 3000 tons of steel will be required for the Ville Lasalle, Que., bridge. A bridge at Carlton Place, Ont., will take 300 tons. Approximately 1000 tons of structural and 500 tons of reinforcing steel will be purchased for Hanson Brothers office building in Montreal.

Old Material.—Current sales are mostly small tonnages, but are fairly numerous. Consumers in Ontario and Quebec continue to adhere to the hand-to-mouth method of buying. Prices are unchanged but are not strong.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Buffalo

Pig Iron Market Is Quiet—Steel Operating Rate Continues High

BUFFALO, May 1.—The pig iron market has been quiet during the past week. Inquiry is light. The Eastern Malleable Iron Co. placed part of the 2500 tons for which it inquired with a Buffalo furnace. An Erie, Pa., consumer ordered 1000 tons of 2X, the major portion going to the Perry furnace. A downstate inquiry is for 500 tons of foundry, and several inquiries of from 100 to 300 tons of foundry and malleable have been converted into orders. Shipping directions are continuing in fair volume.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Inquiry for bars and shapes is fair. Sheet mill operation remains at 85 to 90 per cent. Reinforcing bar projects placed during the week included one mill addition of 100 tons and a high school stadium of 200 tons. Bids are asked on 100 tons for a warehouse and 300 tons for a school. Business in welded fabric and fence wire is reported good. The Wickwire-Spencer plant is running at 75 per cent in the open-hearth department. The Donner Steel Co. is operating five of its nine open-hearth furnaces and Bethlehem's Lackawanna plant 21 of its 24. About 90 per cent operation is being maintained by the Buffalo Bolt Co. April has been the heaviest month of the year in warehouse sales.

Old Material.—A consumer is reported to have purchased No. 1 heavy melting steel, about 1000 tons, at $14.75. Machine shop turnings were sold at Niagara Falls, N. Y., at $9.50 to $9.75, and some stove plate is reported to have been sold at around $13.50. A small tonnage of No. 1 machinery cast was sold at slightly less than $15. Dealers are buying actively against old orders.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	12.75 to 13.25
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.00 to 13.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.25 to 8.75
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.75 to 10.25
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.50 to 13.75
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00 to 15.25
Agricultural	15.00 to 15.25
Industrial	15.00 to 15.25

Shipments of iron and steel products down the Ohio River in 1927 totaled 1,036,621 tons, compared with 575,462 tons in the previous year, an increase of almost 100 per cent. About one-fourth of the iron and steel tonnage traveled the full length of the river and then down the Mississippi River to Memphis and New Orleans. The average haul of all classes of commerce transported last year increased from 56 to 60 miles, with a total ton-mileage increase of 10 per cent.

Youngstown

Steel Shipments Exceed Incoming Business—Sheets Continue Weak

YOUNGSTOWN, May 1.—While steel ingot production in this district is holding up fairly well to its recent rate of about 80 per cent of capacity, signs point strongly to a recession soon, since shipments generally are exceeding incoming business. No slackening of sheet mill operations is observed, but scheduling is becoming more difficult, owing to the weaker tendency of prices, which tends to make consumers more conservative in releasing tonnage. Much sheet tonnage is moving to the automotive industry, but at prices lower than those at which the business was written, it having been necessary for local mills to revise prices to competitive levels to obtain specifications.

On automobile body sheets, 4c., base, is the current price. On black sheets, 2.80c., base, is the ruling level and while makers have encountered 2.75c., they say this usually is on special finishes based on the price of black sheets and carrying large enough extras to permit of some shading of base prices. Galvanized sheets commonly are quoted at 3.65c., base, but as low as 3.55c. has been reported from some districts. Mills here are trying to get 2c. to 2.10c., base, for blue annealed, but the higher figure is becoming exceptional and even less than 2c. is reported to general sales office from district offices, notably Detroit. These prices are lower than those quoted at the close of last year.

Standard-weight pipe business still is fairly active, but in oil country goods no improvement is noticed, and while makers are hopeful that the much-mentioned pipe line orders will soon be placed, they do not yet see any signs of definite action. There is good demand for tin plate and a good engagement of productive capacity in this area. The complaint of strip steel producers is not with volume but with the prices that are being obtained.

St. Louis

Pig Iron Sales Off—Scarcity in Fabricated Steel Orders

ST. LOUIS, May 1.—The pig iron market was quiet during the last week, sales of the St. Louis Gas & Coke Corporation totaling 1650 tons, while the leading Southern interest sold about 250 tons. The local maker's sales included 300 tons each to a district company and an Iowa melter and 200 tons to another Iowa company, with most shipments for second quarter and some into third quarter. The local furnace is accepting third quarter business on its present price of $19 per ton, f.o.b. Granite City. Southern makers, however, have not opened their books for third quarter, their price of $16, Birmingham, continuing for this quarter. Shipments for April by the local furnace exceed those for the corresponding month in 1927. Stove foundries are beginning to slow down, but the larger job foundries report good business.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—The coke market is slow. Dealers have shown no interest in domestic grades. Nearly all foundry coke is being sold by local by-product ovens in small lots.

Finished Iron and Steel.—Fabricators of structural steel continue to complain of the scarcity of orders, the total volume for the week being less than 500 tons, including 150 tons for a municipal market. Demand for reinforcing bars is considerably better, with a far greater volume in sight. The principal business of the week was 475 tons for a hotel to Laclede Steel Co. Galvanized and lighter blue annealed sheets are in good demand. Warehouse business is slightly better.

Old Material.—The purchase of a fairly large tonnage of melting rails and specialties by an East Side mill, together with the inability of dealers to get sufficient melting and shoveling steel at last week's prices, has caused advances in these items. Heavy melting steel, heavy shoveling steel, rails for rolling and railroad malleable have advanced 25c. a ton, while miscellaneous rails, railroad springs, machine shop turnings, steel angle bars are up 50c. a ton, and No. 2 railroad wrought is 75c. higher. Railroad lists: Pennsylvania lines, 45,800 tons; Missouri Pacific, 400 tons; Frisco, 2000 tons; Chicago, Milwaukee & St. Paul, 1000 tons; Chicago & Alton, 700 tons of 80-lb. relaying rails.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.50 to $12.00
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	13.50 to 14.00
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55

	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Cincinnati

Pig Iron Buyers Show Little Interest —Steel Specifications Decline

CINCINNATI, May 1.—With enough pig iron on hand or contracted for to take care of second quarter requirements, consumers are showing practically no interest in buying for future needs. Aside from 1000 tons of Northern foundry for a Michigan melter and a like amount of charcoal iron also for Michigan delivery, sales have been confined to lots of 100 tons or single carloads. Southern Ohio foundry iron is quoted at $19, base Ironton, but that price is almost prohibitive, except in a limited area near the furnaces. Producers in northern Ohio are asking $16.50 to $17, base Cleveland, while Tennessee and Alabama irons are selling at $16, base Birmingham. Jackson County silvery iron is firm at $25, base furnace, for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—There has been a further recession in specifications for by-product foundry coke from companies allied with the automobile industry. Domestic grades, on the other hand, have been moving fairly well on account of the low prices which have encouraged dealers to build up stocks. Quotations of by-product foundry coke will remain at $7 per net ton, f.o.b. ovens, during May, while domestic coke also will be unchanged at $4.50, ovens, for egg, $3.50 for walnut and $3 for No. 2 nut. At Detroit, by-product foundry coke is selling at $8.50, Detroit ovens, for outside delivery and at $9, delivered in Detroit. Demand for beehive foundry coke from the Wise County and New River districts is light.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Finished Material.—The amount of business placed with mills in the past week has been only fair, both specifications and fresh orders having declined somewhat. Structural steel is quiet, and new jobs are coming out more slowly than expected. Some small fabricators have a liberal volume of work on hand, but many large operators are in need of orders to keep their plants running on a normal basis. Bars, structural shapes and plates are selling generally at 1.85c., base Pittsburgh, to contract customers and at 1.90c. to occasional buyers. There is a noticeable tendency, however, to accept single carloads at 1.85c. In the sheet market the situation is much the same as a week ago. Orders for second quarter delivery are being placed at a good rate and the tonnage is well diversified. Specifications from automobile manufacturers are holding up satisfactorily, while the demand from the jobbing trade and from users of electrical sheets has been brisk. Mills are in position to supply the average run of material in from two to three weeks. Operations of district sheet manufacturers have continued close to full capacity with the same producing schedule holding over for the next week. Although there has been no strengthening of prices, quotations apparently are scraping bottom, and some large consumers are reported to be ready to put out inquiries for third quarter, hoping to take advantage of the present low prices to cover their needs up to Oct. 1. Blue annealed sheets range from 2c. to 2.10c., base Pittsburgh, with an occasional dip in the case of preferred customers. Galvanized stock remains at 3.65c. to 3.75c., base Pittsburgh, black sheets at 2.75c. to 2.85c. and automobile body sheets at 4c. Sales of common wire nails continue to reveal price irregularities, particularly at consuming points which can be reached from Ironton by barge down the Ohio River. Quotations are said to be from $2.50 to $2.55, base Ironton.

Warehouse Business.—Sales in April were fairly good in volume, but the tonnage in the aggregate was less than normal. There has been no change in prices.

Reinforcing Bars.—New billet bars are priced at 1.85c. to 1.90c., base Pittsburgh, and rail steel bars at 1.80c., base mill.

Old Material.—Heavy melting steel has dropped 50c. a ton, while sheet clips and bundled sheets are off 25c. Consumers are buying only in small quantities to cover immediate needs. Little scrap is coming onto the market. Steel plants are accepting moderate tonnages on contracts.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	13.00 to 13.50
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.50 to 12.00

Boston

Pig Iron Dull—Sales for Week 4000 Tons—Machinery Cast Scrap Higher

BOSTON, May 1.—May opens with comparatively little pig iron business in sight. The foundries which have been sounding out the market have not as yet given indications that they will buy soon. Current activity centers largely in rounding up scattered third quarter orders. New England sales the past week slightly exceeded 4000 tons, the Mystic Iron Works taking almost half, with eastern New York State, Buffalo and other irons making up the remainder. One of the largest sales was 500 tons of No. 2X to a Massachusetts machinery maker at a price reported as not more than $20.15 a ton, delivered.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. have announced that the May price of by-product foundry coke will remain at $11 a ton, delivered within a $3.10 freight rate zone, the same as in April. The reduction in New England fuel last month failed to stimulate foundry buying to any appreciable extent. Makers of coke outside of New England are pressing sales here at prices about equivalent to $11 a ton, delivered.

Cold-Rolled Strip.—Although the market is not active, there is increased buying of cold-rolled strip. Demand is on a hand-to-mouth basis, but broader owing to the fact that runover deliveries from the first quarter have been pretty well cleaned up. There has been some shading in prices. The American Steel & Wire Co. continues to quote 3.15c. to 3.30c., base Worcester, Mass., on 1 to 3-ton lots.

Warehouse Business.—Average April warehouse sales in this territory were 10 to 20 per cent larger than those for April, 1927, but 5 to 8 per cent smaller than those for March, this year. Stocks are comparatively small and more or less broken. Competition for business remains keen, yet prices are steady.

Old Material.—Exporters who sold heavy melting steel scrap for export to Danzig are having difficulty in filling their orders at the prices paid, namely, $7.50 and $7.75, delivered on dock. Owing to the fact that automobile rims and other objectionable material have been shipped, rejections have been made freely. One shipper reports that nine of 13 cars shipped were rejected. This, together with the fact that some of the eastern Pennsylvania steel plants are holding back shipments of steel scrap, has weakened the market here. Sales of heavy melting steel were made in the past week at $9 and $9.10 on cars, shipping point, indicating a little softness. No. 1 machinery cast, which is scarce, is held at slightly higher prices. Textile cast, on the other hand, is plentiful.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.50
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.25
No. 1 yard wrought	7.50 to 8.00
Machine shop turnings	5.50 to 5.75
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.75 to 6.25
Forge flashings	6.60 to 7.25
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	15.25 to 15.50
No. 2 machinery cast	13.50 to 14.00
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

To Investigate Cost of Tungsten Output

WASHINGTON, May 1.—The metals section of the Tariff Commission will begin field work soon in connection with an investigation concerning the differences in costs of production of tungsten in the United States and China. The study was directed by a resolution introduced by Senator Oddie of Nevada and passed last week. China was named as the chief competing country. The investigation is to be made under Section 315 (flexible provision) of the tariff act. Costs concerning production in China will be ascertained from invoices and other documents, and no representative of the commission will be sent to that country.

Average cargo analyses of Lake Superior ores shipped during 1927 are shown in an annual analysis book issued by the Lake Superior Iron Ore Association, Union Trust Building, Cleveland. Analyses are given for all mines from which shipments were made and include the percentage of iron (both dried and natural), phosphorus, silica, manganese, sulphur and other components, and the percentage of moisture in the natural ore.

Bethlehem Plants Better Previous Safety Records

Marked improvement in accident prevention was effected by the employees of the Bethlehem Steel Corporation during the first quarter of this year, according to the corporation's safety report. The corporation as a whole improved its best previous record by 17.8 per cent. The steel plants alone bettered their safety record by 44 per cent.

This was the first quarter of the 1928 accident prevention contest for gold money awards to Bethlehem employees, announced on Jan. 3 by President E. G. Grace. In this contest three prizes of $1,000, $500 and $250 in gold are awarded each quarter to the three groups of employees which make the greatest reduction in lost time due to accidents. For purposes of the contest the 70,000 employees are divided into 11 groups.

In the first quarter the Maryland plant group won first prize of $1,000 with an improvement in its safety record of 70.3 per cent, the Steelton plant group won the second prize with a 62.4 per cent improvement and the Bethlehem plant group won third prize, bettering its safety record by 59.8 per cent.

Chamber of Commerce of United States to Meet May 7 to 11

WASHINGTON, May 1.—The Chamber of Commerce of the United States will hold its annual meeting in Washington May 7 to 11. Commercial aviation, commercial arbitration, agriculture, the Federal Trade Commission, foreign trade, highways, immigration, merchant marine, taxation, trust legislation, water power and the World Court will be discussed. At a meeting of the department of manufacture of the chamber in the large ballroom of the New Willard Hotel on May 9 the following addresses will be given: "Teamwork for Profits in a Consumers' Market," E. J. Mehren, vice-president McGraw-Hill Publishing Co., Inc.; "Forecasting and Planning—Vital to Industrial Prosperity," Donald Brown, vice-president General Motors Corporation, and "Labor Conservation—Teamwork for Lower Costs of Production," C. S. Ching, president American Management Association. There will be discussion of the addresses, and resolutions will be adopted. The meeting will be preceded by luncheon at 1 o'clock.

Will Study Marketing and Distribution Methods

National marketing and distribution methods and related problems are to be studied, with cooperation from large manufacturers and distributers, under the direction of the bureau of foreign and domestic commerce, Department of Commerce, Washington. The nation-wide survey, which will fit in with regional surveys now under way and to be taken up, has been ordered by Julius Klein, director of the bureau, and the work will be in charge of John M. Hager, who during the period of organization has been director of market survey of the department's domestic commerce division. Mr. Hager will begin his work in New York, extending his operations to other parts of the country later. It is expected the greater part of the current year will be occupied by the task.

The Interstate Commerce Commission has set May 10 as the date for hearing on the application of the Pittsburgh, Lisbon & Western Railroad for authority to build a new line which would traverse Mahoning and Columbiana counties in Ohio and Beaver County in Pennsylvania and connect the Youngstown district with the Ohio River.

Directors of the Sheffield Steel Corporation, Kansas City, Mo., have declared a 33⅓ per cent stock dividend, payable July 1, to stock of record June 15.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 1	Apr. 30	Apr. 28	Apr. 27	Apr. 26	Apr. 25
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.00	14.12½	14.12½	14.12½	14.12½	14.12½
Straits tin, spot, N. Y.	51.12½	51.00	....	52.12½	51.87½	52.25
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.20	6.15	6.15	6.15	6.15	6.15
Zinc, St. Louis	5.85	5.80	5.80	5.80	5.80	5.80

*Refinery quotation; delivered price ¼c. higher

NEW YORK, May 1.—All the markets are devoid of features. Buying of copper is very light, but prices are firmer. A fair business in tin is reported at a lower price level. Lead is unchanged both as to demand and quotations, but zinc values are tending higher.

Copper.—Very little buying by domestic consumers is reported and not much metal is any longer available at a concession from the quotation of 14.25c., delivered in the Connecticut Valley, which practically all electrolytic producers are firmly adhering to. Sales for export have been fairly large the past week, running as high as about 5000 tons on one day. The quotation of Copper Exporters, Inc., is still unchanged at 14.50c., c.i.f. European ports. It is believed that domestic consumers are fairly well covered for May, but that foreign users must still buy considerable for that position. Consumption throughout April was very heavy and keeps up, mills still being urged for deliveries. Opinion is expressed that statistics for April will show a large increase in consumption and a decrease in stocks. Lake copper continues moderately active and firm at 14.25c., delivered, as the minimum.

Copper Averages.—The average price for Lake copper for the month of April, based on daily quotations in THE IRON AGE, was 14.26c., delivered. The average price of electrolytic copper was 14.25c., delivered.

Tin.—Sales for the week have been light at about 1000 tons, dealers being the principal buyers for May-June delivery. In the last week more interest in the July position was in evidence. Yesterday, Monday, the market was quite active, with 400 to 500 tons changing hands, dealers again being the principal buyers. For the most part consumers show little interest. A shortage in May, which was mentioned a week ago as possible, has been to some extent eliminated because more metal is being shipped than was expected. A steamer is due on May 21, bearing 1070 tons, which will probably all be delivered into consumption this month. Statistics for April show that deliveries into consumption in the United States in April were 7010 tons, with 1973 tons in stock and landing on April 30. Shipments from the Straits in April were 6774 tons and the May shipments are estimated at about 7250 tons. The decrease in the visible supply for April was 585 tons, or less than expectations, which placed it at nearer 1000 tons. The visible supply on May 1 is placed at 15,001 tons. The market today was only moderately active, with Straits tin quoted at 51.12½c., New York. Prices in London today were about £3 to £4 per ton less than a week ago, with spot standard quoted at £229 15s., future standard at £230 2s. 6d. and spot Straits at £234 5s. The Singapore price today was £233 5s.

Lead.—Just enough business is being done each day to maintain firmly the prices which have prevailed for about a month both here and in the West. The leading interest continues to maintain its quotation at 6.10c., New York, as the contract price, and in the outside market 6c., East St. Louis, prevails.

Zinc.—Hardly enough business is reported to establish a market, and opinions as to the price at which prime Western zinc can be bought vary considerably. For most of the week the quotation has been 5.80c. to 5.82½c., East St. Louis, but today the metal can probably not be bought for less than 5.85c. The fact that the price for ore at $38 per ton, Joplin, does not permit of a profit at present quotations for the metal causes producers to be extremely backward in making sales. About 9000 tons of ore was sold last week, with production at about 10,000 tons.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.50c. to 54.50c.
Tin, bar	56.00c. to 57.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Zinc sheets have been advanced ½c. per lb., and are now being quoted at 9c., base. Mill quotations on bronze, brass and copper products and on lead full sheets have not been changed.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	16.00c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Buying by dealers has been quite active and Chinese metal for all positions is quoted a little higher at 10.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, May 1.—In a market characterized by light and spotty buying, prices for copper have advanced, while quotations for tin, lead and zinc have dropped to lower levels. The old metal market was moderately active early in the week, but since that time it has been quiet.

Prices, per lb., in carload lots: Lake copper, 14.37½c.; tin, 52.75c.; lead, 6.10c.; zinc, 5.90c.; in less-than-carload lots, antimony, 11.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Erie Inquires for 1000 Freight Cars—500 Refrigerator Cars Bought

FEATURING the equipment market this week were inquiries by the Erie for 1000 freight and 35 passenger cars and an order from the Northwestern Refrigerator Line for 500 refrigerator cars and 100 underframes. The Erie will also make repairs to 2485 box cars. Locomotive purchases included 10 for the Southern Pacific, in addition to those mentioned last week. Details of the week's business follow:

Northwestern Refrigerator Line has purchased 500 40-ton refrigerator cars and 100 refrigerator car underframes from American Car & Foundry Co.

Chicago, Rock Island & Pacific has ordered 500 box car underframes from Pennsylvania Car Co.

Tampagna Sugar Development Co., Philippine Islands, has ordered two Mogul-type locomotives from Baldwin Locomotive Works.

Erie Railroad has made inquiry for 25 passenger coaches, three combination baggage and mail cars, five express and two dining cars. This road is also inquiring for 500 40-ton box cars, 400 40½-ft. automobile furniture cars, 100 50-ft. automobile furniture cars and five 100-ton depressed flat cars. Repairs will also be made to 2485 box cars.

Chicago, Milwaukee, St. Paul & Pacific is inquiring for two flat cars instead of five as reported last week.

Chicago, South Shore & South Bend has made inquiry for 10 motor coaches, with option on five additional, and five trailers.

Delaware, Lackawanna & Western has ordered one combination baggage and mail car from American Car & Foundry Co.

United Sugar Co. of Mexico is inquiring for 10 cane cars.

St. Louis-San Francisco has purchased 250 underframes from Virginia Bridge & Iron Co., and will buy two underframes and superstructures for automobile cars.

Southern Cotton Oil Co., Savannah, Ga., will purchase 20 tank cars.

Southern Pacific has purchased 10 locomotives from Baldwin Locomotive Works, in addition to those mentioned last week, and is inquiring for 50 caboose, six dining and 10 street cars.

Consolidated Coal Co. has ordered 150 coal cars from Bethlehem Steel Co.

Great Northern has purchased two electric locomotives from Baldwin Locomotive Works.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.25c.	11.375c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

REINFORCING STEEL

Awards of 8500 Tons—Only 1250 Tons in New Projects

AWARDS of 8500 tons reported to THE IRON AGE during the week, the largest of which were 1000 tons each for a bridge at Allentown, Pa., and an office building in Chicago. New projects amounted to only 1250 tons, the lowest total of the year thus far. Awards follow:

NEW YORK, 500 tons, section of subway; from Corson Construction Co., general contractor, to Truscon Steel Co.

NEW YORK, 480 tons, loft building at Varick and Dominick Streets, to Truscon Steel Co.

HACKENSACK, N. J., 175 tons, sewer project, to Concrete Steel Co.

PHILADELPHIA, 900 tons, Pennsylvania Railroad cold storage warehouse, to A. Taylor & Co., local.

ALLENTOWN, PA., 1000 tons, Tilghman Street bridge, to Concrete Steel Co.

BUFFALO, 100 tons, addition to plant of Eastern States Milling Co., to a local maker.

BUFFALO, 200 tons, high school stadium, to local maker.

GARY, IND., 100 tons, building for Illinois Bell Telephone Co., to Concrete Steel Co.

CHICAGO, 400 tons of rail steel bars, building for Nu-Art Engraving Co., to Inland Steel Co.

CHICAGO, 100 tons, building for Borland Mfg. Co., to Barton Spiderweb System.

CHICAGO, 500 tons, Woolworth Building, to Kalman Steel Co.

CHICAGO, 170 tons, temporary building for Board of Trade.

CHICAGO, 1000 tons, *Daily News* building, to an unnamed bidder.

CHICAGO, 700 tons of rail steel, apartment building; Wahl Construction Co., builder, to an unnamed bidder.

AURORA, ILL., 350 tons, reservoir, to an unnamed bidder.

STATE OF ILLINOIS, 700 tons of rail steel bars for road work; 200 tons to Calumet Steel Co., 200 tons to Olney J. Dean Co. and 300 tons to Concrete Engineering Co.

STATE OF ILLINOIS, 900 tons, highway bridges; five to A. C. Wood, Rockford, Ill., one to Hansell-Elcock Co., Chicago, and two to Continental Bridge Co., Chicago.

ST. LOUIS, 475 tons, Lennox Hotel at Ninth and Washington Avenues, to Laclede Steel Co.

SEATTLE, 100 tons, addition to Virginia Hospital, to Pacific Coast Steel Co.

SALT LAKE CITY, 155 tons, paving Mount Carmel highway, to unnamed company.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 500 tons, abutments for Hudson River bridge; Arthur McMillen Co., general contractor.

BUFFALO, 100 tons, extension to express building of New York Central Railroad; bids asked.

BUFFALO, 300 tons, school No. 81; being figured.

CHICAGO, tonnage being estimated, 11-story garage building, for Glen E. Holmes, Inc.

CHICAGO, tonnage not stated, building for Illinois Bell Telephone Co.

CHICAGO, 800 tons, approaches to Crawford Avenue bridge; Underground Construction Co., general contractor.

ST. LOUIS, 200 tons, Knights of Pythias building, Grand and Delmar Boulevards.

SEATTLE, 155 tons, piers for West Waterway bridge; bids May 18.

FABRICATED STRUCTURAL STEEL

Two Bridge Projects Take 10,300 Tons—Milwaukee Court House Will Require 6000 Tons

INCLUDING 5500 tons for a railroad bridge at Newark, N. J., 4800 tons for additional work on the Hudson River bridge at New York and 3500 tons for plant additions at Moline, Ill., and Waterloo, Iowa, structural awards amounted to 29,000 tons. New projects totaled 14,000 tons, the largest being a court house at Milwaukee requiring 6000 tons. Awards follow:

State of Vermont, 553 tons, bridges at North Enosburg, East Highgate, North Sheldon and Sheldon Springs, to Lackawanna Steel Construction Co., Buffalo.

Middlesex, Vt., 366 tons, four bridges, to Palmer Steel Co.

Waterbury, Vt., 150 tons, bridges, to Bethlehem Steel Co.

Boston, 160 tons additional, Sears, Roebuck & Co., to New England Structural Co.

State of New Hampshire, 400 tons, three bridges, to American Bridge Co.

Boston & Maine Railroad, 300 tons, two bridges, to Boston Bridge Works, Inc.

New York, 1500 tons, loft building on East Forty-fifth Street, to Harris Structural Steel Co.

New York, 4800 tons, Hudson River bridge, in connection with wire cable work to be done by John Roebling's Sons Co.

State of New York, 286 tons, highway bridges; 125 tons to Bethlehem Steel Co., and 161 tons to McClintic-Marshall Co.

Newark, N. J., 5500 tons, bridge over Newark Bay for Pennsylvania Railroad, to Bethlehem Steel Co.

West End, N. J., 1000 tons, H. T. Parson residence, to Hedden Iron Construction Co.

Philadelphia, 350 tons, mill building for Edward Russ, to Belmont Iron Works.

Philadelphia 2500 tons, apartment building on Spruce Street, to Bethlehem Steel Co.

Baltimore, 318 tons, plates for 80,000-gal. tank for American Oil Co. at Curtis Bay, to Riter-Conley Co.

Waterville, N. C., 800 tons, hydroelectric station, to Virginia Bridge & Iron Co.

Charleston, W. Va., 120 tons, Montgomery Ward & Co. building, to Massillon Bridge & Structural Co.

Birmingham, 200 tons, Crawford Auto Shop, to Southern Steel Works.

Pittsburgh, 100 tons, slag brick plant for Duquesne Slag Products Co., to Jones & Laughlin Steel Corporation.

Pittsburgh, 450 tons, mill building, Crucible Steel Co. of America, to Fort Pitt Bridge Works.

East Liverpool, Ohio, 230 tons, foundry building, to unnamed fabricator.

Dayton, Ohio, 150 tons, W. T. Grant residence, to Massillon Bridge & Structural Co.

State of Michigan, 190 tons, road work, to Massillon Bridge & Structural Co.

Stickney, Ill., 200 tons, building for Sanitary District, to Midland Structural Steel Co., Chicago.

Chicago, 700 tons, Temple Sholem, to Midland Structural Steel Co., local.

Chicago, 300 tons, church and school, to A. Bolter's Sons.

Minneapolis, 2000 tons, Foshay Tower, to Minneapolis Steel & Machinery Co.

Minneapolis, 1100 tons, building for Northern States Power Co., to Minneapolis Steel & Machinery Co.

Moline, Ill., and Waterloo, Iowa, 3500 tons, additions to plants of Deere & Co., to Rochester Bridge Co., Rochester, Ind.

St. Louis Southwestern Railway, 200 tons, bridge at Garland City, Ark., to unnamed fabricator.

Bellingham, Wash., 100 tons, standpipe, to Chicago Bridge & Iron Works.

Coburg, Ore., 220 tons, bridge over McKenzie River, to Portland Bridge Co.

Bodie, Cal., 100 tons, headframe for Clinton West Co., to Moore Dry Dock Co.

Los Angeles, 158 tons, hotel, Lake and Eighth Streets, to Union Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Boston & Maine Railroad, 1000 tons, two highway bridges.

State of New York, 250 tons, highway bridge.

Jersey City, 250 tons, St. Francis Hospital.

Dover, N. J., 200 tons, United States Government building at Piccatinny Arsenal.

Pennsylvania Railroad, 1000 tons, bridges.

Wilmington, Del., 850 tons, bridge; Fredrich Snare Corporation, general contractor; Phoenix Bridge Works, low bidder on steel erected.

Baltimore, 800 tons, highway bridge.

Memphis, 625 tons, six sand barges for Mississippi River Commission.

Cleveland, 400 tons, two junior high schools.

Cleveland Heights, 100 tons, Canterbury School.

Detroit, 150 tons, office and service building for White Motor Co.

Erie, Pa., 275 tons, Erie County bridges; bids taken.

Joliet, Ill., 250 tons, store.

Chicago, 200 tons, building at Ohio and North Michigan Boulevards; Phillip Maher, architect.

Chicago, 250 tons, store at 226 South Wabash Avenue.

Chicago, 200 tons, store at 234 South Wabash Avenue.

Chicago, 250 tons, building for Link-Belt Co.

Milwaukee, 6000 tons, Court House.

St. Louis, 150 tons, Soulard market for Board of Public Service.

Tacoma, Wash., 115 tons, plates for 48-in. riveted pipe; bids April 30.

Oakland, Cal., 4830 tons, plates, Wildcat aqueduct, East Bay Municipal Utility District; Steel Tank & Pipe Co., low bidder.

Oakland, 3668 tons, plates, Sequoia aqueduct, East Bay Municipal Utility District; Steel Tank & Pipe Co., low bidder.

Oakland, 400 tons, Twentieth Century Market; bids being taken.

Oakland, 380 tons, warehouse, foot of Fourteenth Street; Herrick Iron Works, low bidder.

Richmond, Cal., 300 tons, warehouse for Parr Terminal Co.; bids received.

San Francisco, 120 tons, addition to warehouse, Vermont and Fifteenth Streets; bids being taken.

OBITUARY

Nicolay Nelson, founder of the Nelson Machine Works, Waukegan, Ill., died, April 17. He was born in Norway. He and his son founded the Nelson Machine Works 22 years ago.

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William U. Dennison, superintendent of construction for the Carnegie Steel Co. in the Youngstown district and builder of the McDonald plant of the company at McDonald, Ohio, died suddenly, April 21, aged 64 years. He had been with the Carnegie company for 27 years.

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William F. Lane, general superintendent of the Girard works, A. M. Byers Co., Girard, Ohio, died suddenly April 21, in a Youngstown hospital, aged 58 years. He had been connected with the Girard plant of the Byers company since 1909, for the first five years as superintendent of the furnace department and since 1914 as superintendent of the property.

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John A. Kittilsen, vice-president K. I. Willis Corporation, Moline, Ill., died at his home in that city on April 16, following a year's illness. He was 68 years of age and was identified for 29 years with the Moline Scale Co. before becoming one of the organizers of the Willis organization.

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James C. Armstrong, proprietor of the former Armstrong Machine Works, Peoria, Ill., and a pioneer in foundry work in central Illinois, died on April 20. He was 82 years of age and had retired from active business several years ago.

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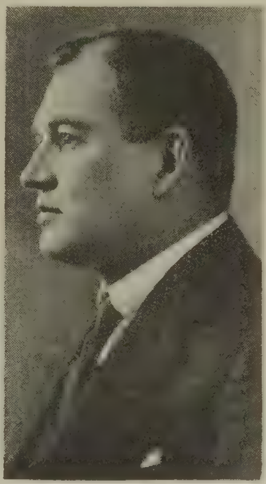
C. Lee Cook, head of the C. Lee Cook Co., Louisville, Ky., manufacturer of metallic steam packing and steam specialties, died on April 25 of pneumonia. He was 57 years of age and had been physically incapacitated since infancy. He was widely known as an inventor and was also prominently identified in civic and artistic circles of Louisville.

PERSONAL

John E. Woods, assistant general manager of sales Carnegie Steel Co., has retired after almost 41 years' association with the company. His successor is Joseph C. Shields, who has been his assistant. Mr. Woods started in the steel business in August, 1887, as a time clerk at the Homestead steel works. He was manager of sales in Cincinnati prior to his appointment as assistant general manager of sales. He was born in Washington, Pa., Dec. 17, 1867, and is a graduate of Washington and Jefferson College. Mr. Shields' entire business career has been in the steel business and with the Carnegie Steel Co., with which he started as an office boy in the order and shipping department Sept. 15, 1897. Later he became shape schedule clerk, then chief clerk with the general sales department, and in December, 1917, he was made assistant to Mr. Woods.

JOHN E. WOODS



JOSEPH C. SHIELDS

James E. Lose has been appointed assistant general superintendent Homestead works, Carnegie Steel Co., succeeding Ralph H. Watson, recently advanced to the general superintendency of that works. Mr. Lose has been identified with the company since 1910, continuously at the Carrie furnaces, which supply pig iron to the Homestead works. He was born in Kansas, but attended the grade and high schools in Pittsburgh, where he also took a year's course in special mathematics at Pittsburgh Academy and four years' mechanical engineering course at the Carnegie Institute of Technology. He started as a tracer in the drawing room at Carrie furnaces and successively served as draftsman, stock house foreman, superintendent of construction, assistant superintendent of blast furnaces, and finally as superintendent of blast furnaces, assuming the latter position in September, 1924. He presented a paper, "Operation of Large Hearth Furnaces," at the 1927 spring meeting of the American Iron and Steel Institute. He is a member of this institute and also of the Eastern States Blast Furnace and Coke Oven Association.

Homer D. Williams, president Pittsburgh Steel Co., Pittsburgh, accompanied by his bride, has gone to California for a month's visit.

B. E. Kibbee, who has been general manager of sales for the Sharon Steel Hoop Co., Sharon, Pa., has been made vice-president of the company, succeeding H. T. Gilbert, recently elected vice-president Republic Iron & Steel Co. Mr. Kibbee will be succeeded by A. S. Booth, who has been assistant general manager of sales for the Sharon company.

Arthur H. Hawkins, recently district representative at Memphis, Tenn., for the Granite City Steel Co., Granite City, Ill., has been transferred to Dallas, Tex., where he will serve the company in a similar capacity. Before going with the Granite City company he was associated with the various subsidiary companies of the United States Steel Corporation at Denver, Colo. Richard W. Orthwein, who has been connected with the Granite City company for a number of years, will succeed Mr. Hawkins as Memphis representative.

Allen E. Hall, manager of the sawmill machinery department, Allis-Chalmers Mfg. Co., Milwaukee, has been appointed a member of the National Committee on Wood Utilization of the Department of Commerce by Secretary Hoover, chairman. He represents the American Society of Mechanical Engineers. The endeavor of the committee is to reduce waste in the production and manufacture of lumber.

A. C. Perrin, formerly associated with Joseph T. Ryerson & Son, Inc., Chicago, has joined the sales organization of the Stocker-Rumely-Wachs Co., 117 North Jefferson Street, Chicago, dealer in machine tools.

B. M. Houston, foundry engineer of the International Nickel Co., was the principal speaker at the April 25 meeting of the Fort Wayne, Ind., group of the American Society for Steel Treating. His subject was "Extending the Limitations of Cast Iron Through the Use of Nickel and Chromium."

Salvador Moreira, research engineer American Steel & Wire Co., was the guest of the Worcester Society of Civil Engineers at their meeting on April 25. Mr. Moreira, a native of Honduras, gave an outline of business and political conditions in Central America.

H. J. Griffing, grinding machine engineer Norton Co., Worcester, Mass., on May 2 presented the film, "The Thirtieth Part of a Hair," before the Employers' Association of Eastern Massachusetts.

La Roy M. Sherwin has been made foundry superintendent of the Brown & Sharpe Mfg. Co., Providence. He was associated with the Providence concern several years ago, but resigned to take up work in other sections of the country.

Charles F. Abbott, executive director American Institute of Steel Construction, Inc., New York, will be the principal speaker at a meeting of the Gray Iron Institute to be held in Philadelphia on May 18 in the convention hall of the Philadelphia Commercial Museum. The meeting will be devoted principally to a discussion of organization problems.

Harry H. Leathers, 80 Federal Street, Boston, has been appointed New England agent for the American Fluid Motors Co., Philadelphia, manufacturer of high-pressure hydraulic pumps and hydraulic motors. R. L. Sittinger will be associated with Mr. Leathers in sales work.

E. F. Doty, formerly chief engineer of the Buffalo Steam Pump Co., Buffalo, has resigned to organize the E. F. Doty Pump Co., 401 Ellicott Square, Buffalo, which will engage in the manufacture of specialized lines of pumping machinery and handle sales in that territory for the American Well Works, Aurora, Ill.

C. P. Potter, engineer in charge of the large motor and transformer divisions of the Wagner Electric Corporation, St. Louis, has been elected chairman St. Louis section, American Institute of Electrical Engineers. He has been a member of the organization since his graduation from the University of Illinois in 1909, having served on various committees and last year as vice-chairman of the section.

L. E. L. Thomas, from 1920 until 1927 chief engineer Indiana Harbor, Ind., works, Inland Steel Co., Chicago, has been appointed vice-president Freyn Engineering Co., Chicago, and will devote himself particularly to work in progress for foreign clients. He is a graduate of McGill University, Toronto, and after a varied experience in the iron and steel industry, was made chief draftsman of the Youngstown Sheet &

Tube Co. In 1916 he was made chief engineer of the Gary Tube Co., Gary, Ind., his work having to do with the construction of a plant to include docks, blast furnaces, steel making capacity, rolling mills and tube mills. With the suspension of that work on account of the war he was made chief engineer of the ordnance department, United States Steel Corporation, which was beginning the construction of a munitions plant. When that project was abandoned at the close of the war he returned to the Gary company, where he remained until 1920.

Theodore Beran, commercial vice-president General Electric Co., in charge of the New York district, has resigned. He had been manager of the company's New York district since 1903 and vice-president since 1926. He was born at Springfield, Mass., in 1862 and received his college training at the College of the City of New York.

Thomas S. Stephens, for the last 25 years associated with the machinery sales activities of Manning, Maxwell & Moore, Inc., New York, most recently as manager of railroad machinery sales, has resigned.

H. VAN ZANDT

H. vanZandt, who has been identified with the Illinois and Carnegie steel company sales departments since 1910, has been appointed assistant general manager of sales for the Illinois Steel Co., in charge of sales of structural shapes, plates, axles and coke oven by-products. He was born at Blawenburg, N. J., in 1882 and attended the Lawrenceville School, Lawrenceville, N. J., and Princeton University, having been graduated from the latter institution in 1905. From 1905 until 1907 he served in the Gautier rolling mill department, Cambria Steel Co., Johnstown, Pa. He then went with the Carnegie Steel Co., where he was employed for a few months in the plate mill department at Homestead before being transferred to the general sales department in May, 1907. He went to the Carnegie Chicago office in February, 1910.

F. C. Turner, 116 Broad Street, New York, has been appointed export representative for the Beamer Handle Co., Manor, Pa.

J. C. Goodnight has joined the Detroit sales organization of the Black & Decker Mfg. Co., Towson, Md., and will specialize in automotive work. He succeeds Henry Fox, who has gone into business for himself. Leon A. Hardy has replaced Jack Caffrey in the company's New York office, Mr. Caffrey having entered another line of business.

Stanley W. Parker has been appointed district manager at Chicago for Wheelock, Lovejoy & Co., Inc., Cambridge, Mass., with headquarters in the Pure Oil Building, 31 East Wacker Drive. He was graduated from the Massachusetts Institute of Technology, and after four years in the metallurgical department of the Pennsylvania Steel Co., Steelton, Pa., became associated with Wheelock, Lovejoy & Co. He has been metallurgist and sales engineer in the Cambridge office for 12 years.

L. A. Bassett, president Hendrick Mfg. Co., Carbondale, Pa., manufacturer of perforated metal screens, elevator buckets and interlocked steel grating, has returned to his office after an absence of four months in California.

Thomas G. Nee has been elected president of the Acme Wire Co., New Haven, Conn., following the retirement of Victor M. Tyler. James W. Hook, president Geometric Tool Co., New Haven, has been elected chairman of the executive committee, and Mr. Nee and William G. Redfield have been elected to the board of directors, succeeding James T. Moran and James E. Wheeler. The new president was graduated from the University of Wisconsin in 1900 and from 1905 to 1917 was vice-president and chief engineer of the Mexican Telephone & Telegraph Co. From 1917 until 1927 he was associated with the Allied Machinery Co., New York, a subsidiary of the American International Corporation, having served as president of its Japanese subsidiary, the Horne Co., Ltd.

William E. Emmett, for the last four years contracting manager in the structural steel department of the Moore Drydock Co., Oakland, Cal., has been appointed field engineer in District No. 10 of the American Institute of Steel Construction, and will have headquarters in the Russ Building, San Francisco. He is a graduate of the University of Kansas and before going with the Moore company was for 11 years identified with the Kansas City Structural Steel Co., Kansas City, Mo.

Ralph Simpson has been appointed to handle sales in Maine, New Hampshire, Rhode Island and eastern Massachusetts for the Geometric Tool Co., New Haven, Conn. Before joining the Geometric company he was sales manager of the Stockbridge Machine Co., Stockbridge, Mass., and previously was connected with the Potter & Johnson Machine Co., Pawtucket, R. I.

B. J. Osborne, for six years identified with the structural sales department of the Moore Drydock Co., Oakland, Cal., has been appointed contracting manager of that department, succeeding William E. Emmett.

J. B. Green, president Fusion Welding Corporation, Chicago, spoke recently on welding at a meeting of managers of railroad, tramway, petroleum and related companies in Mexico City, Mexico. The meeting was arranged by La Consolidada, Mexico City, manufacturer of acetylene welding wire and steel work for welding, and at the invitation of the company, J. J. Sacks, service engineer for the Fusion corporation, has gone to Mexico City, where he will spend several weeks in the interest of Mexican welding developments.

J. E. Montgomery, vice-president in charge of operations for the Wheeling Steel Corporation, Wheeling, W. Va., has been elected a director to succeed the late Edward Hazlett. Mr. Montgomery has been identified with the corporation for 18 years.

B. L. Sommer, who has been president Keystone Steel & Wire Co., Peoria, Ill., has been elected chairman of the board, a newly created position. W. H. Sommer, recently vice-president and general superintendent, has been made president, and has been succeeded by D. P. Sommer. Henry G. and R. E. Sommer have been made vice-presidents, the latter in charge of sales.

John C. Brill, for many years district sales manager at New Orleans for the Inland Steel Co., Chicago, has resigned to become associated in a similar capacity with the Newport Rolling Mill Co., Newport, Ky.

John F. Braam, Paul Renshaw and Frank W. Moffett were elected vice-presidents and directors of the General Railway Signal Co., Rochester, N. Y., at a recent meeting of the board. Mr. Braam, who is also secretary and assistant treasurer of the company, was identified with the Taylor Signal Co., Buffalo, prior to its merger with the General company in 1904 and has been associated with the latter company since that time. Mr. Renshaw has been assistant to the president, in charge of sales, and will continue in charge of the sales department. He was formerly with the Federal Signal Co., having come to the Rochester company following the merger of the two organizations in 1924. Mr. Moffett has been assistant to the general manager, in charge of factory operations.

Graham H. Anthony, for the last 11 years vice-president and secretary of the Allen Mfg. Co., Hartford, Conn., has resigned to become vice-president in charge of manufacturing for Veeder-Root, Inc., recently formed by a consolidation of the Veeder Mfg. Co., Hartford, and the Root Co., Bristol, Conn. Before becoming associated with the Allen company Mr. Anthony was identified with the Gilbert Clock Co., Winsted, Conn.

A. C. Howell, president American Shovel & Tool Co., Boston, has resigned.

L. J. Griffiths, assistant general manager of the iron and steel works of the Broken Hill Proprietary Co., Newcastle, N. S. W., and Mr. Young, of the same organization, are now in the United States on a tour of iron and steel production centers. They will sail for Australia about the middle of June.

J. W. Davis, for the past 10 years attached to the Chicago district office McClintic-Marshall Co., Pittsburgh, has been placed in charge of a St. Louis office, which has just been opened in the Telephone Building, that city.

Thomas J. Bray, who recently was succeeded as president of the Republic Iron & Steel Co. by Elmer T. McCleary, has been elected a director of the Youngstown Sheet & Tube Co. and will be associated in the operating management of the Sheet & Tube company plant. The board of directors of the Sheet & Tube company was reduced from 14 to 11 members; the others are James A. Campbell, Frank Purnell, A. E. Adams, H. G. Dalton, Harry Coulby, John W. Ford, John Tod, Richard Garlick, C. H. Booth and J. L. Severance.

R. S. Dutton, manager of sales, Pickands, Brown & Co., Chicago, left April 26 for a two months' vacation in Europe.

George F. Davie, vice-president and treasurer Interstate Iron & Steel Co., Chicago, has returned from a two months' visit to northern Africa.

Steel Co. of Canada to Equip for Ore and Coal Unloading from Boats

At the annual meeting of the Steel Co. of Canada, held in Hamilton, Ont., April 25, President Ross H. McMaster in his address to the shareholders said: "In connection with future plant improvements, you will understand that, with the opening of the new Welland Canal, it will be possible to arrange delivery of supplies of ore and coal by means of water transportation. It is proposed to establish on the waterfront at Hamilton, adjacent to the steel plant, a modern unloading and storage dock where the large Lake freighters can dock. This has been anticipated for some years and the new plant will involve a substantial expenditure. The installation, however, should prove a valuable addition in normal times, and will also facilitate plant operations. It is also planned to improve equipment for the generation of steam power as well as to centralize pumping facilities and to increase the consumption and efficiency in the use of waste gases. A point should be reached where consideration should be given to the installation of improved and more modern facilities, looking toward the replacement of certain rolling mill equipment. This will involve corresponding changes in steel producing units and blooming mill. Looking further ahead, blast furnace A will require to be modernized and entirely rebuilt when the market demand for pig iron justifies doing so."

Vanadium Corporation Personnel Changes

WARD A. MILLER

Ward A. Miller, most recently New York sales manager for the Midvale Co., Philadelphia, has been appointed vice-president of the Vanadium Corporation of America, 120 Broadway, New York, and will have general supervision over all commercial affairs of the corporation. He entered the steel business with Joseph T. Ryerson & Son, Inc., Chicago, having also served in the company's New York and Pittsburgh offices. At the beginning of the war he was Pittsburgh district manager for the Ryerson company, but left that position to serve as a captain in the Army Ordnance Corps. At the close of the war he became associated with the Midvale Steel & Ordnance Co., Johnstown, Pa., serving first as manager of the distributers' division of general sales and later as Chicago district sales manager. He has been New York sales manager of the Midvale Co. since the Steel & Ordnance company was absorbed by the Bethlehem Steel Corporation, and in that capacity has been in charge of sales in New York, New England and Canada. He is a member of the American Iron and Steel Institute, the American Electrochemical Society and the American Society for Steel Treating.

N. Petinot, general manager of sales of the Vanadium corporation, has been appointed assistant to the president, and will devote his time to technical activities in this country and abroad. J. A. Miller, Jr., who has been assistant general manager of sales, succeeds Mr. Petinot, and has been succeeded in turn by Gustav Laub, recently assistant secretary. P. J. Gibbons, assistant treasurer, will assume Mr. Laub's former duties.

Jerome Strauss, material engineer in the United States Naval Gun Factory, Washington, has been engaged by the Vanadium corporation for special engineering and metallurgical work. He was graduated in mechanical engineering from the Stevens Institute of Technology, Hoboken, N. J., in 1913, and entered the steel industry in the metallurgical department of the Illinois Steel Co., South Chicago. He severed this connection to engage in metallurgical work in drop forging manufacture and was thus occupied until the outbreak of the war, when, as a first lieutenant, he was detailed on general inspection work of ordnance materials. Upon leaving the army in 1919 he was made a captain in the Ordnance Reserve. He joined the naval gun factory in that year as assistant chief chemist and metallurgist, later becoming chief chemist and then material engineer. He holds the rank of Lieutenant Commander in the United States Naval Reserve.

River Shipments of Steel Increase

Inland river movement of iron and steel products continues to make a very favorable showing. According to the report for March of the Pittsburgh office, United States Engineers, iron and steel shipments on the Allegheny River were 725 net tons, compared with 600 tons in March, last year; 77,908 tons on the Monongahela, against 36,112 tons in March, last year, and 77,945 tons on the Ohio River compared with 29,016 tons in March, last year. The total shipments for the first three months of this year compare with those of the same period last year as follows:

	Allegheny	Monongahela	Ohio
1928..........	1,440	227,337	235,330
1927..........	600	93,541	84,636

Opposes Anti-Injunction Bill

(*Continued from page* 1247)

take just as much interest in the figures as does the manager or superintendent.

"Now as to the wage incentive plan for foremen that is in operation in our plant: We have devoted not a little time to the study of the different methods of extra compensation; particularly some means of reducing investment in material, both raw and finished; also, for reducing the amount of work in process. The expense budget was carefully made up and the problem of holding it within a certain amount or lowering it if possible, was one of the chief considerations.

Savings on Budgeted Expenses Distributed Among Foremen

"In previous years, we had never been able to work to a certain budget; in fact, we had never been given a stipulated amount at which we might aim. After a careful analysis of previous performances, we established a certain amount for actual operating expenses, based on productive labor and shipments. This budget was fixed on the basis of normal operation employing a productive payroll required for shipments. If the actual expense is kept within this figure, a bonus amounting to 10 per cent of basic salary is paid. If the productive payroll required for shipments is reduced or increased, the budget expense is reduced or increased a proportionate amount. In addition to the initial bonus of 10 per cent, one-half of the amount saved on actual expense, under adjusted budget, is distributed pro-rata to the foremen. We feel that this part of our bonus plan has helped wonderfully, and aided in keeping expenses at a minimum; in fact, relatively lower than they had ever been before.

"Another part of the plan affects the investment in materials. A budget was established for the amount of material in process for normal shipments. An increase or decrease in the volume of business will change the budget in proportion to the change in budgeted productive pay. If the amount of work in process is kept within the limits of the budget, a bonus amounting to 10 per cent of basic salary is paid. This part of our plan has helped to reduce the investment in materials in process at least 50 per cent.

"Foremen's bonuses, to obtain the maximum good from them, are not as simple to design as one might imagine. The results desired should be well thought out, and the system designed so that money is paid for what is wanted and not paid so as to encourage what is not desired.

"Naturally when the foremen's wages depend on the volume of business, and average efficiency of the productive and non-productive workers, a spirit of cooperation is immediately built up throughout the entire organization, and better results come quickly.

"Every manufacturer likes to feel that his key men are pulling together intelligently. Some achieve that satisfaction. Foremen know the mechanics of their own jobs, but they have rarely been trained in modern team work and in the principles of modern production methods. That is a matter for your foremen training or conference groups."

Men Paid According to What They Produce

The Morkrum-Kleinschmidt Corporation, Chicago, has used an incentive system for wage payment for 10 years. In his paper Mr. Heding of that company said the system has proved highly satisfactory to men and management. Under this plan the men are paid according to what they produce. The original system was one of individual bonuses but this later was changed to the group plan, primarily to simplify the clerical work, eliminate checking elapsed time on operations, simplify the time and cost system and reduce the number of job tickets. All operations on a part performed by a group are combined into one group operation—a group in this sense being a number of workers doing the same class of work and pooling their entire output.

The company has found that there is greater cooperation under this method, since everything that will aid in the completion of the work will mean more money for the group and hence for each man, and the individual is willing to help his fellow workers whenever necessary. In a group, one man will set aside his personal feelings because by so doing he is helping to increase his own earnings as well as those of the other men. The older men realize that the sooner they break in the new man the sooner they will get the full advantage of his efforts, while the fact that his fellow workers are so much interested in his success is a spur to the new man to put forth his best efforts.

Under the individual plan of payment, Mr. Heding pointed out, the employees were sometimes inclined to resent the dismissal of a fellow employee for incompetence or laziness, but under the group plan they are glad to see the incompetent or lazy man discharged because they know that he has been holding down the earnings of the group.

Foremen Participate in Same Proportion as Other Workers

Supervisors, such as general foremen, department foremen and job foremen, also participate in the same proportion as the workers they supervise.

Mr. Heding said that a plant of the type of the Morkrum-Kleinschmidt plant, manufacturing products requiring 20,000 different machine parts made in varying quantities, is usually not considered the ideal shop for any kind of an incentive plan of wage payment; nevertheless, the company believes that an incentive plan built on the proper foundation of time and motion studies, detailed operation instructions carefully planned, machine set-up data, including determined speeds and feeds, teaching workers to perform operations according to methods determined by careful study of experts, and with standard time rates, which include fatigue and other necessary allowances, will reduce costs in any manufacturing plant. While there is a larger plant overhead expense, this is offset many times by the lower unit costs in the manufacturing department.

The company's system is a modified Halsey "50-50" plan. Standard time is determined by adding to the time study allowances for fatigue, power feed machine, hand feed machine, or all hand work, as the case may be. The incentive is based on paying a group of workers working at normal speed a bonus of 20 per cent of their straight hourly rates, provided the group has not wasted any of the time incentive time allowance.

The bonus plan of the company was explained as follows:

Bonuses Are Paid Every Week

"Bonus periods are of one week in order to fit in with the regular payroll period and also to pay the bonus without unnecessary delay. A group is given credit for all "inspected and passed" work that clears through during the week. The total amount of work finished by a group in one week multiplied by the standard time rates gives the total standard output hours for the week. From the 'in and out' time clock records is obtained the total group actual hours for the week. Total standard, or output hours, divided by the total actual hours gives the efficiency of the group in percentage. From this efficiency figure the bonus percentage is readily obtained and applied to the payroll.

"Standard time rates are subject to change only when there has been a change in methods, tooling, design, machine tool, or in other words, only when there is a change not due to the direct efforts of the workers. Rates in force one year without change are re-time studied in order to make sure that no overlooked change in method of operation had been made.

"Standard time rates are in decimal hours, and while it is not possible for a group to readily figure exactly what their bonus earnings will be, a glance at the standard time rate indicated on the job ticket, along with a mental shift of the decimal point allows a conversion of the decimal hour rate to one of time per 10, 100 or 1000 units. This allows the operator, also the supervisor, to know the relative speed at which the job is progressing. Maintaining this speed in the group makes possible a close approximation of the bonus earnings.

"Paying bonuses on a pecentage basis from standard time rates eliminates the necessity of changing rates to compensate for fluctuating prevailing wage rates. It also properly takes care of the skilled and semi-skilled workers in a group by paying the skilled worker a larger bonus than is paid the semi-skilled one, due to the difference in regular day rate pay. For example, in a group being paid a 20 per cent bonus, the skilled worker with an hourly rate of 75c. receives 15c. per hr. additional compensation, whereas the lower class worker with an hourly rate of 45c. receives 9c. per hr. additional.

"A general foreman is given the average of the percentages of the departments over which he is supervisor. A general foreman being paid a salary higher than anyone under his supervision consequently receives an additional compensation proportionately greater.

"The foreman of a department split into two or more groups is given a percentage representing the average of the percentages of the groups. A group leader or a foreman of a department small enough to be handled as one group is paid the same bonus percentage as his workers.

"Another advantage of the percentage plan is that, whether computing bonus for workmen or supervisors, it all fits in with the same general scheme and without undue additional clerical expense.

"Quality of work is taken care of by proper inspection. A job not meeting the requirements of the blueprint, gages, or other specification is returned to the department that turned out the job. Time spent in bringing the job to the proper requirements adds to the number of actual hours of working time in the group. This of course tends to lower the efficiency figure with a consequent lowering of additional compensation. Therefore, from supervision down to the lowest worker, there is a constant guarding against doing work improperly.

"In handling the clerical details of our incentive plan, so much of it fits in with the regular clerical routine of timekeeping, payroll, accounting, etc., that very few additional entry forms are necessary.

"An incentive plan to be successful requires from the employer a knowledge of the best methods of performing various operations and duties, and proper instruction and training so that the employee may reach the required proficiency; a continuous study of and search for improved methods; the maintenance of favorable working conditions, and in general, a sincere sympathy with and clear appreciation of the employee's needs and desires."

Foreman Training by the Blackboard Route

GEORGE SEYLER of the Lunkenheimer Co., Cincinnati, conducted an interesting class in foremanship training at the opening of the Thursday session. He directed 20 of the members and with their aid demonstrated the advantages of the blackboard method of training foremen as against the lecture method. By the blackboard method, he said, the men themselves are more inclined to air their own opinions and grievances, and as they participate actively in the discussions rather than being mere listeners, they are not only more interested, but greater good comes out of such meetings, Mr. Seyler said.

The twenty manufacturers volunteering were asked to put themselves in the position of managers and suggest answers to the following question: What are some of the things that management expects of foremen? The qualifications agreed upon were as follows, in part:

Be a leader
Cooperation
Low costs and expected quality
Be an organizer
Loyalty
A square deal
Discipline
Make his own schedule and plan in his work
Expect him to have knowledge of work in his department

Then reversing the situation, Mr. Seyler asked the members to put themselves in the position of foremen and to suggest answers to this question: What are some of the things foremen expect from management?

Similarly, about twenty such items were finally listed on the board, all to illustrate how a group of foremen can have their thinking quickly directed to the problems at hand. Incidentally the demonstration proved highly amusing as well as informing.

Industrial Budgeting Recommended by Howard Coonley

Howard Coonley, president Walworth Co., Boston, discussed the industrial budgeting plan in operation in the Walworth business. The most recent phase of this work, which has been conducted for more than 10 years, is forecasting by means of plotted curves. Mr. Coonley said that the forecasting chart is first made up by a theorist, and then discussed at a meeting of all heads of departments, and when finally agreed upon is made the basis for all of the company's activities—manufacturing, sales, purchasing and financing—for the period for which the forecast is made. Account is taken of the state of the inventory and seasonal fluctuations in the company's business, but so far as possible the calculations form the groundwork for the budget made up in advance. Mr. Coonley said that it was necessary from time to time to make adjustments in the budget because of conditions arising that could not be forecast, but in the main the budget comes within 5 per cent or so of actual performance.

Among the results which have followed the budgeting plan Mr. Coonley mentioned these: If demands for the company's products do not require full production throughout the year, an effort is made to have the letdown come in the summer, when men can more easily obtain outside jobs and when their financial obligations are lighter. The company is able to estimate more closely its financial requirements for a year in advance and to avoid the pitfalls of ordering new equipment and not having the money for it when it comes in. The greatest advantage, he said, is that management's eyes are turned forward instead of backward. Also, the budget gives something with which actual performance can be compared, thus determining the factors which may deflect actual results as compared with the results forecast. The budget plan enables a company to estimate its work in advance so that a certain portion of its help can be given employment throughout the year, thereby keeping the indispensable men better satisfied. It also enables the company to frame its expense account in keeping with sales possibilities. A disadvantage, Mr. Coonley said, is the feeling of too much security, especially when a high rate of business activity has been predicted. Mr. Coonley said he now believed it was possible to use the forecast to estimate profits a year in advance, and even the trend of prices can be reliably plotted in advance.

Mr. Coonley predicted that the next great step in industry is to be the scientific study of merchandising. This, he said, has already been done to some extent by such organizations as the General Motors Corporation and the National Cash Register Co., but he believed that progress in this direction will be as great in the coming years as the development of improved manufacturing methods in the past decade.

Bituminous coal raised in the week ended April 21 is placed at 7,883,000 net tons by the United States Bureau of Mines. This is a sharp increase from the 7,415,000 tons of the preceding week and 7,158,000 tons of the week ended April 7. For the calendar year through April 21 output has been 151,970,000 tons, against 194,003,000 tons for the same period last year.

European Prices Continue Strong

German Market Active in Expectation of Higher Prices—Britain's Proposed Tax Reduction May Decrease Steel Costs

(By Cable)

London, England, April 30.

CLEVELAND pig iron is more active for export and domestic consumers are more interested in buying, but disinclined to place large contracts for forward delivery. Hematite is in better demand, but stocks are still large and one hematite furnace on the East Coast has transferred its production to foundry pig iron. On the West Coast, the North Lonsdale Iron & Steel Co. is starting two hematite furnaces. Foreign ore is firm as a result of the continuance of the Swedish miners' strike.

Finished iron and steel is slightly more active with improved demand from home engineering plants and some rail business recently booked. Export business, however, is quiet and conditions are less favorable in the shipbuilding industry.

Tin plate is very firm and demand continues heavy. Further heavy tonnages have been booked for delivery to the end of the year so that many makers are now full until August and can book but little for delivery before October. On forward contracts 18s. 4¼d. ($4.49) has been paid. Stock and prompt tin plate is scarce at 18s. 6d. ($4.51). Shipments continue on a large scale.

Galvanized sheets are inactive and most works are prepared to accept the official minimum prices. Business has been moderate in the heavier gages of black sheets and Japan is buying some fair tonnages of light gages.

In April, 19 vessels aggregating 28,400 tons were launched on the Clyde, compared with 21 vessels aggregating 33,700 tons in April, 1927.

The Government's budget proposals include 75 per cent reduction of local tax rates on industrial plants and certain remissions in the local rates on railroads, the total of which it is estimated will result in an average reduction of steel costs by 5s. 6d. ($1.34) per ton. Severe criticism has been evoked by a clause that first relief is to be granted only after 18 months.

Arrival here of Charles M. Schwab is awaited with interest in connection with proposals said to have been made for the amalgamation of British iron and steel companies under the auspices of a new finance company of Great Britain and the United States.

Continental material is fairly firm, except pig iron, which is subject to keen British competition. Better steel demand is reported in Germany based on the possible price advance because of the proposed increase in coal miners' wages and railroad freight rates.

German Buyers Active—Expecting Price Increase

(By Radio)

Berlin, Germany, April 30.

DOMESTIC prices for May are unchanged. The market for semi-finished material and rolled products has become suddenly active with a heavy demand for bars and structural shapes. The cause is the expectation of consumers that the proposed advance in Ruhr coal prices as a result of the 8 per cent increase in miners' wages will make steel costs higher.

Employment reports show a decided improvement in the steel, engineering and electrical industries. Foreign orders for heavy iron and steel are coming in satisfactorily and mills are making efforts to increase export trade.

The unfilled tonnage of the United Steel Works, Düsseldorf, is reported at the same level as December, 1927, but the proportion of foreign orders has increased.

BELGIAN PRICES STEADY

Still Show Tendency to Advance—Competition of British Iron Is Severe

ANTWERP, BELGIUM, April 11.—Despite the limited volume of business which is attributed partly to the recent Easter holidays, mills are maintaining prices fair-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17¾s.		$4.33	
Bilbao Rubio ore*..	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to 3 15½	18.27	to 18.39
East Coast mixed...	3 9	to 3 10	16.81	to 17.05
East Coast hematite.	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese ...	13 10		65.75	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh......	5 7½	to 5 15	26.18	to 28.01
Tin plate, base box.	0 18⅙	to 0 18½	4.48	to 4.51
Black sheets, Japanese specifications.	13 5		64.53	
			C. per Lb.	
Ship plates.........	7 12½	to 8 2½	1.66	to 1.77
Boiler plates........	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2,39
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 0	to 13 2½	2.82	to 2.85
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.		$15.34	
France	3 3		15.34	
Luxemburg	3 3		15.34	
Basic pig iron (nom.)				
Belgium	3 0	to £3 1s.	14.61	to $14.85
France	3 0	to 3 1	14.61	to 14.85
Luxemburg	3 0	to 3 1	14.61	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 10½	to 4 11½	22.04	to 22.29
France	4 10½	to 4 11½	22.04	to 22.29
Merchant bars:			C. per Lb.	
Belgium	5 6	to 5 7	1.17	to 1.18
France	5 6	to 5 7	1.17	to 1.18
Luxemburg	5 6	to 5 7	1.17	to 1.18
Joists (beams):				
Belgium	4 15	to 4 16	1.05	to 1.06
France	4 15	to 4 16	1.05	to 1.06
Luxemburg	4 15	to 4 16	1.05	to 1.06
Angles:				
Belgium	5 3½		1.14	
⅛-in. plate:				
Belgium (a)	6 9	to 6 10	1.42	to 1.43
Germany (a)	6 9	to 6 10	1.42	to 1.43
3/16-in. ship plate:				
Belgium	6 4	to 6 4½	1.32	to 1.33
Luxemburg	6 4	to 6 4½	1.32	to 1.33
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

ly well. Producers claim to be well booked with orders for the present and are not inclined to offer concessions. The French domestic market has improved considerably, so that French mills are not so active in export business, and this is aiding Belgian mills to maintain an independent position on prices. In a few cases there have been slight increases in prices, but these have not yet been tested by actual transactions. Exporters who have accepted foreign orders and have not yet placed the business with mills are still seeking lower prices, but without success.

Pig Iron.—There is a good demand for foundry iron from domestic users, and prices are being maintained at about $16.25 per ton, f.o.b. furnace, for No. 3 phosphoric foundry. British competition in hematite has curtailed export business in this grade, which is quoted at £3 2s. 6d. ($15.40) per ton, f.o.b. Antwerp. As a result of the foreign competition, Bessemer hematite iron is quoted at not more than 650 fr. ($18) per ton, f.o.b. furnace.

Semi-Finished Material.—Following a perod of weakness in prices, semi-finished products have recovered and current quotations for export are £4 3s. to £4 9s. ($20.35 to $21.80) per metric ton on blooms, £4 10s. to £4 11s. 6d. ($22.05 to $22.40) per ton on billets and about £4 13s. ($22.80) per ton on sheet bars, all f.o.b. Antwerp.

Finished Material.—Mills continue to show a firm attitude in the face of efforts by buyers to secure lower prices. The total of orders, however, is small, but makers are still booked with enough business to carry them for some time. Exporters with orders for foreign delivery that they have not yet placed with mills are beginning to show an inclination to meet the price ideas of producers. Prices on steel bars are firm and show a slight tendency to increase. Considerable business could have been done with British consumers and in Far Eastern markets at £5 3s. per ton (1.14c. per lb.), but makers are offering no concessions and are maintaining prices at £5 5s. to £5 6s. per metric ton (1.16c. to 1.17c. per lb.), f.o.b. Antwerp. Prices on beams are stronger at £4 15s. per ton (1.05c. per lb.), but the hoop market still shows some weakness in prices, as production is rather heavy and demand decidedly small. Hoops are quoted at about £6 per ton (1.33c. per lb.), f.o.b. Antwerp. Corrugated bars have been sold at £5 10s. per ton (1.22c. per lb.).

AUSTRALIAN STEEL MERGER

Open-Hearth, Blast Furnaces, Electric Rolling Mills and Centrifugal Pipe Plant Projected

WASHINGTON, May 1.—Recent organization of the Australian Iron & Steel Co., Ltd., capitalized at £5,000,000, is spoken of in Australia as the largest undertaking of the kind in the history of that country, according to a report received by the Department of Commerce from the vice-consul at Sydney. The companies concerned in the merger are Dorman, Long & Co., Ltd., and Baldwin's, Ltd., both of England, Howard Smith, Ltd., Melbourne, and the Hoskins Iron & Steel Co., Ltd. The latter firm has for some years been engaged in manufacture at Brisbane, Queensland, and Sydney and Lithgow, New South Wales. Recently interests were acquired at Port Kembla, New South Wales, which will be the headquarters of the new organization. The products of the new company include a general line of iron and steel.

The Commonwealth Minister for Customs is quoted by an Australian paper as saying that a new blast furnace at Port Kembla will be completed in June and that it is intended to proceed immediately with the erection of steel furnaces, electric power plants, engineering shops and rolling mills. Electrically driven rolling mills will make the new plant one of the most modern in the British Empire. In addition, the minister is quoted as saying that a plant will be established for the manufacture of centrifugal cast iron pipe by the De Lavaud process. The minister, according to press reports, said that the organization of the iron and steel companies into one unit was a direct result of his recent visit to London and of favorable tariff legislation giving additional protection to the iron and steel industry of Australia. The legislation has passed the Australian House of Representatives and now is before the Senate.

The directors of the new company will be Cecil H. Hoskins, chairman of the board Hoskins Iron & Steel Co., chairman; Sir Arthur Dorman, chairman of the board Dorman, Long & Co.; Sir W. Charles Wright, chairman of the board Baldwin's, Ltd.; H. B. Howard Smith, chairman of the board Howard Smith, Ltd.; Arnold S. Taylor, chairman of the board Southern Portland Cement, Ltd., and Lawrence Ennis, A. Sidney Hoskins and Edwin H. Flack, directors of various companies included in the merger.

FRENCH EXPORT PRICES FIRMER

Foreign Bar Orders Go to German Mills—Output Increases—British Pig Iron Competitive

PARIS, FRANCE, April 20.—The domestic market continues firm, and export prices, which had developed some weakness prior to the Easter holidays, are stronger. On the whole, the price situation is satisfactory, but a steady increase in output may result in surplus tonnage in the near future. Among consumers of steel and with a few finishing mills business is slack and full operation has not been possible. This seems to be generally considered as a temporary condition brought about by the elections. Shares of iron and steel companies quoted in the stock market have shown considerable advances in price during the past few weeks, in some cases rising as much as 36 per cent.

Pig Iron.—In the export field, British competition is keen. Foundry iron is quoted at £3 2s. to £3 2s. 6d. ($15.10 to $15.22) per ton, f.o.b. Antwerp. Basic ranges from £2 15s. to £2 16s. ($13.40 to $13.64) per ton. It is reported that concessions from the prices set by the French-Belgian-Luxemburg pig iron entente are being offered by sellers on the seaboard, where British competition is particularly severe. The inland market is satisfactory, with foundry consumers buying freely. A total of 38,000 tons of foundry iron has been set aside for shipment to domestic users in May. This is the same as the April tonnage. At the same time prices have been reduced by 5 fr. (20c.) per ton for inland delivery except in the North, where prices have been advanced 5 fr. (20c.) per ton. However, prices in the North were recently reduced by about 15 fr. (59c.) per ton, so that the new revision leaves a difference of only 5 fr. per ton in domestic quotations. The tonnage of hematite iron set aside for May is 41,000 tons, compared with 35,000 tons in April. Prices have been advanced 2.50 fr. to 5 fr. (10c. to 20c.) per ton on domestic business.

Semi-Finished Material.—Export demand is light, but prices are slightly firmer. Blooms are quoted at £4 to £4 2s. 6d. ($19.48 to $20.09) per ton for the large and medium sizes. Small blooms, 4 to 5 in., are in good demand and have been sold at as high as £4 9s. to £4 10s. ($21.68 to $21.92) per ton, f.o.b. Antwerp. Billets range from £4 9s. to £4 11s. 6d. ($21.68 to $22.29) per ton. Sheet bars are £4 11s. to £4 12s. 6d. ($22.16 to $22.53) per ton.

Finished Material.—Sizable tonnages of bars were offered to exporters for shipment to the United Kingdom and Japan at £5 3s. per ton (1.14c. per lb.), but with the market growing firmer, exporting houses were not inclined to risk being unable to place the business with mills. Current prices range from £5 4s. 6d. to £5 5s. per ton (1.15c. to 1.16c. per lb.), f.o.b. Antwerp. German mills have sold some important bar tonnages to Holland, the total being reported at about 25,000 tons. The price is understood to have been £5 5s. per ton (1.16c. per lb.), delivered. Beam prices are firmer, with normal specifications at £4 13s. to £4 13s. 6d. per ton (1.02c. to 1.03c. per lb.), f.o.b. Antwerp. Wire rod prices have been fixed by the syndicate at £5 15s. per ton (1.27c. per lb.) for 5 to 5.5 mm. £5 17s. 6d. per ton (1.30c. per lb.) for 6 to 8 mm. and £6 per ton (1.32c. per lb.) for 8.5 to 13 mm. Export sheet prices are firm, with 0.5 mm. black sheets at £10 5s. to £10 10s. per ton (2.26c. to 2.32c. per lb.).

Rails.—The European Rail Makers' Association has agreed to maintain the price of £6 7s. 6d. ($31.05) per ton, f.o.b. shipping port, as the price for second quarter. The extra for open-hearth rails has been increased from 5s. ($1.22) to 7s. 6d. ($1.83) per ton. There has been a considerable increase in the tonnage of rails and steel ties used by the French railroads. For example, the Compagnie du Chemin de Fer de Paris à Orleans used 1,271,000 steel ties in 1927, compared with 700,000 in the year prior to the war, and 63,400 tons of new rails, compared with 10,000 tons in 1914.

STEEL IMPORTERS MORE ACTIVE

Bidding on Concrete Bars for Mexico—Japanese to Build Galvanizing Plants in India

New York, April 30.—Importers of European steel report slightly greater activity, but prices are still higher than some time ago, and not much tonnage has been placed by consumers in the United States. There is considerable interest in hoops and bands, however, and business in these products is fairly steady. A number of inquiries for reinforcing bars are outstanding, but they are not regarded as promising prospects by sellers of the foreign product except in the case of about 2500 to 3000 tons of reinforcing bars wanted by the Ambursen Construction Co., Grand Central Terminal, New York, which has a contract in Mexico.

Export business with the Far East is only moderately active. Most of the current buying of light-gage black sheets by Japanese consumers is being done in Great Britain at less than the American market price. The Kioto Oil Co. in Japan, which inquired for about 15,000 base boxes of tin plate, has closed on about 10,000 boxes. These were divided between two large Japanese export houses, which awarded the business to four different American mills.

Tokio municipality has placed 6 miles of 91-lb. high T-rails and is in the market for 2 miles of 100-lb. girder rails and 1 mile of 94-lb. grooved rails, bids on which will open April 29. Nagoya municipality has placed about 430 tons of 91-lb. high T-rails with a Japanese export house for execution by "Columeta" in Belgium.

Recent Japanese purchases of wire rods have been rather large, being estimated by some sellers at close to 6000 tons, of which about half went to the leading American interest and half to the leading Canadian maker. The American prices on this business are understood to have been about $36 per ton, c.i.f. Japan, on the low-carbon rods (0.06 to 0.12 per cent carbon) and about $43 per ton, c.i.f., on the high-carbon rods (0.55 to 0.65 per cent carbon). The Canadian quotations were in most cases about 25c. to 50c. per ton less, but later the Canadian seller withdrew from the market.

The market on wood screws in Japan is reported to be rather unsettled, and an increasing quantity of European screws is replacing the American product. With about 15 brands of American and European screws being offered, competition is keen. Among the American brands bought in Japan are "Amesco," "Reed & Prince," "Marui," "Olbin" and "Bridgeport." European brands in the Japanese market are "A.B.C.," "Arrow Brand," "Stemman," "Woodholm" and "Austria."

Under normal conditions Japanese galvanizing plants export a sizable tonnage of sheets to India. Recently, sheet interests in Japan have been investigating the possibility of establishing galvanzing plants in India, which would be operated with Indian labor at lower costs than in Japan.

German Exports of Aircraft Increasing Rapidly

Hamburg, Germany, April 15.—Exports of aircraft are increasing rapidly, although the total number of machines shipped is still small. In 1925 only 11 airplanes were exported from Germany; in 1926 a total of 24 was shipped, and in 1927 the total was 54. In the first quarter of this year 28 airplanes were exported, so that it is expected that shipments for this year will be considerably in excess of any other year. The figures do not include the machines shipped on reparations account to Italy, Jugoslavia, France, Belgium and other countries, and no account is taken of the airplanes built for the Deutsche Lufthansa in its air service with Russia, Scandinavian countries, Switzerland, Spain, France, Turkey, Persia and the Near East. Of the exports last year, Colombia received six, Japan three, Argentina four and Brazil four machines. All exports were of large air service machines for six to 18 passengers each.

Rails of Electric Furnace Steel Used in Austria

Hamburg, Germany, April 15.—A new type of rail, brought out by the Alpin Montangesellschaft in Austria and now being used by the Austrian railroads, is rolled from electric furnace steel of high manganese and silicon content. While the new rails are higher in price than the open-hearth product, tests by the Austrian railroads are said to have shown that they have better wearing quality and in the mountainous districts have about double the life of ordinary rails.

Qualifications for Welders

(*Concluded from page* 1244)

several welded pressure vessels which are to be studied and tested to destruction at the Bureau of Standards. These tests will supplement those made on smaller tanks, 24 in. in diameter, several years ago, and it is hoped that the results will be convincing enough so the Unfired Pressure Vessel Code of the American Society of Mechanical Engineers may be amended to allow a more liberal use of this new method of construction.

Another committee on structural steel welding, of which J. H. Edwards, American Brdge Co., is chairman, has under way an extensive series of tests to determine safe working stresses of various types of joints in structural steel. An exploratory series has already been tested, and has given much information on the types of joints which should be more intensively studied. This program is so large and requires so many cooperating firms that the committee has drawn up detailed specifications covering methods of testing welders, equipment, welding technique, details of test bars, inspection and tests. This represents the best procedure control for structural welding, either arc-welding or oxwelding, known in the present state of the art, and on publication should be available for a control in many welding shops where important work is being done.

Officers for 1928

New officers elected Thursday, April 26, are as follows:

President: Fred T. Llewellyn, United States Steel Corporation, New York.

Senior vice-president: A. E. Gaynor, John A. Roebling's Sons Co., New York.

Vice-president, Western division: Ernest Lunn, Pullman Car & Mfg. Corporation, Chicago.

Vice-president, Eastern division: W. J. Meadowcroft, Edward G. Budd Mfg. Co., Philadelphia.

Vice-president, New England: H. P. Peabody, John A. Roebling's Sons Co., Boston.

Treasurer: C. A. McCune, American Chain Co., Bridgeport, Conn.

Secretary: Miss M. M. Kelly, New York.

The retiring president, F. M. Farmer, Electrical Testing Laboratories, New York, becomes a member of the board of directors, together with the following new members: A. M. Candy, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; J. H. Deppeler, Metal & Thermit Corporation, Jersey City, N. J.; E. H. Ewertz, consulting engineer, New York, and S. W. Miller, Union Carbide & Carbon Research Laboratory, Long Island City, N. Y.

Large Increase in Steel Exports

Tonnage Greatest in Four Years—Imports Much Larger Than in February, with Pig Iron Showing Considerable Gain

WASHINGTON, April 26.—With exports of iron and steel products from the United States in March aggregating 221,935 gross tons, a gain of 36,020 tons or 19.4 per cent over February, as stated in THE IRON AGE of April 26, the total for the three-month period ended with March amounted to 613,616 tons, or an increase of 60,165 tons over the corresponding period of last year. The March outgoing tonnage was the greatest for any month since January, 1924.

By some this added export movement is attributed to an important degree to the reduction of 20 per cent in the freight rate on iron and steel products which became effective on Jan. 1. The tariffs reducing the rate were filed with this purpose in view and the railroads announced that they were "experimental," intimating that, should the gain in iron and steel exports be substantial, they would be made permanent. The showing so far made lends encouragement to the hope of exporters that the railroads will take such action.

Exports in March, representing an increase of 50,067 tons over the corresponding month of last year, reflected a gain in all but four products—ferromanganese, scrap, wire rope and carwheels and axles—when compared with February. There was an increase in every category of rolled products. For the first quarter there was a gain in the exportation of all but nine products, when compared with the corresponding period of last year. The nine items registering decreases were iron bars, steel bars, galvanized sheets, black steel sheets, black iron sheets, hoops and bands, tin plate, steel rails and boiler tubes and welded pipe.

Imports in March, amounting to 74,128 tons, a gain of 26,500 tons or 55.6 per cent when compared with February, showed increases in most of the important lines, particularly in pig iron, ferromanganese, semi-finished steel, steel bars, hoops and bands, structural shapes and pipe, both cast iron and seamless. For the three months ended with March, however, imports showed an increase of only 5712 tons when compared with the corresponding period of last year, rising to 180,391 tons from 174,679 tons.

Scrap was the largest item of exportation in March, with a total of 26,510 tons, of which 14,058 tons went to Canada, 5895 tons to Japan and 5252 tons to Poland and Danzig. Next came boiler tubes and welded pipe, with a total of 24,068 tons. Black welded pipe exports were 6443 tons, of which 1342 tons went to Venezuela, 965 tons to Mexico, 663 tons to the United Kingdom, 580 tons to Japan and 570 tons to Canada. Casing and oil line pipe exports totaled 11,775 tons, of which 3070 tons went to Colombia, 2534 tons to Venezuela, 2484 tons to Peru and 1072 tons to Argentina. Exports of galvanized pipe amounted to 3191 tons, and were widely scattered in comparatively small lots. Cuba took 433 tons, Brazil 347 tons, and Mexico 345 tons. Of the 22,755 tons of tin plate exported during the month, 4439 tons went to Canada and 2769 tons to Japan.

Steel rail exports for the month were 15,798 tons, Brazil leading as the principal country of consumption,

Imports of Iron and Steel into the United States

(In Gross Tons)

	March		Three Months Ended March	
	1928	1927	1928	1927
Pig iron	16,155	7,492	33,669	21,235
Ferromanganese*	4,666	3,339	10,875	6,596
Ferrosilicon	147	1,272	845	3,141
Ferrochrome	50	....	188	359
Scrap	2,522	5,074	9,215	15,680
Pig iron, ferroalloys and scrap	*23,540*	*17,177*	*54,792*	*47,011*
Steel ingots, blooms, billets and slabs	2,112	1,551	4,465	4,035
Iron blooms, slabs, etc.	3	....	4	....
Wire rods	2,135	1,466	5,399	3,907
Semi-finished steel	*4,250*	*3,017*	*9,868*	*7,942*
Rails and splice bars	940	1,031	4,271	4,885
Structural shapes	17,131	15,079	41,661	36,736
Boiler and other plates	308	166	380	840
Sheets and saw plates	2,708	632	8,490	3,378
Steel bars	9,991	10,999	26,677	22,987
Bar iron	27	441	460	1,306
Hoops, bands and cotton ties	2,949	1,317	6,352	7,047
Tubular products (wrought)	3,504	3,336	7,946	11,543
Nails, tacks, staples	709	209	1,646	1,256
Tin plate	24	20	69	62
Bolts, nuts, rivets and washers	9	14	65	73
Round iron and steel wire	386	233	961	823
Barbed wire	400	584	986	1,882
Flat wire; strip steel	240	252	588	661
Steel telegraph and telephone wire	....	....	46	24
Wire rope and strand	138	245	406	564
Other wire	94	66	188	105
Rolled and finished steel.	*39,558*	*34,624*	*101,192*	*94,172*
Cast iron pipe	6,280	6,759	13,276	24,669
Castings and forgings	500	247	1,263	885
Total	74,128	61,824	180,391	174,679
Manganese ore*	12,786	22,917	40,377	95,107
Iron ore	162,654	197,455	643,410	685,839
Magnesite	9,425	8,220	12,415	15,136

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*Manganese content only.
†Silicon content only.
‡Chromium content only.

Exports of Iron and Steel from the United States

(In Gross Tons)

	March		Three Months Ended March	
	1928	1927	1928	1927
Pig iron	4,356	3,647	12,253	9,808
Ferromanganese	69	13	2,139	107
Scrap	26,510	15,416	85,504	27,300
Pig iron, ferroalloys and scrap	*30,935*	*19,076*	*99,896*	*37,215*
Ingots, blooms, billets, sheet bar, skelp	11,710	6,332	25,252	12,096
Wire rods	2,134	1,450	7,449	5,152
Semi-finished steel	*13,844*	*7,782*	*32,701*	*17,248*
Steel bars	12,005	9,115	30,566	31,504
Alloy steel bars	1,258	533	2,796	1,395
Iron bars	222	581	792	1,367
Plates, iron and steel	12,787	10,027	33,991	29,347
Sheets, galvanized	15,531	13,428	37,947	44,362
Sheets, black steel	13,292	15,433	44,135	48,647
Sheets, black iron	1,151	732	3,256	4,752
Hoops, bands, strip steel.	5,329	5,402	12,434	13,552
Tin plate; terne plate	22,755	26,817	60,552	97,468
Structural shapes, plain material	15,148	8,976	38,366	25,146
Structural material, fabricated	5,915	6,205	16,729	15,929
Steel rails	15,798	13,701	54,403	55,844
Rail fastenings, switches, frogs, etc.	6,271	1,856	19,153	7,223
Boiler tubes, welded pipe and fittings	24,068	16,489	61,701	80,324
Plain wire	5,072	2,663	12,070	7,175
Barbed wire and woven wire fencing	7,076	3,463	17,031	7,871
Wire cloth and screening	178	201	474	583
Wire rope	442	290	1,479	1,103
Wire nails	1,175	571	3,687	1,745
Other nails and tacks	928	592	2,356	1,906
Horseshoes	38	19	112	71
Bolts, nuts, rivets and washers, except track.	1,119	848	2,930	2,696
Rolled and finished steel.	*167,558*	*137,942*	*456,960*	*480,010*
Cast iron pipe and fittings	3,942	1,649	9,209	6,734
Car wheels and axles	1,212	1,071	3,560	2,867
Iron castings	1,393	1,606	3,664	3,389
Steel castings	914	729	2,514	1,410
Forgings	612	585	1,479	1,264
Castings and forgings	*8,073*	*5,640*	*20,426*	*15,664*
All other	1,525	1,428	3,633	3,314
Total	221,935	171,868	613,616	553,451

taking 2514 tons, while Chile took 2409 tons. Canada and Japan, which have been declining as markets for rails and a number of other steel products, took but 699 tons and 1462 tons respectively. Canada took 11,682 tons of the 15,148 tons of plain structural steel exported in March and 10,784 tons of the 12,787 tons of plates exported during that month. Japan took 4978 tons and Canada 6533 tons of the 13,292 tons of black steel sheets exported in March. Of the 3114 tons of hoops and bands exported, Canada took 2676 tons, and of the 2215 tons of cold-rolled strip steel, Canada took 2064 tons.

United States Imports of Iron and Steel Products in March

(In Gross Tons)

Austria	44	United Kingdom	13,801
Belgium	22,110		
Czechoslovakia	676	*Total Europe*	*66,785*
Denmark	70	Canada	3,970
France	13,488	Mexico	31
Germany	10,356	British India	3,338
Italy	63	China	1
Netherlands	2,323	Japan	3
Norway	1,597		
Sweden	2,257	Total	74,128

Total iron and steel exports to Canada in March were 93,537 tons, and for the three months that country took 230,328 tons, or 37.5 per cent of the total of 613,616 tons.

While the import movement of pig iron in March, amounting to 16,155 tons, was not large, it reflected a sharp gain over February's total of 6387 tons. In March 10,748 tons came from the United Kingdom. This has led to speculation as to whether or not that country, which is recouping its foreign markets, is not again likely to be the principal source of pig iron imports, as was the case several years ago. The United Kingdom also was the leading foreign source of supply of ferromanganese in March, furnishing 1971 tons of the 4666 tons imported. Norway sent 1573 tons and Canada 1056 tons.

Belgium was the source of 6825 tons of the 9991 tons of steel bars imported, while 1438 tons came from France and 938 tons from Sweden. Of the 2949 tons of hoops and bands imported, 1707 tons came from Germany and 239 tons from France. There was an unusually large import movement in March of sheets, skelp and saw plate, largely made up of the first and third items, the total being 2708 tons, of which 2067 tons came from Germany. Of the 17,131 tons of shapes imported, Belgium supplied 9002 tons; France, 6146 tons; Germany, 1659 tons.

France furnished 4859 tons of the 6280 tons of cast iron pipe imported, and 1320 tons came from Belgium. "Other pipe" imports were 3504 tons, of which Germany supplied 1968 tons; Czechoslovakia, 561 tons; France, 252 tons; United Kingdom, 202 tons; Canada, 1927 tons; Belgium, 142 tons. Of the 12,786 tons of manganese ore concentrates imported, 10,187 tons came from Brazil and 2584 tons from India.

Belgium was the principal source of the total imports in March, supplying 22,110 tons. The United Kingdom led France by a small margin as the second largest source, supplying 13,801 tons, against 13,488 tons for France.

Pig Iron Imports Increase Heavily

Imports of pig iron in March are reported by the Department of Commerce at 16,155 gross tons. This is more than double the 6387 tons of February and more than double the 7492 tons of March, 1927. Two-thirds of the total imports in March came from the United Kingdom. India and the Netherlands made up the bulk of the remaining tonnage.

For the first quarter the incoming quantity was 33,669 tons. This compares with 21,235 tons a year ago. There have been sharp drops in the tonnage received from Germany and from the Netherlands; that from Germany declined more than 99 per cent, while that from the Netherlands was reduced about one-third. These reductions have been more than compensated for by heavy increases in imports from British India and from the United Kingdom. In the latter case the tonnage was multiplied by more than 11, while India supplied almost three times as much in the recent quarter as a year earlier.

United States Imports of Pig Iron by Countries of Shipment

(In Gross Tons)

	March		Three Months Ended March	
	1928	1927	1928	1927
United Kingdom	10,748	1,250	14,548	1,250
British India	3,338	2,763	12,766	4,574
Germany	.....	690	40	6,596
Netherlands	1,929	2,585	5,529	8,230
Canada	59	56	324	304
France	.....	.....	.....	.....
Belgium	.....	100	197	100
Norway	.....	.....	.....	.....
All others	81	48	265	181
Total	16,155	7,492	33,669	21,235

Increased Production of Malleable Castings

Malleable castings produced in March are reported by the Depatment of Commerce at 63,322 tons. The returns are from 133 plants. The current figure compares with 59,045 tons in February and with 66,372 tons a year ago. With the exception of March, 1927, the total in March was the largest in two years.

Shipments in March were almost exactly the same as production, this being in striking contrast with the five preceding months, in each of which production was much heavier than shipments. Orders booked during the month are reported at 60,697 tons, or about one month's production at current rates. Production is reported to have been at 69.6 per cent of the rated capacity of 91,043 tons.

Sharp Decline in Imports of Foreign Iron Ore

Imports of iron ore in March are reported by the Department of Commerce at 162,654 gross tons. This is a sharp reduction from the 229,578 tons imported in February and the 251,178 tons in January. It compares with 197,455 tons in March of last year and, except for December, is the lowest amount in many months.

For the first quarter of the year imports were 643,410 tons, compared with 623,163 tons in the first quarter of 1927. More than half of the total in each case came from Chile.

SOURCES OF AMERICAN IMPORTS OF IRON ORE

(In Gross Tons)

	March		Three Months Ended March	
	1928	1927	1928	1927
Canada	217	540	38,845	1,366
Cuba	47,200	33,000	94,700	129,000
Chile	90,800	91,000	362,900	323,200
Spain	250	3,723	5,250	3,723
Sweden	6,383	14,143	6,383	44,124
French Africa	9,693	54,090	102,024	110,840
Other countries	8,111	959	33,308	10,910
Total	162,654	197,455	643,410	623,163

Exports of agricultural implements from the United States in March were valued at $9,318,916, or approximately $575,000 more than the exports in March of last year, according to the agricultural implements division, Department of Commerce, Washington. Exports for the first quarter of the present year showed an increase of $6,347,784 over the corresponding period of last year.

The United States has 1075 airport landing fields, according to a list just published by the Aeronautics Branch, Department of Commerce. There are also nearly 4000 others on which planes may land. California, with 115 air fields, leads. Texas is second with 90, and Pennsylvania third with 68.

Heavy Increase in Machine Exports

Largest Value in Seven Years Sent Abroad in March—Imports Higher Than in February

WASHINGTON, April 26.—Making a gain of $6,417,287, exports of machinery of all kinds in March were valued at $42,372,463, against $35,955,176 in February. The movement in March of last year was valued at $38,937,144. For the three months ended with March machinery exports were valued at $114,577,472, compared with $101,968,651 for the first quarter of 1927.

Exports of industrial machinery in March were valued at $19,026,074, according to the classification of the division of statistics, Department of Commerce. This compares with $16,202,582 in February and with $17,729,364 in March of last year. For the three months ended with March the value was $51,489,241, against $49,045,974 for the corresponding period of last year. Power-driven metal-working machinery to the value of $1,960,407 was exported in March, against $1,242,234 in February and $1,325,639 in March of last year. For the first quarter the value was $5,990,096, compared with $3,941,022 for the corresponding period of last year. Exports of power-driven metal-working machinery as listed in THE IRON AGE table represented 740 items in March, valued at $1,103,000, against 686, valued at $1,315,771, in January, and 623, valued at $1,242,234, in February.

Total imports of machinery and vehicles in March were valued at $2,433,564, against $2,668,715 in March of last year. For the first quarter they were valued at $6,550,659, against $6,981,256 for the first three months of 1927. Items listed in THE IRON AGE table of imports of machinery were valued in March at $1,819,672, against $1,714,648 in February and $2,084,261 in March of last year. For the three months of the current year the value was $4,718,486, compared with $4,435,879 for the corresponding period of last year. Imports of industrial, office and printing machinery in March were valued at $1,404,786, against $1,324,521 in February and $1,208,009 in March of last year.

National Machine Tool Exposition to Be Repeated in 1929

The committee on expositions of the National Machine Tool Builders' Association has announced that it is unanimously in favor of holding another national machine tool exposition in 1929. A vote by mail by members of the association disclosed that 52.6 per cent were in favor of another exposition next year, while the remainder of those voting wanted to wait until 1930. Answers to a questionnaire submitted to the members disclosed that a majority was of the opinion that expositions constitute a sound method of merchandising machine tools, an opinion that was fortified by the results of the exposition held in Cleveland last year.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	March		Three Months Ended March	
	1928	1927	1928	1927
Locomotives	$427	$2,256	$633	$3,452
Other steam engines	62	76	161	414
Boilers	112	117	261	534
Accessories and parts	85	123	168	516
Automobile engines	1,781	1,358	3,478	3,142
Other internal combustion engines	606	1,013	1,705	2,824
Accessories and parts	353	418	818	1,116
Electric locomotives	22	58	510	126
Excavating machinery	771	449	1,964	1,080
Concrete mixers	103	114	230	308
Road-making machinery	80	179	230	370
Elevators and elevator machinery	341	444	972	1,204
Mining and quarrying machinery	1,162	1,181	2,128	3,386
Oil-well machinery	1,513	1,280	3,377	4,692
Pumps	871	470	1,907	1,506
Sheet and plate metal-working machines	178	102	400	258
Forging machinery	227	68	212	225
Machine tools*	1,185	823	4,087	2,382
Other metal-working machinery and parts	516	421	1,397	1,058
Textile machinery	1,233	816	3,371	2,563
Sewing machines	802	834	2,189	2,332
Shoe machinery	179	148	481	321
Flour-mill and gristmill machinery	35	27	126	96
Sugar-mill machinery	157	179	1,452	628
Paper and pulp-mill machinery	263	298	951	1,458
Sawmill machinery	13	47	53	185
Other woodworking machinery	115	137	432	331
Refrigerating and ice-making machinery	675	579	1,839	1,620
Air compressors	633	483	1,494	1,207
Typewriters	1,958	1,868	5,691	5,108
Power laundry machinery	119	170	252	427
Typesetting machines	338	384	1,108	912
Printing machinery	1,523	1,274	3,907	3,458
Agricultural machinery and implements	9,319	8,744	25,189	18,862
All other machinery and parts	14,616	11,998	41,407	33,866
Total	$42,372	$38,937	$114,577	$101,969

*Principal details in another table.

Exports of Power-Driven Metal-Working Machinery

	March, 1928		January, 1928	
	No.	Value	No.	Value
Engine lathes	95	$143,373	66	$157,399
Turret lathes	29	93,995	26	82,136
Other lathes	33	34,295	57	155,744
Vertical boring mills and chucking machines	12	23,125	7	30,978
Thread-cutting and automatic screw machines	90	124,902	74	88,723
Knee and column type milling machines	33	97,243	30	69,761
Other milling machines	47	115,442	81	147,290
Gear-cutting machines	26	59,044	31	91,452
Vertical drilling machines	75	23,423	42	44,430
Radial drilling machines	16	53,337	18	31,519
Other drilling machines	80	14,715	42	76,167
Planers and shapers	37	64,787	40	62,459
External cylindrical grinding machines	81	159,396	77	166,151
Internal grinding machines	38	69,356	46	76,359
Metal-working tool-sharpening machines	48	26,567	49	35,203
Total	740	$1,103,000	686	$1,315,771

Imports of Machinery into the United States

(By Value)

	March		Three Months Ended March	
	1928	1927	1928	1927
Metal-working machine tools	$51,918	$79,104	$140,085	$126,730
Agricultural machinery and implements	526,986	958,348	1,473,701	1,285,303
Electrical machinery and apparatus	243,102	303,706	527,844	506,067
Other power-generating machinery	97	469	1,370	1,375
Other machinery	738,879	543,982	1,875,153	2,019,092
Automobiles and other vehicles, except agricultural	258,690	198,652	700,333	497,312
Total	$1,819,672	$2,084,261	$4,718,486	$4,435,879

Machinery Markets and News of the Works

APRIL BUSINESS OFF

Machine Tool Volume Last Month Falls Below That of March

Santa Fe Railroad Buys About 20 Machines and Union Pacific Is Also Placing Orders

MACHINE tool sales in April fell below those of March by 25 to 30 per cent for the country as a whole, though in the Cleveland-Detroit district, which has benefited by purchases by the automobile industry, the volume was about equal to that of the previous month.

While the bulk of the spring buying of shop equipment by the automobile companies has been completed, some business is expected from parts manufacturers who have been awarded contracts by the Ford Motor Co. for the making of repair parts for its old model T car, some of this work having been discontinued in the Ford plant. The Logangear Products Co., Detroit, has bought several machines for making pumps for Ford cars, and will buy some additional equipment.

In the railroad field, the principal activity was in Chicago, where the Santa Fe ordered about 20 machines and the Union Pacific has bought about a dozen tools. Small orders have been placed by the Rock Island and Burlington roads. Prospective buyers in the Chicago market are the J. I. Case Threshing Machine Co., Racine, Wis.; the Allis Chalmers Mfg. Co., Milwaukee, and the Nash Motors Co., Kenosha, Wis.

In the East, the principal buyers are the Wright Aeronautical Corporation and the General Electric Co.

New York

NEW YORK, April 30.

THERE is a steady flow of business in single tools, so that April will apparently rank among the good months of the year, although with most sellers, March still stands as the largest month. The General Electric Co. has closed on several tools and the Wright Aeronautical Corporation is making further purchases of equipment. The New York Central Railroad has issued more inquiries for single pieces of equipment, but has not been a buyer recently. The automotive industry is still contributing much of the current business. Lathes are outstanding among sales of the past week. One seller, out of a total of 51 machines closed sold 23 lathes.

Recent sales have included a 16 x 36-in. Pratt & Whitney lathe to a Connecticut company; 20 x 48-in. lathe to a Vermont machine tool builder; two 16 x 60-in., one 16 x 84-in. and one 20 x 72-in. lathes to an Illinois company; 16 x 36-in. lathe to a Wisconsin motor manufacturer; 13 x 48-in. lathe to a Michigan automobile manufacturer; 16 x 36-in. and 20 x 48-in. lathes and 6-in. vertical shaper to an Indianapolis company. A Chicago company has closed on a Pratt & Whitney hob and cutter grinder and another Chicago manufacturer on a 7-in. thread milling cutter grinder; a Cleveland company on a 14-in. vertical surface grinder, and another Cleveland company on a No. 2 jig borer; a Michigan motor company on a 5-in. production hand milling machine and a Detroit company on four 5-in. production hand milling machines; a Baltimore company on a 3-spindle Sigourney drill and a tool and die manufacturer in Rochester on a 14-in. vertical surface grinder. A large electric manufacturer in New York State bought a 12 x 120-in. Pratt & Whitney thread milling machine, a No. 3 universal bench milling machine, a No. 2 jig borer and a 6-in. vertical shaper; a builder of aeroplane engines a 16 x 60-in. Pratt & Whitney lathe. The Pratt & Whitney Aircraft Corporation has closed on a 13 x 30-in. and three 13 x 36-in. Pratt & Whitney lathes, and the Michigan Central Railroad has bought a single spindle centering machine.

Contract has been let by Progressive Table Co., Inc., 372 Newport Street, Brooklyn, to I. Rosenblum & Sons, 1691 Carroll Street, for new two-story plant to cost about $60,000 with equipment. Kessler & Goldsmith, 5008 Church Avenue, are architects.

Junkers Corporation of America, Inc., 342 Madison Avenue, New York, subsidiary of Junkers Co. of Germany, builder of airplane Bremen, is planning establishment of new plant on site in Middle West for manufacture of complete line of Junkers aircraft, comprising parts and assembling and airplane motors. It is understood that a security issue will be sold to provide a fund for expansion.

De Rose & Cavalieri, 370 West 149th Street, New York, architects, have plans for a two-story automobile service, repair and garage building, 110 x 120 ft., to cost close to $100,000 with equipment.

Cities Service Co., 60 Wall Street, New York, operating electric light and power properties, oil refining plant and pipe lines, is disposing of a bond issue of $50,000,000, a portion of proceeds to be used for expansion and improvements.

Purty Boat Works, Bayview Colony, Port Washington, N. Y., N. Purty, president, has plans for a one-story boatbuilding and repair plant, to cost close to $100,000 with equipment.

H. I. Feldman, 415 Lexington Avenue, New York, architect, has filed plans for a six-story automobile service, repair and garage building, to cost approximately $200,000 with equipment.

Continental Can Co., 1 Pershing Square, New York, has purchased Southern Can Co., with main plant on 66-acre tract at Baltimore, with assets of about $3,500,000. Purchasing company will carry out an expansion program at Baltimore and other points in South. Passaic Metal Ware Co., Passaic, N. J., was recently acquired by purchasing company.

Electro Chemical Engraving Co., 52 Vanderbilt Avenue, New York, has awarded general contract to Turner Construction Co., for seven-story plant on Brook Avenue, to cost about $100,000 with equipment. C. B. Comstock, 110 West Fortieth Street, is architect.

Lackawanna Railroad Co., ..0 West Street, New York, has authorized electrification of its suburban lines as far west as Dover, N. J., about 173 miles of track, using direct-volt overhead wire system of power transmission, to cost close to $18,000,000, of which approximately $4,000,000 will be used for electrical and mechanical equipment. A steam-operated electric generating station is being considered on Hackensack River, Kearny, N. J., for exclusive service, to cost more than $2,000,000. Work is scheduled for completion in about 24 months. G. L. Ray is chief engineer, and H. M. Warren, electrical engineer.

Officials of Pilot Electric Mfg. Co., 323 Berry Street, Brooklyn, have organized Nakken Television Corporation, to manufacture transmission equipment and receiving apparatus for broadcasting moving images. It is understood that portion of Pilot plant will be used for initial production.

American Brake Shoe & Foundry Co., 30 Church Street, New York, has authorized purchase of controlling interest in National Bearing Metals Corporation, St. Louis, manufacturer of brass and bronze castings, bearings, etc., and will operate in conjunction with foundries and plants in different parts of country. Acquired company comprises a recent merger of More & Jones Brass & Metal Co., Keystone Bronze Co., Damascus Bronze Co. and Bronze Metal Co.

Cohen & Siegel, 45 West Fifty-seventh Street, New York, architects, have plans for a two-story automobile service, repair and garage building, 100 x 120 ft., to cost about $100,000 with equipment.

Board of Education, Boonton, N. J., is considering installation of manual training equipment in a new four-story high school to cost in excess of $300,000. Hacker & Hacker, Fort Lee Trust Building, Fort Lee, N. J., are architects.

Board of Education, City Hall, Newark, will receive bids until May 9 for equipment for schools, including metal-working machinery, wood-working machinery, work benches, steel cabinets, steel lockers, sharpening tools, iron and steel, electrical supplies, hardware, etc. R. D. Argue is secretary.

Colonial Western Airways, Inc., Hadley Field, near New Brunswick, N. J., contractor for Government air mail service to Boston, has leased a tract of two acres at municipal airport, Port Newark, Newark, for a new landing and operating headquarters. Plans are under way for construction of hangars, repair shops, oil storage and distributing building, and other mechanical structures.

British-American Metals Co., South Second Street, Plainfield, N. J., manufacturer of brass and copper tubing, etc., is arranging early call for bids for rebuilding of portion of plant recently destroyed by fire, with loss upward of $150,000 including equipment.

Betz Brothers, Inc., manufacturer of hollow metal doors and trim, is occupying its new factory at Pleasant Avenue and Ann Street, Clifton, N. J. It maintains sales offices at 20 Vesey Street, New York.

Roller Bearing Co. of America, 141 Frelinghuysen Avenue, Newark, manufacturer of roller bearings, has purchased plant of Mercer Motor Car Co., Trenton, N. J., and will install its present equipment and also purchase new machinery. Plant occupies 11½-acre tract and contains 175,000 sq. ft. of floor space.

New England

BOSTON, April 30.

WITH quite a number of machine tool dealers April was the dullest month experienced in a long time. The contrast between New England and other sections of the country is most marked. A majority of New England machine tool builders, however, are fairly busy, especially makers of grinding equipment and some lines of lathes, and somewhat behind on deliveries of certain machines. The sale of tools to Connecticut River Valley manufacturers was the outstanding feature the past week, and included a lathe to a Vermont plant and five lathes and a radial drill to a Hartford manufacturer. New tool sales otherwise are few. The used tool market is also dull.

Small tool sales in April took a decided spurt in the last half of the month and business is better than it has been in a long time.

The activity of shops in the Connecticut Valley is accounted for in a large measure by work for the Ford Motor Co. and to building of aeroplane engines, the latter being centered at Hartford, Conn. The plant of the Westinghouse Electric & Mfg. Co., East Springfield, Mass., is considerably busier than it was a year ago. Rolls-Royce Co. of America, Inc., East Springfield, is proceeding at an excellent rate on automobiles and army and navy work. The Indian Motorcycle Co., Springfield, is maintaining a practically full night force to keep up with orders, not only for motorcycles, but shock absorbers and other accessories. Springfield drop forging plants are busy with automobile work. The plant of the Underwood Typewriter Co., Hartford, is producing practically two typewriters a minute, a new high record. The Russell Mfg. Co., Middletown, Conn., automotive products division is operating on overtime schedules, and its other departments also are busy. April production of the Fafnir Bearing Co., New Britain, Conn., was approximately 20 to 25 per cent greater than March.

Blackstone Valley Gas & Electric Co., Main Street, Pawtucket, R. I., has started work on a four-story and basement, power house, 20 x 152 ft., for which equipment is still required.

Commonwealth Portland Cement Corporation, North Pownal, Vt., has tentative plans for a cement plant of 1,150,000 bbl. capacity. Bids for plant, machinery and machine tools are to be received by Kennedy-Van Saun Mfg. & Engineering Corporation, 50 Church Street, New York.

Atwater Mfg. Co., Plantsville, Conn., is building an addition to its plant to accommodate several new drop hammers.

Bohn Aluminum & Brass Corporation, Hartford, Conn., has awarded contracts for an extension which will increase its piston capacity 50 per cent.

In connection with expansion program, Boston Ice Co., 110 State Street, has purchased 20,500 sq. ft. at Chelsea, and plans construction of ice-manufacturing plant to cost upward of $100,000 with equipment. C. Leslie Weir, 41 East Forty-second Street, New York, engineer for Knickerbocker Ice Co., associated organization, will prepare plans.

R. H. Rines, Oak Street and Forest Avenue, Portland, Me., has filed plans for two-story automobile service, repair and garage building, 95 x 150 ft., to cost close to $100,000 with equipment.

Silverfill Mfg. Co., Inc., Boston, recently formed by Howard P. Cobb, 383 Belmont Street, Belmont, Mass., and associates, with capital of $100,000, contemplates operation of local plant for manufacture of line of metal products.

Blanchard Mfg. & Canning Co., Eastport, Me., will rebuild portion of plant destroyed by fire April 24, with loss more than $150,000 including equipment.

North Shore Ice Co., 46 Lake Street, Lynn, Mass., will soon begin work on one-story ice-manufacturing plant, 100 x 180 ft., to cost about $175,000 with equipment. Funk & Wilcox, 26 Pemberton Square, Boston, are architects. A. W. Thomas is president.

Board of Education, New Haven, Conn., has authorized installation of manual training department of new two-story school to be erected at County and Henry Streets. Bids have been asked on general contract by Brown & Von Beren, New Haven, architects. Cost is close to $200,000.

Willhite-Squires Mfg. Co., Winsted, Conn., manufacturer of tables, chairs and other furniture, has taken over former local factory of Carter & Hakes Co., and will remodel for expansion.

H. C. Hearne, 1389 Main Street, Springfield, Mass., architect, has revised plans for a three-story automobile service, repair and garage building, 110 x 140 ft., to cost close to $125,000 with equipment.

Henry J. Guild, Cambridge, Mass., formerly connected with Eastern Mfg. Co., Bangor and Lincoln, Me., operating paper mills has acquired plant of Berkshire Paper Co., Adams, Mass., at a public sale. Plans are under way for organization of new company to operate mill for manufacture of writing papers. Improvements will be made in equipment.

New Department Mfg. Co., Bristol, Conn., will make extensions and improvements in ball bearing plant, including dismantling of building No. 51 and erection in new location, with one-story building, 44 x 67 feet.

Steubing Cowan Co., Cincinnati, manufacturer of lift trucks and platforms has moved its plant at Holyoke, Mass., into larger quarters, where it will carry complete line of its standard model trucks for distribution through New England and Eastern territory.

St. Louis

ST. LOUIS, April 30.

CONTRACT has been let by Pillsbury Flour Mills Co., Minneapolis, Minn., to Jones-Hettelsater Co., Mutual Building, Kansas City, Mo., for flour milling plant and elevator, 800,000-bu. capacity, to cost in excess of $600,000 with machinery.

Board of Education, Wichita, Kan., plans installation of manual training equipment in new one, two and three-story and basement high school to cost $750,000, for which bids are being asked on general contract until May 15. Glen H. Thomas, Wheeler-Kelly-Hagny Building, is architect.

International Oil Heating Co., 3939 Magnolia Street, St. Louis, manufacturer of oil-burning equipment, has asked bids on general contract for a two-story storage and distributing building, with shop for assembling, repairs, etc.

Southwest Gas Utilities Corporation, Ada, Okla., recently formed under Delaware laws to take over and operate 32 natural gas plants and systems in Oklahoma, Texas and Louisiana, is disposing of a bond issue of $1,750,000, a portion of the proceeds to be used for expansion and improvements, including pipe line construction.

Waxide Paper Co., Twentieth and Tracy Streets, Kansas City, Mo., has awarded general contract to Fruin-Colnon Construction Co., Merchants Laclede Building, St. Louis, for new one-story mill, to cost approximately $250,000 with equipment. L. Halger, 3844 Utah Place, St. Louis, is architect.

St. Louis Tool & Mfg. Co., St. Louis, recently organized by George D. Hart, 4920 Berthland Road, and associates, plans operation of local plant for manufacture of tools, dies and kindred equipment.

B. & H. Motor Co., 4517 Troost Street, St. Louis, is having plans drawn for a one-story automobile service, repair

The Crane Market

THERE is very little new inquiry for overhead cranes and the locomotive crane field is less active than for several weeks. Business in both electric and hand power hoists continues good. Of the inquiries for overhead cranes that have been pending for some time, the 100-ton crane for the New York Edison Co., New York, is reported to have been closed. The largest outstanding business in locomotive cranes is the list of cranes and steam shovels inquired for by Dwight P. Robinson & Co., New York, for use in Argentina.

Among recent purchases are:

New Jersey Zinc Co., New York, 12-ton, 60-ft. span hand power crane for Palmerton, Pa., from unnamed builder.

International Combustion Engineering Co., New York, 25-ton, 8-wheel, locomotive crane for International Coal Carbonization Co., from Browning Crane Co.

Turner Construction Co., Boston, 3-ton, 26-ft. 6-in. span, single I-beam hand power crane from Ruggles-Klingeman Mfg. Co., Salem, Mass.

Gray's Harbor Railway & Light Corporation, Aberdeen, Wash., 15-ton, 48-ft. 3-in. span, 1-motor overhead crane from Box Crane & Hoist Corporation.

and garage building to cost about $100,000 with equipment. Archer & Gloyd, Orear-Leslie Building, are architects.

Cities Service Co., 60 Wall Street, New York, is said to be planning construction of a pipe line for natural gas transmission from Wichita, Kan., to Kansas City, Mo., connecting with its Panhandle trunk line from Pampa, Tex., to cost more than $500,000.

Underwood Compress Co., Hollis, Okla., is contemplating erection of a new cotton compressing plant, one story, 225 x 600 ft., to cost in excess of $125,000 with equipment.

Missouri Pacific Railroad, Railway Exchange, St. Louis, is in the market for two pneumatic flanging machines, two 18-in. lathes and a small portable pipe-cutting machine.

St. Louis Southwestern Railway Co., St. Louis, is inquiring for a 90-in. lathe for journal turning and quartering and crank pin turning, heavy-duty axle lathe and small belt-driven floor grinder.

Johnson Devices, Inc., 4340 Troost Avenue, Kansas City, Mo., has been organized to manufacture Johnson electromagnetic vaporizer. Manufacturing facilities have been secured at 1404 Agnes Street, Kansas City, and company is in market for No. 15 magnetic wire, 1½-in. brass tubing, fiber washers, double insulated electric cable, ¼-in. steel rods and ⅛-in. black malleable iron pipe fittings.

South Atlantic States

BALTIMORE, April 30.

BIDS will be received by Board of Awards, office of city register, City Hall, Baltimore, until May 9, for Department of Education for equipment for machine shops, electrical and wood-working shops. Specifications at office of director of business management, school board, Madison and Lafayette Avenues.

Officials of Safety Car Heating & Lighting Co., New Haven, Conn., and Davison Chemical Co., Garrett Building, Baltimore, are organizing Safety Refrigeration, Inc., to manufacture refrigerating equipment for railroad cars, with silica gel method of refrigeration, controlled by last-noted organization. C. Wilbur Miller, president of Davison company, will be prominently identified with new company.

M. Rich & Brothers Co., Broad Street, Atlanta, Ga., is planning construction of a two-story automobile service, repair and garage building, 90 x 100 ft., to cost approximately $90,000 with equipment.

Atlas Plywood Corporation, 31 St. James Avenue, Boston, is concluding arrangements for purchase of plant and business of Empire Mfg. Co., Goldsboro, N. C., manufacturer of textile frames and equipment, and will consolidate with organization. New owner plans expansion in southern district for textile mill apparatus.

Virginia Electric & Power Co., Richmond, Va., will issue bonds in amount of $8,000,000, a portion of fund to be used for general expansion and betterments, including acquisition of other properties, power plants and transmission line construction.

Baker County Power Co., Moultrie, Ga., has plans for an auxiliary steam-operated electric power house to supplement its hydroelectric power station at Newton, Ga., to cost close to $100,000 with transmission lines. Company is operated under direction of W. B. Foshay Co., Minneapolis, Minn.

Commissioner of Public Works, Summerville, S. C., is asking bids until May 10 for one 100,000-gal. capacity steel tank on 100-ft. steel tower, for municipal waterworks. Ryan Engineering Co., Arcade Building, Columbia, S. C., is engineer.

Standard Looms, Inc., Spartanburg, S. C., recently formed by Isaac Andrews, 519 East Main Street, and associates, with capital of $750,000, has engaged Lockwood, Greene & Co., Charlotte, N. C., and Boston, to prepare plans for one-story plant for manufacture of textile looms and kindred machinery, consisting of foundry, machine shop and assembling departments, to cost more than $150,000 with equipment. Mr. Andrews will be president; Jonas Northrop is vice-president and general manager.

DeLion Tire & Rubber Corporation, Fifth and Eager Streets, Baltimore, manufacturer of high pressure and balloon tires, etc., will carry out an expansion program with installation of additional equipment.

Board of Trustees, Lutheran Women's College, Rev. J. Henry Harms, 4614 Chester Avenue, Philadelphia, president, has authorized construction of central power house at new institutional buildings on 190-acre tract, vicinity of Silver Spring, Montgomery County, Md., to cost $750,000. Col. P. M. Anderson, Investment Building, Washington, is architect and engineer.

Burge & Stevens, Marietta Building, Atlanta, Ga., architects, will soon begin work on five-story and basement automobile service, repair and garage building, 90 x 135 ft., to cost upward of $250,000 with equipment.

Philadelphia

PHILADELPHIA, April 30.

PLANS have been filed by Silverman & Levy, Elrae Building, Philadelphia, architects, for a three and four-story automobile service, repair and garage building, 93 x 110 ft., to cost close to $150,000 with equipment.

Chevrolet Motor Co., General Motors Building, Detroit, has awarded general contract to H. K. Ferguson Co., Cleveland, for a two-story factory branch and distributing plant, particularly for parts service, on Stokley Street, Philadelphia, to cost more than $90,000 with equipment.

Commercial Poster Co., 6545 Carnegie Avenue, Cleveland, manufacturer of signs, displays, etc., has purchased four factory units on two-acre tract at Philadelphia, heretofore held by Pennsylvania Globe Corporation for $300,000, and will use for new plant. Present business will be removed to acquired site.

York Ice Machinery Corporation, 1238-44 Belmont Avenue, Philadelphia, has revised plans for additions to plant, including improvements in present building, to cost upward of $65,000. Edmund H. Poggi, Equitable Building, is architect.

H. B. Weldon, 1817 Callowhill Street, Philadelphia, architect, has filed plans for a one-story automobile service, repair and garage building to cost about $115,000 with equipment.

Melrath Supply & Gasket Co., Inc., has been formed with capital of $100,000, to take over and expand company of same name with works at 617 Wood Street, manufacturer of gaskets, bolts, nuts, plumbers' supplies, etc. Earle G. Melrath is treasurer of new company.

H. S. Hagert, Inc., 1923 Manning Street, Philadelphia, manufacturer of lighting fixtures and equipment, has plans for an addition, including alterations in present factory. DeArmond, Ashmeade & Bickley, 20 South Fifteenth Street, are architects.

State Board of Education, Trenton, is arranging for establishment of a machine and repair shop at New Jersey School for Deaf, for repair and rebuilding of typewriters and other office machines used by State departments. State Budget Commission is providing fund for shop.

Standard Tank & Seat Co., 341 North Front Street, Camden, N. J., has awarded general contract to Barclay, White & Co., 1713 Sansom Street, Philadelphia, for a three-story addition, 32 x 80 ft., to cost more than $75,000 with equipment.

Camden Rail & Harbor Terminal Corporation, Camden, N. J., has awarded general contract to Cramp & Co., Dencker Building, Philadelphia, for a cold storage and refrigerating plant comprising three units, to cost $800,000 with machinery. Moores & Dunford, 110 East Forty-second Street, New York, are architects and engineers.

John A. Roebling's Sons Co., Roebling, Trenton, N. J., manufacturer of wire and cable, etc., has awarded contract for electrical equipment for mill addition, now in progress, to General Electric Co., to cost about $175,000. Awards for other equipment will soon be made. New unit will represent investment of close to $700,000 with machinery.

Radio Condenser Co., Copewood and Thorn Streets, Camden, N. J., manufacturer of radio equipment and supplies, has filed plans for a one-story addition, 95 x 145 ft., for which general contract has been let to Carl L. Furner, 96 Kendall Boulevard, Oaklyn, to cost about $35,000 with equipment. Ernest L. Ergood, 320 Market Street, is architect.

Ovens, power equipment, conveying and other machinery will be installed in new one and two-story plant to be erected by Heimbach Baking Co., 701 North Ninth Street, Allentown, Pa., to cost $220,000, for which bids will soon be asked on general contract. Jacoby & Everett, Commonwealth Building, are architects.

A State charter has been secured by Reading Casting Co., Inc., Reading, Pa., with capital of $125,000, which plans for early operation of works at Monocacy, Pa., for production of iron and steel castings, forgings and kindred specialties. New company is headed by H. Claude Bell, 941 North Fourth Street, Reading; Lloyd A. Gass and Joseph E. Logan, both of Reading.

Reading Transportation Co., operated by Philadelphia & Reading Railroad, Philadelphia, for motor bus service, has plans for a one-story service, repair, garage and terminal building at Doylestown, Pa., and for similar unit at Pottsville, Pa., to cost upward of $165,000, with equipment.

Board of Education, Media, Pa., is considering installation of manual training equipment in two-story high and grade school addition to cost $200,000, for which bids are being asked on general contract. MacKenzie & Wiley, Bankers' Trust Building, Philadelphia, are architects.

Brown Products Corporation, Scranton, Pa., manufacturer of furniture, will rebuild portion of plant destroyed by fire April 22, with loss in excess of $125,000 with equipment.

Pittsburgh

PITTSBURGH, April 30.

INQUIRIES for machine tools are fairly numerous, but actual business still is light. Most of the orders are for single items and the large number of repair parts sales emphasizes the tendency of buyers to delay as long as possible the placing of new equipment.

Miller Saw Trimmer Co., Point Building, Pittsburgh, will build a new one and two-story plant, 260 x 295 ft., to cost more than $250,000 with equipment. Hunting, Davis & Dunnells, Century Building, are architects and engineers.

Board of Education of George's Township, Fairchance, Pa., will soon take bids on general contract for a one-story manual training shop in connection with new gymnasium building at York Run, Pa., to cost $65,000. E. R. Johnson and C. F. Wilson, Fayette Title & Trust Building, Uniontown, Pa., are architects.

Board of Education, Fulton Building, Pittsburgh, is asking bids until May 15 for equipment for Clifford B. Connelly Trade School, including boilers, stokers, radiators, temperature regulating equipment, shaving exhaust system, unit heaters, etc. Bids for tools and equipment will be called later. George W. Gerwig is secretary.

Hope Natural Gas Co., Clarksburg, W. Va., has awarded general contract to Rust Engineering Co., 311 Ross Street, Pittsburgh, for a two-story automobile service, repair and garage building, 52 x 140 ft., to cost close to $100,000 with equipment.

Borough Clerk, Etna, Pa., will receive bids until May 14 for one 225-hp. horizontal watertube boiler and accessory equipment. J. N. Chester Engineers, Clark Building, Pittsburgh, are engineers.

Bradford Machine Co., Bradford, Pa., recently organized by P. D. Bonner, Bradford, and associates, with capital of $25,000, will operate local plant for manufacture of machine parts, tools and dies. H. A. Cooney, Bradford, will also be one of heads of new company.

Dravo Contracting Co., 302 Penn Avenue, Pittsburgh, operating a boat building and repair yard on Neville Island, is considering erection of one-story addition, 100 x 140 ft., to cost approximately $60,000 with equipment.

Board of Education, Ebensburg, Pa., plans installation of manual training equipment in two-story and basement high school, to cost about $175,000, for which general contract has just been let to J. C. Snyder, Altoona, Pa.

Clark Car Co., Pittsburgh, has removed its general offices to 1310 Clark Building.

Chicago

CHICAGO, April 30.

INCREASED sales in the closing days of April were not sharp enough to bring the month's total volume up to that of March. Fresh inquiry is developing more rapidly and dealers generally are anticipating a good business in May. The Santa Fe has closed for about 20 items against its list and the Union Pacific is making purchases. The Burlington has ordered two 36-in. shapers and the Rock Island has purchased a drill press. The Nash Motors Co., Kenosha, Wis., is interested in grinders and drill presses and Allis-Chalmers Mfg. Co., Milwaukee, is in the market for miscellaneous tools. The J. I. Case Threshing Machine Co., Racine, Wis., is considering new equipment.

Used machinery is moving in fair volume but dealers are having difficulty in obtaining tools that are in good condition.

Glen E. Holmes, Inc., will erect 11-story garage at Dearborn and Lake Street, Chicago, on site 80 x 160-ft., to cost $900,000.

George Evans Corporation, Moline, Ill., manufacturer of tanks, will build an addition. Axel Carlson Construction Co. is general contractor.

Olson Mfg. Co., Albert Lea, Minn., manufacturer of barn equipment, has awarded contract for an addition to cost $20,000.

Sherwood Sanitary Furnace Co., Danville, Ill., has let contract to Modern Machine Shop, Inc., Danville, to manufacture steel parts and assemble furnaces which it will distribute. Wabash Valley Mfg. Co., Perryville, Ind., will furnish the castings.

A. L. Seaman & Co., manufacturers' agents for steel, brass and copper products, have moved from 549 West Washington Street, Chicago, to 222 West Adams Street.

W. C. West Co., sales agent for forged steel and malleable iron products, has moved from 14 East Jackson Boulevard, Chicago, to 435 North Michigan Avenue.

Moore Speed Crane Co., Chicago, has arranged with Manitowoc Engineering Works, Manitowoc, Wis., division of Manitowoc Shipbuilding Corporation, to build and sell Moore speed cranes. Moore company will continue as Chicago sales representative for these cranes and Forsythe Brothers, 30 Church Street, New York, will remain as New York sales agents.

Contract has been let by Ornamental Brass Shops, Inc., Tenth Avenue, Rockford, Ill., to Linden & Son, local, for a one-story addition, to cost about $30,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

Iowa Power & Light Co., Des Moines, Iowa, is disposing of a preferred stock issue of $1,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction. Company is affiliated with Des Moines Electric Light Co. Clement Studebaker, Jr., is president.

Quaker Oats Co., 80 East Jackson Boulevard, Chicago, has awarded general contract to Leonard Construction Co., 37 South Wabash Avenue, for initial units for new plant at St. Joseph, Mo., to cost in excess of $2,000,000 with machinery. Project will include a boiler house and machine shop.

Common Council, New England, N. D., has authorized extensions and improvements in municipal electric light and power plant, with installation of equipment to double present capacity.

Iowa Soap Co., 816 Valley Street, Burlington, Iowa, has awarded general contract to A. Danielson Co., Burlington, for three-story factory, 100 x 160 ft., adjoining present plant, to cost $100,000 with machinery. Federal Engineering Co., Central Office Building, Davenport, Iowa, is engineer.

Abingdon Sanitary Mfg. Co., Abingdon, Ill., manufacturer of sanitary plumbing ware and equipment, has arranged for bond issue of $500,000, a portion of proceeds to be used for expansion in production.

Municipal Utilities Co., Des Moines, Iowa, is contemplating construction of new steam-operated electric power plant at Emmetsburg, Iowa, to cost about $150,000 with equipment.

Frank Foundry Co., Twenty-first Street, Moline, Ill., contemplates erection of one-story addition, to cost upward of $200,000 with equipment. W. A. C. Hogenbaeck is manager.

Lowry Sign & Advertising Co., 185 North La Salle Street, Chicago, manufacturer of electric signs and displays, has leased property at 428 Milwaukee Avenue, totaling 10,800 sq. ft. floor space, for expansion.

Board of Education, Dixon, Ill., plans installation of manual training equipment in new three-story high school to cost $400,000 for which bids will be asked on general contract about middle of May. Royer, Danely & Smith, 301 West Main Street, Urbana, Ill., are architects.

Chicago Artificial Ice Co., 140 North Dearborn Street, Chicago, is disposing of a bond issue of $1,250,000 and note issue of $850,000, a portion of proceeds to be used for expansion in ice-manufacturing plants.

Buffalo

BUFFALO, April 30.

BIDS have been asked by New York Central Railroad Co., Buffalo, for two one-story shop units at North Yards repair works, to cost more than $65,000 with equipment. F. B. Freeman, 466 Lexington Avenue, New York, is chief engineer.

Board of Education, Genesee Building, Buffalo, is planning installation of manual training equipment in three-story Riverside high school to cost $1,000,000, for which bids are being asked on general contract until May 10. F. J. and W. A. Kidd, 522 Franklin Street, are architects.

LeSuer Oil Corporation, Wellsville, N. Y., has acquired 50 acres of oil lands at Bolivar, N. Y., known as Frazer farm, and plans early installation of producing plant, including pressure pump and other power equipment.

Work will begin about May 15 on new plant unit of Afga-Ansco Mfg. Co., 23 Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, to be two to eight stories, 200 x 700 ft., and to cost more than $1,000,000 with equipment. Otto S. Schlick, 136 Liberty Street, New York, is engineer.

Crouse-Hinds Co., Syracuse, N. Y., manufacturer of electrical products, has plans for a one-story foundry addition, to cost more than $40,000 with equipment. Gaggin & Gaggin, University Building, are architects.

Officials of Rome Brass & Copper Co., Rome, N. Y., have organized Rome Hollow Wire & Tube Co., to take over and expand subsidiary organization of same name. New interest will specialize in iron and steel, brass and other metal products. Howard D. Wolfe, 804 North George Street, is one of principal incorporators.

School District No. 8, Black River, N. Y., is considering installation of manual training equipment in two-story high and grade school to cost about $170,000. Lansing & Green, Sherman Trust Building, Watertown, N. Y., are architects.

Cincinnati

CINCINNATI, April 30.

MACHINE tool sales in April showed a considerable recession from the level attained in March, the decline being estimated at 25 to 30 per cent. There is a fair amount of inquiry before the trade, but buyers are hesitant about placing orders unless the purchase of equipment is imperative. While the automobile industry in the Detroit district is yielding a small volume of business, it is far less than in the first quarter, and buying from this source is likely to be light during the next few months. The Union Pacific Railroad is reported to have closed for about a dozen tools, but otherwise railroads have been inactive in the local market. The Dixie Construction Co., Birmingham, has contracted for a 600-lb. single frame steam hammer.

E. M. Hulse Furniture Co., 153 West Fulton Street, Columbus, Ohio, is completing plans for a three-story factory, 100 x 260 ft., to cost close to $275,000 with equipment. Carmichael & Millspaugh, 7 East Long Street, are architects.

Andrew Jergens Co., Alfred and Spring Grove Avenues, Cincinnati, is having plans drawn for a five-story addition to a soap manufacturing plant, to cost about $200,000 with equipment. Harry Hake, 2400 Gilbert Avenue, is architect.

Tri-State Compress Co., Bankers' Mortgage Building, Huston, Miss., Robert J. Cummings, head, has completed plans for a one-story cotton compressing plant, 260 x 1300 ft., in Hollywood district, Memphis, Tenn., to cost $300,000 with machinery.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until May 9 for aluminum alloy rivets, circular 314; streamline tie rods, circular 318; until May 10 for 16 engine gage assemblies, circular 315; 335 aircraft flight indicators, circular 312; 25 two-blade propellers, circular 319; until May 17 for 56 internal bomb rack assemblies, circular 317; and until May 9, for reconditioning Liberty engines in lots of 400 to 1940, circular 310. Air Corps headquarters, Washington, plans appropriation of $300,000 for transfer and establishment of experimental and testing plant to a permanent site at Wright Field.

Van Buren Township Board of Education, Clark Powell, Fairmount High School, Dayton, Ohio, business manager, contemplates installation of manual training equipment in new school to cost $500,000, for which Walker & Norwich, American Building, architects, will prepare plans.

Board of Trustees, Western State Teachers' College, Bowling Green, Ky., has approved plans for a one-story manual arts building to cost about $50,000. Brinton B. Davis, Columbia Building, Louisville, is architect.

Peter Fox & Sons Co., Fulton Market, Chicago, produce, is said to be completing plans for a new ice and cold storage plant at Nashville, Tenn., to cost upward of $300,000 with equipment.

Milwaukee

MILWAUKEE, April 30.

WHILE some machine-tool plants experienced a somewhat larger volume of business this month, compared with March, others did not fare so well. On the average, however, April volume practically equals the previous month's bookings. The outlook is for a moderately active May trade, inquiry this month having been promising. The city of Milwaukee will soon be in the market with a list for the new fire department construction and repair shop, costing $100,000. Local machine shops as a rule are limiting their inquiry to replacement needs, or for one or two items to meet current requirements.

Unit Corporation of America, Fifty-third Avenue and Burnham Street, Milwaukee, is concluding negotiations for acquisition of Universal Power Shovel Co., Detroit, transaction being effected by an exchange of $750,000 of class A stock of Milwaukee company for controlling interest. William Ford, president Detroit company, will retire. Unit Corporation recently acquired Fuller & Sons Co., Kalamazoo, Mich., manufacturer of automotive transmissions, gears, etc. A $175,000 addition will be made to Fuller works, and Universal operation transferred to that point. Original members of Unit company are Obenberger Forge Co., and Dallmann Machine & Mfg. Co., both of Mauwaukee, which have consolidated their operations in the Obenberger works. William H. Schmidt is president.

Menomonee Falls Mfg. Co., Menomonee Falls, Wis., founder and machinist, sustained a loss of about $50,000 by fire on April 21. Plant was opened only recently for manufacture of bottle washing machinery as an addition to its foundry and machine shop business.

Excavation work has been started by Milwaukee department of public works for a new two-story brick and concrete shop, 100 x 200 ft., costing $100,000, adjoining present fire department repair shop. It will be used for manufacture of complete motor fire equipment, which has been carried on in a limited way for two years. Tooling needs are being scheduled but are not yet complete. R. E. Stoelting is commissioner of public works, and C. E. Malig, municipal architect.

Hicks Printing Co., Oshkosh, Wis., publisher of the Oshkosh *Daily Northwestern,* will erect a new printing and publishing plant to cost about $150,000. Architects are now being selected.

R. H. Bierman, 123 Wisconsin Avenue, Milwaukee, has been engaged by unnamed interests to prepare plans for a two-story automotive headquarters building, 75 x 125 ft., in Wauwatosa. It will cost about $75,000 and contain a machine and service shop. Bids will be taken about May 15.

National Plating Co., 43-45 Eighth Street, Milwaukee, has increased its capital stock from $50,000 to $75,000 and is completing plans for enlarging plant and production.

Milwaukee Ornamental Brass & Iron Works, Inc., has been incorporated with $25,000 capital stock and is establishing a plant at 685 Booth Street for production of gas and electric fixtures, lamps, novelties and similar merchandise. Bernard Breuer, 1124 Richards Street, is president.

Appleton Coated Paper Co., 1200 North Meade Street, Appleton, Wis., has plans by Lockwood, Greene & Co., consulting engineers, Chicago, for an addition to cost $125,000. Work will begin about the middle of May.

Arthur Fairbanks, 646 Madison Street, Waukesha, Wis., is erecting a welding shop, 30 x 50 ft., costing about $20,000 with additional equipment.

Milwaukee File & Rasp Co., 389 Tenth Street, Milwaukee, has increased its capital stock from $5,000 to $15,000 for enlargement.

Detroit

DETROIT, April 30.

AN expansion and improvement program has been authorized by Macklin Co., Jackson, Mich., manufacturer of grinding wheels and other abrasive materials, including two one-story units and four new kilns, to triple present output. Work to cost upward of $100,000 with equipment.

Board of Education, Lincoln Park, Mich., plans installation of manual training equipment in new three-story high and grade school to cost $850,000, for which bids will soon be asked on general contract. Vernier, Wilhelm & Molby, Book Building, Detroit, are architects.

White Motor Co., East Seventy-ninth Street, Cleveland, manufacturer of trucks, will soon take bids for one-story factory branch, service and repair building, 185 x 200 ft., at Detroit, to cost approximately $135,000 with equipment. Hadlow, Hughes, Hick & Conrad, Union Mortgage Building, Cleveland, are architects.

Impression Die Co., 3155 East Willis Street, Detroit, has awarded general contract to Max Bartholomai Son & Co., 1574 East Warren Street, for a one-story addition, to cost close to $25,000 with equipment. Pollmar & Ropes, 2539 Woodward Street, are architects.

Collins Ice Co., Grand Rapids, Mich., is planning a two-story addition to cost about $35,000 with equipment.

AC Spark Plug Co., Flint, Mich., has awarded general contract to W. E. Wood Co., Ford Building, Detroit, for a three-story addition, to cost approximately $50,000 with equipment.

Officials of Chrysler Corporation, Highland Park, Detroit, have formed DeSoto Motor Corporation, a subsidiary, to manufacture a new six-cylinder car under name of DeSoto. Initial production will be carried out at main plant.

In connection with an expansion and improvement program to cost about $2,000,000, Grand Trunk Railroad System, 400 East Jefferson Street, Detroit, has authorized immediate erection of new engine house with repair facilities at Ferndale, Mich., to cost upward of $125,000 with equipment.

Grand Rapids Enamel Sign Corporation, 1331 Phillips Avenue, Southwest, Grand Rapids, Mich., has been organized to manufacture baked enamel signs on galvanized steel. Building has been constructed and is fully tooled for operations.

Fecheimer, Frank & Spedden, Inc., Detroit, will be located after May 12 in larger offices at 1224 Maccabee Building.

Gulf States

BIRMINGHAM, April 30.

A COMPANY is being formed by A. S. Anderson, 519 Twenty-eighth Street, West Palm Beach, Fla., and associates to construct and operate a six-story cold storage and refrigerating plant, 100 x 300 ft., to cost close to $225,000 with equipment.

Bayou State Refining Corporation, Rosston, La., has begun construction of new oil refinery for production of lubricating oils, to cost $240,000 with machinery. Company is operated by Bayou State Oil Corporation.

Ovens, power equipment, conveying and other machinery will be installed in new plant to be erected by Brown Cracker & Candy Co., Dallas, Tex., at San Antonio, Tex., to cost approximately $300,000.

Oil Center Tool Co., 1111 East Twenty-first Street, Houston, Tex., manufacturer of oil well equipment and tools, plans a new one-story factory unit, to cost in excess of $30,000 with machinery.

Houston Gulf Gas Co., Houston, Tex., operating natural gas properties, is concluding arrangements for purchase of controlling interest in Houston Gas & Fuel Co., and Houston Gulf Pipe Line Co., Houston; and Southern Gas Co., San Antonio, Tex. A bond issue of $11,000,000 will be sold, a portion of fund to be used for acquiring properties noted and for expansion in pipe lines and system.

Reo Motor Car Co. of Texas, Inc., Dallas, Tex., has plans for a two-story service, repair and sales building, 100 x 200 ft., to cost about $150,000 with equipment. Entire second floor, totaling 20,000 sq. ft., will be equipped for machine shop service. Company also plans for similar works at Houston, Tex., to cost close to like sum.

Dalhart Public Service Co., Dalhart, Tex., has authorized enlargements in power plant and installation of additional equipment. Extensions in transmission lines are contemplated.

Board of Trustees, Drew Endowment Fund, Lake Charles, La., is planning construction of manual training school, to cost in excess of $100,000 with equipment. H. J. Geary, 929 North Division Street, is member of board in charge.

Union Utilities, Inc., El Paso, Tex., recently formed to take over and operate gas-manufacturing and distributing plants at El Paso, Galveston, Waco and Brenham, Tex., has arranged for a bond issue of $1,300,000, a portion of proceeds to be used for purchase of properties and for expansion in gas-generating and distributing facilities. Company will organize three subsidiaries, Texas Cities Gas Co., Galveston Gas Service Co., and Council Bluffs Gas Co.

Alamo Heights School Board, San Antonio, Tex., will install manual training department in new school to cost upward of $175,000, for which plans will be drawn by Harvey P. Smith, National Bank of Commerce Building, architect.

Maverick County Improvement District No. 1, Eagle Pass, Tex., W. L. Rockwell, engineer, has plans for a hydroelectric power house with capacity of 15,000 hp., for use with proposed irrigation system covering about 60,000 acres. Bids for equipment will be asked soon. Entire project will cost approximately $500,000.

Menefee Motor Co., 2111 Burgundy Street, New Orleans, has plans for new two-story service, repair and garage building, to cost close to $90,000 with equipment. James C. Menefee is head. Favrot & Livaudais, Hibernia Bank Building, are architects.

Peoples Utilities Co., Clinton, La., is completing plans for an electric light and power plant and one-story ice-manufacturing plant, adjoining, to cost more than $70,000 with machinery. E. K. Strahan, Pere Marquette Building, New Orleans, La., is engineer.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, gas, welding equipment, etc., has asked bids on general contract for first unit of plant at Shreveport, La., to cost close to $45,000 with equipment.

Electrical Equipment & Construction Co., Houston, Tex., has been organized to act as manufacturers' representative, consulting and sales engineer in adjacent territory for electrical products and equipment.

Cleveland

CLEVELAND, April 30.

MACHINE tool business continues fair and the volume of sales during April was equal to, if not a little better, than in March. Some good business from automobile parts manufacturers helped considerably in holding up the April volume. A slight improvement is reported in the Detroit territory. The Logangear Products Co., Detroit, has purchased several machines for making pumps for Ford cars and has some additional equipment to buy. The Ford Motor Co. has placed some contracts with outside shops for the manufacture of repair parts for its old model T cars, discontinuing the making of certain parts in its own plant. Shops getting this Ford work are purchasing some additional equipment. Quite a little activity has developed in turret lathes in the Detroit territory in single tool orders. Locally, the market is rather slow. Railroad inquiries are scarce and are limited to single machines.

Bishop & Babcock Mfg. Co., Cleveland, will move its fan and blower plant from Watertown, Mass., to Cleveland. A building, 120 x 120 ft., will be erected, contract for which has been placed with H. K. Ferguson Co. A 5-ton 40-ft. span traveling crane will be installed.

Entire machinery and equipment of Ohio Body & Blower Co., Cleveland, will be sold at public auction, Wednesday, May 23, by Industrial Plants Corporation, auctioneer. Plant, which formerly had capacity of 100 closed car bodies daily, was operated for only two years prior to July 1, 1927, and contains 300,000 sq. ft. of floor space. Equipment to be sold includes woodworking, sheet metal and machine shop, glass finishing machinery, motors, etc. Sale is not subject to court confirmation.

American Electric Switch Corporation, Minerva, Ohio, has added new building to its plant, providing 26,000 sq. ft. of floor space. It is connected with old plant with runway and electric conveyor and will house switchboard, panelboard, knife switch and shipping departments.

Plans are being arranged by Artcraft Metal Works, Athens, Ohio, operated by J. H. Grayson Mfg. Co., same city, for installation of equipment in new one-story plant, to cost more than $25,000.

Nokarbon Oil Burner Co., Cleveland, recently organized to manufacture a new type of industrial and domestic oil burner, will operate a temporary plant at 8612 Superior Avenue, N. E., to be devoted largely to assembling. It is purposed to establish permanent and larger works in near future. Howard W. White is president.

Thompson Products, Inc., 2196 Clarkwood Road, Cleveland, manufacturer of spring bolts, tie rod bolts and kindred products, with branch plant at Detroit, is disposing of a stock issue totaling $1,050,000, of which approximately $265,000 will be used for additions and equipment.

Elyria Belting & Machine Co., Buckeye Street, Lorain, Ohio, is contemplating a one-story addition, to cost upward of $25,000 with equipment.

Ohio Aero Corporation, Youngstown, Ohio, recently formed by Judd Yoho, 3502 Market Street, and associates, will operate a local plant for aircraft manufacture, initial operations to be given over to assembling airplanes of two and three-passenger types. Warren P. Williamson and Hugh H. Hamilton, both of Youngstown, are interested in new company.

Plans have been completed for a reorganization of Williams Alloy Products Co., Elyria, Ohio. New company has authorized sale of 223,250 shares of stock, portion of proceeds to be used for expansion.

Empire Floor & Wall Tile Co., Zanesville, Ohio, is rebuilding portion of plant recently destroyed by fire, with loss of more than $300,000 including equipment.

Economy Engineering Co., Willoughby, Ohio, manufacturer of automatic bolt and nut machinery, has awarded contract to Frank S. Bones & Son, Willoughby, for one-story addition to increase its floor space 50 per cent.

Indiana

INDIANAPOLIS, April 30.

PLANS are in progress for a steam-operated electric power house for Northern Indiana Public Service Co., Gary, at Michigan City, comprising group of 60,000-kw. turbo-generator units, with boilers and accessories, to cost more than $6,000,000. Extensions will be made in transmission lines.

Evansville Ice & Storage Co., Eighth and Division Streets, Evansville, Ind., will soon ask bids for a two-story and basement ice-manufacturing and cold storage plant, to cost about $65,000 with equipment.

Showers Brothers Mfg. Co., Bloomington, manufacturer of kitchen cabinets, etc., has awarded general contract to H. K. Ferguson Co., Cleveland, for a two-story addition, 60 x 150 ft., to cost about $100,000 with equipment.

Capital Airways, Inc., 705 Fletcher Trust Building, Indianapolis, is planning construction of an airport in vicinity of Broad Ripple district, comprising three hangars, repair shop and oil storage and distributing building, to cost close to $50,000.

Indiana Electric Corporation, Indianapolis, has secured permission to issue preferred stock totaling $2,604,500, a portion of proceeds to be used for expansion and betterments, including transmission line construction.

Montgomery Ward & Co., Chicago, has awarded general contract to M. J. Hoffman Construction Co., Furniture Building, Evansville, for a new three-story and basement storage and distributing plant at Evansville, to cost close to $200,000 with equipment. A. E. Neucks, Old National Bank Building, is architect.

Dudley Township Board of Education, New Lisbon, D. Ellabarger, trustee, is considering installation of manual training equipment in new high school at Straughn, to cost about $130,000. Houck & Smenner, 108 East Washington Street, Muncie, are architects.

Pacific Coast

SAN FRANCISCO, April 25.

PLANS have been approved by Board of Education, Los Angeles, for a one-story addition to manual arts shop at George Washington High School, to cost about $40,000. Dodd & Richards, Architects Building, are architects.

California Co-Operative Producers, Inc., foot of Fourteenth Street, Oakland, Cal., has awarded general contract to Sacramento Industrial Corporation, Sacramento, for a new canning plant on 35-acre tract, including boiler plant, machine shop and other buildings, to cost about $300,000 with equipment.

San Carlos Ice & Cold Storage Co., Coolidge, Ariz., will erect a new one-story ice-manufacturing and cold storage plant to cost about $30,000.

Board of Education, Oakland, Cal., plans manual training shop unit at new high school group, entire project to cost about $500,000. Miller & Warnecke, 1404 Franklin Street, are architects.

Northwestern Pulp & Paper Co., Astoria, Ore., B. T. McBain, Portland, engineer and manager, will begin work in May on local pulp and paper mill, to have initial output of 100 tons per day. Project will include boiler plant and machine shop, and will cost in excess of $1,500,000 with machinery. Contracts for buildings have been let to Austin Co.

Oregon Short Line, Pocatello, Idaho, a division of Union Pacific Railroad System, Omaha, Neb., is planning extensions and improvements in local steam-operated electric power plant, to cost about $100,000 with equipment.

Pacific Petroleum Products Co., recently organized as subsidiary of Petroleum Securities Co., Richmond, Cal., will build a new storage and distributing plant at South San Francisco, to cost about $50,000 with equipment. Company is said to be negotiating for property at San Jose, Cal., for a similar plant.

Burke Packing Co., Astoria, Ore., will rebuild portion of cold storage and refrigerating plant recently destroyed by fire, with loss in excess of $50,000 including equipment.

San Juan Pulp Mfg. Co., Cornwall Avenue and Maple Street, Bellingham, Wash., has filed plans for an addition to digester division, to cost more than $85,000 with equipment.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has increased its capital stock from $240,000,000 to $400,000,000, a portion of proceeds to be used for expansion, including hydroelectric power plant and transmission line construction.

Southern Pacific Railroad Co., San Francisco, is reported planning extensions and improvements in locomotive shops at Sacramento, with installation of considerable additional equipment, to cost in excess of $1,000,000.

Clearwater Timber Co., Lewiston, Idaho, contemplates extensions in its mill and installation of additional equipment to cost about $250,000.

American Fruit Growers, Inc., Yakima, Wash., has plans for a new two-story cold storage plant, 110 x 180 ft., to cost about $150,000.

Brown Instrument Co., Philadelphia, manufacturer of measuring instruments, has secured larger quarters for its Pacific Coast branch at 420 Westinghouse Electric Building, 420 South San Pedro Street, Los Angeles. Stanley F. Godfrey is district manager.

Canada

TORONTO, April 30.

MACHINE tool dealers and builders in this territory report a steady flow of new business mostly in single units. Sales for April compared favorably with those of March and business in May is expected to run into a fairly large volume. While automobile manufacturers have done most of their buying some sales are reported for replacement. Garages and automobile repair plants are constant buyers of single machines. Builders of machinery and tools have a considerable volume of unfilled orders on their books and look for almost capacity operations for some time.

Orders have been closed recently for large newsprint paper machines for International Paper Co.'s plant at Bathurst, N. B., and two for St. Lawrence Paper Co. It is reported that an order for one machine for Price Brothers has been divided between Dominion Engineering Co. and Charles Walmsley (Canada) Ltd. Contracts recently placed represent an expenditure of approximately $1,500,000.

Plant of Ontario Boat & Engine Works, Wallaceburg, Ont., was destroyed by fire April 22, with loss of $150,000.

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W. W. Pearse, business administrator and secretary-treasurer Board of Education, 155 College Street, Toronto, is receiving bids until May 14 for equipment for machine shop, wood-working and electrical departments for new Collegiate Institute.

General Motors of Canada, Ltd., Oshawa, Ont., has let contract to Jackson-Lewis Co., Ltd., Federal Building, Toronto, for erection of one-story factory, 68 x 70 ft., to cost $25,000.

Bids are being called by Watt & Blackwell, architects, Bank of Toronto Chambers, for an addition to plant of Richards Wilcox Canadian Co., London, Ont., manufacturer of builders' hardware, fire-doors, etc. It will be one story, 78 x 190 ft., and cost $35,000.

Taylor Electric Mfg. Co., 526 Adelaide Street, London, Ont., has let contract to James Moran & Sons, local, for erection of a $40,000 addition, one story, 75 x 150 ft., for manufacture of electric switches, motor starters, etc. Watt & Blackwell, Bank of Toronto Chambers, London, are architects.

Wells & Gray, Ltd., Confederation Life Building, Toronto, general contractor, has let sub-contracts for new plant for Reid & Brown, Ltd., 63 Esplanade East. Plant will be one story, 70 x 300 ft., and include structural steel shop.

Western Canada

Waterpower site at Ghost Falls, Calgary, Alta., has been leased to the Calgary Power Co. It is understood that a plant will be erected to develop 15,000 hp., and cost $2,000,000. No announcement has been made as to when bids will be called for construction.

Elk River Syndicate, Ltd., Waldo, B. C., is contemplating construction of a power plant and pulp mill at Phillips Canyon on Elk River, to cost approximately $1,000,000.

Plans are being prepared for the construction of an additional power house on Jordan River, Vancouver Island, by British Columbia Electric Railway Co., Vancouver, B. C.

Foreign

PLANS are being prepared by Vitkovice Iron Works, Bredorska 9, Prague, Czechoslovakia, for extensions in plant in Zabreh district, including one-story unit for production of railroad switches, to cost approximately $90,000 exclusive of machinery. Program will provide for expansion in other rolling mills and steel mill, with installation of new furnaces. American Consulate, Prague, K. L. Rankin, assistant trade commissioner, has information regarding project.

Quartermaster General, Washington, is asking bids until May 18, for three 750-hp. Diesel engines with accessories, for installation at Fort Mills, Philippine Islands.

Marconi Wireless Telegraph Co., Chelmsford, England, with local plant for manufacture of radio equipment, is planning establishment of a factory for similar production in Poland for trade in eastern Europe, to cost more than $250,000 with machinery.

A company at Castleton, England, has plans for a new cement mill near that city to cost close to $400,000, with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference England No. 65727; also at American Consulate, London, William L. Cooper, commercial attaché.

Brunner Maschinenfabrik, Prague, Czechoslovakia, manufacturer of machinery and mechanical appliances, is planning an expansion and improvement program, including installation of machinery and facilities for additions to line of construction equipment and apparatus for handling cement, concrete, etc. The ceramic machinery division will also be extended. American Consulate, Prague, K. L. Rankin, assistant trade commissioner, has information regarding project.

R. W. Hebard & Co., Inc., 32 Broadway, New York, engineer and contractor, has secured a contract from municipality of Puerto Limon, Republic of Costa Rica, for installation of a waterworks and sanitation system, including pumping machinery, power equipment, filtration equipment, etc., entire project to cost about $600,000.

New Trade Publications

Oil Burner.—Johnston Mfg. Co., 2825 East Hennepin Avenue, Minneapolis. Catalog sheet 550-A of two pages illustrates and describes a new type of oil burner in which complete mixture of oil and air prior to entering the furnace is claimed.

Electric Furnace Fittings.—Globar Corporation, Niagara Falls, N. Y. Bulletin D of 12 pages illustrates and describes heating elements and terminal fittings for them, in connection with electric furnace use. Instructions are given for replacing elements while the furnace is in operation.

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

WE can hold out no longer. So great has been the pressure brought to bear on us to resume *The Last Word* that it is hereby resumed. Great will be the joy of the thousands who told us that the light of their lives went out when *The Last Word* was withdrawn.

The year is only one-fourth over but we know now who will win the 1928 prize for the most mixed metaphor. We needn't mention names but here is his entry, from page 797, in THE IRON AGE of March 22:

> Nevertheless, it did not take me long, when I got back into the game, *to pick up the threads and to see a hole in the grindstone when the hole was there!*

And let us give a hand, too, to George Rector, famed restaurateur, for the following in the revered *Sat. Eve. Post:*

> "When the United States was in the forging,
> New England was the foundry."

In a moment of weakness a contributor was permitted to use this column for broadcasting the question, *"What is the origin of the word chaplet, as used in the foundry industry?"* A chaplet manufacturer promptly wrote, *"I'll bite. What's the answer?"*

Hopefully your columnist turned to our contributor. He did not know. In a daze, dictionaries, histories, encyclopedias, etc., were consulted without success. Came the thought of referring to a recognized authority on foundry practice. Would he save our record of 100 per cent omniscience? He would, and here's how:

> Chapelet, later chaplet, is a small chapeau, which is French for hat. Another meaning is a small chapel, and drifting into foundry practice, it meant a small bent sheet, in form of a box or simple U laid flat.
>
> Again, another meaning is in connection with the Catholic rosary. Here, again, we have a connection with the molders of olden times, who may have thought of a resemblance between rosary beads and small chaplets.

"How is steel wool made?" we inquired seriously in our own private "Ask Me Another" contest. *"By shearing hydraulic rams,"* a pump manufacturer answers.

Perhaps some disciple of Dr. Freud can tell us why Dun's made the mistake of listing the business of Standart Brothers Hardware Corporation, Detroit, as "Whol Dresses, etc."

We lift our hat to the genius who fashioned the slogan, *"Cutting the price of caskets does not increase the death rate."*

Could the futility of price-cutting (in many kinds of businesses) be more succinctly expressed?

It seems to us that the Anderson Brothers Mfg. Co., Rockford, Ill., strikes the peak of specialization. The product of this firm is Eskimo pie-cutting machinery.

We are fond of this slogan used by Riehle Brothers Testing Machine Co., *"One test is worth a thousand expert opinions,"* and we should like to have a framed copy of it for our office wall.

Having a good slogan, they make good use of it by printing it at the *bottom,* not the top, of their business stationery. They realize that not one man in a hundred reads what is at the top of a letterhead. But the bottom *is read.*

A. H. D.

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THE IRON AGE

ESTABLISHED 1855
New York, May 10, 1928
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A New Method of Making Joints

Assemblies of Simple Parts, Snugly Fitted, Are Heated in a Hydrogen Atmosphere—Powdered Copper, Painted On, Runs Into Joint, Alloys and Makes Tight Weld

BY E. E. THUM

A NEW automatic method of making gas-tight strong joints in fitted assemblies of smaller steel parts has been developed by the resourceful General Electric organization. In its present form, this method represents the development of several years and the combination of many operations and principles known previously and applied in other ways. To Christian Steenstrup, engineer Mechanical Research Department, is undoubtedly due the credit for visualizing the commercial possibilities, and building equipment large enough to treat composite pieces several feet in diameter.

Steel Joined with Copper

The process may perhaps be most easily understood by making certain comparisons with brazing. As is well known, the latter consists of welding with brass or bronze; fluxed surfaces are joined with a thin layer of alloy. Brazing can be done in several ways—either by dipping the assembly into a pot of molten metal, by sprinkling granular metal ("spelter") in the joint and heating it locally, or by the regular method of oxy-acetylene welding, using brass or bronze welding rod and suitable flux. But in any of these modifications the principle is the same; namely, if the steel or iron is clean and hot, melted brass will run over it in a very thin film, "wetting" the metal and forming a strong alloy with the surfaces in contact.

Pure copper, as a "brazing" material, was known to have extraordinary power to penetrate between finished steel surfaces fitted together. For instance, Dr. W. E. Ruder, when studying coarse-grained silicon steel in the General Electric Co. research laboratory several years ago, plated a specimen by dipping it in

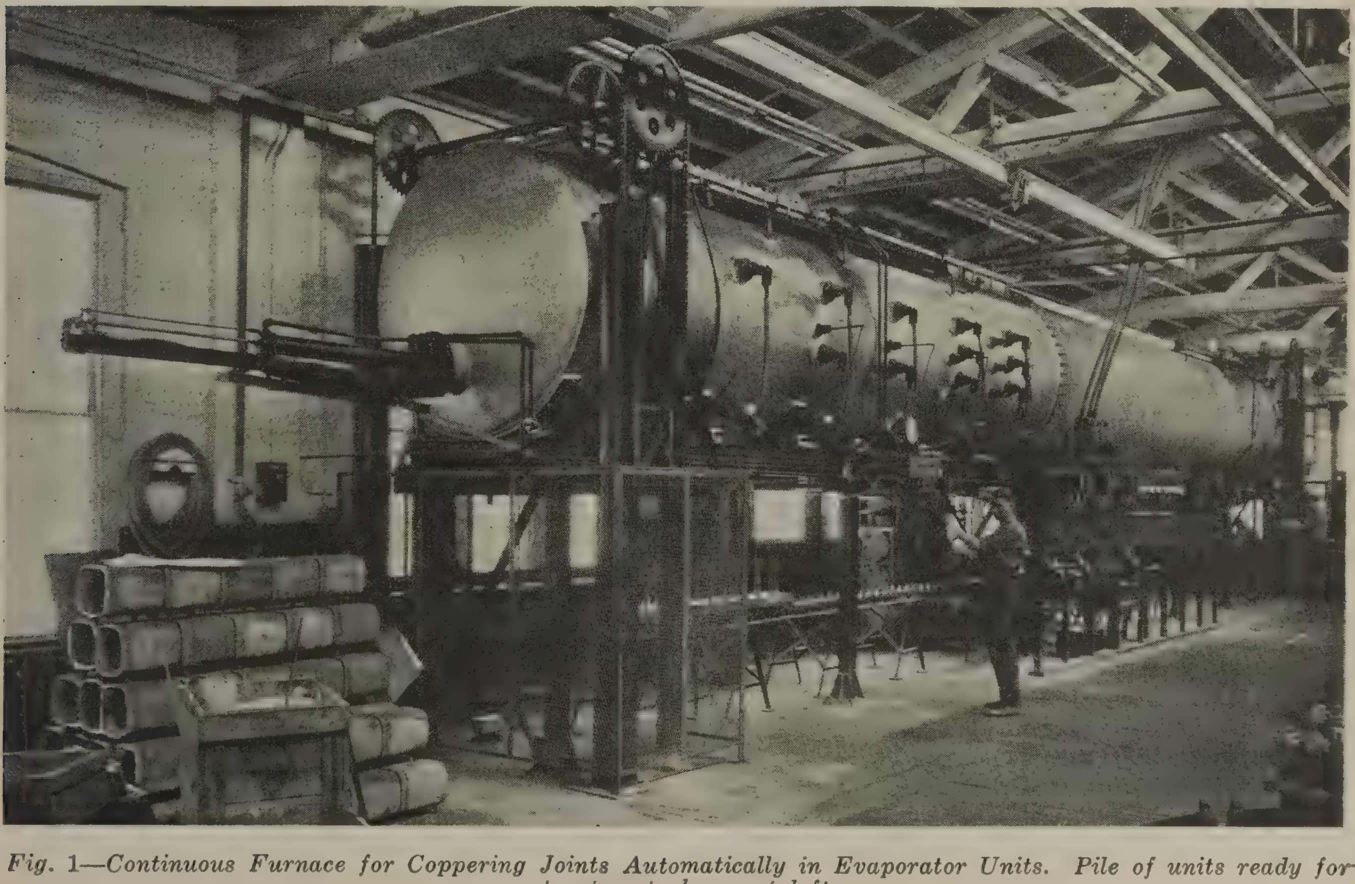

Fig. 1—Continuous Furnace for Coppering Joints Automatically in Evaporator Units. Pile of units ready for treatment shown at left

molten copper, and later found that the copper had penetrated far into the specimen between the metallic crystals, apparently separated from each other by microscopic distances. But hot copper at the melting temperature (unprotected by zinc or tin in alloy) absorbs oxygen from the air very rapidly, with general deterioration. Consequently "brazing" with pure copper would have to be done in an atmosphere containing no oxygen. Very well, fill the furnace with hydrogen, which will not only exclude the air, but will also react with any oxygen in the rust or mill scale on the steel, thus brightening the surfaces and performing the essential function of a flux.

Hydrogen Atmosphere Cleans Steel and Protects Copper

A ready commercial development of this main idea —of "brazing" with copper in an atmosphere of hydrogen—was due to the fact that the General Electric Co. had been annealing quantities of transformer sheets and magnetic irons in hydrogen for some time. Consequently such problems as the production of hydrogen, the prevention of hydrogen fires (hydrogen being a good fuel), the making of tight furnace casings (hot hydrogen leaks through solid steel rapidly), and the proper method of heat production and control had already been solved. How they were adapted to this "coppering" process is well illustrated by a detailed description of a continuous furnace (Fig. 1) designed by the industrial heating and welding engineering department.

The furnace casing is a welded steel shell about 6 ft. in diameter by 60 ft. long, closed at each end with a dished head, the near third being the heating chamber and the remainder a cooling chamber. Work is introduced through a bottom door close to the left end, and removed by similar equipment at the far end.

Fig. 2 gives a view of the charging elevators. The carload of work (two evaporator units made of sheet metal) is about to enter the open door in the very bottom of the furnace shell. When the I-beam cross frame is raised to the limit, the sand seal around the edges of the rectangular door closes against the furnace opening, the rollers on which the car rests are in line with the spool conveyor inside, and the evaporator units are at about the center of the circular casing. At 6 min. intervals the hydraulic ram shown at the end of the furnace pushes all the work in the furnace ahead one car-length, a carload of completed work is then lowered at the far end, rolled away and the empty elevator is raised, the now empty charging platform is lowered, a loaded car is rolled on and re-elevated. These successive operations are interlocked, and one workman attends to the entire routine. Full cars traverse the furnace end to end inside; empty car bodies return on a parallel conveyor near the floor.

Some gas escapes from the furnace when the doors are open. The pressure inside is kept just a little higher than the atmosphere, so a lazy flame plays across the open door, which, being flat, horizontal and pointing downward, gives little opportunity for the light hydrogen to escape. Only one door can be opened at a time, and oxygen which may enter the furnace by this or any other means is promptly burned by the great excess of hot hydrogen existing there, the chemical reaction forming steam. Since the hydrogen in the heating chamber is always far hotter than the kindling temperature, such oxygen is consumed as it may accidentally enter, without any opportunity to build up explosive mixtures.

The combustion hazard due to hydrogen can be mitigated by the introduction of nitrogen. Mixtures as dilute as 15 per cent hydrogen and 85 per cent nitrogen have been found satisfactory for several processes. In utilizing this mixture additional limitations are imposed as to cleanliness of work and absence of water vapor.

In the heated end of the furnace the interior is almost full of insulating materials, except for a rectangular passage down the axis large enough to pass the cars and the work. On the sides of this passage are arranged standard General Electric heating units: ribbons of nickel-chromium looped back and forth around refractory posts. These elements are connected in six circuits to three-phase, 220-volt power; three circuits are arranged in the forward or preheating portion, three more at the hottest region. Each circuit is independently controlled by its own pyrometer, Brown Instrument Co. temperature indicator and regulator, and G. E. contactor bank. This regulating mechanism is mounted on the switchboard shown at the center of the furnace. An operating temperature of 1125 deg. C. is required, since copper, which melts at 1083 deg., must be rendered quite fluid. This would be a rather high temperature for resistor elements in ordinary furnace atmospheres, but the hydrogen atmosphere prevents corrosion entirely. In fact, iron resistor ribbons have been used, but the resistance change with temperature for iron is so great that external resistance or special current control is necessary when starting the furnace cold. A series of manholes on top of the furnace gives access to the narrow heating chamber for such repairs as may be necessary. The view also shows the heavy copper cables for electric energy entering through proper bushings; the slender pipes set midway are pyrometer protection tubes.

The cooling end of the furnace is separated from the hot zone, not by a door but merely by a constriction of the heating passage to the minimum required for clearing the passing work. On passing this bottle neck, the hot metal finds itself traveling down the axis of a large open tank with water-jacketed walls. Time of passage is such that the work has cooled to about 100 deg. C. when it reaches the discharge elevator, and emerges cool enough so the clean copper or bare steel will remain bright. For other applications a certain amount of coloration may be permissible; in such instance the work may be removed a little hotter. If a bright finish is necessary, both the hydrogen and the nitrogen passing slowly through the furnace should be substantially free from oxygen, else the steam formed from combustion will react with the hot metal emerging into the cooling chamber and produce a blued steel surface.

It will be apparent that the furnace described is merely a device for automatically heating and cooling a continuous stream of metal parts in a special atmosphere. Obviously the copper for the welding or "coppering" of the various joints must be placed on the parts before they enter the furnace. How this is done may best be described with the aid of some representative sketches.

Copper Wired or Painted on Joints

Suppose a steel plug must be made of the lightest weight possible. The shaft is too deep for easy cupping, so it is formed of tubing as sketched in Fig. 3. Such a plug requires three pieces: (1) a head, cut from square bar, drilled, and with a round trough cut in one side; (2) a piece of tubing of correct length with internal shoulder at one end; (3) a round disk. The parts are machined to a snug fit; before the disk is placed and crimped down a little shot copper is put inside the tube. A copper wire (about 24 gage) is twisted around the shank close to the head. Such an assembly would be coppered standing on its small end, to make sure that the loose copper shot inside is fairly near the desired joint. During the process the hot hydrogen easily penetrates into the interior, either through the joints or through the metal, and properly deoxidizes all surfaces, so when the copper melts, capillarity will draw it into the joints and up the side of the steel, leaving a suitable fillet at all corners. The condition is sketched in the enlarged view. Excess steel may later be removed from the crimped end, the plug threaded, or any other operation given to it just as though it were a single piece.

When it is inconvenient to place copper wire or shot near the required joint, or when it is desired to copper coat an entire surface, a thick paint made of copper dust suspended in quick-drying pyroxylin may be spread on the article. An instance of this practice, as well as an indication of the complexity of assembly which may be made from simple units automatically and simultaneously, is shown in Fig. 4. All these parts would be gaged to snug fits, and merely pushed together, with the exception of joint C, where an outstanding flange would be rolled over. A copper shot would be placed inside to make joint D, a copper wire would be wound around for A, and perhaps B. All the others, including C, would be painted, which is the simplest and easiest way to get a little copper on a vertical or overhanging surface.

As an instance of the distance that copper will penetrate into such joints, a so-called steam plate may be described. This consists of two pieces of boiler plate with a frame sometimes of 4-in. bars around the edges, and the central portion subdivided by similar bars alternately protruding from opposite sides. This constructs a labyrinth through which the steam must pass. Such an assembly, riveted together on the edges and properly coppered, will be found to possess tight metal-to-metal joints, completely welded, even though the copper must penetrate into contact surfaces 4 in. deep.

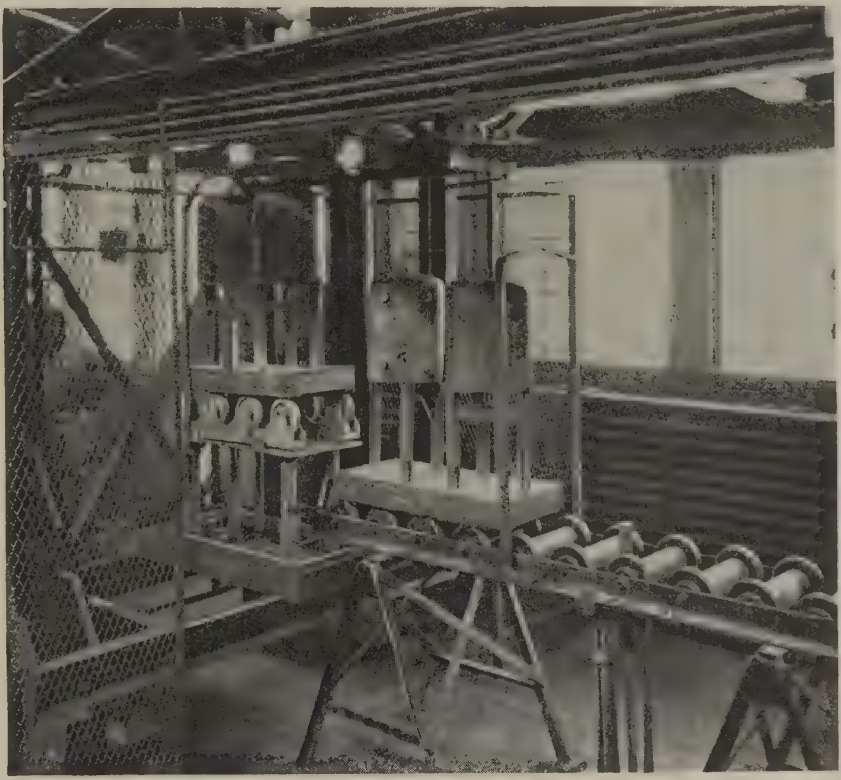

Fig. 5 (Below at Center) tor Raising Carload of Two Units into Furnace. Second carload awaits turn on spool conveyor

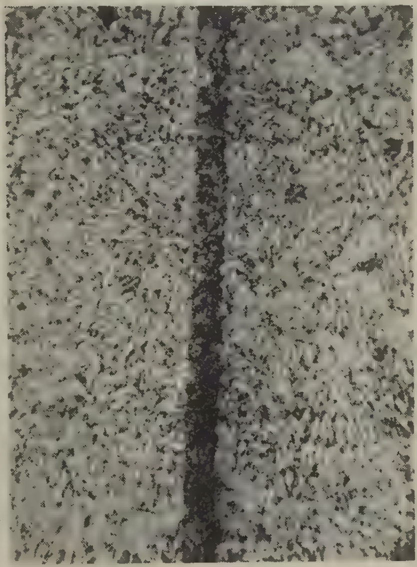

Fig. 5 (Below at Center)—Micrograph of Coppered Joint in Mild Steel Magnified 100 Diameters. In distinction to autogenous welding, coppering causes no pronounced change in microstructure at joint

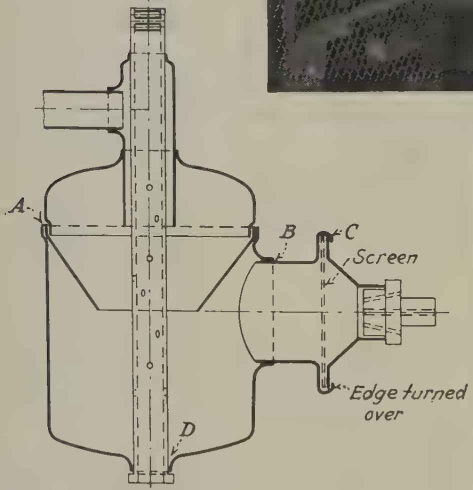

Fig. 4—Simple Stampings and Screw Machine Parts Assembled into Intricate Unit and All Seams Made Simultaneously by Coppering. Powdered copper painted on vertical or overhead surfaces

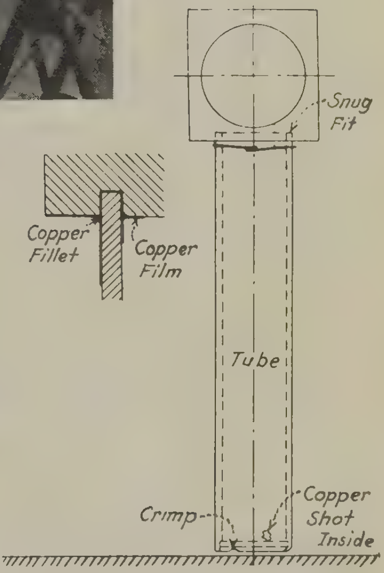

Fig. 3 — Copper Placed Near Required Joints Either by Fine Wire Twist or Copper Shot Inside

Smaller Furnaces for Intermittent Working

While the furnace illustrated in Fig. 1 is a very large one, suitable for mass production of a single piece (14 outlets are coppered simultaneously into each small condenser unit), other types of furnace for intermittent operation are constructed. The simplest is an electric muffle set on stilts, the bottom of which may be lowered away. A complete cycle of operations in furnaces of this type is as follows:

Lower the bottom, load the work, raise the bottom, displace oxygen inside the furnace with hydrogen-nitrogen mixture, raise temperature gradually to coppering heat, shut off heating current, allow furnace to cool, lower bottom, remove completed work. Such a cycle requires many hours, mostly to cool the furnace, for a furnace efficiently insulated for the heating operation is also insulated against the loss of heat for cooling.

To avoid this delay a three-stage furnace has been devised. It consists of a turntable, carrying three furnace bottoms symmetrically placed 120 deg. from each other. One bottom is open to the air for loading and unloading. The next is covered with a bottomless heating muffle. The third is covered with a similar shell, water-cooled. When ready to change loads, the two muffles with their hydrogen-nitrogen atmospheres are slowly raised, the turntable is indexed around 120 degrees, then the muffles are slowly lowered. In this way a fresh load goes to the heating chamber, a hot batch is transferred to the cooling chamber, and a cooled batch is ready for unloading.

Cost Data

Costs of the operation naturally vary with the size and number of pieces to be "coppered." The continuous furnace shown in Fig. 1 operates 24 hr. daily on evaporator units for automatic refrigerators. As noted, each unit has 14 outlets or nipples coppered tightly in the shell at one operation. Each furnace turns out about 500 units daily.

Expense for heat-resisting alloys in ribbons, car bodies and conveyor parts is almost zero, because, as already explained, the hydrogen atmosphere prevents scaling even at full red heat.

Metallurgical Considerations

A cross-section of a coppered joint in steel, as viewed under a microscope, is shown in Fig. 5. The copper has penetrated and alloyed with the surface in exceedingly thin layer; nevertheless this alloyed film is so strong that, when tested to destruction, the fracture will frequently pull the individual iron crystals out of the steel rather than split apart at the junction of copper to iron. As is true of glued, soldered or brazed joints, the closer the original pieces are placed together and the thinner the filling material, the stronger is the resulting coppered union.

Hydrogen at the high temperature of operation has a pronounced decarbonizing tendency; consequently, surface layers of coppered articles will be lower in carbon and softer than at the start. Decarbonizing can be almost entirely prevented by electroplating the surface with copper. The time at high temperature is also sufficient to give a dead soft anneal. This effectually removes any possibility of "season cracking" or failure from internal stresses in parts which have been deep drawn or cold worked nearly to their limit. So-called "hydrogen embrittling," caused by pickling steels in sulphuric acid, is a low-temperature effect of atomic hydrogen existing in what chemists call "nascent" condition; high-temperature heating in hydrogen gas, where the gas is in stable molecules, does not produce a similar effect.

Lastly, the time at high temperature is sufficient to cause considerable grain growth, especially in the higher-carbon steels hardened by cold work. This can be corrected by subsequent reheating to just above the transformation temperature, and desired hardness can be restored by a quick quench.

With these characteristics in mind, however, it is comparatively simple to select mild steels and design most parts so they will be safe when the metal is in the dead soft, most ductile condition. Properties of such steels are little affected by the moderate grain growth that will occur during coppering.

Not all steels respond equally. For instance, it has been found that hot copper will not "wet" and alloy with the surface of cold-drawn bars. During the drawing operation enough of the white lead lubricant used on the dies is caught and squeezed into the steel surface to prevent the copper from alloying with the steel. Furthermore, high-chromium irons and stainless steels do not readily respond—the chromium oxide on the alloy appears to prevent close union with the copper. In general, metals whose oxides do not reduce in hydrogen require an oxide-solvent flux to be used with the hydrogen.

BUSINESS UPS AND DOWNS

Credit, Building and Volume of Manufacture Forecast the Swings

SEVEN major swings in business have occurred in this country since the war, and each has been preceded by a similar movement in credit, in building contracts and in the volume of manufacture, according to Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., who writes in the May 1 issue of *Looking Ahead*. The major movements are listed as follows:

1. Upswing of 1919 and 1920.
2. Downswing through 1921.
3. Upswing to spring of 1923.
4. Downswing to fall of 1924.
5. Upswing to spring of 1926.
6. Downswing to fall of 1927.
7. Upswing since fall of 1927.

Indications are, the author says, that the present upswing will continue to a next high point in the spring of 1929, although there may be a considerable falling off in the summer of 1928.

Mr. Simond's article is illustrated by graphs showing trend lines for credit, building contracts and volume of manufacture for several of the periods mentioned. For credit he used the reverse of commercial paper rates in New York, as reported in the Federal Reserve Bulletin. The trend lines for building were based on contracts awarded in dollars, as reported by the F. W. Dodge Corporation, New York. The volume of manufacture was ascertained from data published by the Harvard Economic Service, Cambridge, Mass. In each case, the trend lines are made by connecting low and high points of major movements and neglecting minor ups and downs.

Speaking of the general tendency to regard credit as a negligible factor in forecasting business, Mr. Simonds says that one cannot get away from the fact that, since the war, business (from 12 to 18 months later) has followed the movement of money rates reversed, that the lowering cost of credit has stimulated building and manufacture and thus increased general business, and that increasing cost of credit has had the opposite effect. Many reason, he asserts, that decreasing business with less demand for credit brings lower money rates, and increasing business with greater demand for credit brings higher money rates; i.e., that changes in business cause changes in credit rather than the reverse. One is reminded of the question whether the hen or the egg came first. So long as the sequence holds good, however, it is well to be guided by it in business, Mr. Simonds holds.

A simplified practice recommendation for coated abrasive paper and cloth was adopted at a general conference at the Department of Commerce recently. The recommendation adopted corresponds to the original agenda and also conforms to the specifications of the Federal Specifications Board.

The Wisconsin Steel Co., South Chicago, placed in operation in April two new 100-ton open-hearth furnaces. This company now has seven 100-ton furnaces operating.

Investments Abroad Promote Exports

Favorable Balance of Trade Sustained by External Loans and Purchases of Foreign Securities—Larger Exports Call for Greater Imports

BY EUGENE P. THOMAS*

ONE of the most outstanding evidences of the recovery of Europe is the stabilization—either already accomplished or likely to be accomplished in the near future—of the currencies of the principal European nations. While the effect on our foreign commerce of this stabilization of the currencies of nations, which in the aggregate are our best customers, has undoubtedly been beneficial, there are other factors to be considered. One, of prime importance, is the payment of reparations and of international debts incurred for the prosecution of the war and for reconstruction purposes. It is obvious that, in the last analysis, these payments can only be made in the form of European exports of merchandise, and by services rendered, such as, for instance, ocean freight and insurance charges. To the extent that such credits are applied to the payment of reparations or international debts, they cease to be available for payment for American exports.

If, therefore, our exports are to be increased, or even maintained at their present volume, the credits available for payment for them must also be increased, either by increasing the volume of our imports of merchandise or by constantly increasing our purchases of foreign securities and extending additional credits. While this, under certain conditions, may be perfectly safe, and good business, it is plain that it has its limits.

Imports, Including "Invisible" Items, Exceed Exports

In arriving at a correct understanding of what is our real balance of trade, it is necessary to take into consideration what are termed by economists "invisible exports" and "invisible imports." Among the "invisible exports," which serve to pay for imports into this country, are the dividends and interest accruing on American investments abroad, re-payments of loans and credits extended to foreign debtors and buyers of our products, purchases by foreigners of American securities, and deposits by foreign bankers and other foreigners in American banks. On the other side of the account, the "invisible imports," which serve to pay for American exports, include the dividends, interest and repayments accruing to foreign investors in American securities and foreign depositors in our banks, expenditures abroad of American tourists and residents, and the remittances of immigrants from this country to Europe.

After taking into consideration all of these various invisible items on both sides of the account, it is estimated that our total net import balance (i.e., the excess of imports over exports, both visible and invisible) during 1926, was $1,025,000,000, which is accounted for by sales in the United States of foreign securities, which, it is estimated, amounted during the same year, to a total of $1,332,000,000.

During the nine years, 1919 to 1927, the value of our total exports of domestic products was slightly under 47 billions of dollars, and of our imports of merchandise, during the same period, slightly over 35 billions of dollars, a difference of approximately 12 billions of dollars which was undoubtedly offset by new American investments in foreign securities during the same period of nine years, to an approximately equal amount, without which it would have been impossible for the foreign purchasers of our products to have paid us for this excess of exports over imports of merchandise.

It is estimated that the total of our foreign investments now amounts approximately to 15 billions of dollars. For the purpose of comparison, it is estimated that Great Britain's foreign investments now amount to at least 20 billions of dollars, on which there is annually accruing a large revenue. During a period of more than 50 years preceding the outbreak of the World War, Great Britain had constantly what economists call an "adverse balance," that is to say, her imports of merchandise heavily exceeded her exports, but nevertheless her wealth and prosperity continued to expand. During all of this period Great Britain's foreign investments steadily enlarged and were an important factor in increasing her exports of merchandise, but nevertheless the so-called "adverse balance" continued, for the reason that it represented the balance, over and above what was reinvested, of the profits derived from the foreign investments.

The experience of Great Britain unquestionably proves that the normal condition of the foreign trade of a creditor nation, such as ours, is what the economists call an "adverse balance"—i.e., so far as excess of imports over exports is concerned—and that any other condition is abnormal and cannot exist permanently.

As our manufacturing industries continue to develop, foreign markets for constantly increasing quantities of our products will be necessary, and we must accept payment for our exports in the only form which is possible to the foreign nations to which we sell, or continue to balance the differences by liberal loans and generous remittances to Europe for expenditures there. If there is a constant increase of our foreign investments and consequently of the dividends, interest and re-payments accruing from them, our imports of merchandise must continue to increase, not only to the extent necessary to cover the so-called "favorable balance" of merchandise shipments, but also, to enable the transfer to this country of the dividends, interest and other payments accruing on our foreign investments in excess of our new exports of capital. There are, in actual practice, only two alternatives, i.e., increased imports or decreased exports. Last year, notwithstanding that our exports of domestic products increased over 1926 by $46,593,000, our imports decreased, as compared with 1926, by $246,510,000.

The demand of Europe for our meat and raw cotton accounts for an excess of merchandise exports to that continent, by a billion dollars annually. This is practically offset by our net merchandise indebtedness to Asia and South America, leaving as a net balance our excess of manufactured exports to North America and Oceania, amounting to some 400 million dollars per year. As pointed out, this gain is offset by the fact that our foreign investments are now running at the rate of more than a billion dollars a year and are in excess of this so-called "favorable balance of trade," but as our prosperity increases, our demand for foreign

(Concluded on page 1334)

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*President United States Steel Products Co., New York. Abstract of address delivered before National Foreign Trade Council at Houston, Tex., April 25.

Stoves Molded and Poure

BY F. L. PRENTISS[*]

ADOPTING modern mechanical handling and mass production methods that are very similar to those followed in automobile manufacturing plants, the Peninsular Stove Co., Detroit, recently placed in operation a new plant, including a continuous foundry, manufacturing departments and assembling lines, that represents a marked step forward in the stove making industry. The Peninsular works is an outstanding example of the modern type of factory construction and efficient plant arrangement.

Straight-Line Flow Is a Feature

One feature of this interesting plant is that all the manufacturing departments are so arranged in one complete manufacturing unit as to provide for a steady and largely a straight-line flow, in the proper volume, of work in process, including the castings produced in the continuous foundry and the finished stamped and enameled parts that finally meet on the assembly lines. Thus the foundry operates on a production schedule that synchronizes with the production in the stamping and other departments in which the sheet metal parts for the stoves are made and finished.

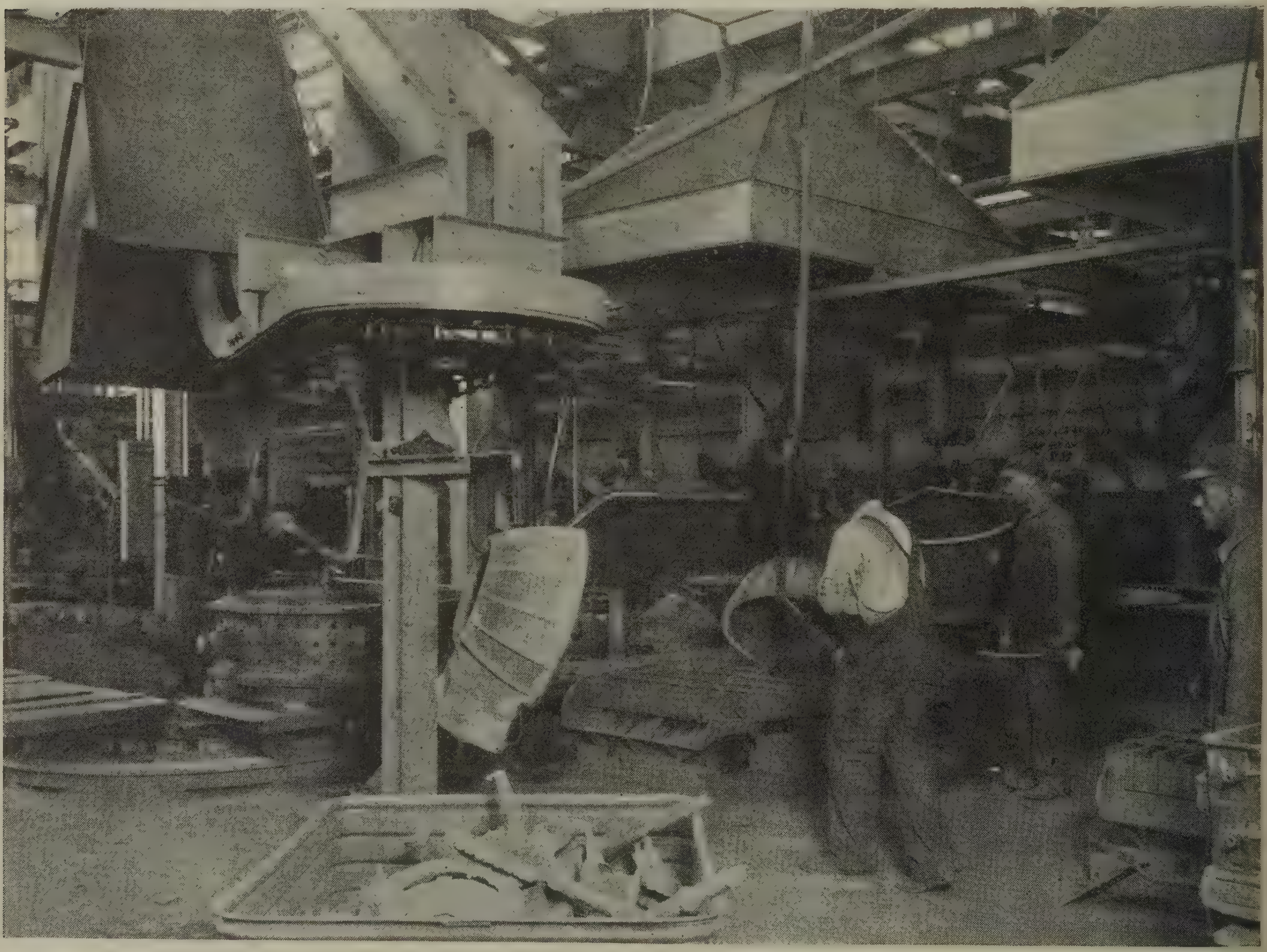
All the departments are located in connecting rooms of one single-story manufacturing building 356 x 910 ft. The plant is served by two railroad sidings. One along the back, or east, side delivers pig iron and other material to the cupola stock yard. The second track, along the north side, delivers sheet steel to the stamping department, which adjoins the foundry and extends into a covered shipping room near the front, at the side of the finished stock room. At the front end of the building, adjoining the shipping department, is a covered loading platform for trucks.

Starting from the cupolas at the east end, the molten iron is carried down a center aisle to the pouring stations. The castings move on in a straight line to the cleaning department and, from there, to the stove assembly department, where the streams of castings and stampings meet at the assembly lines. Completed stoves are crated on these lines and pass along into the adjoining finished product storage room.

First Stove Foundry Arranged for Continuous Operations

The foundry is of particular interest because it is said to be the first stove foundry arranged for continuous pouring and molding. In addition to stoves, house heating furnaces are made, the castings being similarly routed in a straight line and the furnaces finally assembled on a conveyor.

The foundry is well provided with conveyors, hoists and other handling equipment, handling, wherever pos-



MOLDS for Furnace Castings Are Pushed Off the Mold Conveyor by an Air-Operated Pusher. Castings, after shaking out, are handled by an electrically controlled porter bar. Casting conveyor in the foreground carries them up over the roof and down to the sand blast

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[*] Resident editor, THE IRON AGE, Cleveland.

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Straight Line Flow of Materials, Mold Conveyors, Sand Handling and Synchronizing Output of Castings with That of Stampings

sible, being done mechanically. Consequently the amount of man power is cut down and hard foundry labor is reduced to a minimum. The capacity of the foundry is 80 tons of castings per day, and the daily capacity of the plant is 300 gas stoves and 120 furnaces.

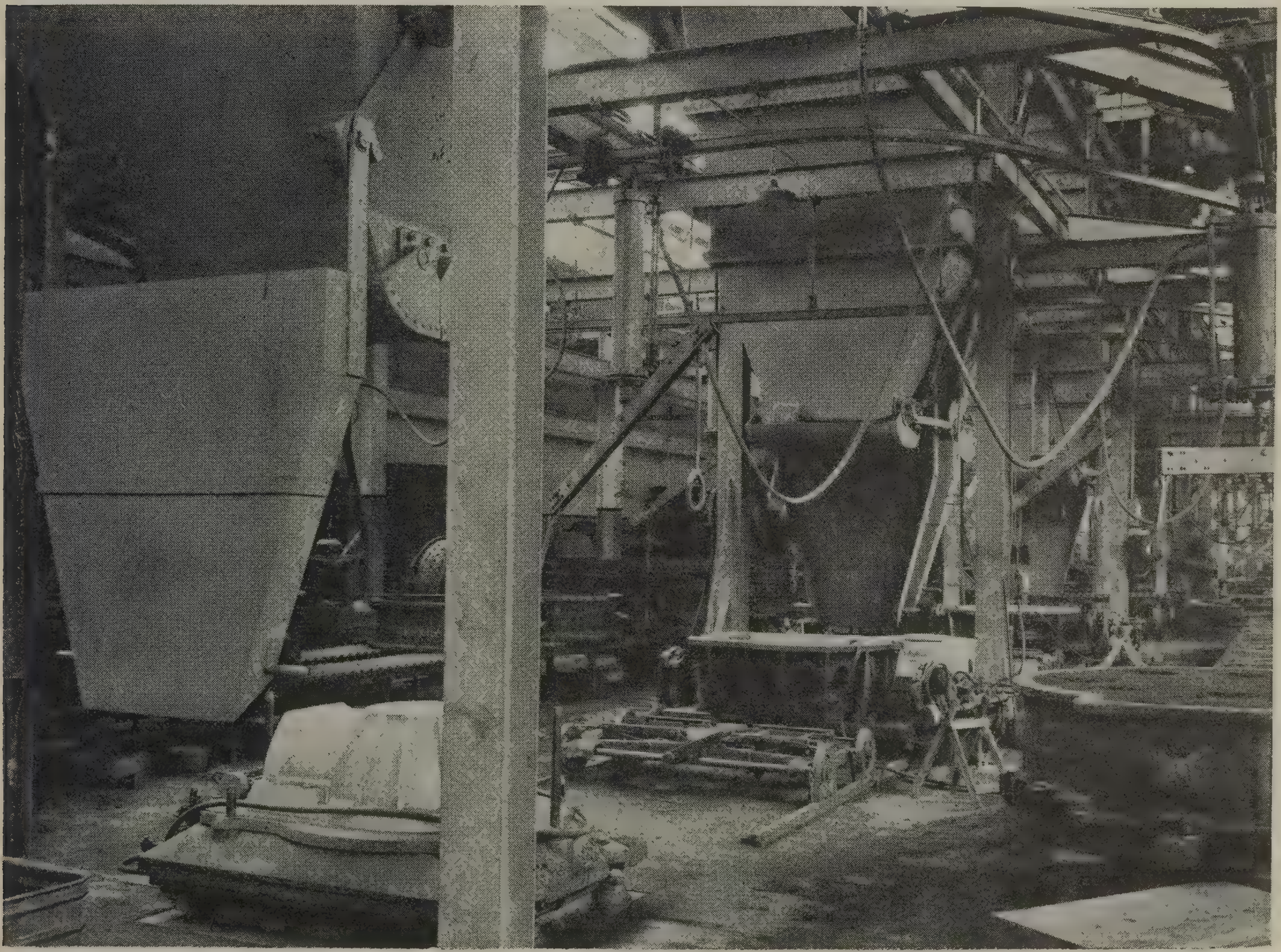
Four Continuous Molding Units

The foundry has four continuous molding units, each for a different class of work. Three of these, located in a line at one side of a center aisle, are provided with mold conveyors. Two are used entirely, and the third to a large extent, for making furnace castings. One molding unit, known as the fire pot unit, is used for making fire pots and grates. In the center unit, designated as the main furnace unit, radiator, ash pit and feed section castings are made. The third unit is used for smaller miscellaneous work, including fronts and doors for furnaces and burners and a few other parts for gas stoves. On the opposite side of the foundry, across the center aisle, in a space 24 x 240 ft., stove plate castings and other stove parts are made. The molds for these are hand made.

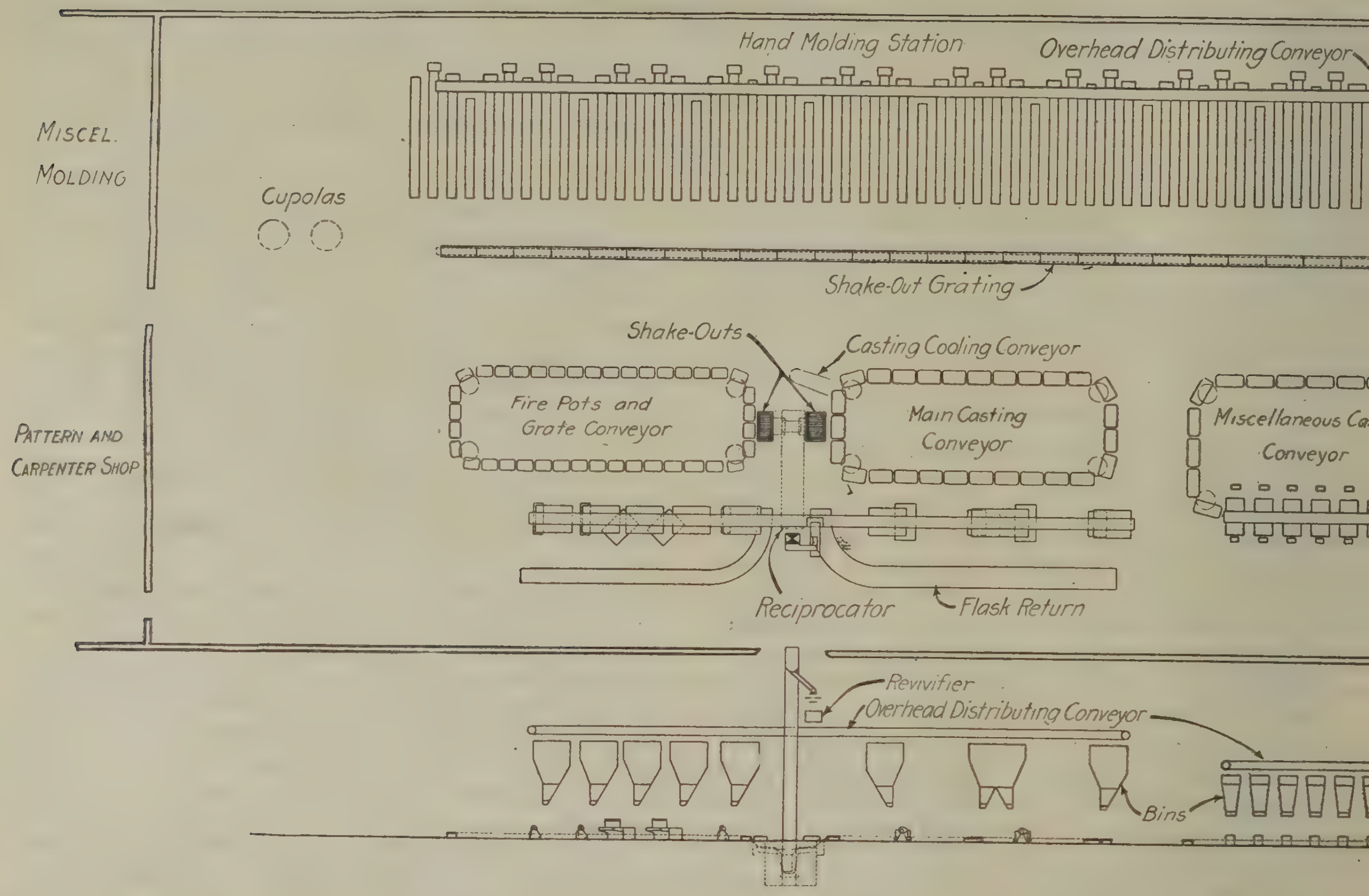
The three mold conveyors are rectangular in form. The main unit is 150 ft. long, and its platform consists of 28 plates, 36 in. wide on 63-in. centers. The fire pot unit is 156 ft. long and has 34 platforms, 30 in. wide on 54-in. centers. The mold conveyor in the small miscellaneous casting unit is 231 ft. long and has 38 platforms, 33 in. wide on 72-in. centers.

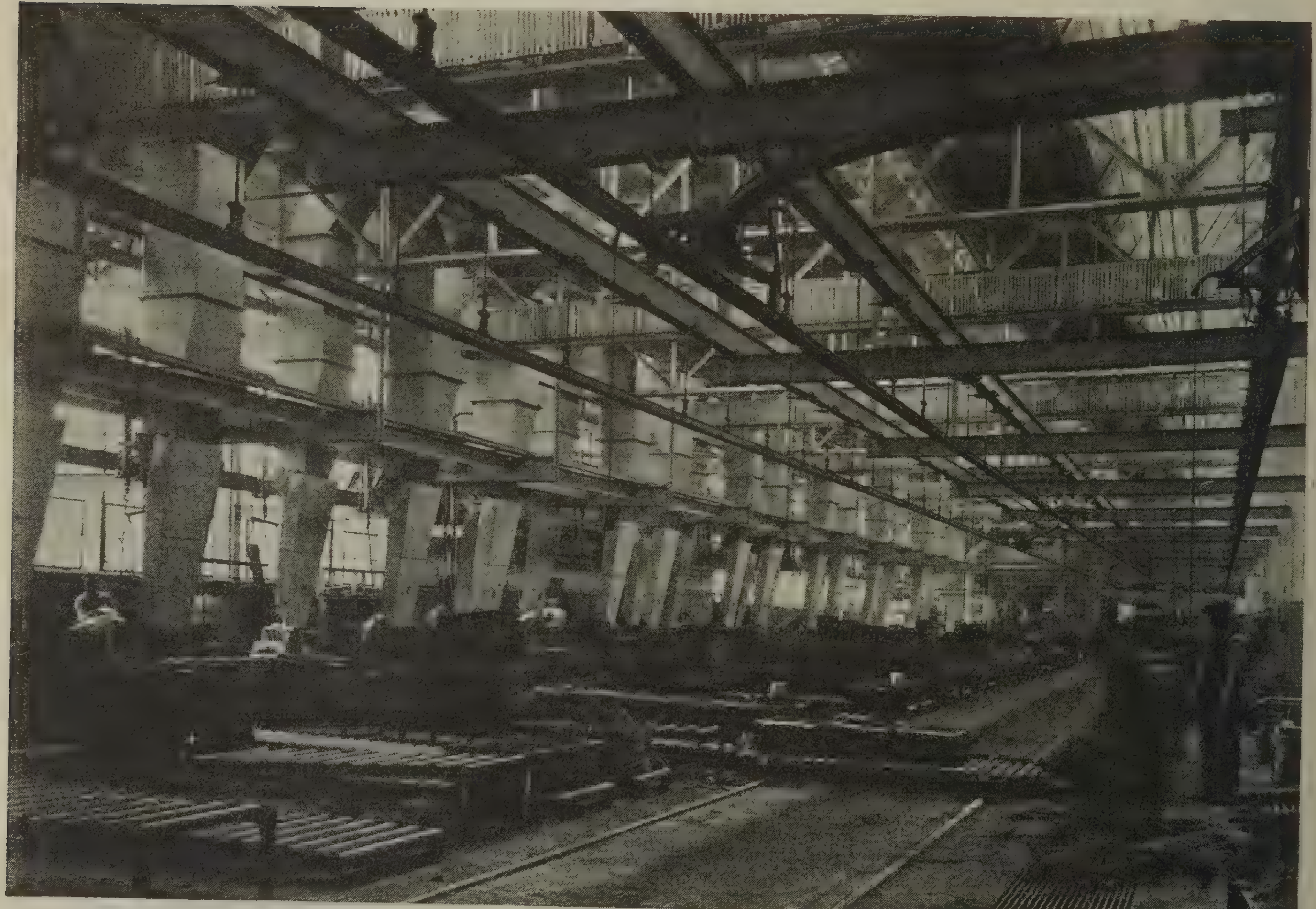
Molds made in the main and fire pot units are transferred to the mold conveyors with air hoists suspended from monorails and are poured on the conveyors. At the end of each conveyor is a jolt-type shakeout, these being located side by side a few feet apart, each serving one unit. The shakeouts have 4 x 5-ft. grating tables, and each is operated by two jolt cylinders, one at each end of the table. The mold is pushed from the conveyor to the shakeout by means of a horizontal, air-operated mold pusher, the bottom plate, which is on a level with the shakeout grate, remaining on the conveyor. After the shaking out, air hoists place the empty flasks, as well as the bottom plates, on gravity roller conveyors, which carry them back to the molding machines. The castings are lifted from the shakeout by means of a porter bar having an electrically controlled lift, so that the work of the operator is confined to steering the castings to a cooling conveyor.

This conveyor is 645 ft. long and consists of an endless chain connecting small trolleys running on a monorail, the trolleys being provided with hooks on which the castings are suspended. The conveyor, starting at the loading end adjoining the shakeout grate, runs up



MAIN Molding Unit Equipped With Four Molding Machines. Starting at the left is the cope and drag of the feed section and further down the line are the cope and drag of the radiator. Part of the mold conveyor is shown at the right and the return flask conveyor at the left


Miscel. Molding
Cupolas
Hand Molding Station
Overhead Distributing Conveyor
Shake-Out Grating
Shake-Outs
Casting Cooling Conveyor
Pattern and Carpenter Shop
Fire Pots and Grate Conveyor
Main Casting Conveyor
Miscellaneous Ca
Conveyor
Reciprocator
Flask Return
Revivifier
Overhead Distributing Conveyor
Bins



STOVE Plate Foundry Floor Equipped for Continuous Operation. *Molds are made on molding frames from which they are pushed on to gravity conveyors. They are poured at the end of these conveyors. Then they are pushed on to the movable conveyor section on the track from which they are dumped over the shakeout. Empty flasks are returned on gravity conveyors at the side of the molding conveyors*

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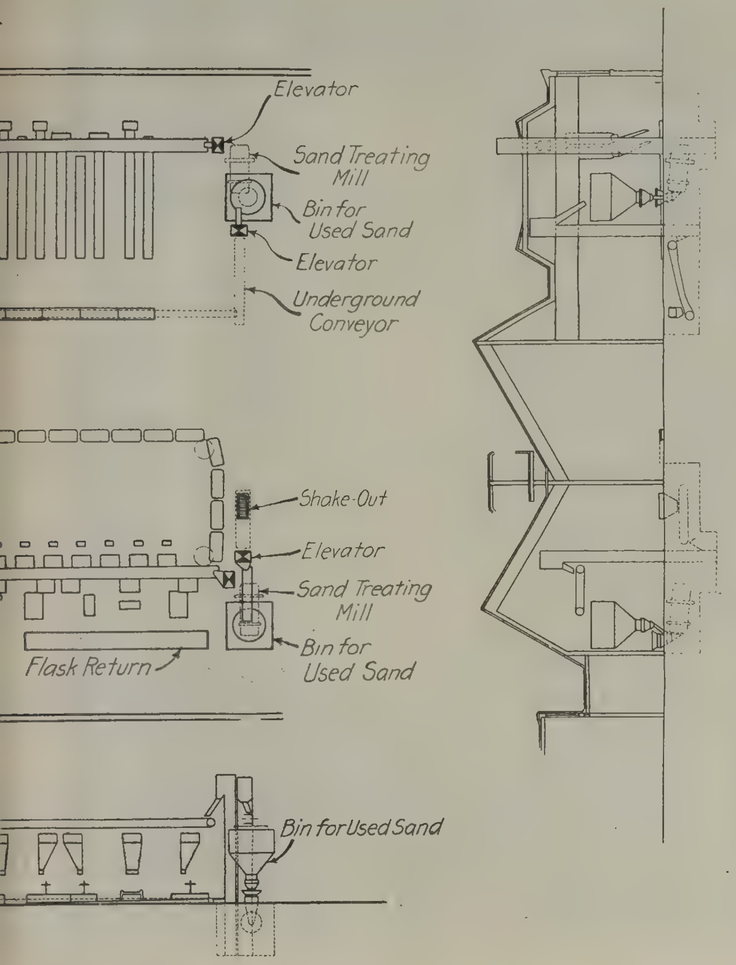
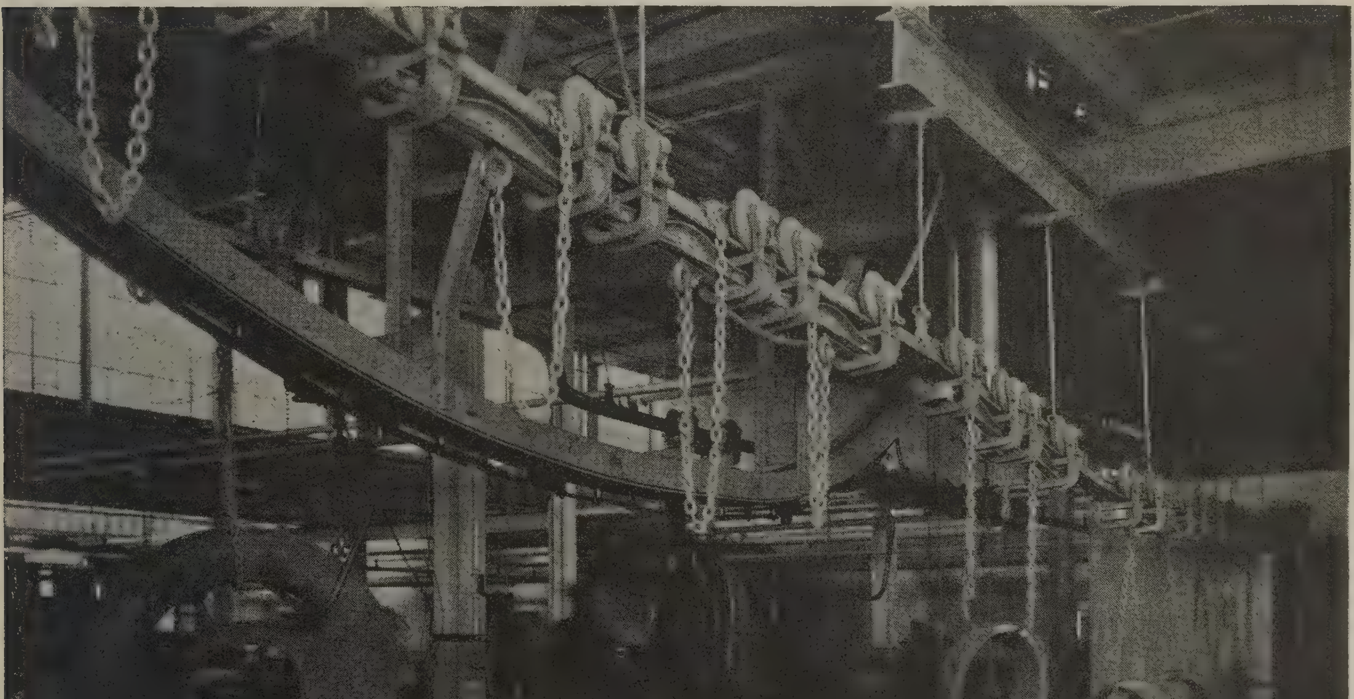
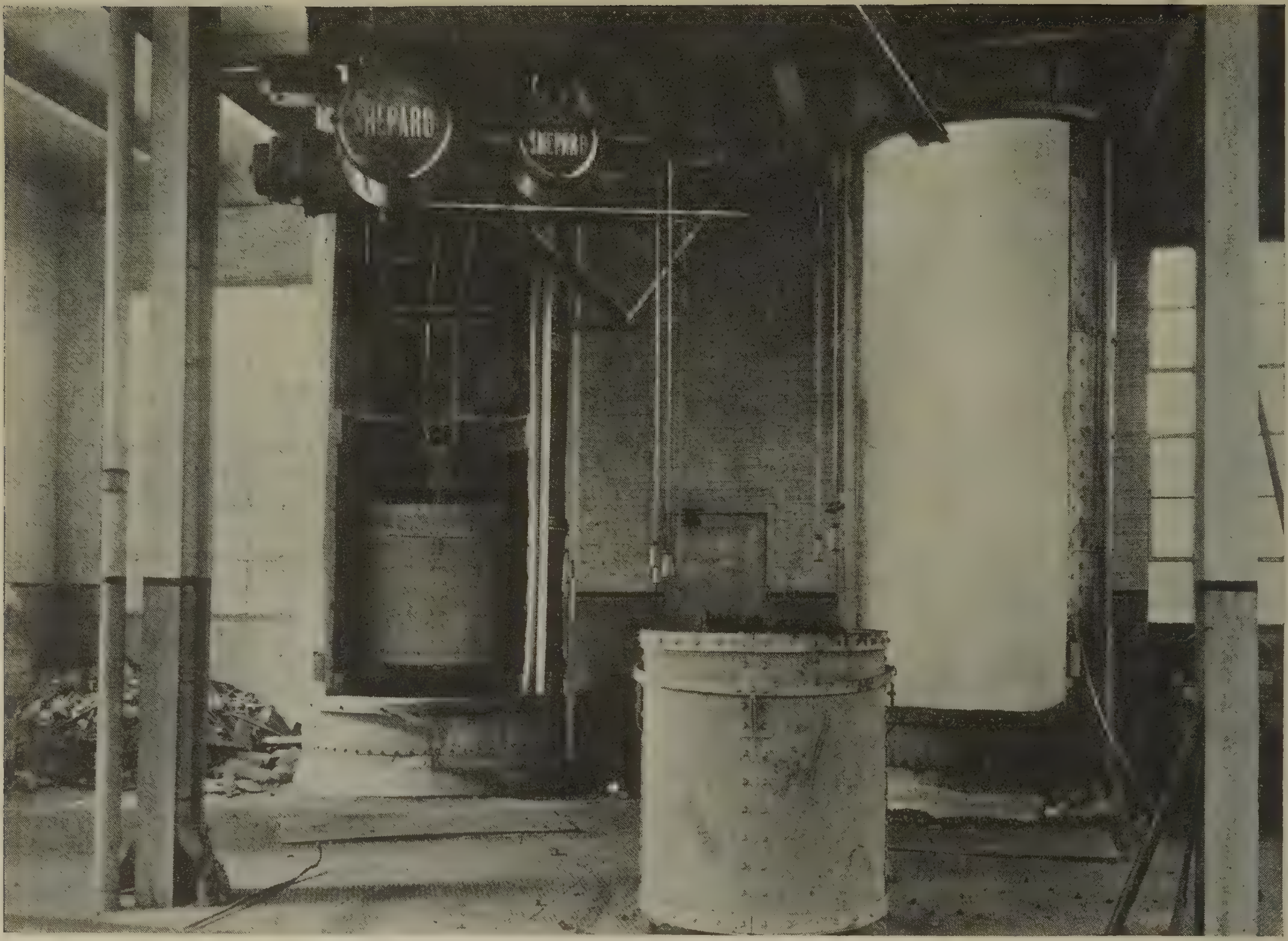

Elevator
Sand Treating Mill
Bin for Used Sand
Elevator
Underground Conveyor
Shake-Out
Elevator
Sand Treating Mill
Bin for Used Sand
Flask Return
Bin for Used Sand

STRAIGHT Line Flow in the Handling of Materials and Castings in the Unique Foundry of the Peninsula Stove Co. Is Clearly Shown by This Plan Drawing

BELOW Is Illustrated Three Types of the Conveying Equipment at One Point in the Foundry. Castings come down from the left on the cooling conveyor (in the curved form), a chain suspended from the adjoining trolley is attached and the forward movement of the cooling conveyor causes the castings to be pulled off the hooks of this conveyor. This is shown at the left. The castings are then pushed on the monorail around to the loading end of the sand blast room shown at the right. Coming out of the discharge end of that room, at the right, they are deposited on the furnace conveyor shown in the lower part of the picture





CUPOLA Charges Are Made Up in Buckets on a Scale Car in a Pit in the Stock Yard and Are Raised to the Cupola Charging Floor by an Electric Crane and Dumped into Either of the Two Cupolas. Only one man is required on the charging floor

a sharp incline to a point above the roof and then down to a sand blast in the furnace assembly department. It takes 105 min. for the casting conveyor to make its circuit.

Mold Conveyors at Variable Speeds

The large molds are made in cast iron flasks, their size being much larger than those usually handled on mold conveyors. The largest flask, that for radiator molds, is approximately 6 ft. in diameter and 20 in. deep. The castings made in this mold weigh about 200 lb. The mold conveyors are operated at variable speed, the speed being regulated to handle molds at the rate required under the production schedule at which the plant is being operated.

No drag molds are used in making feed section, radiator and ash pit molds, these molds being made with a cope and bottom plate. The drag is in effect a green sand core raised above the bottom plate to form an artificial parting. When the mold is pushed off the bottom plate the drag is left on the mold conveyor. Drag molds for radiators and feed sections are made on jolt roll-over pattern-drawing machines, and the copes on jolt stripping machines. Fire pots are made on jolt roll-over pattern-drawing and jolt-squeeze stripping machines.

The third molding unit, used for small miscellaneous castings, has a jolt shakeout at the west end of the molding conveyor, adjoining tumbling mills. The molds are made in snap flasks on two lines of jolt-squeeze machines, one row on each side of the conveyor. The molds are placed on the conveyor by hand.

A Continuous Hand Molding Arrangement

One of the problems that came up in laying out and equipping the foundry was to provide suitable equipment to permit continuous operation of the hand molding department, in which stove parts are made. The bottom board is set on the platform of a specially designed cast iron molding frame on which the mold is made and rammed by hand. The flask is of the usual hinge type used in stove work. When the mold is completed, trunnions are clamped on the flask, which is then turned over with an air hoist. Then, by the operation of a foot treadle, two rollers in the molding frame are raised up, coming in contact with the bottom board and at the same time raising the flask slightly, bringing the bottom board in a horizontal line with an adjoining gravity roller conveyor. The flask is then pushed off the two rollers on to the gravity conveyor without jarring the mold. There are 40 molding stations, each having a gravity mold conveyor. At the side of these conveyors are empty flask gravity conveyors inclined in the opposite direction, one empty flask conveyor being provided for two molders, so that every third gravity conveyor in the line is a return flask conveyor.

The completed molds move down the gravity conveyor to a section of a roller conveyor that moves backward and forward on a 6-ft. wide transfer track extending down the foundry floor between the gravity mold conveyors and a shakeout. When several molds have accumulated at the end of the gravity conveyor, they are poured and pushed over the movable transfer conveyor and dumped on the shakeout grate, which is 30 in. wide and extends the length of the floor molding unit, a distance of 240 ft. Flask and bottom boards are placed on the return conveyor and go back to the molding stations. The castings are loaded in steel boxes mounted on skids, and an electric lift-platform truck takes them to tumbling mills at the end of the molding floor.

Castings are tumbled in eight mills, arranged in two batteries of four each. Five of the units are square mills, four 36 in. square and 56 in. long and one

48 in. square and 60 in. long. The large mills are used for both heavy furnace and stove work, the smaller stove castings being packed in with the larger work. Each mill is provided with a clutch so that it may be operated independently of the others in the unit. The mills were made by the Royersford Foundry & Machine Co., Royersford, Pa. They have "Texrope" drive.

Clam Shell Bucket Handles Coke with Minimum of Crushing

Efficient methods with some new features are provided for handling raw materials to the cupolas. Pig iron and scrap are unloaded from cars with a magnet attached to a 5-ton Shepard crane with a 60-ft. span that serves the raw material storage yard. Coke delivered in hopper bottom cars is dumped into a bin of one carload capacity under the car track in the storage yard. When making up a cupola charge, a specially designed clam shell bucket holding ¼ ton, handled by the yard crane, is let down under a gate at the side of the bin, is filled automatically and is automatically closed when the bucket is lifted. With this handling system, crushing the coke is largely avoided. Sand is stored in one section of the yard in concrete bins having a 20-ton carload capacity.

Charges of iron, coke and limestone are made up on a bucket set on an electrically operated scale car located in a pit about 8 ft. deep, which extends out from beneath the cupola charging floor across the raw material storage yard. The crane delivers the material into the bucket, the top of which stands at about ground level, and the charge is weighed on dial-type scales. The car then moves to the other end of the pit, spotting the bucket beneath a well. Through this opening the bucket is raised to the charging floor by the hoist of a 2-ton Shepard crane.

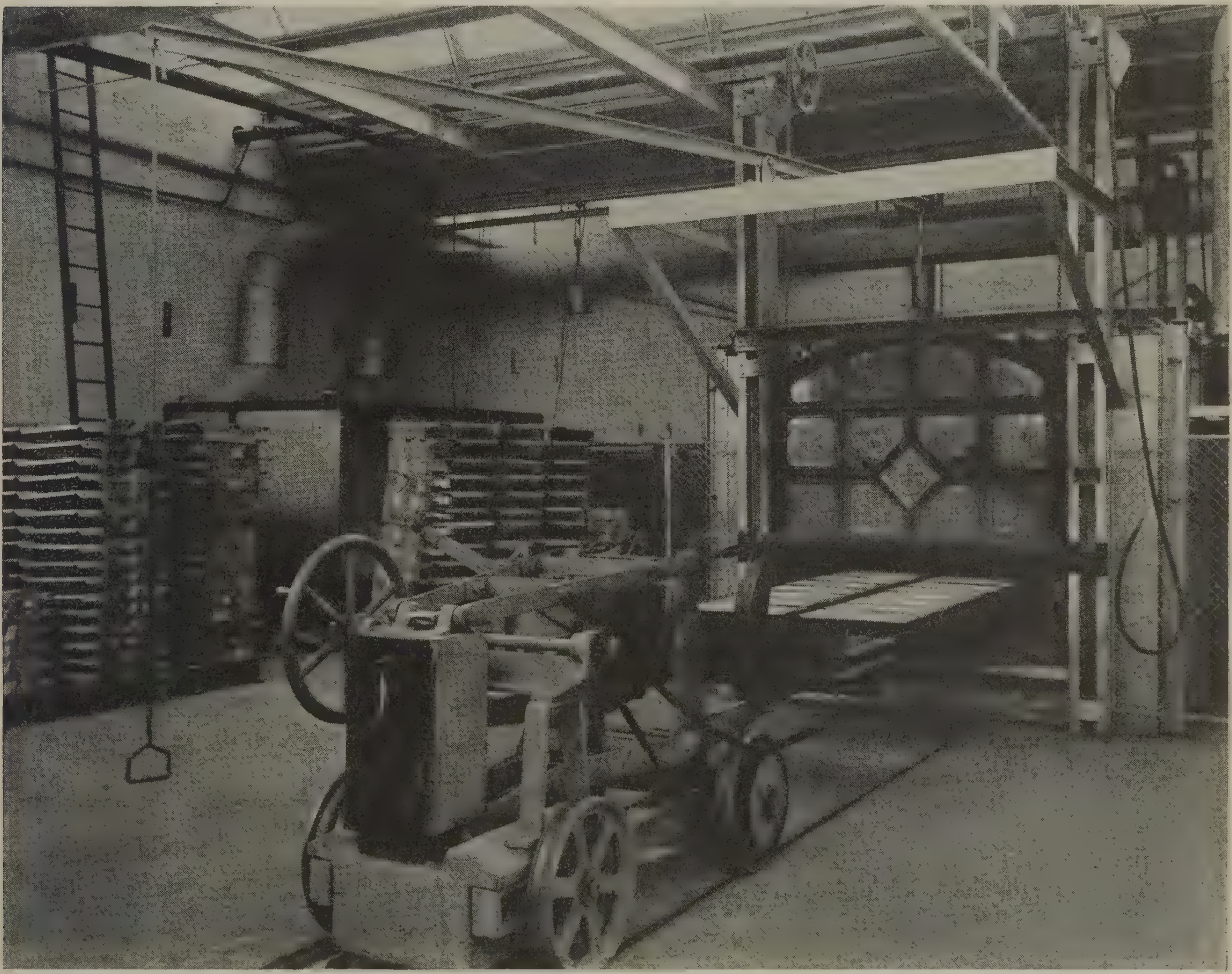
Iron is melted in two cupolas operating on alternate days. The crane, after hoisting the load, delivers the bucket into either cupola through 12-ft. openings, and the charge is dumped from the bottom of the bucket. The bucket is so constructed that, when the empty bucket is drawn from the cupola and set on the floor, the bottom automatically closes. Only one man, the crane operator, is required on the charging floor. The cupolas are 72 in. in diameter, lined down to 52 in. They were built by the Northern Engineering Works, Detroit.

The cupola is tapped with a 1-ton ladle suspended from a monorail crane, hand propelled but having an electric hoist. The molds on the three power conveyor lines are poured directly from the ladle. Iron for the hand floor is conveyed in the ladle to points along the foundry floor where it is poured into hand ladles.

Sand Tempered as It Leaves Shakeout

Three independent sand-handling systems are provided, one for the two large main and fire pot molding units, one for the small miscellaneous unit and a third for the stove plate unit. The sand-preparation plant for the main and fire pot units is located between the two sets of hoppers that serve those units. Sand from the shakeout grates passes to an underground reciprocating conveyor, then up an elevator to an aerator built by the Jeffrey Mfg. Co., Columbus, Ohio. From this the good sand drops on an overhead distributing conveyor, which extends in both directions over the sand hoppers above the molding units. This conveyor is reversible and acts automatically in filling the hoppers. There are eight sand hoppers, four for each unit, seven of 20-ton capacity and the other of 30-ton capacity. Each bin is equipped with one or two clam shell gates and serves one or two molding machines.

A feature of the sand-handling system of these two units is an arrangement for adding water to the sand



ELECTRICALLY Heated Oven for Baking Stampings and Special Machine for Loading the Oven. A similar machine on the opposite side takes out the work after baking as it leaves the shakeout grates, giving the advantage of early tempering of the sand with water before it starts on through the sand-preparation system. The supply of water sprayed on the sand is automatically controlled by the valve that operates the shakeout, so that the amount supplied always depends on the speed at which the molds go to the shakeout.

Sand for the miscellaneous unit is taken from the shakeout through an elevator to a large storage bin. Used sand from this bin and new sand from a smaller bin flow simultaneously and in any desired proportions into a continuous type of sand-treating mill. This mill discharges into an elevator, which delivers the sand to a distributing conveyor that discharges it into 12 bins, each of 6-ton capacity, over the molding machines. Each bin has two clam shell gates and serves two molding machines.

Sand from the shakeout grate of the stove plate unit passes to a belt conveyor, 24 in. wide and 260 ft. long, at the end of which is a magnetic separator pulley. From this the sand makes a right angle turn over a short belt section that delivers it to an elevator from which it is discharged into a sand-treating system similar to that used for the miscellaneous casting unit. A second elevator discharges the sand on to an overhead distributing conveyor, 260 ft. long, which carries it to 40 bins, each of 2-ton capacity, located over the molding positions, the sand being distributed to the bins by plows. Each bin has a clam shell discharge gate control through a hand lever and a swinging spout designed to hold its adjustment in any position.

Mention was made previously of the delivery of furnace castings from the shakeout grates to a casting cooling conveyor. This conveyor, after passing over the roof, extends down to the cleaning department, running alongside a hand-operated trolley that serves a sand blast room. A chain hooked to the trolley on 30-in. centers is hung around the casting, and the movement of the cooling conveyor causes the release of the casting. It is then pushed on the trolley, from which it is now suspended, through the sand blast room. This is a double-chamber unit, one man working on each side of the casting. The sand blast unit was supplied by the New Haven Sand Blast Co., New Haven, Conn.

Castings leaving the sand blast are placed on an assembling table by an air hoist. This table is a flat, continuous moving platform, 30 in. wide and about 125 ft. long. Fins are ground off by a disk grinding wheel located close to the table. Air hoists are provided for lifting the castings off the table for other operations. Practically all the fitting and assembling of the furnace is done on the conveyor.

Special Loading Machine for Enameling Oven

All the presses in the steel stamping department are motor driven. Along the length of one wall are die racks, all numbered. These are wide at the bottom tiers for the larger dies and taper in width toward the top. Stampings to be enameled go to the pickling room and then to the enameling room. Spray enameling booths are located along the sides of this room. Three coats, a slush coat and two white coats of enamel, are applied, each coat being burned on after its application.

Two electric ovens, built by the George J. Hagan Co., Pittsburgh, equipped with Leeds & Northrup pyrometers and registers, are used for baking, one for steel and the other for cast iron. The castings, which are sand blasted before enameling, are kept in the oven 20 min. at a temperature of 1200 deg. Fahr. The steel stampings remain in the oven 2½ min. at a temperature of 1600 deg. The stampings, after enameling, are loaded on forks on the table of a specially designed loading machine and the table is lowered slightly, depositing the work on stationary forks inside of the oven. A similar machine removes the work from the opposite side of the table. With this type of loading equipment the loading forks are not kept in the oven and consequently do not become heated.

There are three assembly lines or mounting tracks, 160 ft. long, for stoves, two for gas units and one for electric stoves. Stove frames and some of the larger pieces are assembled on stands located at the side of the lines. The frames are then placed on the roller conveyors of the assembly lines, located at a convenient working distance above the floor, and on these they are pushed along as the various parts, such as manifolds, linings, heat controls and doors, are put on. When the stoves are assembled, connections are made with gas or electrical lines and they are tested. Then they are inspected, cleaned, wrapped and crated on the assembly line, from which they go to the warehouse.

The pattern shop adjoins the foundry at the east end, and on a mezzanine floor above this is a designing department and sand testing department. A 14-ft. bay on the north side of the foundry, adjoining the large molding units on the side and the pattern shop at one end, is provided for the storage of patterns and flasks along the line of the molding machines.

The building is of steel, brick and glass construction, designed for efficient lighting and ventilation and in other ways providing a comfortable place for men to work. Above the roof are three high and four low monitors. Less than one carload of lumber was used in building the plant. It has a tile slab roof covered with asphalt. In the foundry the flooring is cement except the gangways, for which paving brick was used. There are wood block floors in the assembly department and press shop. The interior walls are painted white except for a strip a few feet up from the foundry floor, which is gray. The entire plant is heated by a forced hot water heating system, water being heated in two 250-hp. boilers. To keep the foundry as free as possible from smoke and dust an exhaust system is provided, with hoods over the shakeout grate.

The plant was designed by Albert Kahn, Inc., Detroit, in collaboration with E. L. Dwyer, vice-president and general manager, and Lon Kimball, general superintendent of the Peninsular company, and with the Osborn Mfg. Co., Cleveland. The Osborn company laid out the entire foundry equipment and designed and built the sand-treating and handling equipment, mold conveyors, casting conveyors, furnace assembly conveyor and molding machines. Tramrail equipment and electric hoists for handling material and castings were supplied by the Cleveland Crane & Engineering Co.

Ten Years of Air Mail

Postmaster General New has done well in designating the week of May 14 as Air Mail Week. He and his department can look with pride on the record of the 10 years since the first regular service, operated with planes and pilots borrowed from the War Department, was started between New York and Washington on May 15, 1918. Between New York and San Francisco the first aim was not at a real air mail service, because no attempt was made to carry a letter on to its destination, but merely to advance it on its journey. Thus, between New York and San Francisco traveling by train at night and plane in daylight hours the old transcontinental mail-time record of 87 hr. was reduced to between 50 and 60 hr. The actual air mail service between the Pacific and Atlantic Coasts began in August, 1923. The best time recorded in the tests of that month with 15 intermediate stops was 26 hr. and 14 min. In July, 1925, came the beginning of an overnight service between New York and Chicago.

In all there are now 22 routes in operation covering a total mileage of 9916. Every day mail pilots fly a distance of 22,110 miles, carrying mail averaging nearly 5700 lb. Three other routes already under contract will add 1705 miles to the system, and four additional routes with a mileage of 2279 have been advertised, with the prospect of contract awards within the year.

Open-Hearth Men Discuss Problems

Furnace Construction and Operation and Methods of Controlling Steel Quality Are Features of Semi-Annual Meeting

REGISTRATION at the seventh semi-annual meeting of the open-hearth committee, functioning under the auspices of the American Institute of Mining and Metallurgical Engineers, was 81. The meeting was held in the Hotel Ohio, Youngstown, under the chairmanship of Leo F. Reinartz, the second meeting under his guidance. At the close of the third technical session Mr. Reinartz was unanimously re-elected as chairman of the committee for the ensuing year. At the same time, C. H. Herty, Jr., United States Bureau of Mines, Pittsburgh, was elected secretary of the committee. Expression was given to the thought that in this capacity Doctor Herty would be able to give the committee more directly the benefits of his researches along the lines on which the committee is working.

In his remarks after calling the assemblage to order, Mr. Reinartz made a plea for promptness in getting into the committee's hands the open-hearth drawings and answers to the open-hearth questionnaire which was set out after the Detroit meeting last fall. Only seven or eight of the companies have responded, so far, in full to the request for data and the point was again emphasized that only those companies which supply such data will be furnished with the accumulation of data from all the sources from which received.

As in previous meetings of this group, great earnestness was displayed in all the topics discussed. This, as before, was carried outside the meeting room. Knots of men in the lobby and in the corridors were "talking shop." They were establishing new contacts, or cementing those already established at earlier meetings, and setting the stage for the inevitable inter-plant correspondence between meetings, which, in the opinion of some of those present, forms one of the most valuable features of the whole affair. Not a few baffling problems have been thus threshed out, with benefits all around.

No Set Papers Read at Meeting

Consideration of topics was taken up in accordance with the preliminary announcement set out before the meeting. The morning session of May 3 was devoted to construction of open-hearth furnaces. The afternoon meeting was devoted to furnace operation, both metallurgical and physical. The morning session of May 4 was concerned with the question of control of quality of steel tapped from the furnace.

During the afternoon of May 4 about half of the men present visited the open-hearth departments of the Republic Iron & Steel Co., and of the Youngstown Sheet & Tube Co. At the Republic plant one of the main features of interest was a stationary furnace tapping 170 tons through a bifurcated spout. R. L. Leventry, superintendent of open-hearth and mills, explained that the two ladles receiving metal from this spout are so evenly divided as to metal contained that they come ordinarily within an ingot of each other. There is provision in the spout, however, for diverting the flow of steel more heavily toward one ladle or the other. This consists of a form of baffle made up of two short stopper rods which can be swung one way or the other. They are, of course, fitted with normal stopper sleeves and heads.

Construction of Open-Hearth Furnaces

IN considering the most desirable hearth area and depth of bath for a furnace tapping 125 gross tons of steel this question was asked: "Is it desirable to have a relatively oversized hearth to melt and refine a charge of very light, bushy scrap?"

Discussion was opened by E. L. Ramsey, superintendent of open-hearth and blooming mills Wisconsin Steel Co., South Chicago. He described his own furnaces as of 100-ton rating, but averaging in 1927 118 tons to the heat. These furnaces have a bath area at the slag line of 620 sq. ft., which figures out about 5¼ ft. to the ton on the heats actually tapped. The depth of this bath on such a heat is 28 in., which was characterized by Mr. Ramsey as about half-way between a deep and a shallow bath. The speaker's preference is for a deep bath. He expressed the opinion that a deep bath is not so fast an operator, but that it usually gives a better quality of steel. It has less surface area to the ton of contents for oxidation by the flame. It cleans up lime better from the bottom.

For acid steel castings the Wisconsin plant has put in two furnaces which are fairly deep. A new furnace for a charge of 100,000 lb. for forging and casting steel has been installed, but it is found that the foundry is satisfied with from 50,000 to 60,000 lb., and consequently the resulting bath is shallow. This at first caused rejected castings to a large amount, sometimes making 75 per cent of scrap. Changes made in this furnace, increasing the depth from 13 in. to somewhat more than 18 in., cut down these rejections materially.

Unusual Tonnage from Deep-Bath Furnace

Further expression of desire for a small hearth, with resulting small slag line to repair, was made by R. L. Leventry, Republic Iron & Steel Co. His plant includes one 100-ton furnace which has been consistently overcharged to such extent that it averaged 136 tons to the heat at its last run. This run persisted through 402 heats, making a total of 54,700 tons of steel in the one campaign. It was under process of rebuilding at the time of the meeting.

This furnace, which uses coke oven gas as a fuel, has a hearth measuring 15 x 40 ft. inside the brick and about 14 x 39 ft. on the slag line. It was reported as giving better steel than the general run of furnaces in the shop, which are tapping about 82 tons on a rated capacity of 60 tons each. These furnaces measure 15 x 34½ ft. and are operated on producer gas. The depth of bath in the large furnace is estimated at 34 in. The charge includes a great deal of light automobile and other scrap. Part of the gain in quality, as compared with steel from the smaller furnaces, was attributed by the speaker to the fact that the coke oven gas was much lower in sulphur than the producer gas.

Furnaces at the Corrigan-McKinney plant have recently been increased in size from 90 to 115 tons. L. E. Yost, open-hearth superintendent at that plant, expressed the belief that the bath should have a depth of 30 in. or so for a 125-ton heat. He made a strong plea, however, for holding the surface of the bath below the sill plate. He characterized as dangerous the common practice of building up a dike of dolomite and permitting the bath to go several inches higher than the sill plate. For 115 tons these furnaces have a hearth area of 630 sq. ft., or 5½ sq. ft. to the ton.

Crane Capacity Sometimes a Governing Feature

Increase in the length of one new furnace, designed originally for 70 tons, was reported by James R. Stuart, open-hearth superintendent of the Colorado Fuel & Iron Co., Pueblo, Colo. This furnace, which originally had a bath measuring 15 x 36 ft., has been lengthened to give a 42 ft. slag line and is at present tapping 80 tons. This is far below its present capacity, however, and it is expected that the charge will be raised so that from 100 to 120 tons may be tapped from the furnace as soon as the crane equipment of the plant is increased to take care of the heavier load. The crane capacity is now the neck of the bottle. The bath is 34 in. deep and the charge includes a large proportion of light scrap. Most of the furnaces in this plant are nominally of 50 tons, but are tapping regularly from 70 to 72 tons.

Limitation of crane capacity was given by J. H. McDonald, open-hearth superintendent Algoma Steel Corporation, Sault Ste. Marie, Canada, as holding his furnaces to 80 tons. His bath measures 14 x 42 in. inside the banks, giving 588 sq. ft. It is only 22 in. deep. The scrap charge is mostly light. He reported tapping 55 tons on a 35-ton furnace by getting the bath up to 13 in. above the sill plate. This gave a depth of 30 in. in the furnace. With this large charge a small furnace takes about the same length of time in making a heat as the 80-ton furnace. Producer gas is the fuel and about 10 per cent of limestone is charged.

Especially Large Furnaces at Weirton

Dimensions of three large furnaces at the plant of the Weirton Steel Co., Weirton, W. Va., were given by Frank A. King, open-hearth superintendent. One furnace, built originally for 100 tons and now tapping 150 tons, has a hearth measuring 16 x 40 ft., with an area of 630 sq. ft., or only 4.2 sq. ft. to the ton. The depth of bath is about 3 ft. This furnace takes 11 to 12 hr. to make a heat. A 200-ton furnace in this plant has a bath measuring 17 x 43 ft. The latest and largest furnace at Weirton is a 300-ton furnace, with a bath measuring 19 x 49 ft. and fully 4 ft. deep. The 200-ton furnace takes 15 or 16 hr. to make a heat, while the big one requires about an hour longer. The quality of steel obtained from these three sizes of large furnaces was reported about the same as from 100-ton furnaces, and they give no more bottom trouble than do the others.

Furnaces at the Lowellville plant of the Sharon Steel Hoop Co. were reported by J. M. Hughes, general superintendent, as having averaged 108 tons to the heat in 1927, against a rating of 91 tons. These furnaces have a bath 34 ft. long and measuring about 14 ft. 9 in. between brickwork and 13 ft. 7 in. on the slag line. This area works out at 501 sq. ft., or 4.65 sq. ft. to the ton. The bath is 2 ft. 9 in. deep. The scrap charge was characterized as "medium light," including a miscellaneous variety of scrap, much of which is decidedly light.

Special Orders Placed With the Deeper Furnaces

At the Donner Steel Co., Buffalo, several furnaces built for 85 tons are tapping 100 tons. Samuel B. Muir, open-hearth superintendent, gave the hearth area as 500 sq. ft. and the depth of bath as 27 in. Two tilting furnaces at this plant, having the same capacity as the others, have hearths of 550 sq. ft. and only 24 in. deep. Mr. Muir explained that very few special heats are made on the tilting furnaces, because it is difficult to get the same grade of steel. There are more inclusions in the steel, although the furnaces are faster working. He attributed this to the fact that the bath was shallower than with the stationary furnaces.

Shallow baths are bad, according to Clem B. Collingwood, superintendent of open-hearth and rolling mill Stanley Works, Bridgeport, Conn. In his plant, which is the old American Tube & Stamping Co. unit, a 75 to 80-ton furnace has a bath measuring 11 x 30 ft., giving 330 sq. ft. of area. It is 30 in. deep. The bath contents are 725 cu. ft., which works out at an average bath depth of 26½ in. He referred to five furnaces measuring 12½ x 42½ ft. on the slag line and only 20 in. deep, in which the limestone was sticking up through the slag during a good portion of the operation. At tapping time these shallow furnaces frequently sent out slag ahead of the steel and the steel quality was expressed as "rotten."

Should All the Scrap Go In at One Time?

Furnaces 34 ft. long and 12½ ft. wide on the slag line were reported by Robert L. Cain, open-hearth superintendent Bourne-Fuller Co., Cleveland. These are tapping 90 tons, the bath being 32 in. deep. The scrap is all light and it is found necessary to put it in on the instalment plan, varying from three to as many as six or seven batches. These are successively partly melted down before there is enough room to get in the next batch.

In the opinion of Kenneth C. McCutcheon, open-hearth superintendent American Rolling Mill Co., Ashland, Ky., it is better to put all the scrap in at once rather than melt in batches, if it is possible to get it into the furnace at one time. Use of an oversize hearth for light scrap, said Mr. Ramsey, results in automatically falling back to a shallow bath. The problem might be met by using a high roof and large doors. This, however, would probably result in a larger fuel consumption. The furnace may be cooled off to a greater degree if all the scrap is charged at once, but when it is charged in instalments the subsequent lots have a tendency to solidify the bath already melted, and thus make it necessary to melt it all over again.

This question was touched on by G. D. Tranter, open-hearth superintendent American Rolling Mill Co., Middletown, Ohio, who explained that his practice is to put in light scrap in from two to five drags. This is with a cold metal charge. He expressed the opinion that there is no difference in the time of making the heat, from variation in the number of drags of scrap, but that there is a greater oxidation loss as the number of drags increases. To offset this it is his practice to charge one buggy of pig iron with the first charge of scrap and get the resultant working.

Larger Furnace Makes More Heats

Improvement in life of furnace was reported by W. F. Davis, open-hearth superintendent Youngstown Sheet & Tube Co., Indiana Harbor, Ind., by increasing the size of the unit. Each end of the furnace pan was lengthened 3 ft., giving a present hearth area of 13 x 39 ft., inside the banks, and a depth of 24 in. From this furnace 106 tons is tapped, with a maximum of 114 tons, against 90 tons before the change. This furnace is now 63 ft. in length, with an addition of 15 ft. for the two dog houses, making 78 ft. over all.

It is using either oil or tar as a fuel. The uptakes, which formerly were 48 in. square, are now 50 x 84 in. Slag pockets are 13 x 14 ft., with a height of 9 ft. to the arch. Regenerators are 25 ft. long and the brick goes 12 ft. above the 4-ft. rider walls. These chambers are 14 ft. wide for air and 8 ft. for gas. The spring of the arch is 19 ft. above the bottom of the chamber. The increase of life on the furnace roof has been from 289 to 430 heats. The backwall is now lasting from 180 to 200 heats, against the previous 60. Slag pockets have gone up from 200 heats to 430 and in one case to 461.

Increasing the length of a furnace from 34 ft. 6 in. to 36 ft. and increasing the charge from 80 tons to 125 tons without changing the regenerators was reported as wholly unsatisfactory, by Howard McClelland, open-hearth superintendent Republic Iron & Steel Co. This furnace operates on producer gas.

Practice on a 40-ton furnace in the plant of the Commonwealth Steel Co., Granite City, Ill., was reported by C. M. Cook. This is a basic furnace making castings. Stone and scrap are charged first and melted in about 2 hr. to a low level. Then the requisite amount of cold pig iron is added. Mr. Cook reported no more melting loss from this practice than when all of the charge was put into the furnace at once. The time of making the heat was reported to be about equal in the two melts. The limestone proportion was 14 to 15 per cent.

Discussion of Regenerator Practice

General discussion of checkers, as to the best type of brick to use and method of laying them up, together with a number of subsidiary topics, was taken up as the second item on the program. Henry A. Young, open-hearth superintendent Allegheny Steel Co., Brackenridge, Pa., opened the discussion by describing his practice as straight 9-in. brick on small regenerator chambers, using natural gas. There are two air chambers at each end of the furnace, with 12,158 sq. ft. of radiating surface. The openings measure 5½ x 6½ in. He expressed the opinion that a deep bank of checkers is better than a shallow one. He favors the use of larger brick with a larger chamber. At the end of a run of 200 to 240 heats he takes out about half the checkers, reclaiming many of those removed. About one-third are lost on each run.

Similar brick was reported by C. R. Henry, open-hearth superintendent Alan Wood Iron & Steel Co., Conshohocken, Pa. In this case the openings are 4½ in. About 65 per cent of the brick are reclaimed after a run. The surface was given as 175 sq. ft. to the ton, with the furnace tapping an average of 78 tons. Coke and tar are the fuels.

Larger brick are used by many of the companies. William C. Kitto, open-hearth superintendent Pittsburgh Steel Co., Monessen, Pa., uses 4½ x 4½ x 10½-in. brick in regenerator chambers measuring about 26 ft. long. These are 7 ft. wide for gas, 10 ft. 9 in. for air, both being 17 ft. 8 in. high to the skewback. There are five rider walls, 21 in. center to center, in the air chamber, measuring 30 in. high and 4½ in. thick. On these are tile 3 x 10 x 21 in. With 29 courses of brick on top, the horizontal opening measures 4½ x 6 in., with 6 x 6 in. vertical opening. There are 21,410 brick in each air chamber. The volume of the air chamber is 5396 cu. ft., or 58 cu. ft. to the ton. The exposed heating surface is 10,734 sq. ft., or 116 to the ton. The volume of the gas chamber, 3565 cu. ft., is about 39 cu. ft. to the ton.

Reclaiming about 42 per cent of the brick for reuse in checkers, with an additional 6 per cent available for bulkheads, makes a total of 48 per cent. The runs are averaging about 300 heats on a 93-ton furnace, using producer gas and having a bath 15 x 35 ft.

This same size of brick is used by the Weirton Steel Co., and about 300 heats are made to the run. Some two-thirds of these brick are reclaimed after a run. The gas chambers of the smaller furnaces in this plant, however, use 9-in. straight brick. Inadequate regenerator capacity, with the use of the 4½ x 4½ x 10½-in. brick, was reported by Robert L. Cain. He stated that it probably would be necessary for him to use smaller brick to obtain the required capacity.

As much as 500 to 600 heats on a run was reported by Major James W. Mills, open-hearth superintendent Granite City Steel Co., Granite City, Ill. This is on 58-ton furnaces using oil as a fuel. From one-third to one-half of the brick are reclaimed after the run. There are 30,000 brick in four chambers, each chamber measuring 8 x 17 ft., with a height of 12 ft. to the arch.

Getting Away from Fire Clay Brick

Silica brick in checker chambers was reported by Ernest A. Smith, open-hearth superintendent Andrews Steel Co., Newport, Ky. One furnace on these brick has run as high as 810 heats. Another one, which is still operating, has reached 550 heats. These brick are 3 x 4½ x 12 in. and there is very little of them left for reclaiming after a run—possibly 25 per cent. Producer gas is the fuel.

Silica brick for the three or four top courses of checkers were reported by Lafe Young, open-hearth superintendent Laclede Steel Co., Alton, Ill. He uses 4 x 4 x 13-in. brick and has 19,640 sq. ft. of surface in the checkers, or 273 sq. ft. to the ton. After a run of 400 to 450 heats he reported a loss of about 10 per cent in brick. The outgoing temperature was given as 1200 deg.

Loftus brick were reported by David G. Baxter, open-hearth superintendent Pittsburgh Crucible Steel Co., Midland, Pa., as being the cleanest he had ever seen in action, even after running for some time. The explanation came from the fact that the sewers were found pretty well clogged up, as the dirt and flue dust were carried from the brick into the sewers. A similar experience was reported by M. A. Smith, general manager Edgewater Steel Co., Pittsburgh. He has 21 courses of Loftus brick on 80-ton furnaces using producer gas and a charge of cold metal. These are in the gas chambers, which measure 16 x 8 ft. 9 in. x 16 ft. high. The time of heat is from 11 to 12½ hr. and waste-heat boilers are used. There appears to be no change in the fuel consumption and about 300 heats are expected from the furnace.

Burners for oil at 95 lb. pressure were described by C. B. Collingwood. The burner tip is set about 8 ft. from the bath. The burner is a home-made one, consisting of a pipe 2½ in. in diameter, reduced successively to 1½ in. and then to 1 in. Inserted in the 2½-in. pipe is a piece of ⅜-in. pipe having on its sides, near the end, four ⅛-in. holes aimed backward into the stream of steam in the larger pipe. Superheated steam is used for atomizing, at 85 lb. pressure for melting and 60 lb. for finishing. The run of the oil and steam mixture to the furnace is about 30 ft. Consumption of oil is about 50 gal. to the ton of ingots on the 40-ton furnaces and 40 gal. on those of 50 tons.

A dry burner with tip about 5 ft. from the bath was reported by H. B. Hubbard, open-hearth superintendent Inland Steel Co., Chicago. The oil is heated to 200 deg. Fahr. and is atomized by using superheated steam at 120 lb. pressure. This pressure is reduced to 90 lb. after the charge is melted. Consumption was reported as averaging 34 gal. to the ton of rail steel.

Variation in oil consumption between 34½ gal. to the ton when running with hot metal and 40 gal. when using cold metal was reported by W. F. Davis. As the Indiana Harbor plant has no mixer, the ladles of metal have to be taken as they come from the blast furnaces.

Oil at 150 lb. pressure, with dry steam at 175 lb. was reported by Frank A. King, Weirton. Oil at 175 lb. and steam at 125 lb. are used by the Laclede Steel Co., as stated by John W. Gething, superintendent. On a cold charge the consumption is 34 gal. to the ton on 80-ton furnaces using 6 per cent of burnt lime.

On a straight suspended roof at the Donner plant Mr. Muir expects to obtain from 450 to 480 heats, there being already 410 heats out on the present run. The time of heats was given as averaging 11 hr.

Special Ports Favored by Several Men

Unlined Blair ports are giving good satisfaction, in the opinion of N. F. Egler, Valley Mold & Iron Corporation. They are easy to install or to change, having fixed dimensions. About 700 heats are being obtained on the gas checker chambers, while the air chambers, after 200 heats, become pretty dirty. For 150 heats the average time has been near 9 hr. each.

Brick-lined Blair ports run dry at the Trumbull Steel Co. were discussed by George D. Cain, open-hearth superintendent. The furnace had 199 heats already out, with an average of 12 hr. each. The checkers appear clean. Coal consumption, using producer gas, has been 448 lb. to the ton of ingots, compared with 510 lb. for unlined Blair ports, water-cooled.

With piped ports, Mr. McClelland stated that the nose of the port stays in very good shape, but that there is a certain amount of cutting away behind the pipe. The original size of these ports was 21 x 30 in., but all of them have since been made smaller.

Speeding Up Furnace Repairs

Steel arch centers, without intermediate support, are used by the Colorado Fuel & Iron Co. in making hot repairs. Mr. Stuart said that no wood is used anywhere in the process. Semicircular steel forms are used in the flues. Two laborers can put in the centers. The masons then work from above them and are not exposed to severe heat at all. After the forms have been used for half the length of a furnace, on a general repair, they are then reversed and used for the other end.

Brick, 4 x 4 in., are put at each end, on the skewback supports, and the center rests on these. When the job has been done, the brick are knocked out from under. The center then drops and is easily pulled out. No one has to go inside the furnace. Use of steel centers was reported, also, by C. R. Henry, of Alan Wood.

Metal forms are used at the Ashland plant of the American Rolling Mill Co. Mr. McCutcheon stated that rail sections are suspended by overhead wires at the two skewbacks to hold the form. The latter is moved along a ring at a time. In general repairs rails are laid across the furnace, resting on brick piers. A steel "flooring" of sheets is placed on the rails and wooden centers then are used above the steel sheets. Complete protection is thus afforded the men and the centers from the residual heat of the bottom.

At the plant of the Sheffield Steel Corporation, Kansas City, no centers are used. T. T. Scott, open-hearth superintendent, reported using a form of hook brick. The roof is laid up with ribs to facilitate the use of this type of brick, each unit of which hooks over the adjoining ring, hanging from the rib. A great deal of hot patching is done here.

Slag Cars as a Time Saver

Use of slag cars in the slag pockets was stated by John E. McCullough, National Malleable & Steel Castings Co., Melrose Park, Ill., to be one of the greatest improvements in open-hearth practice in recent years. In his plant the checkers are directly underneath the furnace, and are accessible from both sides. The car is made of a semicircular steel plate, lined with 4½-in. brick and with sand over the brick. It is on rollers, and is hauled back and forth through use of the crane operating through a snatch block. Steel cable is used on the pit side, but for the connection under the furnace, where great heat is encountered, steel chain of large links is substituted.

This car has capacity for the accumulations of three to five weeks near the beginning of the run, diminishing to two weeks at mid-run and being changed every week (Saturdays) as the end of the run approaches. It takes about 1¾ hr. to take out the car, remove the slag and return the car to its place. The joint is made by 3 x 3-in. angles, with a row of brick laid on them. These are adjusted while the car is outside the heat of the pit. After it is back in place, sand is placed on the brick by means of long-handled spoons, making a sloping surface up to the walls. Mostly liquid slag is gathered here, with some stalactites. The cars are pulled before they get so full as to promise trouble in getting them out.

Blasting Out Recalcitrant Slag

Dynamite is resorted to in many plants to get the slag out. Mr. Stuart stated that in the Colorado plant a water-cooled drill is employed in preparing the hole for the dynamite. When using a long fuse there is the trouble that the dynamite and fuse will both burn up, to no avail in removing slag. Hence a 10-in. fuse is used, by a man familiar with explosives, and no trouble has been experienced with it. By this means four pockets are cleaned out in a day, using eight men.

No damage to the furnace is caused by this method, in the opinion of G. D. Tranter, provided the dynamite is used to undercut the slag. He reported getting into the slag pockets 8 hr. after a furnace goes off, and having them clear in 48 hr. He uses a drill for the holes and shoots the charges from the bottom of the pockets.

Other Methods of Cleaning Slag Pockets

Prying the slag loose is the practice of some of the plants. At the Republic plant air drills are employed to make holes for 8 x 8-in. billets 35 ft. long. A fulcrum is set close to the pocket and then the crane places a ladle or other heavy weight on the outer end of the billet. At the Wisconsin plant the slag is undermined back to the slope. Then the 100-ton crane and a big monkey hook are used to get the slag out. The whole process averages 48 hr. In this case there is a layer of 8 or 10 in. of sand in the bottom of the pocket and the slag volume is 7 or 8 ft. thick.

Tapping out the slag was tried both at the Brier Hill plant and at the Campbell plant of the Youngstown Sheet & Tube Co. At both places it was found too cold to run freely enough to make the attempt a success.

Use of a 12-in. sand bottom and a false wall of loose brick 4 to 6 in. thick and 5 to 6 ft. high was reported by M. A. Smith, Edgewater Steel Co., to facilitate getting the pockets cleaned. The process takes 48 hr., and producer gas is the fuel. Squirting in water while the slag is still hot was recommended by Henry A. Young. This, he said, breaks up the slag and enables him to get it out in 36 to 40 hr. He uses natural gas.

Brick-lined cast iron doors are in use in the Ashland plant of the American Rolling Mill Co. to reduce the time required to break seals in getting at the slag. Some doubt was expressed by several members of the conference as to the ease of opening these doors, but Mr. McCutcheon assured the meeting that they can be opened when required.

Cleaning out flues of checker chambers by means of a vacuum cleaner was reported by Howard McClelland. As this resulted in "putting the flue dust all over the landscape," the practice was discontinued. Then an attempt to clear the flues by blowing them out quickly shut down the furnace. It was found that they had been concentrated at the base of the stack in a pile 8 ft. high.

Furnace Insulation Is Only Partial

Insulation 4 in. thick under the regenerators and 2½ in. thick on the side walls has been installed in connection with the 175-ton furnace at the Republic plant. The flues, also, are lined as far as the stack with 2½ in. of insulation. Coal consumed in the producers feeding the furnace is about 400 to 425 lb. to the ton. There is doubt as to whether the insulation (C3 Sil-o-cel) or the great size of the heat taken from the furnace is responsible for this good fuel showing. The insulation is put on as a sort of Celite concrete, without any inclosing plate.

One furnace of the Pittsburgh Steel Co. at Monessen, said William C. Kitto, open-hearth superintendent, has the regenerators sheathed with ⅜-in. steel plate. Here the outside walls are laid up with 9-in. brick in place of 13½-in. and the division wall between chambers is 22½-in. thick instead of 27 in. Two other furnaces have received a ½-in. coating of Weber's 48 insulating cement, put on while the furnace was hot. This cost about $200 to the furnace, half of which was for the material. Both these methods have stopped a great deal of air infiltration.

Outside the checker chambers at the Inland Steel Co. is a 4½-in. Sil-o-cel brick wall, for insulation. Two new furnaces at the Ashland plant of the American Rolling Mill Co. are insulated from the stacks to the bottom of the uptakes. The flues have received C3 concrete, while the regenerator chambers are covered with 2½-in. of Sil-o-cel "natural," both on sides and roof, being covered with a slurry to avoid air infiltration. Fantails have 4½-in. burned brick (C22) underneath and 2½-in. of the same material on the roofs.

At Portsmouth, Ohio, C. H. Moreland reported, the Wheeling Steel Co. has insulated furnace flues with 2½-in. brick. John W. Gething stated that the Laclede Steel Co. uses insulation over the checker chambers and carries it up to the floor level. Above the floor a silica cement ⅛-in. thick is smeared over the furnace.

NEXT week the two remaining sessions of the conference will be covered: Furnace Operation Problems and Control of Steel Quality.

Locomotive Shipments Drop Again

Total shipments of locomotives from the principal manufacturing plants in the United States are reported for April by the Department of Commerce at 46 units. This is the smallest number in many months. It compares with 70 in March and with 98 in April a year ago. For the first four months the total was 222, against 372 in the first four months of 1927.

Only two of the April shipments were on foreign account, both being steam. This compares with nine in March and with an average of more than 14 a month in 1927. Of the locomotives on domestic account, 38 in April were steam and six electric.

Sales billed by the General Electric Co. in the first three months of 1928 amounted to $71,640,790.40, compared with $72,474,474.03 for the corresponding period last year. Profit available for dividends on common stock was $11,261,842.71 in 1928, compared with $11,028,143.96 for the same three months last year.

The American Rolling Mill Co., Middletown, Ohio, has announced plans for amending its charter to authorize the increase of its capital stock from $30,000,000 to $50,000,000. The new issue will consist of 800,000 shares of $25 par common.

Purge Business of Corruption!

Judge Parker, Addressing National Chamber of Commerce, Demands Turning Out Those Who Flaunt Laws—General Motors Official Describes Forecasting Plan

WITH an estimated attendance of 2000, the sixteenth annual meeting of the Chamber of Commerce of the United States opened in Washington Monday and continues through Thursday, dealing with a wide range of business problems under the general head of "Team Play for Prosperity." The keynote was sounded by Judge Edwin B. Parker, chairman of the Chamber's board of directors, who, in vigorous terms, called upon organized business to cast from its ranks those business men who by their ruthless acts bring discredit upon business as a whole. Judge Parker declared that stockholders of corporations have the duty of publicly repudiating those who misrepresent them by amassing profits through corruption.

"The times demand straight thinking and frank speaking," he said. "They demand that we consider the disturbing evidences of business atavism—of a throwback to a day of unrestrained individualism; a day of the 'public be damned,' when men of great business ability with an eye single to their own selfish interest and immediate returns, and without regard to the future, ruthlessly pursued their predatory lusts in a spirit of 'after me the deluge!' "

Reference was made to recent conspicuous examples of prominent business men becoming involved in transactions tainted with fraud, but, he said, they are not peculiar to this day nor to the profession of business. He demanded to know whether the business community as a whole shall lose the ground it has painstakingly and deservedly gained that a few—a very few in relation to the vast host engaged in American business—"may crash through and demolish the canons of sound business practices." Many Congressional investigations, it was asserted, are of the highest value to the public, including business.

Unless business purge itself of those who flaunt the law and abuse their power, said Judge Parker, the public will "turn loose thunderbolts of wrath which inevitably will bring legislative and governmental regulation of business to a degree that will seriously hamper a legitimate freedom of business initiative."

Addressing the manufacturing group, E. J. Mehren, vice-president McGraw-Hill Publishing Co., New York, presented shrinking profits as one of the most ominous trends in business.

The difficulty was held to have its genesis in overcapacity and to include the craze for volume, overproduction, obsolete equipment and consequently high manufacturing costs, intense competition, a mobile and even fickle buying public, high selling costs, price profiteering by buyers and price cutting by sellers.

"We need, first, to supplant the craze for volume by a reasonable passion for profits," said Mr. Mehren. "And, second, we need to eliminate buyers' profiteering, and the accompanying price cowardice.

"At the very root of our difficulties lies the craze for volume. We'd sooner have volume than profits. A full factory and red ink seems as popular as 60 per cent operation and plenty of black. Craze for volume, swollen sales expense to get the last 20 per cent of business, ruinous prices to fill up the factory; the goal is volume, not profits.

"We fail to realize that the law of diminishing returns cannot be flouted. The nearer we get to perfect performance the smaller the gain for given effort. It can't be escaped. The top business costs more than it is worth and only injects an undesirable color scheme into our balance sheets."

Mr. Mehren declared that the opportunity is present for beneficent propaganda, "for spreading a fire of sound business doctrine the country over; for creating through trade associations and chambers of commerce a country-wide sentiment for restoration of fair profits as our business goal."

The second revolution was held to relate to buyers' profiteering and its accompaniment, "price cowardice." It was declared that they do not exist in every industry or trade, but that a large section of business is suffering from them. The buyer, it was stated, beset by hungry sellers, has the seller on the run and plays one seller against another until the price is down not merely to rock bottom, but "in a hole blasted deep in the rock by the combined dynamite and T. N. T. of buyers' profiteering and price cowardice."

Mr. Mehren wanted to know of the manufacturers if they are practicing on others what they condemn when practiced on them, inquiring if their purchasing agents are profiteers and price clubbers.

"Put your own purchasing right," he said, "and the reformation will have been started. You can, then, with clean hands carry this propaganda into your own circles of influence."

Forecasting Methods of General Motors Corporation

SPEAKING of the experience of the General Motors Corporation, Donaldson Brown, vice-president of that organization, told the manufacturing group that he believed and hoped that some day American business and industry will approach the ideal of stabilization sufficiently to free them from the bogey of the business cycle. He spoke on "Forecasting and Planning Vital to Industrial Prosperity."

"When this is brought about," he said, "it will be very largely due, I am sure, to the closer and more economical control of industrial and merchandising operations that will follow a better appraisal of ultimate consumer demand. And intelligent forecasting and planning—vital to business prosperity—is the mechanism to bring this about and to remove the unnecessary hazards from the course of American business."

Contrary to the view of one group which still regards "the scrawling of the business cycle as almost the handwriting of fate, dictating good business or bad," Mr. Brown said he was in sympathy with the growing tendency to look upon it as an effect rather than a cause. He declared that, with present facilities in the banking structure, there can be no cause for major disturbances of the business cycle except as brought about from conditions of business itself. He expressed the opinion that, while business is subject to the influence of the business cycle, the business cycle itself—to the extent at least that its fluctuations are of any serious consequence—results from lack of knowledge and from errors of judgment on the part of business management. He recited the plan of General Motors in operation for forecasting future consumer demands and for planning and controlling activities in accordance with the indicated expectations. From General Motors' experience with this plan, he said, he believes its results constitute a distinct step toward the stabilization of the automobile industry. Forecasting and planning he declared to be nothing more or less than a system of control whereby production, purchases of materials and the employment of capital are coordinated with sales requirements. Budgetary control was described as an apt phrase except that it is likely to imply a rigidity that must be guarded against. Flexibility, he said, is a prime requisite so that there may be quick response, and thus the possibility of adjustment throughout the system to the requirements of changes of situation that are inevitable. The focal point of the system was said to be the sales output. The flow at this point, said Mr. Brown, must be gaged and every other activity must be coordinated with it. Ultimate consumer demand, it was stated, is the absolutely fundamental factor controlling the continued sale of any product. This was said not to be the demand of the manufacturer who buys from some other producer, but that of the user of the final and completed product.

"Some businesses are more fortunately situated than others as to the opportunity of analyzing the ultimate consumer demand for their product," said Mr. Brown. "Those that are producing and selling products which represent a preliminary stage in the manufacture of a final product that in course of time finds its way into the hands of the ultimate consumer are far removed from such an opportunity. They are nonetheless dependent upon the requirements of the final consumer; and it is poor solace to place the responsibility elsewhere, when an unrecognized state of demand results in a decrease in sales and an enforced curtailment of production."

Effect of Diversification on Employment

The diversification of industry made possible by the economic law of diminishing labor per unit of production, it was said, has a direct bearing upon employment.

"For while regularization of employment in industry depends upon the correct adjustment of supply to consumer demand," Mr. Brown said, "the growth of employment and wages depend upon continuing increase in efficiency and diversification of production as well as upon the growth of consuming power. Unemployment which progressively and in temporary stages may result from efficiency is of constructive benefit in itself. It results adversely only when industry fails to grasp the opportunity thus presented of increasing diversification of production and building additional consuming power by the employment of the labor thus rendered available. A knowledge of consumer needs and adaptability in meeting them is required to take constructive advantage of such an opportunity.

"There is another kind of unemployment that is an unmixed evil from the economic standpoint. It is that which results from a temporary curtailment of production. The labor thus rendered idle is not available for the production of other products which might attract the public fancy, except at the expense of a labor shortage or deficiency in the original line when resumption of activity occurs. Overproduction, due to mistaken appraisal of consumer demand, seasonal fluctuations, style changes, the development of substitutes, or insufficient information regarding accumulated stocks are causes of this sort of forced curtailment and unemployment."

Correct Appraisal of Public's Needs Essential

A theoretically perfect coordination of business was declared to comprehend an exact knowledge in advance of what the public wants and an exact knowledge of how much the public wants. Such a condition, Mr. Brown said, would mean that there no longer would be reason for worrying about the business cycle. The situation in 1921 was cited to illustrate the disastrous economic consequences of wrong appraisal of consumption demands. False values, Mr. Brown stated, were built up by the period of inflation during 1919 and 1920 and exaggerated expectations of future demands were created by the competitive buying of raw materials and semi-finished products by manufacturers of all kinds. A state of overproduction, it was said, existed, but was not recognized. The cause of this situation would not have appeared, it was said, if there had been a way to detect the true state of consumer demand. Mr. Brown said one reason why the automobile industry was the first to recover from the 1921 depression was the fact that the automobile manufacturer has nothing between him and the consumer except a dealer organization, leaving no occasion for accumulation of stocks in the hands of numerous intermediaries, thus differing from some other industries further removed from the ultimate consumer.

The two fundamentals in planning by General Motors are of a statistical and constructive character, as described by Mr. Brown. The former is directed toward ascertaining the statistical facts bearing upon future consumer demand. The constructive efforts are directed toward improving probabilities. Statistical information gathered from dealers gives sales and sales forecasts and other items. The constructive efforts concern "long-term" and "short-term" factors of influence. Among the long-term factors of influence, said Mr. Brown, are those relating to consumer appeal in style, functioning, serviceability, etc., and the engineers and salesmen work hand in hand on this subject. Short-term factors of influence on demand were described, those that may quickly be called into play to offset unfavorable developments. They include special sales stimulus, more intensive advertising, or even temporary under-pricing, whenever these seem called for by a falling off in anticipated and logical demand. Reports are made monthly to cover the ensuing quarter for each division of General Motors and the whole is coordinated into one planning scheme.

Mr. Brown said it was felt the more accurate appraisal of basic requirements and the coordinated control resulting therefrom have formed a distinct step toward the stabilization of the automobile industry. He said that it appears that the stabilization of a multistage industry depends largely upon the proper regulation of commitments in the first stage in accordance with retail demand. After that, he added, with properly applied methods of forecasting and planning, synchronization becomes a matter of one stage keeping in step with another.

A Worcester Museum of Early and Latter-Day Iron Objects

John W. Higgins, president and treasurer Worcester Pressed Steel Co., Worcester, Mass., will found a museum which will be devoted to objects and literature to give the history of iron and steel, particularly sheet iron and steel, from its beginning to the present day. The project has been incorporated in Massachusetts, the incorporators besides Mr. Higgins being his brother, Aldus C. Higgins, treasurer Norton Co.; Paul B. Morgan, president and treasurer Morgan Construction Co., and Harry G. Stoddard, vice-president and treasurer Wyman-Gordon Co. Plans are making for a museum building 50 by 200 ft., and probably four stories, of steel and glass, to be erected next year. There will be a library room as well as the museum proper, which will be arranged to occupy the complete height of a portion of the building.

The collection as planned by Mr. Higgins will combine art with the working and fabrication of iron. Its nucleus will be a large group of medieval armor, together with arms, displaying the craft of the smiths of Italy, Spain, Germany, France and England in the fifteenth and sixteen centuries. Mr. Higgins has been collecting these pieces for years and has brought together a great number of them.

It is the purpose to take the collection back to the beginnings, and by authentic objects, if obtainable, and by plaster cast, or at any rate by illustration and manuscript to trace the evolution to the present time. Objects earlier than the tenth century will be of bronze, since very few earlier iron objects have come down. The museum and library will be furnished with fifteenth and sixteenth century furniture, pennants, portraits of men in armor, and tapestries, to afford a suitable background.

The Hamilton Coke & Iron Co., Hamilton, Ohio, has announced the appointment of Eaton, Rhodes & Co., Cincinnati and Pittsburgh, as exclusive sales agents for its Miami Koppers foundry coke and other coke for industrial purposes.

Cooperation Needed to Help Profits

Metal Branch of National Hardware Association Commends Effort to Obtain Modification of Sherman Anti-Trust Law

THE keynote of the meeting of the Metal Branch of the National Hardware Association in Boston on May 3 and 4 was the need for cooperation to bring adequate profits to manufacturers and distributers. The Metal Branch voted to seek the aid of other organizations, including the American Iron and Steel Institute and the Chamber of Commerce of the United States, in advocating a modification of the Sherman anti-trust law as one step in the bringing about of better business conditions.

George H. Charls, president National Flat Rolled Steel Products Association, Cleveland, pointed out the need for cooperation of steel and affiliated interests in an address, which was in part as follows:

"Today executives require facts and figures on productive capacity, demand, the general and particular trend of business, sales and specifications against contracts, the potential and prospective markets, the inroads of competing commodities, the supply and demand of the material to be purchased, cost comparisons, simplification and standardization of commodities, standardized packing, transportation cost, trade research and sales promotion, labor-saving machinery and its effect upon the cost of manufacture, trade practices and business ethics. It is obvious that such facts must be strictly reliable and up to the minute.

"We must make the sense of frustration which prevails stimulating and useful, by permitting it to lead us to fresh explorations. We must permit a healthy, lawful, decent plan of stabilization extinguish the flicker of sickly, feeble efforts to exist. We must recognize that nothing so quickly destroys confidence and dissolves prosperity as dull vegetation in mindless, senseless, destructive competition.

"Both the mills and the jobbers seem to have been growing unmindful of their dependency, one upon the other, of their obligation to staunchly support each other in a spirit of mutual helpfulness and protection. The average return on steel industry capitalization in 1927 was 5.22 per cent, the lowest in recent years. While production declined less than 8 per cent from the record output of 1926, earnings declined 24 per cent.

Iron and Steel Prices Comparatively Low

"Iron and steel prices are now 38 per cent over the 1913 level; other industrial products about 50 per cent. Iron and steel wages are 125 per cent over the 1913 level, and freight rates are practically double the 1913 basis. American business faces the necessity of collective effort to resist foreign growing trade and business practices, which, though not unethical, are uneconomic.

"It is well known to you and it must be apparent to all who are informed that if the price of sheets and strips is further beaten down, wage reductions may be precipitated. It is possible that if these wage reductions are forced on the manufacturers of steel as they have been forced on the brick and textile industries, they will have a tremendous influence on other industries. This may mean a decrease in purchasing power all over the country. He who flagrantly slashes prices, as well as he who just as flagrantly heckles the seller and breaks them down, cannot deny or ignore his responsibility when the facts show conditions to be as they are today."

While the seriousness of the business situation was stressed throughout the two-day session, many other subjects came up for discussion, such as simplification or standardization, merchandising policies, business relations, direct mill shipments, delivery costs, market channels, etc.

In relation to the question of improving merchandising policies and business relations, Chapin E. Harris, Brown-Wales Co., Boston, maintained the steel mills should take a greater interest in the warehouse and in the distribution of steel and steel products, but he feels that the greatest good can come from cooperation between the jobbers themselves.

Standard Sizes for Steel Roofing Sheets

A report of the sheet steel simplification committee was presented by the chairman of that body, W. L. Latta, Wheeling Steel Corporation, Wheeling, W. Va. It stated that at the October meeting a summary of a survey made by the Division of Simplified Practice, Department of Commerce, contributed by 14 manufacturers was presented and a 51 per cent adherence to roofing sizes and gages was indicated. A similar survey just made by that division disclosed that 18 manufacturers had reported and that adherence had advanced to 55 per cent. The report further stated:

"The importance of sheet steel as a roofing material justifies the publication of standard gages and sizes in a separate simplified practice recommendation; that the title of that recommendation shall be 'sheet steel roofing'; that the present portion of the sheet steel recommendation as applies to roofing and siding be reaffirmed and republished without change; that the following paragraph be added and incorporated in the established standards: 'Standard weight subject to the usual mill tolerances of 2½ per cent plus or minus.'"

In connection with the simplification of sheet steel it developed in discussion that demands in various parts of the country vary. It was shown that No. 29 gage gutter stock is still sold in the South and in some other sections of the country, but has been practically eliminated elsewhere, No. 28 gage being the minimum standard. It also developed that 2½-in. conductor pipe is demanded in certain sections of the country and that rather than lose customers demands are being filled.

Where demands for these now odd sizes are made, orders are treated as specials and an extra charge is made. F. O. Schoedinger, Columbus, chairman of the association, felt that the making of No. 29 gage stock was retroactive and the situation sufficiently serious to warrant the appointing of a committee to make a report on the matter at the next meeting of the association. He appointed the committee.

In connection with this subject, H. R. Colwell, Division of Simplified Practice, Department of Commerce, Washington, quoted from the editorial from THE IRON AGE of April 5, 1928, p. 960, on "Ban the Thin Roofing Sheet."

Address on Continuous Rolling of Sheets

G. F. Ahlbrandt, the American Rolling Mill Co., Middletown, Ohio, gave an address on the process of rolling continuous sheets, and Robert H. Lyon, Lyon, Conklin & Co., Inc., Baltimore, spoke on present conditions concerning mill direct shipments. A. L. Philbrick, Congdon & Carpenter Co., Providence, R. I., and chairman of the overhead expense committee of the National Hardware Association, discussed expenses of the sheet metal distributer as applied to sales.

Subjects that came up for discussion included methods to be employed to increase the use of terne plate, the report of the terne plate simplification board of review, of which L. D. Brueckel, Weirton Steel Co., Weirton, W. Va., is chairman, the justification of free truck delivery of sheet metal as based on margin of profit, and channels for marketing sheet steel seconds.

L. D. Mercer, Central Alloy Steel Corporation, Massillon, Ohio; F. J. McNeive, W. F. Potts, Son & Co., Inc., Philadelphia; John Follansbee, Follansbee Brothers Co., Pittsburgh; G. F. Ahlbrandt, American Rolling Mill Co., and W. T. Ryan, E. P. Sanderson Co., Cambridge, Mass., were re-elected members of the metal committee.

Straight-Line Polishing Machine with Automatic Features

Automatic polishing equipment designated as the Larson straight-line polishing machine, for parts having large flat surfaces such as bumper bars, molding strips, T-squares, etc., is being marketed by the Hanson-Van Winkle-Munning Co., Matawan, N. J.

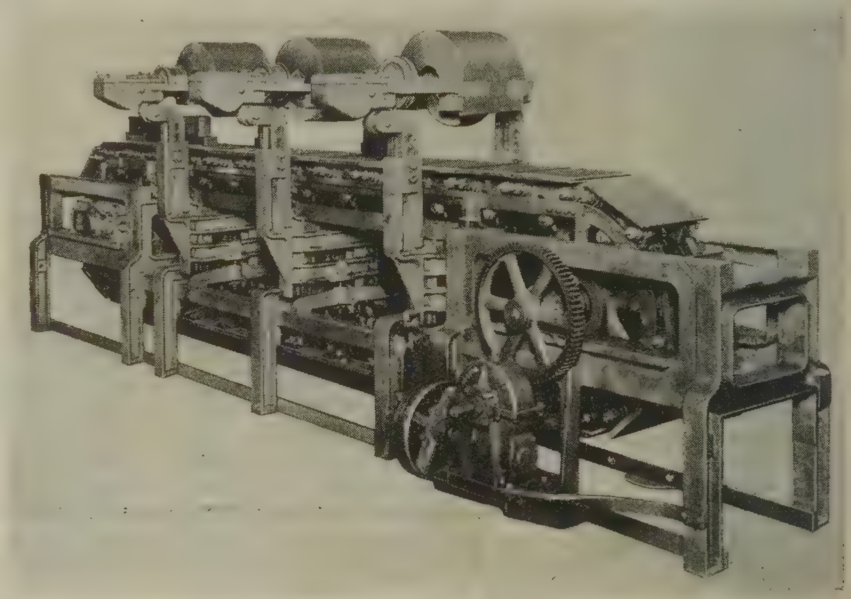
In addition to straight flat polishing, the machine is adapted for a number of special polishing and buffing operations through the use of lifting cams for irregular shapes; positive rotating fixtures for circular work, such as automobile lamps; and automatic spinning fixtures for bolt heads or vanity cases. It is claimed that, because of the flexibility of the spindle adjustment and the rigidity of the work platens, almost any hand operation can be duplicated.

An outstanding feature of the machine is the carrier table, which consists of a series of cast iron platens that interlock to form a solid table on which the work is set. These work platens are machined true and are mounted on adjustable hardened rollers. The adjustment provided is intended to assure proper alinement of the top surface of the platens with each other, and to form an adequate base on which to fasten mechanical fixtures or magnetic chucks for holding the work in place. The rollers in turn are run on a rigid track.

The polishing wheels are carried by heavy steel spindles running in double bearings, which in turn are mounted on heavy yokes controlled by compensating springs. This construction is emphasized as providing proper support for the heavy polishing wheels and permitting uniform pressure of wheels against the work. It is also said to permit longer life of the abrasive and wheels, and prevent excessive spindle bearing wear.

The spindles are adjustable to any pressure and are arranged to oscillate over the work, this combination of balanced spring pressure and continuous to and fro movement of the spindles being intended to provide the constant movement of the wheel over the face of the work that is effected by the skilled polisher. The oscillating motion may be eliminated on the last spindle to straighten the high-light marks. For all cutting operations, the polishing wheels should rotate opposite to the direction the work is taking; but for final finish, the last wheel may be rotated in the opposite direction so that the work goes in the same direction or, "with the wheel to fan" the work. The spindle yokes and wheels may be set at various angles so that each succeeding wheel will polish or buff out the marks left by the preceding wheel by cutting across them. Any number of polishing wheels can be used, the machine being built on a sectional basis, permitting a long or short delivery and feed end to suit conditions.

Movement of the table is controlled by foot levers placed both at the delivery and receiving ends. The table may be brought to a dead stop quickly by pressure of the foot clutch. When the table is started the spindle heads lower the polishing wheels automatically to the work. When the table is stopped the wheels are lifted automatically. When in operation, the work platens carry the parts to be processed under the polishing wheels which are set at predetermined heights. Each wheel takes but a slight cut. By using three or more wheels the total amount of material removed at one handling is multiplied, and production is correspondingly increased. The first wheel may be coated with a coarse abrasive, while the final or finishing wheel can be coated with fine abrasive to produce the best surface for plating or buffing. The polishing wheels may be run dry or greased with tallow and supplied with hoods for connection to exhaust systems, or the work may be lubricated by the use of a coolant oil system with screened reservoir tank.


In Addition to Straight-Line Polishing, the Machine is Adapted for a Number of Special Polishing and Buffing Operations

The polishing wheel may be driven either by motor or by an overhead countershaft. Tex-rope drive, with necessary pulley and motor platform, can be furnished also. The speed of the platens, usually 12 ft. per min., can be altered to suit various conditions. For average polishing, each head requires 3 hp. and the platen drive from 1 to 2 hp. The machine illustrated occupies a floor space of 3½ by 14 ft. and weighs approximately 4500 lb., exclusive of motor, magnetic chucks, or other attachments for special jobs.

Equips Board Drop Hammer with Roller Bearing Heads

Board drop hammers built by the Chambersburg Engineering Co., Chambersburg, Pa., are now available with the rolls mounted in roller bearings, as well as with the plain bearings as heretofore.

With the Roller Bearings, Lubrication Is Assured Over Long Periods and Oil Does Not Reach the Drop Hammer Boards

Savings in power and better maintenance of alinement are claimed for the application of the roller bearings, and also the elimination of interruptions due to oiling and the changing of bushings. It is pointed out that although hammers are usually oiled at least twice daily, the lubrication is not always complete and the oil frequently finds its way to the boards, shortening the life of the boards materially. With the roller bearings, which are packed with lubricant, it is claimed that adequate lubrication is assured over long periods without oil reaching the boards.

Some 343 advisory committees from industry are now cooperating with the Department of Commerce and upward of 1400 conferences with business leaders have been held. The committees feed into the Department of Commerce economic information and views of industry as to Government policy and at the same time take back to industry scientific information and group decisions as the result of group discussions of common problems.

Horizontal Drilling and Tapping Machines for Production Work

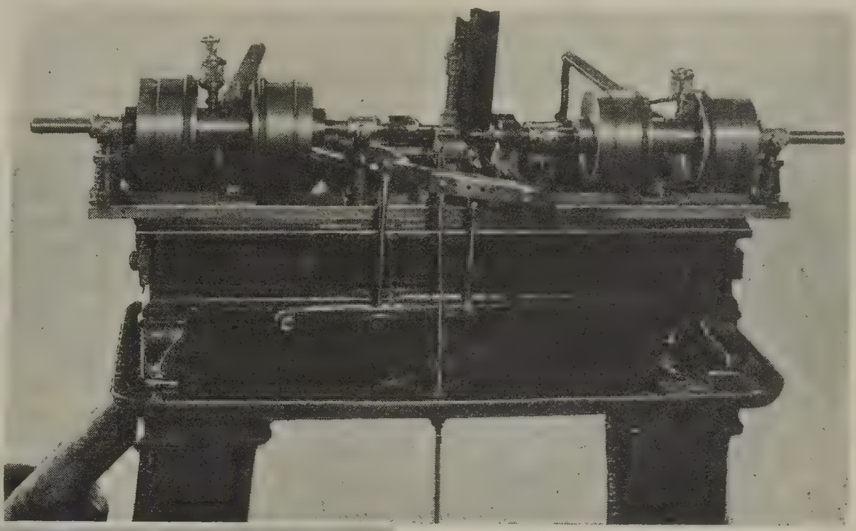
Simplicity of construction and adjustment and high-speed operation are features emphasized in connection with new horizontal combination drilling and tapping machines which have been placed on the market by C. B. Mahan, 162 Longview Terrace, Rochester, N. Y. The machines are available in single or two-spindle, and in bench and floor types. It is claimed that taps have been run on these machines at speeds up to 2000 r.p.m.

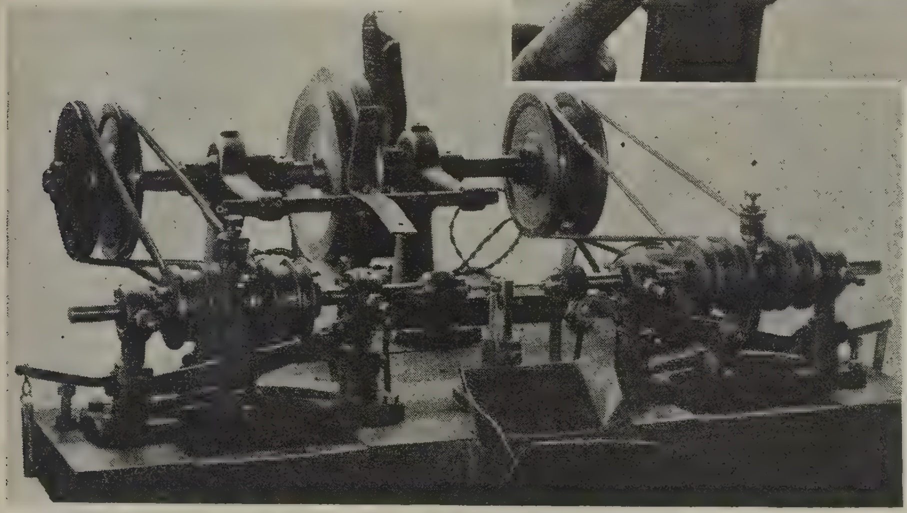
The horizontal design is said to simplify jig construction, obviate trouble from dirt and chips and eliminate the weight and backlash of the spindles. The machines may be set to tap to a definite depth, the tap reversing automatically when it bottoms. Differences in tap leads and cutting speeds are controlled by a spring, the tension of which may be adjusted so that even if the operator should jump on the foot pedal the tap would not be affected.

One of the machines, a floor type combination two-spindle drilling and tapping machine, designated as the model No. 1, is here illustrated. An automatic chucking arrangement is provided and the unit has been used for a wide range of work, including drilling, tapping, threading, counterboring, countersinking, inserting screws, and heading over rivets.

A machine of the same design, arranged for bench mounting and of much higher speed, is also available. One of these machines, using a 4/36 tap, is said to be in daily use, tapping 3400 holes an hour. By shifting the driving belt to the fixed pulley, the machine may be converted into a drilling machine and production up to 4400 holes per hour obtained. By equipping the chuck with a die holder, both ends of a small crank have been threaded at the rate of 1500 pieces per hour. With one side of the machine equipped with a drill and the other side with a tap, production of 1200 drilled and tapped holes is said to be obtained. Another feature stressed is the drilling of two holes very close together in one operation. It is claimed that on one job a ¼-in. hole is drilled and another beside it, leaving a 1/32-in. wall between them.

A third unit, designated as the No. 3 single-spindle drilling and tapping machine, of bench type, is also available. It is in effect just one-half of the regular machine, and can be used for drilling, tapping, cross drilling, and the other operations for which the two-spindle machine may be used.





The Floor-Type Machine, Above, May Be Used for External Threading, Counterboring, Screw Inserting and Rivet Heading, as Well as for High Speed Drilling and Tapping. The bench-type is shown at left

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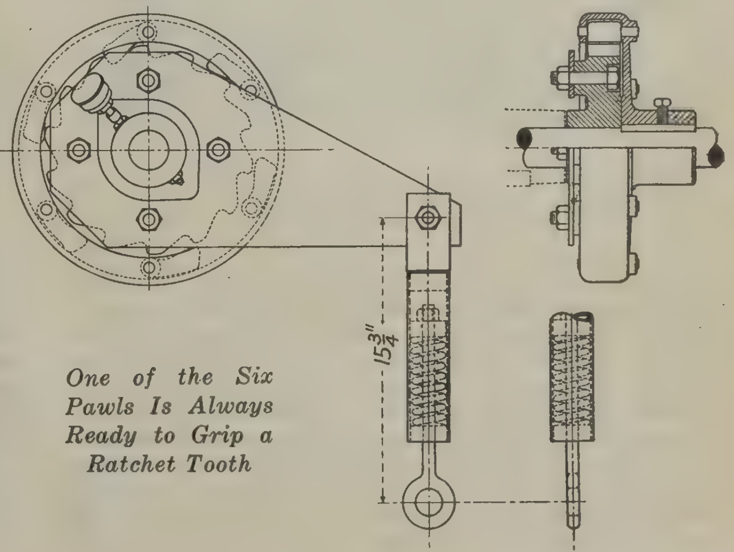
Silent Ratchet Safety Lock to Prevent Backward Run of Loads

To prevent a backward run of the equipment with interruption of power, the Jeffrey Mfg. Co., Columbus, Ohio, has developed a silent ratchet safety lock. It is designed for use with large elevators, pivoted bucket carriers, belt conveyors and similar equipment where vertical lifts are carried. This lock provides protection against spilling a loaded vertical or inclined elevator where an unexpected interruption of power occurs.

As the drawing shows, one of the six pawls grouped around the ratchet is always in position to grip a ratchet tooth. The housing itself is bolted to the countershaft and turns with it when the power is on. The pawls are spaced around the ratchet teeth so that the maximum backward motion of the ratchet is no more than one-third of the distance between the teeth (less than 1 in., even on the largest stone elevator).

Another feature of the safety lock is the spring attachment which takes the jar out of the operation of the mechanism. This spring acts as a snubber on the arm bolted to the ratchet. When the load descends on the pawls the spiral spring takes most of the force of the blow. This safety lock can be fitted on elevators and inclined conveyors now in use, as well as on new installations.

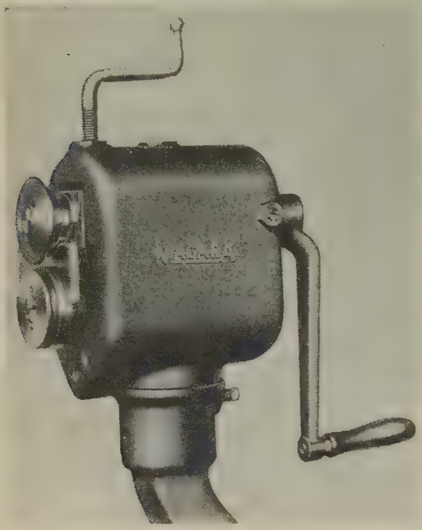


One of the Six Pawls Is Always Ready to Grip a Ratchet Tooth

Bench Machine for Turning, Wiring or Burring Soft Steel up to 18 Gage

A new combination bench machine for turning, wiring and burring operations on 18 gage, and lighter, soft steel has been made available by the Niagara Machine & Tool Works, Buffalo.

This machine, designated as the No. 147-C, is intended for use in the manufacture of sheet metal products and in industrial maintenance work. It is equipped with back gearing and has a one-piece inclosed frame, which construction is emphasized as providing safety of operation and long life in service. The faces are of steel, hardened and polished, and may be interchanged conveniently for the various operations for which the machine is intended. Regular equipment includes one pair of burring faces for each operation, burring, turning and wiring; gage; wrench; and heavy bench stand. The machine may also be furnished as a single-purpose unit with only one pair of rolls for the particular operation required.

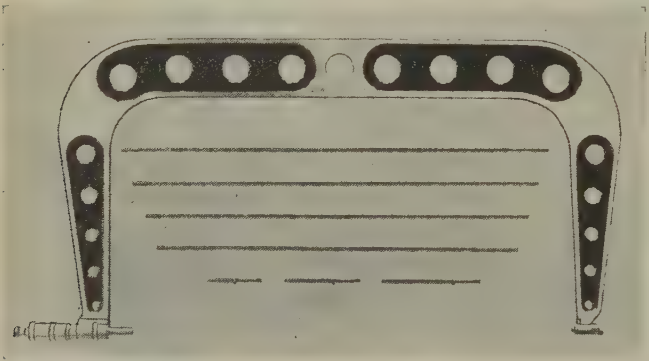


Turning, Wiring, and Burring Faces May Be Interchanged Conveniently

Micrometer Calipers with 4-In. Range

Three new micrometer calipers, the combined measuring capacity of which is equal to that of 12 ordinary micrometers of 1 in. range, have been added to the line of the Brown & Sharpe Mfg. Co., Providence.

The smallest of the three micrometers, designated as the No. 90, has a range from 12 to 16 in. The range of the next size, the No. 91, is from 16 to 20 in. and of the largest, the No. 92, from 20 to 24 in., by thousandths. The range of measurements of each tool is obtained by four interchangeable anvils of different lengths. The anvils may be changed conveniently and are held in place positively by a knurled nut. The anvil cannot revolve but remains in one position in accurate alinement with the spindle. Each anvil has means of adjustment for wear. Clamp rings are furnished for the micrometers, which are available also with metric graduations.



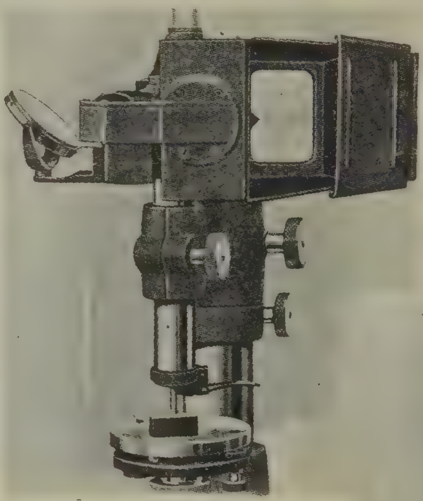
Anvils May Be Changed Conveniently and Have Adjustment for Wear. They are held in place positively by a knurled nut

New Optimeter Arranged to Facilitate Reading of Measurements

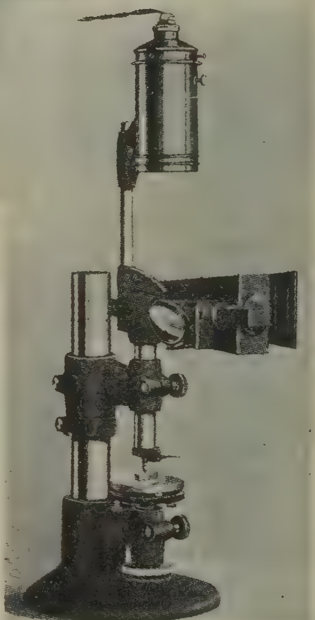
Means for reading the scale by both eyes, instead of through a microscope, is the principal feature of a projection Optimeter recently added to the Carl Zeiss line of optical measuring instruments, which are marketed in the United States by the George Scherr Co., 142 Liberty Street, New York. In this instrument the optical tube has been changed to permit a lamp holder and a screen attachment to be fitted to it. The image of the scale as it is formed in the ocular is projected through a set of prisms on to the screen, as shown in the accompanying illustration.

Reading of the measurements from the screen facilities using the instrument, and without impairing its accuracy in any way, because transfer of the image to the screen is obtained purely by optical means. Because of the greater convenience in reading the measurements the instrument is more adapted to mass inspection work than the previous model of the Optimeter. Application of the Optimeter tube to special fixtures may be made as conveniently as before, the tube and projector being a self-contained unit. Readings on the screen may now be conveniently observed by two or more persons at the same time.

Other improvements embodied in the new design are a table with a serrated instead of a solid surface, and increased range scale to plus and minus 0.005 in. The scale is graduated to 0.00005 in. as heretofore. The projector is also available for horizontal and inside Optimeters.



The Measurement-Reading Screen Is Shown at Left



The Scale May Now Be Read by Both Eyes Instead of Through a Microscope, as Before

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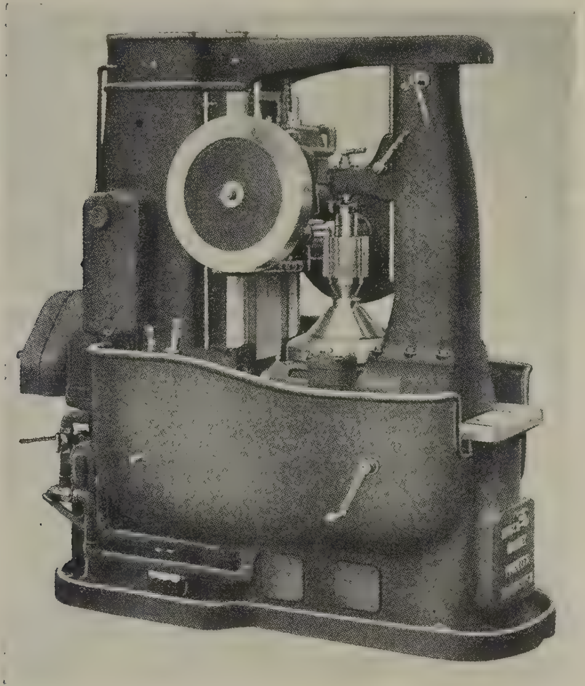
A large increase in the number of foreman training courses in practically all lines of industry is shown in a survey report issued by the Department of Manufacture of the Chamber of Commerce of the United States. The number of foremanship courses, the bulletin shows, has grown from 105 in 1925 to 933 in 1927. Most of the growth in foremanship courses last year was in the larger industrial States, the outstanding increases for the year having been Connecticut, Michigan and West Virginia. The machinery group, not including transportation equipment, has the largest number of courses, the survey shows. On the basis of the number of workers employed, however, the rubber products and chemicals and allied products groups are far in the lead.

Hobbing Machine for Manufacturing Operations

A hobbing machine designed and built by the Hermann Pfauter Co., Chemnitz, Germany, for high production work in automotive and other manufacturing plants, has been placed on the American market by the O. Zernickow Co., 15 Park Row, New York. The machine has capacity for chrome-nickel and other steel spur gears up to 12 in. in diameter, 5 diametral pitch. The maximum hobbing width is 8 in.

The general arrangement of the machine may be noted from the accompanying illustration. The main drive is by a directly coupled 8-hp. 1500-r.p.m. motor which is mounted on a bracket on the bed of the machine and is started and stopped from the operator's position. The hob drive is through spur and bevel gearing and a spline shaft to the hob saddle. An internal-tooth gear cut in one of the flywheels serves to drive the hob spindle. Hob speeds of 62, 89, 125 and 175 r.p.m. are obtainable through change gears.



Convenience of Operation Is a Feature: The machine is intended for quantity production of spur gears up to 12 in. in diameter

The hobbing head carries the adjustable hob spindle and the hob driving spindle, which are located one above the other. Each of these spindles carries a large flywheel at its outer end to equalize the torque on the hob spindle. The hobbing head is arranged to swivel 5 deg. each side of horizontal to suit the lead angle of the hob. The hobbing saddle slides on V-ways on the upright and is provided with taper strips for adjustment. The weight of the hobbing saddle is balanced by a counterweight, and the driving shaft is in tension. The dividing gear drive runs in an oil bath. It consists of a worm wheel and a worm which is adjustable both axially and radially.

Gears to be hobbed are mounted on a vertical arbor, which is supported by a horizontal arm and by the bed of the machine as shown, this inclosed rectangular construction being said to withstand stresses without distortion. The horizontal arm of the work support has a movable center. Interchangeable work arbors are provided so that one arbor may be loaded with gear blanks while another lot of blanks is being hobbed.

A number of feed changes, ranging in rate from 0.028 to 0.236 in., are obtainable, and changes may be made by means of a single lever while the machine is in operation. At the end of the cut the hobbing saddle is returned automatically at rapid rate to the starting position by means of a separate motor. Reversing positions for this saddle are set by movable stops. Rapid traverse of the saddle may also be effected by hand. A coolant system is provided.

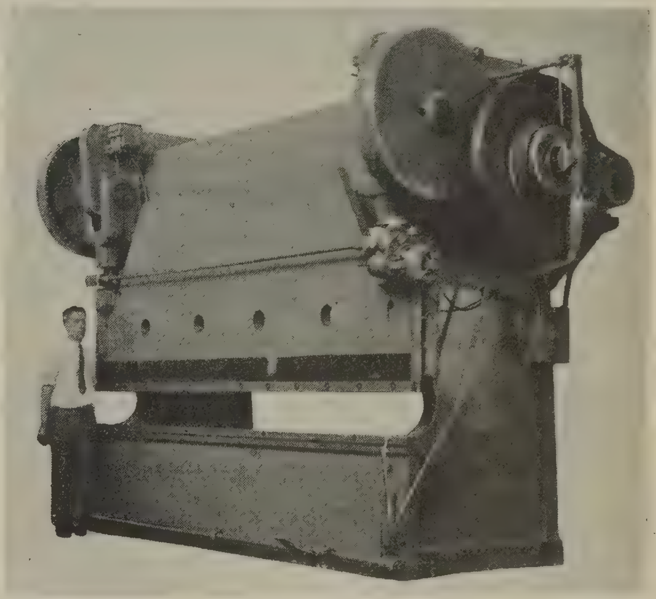
Simplicity of operation is a feature emphasized by the makers. Controls are within easy reach of the operator. After the stops for automatic travel of the hobbing saddle are set and the table is set for correct depth of tooth, the table carriage is locked in position on the bed by means of a single lever. Main shafts of the machine have ring oiling bearings, other important points being lubricated from a central source by means of a pump from which oil is pumped to a distributer which circulates oil through piping to various parts of the machine. The floor space occupied by the machine is 28 in. by 60 in., and the net weight is 5300 lb.

All-Steel Press Brakes With 4¼-In. Single-Plate Housings

Use of a single plate, 4¼-in. thick, for the housings, instead of the double-plate box construction previously employed, is a feature of a new series of all-steel press brakes placed on the market recently by the Cincinnati Shaper Co., Cincinnati.

One of the new machines, which are designated as the No. 120 series, is shown herewith. This unit has capacity for making right-angle bends at one stroke in steel plate ⅜ in. thick and 8 ft. long, over a 3-in. die opening, or in steel plate ¼ in. thick and 12 ft. long, over a 2-in. die opening, without overload.

It is stated that in previous models of these machines it was necessary to use two 2-in. plates, welded and riveted together, because of the difficulty in getting plates of the required size and thickness rolled flat enough for this type of construction. Perfectly flat plates up to 6-in. in thickness now being regularly available are said to have made possible the press brake with the single-plate 4¼-in. housings.



The Method of Mounting the Bed and the Use of a Divided Connecting Rod Are Features

The bed and ram plates are 3 in. thick. The bed extends below the floor line from 18 to 28 in., depending upon the length of the machine. Because of the method of mounting the bed, and the divided connecting rod, a patented feature, the loads are said to be carried directly up and down the center line of the housings, and to this is attributed practical elimination of deflection and greater capacity with the same factors of safety. Other features include automatic oiling, anti-friction bearings on high-speed shafts and in the mounting of the flywheel, disk clutch of special design, over-size brake drum, liberal depth of bed and ram plates, and screws of high carbon and high nickel steel, cut with buttress thread. A dovetail slot is planed along the length of the bed, both front and back, to receive gages or other fixturees. The ram is raised and lowered by means of an independent motor drive, which is standard equipment.

The machines are arranged for motor drive, and the motor is connected by Texrope drive to the flywheel. Standard lengths furnished in this series range from 6 ft. 6 in. between the housings, with a die surface of 8 ft., to 12 ft. 6 in. between the housings, with a die surface of 14 ft.

PROTEST REDUCED RATES

Pittsburgh District Steel Makers Object to Proposed Decrease in Chicago—New Orleans Freight Schedules

WASHINGTON, May 8.—A strong protest has been filed with the Interstate Commerce Commission by Pittsburgh district steel manufacturers, the Pittsburgh Chamber of Commerce, the Eastern Trunk Line railroads, the Baltimore Association of Commerce and other interests in the East, asking that the commission suspend tariffs filed by the Illinois Central Railroad establishing reduced rates, effective May 31, on iron and steel products from the Chicago district by way of New Orleans and the Redwood Line steamers to Pacific Coast ports. The proposed rates range from 56c. to 86c. per 100 lb., and would be a reduction of 8.5c. per 100 lb. By the schedules it is the plan of the Illinois Central to reduce its rate on this traffic from Chicago to New Orleans from 39.5c. to 31c.

The protestants declare that the schedules would set up discrimination against Eastern steel producers who ship to the Pacific Coast through Eastern seaboard ports by way of the Panama Canal and would deprive them of Pacific Coast business. It is also contended that the proposed rates would take traffic from the Eastern lines and put into effect a set of low rates over the Illinois Central that are not justified. Intimation is made that, should the reduced rates be allowed to become effective, reduced rates from the Pittsburgh and other Eastern districts would be demanded and a rate war for the steel business of the Pacific Coast be declared.

Reductions for Many Products

An idea of the proposed rates on various steel products is given in the following list, stated in cents per 100 lb. and covering carload shipments, mixed or straight, of 40,000 lb. per car, except in the instance of raw and semi-finished steel, which would be allowed a maximum of 50,000 lb.:

A rate of 56c.; tin and terne plate.

A rate of 61c.; ingots, billets, blooms, muck bars, wire rods in coils, band, bar and hoop steel, rods, slabs up to 6 in., strip steel, plates (not ship or boiler), plain or punched shapes and bars, boiler flues, pipes and tubes not over 12 in. in diameter and 35 ft. in length and plates and sheets No. 16 gage or thicker.

A rate of 66c.; bolts, nuts, rivets, washers, turnbuckles, chaplets, dowel pins, hoops and wire, spikes, staples, barbed, galvanized and painted wire, pipe fittings, couplings and valves.

A rate of 71c.; plates and sheets No. 17 gage or lighter.

A rate of 86c.; wire and wire goods in bundles, wire bands, fence steel, fencing wire and netting wire.

The Pacific ports of destination are Alameda, Los Angeles, Oakland and San Francisco.

The purpose of the Illinois Central schedules is declared to be to equalize Chicago with Pittsburgh and other Eastern points in rates on iron and steel to the Pacific Coast ports, although the schedules embrace other products as well. The proposed 31c. rate from Chicago to New Orleans is identical with the rate from Pittsburgh to Baltimore, while the rates from Pittsburgh to Philadelphia and New York are 32c. and 34c., respectively.

Pittsburgh Makers' Demands

The Pittsburgh Steel Co., in its protest, says that it feels that the Chicago-New Orleans rate should not be less than the domestic rate of 55c., pointing out that the Pittsburgh producers have to pay domestic rates to Atlantic Seaboard ports. The Pittsburgh-Des Moines Steel Co., Pittsburgh, after asking withdrawal of the proposed Illinois Central rates, declares that if this is not accomplished the rates from Pittsburgh, Youngstown and Cleveland to Baltimore should be reduced to a relative amount, that is on the basis of the same rate of 31c. from Chicago to New York, with the Pittsburgh rate 60 per cent of that rate. 18.5c., and the usual differentials under to Philadelphia and Baltimore of 2c. and 3c., respectively.

The Central Tube Co., Pittsburgh, opposed the tariff as being "vicious," and asked that it be suspended indefinitely. This company said that the proposed adjustment appeared to be a decided discrimination and a deliberate attempt to divert Pacific Coast business from the Pittsburgh district to other sections not so favorably situated. Similar protests were made by the Union Drawn Steel Co., the Page Steel & Wire Co. and other producers.

Position of Carriers

The Eastern Trunk Line carriers said that the proposed and similar rates, as made applicable from Chicago, are also to be applied as maxima at Ohio River crossings of the Illinois Central Railroad, under the recognized rate relationship policy of the Southern carriers, and will undoubtedly be made applicable also from Ohio River crossings as far east as Cincinnati, thereby unbalancing the relationship of commodities in Eastern territory to the serious embarrassment of the carriers serving them.

"The establishment of any rate from Chicago and other Illinois points by the use of subnormal or special rates to New Orleans as the basis for the inland proportion would force more easterly producers to demand protection by relative proportional rates from their shipping points to the North Atlantic seaboard in order to restore the now existing rail relationship of rates to the respective ports made with respect to rail distances," said the carriers' protest. "The necessity for protecting communities is most pressing, and disastrous and wholly unnecessary rate reductions would undoubtedly follow the effectiveness of the proposed rates, transferring to joint rail-and-water routes thus created the chaotic rate conditions which have for a long time characterized the intercoastal steamship port-to-port rate situation."

The Baltimore Association of Commerce declared that the establishment of the proposed rates would tend to attract traffic from Eastern seaboard points and from the routes through the port of Baltimore and thus injuriously affect the shipping of that port. Any appreciable loss of tonnage, it was said, would affect the prosperity of the intercoastal lines operating from Baltimore, contrary to the intent of the transportation act.

A point made generally by the railroads and other protestants also was that the Chicago-New Orleans rate now is lower, mileage considered, than the rates from Pittsburgh to Eastern ports. The distance from Pittsburgh to Baltimore is 312 miles, while from Chicago to New Orleans it is 921 miles.

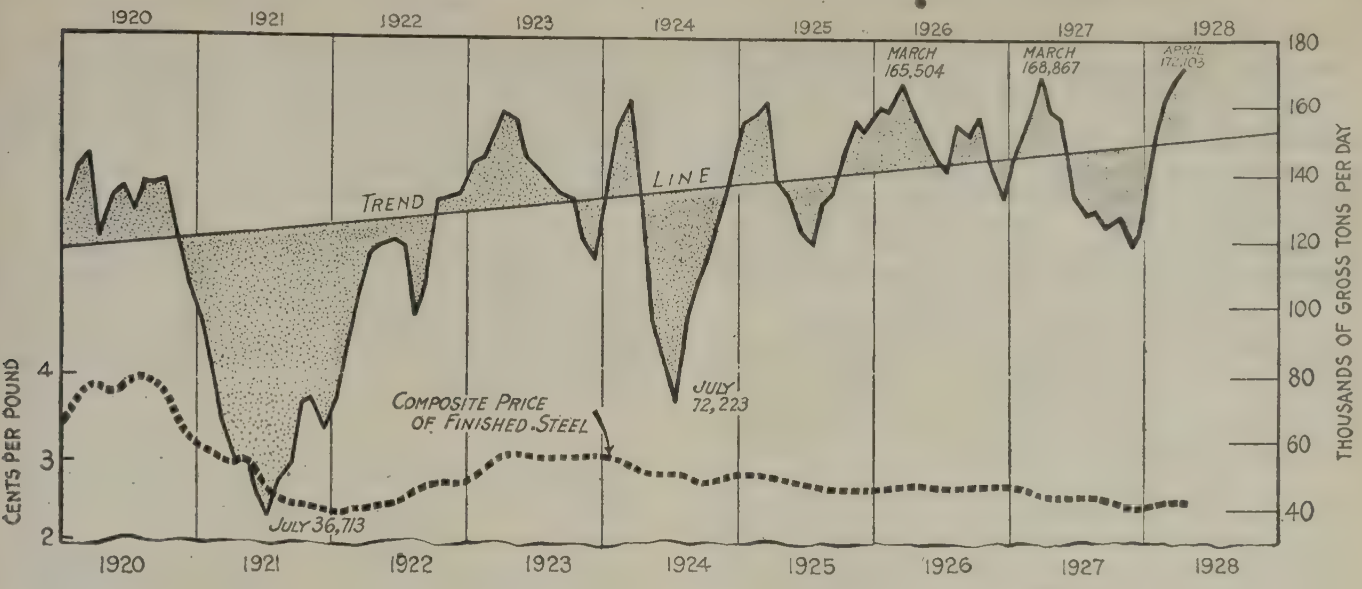
British Tin Plate Industry 200 Years Old

On April 26 the British tin plate industry celebrated its 200th anniversary. It was on that date 200 years ago that a method of rolling plates out of iron was discovered at Pontypool, South Wales. Prior to 1728 they had been beaten out with tilt-hammers, a very slow and laborious process which did not produce the smooth plates obtained by rolling. By 1776 works in Wales were exporting tin plates all over the world. Napoleon offered a prize in 1800 for a method of preserving food, and this was won by M. Appert.

Twelve years later Peter Durand, a London merchant, took out a patent for preserving food in tin "cannisters," which laid the foundation of the canning industry. It is estimated that 50,000,000 cans of food are consumed daily throughout the world.

To Push Intensively on Steel Frame House

The Steel Frame House Co., a subsidiary of the McClintic-Marshall Co., Pittsburgh, plans to distribute through its own representatives, who are to be located in the principal cities of the country. While there will be close cooperation with the branch offices of the parent company, the representatives of the subsidiary are to devote their entire time to the sale of the steel frame for housing and other uses to which it is adapted. Edward Moore, with offices at 39 Broadway, is New York representative of the company.


With a New High Daily Record for April, the Four Months Ingot Production This Year Is Nearly 600,000 Tons Ahead of the Same Period Last Year. Prices were slightly lower than in March

Record Ingot Production in April

Daily Output 2½ Per Cent Ahead of Previous High—The Four Months Period 3½ Per Cent in Excess of That of 1927

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in April was at a new high rate, being 172,103 tons a day (allowing 25 full working days in the month). In March, 1927, with 27 working days, the daily output, revised for the open-hearth and Bessemer and not including either crucible or electric steel ingots, was 167,973 tons. Thus the new figure tops the previous record by 2½ per cent. The original estimate for March, 1927, in which crucible and electric steel ingots were included, was 168,867 tons a day, as shown on the diagram.

So far this year, or through April, the output amounted to 16,847,000 tons, or 3½ per cent more than the production of the corresponding four months of 1927. The total for April was not so large as that for March, which had 27 working days, nor so large as March, 1927, which stands as the highest monthly output.

The compilations are based on returns from companies which, in 1927, produced 94.68 per cent of all the ingots made by the open-hearth and Bessemer processes.

Estimating production in April of electric and crucible steel ingots (no longer covered in the institute's monthly figures) at 1400 tons a day, the total April ingot output would appear to have been at the rate of about 173,500 tons for each working day. Details of the past 16 months are shown in the table.

Production of Steel Ingots*

(Gross Tons)

	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	Approximate Daily Output All Companies
Months 1928	Open-Hearth	Bessemer		
Jan.	3,280,247	498,746	3,991,332	153,513
Feb.	3,308,728	521,366	4,045,304	161,812
March ..	3,700,411	567,309	4,507,520	166,945
April ...	3,509,637	564,039	4,302,573	172,103
4 Months	13,799,023	2,151,460	16,846,729	163,560
1927				
Jan.	3,042,133	545,596	3,789,874	145,764
Feb.	3,043,492	565,226	3,812,046	158,835
March ..	3,702,660	590,709	4,535,272	167,973
April ...	3,341,750	565,440	4,127,335	158,744
4 Months	13,130,035	2,266,971	16,264,527	157,908
May	3,273,593	557,785	4,047,251	155,663
June ...	2,823,107	486,053	3,495,609	134,446
July	2,596,349	436,883	3,204,135	128,165
Aug. ...	2,806,347	505,596	3,498,549	129,576
Sept. ...	2,622,977	471,548	3,268,881	125,726
Oct.	2,643,562	495,845	3,316,292	127,550
Nov. ...	2,478,627	481,599	3,127,015	120,270
Dec.	2,557,955	448,154	3,175,484	122,134
Total..	34,932,552	6,150,434	43,397,743	139,543

*Excluding crucible and electric steel ingots.

Lake Superior Ore Shipments Small in April

Iron ore shipments from Lake Superior ports in April, this year, were only 5946 gross tons. The record this and last year has been as follows in gross tons:

Port	April, 1928	April, 1927
Escanaba	5,946	148,122
Marquette	....	59,831
Ashland	....	128,044
Superior	....	518,055
Duluth	....	546,506
Two Harbors	....	159,528
Total	5,946	1,560,086

The decrease in April, this year, has been 1,554,140 tons from April, 1927.

Decrease in Slab Zinc Output in 1927

WASHINGTON, May 8.—Production of slab zinc at zinc reduction plants in the United States in 1927 amounted to 635,300 net tons, valued at $81,439,000, the output decreasing 23,921 tons or nearly 4 per cent compared with 1926, according to the United States Bureau of Mines. The 1927 production consisted of 576,960 tons of primary metal made from domestic ore; 15,556 tons of primary metal made from Mexican ore and 42,784 tons of redistilled secondary metal. The States having the largest output of primary metal were: Oklahoma, 120,801 tons; Montana, 112,629 tons; Pennsylvania, 106,099 tons, and Illinois, 102,768 tons. The apparent consumption of primary zinc in 1927 amounted to 516,371 tons, a decrease of nearly 41,000 tons from that in 1926.

Having received a sufficient number of written acceptances of the recently revised "Simplified Practice Recommendation No. 51, Die Head Chasers" (for self-opening and adjustable die heads), the division of simplified practice of the Department of Commerce announces that the project is now in effect, as of April 1, subject to annual revision or reaffirmation by the industry.

Presents Bessemer Gold Medal to Charles M. Schwab

LONDON, ENGLAND, May 3.—In accepting the Bessemer Gold Medal presented today to him by the Iron and Steel Institute for distinguished merit in promoting the metallurgy of iron and steel, Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation, said he started his own career as a workman in the steel mills of Pittsburgh in 1879—the same year, curiously enough, in which the Royal Society admitted Sir Henry Bessemer as a Fellow, and the Government of Great Britain honored him with a knighthood.

"May I mention another coincidence," said he, "in connection with the Bessemer medal. The first American to receive this distinction was the famous Peter Cooper, one of the pioneers of American industry. And, oddly enough, you awarded the Bessemer medal to Peter Cooper in the year 1879.

"You have conferred this distinction upon four other great Americans—Abram S. Hewitt, John Fritz, Henry Marion Howe and Andrew Carnegie. I am proud beyond words to be the next to follow Mr. Carnegie among the Americans to be added to the distinguished British, French and other names which you have honored in this unique manner.

"It is interesting also to reflect that you conferred this distinction upon Mr. Carnegie in the same year, 1904, in which you also honored in the same manner Sir Robert Hadfield, whose name we know so well in America and who is still so intimately identified with the progress of the steel business."

[To the above names of Americans mentioned by Mr. Schwab as recipients of the Bessemer medal are to be added those of Alexander Lyman Holley, 1882, and Albert Sauveur, 1924.—EDITOR THE IRON AGE.]

National Machine Shop Meeting in September

A national machine shop practice meeting is to be held in Cincinnati, Sept. 24 to 27, by the machine shop division of the American Society of Mechanical Engineers. Tentative plans announced by L. C. Morrow, chairman of the division, are as follows: Members and guests will embark on a river steamer at noon on Monday, Sept. 24. The afternoon will be spent socially on the boat and after dinner the first technical session will be held. Sleeping accommodations will be provided on the boat. Tuesday morning will be spent in Ashland, Ky., inspecting the continuous sheet-rolling mill of the Armco plant. Tuesday afternoon will be spent socially on the boat. The second technical session will be held after dinner on the boat and passengers will arrive in Cincinnati on Wednesday morning. They will then adjourn to the Engineers Club or some other suitable headquarters, where the third technical session will be held. Wednesday afternoon will be devoted to plant visits in Cincinnati. A dinner will be held Wednesday night. All of Thursday will be devoted to plant visits around Cincinnati.

Two Years' Extension of Mechanical Puddling Experiments

The A. M. Byers Co., Pittsburgh, has secured a two-year extension of its option to buy the plant of the American Puddled Iron Co., Warren, Ohio. The original option was secured as of Nov. 1, 1926. At this plant the company has been developing the commercial possibilities of the Aston process of making wrought iron.

The Bridgeport Safety Emery Wheel Co., whose name was omitted from the list of companies published in the May 3 issue of THE IRON AGE which will exhibit at the convention of the American Foundrymen's Association in Philadelphia the week of May 14, will occupy booth No. 118 and will show its line of foundry grinders and sectional grinding wheels. The exhibit will be in charge of I. L. Burritt and W. M. Hyde.

Electrochemists to Discuss Corrosion of Lead Cable Sheath

At the spring meeting of the New York section of the American Electrochemical Society, to be held at the Chemists' Club, New York, on Friday evening, May 18, "The Corrosion of Lead Cable Sheath" will be the subject of a round table discussion. Dr. R. M. Burns, Bell Telephone Laboratories, will open the discussion with a talk on the characteristics of electrolytic, stray current and chemical corrosion of lead cable sheath and the resulting problems in underground cable maintenance. A general discussion will follow, probably participated in by representatives of the principal users and manufacturers of lead and lead alloy covered cables. The New York section invites all those interested in the subject to attend.

Technical Program for Steel Institute's May Meeting

For the thirty-third general meeting of the American Iron and Steel Institute, to be held at the Hotel Commodore, New York, Friday, May 25, the following technical program has been arranged:

"Basic Open-hearth Steel Practice," by Dr. G. B. Waterhouse, professor of metallurgy Massachusetts Institute of Technology, and consulting engineer and metallurgist, Cambridge, Mass.

"The Effect of Coal Segregation, Mixing and Heating upon the Quality of Metallurgical Coke," by F. F. Marquard, assistant general superintendent Carnegie Steel Co., Clairton, Pa.

"The Manufacture of Alloy Steels," by E. C. Smith, Central Alloy Steel Corporation, Massillon, Ohio.

"The First Iron Works in America—1645," by Howard Corning, Baker Library, Harvard University, Cambridge, Mass.

"Waste Heat Boilers," by R. H. Stevens, chief engineer Cambria Plant, Bethlehem Steel Corporation, Johnstown, Pa.

"The Trend in Ingot Mold Design," by R. H. Watson, general superintendent Homestead Works, Carnegie Steel Co., Munhall, Pa.

"A Modern Steel Works Power and Blowing Plant," by Wilfred Sykes, assistant general manager Inland Steel Co., Chicago.

These papers will be presented at the morning and afternoon sessions as usual, followed by the banquet in the evening.

National Oil and Gas Power Meeting in Mid-June

The first national meeting of the oil and gas power division of the American Society of Mechanical Engineers will be held June 14, 15 and 16 at State College, Pa., in conjunction with the second annual oil power conference of Pennsylvania State College. There will be an exhibition of engines and accessories, a banquet on the evening of June 15, at which Charles M. Schwab, who is a trustee of Pennsylvania State College, and George Heath, of Carels Diesel & Steam Engines, Ltd., London, will speak and a technical program including papers on the following subjects:

Economic field for small and medium-size Diesel engines, by R. M. Reagle, vice-president Bessemer Gas Engine Co. Economic field for large Diesel engines, by E. B. Pollister, general manager Busch-Sulzer Brothers Diesel Engine Co. Diesel fuel oil, by G. H. Michler, Standard Oil Co. of New York.

Better teamwork among all classes of business as the most effective means of maintaining local and national prosperity will be the central theme of the sixteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington, May 7 to 11.

The semi-annual meeting of the American Gear Manufacturers Association will be held Oct. 11, 12, and 13, at the Statler Hotel, Buffalo, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, is secretary.

German Coal Strike in Prospect

Consumers Replenish Stocks Expecting Suspension—Other European Markets Active—Welsh Tin Plate Mills Well Booked

(*By Cable*)

LONDON, ENGLAND, May 7.

PIG iron is quiet but the Cleveland furnace output is being absorbed by current demand. Makers are still unable to regain their export markets, but the domestic market, especially Scottish, is now more in their hands. Hematite is dull, but output has been restricted and stocks are diminishing gradually.

Ferromanganese has been advanced 5s. ($1.22) per ton to domestic consumers, although demand is still slack. Foreign ore is dull, but the Bilbao Rubio price is firm as a result of the continuance of the Swedish strike.

Finished steel business is quiet, except for domestic construction and engineering material. Export trade is quiet in plates and heavy steel.

Welsh sheet bar makers have sold heavily and advanced prices 2s. 6d. (61c.) per ton. Tin plate demand is exceptionally heavy with all quarters buying and inquiring and mills well sold at normal capacity. Prices are strong especially for prompt shipment, which is difficult to obtain at 18s. 7½d. ($4.54) per base box, f.o.b. works port. Forward sales have been recorded at 18s. 6d. ($4.51) per base box. It is reported that American and German interests are negotiating for the regulation of export markets and prices and that probably Welsh mills will be invited to join.

Galvanized sheets continue dull. Japan has bought some small lots of thin-gage black sheets but the market is otherwise quiet.

The Continental iron and steel market is strong and prices are advancing. Large sales of merchant bars to Japan and Argentina are reported by Continental sellers, but little business is passing through the hands of British traders.

Belgium is reported to be asking for an increased production quota at the next meeting of the International Steel Cartel. French production in March was 856,000 tons of pig iron, a record, and 804,000 tons of steel ingots. At the end of March there were 149 furnaces in blast.

GERMANY FACES COAL STRIKE

Coal Operators Claim Losses Even at Present Wage Scale—Steel Mills Protest Higher Coal Prices

BERLIN, GERMANY, April 20.—The immediate future of the iron and steel industry in Germany depends to a great extent on the result of a dispute over wages, working hours and prices in the Ruhr coal mines. A week ago, following arbitration, a decision was rendered that all wages in the coal industry were to be increased 8 per cent. The working day, both for underground workers and surface labor, was fixed at 8 hr. This compares with the present working day for underground workers of 7 hr., to which is added an extra hour of overtime. The miners had demanded a wage increase of 1.50 m. per shift.

The coal operators rejected the decision of the arbitration board, claiming that it would increase the cost of production by about 0.75 m. per ton, and threatened to suspend operation at many mines if the Government sought to enforce the decision. At the same time an official commission, headed by Professor Schmalenbach, which had been investigating the financial condition of the German coal industry, reported that the average cost of coal production is 15.62 m. ($3.67) per ton, while the average yield from sales of coal by the producers is only 14.37 m. ($3.44) per ton. A minority report of the commission, submitted by Professor Bade, estimates the loss per ton at only 0.36 m. (8.6c.). The difference of opinion was the result of different methods of figuring depreciation and other costs. When the profits from production of coal by-products are deducted from the losses on coal, the final loss, according to the majority report, is only 0.27 m. (6.4c.) per ton. On the other hand, the minority re-

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.	to £0 17¾s.	$4.27	to $4.33
Bilbao Rubio ore*..	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 15	to £3 15½s.	18.27	to $18.39
East Coast mixed...	3 9	to 3 10	16.81	to 17.05
East Coast hematite.	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese ...	13 15		66.97	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 17½		28.61	
Tin plate, base box.	0 18½	to 0 18⅓	4.51	to 5.02
Black sheets, Japanese specifications.	13 5		64.53	
			C. per Lb.	
Ship plates.........	7 12½	to 8 2½	1.66	to 1.77
Boiler plates........	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 0	to 13 2½	2.82	to 2.85
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.		$15.34	
France	3 3		15.34	
Luxemburg	3 3		15.34	
Basic pig iron (nom.)				
Belgium	3 0	to £3 1s.	14.61	to $14.85
France	3 0	to 3 1	14.61	to 14.85
Luxemburg	3 0	to 3 1	14.61	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 12½	to 4 13	22.53	to 22.65
France	4 12½	to 4 13	22.53	to 22.65
Merchant bars:			C. per Lb.	
Belgium	5 8	to 5 8½	1.19	to 1.20
France	5 8	to 5 8½	1.19	to 1.20
Luxemburg	5 8	to 5 8½	1.19	to 1.20
Joists (beams):				
Belgium	4 16	to 4 17	1.06	to 1.07
France	4 16	to 4 17	1.06	to 1.07
Luxemburg	4 16	to 4 17	1.06	to 1.07
Angles:				
Belgium	5 6		1.17	
⅛-in. plate:				
Belgium (a)	6 10	to 6 11	1.43	to 1.44
Germany (a)	6 10	to 6 11	1.43	to 1.44
3/16-in. ship plate:				
Belgium	6 5	to 6 6	1.38	to 1.39
Luxemburg	6 5	to 6 6	1.38	to 1.39
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

port indicates a final profit of 0.62 m. (14.8c.) per ton.

Even from the viewpoint of the minority report, which shows some profit for the producers, the coal situation is unsatisfactory. Competition from Great Britain, Poland and even Holland is growing more severe, and the losses from competing with these foreign producers must be borne by the small profits in other markets. Sales of coal in the non-competitive districts of Germany (sections where foreign coal cannot compete) are steadily declining. The average daily sales of the coal syndicate have declined from 271,000 tons in January to 255,000 tons in March, and the average selling price per ton has also decreased.

The Ruhr coal mines have requested permission to increase domestic prices, but the request was rejected by the Federal Coal Council and the Ministry of Industry. It has been calculated that if the unprofitable export trade is to be maintained at the present level the coal syndicate must increase its assessment on members from 1.38 m. (33c.) per ton to 1.80 m. (43c.). The other alternative is to decrease sales by about 4,000,000 tons a year.

The steel industry has protested against the proposal to advance domestic coal prices and the decision calling for higher wages. It is declared by the steel producers that higher coal prices would increase costs of rolled materials by about 2 m. (48c.) per ton and, in the present condition of keen competition, might result in suspension of operations by many steel plants. Should the wage decision not be enforced, a general coal strike is expected.

GERMAN STEEL OUTPUT HIGH

Production in Excess of Last Year—Prices Firm —Steel Makers Seek Higher Tariff

Berlin, Germany, April 20.—Production of both pig iron and steel continues large. In the first three months of the year output exceeded the large total of the corresponding period in 1927. In the first quarter of this year 3,473,436 metric tons of pig iron and 4,212,940 tons of steel were produced, compared with 3,115,800 tons of pig iron and 3,958,227 tons of steel in the first quarter of 1927.

At the meetings of the Stahlwerksverband, the A-Products Syndicate (semi-finished and railroad materials) and the Steel Bar Syndicate, it was reported that specifications were coming out freely, but that the Railroads Corporation was still rather inactive in purchasing this year's requirements. The building trades are improving slowly, largely because of credit difficulties.

Most mills are booked with sufficient business for the next two or three months and are seeking to increase their exports. Efforts to advance export prices, so as to reduce the present wide margin between the domestic and foreign quotations, have not been very successful. Business in steel bars for export has been active, and foreign demand for other products shows considerable improvement.

The subject of tariff protection is being discussed by various industries and recently Doctor Reichert, secretary-general of the Iron and Steel Industries Association, stated that he strongly favored retention of the present duties. He described the present combination of tariff protection and cartels as the only means by which the German domestic market can be protected from foreign competition. There is opposition to protection in the metal-consuming industries, and "Avi," the association of these consumers, has made a declaration against the protective policy. It points out that, at best, a higher tariff could only slightly increase the domestic sales of iron and steel, including machinery, whereas it would result in a serious loss of export business through foreign reprisals. The association contends that the greater part of present export business in finished iron and steel products would be threatened. Throughout its report the association stands firmly for realization of the lower tariff resolutions of the Geneva conference of 1927. The same view is expressed by the association of consumers of sheets and tin plate.

There has been further discussion of the possibility of establishing a syndicate to control the domestic thin sheet market. Several of the larger sheet mills, however, are opposed to such a move, and price concessions continue numerous. The Bandeisen Vereinigung (band syndicate) has established a study corporation, similar to the company created by the wire industry for experimental production.

A corporation has been formed for the purpose of resuming mining operations in the Saxon-Erzegebirge. These ore deposits cover about 100 sq. km., and recent prospecting indicates that a small section of the area contains about 7,000,000 tons of magnetic iron ore and a large quantity of zinc. It is planned to erect an electric smelting plant.

JAPANESE MARKET IMPROVING

Banking Problems Still Unsolved—Black Sheet Imports Larger—Semi-Finished Capacity Increased

GENERAL business conditions in Japan during March showed a distinct improvement over February, and April returns are expected to show further improvement, says the latest monthly report of A. Cameron & Co., importers, Kobe. The report calls attention to the growing dissatisfaction of labor and says that certain legislative reforms are absolutely necessary.

Referring to the financial situation, the report says: "The Minister of Finance is still grappling seriously with the bank situation, insisting that any closed bank which is to be merged with other banks must write off all bad and doubtful debts and therefore merge in a solvent state. It has been pointed out before that there is an opinion that there are far too many small banks, which are usually managed or controlled by inexperienced young men. The five chief banks have deposits exceeding the total amount of all other commercial banks together. Such commercial banks number 1276. At the close of 1927, all commercial banks had, according to official statistics, deposits of yen 5,461,000,000, of which the larger banks, to the number of 13, held yen 4,403,000,000, or about 80 per cent of the total of all clearing house banks."

Black Sheet Imports Increase

Imports of black sheets during February at Kobe, Osaka and Yokohama totaled 11,745 tons, a gain of 1800 tons over the previous month and an increase of 2672 tons over February, 1927. Arrivals by countries were as follows: Great Britain, 8350 tons; United States, 2446 tons; Germany, 878 tons; Belgium, 48 tons; all others, 23 tons. These shipments were mostly to speculators who had purchased late last year in anticipation of an increase in the tariff, which, however, did not materialize. Consequently, there is an excessive stock in the market, which is preventing any advance in price. Prices of light-gage black sheets during February were unchanged at 72 sen (34.06c.) per sheet for British material, 73 sen (35.50c.) for American and 70½ to 71 sen (33.35c. to 33.59c.) for Kawasaki dockyard sheets. Consumption of sheets is fairly active and, as warmer weather approaches, inquiries from China are increasing, and it is expected that a good demand from China for galvanized sheets will stimulate the black sheet market.

Kawasaki Buys Mill Equipment

The Kawasaki Dockyard Co. is reported to have bought yen 800,000 ($378,480) worth of machinery from Friedrich Krupp A. G., Essen, Germany, for rolling sheet bars. According to the report, the new machinery will produce 200,000 tons of bars annually, and the installation will be completed by November of this year. This additional capacity will bring the total for the works to 320,000 tons of sheet bars a year.

Statistics compiled by A. Cameron & Co. show a total Japanese capacity in black sheets of 253,000 tons, of which the Kawasaki Dockyard Co. has capacity for 200,000 tons of Nos. 20 to 30½ gage, the Osaka Teppan Seizo Kaisha, Ltd., Tokuyama, 42,000 tons of Nos. 16 to 30½ gage and the Nihon Kogyo Setetsu Kaisha, Yatsuya, 10,000 tons of Nos. 16 to 30½ gage. Of the total capacity, Nos. 10 to 13 gage are estimated at 170,000 tons.

Output of tin plate by the Yawata Steel Works in February declined considerably, resulting in an improvement of the tin plate market in March. It seems to be the consensus of opinion that the demand for tin plate will steadily increase during the next few months and the market will be quite active. Tin plate prices have been about yen 12.80 ($6.05) per 100-lb. base box for American material and yen 12 ($5.68) per 100-lb. base box for British.

LOW PRICES ON COTTON TIES

Orders Taken Here at 12c. a Bundle Under Domestic Market—Japanese Rail Orders Go to Germany

NEW YORK, May 8.—Importers of European steel report an advance of about 50c. per ton in prices during the past week, so that Thomas grade steel bars are quoted at about 1.75c. per lb., base. There is a moderate demand for structural material, but most of the business being closed is in sales for prompt delivery from arriving steamer.

With the opening of the cotton tie market by American mills at $1.25 per bundle, importers of German, Belgian and British cotton ties found that they had been selling at an unnecessarily low level, most orders for imported ties having been closed at about $1.13 per bundle, except for the British product, said to have been offered by the Barrow Hematite Steel Co., Ltd., which was about 7c. a bundle higher. Belgian ties sold at prices ranging from as low as $1.05 to as high as $1.10 per bundle. Importers estimate that 200,000 to 300,000 ties have been sold for delivery from Europe this season.

Far Eastern business continues rather inactive. Recent orders for rails placed by Japanese railroads have gone to European mills. Two miles of 100-lb. girder rails and one mile of 94-lb. grooved rails were awarded to a German export agency in Japan for execution by the Vereinigte Stahlwerke A.G., Düsseldorf, the leading German steel producer.

Japanese purchases of light-gage black sheets are still being made from British mills or the principal domestic maker, the Kawasaki Dockyard Co. The latest British quotation is understood to be about £14 18s. ($72.57) per ton, c.i.f. Japan, and the price of the Kawasaki Dockyard Co. is equivalent to about $73.25 per ton, c.i.f. Japanese port.

On a tonnage of 7 miles of 30-lb. rails inquired for by the South Manchuria Railway Co., the total German quotation per mile, including accessories, is understood to have been yen 3545 ($1,677.14), which was yen 490 ($231.82) per mile lower than the lowest American bid. The German bid per ton, including accessories, was $33.11, c.i.f. Japanese port.

Production of Steel Ingots and Castings in 1927

THE compilations of production of steel ingots and castings for 1927 have been issued by the American Iron and Steel Institute and are covered in the accompanying tables.

The total output of ingots and castings showed a falling off of 6.95 per cent from 1926. The drop in ingots was 6.73 per cent and that in castings, 14.7 per cent.

The production of electric steel ingots and castings made a new record, being 666,087 tons, compared with the previous high in 1926 of 651,723. There was a decided jump in the output of electric steel ingots and a sharp drop in the output of electric steel castings, but the total, as stated, was a record. The tonnage of castings still remained the highest for any year, except the record of 1926, from which it showed a drop of 9.5 per cent. While there was an increase in the output of electric steel ingots over 1926, the record output of electric steel ingots was in 1918.

The falling off in the production of alloy castings and ingots was in ingots. The reduction was 8 per cent. In the case of castings alone, the production of 145,844 tons in 1927 was only 257 tons less than the output of 1926.

The production of duplex ingots and castings showed a sharp drop of nearly 22.5 per cent from the output of 1926. The figure of 1927 (2,184,674 tons), compares with 2,666,110 tons, the average of the preceding four years.

Production of Steel Ingots and Castings by Processes

Years	Open-hearth			Bessemer	Crucible	Electric	Miscellaneous	Total Gross Tons
	Basic	Acid	Total					
1913	20,344,626	1,255,305	21,599,931	9,545,706	121,226	30,180	3,831	31,300,874
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	......	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	......	44,943,696
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	......	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	......	45,393,524
1926	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	......	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	......	44,935,185

Production of Steel Ingots

1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	587	30,280,130
1914	15,936,985	633,382	16,570,367	6,154,964	78,683	15,458	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,348	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,048	302	41,401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219	43,051,022
1919	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795
1920	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298	40,881,392
1921	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317	19,224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	......	34,568,418
1923	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	......	43,485,665
1924	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	......	36,811,157
1925	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	......	44,140,738
1926	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	......	46,936,205
1927	36,750,387	493,653	37,244,040	6,153,703	7,696	371,278	......	43,776,717

Production of Steel Castings

1913	460,161	450,055	910,216	80,506	17,571	9,207	3,244	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	......	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	......	1,458,031
1924	456,518	402,901	859,419	53,437	1,377	206,549	......	1,120,782
1925	455,282	462,303	917,585	53,834	1,833	279,534	......	1,252,786
1926	480,627	505,379	986,006	43,066	2,041	326,445	......	1,357,558
1927	393,881	430,414	824,295	38,024	1,340	294,809	......	1,158,468

Production of Alloy Steel Ingots and Castings

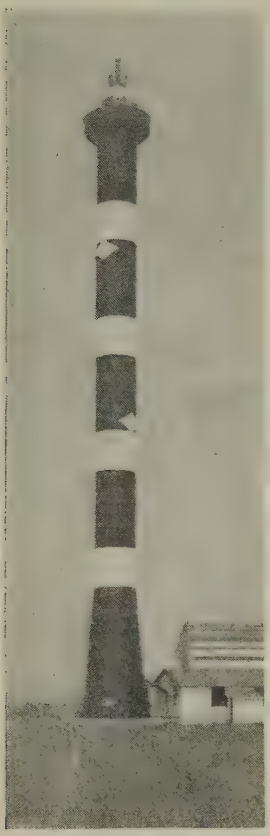
Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1914	577,107	69,846	646,953	1921	769,293	40,255	809,548
1915	923,251	97,896	1,021,147	1922	1,614,392	59,104	1,673,496
1916	1,306,157	56,458	1,362,615	1923	2,014,269	92,220	2,106,489
1917	1,576,806	67,529	1,644,335	1924	1,940,461	85,948	2,026,409
1918	1,721,367	66,485	1,787,852	1925	2,320,390	112,583	2,432,973
1919	1,435,816	45,372	1,481,188	1926	2,317,313	146,101	2,463,414
1920	1,591,939	68,353	1,660,292	1927	2,120,595	145,844	2,266,439

Production of Alloy Steel Ingots and Castings by Processes, Gross Tons, 1927

Processes	Ingots	Castings	Total
Open-hearth steel—basic	1,716,296	26,470	1,742,766
Open-hearth steel—acid	53,320	49,281	102,601
Bessemer steel	63,430	10,664	74,094
Crucible steel	3,189	272	3,461
Electric steel	284,360	59,157	343,517
Total.....Gross tons.	2,120,595	145,844	2,266,439

STEEL MOORING MAST

Sheathed in Sheet Steel and Equipped with Electric Elevator



THE United States Army Air Corps has constructed at Scott Field, nine miles from Belleville, Ill.; a mooring tower for dirigibles which is the first one of its kind in this country. It is made of sheet steel and an angle iron frame and is approximately 168 ft. high. At the base it is 18 ft. in diameter, but tapers within a short distance from the bottom to 11 ft. Near the top of the tower is an observation platform 25 ft. in diameter.

The tower is anchored to a concrete foundation by 24 anchor bolts. The top of the tower may sway 3 to 4 in., as when under wind pressure or the pull of the dirigible.

Within the tower is a Warner geared two-speed alternating current switch controlled elevator, manufactured and installed by the Warner Elevator Mfg. Co., Cincinnati. The elevator travels a distance of 134 ft. and has a capacity of 2000 lb. at 250 ft. per min. The elevator is used for numerous purposes, such as transporting repair parts and crews to dirigibles and carrying the light tender, who takes care of the obstacle lights on the tower. These lights are placed approximately every 25 ft. on the four sides of the tower. For servicing the lights, the elevator cab has a special hinged door in the rear.

In a small frame building at the foot of the tower is a windlass from which a cable passes up through the center of the tower into a tubing leading to a metal cup. It is into the metal cup that the metal nose of the dirigible fits when it is moored.

Within a short time the new tower is to be tested and if it proves as satisfactory as anticipated, other towers will be built at various points throughout the country. The tower was fabricated and erected by the Pittsburgh-Des Moines Steel Co.

Aluminum Output Expanded in 1927 —Imports Declined

WASHINGTON, May 8.—Despite curtailed production of automobiles in 1927, the use of aluminum and high-strength aluminum alloys was large, particularly for pistons and reciprocating parts of automotive engines, according to a statement prepared by J. M. Hill, United States Bureau of Mines, who places the value of new aluminum produced in the United States last year at $39,266,000, an increase of 4 per cent as compared with 1926. The principal producing plant is at Massena, N. Y., where approximately half of the metal made in the United States was recovered. Other works are at Niagara Falls, N. Y.; Alcoa, Tenn., and Badin (Whitey), N. C. Control dams on the Yadkin and Little Tennessee rivers in North Carolina were completed, thus assuring continuous power for the Badin and Alcoa plants of the Aluminum Co. of America.

Use of aluminum for collapsible tubes for pastes, greases, etc., according to the statement, is relatively new but growing. More aluminum is being used in other lines, such as in the manufacture of furniture, airplanes, railroad and street cars, and motor buses.

Imports of aluminum metal, scrap and alloys in 1927 were 4 per cent less in quantity than in 1926. They amounted to 72,188,518 lb. in metal, scrap and alloys; 400,322 lb. in plates, sheets, bars, etc., and 142,453 lb. in hollow ware.

Exports of aluminum ingots, scrap and alloys in 1927 increased 501 per cent in quantity over 1926, amounting to 3,535,085 lb. as against 586,749 lb.; exports of plates, sheets, bars, strips and rods increased 56 per cent to 10,997,475 lb., compared with 7,047,422 lb.; exports of tubes, moldings, castings and other shapes decreased 28 per cent to 1,529,615 lb. as against 2,115,274 lb. in 1926.

Coal and Coke Production in April

Output of bituminous coal in April is estimated by the United States Bureau of Mines at 32,200,000 net tons. This is a sharp reduction from the March output of 43,955,000 tons, and is below the figure of April, 1927, at 34,674,000 tons. Anthracite production, on the other hand, at 6,940,000 tons in April, showed a marked increase over the March output of 5,497,000 tons. It was, however, below that of April, 1927, which was 7,127,000 tons.

Beehive coke production has fallen to a very low figure. The April output is placed at 337,000 tons, against 449,000 tons in March. In April, 1927, it was 779,000 tons. It should be noted that April, 1928, had one working day less than April, 1927, and about two days less than March, 1928.

Investments Abroad Promote Exports

(*Concluded from page* 1309)

raw materials is certain to grow, and similar increases may reasonably be expected in the expenditures of our tourists and foreign residents and in immigrant remittances.

Balancing Exports and Imports

We arrive, therefore, at this analysis: Our export trade must be encouraged and increased in every practical way up to the point where we do not invite reprisals from our foreign competitors in both our domestic and our logical export markets, at excessively low prices, based on their starvation wages. We must consider, in many lines, our higher costs, despite the counterbalance of greater efficiency through expert methods and mass production.

On the other hand, if there occurs any serious diminution in the export of American investment capital, we must continue more largely to import, to whatever extent may be necessary, articles of luxury, raw materials and other necessities for our American industry, to the end that the aggregate may counterbalance our increased exports of merchandise. Irrespective of the problematical ultimate payment of all the war debts and adjustment of reparations, we must continue for some time generously to loan our surplus investment funds abroad, in order to complete the resuscitation of Europe and expansion of industry alike for our competitors and customers there, that their prosperity may increase, and that Europe in turn may resume its investments in the consuming countries to the same extent as before the war. This combined investment of the surplus wealth of the major countries can only produce an ever increasing exchange of exports to and imports from the minor nations, whose assets will continue to expand and whose earnings will provide the means to pay the interest on their liabilities.

Mining and industrial electric locomotives shipped in the first quarter of 1928 numbered 188, valued at $843,011, according to the Department of Commerce. This value was the lowest in two years, and the number was less than the 173, valued at $866,106, shipped in the last quarter of 1927. In the first quarter of 1927 shipments included 283 units, valued at $1,372,225.

FABRICATED STRUCTURAL STEEL

Awards of 24,700 Tons—25,200 Tons in New Work

FALLING below the average of recent weeks, fabricated structural awards reported during the last seven days amounted to slightly less than 24,700 tons. Of this total, 3000 tons was for a bridge for the Missouri Pacific Railroad and 9000 tons for miscellaneous jobs in New York. New projects amounted to 25,200 tons, the largest being a court house at Denver, Colo., which will require 3600 tons. Awards follow:

Boston, 200 tons, Thompson Spa building, to Palmer Steel Co.

East Boston, 250 tons, theater, to A. L. Smith Iron Works.

Fall River, Mass., 475 tons, office building, to Providence Steel & Iron Co.

Leominster, Mass., 150 tons, theater, to Eastern Bridge & Structural Co.

Pawtucket, R. I., 250 tons, power house for Blackstone Valley Gas & Electric Co., to New England Structural Co.

New York, 10,500 tons, reported to the Structural Steel Board of Trade; 9000 tons in the following awards not previously reported: Storage warehouse on White Plains Avenue, subway station on Myrtle Avenue, Brooklyn, Cox Bakery in Jamaica and Eleto warehouse at Thirty-eighth Street and First Avenue, to McClintic-Marshall Co.; column cores for building at 305 East Forty-sixth Street, warehouse for New York Dock Co. at Furman and Joralemon Streets, Brooklyn, and Film Center building at Ninth Avenue, Forty-fourth and Forty-fifth Streets, to Levering & Garrigues Co.; garage and service station at Hempstead, L. I., to Lehigh Structural Steel Co.; recreation building for Temple Emanu-El at Port Richmond, S. I., to Eidlitz & Ross; Explorers' Club at 544 Cathedral Parkway, Flatbush Boys' Club at 2241 Bedford Avenue, Brooklyn, and Tilden Theater at Flatbush and Tilden Avenues, Brooklyn, to Hedden Iron Construction Co.; 10-story loft building at 149th Street and Park Avenue, commercial building at 241st Street and Broadway, 15-story loft building at 253 West Twenty-seventh Street, gymnasium for Hebrew Orphan Asylum at 138th Street and Amsterdam Avenue and Queensborough Library, Jamaica, to Harris Structural Steel Co.

New York, 475 tons, apartment building at 417 East Fifty-first Street, to Easton Structural Steel Co.

Albany, N. Y., 1000 tons, eight scows for New York Division of Canals and Waterways, to Midland Barge Co., Midland, Pa.

Elmira, N. Y., 590 tons including 120-ton junior beams, Mark Twain Hotel, to Jones & Laughlin Steel Corporation.

Philadelphia, 200 tons, bridge arch centers; awarded by Vare Construction Co., to Belmont Iron Works.

Reading Railroad, 175 tons, bridge, to Shoemaker Bridge Co.

Wilmington, Del., 850 tons, North Market Street bridge, to Phoenix Bridge Co.

Pittsburgh, 1000 tons, Allegheny Steam Heating Co. unit, to Jones & Laughlin Steel Corporation.

Pittsburgh, 465 tons, Irene Kaufmann Settlement House extension, to American Bridge Co.

Dayton, Ohio, 150 tons, Y. M. C. A. building, to Massillon Bridge & Structural Co.

Defiance, Ohio, 100 tons, high school, to Massillon Bridge & Structural Co.

Cincinnati, 260 tons, St. Gregory's Seminary, to L. Schreiber & Sons Co.

Memphis, Tenn., 625 tons, five sand barges for Mississippi River Commission, to American Bridge Co.

Birmingham, 1800 tons, car underframes for St. Louis-San Francisco Railway, to Virginia Bridge & Iron Co.

Birmingham, 110 tons, garage at Ensley for Hyatt Phillips Auto Co., to Ingalls Iron Works Co.

Flomaton, Ala., 120 tons, plant for Roquemore Gravel Co., to Ingalls Iron Works Co.

Montgomery, Ala., 150 tons, McGough garage, to Ingalls Iron Works Co.

Detroit, 175 tons, building for American Brass Co., to Pittsburgh Bridge Co.

Chicago, 700 tons, Temple Sholem, to A. Bolter's Sons, local; previously reported to the Midland Structural Steel Co.

Chicago, 250 tons, building for the Link-Belt Co., to Mississippi Valley Structural Steel Co.

Chicago, 650 tons, approach to Crawford Avenue bridge, to unnamed bidder.

Chicago, 500 tons, two apartment buildings, to Duffin Iron Co., local.

Little Rock, Ark., 3000 tons, bridge for Missouri Pacific Railroad, to American Bridge Co.

Sacramento, Cal., 950 tons, bridge over San Joaquin River at Herndon, to United States Steel Products Co.

Oakland, Cal., 380 tons, warehouse for Port Commission, to California Steel Co.

San Francisco, 110 tons, apartment at Fillmore and Washington Streets, to Golden Gate Iron Works.

Appletree, Wash., 155 tons, motor sheds for Great Northern Railway, to Hofius Steel & Equipment Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of New Hampshire, 200 tons, highway bridges.

Boston, 1500 tons, Charles H. Tenney Co. office building.

Biddeford, Me., 800 tons, Boston & Maine railroad bridge.

Lowell, Mass., 700 tons, Boston & Maine railroad bridge.

Holyoke, Mass., 400 tons, Boston & Maine railroad bridge.

Bristol, N. H., 140 tons, bridge.

Piedmont, N. Y., 500 tons, Standard Trap Rock Co. plant.

New York Central Railroad, 2000 tons, bridges.

State of New York, 200 tons, bridges for State Highway Commission; bids May 12.

Newark, N. J., 400 tons, manufacturing building; Walter Kidde & Co., engineers.

Philadelphia, 2000 tons, Y. M. C. A. building.

Chesapeake & Ohio Railway, 300 tons, bridges.

Mansfield, Ohio, 400 tons, Farmers National Bank building.

Dayton, Ohio, 725 tons, four hangars at Wright flying field.

Big Four Railroad, 260 tons, bridges.

Michigan Central Railroad, 450 tons, bridges.

Flint, Mich., 500 tons, store building for Kresge Co.

State of Michigan, 200 tons, bridge work for State Highway Department.

South Bend, Ind., 1000 tons, New York Central station.

Chicago, 5000 tons, reconstruction of Fine Arts Building; previously reported as 2000 tons.

Glenview, Ill., 2500 tons, race track grandstand.

Portage, Wis., 160 tons, Dewitt Street bridge; bids May 15.

Milwaukee, 300 tons, new Kinnickinnic River span at Lincoln Avenue; bids May 15.

St. Louis, 1000 tons, building for Swift & Co.

Memphis, Tenn., 250 tons, two snag barges for United States Engineering Corps; Dravo Contracting Co., low bidder.

Hastings, Neb., 400 tons, Masonic Temple.

Denver, Colo., 3600 tons, court house.

Astoria, Ore., 1500 tons, pulp plant; bids at once.

Kettle Falls, Wash., 1125 tons, bridge over Columbia River; J. H. Tillman, Santa Cruz, Cal., low bidder on general contract.

Cherry, Wash., 200 tons, school; bids being taken.

Seattle, 800 to 1000 tons, West Waterway bridge; bids soon.

Los Angeles, 250 tons, apartment at Kenmore & Wilshire Boulevards; bids being taken.

San Francisco, 125 tons, office building at Pine and Leisdorrf Streets; bids in.

Oakland, Cal., 140 tons, office building at Fourteenth and Webster Streets; bids in.

Oakland, Cal., 160 tons, hotel at Seventeenth and Jefferson Streets; bids being taken.

Screw Machine Products Association Meets Next Week

A general meeting of the screw machine products association will be held Thursday, May 17, at the Great Northern Hotel, Chicago. Dr. Arthur E. Swanson, consulting economic engineer, will speak on "some dangers in the present business situation." Malcolm Baird is field secretary of the association.

The Director of Supplies, United States Shipping Board Emergency Fleet Corporation, will receive bids up to May 21 for the sale of steel rails, switches, frogs, etc., of the railroad tracks at Hog Island, Pa. The rails include approximately the following tonnages: 6353 gross tons of 85-lb., 261 tons of 67½-lb. and small lots of 60 lb., 30 lb. and guard rails.

A tow of six barges loaded with pig iron is now en route from the furnaces of the Sheffield Steel & Iron Corporation, Sheffield, Ala., via the Tennessee and Ohio Rivers. This is said to be the largest tow of pig iron ever moved on these rivers. The pig iron will be loaded on cars at Joffa, Brookport and Metropolis, and transported by rail to melters in the St. Louis and Chicago territories.

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This Issue in Brief

Supplant the craze for volume with a reasonable passion for profits, urges editor. Unreasoning drive for the last 20 per cent of business is an important contributing cause for shrinking earnings. Many manufacturers seem to prefer full operation with red ink than part operation with black.—Page 1320.

Stove plant takes a leaf from automotive industry's experience and adopts mass production methods with noteworthy success. All manufacturing departments form one complete manufacturing unit, to provide for a straight-line flow.—Page 1310.

New joint of great strength, and gas tight, is formed by painting steel parts with powdered copper and heating in hydrogen atmosphere. The copper melts and penetrates deeply into the steel. Destruction tests frequently reveal that the individual iron crystals will be pulled apart while the junction of copper and iron holds.—Page 1305.

Business upswing will continue until a high point is reached in spring of 1929, A. T. Simonds predicts. Business is now, he says, in the seventh major movement since the war, an upward movement that started in the fall of 1927.—Page 1308.

You will stabilize your business and free yourself from the bogey of the business cycle by finding a way to appraise ultimate consumer demand, says General Motors official. With that fundamental factor determined, it is not difficult to coordinate it with production, purchases and employment of capital.—Page 1322.

Saves time by dumping slag directly into cars in slag pockets under open-hearth furnaces. Cars are of steel plate, brick lined. They are mounted on rollers, and are pulled out by means of a steel cable.—Page 1320.

Wage reductions may be precipitated if price of sheets and strips is further beaten down, says head of producers' association. Wage cuts might have a tremendous influence on other industries, he declares, and might decrease purchasing power all over the country.—Page 1323.

New high record in steel output. April daily rate of ingot production was 172,103 tons, which was 2.5 per cent above the previous high rate of 167,973 tons, established in March, 1927. —Page 1329.

If we want a growing export business, we must continue to buy more from abroad, says E. P. Thomas. Europe must sell *to* us if she is to have money to buy *from* us. If imports are not adequate the difference may be balanced by liberal foreign loans, but, of course, these have their limits.—Page 1309.

Foundry avoids crushing coke by using a special clam shell bucket. When making up a cupola charge the bucket is let down into coke bin, is filled automatically and automatically closed when the bucket is lifted. —Page 1315.

Deep bath produces better steel, open-hearth man declares. Though a shallow bath is quicker, the deep bath has less surface area to the ton of contents for oxidation by the flame, and cleans up the lime better.—Page 1317.

Business trend follows the movement of money rates, says manufacturer. Lowering cost of credit stimulates manufacture and construction, improving business in general. Raising the cost of credit has the opposite effect.—Page 1308.

Many manufacturers who could benefit by adopting budgetary control are afraid of it because they believe it implies rigidity, says General Motors executive. This is a totally wrong conception, for flexibility is a prime requisite. There must be a quick response when changing conditions necessitate adjustment.—Page 1322.

Cooling conveyor for castings is 645 ft. long. It consists of an endless chain and a monorail. Stove castings are suspended from small trolleys. The conveyor runs up to a point above the roof and then down to the sand blast, the circuit taking 105 min.—Page 1314.

Over-capacity competition is causing depletion of our resources of metal ores. Production is being pushed as if resources were boundless and as if realization must be hurried. Prices crumble under competition and the marginal producers ought to quit.—Page 1338.

Steel buyers are increasing their demands for quality—at a low price. Steel is no longer just "steel." Producers need to raise the number of classifications as to quality, which will require increasing cooperation between sales department and the mill.—Page 1339.

ESTABLISHED 1855

THE IRON AGE

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Over-Capacity Competition

IN almost every old industry in the United States there is an excess of producing capacity and also an excess of personnel. The desire to use as much as is possible of both develops keen competition and contraction, even extinguishment, of margin and profit. The economic theory is that this condition should reduce prices to the level of the marginal producer and should lead to the survival of the fittest only. The difference between theory and practice pertains to what is the cost of production and the margin of profit.

This is the most difficult determination in the case of production out of natural resources, especially the minerals, that are wasting assets. The producers of petroleum, copper, lead and zinc are particularly confused by this problem. In principle iron and coal are in the same position, but owing to the greater extent of the known resources of both there is less immediate concern about them.

We may point out also, as we have done heretofore, a difference as regards petroleum, in that it is a migratory substance and our American land system compels land owners to be hasty in getting of it what they can, having no assurance that, like the ores, it will remain stationary where nature put it.

The development of the natural resources of the non-ferrous metals is seldom very far ahead; i. e., broadly thinking. The porphyry copper mines as a group can probably maintain their present rate of production for 50 to 60 years; but the rest of the world's copper is derived from mines that are hardly to be expected to live for more than 20 years. The lead and zinc mines that are now producing are on the whole even less assured. Nevertheless production is pushed as if their resources were boundless and as if realization must be hurried. Prices crumble under competition and the marginal producers ought to quit; but generally they do not know that they are marginal producers until they have become insolvent.

Once an enterprise has been capitalized it must generally be kept going, and the law of the survival of the fittest may be very slow in its operation. The economic corrective is delayed until such time as there is no inducement to adventurers to invest in the class of enterprise that has become unprofitable. Adversity thus operates rather through the check to new capitalization than through curtailment of immediate production.

Of course, it is not necessary to rush metal production and *ipso facto* impair profits. The copper producers have learned this, and without any collusion among themselves the major interests in that metal deem it wisest to gage production according to market requirements at a reasonable price, figuring that it is better business to sell 80 or 90 pounds at a moderate profit than 100 pounds at no profit at all. Their intelligence and temperance put them in a sound industrial position; on the other hand, the great medley of the zinc industry is in bad. It is in petroleum, however, that the ravages of a rush to squander natural resources is to be seen at the worst.

Welded Steel—Gains and Losses

THIS growing vogue of welding is causing mixed feelings in the iron and steel industry. Foundrymen may view with concern the supplanting of a sizable quantity of gray iron or large steel castings with built up pieces made of rolled steel; at the same time sellers of the latter product may hail it for bringing them a new outlet. Drop forgers may worry when a forged brake lever is redesigned into a piece of tubing and two end fittings, but the makers of seamless tubes of all sorts regard the rise of the art of welding as a leading factor in the later expansion of their business. Sheet steel has been used in much additional tonnage for automobile bodies and parts, tankage, furniture and architectural details solely because the welded joint has made it adaptable for those purposes. (Nor has the end been reached yet. Elsewhere in this issue is described a new method of automatic welding which is calculated to extend further the field of stampings and screw machine parts.)

It is a case of gains offsetting losses; for welding has enabled steel to invade fields formerly held exclusively by other materials of construction, notably wood. Testimony to the same effect was given at the American Welding Society's meeting, just past—that it would help regain some of that large market lost to reinforced concrete.

Before an audience containing many engineers and fabricators, G. A. Caldwell, vice-president Mississippi Valley Structural Steel Co., said that welded structural steel was enabling his company to compete far more successfully with reinforced concrete in that intermediate zone where the advantages of the two systems overlap. He believes that welding, especially when specialized automatic machinery shall have been developed, will so lower the costs of shop fabrication that this midway zone will be pushed over considerably toward the concrete side, with a corresponding improvement in the economic position of those structural shops which specialize in medium heavy buildings.

This development would be gratifying to many branches of the steel trade, though it may bring regret to those who now make and sell steel reinforcement. But here again the net result would be an expansion in steel consumption, since a welded steel structure, even though it may contain somewhat less metal than a riveted equivalent, still uses many times as much steel as the concrete reinforcement in a substitute building.

Quality and Price in Steel

FREQUENTLY steel makers are disposed to complain of customers who, after crowding for the lowest price by the last dollar or even fifty cents per ton, thereupon proceed to make exacting demands as to quality, demands which the producer is disposed to feel place the steel quite in a class by itself. With the passage of time such complaints seem to grow more numerous rather than less.

These controversies, if they may be called such, as to quality are not by the march of events destined to die out. Rather the natural tendency is for them to increase unless something specific and definite is done about it, and indeed a great many things. For consider that in the old days nearly all the steel made was simply "steel" and once made it passed as well into one line of consumption as another. Year by year steel has been growing more specialized. With new conditions new problems are presented and new practices must be adopted.

The buyer, having agreed to pay certain money, naturally wants to secure all he can for that money. He has an advantage, unfortunate for the seller, in that he deals successively with two distinct parties. First he makes his bargain with the salesman and later he has dealings with the mill, as to quality, tolerances, rejections, etc. The desideratum is to increase cooperation between the sales department and the mill.

The steel industry needs to increase the number of its classifications as to quality, not at this one time or at another, but continuously, for improvement, specialization or adaptation is growing continually. The procedure by which the seller is placed at a disadvantage is insidious. Users of steel are in competition and are trying to succeed just as hard as are other people. Little by little they change their practices, subjecting the steel to harder and harder usage.

Reflection shows that standardization may be in some respects a hindrance rather than a help in this matter. It is easy to be deluded by standards, which may seem to define much more than they do. It is simple to call one steel "deep drawing" and another steel "extra deep drawing," for instance, but these are practically mill standards, the buyer seeking to get all he can from the first class, to avoid buying the second.

The various standards in steel quality are set up according to processes. An extra process involves an extra price, but with the same process costs differ according to the assiduity of the buyer. These variations require that the mill and sales department work closer and closer together, for competition between producers does not end with the sales department. The whole transaction is to be considered in the light of satisfaction to the customer. The seller has not really bested his competitor if he secures a slightly higher price but in the end delivers a considerably better quality.

Teapot Dome By-Products

AS the exposure of the oil scandal has become practically complete we may now try to summarize it, at least the Teapot Dome part of it, in a way that is different from that of the cartoonists, the paragraphers and the politicians. That stern sleuth-hound, Senator Walsh, thought he was following the scent of a political stink-pot, and was regaining for the American people a valuable natural resource. He scented something, to be sure, but it turned out to be a sordid commercial affair, quite unpolitical, and it is a wonder that the senatorial committee continued to think of it as any of its business. Nevertheless it must be said that, even if Senator Walsh failed to make capital for his political party, or to render a real service to the American people, he did indeed work well for those of them who are stockholders in the Sinclair Consolidated Oil Co.

H. F. Sinclair believed the Teapot Dome to have oil sands that would be productive and profitable and secured a lease of it through Secretary Fall. He transferred this lease to the Mammoth Oil Co. that he organized; then he sold an interest in that company to the Sinclair Consolidated Oil Co. for 250,000 shares of the common stock of the Sinclair company and an arrangement whereby it was to build at Portsmouth, N. H., certain tankage required by the terms of the lease from the Government. Mr. Sinclair was then the chairman of the board of the Sinclair company. At the time of this transaction its common shares were selling in the thirties, so that the value of 250,000 of them ran well into the millions.

The Sinclair company was also led to build, through a subsidiary, a pipe line to Wyoming that cost about 27 million dollars.

The Teapot Dome turned out to be less productive than was expected; and up to the time when Senator Walsh stepped in the stock of the Mammoth Oil Co. looked like a bad investment for the Sinclair company. However, its pipe line proved useful for the conveyance of other Wyoming oil.

The United States Supreme Court decided that the lease made by Secretary Fall to Mr. Sinclair was fraudulent and cancelled it. This had nothing to do with the considerations that the terms of the lease were fair to the Government and better than the conventional; or to the prospect that the oil of the dome might be drained off by others, leaving the Government with only the shell. It does not look like the Government regaining an asset of immense value that had been stolen from it. It looks more like the Government losing its royalty oil, but perhaps getting $1,340,000 worth of steel tankage at Portsmouth at the expense of the Sinclair stockholders, who have been, of course, quite innocent. However, the lease was fraudulent and was consequently cancelled, and that was that.

So this has naturally raised the question in the Sinclair board how it stands after having given up 250,000 of its common shares and built more than a million dollars' worth of tankage in a Government navy yard in consideration of property rights that the Supreme Court has said the vendor did not own. Conversations on the matter between the board and the other parties are going on.

The Continental bond issue that has so much exercised the senators was quite a different affair. They had an idea that it was the cloak for a political corruption fund of first-class magnitude, but it proved to be merely a shield under which certain oil magnates bought a large quantity of crude petroleum and immediately resold it to their own companies at a profit. Their trips to regions remote from Washington and their refusals to answer questions were quite explainable. The truth as to this was deduced by business men long before the senators became aware of it. When finally the disclosure was made, two of these magnates turned their shares into the Sinclair Crude Oil Purchasing Co., which is jointly owned by Sinclair Consolidated and Standard Oil of Indiana.

Sinclair Consolidated is a very big and very successful company, whose shares are widely distributed among the public. Thanks to Senator Walsh it has obtained restitution of a lot of cash, and perhaps it may come to enjoy some other adjustments.

Changes in the Finished Steel Line-Up

SOME interesting changes occurred in the distribution of steel last year among the different finished products, but they were not large. Changes in the forms of steel have not been so great in recent years as they used to be. There appears to be less occasion than formerly for the steel company making diversified products to maintain a substantial excess of steel finishing over steel making capacity.

The statistics of last year's production, given elsewhere in this issue of THE IRON AGE, show that from 1926 rails, bars and plates had the larger decreases while shapes, tubular goods and tin plate had the smaller decreases. This is not in line with the attitude of some of the trades during the year, for pipe was regarded as having a decidedly off year and tin plate a very substantial decline. Yet while production of rails decreased 12.8 per cent, of plates 11.4 per cent and of bars 11.0 per cent, tubular goods lost only 4.7 per cent and tin plate only 6.1 per cent.

Department of Commerce statistics showed an increase in fabricated structural steel lettings of 6.0 per cent, from 2,890,800 net tons in 1926 to 3,063,500 net tons in 1927. According to the figures of *Railway Age* the number of freight cars built in the United States and Canada decreased 27.9 per cent, from 93,278 in 1926 to 67,328 in 1927. These are important consuming lines for shapes and plates and now we find that shape production decreased 4.3 per cent while plate production decreased 11.4 per cent.

It is rather surprising to find that the total production of tubular goods decreased only 4.7 per cent, when there was so much talk of dullness. Welded decreased 8.4 per cent, while seamless increased 11.5 per cent. Welded lost 290,064 tons but seamless gained 88,811 tons. Of the total loss in welded nearly one-third was to seamless, which is likely to make further gain in view of the number of seamless mills recently built or now building.

Wire rod production actually made a gain, though of less than 1 per cent, and in face of the fact that wire nail production decreased by 3.2 per cent. By the long range comparison, however, rod production was light last year, as there were six better years.

As the strip industry has been growing rapidly it is interesting to observe how sheets and strips fared. Sheets, not including black plates for tinning, decreased 6.9 per cent while hot rolled strips increased 7.9 per cent. The two combined lost 3.8 per cent. A portion of the sheet loss was to strips, but not a large proportion.

Pig Iron at Over 1000 Tons a Day

BLAST furnaces producing more than 1000 tons of pig iron a day are getting into the news columns of THE IRON AGE. Not so long ago such an accomplishment was regarded as an iridescent dream. Large outputs, even at the rate of 700 tons a day, had been looked upon as possible only by the use of large scrap charges. But both in the United States and in Germany over 1100 tons has been produced from normal charges of ore, limestone and coke, scrap percentages being small. One American furnace has recently made close to 30,000 tons in a 31-day month, with outputs of single days running from 1075 to nearly 1200 tons. A German furnace is reported to have produced 1150 tons in one day.

Two important factors are represented in these records: the use of larger volumes of air and improved methods of charging. Furnaces into which formerly 50,000 cubic feet of air per minute was blown are now taking up to 75,000 to 80,000 cubic feet. In charging, coarse ore is being segregated from fine and introduced separately, thus minimizing channeling. These changes as well as an increase in the size of the hearths are revolutionizing furnace outputs.

With the capacity of older furnaces increased by the use of larger hearths and augmented blowing equipment, and with new stacks built on expansive lines, greater production with still fewer furnaces may be looked for. This has been the steady trend of the American industry in quite recent years. However, it will take time to determine whether the 1000-ton furnace can be considered as other than extraordinary—the exception that proves the rule.

CORRESPONDENCE

Non-Ferrous Alloys and Their Names

To the Editor: It is the opinion of the writer that attempts to name nickel silver by such a designation as coppernick, as suggested in your editorial of April 5, or a similar abbreviated form should be discouraged.

Fundamentally so-called nickel silver is nothing more nor less than a yellow brass to which nickel has been added. It would appear that the name "nickel brass" would be most informative to the trade at large and would be in keeping with the present-day practice of eliminating brand and proprietary names in designating engineering materials. By the use of the term nickel brass, the prefix giving the percentage is usually recognized as the percentage of the special alloy added to the brass, i.e., "15 per cent nickel brass" indicates at a glance that it is a nickel-bearing copper-zinc alloy containing 15 per cent of nickel.

P. E. McKinney.

Superintendent forge and foundry division,
United States Naval Gun Factory, Washington.

—

To the Editor: Your thought of applying the general scheme of the Society of Automotive Engineers numbering system for steels to the non-ferrous alloys is a reasonable one. However, before this could be done, standard and better recognized non-ferrous compositions should be promulgated by some specification-writing body. The combinations that can be made of the various elements entering into commercial alloys are infinite. This leads to an unnecessary and, moreover, a costly and uneconomic procedure when applied to both the purchase of non-ferrous materials and their use in the foundry. Several years ago the American Society for Testing Materials published a list of approximately 1500 different non-ferrous compositions known to the trade. This large number of alloys is a product of inventive genius, a desire for novelty, both from the sales promotion and patent protection standpoints, but is not necessarily an economic necessity. The facility of manufacture and physical and other properties of the alloy should be the determining factors.

Referring to the Society of Automotive Engineers specifications for non-ferrous alloys (which, incidentally, are not numbered in accordance with their system for steels), one finds 13 alloys covering brass and bronze compositions. This seems rather reasonable. Of course, considerable work has been done by this society and other specification-writing bodies to narrow down the compositions of non-ferrous alloys, but considerably more work can be done with the aim of greater standardization. A simple, comprehensive numbering system would be a further incentive to specify and use standard compositions.

In the non-ferrous products there is a general tendency to add a little more of this or a little less of that element when trouble is experienced, either in the foundry or machine shops, with the hope that the unknown reason for the trouble will be eliminated. It is a very easy thing to increase or decrease the zinc 2 per cent in a red brass. It will still be a red brass, and, if the difficulties experienced with the previous mixture vanish, we have then another composition to swear by or swear at, depending on what the future holds forth. An example of this is the old standard gun metal formula, 88-10-2, and its step-child, 88-8-4.

The red brass composition of 85-5-5-5 is almost a standard, with the exception that the producer of ingots is called upon to supply numerous varieties of it differing only a little in composition.

Referring particularly to the nickel-copper and nickel-copper-zinc series, there is a large variety of compositions. I believe that the rolled nickel-silver compositions are fairly well standardized, basing the various compositions on nickel content. On the other hand, the varieties of cast alloys are extensive. A perusal of the patents issued covering cast nickel-silver compositions gives one occasion to wonder whether the patenting of an alloy has any value whatsoever. The compositions overlap and even are similar for various patents for all practical applications.

In conclusion, I will say that an effort on the part of specification-writing bodies to establish a limited number of compositions for the various alloy series and to number them in a logical, orderly manner, similar to the S.A.E. steel nomenclature, would be most desirable. The use of these standard alloys, identified in such a manner, would eventually make for a great saving in the operations of both consumers and producers.

W. F. Graham.

Technical division, Ohio Brass Co.,
Mansfield, Ohio.

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Service—A Protest

To the Editor: You hear a lot nowadays about service. The term is probably as much abused as any expression we have, and the fault may quite generally be laid at the door of those organizations that in a desperate effort to embellish the advantages of ownership of a product stress the point that with ownership there accrues an obligation out of all proportion to the product itself.

True service, as it should apply to merchandising, should be a guarantee of satisfaction in the stipulated performance of the product, and should not, in its appeal, be directed along the lines of least resistance to an extent that the customer expects an everlasting attendance to the details of operation. Whether an organization sells sewing machines, tractors, automobiles or electric light and power, an overemphasis on the service that may be expected from the day of purchase or installation until every complex human desire is satisfied can only arouse suspicion as to the basic merits of the product or the organization behind the product.

True service consists in the maintaining of certain standards of value. To exaggerate those values with promises of unreasonable after-sales service has an inevitable reaction of dissatisfaction in the public consciousness.

Hugo E. Jung.

Kerman, Cal.

Veeder-Root Directorate Selected

Incident to the organization of Veeder-Root, Inc., Hartford, Conn., which is being formed as a merger of the Veeder Mfg. Co., Hartford, and the Root Co., Bristol, Conn., as a manufacturer of calculating machines and kindred equipment, the following directors have been chosen: John T. Chidsey, recently president and treasurer Root Co., who will be president of the new company; Graham H. Anthony, formerly vice-president and secretary Allen Mfg. Co., Hartford, who will be vice-president in charge of manufacturing for the new organization; Ralph C. Coxhead, who has been president Ralph C. Coxhead Corporation, New York, and will be vice-president in charge of sales for Veeder-Root, Inc.; Curtis H. Veeder, recently president Veeder Mfg. Co.; David J. Post, who has been treasurer Veeder Mfg. Co.; Fuller F. Barnes, president of the Wallace Barnes Co., the Associated Spring Corporation and Barnes-Gibson-Raymond, Inc., and formerly vice-president Root Co.; Frederick S. Chase, president of the Chase Cos., Inc., Waterbury, Conn.; Henry H. Conland, publisher of the Hartford *Courant;* Charles B. Cook, vice-president Royal Typewriter Co., Brooks Leavitt, a member of Paine, Webber & Co., New York investment bankers; V. Russell Leavitt, manager of the Hartford office of Paine, Webber & Co.; Charles D. Rice, factory manager of the Underwood-Elliott Fisher Co.; Charles T. Treadway, chairman of the Bristol National Bank and the American Trust Co., and Frank E. Wolcott, president Frank E. Wolcott Mfg. Co. Another director will be elected.

"Spray Coating—its Hazards and Safeguards" is the title of a booklet recently issued by the Hartford Accident & Indemnity Co., Hartford, Conn., which contains the results of a comprehensive investigation into the health and property hazards connected with the use of spray lacquers.

April Iron Output Gains Moderately

Actual Data Show That Daily Rate Gained 2968 Tons or 2.9 Per Cent Over March—Net Loss of Two Furnaces

ACTUAL data of the April production of pig iron, reported by practically all companies, show that the estimates, made by the companies a week ago and published last week, were very close to the real output. The April production was 106,183 tons per day, according to the final returns, or only 153 tons more than the estimate of 106,030 tons published a week ago.

Total April coke pig iron output was 3,185,504 gross tons or 106,183 tons per day for the 30 days, as compared with 3,199,674 tons, or 103,215 tons per day, for the 31 days in March. This is a gain for April of 2968 tons, or 2.88 per cent. This compares with a gain in March of 3.2 per cent over February. The April production last year was 3,422,226 tons, or 114,074 tons per day—a gain of about 7.4 per cent over April this year. Production last month was the smallest for that month since 1922, which was also true of January, February and March. It was, however, the largest thus far this year.

Production for the first four months of this year has been 12,155,065 tons, as compared with 12,950,087 tons for the same four months in 1927.

Net Loss of Two Furnaces

Eight furnaces were shut down and six were blown in during April—a net loss of two. Three of the furnaces blown in were Steel Corporation stacks and two were independent steel company furnaces. One merchant stack was lighted. Of the furnaces blown out three were merchant, three were independent steel company stacks, and two belong to the Steel Corporation. Thus there was no gain or loss in steel making furnaces, the net loss for the month being merchant stacks.

Possibly Active Furnaces Reduced

Two of the Lackawanna furnaces of the Bethlehem Steel Corporation at Lackawanna, N. Y., have been abandoned and will soon be dismantled. The Lebanon furnace of the Lavino Furnace Co. in the Lebanon Valley has also been dismantled and the Princess stack

Daily rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant* Iron	Total
April, 1927	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	Feb. (29 days)	Jan. (31 days)
New York and Mass.	205,556	216,224	204,744	203,715
Lehigh Valley	81,140	80,058	75,394	72,639
Schuylkill Valley	60,062	51,325	44,861	43,946
Lower Susq. and Lebanon Valleys	31,522	33,301	29,387	30,338
Pittsburgh district	663,784	639,693	597,543	582,497
Shenango Valley	100,073	101,946	90,179	77,023
Western Penna.	116,405	101,365	86,725	89,372
Maryland, Virginia and Kentucky	102,678	103,857	89,803	94,590
Wheeling district	115,284	133,764	118,108	108,188
Mahoning Valley	310,227	296,491	261,837	247,371
Central and Northern Ohio	336,200	330,176	294,427	313,697
Southern Ohio	25,548	25,729	24,773	32,480
Illinois and Indiana	693,271	715,439	639,763	608,771
Mich., Minn., Mo., Wis., Colo. and Utah	134,163	139,101	130,586	134,718
Alabama	199,487	223,314	207,108	224,132
Tennessee	10,104	7,891	4,888	6,284
Total	3,185,504	3,199,674	2,900,126	2,869,761

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	......
June	67,541	89,115	107,844	102,988	......
½ year	95,794	105,039	109,660	107,351	......
July	57,577	85,936	103,978	95,199	......
Aug.	60,875	87,241	103,241	95,073	......
Sept.	68,442	90,873	104,543	92,498	......
Oct.	79,907	97,528	107,553	89,810	......
Nov.	83,656	100,767	107,890	88,279	......
Dec.	95,539	104,853	99,712	86,960	......
Year	85,075	99,735	107,043	99,266	......

Coke Furnaces in Blast

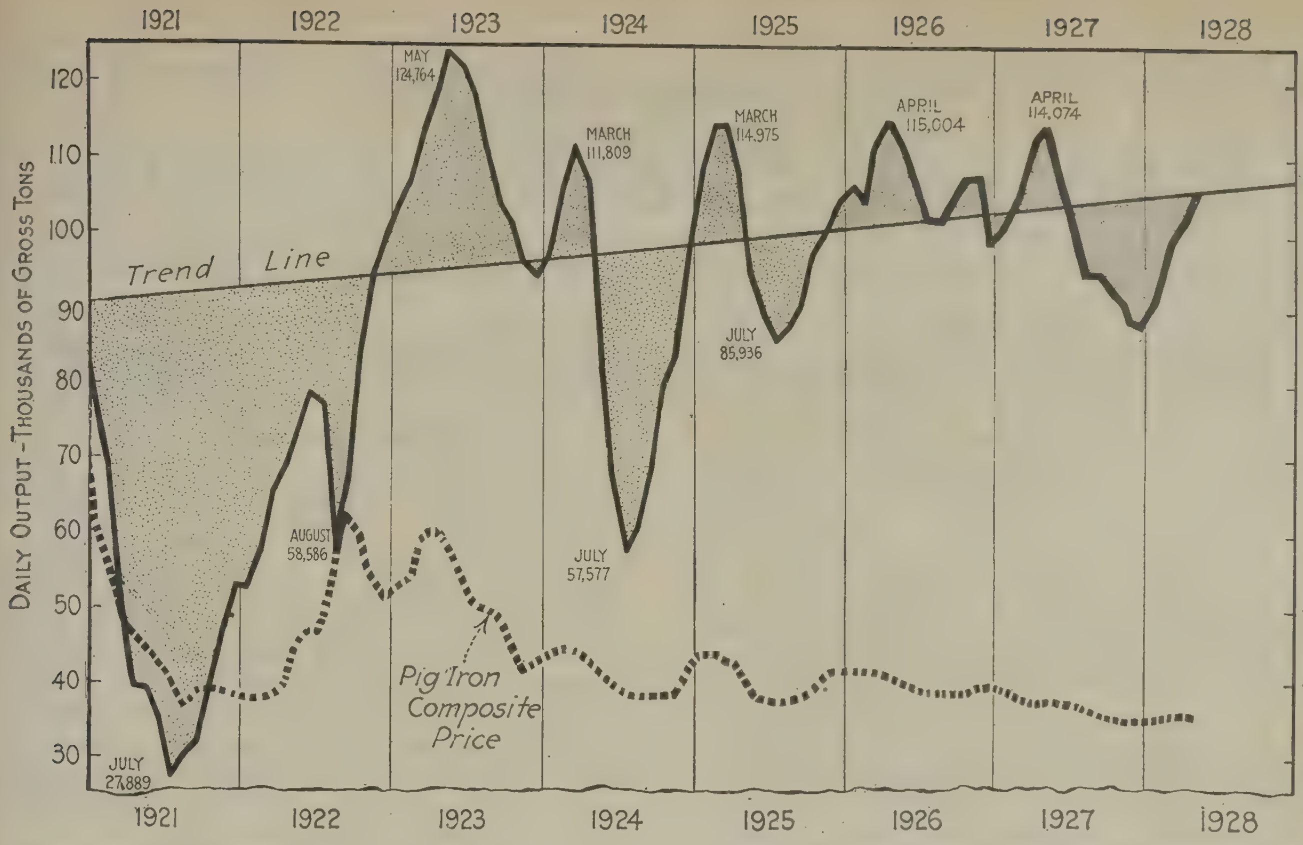
Furnaces	May 1		April 1	
	Number in Blast	Capacity per Day	Number in Blast	Capacity per Day
New York:				
Buffalo	12	5,695	12	5,720
Other N. Y. and Mass	3	1,155	3	1,230
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,600*	5	2,600*
Schuylkill Valley	4	1,600	5	1,820
Susquehanna Valley	2	980	2	1,015
Ferro. and Spiegel.	1	240	1	60
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	35	21,500	35	21,560
Ferro. and Spiegel.	3	490	2	350
Shenango Valley	7	3,550	6	3,290
Western Pennsylvania	7	3,500	6	2,900
Ferromanganese	1	220	2	430
Maryland	5	2,520	6	3,045
Wheeling District	6	3,670	7	4,315
Ohio:				
Mahoning Valley	18	10,410	17	10,000
Central and Northern	18	10,700	18	10,300
Southern	3	850	3	830
Illinois and Indiana	34	22,440	35	23,070
Mich., Wis. and Minn.	6	2,565	6	2,745
Colo., Mo. and Utah	4	1,710	4	1,745
The South:				
Virginia	1	220	1	215
Kentucky	1	370	1	380
Alabama	16	6,600	17	7,140
Ferromanganese	1	95	1	70
Tennesssee	2	335	2	250
Total	195	104,015	197	104,650

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	....
June	3,235,309	3,089,651	....
½ year	19,848,461	19,430,678	....
July	3,223,338	2,951,160	....
Aug.	3,200,479	2,947,276	....
Sept.	3,136,293	2,774,949	....
Oct.	3,334,132	2,784,112	....
Nov.	3,236,707	2,648,376	....
Dec.	3,091,060	2,695,755	....
Year*	39,070,470	36,232,306	....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in April Was 2.9 Per Cent More Than in March; Composite Price Decreases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now substantially normal. Dotted line represents THE IRON AGE *composite price*

of the Princess Iron Corporation at Glen Wilton, Va., which was recently sold at public auction, will not be operated again. This reduces the number of possibly active furnaces in the United States from 347 to 343.

Capacity Active on May 1

The operating rate of the 195 furnaces active on May 1 is estimated at 104,015 tons per day, as compared with an operating rate of 104,650 tons per day for the 197 furnaces on April 1.

Manganese Alloy Output

Production of ferromanganese in April was 18,405 tons, or the smallest this year. Two companies made spiegeleisen in April, but the data cannot be made public.

Furnaces Blown in and Out

During April the following furnaces were blown in: one Carrie and one Clairton furnace of the Carnegie Steel Co. in the Pittsburgh district; the Claire furnace in the Shenango Valley; one Cambria furnace of the Bethlehem Steel Corporation in western Pennsylvania; one Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley, and one Gary furnace of the Illinois Steel Co. in the Chicago district.

Furnaces blown out or banked during April were as follows: The Brooke furnace in the Schuylkill Valley; one Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; the Colonial furnace in western Pennsylvania; one Sparrows Point furnace of the Bethlehem Steel Corporation in Maryland; one La Belle furnace of the Wheeling Steel Corporation in the Wheeling district; one Gary furnace of the Illinois Steel Co. and one Indiana Harbor furnace of the Youngstown Sheet & Tube Co. in the Chicago district, and one Woodward furnace of the Woodward Iron Co. in Alabama.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1927		1928	
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb. ...	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar. ..	2,675,417	2,588,158	27,834	7,650	27,912	†....
Apr. ...	2,637,919	2,555,500	24,735	12,907	18,405	†....
May ...	2,619,078	....	28,734	9,788	....	....
June ..	2,343,409	....	29,232	10,535	....	....
½ year.	14,876,355	....	166,939	55,411	....	....
July ...	2,163,101	....	26,394	9,350	....	....
Aug. ...	2,213,815	....	21,279	9,104	....	....
Sept. ..	2,090,200	....	20,675	6,037	....	....
Oct. ...	2,076,722	....	17,710	6,129	....	....
Nov. ...	1,938,043	....	17,851	6,521	....	....
Dec. ...	1,987,652	....	20,992	6,816	....	....
Year..	27,345,888	....	291,840	99,368	....	....

*Includes output of merchant furnaces.
†Data not available for publication.

American Management Association to Hold Conference

The 1928 production executives' conference of the American Management Association will be held at the Hotel Statler, Buffalo, June 6, 7 and 8. Group bonuses will be the subject at the morning session on the first days, the principal speakers being Walter N. Polakov, consulting engineer, New York; R. F. Whisler, head of rate and time study department, National Cash Register Co., Dayton, Ohio, and Brooks Shepard, secretary Eberhard Mfg. Co., Cleveland. At the luncheon meeting on that day Ernest G. Draper, treasurer Hills Brothers Co., New York, will discuss unemployment.

A further discussion of bonuses will occupy the next two sessions of the meeting, while the remainder of the conference will be given over to the subject of apprentice and other employee training methods. Among the speakers on this subject will be A. B. Gates, assistant manager of industrial relations for the Commonwealth Edison Co., Chicago; Dr. J. A. Randall, president Rochester Mechanics Institute, Rochester, N. Y.; Russell N. Keppel, personnel manager Standard Oil Co. of New Jersey, Bayonne, N. J.; George F. Kent, manager of industrial relations for the Bucyrus-Erie Co., South Milwaukee, and E. W. Kempton, educational director American Steel & Wire Co.

Iron and Steel Markets

Record Four-Month Steel Output

Daily Rate Reaches New Peak in April—Steel Bookings Show Slight Recession—Sheets Weaker—Price Reductions in Pig Iron

STEEL ingot production in the first third of the year, as forecast by THE IRON AGE last week, established a new four-month record. Output so far in May has shown surprisingly little recession. Chicago mills remain on a 95 per cent basis, and average operations in the Greater Pittsburgh district, despite a decline at Youngstown, are holding at 80 per cent.

Mill bookings, including specifications against contracts, are not materially smaller than for the first third of April. In fact, at Cleveland, plates, shapes and bars are moving in somewhat better volume.

Aside from further weakness in some finishes of sheets and reductions in basic pig iron in eastern Pennsylvania and foundry iron at Birmingham, prices have shown little change.

The nearest approach to the ingot output of 16,846,729 tons in the first four months of this year was a production of 16,521,904 tons in February, March, April and May of 1927. The high operations of the industry in the first third of 1928 may owe something to the price advances that began late in December, although there is little evidence of accumulated stocks in buyers' hands save in a few isolated lines like wire nails. On the contrary, Pittsburgh reports instances of pressure by buyers for prompt deliveries, indicating an underestimating of requirements.

The large four-month output is testimony to the volume of steel going into widely ramifying uses and suggests that evidence furnished by the staple barometers of steel consumption is less conclusive than formerly.

Building activity was fully in keeping with steel production, but automobile output, although virtually equal to that of the first third of last year, fell considerably short of the totals for the corresponding periods in 1926 and 1924.

Depression in the oil fields has been reflected in subnormal purchases of steel, and railroad equipment buying has been in meager volume. Rail bookings during the entire winter buying movement, which began late last fall, showed a gain of possibly 10 per cent over commitments a year previous.

There was a similar gain in purchases by the farm implement industry, which, however, is one of the minor consuming lines, taking a relatively small percentage of the total production of finished steel.

Steel ingot output in April exceeded expectations. While mill operations tapered toward the end of the month, production, at 4,302,573 tons, was the fourth highest monthly total, and the daily average, at 172,103 tons, established a new record.

Estimates that ingot production this month will fall 5 per cent from the rate for April would still make the output for May with its two extra working days in excess of 4,400,000 tons.

The slower pace of steel buying is being met with the contention among makers that price reductions will not develop business and that stabilization of both volume and price will be the record of the next few weeks.

Further weakness, however, has occurred in certain products. Black sheets are more generally available at 2.70c., Pittsburgh, a decline of $1 a ton. On galvanized sheets, prices as low as 3.55c. and 3.50c., Pittsburgh, have appeared, compared with a recent minimum of 3.60c. Invasion of the Chicago district by more easterly mills has adversely affected Western sheet production and has resulted in concessions from the Chicago price of 2c. on plates, shapes and bars, particularly in outlying territories.

Prices on cotton ties announced for 1928 take a different form in that they are on a quantity basis. On mill shipments in carloads the price is $1.27 per 45-lb. bundle, f.o.b. Atlantic or Gulf ports; in lots of 2000 bundles, $1.25, and in larger lots, $1.23. Last year's prices were $1.20 at Atlantic ports and $1.21 at Gulf ports.

While rail mill operations continue at a high rate, one large road has canceled its May quota of rails and another has failed to exercise an option on 100,000 tons in addition to its winter purchase of 200,000 tons.

Structural steel awards, at about 25,000 tons, were below the average of recent weeks, but considerable business is pending. At Chicago about 100,000 tons, including 50,000 tons for the Mercantile Mart, is in prospect for early action.

A reduction of 50c. a ton on Southern foundry iron and a like decline on basic pig iron in eastern Pennsylvania, where two steel companies have purchased a total of about 30,000 tons, reflect the growing competition for business. Cleveland iron, moved by boat to Chicago, is being offered for prompt shipment at $18 dock, or 50c. a ton below the quotations of Chicago merchant furnaces. An effect of the competition of English low phosphorus iron at Great Lakes ports, where it is being offered at $26, duty paid, is a reduction of 50c. a ton on this grade of iron at Valley furnace.

Both of the THE IRON AGE composite prices have dropped this week, that for pig iron reaching a new low point for the year at $17.50 a ton, compared with a previous low of $17.54 early in January. The finished steel composite has declined to 2.348c. a lb., but is still 1½ per cent above the year's low, in January, of 2.314c.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 8, 1928	May 1, 1928	Apr. 10, 1928	May 10, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	*19.19*	19.69	19.69	21.69
No. 2, Birmingham	*15.50*	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	*19.00*	19.50	19.50	20.75
Basic, Valley furnace	16.50	16.50	17.00	18.50
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	100.00	95.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 8, 1928 Cents	May 1, 1928 Cents	Apr. 10, 1928 Cents	May 10, 1927 Cents
Sheets, black, No. 24, P'gh	*2.70*	2.75	2.80	2.80
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	3.00	3.10
Sheets, galv., No. 24, P'gh	3.60	3.60	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.70	3.70	3.85	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.20	2.35
Wire nails, Pittsburgh	2.55	2.55	2.65	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$15.50**	$15.25	$15.50	$15.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	13.00	13.00	12.50	12.25
Carwheels, Chicago	13.50	13.50	13.50	14.25
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	16.00
No. 1 RR. wrot. Phila	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	11.50	11.50	11.00	11.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.00
Foundry coke, prompt	3.75	3.75	3:75	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.30	13.12½
Electrolytic copper, refinery	14.00	14.00	14.12½	12.75
Zinc, St. Louis	**5.95**	5.85	5.75	6.15
Zinc, New York	**6.30**	6.20	6.10	6.50
Lead, St. Louis	6.00	6.00	6.00	6.40
Lead, New York	6.10	6.10	6.10	6.75
Tin (Straits), New York	**51.37½**	51.12½	52.00	68.00
Antimony (Asiatic), N. Y.	**11.25**	10.50	9.62½	13.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Demand Steady, But Buyers Are More Insistent on Quick Deliveries

PITTSBURGH, May 8.—Demand for steel products still is remarkable for persistency rather than volume. Seemingly, consumption is holding up well in most directions. Besides a fairly steady flow of specifications on old orders, new business is not materially behind that of the first week or 10 days of last month. Some indication of underestimating of requirements still is seen in the insistence of buyers for prompt deliveries, and cases are fairly numerous where the best promise of delivery won the order.

Scheduling of mills still is at short range, but as yet no great difficulty has been experienced in filling them. The trend of ingot production is down, but against some slipping in the Youngstown district, there is virtually full production in the Wheeling district. In the Pittsburgh district the rate is not below 80 per cent, which is a fair estimate of the combined areas of the Greater Pittsburgh district.

Prices still show irregularity, and in the case of sheets and the wider strips they are weak. Viewed as a general proposition, the market reflects merely the anxiety there always is on the part of some steel mills for orders when buyers are conservative, as they usually are at this time of the year, when sales rather than production problems are uppermost.

Jobbers are heavily stocked with wire nails as a result of unusually large shipments against orders placed last December and for first quarter at prices well under those now quoted. A mill that might want to sell now would in many instances find jobbers thinking in terms of the cost of present stocks and unwilling to add to them at any higher price. It is this condition that has brought out quotations of less than $2.65, base, per keg, Pittsburgh, which most makers still regard as the market.

There is no life to the pig iron market, which is becoming nominal as to prices in the absence of the test of large inquiries. Activity in scrap is on the part of dealers rather than the mills. The coal and coke market is in the doldrums.

Pig Iron.—The market is dull to the point of stagnation, with sales few and only occasionally of more than a carload lot. Prices are where they were a week ago, but are being supported solely by carload sales. Valley basic iron seems to have steadied at $16.50, but doubt exists that this price can be done except in the immediate vicinity of the furnaces, as the most recent sales have demonstrated that $16 is all that could possibly be obtained on business in competitive territory either toward Pittsburgh or north of the Valleys. The Central Alloy Steel Corporation reports that it did not sell the iron recently purchased by the American Steel Foundries at Alliance, Ohio. Since it is well established that the iron is moving from Canton to Alliance, the assumption is that it was some owned by middlemen. Carload lots of Bessemer iron are moving at the full quotation, which represents a differential of $1 a ton over basic iron, as against 50c. recently.

Low phosphorus iron is offered at $26.50, Valley furnace, a drop of 50c. a ton.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Regular users of spiegeleisen have quite generally signed contracts covering their requirements over the last half of the year, paying the same prices as on first half commitments. There has not been enough of a recession in steel ingot production to affect seriously the specifications for the commonly used ferroalloys. No attempt yet is being made to negotiate last half contracts for ferromanganese, and most consumers of high content ferrosilicon are covered for the entire year.

Bars, Plates and Shapes.—Rolling of these products are maintained by releases against contracts and a generous sprinkling of new orders, but order books are gradually becoming slimmer, and a little more anxiety for business on the part of the mills is seen in the fact that spot sales are more frequent at the contract price of 1.85c. base, Pittsburgh, and there is a willingness to accept that price on small lots on which 1.90c. recently would have been asked. Plate makers are encouraged by the inquiries of the Erie Railroad for 1000 box cars and the Virginian Railway for 1000 50-ton hopper cars; also by the fact that there continues to be a good demand for river barges and towboats. Fabricated steel business is lighter than it has been and inquiries are fewer. Demand for bars is declining, since makers of cold-finished bars are taking fewer, and the orders for bolts and nuts have fallen off about 10 per cent from the recent peak. Reinforcing bar prices are irregular and on the worthwhile jobs price competition is rather sharp.

Wire Products.—Makers here still insist that the market on wire nails is $2.65, base, per keg, Pittsburgh, and report specifications against second quarter contract carrying that price. Specifications reflect the fact that jobbers stocked up pretty heavily during the early part of the year, and the movement into consumption not having been in keeping, they still have sizable inventories. First quarter contracts having been completed last month, some makers seem to need orders and have offered concessions amounting to as much as 10c. per keg, but mills still holding to $2.65 say that lower prices are concessions rather than outright reductions. The market is undergoing a test which should determine whether the price of $2.65 is to stand or fall. Plain wire is moving well.

Semi-Finished Steel.—There is still a fairly heavy movement of billets, slabs and sheet bars on contracts, but an almost complete dearth of open market activity. Mills here and in Youngstown still are quoting $33 for large billets and slabs and $34 for sheet bars and small billets and slabs. Forging quality billets still are held at $5 a ton higher than ordinary billets. A few specifications are being received against second quarter wire rod contracts carrying a price of $44, base, Pittsburgh. The movement is not yet heavy, as a good many consumers still have lower-priced stocks upon which to draw.

Cotton Ties.—Prices have been announced for the 1928 season and take somewhat different form than those of the past few years in that they are placed upon a quantity basis. Prices are the same whether delivered at Atlantic or Gulf ports. On mill shipments in car lots the price is $1.27 per bundle of 45 lb., in lots of 2000 bundles, $1.25, and in larger lots, $1.23. Last year the price was $1.20, f.o.b. Atlantic ports, and $1.21, f.o.b. Gulf ports, and the year before $1.20, f.o.b. Gulf ports, and $1.22, f.o.b. Atlantic ports. Quoting cotton ties f.o.b. port, came into vogue in 1924, partly in recognition of the abolition of Pittsburgh as a sole price basing point on steel, and partly to conform to quotations on imported ties. Previously, prices were quoted f.o.b. Pittsburgh.

Tubular Goods.—Movement of building and construction pipe still is satisfactory, but no improvement in the demand for oil country goods can be chronicled. It begins to look as if inquiries for the gas pipe line to run from Monroe, La., to Memphis and St. Louis may soon reach the mills, as the same interests are behind that project as sponsored the Amarillo-Denver line, which now is nearing completion.

Sheets.—The market is generally weak on the common finishes, but particularly so on galvanized sheets, which are not hard to get at 3.60c., base, and in some instances have been sold at that price subject to a commission of $2 a ton to the jobber, or 3.50c. net to maker. Observance of No. 28 as the lightest gage of galvanized sheets to be rolled for roofing and siding is on the part of the few rather than the many. It seems that in the South and Southwest, where the demand is heaviest for these purposes, price rather than service has the strongest appeal and, to meet the situation, material running 72 to 73 lb. per square is being produced, as against 77 lb., the weight of a square of No. 28 gage steel. Generally, 3.65c. measures the top of the market, although some companies have not formally abandoned 3.75c. On black sheets 2.75c., base, is regarded as the minimum, although lower prices are reported. Blue annealed sheets commonly are 2c., base. New demands are light. Automobile body sheets still are moving well and at maintained prices.

Tin Plate.—Mill operations continue at substantially full physical capacity, as specifications on contracts are large. Unseasonable weather has probably caused some delay in putting in packing crops, but does not appear to have hurt the prospects for orchard fruits and there is a fair degree of optimism as to this year's

THE IRON AGE Composite Prices

Finished Steel

May 8, 1928, 2.348c. a Lb.

One week ago	2.355c.
One month ago	2.362c.
One year ago	2.353c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 8, 1928, $17.50 a Gross Ton

One week ago	$17.59
One month ago	17.67
One year ago	19.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.50,	May 8
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.05c. to 2.10c.
6 in. and wider, P'gh	*1.80c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 3.00c.
No. 24, del'd Cleveland	2.84c. to 2.94c.
No. 24, del'd Philadelphia	3.07c. to 3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.85c.
No. 24, del'd Cleveland	3.64c. to 3.84c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

pack. The common estimate is that tin plate production this year will run between that of 1926 and 1927, or, figuring 1926 as 100 per cent, at 95 per cent.

Cold-Finished Steel Bars.—Orders and specifications individually are smaller than they were a month or six weeks ago, but are numerous enough to provide a fairly satisfactory volume and are still coming in steadily. The price is steady at 2.20c., base Pittsburgh.

Bolts, Nuts and Rivets.—Bolt and nut business has tapered off about 10 per cent from its recent rate, which was sufficient to provide engagement of about 60 to 65 per cent of productive capacity. Prices are firm. Rivets also are firmly held.

Hot-Rolled Strips.—Most makers are well sold up on widths of 3-in. and less and are not much interested in additional business except at the full quotation of 2.20c., base Pittsburgh, but on wider stock the prices vary with the individual maker. While business is being booked at 2.10c., base, for the 3 to 6-in. bracket, it is not claimed that this is minimum. Similarly with 6 to 12-in. strips, 1.90c. is being done, but is not as low as has been reported. On 12-in. and wider strip, prices are very irregular and reflect the weakness of blue annealed sheets. The movement on old business is reported good, but local mills have noticed some tapering in new business so far this month compared with the same period last month.

Cold-Rolled Strips.—On the small tonnages 2.90c. for 3 tons or more is being done, but the tonnage buyers generally are finding accommodation at 2.75c. The market has failed to make its advance, primarily because competition for orders has been sharp, but the break in full finished sheets which forced strip fender stock lower has been an important contributing factor, since it has rarely happened that the general line has stayed up in price when fender stock was going the other way.

Coke and Coal.—The market is dull, soft and featureless, except that slack coal no longer is showing a price tendency contrary to the general market. The Southern fields are producing and shipping a good deal of screened coal to the Lakes as a result of the restoration of the former differential between rail rates on Northern and Southern coal. The production of slack consequently is heavy in the South, which is supplying a demand that recently was coming to this district. While the local supply still is light, sales are possible only at a recession of 10c. a ton from last week's prices. Foundries seem to be specifying a little more freely against contracts for foundry coke, but there is no improvement in the demand for spot tonnages of that or furnace coke. Buyers are able to dictate prices on spot coke, both furnace and foundry.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—A few small lots of heavy melting steel shipped without orders have been taken in at $15 at one point in the district, but $15.25 is as low as dealers are obliged to go on direct inquiry. The offerings of this grade in the May list of the Pennsylvania Railroad were sold to dealers at around $15.50, some going to three points in the Pittsburgh district. The railroad scrap is applied against orders carrying from $15.75 to $16; it is doubtful if less could be done today on sizable lots. Most of the tonnage sold during the week was at $15.50. Scrap prices generally show no important change. Compressed sheets still are hard to obtain at less than $15.50. The May list of the Norfolk & Western, closing May 10, contains 5030 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
No. 1 heavy melting steel	$15.00 to $15.75
Scrap rails	15.00 to 15.25
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.25 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	15.00 to 15.75
Industrial	14.50 to 15.25
Agricultural	14.00 to 14.75

Steel Cargoes to Move on Great Lakes

A Chicago dock company has arranged to unload a boat of reinforcing bars bound from Buffalo to Milwaukee. A boat load of rails has been assembled at Chicago for water shipment to Port William, Ont., on Lake Superior. The National Terminals Corporation, East Chicago, plans to have three boats of 3000 tons each in operation between Chicago and Buffalo.

The Newton Steel Co., Youngstown, is offering an issue of new 6 per cent preferred stock to replace the present 7 per cent issue and to provide funds for plant improvements. The present outstanding preferred, in par amount of $538,500, is to be retired July 1. The financial statement shows that the company has total assets of $6,704,373 and net tangible assets of $5,974,857 applicable to the preferred stock.

"Power Capacity and Production in the United States" is the title of Water Supply Paper 579, issued by the United States Geological Survey. It covers 210 pages dealing with water-power and power produced by fuels. The data are given in great profusion, with numerous diagrams. Some of the figures go back almost 80 years.

Construction volume in April showed a considerable improvement over the earlier months of the year, according to figures of the Associated General Contractors of America. The index is given as 164, compared with 137 in March and with 166 in April, 1927.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores. Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.05 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	—
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	48.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Demand Continues Heavy—100,000 Tons of Structural Projects Pending

CHICAGO, May 8.—Sustained demand continues to hold production of steel at Chicago district mills at 95 per cent of ingot capacity. The outlook is encouraging, particularly in structural steel in which there are active projects totaling 100,000 tons, including 50,000 tons for the Chicago Mercantile Mart.

Steel sales are being made at a remarkably steady rate, although in some instances at prices below 2c., Chicago, for bars, shapes and plates. The lower quotations have not greatly affected the immediate Chicago territory, being most common in outlying sections. Chicago producers are hopeful that third quarter prices will hold at the second quarter level.

Evidence is at hand that a number of large users who normally carry 8000 to 15,000 tons of finished steel in stock have allowed steel on hand to become low, and inquiries now before the trade indicate an interest in the building up of stocks.

Three gas line projects, one to Omaha, another to Kansas City and a third to St. Louis, are still in the stage of being financed, but a tentative agreement is said to have been reached with a Western maker for the steel pipe needed for one of the lines. The Missouri Pacific has placed 3000 tons of steel for a bridge at Little Rock, Ark.

Pig Iron.—A Federal furnace was blown out May 8. Merchant stacks now in blast are one Federal, two Iroquois and the furnace at Duluth. The change this week was made necessary by needed repairs and plant improvements. Furnace stocks, which are unusually heavy, will act as a balance against demand during the coming months. Shipments this month continue at the April rate, but new sales are declining in volume. A Milwaukee melter has taken 1500 tons of Northern iron, and several fresh inquiries for lots of about 500 tons each are before the trade. A 2000-ton cargo of iron brought from Cleveland by boat has been unloaded at Chicago and another boat is expected here this week. Mixed cargoes of pig iron and steel are scheduled to arrive here from Buffalo at the rate of one a week. Iron brought by boat brings $18, Chicago, on contract, while spot sales from that source and iron made locally are steady at $18.50. The 700-ton inquiry for silvery iron reported a week ago has been withdrawn. The trend of prices for this commodity is still somewhat uncertain. Southern iron, marked off 50c. a ton in some sections, is still being sold in this district on the basis of $16, Birmingham.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—From the viewpoint of actual sales, this market is quiet, but specifications are large. Users of ferromanganese are taking increased quantities, probably as a result of reports that prices for the third quarter will be advanced.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Reports of the last few weeks that oil consumption is keeping pace with production are reflected in the scarcity of plate orders for tank construction. A purchase by a west Texas producer is for 1000 tons, but other users are finding need only for miscellaneous small tonnages. The only railroad car business of note this week is an order for 300 gondola cars placed with the Siems-Stembel Co. by the Chicago, Minneapolis, St. Paul & Omaha. This railroad will buy 450 additional cars, of which 250 will be stock cars. Reports are persistent here that both the New York Central and the Pennsylvania will be ready to inquire for large numbers of cars before July 1. Heavy specifications against recent railroad equipment orders are nearing an end, car builders having already made known not less than 75 per cent of their requirements necessary to build the cars for the St. Paul. Miscellaneous business in plates continues to run heavy, and local producers are engaged at close to 95 per cent of capacity. Deliveries range from four to six weeks, a condition unchanged for over a month. Shipping schedules are heaviest on the narrow width of universal mill products. Users are finding that prices are somewhat unstable, particularly in the extreme eastern portion of this district and in the Southwest, also to some extent in central and southern Illinois. Business, attractive from the viewpoints of tonnage or rolling mill schedules, has been taken in these districts at $1 below the prices that are being maintained in and near Chicago.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—Fresh inquiry shows a decided turn for the better, although as yet shops are not free from schedule troubles resulting from an inadequate number of small fill-in jobs. Large shops in this district are operating at close to capacity, while those of smaller output will not average above 70 per cent. To the west, in such centers as Omaha, fabricators are busy, but prices obtained are low. Of special note is an announcement that the project formerly known as the Marshall Field & Co. warehouse has been renamed the Mercantile Mart, and in the redesigning the building has been greatly enlarged. Local interests believe that the steel requirements will be well in excess of 50,000 tons. Reconstruction of the Fine Arts Building, Chicago, will take 5000 tons, or about double the figure previously reported. Other large inquiries include 3600 tons for a court house at Denver, Colo.; 1000 tons for a railroad station at South Bend, Ind.; 1000 tons for a meat packing building at St. Louis, and 2500 tons for a race track pavilion at Glenview, Ill. Among recent awards in Chicago are two apartment buildings taking 500 tons of steel. Structural mills are well engaged, and deliveries are not better than four weeks in most sizes of structural shapes.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Users of soft steel bars are entering liberal specifications, and local mills are engaged at close to capacity. Producers of cold-drawn bars are taking large quantities and reinforcing bar warehouses are drawing out larger tonnages. Demand by farm implement manufacturers is steady, but lighter shipments to that industry are expected by the end of the month, when all but the tractor plants that are far behind on orders will close down for a seven to 10-day inventory period. Reports from farm districts indicate that dealers' stocks of farm machinery are low and manufacturers expect to forge ahead at close to top speed by the third week in June. Some unsteadiness in soft steel bar prices is found in outlying territory. In and near Chicago 2c. is the ruling quotation. Railroads continue to enter liberal orders for iron bars, and mill output is the heaviest in months. Prices are unchanged at 2c., Chicago. Demand for alloy steel bars is active, and specifications entered at mills by users are keeping schedules well filled. Specifications for rail steel bars have fallen below shipments, forestalling for the present at least a lengthening of mill operating hours. Shipments last month were the largest for any April since 1920. New business is widely scattered and comes to mills in small lots, so indications are that the May demand will not compare favorably with that in the preceding month. Reinforcing bars now represent a large part of present output. Deliveries are reasonably prompt, ranging from 10 days to two weeks, and prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Rails and Track Supplies.—The local rail market is quiet from the viewpoint of new sales. Shipments, however, are steady. In some quarters it is believed that the secondary buying movement may come short of the volume placed a year ago for the reason that last fall railroads were less hesitant to take options than has been the case in recent years. Miscellaneous orders for track accessories total 4000 tons. New inquiry, which is not large, includes one lot of 2000 kegs of track bolts. Prices for tie plates are steady at $43 a net ton.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—This market continues unsettled. One group of hot mills was shut down Friday of last week and did not resume operations until Tuesday of this week, and then only with a schedule arranged for four days. Specifications against contracts are a trifle more liberal, but new buying, even at lower prices, is slow. Jobbers are reducing stocks and are sending only small orders to mills.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.90c. to 3.05c.; No. 24 galvanized, 3.75c. to 3.90c.; No. 10 blue annealed, 2.20c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cast Iron Pipe.—Detroit has awarded 12,000 tons of pipe to five bidders. The United States Cast Iron Pipe & Foundry Co. took 5750 tons at $38.65 a ton, delivered, or $30.73, Birmingham; 3000 tons will be furnished by French makers at $29; other successful bidders were the American Cast Iron Pipe Co., 1000 tons at $30.08, Birmingham; National Cast Iron Pipe Co., 750 tons, and James B. Clow & Sons, 1500 tons. The United States company has been awarded 2800 tons of 24-in. and 48-in. pipe by Milwaukee, and the National Cast Iron Pipe Co. has taken 550 tons of 6 to 24-in. pipe for Royal Oak, Mich. The price of the latter award was $30.30, Birmingham. John A. McDace & Co., contractors at Detroit, have been awarded 28,000 ft. of pipe by Dearborn, Mich. Recent awards indicate a stiffening in prices. Sizable tonnages have been taken in this district as high as $33, Birmingham, while prices paid at Detroit show that minimum quotations for American-made pipe are now above $30. Several orders have been placed by railroads and public utilities.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

Reinforcing Bars.—Awards for the week bulk large, and a round tonnage of active projects is before the trade. The Truscon Steel Co. has taken 800 tons of billet steel reinforcing bars for a sewer job and a rail steel mill has taken two orders that total 800 tons. Shops in this district are engaged at 80 per cent of capacity or better, a little less favorable position than they occupied at this time a year ago. A new hotel in Chicago will take 1000 tons and the Chicago Motor Club Building calls for 400 tons. Recent awards have been keenly contested as to price, billet bar quotations having dipped to 2.10c. a lb., Chicago warehouses. Prices for the hard steel bar commodity are steady at 1.85c., Chicago Heights. Awards and inquiries are shown on page 1363.

Wire Products.—As a whole, this market is steady and mills continue to produce at close to 70 per cent of capacity. Jobbers in the Northwest are finding business brisk, and sales in Texas and the lower Mississippi Valley are in good volume. Nails are moving slowly, and prices are not more stable than a week ago. Mill stocks of nails are large for this time of the year. The movement of woven wire fencing has been heavy against orders taken in the late winter, and producers' stocks are not large. A secondary buying movement is under way, pointing to a demand that will carry into the early summer months. Manufacturers' wire is moving at a steady rate. Prices for wire and wire products are given on page 1347.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c. to 2.40c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Bolts, Nuts and Rivets.—Specifications have dropped in volume as a result of lighter requirements by farm implement manufacturing plants, which, with exception of those making tractors, will close about June 1 for inventories. Prices on large rivets are steady at $3, Chicago.

Coke.—Specifications against contracts are in good volume and prices are steady. All by-product coke ovens in this district are lighted.

Old Materials.—An undertone of weakness is making itself apparent in the local scrap market. A steel mill has taken 2000 tons of heavy melting steel at $13 a gross ton and a consumer has purchased 2500 tons of rerolling rails at $14.50. Three thousand tons of railroad malleable has been sold at $13.50 a gross ton. Rejections of melting steel are numerous and dealers have been forced to pay as high as $14 a ton to meet obligations. A disturbing condition in this market is that large users more frequently purchase direct from producers of scrap. The Santa Fe and the Chicago & North Western have sold lists totaling 6000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton		
Basic Open-Hearth Grades:		
Heavy melting steel	$13.00 to	$13.50
Shoveling steel	13.00 to	13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to	14.00
Hydraulic compressed sheets	11.50 to	12.00
Drop forge flashings	9.50 to	10.00
Forged, cast and rolled steel carwheels	15.50 to	16.00
Railroad tires, charging box size	16.75 to	17.25
Railroad leaf springs, cut apart	16.75 to	17.25
Acid Open-Hearth Grades:		
Steel couplers and knuckles	14.50 to	15.00
Coil springs	17.00 to	17.50
Electric Furnace Grades:		
Axle turnings	13.00 to	13.50
Low phosphorus punchings	14.00 to	14.50
Low phosphorus plate, 12 in. and under	14.25 to	14.75
Blast Furnace Grades:		
Axle turnings	10.00 to	10.50
Cast iron borings	9.25 to	9.75
Short shoveling turnings	9.25 to	9.75
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	14.00 to	14.50
Rerolling rails	14.00 to	14.50
Cupola Grades:		
Steel rails less than 3 ft	15.00 to	15.50
Angle bars, steel	14.25 to	14.75
Cast iron carwheels	13.50 to	14.00
Malleable Grades:		
Railroad	13.00 to	13.50
Agricultural	12.00 to	12.50
Miscellaneous:		
*Relaying rails, 56 to 60 lb	23.00 to	25.00
*Relaying rails, 65 lb. and heavier	26.00 to	31.00
Per Net Ton		
Rolling Mill Grades:		
Iron angles and splice bars	14.00 to	14.50
Iron arch bars and transoms	19.00 to	19.50
Iron car axles	21.50 to	22.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	10.00 to	10.50
No. 2 busheling	5.75 to	6.25
Locomotive tires, smooth	12.50 to	13.00
Pipes and flues	8.00 to	8.50
Cupola Grades:		
No. 1 machinery cast	14.00 to	14.50
No. 1 railroad cast	12.75 to	13.25
No. 1 agricultural cast	12.50 to	13.00
Stove plate	11.25 to	11.75
Grate bars	11.25 to	11.75
Brake shoes	11.00 to	11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Shape Prices Recede Slightly—Basic Iron Lower on Recent Large Sale

PHILADELPHIA, May 8.—Producers of plates, shapes and bars are receding slightly from the firm stand they have recently taken on prices. Structural shapes are now quite generally quoted at 2c., Bethlehem, or 2.13c., delivered Philadelphia, instead of 2.05c., which was named for second quarter. A nearby producer of shapes has quoted delivered prices as low as 2.06c., Philadelphia, and this has been met on the more desirable tonnages by other eastern Pennsylvania mills. On plates, 2.05c., Coatesville, is still the asking price, but competition for business brings out 2c. quotations frequently. Steel bars range from 1.85c. to 1.90c., Pittsburgh, but there is a disposition on the part of mills to accept 1.85c. on some orders that would recently have been unattractive at less than 1.90c.

Producers of blue annealed sheets are still quoting 2.10c., Pittsburgh, on the average run of orders, but buyers have been able to get quotations of 2c. and 2.05c. on the more attractive lots. Black sheets range from 2.70c. to 2.75c. and galvanized from 3.60c. to 3.70c., Pittsburgh.

Basic pig iron is 50c. a ton lower in this market on sales of close to 30,000 tons to two Eastern steel makers. It is now quoted at $19 to $19.50, delivered.

Pig Iron.—Foundry grades are fairly firm at $20, base furnace. Business is limited to occasional carload lots. Basic iron, on recent sales of 6000 to 7000 tons to one steel company and 20,000 to 25,000 tons to another, is quotable at $19 to $19.50 per ton, delivered, a decline of 50c. a ton. The tonnage taken by the latter was divided among three eastern Pennsylvania furnaces. Low phosphorus buying is confined to small lots, on which the published market prices apply, although sales to consumers in western Pennsylvania and other districts have been made at concessions. Buffalo foundry iron bought for delivery by barge is being shipped to consumers in this district; the total sold is estimated at from 20,000 to 30,000 tons.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Ferromanganese.—Quotations are unchanged at $100 per ton, seaboard. Current business is confined largely to shipments against contracts. Apparently neither domestic nor foreign sellers are desirous of quoting for the second half, and thus far consumers have shown little interest in further contracting.

Bars.—The current market is quotable at 1.85c. to 1.90c. per lb., base Pittsburgh, or 2.17c. to 2.22c. per lb., Philadelphia. New orders are limited both in number and in size, but there is a fair tonnage moving on second quarter contracts.

Shapes.—Mills are fairly well booked with business in the smaller sizes, but on larger specifications, where the competition of special beams rolled by two companies is encountered, there is a tendency to shade prices. On small sizes and limited tonnages, 2.05c. per lb., Bethlehem, or 2.18c. per lb., Philadelphia, is still obtained by some mills, but on medium-sized and large lots, 2c., Bethlehem, or 2.13c., Philadelphia, usually applies. One producer is reported to be quoting delivered prices on shapes as low as 2.06c. per lb., Philadelphia, or 2c., f.o.b. mill, and this competition has been met by other eastern Pennsylvania producers. Fabricators are moderately well booked with business, and there is a fair volume of small projects in the market.

Plates.—Prices on plates are 2.05c., Coatesville, or 2.15c., Philadelphia, on small orders and 2c., Coatesville, or 2.10c., Philadelphia, on the more desirable business. Shipments on second quarter contracts are good, but new business is limited.

Sheets.—There is only a small tonnage of new business in the market. Prices on blue annealed, black and galvanized sheets continue irregular. Eastern Pennsylvania mills are still endeavoring to maintain the blue annealed sheet market at 2.10c. per lb., base Pittsburgh, notwithstanding sales to automobile body builders and other large users at 2c. and 2.05c., Pittsburgh. Black sheets range from 2.70c. to 2.75c., Pittsburgh, and galvanized from 3.60c. to 3.70c.

Old Material.—Prices of all grades are unchanged. Only a moderate tonnage is moving to consumers. No. 1 heavy melting steel is being shipped from the Baltimore district to Steelton, Pa., at $13.50 per ton, delivered, which nets the seller considerably less than on the Sparrows Point, Md., contract at the same price. Shipments to the latter mill, however, have been suspended. A consumer at Phoenixville, Pa., is offering $11.50 per ton for stove plate and $10.50 per ton for machine shop turnings, but no contracts are reported at these prices, dealers quoting 50c. per ton higher. Brokers are showing increasing interest in export shipments of steel, in the belief that if more scrap is sold abroad there will be less surplus available to depress the market here.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)	10.50 to	10.75
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)	10.50 to	11.00
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)		12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap	10.50 to	11.00
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	14.75 to	15.25
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Warehouse Business.—There is a moderate demand for structural material, but competition among jobbers is keen and as low as 2.35c. per lb., base, is occasionally quoted. As a result, the application of quantity differentials on structural steel and plates as well as steel bars, small shapes and cold rolled steel is being considered. The quantity bases on black and galvanized

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sheets are being maintained, although business is small.

Imports.—In the week ended May 5, 2565 tons of chrome ore arrived at this port from Portuguese Africa. No pig iron came in. Steel imports consisted of 52 tons of steel skelp, 16 tons of steel bars and 168 tons of structural shapes from Belgium; 31 tons of steel bands, 35 tons of bars and 6 tons of shapes from France.

New York

Pig Iron Inquiries for Third Quarter—Sheet Prices Weaker

NEW YORK, May 8.—Pig iron sales are confined mainly to scattered small tonnages for relatively early shipment. Total bookings by local sellers, at 7000 tons, were nearly as large as in the previous week. Outstanding purchases were 1000 tons of foundry, bought by Crane Co., Bridgeport, Conn., and 275 tons, placed by the Worthington Pump & Machinery Corporation, for its Harrison, N. J., works. The Moore Brothers Co., Elizabeth, N. J., closed against its inquiry for 100 tons of No. 3 foundry. Operations among foundries are spotty, but total melt shows little change. Some of the more active plants are finding that they underestimated their second quarter requirements. The Thatcher Co., Garwood, N. J., has entered the market for 2000 tons of No. 2 plain for delivery this quarter. The first important inquiries for third quarter have made their appearance. A New Jersey melter wants 1000 to 2000 tons of No. 1X for second and third quarter delivery, and the A. P. Smith Mfg. Co., Bloomfield, N. J., is asking for 600 tons of No. 2 plain and No. 2X for third quarter. New York State foundry iron continues to sell at $16 to $16.50, base Buffalo. Eastern Pennsylvania producers are still quoting $20, base furnace, without taking much business in this section.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—The Kalman Steel Co. will furnish 2400 tons of bars for a highway bridge at New Brunswick, N. J., and 500 tons of rail steel for the piers of the Hudson River bridge will be supplied by the Truscon Steel Co. Business as a whole, however, has shown little improvement over previous weeks. A number of jobbers in this district are placing considerable tonnages of foreign steel, usually in small lots, but bulking rather large in the aggregate. This steel is offered at prices which distributers of the domestic product seldom attempt to meet and the situation has not led to any material price weakness. Some business is being placed at 2c., Pittsburgh mill, but 1.95c. may be had on attractive tonnages, and in the absence of much activity in the market the entire price structure lacks definite strength. The Youngstown warehouse price is unchanged at 2.20c., or 2.57½c. on cars at New York, and out of New York warehouse the general quotations are 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Finished Steel.—Further weakness in prices of sheets and a declining volume of demand for nearly all steel products are the major developments in this market. Black sheets have been sold at 2.65c. and 2.70c., Pittsburgh, and 2.75c., which was recently the low, is now regarded as the top of the market. Galvanized sheets are being commonly sold at 3.60c., Pittsburgh, but a few sales have been made at 3.55c. On blue annealed sheets, quotations of 2c. have become quite general. On plates, little effort is now being made to obtain higher than 2c., Coatesville, except on lots of warehouse size. Concessions from 2c., Coatesville, or 2.17½c. delivered New York, apparently have not been given in more than a few instances. The smallness of current plate orders accounts in some measure for the fairly steady prices. Shapes are obtainable on the basis of 2c., Bethlehem, while on steel bars quotations of 1.90c., Pittsburgh, are less frequent in view of the willingness of some mills to book average-size orders for early rolling at 1.85c. Although reports are uniformly of a good rate of operations in consuming industries, the volume of steel business, taking specifications against contracts and new orders together, is falling somewhat below the daily rate in April. This situation is taken to mean that consumers are using up stocks and awaiting price developments. The declining volume of structural steel business in the New York district is reflected by the total of 28,200 tons booked in April by members of the Structural Steel Board of Trade compared with 32,200 in March and 59,000 tons in April, 1927.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c..
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Activity is fairly well distributed to all products, but there is some irregularity in the size of tonnages and in prices. Concessions on blue annealed sheets seldom exceed about $1 per ton, but both black and galvanized sheet sales have been made at reductions of 20c. and 25c. per 100 lb. for small lots, which usually take the full base price and size extras. Jobbers handling structural material report continued competition from imported steel and increasing encroachment on small tonnage business by mills, which are willing to offer prompt shipment.

Cast Iron Pipe.—Makers in the North report sufficient tonnage on their books to carry them, in most cases, for 60 days or more and, as a result, are showing greater firmness on prices. New orders, however, are limited, coming for the most part from private users of pipe. Birmingham foundries are maintaining their price level at $30 and $31 per ton, base Birmingham, which is too high to compete with the present quotations of Northern foundries. The inquiry of the city of New York for 2754 tons of pipe is about the only municipal project of consequence, but there are some sizable private purchases in prospect.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Coke.—The market is quiet and prices of all grades unchanged. Furnace coke continues at about $2.75 per ton, Connellsville, and standard Connellsville furnace coke at about $3.75 per ton. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.71 to $8.81 per net ton; to New York and Brooklyn, $9.59 to $9.69 per net ton. By-product coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, N. J., and from $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—Prices of a few grades show a slight decline in a quiet market. No. 1 heavy melting steel is unchanged at $13.50 per ton, delivered eastern Pennsylvania. Yard grade buying prices range from $10.50 to $11 per ton, delivered, with shipments going to Pottsville, Steelton and Conshohocken. Brokers show continued interest in export business and some small tonnages of heavy melting steel are being shipped to Japan, Italy and Germany.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.25 to 7.75
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.75 to 8.25
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Specifications from Automobile Industry Still Heavy—Sheets Continue Weak

CLEVELAND, May 8.—May has started out with a somewhat better volume of orders for steel bars, plates and structural material than the first week in April. However, early April orders were light because of the heavy specifications of late March. The demand is quite irregular, orders some days being fair and other days light. Consumers are ordering in small lots and nearly all business is in specifications against contracts. Orders for hot-rolled strip show a gain in this territory, as consumers are getting near the end of their stocks ordered at the end of the first quarter.

Specifications for steel bars, sheets and strip steel from the automotive industry continue at the recent good volume, but it is scarcely expected that the present demand from this source will be maintained many weeks longer, as there will probably be a seasonal slowing down of the automotive industry starting not later than July 1. Automobile manufacturers are not carrying large stocks, and consequently may not make much reduction in shipping orders before they cut down production schedules. With Ford production still rather low, other makers of low-priced cars may be able to maintain operations at a good rate through the summer.

Consuming industries in this territory outside of the automotive field show a slight gain in average operations over last month. In the building field, structural lettings are still rather light. With no large boats in prospect, the output for the lake shipbuilding industry this season is not very promising.

The price situation shows little change. Sheets and hot-rolled strip continue weak. Steel bars, plates and structural material are firm at 1.85c., Pittsburgh. Small undesirable lots are bringing 1.90c. Cleveland mills quote steel bars at 1.85c., mill.

Pig Iron.—Producers continue to sell a fair tonnage of foundry and malleable iron for early shipment or for the remainder of the quarter. The only noticeable change in the buying situation recently is an increase in small-lot orders. These are coming out not only from small consumers, but from some of the large-lot buyers who are following a hand-to-mouth buying policy. Only a few third quarter sales have been made. Lake furnace prices are well stabilized at recent levels, with a range of $16.50 to $17 for foundry and malleable iron, the lower price being rather common for delivery to competitive points. However, at least one Lake furnace is holding to a $16.75 minimum. For Cleveland delivery and in Michigan, the price is unchanged at $18, furnace. Valley furnaces appear to be holding to $16.50 for basic iron. The offer of English low phosphorus iron at $26, delivered Lake Erie ports, in direct water shipments from England has raised a question as to whether the anti-dumping clause of the tariff could not be invoked against bringing in this foreign iron. However, the delivered price of $26, duty paid, is said to be about equivalent to the $23 price at which this iron has been offered delivered on the Eastern seaboard, the additional $3 a ton charge covering the additional Lake and canal transportation charges.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	16.50
Standard low phos., Valley furnace	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—First ore cargoes of the season are on the way down the Lakes, and it is expected that a good start will be made in shipments before the end of the week. However, some of the ore firms are in no hurry to get all their boats going and May shipments will probably be rather light. Only one cargo was shipped during April, this being 5946 tons sent from Escanaba to a nearby Michigan port. During April last year over 1,500,000 tons of ore was shipped. There is very little activity in the ore market and no inquiries for large lots are pending.

Sheets.—While sheet prices do not appear to have gone any lower than those reported a week ago, the minimum quotations have become more general, indicating a somewhat weaker market situation. A Valley basing point is being freely used, giving buyers an additional advantage that in Cleveland amounts to about $2 a ton. Black sheets are plentiful at 2.75c., Valley mill. On blue annealed sheets, 1.90c., Pittsburgh, and 2c., Valley, seem to be the minimum prices, with 2.05c., Valley, rather common. Galvanized sheets are available at 3.55c., Valley mill. Present minimum sheet prices are about $2 a ton lower than those prevailing late last year, except on auto body sheets, which are holding steady to 4c., Pittsburgh. Specifications are fair against contracts, but new business is rather slow.

Strip Steel.—The hot-rolled strip market continues highly competitive on wide material, and some of the mills do not appear to be adhering to a regular base, the price being gaged by the amount of extras. On wide material, 1.80c., Pittsburgh, seems to be about the average price, with some quotations $1 a ton higher and lower. Cold-rolled strip is unchanged at a minimum of 2.75c., Cleveland, for 3 tons and over. Some small-lot buyers are still paying 2.90c. to irregular sources of supply.

Wire Products.—The nail market shows a firmer tone in central Ohio, where $2.60 per keg has become the more common quotation, or an advance of $1 a keg. In northern Ohio, large buyers are still able to get concessions from $2.65.

Reinforcing Bars.—The Cleveland Union Terminals Co. has placed 2500 tons and has another inquiry out estimated at 800 to 1000 tons. Small lots are in good demand. Rail steel bars are holding to 1.75c., mill.

Warehouse Business.—Sales are not holding up to recent volume. The demand for steel bars, plates and structural material is well scattered among consuming industries, but only moderate from any of them. Prices are firm. Galvanized sheets are moving better than recently, but the seasonal spring demand is not as good as expected. A leading jobber has reduced galvanized sheets $2 a ton.

Old Material.—The market has a weak tone. Dealers anxious to move scrap sold No. 1 heavy melting steel at $13.40 during the week, and a price above $13.50 has about disappeared. Considerable scrap is backing up on dealers' books, and more material is coming on the market than mills are taking in. Drop forge flashings have declined 25c. a ton. Other prices are unchanged.

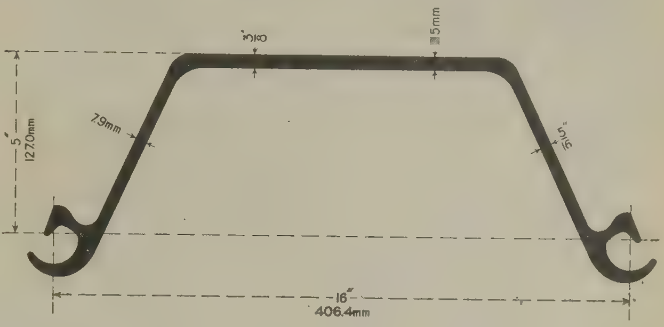
Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.50 to $13.75
No. 2 heavy melting steel	12.75 to 13.00
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	11.75 to 12.25
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Bolts, Nuts and Rivets.—The demand for bolts and nuts is fairly good, the volume of orders being about the same as last month. Rivet specifications are moderate, and manufacturers are disappointed that there is no improvement in current orders, which are scarce.

New Section of Lackawanna Piling

Bethlehem Steel Co. has added a deep-arch type section to its line of Lackawanna steel sheet piling. This form, designated as Section DP165, is characterized by the depth and shape of its arch construction. The chief particulars of the new section are: Nominal width, 16 in.; depth, 5 in.; thickness of web, ⅜ in.; weight per foot of pile, 33.3 lb.; weight per square foot of wall, 25 lb.; section modulus per foot of wall, single, 10.07; interlocked, 16.14.



Depth of Arch Construction Characterizes New Lackawanna Sheet Steel Piling

This new section is adapted for general use in types of construction where strength and light weight are of importance, and where the piling is to be used permanently, such as in the case of bulkheads, docks, retaining walls, wharves and similar structures. The interlock is of the double-lock type, already a feature of Lackawanna piling.

Early Rolling of Sheets

At the meeting of the metal branch of the National Hardware Association at Boston last week, C. F. Ahlbrandt, general manager of sales American Rolling Mill Co., Middletown, Ohio, discussed the rolling of sheets. The following is taken from his paper:

The first mention of rolling sheets seems to be in the work of Christopher Polhem, a Swedish mechanical genius, whose book, printed in 1761, ten years after his death, speaks of mills rolling both plates and bar iron. In chapter 14 he says: "Much time and labor can be saved by good rolling mills, because the rolling mill can produce 10 to 20 and still more bars in the same time required to upset one bar with a hammer."

After mentioning the economic difficulties which prevented him from using his mill, Mr. Polhem concluded: "Yet I willingly grant to others who will perhaps live during more happy times, what I have not had the opportunity to use myself." Concurrently, practical developments were being made in Wales. It was about 1750 that the Welsh tin plate business developed into a real industry, and rolling became the standard method of sheet manufacture.

You frequently hear the statement that the sheet rolling process is antiquated and has not been improved in the past 150 years. Before the opening of the present century, black and galvanized sheets and tin plate constituted practically the entire production of the world's sheet mills. How different it is today, with furniture sheets, electrical sheets, enameling sheets—products with surface refinements, drawing properties, analysis and performance possibilities undreamed of only a few decades ago. The production of all of these has meant tremendous pioneering effort in the manufacturing processes.

Now comes the continuous method of rolling, which worked an entire revolution in the old system. Though public attention was not focused on this development until last year, the Ashland, Ky., unit of the American Rolling Mill Co. has been producing sheets by the continuous process since 1923.

The nature of the work made a small experimental unit impossible. Millions of dollars had to be put into the plant before it could be definitely determined whether the principles were sound and practicable.

San Francisco

Reinforcing Steel Awards Large—Prices Firm Except on Sheets

SAN FRANCISCO, May 5, (*By Air Mail*).—Movement of iron and steel products on the Pacific Coast during the past week showed little improvement over the previous week. The most active commodity was reinforcing steel, and several fair-sized awards were reported. Cast iron pipe inquiries have increased, but business booked did not exceed 1000 tons. The price structure is on a fairly firm basis in most lines, although low quotations continue on reinforcing bars out-of-stock in the San Francisco district.

Pig Iron.—During the past week more than 1400 tons of Indian foundry iron were imported. Most of it was taken by San Francisco and Los Angeles users, but several hundred tons went to Seattle and Portland. The next shipment, 1500 tons, is scheduled to arrive on the Coast in early June and will be distributed among Los Angeles and San Francisco melters. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards reported this week included 2000 tons for the Bon Marche Store at Seattle, divided between the Pacific Coast Steel Co. and the Northwest Steel Rolling Mills; 400 tons for the Kezar Stadium in San Francisco, placed with Gunn, Carle & Co., and 400 tons for foundations for the Capwell Store, Oakland, awarded to a San Francisco jobber. Pending business involves lots of less than 100 tons each. In the Bay district less than 2c. per lb. continues to be quoted in many instances.

Plates.—Plate business this week was in small lots. No action has yet been taken on 8000 tons for the Sequoia and Wildcat aqueducts, but a definite decision regarding the type of pipe to be used will no doubt be announced within a few days. Bids are in on 700 tons for a car float for the Santa Fe, and the Western Pacific will come into the market shortly for a similar float. Bids have been opened on a pipe line at Tacoma, calling for 120 tons. An inquiry is before plate mill representatives for 500 tons of 3/16 and ¼-in. material. The price is firm at 2.30c., c.i.f.

Shapes.—While structural shape awards were not numerous this week, totaling less than 1600 tons, new and pending inquiries call for close to 16,000 tons. The California Steel Co. took 380 tons for a warehouse in Oakland for the Port Commission. A bridge over the San Joaquin River at Herndon, Cal., calling for 1000 tons, went to the United States Steel Products Co. Bids were opened on 1125 tons for a bridge over the Columbia River at Kettle Falls, Wash. Other inquiries include 800 to 1000 tons for the West Waterway bridge in Seattle, 1500 tons for a pulp plant at Astoria, Ore., and 250 tons for an apartment building in Los Angeles. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Improvement in demand for cast iron pipe is noted. Awards include 234 tons of 4 and 8-in. class B for the Miller Cattle Co., Phoenix, Ariz., booked by O. F. Fisher of the same city, and 111 tons of 6 and 12-in. class B for a sewer project at Long Beach, Cal., awarded to C. Anill Co., Huntington Park, Cal. Bids were opened this week on 152 tons of 2 to 8-in. class B for Camas, Wash. On May 14, Lovelock, Nev., will open bids on 887 tons of 10 to 14-in. class 150. Los Angeles will open bids on May 11 for 1665 tons of 6-in. class B, and Pasadena, Cal., will receive bids on May 12 for 417 tons of 6 and 8-in. classes C and B. South Vancouver, B. C., has opened bids on 113 tons of 4 to 8-in. class B. Bids will be opened on May 21 for 131 tons of 10 and 14-in. class B pipe for a sewer project in Pacific Beach, San Diego, Cal.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Sheets.—Prices on black and galvanized sheets have weakened somewhat, reflecting the softness in Eastern centers. Demand is limited to unimportant tonnages. The Kittle Mfg. Co., Los Angeles, has been awarded the contract for the Texas license plates for 1929, requiring about 400 tons of black sheets.

Coke.—A shipment of 4500 tons of English byproduct and beehive foundry coke has arrived on the Coast and part of the cargo is now being unloaded at Los Angeles, the rest to be delivered to San Francisco melters. Prices are unchanged.

St. Louis

Expansion in Pig Iron Sales—Higher Prices on Some Scrap Items

ST. LOUIS, May 8.—Pig iron sales showed considerable improvement over the preceding week. The St. Louis Gas & Coke Corporation sold about 4500 tons, some for shipment into third quarter, including lots of 500 and 300 tons to two Iowa melters, 200 tons to a St. Louis stove foundry, and the remainder in scattered lots of a carload up to 200 tons. A leading Southern interest sold 1050 tons for May and June delivery. Shipments of the Granite City producer for April equaled March shipments, and were slightly better than those in April, 1927. The melt in the district is improving, but the stove plants report business is quiet. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.66
Northern basic, delivered	**20.66**

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Business in domestic coke during April was fairly good, dealers taking in heavier stocks than had been expected. Buying of foundry grades is quiet.

Finished Iron and Steel.—Blue annealed sheets are in good demand; tank plate buying is heavy, with prices improving, and there is a good demand for tin plate, according to the Granite City Steel Co. However, the situation as to galvanized sheets is not so good, buying from the agricultural districts not being up to expectations, and there is some price cutting. April warehouse business is about the same as in the preceding month, but about 10 per cent less than in April, 1927; the greatest loss comes from the oil-producing sections, buying in the St. Louis industrial district proper being

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

fairly good. Business is extremely dull with fabricators of structural steel, and there is complaint that prices are too low on the little trade that is available. About 600 tons of reinforcing steel was bought during the week.

Old Material.—Miscellaneous standard-section rails, railroad springs and cast iron borings were 25c. a ton higher, and cast iron car wheels were 50c. higher during the week, dealers paying more to obtain material to cover contracts. A higher market is expected on No. 1 busheling, as the result of more exacting specifications issued by the leading consumer in the district. It is expected that this also will cause higher prices to rule for shoveling steel. Railroad lists: Wabash, 2900 tons; Southern Pacific, 2800 tons; Kansas City Southern, 2400 tons; Chicago & Eastern Illinois, 450 tons.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.50 to $12.00
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.75 to 13.25
Railroad springs	13.75 to 14.25
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.50 to 10.00
Cast iron borings	9.00 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Canada

Steel Mill Operations Continue at High Rate—Pig Iron Weak

TORONTO, ONT., May 8.—The near-capacity operations that have featured activities of Canadian steel mills and various iron and steel consuming lines show no signs of declining. Most companies have a large volume of unfilled orders on their books and report a steady flow of new business. The Canadian National Railways have distributed the following orders among Canadian companies: To Canadian Car & Foundry Co., five cafe-parlor cars, two library observation buffet cars, 60 Hart-Otis ballast cars, and 30 colonist cars; to National Steel Car Corporation, Ltd., 12 box baggage cars, and 20 colonist cars; Eastern Car Co., 200 Hart-Otis ballast cars, and 12 steel drop-nose snow plows.

Pig Iron.—Conditions and activities in the market remain practically unchanged for the week. While no forward buying of importance is reported, a steady flow of shipping orders against contracts is appearing, which, together with the current demand on spot delivery account, is responsible for a large movement of foundry and malleable iron. Present sales are being made to hand-to-mouth consumers, who prefer to buy in this way rather than lay in large yard stocks. Spot sales of the week averaged between 50 and 200 tons. A couple of inquiries are out for as high as 500 tons, and these tonnages are to be delivered over water routes. Now that Great Lakes and St. Lawrence navigation has opened, pig iron interests look for larger tonnage placements by melters who are advantageously situated for water delivery. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—While general business is without special feature, current sales are reported at a good level. The market is spotty in some respects, showing general improvement for a couple of days in the week when several consumers came into the market for supplies for immediate needs. Advance buying is not an issue in the present market. Prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Plates, Shapes and Bars in Good Demand—Pig Iron Quiet

BIRMINGHAM, May 8.—The quiet selling under way for the past several weeks is still the outstanding characteristic of the pig iron market. Purchases are largely for immediate needs and a considerable portion of June iron is yet to be sold. Books have not been opened for third quarter. Foundries are taking shipments against contracts at a steady rate, and very little iron is being stocked. On some of the larger lots of foundry iron recently sold, furnaces have gone to $15.50, a reduction of 50c. a ton, but the usual quotation on small lots is $16, base. Seventeen furnaces continue in operation, 10 on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$15.50 to $16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.00 to 16.50
Basic	15.00

Finished Steel.—Orders and inquiries for bars, plates and shapes continue to hold close to the recent volume. Prices are substantially unchanged, though some variations from present quotations are made from time to time on the larger orders. New business in sheets is in reduced volume. Railroads have placed a fair volume of new business recently. New business with the structural steel fabricators shows improvement. The Virginia Bridge & Iron Co. has an order for 1800 tons for underframes for the Frisco System. The Ingalls Iron Works has received three orders totaling 380 tons. Reinforcing bar manufacturers are receiving sufficient tonnage to round out shop schedules. The Connors Steel Co. booked a 350-ton order for a Government building at Fort Bennings, Ga. Open-hearth operations have been the same during the past two weeks with the Tennessee company operating seven at Ensley and four at Fairfield, and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—Pressure pipe manufacturers obtained a moderate amount of new business in small orders during the week. Public utility buying has not developed to the extent expected. Local plants hope to share in a few of the orders to be placed by municipalities. Bids are to be opened this week on good-sized tonnages for Knoxville, Tenn., Greer, S. C., and Summerville, S. C. Inquiries show marked increase. Prices have advanced $2 a ton, and quotations are now being made at $31 to $33. Soil pipe makers are finding business fair. Shipments have increased slightly.

Coke.—Sales have been on a spot basis for some time owing to previous purchases by all of the important consumers. No change in the volume of current business is noted. Shipments of foundry coke on second quarter contracts are being made at fair rate. Quotations remain at $5.

Old Material.—The recent improvement in No. 1 machinery cast and steel scrap trading failed to carry forward into the past week. Both sales and demand are low in all lines. The quotation on above plate has dropped to $13.50. Other prices are the same.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to	$10.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	8.00 to	8.50
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.50
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Boston

Pig Iron Sales 8000 Tons, Mostly at $16, Buffalo—Scrap Prices Easier

BOSTON, May 8.—Pig iron sales the past week were nearly twice as large as in the previous week, running close to 8000 tons, including 4500 tons of Mystic iron and 1200 tons of Buffalo iron and some from Alabama, eastern New York and western Pennsylvania. Mystic sales included one lot of 3000 tons, and a Buffalo furnace sold 800 tons of No. 2X. A small amount of Indian iron, mostly No. 2X, at $21.75 and $22 on dock here, duty paid, was sold. Some sales were for prompt shipment, but most of them were for deliveries running into third quarter. Prices remain low, with Mystic, eastern New York State and Buffalo irons selling on a basis of $16 a ton, base Buffalo. Foundries with iron contracted for are taking it on schedule, and a few instances are cited where shipments are taken ahead of time. Indications are that buying for third quarter will be larger than expected a month ago. The New England melt increased quite noticeably during April and so far this month has shown a further gain.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.41 to	24.27
Alabama, sil. 2.25 to 2.75	22.91 to	24.77

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Iron Importations.—April receipts of foreign iron at this port totaled 1322 tons, compared with 558 tons in March, this year, 110 tons in April, 1927, 6332 tons in April, 1926, and 6167 tons in April, 1925. The April importations were made up of 997 tons of Indian iron and 335 tons of Dutch. Importers intimate that receipts of Indian iron from now on will be increased.

Coke.—Not much increase has occurred in the movement of by-product foundry coke from ovens to foundries. The movement, however, is no indication of the iron melt, because foundries are drawing on supplies taken in the last of 1927 and in March, this year. Foundry fuel is selling at $11 a ton, delivered within a $3.10 freight rate zone. Dealers are stocking up heavily with domestic coke; consequently ovens in New England for the first time this year are not increasing their storage piles.

Cold-Rolled Strip.—Little cold-rolled strip steel tonnage is coming into the market. Business is being taken on a basis of 3.15c. to 3.30c., base Worcester, Mass., for 1 to 3 ton lots.

Bars.—Mills report some slackening in buying of bars, but specifications against contracts are liberal. The market for bars is firm at 1.90c. per lb., base Pittsburgh. Orders for reinforcing steel are usually for small tonnages, yet the weekly turnover in New England runs into several thousand tons. The mill price remains at 1.90c. per lb., base Pittsburgh, but out-of-stock prices are irregular.

Old Material.—The old material market has lapsed into dullness. A little heavy melting steel for Pennsylvania delivery was bought in the past week at $9 to $9.25 a ton on cars, shipping point, indicating a slight easing in prices. Car lots of steel turnings, mixed borings and turnings, forged scrap, T rails and miscellaneous other materials have been moved, generally at inside quotations. Most shippers have completed their Pennsylvania orders for textile and machinery cast, and the turnover the past week was smaller than it has been in some time. On May 8 there was an auction sale of surplus materials at the Navy Yard, Boston, including 2,000,000 lb. of ferrous metals, 360,000 lb. of non-ferrous metals, 30,000 lb. of copper wire, 25,000 lb. of cable, and 150,000 lb. of black and galvanized heavy and light iron and steel.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.25
Scrap T rails	8.50 to	9.00
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.25
No. 1 yard wrought	7.50 to	8.00
Machine shop turnings	5.50 to	6.00
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.75 to	6.25
Forge flashings	6.60 to	7.25
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.25
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to	8.00
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	15.25 to	15.50
No. 2 machinery cast	13.50 to	14.00
Stove plate	10.00 to	10.50
Railroad malleable	13.00 to	13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c
Squares	4.35c
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Cincinnati

Southern Iron Off 50c.—Cast and Malleable Scrap Declines

CINCINNATI, May 8.—With substantial tonnages of pig iron on the yards of Southern producers, prices in the South are sagging, with the result that quotations have been made at $15.50, base Birmingham, a drop of 50c. a ton from the previous schedule. This puts Southern iron into Cincinnati at the lowest delivered price since October, 1916. In fact, it gives Southern furnaces a differential of 19c. a ton over northern Ohio interests, figuring quotations of the latter at $16.50, base furnace. Just how important the decrease will be in broadening sales in the district adjacent to and north of the Ohio River depends considerably upon whether Lake Erie producers will see fit to dip under $16.50 to obtain orders at such points as Louisville and Evansville. Undoubtedly Southern makers will have an advantage. Southern Ohio foundry iron remains nominally at $19, base Ironton. A local dealer has sold 7000 tons of foundry iron. The Ford Motor Co. is inquiring for 400 tons of 14 to 16 per cent ferrosilicon and the Andrews Steel Co. is in the market for 100 to 200 tons of ferromanganese.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.19 to 19.69
Alabama fdy., sil. 2.25 to 2.75	19.69 to 20.19
Tennessee fdy., sil. 1.75 to 2.25	19.19 to 19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Mills are having difficulty in obtaining orders and specifications in sufficient volume to sustain operations at the current rate. Especially in bars, structural shapes and plates is demand lagging, although these heavy steel products are firm at 1.85c., base Pittsburgh, for contract tonnages and at 1.90c. for small miscellaneous lots. Fabricators report that considerable work is about to come out, but jobs actually being figured are few in number. The only major project calls for 725 tons of steel for four hangars at Wright Flying Field, Dayton, Ohio. Orders for sheets have been received at a moderate rate by district mills, sales having been well distributed among all consuming lines. While there has been a slight letdown in specifications from the automotive industry, bookings from that source still are in impressive proportions. Black sheets are bringing 2.75c. to 2.85c., base Pittsburgh, galvanized stock, 3.65c. to 3.75c., automobile body sheets, 4c., and blue annealed, 2c. to 2.10c. Production of sheet companies in this district has been well sustained in the past week and no change is contemplated in the next week. Wire goods are rather quiet, with interest centering mostly in common wire nails, which are quoted at $2.50 to $2.55 per keg, base Ironton, with a barge rate of 14c. to this city. That there has been considerable irregularity in prices of nails is the report from producers. Makers of standard steel pipe declare that shipments to consumers in this territory have been exceptionally good, while sales of tin plate also have been brisk.

Reinforcing Bars.—New billet bars are firm at 1.85c., base Pittsburgh, and rail steel stock at 1.80c., base mill.

Warehouse Business.—Several important jobbers state that sales in the first week of May showed considerable improvement. Quotations on all items are steady and unchanged.

Coke.—Specifications and orders for by-product foundry coke have been in about the same volume as in the last week of April, while domestic grades still are in moderate demand for dealers' stocks. Shipments of beehive foundry coke from the Wise County and New River districts have been only fair. A central Indiana steel company is expected to buy 8000 tons of by-product furnace coke.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—There is perceptible weakness in the scrap market, cast iron and malleable iron grades having declined 25c. to 50c. a ton. Movement of material to district steel plants is slightly lower in volume. Dealers report that they are having less difficulty in buying scrap which some consumers have been holding in the hope of getting higher prices. Railroad lists closing this week are: Louisville & Nashville, Norfolk & Western, Southern and Chesapeake & Ohio.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

Buffalo

Detroit Scrap Again Moving to Buffalo by Boat—Pig Iron Melt High

BUFFALO, May 8.—Orders for pig iron placed during the week were small in number and tonnage. Practically all of them were 100-ton lots of foundry and malleable, with a few 200-ton lots, and the remainder carloads. Inquiry was light, the one outstanding being that of the Central Foundry Co. for Dundalk, Md., for an indefinite tonnage for the third quarter. The melt throughout the East, according to furnacemen, is increasing; shipments in April were larger than during March.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations continue at approximately the same percentage as in recent weeks. Prices for bars, shapes and plates are firm and the demand is fair. Sheet demand continues good, especially for automobile body and metal furniture sheets. Bolt and nut specifications are holding to a high level. Fabricated structural business is exceptionally quiet. Reinforcing bar ordering had an off-week; only small lots were placed.

Old Material.—The market seems to have weaker tendencies. A mill which last week was reported to have taken 1000 tons of No. 1 heavy melting steel at $14.75 is said to have bought an additional lot of about 1000 tons at this figure. The first shipment of scrap from Detroit was made by boat during the week. One of the local mills, which is said to have purchased about 60,000 tons of hydraulic compressed sheets and flashings last year, has received a shipment of between 3500 and 5000 tons of this material. Scrap shipments have been temporarily suspended by one of the prin-

Warehouse Prices, f.o.b. Buffalo

	Base per Lb
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

cipal consumers contributing to the dullness of the market.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$15.00
No. 2 heavy melting steel	12.75 to	13.25
Scrap rails	13.75 to	14.25
Hydraulic compressed sheets	13.00 to	13.50
Hand bundled sheets	9.00 to	9.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.50 to	12.75
Machine shop turnings	8.25 to	8.75
Acid Open-Hearth Grades		
Railroad knuckles and couplers	15.50 to	16.00
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
Low phosphorus billet and bloom ends	17.00 to	17.50
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.75 to	10.25
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades		
Steel car axles	17.00 to	17.50
Iron axles	22.00 to	23.00
No. 1 railroad wrought	12.50 to	13.00
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.50 to	13.75
Locomotive grate bars	12.00 to	12.50
Steel rails, 3 ft. and under	16.50 to	17.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Railroad	15.00 to	15.25
Agricultural	15.00 to	15.25
Industrial	15.00 to	15.25

Detroit

High Rate of Automobile Output Assured Until After June 1

DETROIT, May 8.—The feeling in the automotive industry seems to be that there is no apparent letup in the record breaking production schedules attained in the first four months of this year. In any event, present operations will prevail until after June 1. On the whole, production is still climbing, in spite of the fact that March totals in a few instances have not been equaled during the month just closed.

Buick is still running about 800 units per day. Cadillac and La Salle lines combined showed an April production of approximately 3300 units, or 647 better than the same month a year ago. This April figure, however, is 1200 units less than that for the previous month. Production for the first four months of 1928, at 14,184 units, showed an increase of about 46 per cent over that for the same period of 1927. Production is about equally divided between the two cars.

Chevrolet had an April production in excess of 132,000 cars and trucks, or practically the same as for March. April, 1927, production ran only 111,937. The first four months of 1928 show a total of approximately 474,000, against 379,330 for the same period in 1927.

Dodge Brothers turned out 22,533 units during the month just passed, or 8261 better than April, 1927. During the first four months of the year, Dodge production reached 82,943 units, against 60,838 for 1927, or a gain of 22,105 units.

Ford Motor Co. is producing model A cars at the rate of about 2300 per day, or about 300 more per day than reported last month. Edsel Ford states that by advancing production schedules a rate of 5000 units per day by July is aimed at. Thus far approximately 100,000 units have been turned out and unfilled orders run somewhere between 800,000 and 900,000.

During the past week the total production so far this year for Graham-Paige passed the entire total for 1927, which amounted to 28,881 units. The April figure is 8275, showing a gain of 5445 over that of April, 1927. During the first four months of 1928 21,407 units were produced, or nearly two and one-half times the 1927 figure for the same period, which was 8783. The Graham-Paige Motors Corporation has passed an appropriation to increase its capacity by one-third. The added facilities should be completed by July 1.

Hudson-Essex produced better than 28,000 units during April, bringing the total for the first four months to approximately 120,000 units. April figures, approximately 7700, are below those for March, and show a slight daily decline, even when allowance is made for the two extra working days in March. The May schedule has been set in advance of 28,000.

The Hupp Motor Car Co.'s April production of 8082 showed an increase of 3971 units over that for April, 1927. It was also better by 48 units than the figure for March of this year. During the first four months of the current year 24,952 units were produced, an increase of 9037 units over the same period in 1927.

April showed a production of 27,061 for Oakland and Pontiac cars, a decrease of 485 cars from the March production, but an increase of 7135 over April, 1927. Production for the first four months of this year amount to 100,004 units, or nearly twice that for the same period of 1927, which accounted for only 54,653. It is understood that the entire schedule for 1928 contemplates an increase of 40 per cent over 1927.

A new record was established during the past month for the Olds Motor Works, when 11,089 units were completed, contrasted with 9142 for March and 6000 for April a year ago. This company entered May with 7500 unfilled orders, and has tentatively set a schedule of 12,000 units for the current month.

Packard ran six units ahead of March, with an April production of 4434 units, which is better than twice the 1927 figure for the same month. The first quarter production for Packard ran 12,999 units, as against 6250 for 1927.

Reo turned out 5277 units in April, or an increase of 2028 over the previous month, but not equal to the 1927 mark for April, which stands at 5519. Reo had 6430 unfilled orders on the books May 1, and has set a production schedule for May of between 7500 and 8000 units, which if it is attained will far surpass production for May, 1927, which ran 5545.

April showed a total of 14,500 Studebakers completed. This is an increase of 1600 units over April, 1927, but a decrease of 2000 from the March figure of 16,500. During the first four months of this year 50,000 units were produced, while in the same period of 1927 only 43,000 were turned out.

Murray Corporation has booked approximately $7,000,000 worth of orders for Hupp Motor Car Co.

Auto body sheet is firm at 4c., Pittsburgh. Blue annealed is quoted at 2c., Pittsburgh. There is no change in cold finished bars and shafting, and alloy steel bars remain firm. No change is noted in the structural market. Volume holds up and prices of 1.85c. to 1.90c., Pittsburgh, remain unchanged.

Pig iron shipments will be slightly below March figures, owing to the fact that some of the automobile companies are preparing to bring out their new models, which necessitates some changes in patterns.

There have been no changes in prices on old materials in this district during the past two weeks.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to	$11.50
Borings and short turnings	7.25 to	7.75
Long turnings	6.75 to	7.25
No. 1 machinery cast	14.00 to	15.00
Automobile cast	19.50 to	21.00
Hydraulic compressed sheets	9.75 to	10.25
Stove plate	11.00 to	12.00
No. 1 busheling	8.50 to	9.00
Sheet clippings	6.00 to	7.00
Flashings	9.25 to	9.75

"Unusual Features in the Microstructure of Ferrite" is the title of a pamphlet of 68 pages issued by the Bureau of Standards at Washington as No. 571 of its Scientific Papers. The authors are Henry S. Rawdon, senior metallurgist of the bureau, and Torkel Berglund, research fellow Swedish American Foundation, Stockholm.

The Celite Co., Los Angeles, has purchased the plant and property of the National Magnesia Mfg. Co., Redwood City, Cal., and will continue business of latter company under name of National Magnesia Co. Both companies are manufacturers of diatomaceous earth insulating materials and kindred products.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 8	May 7	May 5	May 4	May 3	May 2
Lake copper, New York	14.25	14.25	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.00	14.00	14.00	14.00	14.00	14.00
Straits tin, spot, N. Y.	51.37½	51.12½	....	51.62½	51.87½	51.37½
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.30	6.27½	6.22½	6.22½	6.22½	6.22½
Zinc, St. Louis	5.95	5.92½	5.87½	5.87½	5.87½	5.87½

*Refinery quotation: delivered price ¼c. higher.

NEW YORK, May 8.—Demand is not particularly active in any of the markets; prices are generally strong. Copper is firmer, with a better tone. Tin is steady and moderately active. The lead market is unchanged. Zinc prices are again higher with demand fairly good.

Copper.—A decidedly cheerful tone pervades the market. A fair demand each day is reported for electrolytic copper, with no shading of prices, the quotation being firm at 14.25c., delivered in the Connecticut Valley. Domestic consumers still have considerable metal to buy for May as well as June. The wire makers are again buying more metal and other lines are well booked. Demand from foreign consumers is still good and their needs are not covered for May and June. All producers are still hard pressed to make deliveries on contracts and as a result there is very little prompt metal available. April statistics are expected to show a marked decline in stocks of refined metal and an increase in deliveries into consumption. Lake copper is in good demand at 14.25c. to 14.37½c., delivered, with buying about equally divided between May and June delivery.

Tin.—Sales for the week ended Saturday, May 5, were about 1000 tons, dealers doing practically all the buying. Consumers have been quite indifferent except for small purchases of spot lots. Spot and May metal is held under close control. Generally the market is featureless. Yesterday, Monday, about 100 tons changed hands and today demand was not heavy. Prices have about held their own with spot Straits tin today quoted at 51.37½c., New York. In London quotations today were higher than a week ago with spot standard quoted at £232, future standard at £231 2s. 6d. and spot Straits at £236 10s. The Singapore price today was £233 5s. Arrivals thus far this month have been 2575 tons, with 5675 tons reported afloat.

Lead.—Conditions are unchanged from last week. Only a moderate demand is reported with some good inquiry for June. Prices are evidently firmly entrenched at 6c., East St. Louis, for the outside market and 6.10c., New York, as the contract price of the leading interest.

Zinc.—In sympathy with an advance of $1 per ton in ore last week to $39, Joplin, prime Western zinc is now quoted at 5.95c. to 6c., St. Louis, or 6.30c. to 6.35c., New York. A moderately good business is reported as having been done each day. Producers are not eager sellers and are watching the ore situation keenly. About 15,000 tons was sold last week with production about 10,000 tons, thus reducing the large stocks slightly. Some producers will not sell at less than 6c., St. Louis.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The war situation in China is reflected in higher prices in this market where Chinese metal is today quoted at 11.25c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Market at Chicago

CHICAGO, May 8.—This market is quiet except in small and scattered sales. Prices for tin are lower

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.00c. to 54.00c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.50c. to 34.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets, open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged. Zinc sheets are being quoted at 9c., base, and lead full sheets at 9.75c. to 10c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	16.00c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Copper, cold rolled, 14 oz. and heavier	25.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

and quotations on antimony and zinc are higher. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 14.37½c.; tin, 52.25c.; lead, 6.10c.; zinc, 6.05c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

OBITUARY

Alexander W. Copland, president Copland Gear Lapping Syndicate, Detroit, died April 23 at his home near Birmingham, Mich., aged 60 years. He had formerly been president of the Detroit Gear & Machine Co., Detroit, and was previously manager of the Cincinnati plant of the National Biscuit Co. In the latter position he developed cake baking equipment that is said to have brought about marked changes in previous methods of baking. He served on the truck standardization committee during the world war. For a number of years Mr. Copland had been active in the affairs of the American Gear Manufacturers Association, having served as first vice-president and having been a member of the executive committee since 1922. He attended the recent meeting of the association in Rochester, N. Y., only three days prior to his death.

A. W. COPLAND

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Charles D. Jones, superintendent of the Hubbard Pressed Steel Co., Niles, Ohio, died May 5 as a result of injuries sustained when he was struck by an automobile. He was 48 years of age.

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Norris S. Rathburn, for several years treasurer of the National Acme Co., Cleveland, died suddenly May 6, aged 50 years. He had retired three years ago because of poor health.

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Ira Hobart Spencer, president of the Spencer Turbine Co., Hartford, Conn., died April 28, at the Hartford Hospital, following a short illness. He was born at Barkhamsted, Conn., 54 years ago. He was considered a leading authority on compressed air machinery and turbines, and during the war served in an advisory capacity for the Government. He was a member of the American Society of Mechanical Engineers.

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Charles F. Koopman, long identified with the New England Iron Works Co., New Haven, Conn., and its predecessor, the Cunningham Iron Co., died May 1 at his home in West Roxbury, Mass. He was born in Freeport, Me., Oct. 11, 1863.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.25c.	11.375c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

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William T. Emmes, vice-president of the Boye & Emmes Machine Tool Co., Cincinnati, died May 1 at Good Samaritan Hospital in that city, following a protracted illness. He was born at Winchester, N. H., in 1863 and went to Cincinnati 35 years ago, entering the employ of the R. K. LeBlond Machine Tool Co. In 1898 he became associated as superintendent with Dietz, Schumacher & Boye, which two years later was reorganized as the Schumacher & Boye Co. In 1912 the company was succeeded by the Boye & Emmes Machine Tool Co., Mr. Emmes at that time becoming vice-president and a member of the firm. For the past three years he had been inactive.

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John Markey, founder, president and general manager of the National Wrought Iron and Annealing Box Mfg. Co., Washington, Pa., died at his home there May 1. He was born in Wolverhampton, England, 62 years ago. His parents came to this country when he was four years old and located in Indianapolis. Mr. Markey started his company at Anderson, Ind., in 1893, but about 20 years ago it was removed to Washington. In 1902 he patented a tin plate annealing box and four years later, a sheet annealing box, which also was patented in England and Germany. He was a director of the Citizens National Bank, Washington, and a member of the American Steel and Iron Institute and the Foreign Trade Council.

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Edward C. Chapman, machinery dealer at Rochester, N. Y., and representative in that city for the Harding Co., Chicago, died in Rochester on April 14. He went to Rochester 20 years ago, where he became associated with the Davis Machine Tool Co., remaining with that company until it suspended business.

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A. M. Campbell, chairman of the board of the Glamorgan Pipe & Foundry Co., Lynchburg, Va., died on May 7. He had been identified with the company for 30 years, having begun as secretary to H. E. McWane, president of the company, and gradually promoted to his late position.

Speedy structural steel erection is reported from Chicago. The skeleton of the new Lawyers Building at 100 North LaSalle Street, comprising 25 stories and basement and requiring 1958 tons of structural steel, was erected in 36 working days. The Gage Structural Steel Co., Chicago, began deliveries of the steel work on Feb. 24 and made the final delivery April 13, and the erection, which was done by the Overland Construction Co., was completed shortly thereafter.

New orders booked during the first quarter of 1928, as reported to the Department of Commerce by 86 manufacturers of electrical goods, were $244,916,615, compared with $239,999,298 for the last quarter of 1927 and $243,651,415 for the first quarter of 1927. The recent figure is the highest since the last quarter of 1926.

RAILROAD EQUIPMENT

Virginian to Buy 1000 Car Bodies—Orders for 600 Freight and 100 Sleeping Cars

ORDERS for 300 gondolas for the Chicago, St. Paul, Minneapolis & Omaha, 200 poultry cars for the North American Car Corporation and 100 sleeping cars for the Pullman Co. featured the week's equipment buying. The Canadian Pacific placed orders for 25 locomotives and 11 snow plows. Among the new inquiries were 1000 hopper bodies for the Virginian Railway and 450 freight cars for the Chicago, St. Paul, Minneapolis & Omaha. Details of the week's business follow:

Chicago, St. Paul, Minneapolis & Omaha has purchased 300 general service gondola cars from Siems-Stemble Co. This road has also made inquiry for 200 50-ton flat cars and is expected to buy 250 additional freight cars.

North American Car Corporation has ordered 200 poultry cars from Standard Steel Car Co.

North Western Refrigerator Line will build 100 refrigerator cars in its own shops.

Chicago Rapid Transit Co. has withdrawn its inquiry for 50 to 100 motor passenger cars and 50 to 100 trailers. Chicago, South Shore & South Bend has also withdrawn its inquiry for passenger equipment.

Canadian Pacific has purchased 25 locomotives from American Locomotive Co., through Montreal Locomotive Works, Ltd. This road will also build 11 snow plows and 40 caboose cars at its Angus shops.

Virginian Railway is inquiring for 1000 hopper car bodies of 57½ tons' capacity.

Chicago, Burlington & Quincy is rebuilding 250 ballast cars at its Galesburg, Ill., shops.

Kansas City, Mexico & Orient is expected to make inquiry for 100 box cars.

Amtorg Trading Corporation, New York, has ordered 16 30-ton flat cars from Magor Car Corporation.

Pullman Co. has ordered 100 sleeping cars from Pullman Car & Mfg. Corporation.

Canadian Pacific has purchased five sleeping car underframes from Canadian Car & Foundry Co. and five from National Steel Car Corporation.

REINFORCING STEEL

Two Large Awards Bring Total to 10,700 Tons —5200 Tons in New Projects

WITH foundation work for the Cleveland Union Terminals Co. taking 2500 tons and a highway bridge at New Brunswick, N. J., 2400 tons, awards reported to The Iron Age in the last week amounted to 10,700 tons. New projects amounted to 5200 tons, including 2000 tons for a cold storage warehouse at Philadelphia and 1000 tons for a Chicago hotel. Awards follow:

New York, 500 tons of rail steel, piers for Hudson River Bridge, to Truscon Steel Co.

New York, 250 tons, Spatz Building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

New Brunswick, N. J., 2400 tons, highway bridge across Raritan River, to Kalman Steel Co.

State of New Jersey, 250 tons, road work; from Joseph F. Burke, general contractor, to Igoe Brothers.

Fort Benning, Ga., 350 tons, United States Army officers' quarters, to Connors Steel Co., Birmingham.

Uniontown, Ala., 100 tons, street paving, to Connors Steel Co.

Cleveland, 2500 tons, foundation and building work for Cleveland Union Terminals Co., to Bourne-Fuller Co.

Chicago, 500 tons, office building at 301 West Jackson Boulevard, to Kalman Steel Co.

Chicago, 400 tons of rail steel, Foreman National Bank Building, to Inland Steel Co.

Chicago, 400 tons of rail steel, building for the Union Carbide & Carbon Corporation, to Inland Steel Co.

Stickney, Ill., 800 tons, sewer for Sanitary District, to Truscon Steel Co.

State of Illinois, 300 tons of rail steel, road work, to Calumet Steel Co.

Aurora, Ill., 100 tons, school, to Concrete Engineering Co.

St. Louis, 500 tons; 350 tons for two retail stores for Sears, Roebuck & Co. and 150 tons for apartment at 4011 Delmar Boulevard, to Laclede Steel Co.

St. Louis, 100 tons, pumping station at City Sanitarium, to Missouri Rolling Mills Corporation.

San Francisco, 400 tons, Kezar Stadium, to Gunn, Carle & Co.

San Francisco, 100 tons, firewall for Union Oil Co., to Pacific Coast Steel Co.

Oakland, Cal., 120 tons, storm sewer, to Badt-Falk Co.

Oakland, Cal., 400 tons, foundation for Capwell store, to an unnamed San Francisco jobber.

Fresno, Cal., 100 tons, Teachers College, to an unnamed San Francisco jobber.

Sacramento, Cal., 100 tons, bridge over San Joaquin River at Herndon, to unnamed San Francisco jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

Boston, 600 tons, Charles H. Tenney Co. office building.

Philadelphia, 200 tons, Huntington Street station of Reading Railroad.

Philadelphia, about 2000 tons, cold storage warehouse for Reading Railroad; inquiry not yet issued.

Cleveland, 800 to 1000 tons, station building and viaduct for Cleveland Union Terminals Co.

Chicago, 1000 tons, hotel at Walton Place and Seneca Street; Levy & Klein, architects.

Chicago, tonnage not stated, plant addition for Container Corporation of America.

Chicago, 400 tons, Chicago Motor Club building.

Urbana, Ill., 100 tons, Lincoln Hall for University of Illinois.

New Trade Publications

Dust Precipitation Equipment.—General Electric Co., Schenectady, N. Y. Sixteen-page booklet, G. E. A. 916, describing general principles of Cottrell electrostatic process for cleaning blast furnace gas or other industrial smoke, and the special electric equipment required, such as mechanical rectifiers or vacuum tube kenotrons for transforming alternating current into direct current at from 65,000 to 100,000 volts, transformers, switchboards and protective devices.

Welding Supplies.—Lincoln Electric Co., Cleveland. Four-page pamphlet showing cables, shields, electrodes, holders and other supplies for arc welding.

Good Welding Essentials.—Wilson Welder & Metals Co., Hoboken, N. J. Instruction pamphlet (Bulletin E) showing how to maintain short arc, how to test welds, and notes on the strength of welds made under proper conditions.

Anti-Corrosive Metal.—American Sheet & Tin Plate Co., Pittsburgh. Twenty-page booklet, profusely illustrated, showing performance of steel containing fractional percentages of copper ("Keystone Copper Steel") when built into railroad cars, when used as corrugated sheets on buildings or for culverts and flumes on irrigation projects and when employed for various uses by sheet-metal workers.

Seamless Slip-Joint Pipe.—Otto Kafka, Esperson Building, Houston, Tex. Loose-leaf catalog of 16 pages devoted to "Kaysteel" seamless tubes, which are made by the Mannesmann piercing and pilgering process. The pamphlet deals with the process of manufacture, properties of the material, details of specifications and description of the joint as prepared for welding.

Materials-Handling Equipment.—Revolvator Co., 336 Garfield Avenue, Jersey City, N. J. Bulletin 82 illustrates on one large sheet a variety of equipment for raising and stacking material in warehouses and elsewhere. The raising element may be revolved on its center, operating on ball bearings in a large raceway.

Air Preheater.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Catalog AH-3 of 24 pages, illustrated, describes preheaters for boiler practice and tells of the advantages of heating air to be used for combustion. Illustrations include a number of applications.

Portable Compressors.—Ingersoll-Rand Co., 11 Broadway, New York. Pamphlet of 112 pages illustrating and describing multitudinous uses for portable compressors carried on motor trucks or trailers and employed at various places where compressed air can be utilized to advantage. City streets, mountainous districts, isolated operations of all sorts are included in the examples given.

Pyrometers.—Wilson-Maeulen Co., 383 Concord Avenue, New York. Miniature catalog, reproducing at one-quarter size (4¼ x 5¼ in. page) the firm's regular large catalog of equipment for recording, indicating and automatic control of high temperatures.

PERSONAL

F. A. Ernst has been appointed assistant district sales manager at St. Louis for the Inland Steel Co., Chicago, succeeding W. P. Brumm, who was advanced to the sales managership of the office in August, 1927. Mr. Ernst began his career with the Trumbull Steel Co. in 1914 and has since been associated with the sales departments of a number of companies. Most recently he was in the Chicago office of the American Rolling Mill Co.

F. A. ERNST

George A. Uhlmeyer, industrial engineer Peoples Power Co., Moline, Ill., has been elected chairman of the Tri-City chapter of the American Society for Steel Treating. Other new officers are R. E. McGee, International Harvester Co., Rock Island, Ill., vice-chairman, and Ernest E. Mueller, representative Carpenter Steel Co., secretary-treasurer. The executive committee consists of Earl Taylor, Yellow Sleeve Valve Engine Works, East Moline; E. H. Sohner, International Harvester Co., Rock Island; P. J. Barry, Barry Co., Muscatine, Iowa; Prof. John Fielding, University of Iowa; Fred Turner, Walworth Mfg. Co., Kewanee, Ill.; Hyman Bornstein, Deere & Co., Moline; W. H. Hull, John Deere Harvester Works, East Moline, and E. E. Einfeldt, French & Hecht Co., Davenport, Iowa.

E. B. Whitacre has been appointed superintendent of the Salem, Ohio, works of the American Steel & Wire Co. to succeed the late Robert C. Garrison. Mr. Whitacre has been employed by the company since 1901, having served as machinist and machine shop foreman in the Salem plant until 1915. He then went to the Trenton, N. J., plant as a master mechanic and in 1921 returned to Salem in the same capacity, retaining that position until his promotion to the superintendency.

Ralph C. Coxhead, since 1921 president of the Ralph C. Coxhead Corporation, New York, distributer in the United States and Canada of the Mercedes calculating machine, has been made vice-president in charge of sales of Veeder-Root, Inc., Hartford, Conn., recently formed by a merger of the Veeder Mfg. Co., Hartford, and the Root Co., Bristol, Conn. He was born at Oakland, Cal., in 1892, and began his business career in 1914 in the sales department of the Dalton Adding Machine Co., Cincinnati. Later he organized the Office Appliance Sales Co. and designed an automatic carriage shift for the Marchant calculating machine. Until 1917 he was employed in various capacities by the Burroughs Adding Machine Co. and as consulting engineer to the Marchant company. During the war he was active in the design of shells, fuses and other munitions, serving in both the United States and France. Following the war he was associated with the American International Corporation as assistant to the president of G. Amsinck & Co., a subsidiary.

Arthur C. Hitchcock, New Departure Mfg. Co., Bristol, Conn., has gone to Europe for a several months' vacation.

M. B. Hoffman, chief metallurgist Colonial Steel Co., Pittsburgh, spoke on April 24 at the dinner meeting of the Tri-City chapter of the American Society for Steel Treating. He gave an illustrated discussion of the general metallurgical terms as applied to both carbon and high-speed steels.

Dr. Robert J. Anderson, director of research Fairmont Mfg. Co., Fairmont, W. Va., producer of aluminum sheet and coil, was elected a vice-president of the company at a recent meeting of the board.

Howard W. Dunbar has been promoted from the position of assistant general sales manager of the Norton Co., Worcester, Mass., to that of works manager of the machine division. He succeeds John C. Spence who recently resigned. Mr. Dunbar will have charge of all production and engineering of his division. He joined the company in 1913 as assistant chief engineer of the machine division.

George N. Jeppson has been elected vice-president of the Norton Co., Worcester, Mass., in charge of production. He has been works manager and secretary of the board of directors since 1919, and will retain the duties of both these offices.

Myron C. Summers, president of the Thomas Sheet Steel Co., Niles, Ohio, at the time of its absorption by the Empire Steel Corporation, heads a new organization which has acquired the Pittsburgh Cold-Rolled Steel Co., Verona, Pa. This company is a producer of cold rolled strip steel with an annual capacity of 7000 tons, and recently has been in the hands of a creditors' committee. Mr. Summers has long been active in steel sales, having been sales manager of the DeForest Sheet & Tin Plate Co., acquired about nine years ago by the Republic Iron & Steel Co. Subsequently he became sales manager Superior Sheet Steel Co., Canton, Ohio, having left that position to become president of the Thomas company about six years ago. This company took over the Thomas works from the Youngstown Sheet & Tube Co., which had acquired it in its purchase late in 1922 of the Brier Hill Steel Co. A. H. Dillon, who has been in the steel brokerage business in Youngstown, is associated with Mr. Summers as vice-president, and D. S. Thomas, new secretary-treasurer, was formerly identified with the sheet steel industry in the Youngstown district.

J. I. Andrews, vice-president and general manager of sales for the American Sheet & Tin Plate Co., has resumed his duties after a two months' European trip.

D. W. Wallace, formerly manager of the Minneapolis branch of the American Cast Iron Pipe Co., Birmingham, has been transferred to the Chicago office of that company, succeeding R. R. Banta, resigned.

Wilbur B. Topping continues as general manager of sales Republic Iron & Steel Co., Youngstown, Ohio, and A. E. Walker as assistant general manager of sales in the reorganization of the sales personnel of the company incident to its formal absorption of the Trumbull Steel Co. James E. Holmes, who has been attached to the New York office of the Republic company, has been transferred to the general offices and will have charge of the steel tube division. The strip steel division is headed by F. H. Loomis, who recently was general sales manager Trumbull Steel Co. Frank Rownd, in charge of Republic sheet sales for several years, has similar duties as head of the sheet division; Walter W. Hall, for several years assistant to Mr. Topping, has been placed in charge of the bar and specialties division, and Avery Adams, formerly assistant general manager of sales for the Trumbull company, heads the tin plate division.

R. W. Wales has been appointed factory representative of the Celoron Co., Bridgeport, Pa., division of Diamond State Fiber Co., and will specialize on molding powders and resins.

George W. Mason has been elected president of Copeland Products, Inc., 630 Lycaste Avenue, Detroit, manufacturer of electric refrigeration machines, succeeding William Robert Wilson, who has been made chairman of the board. Mr. Mason was for a number of years works manager for the Chrysler Corporation, Detroit.

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J. C. Ward, president of the Edgar Allen Steel Co., New York and Chicago, sailed from England for the United States on May 2.

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Merle W. Pabst has been elected vice-president in charge of sales and purchases for the Mid-State Tools Co., Syracuse, N. Y.

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Alfred E. Munch, Jr., has been appointed representative in the Chicago-Milwaukee district of the Rollway Bearing Co., Inc., Syracuse, N. Y., and will have headquarters at 544 Railway Exchange Building, Chicago.

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William J. Serrill, assistant general manager United Gas Improvement Co., Philadelphia, has been elected chairman of the American Engineering Standards Committee, succeeding C. E. Skinner, chief engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, who has held the position for three years. Mr. Serrill has been prominent in the standardizing activities of the gas industry, and, as representative of the American Gas Association, he has been identified with the national standardization movement for several years. Cloyd M. Chapman, consulting engineer, New York, will serve as vice-chairman of the Standards Committee during the coming year.

W. J. SERRILL

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Will McNamee, for the past three years manager of the Pittsburgh district plant of Briggs & Turivas, Inc., Chicago, at Imperial, Pa., has been placed in charge also of Pittsburgh district sales. He was originally from the company's Chicago organization.

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Arthur E. Hodgkins, for several years assistant secretary and treasurer in charge of iron ore sales for Witherbee, Sherman & Co., Port Henry, N. Y., has severed his connection with that firm.

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J. L. Neely, traffic manager American Sheet & Tin Plate Co., Pittsburgh, has retired and Howard H. Smith, assistant traffic manager, has been named to succeed him.

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C. L. Wood, general manager sales Carnegie Steel Co., is back at his desk after an extended European tour.

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J. S. Keefe, president American Steel & Wire Co., accompanied by other executives of the company, is making an inspection tour of the company's plants, his first as president of the company. Plants in Cleveland, Farrell, Pa., and the Pittsburgh district will be visited this week.

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C. B. Gleason has gone with H. T. Gilbert to the Republic Iron & Steel Co. from the Sharon Steel Hoop Co., continuing as Mr. Gilbert's assistant, a position he has held during much of the latter's connection with the iron and steel industry.

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C. Irving Dwinell, recently a sales engineer at Providence for the General Electric Co., Schenectady, N. Y., has been appointed manager of the Boston branch of the United States Electrical Tool Co., Cincinnati, which is located at 514 Atlantic Avenue.

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H. S. Braman has resigned as a department superintendent of the Youngstown Sheet & Tube Co., Youngstown, Ohio.

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Thomas Pritchard has been appointed superintendent of the Girard, Ohio, plant of the A. M. Byers Co., Pittsburgh, succeeding the late William F. Lane. Mr. Pritchard has been with the company 25 years, serving first as chief clerk and later as assistant superintendent.

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D. B. Burleigh, sales manager Sundstrand Machine Tool Co., Rockford, Ill., sailed from New York May 4 on the steamship France for a two months' stay in Europe.

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Lieut.-Col. Sir William H. Ellis, a director of John Brown & Co., Ltd. (Atlas Works), Sheffield, England, and a past president of both the Iron and Steel Institute and the Institution of Civil Engineers, is at present on a tour in the United States.

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H. A. Stamper has been placed in charge of consumer motor sales at New York for the Lincoln Electric Co., Cleveland, and D. F. Titus, recently with the Portland Cement Association, has taken over the direction of welder service for the company in the same city. In the Cincinnati district A. H. Kirkpatrick has succeeded D. W. Carver as manager of welder service, Mr. Carver having been transferred to Cleveland. Consumer motor sales in Cincinnati district have been taken over by H. E. Nelson, formerly associated with the Willys-Overland Co., Toledo, Ohio. At Philadelphia, P. A. Ludwig, recently with Welding Engineers, Inc., has taken over welder service for the Lincoln organization. Forrest Kessler, who has been in the welding time study department at the Lincoln factory, has been transferred to the welder service division at Cleveland. At Chicago, J. R. Rothermel has been placed in charge of welder service, and W. Weaver, of consumer motor sales.

INSTITUTE ELECTIONS

W. L. King Honorary Vice-President and T. M. Girdler and G. M. Verity Directors

Willis L. King, vice-president Jones & Laughlin Steel Corporation, was made honorary vice-president of the American Iron and Steel Institute, at a meeting of the directors, May 7. He resigned as director for the term ending this year, but in his elevation to the honorary position, he retains the privileges of participation in the regular meetings of the directors. He is succeeded as a director by T. M. Girdler, president Jones & Laughlin Steel Corporation.

George M. Verity, president American Rolling Mill Co., was elected a director, taking the place of the late Joseph G. Butler, Jr.

The vacancy caused by the death of Judge Gary was filled at an earlier meeting by E. J. Buffington, president Illinois Steel Co.

The other members of the class of directors whose terms expire this year were reelected for the ensuing three years, namely, E. A. S. Clarke, William H. Donner, William J. Filbert, Samuel Mather, Isaac M. Scott, John A. Topping.

The board voted to increase the number of directors from 24 to 30, so that hereafter there will be three classes with ten in each group, each class serving for three years. It is expected that the additional number of directors will be elected by the board at its meeting prior to the semi-annual meeting in New York on May 25.

Machinery Markets and News of the Works

LARGE LIST AT CHICAGO

Deere & Co. Inquire for $500,000 Worth of Tools for Two Plants

General Business in Machinery Continues at About April Rate—Foreign Sales a Feature at Cincinnati

AN inquiry at Chicago for about $500,000 worth of machine tools for the Moline, Ill., and Waterloo, Iowa, plants of Deere & Co., agricultural machinery manufacturers, is of foremost interest in this week's machine tool developments. Other farm equipment manufacturers who are active buyers of shop equipment are the J. I. Case Threshing Machine Co., Racine, Wis., the International Harvester Co., Chicago, and the Monarch tractor plant of the Allis-Chalmers Mfg. Co., Springfield, Ill.

In the automobile field, buying has tapered off to a considerable extent, yet a fair demand has come within the past week from companies which have contracted to supply parts or accessories for Ford cars. The Logangear Products Co., Detroit, which will make oil pumps for the Ford company, bought about 25 machines from one dealer.

Railroad purchasing has been confined largely to orders of the Santa Fe and Union Pacific against recent inquiries. Small lists have been sent out by the New York Central, Erie, Rock Island and the Oregon Short Line.

In the East, the largest purchases have been made by the General Electric Co. for its Schenectady, N. Y., and Pittsfield, Mass., plants. Some of the textile machinery plants in New England have recently placed fair-sized orders, an interesting development in view of the unsatisfactory conditions which have prevailed in the textile industry.

Foreign sales have been conspicuous in the past few weeks, particularly at Cincinnati, where one company reports that its export bookings in the last 30 days have almost equaled domestic sales. A Cleveland turret lathe manufacturer took an order for four machines to be shipped to France.

The general purchasing officer, Panama Canal, Washington, is asking for bids by May 25 on a number of tools. The Ingersoll Milling Machine Co., Rockford, Ill., is in the market for several machines for a plant addition.

New York

NEW YORK, May 8.

MACHINE tool buying has gradually tapered off since March, but the decline has been gradual. Some New York State dealers did more business in April than in March, but the average was somewhat below the March rate. Since May 1 business has been only fair. Western New York State is quiet, but other sections of the eastern territory are fairly busy. Some good orders have recently come from New England makers of textile machinery. The Erie Railroad has inquired for a half dozen tools, including a 90-in. driving wheel lathe, 20-in. turret lathe, milling machine and a cylinder facing machine. The General Electric Co. has been a fairly large buyer.

Among the week's sales were the following: A Pratt & Whitney No. I A jig borer to an electrical manufacturer in Ohio; No. 2 jig borer to a Cleveland company; 22-in. vertical surface grinder and 16 x 36-in. lathe to an automobile company in Indiana; 13 x 30-in. lathe and 16 x 60-in. lathe to an electrical manufacturer in the East; gear-tooth grinding machine to a company in New Jersey; 4-spindle drum-type milling machine to a motor company in Michigan; 600-lb. steam hammer to a construction company in Birmingham.

Contract has been let by Ramsey Chain Co., Inc., 1031 Broadway, Albany, N. Y., manufacturer of silent chain transmissions, etc., to William Sayles & Son, 266 Hudson Avenue, for a one and two-story plant on Troy Road, to cost in excess of $450,000 with equipment. E. J. Opie is company engineer; Anthony B. Farrell is president.

Liberty Construction Stone Co., New York, care of Sidney F. Oppenheim, 156 East Forty-second Street, architect, has plans for a two-story plant, 100 x 225 ft., on Longfellow Avenue, near East Bay Avenue, for cutting, polishing, finishing, etc., to cost $90,000 with machinery.

Board of Education, Ossining, N. Y., plans installation of manual training equipment in new high school on South Highland Avenue (Albany Post Road), estimated to cost $750,000, in which amount a bond issue has been voted.

Rumidor Corporation, 500 Fifth Avenue, New York, manufacturer of humidors and other containers, is disposing of stock issue to total $144,000, a portion of fund to be used for expansion. Richard D. Zucker is president.

Jacob Mark, 51 Chambers Street, New York, is organizing a company to construct and operate a seven-story automobile service, repair and garage building at Seventh Avenue and Union Street, Brooklyn, to cost more than $400,000 with equipment.

J. Edward Birmingham, 45 Warburton Avenue, Yonkers, N. Y., architect, has taken out permit for a two-story and basement automobile service, repair and garage building, 90 x 100 ft., at 5120 Broadway, New York, to cost $100,000 with equipment.

General Motors Truck Co., has removed to its new seven-story and basement service, repair and sales building at 211-225 West Sixty-first Street, from Fifty-seventh Street and Eleventh Avenue, New York, and will operate motor truck rebuilding and repair plant at new location; each floor totals 20,000 sq. ft. floor space. Divisions will include department for trucks, coachs and cabs, machine shop, unit overhauling department, woodworking division, paint and trim shops, and other mechanical departments. Entire works will represent investment of $1,000,000. E. M. Seymour is general manager of local branch.

New York Steam Corporation, 280 Madison Avenue, New York, operating steam power plants and system for central heating service in different parts of city, has arranged for bond issue of $4,000,000, a portion of fund to be used for expansion. James D. Hurd is president.

Reid Ice Cream Corporation, 524 Waverly Avenue, Brooklyn, has plans under way for three-story automobile service, repair and garage building at Waverly and Atlantic Avenues, to cost about $100,000 with equipment. Kleinert & Klie, 250 Park Avenue, New York, are architects.

Board of Village Trustees, Freeport, L. I., is considering extensions and improvements in municipal power plant, to cost $250,000 with equipment. Special election is being arranged to approve bonds in that sum.

S. Friedman Co., New York, manufacturer of metal novelties, has leased a floor in building at 575 Eighth Avenue, for a local works.

Board of Education, Monroe, N. Y., plans installation of manual training equipment in proposed two-story high school, to cost about $165,000, to replace a structure lately destroyed by fire. F. B. Brooks is president, in charge.

Best Mfg. Co., 1200 Grove Street, Irvington, N. J., manufacturer of electrical products, radio equipment, etc., has awarded general contract to Kiegel & Spieler, Irvington, for a two-story addition, 35 x 130 ft., to cost about $35,000 with equipment. Victor H. Stromback, 1243 Springfield Avenue, is architect.

Board of Education, Oradel, N. J., is considering installation of manual training equipment in three-story junior high school, estimated to cost $385,000, for which plans will be drawn by Coffin & Coffin, 522 Fifth Avenue, New York, architects.

Gates-Day Aircraft Corporation, Paterson, N. J., recently organized, has leased factory property at 909-29 Twenty-third Street, and will establish plant for manufacture of airplanes and parts. Initial works are reported to cost in excess of $60,000. Company has also leased property at Teterboro, near Paterson, for flying field. Assets of former Standard Aeronautical Works, Elizabeth, N. J., have also been secured, and will be consolidated with new company. Ivan R. Gates is president; Charles H. Day, formerly chief engineer of Standard Works, vice-president; and Reuben Reiffin, president, West Paterson Bank, treasurer.

Shenken & Bristel, Newark, have leased a portion of factory at 39 South Sixth Street, and will install a machine shop for production of special automatic machinery and parts.

Board of Education, Summit, N. J., John D. Morgan, president, will receive bids until May 21, for machinery and equipment for woodworking and general shops in junior high school, steel lockers, and other equipment.

H. E. Salzberg Co., Inc., 54 Brook Street, Jersey City, N. J., manufacturer of electrical machinery and parts, has filed plans for new one-story plant, 50 x 215 ft., at Water and Clark Streets, to cost about $50,000 with equipment.

Quartermaster Department, United States Army, Washington, is arranging for early construction of a group of buildings at Picatinny Arsenal, near Dover, N. J., to replace structures destroyed by an explosion a number of months ago, reported to cost more than $850,000.

Modern Heating & Engineering Co., 170 Monmouth Street, Red Bank, N. J., has been organized to deal in product of Petroleum Heat & Power Co. Company has machine shop facilities and purchases materials other than Petro equipment in open market.

National Flue Cleaner Co., Inc., Groveville, N. J., manufacturer of soot blowers for return tubular and Scotch marine boilers has appointed following representatives: Walter G. Heacock Co., 30 Union Arcade, Cleveland, and 413 Penobscot Building, Detroit; Jack Deerwester Co., 1621 University Avenue, St. Paul, Minn.; Charles Zinram, P. O. Box 487, Erie, Pa., and Laib Co., Louisville, Ky.

National Oven Co., has removed its general offices from Grand Central Terminal, New York, to factory at Glenham, N. Y.

Atkinson & Utech, Inc., New York, dealer in iron and steel products including forgings and castings, has removed its offices to 117 Liberty Street.

Philadelphia Porcelain Co., Woodlynne, N. J., has been reorganized and plant will be completely revamped within short time. R. A. Weaver is president and R. A. Nelson, secretary and general manager. New furnace and special handling equipment will be installed immediately.

St. Louis

ST. LOUIS, May 8.

THE Missouri-Kansas-Texas Railway, Railway Exchange Building, St. Louis, is in the market for a 90-in. lathe for journal turning and quartering and crank pin turning. The St. Louis-Southwestern Railway, Buder Building, St. Louis, has purchased from Manning, Maxwell & Moore, a Putnam 90-in. lathe for journal turning and quartering, a Putnam heavy-duty axle lathe, and a Bridgeport floor grinder.

American Yard-O-Meter Corporation, has been organized at St. Louis, to manufacture a fabric-measuring and cost-computing device for retail dry goods stores. Company has authorized capitalization of 1250 shares of preferred stock, $100 each, and 1250 shares of common no par value stock. Principals in new company are officers of the American Fixture & Show Case Mfg. Co. Manufacturing plant is at 810 North Tenth Street.

New company is being organized by Frederick E. Kern, Syndicate Trust Building, St. Louis, and associates, to construct and operate new plant on Clayton Road, where site has been secured, for manufacture of special insulating brick, fire brick and other refractories, reported to cost more than $150,000 with machinery.

Anheuser-Busch, Inc., Ninth Street, St. Louis, is having plans drawn for an addition to power plant at its bottling works, including remodeling of present station and installation of new machinery, reported to cost about $200,000. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers.

General Airplane Co., Wichita, Kan., M. L. Howe, president, is reported planning establishment of new plant at Muskogee, Okla., for assembling service, to cost more than $30,000 with equipment.

Shellabarger Mill & Elevator Co., Salina, Kan., has approved plans for new grain elevator with capacity of 1,000,000 bu., reported to cost more than $350,000, with elevating, conveying and other mechanical equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Airmotor Corporation, Ponca City, Okla., is considering a new one-story plant for manufacture of aircraft equipment, reported to cost close to $32,000 with machinery.

Union Electric Light & Power Co., Twelfth and Locust Streets, St. Louis, has filed plans for one and two-story automatic power substation at 1408 Clark Street, to cost approximately $50,000 with equipment.

Seamon-Dunning Corporation, West Fourth Street, Pine Bluff, Ark., manufacturer of automobile bodies, is planning a one-story addition to cost in excess of $35,000 with equipment.

Swift & Co., Union Stock Yards, Chicago, will install cold storage and refrigerating machinery, and other power equipment, including mechanical handling equipment, in a new meat-packing plant at South Vandeventer and Papin Streets, St. Louis, consisting of three six-story units, to cost approximately $650,000. John H. Hall is local manager.

Board of Trustees, Kemper Military School, Boonville, Mo., is having plans drawn for one-story addition to power plant, including installation of engine-generator unit, and will soon take bids. Henrici-Lowry Engineering Co., Security Building, Kansas City, Mo., is engineer.

Griffin Brothers, El Dorado, Ark., are planning one-story automobile service, repair and garage building on South Jefferson Avenue, 120 x 300 ft., to cost about $65,000 with equipment.

Board of Education, Brookfield, Mo., is considering installation of manual training equipment in proposed new high school, estimated to cost $200,000, for which plans will be drawn by H. D. Pampel, Finance Building, Kansas City, Mo., architect.

City Council, Perryville, Mo., plans installation of pumping machinery and other power equipment in connection with proposed extensions and improvements in municipal waterworks. Bond issue of $120,000, has been approved for project. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Central West Public Service Co., Albion, Neb., has secured permission to issue bonds for $400,000, a portion of fund to be used for expansion and improvements, including transmission line construction.

Ingersoll-Rand Drill Co., 314 North Broadway, St. Louis, has been succeeded by Ingersoll-Rand, Inc., and has opened a new branch at 226 West A Street, Picher, Okla.

New England

BOSTON, May 8.

NEW ENGLAND machine tool dealers report that business is quieter than during the closing days of April. Inquiries have fallen off, but dealers say they have a large number of quotations out.

The Pneumatic Drop Hammer Co., Boston, is busy. It installed this week four 250-lb. and 300-lb. hammers in a leading Rhode Island jewelry manufacturing plant; has just booked a 900-lb. hammer for an Indiana plant; a cimilar hammer for a Utica, N. Y., manufacturer; two large hammers for an Eastern silverware maker; eight 200-lb. and 300-lb. hammers for Meriden, Conn., manufacturer and has a repeat order for a large hammer from a Providence, R. I., shop.

Some small tool houses did the largest business in April of any month this year, and at least one did more than in any month in more than a year. May, to date, is running far ahead of April.

The Crane Market

THERE is very little new inquiry for either overhead or locomotive cranes. About to close are six ¾-cu. yd. bucket handling overhead cranes for the Brooklyn Ash Removal Co., 186 Remsen Street, Brooklyn. The Franklin Lumber Co., Newark, N. J., is taking bids on a 10-ton crawl tread locomotive crane and has not yet placed two 15-ton overhead cranes for lumber handling.

In the Pittsburgh district the market is showing much activity. Carnegie Steel Co. will close soon for four cranes for its McDonald, Ohio, works. An order for a 20-ton 66-ft. span crane for Lorain Steel Co., Johnstown, Pa., is pending, and the Diamond Alkali Co. is expected to close soon for a 15-ton, 2 motor, 37-ft. span crane, and for a 1-motor crane for its Alkali, Ohio, works. American Rolling Mill Co. later in the year will want seven or eight cranes in connection with changes at its Butler, Pa., works. Appropriation has been granted for a new skelp mill at National works, National Tube Co., McKeesport, Pa., for which a few cranes will be required. Deere & Co., Moline, Ill., and Waterloo, Iowa, will purchase several overhead electric cranes. Williams, White & Co., Moline, Ill., is in the market for five overhead electric traveling cranes.

Among recent purchases are:

Interstate Palisade Park Commission, Bear Mountain, N. Y., two truck cranes from Browning Crane Co.

J. J. McGarry, Edgewater, N. J., one truck crane from Browning Crane Co.

G. W. Corson & Sons, New York, one truck crane from Browning Crane Co.

New Jersey Zinc Co., New York, 1¾ cu. yd. bucket handling crane from Western builder.

H. J. Heinz Co., Pittsburgh, two 2-ton 2-motor trolleys and one 2-ton 3-motor crane from Northern Engineering Works.

Bethlehem Steel Co., two 150-ton ingot stripper cranes, one each for Cambria works and Lackawanna works from Morgan Engineering Co.

A. M. Byers Co., Warren, Ohio, two 10-ton gantry cranes from Wellman-Seaver-Morgan Co.

Pittsburgh Coal Washer Co., one 50-ton, 77-ft. span crane from Morgan Engineering Co.

Interest in the crane market centers largely in the Boston & Maine Railroad Co. announcement that maintenance headquarters for work and wrecking equipment, as well as rail motor car equipment, are to be established at Keene, N. H. The car shops there are being enlarged and improved. New hoists of large capacity are to be installed, and the machine shop is to be re-equipped with new tools and appliances. Gasoline rail cars, wrecking cranes, coal cranes, locomotive hoists, ditchers, rail unloaders, ballast spreaders and pile drivers will be repaired there. The company has under consideration a number of wrecking and coal cranes as well as locomotive hoists.

Billings & Spencer Co., Hartford, Conn., tools and machinery, is operating at 100 per cent of capacity. Raw and finished stock on hand are not excessive. Customers are ordering conservatively, but often.

Sullivan Machinery Co., Claremont, N. H., reports its plants in excellent condition and in a position to take care of additional business without additional expenditures for machine tools and other equipment. Invoices for the first quarter of this year were 10 per cent less than for the corresponding period of 1927, but orders on books increased approximately 30 per cent.

New England Fuel & Transportation Co., 250 Stuart Street, Boston, contemplates additions to its Everett, Mass., coke-making equipment.

Taunton-New Bedford Copper Co., North Front Street, New Bedford, Mass., has started a one-story, 20 x 24 ft. plant addition.

W. A. Stone, State purchasing agent has plans for a repair shop and military equipment storage plant at Concord, N. H., State Camp Grounds. William M. Butterfield Co., 801 Beach Street, Manchester, N. H., are the architects.

Plans are in progress for a four-story sales and service plant addition on Commonwealth Avenue and Melvin Street, Boston, for the Packard Motor Car Co. Alvin Macaulay, 1530 East Grand Boulevard, Detroit, will make the award for construction and equipment.

Baird Machine Co., Stratford Avenue, Stratford, Conn., manufacturer of machine tools, will soon ask bids on general contract for one-story addition, 100 x 150 ft., to be equipped primarily as extension to machine shop, estimated to cost $75,000. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Charles Street Garage Corporation, 252 Cambridge Street, Boston, has plans nearing completion for three-story addition to service, repair and garage building, 80 x 100 ft., reported to cost in excess of $100,000 with equipment. Lockwood, Greene & Co., 24 Federal Street, are architects and engineers.

Colonial Can Co., 26-28 Pittsburgh Street, South Boston, plans early rebuilding of portion of plant destroyed by fire, April 28, with loss reported at $50,000, including equipment.

D. M. Watkins Co., Inc., Pine and Foster Streets, Providence, R. I., manufacturer of screw machine products, has filed plans for two-story addition, reported to cost in excess of $25,000 with equipment. William R. Walker & Son, Providence, are architects.

Connecticut Light & Power Co., Hartford, Conn., will soon begin work on two-story equipment storage and distributing plant on Curtis Street with mechanical repair and parts department, and one-story service and garage building for company trucks and cars, adjoining, estimated to cost $200,000 with equipment.

Perry, Buxton, Doane Co., 216 West First Street, Boston, operating a scrap iron and metal business, has acquired plant and equipment of Tremont Nail Co., Wareham, Mass., exclusive of real estate. The machinery will be dismantled and sold.

United Illuminating Co., New Haven, Conn., is asking bids on general contract for superstructure of its proposed new steam-operated electric generating plant on Grand Avenue. Entire project is reported to cost in excess of $750,000, with machinery. Westcott & Mapes, New Haven, are engineers. Company has filed plans for one-story automatic power substation on Jackson Avenue, Bridgeport, Conn., to cost more than $100,000.

Machinery, equipment and real estate of Vermont Machine Co., Inc., Bellows Falls, Vt., will be offered at a public sale on premises, May 17 and 18.

Boston & Albany Railroad Co., South Station, Boston, has filed plans for a new coaling station at 140 Cambridge Street, to cost about $50,000 with equipment.

South Atlantic States

BALTIMORE, MAY 8.

CONTRACT has been let by Bethlehem Shipbuilding Corporation, Key Highway, Baltimore, a subsidiary of Bethlehem Steel Corporation, Bethlehem, Pa., to Consolidated Engineering Co., 20 East Franklin Street, for second unit of shipyard addition, to be one and two-story, reported to cost in excess of $400,000, with equipment. Wilson & Tomlinson, 201 Devonshire Street, Boston, are engineers. J. M. Willis is manager.

Baltimore Coach Co., 2 St. Paul Street, Baltimore, has plans for one-story machine and repair shop at 120 West Fayette Street, reported to cost close to $20,000.

American Chatillon Corporation, 393 Seventh Avenue, New York, recently formed with capital of $10,000,000, plans installation of power house and machine shop, with other mechanical units, at proposed rayon mill at Rome, Ga. Entire project will cost in excess of $3,500,000. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers.

General purchasing officer, Panama Canal, Washington, is asking bids until May 25, for turret lathe, screw-cutting lathes, milling machines, drill presses, grinding machines, electric welding machine, hacksaws, wire rope, concrete mixers, etc., Panama schedule 1876.

Ruberoid Co., 95 Madison Avenue, New York, manufacturer of roofing, with main plant at Bound Brook, N. J., has perfected plans for merger with Continental Roofing & Mfg. Co., 1200 South Sixteenth Street, Baltimore, with branch factory at Mobile, Ala.; and P. F. Watson Co., Erie, Pa., manufacturer of kindred products. All present plants will be continued and general expansion program arranged. Each division of consolidated company will maintain identity as in past.

City Council, Florence, S. C., has authorized purchase of tract of 140 acres of land for establishment of municipal airport, and plans early construction of hangars, repair shops, oil storage and distributing building, and other structures. H. K. Gilbert, mayor, in charge.

Starke Foundry & Mfg. Co., Richmond, Va., recently organized by Allen J. Saville, Electric Building, and associates, with capital of $25,000, is planning operation of local foundry.

Columbus Electric & Power Co., Columbus, Ga., has authorized a note issue of $2,500,000, a portion of proceeds to be used for expansion, including transmission line construction.

General Public Service Corporation, Citizens' National Bank Building, Baltimore, Clarence B. Love, secretary, recently organized, is asking bids on general contract until May 15, for one-story fertilizer-manufacturing plant, 80 x 120 ft., reported to cost about $23,000, with machinery. Howard Borden, Catonsville, Baltimore, is architect.

United States Bureau of Standards, Connecticut Avenue, N. W., Washington, has asked appropriation of $350,000, for new four-story hydraulic laboratory, with equipment.

Hiner Supply & Mfg. Co., Raleigh, N. C., manufacturer of iron castings, etc., plans rebuilding of portion of foundry recently destroyed by fire with loss reported at $22,000, including equipment. C. N. Hiner is head.

Arrington Cold Storage Corporation, Arrington, Va., has approved plans for new one-story cold storage and refrigerating plant, reported to cost in excess of $50,000, with machinery. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer. John W. Wheeler is secretary.

Spear Engineers, Inc., Bankers' Trust Building, Norfolk, Va., H. B. Spear, president, is said to be planning a shipbuilding and repair yard on 15-acre tract of land at West Norfolk, to cost in excess of $100,000, with equipment.

Forsyth Street Garage Corporation, Atlanta, Ga., care of Pringle & Smith, Norris Building, architects, has asked bids on general contract for two-story and basement service, repair and garage building at Forsyth and Hunter Streets, reported to cost about $85,000, with equipment.

Nitrate Agencies Co., Wilmington, N. C., operated by W. R. Grace & Co., Murchinson Building, is planning rebuilding of portion of fertilizer plant destroyed by fire, April 30, with loss of about $150,000, in machinery and supplies, exclusive of building, which was owned by Atlantic Coast Line.

United States Engineer office, Savannah, Ga., will receive bids until May 16, for one 2-cylinder internal combustion engine, circular 132.

City Council, Warrenton, Ga., is asking bids until May 17, for deep-well pumping machinery and auxiliary equipment, steel water tank on elevated steel tower, and accessories, for municipal waterworks. J. B. McCrary Engineering Corporation, Atlanta, Ga., is engineer.

Public Improvement Commission, Baltimore, has authorized Board of Education, Madison and Lafayette Avenues, to purchase 11-acre tract of land on Barrington Road, near Garrison Boulevard, as site for proposed Forest Park high school, to include manual training department. Estimated cost is $1,000,000. Plans will be prepared under direction of Dr. David E. Weglein, superintendent.

Duke Power Co., Charlotte, N. C., has secured franchise for 100,000-volt transmission line to Marion, N. C., estimated to cost close to $160,000. W. D. Lee is engineer.

Philadelphia

PHILADELPHIA, May 7.

Contract has been let by Edward H. Reuss, Jr., Thirtieth and Race Streets, Philadelphia, manufacturer of pipe, heating equipment, etc., to Wark Co., 1600 Walnut Street, for one and two-story pipe-bending and fabricating plant at Forty-ninth Street and Gray's Ferry Avenue, to cost close to $150,000, with equipment. Philip H. Johnson, Widener Building, is architect.

Reading Railroad, Reading Terminal, Philadelphia, has acquired 12-acre tract of land at Nineteenth and Rockland Streets, and Germantown Avenue, for new shop and storage terminal for electric trains, to include repair and reconditioning departments and other mechanical shops. Work will be carried out in connection with electrification program on suburban lines, estimated to cost $20,000,000.

Simon Scullin, operating an iron foundry at Cambria and American Streets, Philadelphia, has awarded general contract to Knox Landers Co., 1132 Vine Street, for rebuilding of two-story plant, recently damaged by fire.

Sentman Motor Co., Fifty-eighth and Walnut Streets, Philadelphia, has leased a two-story building, 70 x 130 ft., to be erected on Chestnut Street, near Fifty-seventh Street, for a new service, repair and garage building, estimated to cost close to $100,000 with equipment. Eugene A. Stopper, 10 South Eighteenth Street, is architect.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has awarded general contract to Henry E. Baton, Inc., 1713 Sansom Street, for a one-story motor bus repair shop, 282 x 406 ft., at Third Street and Hunting Park Avenue, consisting of machine shop, parts department, woodworking department, reconditioning division and other mechanical departments, to cost approximately $300,000, with equipment.

South Jersey Port Commission, Harold Bennett, 317 Market Street, Camden, N. J., representative, in co-operation with City Council, Camden, has preliminary plans for new marine terminal on Delaware River, between Clinton and State Streets, to cost approximately $2,000,000, with unloading, elevating, conveying and other equipment. Charles W. Staniford, 50 Church Street, New York, is engineer for commission.

Public Service Electric & Gas Co., Public Service Terminal, Newark, N. J., has filed plans for a one-story power substation on Thirty-second Street, Camden, N. J., to cost close to $500,000, with equipment.

Board of Education, Elizabethtown, Pa., plans installation of manual training equipment in new two-story senior and junior high school on West High Street, estimated to cost $125,000, for which bids on general contract will be received on May 14. C. E. Urban, Woolworth Building, Lancaster, Pa., is architect.

Harrisburg Airport Corporation, Harrisburg, Pa., has been chartered by George R. Bailey, Harrisburg, and associates, with capital of $25,000, to construct and operate local airport, for which site has been acquired. Work will soon begin on hangars, repair shop, oil storage and distributing building, and other structures. Harry T. Neale, Harrisburg, is also interested in new company.

Pennsylvania Power & Light Co., Allentown, Pa., is concluding arrangements for purchase of Harrisburg Light & Power Co., Harrisburg, Pa., and will operate as unit of its organization. Expansion will be carried out in Harrisburg district, including transmission line construction.

Bridgeport Iron Works, Inc., care of W. R. Browne, Powell Street, Bridgeport, Pa., has awarded general contract to Friend-Reiff Co., Norristown Trust Building, Norristown, Pa., for a one-story foundry, 95 x 200 ft., at Church Road and Crooked Lane, Upper Merion, Pa., to cost about $65,000, with equipment.

Central Railroad of New Jersey, 143 Liberty Street, New York, has work nearing completion on a number of units at its new engine terminal and shops at Bethlehem, Pa., including machine shop, forge shop, wheel works, and other structures. Entire project will cost about $225,000.

Officials of International Cement Corporation, 342 Madison Avenue, New York, have organized a new subsidiary under Pennsylvania laws, to be known as Lone Star Cement Co., to take over and operate plant of Phoenix Portland Cement Co., Nazareth, Pa., recently acquired. New owner plans expansion in output. International company has also concluded negotiations for purchase of plant and property of Warrior Cement Corporation, Demopolis, Ala., and will operate as a unit of mills in different parts of country, totaling 13. H. Struckmann is president.

Marmon-Philadelphia Co., 847 North Broad Street, Philadelphia, local representative for Marmon automobile, has plans for extensions and improvements in service, repair and garage building at 661-69 North Broad Street, to cost about $35,000. Clarence E. Wunder, 1520 Locust Street, is architect.

Gill-Virden Co., Inc., Amber and Venango Streets, Philadelphia, manufacturer of illuminating glassware, is closing the plant of former Virden Co., 6103 Longfellow Avenue, S. E., Cleveland, manufacturer of brass and bronze lighting fixtures, recently acquired, and will consolidate the metal-working branch at Philadelphia works, where increased production will be carried out.

Waiskette Mfg. Co., 3240 North Thirteenth Street, Philadelphia, has been organized to manufacture steel wool brush for cleaning and polishing aluminum and other metals. It is in market for steel wool and will also purchase cutters, stitchers and other machinery.

Pittsburgh

PITTSBURGH, May 7.

MACHINERY dealers still are finding business slow, and some report inquiries to be fewer than they were recently. Sales run chiefly to single tools and repair parts. In cranes and heavy machinery business is fairly active and the prospect is bright, with several cranes likely to be placed soon. National Tube Co. has been granted an appropriation for a new skelp mill at its National Works, McKeesport, Pa. Crucible Steel Co. of America has bought a mill to roll alloy sheets at its Park works, Pittsburgh.

Pittsburgh Airways, Inc., 800 Union Trust Building, Pittsburgh, recently organized, has applied for permission to establish and operate local airport, to include hangars, repair shop and other mechanical buildings. It is purposed to operate an airline for passenger and freight service. John D. Shaner is representative.

Weil-McLain Co., Erie, Pa., manufacturer of heating and plumbing equipment, with branch plants at Chicago, and Michigan City, Ind., is disposing of a note issue of $1,000,000, a portion of proceeds to be used for expansion. Company has recently been making additions to plants.

Board of Education, Altoona, Pa., is planning installation in new West Side junior high school, at Thirteenth Street and Nineteenth Avenue, four-story, estimated to cost $750,000, for which bids will soon be asked on general contract by Hersh & Shellar, Commerce Building, architects.

Town Council, Romney, W. Va., is asking bids until May 17, for motor-driven pumping machinery and auxiliary equipment for municipal waterworks.

United States Engineer office, Huntington, W. Va., will receive bids until May 14 for iron and steel castings, including cast iron quoins, cast iron bearings and cast steel quoin locks, circular 197. Also, until May 15, for chain wheel and ¾-in chain, circular 198.

A. M. Byers Co., 235 Water Street, Pittsburgh, manufacturer of wrought iron pipe, etc., is arranging for sale of 125,000 shares of additional stock, to net from $11,000,000 to $13,000,000, a portion of fund to be used for expansion and development. Arrangements have been made for renewal of lease and option to purchase plant of American Puddled Iron Co., Youngstown, Ohio, now being operated, from Nov. 1, 1928 to Jan 1, 1930.

Kosmos Carbon Co., Union Building, Charleston, W. Va., is perfecting plans for two new carbon black producing plants in vicinity of Stinett and Sanford, Tex., each of 3-unit type, comprising 18 buildings, reported to cost in excess of $225,000, with machinery. Purchases will be under direction of C. A. Urban, company headquarters.

Rust Engineering Co., Rust Construction Co. and Bolivar Clay Products Co., Pittsburgh, have removed their offices to American Bank Building, Sixth Avenue and Grant Street.

Cincinnati

CINCINNATI, May 7.

THE first week of May brought a fair amount of business to machine tool builders, and inquiries indicate that sales this month will be in about the same volume as in April. Most orders are for single tools, and current demand is representative of all parts of the country. The Santa Fe and the Union Pacific have been active buyers in the past 10 days, and several other railroads are expected to purchase small lots of equipment. The New York Central, Southern Pacific and Kansas City Terminal Railroad each is in the market for an engine lathe, while the Boston & Maine is taking bids on two engine lathes. An important manufacturer reports that foreign sales in the past 30 days have been almost as large as domestic bookings. In the Detroit district, automobile makers have bought sparingly, although several orders have been placed by companies having Ford contracts. The Reynolds Engineering Co., Rock Island, Ill., has contracted for a 60-in. duplex control borer.

Contract has been let by Fremont Foundry Co., Fremont, Ohio, to Steinle & Wolfe Co., Crogan Street, for one-story foundry addition on Dickinson Street, reported to cost about $22,000 with equipment.

American Aggregates Corporation, Greenville, Ohio, recently organized to take over Greenville Gravel Co. and other properties, to specialize in production and distribution of concrete aggregates; manufacture gravel plant machinery and equipment, road maintenance trucks, etc., is disposing of bond issue of $2,000,000 a portion of proceeds to be used for expansion. F. D. Coppock is president.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until May 14, for 35 fuel pressure gages; 100 pressure thermometer gages; 40 oil-pressure gages; 1000 thermometer nuts; and 1000 tachometer shaft washers, circular 324; at same time, for 70 straight-side wheel assemblies, circular 323.

Common Council, Cookeville, Tenn., is considering a bond issue of $150,000, for extensions and improvements in municipal hydroelectric power plant on Falling Water River.

Edward J. Bosler, Tyler Hotel, Louisville, will take bids at once for proposed three-story and basement automobile service, repair and garage building, 165 x 200 ft., at Third and Guthrie Streets, to cost about $300,000 with equipment. Company is being organized to carry out project. E. T. Hutchings, 418 South Fifth Street, is architect.

Purchasing and contracting office, quartermaster department, Fort Hayes, Columbus, Ohio, is asking bids until May 21, for two boilers, with accessories, circular 53.

Southern Cities Power Co., Provident Building, Chattanooga, Tenn., is arranging for a bond issue of $3,500,000, a portion of fund to be used for purchase of interest in Southern Cities Utilities Co., and for expansion and improvements, including transmission line construction.

American Rolling Mill Co., Middletown, Ohio, has made application for permission to construct and operate a terminal wharf for handling materials at its West Works, Ashland, Ky., to include installation of crane runway and 10-ton electric traveling crane, and other elevating and conveying equipment. Facilities will be provided to handle about 20,000 tons per month.

Board of Public Works, Springfield, Ohio, is having plans drawn for extensions and improvements in municipal pumping plant for water service, to include installation of additional equipment. Eastman & Budke, Springfield, are architects.

Standard Ice Co., Knoxville, Tenn., has filed plans for a one-story ice-manufacturing plant, 86 x 115 ft., reported to cost more than $150,000, including equipment.

State Board of Education, Nashville, Tenn., has rejected bids recently received for new power plant, in conjunction with science building, at school at Cookeville, Tenn., and will have revised plans drawn and call for new bids, reported to cost in excess of $175,000.

Common Council, Centerville, Tenn., plans installation of pumping machinery and power equipment in connection with proposed extensions and improvements in municipal waterworks. A special election has been called for May 24 to vote bonds for $75,000.

The Fountain-Way Corporation, Cincinnati, with a capitalization of $300,000, has been incorporated to manufacture a new type of washing machine and will erect a one-story brick and concrete factory having 17,000 sq. ft. of manufacturing space at Mariemont Avenue and Trade Street, Westover, a suburb of Cincinnati. Expansion plans of the company call eventually for a two-story building with 160,000 sq. ft. of production area. Gregory T. Desjardins is vice-president and general manager.

Cleveland

CLEVELAND, May 8.

THE demand for machinery in Detroit from shops that have taken orders for parts for Ford cars continues fairly active. A Cleveland manufacturer of turret lathes during the week took single orders in Detroit for six machines for making Ford parts. The business placed by the Logangear Products Co., Detroit, for making oil pumps for Ford cars included about 25 machines bought from one dealer. Locally, the market is rather dull. Most of the business in this territory is coming from manufacturers of automobile parts. A Cleveland manufacturer during the week took an export order for four turret lathes for shipment to Paris, France. The New York Central Railroad is inquiring for a 24-in. lathe, a turret lathe and shaper. Small lists have been issued by the Santa Fe, Rock Island and Oregan Short Line Railroad.

American Electric Switch Corporation, Minerva, Ohio, is in the market for euipment for the manufacture of pressed steel threadless conduit fittings. Requirements include cadmium plating equipment; power presses for manufacture of collars and hubs; and automatic butt welding machines for joining the hubs to the bodies. Also automatic tapping and threading machinery for the collars and nuts, and automatic surface grinders for the completed fittings.

Air-O-Lator Corporation, Cleveland, has been organized to manufacture ventilating fans. Contracts for motors and frames have been made for one year at which time company will announce future plans which may include building of assembly plant.

C. & G. Cooper Co., Mount Vernon, Ohio, manufacturer of engines and power equipment, has awarded contract for construction of machine and tool building to H. K. Ferguson Co., Cleveland. New building will cost $60,000 and will replace two former structures.

Group of Warren, Ohio, interests is organizing a $200,000 company to manufacture steel stampings and pressed steel parts.

General Pressed Steel Co., which is building a plant at Newton Falls, Ohio, expects to get into operation within the next 45 days. Equipment has been purchased.

Chapman-Stein Furnace Co. and Chapman Engineering Co., Mount Vernon, Ohio, have been merged as Chapman-

Stein Co. and will continue in combustion engineering field, giving special attention to sale of gas producers, industrial furnaces and allied equipment. Personnel of old companies is practically unchanged.

Plans have been filed by Patterson Foundry & Machine Co., East Liverpool, Ohio, manufacturer of iron and steel products, ceramic machinery, etc., for a one-story addition to East End plant, 110 x 300 ft., reported to cost in excess of $100,000 with machinery. Richard L. Cawood is president.

W. H. Marlatt, receiver for McGraw-Tire & Rubber Co., East Palestine, Ohio, is arranging for sale of plant and property of company at public auction.

Henry & Murphy, Second National Bank Building, Akron, Ohio, architects, have plans for a two-story automobile service, repair and garage building on South High Street, to cost close to $90,000 with equipment.

Board of Education, Cleveland, is planning installation of manual training equipment in two new junior high schools, each three-story, on sites at Benham Street and East Boulevard, and at Bosworth Street and Parkhurst Drive, respectively, estimated to cost $700,000, for which bids are being asked on general contract until May 14.

Kilgore Mfg. Co., Uhrichsville, Ohio, manufacturer of cap pistols and kindred specialties, plans rebuilding of portion of plant destroyed by fire, May 2, with loss reported at close to $30,000, including equipment. Building was owned by Uhrichsville Board of Trade and occupied under lease.

Ohio Water Service Co., Massillon, Ohio, is disposing of bond issue of $3,000,000, and preferred stock in amount of $1,173,000, a portion of proceeds to be used for expansion in plants and systems, including acquisition of additional properties.

Fire, May 3, destroyed a portion of grain mill and elevator of Carey Mill & Elevator Co., Carey, Ohio, with loss reported at $100,000, including elevating, conveying and other mechanical equipment. It is planned to rebuild. D. C. Henry is general manager.

Scott & Fetzer Co., 11401 Locust Avenue, Cleveland, manufacturer of vacuum cleaners, etc., has taken out a permit for two-story addition, 43 x 60 ft., for which general contract recently was let to Webber Co., 1609 West Twenty-fifth Street. It will cost about $45,000 with equipment. A. G. Wolf, Swetland Building, is architect.

Chicago

CHICAGO, May 7.

OF foremost interest in this market is a list for more than $500,000 worth of machine tools for the Moline, Ill., and Waterloo, Iowa, plants of Deere & Co. J. I. Case Threshing Machine Co., Racine, Wis., and the International Harvester Co. are still actively engaged in making purchases. Allis-Chalmers Mfg. Co. has closed for a number of items for its Monarch tractor plant, Springfield, Ill., and is contemplating adding more equipment at an early date. The Ingersoll Milling Machine Co., Rockford, Ill., is in the market for tools for a plant addition. Dealers are receiving orders against the Union Pacific list; otherwise railroad buying is unusually quiet. Taken as a whole, this market is steady and prospects are that May sales will compare well with those of April.

Bids have been asked on general contract by Illinois Copper & Iron Co., 217 Maplewood Avenue, Chicago, manufacturer of kettles, expansion joints, etc., for a one-story addition, 48 x 100 ft., to cost about $25,000 with equipment. E. J. Patelski, 179 North Wells Street, is architect.

Combustioneer, Inc., Chicago, recently organized to manufacture automatic coal burners, has leased a one-story factory at 1829-39 South Fifty-fifth Avenue, totaling about 18,000 sq. ft., and will equip for new plant.

Illinois Power & Light Corporation, 231 South La Salle Street, Chicago, is disposing of a preferred stock issue to total $36,474,000, a portion of proceeds to be used for extensions in power plants and transmission lines. Clement Studebaker, Jr., is president.

Nimmons, Carr & Wright, 122 South Michigan Avenue, Chicago, architects, have plans under way for a 10-story automobile service, repair and garage building in Chicago Beach district, reported to cost in excess of $400,000 with equipment.

Minnesota Power & Light Co., Duluth, Minn., has arranged a fund of $1,120,400, for extensions and improvements in power plants, power substations and transmission lines during 1928. Additional equipment will be installed in Thomson generating station at Duluth.

Great Northern Railway Co., St. Paul, Minn., has plans under way for a new engine house and repair shops at Grand Forks, N. D., to cost about $140,000 with equipment. T. D. McMahon, Great Northern Railway Building, St. Paul, is company architect.

Board of Public Works, Cedar Rapids, Iowa, plans installation of pumping machinery and other power equipment in connection with extensions and improvements in municipal waterworks, for which a fund of about $500,000, is being arranged. Alvord, Burdick & Howson, Hartford Building, Chicago, are consulting engineers.

Maytag Co., Newton, Iowa, manufacturer of electric-operated clothes washing machines, is disposing of a preferred stock issue to total $13,250,000, a portion of proceeds to be used for expansion. E. H. Maytag is president.

Lapham-Hickey Co., 1625 West Pershing Road, Chicago, steel products, has acquired property, 160 x 175 ft., at South Turner Avenue and Forty-seventh Place, and plans early erection of a one-story and basement storage and distributing plant, totaling 25,000 sq. ft. floor space, reported to cost in excess of $50,000 with equipment.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of corrugated paper boxes and containers, will have plans drawn for a new mill on Ogden Avenue, for manufacture of paperboard, to cost in excess of $400,000 with equipment. Walter P. Paepcke is president.

Coleman Lamp & Stove Co., Wichita, Kan., has sold a stock issue in amount of $1,710,000, a portion of fund to be used for expansion. W. C. Coleman is president.

Belsky Motor Co., Iowa Avenue and Eighth Street, Dubuque, Iowa, has plans for a one-story service, repair and garage building to cost about $40,000 with equipment. C. I. Krajewski, 730 Main Street, is architect.

Great Lakes Paper Co., operated by Backus-Brooks Co., Builders' Exchange, Minneapolis, Minn., has disposed of a bond issue of $10,000,000, a considerable portion of fund to be used in connection with a new newsprint mill at Fort William, Ont. Initial unit is now nearing completion and work will soon proceed with a second unit, to be ready for service in about 12 months. A sulphite mill is being built.

American Signs Corporation, Kalamazoo, Mich., has completed installation of porcelain enameling department. Enameling furnace is operated electrically and installation was designed by Ferro Enamel Supply Co., Cleveland.

Cribben & Sexton Co., Chicago, is installing new Alundum "V" bottom furnace, with special hanging rack equipment, supplied by Ferro Enamel Supply Co., Cleveland.

Black Hawk Brass & Aluminum Foundry, Westfield Avenue, Waterloo, Iowa, has been opened by E. E. and C. P. Foster and will engage in brass, aluminum and bronze foundry work, specializing in new acid resisting metal invented by E. E. Foster.

Arthur L. Stevens Corporation Chicago, has removed from 28 East Jackson Street to Engineering Building, 205 West Wacker Drive.

Chicago office of David Lupton's Sons Co., manufacturer of steel windows, has been removed from Steger Building to larger quarters at 333 North Michigan Avenue. Roy A. Sanborn is district manager.

O. E. Szekeley Corporation has purchased the factory and foundry of the Burke Engineering Company, Seventh Street, Holland, Mich., and already has begun operations. New equipment has been added to the foundry which includes provision for making brass and aluminum castings.

Link-Belt Co., 329 West Pershing Road, Chicago, will build a one-story factory, 120 x 220 ft., to cost $60,000.

Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, manufacturer of air chucks, will build a two-story factory addition, 75 x 116 ft., to cost $35,000.

Servel Corporation, Evansville, Ind., manufacturer of electrical refrigeration units, will build a factory addition to cost $15,000.

Buffalo

BUFFALO, May 7.

Bids have been asked on general contract by U. S. Hoffman Machinery Corporation, 329 Temple Street, Syracuse, N. Y., manufacturer of clothes-pressing machines, parts, etc., for three-story addition, estimated to cost $70,000, with equipment. Portion of unit will be used as a foundry. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers.

Eastern States Milling Co., Ontario Street and Cloverdale Road, Buffalo, has awarded contract to Monarch Engineering Co., Chamber of Commerce Building, for three-story addition to mill and elevator, estimated to cost $200,000; installation will include mechanical cleaning, packing and other machinery. C. B. Lee is secretary and general manager.

Consolidated Water Co., Utica, N. Y., is disposing of a bond issue of $4,000,000, a portion of proceeds to be used for extensions and improvements in plants and system. Waterworks are operated at Frankfort, New Hartford, Whitesboro, Deerfield and other points. Franklyn C. Hopkins is president.

Utica Ramp Parking Co., Mayer Building, Utica, has plans under way for multi-story service, repair and garage building at Washington and Oriskany Streets, estimated to cost $275,000, with equipment. R. S. Westbrook, Utica Bank Building, is architect; C. Kiehm, Gardner Building, is engineer.

Buffalo Foundry & Machine Co., 1543 Fillmore Avenue, Buffalo, manufacturer of vacuum drying machinery, evaporators, etc., has taken over plant and property of Chemical & Vacuum Machinery Co., 1608 Main Street, manufacturer of kindred equipment, and will consolidate with its organization. Expansion in output is being arranged, including production of additional machinery, comprising new design of vacuum rotary dryer, spray film feed, etc. Charles O. Lavett and H. E. Neubauer, heretofore general manager and chief engineer, respectively, of purchased company, will continue with Buffalo Foundry Company.

Rochester Gas & Electric Co., Rochester, N. Y., has filed application with Public Service Commission for permission to use additional property on Geneseo River for proposed extensions in hydroelectric power facilities.

Board of Education, Binghamton, N. Y., is planning installation of manual training equipment in proposed junior high school at Helen and Highland Avenues, estimated to cost $750,000. T. I. Lacey & Son, Press Building, are architects.

Board of Education, Canandaigua, N. Y., is asking bids on general contract until May 22, for one-story manual arts shop, in conjunction with gymnasium at Canandaigua Free Academy, West Main Street, estimated to cost $200,000, with equipment. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

Detroit

DETROIT, May 8.

PLANS have been completed by Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, for a one-story addition to power plant at local works, reported to cost in excess of $85,000 with equipment. Albert Kahn, Marquette Building, is architect.

George Bachman, Flint P. Smith Building, Flint, Mich., architect, has plans under way for a three-story automobile service, repair and garage building at North Saginaw and Wood Streets, to cost about $130,000 with equipment.

Monroe Auto Equipment Co., Monroe, Mich., is arranging for immediate construction of new one-story plant unit to cost close to $150,000, and will equip for production of hydraulic shock absorbers, on basis of 500,000 sets per annum. Manufacture will also be increased for self-oiling tire pumps and automobile heater units. C. S. McIntyre is president and general manager.

Board of County Supervisors, Menominee, Mich., has authorized purchase of tract of 100 acres of land north of city for establishment of municipal airport, and will soon have plans drawn for hangars, repair shop, oil storage and distributing building, and other mechanical units.

Copeland Products, Inc., 630 Lycaste Street, Detroit, manufacturer of electric refrigerating equipment, has leased property adjoining plant, and will arrange for additional facilities to double the present capacity, reported to cost in excess of $100,000. W. D. McElhinny is vice-president.

Victor Body Co., Lansing, Mich., recently organized by H. Jay Hayes and associates, is establishing a local plant for manufacture of automobile bodies and will begin operations at an early date. H. B. Nelson, formerly connected with Hayes-Hunt Co., at Elizabeth, N. J., will be chief engineer.

Universal Products Co., 6455 Kingsley Avenue, Detroit, will make extensions in machine shop for production of small parts for automobiles, reported to cost about $40,000, with equipment.

In connection with expansion program at Lansing, Mich., plant, Durant Motors, Inc., 250 West Fifty-seventh Street, New York, will build an addition to power plant, with installation of additional equipment. Superstructure will soon begin on one-story factory unit, 62 x 500 ft., with wing extension 490 ft., and second wing, 400 ft. New structure will provide about 225,000 sq. ft. floor space, and will develop local plant to production of 1000 cars per day. It will cost more than $700,000 with equipment.

Plans are under way for a merger of Marvel Carburetor Co., Flint, Mich.; Borg & Beck Co., 310 South Michigan Avenue, Chicago, manufacturer of automobile clutches and kindred products, with main plants at Clearing and Moline, Ill.; and Mechanics Machine Co., Rockford, Ill., manufacturer of automotive equipment. It is purposed to continue all present plants in operation and carry out expansion program for increased manufacture.

Line-O-Scribe, Inc., Adrian, Mich., manufacturer of window-card writing machines, is planning for early removal of plant to larger factory, where capacity will be increased. Company has been leasing portion of local plant of Bond Steel Post Co., which has now been sold to Evans Auto Loading Co., which will occupy entire structure.

Motor Camshaft & Parts Corporation, 244 Houseman Building, Grand Rapids, Mich., has been organized to manufacture camshafts and pistons. Company owns Yassenoff welded camshaft patents and Stungo non-ring piston patents. Automobile companies are being licensed to make camshafts under company's patents and within year shafts will be furnished by maker.

Fleckenstein Pump Co., 326 Bond Avenue, Grand Rapids, Mich., has been organized to succeed Fleckenstein Visible Gasometer Co. and is manufacturing visible gasoline pumps for filling stations. Company has its own equipment, does its own machine work and purchases raw materials locally and in Chicago market. Company also does jobbing business in other items used by oil and gasoline distributers.

Milwaukee

MILWAUKEE, May 7.

BUSINESS in machine tools during the past week showed some signs of hesitancy as compared with several previous weeks, but inquiry was well maintained and a moderate number of orders for one or two machines was booked. Automotive industries are now doing little beyond the making of necessary replacements or changes, although in one or two instances plans call for the purchase of additional tools on a fairly large scale. The power farm machinery industry is still active, although its needs appear largely filled for the present. Payrolls and production schedules of most tool shops continue at the recent peak.

International Harvester Co., 784 Park Street, Milwaukee, has placed general contract with Worden-Allen Co. for construction of brick and steel boiler room building, 65 x 140 ft. Equipment contracts remain to be placed. Paul F. Schryer is general superintendent.

Olsen Mfg. Co., Kenosha, Wis., has been organized by Hans P. Olsen, 501 Cherry Street, Milwaukee, to engage in production of tools, dies, jigs, fixtures and special machinery in plant of former Winther Motor Co., Kenosha, which was acquired recently. Some additions are being made to equipment purchased with factory buildings, and considerable replacement work will also be done. Lester L. Olsen is vice-president and general manager, and Robert E. Bussian, works manager.

Highway Trailer Co., Edgerton, Wis., is making additions to its equipment to facilitate execution of several large orders just booked. American Telephone & Telegraph Co. has placed order for $600,000 worth of trailers; City of Chicago, $500,000 for 85 units for rubbish hauling, and City of Cincinnati, garbage trailers valued at $65,000.

Members of Philip Orth Co., 202 Florida Street, maker of bakery equipment and supplies, have formed Beat-All Corporation, to manufacture similar machinery. Production at first will be centered on variable speed cake-mixing machine with 1½ hp. Century electric motor. Philip Orth, Jr., is vice-president and general manager.

Madison Gas & Electric Co., Madison, Wis., which is at work on $500,000 addition to its steam generating capacity, has placed order for 15,000 kw. turbine condenser with the Allis-Chalmers Mfg. Co., Milwaukee. Project is in charge of Mead & Seastone, consulting engineers, Madison.

Drott Tractor Co., 123 Wisconsin Avenue, Milwaukee, territorial distributer of caterpillar tractors and equipment, has plans by M. Tullgren & Sons, local architects, for $125,000 headquarters building for sales and service on Wisconsin Avenue, near Thirty-seventh Street.

Production of steel stanchions, stalls and pens, litter carriers and other steel bran and dairy equipment has been started by Fitzgerald Mfg. Co., in a new plant at Merrill, Wis. Manufacture of hardware specialties for wholesale trade is planned during slack seasons in its regular lines. Edward Fitzgerald is general superintendent.

Milwaukee Board of School Directors will close bids May 31 on enlargement and re-equipment of boiler house of Twentieth Street school, estimated to cost $40,000. Frank M. Harbach is business manager.

Modine Mfg. Co., Racine, Wis., manufacturer of automobile, truck, tractor and industrial gas engine cooling systems, is considering erection of plant additions costing $100,000 to increase its capacity about 25 per cent. An architect will be selected shortly. A. B. Modine is president and general manager.

Common Council, Randolph, Wis., is about to request bids for the reconstruction and repair of the municipal steam generating plant at an estimated cost of $58,000, for which appropriation has just been made. New boilers, two new generators, switchboard and other equipment is specified. B. C. Keeley is superintendent.

Hawthorne Building Corporation, 1 South Pinckney Street, Madison, Wis., has engaged Fred L. Kronenberg, local architect, to design an automotive sales, service and storage building on University Avenue, to cost $125,000. Perry Sletteland is president.

Wisconsin Power & Light Co., Madison, Wis., has acquired the dam site and property of the former Necedah Mill Co. at Necedah, Wis., and plans the erection of a new hydroelectric generating plant to cost about $100,000.

Badger Meter Mfg. Co., 841 Thirtieth Street, Milwaukee, water meters, has placed general contract with R. L. Reisinger & Co., 484 Oakland Avenue, local, for erecting foundry and carpenter shop addition, 60 x 120 ft., costing about $65,000 with equipment. C. W. Wright is president and general manager.

Belle City Malleable & Wrought Iron Co., Racine, Wis., has started work on the construction of a plant addition, 60 x 118 ft., at its works at Forest Avenue and Kewaunee Street. Investment will total about $40,000. Nelson Co., Racine, is general contractor.

Indiana

INDIANAPOLIS, May 8.

BIDS will be received by Common Council, Edinburg, Ind., until May 21, for power house for municipal service, reported to cost about $23,000. Donald Graham, Hume-Mansur Building, Indianapolis, is architect and engineer.

Indiana Truck Corporation, Marion, Ind., recently merged with Brockway Motor Truck Corporation, Cortland, N. Y., is reported planning a new assembling plant at Atlanta, Ga., to cost in excess of $100,000, with equipment. Another plant of same character is also projected for Southern district, on site to be selected. Both works are scheduled for completion before close of year.

George J. Mayer Co., Market and Liberty Street, Indianapolis, manufacturer of aluminum and brass plates for automobiles, small metal stampings, etc., has plans for a new addition, designed to double present output, two-story, reported to cost more than $100,000 with equipment.

Southeastern Indiana Power Co., recently organized to take over electric power business of Indianapolis & Cincinnati Traction Co., Indianapolis, lately secured at a public sale, is arranging for extensions and improvements to cost more than $100,000, including transmission line construction. Headquarters will be at Indianapolis. Company will acquire Milroy Light & Power Co., Milroy, Ind., Atwood-Burkett Light & Power Co.; Battle Ground Light & Power Co., and other utilities, and will carry out expansion program.

Davis Industries, Inc., Kokomo, Ind., manufacturer of radio equipment, cabinets, etc., has disposed of a preferred stock issue to total $341,000, a portion of proceeds to be used for expansion.

Department of Water, Evansville, Ind., will soon take bids for one-story and basement equipment storage and distributing plant at Water and Pine Streets, 70 x 150 ft., with pipe and repair department, garage and service facilities, to cost close to $40,000, with equipment. John C. Males, City Hall, is secretary. Frank J. Schlotter, Dickman Building, is architect.

Gulf States

BIRMINGHAM, May 8.

GULF STATES UTILITIES CO., Beaumont, Tex., operating electric light and power plants, and ice-manufacturing plants, is disposing of preferred stock issue of $2,940,000, a portion of proceeds to be used for expansion, including installation of additional equipment. George H. Clifford is president.

Mississippi Steel & Iron Co., Inc., High and Monroe Streets, Jackson, Miss., plans new plant unit for production of ornamental iron and structural steel products, with output of about 200 tons per month. Equipment purchases will soon be made.

Inland Utilities Co., Kansas City, Mo., has secured a franchise at Blue Mountain, Miss., and plans construction of electric light and power plant, reported to cost in excess of $80,000 with equipment.

Gulf, Colorado & Santa Fe Railway Co., Galveston, Tex., has approved plans for a new engine house with repair facilities at San Angelo, Tex., in connection with freight terminal. Entire project will cost about $350,000.

Southern States Power Co., Marianna, Fla., is arranging an expansion and improvement program to cost about $100,000, including new steam-operated electric power plant on Jefferson Street.

Planters' Cotton Oil Co., Yazoo City, Miss., has authorized plans for complete electrification of its plant, and will soon begin installation of equipment.

Texas Cities Gas Co., El Paso, Tex., recently organized as a subsidiary of Union Utilities, Inc., to operate gas-manufacturing properties, is disposing of a note issue of $2,500,000, a portion of proceeds to be used for purchase of existing gas generating stations and installation of additional plants. H. G. Scott is president.

Board of Education, Panhandle, Tex., plans installation of manual training equipment in new two-story high school, estimated to cost $140,000. Butler Co., Hersh Building, Oklahoma City, Okla., is architect.

West Texas Gas Co., Amarillo, Tex., operating natural gas properties, is said to be planning additions in pipe lines to total close to 100 miles for service at Tahoka, Lamesa, Stanton, and vicinity, reported to cost more than $325,000 with equipment.

Florida Power Corporation, St. Petersburg, Fla., is considering a new steam-operated electric power plant on Monroe Street, Mayo, Fla., with Diesel engine installation, reported to cost more than $65,000. An ice-manufacturing plant is also planned at same place.

Board of Education, Fairfield, Ala., plans installation of manual training equipment in new three-story high school, estimated to cost $200,000, for which bids are being asked on general contract until May 16. Denham & Denham, Comer Building, Birmingham, Ala., are architects.

Board of Public Works, Baton Rouge, La., will take bids early in June for new pumping plant in connection with extensions in sewage system; project will cost about $180,000.

Chadwick Machinery Co., 125 Blue Star Street, San Antonio, Tex., has been organized to deal in machinery, supplies and construction equipment and is handling accounts of Barber-Greene Co., Aurora, Ill.; Chain Belt Co., Milwaukee; Northwest Engineering Co., Green Bay, Wis., and Sullivan Machinery Co., Chicago.

Pacific Coast

SAN FRANCISCO, May 5.

WORK has begun on two one-story additions to plant of Moreland Truck Co., Burbank, Cal., 30 x 100 ft., and 60 x 75 ft., reported to cost about $50,000. T. E. Young is superintendent in charge of erection.

Great Western Power Co., 530 Bush Street, San Francisco, has concluded arrangements with county for closing of certain streets in Hunter's Point section, to provide site for its proposed steam-operated electric power plant. Initial unit is estimated to cost $4,000,000, and ultimate station, $15,000,000, including transmission lines.

Puget Sound Power & Light Co., Seattle, has arranged for sale of block of preferred stock to total about $10,560,000, a portion of proceeds to be used for extensions and improvements in power plants and system. Company is reported planning increase in present hydroelectric power facilities.

Northwestern Air Lines Co., 515 Puyallup Avenue, Tacoma, Wash., A. O. Berg, head, plans development of airport on 90-acre tract of land at Parkland, vicinity of Tacoma, including hangars, machine repair shop, oil storage and distributing plant and other mechanical buildings, reported to cost in excess of $50,000.

San Diego Consolidated Gas & Electric Co., San Diego, Cal., has begun expansion program at power station B, to increase capacity from 35,000 kw. to 63,000 kw., reported to cost more than $1,000,000 including machinery and transmission line extensions. Company is under direction of Byllesby Engineering & Management Corporation, 231 South La Salle Street, Chicago.

Oregon-Washington Railroad & Navigation Co., Portland, has authorized fund of $133,000 for extensions and improvements in car and locomotive shops on different points of line; also, an appropriation of $1,430,000 for new equipment, including rolling stock.

Merger of the Grays Harbor Iron & Machine Works, Aberdeen, Wash., with Lamb Machine Works, Hoquiam, Wash., has been announced. Fred H. Lamb, head of the latter company, acquired the controlling interest in the Aberdeen plant. Officers of the consolidation are: Frank H. Lamb, president; I. W. Johnson, vice-president; M. T. Thorpe, treasurer, and George E. Lamb, secretary.

The H. J. Armstrong Co. of Oregon has been succeeded by the Pacific Equipment Corporation, capitalized at $199,000. Offices are in the Board of Trade Building. E. M. Ricker, formerly owner of the Ricker Machinery Co. of San Francisco, is president of the new company; Z. A. Toye is vice-president and general manager, and H. J. Armstrong, Seattle, is secretary. The company will specialize in purchase and sale of all kinds of equipment for construction and logging industries.

R. L. Balzer Machinery Co., Portland, Ore., has taken office and warehouse space at East Sixth and Market Streets, that city. Mr. Balzer was formerly manager of the Clyde Equipment Co. In his new business he will handle the Gardner-Denver line of road machinery and Ohio locomotive cranes.

Canada

TORONTO, ONT., May 8.

LINK-BELT, LTD., Eastern Avenue, Toronto, Ont., has had plans prepared by Ewart, Armer & Bam, Excelsior Life Building, Toronto, for a $10,000 addition to its foundry at Elmira, Ont.

Simmons, Ltd., 400 St. Ambrose Street, Montreal, Que., manufacturer of beds, etc., will build an addition to its plant and is calling for bids.

F. Robb, 1111 Beaver Hall Hill, Montreal, Que., has prepared plans for a factory on Smith Street, for Henderson & Barwick, 5 Olier Street, manufacturers of elevator buckets, coal chutes, etc.

Standard Brick Co., Ltd., Greenwood Avenue, Toronto, Ont., is having plans prepared by E. G. Wilson, 42 Langley Avenue, for the erection of boiler room, engine house and dry kiln.

Toronto, Hamilton & Buffalo Railroad will spend $1,000,000 on a development scheme at Hamilton, Ont., according to H. T. Malcolmson, general manager. Modern engine terminal will replace the present one, and a substantial share of the expenditure will go into the purchase of machinery and other equipment. A 25-ft. stall roundhouse, 110 ft. deep, with a serving turntable of 100 ft. is planned. Buildings to be erected include a roundhouse, power house, coaling plant, locomotive repair shop, brick storehouse and a huge water tank.

The Kitchener Ornamental Iron Co., Kitchener, Ont., has purchased a site of five acres on Guelph Street, and will start work immediately on the erection of a foundry to cost $75,000. Equipment for the plant will cost $65,000, bringing the total expenditure up to $140,000. The company which will manufacture ornamental iron including bank fixtures, stairways, and building equipment, expects to be operating within three months. Those interested in the new company include: A. W. Law, Detroit, W. G. Weichel and August Frank, Kitchener.

Western Canada

Bids will be received by J. W. Johnston, secretary-treasurer, Dauphin, Man., until May 19, for equipment for power plant including water tube boilers, turbo alternator, condenser and complete electrical equipment. Consulting engineer, N. M. Hall, Engineering Building, Sherbrooke and Portage Avenue, Winnipeg, Man.

Business men of Vancouver, B. C., have subscribed $100,000 towards the project of Senator Charles G. Heifner of Seattle, Wash., whose present address is Devonshire Apartments, Vancouver, to establish a pulp mill on Poplar Island, B. C. Charles Maravec, 2535 Seventh Avenue West, Vancouver, is also interested in the project, which will cost approximately $450,000.

Foreign

BOND issue of $4,000,000, is being sold by Ruhr Chemical Corporation, (Ruhrchemie Aktiengesellschaft), Berlin, Germany, considerable portion to be used for new plant in Ruhr district for production of ammonia, nitric acid, fertilizer, etc., reported to cost close to $5,000,000 with machinery. Initial unit scheduled for completion early next spring. Dr. Fritz Mueller is head.

Ulen & Co., 120 Broadway, New York, in cooperation with Holtzman, Beger and Siemens interests, Berlin, Germany, have contracted with Persian Government for construction of a railroad from Bender Abbas, on Persian Gulf, to a port on Caspian Sea, including locomotive and car repair shops, rolling stock, etc.; entire project is estimated to require from seven to eight years for completion, and will cost $100,000,000.

Power company in England is arranging for construction of a new electric light and power plant, with transmission system, on Island of Jersey, estimated to cost $1,200,000. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference England No. 66028; also, at American Consulate, London, England, William L. Cooper, commercial attaché.

American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, has secured a controlling interest in Mexican Utilities Co., and its subsidiaries, Central Mexico Light & Power Co., and Guanajuato Power & Electric Co., operating in central part of Mexico. New owner plans expansion and improvement program, including increase in power facilities and transmission lines.

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

A COLORED preacher was describing the wonders of the hereafter. "You all is seen molten iron runnin' out fum a furnace, ain't you?" he asked.

The congregation silently assented.

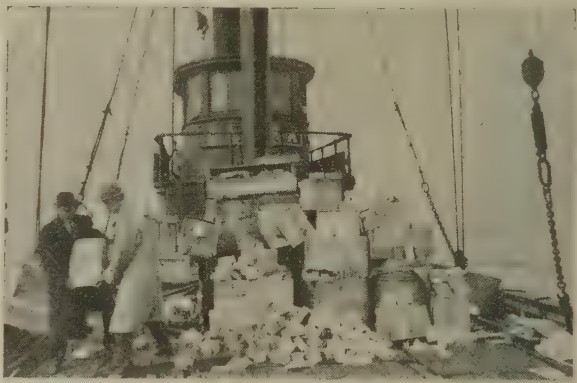
"Well," continued the preacher, "in de place what I'm talkin' 'bout dey uses dat stuff fo' ice cream."

For the business long jump contest our entry is A. F. Hartranft, who has been with the Reading Iron Co. for a great many years. He recently resigned to engage in the manufacture of *men's handkerchiefs.*

Are automatic machinery and highly specialized jobs slowly exterminating the old-time machinist, who raised his trade to the status of a profession? The fact that of 427 members of the National Metal Trades Association, 88 or more than 20 per cent reported a shortage of skilled machinists strikes us as significant.

Apparently boys are not being raised to be machinists. When the law of supply and demand begins to exact its toll, those far-sighted youths who have elected to learn the secrets of the "mike" will be high-hatting their bond-selling brothers.

No, Waldo, the spark plugs these gentlemen are tossing into the ocean, used and recommended by Lindbergh for transatlantic flying, are not for the new model electric eels. They are discarded spark plugs, purchased from service stations, refurbished, and sold again under the original brand names, as "reconditioned."



The manufacturers of "AC" and "Champion" plugs brought suit against the ingenious gentlemen who conceived the idea. And the judge told the i. g. that they could sell the plugs but that they would have to remove the brand names. "But then we couldn't sell them," he was naively told. Did the judge burst into tears over the plight of the defendants? No, instead he suggested coldly that they go into an honest business.

Write your own moral.

A manufacturer whose letterhead bears the legend, "Cinderella Kiddy Clothes—Children's Dresses, Boys' Suits, and Creepers," writes for a copy of THE IRON AGE. He may be thinking of putting on a sideline of children's armor for sale in certain of our large cities.

Who is the oldest Iron Age subscriber? H. L. Green, Chicago steel merchant, writes, "I wish you would look up and see if we are not just about the oldest continuous subscriber you have in these parts. Before coming to Chicago in 1882 we were taking THE IRON AGE in Milwaukee under the name of Starkweather & Co."

Since 1855 our headquarters have been moved several times, and our old circulation lists are not complete. *How long have you been a reader?* Our address is 239 West Thirty-ninth Street, New York.

A. H. D.

THE IRON AGE

ESTABLISHED 1855 New York, May 17, 1928 VOL. 121, No. 20

Efficiency Without Volume

Inventory Control, Reduction of Waste and Intelligent Adaptation of Materials-Handling Equipment Are Features of Stutz Plant

BY BURNHAM FINNEY*

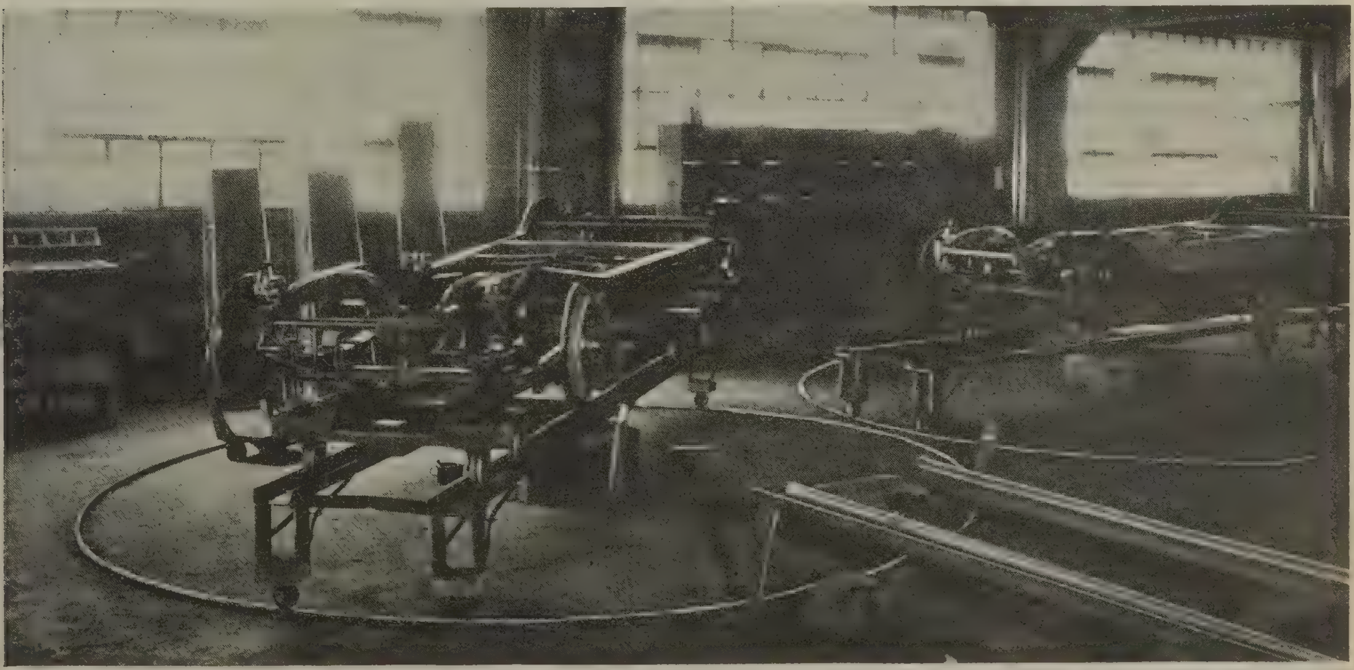
IN a period when automobiles are being manufactured by the thousands on the basis of mass production, it is uncommon to find a company that has as its slogan, "No two cars alike." Yet this is the policy on which the Stutz Motor Car Co. of America, Inc., Indianapolis, has built a substantial business.

The fact that its manufacturing process calls for individuality, rather than standardization, in turning out what might well be termed a custom-made car, does not imply that the company overlooks opportunities for introducing production economies. Its methods of controlling inventory, of reducing wastage, of handling materials mechanically, of inspecting all parts minutely and of machining castings by special operations have been responsible for the attainment of a high degree of efficiency.

Stock Turned Over 18 Times a Year

By closely watching its manufacturing schedules, the company has been able to turn over its stock 18 times a year. The entire plant has only one stockroom, which is adjacent to the receiving department, and all departments call upon this source of supply when in need of small parts. The larger units, such as bodies and frames, do not pass through the receiving department, but instead are delivered directly to the point where work is first begun on them. The flow of material into the factory is regulated so that the stockroom is not crowded beyond its normal capacity and so that the number of larger units passing into the plant never exceeds the current demand, all unnecessary storing thereby being eliminated.

The amount of stock on hand at any time can be computed from a master file in the office of the receiving clerk. The stock record consists of a yellow card, 6 x 9 in., on which the part name and the part number are put down. At the left side is a place for information about the purchase of the part, while the receiving, inspection and stores record occupies the center of the card. Data regarding the issuance of parts to the production department or to the service department are set down in a space at the right side. In connection with the purchase record, there is a column in which the number of parts returned to the maker can be en-



In the Assembly Line, Turntables Are Used to Make Rectangular Transfers of the Automobile Frames tered. In addition, a record is kept of the quantity rejected and salvaged.

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*Resident editor at Cincinnati for THE IRON AGE.

Whenever parts are issued from the stockroom, the amount taken is subtracted from the total previously on hand, so that the clerk has before him the exact number of all parts that are in stock. For example, he can turn to the card showing the record of part No. 20,911, which is a "stop and back up light switch." By looking at the column at the right marked "on hand," he can determine the number of stop and back up light switches in stock. Furthermore, by going through the file and ascertaining from each card the same information, he can tabulate in a short time the inventory of the entire factory. Aside from the receiving clerk's office, the only other place in the plant having these data is the purchasing department. This simplified plan does away with the annoyance of having numerous departments cluttered up with records duplicating those which are available at all times in the office of the receiving clerk.

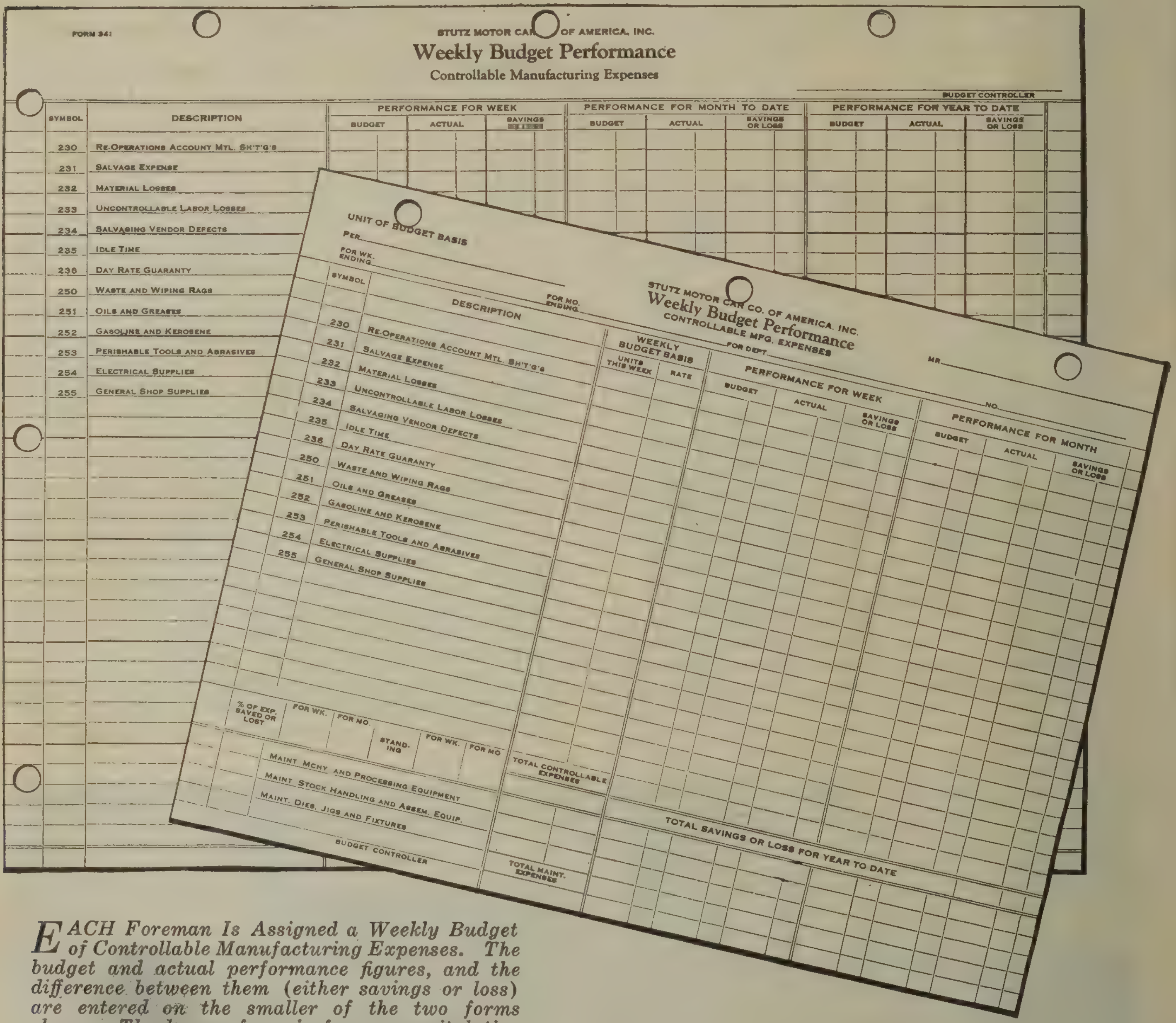
Payment of wages is based on a group plan. Workmen are formed into small gangs of not more than 25 men and a wage rate is established for each man, but the amount of wages is determined by the number of units turned out by the gang. For instance, each operator working along the motor assembly line has a wage rate based on the degree of skill and the kind of work he does. He is paid, however, according to the number of motors which come off the assembly line rather than on the individual operations he performs. Incidentally, this rule has some exceptions in that some men on special work are paid by the piece.

Inspection Charged to Production

Inspection of materials and of parts is so precise that wherever 100 per cent inspection is specified the expense of the inspectors' wages is charged to production instead of overhead expenses. Generally, in such cases, inspectors are concentrating their attention on one type of work. An example of this method of charging costs is found in the receiving inspection department, where time for the thorough examination of 28 parts is applied to manufacturing costs rather than to standard burden.

Among the instruments used in the receiving inspection department are a Brinell machine for ascertaining the toughness and hardness of certain parts, such as connecting rods and other forgings in which great strength is required, a Rockwell hardness tester, and a scleroscope, which determines the hardness of camshafts, piston pins, connecting rod bolts and other parts. Other inspections include the weighing of valve springs, the comparison of all front-end drive chains with a master chain, the checking of all camshafts with a master shaft on the comparator and the testing of chassis springs for equalization.

Since the company is on a basis of quality output rather than mass production, the employment of workmen whose versatility is above the average is imperative. In many departments each operator is called



FORM 341

STUTZ MOTOR CA OF AMERICA, INC.

Weekly Budget Performance

Controllable Manufacturing Expenses

BUDGET CONTROLLER

SYMBOL	DESCRIPTION	PERFORMANCE FOR WEEK			PERFORMANCE FOR MONTH TO DATE			PERFORMANCE FOR YEAR TO DATE		
		BUDGET	ACTUAL	SAVINGS	BUDGET	ACTUAL	SAVINGS OR LOSS	BUDGET	ACTUAL	SAVINGS OR LOSS
230	RE-OPERATIONS ACCOUNT MTL. SH'T'G'S									
231	SALVAGE EXPENSE									
232	MATERIAL LOSSES									
233	UNCONTROLLABLE LABOR LOSSES									
234	SALVAGING VENDOR DEFECTS									
235	IDLE TIME									
236	DAY RATE GUARANTY									
250	WASTE AND WIPING RAGS									
251	OILS AND GREASES									
252	GASOLINE AND KEROSENE									
253	PERISHABLE TOOLS AND ABRASIVES									
254	ELECTRICAL SUPPLIES									
255	GENERAL SHOP SUPPLIES									

STUTZ MOTOR CAR CO. OF AMERICA, INC.

Weekly Budget Performance

CONTROLLABLE MFG. EXPENSES

UNIT OF BUDGET BASIS

PER

FOR WK. ENDING

FOR MO. ENDING

FOR DEPT.

MR.

NO.

SYMBOL	DESCRIPTION	WEEKLY BUDGET BASIS		PERFORMANCE FOR WEEK			PERFORMANCE FOR MONTH		
		UNITS THIS WEEK	RATE	BUDGET	ACTUAL	SAVINGS OR LOSS	BUDGET	ACTUAL	SAVINGS OR LOSS
230	RE-OPERATIONS ACCOUNT MTL. SH'T'G'S								
231	SALVAGE EXPENSE								
232	MATERIAL LOSSES								
233	UNCONTROLLABLE LABOR LOSSES								
234	SALVAGING VENDOR DEFECTS								
235	IDLE TIME								
236	DAY RATE GUARANTY								
250	WASTE AND WIPING RAGS								
251	OILS AND GREASES								
252	GASOLINE AND KEROSENE								
253	PERISHABLE TOOLS AND ABRASIVES								
254	ELECTRICAL SUPPLIES								
255	GENERAL SHOP SUPPLIES								

% OF EXP. SAVED OR LOST

FOR WK.

FOR MO.

STANDING

FOR WK.

FOR MO

TOTAL CONTROLLABLE EXPENSES

MAINT. MCHY AND PROCESSING EQUIPMENT

MAINT. STOCK HANDLING AND ASSEM. EQUIP.

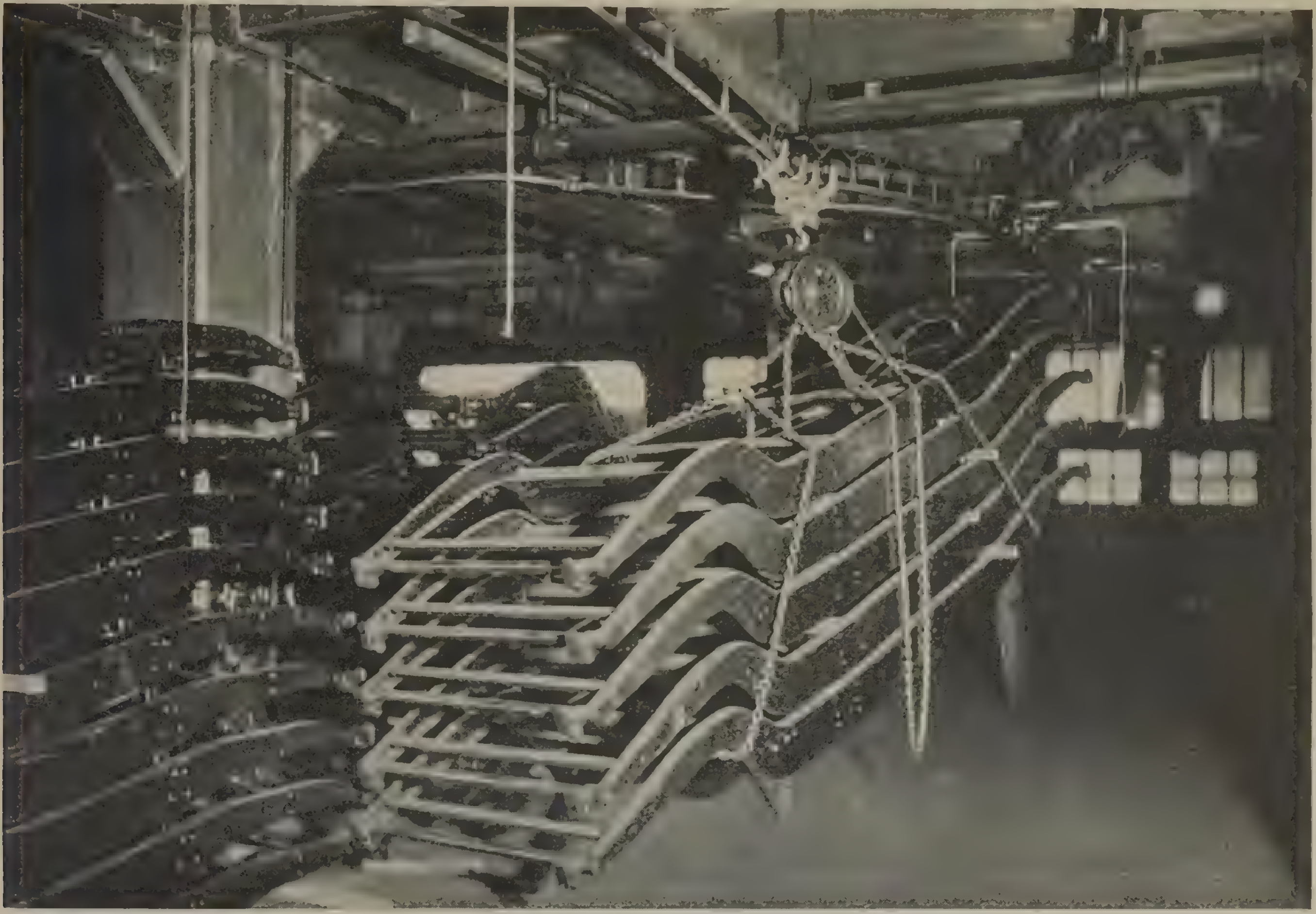
MAINT. DIES, JIGS AND FIXTURES

BUDGET CONTROLLER

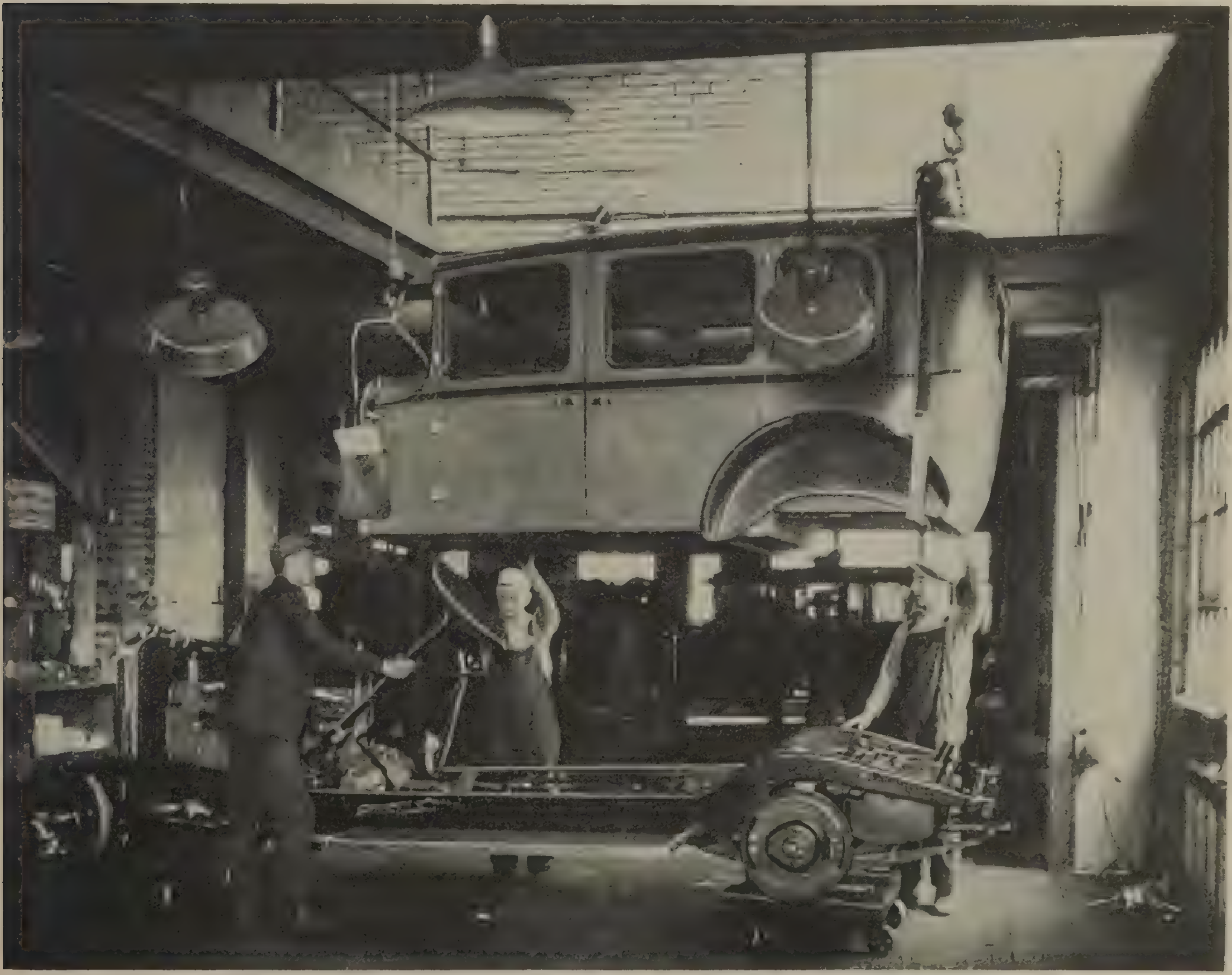
TOTAL MAINT. EXPENSES

TOTAL SAVINGS OR LOSS FOR YEAR TO DATE

EACH Foreman Is Assigned a Weekly Budget of Controllable Manufacturing Expenses. The budget and actual performance figures, and the difference between them (either savings or loss) are entered on the smaller of the two forms shown. The larger form is for a recapitulation of the figures received from all the foremen



(Above) Frames Are Handled in Quantities by Overhead Monorail. (Below) When the chassis has been assembled, save for mounting wheels and tires, the body is lowered through a well from the floor above



upon to do several things requiring unusual skill. Especially during periods when the factory is running at less than capacity and the number of workmen is below normal is the versatility of each operator brought into play, for often one man must divide his time between the work to which he is accustomed and a job ordinarily done by another man.

Each large division of the plant, such as the machine shop, is in charge of a foreman. Under him are various gang leaders, each of whom may be supervising gangs in two or three departments. This arrangement makes for the concentration of responsibility and gives to the foremen authority generally lodged in the superintendent in the average metal-working plant.

Budget Plan Cuts Down Waste

Wastage in all departments has declined to a marked extent through the successful operation of a budget plan recently devised. The plan calls for a yearly budget that allows each department a stated amount each month for wastage and other losses. Each foreman receives a "weekly budget performance" of controllable manufacturing expenses on a form sheet, 8½ x 11-in. On this sheet are listed the following items: Re-operations account, material shortages, salvage expense, material losses, uncontrollable labor losses, salvaging vendor defects, idle time, day rate guaranty, waste and wiping rags, oils and greases, gasoline and kerosene, perishable tools and abrasives, electrical supplies and general shop supplies. There are some items not included which the foreman must fill in to complete the record for his department. For example, the foreman of the machine shop would add setting-up time, tool grinding and sweepers and janitors.

Next to the names of the items is a column for the weekly budget basis, in which the units for the week and the rate are to be listed. The unit of the budget is based on each $100 of the payroll for the department. The second major division of the sheet gives the figures of the performance for the week. Here there is a column in which the budget is put down, a second column for the actual performance figures, and a third for either the savings or the losses. The third major division details the performance for the month, while at the bottom of the sheet at the right the total savings or losses for the year to date are listed. In the lower left hand corner are given expenses for maintaining machinery and processing equipment, stock handling and assembling equipment, and dies, jigs and fixtures. A recapitulation of the figures from all of the foremen is put on a separate sheet, which goes to the superintendent of the plant.

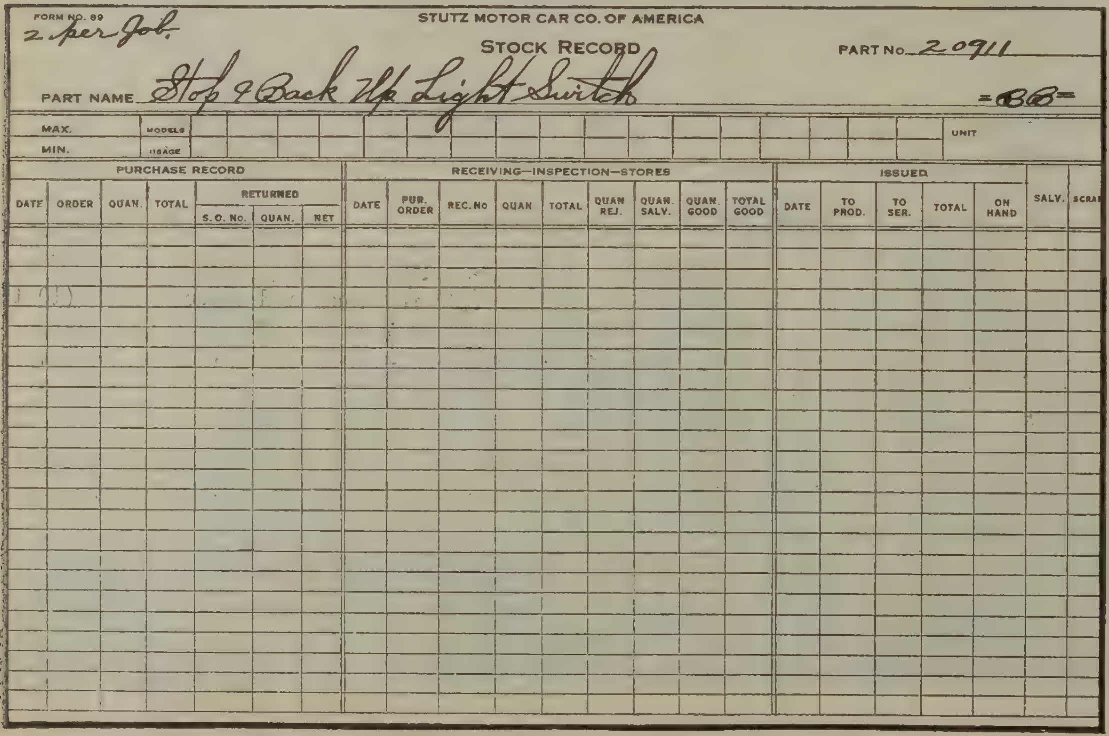
Bonuses Given Foremen for Reducing Losses

To create and maintain a spirit of competition among the foremen in cutting down wastage, the foreman making the best showing each month receives from the management a bonus of $25. Bonuses of $20, $15, $10 and $5 also are awarded to the second, third, fourth and fifth positions. Winners are chosen on the basis of the percentage of savings in the departmental expense of indirect labor, material and direct labor losses and manufacturing supplies. To the foreman performing the most outstanding service each month goes an extra bonus of $25. Each of the three operating officials names the foreman who has, in his opinion, contributed the most in the previous month to the efficiency of the organization as a whole. These names are submitted to the foremen, who vote for the man they consider most deserving of recognition, and the man getting the highest number of votes wins.

Every morning the foremen gather in the salvage room, into which, during the previous day, has been brought all material branded as defective. At this meeting the foremen examine each piece to determine whether it can be salvaged, whether it shall go to the scrap pile or whether it should be returned to the maker. Thus, since each man sees his fellow foremen examining the defective work turned out by his department, his pride spurs him in his efforts to increase the efficiency of his men. It is interesting to note, in this regard, that in less than a year the size of the salvage department has been cut 50 per cent, this decrease reflecting a corresponding lowering of waste.

Variety of Materials-Handling Methods Used in Progressive Assembly

Since unusual care is exercised in every activity, from the examination of raw materials as they come into the factory to the final inspection, when the car is ready to be shipped to the dealer, the movement of parts from one operation to the next is necessarily slow. Under the circumstances, a straight-line conveying system, depending for its success upon a continuous flow of materials, would be impractical, because its cost of operation would be excessive in view of the small number of units which would move along it daily. However, this does not mean that the company cannot use mechanical transportation of materials to lower



FORM NO. 89
2 per Job.
STUTZ MOTOR CAR CO. OF AMERICA
STOCK RECORD
PART NO. 20911
PART NAME Stop & Back Up Light Switch
=BB=
MAX.
MIN.
MODELS
USAGE
UNIT

PURCHASE RECORD							RECEIVING—INSPECTION—STORES									ISSUED					SALV.	SCRA
DATE	ORDER	QUAN.	TOTAL	RETURNED			DATE	PUR. ORDER	REC. No	QUAN	TOTAL	QUAN REJ.	QUAN. SALV.	QUAN. GOOD	TOTAL GOOD	DATE	TO PROD.	TO SER.	TOTAL	ON HAND		
				S. O. No.	QUAN.	NET																

From Stock Record Cards, Kept in the Receiving Clerk's Office, the Amount of Stock on Hand Can Be Computed at Any Time production costs; it merely signifies that to meet special conditions specially designed equipment has been constructed to take the place of standardized conveyors. But there are several parts of the plant in which standard types of conveying equipment are used.

Automobile frames are taken by hoist from the first floor to the second through an opening in the ceiling, and the same means is used to lower fenders and other enameled stock from the enameling department to the assembly line at the points where they are needed. Frames are carried in lots of five on a Louden overhead monorail conveyor to the various operations in the frame department. Then they are taken by hoist to the next floor to the beginning of the assembly line. Incidentally, the frame is upside down when it reaches the line, so that the front and rear axles, springs, spring shackles and step hangers and brackets can be put on conveniently. When this work is completed, workmen slip a chain around the frame, raise it a few feet with a block and tackle, turn it right side up and place it on small trucks running on a narrow-gage track, a truck being placed under the front axle and another under the rear axle.

As the frame starts down the track, shock absorbers are assembled and the brake, shields, brake tubing, propeller shaft and exhaust muffler are installed. In progressing along the track, the frame is sprayed with lacquer in a booth containing a turntable so that the frame can be moved around quickly for the convenience of the workman. When the frame reaches the corner of the room, it swings about on another turntable and starts away at right angles. Within a short space the running boards, gasoline tank, shock absorbers, battery box, battery, gasoline line, chassis-lubricating oil lines and electric wiring are installed.

Foremen Meet Every Morning and Examine Each Piece of Rejected Material to Determine Whether It Can Be Salvaged

Body Lowered Through Well to Chassis Below

As the chassis moves along the assembly line, the motor is dropped into place, the radiator is put on and the brake system is filled. Next the chassis-lubrication oil reserves, or magazines, are filled, and oil is forced at high pressure through all of the spring bushings. A few feet farther on, the steering gear assembly is installed and the body is mounted on the chassis. The last-named operation is particularly interesting. The assembly line is on the second floor and the body department on the third. Finished bodies are brought to an open shaft directly over the assembly line where the body is to be mounted on the chassis. The body is then lowered by means of a hoist into the proper position on the chassis.

Tires and wheels are brought from the wheel department on the fourth floor to the assembly line by means of a chute just wide enough for a tire to move easily in an upright position, handling costs having been eliminated by this inexpensive method.

In the machine shop a variety of methods is used for handling materials. In two instances roller conveyors are utilized for carrying certain parts a short distance, but this is the exception rather than the rule. For transporting heavy castings from one machine to another a Louden overhead monorail system, with various types of carriers suspended from the monorail, is used.

In some parts of the shop, tools are so compactly arranged that the castings being machined are within reach of the man in charge of the next operation. For interdepartmental hauls electric lift trucks have been found economical. These are particularly satisfactory for conveying small parts from the stockroom to the departments where they are needed.

Nowhere in the plant is greater care taken than in the painting department. Bodies "in the white," or in their raw state, are filed to remove the major rough spots from the metal, and then are sanded to eliminate any minor roughness. An acid bath takes away all dirt, filings and other particles that might cause a rough paint surface or keep the paint from adhering. After priming and filler coats have been applied, the bodies are sent to baking ovens. After the baking process the bodies are again rubbed, from four to eight coats of lacquer are sprayed on and finally a coat of "thinner" is applied. After the polishing, hairline stripes are painted on the molding of the bodies and along the hood louvers. One of the distinctive features is the fact that there are no two cars on which the combination of colors, especially the stripes, is the same.

By means of the methods just described the Stutz Motor Car Co. is manufacturing a car on a plan of stressing quality and individuality. To achieve the best results, principles of mass production have been adopted successfully in some cases, but in other instances special problems have required special treatment. That its means of handling materials, its efforts to prevent wastage, its thorough inspection of parts and its close control of inventory have contributed directly to economical production is the testimony of the management.

Cuts Costs of Laying Cable

Completely automatic, a novel subterranean cable-laying machine, said to have been designed by a German manufacturer, has been in operation in Germany since last October, says a report received by the industrial machinery division, Department of Commerce, from Trade Commissioner Thomas Butts, Berlin. The machine is a combined trench digger, cable layer and trench filler. It is said that the cost of laying cable has been reduced 75 per cent by this device and that, with a crew of only five men, it does the work formerly accomplished by 150 workmen. The entire apparatus is 18 meters (60 ft.) long and three meters (10 ft.) wide and weighs 22 tons. The digging apparatus alone weighs 15.5 tons, and the cable car weighs 6.4 tons.

"Use of Welding in Fabrication," was the subject of a joint paper given by H. V. Putman and C. C. Brinton, Westinghouse Electric & Mfg. Co., at the monthly meeting of the Pittsburgh section, American Welding Society, in the quarters of the Engineers' Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, Wednesday evening, May 2. Mr. Putman talked on design and manufacturing, and Mr. Brinton on the engineering phases of the subject.

Mill to Roll New Carnegie Beams

Bloomer and Three Stands Designed for Huge Tonnage—Automatic Control of Screwdowns a Feature

BY SIDNEY G. KOON*

IN 1925 nine mills of more or less ancient vintage occupied the site to be utilized in the reconstruction of the structural unit at the Homestead Works of the Carnegie Steel Co. To keep these mills running during the construction period was an engineering feat of itself. But by shifting hot beds, and even reversing the direction of travel from the hot beds, all were kept in operation until the first new unit, the standard structural mill, was in service. These old mills consisted of a 40-in. blooming mill and 35-in. structural mill; a 33-in. blooming mill and 23-in. and 33-in. structural mills; 28-in. and 38-in. blooming mills and two old merchant mills, 16-in. and 12-in., which had long been inactive. All have been completely dismantled; the last, the 38-in. blooming mill, went a few months before the Carnegie H-beam mill was put in operation.

Included in the new development are a dual set of mills running parallel to each other, with a large motor room between them, and with soaking pits at the end so interconnected that, although one set nominally serves one mill and the other set the other mill, ingots may be shifted from either set to either mill. There are 26 acres covered under the one roof. Incidentally more than 1000 tons of structural steel to the acre were used in putting up the building, which is reported to have a total of 26,818 tons in it.

One set of mills includes a 44-in. blooming mill, followed by a 36-in. roughing mill and 28/32-in. structural mill rolling standard sections. This was the first installed and it has taken over the work of rolling the sections formerly made in the old, discarded mills. When this unit got into production the remainder of the site was cleared of the older equipment.

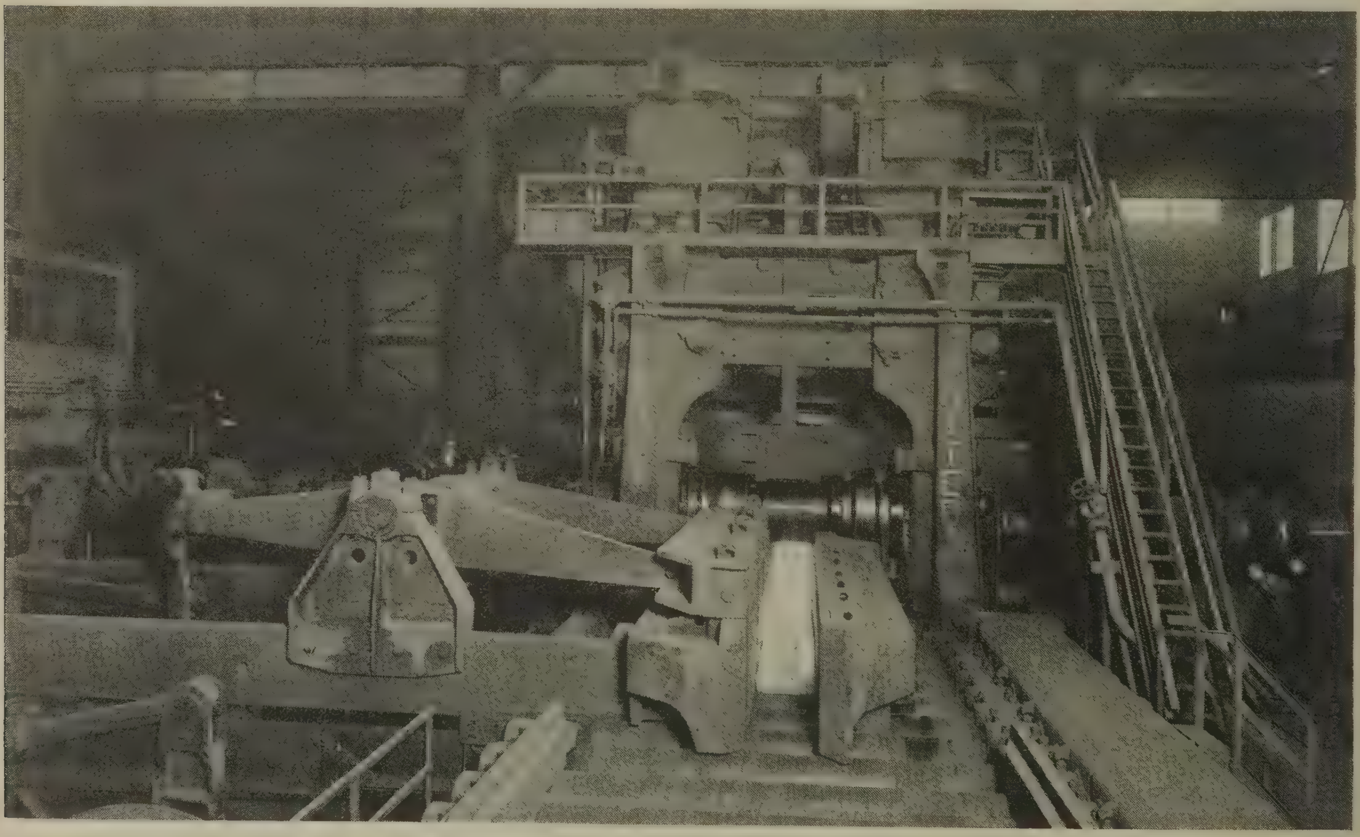
At the north side of the motor room the new mill rolling the Carnegie H-beams was then put in. This consists of a 54-in. blooming mill, the largest and heaviest in the world, and three 52-in. sets—roughing, intermediate and finishing.

This group was designed for a production of 26,000 tons a month, but has actually had a maximum day as high as 2533 tons. The Carnegie beam sections rolled comprise a series of 42 structural shapes in 11 depths ranging from 8 to 30 in. They have flanges of uniform thickness—in other words, parallel—throughout their width, and are designed to cover the range of maximum structural demand for buildings and bridges and provide simple rolled sections where, previously, large tonnages of built-up members were required. Sections are provided within this range suitable for use as beams, girders and columns, with flange widths varying from 6 to 15 in. and in weights from 21 to 425 lb. to the foot.

Clearing of the site of the new mill was started March 6, 1926. The first ingot was rolled in the blooming mill Nov. 10 of that year and the first H-beam in the 52-in. mill on Dec. 30. Trial beams had gone through previously and necessitated slight adjustment of the rolls, until production really got under way, as mentioned, just before the end of the year.

Large Electric Units Required

In conjunction with the new equipment, a 15,000-kw. turbo-generator, with boiler plant and auxiliaries, was installed at the Carrie furnaces across the river. Electric drive is used throughout and the interconnecting control on the electric basis is most elaborate. The roughing and the intermediate sets have two motors



Manipulator Handling Beam Blank for the 54-In. Blooming Mill, Which Appears in Background each, one of 7000 hp. for the main stand and one of 2000 hp. for the edging rolls. These are so controlled in each case that the bar between the sets of rolls (12 ft. apart) driven by these two motors is neither stretched nor forced. In other words, the speeds of the respective rolls are synchronized automatically with each other. Both these stands are reversing, and the motors correspondingly are of the reversing mill type.

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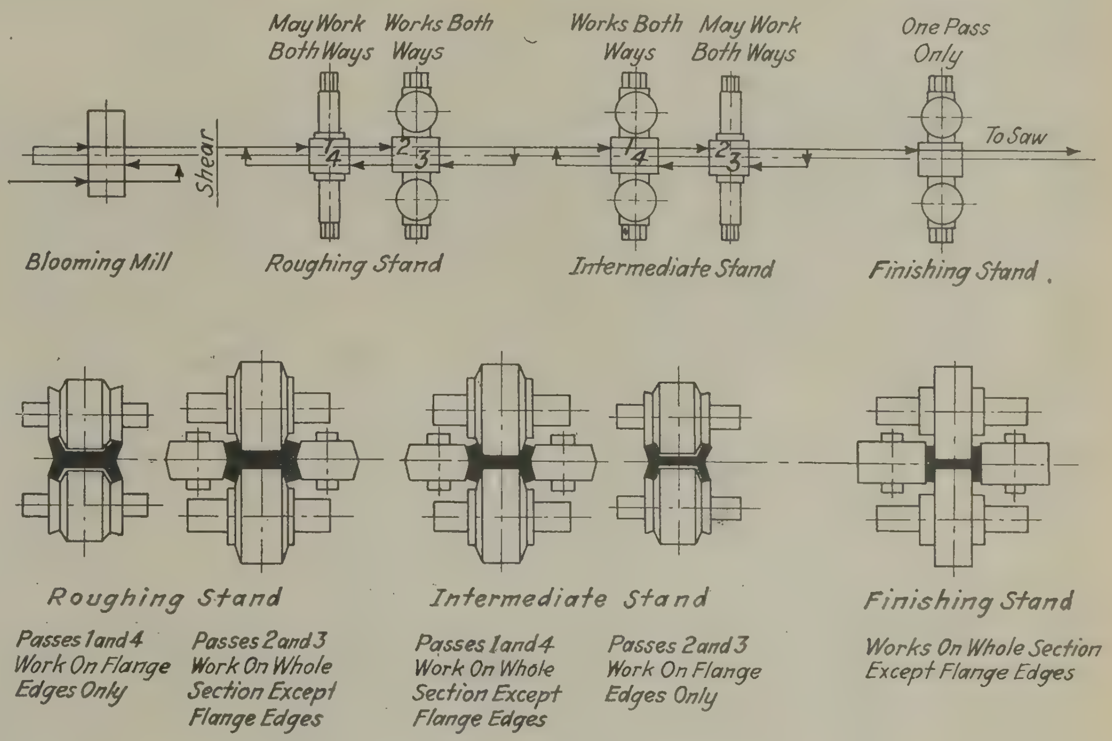
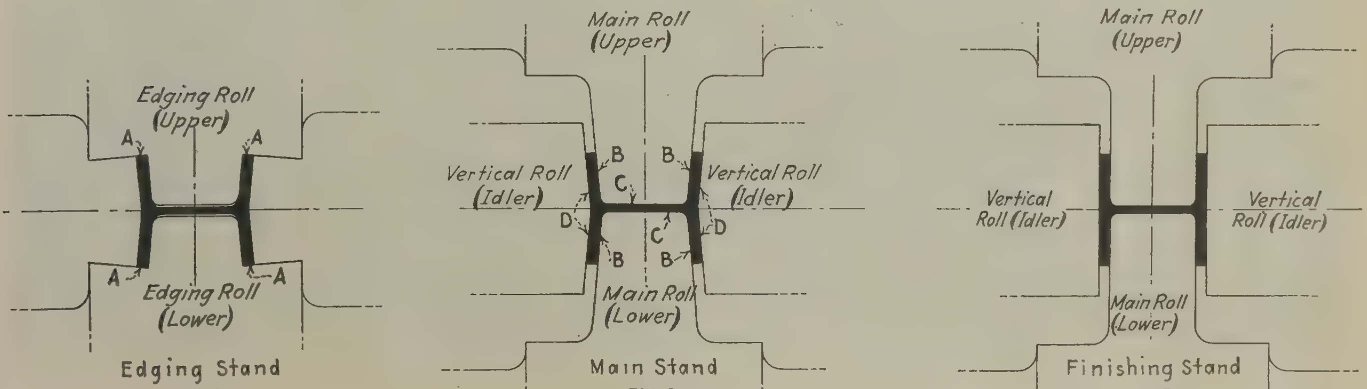
*Associate editor THE IRON AGE, New York.

The finishing stand is operated by a 5000-hp. induction motor, non-reversing. Only one pass is made on this stand, whereas customarily there are nine passes through the roughing stand and five through the intermediate, making an average total of 15 passes. The blooming mill is driven by an 8000-hp. motor, which has a maximum operating peak rating of 14,400 hp. This also is a reversing unit, the largest of this type ever built.

How the Three Stands of Rolls Work Successively on the Steel. Fig. 1 shows the action in the "edging" rolls preceding the roughing stand and following the intermediate stand. Fig. 2 indicates the action of vertical and horizontal main rolls in roughing and intermediate stands. Fig. 3 shows the straightening and planishing effect of the finishing stand


May Work Both Ways
Works Both Ways
Works Both Ways
May Work Both Ways
One Pass Only
Shear
To Saw
1
4
2
3
1
4
2
3
Blooming Mill
Roughing Stand
Intermediate Stand
Finishing Stand
Roughing Stand
Passes 1 and 4 Work On Flange Edges Only
Passes 2 and 3 Work On Whole Section Except Flange Edges
Intermediate Stand
Passes 1 and 4 Work On Whole Section Except Flange Edges
Passes 2 and 3 Work On Flange Edges Only
Finishing Stand
Works On Whole Section Except Flange Edges


Edging Roll (Upper)
A
A
A
A
Edging Roll (Lower)
Main Roll (Upper)
Vertical Roll (Idler)
Vertical Roll (Idler)
B
B
C
D
C'
D
B
B
Main Roll (Lower)
Main Roll (Upper)
Vertical Roll (Idler)
Vertical Roll (Idler)
Main Roll (Lower)

Edging Stand FIG.1 — Main Stand FIG.2 — Finishing Stand FIG.3

Flexible Control for Soaking Pits

At the west end of the plant are the soaking pit furnaces. There are seven units of four holes each in the north bank, designed for serving the H-beam mill, and a duplicate set in the south bank for serving the structural mill. The stacks are in the middle between the two sets. Tunnels under the pits, providing access to the regenerator chambers and gas-control apparatus, are provided with a considerable amount of automatic equipment. One man on each turn suffices to look after these underground sections.

Special control equipment for the soaking pits permits the pit craneman to open or close the pit covers during charging or drawing of ingots. Each bank of pits is served by two 15-ton low stiff-leg cranes, spanning four pits at once. The lines of pits are located about 40 ft. apart and the contact rails are in sections of 40 ft. to correspond. The ingot car is under the control of either craneman and is set in the most convenient position for loading. While the craneman cannot operate any pit except those opposite the section of contact rail in which he happens to be at the moment, they may be operated from the floor by the usual electric control. Safeguards are provided so that, when the pit cover is being operated from the floor, it cannot be moved by the craneman.

When the ingot has been loaded into the ingot car the craneman starts the loaded car toward the blooming mill. The car is automatically stopped, without further attention from him, and the ingot is dumped upon the waiting transfer car by the transfer car operator. This car operates on a track running at right angle to the approach tables to the 44-in. and the 54-in. blooming mills. One man operates the two transfer cars serving the two mills. He also controls both ingot cars after they have passed into the dumping zone.

The track accommodating the ingot transfer buggies extends far enough beyond the approach tables to the two blooming mills so that either buggy may serve either mill, although in regular operation the north buggy serves the north mill and the south buggy the south mill. This arrangement makes for great flexibility in case of breakdown of either buggy.

Between the 54-in. blooming mill and the 44-in. blooming mill runout tables is a row of three large reheating furnaces, which are used for supplying the 36-in. mill. H-beams, however, are rolled direct from the ingots through the four sets comprising the 54-in.-52-in. units.

Great Length of the H-Beam Mill Layout

Spacing in the new mill, center to center of main rolls, is 299 ft. from the 54-in. blooming mill to the roughing stand. From the roughing stand to the main rolls of the intermediate stand the distance is 190 ft., with 210 ft. from the intermediate to the finishing stand. Beyond the finishing stand is a transfer table to the hot saw, measuring 208 ft. in length. The longitudinal distance from the blooming mill rolls to the hot saw is 917 ft. 6 in.

As the piece enters the roughing mill it meets first a set known as edging rolls. These are not vertical rolls, as the term "edging rolls" customarily indicates. They are rolls with horizontal axes, and receive their name from the fact that they work only on the toe or edge (*A*, in Fig. 1) of the flanges of the embryo H-beam. They serve also as a feeder into the main rolls, even though they do not effect much reduction. The main rolls do not touch the edges which have just been worked on by the edging rolls, but do work across the entire face of the web (*C*, in Fig. 2) and the inside faces (*B*) of the flanges.

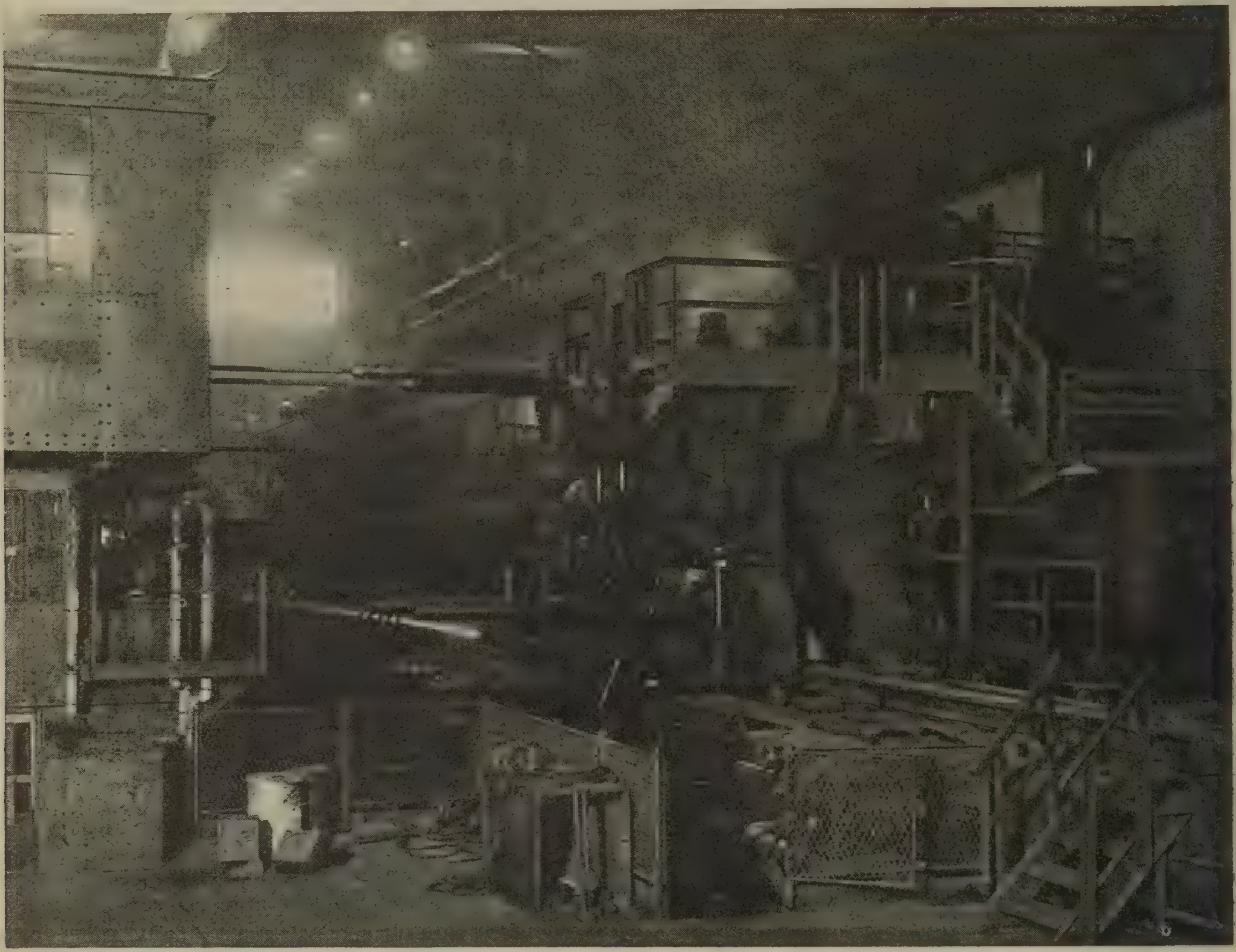
Meantime the rolls with vertical axes, operating on tapered roller bearings, work on the outside of the flange (*D*) over its entire width. In plan view these rolls with vertical axes are in line with the main rolls. They lie between the necks of those rolls, but are not driven. Their rotation is imparted by the steel passing through, but they give to it a definite rolling action nevertheless, through the rigid control over their center distances.

In the intermediate set of rolls this procedure is reversed. The bar by this time has acquired the familiar tongue, so that it may be gripped by the surfaces of the main rolls and pulled through. Here again a set of vertical rolls—idlers—works on the outside of the flange, while the main rolls work on the inside of the flange and clear across the web. In this set the so-called edging rolls come after the main rolls, and give the necessary amount of work on the edges of the flanges. As these edges are not touched in the finishing rolls, it is fitting that they should here be the last to be worked on.

Throughout the preceding process of manufacture the flanges have been flared outward, in accordance with the sketches. This has permitted the operation of the main rolls upon both flange and web, while the idler vertical rolls are shaped accordingly. The sketches exaggerate the angularity, to show the principle. The finishing rolls are primarily merely a straightening and planishing set, including both horizontal and vertical rolls. They overcome the slight angularity of the relation between web and flange, which was greater in the roughing rolls than in the intermediate, and turn out a finished product in which the respective angles are 90 deg. (Fig. 3). Thus it is that the product comes out with parallel-sided flanges.

Stiff Support to the Rolling Members

In the design of the mill it was arranged to have as short a section of unsupported roll between housings as possible. To this end, sets of distance pieces, each set suited to certain sections to be rolled on the mill, are used to space the housings in their relation to each other. That half of the housing which is farthest from the motors and spindles is arranged so that it may be slid, in a direction parallel to the axis of the main rolls, to a position determined by the section to be rolled. Thus, when a 12-in. beam is being rolled, the two halves of the housing are about a foot closer together than when a 24-in. beam is being rolled. All of this means greater stiffness in the equipment and must help uniformity in the product.

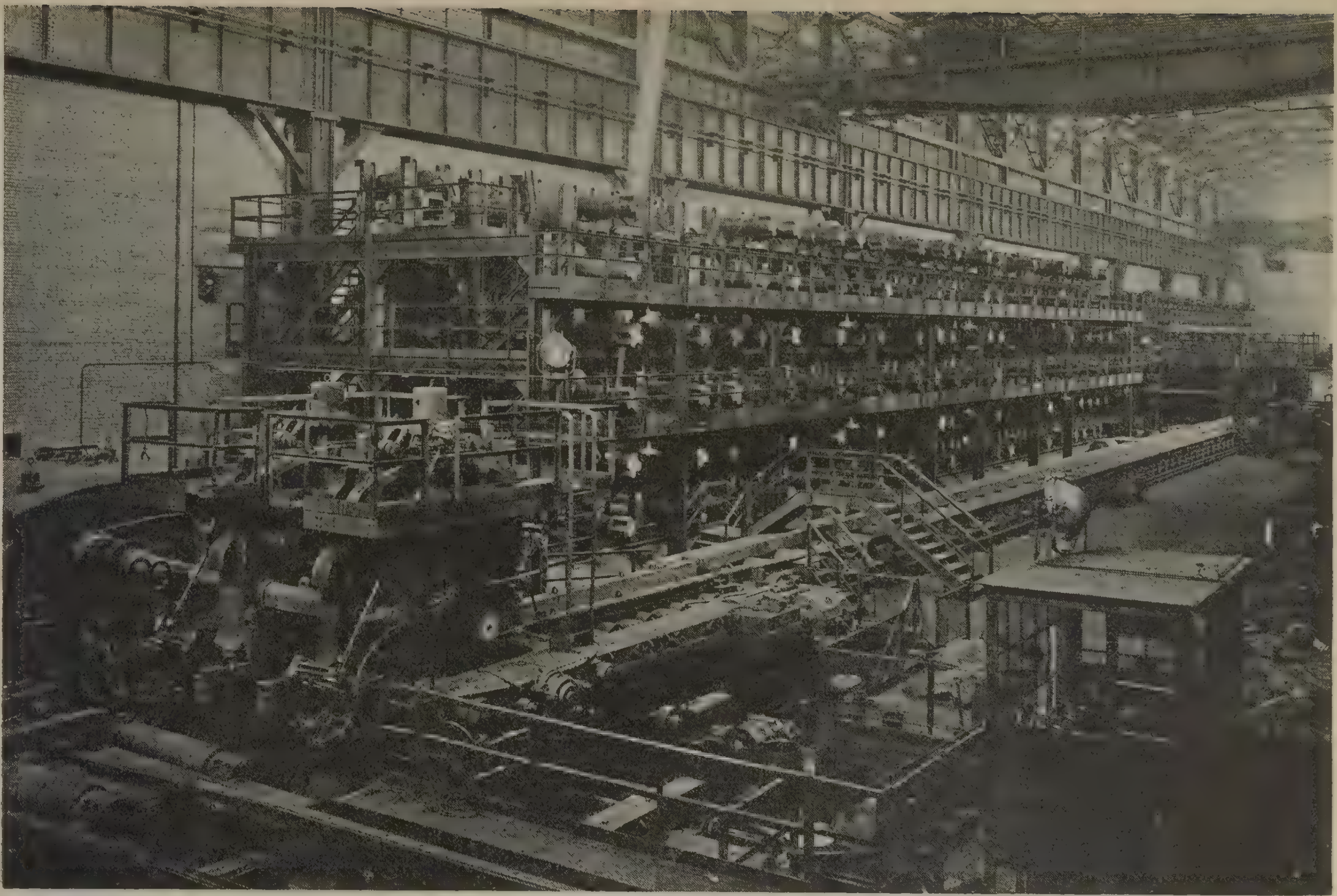


Entering Side of the Intermediate Stand of the H-Beam Mill. At left is the pulpit from which the mill is controlled. A flood light atop the pulpit aids in night work

Pins and other connections used in setting up the mill, on roll changes, are subject to the usual drive fit, thus securing to the highest degree the necessary alinement and accuracy in positioning of the parts.

Spare rolls are stored wholly under cover. Advantage has been taken of the presence of a long, narrow space between the mill tables and the motor room to put in racks where several hundred rolls may be placed. This avoids the rusting rolls get when stored outdoors, and at the same time makes the rolls particularly accessible, as they are under the same crane which is used in placing them in the mill.

Two operators control the main and auxiliary drives in the blooming mill. The roller controls the setting of the rolls and operates front and back mill tables by



Finishing Stand of the 52-In. Beam Mill, in Left Foreground. Near extreme right is the intermediate stand, 210 ft. away. In right foreground is the pulpit for the finishing stand. Against the wall is the roll storage. Back of the wall is the motor room

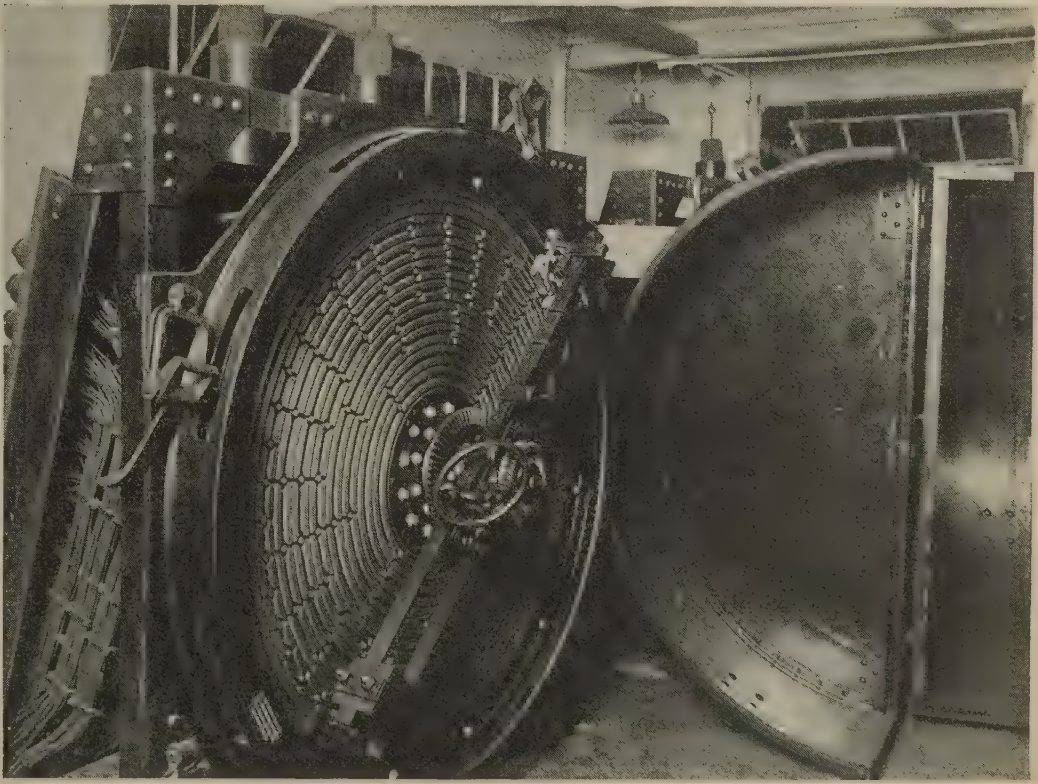
hand master-switches. By means of a foot master-switch he controls the speed and direction of rotation of the reversing motor. The roller's helper operates the approach table for the mill. During the rolling of the ingot, he controls also the electrically-driven manipulators.

Roughing and intermediate mills have automatic screw-down devices. These permit one man, using a single master-switch, to operate the three screw-downs, which automatically stop at predetermined settings by means of a specially designed limit switch. Through similar automatic control, proper speed relations are obtained between the motors driving the main and the edging stands for any conditions of drafting. The standard foot master-switch enables this same man to control the speed and direction of rotation of both mill motors.

Owing to the ease with which this man can set the screw-downs and control the main motors, he is able also to run the approach table and the front and back tables, and to operate the valves controlling the cooling water for the rolls and the steam jets for removing scale. This man controls thirteen operations during the rolling of each beam.

Since the drafting follows a predetermined schedule, and the roll settings are made automatically through an electric limit switch control system, a product is obtained which is free from the internal rolling stresses sometimes caused by irregular drafting. From the time the bloom leaves the bloom shear until the finished

Limit Switch Used in Connection with Automatic Control for the Intermediate Stand of the 52-in. Mill. This is set for the succession of reductions to be made on the mill and thereafter automatically controls the screwdown for both horizontal and vertical rolls



beam is delivered from the finishing pass, all operations are controlled by four men.

Automatic Setting of Screw-Downs

One of the most interesting features of control of the mill lies in the automatic devices for adjusting the position of the rolls for successive passes. There are in the pulpit of the roughing set three large spiral limit switches intricately wired and connected with the various control units. These are set in advance for each section which is to be rolled. They automatically synchronize the movement of the three pairs of rolls in the stand such that the proper drafts are taken in the successive passes. A similar equipment is used in the intermediate set.

As the rolls are worn in use many of them are dressed to take care of sections of less depth. It is reported that there has been a surprising absence of trouble from bearings since this mill was started. None of the roller bearings has had to be changed, largely because they were designed with ample overload capacity.

Automatic forced grease lubrication is applied to all horizontal roll necks, as well as to vertical rolls, and is also widely applied to tables and manipulators. In addition, oil circulating systems supply all mill pinion lubrication, as well as a large portion of the table system.

In THE IRON AGE of June 23, 1927, page 1815, was published a brief account of the new Homestead structural mills, primarily from the electric side. This gave many details of motor speeds, motor-generator flywheel sets, and other particulars it is not necessary to repeat here.

Handling Steel In and from the Mill

In laying out the mill it was found that, in spite of the 2000 ft. of length available for the entire plant, it would not be possible to have a long enough run between stands to permit bars to be rolled back and forth in one and then in the other without interference. Hence, between the roughing set and the intermediate set there is an offset of 11 ft. 3 in., in which bars are transferred sidewise before entering the intermediate stand. The opinion is expressed by the engineers that, although this move was forced by conditions, it was one which would probably be repeated in a subsequent design, even if the conditions did not require it. This is because the narrow transfer does not interfere with rolling in either set and has the advantage of bringing the sets closer to each other.

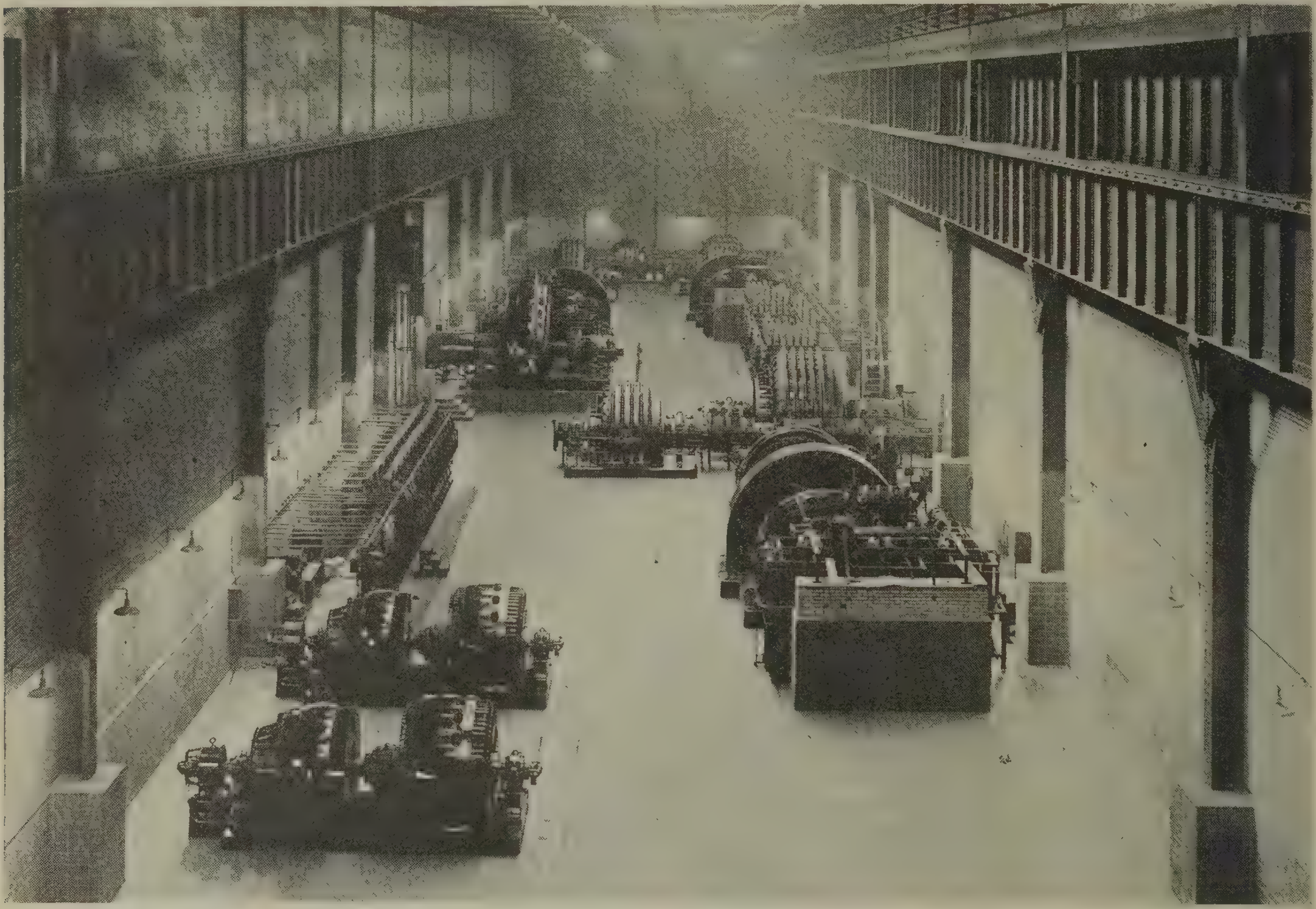
Beyond the long transfer to the hot saw is a hot bed occupying a space about 100 by 250 ft. This is in three independent sections, each some 85 by 100 ft., permitting great flexibility in handling the product. Alongside the hot bed is a roller straightener for the smaller beams and two gag presses for the larger beams. Two cold saws are provided also.

Shipping of the product takes place in a wide bay running at right angle to the length of the mill, and covering also the stripping floor of the new structural mill to the south of the H-beam mill. This bay has three 20-ton cranes of unusual design. Bars come from the mill in an east and west direction. For shipping they have to be turned north and south, or through 90 deg.

Each crane has a turntable on its trolley, which is operated from the cab and which carries a long spreader arm. At each end of the spreader arm is a separate hoist of 10 tons capacity. These may be operated either independently or in unison. For handling the big product of the mill they are operated, of course, in unison. One great incidental advantage of this equipment lies in the fact that the trolley may be run over to one end of the bridge, with the spreader parallel to the bridge, thus making it possible to pick up as much as a 10-ton load in the adjoining bay. The design is so rigid that such a load at one end of the spreader does not upset the equilibrium of the unit.

Storage space for stock is provided in adjoining bays, 3.7 acres being available under cover for this purpose.

Between the blooming mill and the roughing stands is a transfer whereby hot steel may be shunted off to other operations during the time of roll changes in the 52-in. mill. From the transfer the blooms pass upon a pivoted roller table which may be swung through about 30 deg., thus delivering the blooms upon the approach table to a wheel-blank cutting machine. Here rounds



Motor Room for the Standard Beam Mill and the H-Beam Mill. The motors and motor-generator sets for the latter are at the right. At the far end is the blooming mill motor, with the others nearer the reader. The motors at the left are for the standard beam mill up to 15 in. diameter are cut off to such length as may be required for the wheels being made at the Schoen Steel Wheel Works, where these blanks are sent.

Between the pivoted roller table and the cutting machine is a further detour, by means of which slabs rolled in the blooming mill may be taken off and shipped to a plate mill at some distance. For this purpose the slabs have to be reheated, of course.

Within the area of the new mills were several old boiler plants serving these several mills. All of these were dismantled and taken out, to the number of more than 100 boilers. Ten waste-heat boilers were installed in connection with open-hearth plant No. 4, for heating and other purposes around the mill. Power, however, is derived now from the new turbo-generator across the river.

The Homestead works organization was responsible for the remarkable speed with which the entire construction program for all the new mills was carried out, while successfully meeting the requirement that none of the product of the old mills should be lost. The Homestead organization is also to be credited with the complete design of the 52-in. Carnegie H-beam mill and the novel features of roll design used in this mill.

Urges Curb on "Price Hammering"

Chamber of Commerce of United States Adopts Resolution Favoring "Firm Bids"—Wider Knowledge of Production and Distribution Data a Need of Industry

AT the meeting of the manufacturers' group of the Chamber of Commerce of the United States in Washington last week two resolutions were adopted with a view to establishing more "teamwork" in manufacturing and industrial expansion and eliminating "price hammering and price cutting." Both were introduced through L. S. Horner, president Niles-Bement-Pond Co., New York. The first resolution, noting the rapid growth and tremendous development of the nation's industries, accompanied by excessive productive capacity in many lines, called for knowledge of the true cost of production and distribution, based upon uniform cost accounting for a given industry, and the necessity for wide publicity through trade associations of reliable statistics covering current facts on orders, shipments, stocks, etc. Chambers of commerce interested in promoting new industries for their communities were asked to consider such current economic facts before encouraging development of additional capacity in any given industry.

The second resolution, pointing to prevalent "price hammering by buyers and price cutting by sellers," affecting profits and stability of many businesses, declared for a system of firm prices and bids, which, it was stated, would not lessen competition and would be a benefit to the public. Trade associations, chambers of commerce and the business press were urged to use their influence to create a widespread sentiment in favor of such prices and bids, which would not be reduced once they were submitted.

In discussing these resolutions, Mr. Horner declared that there is a "crying need for outstanding leaders to step into the open and lead the way to better, saner and more honorable methods of conducting their business and education of executives not so well informed."

Purchasing agents who engage in the practice of "pounding" down prices were criticized by M. L. Lissberger, president Marks Lissberger & Son, Inc., Long Island City, N. Y. He said that, by beating down prices of products that they purchase, the prices of their own products are reduced and that therefore the practice reacts to the detriment of their own industries. He also urged trade association executives to obtain and distribute more business facts as a means of preventing the hammering down of prices.

Business Statistics Defended

In a spirited reply to one delegate, who objected that trade statistics do not mean anything except time and expense, E. F. DuBrul, general manager National Machine Tool Builders' Association, Cincinnati, stoutly maintained that such facts are absolutely essential to the intelligent conduct of business, but that one difficulty is that some executives do not use them after they are supplied. In discussing price cutting, Mr. DuBrul complained that there is a lack of courage on the part of sellers in maintaining their figures, with the result that profits are brought down. George D. McIlvaine, National Pipe and Suppliers' Association, Pittsburgh, said that the problem of distribution is becoming more intense each day, but that men are getting into distribution who are not qualified by either education or capital.

A paper on "Labor Conservation—Teamwork for Lower Costs of Production," prepared by C. S. Ching, president American Management Association, New York, was read in his absence by W. J. Donald, director of the association. New machinery and improved methods of production were declared to be the one thing which has raised man from a mere existence level to economic independence. Those who would limit or restrict this development, it was said, are fighting against industrial progress and striking at the basic cause of the present high standard of living. Comparative freedom in the United States from opposition to improved methods of production on the part of both employees and management was named as one of the most important factors in the industrial supremacy of this country. The favorable attitude of both workers and executives, their teamwork and confidence in each other, was declared to be a necessary factor which had developed improved methods of production and benefited wage earner, management, stockholders and the general public through greater output of goods and cheaper costs.

An examination of the census of manufactures was said to show conclusively that the per capita income of the wage earner has increased in direct proportion to the per capita value of goods produced. One of the important reasons for the relationship between workers and management was declared to be the lack of class consciousness in the United States.

"Our industrial organization is unusually democratic," it was pointed out. "The wage earner of today is the industrial leader of tomorrow. . . . As a result, management cannot be regarded as set apart from the rest of the organization. It is no super-imposed group. Its ranks are being continually filled from every position within industry."

Denounces Government Muckraking

In an address at a general session of the chamber, William E. Humphrey, chairman of the Federal Trade Commission, strongly denounced Government muckraking investigations based merely upon the hope of finding something scandalous or reprehensible. Mr. Humphrey said that he is utterly opposed to any investigation by the Federal Trade Commission that is not based upon alleged violation of the law. Constructive methods by which the commission is cooperating with business to eliminate abuses and unfair trade practices were outlined by Commissioner Humphrey.

Addressing the foreign commerce group, Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, spoke of foreign trade combinations and in the course of his remarks said that the cartel has its distinct limitations and by no means affords the panacea which had been confidently expected of it. The international steel cartel was cited as an example in proof of his statement. He said, however, there is need for collaboration in the furthering of uniform commercial legislation, for the interchange of statistical information along mutually helpful lines, etc., in advancing the standards and possibilities of the world's commerce.

Era of Large Unit in Business Only Begun

The outpouring of restrictive and regulatory laws from American legislatures was subjected to attack by Silas H. Strawn, chairman of the board of Montgomery Ward & Co., Chicago, and president of the American Bar Association, at a general session. He predicted that the era of the big unit in business is only beginning.

"Commencing with the amalgamation of the constituent companies into the United States Steel Corporation, in 1901, the last 25 years may be known as the age of the big unit," said Mr. Strawn. "Competition and economy have made necessary the creation of big units in almost every industry and business. I predict that the age of the big unit has only just begun and that in the future the problem of our Congress and our legislatures should be, and let us hope it may be, not how combinations of capital and labor may be disintegrated and destroyed, but how they should be regulated and controlled so as best to serve the people."

International Trade and Finances Discussed

New problems, national as well as international, confronting the United States as the most productive country of the world were discussed at the annual dinner last Thursday evening, which was attended by some of the country's most distinguished industrialists and business men. Owen D. Young, chairman General Electric Co., presided. Among questions dealt with were how foreign countries are to pay for the growing volume of supplies purchased in America and how the United States is to maintain and control its growing productive energy.

A warning that this country cannot go on indefinitely receiving yearly an increasing amount of interest and sinking fund payments on its loans and investments and maintain its present tariff policy and export trade was given by Dr. Alberto Pierelli, Milan, Italy, president International Chamber of Commerce. He said, however, there would appear to be a number of compensating influences, such as the rising standards of living in this country and throughout the world. Sometimes, also, new scientific discoveries revolutionize the course of economic development, it was pointed out. Nor should the influence incident to the development of new territories be disregarded, Doctor Pierelli said.

Better Control of Increasing Production Urged

Adequate control of the economic thunderbolt of increasing production unloosed by industry was put forward by Lewis E. Pierson, retiring president of the chamber, as the overshadowing problem of business. He said that the nation has a new problem before it and must prove that production is its servant and not its master. It must, he said, demonstrate that it has the will and the skill to control the machine it has created. Closer cooperation on the part of business, labor, agriculture and finance to accomplish this purpose was predicted by Mr. Pierson. He foresaw teamwork on the part of these interests lifting the fear of unemployment and suffering from the minds of those who toil, permitting the wheels of industry to turn with increasing effectiveness "to bring more and more of the comforts and even the luxuries of life to all who contribute to the productive power of America and remove the threat of an unused surplus from the nation that has staked its economic future on the doctrine of increasing production."

Joseph H. Defrees Elected Chairman

Following the conclusion of the convention, the board of directors on Friday elected officers for the ensuing year. Joseph H. Defrees, lawyer and business man of Chicago, was chosen as chairman of the board, succeeding Judge Edward B. Parker. William Butterworth, president Deere & Co., Moline, Ill., was elected president, succeeding Lewis E. Pierson. Other officers elected were: Vice-president Eastern division, Alfred J. Brosseau, New York, president Mack Trucks, Inc.; vice-president South Central division, Robert R. Ellis, Memphis, Tenn., president Hessig-Ellis Drug Co.; vice-president North Central division, Robert P. Lamont, Chicago, president American Steel Foundries; vice-president Western division, Paul Shoup, San Francisco, executive vice-president Southern Pacific Co.. Frederick J. Haynes, Detroit, chairman of the board Dodge Brothers, was reelected a director.

Purge Business of Corruption, Resolution Urges

The outstanding resolution, following the lines of the keynote address of the meeting by Judge Parker, while recognizing the general integrity of business, urged that it be purged of commercial and political corruption and other dishonest practices. It reaffirmed the chamber's principle that "business should render restrictive legislation unnecessary through so conducting itself as to deserve and inspire public confidence." Another resolution opposed government in business that can be successfully undertaken and conducted in public interest by private enterprise. In a resolution concerning the Federal courts, the chamber deplored efforts by the legislative branch to usurp or limit the functions of the judiciary which, it was said, must result in disaster. In passing upon taxation, a resolution urged reduction of the corporate income tax to not more than 10 per cent, the elimination of the war excise taxes on particular business and repeal of the estate tax; another resolution urged greater efficiency in the administration of Federal taxation. Opposition to Government operation of the merchant marine was expressed and approval given of pending legislation for the encouragement of private shipbuilding and operation through loans. Opposition also was reiterated respecting provisions of the Jones-White bill, which authorize the Shipping Board to include in its activities marine underwriting, which was held to constitute an unnecessary and unsound abridgment of private enterprise. Amendment of the national defense act to permit the placing of educational orders with industries was urged.

Collective buying of imported raw materials not available in the United States was sponsored, with advocacy of an amendment to the Webb-Pomerene act to this end. It was held that this would assist in releasing American buyers from the grip of foreign monopolies. Industrial information was recognized as being necessary so that business may be conducted intelligently; the gathering and distribution of such material, bearing upon true costs of production and distribution based upon uniform cost accounting, was approved.

Appreciation and support were given the policies of the Department of Commerce for the promotion of commercial aviation, as giving private initiative encouragement toward building of air commerce upon a sound basis for future expansion.

Furnace Operation; Quality Control

Open-Hearth Men Discuss Their Problems at Youngstown Meeting — Impurities in Scrap Charged Cause Much Trouble

THREE half-day technical sessions of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers were held at the Hotel Ohio, Youngstown, on May 3 and 4. More than 80 open-hearth superintendents and others interested in open-hearth matters were present. Last week, pages 1317 to 1320, the general features of the meeting were covered, including the discussion of the first morning's session, which was devoted to matters relating to the construction of open-hearth furnaces. In the following paragraphs are the discussion of furnace operation, which formed the topic for the afternoon session on May 3, and of quality control in producing steel, which was discussed on the morning of May 4. There were no set papers at any of the sessions. Many men participated on each topic.

Consideration of Furnace Operating Results

AUTOMOBILE scrap and some machinery scrap contains ingredients which may run right through the bottom of the furnace within two or three days, in the opinion of John H. McDonald. It is of such a character that it cuts through the pan. This seems to be the general consensus of opinion as to this type of scrap, which is reaching the mills in great quantities.

Scrap foremen and others handling scrap are given bonuses, in several plants, for all of the brass and lead, nickel, aluminum, babbitt, zinc and other impurities which they separate out from the scrap. As a result of this practice, which gives the foremen as much as $60 to $75 extra a month, Henry A. Young reports very little trouble from dirty scrap at Allegheny Steel Co.

Effect of Impurities in Scrap

Chromium in scrap results in a slag which is hard to shape up, according to J. M. Hughes, Sharon Steel Hoop Co. Nickel does not seem to give trouble, but brass, aluminum and lead do. Brass, babbitt and other impurities have been giving trouble at the Wisconsin Steel Co. in furnace practice, but Mr. Ramsey said that no detriment to the quality of the product had been observed.

Nickel at about 0.1 per cent was reported by R. S. Simmons, research manager Pittsburgh Steel Co., to result in a heavy coating of scale, especially on strip steel. Tin oxidizes in the bath. The foreman of the Pilger mill refuses to accept a heat of this character. It will not pierce and, in one instance, such a heat could not be rolled on the 28-in. mill. The influence of the tin inclusions was such as to raise a 0.14 per cent carbon heat from the normal 48,000 or 52,000 lb. to the square inch to 68,000 lb.

Galvanized sheets are charged on top of the upper layer of scrap at the Edgewater Steel Co., for the purpose of allowing the zinc to burn off. This material has been known to run through the bottom of the furnace and pile up below the tap hole. Babbitt runs through the furnace in a similar way, said Frank B. McKune, open-hearth superintendent Steel Co. of Canada. It is regular practice at that plant to prepare all the scrap before it is put into the furnace. As much as 500 lb. of babbitt has been gleaned from a drag of ten cars of scrap. This material includes about 85 per cent of lead and 8 or 9 per cent of antimony.

How Lead Acts in Bath of Steel

Lead goes at once to the bottom of a furnace because of its greater specific gravity, and lead oxide does the same, according to G. D. Tranter. Brown fumes coming off the furnace bottom are an indication that lead is present there. Journal brasses in the scrap contain some 15 per cent of lead. When this trouble is encountered it becomes necessary to wash about 6 in. off the bottom of the furnace and remake the bottom with fresh magnesite. Nickel, chromium and aluminum cause little of this trouble, but have their effects on the quality of the steel. Any lead above 0.008 per cent in the bath will tend to cause trouble, making small checks show up on bars, and a lot of small scabs. One source of lead is the heavy paint existing on some bridge scrap. Sometimes this lead oxide coating is as much as ¼-in. thick.

High copper content gives much trouble in forging steel, reported C. C. Wales, superintendent open-hearth and blooming mill, Otis Steel Co. For this purpose the copper must be held under 0.04 per cent. He stated that both copper and nickel go out with the metal, while lead and chromium stay in the furnace. Hence, the two groups must be considered separately. T. T. Scott, Sheffield Steel Co., expressed the opinion that nickel and copper do no harm if under 0.20 per cent.

Reclaiming Valuable Non-Ferrous Metals

As the secondary metals under discussion are much more valuable, pound for pound, than the steel scrap, Dr. Thomas T. Read, secretary of the committee, suggested that perhaps an economic solution might come, through the scrap dealer sorting out the non-ferrous items. Selling this at the higher price which it com-

Unusually Broad Participation in Deliberations

MEETINGS of men earnestly debating the means of improving the technique of their work have become common in the United States in recent years. But the semi-annual gatherings of the open-hearth committee are perhaps unique in the extent to which nearly every member gets his day in court. Forty-two different men are quoted in our report of the Youngstown meeting—just two-thirds of the number of active steel works men present. Some of the others spoke, also, but limitations of space have held us to those mentioned. And the way in which differences of opinion were ironed out in the meeting, largely through the leadership of the chairman, holds happy augury for the future work of the committee.

mands would be looked to to compensate for the cost of labor involved. But several speakers stated that the cost of separating some of the metals in that manner would be greater than the selling price of what might be recovered.

Scrap dealers already are worrying about the rejection of scrap carrying large quantities of impurities, Mr. Reinartz said. "What if everybody starts to reject automobile scrap?" Mr. Ramsey suggested that it might be expressed as the sense of the meeting that automobile scrap be rejected in all cases except where it is bought as such. If such a standard specification be made, and everyone would live up to it, this might stop the mixing of automobile scrap with scrap of a cleaner grade. Some one amplified this by suggesting that no one accept automobile scrap except in carload lots. A single piece of such scrap in another kind of scrap, even though some of the scrap had been unloaded and used, should be cause for rejection of the remainder.

Doctor Herty explained that the kind of steel being made has an influence on the effect of the deleterious element. For instance, with steel of 0.60 per cent carbon, as little as 0.03 per cent tin would be likely to cause trouble. But with 0.08 per cent carbon tin may be accepted up to 0.20 per cent, without reason to apprehend trouble.

Regarding copper-bearing steels, the Allegheny Steel Co., which has been making this grade for years, formerly had to add considerable copper. It now has to add only half as much, or even less, due to what the scrap already contains. It is necessary to run a preliminary test, to ascertain how much copper to add, because the residual in the bath varies so much. This is at about 0.10 to 0.15 per cent at present.

Control of Furnace Temperatures

Using a Venturi-type part at the incoming end of the furnace, with a cross section of 900 sq. in., the Steel Co. of Canada makes it a practice to set the damper as experience has dictated and then not to change it during the run. Gas meters are used at each furnace of the Republic plant, so that the flow is known and can be controlled.

With the Isley control method on 115-ton furnaces at the Ashland plant of the American Rolling Mill Co., a pyrometer is placed at each end of the furnace and reversal is made at a predetermined temperature in the flue. There is a Brown instrument set to ring a bell when this temperature is reached. An indicating pressure gage in the downtake measures the stack draft and the pressure of the incoming air. A variable-speed fan is connected with a rheostat set to give the draft and pressure wanted. Using natural gas, the consumption is 80,000 to 85,000 cu. ft. an hour during the melting period, about 60,000 cu. ft. on the lime boil and 55,000 to 60,000 cu. ft. for finishing the heat.

Fuel Savings Shown in Controlled Furnaces

At the Middletown plant of this company pyrometric controls are placed on various parts of the furnace. A fan is used on the air inlet, to know how much is going in. Carbon dioxide in the slag pocket ranges from 17 to 18 per cent, with perhaps 2 per cent of oxygen. Coal consumption is about 600 lb. to the ton of steel. Heats are being made in 12 hr., which is a bit better than the normal run on ingot steel. It is found necessary to keep changing the fan speed throughout the progress of the heat, to obtain perfect combustion conditions. Using producer gas, the air blown in ranges from 4500 to 7000 cu. ft. a minute.

Savings of about 3 gal. of oil to a ton of steel are attributed to pyrometric control on Laclede Steel Co. furnaces, by John W. Gething. Positive pressure is carried on both the uptake and the downtake. This does not result in blowing out at the doors, except for a small amount at the last door near the outgoing end.

Refractories for Various Services

Burnt magnesite is used on the bottoms and a 2-to-1 mixture of dead burnt and raw dolomite on the banks and sides of the Granite City furnaces. Major James W. Mills, open-hearth superintendent, expressed a liking for the domestic grades of magnesite. For a hole, he uses a mixture of ground slag and magnesite.

Patches are made with magnesite at the Pittsburgh Crucible Steel Co., as reported by David G. Baxter, open-hearth superintendent. Different kinds of prepared refractories have been tried for bottom repairs. For washing out high bottoms, Magnifer is used. T. T. Scott, Sheffield Steel Co., stating that his practice is hard on banks and bottoms, uses some magnesite with raw dolomite. On the other hand, C. Foster, open-hearth superintendent American Steel Foundries, East St. Louis, Ill., uses no magnesite except on the Sunday overhauling. Burnt dolomite is used regularly. He considers the domestic magnesite very satisfactory.

Preference was expressed for raw dolomite and magnesite, over the patented materials, by W. T. Kilgore, open-hearth superintendent Erie Forge & Steel Co., "because the cost is less than half as great." He uses as little magnesite as possible, for similar reasons, but closes the taphole with Austrian magnesite.

Each Type of Refractory Has Its Use

Roasting the dolomite in the plant was reported by H. B. Hubbard, Inland Steel Co., and R. L. Leventry, Republic Iron & Steel Co. Mr. Hubbard said that his consumption of dolomite averaged 62 lb. to the ton of steel in 1927, and of (foreign) magnesite, 2 lb. Mr. Leventry uses foreign magnesite for bad holes, and is experimenting with Canadian magnesite. He uses some of the patented materials, believing that each type of refractory has its own use, which it can fill better than other materials.

Austrian magnesite is used for bad holes and Kendolag and Magnifer for slag lines at the Corrigan-McKinney plant. L. E. Yost, open-hearth superintendent, stated that a change from 42 per cent to 65 per cent pig iron in the charge involves a change from 2 per cent to 12 per cent of ore in finishing. And it must be remembered that the higher the metal charge the greater will be the refractory costs.

How Much Do Tapholes Grow?

Considerable discussion was evoked by the statement that the taphole grows as heat after heat is run out through it. W. F. Davis, Youngstown company, Inland Harbor plant, said that a 5-in. hole will take out a 106-ton heat in 8 or 9 min. This time is reduced to 6 min. when the taphole has gone up to 6 or 7 in. in diameter. Frank A. King reported that on the big furnaces at Weirton a 6-in. hole cuts to 7 in.

On the other hand, Mr. Kilgore stated that a taphole laid up with magnesite does not grow. William Herman, superintendent steel plant Keystone Steel & Wire Co., Peoria, Ill., uses a special form of magnesite tile for the taphole when rebuilding a furnace. This gives a hole 6 in. in diameter and 13 in. long, which lasts about 70 heats. Then he relines the hole around a 5-in. pipe. At the Donner Steel Co. a 6-in. pipe on 100-ton heats lasts about 30 heats. At Laclede Steel Co. a 7-in. pipe is used on 80-ton heats, lasting for about 35 heats. With a 5-in. or 6-in. pipe, only 15 to 20 heats are obtained from each pipe by the Andrews Steel Co., E. A. Smith reported.

Low-carbon steel is particularly hard on the taphole, according to several speakers. With the big furnace and bifurcated spout at the Republic plant a large hole is needed. Mr. McCutcheon reported "no luck with tapholes." He uses 6-in. pipe on soft heats. A long discussion followed as to heats breaking out at the taphole and spurting over the top of the ladle when raw dolomite is used for the taphole. Burnt material as a lining, on the metal side, was said to obviate this trouble.

Aids in Bottom-Making Time

Using a Blaw-Knox bottom-making gun, the average time for this process at the Middletown plant was reduced from 49 min. to 31 min. A sloping backwall, according to G. D. Tranter, needs a dolomite gun to keep it in shape. Also, if the slag line begins to cut, near the end of a heat, the dolomite gun is brought up to hold it in place.

A similar view was expressed by Henry A. Young, who believes that the use of the gun keeps the banks in better shape than is possible by hand. This innovation has eliminated the services of many third helpers. At the Bourne-Fuller Co., one man to the furnace has thus been displaced, while the banks are better maintained, and with less material. For a plant of six to eight furnaces, the gun permits the crew to be only two men to the furnace, with four men in the pits, according to Mr. McCutcheon. It simplifies the hard job of bottom making, and does it with the least effort.

Advantages of Sloping Backwalls

Sloping backwalls were characterized by Robert L. Cain as a money saver. After two years of use, he said, no brick have had to be replaced, against a repair job, previously, after every 30 heats or so. Similar results were reported by R. L. Leventry, who stated that he had never had to shut down to make a backwall repair, with sloping backwalls. After a run of some 275 heats the chrome brick at the slag line have to be replaced. He called the slope a "good improvement."

While H. B. Hubbard averred that the sloping backwall is worth while on account of saving delays, Mr. McCutcheon sounded a note of warning. The roof over the slope becomes a problem, he said. It cuts badly near the skewback line, where the roof has been widened from 15 ft. 6 in. to 19 ft. An incidental advantage was cited by G. D. Tranter in connection with the frontwall. An extra 10 to 15 heats may be obtained from it, when a sloping backwall is used, by not repairing the frontwall as a matter of routine when the furnace is off for backwall repairs. On this point, Mr. Cain and Mr. Kitto both said that the sloping backwall has doubled the life of the frontwall.

Speaking on the proper grade of sand to use for the bottom of an acid furnace, R. A. Mercur, Jr., assistant superintendent steel mills John A. Roebling's Sons Co., Roebling, N. J., stated that his company can dig the sand out from under the property. He uses a mixture of two grades, in the proportion of six parts of the white local sand to one of a red sand. Analyses of the two sands were given, as follows:

	White Sand	Red Sand
SiO_2	97.84	84.36
Fe_2O_3	1.70	3.59
Al_2O_3	0.68	8.39

Session on Control of Quality in Steel

CAUSE and cure for blisters in full finished and galvanized sheets was the opening topic of discussion at the third session of the conference, Friday morning, May 4. J. A. Durfee, metallurgist Weirton Steel Co., expressed the opinion that blisters on galvanized sheets are caused mostly in the annealing process. Hydrogen itself does not expand blisters, but moisture which has crept in does. Water vapor expands from water to the extent of 2240 times its original volume, against only two volumes for hydrogen. It is necessary to hold the sheets in the water vat long enough after pickling to be sure of getting the surface clean. Holding them too long, however, is likely to give trouble. It is a question whether sheets should not be dried thoroughly, over a coke fire or otherwise, before galvanizing.

Too Little Top Cut Off the Ingot

Lack of sufficient cropping of the ingot was mentioned by L. E. Yost as a cause to which trouble may be attributed. E. A. Smith made the same observation. He suggested that an increase in the amount of lime in the heat might help this condition, as a slag which is too thin will not give good surface results to the steel. He reported a marked difference in blisters in the surface, between steel which had been made with 12 per cent of limestone in the bath and that which had had only 10 per cent.

Opposed to this large use of limestone, W. F. Davis reported using only 7 or 8 per cent with a charge of 38 to 42 per cent of pig iron. This quantity of stone appears sufficient to give good heavy slags, but, of course, the proportion must be related to the amount of iron charged. Howard McClelland stated that there are more gray sheets resulting from killed than from rimmed steel. Much trouble is experienced in the pickling and some trouble from small blisters. In his practice the limestone is 11 to 12 per cent.

Pickling Process Blamed

Many very fine blisters, reported by the chairman from the Middletown plant, were attributed to taking too long a time in the pickling process. Certain mechanical changes were being made in the pickling department, resulting in the operation stretching out to twice the normal time. When this was speeded up again the blisters were got rid of.

Sheets with the most inclusions are, in his opinion, the ones showing the greatest tendency to blister. With 0.08 to 0.10 per cent carbon rimming steel, there are three or four times as many blisters in the top part of the ingot as elsewhere. Practically none are found in the bottom. Low-temperature annealing, also, seems to have a greater tendency to result in blisters than when the temperature is higher.

Sloppy-Working Furnace a Common Offender

Most of the trouble of this character, according to C. C. Wales, is due to slag inclusions. Somewhat the same idea was expressed by N. F. Egler, who laid the source of the trouble to a sloppy-working furnace. Little such trouble is experienced when the furnace is working sharply. Consequently he believes it good practice, when the bottom gets dirty, to take that furnace off of such particular products as sheet bar. Blisters will be produced if the furnace is ored too close to tapping time. Trouble may be caused by the furnace melting the charge too soft, if there is high-silicon pig iron in the mixer.

Blisters, according to Mr. Egler, come from a sloppy furnace because of slag inclusions. There is a greater amount of oxide present than on faster-working furnaces. There are more cold heats and as a result larger skulls left in the ladles. High-carbon steel can be made satisfactorily on a slow-working furnace, but it is not feasible to make low-carbon steels on such a furnace, if it is nearly ready to go down for general repairs.

Major James W. Mills placed the seat of trouble from blisters squarely in the open-hearth department. It is essential to have a good slag on the bath. There is trouble if the slag is too thin and trouble if it is too thick and lumpy. His plant uses about 8 per cent of limestone, or a corresponding amount of burnt lime, but with only 20 per cent or so of hot metal. He prefers metal with from 1 to 1¼ per cent silicon and 1½ per cent manganese, and states that 16 to 18 per cent silica in the tapping slag makes for good steel.

Feeding ore into the furnace within 45 or 60 min. of tapping was condemned by J. M. Hughes. With rimming steel he recommends a drop of from 2 to 4 in. on the ingot, if trouble is to be avoided.

Placing Responsibility for Seams and Pits

Soft-melting heats are charged with most of the responsibility for surface trouble, by J. D. Walters, assistant open-hearth superintendent, Lukens Steel Co. Such defects as seams, pits, etc., in plates (his company does not make sheets) go up from a normal 5 per cent to as much as 15 per cent under these conditions. Trouble is caused also by low-silicon iron—around 0.7 or 0.75 per cent—because it is difficult to get action in the bath. Above 1 per cent of silicon—or, better, 1¼ per cent—the action is good. He recommends the same 45 to 60 min. leeway, after the last ore addition before tapping, as did Mr. Hughes. He believes that fire-clay in the spouts and ladles is sometimes the cause of trouble, through loosening up and getting into the steel or slag.

Four main sources of trouble from blisters were given by G. D. Tranter. First he mentioned a larger skull in the ladle. Over-oxidized steel was the second item. Too low a manganese was the third, as 0.35 to 0.45 per cent manganese in the steel will give less trouble, with carbon from 0.08 to 0.12 per cent, than if the manganese is below 0.30 per cent. His fourth cause was melting the charge soft and then repigging. If, however, the recarburizing process is carried beyond the immediate need, and then the charge is ored down a bit, less trouble ensues.

Urges Omitting Use of Ore

Avoid the use of ore altogether and thus avoid trouble, was the counsel of F. B. McKune. It is his practice to lower the carbon content through reaction induced by stirring the furnace continuously with rods, from as high as 1.25 per cent carbon down to 0.6 per cent.

Good forging steel of 0.08 to 0.20 per cent carbon can be made on a slow-working furnace, in the opinion of Samuel B. Muir. Charles H. Moreland, however, states that special steels should never be made on a slow-working furnace and that at least 1.35 per cent silicon in the iron should be required for them.

Better results from iron high in phosphorus—1.75 per cent in place of 1.15 or 1.20 per cent—were reported by W. F. Davis. This iron gives a more fluid slag and results in the production of better plates, in which the phosphorus is up to 0.035 to 0.038 per cent. By-product gas gives more of a tendency to the furnace to foam than any other fuel, according to Howard McClelland. He stated that there is no sure cure for foaming. Several palliatives are available, but the condition always comes back.

Improvement of Pouring Practice

Practice seems to be tending toward using as small a nozzle as is practicable to pour the heat. Major Mills recommended opening up the nozzle as easily as possible, to avoid splashing. If there is a tendency to spray, the nozzle should be lengthened. In this connection C. B. Collingwood reported that he had just ordered some new nozzles 15 in. long in place of his standard 12-in. length.

Poor success in pouring small ingots from the top was reported by J. D. Walters. With molds measuring 7 x 14 in. and 9 x 14 in. there was so much splash as to give a bad surface. Hence a section of stove pipe was used, running down to near the bottom of the mold, through which the steel was poured.

Reporting upon the use of a square nozzle opening, in place of the customary round, Kenneth C. McCutcheon stated that the 1½-in. size is ideal for narrow molds. He uses a long nozzle with the sides of the square set parallel to the sides of the mold, and can pour an ingot of 11,500 lb. in 87 seconds. On soft steel, however, this nozzle cuts away quite rapidly, resulting in pouring this size of ingot later in 60 seconds or less.

Pouring with Two Nozzles

Use of two nozzles to the ladle, each with a 1-in. hole and separately controlled, was reported by F. B. McKune. He is getting down to as small a nozzle as he can use. He pours two ingots at once, thus minimizing the time of pouring the heat, and reports getting a better surface with these small nozzles. There is almost no trouble experienced from leaky nozzles or running stoppers. The time of pouring increases from 2 min. at the beginning to 2 min. 35 sec., as the steel gets colder, at the end of the pour. It takes from 47 to 50 min. to pour 80 tons of steel in this manner, with the nozzles at 37-in. centers. He is trying to get away entirely from the nuisance of bottom pouring.

Setting the nozzles straight, so that the stream will not strike the side of the mold, and then getting the nozzle centered over the axis of the mold was recommended by G. D. Tranter. The molds must be clean and warm for best results. Samuel B. Muir reported that nozzles ordinarily cut as much as ¼ to ¾ in. while pouring a heat.

Getting Carbon Analysis on High-Carbon Steels

To avoid adding pig iron, as much as possible, it is the practice in the Donner Steel Co. plant to catch the carbon coming down. Samuel B. Muir reported limiting the anthracite additions to two bags (four points). Consequently, for high-carbon steels, such as 0.90 per cent, the furnace must be tapped at above 0.85 per cent carbon.

Quite a different practice was reported by E. L. Ramsey, who works the bath down to 0.15 or 0.18 per cent carbon and then recarburizes for all steels of under 0.50 per cent carbon. The steel is held for 10 to 25 min. after recarburizing, depending upon the size of the jigger put in. In addition, if silicon in the recarburizer is under 0.90 per cent he adds some 15 per cent silicon pig, to overcome the drop in silicon caused by holding the heat in the furnace.

Quality and Tonnage Viewpoints Differ

From the quality standpoint it is necessary, he believes, to catch some of the steels coming down. From the tonnage standpoint, however, he prefers to recarburize. He uses a 1½-in. nozzle to pour a heat of 118 tons, but has ordered 1¼-in. nozzles for trial. He believes that a higher temperature in the steel is needed if hot tops are used on the molds. For such purpose he recommends 2800 deg. Fahr. for steel of 0.40 to 0.75 per cent carbon.

Rail steel at the Inland plant is worked down to 0.15 or 0.16 per cent carbon and then recarburized. Use of a screwhead for the stopper was recommended both by W. T. Kilgore and Henry A. Young. Both have used them for years and stated that they would not go back to the pin and nut arrangement. This point of view caused disagreement from some other speakers.

Bottom Pouring High-Carbon Steel

Not very good success from bottom pouring of high-carbon steel was reported by J. D. Walters. He stated that a very dirty surface results, because of slag inclusions. Another speaker, referring to long ingots, on which sinkheads are placed, stated that with eight ingots on one bottom plate it takes 5 min. for ingots of 4 tons each and an additional 2 min. to fill in the heads. These ingots including the sinkhead are 115 in. long. Ingots are poured by this means from 13 to 30 in. in diameter, and the steel is at about 2900 deg. Fahr.

All ingots for the Pilger mill at the Pittsburgh Steel Co. are bottom cast, according to R. S. Simmons, research manager. These ingots are very small and are dead killed. The skin forms quickly, and gas is found close to the surface.

Temperature Requirements for 3 Per Cent Nickel Steel

Best results, according to Samuel B. Muir, are obtained with a pyrometer reading of about 2900 deg. Fahr., with steel containing 3¼ to 5 per cent of nickel. The hotter the steel is poured the cleaner it is. Possibly 2850 or 2875 deg. might be satisfactory.

Addition of nickel into the bath should not be too close to time of tapping. There is very little loss of nickel in the bath, as 98 per cent nickel drops only to about 96 per cent. Ingots should be left in the molds (20 x 20 in.) for about 1½ hr. Then they should be put right into a pit immediately after stripping. If they are allowed to get cold, a preliminary or warming pit should be used to bring them to a certain intermediate temperature, before charging them into the soaking pit.

All steel should be worked hot, according to L. E. Yost, so as to aid the oxides to get through the bath into the slag. The pouring temperature can then be adjusted as needed.

Hot tops of sand and a glutrine bond are made on the jarring machine at the Edgewater Steel Co. Mr. Smith reports that these are dried out thoroughly in an oven before being used. The discard from the ingot is about 10 or 11 per cent. Using bottom pour, these sinkheads have cut the pouring time from 7 min. to 5½ min.

In recognition of the efforts of the foremen and safety committeemen at the Joliet, Ill., works of the Illinois Steel Co., that company was host at a banquet, April 26, to 362 of these men, who had achieved a new record in safety measures for 1927. Last year only four lost-time accidents were recorded. Of these, three caused a time loss of more than seven days each. Nine calendar months passed without a single lost-time accident, shattering all the previous records.

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Sponge Iron As a Melting Base

Recent Experience in the United States and in Sweden—Superior Workability of Steel Revealed by Tests

BY N. K. G. THOLAND*

IN recent years sponge iron has attracted considerable interest as a melting base for high-grade steels, and has also been a theme for much discussion. While the extent of the application of sponge iron is still uncertain, it has already secured a definite place in some phases of modern steel making.

At one time sponge iron was probably the only iron base in use, because, in the early days of our "iron age," it was impossible to obtain temperatures high enough to melt iron. Therefore, sponge iron—iron reduced from the ore at temperatures below the melting point of iron—undoubtedly was the earliest form in which iron was produced. Later, with the development of blowing engines, following the Catalan forge and shaft furnaces of various types, man developed the modern blast furnace, which is the main producer of iron today.

In various localities, however, interest in iron produced by "direct reduction" from the ore has persisted, and from time to time different methods have been developed and tried. However, the instances where extensive comparative tests have been made, and published, of similar steels, made with and without sponge iron, are few.

Recently sponge iron has been tried along new lines in this country, and it is the object of this article to discuss briefly such figures and generally comparative results that can be made public at this time. The meltings that will be referred to, here and abroad, were made with the sponge iron from the plant of the Hoeganaes-Billesholms Co. of Sweden. This product contains about 97 per cent Fe and a very small amount of detrimental impurities.

Red-Shortness Claimed Reduced

Since the production of sponge iron started at Hoeganaes in 1908 it has been used chiefly in open-hearth and electric steel furnaces, both basic and acid. Very early the product was tried in low and medium-carbon charges with scrap and pig iron in making steels for seamless tubes. In that application it was noticed that the melting and the refining of a heat proceeded very quickly and smoothly as compared with an ordinary, otherwise equally balanced, scrap and pig iron charge. The metal poured with a clear color, fluid and coherent. The steels produced showed marked freedom from red-shortness.

The difficult piercing operation of the tube billets proceeded with greater ease than ordinarily and with very few rejections. The amount of sponge iron used in the charge varied, and, with 7 to 15 per cent of the total iron weight of the charge was common, as little as 4 per cent is used in such steels today. For most steels, 7 to 25 per cent of sponge iron is commonly used for open-hearth charges, with 45 per cent as the maximum, while for electric furnace charges 15 to 30 per cent is not unusual, with 50 per cent usually considered as a maximum. There are steels produced from a 100 per cent sponge iron charge in electric furnaces using coke, electrodes, etc., as carburizers.

Freedom from red-shortness has also manifested itself in the violent operations of forging and piercing to which other steels are subjected while red hot. Sponge iron steels show less cracking than other steels of good quality, and, in this connection, well-known authorities have expressed the opinion that the more elastic cohesion between the iron crystals in sponge iron steels has a definite bearing on the hot and cold working of the metal.

In the production of open-hearth and electric steels where it has been considered necessary to add high-quality muckbars to the charge, a pure sponge iron has supplanted, and may soon entirely supplant, the more expensive stock. In addition to a saving of about 30 per cent of the cost of the raw materials, this "new" material has shown definite advantages, especially in regard to the workability of the steels produced.

While definite testimony as to the superior workability of sponge iron steels is available, few records of actual results can be obtained. There have been fracture tests after heat treatment, however, and, as a result, a greater "safety range" is claimed for sponge iron steels than for other steels of high quality. Straight-carbon tool steels made with and without sponge iron have been quenched at various temperatures, and fractures have been compared. It was noticed that, while steels generally considered as giving excellent performance showed approximately the same fracture from 1420 deg. Fahr. to possibly 1530 deg. Fahr., the sponge iron steels gave corresponding results between 1420 and 1630 deg. Fahr.

As a Melting Base in Making Wire

In recent years sponge iron has been used as a melting base for better grades of wire steels. With an increasing demand for better physical properties in steel wire of various kinds, such as cable wire, spring wire and special wires, the manufacturers have resorted to various processes in order to increase the strength of the wire and improve its torsional and bending properties.

For some purposes alloys have been introduced in the steel to meet difficult specifications, and usually at great expense. Lately, specially made carbon wires have been known to give as good service at a considerably lower cost. Sponge-iron wires are known to respond very well to heat treatment, but at the same time the treatment may vary somewhat from standard practice. Therefore, in order to obtain a desired result, this point should be especially studied.

Cases are known, where cold-drawn, high-tensile wire, made in this country from sponge-iron steel, has shown unusual physical properties. The wire produced carried, in spite of higher raw material cost, a low comparative price, even in large dimensions, evidently on account of cheaper working.

Another example of the improvement of cable or rope wire may be taken from the experience of a manufacturer of wire of established quality. The production was based on carefully selected scrap and a high-grade pig iron. By substituting sponge iron for a certain portion of the charge it was possible to improve the quality from 6 to 20 per cent in torsional properties and from 20 to 35 per cent in bending properties. Certain torsional and bending specifications could formerly be met with a maximum tensile strength of 200,000 lb. per sq. in., but can now be met with a tensile strength of 255,000 lb. per sq. in., using the same equipment and general process of manufacture. Because of increased ductility of the steel, it is claimed that greater reductions per draft are permissible, and it is interesting to note that no higher cost for the final product is reported.

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Manufacturers of fine, cold-rolled steels, such as tempered and untempered spring steel, razor blade steels, etc., have had similar experience with sponge iron.

Better Electric Steels from Sponge Iron

Electric steels in the United States have today reached a high stage of development, using comparatively low grades of raw materials, which are highly refined under a double or single slag, but requiring a considerable amount of power for the refining. There have been cases where the addition of a high-grade sponge iron has decreased the refining necessary with a better product the result. While this especially refers to straight-carbon tool steels, alloy tool steels also are being produced with an addition of sponge iron to the charge. Steels extremely low in carbon have been produced in this country directly from sponge iron in the electric furnace under a basic slag, the product showing little or no red-shortness.

The growing difficulty for the maker of straight-carbon, high-grade tool steels in obtaining melting materials entirely free from alloys, especially nickel, makes the application of sponge iron as a melting base for high-grade electric tool steels an interesting possibility. Recent statements are that the average nickel content of plain-carbon selected scrap today is 0.15 per cent and is increasing, because of the wider application of nickel in various commercial steels.

Some electric tool steel makers, who are very particular as to the quality of their product, are today using other high-grade raw materials such as muck-bars, washed metal and pig iron, in addition to scrap from previous meltings of the same steel. For those manufacturers the application of a high-grade sponge iron, low in detrimental impurities and with a high grade of reduction, is of interest. This is especially true if the manufacturers intend to melt with a single carbide slag.

High-quality sponge iron has been repeatedly mentioned in the foregoing discussion. The term "sponge iron," as generally understood, applies, of course, to all iron reduced from the ore at temperatures below the melting point of iron. The grade of reduction—or the extent to which the iron content in the sponge iron is present as metallic iron or as oxides—and also the amount of detrimental impurities are important points to take into consideration. It is important also to know whether or not the impurities are combined with the iron.

By whatever method the production of sponge iron has been attempted, the principle of reduction is radically different from that of the blast furnace. Sponge iron is produced in a constantly reducing atmosphere, where no violent reactions take place. The factors influencing the process are balanced so as not to introduce any excess of carbon or other materials that have to be removed by refining in subsequent working. Properly made sponge iron gives the steel maker a virgin iron base, never molten and never subjected to reactions which, if not detrimental, are at least not very advantageous.

Some Facts About the Swedish Product and Process

The first plant of the Hoeganaes company at Helsingborg, Sweden, had a capacity of only 4000 gross tons of sponge iron a year, while its present capacity is about 15,000 tons. The Hoeganaes process was designed by E. Sieurin, chief engineer in charge of the various operations of the company's plants. In the original process Sieurin used a tunnel kiln. "Crucibles," with layers of coal and ore, as well as other materials, were placed on cars, which were moved through the tunnel in an opposite direction to that of a gas current used for firing the kiln. The cars passed through three distinctly different zones, a preheating zone, a combustion zone and a cooling zone. The product at the start consisted of comparatively small disks of a well-reduced iron, low in impurities. It gained a market at once as a high-grade melting stock, although its price at that time was very high, on account of the high cost of the handling and of the ore used in the process. Subsequently the method was changed considerably, utilizing labor-saving devices and other methods of charging, but the principle of reduction, by carbon monoxide and coal, is the same.

Magnetites, as well as hematites, are used as raw material. An interesting feature of the process is the comparatively low grade of coal used, both for firing the kiln and for charging with the ore. The Hoeganaes company owns large deposits of such coal, high in sulphur and ash, in the southern part of Sweden, and their desire to utilize these deposits was a vital factor in starting sponge iron production.

In the Sieurin process the ore usually is concentrated before the reduction, but separation from the gangue after the reduction is also successfully accomplished. The method of treatment depends on the ore used and use to which the sponge iron is to be put.

Appearance and Composition of the Iron

The product is graded into several classes according to the impurities, chiefly sulphur. In this article it may be sufficient to discuss the grade ordinarily used for steel-making purposes. It is now delivered in round pigs, 10 to 11 in. in diameter and about 2 to 2½ in. thick. Because of the process of manufacture, it is very light and porous, with a specific gravity of 2. When so desired, it is compressed to nearly solid pieces. The pigs are charged directly into the steel furnaces. The iron content has increased as the method has developed; formerly averaging about 94 per cent, it today averages 97 per cent. The grade of reduction is very high, the material containing less than 4 per cent of FeO.

The quantity of detrimental impurities is low, and, owing to the method of production, they are still in the gangue form. The phosphorus usually runs around 0.010 per cent, with 0.013 per cent the maximum; the sulphur content, as CaS, is in this grade 0.025 per cent maximum. No metallic silicon is found, and manganese runs uniformly around 0.025 per cent. As delivered today, the sponge iron contains vanadium to the extent of 0.13 to 0.15 per cent, probably as V_2O_5.

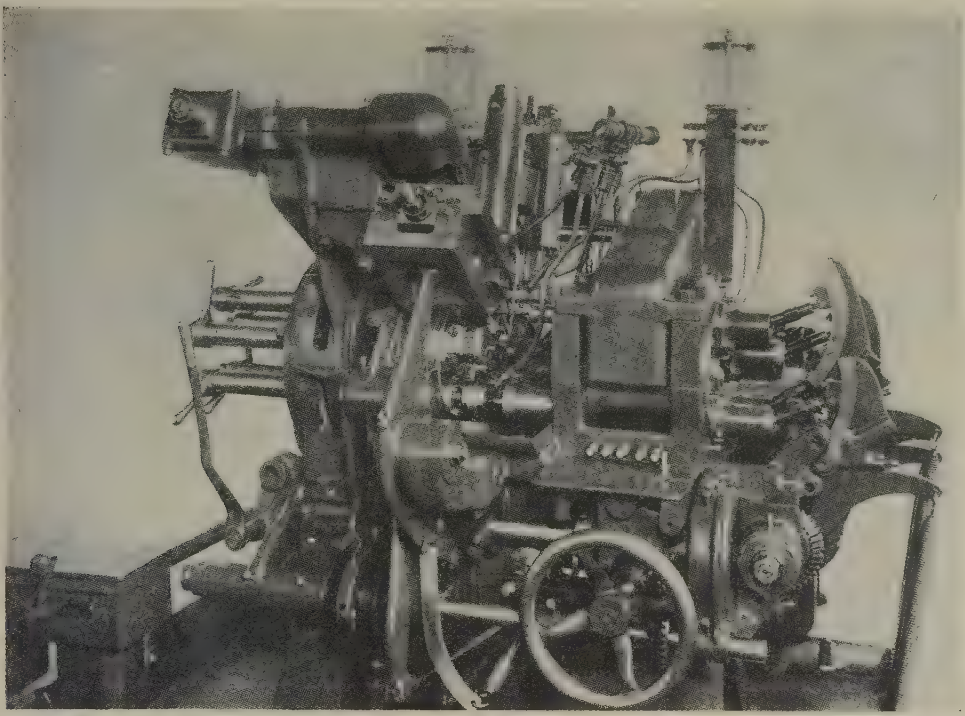
As a residue from the process, carbon is present to 0.03 per cent maximum, while the sponge iron itself is free from carbon, whether as graphite or as combined carbon. The balance is gangue, mainly SiO_2. While one pig may vary somewhat from another, the general analysis given is unusually uniform.

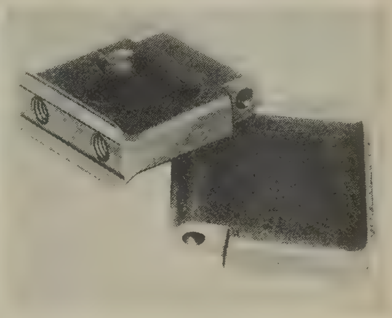
April production of track work for T-rail track of 60 lb. a yard and heavier was 13,511 net tons, according to a report by the American Iron and Steel Institute. This represented a reduction of more than 10 per cent from the March figure of 15,058 tons, but is otherwise the largest monthly total since last June. For the first four months of the year the production has been 49,272 tons, against 62,944 tons last year.

Adapts Automatic Screw Machine for Other Classes of Work

The Davenport Machine Tool Co., Rochester, N. Y., has brought out a "modified" automatic screw machine for work not ordinarily regarded as of screw machine class. The modified machine is adapted for a wide variety of work and increase in production as compared with usual methods is claimed. One application, illustrated herewith, has been the drilling of holes in the male part of an automobile hinge.

The tool mechanism is reversed from that of the regular screw machine, the tools being arranged to revolve while the work is held stationary. The hinge is placed in a fixture in the position usually occupied by the work spindle, and is clamped by one of the five handles shown at the left of the machine. The pin hole is drilled by tools located at the right-hand end of the machine, the first drill being guided by a bushing close to the work and drilling about one-third of the depth. In the succeeding operations the tools in the other positions drill the remainder of the pin hole and in the last position the hole is reamed.





Automatic Screw Machine Adapted for Drilling Holes in the Male Part of the Automobile Hinge Shown Above. The tool mechanism is reversed, the tools being arranged to revolve and the work held stationary

During the pin hole drilling operations the drill spindles, mounted on cross slides, drill the holes for fastening the hinge to the car body. One set of tools drills part of the depth, a second set completes the drilling, and a third set taps the holes. These holes, for fastening the hinge to the car body, are only 1 in. apart, but the drill spindles are arranged so that the driving gears are of fair size and each spindle has independent lengthwise adjustment for the drill.

The method of drilling all the holes at one time is claimed to eliminate errors which might occur by doing the work in several successive fixtures and machines. The longest hole drilled is 1⅜ in. The hinges are drilled and tapped at the rate of 260 to 400 or more per hour, depending upon the carbon content of the material and the speed of the operator. It is also pointed out that this modification of the screw machine permits utilization of one of the advantages of the multiple-spindle automatic, that of dividing long operations into two or more short ones, thereby materially reducing the total time of the machining operations. In common with other of the company's screw machines independent feed is provided for each tool, which permits selection of the proper feeds for the work of each tool.

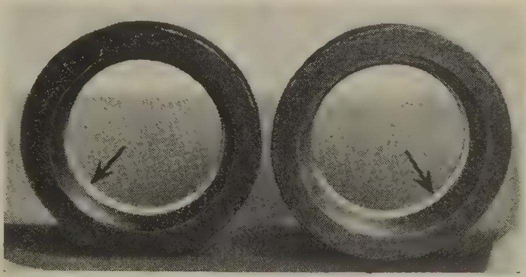
Stellited Carbon Steel Dies Replace Chromium Steel

An improvement in the performance of certain hot-forming dies is noted in the May issue of *Oxy-Acetylene Tips*. It has particular reference to the manufacture of seamless tubing or cylinders by the cupping process. A heat-treated 3 per cent chromium steel ring had been used on the finishing bench (which in this particular instance had a horizontal ram operating through three closely set dies). These dies produced from 30 to 40 pieces each. They were then reground to a larger internal diameter and used in an earlier stage of the process. One difficulty with this type of die was that when deeply ground it became out of round during operation and was difficult to remove from the holder without breakage.

Much better life is now secured from carbon steel rings, having the working surface built up by stellite, welded on by the oxy-acetylene blowpipe. After grinding to correct size, the die is ready for work.

When the die is worn too large or the base metal is reached, the surface is ground, re-stellited and trued up. It is then ready again for use in the same stage. This operation is repeated over and over again. The stellite surface only is exposed to abrasive wear, and, when this is renewed, about the same service is obtained as from the original coating.

Such dies in the first and second stages of the finishing bench will yield as high as 2000 pieces before it is necessary to rebuild them. The last die must be held much closer to dimension, and makes from 200 to 800 pieces before it needs to be replaced.

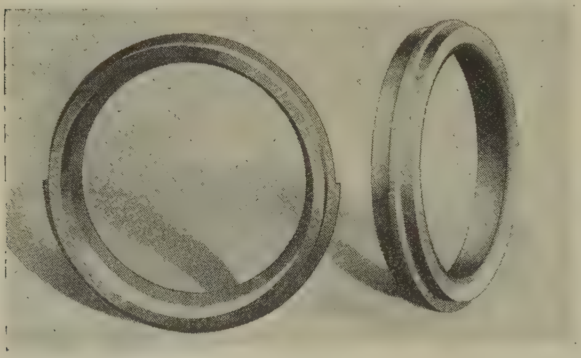


Stellited Rings Used for Dies in Cupping Draw. Left, newly made; right, after 822 draws

Double-Suction Centrifugal Pumps

A new line of general service centrifugal pumps has been placed on the market by the Economy Pumping Machinery Co., 3431 West Forty-eighth Place, Chicago.

These pumps, a re-design of the original Economy double suction line, contain many refinements, both mechanical and hydraulic. The makers claim efficiencies over 80 per cent from pumps of 800 gal. a minute and still higher efficiencies in larger sizes. The new line is designed for standard motor speeds of 1750 r.p.m. at 100 ft. head and 1750 or 3600 r.p.m. for heads up to 200 ft.

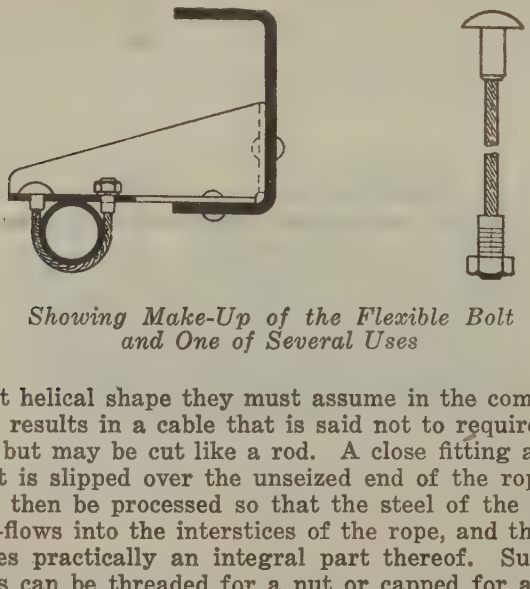

Renewable Bronze Wearing Rings, Showing the Semi-Circular Locking Flange Which Makes a Tongued and Grooved Joint with the Case and Butts Against the Cover, to Prevent Turning

All these single-stage pumps are of the horizontal split-case design, equipped with sealed type ring oiling bearings. Bearing brackets are cast with the case. Renewable bronze wearing rings are designed with a semi-circular male flange which locks them in the case. They are of the ell shape, which takes advantage of the centrifugal action of the water to prevent leakage. Shafts are of alloy steel turned and ground all over. They are protected, where exposed to the liquid, by cast bronze shaft sleeves held in place with nuts.

Flexible Bolt Made from Wire Rope

Designed for places where rigid U-bolts are impracticable, the flexible bolt illustrated has been developed by the American Cable Co., Chicago. It may serve as an auxiliary hanger for power shafts, suspension bracket for overhead steam or water piping, shackle bolt for temporary wall boxes, tanks, etc., for scaffolding and tackle, on various parts of machinery, and in other places where semi-flexible connections are necessary.

This new flexible bolt rests on the preformed type of wire rope. Preforming the wires and strands to the exact helical shape they must assume in the completed rope results in a cable that is said not to require seizing, but may be cut like a rod. A close fitting attachment is slipped over the unseized end of the rope. It may then be processed so that the steel of the fitting cold-flows into the interstices of the rope, and thus becomes practically an integral part thereof. Such fittings can be threaded for a nut or capped for a head. The flexible bolt which has resulted from these developments is available in varying lengths.

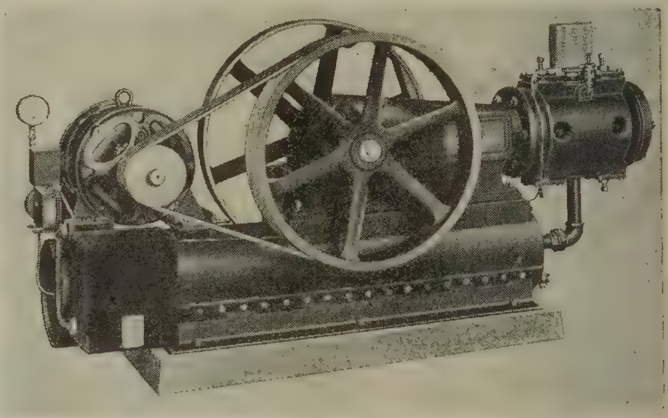

Showing Make-Up of the Flexible Bolt and One of Several Uses

Self-Contained Single-Stage Compressor

For use in small industrial plants and garages where compressed air requirements are comparatively limited, the Pennsylvania Pump & Compressor Co., Easton, Pa., is offering the single-stage double-acting multiple-belt-driven air compressor here illustrated.

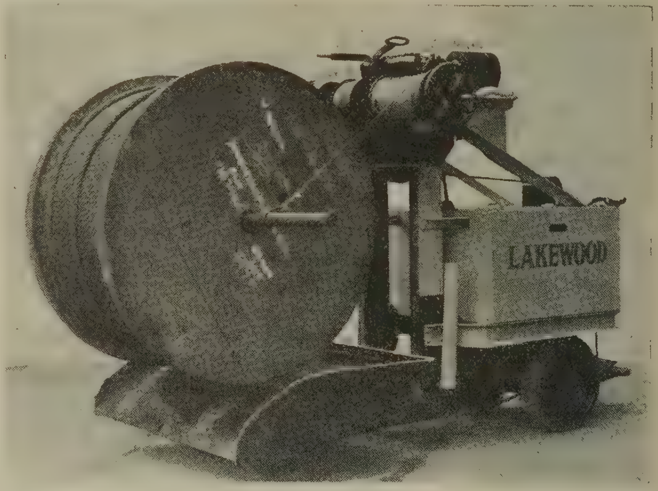
The machine is self-contained and semi-portable. The motor, starter, multiple-belt drive, air receiver, air filter, and automatic start-and-stop control are assembled in place, forming a compact unit which occupies floor space of 6 ft. 6 in. by 2 ft. 4 in. A hopper cooling tank can be furnished.

Valves are of the company's air cushioned type. The machine is equipped with a 10-hp. high torque motor which drives the compressor at 400 r.p.m. The piston displacement is 65 cu. ft. of free air per min. and the automatic control is for pressures of 85 and 125 lb. The weight of the machine is 1380 lb.


The Capacity Is 65 Cu. Ft. of Free Air Per Min., Piston Displacement

Lift-Truck for Handling Heavy Reels

A new storage battery lift truck designed especially for handling reels of wire, cable, etc., has been developed by the Lakewood Engineering Co., Cleveland. The truck has a capacity of 6000 lb. and will handle reels up to 60 in. in diameter and 42 in. wide.



Illustrating How the Reel Is Hauled Up the Apron to the Platform

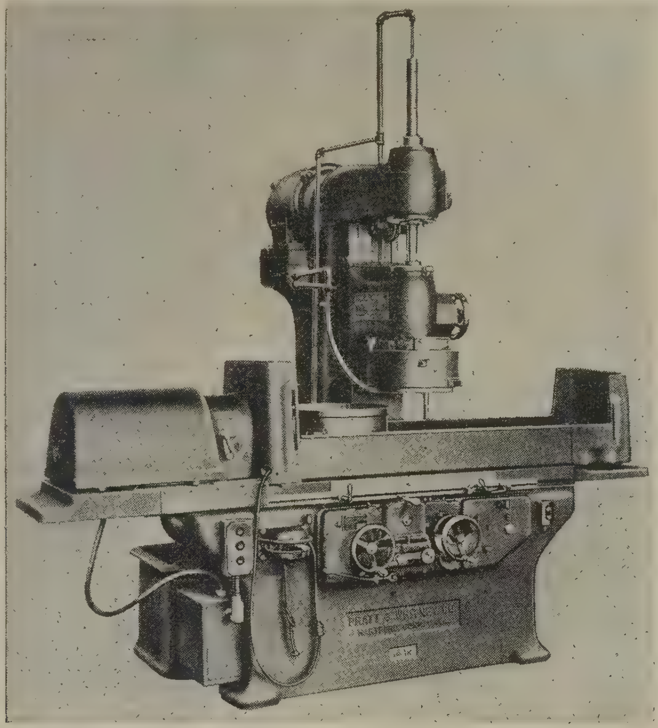
The winches slide upward on the trunnions and wind in at the same time, thus securing a double action. Previously a rather difficult handling problem, the transportation of these heavy reels is now made safe and easy. The sloping apron on the carrying table is shown in the illustration.

Engineering Foundation has issued its annual report for its thirteenth year, which ended Feb. 16. Brief details are given of a considerable number of researches under way, illustrations being shown of some of the apparatus used in the work.

New Rotary Chuck for Pratt & Whitney Vertical Surface Grinder

A separately-driven self-contained rotary chuck has been developed by the Pratt & Whitney Co., Hartford, for use with its 14-in. vertical surface grinder, model B.

The chuck is 16 in. in diameter and may be either of plain or magnetic type. It is arranged for bolting to the left-hand end of the regular table of the machine and is driven by a separate 2-hp. 1200-r.p.m. motor, which is also mounted on the left-hand end of the table. This motor drives the chuck through a two-speed gear box, spiral bevel gears and a worm and worm wheel being used to transmit the power from the gear box to the chuck. The gear box provides chuck speeds of 108 and 154 r.p.m., changes being made by means of a lever on the front of the housing. Operation is further facilitated by a push-button control which includes a jog button. The regular machine controls are used to move the table in and out under the grinding wheel.



The New Rotary Chuck Is Bolted to the Table of the Machine and Driven by a Separate Motor Through a Two-Speed Gear Box. A device for automatically locating the chuck under the wheel is available

The plain rotary chuck has its surface finished smooth for the use of fixtures, which may be held in place with screws tapped into the surface. The new magnetic rotary chuck has greater holding power than previous models. Current is carried to the coils through a new type of collector ring, and the chuck is designed so that water and lubricating oil cannot reach and damage the coils. There is a set screw at the side of either type of chuck to permit tilting it, and in thus providing for a wide range of concave and convex surfacing the usefulness of this type of machine is widened. Lubrication is supplied to all moving parts, except in the motor, from three reservoirs, and all parts are entirely inclosed to protect the gears and bearings from grit and coolant.

Electrical braking is provided for the motor so that the chuck may be stopped quickly when the power is turned off. Solenoid type braking is employed for alternating current motors and dynamic braking for direct current motors.

The new rotary chuck is arranged for tilting 1½ deg. above, or 5 deg. below, horizontal. The distance from the chuck surface to a new wheel is 7¼ in. for the plain chuck, and 4 in. for the magnetic chuck. These distances can be increased with raising blocks if desired. A special device which will automatically locate the rotary chuck under the wheel, in the proper position for grinding, is available for use on the machine. With this device the table of the machine advances to the right under power and is stopped in the correct position without attention from the operator. It is withdrawn from under the wheel to the loading position in the same manner.

Gasoline Driven Excavating Shovel

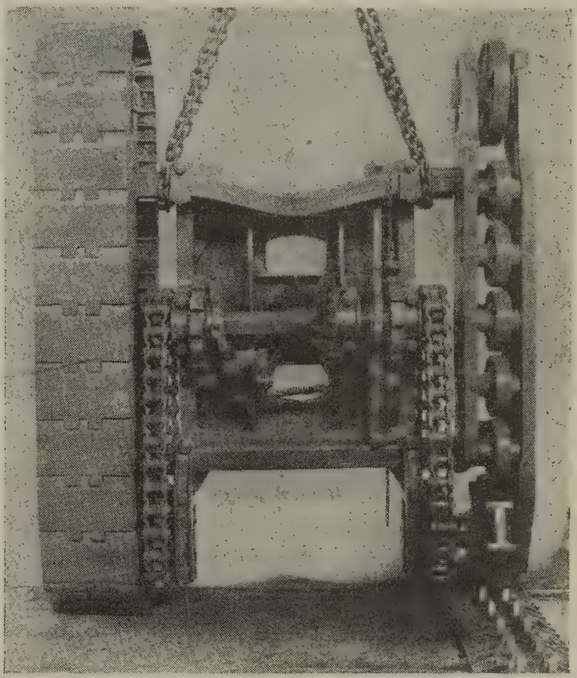
A new gasoline shovel of the full revolving type, and fully convertible to dragline, back hoe, clamshell and crane service, has been placed on the market by the Osgood Co., Marion, Ohio. The unit is mounted on a new and improved continuous-tread truck frame of the double-chain drive type.

As a shovel, the machine carries a minimum length boom of 20 ft. and a handle of 15 ft., with a back hitch type dipper. For crane service it carries a 45-ft. boom of the structural lattice bow-type, with built-in tagline, and with a fairlead for dragline service, self-adjusting to any angle of the boom.

An 80-hp., six-cylinder gasoline motor is mounted at the rear of the machine on the massive unit steel main body frame casting. Heavy unit steel sideframes securely attached to the main body casting support the drum shaft and the reversing shaft. This assures alinement of parts and reduces vibration to the minimum.

A special feature is the combination of cast iron gasoline tank and counterweight, which is set into the deck at the rear of the motor. This arrangement saves space and extra counterweight and at the same time greatly reduces the fire hazard, because of the heavy walls of the gas tank. The tank has capacity of about 75 gal., which is usually enough for a two-day supply.

The continuous-tread truck, of the double-chain drive type, is built up of steel castings, with axles and cross-travel shaft of hammered steel. The truck frame is a single massive steel casting. The roller path gear is of cast steel with cut teeth of the outside type. It is securely riveted into place on the truck frame casting, and has a machined shoulder to hold it securely in place. The side frames are large unit castings of box section, bow type construction. Five travel rollers 14 in. in diameter are mounted within each side frame. These rollers operate on stationary shafts and are lubricated by recessed high-pressure gun fittings.



Caterpillar Tread Turned Up on End, to Show the Method of Driving

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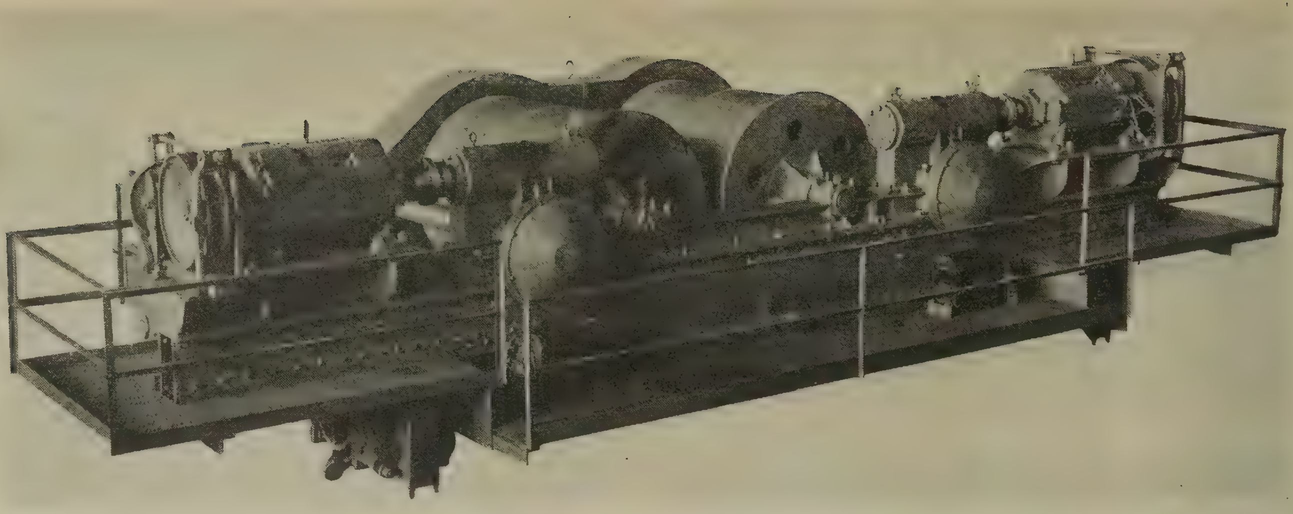
Shipments of electric industrial trucks and tractors in April are reported by the Department of Commerce at 137 units, compared with 131 in March. Except for last June, with 140, the April total is the largest in more than a year. It included six units for export. Of the domestic total, nine were tractors and 122 of other types.



Main Hoist of Morgan Crane for Otis Steel Co.

Crane with Four Girders and Two Trolley Tracks

Designed with various improvements to assure efficient operation, low upkeep, long life and safety, a 200-ton seven-motor, four-girder crane was built recently for the Otis Steel Co., Cleveland, by the Morgan Engineering Co., Alliance, Ohio. One feature of this crane is that the main hoist is worm driven. Besides the main trolley the crane has a 40-ton auxiliary.

Two outside or main girders support the main trolley while the two inside girders support the auxiliary trolley. The design permits full travel of each trolley on its own set of girders; the small trolley may pass underneath the larger one without interference. The bridge of 59-ft. span is carried on double compensating trucks, eight in number, and connected by structural steel equalizers. A total of 16 heat-treated steel wheels 30 in. in diameter supports the load. The bridge is driven by two 85-hp. Crocker-Wheeler mill-type motors. Full magnetic control is used throughout.

The main trolley of 200-ton capacity is supported on four cast steel compensating trucks bearing on eight heat-treated steel wheels 24-in. diameter. The main trolley frames, as shown in the view, are heavy structural steel beams to which are attached cast steel brackets. The main hoisting mechanism consists of two interlocked drums driven by two 110-hp. Crocker-Wheeler mill-type motors through individual trains of worm and spur gearing. Each motor is connected with the driving worm by a flexible coupling, which compensates for any slight misalinement. The worm is an alloy steel forging, carbonized, heat treated and ground, and is carried in roller bearings in the cast steel housing. The worm wheel is a bronze alloy rim with hobbed teeth, bolted to a cast steel center. The entire unit is inclosed in a steel housing and runs in an oil bath. It is stated that the worm reduction unit is highly efficient and makes a quiet and smooth running hoist.

Under normal conditions each hoisting unit takes an equal share of the load, but should the current be cut off from one motor the entire load may be temporarily handled by the active motor. This emergency is taken care of by means of the Morgan patented compensating ratchet device, which temporarily allows one motor to lift the entire load without turning the idle motor. It is stated that where interlocking drums are used the compensating ratchet device is necessary to prevent breakage in the hoisting mechanism.

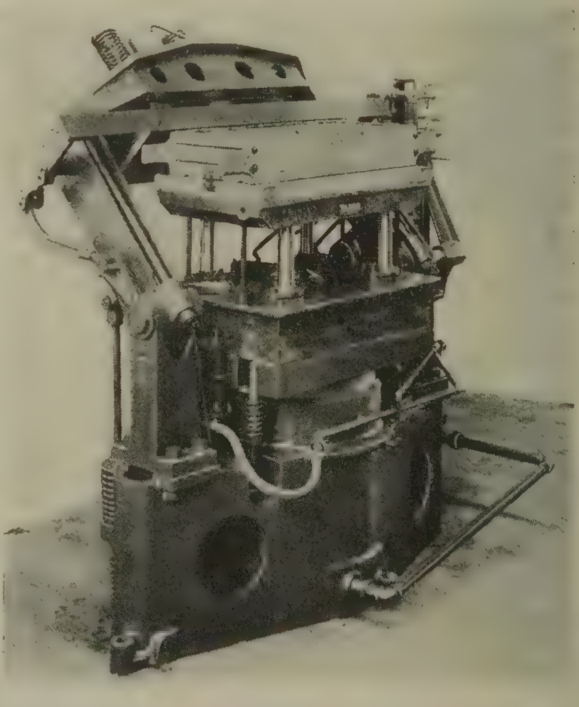
An 85-hp. motor drives the 40-ton auxiliary hoist. This trolley is carried on four 18-in. track wheels. The trolley frame, motor supports and sheave supports of cast steel are cast integral, thus eliminating loose and bolted parts. Sheaves are equipped with Hyatt roller bearings, and the bridge trucks are so arranged that these bearings may be added if desired.

Jarring, Stripping, Squeezing Machine for Automobile Manufacture

Use of the trunnion type yoke in place of the pintle swung yoke is one of the features of a 30-in. jarring, stripping, squeezing, molding machine made by the Tabor Mfg. Co., Philadelphia, for a manufacturer of high-grade automobiles. The machine is of the Tabor flask life type, embodying the company's shockless jarring machine principle. The mold is vented by an air-operated head mounted in the yoke and the automatic strike-off is another special feature.

Circuit Breaker for Heavy Current

An oil circuit breaker adapted for service where a relatively compact unit for heavy alternating current, 2500 volts or less, is required has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The breaker is self-contained, the pole units, operating mechanism and control panel all being carried on a rigid steel frame arranged to mount on and bolt to the floor. The tanks can be lowered to the floor and removed from either side of the breaker. Current-carrying studs are arranged for direct bolted connection to the buses. The standard arrangement for operating the breaker is by an electric solenoid mechanism.



One Feature of This Machine Lies in the Employment of the Trunnion-Type Yoke. Automatic strike-off is provided

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Expansion of activity in chief consuming industries has been halted and further decline may be anticipated.

Car and locomotive buying in April showed a good gain, but surplus cars give little promise of early orders.

Automobile production is clearly expanding and has been a recent leader in upholding steel demand.

Building volume continues large, but expansion may not be sustained; structural sales are declining.

Iron and steel exports have held up well, but are not expected to expand.

It looks very much as though steel production is developing in excess of requirements. Of course, one might draw this conclusion from the mere fact that prices in general are weak. Ordinarily, if production is well in line with requirements, there would be no such prevalence of price concessions and failure to hold announced prices as now exist. However, our statement is based on the statistical fact that in April the average daily rate of steel ingot output rose well above its usual relation to the activity in the chief steel consuming industries. Production in March was moderate in comparison with the composite demand line. In fact, this is true of the whole first quarter. But apparently this condition has stimulated activity in production unduly, causing the ingot output curve to rise with unusual sharpness, considering the season. *The upturn in our adjusted index in April has not been equaled since the same month in* 1923.

Index of Composite Demand is Lower

In March, however, our index of the average activity in the steel consuming industries declined, and present indications are that a further decline will appear in the April figures. Even if there is no decline, the curve of indicated consumption requirements will be below the production curve, which of course means a tendency to over-production. As long as production is above the level indicated by the composite demand line, steel markets will be in an unstable equilibrium, prices will be weak, and ultimately curtailment will inevitably occur.

Production may show only the usual seasonal decline for several months, as was the case at this time in 1923, when the seasonally adjusted curve held steady through July; but the longer curtailment is postponed, the more drastic will probably be the final readjustment. The normal seasonal movement in steel production calls for a 12 per cent reduction in the average daily ingot output between April and July. That is, unless a reduction of that amount occurs, production will become more excessive—assuming that the composite demand line does not rise in the meanwhile.

The decline in the composite demand line in March was due (1) to the failure of railroad freight traffic to show a normal seasonal gain; (2) to a sharp reduction in the rate of building contracts (floor space); (3) to a slight recession in general manufacturing. That the decline was no sharper was due to a slightly more than seasonal gain in automobile production and exports, and a well maintained volume of mining and agricultural requirements. The fact that machine tool orders increased in March may be mentioned, also.

Conditions in Definite Lines

As to the future of the requirements of steel, the following observations seem pertinent:

1.—The demand from *railroads* does not seem likely to show much if any increase. April freight tonnage

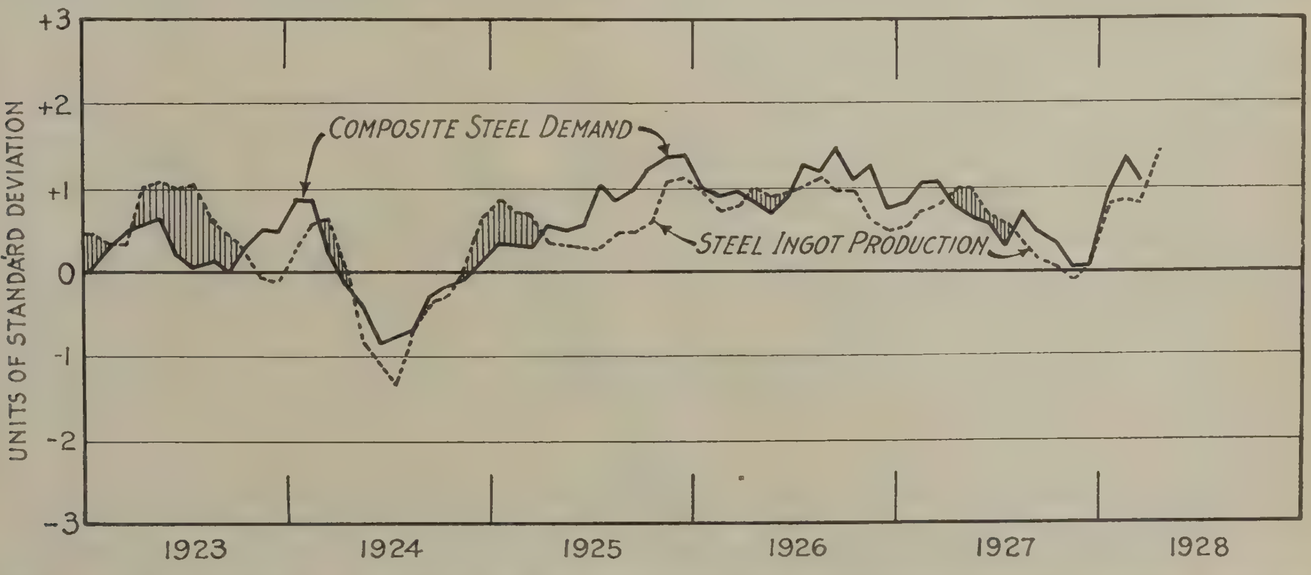


Fig. 1—*Steel Production Has Advanced Still Further Above the High Levels of January to March. But the curve of composite demand declined in March and the outlook for the immediate future is less encouraging*

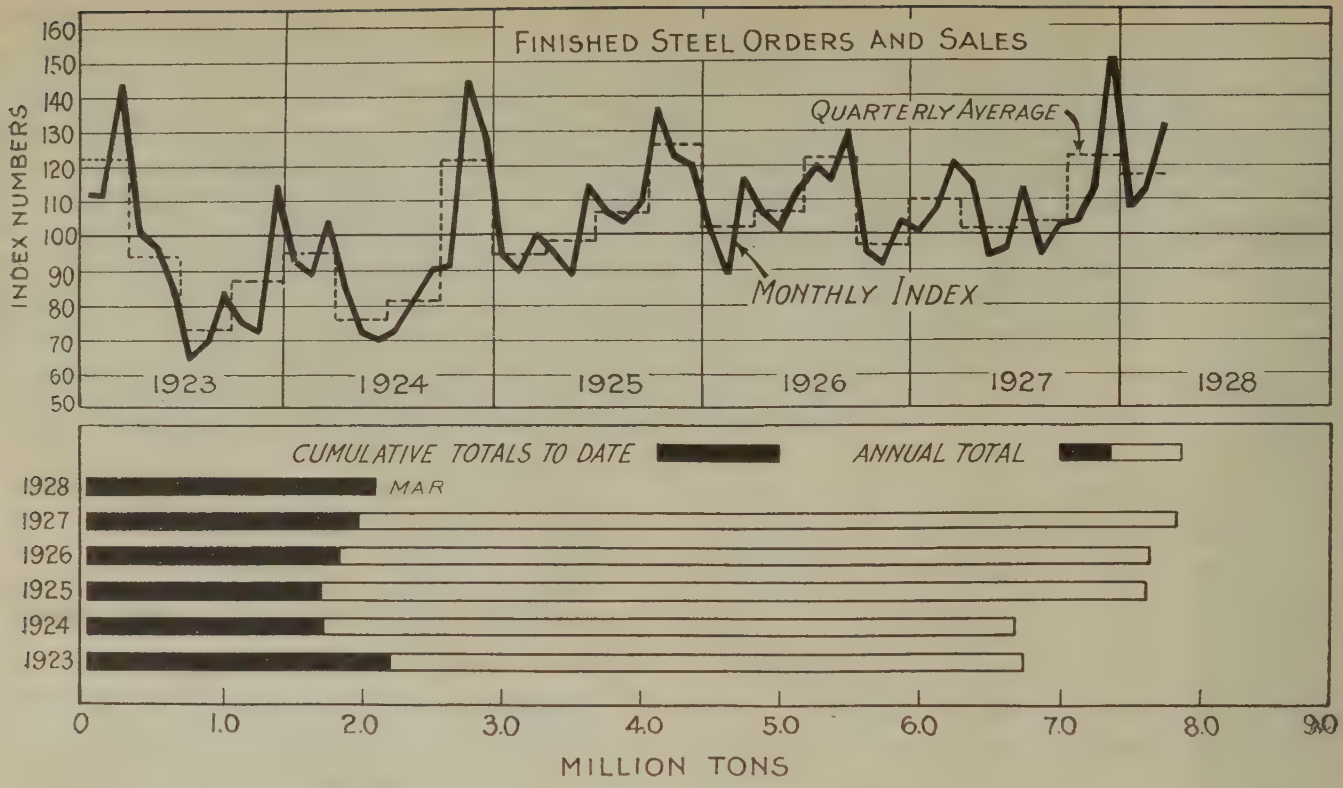


Fig. 2—Buying of Finished Steel Showed a Good Seasonal Increase in March, and the First Quarter Was the Highest First Quarter Since 1923

declined sharply, when allowance is made for seasonal conditions, and our index is only 99.4 per cent of the average for the last seven years, in comparison with 106.3 per cent in March. The trend of railroad gross revenues has been downward and only through drastic economies has net income been maintained fairly well by the carriers. The condition of the coal business and the prospects for a let-up in building activity make the outlook hardly fair, either as to the carriers' needs or as to their ability to pay.

2.—*General manufacturing* activity (excluding the steel and automobile industries) declined a little in March, which is an unfavorable sympton. Our adjusted index has not declined previously in that month since 1924. The prevalence of severe competition and narrow margins of profit is to be noted. There was a sharp decline in retail trade in April, which indicates the effect of unemployment and bad weather. The P-V line has fallen a little lower. It seems doubtful if manufacturing activity will be maintained at present levels much longer.

3.—In view of the upward trend in money rates, speculative *building activity* will probably soon be checked. Already the volume of real estate transfers has declined. But construction contracts made a little recovery in April, increasing more than usual for the season, so that any decline in building is not likely to be sharp. Building permits, however, slumped rather badly in April and, as the trend of such permits generally leads the contracts awarded, it seems probable that some decrease in the actual volume will be seen within a month or two. It will be noted that the awards of structural steel have tapered off during the past four or five weeks. The decrease in residential building may be partly responsible for the situation in the market for nails. Building has been one of the mainstays of the demand for steel this winter and spring, so that any recession here will probably necessitate curtailment in production.

4.—The *automobile industry* has been the largest factor in the increase of steel consumption. Here we find the seasonal peak reached, and early estimates for April indicate that some decline occurred, in spite of the fact that normally an increase was to have been expected. Ford production is gradually expanding and at the same time we see signs of even keener competition. It seems probable that the steel industry has already enjoyed the maximum stimulus from the 1928 automobile program, and that some decrease in orders from that quarter is near at hand.

5.—*Mining* (including the oil industry) continues about steady at a low level, with no prospects of early improvement. The coal industry is depressed and, although the average daily output of bituminous coal turned downward sharply in April, the price situation has not become any more favorable. Oil refining has

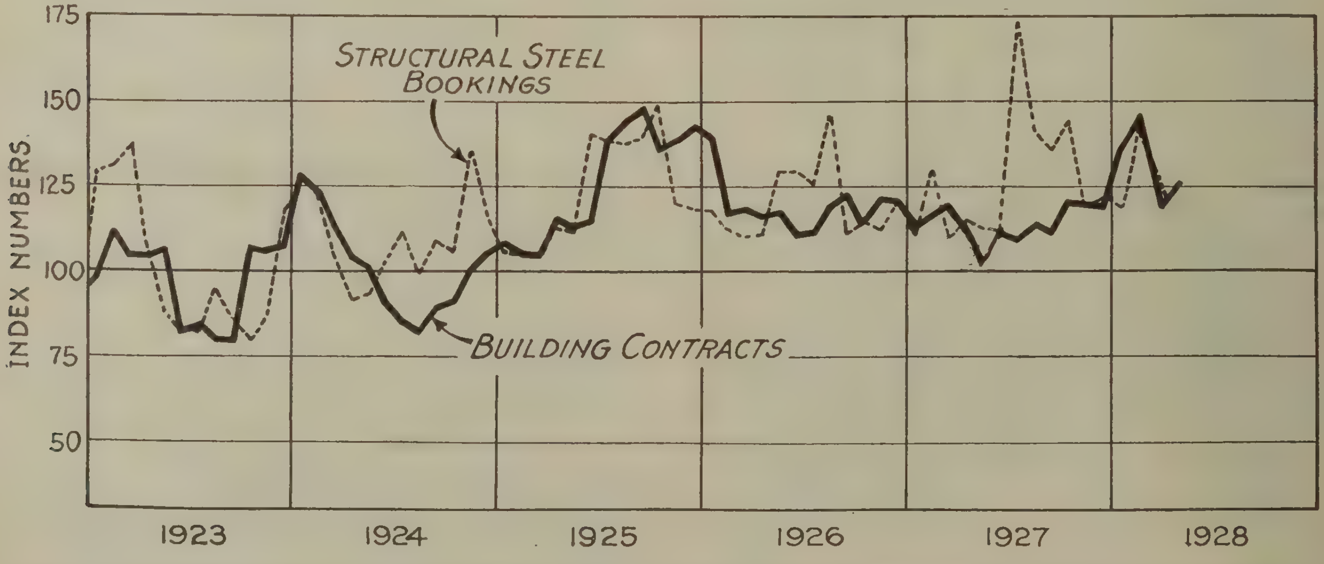


Fig. 3—Building Contracts Have Remained High But Show Signs of Slackening. Structural steel bookings declined in March by more than the usual amount

become a little more profitable during the last month or two, due chiefly to higher gasoline prices. But crude oil production and imports continue excessive, in spite of the low domestic drilling activity. The copper industry is fairly prosperous and prices are firmer, but probably copper markets are maintained largely as a result of a very moderate rate of production, which naturally does not indicate any large consumption of steel.

6.—The demand for *agricultural machinery* has been good for some months and has supplied the steel business with an appreciable volume of orders. Just now a little seasonal let-up is to be expected. As to the situation in the second half of the year, we receive reports that dealers' stocks are small, which would suggest the possibility of renewed activity in the agricultural implement industries. Some food for thought, however, may be seen in the fact that the outlook for some of the staple grain crops and cotton does not seem to be good. The higher the prices for wheat, the smaller the acreage to be harvested is likely to be.

As to steel *exports*, it must be admitted that they have held up very well, in spite of the increase in foreign production. Apparently no early let-up is to be anticipated. Nevertheless, developments in foreign exchange and in the capacity of European steel producers do not lend much support to any hope of further gains.

On the whole, the prospects seem to indicate a gradual decline in the activity of the chief steel consuming industries. Also the narrowness of the margins of profit in most industries does not indicate a strong purchasing power. Nor does it seem likely that any considerable shortages of material or equipment exist. We conclude, therefore, that the composite demand line will show a downward trend, and that the longer steel ingot production moves against the seasonal trend, the more severe will be the ensuing readjustment.

Highest First Quarter Since 1923

OUR second chart shows the trend of orders or sales covering some of the chief items of finished steel. No adjustment for seasonal variation is made in this chart. The finished steel orders curve showed a good seasonal increase in March. The index for that month was the highest to be found in any March since 1923. In fact, the total for the first quarter is larger than any other first quarter since 1923—an unusually small decline from the total in the preceding quarter. This fact is not out of line with the indications as to the industrial requirements of the country, as shown in the composite demand line. It reflects the large increase in automobile production and the high level of building activity.

The outstanding factor in the March gain in orders is found in the large volume of sheet sales. The increase in sales of sheets was not much more than usual for the season, but it carried the March figure to a new record, the 399,400 odd tons of sheets sold in that month comparing with 325,500 tons in March, 1923.

Structural steel bookings were large also, in comparison with February, but decreased more than usual for the season. Nor was the March volume so extraordinarily large in comparison with the same month in recent years as was the case with sheets. Moreover, current reports indicate a decline in structural business during April, in which month there is usually a gain. The average weekly structural awards amounted to only 31,000 tons, against an average of 37,000 tons in March. Fabricated plates made a relatively poor showing, the sales declining in March, as they did last year. The volume was below that of a year ago and far under the level reached in March, 1923. Bookings of steel castings decreased in March also, and were the lowest for the month since March, 1922.

Thus sheet tonnage has been the chief factor in the high first quarter level of orders for finished steel. This confirms the opinion that the automobile industry, not building activity, has been the leader in the recent expansion.

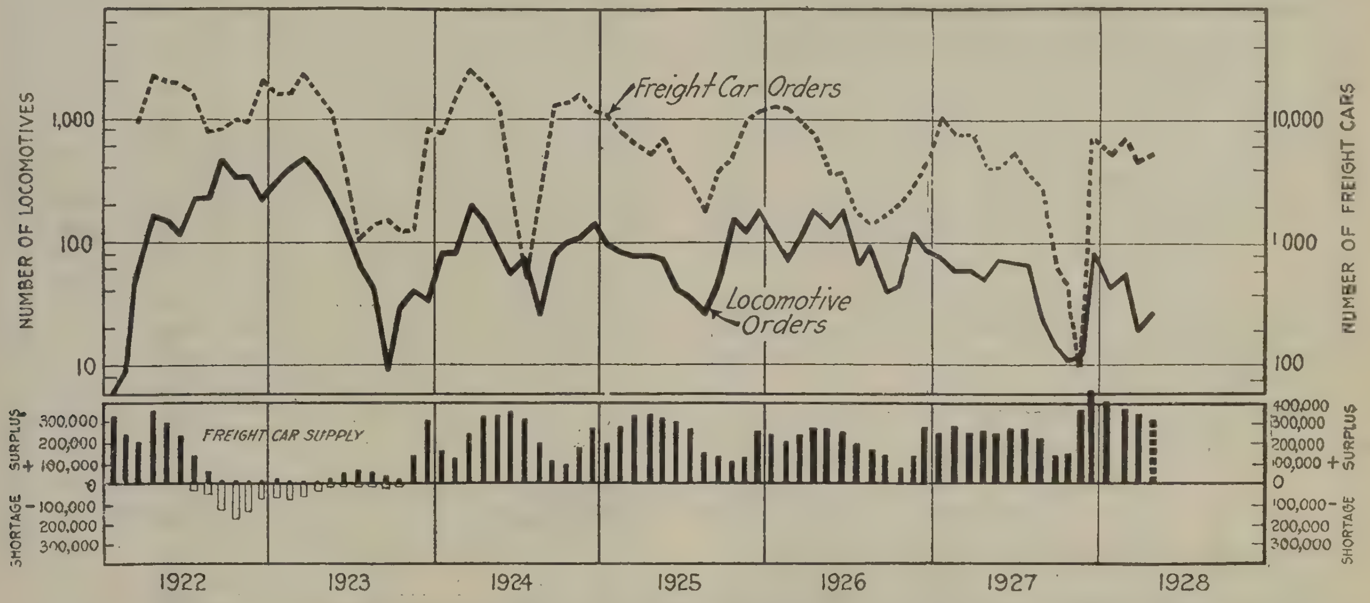


Fig. 4—Locomotive and Railroad Car Orders Were Higher in March. But the large surplus of cars does not indicate immediate need for heavy purchases

Building Less Buoyant Than Reported

ACCORDING to our interpretation, the building data for April do not furnish the basis for so much optimism as has appeared in the press statements. The floor space in contracts awarded certainly made no new record. There is usually and normally an increase in April, and this year the April figures did little more than average in this respect. Allowing for seasonal variation, building is far below the rate that was maintained between July, 1925, and January, 1926, inclusive. Moreover, it is considerably below the rate in January and February of this year. It is true, however, that building contracts continued much above the average of recent years, and that the interruption of the sharp March decline is encouraging. We may look for a good volume of structural steel business, but it is doubtful if there is reason to expect that any sustained expansion is beginning.

Structural steel bookings declined in March, and the

Schedule of the next instalments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: May 24—Position of Iron and Steel Producers;* ***June 14****—Activity in Steel Consuming Industries.*

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decline was greater than usual for the month. This trend followed closely that of building contracts (see Fig. 3). Normally the bookings gain about 7 per cent in April. This year, however, the weekly trade figures indicate a decline in structural steel awards last month. If this indication is correct, we may infer that the increase in building contracts involved a smaller quantity of steel than usual.

Some Recovery in Railroad Orders

RAILROAD equipment orders last month made a fair showing as to trend. Orders for both cars and locomotives were larger than in the preceding month and in the same month last year. According to *Railway Age*, 33 steam locomotives were ordered by domestic companies. Except for last year, this is the lowest volume of April business in a good many years. Moreover, while the total unfilled orders of the locomotive manufacturers increased a little in April, shipments declined to a greater extent, thus indicating that total orders fell off.

Freight car orders in April amounted to 5318, which compares with 4470 in March and 3362 a year ago. These figures, however, are very small when contrasted with the business done in earlier years. Thus, in 1922 April orders amounted to 34,192; in 1923 to 10,420; in 1924 to 11,903.

The plain fact is that railroad traffic is not expanding so much as usual and that the carriers on the whole have neither the need nor the income for large purchases of equipment. As shown in the fourth chart, they have a large surplus of freight cars in good condition.

British Iron and Steel Output Small in April

LONDON, ENGLAND, May 14 (*By Cable*).—Pig iron production in April was 555,000 gross tons and that of steel, castings included, was 644,100 tons. Both are next to the smallest this year.

A comparison of the April output with that of the other three months of the year and with the monthly rate for previous years is as follows in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly......	855,000	638,600
1920—Average monthly......	669,500	755,600
1922—Average monthly......	408,500	490,100
1923—Average monthly......	620,000	706,800
1924—Average monthly......	609,900	685,100
1925—Average monthly......	519,700	616,400
1926—Average monthly......	203,500	296,700
1927—Average monthly......	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100

April Construction Contracts Broke All Records

Building contracts in the 37 States east of the Rocky Mountains made a new high record in April, according to F. W. Dodge Corporation. The total was $643,137,000, exceeding the previous high mark, in June, 1927, of $632,478,000, by nearly 2 per cent. Only five other months—August, 1925, March and August, 1926, and March and April, 1927—have reached $600,000,000.

For the first four months a new record was made, at $2,128,204,000, a gain of 6 per cent over last year.

April made the highest total ever reached in the Middle Atlantic States and the highest April in both New England and the Central West. It was the second highest April in the Southeastern States. There was a falling off, however, in the Pittsburgh district, in the Northwest and in Texas.

Average weekly earnings in representative factories in March are reported by the New York State Industrial Commissioner at $29.64. Except for the $29.78 of March last year, this is the highest monthly figure ever reported. It represents a gain of 48c. over February, this being about 1.7 per cent.

SHEET SHIPMENTS HEAVY

Slump in Sales Cuts Backlog—Record Four Months' Output

THE interesting feature of the monthly report of the sheet division, National Association of Flat Rolled Steel Manufacturers, 511 Terminal Tower Building, Cleveland, is that the shipments and the production of steel sheets in April were practically the same. The difference was only 235 tons. Shipments exceeded sales for the month by 43,604 tons. Unfilled orders at the end of April amounted to 571,761 tons, a decrease of 103,435 tons, compared with the total at the end of March. The unfilled orders as of March 31, plus the sales of April and minus the shipments, would have produced unfilled orders of 631,592 tons at the end of last month, but the official report gives a total of 59,831 tons lower.

For the first four months of the year production was 1,341,142 tons, which is a record for that period. This record gains further importance from the fact that the most active period in sheets, the report discloses, is in the first quarter of the year and the figures and comparisons include that period. The nearest approach to this year's showing was in 1926, when the production for the first third of the year was 1,297,139 tons. Shipments in the same period this year were 1,259,752 tons, or approximately 27,000 tons more than in the same period in 1926, which stood out as the best year in the history of the sheet industry.

Production and shipment figures for the first four months of the past four years, in net tons, compiled from the monthly reports of the sheet manufacturers' association, make the following comparison:

	Production	Shipments
1928 (four months)......	1,341,142	1,259,752
1927	1,241,467	1,139,725
1926	1,297,139	1,232,893
1925	1,171,104	1,071,336

The April report with comparisons follows:

	April	March	February
Total number of mills..	721	721	718
Capacity per month....	464,422	492,150	461,750
Percentage reporting...	72.2	72.3	72.6
Sales	284,070	399,441	266,210
Production	327,909	366,127	330,565
Shipments	327,674	359,532	298,420
Unfilled orders	571,761	675,196	667,054
Unshipped orders	109,200	110,702	......
Unsold stocks	53,853	53,144	......
Percentages to Capacity			
Sales	84.7	112.4	79.5
Production	97.8	103.0	98.7
Shipments	97.7	101.1	89.1
Unfilled orders	170.4	189.9	199.2
Unshipped orders	32.6	31.1	....
Unsold stocks	16.0	15.0	....

Large Shipments of Galvanized and Enameled Sheet-Metal Ware

WASHINGTON, May 15. — Shipments of enameled sheet-metal ware in March, as reported to the Department of Commerce from 18 manufacturers, comprising approximately 80 per cent of the industry, were 442,689 dozens, valued at $1,665,470, as compared with 372,848 dozens, valued at $1,459,188, in February. The March total, comparing with 440,689 dozens and $1,484,980 in March, 1927, was the largest in considerably more than a year.

March shipments of galvanized sheet-metal ware, as reported to the Department of Commerce by 15 concerns comprising a large proportion of the industry, were 220,677 dozens, valued at $824,143, as compared with 188,487 dozens, valued at $727,257, in February. In March, 1927, the totals were 213,672 dozens, valued at $790,371. Except for April, 1927, the most recent totals were the largest in more than a year.

Index numbers of wholesale prices on the pre-war base, and covering the period from 1890 to 1927, inclusive, have been published by the United States Bureau of Labor Statistics, Washington. The pamphlet is of 52 pages and gives the month-by-month figures for groups of commodities. For 1927 the monthly details are given for the hundreds of individual commodities used in making up the groups.

Fifth Largest Year in Production of Rolled Steel

PRODUCTION of all kinds of finished rolled iron and steel in 1927 is reported by the American Iron and Steel Institute at 32,879,031 gross tons. This is a reduction of 7.37 per cent from the record total of 35,495,892 tons in 1926. It has been exceeded by only three other previous years—1917, 1923 and 1925—each of which made between 33,000,000 and 33,400,000 tons. Of the 1927 total, steel accounted for 32,334,687 tons and iron for 544,344 tons, the latter being only 1.66 per cent of the aggregate. Comparison may here be made with 1921, when the iron tonnage was almost precisely the same as in 1927, whereas the steel tonnage was considerably less than half that of last year. The proportion of iron is dwindling rapidly.

Structural shapes made a tonnage in 1927 second only to the great total of 1926. Plates and sheets, taken as an aggregate, made the largest total ever recorded, with the exception of 1925 and 1926. Steel black plates for tinning were second only to 1926. Concrete bars, showing a slight gain over 1926, made the largest total on record with the exception of 1925, which was less than ½ per cent greater. Skelp made the third largest year's total, having been exceeded only by 1923 and 1926. Galvanized sheets and formed

otal Production of All Kinds of Finished Rolled Iron and Steel, 1891-1927

Years	Iron and Steel Rails	Plates and Sheets	Nail Plate	Wire Rods	Structural Shapes	All Other Finished Rolled	Total Gross Tons
1891	1,307,176	678,927	223,312	536,607	....	2,644,941	5,390,963
1892	1,551,844	751,460	201,242	627,829	453,957	2,579,482	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,570	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,487,845	6,189,574
1896	1,122,010	965,776	72,137	623,986	495,571	2,236,361	5,515,841
1897	1,647,892	1,207,286	94,054	970,736	583,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,683	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,665,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,095,813	4,952,185	13,207,697
1904	2,284,711	2,421,398	61,601	1,699,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,532,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,083,181	4,311,608	11,828,193
1909	3,023,845	4,234,346	63,746	2,335,685	2,275,562	7,711,506	19,644,690
1910	3,636,031	4,955,484	45,294	2,241,830	2,266,890	8,475,750	21,621,279
1911	2,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,875,080	45,331	2,653,553	2,846,487	9,908,475	24,656,841
1913	3,502,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,196
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544
1920	2,604,116	9,337,680	20,577	3,136,907	3,306,748	13,941,835	32,347,863
1921	2,178,818	4,260,574	14,573	1,564,330	1,272,624	5,483,087	14,774,006
1922	2,171,776	7,968,397	21,969	2,654,741	2,718,768	10,916,353	26,452,004
1923	2,904,516	9,497,717	22,833	3,075,892	3,405,197	14,370,921	33,277,076
1924	2,433,332	8,087,883	22,175	2,522,545	3,283,708	11,736,792	28,086,435
1925	2,785,257	9,807,659	22,038	2,844,656	3,604,130	14,323,220	33,386,960
1926	3,217,649	10,529,056	17,337	2,722,032	3,911,663	15,098,155	35,495,892
1927	2,806,486	9,627,734	18,051	2,770,271	3,742,445	13,914,044	32,879,031

Production of Wrought Pipe and Seamless Steel Tubes, Including Boiler Tubes, Gross Tons, in 1927

Kinds of Pipe or Tubes	Lap Weld and Butt Weld Pipe or Tubes—Gross Tons			Seamless Pipe or Tubes—Gross Tons		
	Iron	Steel	Total Welded	Hot Finished	Cold Drawn	Total Seamless
Black, standard....	65,712	1,172,071	1,237,783	13,628	689	14,317
Galvanized........	41,765	446,467	488,232	2,030	....	2,030
Oil country goods...	19,583	1,180,353	1,199,936	560,309	693	561,002
Mechanical tubes...	....	....	....	16,219	78,947	95,166
O.D. & miscellaneous	....	144,515	144,515	6,201	28,219	34,420
Boiler tubes........	11,898	35,087	46,985	127,583	29,622	157,205
Total...........	138,958	2,978,493	3,117,451	725,970	138,170	864,140

Production of Wrought Pipe and Boiler Tubes, 1922-1927

Years	Black Standard	Galvanized	Oil Country Goods	O.D. and Miscellaneous	Boiler Tubes	Total Gross Tons
1922	1,061,060	390,140	1,139,834	66,775	74,427	2,732,236
1923	1,377,347	457,915	1,358,889	65,831	91,041	3,351,023
1924	1,080,432	454,019	1,183,867	50,046	55,892	2,824,256
1925	1,232,375	548,567	1,018,302	168,519	62,778	3,030,541
1926	1,377,747	526,101	1,328,294	109,520	60,853	3,402,515
1927	1,237,783	488,232	1,199,936	144,515	46,985	3,117,451

Production of Seamless Steel Tubes, Gross Tons, 1922-1927

Years	Hot Finished	Cold Drawn	Total	Years	Hot Finished	Cold Drawn	Total
1922	120,652	137,183	257,835	1925	403,965	164,225	*568,190
1923	202,669	201,114	403,783	1926	620,936	154,393	*775,329
1924	131,758	129,399	261,157	1927	725,970	138,170	*864,149

*Includes 162,294 tons of seamless steel boiler tubes in 1925, 174,000 tons in 1926, and 157,205 tons in 1927. Figures for prior years not available.

Production of Cast Iron Pipe, Net Tons, 1922-1927

Years	Gas and Water*	Soil and Plumbers	Total	Years	Gas and Water*	Soil and Plumbers	Total
1922	926,577	356,872	1,283,449	1925	1,414,252	510,483	1,924,735
1923	1,134,059	432,828	1,566,887	1926	1,534,278	469,228	2,003,506
1924	1,365,272	476,078	1,841,350	1927	1,488,644	553,871	2,042,515

*Includes culvert pipe.

Production of Hammered Charcoal Iron Blooms, Billets, Etc.

Years	For Sale	For Own Use	Total Gross Tons	Years	For Sale	For Own Use	Total Gross Tons
1920	2,731	59,893	62,624	1924	1,702	27,081	28,783
1921	2,871	23,208	26,079	1925	1,571	29,402	30,973
1922	1,624	39,377	41,001	1926	2,147	29,545	31,692
1923	3,522	47,021	50,543	1927	222	17,663	17,885

Production of Plates and Sheets by Kinds, 1926-1927

Kinds	1926—Gross Tons			1927—Gross Tons		
	Iron	Steel	Total	Iron	Steel	Total
Universal plates*.........	5,543	1,402,004	1,407,547	2,704	1,241,845	1,244,549
Sheared plates—						
Rolled on single stands..	211	2,193,071	2,193,282	74	1,888,134	1,188,208
Roughed and finished on separate stands.......	......	600,353	600,353	0	588,053	588,053
Black sheets rolled on sheet or job. mills............	4,645	4,232,834	4,237,479	4,726	3,974,311	3,979,037
Black plates, including black plates for tinning and black plate specialties rolled on tin mills...	......	2,090,395	2,090,395	0	1,927,887	1,927,887
Total...............	10,399	10,518,657	10,529,056	7,504	9,620,230	9,627,734

*Include flats or bars over 6 inches wide.

Production of Merchant Bars, Showing Iron and Steel Merchant Bars Separately, Gross Tons, 1906-1927

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1906	1,481,348	2,510,852	3,992,200	1917	983,926	5,226,031	6,209,957
1907	1,440,356	2,530,632	3,970,988	1918	846,898	5,395,851	6,242,749
1908	685,233	1,301,405	1,986,638	1919	446,549	3,945,075	4,391,624
1909	952,230	2,311,301	3,263,531	1920	663,032	5,467,208	6,130,240
1910	1,074,163	2,711,568	3,785,731	1921	198,324	1,367,430	1,565,754
1911	835,625	2,211,737	3,047,362	1922	317,665	3,660,993	3,978,658
1912	944,790	2,752,324	3,697,114	1923	404,730	5,148,066	5,552,796
1913	1,026,632	2,930,977	3,957,609	1924	258,737	4,022,184	4,280,921
1914	563,171	1,960,460	2,523,631	1925	290,488	5,368,827	5,659,315
1915	657,107	3,474,135	4,131,242	1926	252,437	5,221,399	5,473,836
1916	993,948	5,236,354	6,230,302	1927	187,995	4,682,252	4,870,247

Statistics are not available prior to 1905.

Production of Concrete Bars, Showing Iron and Steel Concrete Bars Separately, Gross Tons, 1910-1927

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1910	4,645	236,464	241,109	1919	2,295	416,726	419,021
1911	2,388	256,353	258,741	1920	698	571,747	572,445
1912	2,500	271,832	274,332	1921	1,094	226,134	227,228
1913	113	319,557	319,670	1922	696	575,120	575,816
1914	....	288,471	288,471	1923	368	680,499	680,867
1915	....	353,408	353,408	1924	507	655,615	656,122
1916	2,683	458,717	461,400	1925	1,195	818,392	819,587
1917	1,497	469,687	471,184	1926	1,649	814,180	815,829
1918	468	344,152	344,620	1927	2,428	813,585	816,013

Statistics are not available prior to 1909.

Production of Iron and Steel Black Plates for Tinning 1904-1927

Years	Gross Tons	Years	Gross Tons	Years	Gross Tons
1904	472,569	1912	982,197	1920	*1,449,330
1905	507,587	1913	827,266	1921	*786,962
1906	576,079	1914	938,181	1922	*1,266,652
1907	504,072	1915	1,093,345	1923	*1,498,830
1908	513,771	1916	*1,274,137	1924	*1,415,182
1909	606,482	1917	*1,505,338	1925	*1,632,236
1910	712,137	1918	*1,489,586	1926	*1,761,944
1911	798,598	1919	*1,144,601	1927	*1,657,215

*Does not include black sheets rolled on sheet mills and used in the manufacture of long terne plates.

products came within ¼ per cent of the record-breaking total of the preceding year. Tin plate made its second largest total, having been exceeded only in 1926 and by less than 7 per cent. Seamless tubes made a new high record, as did also cast iron pipe. The latter exceeded the total of 1926 by less than 2 per cent, but the seamless tubes were almost 12 per cent ahead of the previous record, made in 1926.

Production of Heavy and Light Structural Shapes, Gross Tons, 1916-1927

Years	Heavy Shapes	Light Shapes	Total	Years	Heavy Shapes	Light Shapes	Total
1916	2,649,961	380,003	3,029,964	1922	2,337,026	381,742	2,718,768
1917	2,575,810	534,190	3,110,000	1923	2,917,446	487,751	3,405,197
1918	2,438,126	411,843	2,849,969	1924	2,805,084	478,624	3,283,708
1919	2,136,424	477,612	2,614,036	1925	3,049,817	554,313	3,604,130
1920	2,741,120	565,628	3,306,748	1926	3,330,572	581,091	3,911,663
1921	1,082,727	189,897	1,272,624	1927	3,083,211	659,234	3,742,445

Production of Wire Rods, Gross Tons, 1896-1927

Years	Tons	Years	Tons	Years	Tons	Years	Tons
1896	623,986	1904	1,699,028	1912	2,653,553	1920	3,136,907
1897	970,736	1905	1,808,688	1913	2,464,807	1921	1,564,330
1898	1,071,683	1906	1,871,614	1914	2,431,714	1922	2,654,741
1899	1,036,398	1907	2,017,583	1915	3,095,907	1923	3,075,892
1900	846,291	1908	1,816,949	1916	3,518,746	1924	2,522,545
1901	1,365,934	1909	2,335,685	1917	3,137,138	1925	2,844,656
1902	1,574,293	1910	2,241,830	1918	2,562,390	1926	2,722,032
1903	1,503,455	1911	2,450,453	1919	2,538,476	1927	2,770,271

Small quantities of copper-clad steel wire rods are included.

Production and Shipments of Portland Cement in Close Balance

Production of Portland cement in April is reported by the United States Bureau of Mines at 13,468,000 bbl., representing a seasonal advance from the 10,223,000 bbl. of March. The figure is about 4 per cent under that for April, 1927, at 14,048,000 bbl. Shipments in April were 13,307,000 bbl., being within about 1 per cent of production. As a result, the increase in stocks at the end of the month was very slight, the total having been 27,605,000 bbl. This figure is the highest in considerably more than a year, but should decline seasonally every month until November.

For the first four months of the year production amounted to 42,256,000 bbl. This is a new high record for the first third of a year, having displaced the previous record of 41,133,000 bbl. made in the first four months of 1927.

American Share of the Automobile Industry in 1927

Numerous facts regarding the automobile industry are covered in the 1928 edition of "Facts and Figures of the Automobile Industry," issued by the National Automobile Chamber of Commerce, 306 Madison Avenue, New York. The publication covers 96 pages, including a number of diagrams and a wealth of statistical material.

Among the other pertinent facts brought out, it is shown that at the end of last year there were 23,127,315 motor vehicles in the United States, of which 2,896,886 were trucks. Production in the year is given as 3,573,671 units, of which 487,653 were trucks. Of the passenger cars, 83 per cent, representing 2,555,223 units, were closed cars. The wholesale value of vehicles and parts is given as $4,274,800,743. More than one-third of this total represents replacement parts, accessories and tires. Production figures, including values, are for the United States and Canada. Exports of automobiles from the United States are given as 461,124 units and the value, including parts, accessories and tires, was $449,277,117.

One innovation in the book this year lies in the fact that the heads of tables are expressed in French, Spanish and German, as well as in English. This international feature is emphasized by a two-page table showing the number of passenger cars, buses, trucks and total motor vehicles in about 150 countries and colonies. The total for the world as of Jan. 1, 1928, is given as 29,505,475, of which 78 per cent is in the United States. Our proportion of the passenger cars is rather higher than this, being slightly above 80 per cent. In buses we have less than half the total, with 46 per cent. In trucks we have about 68 per cent of the aggregate.

As to production, the United States in 1927 registered 81.6 per cent of the total. The world aggregate is given as 4,151,449 vehicles, of which trucks and buses accounted for 575,848. Great Britain stands second as a producing nation, with 5.5 per cent, France being third with 4.6 per cent, and Canada fourth with 4.3 per cent. None of the other countries reached 2 per cent of the total.

Declining Stocks of Industrial Coal

Bituminous coal in the hands of commercial consumers in the United States on April 1 is estimated by the Bureau of Mines at 48,300,000 net tons. This represents a decline of 3,200,000 tons, or 6 per cent, from the corresponding figure of Feb. 1. It is the lowest recorded figure since Oct. 1, 1926. A year ago, in anticipation of a coal strike, the stocks had been built up to the unprecedented figure of 75,000,000 tons. Monthly declines from that total have been almost uninterrupted.

Estimates of the National Coal Association place the production of bituminous coal in the week ended May 5 at 8,100,000 net tons. This is about 1 per cent less than the figure for the preceding week, as reported by the United States Bureau of Mines, but is 2½ per cent higher than the total for the week ended April 21.

Employment Conditions Good in Ohio

April employment in the machinery industry of Ohio was the highest since June, 1927, according to the current bulletin of the Bureau of Business Research, Ohio State University. Reports from 182 companies comprising machine tool manufacturers, builders of electrical machinery, foundries and machine shops put the index figure at 102, with an average month in 1923 taken as 100. Dayton with 152, Cincinnati with 106 and Cleveland with 101 were the centers employing the highest percentage of wage earners. In the first four months of 1928, however, employment was 6 per cent less than in the same months last year.

In the iron and steel industry the index fell one point in April, to 101, and the average employment during the first four months of the year was 1 per cent under that in the same period of 1927. Manufacturers of automobiles and parts employed 5 per cent more workers in April than in March, but 13 per cent less than in April, 1927. In the non-ferrous metal group the number of employees in April was 13 per cent greater than in the same month last year. With 569 companies reporting from all industries, manufacturing employment in Ohio during April stood at 102, the same figure as in March.

The Department of Practical Mechanics, Purdue University, Lafayette, Ind., will offer a nine-week course in welding, beginning June 14. Applications will be filed in the order in which they are received, up to the capacity of the laboratories and the equipment.

British Buyers Await Lower Prices

Reduction Expected Soon—Continental Markets Advancing—British Mill Dismantled for Shipment to Australia

(By Cable)

London, England, May 14.

CLEVELAND pig iron is rather more active and makers are anticipating increased export demand with Continental costs increasing. Cleveland output is restricted and prices are being maintained.

Hematite is quiet and selling prices are said to be below cost, but demand is insufficient to enable makers to advance quotations. Foreign ore is dull. Renewed efforts have been made to end the Swedish miners' strike this week.

Finished steel is dull, particularly for export and in the shipbuilding trades. Domestic consumers are moderately busy, but buyers generally are waiting on the steel makers' meeting Wednesday, May 16, when, it is believed, lower prices may be adopted. There is an inquiry from the United States for more than 125,000 tons of welded steel pipe.

Tin plate activity continues and works are heavily sold for several months. Consumers at home and abroad have bought freely and there are important inquiries in the market. Galvanized sheets are dull and black sheets quiet.

Baldwins, Ltd., is dismantling the heavy mill and rolling gear of the Margam works at Port Talbot, erected during the war, and shipping it to Australia for re-erection at the new plant of the Australian Iron & Steel Corporation in which Baldwins, Ltd., and Dorman, Long & Co. are interested.

April exports of pig iron totaled 28,174 tons, of which 50 tons went to the United States. The total exports of iron and steel were 344,333 tons.

Continental iron and steel prices are strong as a result of the advance in German miners' wages, higher priced ore and the stoppage of Rhine traffic. Continental works are reported to be well booked with orders, but little of the business has passed through the hands of traders in this country.

GERMAN EXPORT TRADE BETTER

Domestic Business Also Active as Consumers Increase Stocks—Coal Exports May Be Restricted

Berlin, Germany, April 28.—Business conditions are considerably better, partly because of seasonal activity. The improvement, however, extends to branches of industry in which there is not much seasonal fluctuation in trade. The total number of unemployed had declined by April 15 to 997,000, compared with 1,600,000 Feb. 15. Only 5 per cent of the members of the metals labor unions are reported without employment. There is a growing belief that the business reaction that was expected to develop as a result of the activity in 1926 and 1927 will not prove so serious. While manufacturers of finished products report a smaller volume of business, producers of semi-finished or raw materials in all fields are as well booked as at any time in the past two years. The Institute for Study of Trade Statistics points out that the present satisfactory situation is the result of increasing export orders, which have offset the moderate decline in domestic consumption.

Allowing for the rise in prices, export trade is virtually back to the pre-war level. In March, for the first time since the war, total exports, exclusive of precious metals, were in excess of 1,000,000,000 m., and the monthly average, since Jan. 1, has been 942,000,000 m.

Coal Exports to Be Reduced

The Ruhr coal dispute has not yet been settled. The Ministry of Industry has declared that the decision providing an 8 per cent increase in miners' wages will be enforced. The operators have decided temporarily to reduce exports of coal, on which there is a loss, and this is expected to react to the advantage of Great Britain and Poland. The total amount of the reduction in exports will be decided as soon as the producers ascertain the amount of increase that the Federal Coal Council will permit in domestic prices. Application for an increase

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	17½s.				$4.27		
Bilbao Rubio ore*	1	2½				5.48		
Cleveland No. 1 fdy.	3	8½				16.56		
Cleveland No. 3 fdy.	3	6				16.07		
Cleveland No. 4 fdy.	3	5				15.83		
Cleveland No. 4 forge	3	4½				15.71		
Cleveland basic (nom.)	3	5				15.83		
East Coast mixed	3	9	to	3	10	16.81	to	17.05
East Coast hematite	3	10½				17.17		
Rails, 60 lb. and up	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	15				66.97		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	17½				28.61		
Tin plate, base box	0	18½	to	0	18⅓	4.51	to	5.02
Black sheets, Japanese specifications	13	5				64.53		
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	9	2½	to	9	12½	1.98	to	2.09
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	9	15	to	9	17½	2.12	to	2.14
Galv. sheets, 24 gage	13	0	to	13	2½	2.82	to	2.85
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):								
Belgium	£3	3s.				$15.34		
France	3	3				15.34		
Luxemburg	3	3				15.34		
Basic pig iron (nom.)								
Belgium	3	0	to	£3	1s.	14.61	to	$14.85
France	3	0	to	3	1	14.61	to	14.85
Luxemburg	3	0	to	3	1	14.61	to	14.85
Coke	0	18				4.39		
Billets:								
Belgium	4	15				23.14		
France	4	15				23.14		
Merchant bars:						C. per Lb.		
Belgium	5	10	to	5	12½	1.21	to	1.24
France	5	10	to	5	12½	1.21	to	1.24
Luxemburg	5	10	to	5	12½	1.21	to	1.24
Joists (beams):								
Belgium	4	17	to	4	17½	1.07	to	1.08
France	4	17	to	4	17½	1.07	to	1.08
Luxemburg	4	17	to	4	17½	1.07	to	1.08
Angles:								
Belgium	5	8				1.19		
⅛-in. plate:								
Belgium (a)	6	11				1.44		
Germany (a)	6	11				1.44		
3/16-in. ship plate:								
Belgium	6	6				1.39		
Luxemburg	6	6				1.39		
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

has been made, and some coal operators are urging that they be given entire freedom to fix prices, as prior to the war. They contend that the public has protection in the cartel regulations, which permit the Government to take action in case prices become unduly high, and in the keen international competition, foreign coal entering the country duty free.

The possibility of a coal strike has had the effect of reviving the iron and steel markets. As in December and January, when a lockout in the steel industry was threatened, consumers have been buying heavily to build up stocks before there is an increase in steel prices. Demand for steel bars, structural material, wire rods and sheets is active. In pig iron some producers who blew out furnaces recently, in expectation of a dull period, have more tonnage booked than they can supply at their current rate of operation. The present activity, however, is not expected to last long.

Deny That Export Rebates Are Bounties

A reply to a new American complaint that rebates paid to exporting manufacturers are equivalent to export bounties is published by the Essen *Bergwerks-Zeitung*, a daily publication for the steel industry. The substance of the reply is that Germany exports only at "world market prices," which are determined on the Brussels Metal Exchange, and that on some German products higher prices prevail than on the same products from France, Belgium or Luxemburg.

The recent quarterly report of the Vereinigte Stahlwerke A. G., Düsseldorf, showed that, except for pig iron, production in the first quarter exceeded that of the fourth quarter of last year. Unfilled orders on April 1 were 99.9 per cent of the unfilled tonnage on Jan. 1, but a larger percentage of the orders was for export shipment. The number of workmen employed April 1 was 182,014, compared with 182,235 on Jan. 1. Steel ingot output was 1,842,187 metric tons, compared with 1,831,538 metric tons in the final quarter of 1927, and pig iron production was 1,703,105 tons, compared with 1,725,719 tons in the last quarter of last year.

The Mannesmann Buizen Handels Matschappy has been established by the Mannesmann interests at Rotterdam to handle sales of pipe and tubing. The Linke-Hofmann Co., Breslau, the Sachsen Waggon Fabrik, Bautzen, and the Waggon Fabrik Busch, Bautzen, have negotiated a merger. With the exception of the Gorlitzer Waggonwerke, all the leading railroad car building companies of Saxony and Silesia have been consolidated.

FRENCH EXPORT PRICES FIRM

Mills Well Booked with Orders—British Pig Iron Still Offers Keen Competition

PARIS, FRANCE, May 4.—The export market, which during recent weeks was rather irregular, is again firm, and at the Brussels Bourse, April 25, the previous minimum quotations were not obtainable. On May 2, the price situation was even firmer. However, some foreign consumers, particularly those in the Far East, are unwilling to pay the prices now being asked, and it is reported that British and Continental exporters are, in a few cases, accepting orders speculatively at lower prices.

In some quarters it is believed that there will be a continuation of the present firmness in prices, and stress is laid upon the fact that, although the steel output of the first quarter of this year exceeded the allotments to all members of the International Steel Cartel by about 1,200,000 metric tons, prices are strong with an upward tendency. Another favorable factor in the present market is the tonnage of rail orders being executed by French mills. The domestic market has been quiet, probably as a result of the election, but prices continue firm.

Pig Iron.—Export prices show irregularity because of keen British competition, and as low as £3 7s. ($16.32), f.o.b. Antwerp, is reported to have been done on an order for 3000 tons of Cleveland foundry iron. Domestic foundry is fairly firm at £3 2s. to £3 2s. 6d. ($15.10 to $15.22) per metric ton, f.o.b. Antwerp. March output of pig iron was 858,000 tons, which constitutes a record, the highest previous production for one month, in December, 1926, having been 827,000 metric tons. Of the March production, 671,000 tons was basic, 109,000 tons foundry and 1000 tons forge iron. Included also was 35,000 tons of hematite foundry, 21,000 tons of hematite forge and Bessemer iron and 21,000 tons of ferroalloys. This record output was reached with 149 furnaces in blast, four more than at the beginning of the year and six less than were in operation in December, 1926. Demand for basic iron is increasing, but May purchases of foundry grade are expected to be smaller than in April, as foundries are less active.

Semi-Finished Material.—Prices for export are firm, with blooms at £4 2s. to £4 4s. 6d. ($19.97 to $20.58) per ton for large and medium sizes and £4 10s. to £4 12s. ($21.92 to $22.41) per ton for small sizes. Billets range from £4 11s. to £4 14s. ($22.16 to $22.90) per ton, f.o.b. Antwerp. Sheet bars are quoted at £4 14s. to £4 14s. 6d. ($22.90 to $23.02) per ton.

Finished Material.—Export prices are decidedly firmer and in some cases have advanced. Merchant bars are quoted, f.o.b. Antwerp, at £5 7s. 6d. to £5 8s. 6d. per ton (1.19c. to 1.20c. per lb.), an advance of 3s. (73c.) per ton in a fortnight. Standard beams are quoted at £4 13s. 6d. to £4 14s. (1.03c. to 1.04c. per lb.), an advance of 6d. (12c.) per ton. There has been practically no change in the domestic market situation. Merchants have been rather heavy buyers, but manufacturing consumers are inactive. Some important tonnages of bars and beams for public works are expected to be placed in May. Most mills are well booked with export tonnages of rails and merchant products, but there is some question that the present high level of production can be maintained. Export prices of sheets are firm, especially for the heavy gages.

Rails.—The base price on rails for the French railroads has been increased for second quarter to 820 fr. ($32.23) per ton, f.o.b. Eastern mills. The previous quotation of 755 fr. ($29.67) per ton had been effective since Oct. 1, 1927.

Luxemburg Export Trade Less Active, But Prices Are Firm

LUXEMBURG, April 29.—Foreign trade began to decline in March, and April has been quiet also. Prices, however, show no further downward tendency and are expected to continue unchanged. The French domestic market has been quite active.

British imports of European steel have declined and demand from the United States and from South and Central American markets has been less pressing. Japanese buying continues irregular. Slightly more activity is reported in the Chinese markets. Most Luxemburg producers are fairly well booked with business and are able to maintain an independent position on prices.

On April 1 there were 40 out of 47 furnaces in blast, and production in March totaled 240,234 tons of pig iron, compared with 220,114 tons in February. Steel ingot output was 220,309 tons in March, compared with 205,053 tons in February.

German Aluminum Works to Use New Electrolytic Process

HAMBURG, GERMANY, April 28.—Aluminum production of the Vereinigte Aluminiumwerke Lautawerk, one of the largest German plants, is being converted to a new electrolytic process under the Hagelung patents. This follows about three years of experiment with the Hagelung process, which is said to be as much as $27 per ton cheaper than the present method. As the new process uses clay, of which there are rich deposits in Germany, it will be no longer necessary to import large quantities of bauxite from British Guiana, Jugoslavia, France and Hungary.

BELGIAN MARKET IMPROVES

Steel Prices, Especially Bars, Show Advances—Pig Iron Quiet and Foreign Competition Keen

ANTWERP, BELGIUM, April 27.—Prices have strengthened, and the market is showing greater activity. Producers are well booked with business and are able to adopt an independent attitude. The market is especially firm on steel bars, with only a few mills openly soliciting orders and most of these limiting their quotations to certain sizes to complete rolling schedules. This has resulted in a division of orders among the various mills willing to accept certain sizes. Deliveries are becoming extended, and exporters are beginning to place their orders with mills without seeking concessions. Another favorable factor is the improvement in the French domestic market. German mills have taken some sizable orders in Holland, and export business, generally, is increasing, with foreign buyers seeking early deliveries.

Pig Iron.—Domestic business continues satisfactory and available supplies are limited. Export business is less active, the present quotation on phosphoric foundry of £3 2s. to £3 2s. 6d. ($15.10 to $15.22) per ton, f.o.b. Antwerp, apparently being too high to interest British consumers, who constitute the best available market. Thomas grade is unchanged for export at £2 15s. to £2 16s. ($13.40 to $13.64) per ton, f.o.b. Antwerp. Foreign hematite is still competing with the domestic product, which is quoted at about 650 fr. ($18) per ton, f.o.b. furnace. Iron and steel scrap prices have declined slightly in a quiet market. Heavy melting steel is quoted at 460 fr. ($12.80) per ton.

Semi-Finished Material.—Prices are decidedly strong and show an irregular upward tendency. The smaller specifications are bringing higher prices, with demand heavy and supplies small. Export business is slack. Blooms range from £4 1s. ($19.72) per ton for 8-in. to £4 10s. ($21.92) per ton for 4-in. blooms. Billets are quoted at £4 10s. ($21.92) per ton for 3-in. and £4 12s. ($22.41) per ton for 2-in. billets. Sheet bar prices are stationary at £4 13s. ($22.65) per ton, f.o.b. Antwerp.

Finished Material.—The general tendency of prices seems to be toward still greater strength, especially on steel bars. The further extensions in deliveries being offered by makers indicate that most mills are well booked with business. Exporters, evidently convinced that no immediate recession of prices is in prospect, are seeking to place their requirements. There is a fair demand from foreign markets, with buyers requesting early shipment. Bar prices have advanced to £5 7s. per ton (1.19c. per lb.), f.o.b. Antwerp. Structural rounds are reported no longer available from stock, and the current market is quoted at £5 5s. per ton (1.16c. per lb.). Beams are not so firm as other steel products, but have improved considerably, with the market at about £4 15s. per ton (1.05c. per lb.), f.o.b. Antwerp. Hot-rolled hoops are quoted at £6 per ton (1.32c. per lb.) f.o.b. Antwerp. Sheet prices are firmer, and mills show no inclination to seek heavy tonnage at the present market level.

Spain to Destroy Obsolete Textile Machinery

MADRID, SPAIN, April 28.—In a move to reduce the cost of textiles in Spain, the Spanish Government is reported to have ordered that textile machinery more than 40 years old be destroyed in one year and sold as scrap. To replace this equipment, it is understood that machinery may be imported duty free, provided the prices of the Spanish textile machinery builders are 10 per cent higher than those on imported machines. Under the decision the Government will pay a maximum premium of 1000 pesetas ($167.70) for each textile machine destroyed which was bought between 1890 and 1920, the amount of the premium depending upon the age of the machine. Large imports of textile machinery by Spanish manufacturers are expected as a result of the law.

Germans Actively Developing Welded Steel Construction

HAMBURG, GERMANY, April 28.—There has been considerable interest in the welded steel building of the Westinghouse Electric & Mfg. Co. at Sharon, Pa. The United Steel Works at Düsseldorf and other companies are devoting much time to further improvement of welding methods. In Berlin the Lehr und Versuchswerkstatten für Schweisstechnik, a special training school, has been established, where experiments will be made and engineers and workmen trained in welding procedure.

Japanese Plan 700,000-Ton Increase in Pig Iron Output

WASHINGTON, May 15.—Projected expansion of blast furnace capacity in Japan is calculated to add about 700,000 tons annual capacity, bringing the total for the entire country to about 2,500,000 tons, according to a report to the Department of Commerce from Tokio.

The projected expansion includes the installation of two 500-ton blast furnaces at the Imperial Steel Works plant at Yawata, a 500-ton furnace at the Anzin Steel Works in Manchuria, conversion of two of the three 100-ton blast furnaces at the Wanishi plant of the Japan Steel Works to 200 tons and 160 tons capacity, conversion of a 150-ton furnace at the Tsurumi plant of the Asano Shipbuilding Co. to 300 tons capacity and erection of a 200-ton furnace at the Kamaishi Iron Works.

This program, if executed in full, would meet the pig iron requirements of Japan and obviate the necessity of importing iron. The success of the projected expansion, however, is said to depend upon securing adequate supplies of iron ore. At present Japan is importing pig iron from India, Manchuria and Chosen.

German-Owned Polish Companies Merged

WASHINGTON, May 15.—A further step in the centralization of the Polish iron and steel industry appears in the recent announcement that the Oberschlesische Eisenbahn Bedarfs A. G. of Germany has brought about the amalgamation of the Friedenshuette Works, Baildon Foundry, Ferrum Co. and Graf Balestrom Co., all of Upper Silesia, and all for the most part German-owned, according to a report received from Warsaw by the iron and steel division, Department of Commerce. The new group, it is stated, will be the largest iron and steel organization in Poland, employing about 18,000 workmen and controlling iron ore and coal mines, foundries, rolling mills, by-product coke ovens and electrical power plants.

Immigrants Coming In Average 25,552 Monthly

Immigrant aliens to the number of 26,270 were admitted to the United States in March, an increase of 5382 over the previous month, but 3598 less than the number for March, 1927, according to the Bureau of Immigration. In the first nine months of the current fiscal year, a total of 229,969 immigrants entered the country, a monthly average of 25,552. This compares with 27,369 for the corresponding period of last year.

Of the 229,969 immigrants admitted from July to March last, the Mexican race contributed 42,213 and the German 39,820. The Irish were third in the list with 27,423, followed closely by the English with 26,685, while the Scotch numbered 17,965, French 14,169, Scandinavian 13,634, Italian 13,551 and Hebrew 8878. These nine races constituted 88.9 per cent of the total for the nine months. Skilled laborers admitted during this period totaled 44,582 and common laborers 26,375.

TESTING SOCIETY PROGRAM

Symposium on Wear Testing of Metals and Papers on Magnetic Analysis and Gray Iron Are Features

CONSIDERABLE valuable technical data will be presented at the various sessions of the thirty-first annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, June 25 to 29.

Following the usual plan the metal sessions are scheduled for the early part of the week, with concrete and other topics left for the later sessions. Monday, June 25, is devoted to committee meetings. On Tuesday, June 26, at 2 p. m., an opening general session is scheduled, at which Prof. H. F. Moore, professor of engineering materials, University of Illinois, Urbana, Ill., will deliver a brief address followed by reports of three committees: E-6 on papers and publications, E-9 on correlation of research and E-5 on standing committees. This will be followed by the announcement of the election of officers for the new year and the transaction of general business. The usual committee reports will be presented. Technical papers will be as follows:

Tuesday, June 26, 3 P. M.

Session on Wrought Iron and Cast Iron:

"A Study of Centrifugally Cast Pipe *versus* Sand Cast Pipe," by F. N. Menefee and A. E. White; report of sectional committee on specifications for cast iron pipe; "The Static and Fatigue Properties of Some Cast Irons," by J. B. Kommers; "Effect of Sulphur on Physical Properties of Gray Iron," by Edwin K. Smith and Fred B. Riggan.

Tuesday, June 26, 8 P. M.

Session on Testing and Wear Testing of Metals:

"Methods of Particle Size Determination," by Lincoln T. Work; "Calibration of Rockwell Hardness Testing Machines," by F. S. Mapes; "The Calibration of Extensometers," by R. L. Templin; "Measurement of Brittleness," by P. L. Irwin; "Wear and Other Properties of Some Railroad Bearing Bronzes at Different Temperatures," by H. J. French; "Wearing Tests of 12 Per Cent Manganese Steel," by J. H. Hall; "The Wearing Qualities of Tire Chains," by W. H. Parker.

Wednesday, June 27, 9.30 A. M.

Session on Steel and Magnetic Testing:

"Ferrous Silicates in Steel," by C. H. Herty, Jr., and G. R. Fitterer; "Tests of Specimens Cut from Different Parts of Structural Steel Shapes," by M. O. Withey; "The Incremental Permeability Method for the Magnetic Analysis of High-Speed Steel," by W. B. Kouwenhoven and Julian D. Tebo; "Endurance of High-Speed Cut-Off Tools in Relation to Magnetic and Other Measurements," by Haakon Styri.

Thursday, June 28, 9.30 A. M.

Session on Metals: Corrosion, Fatigue and Properties at Elevated Temperatures:

"Welding of Corrosion-Resistant Chromium Alloys," by W. B. Miller; "Some Factors Involved in Corrosion and Corrosion-Fatigue of Metals," by D. J. McAdam, Jr.; "Influence of Inhibitors and Accelerators on Corrosion-Fatigue of Metals," by F. N. Speller, I. B. McCorkle and P. F. Mumma; "Long-Time or Flow Tests of Carbon Steels with Particular Reference to Stresses Below the Proportional Limit," by J. J. Kanter and L. W. Spring; "Testing of Materials at Elevated Temperatures," by P. G. McVetty; "The Seizing of Metals at High Temperatures," by N. L. Mochel.

Thursday, June 28, 8 P. M.

Session on Non-Ferrous Metals and Metallography:

"Some Mechanical Properties of Nickel, Manganese-Nickel and Copper-Nickel Alloys," by W. A. Mudge and L. W. Luff; "Tension Tests of Copper with Varying Dimensions of Test Specimen," by C. H. Marshall.

The annual address of the president, Prof. H. F. Moore, and the annual report of the executive committee, will be presented Wednesday evening, June 27. The president's subject is "Hooke's Law of Stress and Strain—An Address Commemorative of the Two Hundred and Fiftieth Anniversary of Its Announcement."

Marburg Lecture and Dudley Medal

The third Edgar Marburg lecture will be delivered by Dr. Frank B. Jewett on "Some Research Problems Involved in Transoceanic Telephony." Doctor Jewett is president of the Bell Telephone Laboratories and vice-president of the American Telephone & Telegraph Co., New York.

The second award of the Charles B. Dudley medal will be bestowed on A. V. de Forest, research engineer American Chain Co., Bridgeport, Conn., for his paper on "A Method of Graphic Representation of Magnetic Characteristics," delivered last year. The award was established for recognition of meritorious papers on research in engineering materials, and was made this year on the unanimous recommendation of the medal committee: Dr. Zay Jeffries, chairman; P. J. Freeman and John H. Hall.

New International Association for Testing Materials

In response to the solicitation for applications for membership in the New International Association for Testing Materials, 82 individuals and 13 companies have applied for membership in the new association. The applications will be forwarded to the secretary of that body, Dr. M. Ros, Leonhardstrasse 27, Zurich, Switzerland, from whom applicants will receive a membership card in due course. The executive committee of the A.S.T.M. has appointed Past-President W. H. Fulweiler, chemical engineer United Gas Improvement Co., Philadelphia, to serve as the American member on the permanent committee of the international association, which is the governing body and consists of one member from each country having at least 20 members in the association. The permanent committee has started work on plans for the next international congress, which will be held in Zurich in 1931.

New England Foundrymen Discuss Gray Iron Institute

The dominating subject at the May meeting of the New England Foundrymen's Association, held Wednesday evening, May 9, at the Exchange Club, Boston, was the Gray Iron Institute. Charles F. Miller, president, introduced as the first speaker of the evening, H. S. Chafee, Builders Iron Foundry, Providence, R. I.

Mr. Chafee was the association's representative at the Pittsburgh and Cleveland meetings of gray iron foundries in connection with the proposal to form the Gray Iron Institute, and he presented to the members a thorough report of the proceedings, as well as an outline of what the institute purposes to be and do, and the cost to membership foundries. E. A. Custer, Jr., foundry engineer, Philadelphia, the guest of the association, went into detail as to the importance of the Gray Iron Institute to the industry. His talk prefaced an informal discussion on some of the recent improvements in gray iron foundries and on the use of permanent molds.

He told of Germans developing pearlitic iron; of their succeeding in interesting English and Danish foundries in it, but their failure to interest Americans, and added that those English and Danish foundries, making the product, have run full since its introduction.

He asked, "Why is it not possible to make a synthetic sand in this country that will eliminate much of our troubles?" Two years ago, he said, an Italian foundry announced it was operating on such sands, and it is known that France has foundries experimenting with them. Experiments also have been conducted at a Bridgeport, Conn., foundry.

Permanent or long-life molds, according to Mr. Custer, who started experiments with them in 1908, will never be a cure-all for foundry troubles, but they will materially help matters. The foundryman starting to use them, according to his own confession, must go through "a period of agony."

Gas Association Establishes a Fellowship to Study Cores

On May 1 the American Gas Association, through its committee on industrial gas research, F. J. Rutledge, chairman, established a fellowship at the University of Michigan, Ann Arbor, Mich., to make an intensive study of the many factors entering into the proper baking of cores. This research will be conducted at the department of engineering research under the supervision of H. L. Campbell, associate professor of shop practice. Prof. A. E. White is director of the department. Every factor affecting the application of heat in core baking will be investigated and fundamental facts established to determine the advantages of properly controlled atmospheres, temperatures and ventilation in core ovens.

Obtaining Clean Steel in the Ingot

British Iron and Steel Institute Studies Segregation—Notable Papers on Blast Furnace Work—Honors Talbot and Schwab

LONDON, ENGLAND, May 4.—Aside from an unusual number of contributions on various phases of blast furnace practice, the annual meeting of the Iron and Steel Institute, held in London yesterday and today, was most interesting to Americans because of signal honors extended to men well known in the United States. Benjamin Talbot, who spent many years in America, was inducted into the office of president of the institute, and Charles M. Schwab was awarded the Bessemer medal.

Mr. Schwab in his acceptance departed from the prepared address (reported in THE IRON AGE last week) and expressed his appreciation quite informally in a way that won the audience completely. Among other things he recalled a former meeting he attended 43 years ago with Captain "Bill" Jones, his friend and associate at Homestead.

"He sat next to your president, the noble Duke; I sat in the front row. The captain was a puddler. He was a native genius. He was a great master of iron and steel. His mixer is used in every steel works of the world. You were discussing at that time the plates for the great Firth of Forth bridge, which was then being built, and the president called upon the greatest American steelmaster then known for an expression of his opinion.

"It was a trying experience for him to speak before this assembly, because you are in your English meetings dignified, conventional and proper. The captain arose quite unperturbed, while I sat trembling in the front row wondering what sort of a speech this great American was going to make. The question was whether the holes for riveting the gusset plates should be drilled or punched. He got up and said just one sentence. He said 'Mr. President, you ask me whether I think these plates should be punched or drilled. All I have got to say is that any man that would punch a steel plate like that ought to have a good swift kick in the pants.' That was the whole of the captain's speech."

Schwab Says Selling Is Biggest Problem

A newly completed plant of the Appleby Iron Co. was described by A. Crooke and T. Thomson. This contains six blast furnaces, each making about 250 tons of pig iron per day from calcined ore. Gas is exploited to the utmost. No coke oven gas is available, but only about 450 lb. of coal per ton of ingots, beyond blast furnace fuel, is required for the entire plant. Three 250-ton and one 300-ton tilting open-hearth furnaces and one 500-ton mixer comprise the steel-making department. Labor is reduced to the minimum; production is 40 tons of ingots per man per week. Ingots weighing from 6 to 20 tons are made, and rolled down in a 42-in. blooming mill, a 120-in. and an 84-in. plate mill, all fully electrified. Mechanical devices at the shears enable three men to handle up to 60 tons per hour of ⅝-in. plate.

Mr. Schwab, in commenting on this plant, said that he did not feel that America deserved the credit it was given for efficiency, which, after all, has been made possible by quantity production. Taking a mill that runs continuously on one size of rods or sheets—if it were not possible to get good costs under those conditions, the designers would be pretty bad engineers. He had been asked about coming things in America. First of all he mentioned very large blast furnaces now being planned for a minimum of 800 tons of pig iron a day. About 1000 tons of pig iron can be obtained from such stacks, and as a result direct labor costs on blast furnaces are cut 35 per cent or more. The next great improvement that had been made is in the size of open-hearth furnaces; they were now making them very much larger than ever before, up to 250 and 300-ton heats, dividing the heats in the ladle and getting great economies. The chief change in the years to come, he said, would be the continuous rolling of sheets. Continuous mills have been able to show an economy of about $10 per ton in the cost of producing sheets.

He was ashamed to say that, with the vast investment of something like six billion dollars, American mills are not making much over 5 per cent on their invested capital. He thought the thing of the future was not the perfecting of costs in manufacture but the perfection of methods of distributing the steel so as to get a better price. A better return would come from some method of selling by which they would be first of all protected in their home markets for the chief consumption, and secondly distribute the surplus collectively in some manner that would comply with the law, and yet enable them to sell at a price that would give a profit on the capital invested. While it was exceedingly interesting to listen to technical discussions his mind, Mr. Schwab said, was constantly running on the matter of where they were going to get a better price for the steel.

Early Development of Continuous Process

In his presidential address, Mr. Talbot recalled that in 1890 he went to America to introduce the manufacture of basic open-hearth steel in the South. In going through various works there he found a great development in open-hearth basic practice going on. In his experiments in 1891-92 on refining iron in Alabama in fixed furnaces he had become interested in the tilting furnace, and had recommended the introduction of a large one to run continuously for desiliconizing the siliceous blast furnace metal by means of a basic slag instead of using an acid Bessemer converter for the purpose. Mr. Talbot selected Wellman's method of rolling forward instead of tilting centrally, as being the better for the purpose. In place of the cylindrical shape of the body of the furnace, as built at the Illinois steel works, they decided on a furnace with sloping sides. As it was decided to have close joints between the tilting sections, movable ports with water-cooled chills were used, capable of being moved backward and forward. The flared sides were for the double purpose of more easily repairing the back wall and slag line, and for holding the side walls (especially on the charging side) more firmly when tilting. The other interesting development in the continuous process was the bringing about, when desired, of the carbonic oxide reaction, in which the carbon in the bath is rapidly oxidized simultaneously with the phosphorus.

Segregation in Ingots

A 170-page report of a special committee studying heterogeneity of steel ingots was presented, describing work done in the two years since its first report. The earlier work was principally on killed carbon steel; more recent studies have been on alloy steels and effervescing steel.

Comparing analyses, sulphur prints and macrostructures of two acid open-hearth steel ingots containing 3 per cent nickel (cast from the same heat, but one nearly four times as large as the other), distinctly greater segregation was found in the bigger ingot. There is also a slight but definite segregation of nickel, following the same general mode of distribution as carbon, sulphur and phosphorus, and comparable with manganese in a well killed steel. Nickel does not appear to have any influence on the degree of segregation, as observed in a similar plain-carbon ingot. The general mode is the same: a comparatively pure zone exists along the axis and toward the bottom; a high concentration at the top subdivides lower down so as to straddle the purer axis.

Two 2-ton ingots (C 0.29; Ni 4.4; Cr. 1.4) were selected from a heat, one poured in 4 min. at 1590 deg. C., and the other in 2 min. at 1550 deg. C. In each is a well defined outer layer of very small crystals. In the hot-poured ingot this merges into a region of columnar crystals, which tapers off toward the top; in the cold-poured ingot this region is lacking. Two important central zones occur in both: uniformly small crystals at the bottom, very large columnar crystals at the top. In the hot-poured ingot the latter exends half way down; in the other hardly a quarter way to the bottom.

Alloy steel ingots weighing 49 and 119 tons were also studied. Segregation is greater in degree in these large ingots. In the biggest one the maximum variation of nickel is about 5 per cent of the mean analysis: chromium varies 30 per cent, molybdenum 70 per cent (no analyses taken in the unsound sink head).

Many illustrations are given of sectioned low-carbon ingots of rising steel, showing the familiar sound skin, the zone of blow-holes just below and the top central unsoundness. The ingots ranged from 3 to 8 tons in weight, and were destined for tubes or plate. All show increased silicon in the lower middle portion. Carbon, sulphur, phosphorus and manganese segregate in the same manner and to about the same degree as in killed steel. All ingots show less distinct V segregates near the central axis; the inverted vee segregates found in piping steel do not show in rising steel but do appear in semi-killed ingots.

A 50-ton heat of basic open-hearth steel destined for free-cutting stock and containing but 0.03 per cent silicon, cast into ingots, had all the characteristics of killed steel as to segregation. No aluminum was used. One hundred and fifty pounds of sulphur and 450 lb. of ferrophosphorus, added to the ladle, effectively prevented gas evolution during solidification.

The report notes that casting temperature, rate of teeming, rate of solidification, and gas evolution during solidification are most important factors in the production of uniform steel. Some of them are modified by the mold design; others by the furnace practice. At present most of the knowledge concerning these matters is empirical rather than capable of scientific analysis and precise statement.

Blast Furnace Operation

From a study of over 120 blast furnace operating results, Edgar C. Evans and F. J. Bailey developed a method of correlating blast furnace data on a common basis. This method shows that, other things being equal, the greater the effective time of contact between the reducing gases and the ore before the hearth is reached, the lower is the fuel consumption. Much more carbon is required for external heat losses in the hearth than has previously been supposed, and therefore slow driving of the furnace is the least economical method of obtaining effective time of contact, since the external heat losses per ton of pig iron produced per unit of time are increased proportionately. External heat losses are inversely proportional to the hearth diameter, so that in furnaces having the same effective time of contact between reducing gases and ore small hearths are less economical than large.

In comment, A. K. Reese doubted the propriety of including data regarding obsolete or quite inefficient practices and attempting to deduce generalizations therefrom applicable equally well to more up-to-date operations. For instance, it would be quite questionable to assume an equal amount of carbon lost in solution before arriving at the tuyeres in all furnaces, as the authors did in deriving one of their formulas. Yet they appeared to have arrived at a number of conclusions which confirmed those which he had many times referred to as being essential if the best results were to be obtained, namely, that the preparation of materials is very important, as is their distribution and the lines of the furnace and coke quality.

D. Sillars commented on the attitude of the authors that certain changes had straight-line relations with one another, whereas operators know that no change in a blast furnace, and particularly in the hearth, has any straight-line relation with another. One change is followed by a change of another kind, generally obeying some sort of "law of diminishing returns."

E. H. Lewis said that one of the author's curves, showing the relation between moisture in the blast and iron production, was confirmed in his experience with excessively dry air. The curve shows that the best operation would not be had with absolutely dry air; some moisture helps the furnace. He believed that it would greatly benefit any blast furnace man to work out his own results in accordance with the author's curve, for it would give him a proper perspective of some of the varying factors in the blast furnace and enable him, through that proper perspective, to look over and find the causes of many of the irregularities which everyone found in blast furnace practice.

Africa's Blast Furnace

For some years an open-hearth plant has been in operation in the Transvaal, making a variety of steel shapes from steel scrap. But the supply of suitable scrap, although it looked large, was rapidly exhausted, and a blast furnace was erected at Newcastle, Natal, to produce necessary pig iron, and also to supply foundry iron to South African industries. J. E. Holgate and R. R. F. Walton described its construction and operation. Ore is hauled 60 miles, coke 50 miles, and flux 180 miles, but sufficient good water could not be secured any closer to the other raw materials. The furnace is 70 ft. high, has a 10-ft. hearth, and is driven to produce 125 tons of pig iron a day. The ore is a carbonate, 50 per cent iron, very low in sulphur, and contains 5 per cent of free carbon disseminated through it. It has been found more economical to charge it raw than roasted. Coke consumption is 1800 lb. per ton of pig iron, the gas is not dusty, it contains 28 per cent CO, and the top is very cold. Costs total to about $20 per ton, plus depreciation, interest and profit, and the furnace is able to meet foreign competition by virtue of the high freight charges into the district and a Government bounty on the iron produced.

Cleaning Blast Furnace Gas

V. Harbord read a paper entitled "A Comparison of the Most Important Methods Employed in the Cleaning of Blast Furnace Gas," in which he analyzed the work done and the costs at 12 different furnace plants employing five different systems. The figures show that, if gas no cleaner than 0.4 gm. per cubic meter is required, the Cottrell electrostatic cleaner is the cheapest. Lower dust contents require either a bag filter (Halberg-Beth) or a spray tower and disintegrator of the Theisen type. Bag filters can clean down to 0.025 gm. per cubic meter, but the labor cost of handling the dry, fine dust and disposing of it is high. With a final spray such gas can be delivered to engines with no more than 0.004 gm. solid per cubic meter. The corresponding figure is 0.025 for spray tower and Theisen washer; costs are highest on account of the large amount of power required for pumping and for driving the washer. Total costs (power, labor, materials and maintenance) range from 0.05c. per 1000 cu. ft. of gas cleaned in the electrostatic system to 0.2c. per 1000 cu. ft. for sprays plus Theisen washers.

Princess Furnace Sold for $21,850

Sale of the property of the Princess Iron Corporation at Glen Wilton, Va., to W. W. Zimmerman, of Clifton Forge, Va., for $21,850 has been confirmed by Judge Henry C. McDowell, United States District Court, Roanoke, Va. The Princess furnace, which had an annual capacity of 36,000 tons of foundry iron, was built in 1883-84 and rebuilt in 1912. The Princess Iron Corporation took over the property in 1918, and the furnace had been idle since October, 1921. J. H. Drewry was appointed receiver of the company in August, 1923. The furnace will probably be scrapped.

Heat-Treating Educational Conference

Metallurgists and Practical Treaters Hear Papers on Carburizers, Stainless Steels and Fatigue at Purdue University

METHODS of steel production and the application of special steels and their heat treatment were discussed at the second annual conference on steel treating held at Purdue University, Lafayette, Ind., May 10 and 11. The purpose of the two-day program was accomplished for it brought together many active plant officials, superintendents, metallurgists and foremen of steel treating departments for a well defined educational conference.

Problems Connected with Carburizers

Practical and theoretical problems were discussed in a paper entitled "Carburizing" presented by H. B. Northrup, metallurgist J. W. Kelly Co., Cleveland. Carburizing compounds should be reasonably free from dust and fines, so that gas circulation through the container will be assured and heating throughout the box will be uniform. Energizers, of which there are commonly three, may be used in any combination, but the amount and kind depend on the characteristics and depth of case desired at given operating temperatures. After usage, compounds should be exposed to the air for about 18 hr. so that the basic oxides formed during the operation may react with the carbon dioxide of the air and thus recarbonate themselves.

Carburization of steel is dependent on three essentials: temperature, time, and gas pressure. Temperatures employed usually run close to 50 deg. Fahr. above the upper critical range of the steel being treated. For any particular temperature chosen and with the use of a selected carburizing compound, there will be generated in the carburizing container a definite partial pressure of carbon monoxide, which will produce a case of definite depth and characteristics in a given time.

Electricity for Heating

It is not wise to overlook the use of electricity as a means of heat supply until it has been given every consideration, for in the final analysis the method of heat application that is most economical cannot be decided until after all factors have been carefully studied. Furnaces should be well insulated and constructed to withstand thermal strains. Uniformly carburized work can be obtained only with uniformity of hearth temperatures, which can be obtained by a survey of temperatures in various parts of the furnace and by manipulation of ports and burners.

Carburizing containers are important for the reason that gas pressure must be kept under control. Containers made principally of iron are inefficient because they warp and scale. Warpage defeats the purpose of fitting covers tightly, and scaling contaminates the compound and is therefore a direct cause of soft spots in carburized steel. Containers, the analysis of which is mainly nickel and chromium, give satisfactory service.

Preventing Carbon Penetration

Prevention of carbon penetration can be effected in five ways: (1) Electroplating in a cyanide bath; (2) electroplating in an acid bath; (3) painting with copper sulphate; (4) painting with prepared clay or kaolin base paints, and (5) daubing with fire clay.

The first two methods are the most commonly used because they are most positive. Soft spots may be caused by "copper migration," which may result from too high a current density in the copper-plating tanks. This results in inclusion of minute portions of the electrolyte, which are not removed by subsequent washing or scrubbing operations. Faulty or insufficient washing of plated articles allows the electrolyte to be carried over into the carburizing boxes, thus contaminating the carburizing compound.

Some New Stainless Alloys

"Stainless and Heat-Resisting Steel" was the subject of a paper by C. B. Callomon, metallurgical engineer Allegheny Steel Co., Brackenridge, Pa. He said that stainless steel usually contains from 12 to 16 per cent chromium, and that the higher the percentage of chromium, the higher the carbon content may be and permit the steel to retain its stainless properties. From the standpoint of commercial use the stainless qualities of iron and steel are among those least desired by users. Stainless iron and steel vary only in the carbon content, stainless iron being in reality a mild steel. Its tensile strength is derived not from carbon but from the chromium-iron combination. Stainless iron can be heat treated to a hardness of 400 Brinell, with a maximum tensile strength of 175,000 lb. per sq. in. Characteristics of this material are its ease of control and the uniform results obtained in heat treatment. At elevated temperatures, say at 1500 deg. Fahr., stainless iron has a tensile strength of 12,000 lb. per sq. in. and also still retains high fatigue values.

New Alloys Developed by Krupp

A new alloy, known as V2A, has recently been developed by the Krupps in Germany, said Mr. Callomon. It contains 17 to 20 per cent of chromium and 7 to 10 per cent of nickel. It cannot be heat treated, but it can be fabricated in almost any manner. It hardens rapidly under cold working and has a tensile strength of 90,000 lb. per sq. in. in the annealed condition. Cold rolling will increase the tensile strength to about 190,000 lb. per sq. in. It is subject to grain growth at higher temperatures, so that annealing must be limited to the range of 1800 to 2200 deg. Fahr. At higher temperatures this material becomes softer by the Brinell test, but the tensile strength remains about the same. When cold drawn, the tensile strength is readily increased from 90,000 lb. per sq. in. to 300,000 lb. per sq. in., but at the higher figure the metal becomes quite brittle. It is non-magnetic.

The Krupps have also recently developed a heat-resisting material containing 8 to 12 per cent nickel and 24 to 26 per cent chromium, the remainder of the mixture being largely iron. The carbon in this alloy is kept low, and its heat-resisting qualities are equal to the nickel-chrome series. When hot rolled, it has a tensile strength of 130,000 lb. per sq. in., and it retains this tensile strength up to about 1700 deg. Fahr. Its thermal conductivity is low, being only about 28 per cent of that of soft iron. It makes an excellent carburizing container when formed in sheets and welded.

Calls Alloy Steels Automotive Steels

Alloy steel output represents about 2 per cent of the annual American production of ingots and steel castings, and fully 75 per cent of the alloy steel made is used by the automotive industry. Much of the remaining 25 per cent can be traced to industries dependent on automotive needs. E. C. Smith, assistant general superintendent Central Alloy Steel Corporation, Massillon, Ohio, in a paper on alloy steels, said that it might be considered fair to discuss alloy steels under the name of automotive steels.

Strictly speaking, he said, all steels are alloyed with something other than the essential ingredients, but common practice designates only those carrying un-

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This Issue in Brief

Reduces defective parts 50 per cent in less than a year by introducing waste budget plan. Each department of Stutz plant is allowed a stated amount each month for wastage and other controllable losses. Prizes are given to the foremen making the best showing.—Page 1378.

Era of consolidations is just beginning, says Montgomery Ward & Co. chairman. He predicts a great increase in the number of large units in business, owing to competition and the need for economy.—Page 1386.

Blisters on steel sheets are due to too little lime in the bath, one open-hearth superintendent believes. Others disagree, and give as reasons: too long a time in the pickling process, inclusions in the steel, and a sloppy-working furnace.—Page 1389.

Sees bright future for sponge iron. Already it is being used to advantage as a base for finer steels, such as wire steels, spring steels, razor blade steels, etc. It has superior workability, is free from red shortness, and in some cases reduces the cost of the finished product, sponge iron producer declares.—Page 1391.

Is steel output higher than demand warrants? Dr. Haney thinks so. His demand curve has gone down, while production curve has risen.—Page 1397.

By giving the scrap foreman a bonus, trouble resulting from non-ferrous metals and other impurities getting into open-hearth furnace has been almost wholly eliminated. Steel maker says he now has little difficulty with dirty scrap.—Page 1387.

Fatigue strength of metals may be roughly estimated as 250 times the Brinell number or one-half the tensile strength, says metallurgist. Fatigue failures in moving loads often have their origin in tool marks and other surface irregularities not visible to the naked eye.—Page 1429.

Price cutting is unsound and unethical, says Charles F. Abbott, who tells purchasing agents that if business is to be transacted on a basis of profit, manufacturers must adhere to a one-price policy.—Page 1429.

While population increased only 15 per cent in 10 years, the number of engineers increased 52 per cent. Low income is apparently due to an over-supply. If the unfit could be weeded out before or during their apprentice period, the situation would be remedied.—Page 1414.

You must scrap your old machinery, foreign government tells manufacturers. To reduce production costs, Spanish textile manufacturers are ordered to destroy all machinery more than 40 years old. New replacements may be imported duty free. Also, a premium will be paid for each machine destroyed which was bought before 1920.—Page 1405.

Not reduction of manufacturing costs, but perfection of distribution methods, so as to get a better price, is problem confronting steel makers, C. M. Schwab tells British industrialists. He bemoans the fact that American mills are not making much over 5 per cent on their invested capital.—Page 1407.

To get the best carburizing results, be sure your carburizing compounds are free from dust and fines. Otherwise the gas will not circulate freely through the container and the heating will not be uniform throughout.—Page 1409.

Sharp reduction in defective work is result of daily meeting of foremen for consideration of parts to be salvaged. In automobile plant the foremen meet each morning to examine all material branded as defective and to decide which pieces can be salvaged. Reduction of spoiled goods in his department becomes a matter of personal pride with each foreman.—Page 1378.

Copper content of steel scrap is steadily increasing, says open-hearth man. In making copper-bearing steel he finds that it is now necessary to add only half as much copper as formerly.—Page 1388.

If price-fixing is illegal, why is not selling at no profit equally illegal? association head inquires. Each practice is demoralizing, for public interest is just as seriously affected by one as by the other.—Page 1429.

Sloping back walls of open-hearth furnaces are a money-saver, says steel maker. After two years of use no bricks have had to be replaced, while previously repairs were necessary after approximately every 30 heats.—Page 1389.

Internal rolling stresses, caused by irregular drafting, are prevented by automatic roll settings in new structural steel mill. From the time the bloom leaves the bloom shear until the finished beam is delivered from the finishing pass, all operations are controlled by four men.—Page 1383.

ESTABLISHED 1855

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Trends in Non-Ferrous Metals

IN 1927 there was a sharp contraction in the consumption of most of the non-ferrous metals, but especially in copper, lead, tin and zinc. This was associated largely with the decline in automobile manufacturing and also was a reflection of the general recession in industrial activity. Even the manufacture of tin plate diminished and that industry has no close association with automobile manufacturing. Anyway, a consequence of several conditions was sharp declines in the prices for these metals. Copper stood up better than the others.

Recently there has been some revival in the markets. The sentiment in copper is quite good. In zinc there has been some improvement, especially since the producers have evinced the intention to become more restrained in their activity. The European producers at a meeting in Brussels on May 7 arranged a sort of a cartel among themselves. Even silver has been a little stronger owing to increased Chinese demand arising from disturbances in that country, which cause the Chinese to prefer to invest in silver rather than in other things.

A fundamental trouble with several branches of the non-ferrous metal industry of the world, as we have heretofore suggested, is the absence of adequate statistics. Of course, statistical information makes no magic formulas, but is simply a numerical expression of facts—that is, knowledge. The statistical knowledge in respect to copper is much superior, and therefore the copper producers are able to govern themselves more intelligently than others.

Our meaning is that the world's resources of copper, lead, tin and zinc, so far as known at present, will not last for a long period of time. The copper resources are better capable of measurement than are those of lead, tin and zinc, and we know that their present development is more extensive. There is no good reason, however, why copper producers possessing these resources should consider it necessary to liquidate them in the minimum of time, perhaps destroying all profit by excessive competition among themselves. Logical consideration points toward an opposite policy.

It is not necessary to have collusion among producers in order to develop such a policy. In its soundest development it will be a matter of individual action, determined by individual self-interest, but to arrive at such wisdom there must be knowledge.

Theoretically the same ideas should obtain for the other minerals—iron ore, coal, petroleum, etc. Practically, however, the world's resources of iron ore and coal are so great that no one figures upon a diminishing supply, it being left to future generations to worry on that score. In petroleum the condition is still different. The geologists tell us that the world's supply of it is relatively limited and that it will not be many years before its scarcity will become evident. Meanwhile there is a petroleum flood owing to the fear of producers, especially in the United States, that if they do not quickly drain their lands their neighbors will do it for them.

This condition in petroleum leads to a complicated chain of economic events. It gives us cheap gasoline and promotes the automobile industry. That in turn increases the use of all the metals. It adds to railroad income in many ways. And so on. But, on the other hand, it impairs the earning capacity of something like $11,000,000,000 that is estimated to be the American investment in petroleum production. This illustrates how closely is the interlocking of many of our great industries and how futile it is for the human mind to try to adjust and coordinate them as the Marxians have been essaying to do in Russia.

How to Make Things Dear

AS we have pointed out heretofore, no Senate investigation of the situation in bituminous coal mining was needed for the ascertainment of the industrial and economic facts. Any expert could have communicated them offhand in no time worth mentioning. But, of course, that is not the purpose of the senatorial investigation, which is rather to find some excuse for doing what John L. Lewis and his associates want to do; namely, to make coal dear. Consequently the cards are being shuffled preparatory to dealing some sort of proposal for Federal control over bituminous coal mining.

Of the same nature is legislation that in several States is being enacted against chain stores, whose only crime is that, being more efficient and more economical than local merchants, they are able to sell goods relatively cheaply.

We might go further in a review of political complaint against efficiency and obstruction to the public enjoyment thereof, but it is unnecessary. That there should be such an attitude is rather to be expected in the pages of Alice in Wonderland than in those of the *Congressional Record.*

If we stop to think, however, it is an expression of resentment against economic law, or rather against the laws of nature, especially the law of the survival of the fittest, which a great ambit of thought, from philanthropological to socialistic, does its best to counteract. Instead of promoting fitness it leads us to foster the unfit, and as the latter multiply we increase our social problems. In economics and politics the prophets of unfitness preach a leveling down. Let the local grocer live at the expense of his neighbors and banish the chain store and mail order house. Let the superfluous coal mines share the work of the industry, considering that it is better for seven men to work four days a week than for five to work six days and two none at all. And so on.

Let there be no competition among human beings in their bread-winning, even if blackjacks have to be used to prevent it. Let no man or women be compelled to do what he does not desire, such as entering domestic service. This sounds rather like Soviet talk, and is different from the lesson that has been learned by those who have gone further on this line—British labor, for example.

The British labor unions, that erstwhile were socialistic in their thought, have straightened themselves entirely from that leaning, as appears in a recent report by their general federation on the causes and cure of unemployment. In this it is declared very frankly, and with simple good sense, that the cause of hard times cannot be the capitalistic system, as is proved by the fact that the most poverty-stricken country is Russia, where capitalism has been abolished, while the most prosperous country is the United States, "which is the most capitalistic of all." Our senatorial committees might well ponder over this obvious conclusion and at least let things alone, even if they cannot bring themselves to promote industrial efficiency.

Lake Coal Rates Down Again

IT has been "off again, on again" with the freight rate differential between the northern and southern fields on lake coal. For years the differential was 25 cents, being increased to 45 cents on Aug. 10, 1927, by a reduction in the Pittsburgh rate from $1.66 to $1.46, approved by the Interstate Commerce Commission. Then the roads reduced the southern rate from $1.91 to $1.71 to counterbalance; the commission threw out the case; the Richmond injunction of April 14 was secured against the commission; the $1.71 rate was put into force April 20; and now the northern roads have filed 20-cent reductions making the Pittsburgh rate $1.26, to go into effect about June 20.

To the railroads the net result of this jockeying, bordering on a rate war, is a loss of 20 cents a ton revenue on the lake coal, amounting to $6,000,000 or $7,000,000 for a season. Coal shippers maintain the business will still be very profitable to the railroads. It is considered only a remote possibility that the commission will disallow the northern reduction now proposed, since it provides the 45-cent differential the commission approved last year.

Of course the Supreme Court's decision on the appeal from the Richmond injunction, expected late this year, will be of much interest; but there is room for doubt whether it will do much to clarify or interpret the Hoch-Smith resolution. The latter refers to all rates which may be found "unjust, unreasonable, unjustly discriminatory, or unduly preferential, thereby imposing undue burdens, or giving undue advantage," etc. When the Pittsburgh district had lost nearly all its lake coal trade and the ton-mile rates were approximately twice as large on Pittsburgh coal as on southern coal it is hard to see how the matter can be permanently placed outside the scope of the Hoch-Smith resolution.

The Pittsburgh district shipped about 2,500,000 tons of lake coal last year and year before, against 8,000,000 tons as late as 1923 and much more than that years earlier. Its participation in the trade will now increase by several million tons, the amount to be limited more by physical conditions of production than by bare marketing conditions. There will be further confusion as to the coal strike, defunct for several months except that a large number of men are still strikers, sustained in that position by some public sympathy, by misapprehension as to what the Senate investigating committee could or would do, and now by this rate change, which the strike leaders will try to claim should help the operators to pay the absurd wage scale the union continues to demand.

Perhaps with more employment offered there will be a stampede of union miners, or a migration of miners from southern fields to the Pittsburgh district. Affairs in coal have been a succession of surprises and the supply of the latter is probably not exhausted.

Gains in Hot Rolled Flats

BANDS, hoops, strips and sheets are distinct products as to origin and trade usage, but they fall into one general category. No absolute lines can be drawn between them except by making artificial distinctions, such as calling 12 gage and heavier a "band" and 13 gage and lighter a "hoop," while the official statistics do not even follow this distinction when they include cotton ties with bands. It is interesting, therefore, to follow the total tonnage production of the entire group. There was a decrease from 1926 to 1927 of 4.2 per cent in the total of flat products, whereas the decrease in all finished rolled iron and steel was 7.4 per cent.

It was for 1920 that the production of strips was first reported, and from 1920 to 1927 the group gained 36.6 per cent, against an increase of only 1.6 per cent in total rolled iron and steel. Steel ingot production gained 7.1 per cent in that period, but the proportion of rolled steel to ingots decreased and there was a large decrease in rolled iron, and thus the rolling industry as a whole showed little gain.

The detailed comparison between 1920 and 1927 is made below, sheets being divided into 13 gage and lighter and 12 gage and heavier, while tin mill product not tinned, being essentially a sheet product, is included.

Output of Flat Products—Gross Tons

	1920	1927	Change
Bands	388,862	323,129	—65,733
Hoops	333,440	176,300	—157,140
Strips	586,524	1,318,419	+731,895
Sheets, 13 up...	2,519,072	3,557,988	+1,038,916
Sheets, 12 down.	367,329	421,049	+53,720
Tin mill black..	246,816	270,672	+23,856
Total	4,442,043	6,067,557	+1,625,514

This is a case in which percentages are misleading. To say, from the figures, that 1920 to 1927 strips more than doubled—increasing 125 per cent—while sheets increased "only" 36 per cent is correct arithmetically, but is quite misleading as a comparison. When all rolled iron and steel increased only 1.6 per cent sheets did remarkably well to increase as they did. Strips may have gained a little by taking what would otherwise have been sheet tonnage, but they gained also from bands and hoops and they had a great gain by going into new products not previously made.

It is a common remark that the success of the wide strip mill, which is assumed, is likely to put many old sheet mills out of the running, but the 1920 to 1927 comparison does not support such a view. When sheet production has so increased in only seven years there must be a rapidly growing demand, while according to the production figures less than three-fourths of last year's sheet industry was in existence only seven years earlier. By no means is the whole sheet industry old.

Demand for these various classes of flat rolled material may reasonably be expected to continue to grow at the remarkable rate of the past few years. There will be changes, losses and abandonments, but there will be ample room for the great majority to survive.

Too Many Engineers?

COMMENTATORS on latter-day education are inclined to view with alarm the statistics gathered among various engineering alumni showing a pronounced drift to other occupations. A report from Lehigh University shows that five years after graduation 30 per cent of a class have abandoned engineering; in 15 years the figure has grown to 41.5 per cent and after 25 years to 56.5 per cent. This indicates, say they, that engineers have been driven from their profession by starvation wages.

This does not exactly follow. If one bears in mind the fact that any high school graduate has been able to enter some engineering school without any aptitude test other than scholastic, and that more than half of those entering are dropped or change their minds about continuing, before the four years in college are finished, it is rather surprising that as many as 70 per cent of the graduates survive five years' competition in the profession. Or, if we hold to the somewhat old-fashioned notion that advanced education is to broaden a man's mentality, to enable him to solve easier the problems he meets, to make him a better citizen, and to help him to get more satisfaction out of life, then we can be thankful that engineering education has not yet become so highly specialized and so like a trade school that the engineers are unable to turn their hands to other work when they find that engineering does not hold the expected rewards.

Put in other words, part of the men who drift out of engineering are failures as engineers. They ought never to have been admitted to a scientific school. Another part are open-eyed enough to see opportunities in other walks of life and flexible enough in mind and habits to make a change. The first classification should be reduced to the smallest possible figure. The second classification should increase, rather than decrease. It would tone up the body politic.

Much more pertinent data on the status of the engineer can be found in figures comparing salaries of various occupations. In New York City, for instance, the average pay of engineers in municipal departments is less than that of teachers or mechanics, and hardly half that of men in the law. Furthermore, the United States Census shows that from 1910 to 1920, while the population was gaining only 15 per cent, the number of engineers increased 52 per cent. In the same period the legal profession increased only 7 per cent and the building trades *decreased* 23 per cent. No wonder plasterers and bricklayers get the wages!

But even after discounting the figures by the number of low-grade draftsmen and engineering assistants undoubtedly included (even though their duties require no very advanced training), they reinforce the conclusion that engineering societies and schools would do well to follow the lead set by their professional brothers, the doctors and lawyers, and their unionized mechanics —namely, regulation of the number of apprentices. If entering freshmen students could be weeded out by more searching entrance test, both mental and physical, it would save an enormous amount of misspent energy on the part of those foredoomed to failure in engineering.

Such a plan would doubtless be resisted by certain so-called educators. But because it attacks the trouble at its roots it would be the quickest and best solution—far better than the palliative of licensing and of stiff professional qualifications to start out a few elect from a horde of misfit graduates.

Correspondence

To the Editor: I think the able paper of Eugene P. Thomas, in THE IRON AGE of May 10, should go far toward proving to the uninitiated that it is not criminal or un-American to purchase a foreign-made product.

No one can question that we are equipped to produce considerably more than we consume, and a really healthy condition of business, where all who want to work can find employment, cannot be brought about until we find markets abroad to take care of that surplus we cannot utilize.

As Mr. Thomas states, "if we want a growing export business, we must continue to buy from abroad, as Europe must sell to us if she is to have money to buy from us."

I commend the article on this subject on page 1309. Too many of the speakers on public platforms who advocate the discontinuance of purchases of foreign-made goods apparently do not realize the harm they are doing to real prosperity here.

GILBERT J. MACQUARRIE.

Boston, May 10.

P. L. & W. HEARINGS BEGIN

Proposed Extension Would Link Youngstown District with Ohio River

WASHINGTON, May 15.—Hearings were begun yesterday before C. V. Burnside, assistant director of traffic of the Interstate Commerce Commission, on the application of the Pittsburgh, Lisbon & Western Railroad to build two branches, totaling 41 miles, which would connect the Youngstown district with the Ohio River. The hearings also include the application of the Montour Railroad, a subsidiary of the Pittsburgh Coal Co., to acquire the outstanding capital stock of the Pittsburgh, Lisbon & Western. The Pennsylvania, Baltimore & Ohio and Pittsburgh & Lake Erie railroads are opposing the project, while it is being supported by the Youngstown Chamber of Commerce and steel companies in the Youngstown district.

Would Haul Coal from Pennsylvania and Steel from Youngstown

One proposed branch would extend from Smith's Ferry, Pa., on the Ohio River, to the present line of the P. L. & W. at Negley, Ohio, and the other from Mill Rock, Ohio, on the Present P. L. & W. to Youngstown and Struthers, Ohio. H. J. German, president of the Montour Railroad, describing the plans in detail, said it is contemplated to make more effective use of the Government's development of the Ohio River system, including the Allegheny and the Monongahela. It is proposed that the coal of western Pennsylvania will be moved down the river by barge to Smith's Ferry, there transferred to the projected railroad and moved into the steel manufacturing district of Youngstown and vicinity. The same railroad line, he pointed out, would then permit the movement of the steel products of the Youngstown territory back to the river for movement into the South and Southwest. The investment, it was stated, would be about $8,000,000. It was declared that the plan, if consummated, would better enable the steel manufacturers of the affected territory to compete in the markets of the South and Southwest and also allow greater use of the river for Pittsburgh district coal. Also, it was said, the new road would open up the intermediate territory, where there is situated an extensive clay producing district, the present chief market of which is the Youngstown district. Although only 25 miles from Youngstown, it was stated, this district has to ship by a two-line haul in order to reach that city.

Would Greatly Increase Coal Movements

Mr. German said that in the third year it is expected that the P. L. & W., with the new branches, will haul 2,500,000 tons of coal, as against 500,000 tons at present, and that in the fifth year the total will be 3,000,000 tons. It was estimated it would handle 1,000,000 tons of additional traffic, that the average haul would be 37.5 miles and the average rate 60c. per ton. Among large tonnages of coal that would be hauled, aside from shipments by the Pittsburgh Coal Co., it was said, is coal along the Monongahela River belonging to the Youngstown Sheet & Tube Co. The reserves of this company, it was stated, are estimated to be sufficient to last for 40 years. Reserves of the Pittsburgh Coal Co. were estimated to be enough for 50 years. It was stated that the Youngstown Sheet & Tube Co. now uses 1,500,000 tons of coal annually from along the Monongahela River, while the total coal requirements of the Youngstown district were placed at 8,000,000 tons yearly.

Simplified List of Metal Packages

WASHINGTON, May 15.—Five sizes of metal packages and one size of iron drums were approved of a list of 10 determined upon at a simplified practice conference here relating to containers for vegetable containers. The meeting was under the auspices of the Division of Simplified Practice, Department of Commerce, and was attended by manufacturers, distributers and organized users. The conference named Sept. 1, 1928, as the effective date for new production of containers under the approved recommendation, allowing until Jan. 1, 1929, for disposition of present stocks. The approved list follows: Iron drums, 110 lb.; metal packages, 45 lb., 16 lb., 8 lb., 4 lb., and 2 lb.

Second National Fuels Meeting in September

The second national fuels meeting will be held in Cleveland, Sept. 17-20. The fuels division of the American Society of Mechanical Engineers is planning a broad selection of subjects and speakers. Participation is not limited to the membership of the society.

COMING MEETINGS

May

American Foundrymen's Association. May 14 to 18. Annual meeting and exhibition, Commercial Museum, Philadelphia. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

American Steel and Heavy Hardware Association. May 22 to 24. Nineteenth annual convention, Copley-Plaza Hotel, Boston. Benjamin R. Sackett, 503 Arch Street, Philadelphia, secretary.

Associated Machine Tool Dealers. May 23 to 25. Annual meeting, Granville, Ohio. E. P. Essley, E. L. Essley Machinery Co., Chicago, secretary.

American Iron and Steel Institute. May 25. Annual meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

National Association of Purchasing Agents. May 28 to 31. Inform-A-Show and thirteenth annual meeting, Muelenbach Hotel, Kansas City, Mo. George A. Renard, 11 Park Place, New York, secretary.

June

American Association of Engineers. June 4 to 6. Annual meeting, Hotel Hussman, El Paso, Tex. M. E. McIver, 63 East Adams Street, Chicago, secretary.

American Management Association. June 6 to 8. Production executives' conference, Hotel Statler, Buffalo. W. J. Donald, 20 Vesey Street, New York, managing director.

American Society of Mechanical Engineers. June 14 to 16. Oil and gas power division, Pennsylvania State College, State College, Pa. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Railway Association. June 20 to 27. Mechanical division, Million Dollar Pier, Atlantic City, N. J. V. R. Hawthorne, 30 Vesey Street, New York, secretary.

Association of Iron and Steel Electrical Engineers. June 25 to 29. Annual meeting, Stevens Hotel, Chicago. J. F. Kelly, 513 Empire Building, Pittsburgh, secretary.

American Society for Testing Materials. June 25 to 29. Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

Society of Automotive Engineers. June 26 to 29. Summer meeting, Chateau Frontenac, Quebec, Canada. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

Iron and Steel Markets

Steel Buying Again Hand-to-Mouth

New Business Light, But Liberal Specifying Sustains Mill Output—Automobile Production Undiminished —Pig Iron Drops 50c. at Chicago

HAND-TO-MOUTH buying again prevails in the steel industry, following several months during which advancing prices encouraged forward contracting. The April decline of 463,000 tons in the unfilled orders of the Steel Corporation caused little surprise in the trade. It was recognized that strictly new business was light, since the latter part of March brought out heavy specifications, as well as the acceptance of liberal extensions of first quarter contracts.

Unfilled tonnage, to a large extent, measures the willingness of consumers to buy ahead, and, since the current price situation offers no incentive for unusual commitments, further sharp reductions in the total may occur without indicating proportionate declines in consumption. Even with the large drop in April, unfilled orders of the Steel Corporation were still 12 per cent higher than on April 30, 1927, and slightly above the level of two years ago.

The reduction of mill backlogs is commencing to cause some concern, but, to date, shipping orders, consisting principally of specifications against contracts, have sustained production at a virtually unchanged rate. The average for Steel Corporation plants has dipped only slightly under the 90 per cent operations maintained through most of the first third of the year. The rate of the leading Eastern steel company has actually shown a gain since April, now standing at well above 80 per cent of capacity. In the Chicago district, where output remains on a 95 per cent basis, specifications are the best in five weeks and sales, in contrast with reports from other market centers, are equal to shipments. Ingot production in the Greater Pittsburgh area continues at an 80 per cent rate.

New business in finished steel in most markets has been too light to give prices a severe test. Hot-rolled strip steel, particularly the wide material, has shown further weakness, selling as low as 1.75c., Pittsburgh, for 6-in. and wider, or $1 below the recent minimum. Pig iron prices also lack buoyancy, and in the Chicago district have declined 50c. a ton to $18, furnace.

The automotive industry remains a leading outlet for steel, specifying at an undiminished rate. Motor car builders with two or three exceptions have made no reduction in output, and present indications are that there will be no seasonal slowing down of operations before June 15. Some of the automobile companies have placed steel for their July production, and the Ford Motor Co. is taking an increasing tonnage of automobile body sheets, at the same time placing liberal orders for long ternes.

A good movement of metal furniture sheets, especially to builders of electrical refrigerators, emphasizes the support steel production receives from the minor, unclassified consuming lines.

Tin plate production is virtually at capacity, and optimistic expressions by can makers point to a good summer operation of mills. Output for the first half of this year will be much better than had been expected, since container manufacturers lately have added to their original specifications.

A late spring has delayed the movement of wire products into consumption, and distributers are still rather heavily stocked with material shipped by the mills in the first third of the year. Cleveland jobbers have reduced nail prices 10c. per keg for stock shipment and to $2.65, Cleveland, for mill shipment, the latter being the same price that most producers are quoting.

Water delivery of steel is a factor of growing importance on the Great Lakes. A Buffalo steel plant has inaugurated weekly boat shipments to Chicago.

The reduction of 50c. a ton on foundry and malleable pig iron by Chicago producers follows the invasion of that market by Lake Erie iron, shipped by boat and offered at Lake Michigan ports at $18, dock. Two cargoes totaling 3000 tons have already arrived at Chicago, and a third boat is on the way. Shipments will also be made from Buffalo to lower Lake Michigan.

Sales of foundry iron have been fairly large in some markets, totaling 19,000 tons at New York, 14,500 tons at Cleveland and 9000 tons at Cincinnati. In some measure this buying represents the interest of consumers in third quarter requirements. A noteworthy feature is that there is no slowing down in the demand for pig iron from the automobile industry. The American Rolling Mill Co. is inquiring for 25,000 tons of basic iron for its Butler, Pa., works. An unusual transaction was the exchange of 10,000 tons of pig iron by an eastern Pennsylvania maker for New Jersey ore of equivalent value to be furnished by a cast iron pipe company.

Ferromanganese has been advanced $5 a ton to $105, seaboard, by domestic producers and importers of English alloy. The new price applies on business for the remainder of the first half as well as for second half, but there was liberal coverage prior to the advance and it may not become fully effective for some time.

Copper producers have advanced prices ⅛c. per lb. to 14.37½c., delivered, following a week of heavy buying in which consumers took fully 37,500 tons.

THE IRON AGE composite price for pig iron has declined to $17.42 a ton, displacing last week's $17.50 as the year's low figure. The finished steel composite is unchanged at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 15, 1928	May 8, 1928	Apr. 17, 1928	May 17, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.19	19.19	19.69	21.69
No. 2, Birmingham	15.50	15.50	16.00	18.00
No. 2 foundry, Chicago*	*18.00*	18.50	18.50	20.00
Basic, del'd eastern Pa	19.00	19.00	19.50	20.75
Basic, Valley furnace	16.50	16.50	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	*18.00*	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18,51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	**105.00**	100.00	100.00	95.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 15, 1928 Cents	May 8, 1928 Cents	Apr. 17, 1928 Cents	May 17, 1927 Cents
Sheets, black, No. 24, P'gh	2.70	2.70	2.80	2.90
Sheets, black, No. 24, Chicago dist. mill	*2.80*	2.85	3.00	3.10
Sheets, galv., No. 24, P'gh	3.60	3.60	3.65	3.75
Sheets, galv. No. 24, Chicago dist. mill	3.70	3.70	3.85	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.10	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.20	2.35
Wire nails, Pittsburgh	2.55	2.55	2.65	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$15.50	$15.50	$15.50	$15.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go.	13.00	13.00	12.50	12.25
Carwheels, Chicago	13.50	13.50	13.50	14.25
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	16.00
No. 1 RR. wrot. Phila	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	**11.75**	11.50	11.50	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.37½**	14.25	14.25	13.12½
Electrolytic copper, refinery	**14.12½**	14.00	14.12½	12.75
Zinc, St. Louis	**6.05**	5.95	5.75	6.00
Zinc, New York	**6.40**	6.30	6.10	6.35
Lead, St. Louis	6.00	6.00	6.00	6.30
Lead, New York	6.10	6.10	6.10	6.65
Tin (Straits), New York	**52.50**	51.37½	52.75	67.00
Antimony (Asiatic), N. Y.	11.25	11.25	10.25	12.50

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Backlogs Being Steadily Reduced But Operations Remain High

PITTSBURGH, May 15.—Steel consumers continue to take shipments against old orders very steadily, and, while backlogs are being steadily reduced because new demands are moderate, steel works and rolling mill operations remain well up to the recent rate.

The automotive industry continues the largest single outlet for steel, and the products going into motor vehicles still are making the best showing in mill shipments. The oil industry is providing comparatively little tonnage and disappointment is expressed that railroad demands are not yet showing any measurable increase. The engagement of structural mills is heavier on account of old than new bookings. Tin plate demands are still very heavy and the showing of this product for the first half of the year will be much better than was expected earlier in the year, as in the past three or four weeks can makers have added to their original specifications.

There seems to be very little variation from year to year in the requirements of miscellaneous consuming industries; the fact that the steel industry as a whole is making so favorable a record probably is owing in no small measure to the sustained demand from the unclassified consuming sources, a notable one of which is the electrical refrigerator industry.

Ingot production for this and nearby districts still may be said to approximate 80 per cent of capacity. The steep decline in the unfilled obligations of the Steel Corporation in April occasions little surprise here, since it was pretty well understood that new business was light in April, following the acceptance of much additional business on first quarter contracts, and that the liberal specifications of late March against earlier contracts were responsible for the high rate of plant engagement. The experience of the independent companies has not been much different from that of the Steel Corporation. A lower rate of production seems likely before the end of the month, unless there suddenly develops a demand of size from some source that will change the present condition of shipments being in excess of new orders.

Sheet prices do not seem to have stopped declining, but new buying is so scant that it does not furnish much of a test of prices in general, and the market as a whole is quotable at the levels of a week ago.

The price of ferromanganese has been advanced $5 a ton, but this step appears to have been preceded by acceptance of additional business at the first half price. The effectiveness of the advance is probably delayed until well into the third quarter of the year.

Except for one good-sized inquiry for basic grade, the pig iron market continues lifeless.

Pig Iron.—The American Rolling Mill Co. is taking prices on 25,000 tons of basic iron for shipment to its Butler, Pa., works. Except for this inquiry, the market is as dull as it has been at any time recently. Sales are of one to two carloads, and at the prices that have ruled for some time. The large melters are well covered by contracts; some of them have supplies sufficient to carry them well into the third quarter. Steel foundries serving the railroads have very little business and are very sparing buyers, not only of pig iron but all other raw materials.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—One producer of ferromanganese announced an advance of $5 a ton effective May 10, applying on new spot business and last half contracts, and other makers have since followed. It is early for a test of the new price, since very few consumers are not under contract until the end of June, and it is believed there was acceptance of additional business at $100, a day or two before the announcement of the advance. Most contracts are upon a requirement basis and, no doubt, specifications for June and July shipment will be heavy. Actual requirements are lighter, in keeping with the fact that ingot production is no longer being pushed to the limit. Users of spiegeleisen are pretty well under contract for the remainder of the year, and the arrangement in high content ferrosilicon is on annual basis.

Semi-Finished Steel.—A northern Ohio producer of sheet bars has taken a firmer attitude on prices for third quarter contracts, but makers here and in Youngstown, not having recognized lower prices made by the former, have no occasion to change their quotations at this time. The open market quotation for some time has been $34, Pittsburgh or Youngstown, and now it is $34, Cleveland, instead of $33, previously. Business no longer is subject to competitive bidding, and the compensation is in the flexibility of the private arrangements both as to duration and prices. It is not believed that much tonnage actually moves at the full public quotations. Tin mill operations are still high and the tin bar requirements are in keeping, but tapering sheet mill operations mean lighter specifications for sheet bars. There is still fairly active specifying for billets and slabs. Most of the movement of wire rods is at prices below what makers now ask, but there are a few releases against $44 contracts.

Bars, Plates and Shapes.—While strictly new business in these products does not amount to much, it is sufficient, with specifications against old orders, to provide a fairly large total and to restrain selling pressure. Little business is being done at more than 1.85c., base Pittsburgh, and that appears to be the top and bottom of the market, since there is very little difference in size between the releases of large users and the purchases of the small-lot consumers. A very fair amount of plate tonnage is appearing in river barge orders. Bar requirements are decreasing, and new fabricated steel business is quiet.

Rails and Track Supplies.—Business is only moderately active, but the action of the Northern railroads in reducing Lake coal freight rates 20c. a ton until Dec. 1 is expected to mean considerable Lake coal business for western Pennsylvania and southern Ohio mines, and probably forecasts heavier operations and a larger demand for light-section rails and small spikes, which have been very quiet in the past few months. Heavy deliveries of standard-section rails contributed to the big decrease in the unfilled orders of the Steel Corporation last month.

Wire Products.—The market is quiet. A late spring has somewhat deferred the movement into consumption and, as there were heavy shipments over the first four months of the year, distributers still are rather heavily stocked. Good weather will probably mean fresh demands upon the mills, but in the meantime prices now quoted, which are $2 a ton higher than those of the first quarter of the year, are largely untested. Larger producers are quoting nails at $2.65 base, per keg, Pittsburgh, and are insisting on that price, but there is considerable resistance to that quotation and producers lacking backlog business are quoting as low as $2.55 to secure orders. Consumers of plain wire in many instances were given permission to specify April and May requirements on first quarter contracts.

Tubular Goods.—The market generally is quiet, even sales of standard-weight pipe having slipped as a result of the fact that jobbers took advantage of the chance to specify for a month's supply before the advance of April 2 became effective and are now fairly heavily stocked. No improvement is noted in the demand for lap-welded pipe for oil country use, and pipe line orders are not reaching the mills in volume.

Sheets.—There is a fairly good volume of business in sheets, but seemingly it is not heavy enough to strengthen prices on the ordinary finishes. On black sheets 2.70c., base Pittsburgh, is fairly common and, while there are occasional sales as high as 2.85c., the small-lot buyer seldom has to go beyond 2.80c. Galvanized sheets generally are bringing 3.60c., but business is reported at above and below that figure. Blue annealed sheets still are quoted at 2c. and 2.10c. Automobile body sheets are firm at 4c., and the movement is good, with the Ford Motor Co. increasing its takings and also buying a good tonnage of long ternes for gasoline tanks. Metal furniture sheets also are moving well, a particularly strong demand being noted from the builders of electrical refrigerator cabinets.

Tin Plate.—Container manufacturers are taking shipments freely, and there are a few cases where they have exceeded their first half contract tonnages. Tin plate output remains substantially at plant capacity, and can makers talk so optimistically of the prospect that a good summer operation of the mills is looked for. No formal announcement of the price for last half tonnages is likely, but large consumers understand that the present price of $5.25 per base box, Pittsburgh, will be continued.

Cold-Finished Steel Bars.—Individual orders are small, but they are numerous and coming in steadily. There is no change in prices.

THE IRON AGE Composite Prices

Finished Steel

May 15, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.362c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 15, 1928, $17.42 a Gross Ton

One week ago	$17.50
One month ago	17.67
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.42,	May 15
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.05c. to 2.10c.
6 in. and wider, P'gh	*1.80c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.25c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.90c.
No. 24, del'd Cleveland	2.84c. to 2.94c.
No. 24, del'd Philadelphia	3.02c. to 3.12c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.80c.
No. 24, del'd Cleveland	3.64c. to 3.84c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

S.A.E. Series Numbers		*Per* 100 *Lb.*
2000	(½% Nickel)	$2.90
2100	(1½% Nickel)	3.20
2300	(3½% Nickel)	4.15
2500	(5% Nickel)	4.90
3100	Nickel Chromium	3.20
3200	Nickel Chromium	3.65
3300	Nickel Chromium	6.45
3400	Nickel Chromium	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100	Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100	Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100	Chromium Spring Steel	2.85
6100	Chromium Vanadium Bars	3.85
6100	Chromium Vanadium Spring Steel	3.60
9250	Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium		4.15
Carbon Vanadium		3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	18
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	18
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Hot-Rolled Flats.—The market is holding very firmly on cooperage stock and is making a good showing as to prices on strips 6 in. and narrower, as most makers are well sold up on narrow material and are not particularly anxious for more business. Some makers find that price weakness exists principally in material wider than 12 in., where sheet and plate competition comes into play. Good releases are coming out against contracts, but strictly new orders are few.

Cold-Rolled Strips.—Specifications against contracts are good, but makers are not being asked to quote on many new inquiries, and order books are beginning to decline. The tonnage buyers are getting shipments at 3c. base (1 to 3 tons), while 3.15c. is the ruling small-lot base price.

Bolts, Nuts and Rivets.—Demand is steady, but is off somewhat in volume from that of last month and the month before. Prices are firm.

Coke and Coal.—Interest centers in the effect upon the coal market of the recently announced voluntary reduction by Northern railroads of 20c. a ton on coal moving to the Lake trade. This rate cut, which will become effective about the middle of June, restores the differential of 45c. between rates on Northern and Southern coal. It is expected to stimulate the market for western Pennsylvania coal and will probably mean more for the non-union mines than those formerly operated under agreements with the union, as it is generally believed that much difficulty would attend the starting of the former union mines. It is also believed that there will be coal enough and no material advance in prices. The market in both coal and coke still is very dull and prices do not show much strength. Spot furnace coke ranges from $2.50 to $2.75, but standard furnace fuel is not selling under $2.65. Spot foundry coke is quoted from $3.50 to $4.85, the latter for so-called premium brands, which recently were priced at $5.10.

Old Material.—Heavy melting steel this week ranges from $15 to $16, and scrap rails also are quotable up to $16. The steel and rails in the May list of the Baltimore & Ohio Railroad went on a direct bid to the same steel company here which took the offerings of those grades from that road's April list. The price was $15.85 to the road, while the buyer had to pay 15c. a ton additional freight from the nearest Baltimore & Ohio point to its plant. The $15 price is based on a good-sized sale to another Pittsburgh district mill, and there have been sales into consumption at another point at $15.25. Compressed sheets appear to be slightly easier, and $15 is all that now can be obtained for them in this district; supplies still are scant, but wants are smaller. The Ford Motor Co. last week sold 3000 tons of this grade at $11.10, Detroit, to a Buffalo melter. Machine shop turnings are a little stronger. There is no life to the demand for foundry grades, but short rails are stronger because of the higher prices ruling for uncut ones.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.00 to $16.00
Scrap rails	15.25 to 16.00
Compressed sheet steel	15.00
Bundled sheets, sides and ends	14.00
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	16.00 to 16.50
Heavy breakable cast	13.00
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50 to 10.75
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 12.00
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	16.00 to 16.50
Malleable Grades:	
Railroad	15.00 to 16.00
Industrial	14.50 to 15.50
Agricultural	14.00 to 15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

REINFORCING STEEL

Awards of 4000 Tons—1400 Tons in New Projects

AWARDS of only 4000 tons reported in the last week included no jobs of outstanding size. New projects amounted to less than 1400 tons. Awards follow:

STATE OF NEW HAMPSHIRE, 300 tons of road mesh, to American Steel & Wire Co. and Truscon Steel Co.

CHICAGO, 165 tons, Willoughby Tower Building, to Concrete Engineering Co.

CHICAGO, 125 tons of rail steel, packing plant, to Calumet Steel Co.

CHICAGO, 850 tons, approaches to Crawford Avenue Bridge, to Barton Spiderweb System.

CHICAGO, 140 tons of rail steel, Temple Sholem, to Inland Steel Co.

CHICAGO, 700 tons of rail steel, apartment building, from Wahl Construction Co., general contractors, to Inland Steel Co.

CHICAGO, 500 tons, building for General Tire & Rubber Co., to an unnamed bidder.

CHICAGO, 100 tons, Ogden National Bank Building, to Olney J. Dean & Co.

STATE OF ILLINOIS, 300 tons of rail steel, road work, to Calumet Steel Co.

ST. LOUIS, 445 tons, 220 tons for apartment house at 4615 Lindell Boulevard and 225 tons for garage at Seventh and Morgan Streets, to Laclede Steel Co.

NASHVILLE, TENN., 120 tons, Victor Chemical Works plant, to Connors Steel Co.

ELLENSBURG, WASH., 270 tons, Kittitas Division of Yakima Project for United States Bureau of Reclamation, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

WORCESTER, MASS., 400 tons, telephone building.

NEW YORK, 200 tons, Pier No. 3, North River.

PHILADELPHIA, 125 tons, North Broad Street station for Reading Railroad; bids in.

CHICAGO, tonnage not stated, reconstruction of Fine Arts Building in Jackson Park.

EUGENE, ORE., 450 tons, penstock, dam and power house; bids June 5.

SEATTLE, 200 tons, Stimson Building; bids being taken.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.05 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 *f.o.b. Works* First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex, head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Best in Five Weeks—Foundry Pig Iron Reduced 50c.

CHICAGO, May 15.—Specifications for finished steel products are the best in five weeks and sales in the past seven days are fully equal to shipments and are on a par with the average in the closing weeks of April. Early in the spring the delivery situation and general business conditions led consumers to anticipate requirements beyond what had been their custom, but as the summer months approach there is a growing tendency to order in smaller lots. Steel mill output in practically all departments, sheets being an exception, remains steady. Although backlogs continue to dwindle, it is rather commonly believed by producers that the steel business enters the end of the fifth month in a stronger position than in any like period since 1923. Changes in blast furnace operation are only a matter of readjustment, there still being 28 out of 36 steel company stacks in blast in this district. No. 12 furnace was blown in at Gary on May 9 and No. 7 was taken out of service at South Works on May 12. The leading producer is now operating 11 furnaces at Gary, eight at South Works and one at Joliet. Chicago merchant iron has been reduced 50c. a ton.

Price concessions in finished steel are less common except in narrow plates. Competition for hot mill products is unusually keen, not alone among sheet makers but also with producers of strip sheets.

Pig Iron.—Producers of Northern foundry iron have reduced prices to $18, f.o.b. local furnaces, for the No. 2 grade. This change comes at a time when purchases are slow and iron is moving here by boat from Lake Erie ports. Two cargoes, about 3000 tons, have already been unloaded and a third boat is due to arrive before the end of the week. Shipments from Buffalo also are under way. Deliveries are steady and well ahead of production, which is now confined to three merchant stacks in the immediate Chicago territory. Southern iron sold locally brings $21.51 when shipped by all-rail and $20.68 when delivered by rail and barge. Scattered carload orders for charcoal iron bring $24, furnace, or $27.04, delivered, Chicago. The silvery market is quiet.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	21.51
Southern No. 2 (barge and rail)	20.68
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The local ferromanganese market has been active both in anticipation of and following an advance in price of $5 a ton. Chicago delivered prices are now $112.56. New prices have no bearing on old contracts, which expire June 30, and new agreements protect buyers against a drop in prices in the second half. A tonnage sale of 19 to 21 per cent spiegeleisen has been made at $30, Hazard, Pa. Small lots bring $32.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—Orders for oil storage tankage plates again play an important part in the Chicago market. A Texas producer of petroleum products has purchased 6000 tons to be fabricated in a Chicago shop. Two oil refiners, one in Louisiana and one in Texas, have come into the market for a total of 8000 tons. Bids will be opened June 1 in Denver, Colo., on a water pipe project requiring close to 12,000 tons, and the general contract has been awarded for a similar project at Oklahoma City, Okla., taking about 3000 tons. The railroad equipment market is quiet. Ten gas-electric cars have been placed by the Chicago, Burlington & Quincy. Large producers of plates in this district are well engaged, and as a general rule rolling schedules are satisfactory, but several mills of small capacity, and whose product usually runs to narrow widths, appear to be anxious to take business and are offering concessions in prices. As low as 1.90c., Chicago, has been named on a few scattered lots. However, 2c. is the ruling price, even in territory to the east, which for several weeks has shown unstable tendencies.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—At one source it is estimated that fully 100 projects tributary to local mills are pending and will require more than 1000 tons each, the aggregate being close to 200,000 tons. Probably a fair share of this, however, is of a speculative nature, and, if it does eventually go through, rolling and fabrication will be spread over many months. Outstanding among local awards is 1700 tons for a lift bridge across the Chicago River for the Baltimore & Ohio Railroad. Fresh inquiry is moderate in size and is well scattered over the Middle West. Swift & Co. will soon buy 600 tons for an office building at Kansas City, Mo., and the Interstate Iron & Steel Co., Chicago, will take 600 tons for an addition to a billet mill. Keen competition among fabricators continues to hold prices at low levels. On special jobs it is not uncommon for shops to solicit and get aid from steel producers in the form of price concessions. These same fabricators, in buying for stock or against less desirable jobs, commonly pay 2c., Chicago.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Of interest in this market is an acceleration of buying, so that new bookings in mild steel bars are practically equal to shipments. The character of purchases is changing toward smaller lots and for the earliest possible delivery. In some instances it develops that users have fair stocks, and current orders are mostly to round out the sizes of bars on hand. Specifications from cold-drawn bar manufacturers are heavy, and warehouses are taking a larger part of the output. Notwithstanding reports of recessions in automobile manufacturing, this week has witnessed rather a sharp increase in demand for bars from that industry, forgers particularly being in need of additional stock. Farm implement plant requirements are lower, but there is evidence that these manufacturers will not hesitate to round out stocks in anticipation that as soon as the inventory period, about June 1, is over they will swing into near-capacity output. Less uneasiness is noticed in soft steel bar prices, it being evident that competition from the East is less active. The iron bar market is quiet both in sales and specifications. Prices are steady at 2c., Chicago. Alloy bar mills are engaged at close to capacity, and price schedules are holding at the levels recently established. As gaged by orders to Chicago district alloy bar mills, there is little or no change in the rate of automobile output. New sales in rail steel bars have brought a substantial volume of business to local mills; specifications, after lagging for several weeks, have again jumped a trifle ahead of shipments. Reinforcing bar requirements are large, but fair tonnages are also going to barn equipment makers and manufacturers of farm machinery. Prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Cast Iron Pipe.—Conditions are somewhat improved in the local cast iron pipe market. Price advances put in effect a week or 10 days ago are holding. In fact, in the last few days a number of small sales have been closed at prices that were well above $33, Birmingham. Large inquiries are not numerous, but there is a more lively interest shown over a wider territory. The National Cast Iron Pipe Co. has taken 600 tons of 6 to 12-in. centrifugal pipe for Dearborn, Mich. Among the larger inquiries are 2500 tons of 6 to 24-in. class C pipe for Roseville, Mich., and 1100 tons 6 to 16-in. pipe for St. Paul, Minn. Chicago will buy a round tonnage of 6 to 12-in. offsets and on May 22 will take bids on 225 tons of 16-in. class C pipe. Milwaukee, Detroit and Durbin, W. Va., are in the market for tonnages that range from 100 to 200 tons each. Contractors in the Chicago area are busy, and the trade expects that fresh inquiry in good volume will soon be forthcoming from that source. Pipe foundries are reported moderately busy. Deliveries range from 30 to 45 days on most sizes.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

Rails and Track Supplies.—Several miscellaneous lots of standard-section rails have added 3000 tons to makers' books. Reports in this district are mixed as to the extent of or the possibilities of a secondary buying movement. In some quarters doubt is expressed that the railroads as a general rule will even go as far as to specify fully against options taken last fall and winter. Scattered orders for track accessories total 3000 tons. Inquiry is dull. Chicago rail mills continue to produce at close to 90 per cent of capacity, and track supply departments are operating in like proportion. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—New business is in small volume. Local mills are operating at about 60 per cent of capacity. Lack of sheet business does not indicate an unusual slackness in industries that use this commodity, as it is evident that stocks are large, though possibly not well rounded out, and that current orders are merely to hold consumers' stocks in a balanced condition. Competition by strip sheet manufacturers is keener in a few gages and widths.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.95c.; No. 24 galvanized, 3.75c. to 3.85c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—Of special interest in this market is the announcement that reinforcing bar warehouses in Chicago will handle rail steel reinforcing bars on a price schedule $6 a ton below that which has been set for the billet bar commodity. Prices for rail steel reinforcing bars for road work will remain at 1.85c., Chicago Heights, and 1.95c. on bridges. On building work the schedule will be 2c. for 18 tons or more, 2.30c. for 5 tons up to 18 tons and 2.70c. for less than 5 tons. Outstanding among new awards are 700 tons of rail steel bars for an apartment building in Chicago and 850 tons of new billet reinforcing bars for the approaches to the Crawford Avenue bridge. Illinois State roadwork awards remain active, the total placed this week being close to 300 tons. Fresh inquiry is a bit more sluggish than a week ago, but there still remains a sizable tonnage of projects against which dealers are bidding. Recent awards and new inquiries are given on page 1420.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c. to 2.40c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Bolts, Nuts and Rivets.—For the second week specifications have shrunk from the average that was maintained during the early spring. Shipping orders are of fair size. Output is still at close to 60 per cent. Spot sales are in small volume, but are at the full prices.

Wire Products.—Reports from the jobbing trade to the East and in the Missouri River Valley are spotty, but to the South and in the Northwest new business and shipments are steady. A substantial volume of woven wire fencing is moving to dealers. Orders for staples are light because of the fact that steel posts are coming into more common usage. Little is known of the agricultural outlook for 1928 for the reason that in most parts of the country planting has been from 15 to 40 days late. Nails are moving very slowly in this market and there has been little or no business of a character that would test prices. Orders from the manufacturing trade are steady.

Coke.—Shipments of by-product foundry coke are steady and average close to the April rate. Prices are firm at $9, local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—The scrap market is marking time in all phases except shipments, which are still heavy. Mills are well supplied with heavy melting steel. A mill has taken a tonnage of bundled sheets at a reported delivered price of $11.75 a gross ton. A melter has purchased rolled steel wheels at $16 a gross ton, delivered. Railroad shipments are heavy. There is a tendency among some of the larger rail systems to issue more frequent and smaller lists. The Rock Island will sell 7000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.75 to 17.25
Railroad leaf springs, cut apart	16.75 to 17.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.	15.25 to 15.75
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Prices of Shapes and Black Sheets Lower —Pig Iron Exchanged for Ore

PHILADELPHIA, May 15.—Steel prices still show a lack of stability, but in eastern Pennsylvania, except on shapes, recessions have been less decided than in other districts. Transactions in shapes are reported at less than 2c. per lb., delivered Philadelphia, but 2.06c. to 2.13c. per lb., delivered, is the usual range of the market. Plate and bar prices in this district have apparently not gone below 2c., Coatesville, on plates and 1.85c., Pittsburgh, on bars.

While there is still a fair tonnage of fabricated steel business, much of the tonnage being placed is in sizable projects, usually secured by the leading fabricators. Prices on fabricated steel continue to recede, and the small fabricating shops complain that current business represents a loss, despite concessions in plain material prices.

Pig iron is quiet, except for a sizable transaction between a Phillipsburg, N. J., pipe maker and the leading eastern Pennsylvania independent, involving the exchange of about 10,000 tons of foundry iron for an equivalent value in iron ore from the Wharton, N. J., mines. Iron and steel scrap is inactive, and, with a slightly lower rate of mill operations a possibility, dealers look upon price recovery as remote.

Ferromanganese.—The new price of $105 per ton, seaboard, is being quoted by both domestic makers and importers on current small-lot shipments and for third quarter and second half contracts. Thus far, consumers have manifested no interest in contracting for the remainder of the year.

Pig Iron.—Buying is still limited to small lots, in most cases for early delivery, consumers not showing much interest in third quarter commitments. A York, Pa., manufacturer has closed on a small tonnage of No. 2 and No. 2X foundry iron for early delivery from an eastern Pennsylvania furnace. No concession from $20 per ton, base, is reported in the eastern Pennsylvania price. A Phillipsburg, N. J., pipe foundry has closed for about 10,000 tons of foundry iron with the leading eastern Pennsylvania independent producer on a basis of exchange of iron ore of equivalent value from the Wharton, N. J., mines. Pressure pipe producers are fairly well covered for the present, but soil pipe plants have only small stocks of iron and may appear as buyers before long. Low phosphorus is quiet, and, with a fair tonnage on its yard to supply customers for the next few months, Chateaugay furnace is expected to go out of blast about the end of this month or early in June. The recent reduction of 50c. a ton in the price of Birmingham foundry iron is expected to result in a corresponding recession in the Virginia iron price when either of the two Virginia cast iron pipe plants enter the market. Meanwhile, on current small-lot orders the price is unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Bars.—New business is still rather limited, being confined to small tonnages, on which 1.85c. per lb. and occasionally 1.90c. per lb., Pittsburgh, or 2.17c. to 2.22c., delivered Philadelphia, usually apply. Reinforcing bar projects are in most cases small, usually being tonnages to be used in conjunction with structural steel construction.

Shapes.—Prices continue irregular, with less than 2c. per lb., delivered Philadelphia, reported on desirable specifications, although the current market is quotable at 2.06c. to 2.13c. per lb., delivered, the lower price being on the basis of 2c. per lb., Pencoyd. Fabricated steel prices still show softness, and, even at the present slightly lower level of structural steel prices, fabricators claim that there is little or no profit to be taken from most projects. Only small tonnages are included in the construction reported in this district, except for 1900 tons in a bridge at Sunbury, Pa., and about 3000 tons in a Lake Champlain bridge, both of which have been closed.

Plates.—A moderate volume of small orders is being placed, and on much of this 2.05c., Coatesville, or 2.15c., delivered Philadelphia, is being obtained, with 2c., Coatesville, or 2.10c., Philadelphia, applying on larger lots. Not much interest is shown by consumers in third quarter buying, as second quarter contracts at the present rate of consumption may carry buyers well into July, if extensions are granted. There is some plate tonnage in recent bridge projects, such as the Lake Champlain bridge, which includes about 1000 tons of plates, and the Sunbury, Pa., bridge, which takes a smaller tonnage. Although price concessions have been made in other districts, the minimum quotation of eastern Pennsylvania producers is apparently still 2c., Coatesville.

Sheets.—Local producers of blue annealed sheets are still endeavoring to maintain 2.10c. per lb., Pittsburgh, on blue annealed sheets, and on much of the present business, which seldom exceeds a carload and is often less, this price seems to apply. On more desirable business, however, 2.05c. and 2c. per lb., Pittsburgh, or 2.32c. to 2.37c., delivered Philadelphia, are being done. Black sheets still show a downward tendency, with quotations at 2.70c. to 2.75c., Pittsburgh, or 3.02c. to 3.07c., Philadelphia, and occasional sales reported on a basis of 3.65c., Pittsburgh. Galvanized sheets range from 3.60c. to 3.70c., Pittsburgh. Despite the irregularity of prices, business continues fairly good, although confined to small tonnages.

Warehouse Business.—Quantity differentials, which have been effective on bars and bar-sized shapes, have now been extended by warehouses in this district to include cold-finished steel, hoops and bands. Base prices on cold-finished material continue unchanged at 3.35c. per lb. for rounds and hexagons and 3.85c. per lb. for squares and flats, but hoops have been reduced to 3.50c. per lb., base, and bands to 3.25c. per lb., base. There is a fair volume of business, comparing favorably with the average for April.

Imports.—In the week ended May 12, a total of 2000 tons of chrome ore arrived at this port from Portuguese Africa. Pig iron arrivals totaled 750 tons, of which 447 tons was Indian and 303 tons Dutch iron. There was also ¼ ton of ferrozirconium from the United Kingdom. Steel imports consisted of 55 tons of structural shapes, 27 tons of sheets and 1 ton of hoops and bands from Germany, 62 tons of hoops and bands, 150 tons of steel bars and 299 tons of shapes from Belgium and 503 tons of bars and 65 tons of shapes from France.

Old Material.—Prices of some grades of scrap still show a downward tendency, and, in view of the possibility that the recent high rate of mill operations may not be maintained, an early recovery of prices is not looked for. One large eastern Pennsylvania consumer, which recently bought about 15,000 tons of No. 1 heavy melting steel for Steelton, Pa., at $13.50 per ton, delivered, has closed on about 5000 tons at the same price for delivery to Sparrows Point, Md. About 1000 tons of blast furnace scrap has been bought at $10.50 per ton, delivered Sparrows Point, and the consumer at Bethlehem is not expected to offer more than $10.50, Steelton, or $10, Bethlehem, on future purchases of blast furnace material. A Phoenixville, Pa., mill is taking machine shop turnings at $10.50 per ton and is offering $11 for yard steel and $11.50 for stove plate.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50 to 10.75
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	10.50 to 11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling	14.75 to 15.25
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

New York

Pig Iron Sales of 19,000 Tons—Eastern Steel Mills Operating Well

NEW YORK, May 15.—Sales of pig iron in this district, at 19,000 tons, were the largest in many weeks. A considerable portion of this tonnage was for third quarter delivery, and there is an increasing volume of inquiry for that period. Melters are taking advantage of barge or barge-and-rail shipment to a greater extent than in previous years. A New Jersey melter is reported to have bought Buffalo pig iron at delivered prices ranging from $19.25 to $19.50. Eastern Pennsylvania producers are finding it difficult to reach this section, and their quotations of $20, base furnace, are consequently largely nominal. Buffalo foundry iron continues to range from $16 to $16.50, base furnace. Eastern New York furnaces are meeting Buffalo competition. The Thatcher Co., Garwood, N. J., has placed 2000 tons of No. 2 plain for the current quarter. The Central Foundry Co., New York, has closed for 5000 tons for its Dundalk, Md., plant, of which 3000 tons is understood to have gone to a nearby furnace and 1000 tons each to eastern New York and New England producers. The A. P. Smith Mfg. Co., Bloomfield, N. J., has placed 900 tons of No. 2 plain and No. 2X for third quarter shipment. An inquiry in this district calls for 2000 tons of malleable. A New Jersey melter is still in the market for 1000 to 2000 tons of No. 1X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—Business has been very quiet in the last week with no sizable jobs reported let. Reconstruction of a pier on the North River will require 200 tons. Prices have shown no further weakness.

Finished Steel.—While specifications and orders for steel products in the first half of May have fallen below the average of April bookings, shipments are holding up at a good rate. Eastern mills are running on the average about as well as in April, and in the case of the leading Eastern steel company operations this month are larger, being above 80 per cent. Weakening prices of sheets have somewhat curtailed the volume of ordering, but business in plates, shapes and bars is fairly active. Current bookings of fabricated structural steel are in reduced volume, so that present mill activity in shapes represents largely the projects that have been placed during recent months. Sheet prices are not materially different from those in effect a week ago, except that sales of black sheets at 2.70c., Pittsburgh, have become more common and there have

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

been further sales of galvanized sheets at 3.55c. However, on the latter grade 3.60c. is more representative of a majority of the transactions. Blue annealed sheets continue at 2c. to 2.10c., Pittsburgh. The leading producers of wire nails are maintaining quotations of $2.65 per keg, base Pittsburgh, but users are having little difficulty in getting nails from some of the smaller producers at $2.55. The American Bridge Co. is low bidder on 3000 tons for a Lake Champlain bridge. The Hay Foundry & Iron Works has been awarded 2000 tons for an apartment building in New York. A Syracuse, N. Y., office building will take 2500 tons.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Orders are small, but in the aggregate represent a fair total, which is expected to compare favorably with last month. There is moderate activity in structural material, but sheet business is small and concessions are not unusual. Black sheets are quoted at 4c. per lb., base, and galvanized at 4.70c., base, but in both cases concessions range from 10c. to 20c. per 100 lb. There is also slight softness in blue annealed sheets, but concessions on this grade seldom exceed 5c. per 100 lb.

Cast Iron Pipe.—Prices continue fairly firm, with Northern makers seldom quoting below $38.60 per net ton, New York, which is sufficiently low to prevent Southern foundries from competing, as the Birmingham base is $31 per ton for sizable lots and $33 per ton for small orders, to which must be added a freight rate of $9.25 per ton to New York. Although $33, base, is generally asked by Southern pipe makers, very little business has been closed on this basis. There is some buying in New York for shipment to projects in other districts and a moderate volume of inquiry from private utility companies. Municipal business continues light, only a few small purchases being reported.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Old Material.—Prices show no strength and the market continues quiet. While brokers are apparently unwilling to contract for a substantial tonnage of stove plate at $11.50 per ton, delivered Phoenixville, Pa., carload lots are being shipped on this basis, also yard steel purchased at $10.50 and machine shop turnings at $10 and $10.25 per ton, delivered Phoenixville. Blast furnace scrap is being purchased at $10 per ton, delivered to Bethlehem, Pa., against $10.50 orders, but the consumer there is apparently now unwilling to pay more than $10 per ton. Chemical borings are being shipped to a consumer at Bound Brook, N. J., at $13.25 per ton, delivered. Stove plate to local foundries continues unchanged at $10.50 to $11 a ton, delivered.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.25 to 7.50
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.00 to 8.50
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Coke.—There is very little activity in prompt shipment coke and consumers are not yet interested in third quarter and last half contracts. Of the special brands of foundry coke, one, which has been selling at $5.10 per net ton, ovens, has been reduced 25c. per ton to $4.85. Other brands continue at $5 and $5.10 per ton. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 to $8.81 per net ton; to New York and Brooklyn, $9.44 to $9.59 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, N. J., and from $10.06 to $10.29 per ton, New York or Brooklyn.

Cleveland

Demand for Plates, Shapes and Bars Falls Off—Hot-Rolled Strips Weak

CLEVELAND, May 15.—The steel market showed evidence of slowing down during the past week. The demand for steel bars, plates and structural material fell off. There was very little new business and specifications against contracts were limited to small lots. Plate orders are especially light.

Shipments generally are in excess of orders, and unless the demand takes a turn for the better some of the mills will probably slow down operations before the end of the month. The automotive industry continues the bright spot in an otherwise dull market. Specifications from this industry are holding up to the recent volume, and the motor car builders, with two or three exceptions, have made no curtailment in operations. Some of the automobile companies have placed steel orders for July production. Present indications are that a seasonal slowing down in that industry will not occur before June 15 or later. Most of the mills that serve the automobile industry with alloy steel bars, sheets and strip steel have enough tonnage on their books to maintain present operations for two weeks or longer.

Inquiry in the structural field, while not good, shows slight improvement. Industries outside of the automotive field are maintaining recent operations.

Little change in the price situation developed during the week further than a more pronounced weakness in hot-rolled strip steel. Sheets continue weak, but are not lower than they have been. Steel bars, plates and structural material are firm at 1.85c., Pittsburgh. Local mills are maintaining 1.85c., Cleveland, on steel bars.

Iron Ore.—The market is almost devoid of inquiry. Shippers now have most of their boats in commission and the water movement during the latter half of the month will be fair. On May 1 there was 5,182,388 tons of ore on Lake Erie docks, as compared with 4,703,294 tons on the same date a year ago. Dock shipments are light; they were only 397,246 tons during April, compared with 1,150,507 tons during the same month last year.

Pig Iron.—Sales continue in moderate volume, business being about evenly divided between orders for early shipment and third quarter contracts. Cleveland interests sold 14,500 tons of foundry and malleable iron during the week. The American Rolling Mill Co. has an inquiry out for 25,000 tons of basic iron for its Butler, Pa., plant for the third quarter. This promises a test of the present $16.50 price on basic iron. Not much interest is being shown as yet in foundry and malleable iron for the third quarter. Foundries in the automotive industry are awaiting the development of the business outlook for that industry for the latter part of the year. As yet there has been no slowing down in the demand for pig iron from motor car build-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.85
No. 9 galvanized wire, per 100 lb	3.30
Common wire nails, base per keg	2.85

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*Net base, including boxing and cutting to length.

ers and allied foundries, so that May shipments are expected to about equal those of April. Prices show no change, ranging from $16.50 to $17, Lake furnace, for foundry and malleable iron. For Cleveland and Michigan delivery the price is fairly steady at $18.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fry., sil. 1.75 to 2.25	21.50
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	16.50
Standard low phos., Valley furnace	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Coke.—New demand for foundry coke is light. Prices are steady at $7.75, Painesville, for Ohio by-product coke and $3.75 to $5.10 for Connellsville grades. Small lots of Ohio by-product coke for domestic use are moving at $4.50, Valley ovens, for egg size.

Bolts, Nuts and Rivets.—The demand for bolts and nuts from the automotive industry has started to slow down. Consequently the volume of business is less than last month. Rivets are not very active. Prices are firm.

Semi-Finished Steel.—Some of the sheet mills are not running quite as well as recently, and this is reflected in a slight falling off in the demand for sheet bars. However, the leading local producer is still operating its plant at 100 per cent of capacity. A few buyers have indicated that they are willing to close third quarter contracts for sheet bars at the present price, $33, Cleveland, but mills are not quoting for that delivery and there is some talk of trying to get $1 a ton advance, or $34, for sheet bars and also for slabs and billets.

Sheets.—The demand in this territory has declined somewhat and is light both in new business and in specifications against contracts. While specifications from the automotive industry continue heavy, some of the mills need orders to maintain present operations. The market continues weak, but mills are not inclined to shade the minimum quotations that have appeared in the past two weeks. Black sheets are selling as low as 2.70c. to 2.75c., Valley mill. On galvanized sheets 3.55c., Valley mill, is a rather common quotation. Blue annealed sheets have sold at 2c., Valley, although 2.05c. is the usual minimum quotation by jobbing sheet mills and most producers are holding to 2c., Pittsburgh. While some business has been taken at 1.90c., Pittsburgh, this price, it is claimed, has been for continuous mill products. Auto body sheets are firm at 4c.

Strip Steel.—Mills continue to get a good volume of business from the Detroit territory, but the local market is dull. Prices on hot-rolled strip, particularly in wide material, are weak. Strip 12 in. and wider is selling as low as 1.75c., Pittsburgh, and some of the mills are going to about the same price on 6 to 12-in. material, or $1 a ton lower than the recent minimum prices. Strip 3 in. to 6 in. wide is around 1.95c., and on material narrower than 3 in. there is a range of from 2.10c. to 2.20c. Cold-rolled strip is commonly quoted at 2.75c., Cleveland for 3 tons and over, although some small lots are still bringing 2.90c.

Nails and Wire.—Local jobbers have reduced nail prices 10c. per keg for stock shipment and to $2.65 per keg, Cleveland, for mill shipment, or the same price that mills are quoting to most buyers in this territory. Jobbers have also reduced annealed and galvanized wire $2 per ton. They have good stocks bought before the last price advance, and these are moving rather slowly. Nail prices continue irregular in sections served by Ohio River mills.

Reinforcing Bars.—Little business or inquiry developed during the week. The only round lot pending is 800 tons for the Cleveland Union Terminals Co., which probably will go to a local mill. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—The demand for steel bars, plates and structural material is moderate, holding up to about the April volume. Aside from some irregularity in steel bars in outlying sections, prices are well maintained. Sheets are moving rather slowly.

Old Material.—The market is weak on heavy melting steel scrap, which has declined 25c. a ton. At present $13.25 is the maximum for No. 1 grade and more than is wanted is available at that price. A Cleveland consumer who is restricting shipments has made further curtailments, which is a contributing factor to the weakness on steel-making grades. Another Cleveland consumer, who seldom comes in the open market and whose specifications are exacting, purchased a small tonnage of heavy melting steel at $14, and dealers are paying $13.50 to $13.60 for scrap to meet this customer's requirements. In the Valley district dealers are paying $14.50 for heavy melting steel. Small lots of blast furnace scrap are moving at the quoted prices.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.00 to $13.25
No. 2 heavy melting steel	12.50 to 12.75
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	11.75 to 12.25
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Detroit Scrap Market Quiet and Prices Are Unchanged

DETROIT, May 15.—There have been no sales of large tonnages of scrap during the past week. Prices have shown no change.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Weirton Steel Co. Starts Another Expansion Program

Work began this week on additions and improvements to the plant of the Weirton Steel Co., Weirton, W. Va., involving an expenditure of $1,350,000. The program calls for a new 250-ton open-hearth furnace with producers; additions to the pit furnaces; a stripper building with one additional row of soaking pits and the necessary equipment; an addition to the slab yard; also changes in the 10-in. and 16-in. mills, adding materially to the productive capacity of these units.

The additional finishing capacity has made necessary the addition to the steel plant, which will bring the annual open-hearth ingot capacity to 1,200,000 gross tons in 1929. It is now 1,050,000 tons, although the March production of 103,576 tons was at an annual rate of 1,193,000 tons. In 1925 the company had a capacity of 570,000 tons annually.

John C. Williams, vice-president and general manager, and C. H. Hunt, chief engineer, have been responsible for all extensions of productive facilities the company has made, and have been the guiding hands in its transition from merely a producer of tin plate to a fully integrated steel company, having its own ore and coal mines, blast furnaces, coke ovens and steel works.

San Francisco

Improvement in Demand for Shapes, Plates and Cast Iron Pipe

San Francisco, May 12 (*By Air Mail*).—Demand for structural shapes, plates and cast iron pipe has increased during the past week or 10 days. Awards include 270 tons of bars for the Kittitas project at Ellensburg, Wash., placed with the Pacific Coast Steel Co., 360 tons of shapes for the Twentieth Century Market, Oakland, taken by Judson-Pacific Co., and 425 tons for the new A. M. Castle Co. steel warehouse in Los Angeles, obtained by the Baker Iron Works.

Pig Iron.—Importations in February were 36,596 tons at the four Pacific ports. San Francisco interests took 36,000 tons of iron ore and concentrates, all from Canada. Pig iron quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—New business placed this week, with one exception, was confined to lots ranging from 30 to 50 tons. Bids are being taken on 200 tons for the Stimson Building at Seattle, and bids have been called for, to be opened on June 4, for 450 tons for a power house and dam at Eugene, Ore. Imports of merchant and reinforcing bars in February totaled 4032 tons, compared with 1612 tons for February, 1927, and 4322 tons for January, this year. Out-of-stock prices in the bay district on reinforcing steel bars remain weak, and 2c. is being quoted.

Plates.—Several new inquiries for plates have come up for figures. The Chicago Bridge & Iron Works took 150 tons for two tanks for the Zellerbach Paper Co. at Port Townsend, Wash., and 100 tons for two tanks for the Grays Harbor Pulp & Paper Co. at Grays Harbor, Wash. Bids are to be opened next week on 1600 tons for a pipe line at Tacoma, Wash. The Birchfield Boiler Co. was low bidder on 115 tons for a pipe line for the same city. No action has yet been taken on the 700-ton inquiry for a car float for the Santa Fe. The Western Pacific is also asking for bids on a 700-ton car float. The Wildcat and Sequoia aqueduct projects, calling for 8000 tons of plates, will most likely be awarded next week. The district engineers, it is reported, are in favor of using steel-lined concrete pipe. Prices on plates are firm at 2.30c., c.i.f. Coast ports.

Shapes.—During February 2996 tons of foreign shapes were imported on the Coast as compared with 1044 tons for February, 1927. Only four awards of over 100 tons were noted this week. The Wallace Bridge & Structural Steel Co. booked 100 tons for the Bon Marche store, Seattle. C. & F. W. Steffgen, San Diego, got the general contract for 260 tons for a bridge on the Benson highway at Phoenix, Ariz. Considerable new and pending work is before the trade for figures, about 15,000 tons being involved. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is improving, although only one award of over 100 tons was reported this week. Camas, Wash., placed 152 tons of 2 to 8-in. class B pipe with C. A. Knapp of the same city. Los Angeles rejected all bids on 234 tons of 24-in. class B pipe. Bids will be opened May 23 for 1560 tons of 4 to 12-in. class B for street improvements at Oceanside, Cal. Los Angeles opened bids on 1665 tons of 6-in. class B pipe and on 1800 tons of 30 and 36-in. class B pipe for the Venice outfall sewer, the United States Cast Iron Pipe & Foundry Co. being low on the latter project. Long Beach opened bids on 417 tons of 6 and 8-in. class B and C pipe. Puyallup, Wash., will open bids on July 10 for 149 tons of 14-in. class B or centrifugal pipe. San Diego, Cal., will open bids on June 4 for 113 tons of 18-in. class B for a dredging project. Importations during February aggregated 1843 tons, compared with 4583 tons for the same month a year ago.

Standard Pipe.—Importations of tubular products during February totaled 1343 tons, compared with 1503 tons for February, 1927. The only inquiry of importance is for 193 tons of ½ to 4-in. standard pipe for Los Angeles.

Coke.—Demand for coke reflects the quiet condition prevailing in the pig iron market; sales and inquiries appear to be confined entirely to small lots. Prices are unchanged.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

St. Louis

Steel Specifications Top Those of April —Weakness in Some Scrap Items

St. Louis, May 15.—The tonnage of pig iron sold during the last week was less than that of the previous week. The sales of the St. Louis Gas & Coke Corporation totaled 3500 tons, including 1000 tons of malleable to an Illinois melter, 500 tons of malleable to a local plant and 800 tons of foundry iron to an implement manufacturer for third quarter shipment; the remainder was in lots up to 150 tons for prompt shipment. The leading Southern interest sold 600 tons for prompt shipment. The only definite inquiry pending is for 250 tons of foundry, but a number of other transactions are pending. The fact that there is considerable iron yet to be bought for third quarter shipment lends strength to the market. Prices are firm and unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of domestic grades of coke is good, considering the season. Consumers of foundry coke continue to buy of local by-product ovens as the fuel is required.

Finished Iron and Steel.—The Granite City Steel Co. reports that specifications so far this month have been in larger volume than the corresponding period in April. The company is well fortified as regards backlog tonnage in blue annealed and black sheets, tin plate and tank plate. Galvanized sheets continue slow, and prices are lower than they were a week ago, but the indications are that the demand will pick up within the next two or three weeks, when it is believed the agricultural districts will be buying. Fabricators of structural steel continue to complain of poor business.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/16-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Track Supplies.—The Missouri Pacific has purchased 1000 kegs of track spikes for its Western lines from the Colorado Fuel & Iron Co. That road is now in the market for 1000 kegs of track bolts.

Old Material.—The market for old material is weaker, and prices for heavy melting steel, heavy shoveling steel and No. 2 railroad wrought are 25c. lower. A leading East Side mill was in the market for specialties, but the prices offered were lower than dealers had expected, and the tonnages purchased were small. Some dealers believe that most of the consumers will be in the market again within the next 10 days or two weeks. Railroad lists are unusually heavy, including the following: Baltimore & Ohio, 17,880 tons; Louisville & Nashville, 16,760 tons; Chesapeake & Ohio, 10,011 tons; Wabash, 2880 tons; Southern Pacific, 2766 tons; International Great Northern, 895 tons; Texas & Pacific, 820 tons; Southern, 782 tons; Ann Arbor, 282 tons; Kansas City Southern, 239 tons; Great Northern, 90 carloads; Cotton Belt, 25 carloads; Nickel Plate, 21 carloads; St. Louis-San Francisco, 16 carloads; Chicago & Eastern Illinois, 13 carloads; Chicago, Milwaukee, St. Paul & Pacific, 11 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.25 to $11.75
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.75 to 13.25
Railroad springs	13,75 to 14.25
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	9.00 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Birmingham

Southern Pipe Foundries Receive Large Orders—Sheets Reduced $1

BIRMINGHAM, May 15.—Conditions in the pig iron market are practically unchanged. Sales for the week barely reached the average of the two preceding weeks. Buying is in small lots for early delivery and furnace interests are unable to definitely determine the strength of the market. Stove plants and machine shops are the chief buyers at present. Increased business with pressure pipe makers is expected to increase the demand from that field shortly. Iron under contract is moving out at a fair rate. The Woodward Iron Co. blew in furnace No. 1 on foundry May 12. This was blown out on March 31 for relining. No other changes have been made. Eighteen furnaces are now in blast. Of this number 11 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$15.50 to $16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.00 to 16.50
Basic	15.00

Finished Steel.—A reduction of $1 a ton has been made on black, galvanized and blue annealed sheets. May bookings in principal lines compare favorably with the corresponding period for April and little decrease in mill operations is in prospect for the next few weeks. Structural steel fabricators and bar manufacturers booked very little business during the past week. Local demand is the lowest for some time. Openhearth operations have not changed during the past three weeks. The Tennessee company is operating seven at Ensley and four at Fairfield. The Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—New business with the pressure pipe manufacturers showed a good increase during the past week. Local plants shared in the recent contracts placed by Detroit; the United States Cast Iron Pipe Co. took 5750 tons, the American Cast Iron Pipe Co. 1000 tons, and the National Cast Iron Pipe Co., 750 tons. The American Cast Iron Pipe Co. was awarded contracts on small municipal jobs at Greer, S. C., and Montgomery, Ala. The United States Cast Iron Pipe Co. received an order for about 8000 tons for Long Beach, Cal. Contracts are still pending on tonnages at Knoxville, Tenn., and Summerville, S. C. Inquiries have been received on additional tonnage for the district around Detroit. Shipments are keeping close to production. Quotations continue to be made at $31 to $33 on 6-in. and larger. The soil pipe market shows little or no improvement.

Coke.—The between-quarters inertia is noticeable in the coke market, where sales show a decline. Shipments have dropped below the average for the past several weeks. Quotations are unchanged from a $5 base.

Old Material.—The market is still weak and prices on some grades have been lowered. Heavy melting steel is being quoted at $9 to $9.50 instead of $9.50 to $10, and short shoveling turnings are being offered at $7.50 to $8. No. 1 cast has dropped 25c. Other prices remain the same.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.00 to $9.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.50 to 8.00
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.25
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Canada

Pig Iron Producers Not Yet Encouraging Third Quarter Buying

TORONTO, ONT., May 15.—Forward buying of pig iron is light at present as neither producers nor consumers are interested in negotiating third quarter business. Some existing contracts call for deliveries as far ahead as the middle of the third quarter, but generally speaking local blast furnace representatives have not opened their books for third quarter business and are not encouraging it. Spot sales are holding up well. Several inquiries appeared during the week, each of 200 to 600 tons. Melters now inquiring are specifying water delivery on which freight charges are considerably less than on rail shipments. Canadian pig iron producers continue to complain of the strong competition in the local markets from United States and British pig iron makers. This competition has not only deprived Canadian furnace operators of a part of their market for foundry and malleable grades, but at the same time has had a tendency to bring prices here to a level at which some furnaces cannot afford to sell, and as a consequence some are refusing orders outright or are quoting $1 per ton above the going prices. The increased consumption of foundry and malleable iron in Canada, which amounts to from 10 to 20 per cent over that of a year ago, is mostly supplied by imported iron; thus Canadian producers have not materially benefited by the betterment in general conditions here.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—A spotty but somewhat improved demand features the Canadian old material markets.

Several large sales were made during the week, and inquiries for forward delivery were more prominent in both Toronto and Montreal markets. Current demand calls chiefly for heavy melting steel, machine shop turnings and machinery cast in Toronto, while in Montreal wrought iron and steel axles are also in demand. Prices are unchanged, but a softening tendency is setting in.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Cincinnati

Pig Iron Sales of 9,000 Tons—Some Falling Off in Steel Business

CINCINNATI, May 15.—Pig iron sales in the past week have amounted to about 9000 tons, of which 6000 tons was bought by a malleable foundry at Muncie, Ind., from a Lake Erie furnace. The only other sizable transaction consisted of 500 tons of Jackson County silvery iron for delivery to a Michigan consumer. Aside from 400 tons of foundry iron for the Lunkenheimer Co., Cincinnati, inquiries have been for small lots ranging from 100 tons down to single carloads. The price situation is virtually unchanged. Southern iron is reported to be available at $15.50, base Birmingham, although some producers declare that they are refusing to book orders under $16. Southern Ohio foundry remains nominally at $19, base Ironton, while Jackson County silvery is selling at $25, base furnace, for 8 per cent. Northern Ohio makers are said to be quoting a minimum of $16.50, base furnace, for delivery into this district.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy. sil. 1.75 to 2.25	19.19 to	19.69
Alabama fdy., sil. 2.25 to 2.75	19.69 to	20.19
Tennessee fdy. sil. 1.75 to 2.25	19.19 to	19.69
Southern Ohio silvery 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—There has been a further recession in specifications and orders for heavy steel products and for sheets. Fabricators are disappointed because the amount of work now pending is less than normal for this time of the year and several major projects for which plans have been made will not come up for bids until fall. Meanwhile, most shops are counting upon a moderate number of small orders to keep production up to a fair level. Bars, structural shapes and plates are firm at 1.85c., base Pittsburgh, and there is an increasing tendency on the part of mills to accept that figure for small miscellaneous lots. In the sheet market, bookings have slumped in the past two weeks to a point considerably short of production and shipments. The brightest spot is the activity in electrical sheets, many consumers being busy on electrical apparatus for the radio industry. Releases of tonnages for automobile makers still hold up well. There has been no change of consequence in prices, which are stationary at the low level of the year, black sheets bringing 2.75c. to 2.85c., base Pittsburgh, blue annealed 2c. to 2.10c., galvanized, 3.65c. to 3.75c. and automobile body sheets, 4c. Users of wire goods are taking only a fair volume of material and prices are depressed. Common wire nails are selling at $2.50 per keg, base Ironton, plus a 14c. barge rate to this city, while plain wire is quoted at $2.40 per 100 lb., base Ironton.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Warehouse Business.—Shipments from warehouses of local jobbers are closely paralleling those in the corresponding period of 1927. From the standpoint of tonnage, bars and structural steel are the leaders. Quotations are steady and unchanged.

Coke.—The purchase of 12,000 tons of by-product furnace coke by the Kokomo Steel & Wire Co., Kokomo, Ind., from a central Indiana company was the feature of the week. By-product foundry coke specifications have fallen behind the volume maintained during April. Shipments of beehive foundry coke into this district have been rather sluggish.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—While there have been no changes in prices, quotations in some items are showing a tendency toward weakness. Offerings of railroads in the past week are reported to have brought less than in April. Shipments to district steel plants have been of fair volume.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to	$11.50
Scrap rails for melting	11.25 to	11.75
Loose sheet clippings	8.25 to	8.75
Bundled sheets	9.25 to	9.75
Cast iron borings	8.00 to	8.50
Machine shop turnings	7.50 to	8.00
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.00 to	10.50
Short rails	15.75 to	16.25
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.25 to	15.75
No. 1 railroad cast	12.75 to	13.25
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.00 to	11.50

Buffalo

Lackawanna Plant Increases Operations —Pig Iron Market Quiet

BUFFALO, May 15.—The pig iron market is very quiet. Prices remain at about the levels of recent weeks. Buffalo iron can be bought in New England at prices ranging from $16 to $16.50, Buffalo, but $17 for No. 2 plain and $17.50 for malleable prevail in this district. A part of the Thatcher Co.'s inquiry for 2000

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire base per 100 lb.	3.90

tons of No. 2X and No. 2 plain has been placed. One maker reports orders for about 2000 tons of foundry and malleable. There is some third quarter inquiry from New Jersey and Pennsylvania. A Maryland inquiry for 1000 tons of foundry is reported to be still open.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Bethlehem's Lackawanna plant has increased open-hearth operation to 22 furnaces out of 24. Bar, shape and plate prices are firm, and sheet prices show a firmer tendency. A 500-ton inquiry for reinforcing bars is pending. Reinforcing bar prices are not strong, showing a range of 2.40c. to 2.75c. for truck delivery. The nut and bolt demand from the automobile industry is tapering slightly, but railroad buying is satisfactory. An improvement is noticed in the market for semi-finished nuts, on which the market has been not quite so firm as on bolts. Makers report heavy commitments for road mesh.

Old Material.—The market is unusually quiet and is rendered more so by the continued suspension of shipments by one of the large consumers. There have been no sales of size. Prices in general have softened. One mill has taken in about 1500 tons of heavy melting steel by barge from an Eastern point. Dealers' stocks are low. Pennsylvania, Erie, New York Central and Michigan Central railroad lists closed last week. The Pennsylvania heavy melting steel brought $15.50, Pittsburgh district.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$14.75
No. 2 heavy melting steel	12.50 to	13.00
Scrap rails	13.50 to	14.00
Hydraulic compressed sheets	12.50 to	13.00
Hand bundled sheets	8.50 to	9.00
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.50 to	12.75
Machine shop turnings	8.25 to	8.75
Acid Open-Hearth Grades		
Railroad knuckles and couplers		15.50
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.00 to	15.50
Low phosphorus billet and bloom ends	16.50 to	17.00
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.25 to	9.75
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	17.00 to	17.50
Iron axles	22.00 to	23.00
No. 1 railroad wrought	12.50 to	13.00
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.50 to	13.75
Locomotive grate bars	12.00 to	12.50
Steel rails 3 ft. and under	16.50 to	17.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Railroad		15.00
Agricultural		15.00
Industrial		15.00

A. M. Castle Co. to Build Plant at Los Angeles

Contract for the construction of a new steel plant at Los Angeles for the A. M. Castle Co., Chicago, has been awarded to the Baker Iron Works, Los Angeles. The new structure will cover about five acres and will be devoted to the warehousing and distribution of iron and steel products. The building will be in four bays, each 70 x 500 ft., which will be constructed entirely of steel and will be served by traveling cranes. Additional equipment will include motor-driven cutting machines for plates, sheets, bars and structural shapes. When completed the plant will represent an outlay of approximately $350,000.

The Castle company also has branches at Seattle and San Francisco. Officials of the company state that in addition to caring for the needs of southern California, the markets of Mexico and South America will be served from the Los Angeles plant.

Youngstown

Steel Demands of Motor Car Builders Chief Prop of Mill Activities

YOUNGSTOWN, May 15.—Steel manufacturers in this district still make a favorable report about business, crediting the good showing largely to the fact that motor car builders are taking steel freely. There has rarely been a better movement of automobile body sheets than now. Strips also are moving well from plants in this district. The other products of the district mills, however, are not doing particularly well, and doubt is expressed that the present rate of ingot production, which ranges from 75 to 80 per cent of capacity, could be maintained if there is any letdown by the automotive industry.

Pipe, which ranks with sheets in importance in point of output in this district again is quiet. The withdrawal of the extra 5 per cent discount on standard-weight pipe, effective as of April 2, stimulated buying by jobbers, who were given the right to order a month's supply at the old prices, but such business now is water over the dam, and new mill orders are somewhat limited while the jobbers work off their extra purchases. Oil country pipe demands are small, as they have been since late last year, and there are few so optimistic about the situation as to predict that the oil situation will have been corrected in time to have a helpful effect upon the demand for drill and drive pipe and casing during the remainder of this year. There are several gas pipe line projects under consideration taking huge tonnages of large outside diameter pipe, but they do not appear to be moving very rapidly toward the mills.

Demand for the common finishes of sheets has been adversely affected by the weakness of prices, and there is not only a lighter operation of sheet mills than that of a few weeks ago, but also a lighter demand for sheet bars from the non-integrated manufacturers. The larger sheet producers here are making an effort to maintain black sheets at 2.75c., base Pittsburgh, galvanized at 3.65c., base Pittsburgh, and blue annealed at 2c., base Pittsburgh, but find that such prices are not easily obtainable in markets to the north and west. Competition makes necessary a price of 2.80c., mill, in Cleveland, on black sheets, which works back to 2.70c., base, at Pittsburgh, and similarly on blue annealed sheets it is necessary to make a Pittsburgh base equivalent of 1.90c. to get orders. Some makers are meeting rather than making these prices. Usually, a mill base on sheets is quoted only to large users within the confines of the Youngstown district.

The experience of the one maker of wire products in this territory is that the larger producers generally are holding firmly to $2.65, base, per keg, Pittsburgh or Cleveland, on bright nails and that there is a fair amount of specifying on second quarter contracts carrying that price. Bars are only fairly active, as makers of bolts and nuts are not as busy now as they were a short time ago and producers of cold-finished bars, in response to smaller orders for their product, are specifying less freely for hot-rolled bars. While occasional sales are being made at 1.90c., base Pittsburgh, 1.85c. is the ruling price and is being quoted on what would have been regarded as a small order recently when the buying was better. Tin plate plants are running practically full.

It is reported that basic iron recently has been sold at less than $16.50, Valley furnace, and while details are lacking, there is a disposition to credit the statement, since it is generally realized that the market for merchant Valley basic iron has been reduced to the territory adjacent to the Valley furnaces, in which there is only a limited demand. To get into the Pittsburgh district with that grade, producers would have to sell at $16 or less, furnace, to meet competition. The recent sale at $17, delivered Alliance, suggests a similar condition in that direction.

Most recent sales of heavy melting steel scrap in this district were at $15.50 for No. 1 grade, while $15 was paid for hydraulic compressed sheet scrap.

Boston

More Scrap Being Loaded for Danzig at an Advance of 50c. a Ton

Boston, May 15.—Pig iron sales have dropped sharply. The Mystic Iron Works booked orders for 3500 tons, divided between No. 2X and No. 1X, most of it for New England delivery, while the combined sales of other stacks did not quite reach that figure. Prospective business is confined to a few sizable tentative inquiries, aggregating several thousand tons, but foundries give no indication when they may buy. Contract iron is being taken on schedule, and stock piles in foundry yards have shrunk materially in the past month. Consequently, it is practically certain that third quarter buying will be more active shortly and of larger proportions than previously anticipated by sellers. At least one Buffalo furnace continues to accept business at $16 a ton, base stack, and recently has waived the 50c. differential on No. 2X. In addition, new rail-and-water freight rates from Buffalo, Troy and Port Henry, N. Y., give the seller quite a latitude in figuring on business. For the next four months, at least, the all-rail rate of $4.91 from Buffalo to New England will apply in only a few unimportant cases. Buyers will be able to secure a much lower rate in most instances.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—New England makers of by-product foundry coke see some improvement in contract specifications, and are reasonably certain that in June there will be a decided betterment, for by that time reserve stocks of foundries should be depleted. Competition from coke made outside of New England is still keen. While the tonnage brought into New England is not important, it has an important influence on prices.

Shapes and Plates.—The Boston & Maine Railroad will enter in the market this week for 15 bridges. How much steel is called for is not yet known. It is reported that the company will ask for bids next week on additional bridges. This week it will close on three, calling for 1900 tons of steel. Fabricators are securing a good number of small orders at good prices. Contract standard shapes are being billed out by mills at 1.80c. per lb., base Pittsburgh. Producers are soliciting new business at 1.85c. per lb. for round tonnages, and at 1.90c. for small lots, but fabricators maintain 1.80c. can still be done. Current business in plates is in small lots, but the weekly movement foots up well. Plates are steady at 1.85c. per lb., base Pittsburgh.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cold-Rolled Strip.—New business is coming in slowly, and current orders are for consumers' immediate requirements only. Prices hold steady at 3c. to 3.15c. per lb., base Pittsburgh, on 1 to 3-ton lots. The American Steel & Wire Co. quotes 3.15c. to 3.30c. per lb., base Worcester, Mass.

Cast Iron Pipe.—Prices on small sizes of cast iron pipe have advanced about $2 a ton during the past fortnight. Four-inch pipe is now selling at $46.10 to $47.10 a ton, delivered common Boston freight rate points, and 6-in. at $41.10 to $42.10. Foundries are fairly well booked on these sizes. Concessions are still being made on 16-in. and larger pipe, however. The usual $5 differential is asked on Class A and gas pipe. One of the largest New England gas companies has closed several thousand tons of 24-in. pipe, and it is reported the Warren Foundry & Pipe Co. secured the business. That foundry was awarded 400 tons of 16-in. pipe by Haverhill, Mass. The Great Barrington, Mass., fire district has bought 200 tons of 6-in. and 8-in. pipe from the Donaldson Iron Co. Attleboro, Mass., closed bids May 14 on 100 tons 6-in. pipe.

Old Material.—So far as shipments of scrap to steel mill centers are concerned, the market is quieter than it has been for some time. Activity appears to center in scattering carlots of heavy cast at $10.50 to $11 a ton, on cars shipping point; heavy melting steel at $9 and $9.10; cotton ties at $6 to $6.50; No. 2 steel at $7.50 to $7.75, with an occasional lot at $8, and mixed borings and turnings at $6 to $6.25 in most cases. Otherwise activity centers in local or nearby deliveries. One steamer is practically loaded with No. 1 yard steel for Danzig at $9.50 a ton on dock here, an advance of 50c. a ton. Another boat has started to load 4500 tons, and a third will load this month, bringing the total exports for May up to more than 12,000 tons. The advance in price was made with the understanding that automobile scrap would be eliminated. Indications are that exports will continue in June, with a possibility that on this movement more than 20,000 tons of scrap will have been taken out of New England. Foundries have bought textile machinery cast, mostly at $14 a ton, delivered, and No. 1 machinery cast at $14.50 to $15, with an occasional sale at $15.50 where the freight rate has been favorable.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to	$9.10
Scrap T rails	8.50 to	9.00
Scrap girder rails	7.50 to	8.00
No. 1 railroad wrought	10.00 to	10.25
No. 1 yard wrought	7.50 to	8.00
Machine shop turnings	5.50 to	6.00
Cast iron borings (steel works and rolling mill)	6.00 to	6.25
Bundled skeleton, long	5.75 to	6.25
Forge flashings	6.60 to	7.25
Blast furnace borings and turnings	5.75 to	6.25
Forge scrap	6.00 to	6.25
Shafting	13.00 to	13.50
Steel car axles	15.50 to	16.00
Wrought pipe 1 in. in diameter, (over 2 ft. long)	7.50 to	8.00
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.50 to	10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to	$14.00
No. 1 machinery cast	14.50 to	15.00
No. 2 machinery cast	13.00 to	13.50
Stove plate	10.00 to	10.50
Railroad malleable	13.00 to	13.50

The Dravo Contracting Co. is building on its own account a modern river and rail transfer dock at Woodlawn, Pa., on the Ohio River, just beyond the Aliquippa works of the Jones & Laughlin Steel Corporation. This is probably the first of several similar projects, since the Youngstown district steel companies still are interested in securing some use of the Ohio River in the inward movement of coal and the outward movement of steel products.

The American Rolling Mill Co. has moved its Pittsburgh office from suite 432 to suite 1632 Henry W. Oliver Building.

Heat-Treating Educational Conference

(*Concluded from page* 1409)

common amounts of the added elements as alloy steels. Alloys of nickel and chromium dominate the field, while alloys of vanadium, molybdenum, tungsten, silicon, manganese and aluminum have wide uses but are distinctly secondary.

Alloy steels are produced in basic and in acid open-hearth furnaces, in electric arc and induction furnaces, in crucibles and in Bessemer converters. In order of importance the basic open-hearth dominates and the basic electric furnace is next.

Nickel, Chromium and Molybdenum as Alloys

Outstanding reasons for the use of nickel as an alloy are that it increases strength without loss of ductility and it lowers the temperature at which steel hardens. The latter advantage results in less scaling and less distortion, especially advantageous with parts finished to shape before treatment.

Chromium is the only alloying element that covers all ranges from carbonizing steel to hard steel, such as ball race steels. These steels demonstrate that physical chemistry is more important than quantitative chemistry, for the analysis is usually easily controlled but physical factors are difficult to govern. Economically, chromium dominates the field because of its wide application, but it has the disadvantages of high critical temperatures and slow diffusion rates. In all carbonized applications, chromium steels are best treated with fused salts or lead baths. In the medium-carbon ranges, they may be treated in any manner if machined to shape after treatment.

Vanadium serves best where hot treatments are severe. Molybdenum is commercially satisfactory in water-hardened parts when the machine work is done after treatment. A combination of molybdenum and aluminum serves well for surface-hardening applications that are to be nitrated. Serious trouble is encountered in cooling nickel-molybdenum steels if much carbon is present. This combination requires further study, because the depression of the critical temperature of nickel is pronounced when molybdenum is present.

Metal Fatigue Shown by Motion Pictures

Motion pictures and many photomicrographs taken of specimens when being subjected to repeated alternating stresses were shown by H. F. Moore, professor of engineering materials University of Illinois, Urbana, Ill., who spoke on "The Fatigue of Metals." The motion pictures plainly showed the development of slip planes, followed by the opening of the cracks. Professor Moore pointed out that slipping in itself is not serious, provided that nothing else happens, but this situation rarely occurs, because repeated slippage is almost certain to result in actual fracture or cracks. The rate of slip increases rapidly as the elastic limit is approached.

Experiments have shown that the unit stresses at the edges of irregularities may be four times the average through the piece. This applies to moving and not to stationary loads. Cracks may readily start at the edges where these stresses prevail. Tool marks and the surfaces remaining after grinding and reaming leave irregular surfaces, notwithstanding their appearance of smoothness to the naked eye. These marks are points of concentration of high stresses, opening chances for cracks and ultimate failure of the part. Cracks often hunt out inclusions, and they seldom follow grain boundaries. In the absence of specific data, fatigue strength may be roughly estimated as 250 times the Brinell number or one-half the tensile strength of the material.

PRICE CUTTING UNETHICAL

Profitless Selling Affects Public Interest as Much as Price Fixing, Says Charles F. Abbott

PRICE cutting is unsound and unethical, and should be just as illegal as collusion among sellers to control prices, said Charles F. Abbott, executive director American Institute of Steel Construction, New York, in an address before the Purchasing Agents' Association of Buffalo on May 9. The remedy lies to a large extent with manufacturers, he added.

"There are many instances on record where manufacturers are selling to the ultimate consumers at prices lower than either the jobber or the retailer could possibly quote," he stated. "Then, again, we experience in many instances the old vicious system of secret rebating with all of its destructive influences. We also find manufacturers who are selling to jobbers or retailers of questionable financial standing, thereby encouraging destructive competition on the part of the incompetent. We witness manufacturers selling to brokers or those who have no rightful position in the cycle of distribution.

"If demoralizing price cutting is to be eliminated and the business transacted on a basis of profit, the manufacturer must exert his leadership. In the formation of his selling policy, he must define fair practices and then vigorously enforce them without any partiality or deviation. One of the most constructive influences is the establishment of a one-price policy, thereby establishing prices and discounts fair to all.

"It is obvious that the problem of the distributers, therefore, becomes the problem of the manufacturers. On the other hand, the distributers cannot expect to profit unless they on their part extend to the manufacturer that degree of efficient distribution which he has a right to expect.

"Price cutting is to be condemned as being unsound and unethical. Society is affected because any industry that fails to make a reasonable profit is a liability. Prosperity depends upon the ability of our business organizations to transact a volume of business upon a basis of reasonable profit.

"The purchasing agent who is interested in the prosperity of his company must recognize that to jeopardize the interests of his principal sources of supply, forcing prices below cost in a vain attempt to obtain a cut price or concession, is the direct means of undermining the whole business structure. The whole problem of purchasing is based upon business procedure, and, while it may appear that in one instance a purchasing agent may be receiving an unusual concession which will enable his concern to quote lower prices, the fact remains that his competitor has probably gone him one better and received an even greater concession.

"It is illegal for manufacturers to get together and control selling prices. It should be just as illegal for any seller to solicit business on a basis of cost or below cost, because public interest is just as seriously affected by business transacted on such a basis as it would be should it be legal to agree upon selling prices for the purpose of obtaining an exorbitant profit.

"There is no more constructive suggestion that I can think of than for purchasing agents and sellers to get together and frankly discuss the problems of buying and selling in the hope that policies may be established and ethics defined which will eliminate unfair methods and create a condition whereby all relations between the buyer and seller can be conducted upon a sound business basis, with the interests of both amply protected.

"The success of the manufacturer of any commodity depends largely upon his ability to create consumer good will, to exploit demand and build up public recognition. Such an investment should be protected by a clear recognition of the rights of the jobber or distributer, and the retailer. Their support must be obtained, as it is through them that service must be extended and applied. If this service is inefficient, the manufacturer suffers and his interests are jeopardized because good will becomes impaired.

"The solution for much of the present demoralization of prices is, to a very large extent, in the hands of the manufacturer or producer, who is the only one who has the power to lead in the campaign to improve conditions, and he can do so if he will exert that leadership which is rightfully his by virtue of his position in the industry."

NON-FERROUS METAL MARKETS

The Week's Prices Cents per Pound for Early Delivery	May 15	May 14	May 12	May 11	May 10	May 9
Lake copper, New York	14.37½	14.37½	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.12½	14.12½	14.00	14.00	14.00	14.00
Straits tin, spot, N. Y.	52.50	52.20	....	52.00	51.80	51.80
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.40	6.35	6.32½	6.30	6.30	6.30
Zinc, St. Louis	6.05	6.00	5.97½	5.95	5.95	5.95

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 15.—Large sales and higher prices have featured copper. Tin is quiet, but prices are slightly advanced. Zinc is also up because of continued uncertainty as to the ore situation. Lead is dull at unchanged prices.

Copper.—Heavy buying of copper last week preceded the issuance of statistics for April that were decidedly favorable to the producers' side of the market. During the past week sales of electrolytic have probably been not less than 75,000,000 lb., much of which was sold for May-June at 14.25c., delivered Connecticut Valley. On Monday producers advanced quotations ⅛c. per lb., but there was further large buying at the higher level. On Tuesday the export price was raised by Copper Exporters, Inc., to 14.62½c., c.i.f. European ports, it having been 14.50c. for some time. Export buying has continued a strong feature of the market, one important transaction involving 2500 tons for France. Lake copper has advanced along with electrolytic and has also had a week of large buying. The copper statistics for April showed a total reduction of refined and blister stocks during that month of 21,000 tons, of which 14,000 tons was in refined stocks and 7000 tons in blister stocks. Export shipments last month were more than 60,000 tons. Production of refined copper last month declined more than 6500 tons from that of March. Total production for the first four months of the year was 499,367 tons, compared with 508,554 tons in the corresponding period last year. Domestic shipments in the four months were 54,000 tons less than in the first four months of 1927, but export shipments were 41,000 tons larger.

Tin.—The past week has been rather uneventful in the tin market. Sales were probably under 1000 tons, and most of this consisted of trades between dealers. In some cases the trades were for the purpose of switching deliveries. Consumers took little or no interest in the market. Most of them are covered for May and June, and although they will need metal for July shipment they are not yet in a mood to come into the market. In part, at least, their indifference may be a result of recent published predictions that production of Malay tin will increase to a point that will tend to relieve any scarcity, and that prices over the next year or so may tend downward rather than upward. In the week the price changes have been upward, ranging from 51.80c. per lb. on May 9 and 10 to a nominal quotation of 52.50c. on May 15. Tin stocks are not large. Dealers who have metal are holding it, but on the other hand there is very little demand for it. London prices today were £232 15s. for spot standard, £232 for future standard, £237 5s. for spot Straits, and the Singapore price was £234 12s. 6d.

Lead.—Buying is in moderate volume and at unchanged prices, namely 6c., East St. Louis, for the outside market and 6.10c., New York, the contract price of the leading interest.

Zinc.—The zinc market is still largely dominated by the ore situation, which is stronger at Joplin, with prospects that the price may be advanced $1 a ton. In the last few days prices paid for zinc have ranged from 6c. to 6.10c., St. Louis. In all probability the 6c. price was on stocks in dealers' hands, and little, if any, metal is now available at less than 6.05c. and sales have been made at 6.07½c., with some interests asking 6.10c. A representative range of the market is 6.05c. to 6.10c.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.25c. to 54.25c.
Tin, bar	55.75c. to 56.75c.
Copper, Lake	15.37½c.
Copper, electrolytic	15.12½c.
Copper, casting	14.37½c.
Zinc slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.50c. to 34.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier,	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on copper wire were advanced ⅛c. on May 14 and rolled brass products and copper tubing were advanced ¼c. on May 15. Zinc sheets and lead full sheets are unchanged.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.00c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.87½c.
Copper	24.75c.
Rods—	
High brass	16.75c.
Naval brass	19.50c.
Wire—	
Copper	16.12½c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	23.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Copper, cold rolled, 14 oz. and heavier	25.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., shot nickel is 36c. and electrolytic is 37c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is held at 23.90c. per lb., delivered.

Antimony.—There has been fairly good buying of antimony at 11.25c. per lb., duty paid, for prompt and future deliveries. Some consumers have covered up to and including July and August.

Non-Ferrous Metals at Chicago

This market is marked by moderate activity. Prices for tin and zinc have advanced and quotations on other commodities are steady. A fair volume of business is being done in old metals.

Prices, per lb., in carload lots: Lake copper, 14.37½c.; tin, 53c.; lead, 6.10c.; zinc, 6.10c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Wheeling Steel Corporation has inquired for 10 gondola and 20 hopper cars.

Chicago, Burlington & Quincy has ordered 10 gas-electric rail motor cars from Pullman Car & Mfg. Corporation.

Interborough Rapid Transit Co. has ordered 23 built-up, bar-type trucks for motor subway cars from American Car & Foundry Co.

Northwestern Pacific is inquiring for from one to seven gas-electric passenger-baggage rail motor cars.

Baltimore & Ohio has purchased 10 70-ft. steel baggage and mail cars from American Car & Foundry Co.

Missouri Pacific has revived its inquiry for five 2-8-4 type locomotives.

New Pipe Warehouse in New York

A downtown warehouse has been opened in New York by E. D. Giberson & Co., 40 Rector Street, New York, distributer of boiler tubes, pipe and welding rods and seamless steel tubing for mechanical purposes. E. D. Giberson & Co. are also Eastern sales representatives for the Lebanon Iron Co., Lebanon, Pa., maker of iron bars, bolts, nuts, spikes and rivets and are agents in the United States for Ferrostahl G. m. b. H., a German iron and steel export organization, and the German tube works, Kronprinz A. G. at Immigrath, Rhineland.

Suspends Proposed Increase in Rates from Atlanta to Gulf Ports

WASHINGTON, May 15.—The Interstate Commerce Commission today suspended, from May 15 to Dec. 15, tariff schedules proposing cancellation of present export and coastwise rates on iron and steel products in carloads from Atlanta, Ga., to Mobile, Ala., and New Orleans, by way of rail lines in connection with the barge line of the Mississippi-Warrior River service, and to apply domestic rates in their place. The tariffs would increase the rates from Atlanta via Mobile to Cuba and other coastwise territory from 18c. per 100 lb. to 27.5c. per 100 lb. From Atlanta via New Orleans to Cuba the present rate of 18c. would be increased to 34c., while the present rate of 20c. to coastwise territory outside of Cuba would also be increased to 34c.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.25c.	13.75c.
Copper, heavy and wire	12.00c.	13.00c.
Copper, light and bottoms	10.25c.	11.375c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

FOUNDRYMEN MEET

Thirty-Second Annual Convention of American Association Opens in Philadelphia

PHILADELPHIA, May 15.—The thirty-second annual convention of the American Foundrymen's Association, which began on Monday, promises to be very successful. Attendance at the three technical sessions this morning at the Bellevue-Stratford Hotel on gray iron, steel castings and non-ferrous foundry products was decidedly large. Marked interest, particularly in gray iron, is a feature. Registration is heavy thus far.

The exhibition, the first since the fall of 1926 at Detroit, was formally opened Monday morning by Mayor Mackey of Philadelphia, who, in the presence of city officials and officers of the foundrymen's association, pressed a button in the mayor's reception room which started in motion the power machinery at the Commercial Museum. Exhibits of at least 250 companies present an attractive display which is drawing a large attendance.

The convention committee of the Chamber of Commerce tendered the officers and exhibitors a luncheon Monday at the Museum.

Tonight at the Manufacturers' Club a dinner is being given to 34 of the men who assisted in forming the association in Philadelphia in 1896. Including the officers, past officers and board of directors, 50 men were in attendance.

A new feature this year is four sessions on cupola operation, one each day, led by prominent foundrymen. The first was directed by Dr. Richard Moldenke. The attendance was about 250. The second, held this afternoon, was led by E. J. Lowry.

At the regular business meeting today, the retiring president, S. W. Utley, delivered an address on the functions of the association. Chairmen of the chief committees made their reports. President Utley was unanimously chosen an honorary member. New officers and directors, as published in THE IRON AGE, May 3, were elected.

American Refractories Institute Elects J. M. McKinley President

J. M. McKinley, Crescent Refractories Co., Curwensville, Pa., was elected president American Refractories Institute at its annual meeting at White Sulphur Springs, W. Va., May 8; R. M. Sievers, Evens & Howard Fire Brick Co., St. Louis, first vice-president; W. B. Coullie, Harbison-Walker Refractories Co., Pittsburgh, second vice-president; C. E. Edmunds, McLain Fire Brick Co., Pittsburgh, treasurer, and Miss Dorothy Texter, secretary.

Five well-known specifications were reviewed and the requirements of the specifications discussed at this meeting, with producers, consumers and technicians participating. The desirability of having tests follow service conditions was emphasized, and it was brought out that it has been difficult to interpret the test data available. Indeed, all that has been possible is to stimulate service conditions. Attention to service tests was urged.

FABRICATED STRUCTURAL STEEL

Two Western Pipe Lines to Take 15,000 Tons of Plates—Awards Only 13,800 Tons

WITH a pipe line at Denver requiring 12,000 tons of plates and another at Oklahoma City, 3000 tons, new fabricated structural projects reported during the week totaled 31,400 tons. Awards declined to 13,800 tons, one of the lowest weekly totals in several months. The largest project, a bridge across Lake Champlain at Crown Point, N. Y., took 3000 tons. Awards follow:

State of New Hampshire, 150 tons, highway bridge, to Berlin Construction Co., Inc.

Boston, 100 tons, additional work on Sears, Roebuck & Co. warehouse, to New England Structural Co.

Hartford, Conn., 125 tons, trade school, to an unnamed fabricator.

Crown Point, N. Y., 3000 tons, bridge over Lake Champlain; probably to American Bridge Co., low bidder.

New York, 2000 tons, apartment building at 720 Park Avenue, to Hay Foundry & Iron Works.

New York, 275 tons, section of Pier 21, North River, to American Bridge Co.

Flemington, N. J., 120 tons, bridge for New Jersey State Highway Commission, to Phoenix Bridge Co.

Trenton, N. J., 125 tons, highway bridge, to American Bridge Co.

Pennsylvania Railroad, 200 tons, bridge, to Bethlehem Steel Co.

Lewistown, Pa., 1500 tons, silk mill, to McClintic-Marshall Co.

Sunbury, Pa., 1900 tons, highway bridge, to Bethlehem Steel Co.

Wilmington, Del., 300 tons, shop building for Pennsylvania Railroad, to Belmont Iron Works.

Dayton, Ohio, 200 tons, recreation building, to Massillon Bridge & Structural Co.

Chicago, 1700 tons, bascule bridge over Chicago River for Baltimore & Ohio Railroad, to an unnamed fabricator.

Oak Park, Ill., 180 tons, hotel, to Gage Structural Steel Co.

State of Illinois, 400 tons, highway bridges, to A. C. Wood Co., Rockford, and Wisconsin Bridge Co., Milwaukee.

Minneapolis, 1600 tons, building for University of Minnesota, to American Bridge Co.; previously reported to an unnamed fabricator.

Minneapolis, 250 tons, building for Russell Grader Mfg. Co., to American Bridge Co.

Seattle, 100 tons, Bon Marche Store, to Wallace Bridge & Structural Steel Co.

Port Townsend, Wash., 150 tons of plates, two tanks and towers for Zellerbach Paper Co., to Chicago Bridge & Iron Works.

Grays Harbor, Wash., 100 tons of plates, two tanks for Grays Harbor Pulp & Paper Co., to Chicago Bridge & Iron Works.

San Francisco, 150 tons of plates for Standard Oil Co., to an unnamed interest.

Oakland, Cal., 360 tons, Twentieth Century Market, to Judson-Pacific Co.

Los Angeles, 425 tons, warehouse for A. M. Castle Co., to Baker Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Boston, 150 tons, mercantile building on North Street.

Cambridge, Mass., 500 tons, addition to Langdell Hall, Harvard University.

Quincy, Mass., 200 tons, office building for Granite Trust Co.

New York, 500 tons, fur storage warehouse on Twenty-eighth Street.

Syracuse, N. Y., 2500 tons, office building.

Utica, N. Y., 250 tons, Oneida County Hospital.

Philadelphia, 3000 tons, Y. M. C. A., previously reported as 2000 tons; general contract to Irwin & Leighton.

Philadelphia, 800 tons, Homeopathic Hospital.

Philadelphia, 250 tons, highway bridge.

Pennsylvania Railroad, 500 tons, bridges.

Wilkes-Barre, Pa., 1100 tons, Wilkes-Barre Savings Bank.

Norfolk & Western Railway, 100 tons, bridge.

Southern Railway, 500 tons, bridge.

Cleveland, 655 tons, Parkhurst and Nathan Hale schools.

Cleveland, 400 tons, Thirty-seventh Street bridge for Nickel Plate Railroad.

Akron, Ohio, 500 tons, Loew theater.

Toledo, Ohio, tonnage unstated, Masonic Temple.

Chicago, tonnage being estimated, office building for Union Carbide & Carbon Corporation.

Chicago, 600 tons, addition to billet mill of Interstate Iron & Steel Co.

Chicago, 400 tons, St. Michael's High School.

Kansas City, Mo., 600 tons, office building for Swift & Co.

Oklahoma City, Okla., 3000 tons of plates, water pipe line; general contract let.

Freeport, Tex., 400 tons, bridge over Brazos River.

Denver, 12,000 tons of plates, water pipe line; bids June 1.

Tacoma, Wash., 1600 tons of plates, 51 to 66-in. riveted pipe line; bids in.

Tacoma, 115 tons of plates, 48-in. pipe line; Birchfield Boiler Co., low bidder.

Olympia, Wash., 600 tons, bridge over Queets River; general contract to McGuire & Blakesley, Great Falls, Mont.

Eugene, Ore., 215 tons, dam, penstock and power house; bids June 4.

San Francisco, 700 tons of plates, carfloat for Western Pacific Railroad.

San Francisco, 130 to 200 tons, addition to Dollar Building.

Oakland, Cal., 1100 tons, office building at Fourteenth and Franklin Streets.

Oakland, 250 tons, school at Eighty-seventh Avenue and Foothill Boulevard.

Los Angeles, 225 tons, apartment building at 906 North Bonnie Brae Street.

Phoenix, Ariz., 260 tons, bridge on Benson-Douglas highway; general contract to Charles & E. W. Steffgen, San Diego, Cal.

Asks Deferring of New Southwestern Rates on Wrought Pipe

Washington, May 15.—Postponement of the effective date, July 8, of the decision of the Interstate Commerce Commission in the Consolidated Southwestern cases in so far as it affects wrought iron or steel pipe and fittings is asked in a petition filed with the commission by the Transcontinental Oil Co. The petition says that the commission has postponed the effective date as it applies to cast iron pipe and fittings and that the reasons cited for that postponement apply with equal, if not greater force, to wrought pipe, with the exception of the allegation that the value of cast iron pipe is less than the value of wrought iron pipe.

Practically all wrought pipe consumed by the oil industry, it is stated, is purchased directly from the manufacturer and shipped directly to final destination. In all cases where it is necessary, because of an emergency, to purchase from stocks in this field, it is stated, the freight from point of last loading to final destination must be borne by the purchaser, in addition to the transportation cost from point of manufacture to storage point. Due to this fact and the absence of storage-in-transit provisions, and also because of the large consumption of wrought pipe in the affected territory, it is declared, competition between jobbing points, so marked on other commodities, "does not now and probably never will prevail." It is submitted by the petitioner that there is less competition between jobbing cities in the Southwest on wrought iron pipe than on cast iron pipe. It is pointed out that the minimum weight of 40,000 lb. prescribed on wrought pipe is 72.1 per cent of the average loading in the Southwest, 55,480 lb., while the other minimum weights prescribed on iron and steel products range from 78.4 per cent to 90.4 per cent of the average loading. The general minimum weight on wrought pipe in the Southwest at the present time is 46,000 lb. The average weight of wrought iron pipe received by the Transcontinental Oil Co. is declared to be 68,000 lb. It is contended that consumers of wrought pipe should not be penalized by having this product placed with other iron and steel products on a higher rate than is justifiable on wrought pipe because of its heavier loading and the absence of the commercial characteristics that prevail on other iron and steel products.

It is urged that transportation and commercial conditions affecting wrought pipe are such as to warrant its separation from the other articles of iron and steel.

PERSONAL

C. F. W. Rys, since 1911 metallurgical engineer in charge of the metallurgical department of the Carnegie Steel Co., Pittsburgh, has been made an assistant to the president. He has been with the Carnegie company since 1904 and is a graduate of the School of Mines, Freiberg, Saxony. He achieved considerable distinction as a member of committees of national engineering societies in connection with work done on standard specifications for iron and steel materials and products. He is a member of the American Iron and Steel Institute, Iron and Steel Institute (British), and the American Society for Testing Materials, and is on the metallurgical advisory board of the Carnegie Institute of Technology.

C. F. W. RYS

E. J. Lowry, until recently metallurgist for Hickman, Williams & Co., Pittsburgh, but more recently engaged in consulting engineering work, with offices in the General Motors Building, Detroit, has been engaged as a consulting metallurgist by the Molybdenum Corporation of America, Pittsburgh, to further the use of molybdenum in iron and steel.

W. P. Gleason, general superintendent Gary, Ind., works, Illinois Steel Co., has been named a member of the board of trustees of the Lake County, Ind., Tuberculosis Sanitarium.

A. T. Leavitt has been made president of the Hamilton By-Product Coke Ovens, Ltd., Hamilton, Ont.

O. W. Stokes has been transferred from the Seattle to the San Francisco office of the Worthington Co., Inc., and is now located at 543 Howard Street, San Francisco.

Harry E. Kies, executive manager of the malleable iron department of the American Radiator Co., Buffalo, has also taken over the activities of the Arco steel department and is now manager of both plants. He succeeds E. P. Langworthy in the Arco department.

Fred A. Hanlin was elected secretary Weirton Steel Co., Weirton, W. Va.; Frank M. Hesse was elected treasurer, T. J. Hudson, assistant secretary, and W. L. Horner, assistant treasurer at a special meeting of the directors of the company held in Pittsburgh, May 8. Mr. Hanlin and Mr. Hesse previously were respectively assistant secretary and assistant treasurer of the company, the official personnel of which, except for these promotions, is unchanged.

J. E. Heber has been elected vice-president of the Truscon Steel Co., Youngstown, in charge of its Pacific Coast activities, with headquarters at Los Angeles. For the past 17 years he has been district manager for the company in that city, and for the preceding five years he was connected with the Truscon sales organization in Canada.

A. Levin, for the past two years connected with the Pacific Coast sales organization of the Minneapolis Steel & Machinery Co., Minneapolis, has joined the sales organization of the Moore Drydock Co., Oakland, Cal.

Hans J. Meyer has been made an engineer of the foreign department, International Combustion Engineering Corporation, New York, and will sail on June 6 for the Far East. Mr. Meyer's early engineering training was with the Milwaukee Electric Railway & Light Co. His later identifications were as district engineer Allis-Chalmers Co.; sales engineer Westinghouse Electric & Mfg. Co.; superintendent Shreveport Gas, Electric Light & Power Co., Shreveport La.; partner in the consulting engineering firm of Vaughn, Meyer & Sweet, Milwaukee; and partner in the consulting engineering firm of Charles L. Pillsbury Co., Minneapolis and St. Paul. During the war he served as administrative engineer, United States Fuel Administration, Bureau of Conservation. He became identified with Combustion Engineering Corporation in 1926 and was placed in charge of design and construction of complete fuel burning and steam generating equipment for the Kip's Bay station of the New York Steam Corporation.

H. N. Smith has been appointed district sales manager of a new office which has been opened at 48 West McLemore Avenue, Memphis, Tenn., by the Linde Air Products Co., New York. His territory will include western Tennessee, northern Mississippi and eastern Arkansas.

Charles S. Garland, New York district manager for Hickman, Williams & Co., has resigned to become associated with Brown Brothers & Co., New York investment bankers. He has been associated with Hickman, Williams & Co. since his graduation from Yale University in 1920, for four years in the company's Pittsburgh office and since November, 1924, as district manager at New York.

Earl D. Stearns, formerly with the Stearns Conveyor Corporation, Cleveland, has been appointed vice-president of the Fairfield Engineering Co., Marion, Ohio, manufacturer of conveying equipment.

Messrs. Nagel and Blumenfeld, general manager and director respectively of the Badische Machine Works, Durlach, Germany, manufacturer of foundry equipment, arrived in the United States on May 7 and will visit the convention of the American Foundrymen's Association in Philadelphia, and also numerous foundries and equipment companies in this country. They will maintain headquarters at Albert T. Otto & Sons, Inc., 18 East Forty-first Street, New York, agent in the United States for the Durlach works.

Henry D. Sharpe, president Brown & Sharpe Mfg. Co., Providence, R. I., has been made vice-president of the American Association of Community Chests and Councils. He is president of the Providence Community Chest.

C. H. Heist, formerly furnace superintendent Mayville Iron Co., Mayville, Wis., subsidiary of the Youngstown Sheet & Tube Co., has been named superintendent in charge of all blast furnaces of the latter company, with headquarters in Youngstown.

Allen Wood Smith has been appointed manager of the roll sales department, Aetna Standard Engineering Co., Youngstown. Associated with him is Robert G. Crawford, formerly with the Mesta Machine Co., Pittsburgh.

W. C. Fownes, formerly president Standard Seamless Tube Co., Pittsburgh, now head of Fownes & Orr Co., Inc., has been elected a director McKinney Mfg. Co., Pittsburgh, hardware manufacturer. J. B. Orr, associated with Mr. Fownes, also has been elected a director of the McKinney company.

W. B. Ohl, formerly auditor Trumbull Steel Co., has been appointed to the newly created office of comptroller of the Republic Iron & Steel Co., Youngstown. Harry D. Rhodehouse, for many years traffic manager Youngstown Chamber of Commerce, has been appointed traffic manager of the Republic company.

Charles L. Hyland has been appointed sales representative for the Empire Steel Corporation, Mansfield, Ohio, in the Cincinnati territory. His district will include portions of Ohio, Kentucky, Tennessee and West Virginia. Mr. Hyland was formerly with the Wheeling Steel Corporation, Wheeling, W. Va., and more recently with the Trumbull Steel Co., Warren, Ohio. His address is 3437 Hazelwood Avenue, Cincinnati.

W. B. Ohl, formerly general auditor of the Trumbull Steel Co., has been appointed comptroller of the Republic Iron & Steel Co.

Louis Renault, head of Societe Anonyme des Usines Renault, French automobile manufacturer, and E. C. Serre and E. A. Tordet, chief engineer and factory manager of the Renault company, are in this country devoting considerable time to inspecting automobile and parts making plants. At Flint, Mich., M. Renault and party were the guests of B. W. de Guichard, president AC Spark Plug Co.

Reginald G. Matthews, Floral Park, N. Y., has been appointed assistant chief of the industrial machinery division, Department of Commerce, Washington. He was born at Orange, N. J., and attended Pratt Institute, Brooklyn, and other technical schools, specializing in mechanical and electrical engineering. His experience includes extensive travel abroad and in the United States selling and estimating machinery, and service with a financial house, which took him to Japan. During the World War he served in the United States Ordnance Department.

Eugene G. Grace, president Bethlehem Steel Co., Bethlehem, Pa., and G. H. Blakeley, vice-president, are on a business trip to the Pacific Coast.

A. F. Morris, vice-president and general manager of sales Morgan Engineering Co., Alliance, Ohio, has been elected president. He was appointed sales manager in 1903 and in 1923 was elected vice-president.

Henry F. Angelberger, engineer for the H. K. Ferguson Co., Cleveland, will sail for Japan on May 17 to take charge of the company's construction work in that country.

Thomas G. Kus, formerly with the St. Louis Gas & Coke Corporation, Granite City, Ill., has been appointed vice-president of the Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago, furnace engineer.

T. L. Simpson has been placed in charge of a branch office which has been opened at 1209 Empire Building, Pittsburgh, by the American Cast Iron Pipe Co., Birmingham.

Welding Prizes Awarded at Meeting of Mechanical Engineers

PITTSBURGH, May 15.—The Lincoln arc welding prizes were awarded at the business session of the American Society of Mechanical Engineers, which is now holding its spring meeting at Pittsburgh. Three awards were made for essays which were held to contribute materially to the art of arc welding. The society had engaged some time ago to conduct the competition and had appointed a committee of judges under the chairmanship of L. P. Alford, J. F. Lincoln, president Lincoln Electric Co., Cleveland, explained the purpose of the contest as aiming particularly toward advancement of the art. The first prize, carrying a check of $10,000, was awarded to James W. Owens, director of welding Newport News Shipbuilding & Dry Dock Co. His paper was entitled "Arc Welding, Its Fundamentals and Economics." It covers design and shop practice, together with an analysis of industrial applications and world-wide possibilities.

C. F. Bailey, engineering director Newport News company, represented President Homer Ferguson in expressing pleasure at the award and eulogy of the winner. The second prize went to Prof. Henry Dustin, of the faculty of applied science, University of Brussels, Belgium. This was for $5,000. The third prize, $2,500, was awarded to Com. H. E. Rossell, mathematics department, Naval Academy, Annapolis.

OBITUARY

A. M. CAMPBELL

ARCHER MAYNARD CAMPBELL, chairman of the board of the Glamorgan Pipe & Foundry Co., Lynchburg, Va., whose death on May 7 was metioned in THE IRON AGE last week, was born at Lynchburg in 1873 and had been identified with the Glamorgan company since 1888. He began work in clerical capacities and was advanced through various executive positions until he became president of the company in 1916. He had been chairman since 1921. Mr. Campbell had taken an active part in the industry with which he had been identified and had served as chairman of the Cast Iron Pipe Research Association since its formation in 1915. He was also a councillor in the United States Chamber of Commerce and was a director of the United Cigarette Machine Co. and of numerous other financial and industrial companies. A brother, H. L. Campbell, is president of the Glamorgan company.

MICHAEL BLAKE, for many years president Federal Iron & Metal Co., Newark, N. J., died on April 30 at Tucson, Ariz., where he had been living since the first of the year on account of illness. He was 59 years of age and had been engaged in the scrap metal business in the East for more than 40 years. During the war he served on the Mayor's Committee of National Defense of New York, and at the time of his death he was a member of the American Iron and Steel Institute and of the Chamber of Commerce of Newark.

Memory of Charles A. Coffin Honored

In the presence of more than 10,000 employees, the board of directors and a few invited guests, a bronze tablet honoring the memory of Charles A. Coffin, founder of the General Electric Co., was unveiled by Miss Alice Coffin, his daughter, May 8, at the Schenectady plant of that company. Elaborate ceremonies included an address by E. W. Rice, Jr., honorary chairman of the General Electric board. The fund which made the tablet possible was established 25 years ago by General Electric employees.

Industrial activity in the New England States in the first quarter of the year is estimated by *Electrical World* at 113.7, on the basis of 100 as the average monthly figure for 1923 to 1925. This shows a reduction of 2.7 per cent from the average of 116.8 for the first quarter of 1927. A number of industries, however, showed a gain, these including chemicals, leather, metals, paper and rubber. The metals were 126.5, against 118.7 a year earlier.

Where Steel Exports Went in First Quarter

Canada Took 119,249 Tons of Nine Leading Items—Japan Retains Second Position with 42,268 Tons, Followed by Philippines, 12,153 Tons; Argentina, 11,505 Tons; Brazil, 10,923 Tons; Mexico, 10,467 Tons

Exports from United States, by Countries of Destination

(*In Gross Tons*)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*12,787*	*10,027*	*33,991*	*29,347*	*15,531*	*13,428*	*37,947*	*44,362*	*13,292*	*15,433*	*44,135*	*48,647*
Canada	10,784	9,143	28,959	23,676	3,072	2,936	7,397	7,150	6,533	6,587	15,810	18,101
Japan	8	64	355	312	548	227	644	733	4,978	7,115	22,130	24,367
Cuba	38	35	97	91	510	906	1,402	4,191	239	137	650	329
Philippine Islands	591	109	649	123	2,715	1,068	7,066	5,178	97	580	860	1,083
Mexico	78	62	150	114	563	668	1,490	1,680	160	....	505	439
Argentina	....	....	....	....	535	1,148	1,910	3,041	174	228	454	615
Chile	....	....	....	....	....	78	....	741	33	13	61	453
Colombia	....	....	....	....	389	595	1,672	2,168	....	....	217	215

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*15,798*	*13,701*	*54,403*	*55,844*	*7,076*	*3,463*	*17,031*	*7,871*	*5,072*	*2,663*	*12,070*	*7,175*
Canada	699	788	1,885	3,802	610	708	951	966	2,299	1,912	4,944	4,336
Japan	1,462	1,255	3,358	14,090	....	....	....	....	108	11	224	382
Cuba	46	295	596	3,939	370	63	929	222	103	70	164	306
Philippine Islands	....	....	3,236	....	....	....	303	....	....	....	39	....
Mexico	1,372	865	2,166	2,208	468	449	1,517	952	238	250	550	511
Argentina	....	....	1,360	....	....	....	3,154	....	....	....	....	....
Chile	2,409	7	7,513	10	....	....	67	....	....	....	....	....
Colombia	865	152	3,081	397	486	302	948	....	....	....	....	....
Brazil	2,514	5,501	7,134	12,586	1,675	237	3,539	493	44	23	250	78
Australia	....	....	....	....	....	....	....	....	259	81	259	302

	Tin Plate				Steel Bars				Plain Heavy Structural Material			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*22,755*	*26,817*	*60,552*	*97,468*	*12,005*	*9,115*	*30,566*	*31,504*	*15,148*	*8,976*	*38,366*	*25,146*
Canada	4,439	5,204	9,804	12,978	7,182	5,648	18,429	18,069	11,682	7,182	31,070	19,404
Japan	2,769	5,741	14,438	20,095	39	213	252	328	329	436	867	755
Cuba	650	275	1,053	870	598	297	1,194	608	606	718	1,320	1,909
Mexico	2,018	39	4,089	3,349	210	....	....	....	....	....	....	....
Argentina	2,260	4,250	4,627	15,904	....	....	....	....	....	13	....	136
Chile	311	163	909	1,470	....	....	....	....	158	163	636	290
Brazil	1,045	....	....	2,048	....	....	....	....	....	....	....	....
China	2,647	3,240	3,650	7,317	....	....	....	....	....	....	....	....
British India	1,627	154	1,627	3,369	....	....	....	....	....	....	....	....
United Kingdom	74	607	74	3,960	1,586	957	4,271	5,823	....	....	....	....
Italy	2,142	1,466	3,611	3,471	....	....	....	....	....	....	....	....

Destination of All Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	March, 1928	January through March 1928	January through March 1927
North and Central America and the West Indies	*116,916*	*288,724*	*242,371*
Canada and Newfoundland	93,678	231,485	182,093
Cuba	6,364	16,800	21,920
Mexico	9,414	20,002	19,906
Guatemala	447	4,364	2,544
Panama	2,478	4.507	3,899
Salvador	219	731	1,247
British West Indies	743	1,762	3,026
Other West Indies	1,302	4,759	3,973
Other Central America	2,271	4,314	3,763
South America	*39,803*	*104,239*	*111,422*
Argentina	8,113	23,568	24,783
Brazil	9,421	20,211	24,779
Chile	5,860	18,120	6,102
Colombia	6,083	16,825	22,700
Peru	4,095	8,269	3,956
Uruguay	841	1,799	4,595
Venezuela	4,694	13,970	23,932
Other South America	696	1,477	575
Europe	*14,467*	*39,784*	*35,028*
Belgium	616	3,699	793
France	328	817	670
Greece	45	117	800
Italy	2,328	4,011	4,108
Netherlands	164	796	1,023
Russia	20	1,222	1,149
United Kingdom	4,036	13,262	20,069
Other Europe	6,921	15,860	6,416
Far East	*49,015*	*176,519*	*160,167*
British Malaya	851	1,921	4,250
China	9,451	32,957	22,253
Dutch East Indies	2,340	6,403	12,025
India and Ceylon	3,492	9,620	11,728
Japan and Chosen	19,344	91,884	80,748
Kwangtung	344	1,870	4,517
Philippine Islands	10,868	25,484	11,455
Australia	1,296	4,478	7,776
New Zealand	54	496	475
Other Asia and Far East	975	1,406	4,940
Africa	*1,734*	*4,350*	*4,463*
British South Africa	794	2,140	1,513
Egypt	685	1,419	1,411
Mozambique	38	208	1,149
Other Africa	217	583	390
Total	221,935	613,619	553,451

Machinery Markets and News of the Works

BUSINESS STEADY

Demand Well Distributed and Tools Are Largely for Replacement

New Inquiry Includes Equipment for Chicago Continuation School

ALTHOUGH there has been a slight decline in machine tool orders in some districts, the letdown is attributed to seasonal conditions and little significance is attached to it by some of the larger builders. Pending business is still of good volume, and, taken as a whole, market activity may be characterized as steady.

Favorable conditions are also indicated by the monthly review of the National Machine Tool Builders Association, issued May 10, which points out that indexes used to measure general business conditions are rather uniformly favorable, and that the machine tool industry is no exception to this general rule.

"Demand for machine tools seems to have been coming from broadly distributed sources, without such concentration in the automotive industry as there was in 1923 and 1924," states the review. "The result is a healthier demand. Another favorable factor is that the business coming out is very largely a replacement rather than an expansive business."

The railroads have shown little interest in the market during the past week. Activity in the Detroit district has been slow, and business from some of the companies that have taken Ford contracts has not been of the volume expected.

Among new inquiries is a list of three tools for a continuation school in Chicago. Orders for the nine machines for the Alexander Hamilton junior high school, Cleveland, have been placed.

It is reported in New England that good demand for small tools continues, the volume of this business so far this month being greater than that in the same period in April, the best month to date in 1928.

Price advances in woodworking equipment are noted in the Cleveland district.

New York

NEW YORK, May 15.

REPORTS from the local machine tool trade quite uniformly point to a slight falling off in business in the first half of May, compared with the last half of April. A fair amount of buying is being done, however, and a good deal of inquiry is pending. Sales are frequently governed by the promise of delivery rather than price. Some machine tool builders have certain sizes and types of machines in stock, while others quote deliveries ranging from one to three months. Mack Trucks, Inc., has bought a few machines for its New Brunswick, N. J., plant. The New York, New Haven & Hartford Railroad has inquired for a few machines. The New York Central Railroad continues to send out inquiries, but has done very little buying. A promising prospect for the near future is the large requirements of the Wright Aeronautical Corporation, but no inquiries have yet appeared.

The Niles-Bement-Pond Co., including the Pratt & Whitney division, reports the following sales: A 6-ft. plain Right-Line radial drill, a 60-in. horizontal boring mill, a Cincinnati No. 2 B I high-speed drilling machine, a Ransom No. 109 grinder, a Long & Allstatter vertical I-beam punch, a Brown & Sharpe No. 1 wire feed screw machine, an Oster 16-in. shaper, a used 48-in., 200-ton wheel press, a 13 x 48-in. lathe, a 16 x 36-in. lathe, three 5-in. production hand milling machines, a No. 2 jig borer, a 12-in. vertical shaper, a 14-in. surface grinder, two 3-spindle Sigourney drilling machines.

Chain Products Co., Cooper Avenue and Pennsylvania Railroad, Cleveland, manufacturer of Hodell chains, has removed its New York office from 150-152 Chambers Street to 200 Varick Street. Thomas A. Troy is the New York manager.

Ireland Aircraft, Inc., Garden City, N. Y., has been organized to manufacture flying boats. Company has plant at Garden City, where entire plane is built, with exception of motor, instruments, etc., and is in market for materials.

Automatic Metal Drawing & Stampings, Inc., 30 Church Street, New York, has been formed to manufacture sheet metal drawings and stampings. Company also make dies when not supplied by customer. Plant is in New York.

Contract has been let by New York, New Haven & Hartford Railroad Co., Grand Central Terminal, New York, to Babor-Comeau & Co., Inc., same address, for proposed two-story electric inspection and operating shop, 106 x 375 ft., on Mathews Avenue, to cost $180,000, with equipment.

Nichols Copper Co., Laurel Hill, L. I., has disposed of block of 140,000 shares of stock to net more than $4,000,000, entire proceeds to be used exclusively for new electrolytic copper refining plant in southwestern district; site will soon be selected. An option has been secured on property in Ascarate district, near El Paso, Tex., with view to utilizing for proposed mill. Plans will soon be drawn. Company is affiliated with Calumet & Arizona Mining Co., New Cornelia Copper Co., and Phelps Dodge Corporation, 99 John Street, New York. C. Walter Nichols is president; Frank E. Lee is secretary. Walter Douglas, president of Phelps Dodge organization, will be active in project.

Andrew J. Thomas, 2 West Forty-sixth Street, New York, architect, has filed plans for extensions and improvements in two-story service, repair and garage building at 335-37 East Forty-seventh Street, reported to cost close to $100,000, with equipment.

Superintendent of Lighthouses, Staten Island, N. Y., is asking bids until May 21, for four 2-kw. automatic gasoline engine-driven generator units, proposal 26993.

Purty Boat Works, Inc., Bayview Colony, Port Washington, N. Y., has awarded general contract to Standard Erecting Corporation, 551 Fifth Avenue, New York, for one-story boat-building and ship repair works, to cost about $175,000 with equipment. Ned Purty is president.

Department of Plant and Structures, Municipal Building, New York, will soon begin construction of municipal airport on Barren Island, Jamaica Bay, comprising hangars, equipment and repair shops, oil storage and distributing buildings and other mechanical units, estimated to cost $500,000, in which amount appropriation has been made.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in new baking plant unit to be built by Cox Baking Co., Inc., Van Wyck Boulevard and Ninety-first Street, Jamaica, L. I., reported to cost about $100,000.

Hugo E. Magnuson, 420 Lexington Avenue, New York, architect, has plans under way for five-story automobile service, repair and garage building at 1076-82 First Avenue, to cost approximately $190,000 with equipment.

Street Cleaning Department, Municipal Building, New York, has been granted appropriation of $2,052,495, by Board of Estimate, for construction of six steel and con-

The Crane Market

THERE is only a small volume of new inquiry for electric overhead and locomotive cranes. No action has been taken as yet by Dwight P. Robinson & Co., New York, on six crawl tread locomotive cranes and seven steam shovels for use at Buenos Aires, Argentina. The Mullaney Iron Works, West New York, N. J., is about to close on a 10-ton, 60-ft. span, electric traveling crane. Two 15-ton lumber handling cranes and a 10-ton crawl tread locomotive crane for the Franklin Lumber Co., Newark, N. J., are still pending.

Among recent purchases are:

New York Edison Co., New York, 100-ton, 31-ft. 8-in. span, 3-motor overhead crane from Niles Crane Corporation.

General Electric Co., Schenectady, N. Y., 15-ton, 90-ft. span, 4-motor gantry crane reported purchased from Alliance Machine Co.

Public Service Production Co., Newark, N. J., 10-ton, 17-ft. 8-in. span hand power crane for Trenton, N. J., from New Jersey Foundry & Machine Co.

La Cour Iron Works, Hunters Point Avenue, Brooklyn, N. Y., 7½-ton, 45-ft. span, 3-motor overhead crane from Box Crane & Hoist Corporation.

Gilbert & Barker Mfg. Co., Springfield, Mass., two 5-ton electric transfer cranes, two 1-ton single I-beam cranes, one 5-ton and one 2-ton electric hoists from an unnamed builder.

Gaffney Construction Corporation, Zerega and Storey Avenues, New York, two 7½-ton crawl tread locomotive cranes from Browning Crane Co.

Welker & Wade, Inc., New York, one truck crane from Browning Crane Co.

Atchison, Topeka & Santa Fe, six gib cranes for several of its shops from unnamed bidder.

Link-Belt Co., Chicago, 15-ton electric crane from Shaw Electric Crane Works and a 5-ton and two 3-ton overhead electric cranes from Cleveland Crane & Engineering Co.

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crete dumping and handling stations on waterfront, replacing present wooden units, with installation of unloading, conveying and other mechanical handling equipment.

Westchester Service Corporation, New Rochelle, N. Y., recently formed to take over and consolidate group of ice manufacturing plants at Mount Vernon, New Rochelle, Port Chester, White Plains and Yonkers, is disposing of preferred stock issue to total $600,000, a portion of proceeds to be used for extensions and improvements.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has arranged fund of $476,000, for mechanical equipment in proposed three-story Samuel Tilden high school at Beverly Road and East Fifty-ninth Street, Brooklyn, for which plans will soon be completed. Entire structure will cost $1,891,000.

In connection with proposed future development of its properties, Cerro de Pasco Copper Corporation, 44 Wall Street, New York, contemplates installation of electrolytic zinc plant, with water power facilities and other expansion, estimated to cost $5,000,000. E. H. Clark is vice-president.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has plans for two one-story equipment storage and distributing buildings, with repair facilities, each 35 x 136 ft., at Walnut Avenue and 134th Street, to cost $50,000. Thomas E. Murray, Inc., 55 Duane Street, is architect and engineer.

Signal Corps Procurement District, Governors Island, New York, is asking bids until May 22, for 250 manhole frames and 200 manhole covers, circular 158.

Village School Board, Dobbs Ferry, N. Y., has plans for a one-story trade school building and mechanical shop for automobile work. P. B. Nichols, Depot Plaza, West Plains, N. Y., is architect.

Frederick J. Maywald, William and Main Streets, Belleville, N. J., chemist, and associates are organizing new company to be known as Fremay Co., to establish and operate plant at Carlstadt, N. J., for manufacture of rubber products. Former factory of S. Klaber & Co., Hoboken Road and Tenth Street, Carlstadt, marble and stone products, has been acquired, and will be remodeled and equipped at early date.

Simmons Co., Brunswick Avenue, Linden, N. J., manufacturer of brass and other metal bedsteads, with main plant at Kenosha, Wis., has plans for a new one-story addition to local factory, including improvements in present plant, reported to cost in excess of $50,000. Company has arranged for increase in capital from 1,000,000 to 2,000,000 shares of stock, no par value, portion of fund to be used for expansion at different branch plants throughout country.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, contemplates installation of new pumping plant in connection with water supply system at Wanaque, N. J., to cost $300,000, with machinery. George W. Fuller is engineer.

D. W. May, Inc., 380 Central Avenue, Newark, electrical equipment and supplies, automotive specialties, etc., has plans in progress for two one-story factory units, reported to cost more than $50,000. Marshall N. Shoemaker, 15 Central Avenue, is architect and engineer.

Syndicate Toy & Novelty Co., 181 Chestnut Street, Newark, has leased space in factory at 339 Chestnut Street, for expansion. Present works will be removed to new location and capacity increased.

American Telephone & Telegraph Co., 195 Broadway, New York, has acquired tract of land between Netcong and Flanders, Morris County, N. J., as site for new radio receiving station for trans-Atlantic service, to include steel towers, power station, etc.

Sonatron Tube Co., 88 Eighth Avenue, Newark, manufacturer of radio equipment, is disposing of a stock issue to total about $652,000, a portion of fund to be used for expansion.

Board of Public Works, City Hall, Paterson, N. J., will receive bids until June 12, for refuse destructor plant equipment, including monorail grab-bucket type electric hoist; electric skip and tub hoists, ash bunker, tunnel trackage, tip cars, and movable hopper; pneumatic ash conveyor system complete; and ventilating, air washing and chlorinating system complete. Plans and specifications at office of city engineer, City Hall.

New England

BOSTON, May 15.

MACHINE tool dealers in New England States except Connecticut report little business of importance. Connecticut dealers are getting some good business, particularly in lathes, radial drills, milling machines and grinding equipment. Quite a few Connecticut industrial plants are running well in excess of operations a year ago, and practically all of those directly or indirectly affiliated with the iron and steel business are more active than they have been in a long time. Among sales reported locally the past week were a new 20-ft. x 12-in. Monotrol lathe, a new 20-in. upright drill, a new 10-ft. bending roll, and a large used planing machine. Quite a few core making machines were sold to foundries. The Boston & Albany Railroad may make purchases this week. Small tools continue to sell freely.

The General Electric Co. has booked 28 electric-drive equipments for gasoline buses for the Boston Elevated Railway.

New company to be known as the Maine Steel Products Co. will shortly be announced. It will practically be a re-establishment of the Union Iron Works, Bangor, Me., but will be located at South Portland. It is to manufacture steel snow plows, snow removal machines and various other types of highway construction equipment.

Baird Machine Co., Bridgeport, Conn., is to erect one-story, 110 x 150-ft. machine shop to cost, without equipment, $80,000.

Davis-Furber Machine Co., Water Street, North Andover, Mass., has started a two-story, 30 x 50-ft. foundry addition.

George Howard & Sons Co., Brockton, Mass., has been awarded contract to build a two-story cold storage plant for Cudahy Packing Co., at North Montello, Mass. Conveying equipment is required.

Fafnir Bearing Co., New Britain, Conn., has been granted permission to build a two-story, 60 x 70-ft. and a one-story, 60 x 120-ft. plant additions to cost, without equipment, $56,000.

Kenney Mfg. Co., Wellingford Avenue, Cranston, R. I., curtain rods, has started work on a two-story, 66 x 120-ft. plant addition. E. B. Whipple, Weybosset Street, Providence, R. I., is engineer.

Real estate, machinery and equipment of Vermont Machine Co., Inc., Bellows Falls, Vt., will be sold at public auction May 17 and 18.

Boston Gear Works, Inc., Norfolk Downs, Mass., manufacturer of standardized gears, speed reducers and power transmission equipment, has erected brick and concrete plant addition, 67 x 95 ft. Building is of three stories, the third given over to company's recreation facilities.

Contract has been let by Collyer Insulated Wire Co., North Main Street, Pawtucket, R. I., manufacturer electrical wires, etc., to Henry M. Soule, 110 Brook Street, for a three-story addition, 75 x 105 ft. to cost about $115,000 with equipment. Monahan & Meikle, Main Street, are architects.

Ever-Spark Plug Co., Inc., Fitchburg, Mass., has acquired one of local mill units of Grant Yarn Co., for consideration of $38,000, and will equip for a new plant.

Rumford Falls Power Co., Rumford, Me., controlled by Oxford Paper Co., same address, has arranged for bond issue of $2,000,000, a portion of fund to be used for expansion in generating and transmission facilities. Hugh J. Chisholm is president.

Connecticut Light & Power Co., Hartford, Conn., has awarded contract to United Gas Improvement Contracting Co., Broad and Arch Streets, Philadelphia, for additions to gas storage and distributing works on Harbor Avenue, Norwalk, Conn., to cost $150,000.

William H. Haskell Co., Bailey Street, Pawtucket, R. I., manufacturer of expansion bolts, studs, etc., has awarded general contract to Cruise Construction Co., Pawtucket, for one-story addition to machine shop, 60 x 66 ft. Warren B. Lewis is engineer.

Atlas Plywood Corporation, 31 St. James Avenue, Boston, has arranged for increase in capital stock from 50,000 to 100,000 shares, no par value. A bond issue of $2,500,000 is being sold, a considerable portion of proceeds to be used for expansion, including acquisition of Empire Mfg. Co., Goldsboro, N. C., manufacturer of textile frames and equipment, and for expansion of such line of production in Southern territory.

Rosenblatt Brothers, Mallaney Building, Framingham, Mass., architects, will soon begin construction of one-story automobile service, repair and garage building, 100 x 140 ft., at Union Avenue and Mount Wayte Road, to cost about $90,000 with equipment.

C. H. Smith Corporation, 33 Sylvan Street, West Springfield, Mass., manufacturer of wire cloth, etc., has begun erection of one-story addition, 36 x 70 ft., for which general contract was let recently to Unit Construction Co., Springfield. R. G. Milliken is manager.

Raybestos Co., Bridgeport, Conn., manufacturer of automobile brake lining, etc., is disposing of stock issue to total $1,960,000, portion of fund to be used for expansion. Company operates subsidiaries and branch plants at Stratford, Conn., Charleston, S. C., and Peterborough, Ont. Sumner Simpson is president.

Henry Weyand Co., Brown Place, Waterbury, Conn., manufacturer of pipe, pipe bends, etc., has plans nearing completion for one-story addition, 18 x 105 ft., for which bids will be asked by Thomas M. Freney, Waterbury, architect.

Greenfield Electric Light & Power Co., Greenfield, Mass., has secured permission to dispose of stock issue totaling 300,000 shares, a portion of proceeds to be used for expansion and improvements.

St. Louis

St. Louis, May 15.

PLANS are being considered by International Oil Heating Co., 3939 Magnolia Street, St. Louis, manufacturer of oil burning equipment for a new one-story plant, reported to cost about $20,000.

Cudahy Packing Co., 111 West Monroe Street, Chicago, meat packer, has awarded general contract to Miller-Straub Construction Co., Railway Exchange Building, Kansas City, Mo., for new six-story packing plant, with power and refrigerating departments, at Kansas City, Kan., to cost approximately $400,000, with equipment.

Officials of Braden Steel & Winch Co., Tulsa, Okla., manufacturer of sectional steel buildings, steel derricks, etc., have organized a new subsidiary to be known as Braden Steel Corporation to take over and expand the structural steel branch of business. Present company will continue to function as heretofore and plans extensions in its division.

Oklahoma Portland Cement Co., Perrine Building, Oklahoma City, Okla., has purchased tract of about 100 acres of land near Saratoga, Ark., and is said to be planning construction of new mill to cost more than $600,000, with equipment. M. O. Mathews is manager.

Board of Trustees, University of Arkansas, Fayetteville, is considering rebuilding of engineering laboratory and machine shop on campus, destroyed by fire, May 4, with loss reported in excess of $100,000, including equipment.

Viking Refrigerator Co., 7500 Independence Road, Kansas City, Mo., manufacturer of refrigerators, etc., has awarded general contract to Charles F. Woodling, 126 South Van Brunt Street, for a one-story addition, reported to cost more than $20,000, with equipment.

Board of Education, University City, Mo., is having plans completed for first unit of new senior high school, with manual training department, to cost approximately $450,000, for which bids will be received in near future. Ferrand & Fitch, 6188 Delmar Boulevard, St. Louis, are architects.

Talbot Mfg. Co., 1213 Chestnut Street, St. Louis, Albert R. Walker, head, recently formed by Mr. Walker and associates, is said to be planning operation of local plant for manufacture of electrical equipment and devices.

Phillips Petroleum Co., Bartlesville, Okla., has begun an expansion and improvement program at gasoline refining plants, reported to cost close to $450,000 with equipment. Work will include addition to Pampa plant in Texas Panhandle to develop a capacity of about 25,000 gal. per day; new plant in Hutchinson County, Tex., to be equipped for ultimate output of 20,000 gal. per day, to be known as Rock Creek plant; new plant at Sanford, Tex., now nearing completion, with capacity in excess of 18,000 gal. per day; and proposed new plant in Texroy district, Panhandle field, to be equipped for output of more than 15,000 gal. daily.

Board of Education, Stillwater, Okla., will soon break ground for proposed one-story manual training school, 100 x 100 ft., to cost more than $70,000, with equipment. Philip A. Wilbur, Architectural Department, Agricultural and Mechanical College, Stillwater, is architect.

Missouri Insulating & Refractories Corporation, St. Louis, has been formed by Frederick E. Kern, Syndicate Trust Building, and associates, to carry out proposed new mill on Clayton Road for manufacture of firebrick, insulating brick and other refractories, to cost more than $150,000, including equipment.

General Airplane Co., Wichita, Kan., M. L. Howe, president, is reported planning a new branch plant at Muskogee, Okla., to cost more than $25,000, with equipment.

Cleveland

Cleveland, May 14.

MACHINE tool business continues fair, although not quite up to the April volume. Orders with few exceptions are for single machines. April was the best month of the year with some of the local dealers, whose total volume of sales was helped materially by good orders from two or three companies equipping plants for making parts for Ford cars. Business from other companies that have taken Ford contracts has not materialized to the extent that was expected. Activity in the Detroit territory is rather slow. Turret lathes are moving well in single machine orders from scattered sources. The Cleveland Board of Education, which recently inquired for nine metal and woodworking machines for the Alexander Hamilton Junior High School, placed its orders during the week, dividing the business among several dealers. The Electric Auto-Lite Co., Toledo, purchased a few small machines. A price advance of from 7 to 10 per cent, and in a few cases as much as 15 per cent, was announced on woodworking machinery.

Erie City Iron Works, Erie, Pa., maker of powdered fuel equipment, steam boilers and engines, gray iron castings and fabricated steel, has established direct sales office at 1105 Leader Building, Cleveland, with Eugene Smith as district manager.

Ohio Power Shovel Co., Lima, Ohio, maker of gasoline shovels, has opened an office at 30 Church Street, New York, with L. H. Morris in charge; a Philadelphia office at 1119 South Fifty-sixth Street, in charge of E. E. Fort, and a Chicago office at 1250 Straus Building, with H. P. Steinbrenner in charge.

Contract has been let by Acme Auto Radiator Co., 7707 Carnegie Avenue, Cleveland, to A. H. Binns & Co., 7504 Carnegie Avenue, for one-story addition, 40 x 175 ft., to cost about $60,000 with equipment. T. C. Cerny, 4025 East Fifty-second Street, is architect. J. T. Bares is manager.

Solomon Auto Parts Co., Fostoria, Ohio, plans rebuilding of portion of works destroyed by fire, May 4, with loss reported in excess of $40,000 with equipment.

Toledo Central Garages, Inc., Produce Exchange Building, M. O. Baker, head, has plans nearing completion for six-story service, repair and garage building on Superior Street, near Monroe Street, to cost in excess of $250,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Building, are architects.

B. F. Goodrich Co., Akron, Ohio, manufacturer of tires, mechanical rubber goods, etc., is arranging for increase in capital from 750,000 to 1,000,000 shares of stock, no par value, a portion of proceeds to be used for expansion. A new plant is being completed at Los Angeles, with rated capacity of 6000 tires and 7500 tubes per day. Plans are reported under consideration for rebuilding of plant at Tokio, Japan, to cost more than $500,000.

Gledhill & Kime Lumber Co., Cresline, Ohio, is planning installation of additional machinery at its mill, including motor-driven saws, combination wood-working machine, and other tools.

Spicer Mfg. Corporation, South Plainfield, N. J., manufacturer of universal joints, axles, etc., has completed construction of branch plant at Toledo, Ohio, and will develop capacity to increase present gross output at all plants about 50 per cent. New plant will be operated under name of Dana Mfg. Co., and represents investment of close to $500,000. Charles A. Dana is president.

J. E. Orford, Jefferson, Ohio, has awarded general contract to Lakeshore Construction Co., Ashtabula, Ohio, for a one-story automobile service, repair and garage building on Chestnut Street, to cost close to $65,000, with equipment.

Gulf States

BIRMINGHAM, May 15.

PLANS are being arranged by Gonzales Cement Works, Gonzales, Tex., for removal of mill to San Antonio, Tex., where consolidation will be carried out with another plant at that place. Proposed to increase capacity with installation of additional equipment.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in proposed two-story addition to be erected by Malbis Baking Co., 871 Broad Street, Mobile, Ala., 100 x 160 ft., to cost about $70,000, with equipment.

Marianna Lime Products Co., Marianna, Fla., has acquired limestone properties of Lime Products Co., White Cliffs, Little River County, Ark., and plans early construction of new plant for manufacture of lime products, reported to cost more than $90,000, with machinery. A. M. Lewis heads first-noted company.

Humble Pipe Line Co., operated by Humble Oil & Refining Co., Houston, Tex., will build two docks at Aransas Pass, Tex., with elevating, conveying and other handling equipment, estimated to cost $200,000.

Central Power & Light Co., San Antonio, Tex., has acquired Nixon Electric Light & Power Co., Nixon, Tex., and will operate as subsidiary. Plans are under way for extensions in Nixon district, including installation of transmission lines.

Herman Rosch, city clerk, El Paso, Tex., is asking bids until May 24, for buildings for municipal airport, including hangar with repair facilities, lighting system for landing field, etc.

Golden West Oil Co., National Bank of Commerce Building, San Antonio, Tex., is planning construction of new refining plant in Medina County for lubricating and other refined oils, reported to cost more than $85,000, with equipment.

Belchie & Laskey, Inc., Slattery Building, Shreveport, La., has surveys under way for a new 16 and 20-in. pipe line from Richmond to Lafayette, La., for natural gas transmission, reported to cost more than $100,000.

Chevrolet Motor Co., Laredo, Tex., local representative for Chevrolet automobile, will soon begin work on one-story service, repair and garage addition, 55 x 110 ft., reported to cost in excess of $80,000, with equipment. Guy M. Trout, Ramos Building, is architect.

Board of Water Commissioners, Dallas, Tex., will soon take bids for equipment for large central pumping plant in connection with $4,000,000 expansion and improvement program for municipal waterworks. Fuller & McClintock, 170 Broadway, New York, are consulting engineers. S. E. Moss is head of board.

City Council, Vernon, Tex., has approved plans for a one-story municipal electric light and power plant, reported to cost about $30,000, with equipment. A traveling crane will be installed. R. H. Stuckey, Vernon, is architect.

Board of Education, Big Spring, Tex., is said to be planning installation of manual training equipment in proposed three-story high school addition, reported to cost in excess of $175,000. Trost & Trost, Two Republics Building, El Paso, Tex., are architects.

American Potash Co., Dallas, Tex., care of T. G. Leachman, 3725 Stratford Avenue, recently organized, has taken title to potash properties in vicinity of Odessa, Tex., and plans early installation of complete mining plant. A refining plant for daily capacity of about 2000 tons will be installed. Entire project is reported to cost more than $500,000. Max Agress has been elected president.

Tritex Oil Co., Gunter Building, San Antonio, Tex., is planning construction of pipe line, about 15 miles long, to Uvalde, Tex., and vicinity, for natural gas supply, reported to cost approximately $50,000, with equipment.

Linde Air Products Co., 30 East Forty-second Street, New York, a subsidiary of Union Carbide & Carbon Corporation, same address, will soon begin work on first unit of new industrial oxygen plant at Shreveport, La., to cost about $45,000, with equipment. Other units will be built at later date.

Duval-Texas Sulphur Co., Second National Bank Building, Houston, Tex., J. W. Cain, president, plans installation of mining plant on sulphur properties in vicinity of San Diego, Duval County, to cost more than $80,000, with machinery. Company has arranged with Houston Gulf Gas Co. for construction of pipe line to plant site for fuel supply.

Stilwell Benzol Refining Co., Port Arthur, Tex., A. E. Stilwell, head, is reported planning a new refining plant on local site, with rated output of about 800 bbl. per day, to cost approximately $300,000, with machinery.

City Council, Laredo, Tex., has acquired a tract of about 400 acres of land for municipal airport and plans early construction of hangars, repair shop, oil storage and distributing building, and other mechanical structures.

Philadelphia

PHILADELPHIA, May 15.

PLANS have been filed by Pennsylvania Railroad Co., Philadelphia, for eight-story cold storage and refrigerating plant on Oregon Avenue, near Delaware Avenue, with one-story unit adjoining for power service, etc., to cost close to $1,100,000, for which erection contract has been let to United Engineers & Constructors, Inc., 125 East Forty-sixth Street, New York. Day & Zimmermann, Inc., Sixteenth and Walnut Streets, is engineer.

Welsbach Street Lighting Co. of America, Twentieth and Arch Streets, Philadelphia, manufacturer and operator of highway gas-lighting equipment, has leased two-story factory, 60 x 275 ft., to be erected at Westmoreland and Stokley Streets, reported to cost in excess of $75,000, for a new plant. E. A. Stopper, 10 South Eighteenth Street, is architect.

Union Dental Instrument Mfg. Co., 831 Cherry Street, Philadelphia, has purchased property at 700-2 North Franklin Street, and will have plans drawn for a new plant, totaling about 20,000 sq. ft. floor space.

American Brown-Boveri Corporation, 420 Lexington Avenue, New York, operating former plant of New York Shipbuilding Co., Camden, N. J., has taken an option on purchase of part of shipbuilding plant of William Cramp & Sons Ship & Engine Building Co., Richmond and Norris Streets, Philadelphia, where operations recently were discontinued, and purposes to use for new shipbuilding unit; majority of light machinery and portable equipment at plant has been sold, and will be replaced by purchasing company.

Crown Smelting Co., Chester, Pa., plans to devote a considerable part of production in future to manganese bronze propellers, and has secured a contract from Government for 20 naval propellers for scout cruiser service, totaling about $75,000.

Sentry Safety Control Co., Thirteenth and Cherry Streets, Philadelphia, manufacturer of safety devices and equipment for motion picture booths, etc., has leased additional space in building at location noted to double present quarters and will increase capacity. Joseph E. Cohen is president.

Barbour Brothers, Trenton, N. J., operating an iron and steel works at Marion Street and line of Reading Railroad, are having plans drawn for a one-story shop addition, 76 x 150 ft. Walter Hankin, 224 East Hanover Street, is architect.

Board of Education, Pleasantville, N. J., plans installation of manual training equipment in new three-story high school, reported to cost more than $200,000, for which bids will be asked in about a month. S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

Board of Trustees, Lafayette College, Easton, Pa., is having plans prepared for a three-story engineering building, to cost about $500,000 with equipment. C. Z. Klauder, 1429 Walnut Street, Philadelphia, is architect. Dr. Mathew Lewis is president.

James K. Peck, 1013 Olive Street, Scranton, Pa., and associates have organized Scranton Auto Body Co., to operate a local body-building and repair plant. H. E. Thomas, Scranton, is also interested in company.

Pusey & Jones Corporation, Wilmington, Del., has begun an expansion and improvement program in paper-making machinery division of plant, to include new forge shop and two-story woodworking plant, with installation of additional equipment in machine shop and foundry. Entire expansion will cost about $350,000.

New York & Pennsylvania Co., Lock Haven, Pa., is reported planning a new building at its paper mill to cost in excess of $200,000 with equipment. Headquarters are at 200 Fifth Avenue, New York.

Reading Co., Reading Terminal, Philadelphia, has work under way on extension and improvement program at engine terminal and shops at Sunbury, Pa., to include installation of additional equipment, estimated to cost about $100,000. Program will also provide facilities for handling repair and reconditioning of locomotives of Pennsylvania Railroad, which will abandon its present engine terminal at that place.

South Atlantic States

Baltimore, May 15.

CONTRACT has been let by C. Hoffberger & Co., 538 East Monument Street, Baltimore, operating ice-manufacturing and cold storage plants, to M. A. Long Co., 10 West Chase Street, for an eleven-story and basement cold storage and refrigerating plant, 115 x 140 ft., to cost $1,000,000 with machinery. It will provide 1,330,000 cu. ft. of space. John H. Wickersham, Lancaster, Pa., is engineer.

Board of Education, Baltimore, plans installation of manual training equipment in proposed four-story junior high school on site selected on Barrington Road, near Garrison Boulevard, reported to cost $1,000,000, for which architect will soon be appointed. H. J. Leimbach, Municipal Office Building, is chief engineer, Public Improvement Commission, in charge.

Annapolis & Chesapeake Bay Power Co., Annapolis, Md., operated by Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has secured permission to acquire Herald Harbor Power Co. and Severna Electric Co., Anne Arundel County, and will consolidate with system. Plans under consideration for expansion in acquired properties, including transmission line construction.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until June 13, for 12,138 lineal ft. wire fencing for naval petroleum reserve No. 3, Natrona, Wyo., 7 ft. high, non-climbable type with link chain, diamond mesh wire fabric, extension arms, etc., specification 5610. Also, for salt water pumping plant for naval operating base, San Diego, Cal., no closing date stated, specification 5478.

General Public Service Corporation, Citizens Bank Building, Baltimore, Clarence B. Love, secretary, recently organized, has plans for a one-story plant, 75 x 125 ft., for manufacture of fertilizer products, to cost close to $40,000 with equipment. Howard Borden, Catonsville, Baltimore, is architect.

Toland & Son, 232 North Front Street, Baltimore, manufacturer of saws, tools, etc., plan early rebuilding of portion of plant recently destroyed by fire with loss estimated at close to $25,000 including equipment.

Chevrolet Motor Car Co., Flint, Mich., has completed initial units of new assembling plant at Atlanta, Ga., and will place in service at once. It is proposed to develop a production schedule of 6000 cars per month.

Board of Crisp County Power Commissioners, Cordele, Ga., is asking bids until July 10, for a hydroelectric power project on Flint River, to be operated as county property and for which appropriation of $1,250,000 has been approved. Project will include power dam; one-story power house, 40 x 150 ft.; two 3600-hp. vertical waterwheels, with generators and complete accessories. At later date, bids will be asked for additional generating equipment to develop gross output of 14,000 hp.; also, for transmission lines, etc. Emmett S. Killibrew, Albany, Ga., is engineer; J. E. Sirrine & Co., Greenville, S. C., are consulting engineers.

Yancey Brothers, 550 Whitehall Street, Atlanta, Ga., manufacturers of road-building machinery, are planning rebuilding of portion of machine shop destroyed by fire, May 4, with loss reported in excess of $20,000; storage and distributing building was also destroyed in same fire.

Roanoke Gas Light Co., Roanoke, Va., is planning extensions and improvements in plant and system, including construction of lines to Salem, Va., and vicinity, installation of air compressors and other equipment. W. J. McCorkingdale is manager and engineer.

American Creosoting Works, Inc., Bank of Commerce Building, Norfolk, Va., has plans completed for a new plant for distillation of creosote from coal tar, to be equipped for initial output of about 350,000 gal. per month, reported to cost in excess of $450,000 with machinery.

City Council, Kings Mountain, N. C., is asking bids until May 29 for a complete water purification plant for municipal waterworks, with capacity of 1,000,000 gal. Carolina Engineering Co., Johnston Building, Charlotte, N. C., is engineer.

Procter & Gamble Co., Sixth and Main Streets, Cincinnati, has awarded a general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for new soap manufacturing plant at Baltimore, where 8-acre tract of land recently was acquired in Locust Point district. Will consist of several units, with power house, machine shop and other mechanical buildings, reported to cost $4,000,000 with machinery.

Southern Factories & Stores Corporation, Richmond, Va., care of Rives Fleming, 3609 Hawthorne Avenue, recently formed with capital of $1,000,000, is said to be concluding arrangements for purchase of Cameron Stove Co., 2100 Decatur Street, and intends carrying out expansion program.

Bristol Gas & Electric Co., Bristol, Va.-Tenn., will carry out expansion and improvement program to cost about $500,000, including expansion in power facilities, installation of automatic power substations and transmission line construction. Company is under direction of Henry L. Doherty & Co., 60 Wall Street, New York.

Fruit Growers' Express Co., Munsey Building, Washington, W. D. Martin, chief engineer, is reported planning a new one-story ice-manufacturing plant at Aberdeen, N. C., 50 x 180 ft., with cold storage and refrigerating division, reported to cost more than $200,000 with machinery.

Chemical Warfare Service, Edgewood Arsenal, Md., will receive bids until May 22 for valves, traps, plugs, tees, unions, copper floats and kindred supplies, circular 101; for bolts, nuts, screws, clamps, gage glasses, oil cups, etc., circular 102; and for electric equipment, including compensators, switches, fuses, 30,000 ft. rubber-covered wire, etc., circular 103.

Detroit

Detroit, May 15.

GENERAL contract has been let by White Co., Seventy-ninth Street and St. Clair Avenue, Cleveland, manufacturer of motor trucks, to Corrick Brothers, Owen Building, Detroit, for one-story factory branch, with service and repair departments, on Twelfth Street, Detroit, to cost $150,000 with equipment. Hadlow, Hughes, Hicks & Conrad, Union Mortgage Building, Cleveland, are architects.

National Gas & Electric Co., Battle Creek, Mich., will make extensions and improvements in gas plant at Grand Haven, Mich., including installation of two 217-hp. boiler units and accessories, to cost about $35,000.

Machinery and equipment at plant of Wills-St. Claire Co., Marysville, Mich., manufacturer of automobiles, inactive since November last, has been sold to A. Shiffman and Theodore Friedeberg, 30 Church Street, New York, machinery dealers, who will dismantle the plant and dispose of tools and equipment at private sale. The plant originally carried a valuation of $2,000,000.

Monroe Auto Equipment, Monroe, Mich., manufacturer of tire pumps, automobile heaters, etc., has awarded general contract to Gettins & Kopitke Co., Fifteenth Street, Toledo, Ohio, for one-story addition, 55 x 175 ft., to cost in excess of $75,000 with equipment. Other expansion will be carried out at early date to cost approximately double this sum. C. O. Miniger, president, Electric Auto-Lite Co., Toledo, has acquired an interest in company and will become actively identified with management.

Chrysler Motor Corporation, Highland Park, Detroit, has plans in progress for a one-story power house, reported to cost in excess of $75,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are engineers. Company will proceed with immediate erection of new one-story unit for nickel-plating service, to cost close to $60,000 with equipment.

Officials of Roamer Motor Car Co., Kalamazoo, Mich., manufacturer of automobiles, have formed a new company under Delaware laws to be known as Roamer Consolidated Corporation, capitalized at $2,500,000, to take over and expand present company. Several companies in kindred field will be acquired by new organization and merger carried out. A. C. Barley, head of present concern, will act in same capacity with new corporation.

Wilson Foundry & Machine Co., Pontiac, Mich., affiliated with Willys-Overland Co., Toledo, Ohio, is carrying out an expansion program for increase in manufacture of six-cylinder motors for Whippet automobiles, to cost more than $500,000, the bulk of fund being used for new machinery and equipment. Working force has been increased by more than 500 men, making a total of more than 4300 operatives at plant, highest in history of company.

Wisconsin-Michigan Power Co., Iron River, Mich., will make extensions in transmission lines from Iron River to Phelps and vicinity, reported to cost close to $24,000.

Bohn Aluminum & Brass Co., 2512 East Grand Boulevard, Detroit, is said to have plans under way for an addition to plant devoted to production of aluminum pistons for aircraft motors, to increase present capacity by about 50 per cent. Company has recently secured large contracts for pistons for Whippet cars and other automobiles.

Michigan Transit Co., 6649 Dix Street, Detroit, has acquired a tract of waterfront property at Ecorse, Mich., totaling about 18 acres, and plans to use portion of site for a new dock, 1000 ft. long, to be equipped with elevating, conveying and other mechanical-handling equipment.

Contract for construction work on new dryer building for Postum Co., Battle Creek, Mich., has been let to H. G. Christman-Lansing Co., Lansing, Mich., and work will begin immediately with view to completion July 1. Lockwood, Greene & Co., Inc., Chicago, is engineer.

Hutchins Car Roofing Co., Detroit, has removed its office from 1203 Ford Building to 2310 Eaton Tower, Woodward Avenue at Grand Circus Park.

Durant Motors, Inc., Lansing, Mich., has awarded a general contract for a plant addition to H. G. Christman & Co.

Milwaukee

MILWAUKEE, May 14.

WHILE but slight gains are being made in the volume of machine-tool business, considerable satisfaction is expressed in some quarters over the fact that trade is well maintained. The lull in automotive buying is expected to be relieved, there having been a renewal of inquiry. Usually, however, requests for prices and deliveries cover but one or two machines. Several important industrial projects are developing in Milwaukee which will require considerable equipment. Moderate activity is reported in the used machinery market.

L. J. Mueller Furnace Co., 197 Reed Street, Milwaukee, a pioneer manufacturer of hot air and vapor heating furnaces, is preparing to engage extensively in the production of gas heating units for domestic, institutional and industrial heating. A bond issue of $500,000 has been underwritten by the Mississippi Valley Trust Co., St. Louis, the proceeds to be applied to the acquisition of new machinery, additions to the sales force, and advertising. No plant extensions are contemplated at this time. L. J. Mueller, Jr., is president and treasurer.

Appleton Machine Co., 618 South Oneida Street, Appleton, Wis., has engaged W. F. Dolke, consulting engineer, 1841 Asbury Avenue, Evanston, Ill., to design a new foundry building of brick and steel construction, estimated to cost $75,000. Preliminary plans will be ready about May 25. F. E. Saecker is president.

E. I. DuPont De Nemours Co., Tenth and Market Streets, Wilmington, Del., expect to begin June 1 on new and reconstruction work costing about $425,000, to provide a complete ammonia oxidization plant at its works at Barksdale, near Washburn, in Bayfield County, Wis. R. T. Cann is general superintendent.

Board of Education, Racine, Wis., is closing bids May 23 for furnishing shop tools, electric shop equipment, motors, auto mechanics equipment, printing shop equipment and mechanical drawing equipment for the vocational training departments of the new Washington Park and the William Horlick High Schools. Each school will cost about $750,000. The architects are Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., and J. Mandor Matson, Racine.

U. S. Property and Disbursing Officer for State of Wisconsin, Camp Douglas, Wis., closes bids June 2, separately on a 150-ft. 10-in. bore deep well; 100-ft. steel tower and 50,000 gal. steel tank; about 8000 lineal ft. of cast iron pipe; two 200-gal. pumps; hydrants, valves, fittings, for a central water system on the State military reservation. Maj. H. C. Engels, 445 Milwaukee Street, Milwaukee, is State military architect and engineer. The work will cost about $80,000.

Metal Forms Corporation, 1440 Booth Street, Milwaukee, making metal forms for concrete construction, will build a one-story factory extension, 21 x 64 ft. Roy M. Moss is secretary and manager.

Milwaukee Electric Railway & Light Co., 217 Michigan Street, Milwaukee, was granted a franchise May 7 for the construction of a $4,000,000 subway and rapid transit line, 2.8 miles long, with a tunnel of about ½ mile, from the terminal at Second and Michigan Streets to Eighth Street and St. Paul Avenue. All grade crossings will be eliminated by two stretches of elevated line, one 500 ft. and the other 1100 ft. long. E. J. Archambault is engineer in charge.

Maynard Electric Steel Casting Co., Milwaukee, has plans by Frank S. Gurda, architect, 448 Mitchell Street, for a two-story pattern storage building, 60 x 108 ft., at Twenty-second Avenue and Kilbourn Road. It will cost about $30,000. Frank J. Wabisczewski is secretary and general manager.

Milwaukee Works, International Harvester Co. of America, 784 Park Street, Milwaukee, which has started work on a new boiler room building, 65 x 140 ft., 75 ft. high, costing $500,000, also will build a factory addition to be known as building No. 33, estimated to cost $350,000. Both projects are in charge of the Worden-Allen Co. Plans for the factory, to be four stories, will be ready about June 15. Paul F. Schryer is general superintendent.

Thinker Motor Co., 84 Farwell Avenue, Milwaukee, distributer of Pierce-Arrow motor cars and trucks, will build a one-story fireproof sales and maintenance building, 120 x 150 ft., at 365-371 Kenilworth Place, at a cost of about $50,000 complete. The general contractor is H. Schmitt & Sons, Inc., 14 Burleigh Street, local.

Drott Tractor Co., 123 Wisconsin Avenue, Milwaukee, closes bids May 17 on the erection of a new office-service building, 90 x 130 ft., three stories, on Wisconsin Avenue, near Thirty-seventh Street. It will cost about $80,000. The concern is distributer of Caterpillar tractors and equipment. E. A. Drott is president and general manager.

Chicago

CHICAGO, May 14.

THE Chicago machine tool market holds steady from the viewpoint of sales. Inquiry, both old and new, from miscellaneous industries bulks large. The railroads are showing very little interest in the market, the only new inquiry this week being for a die grinder by the Chicago, Burlington & Quincy. Although the Santa Fe placed a few items several weeks ago, additional purchases against its list apparently have been deferred. The Board of Education, Chicago, is asking for a No. 80 C. Oliver saw, a tool room grinder and a 15-in. x 6 ft. engine lathe for the Sheldon Continuation School.

Julius Schultz and Maurice Cohn, Waterloo, Iowa, have formed a partnership to purchase equipment and stock of Waller Mfg. Co., Waterloo, and have occupied company plant at Westfield Avenue and Lamson Street, where manufacture of auto heaters will be continued.

Waterloo Register Co., Waterloo, Iowa, manufacturer of warm air registers and cast iron smoke pipe for furnaces, has sold its present factory at 110 Rath Street to Rath Packing Co. and has purchased plant of Interstate Tractor Co., 2520 Fourth Street, which register company will occupy July 1. New plant consists of two factory buildings, foundry and office building. John C. Knox is president.

University of Chicago will build a power plant to cost $1,500,000.

Madison Silo Co., Madison, Wis., has purchased two and one-half acres on which it will erect a modern factory building.

Evans-Miller Co., Adrian, Mich., manufacturer of battery separators, has practically completed the installation of equipment and is now on a production basis.

George J. Meyer Mfg. Co., Milwaukee, manufacturer of bottle washing machinery, has acquired the Cudahy, Wis., plant of the Worthington Pump & Machinery Co. The Cudahy property will provide facilities that will enable the company to more than double its production.

Lyons Metal Products, Inc., is the name of the new company formed as the result of the consolidation of the Lyons Metallic Mfg. Co., Aurora, Ill., and the Durand Steel Locker Co., Chicago Heights, Ill., manufacturers of steel lockers, cabinets and other steel products. New company will have assets of about $3,375,000. F. S. Waters is president and Keith Spalding vice-president.

Negotiations have been closed for a $15,000,000 merger of the Borg & Beck Co., Chicago, the Warner Gear Co., Muncie, Ind.; the Marvel Carburetor Co., Flint, Mich., and the Mechanics Machine Co., Rockford, Ill. The new company will be known as the Borg-Warner Corporation. It will have $5,000,000 of 7 per cent preferred stock of which $3,500,000 will be issued, and 500,000 shares of no par common stock, of which 410,000 shares will be issued.

City Council, Evanston, Ill., contemplates installation of municipal electric light and power plant, reported to cost in excess of $60,000 with equipment. R. Long, City Hall, is city engineer.

Bassick Mfg. Co., 2650 North Crawford Avenue, Chicago, manufacturer of lubricating equipment for automobile service, an interest of Stewart Warner Speedometer Corporation, 1828 Diversey Parkway, has filed plans for a three-story addition, 80 x 120 ft., reported to cost about $175,000 with equipment.

Bliss & McLaughlin, Inc., Harvey, Ill., manufacturer of shafting, cold finished bar stocks, etc., has purchased former plant of Hotchkiss, Blue & Co., Harvey, manufacturer of railroad car equipment, and adjoining site, totaling about five acres in all, and will occupy for expansion. Present buildings will be remodeled and improved.

Empire Zinc Co., Belden, Colo., is considering erection of new milling plant at its Eagle mine, estimated to cost $200,000 with equipment.

National Wire Cloth & Iron Co., St. Paul, Minn., recently organized, will operate a plant at 260 West Fairfield Avenue, for manufacture of wire window guards, coal screens and kindred products.

Signal Corps, Procurement District, Chicago, will receive bids until May 22, for magnet wire, hand generator, 1000 washers, induction coils, cranks, etc., circular 99.

Western Public Service Co., Colorado Springs, Colo., has approved plans for a new steam-operated electric power plant at Laramie, Wyo., reported to cost about $80,000 with equipment.

Cellucraft Co., 1709 West Austin Avenue, Chicago, manufacturer of ventilators for automobiles, celluloid products, etc., has begun work on a new addition, 25 x 100 ft., on adjoining site, for which general contract recently was let to G. Kehl & Sons, 1225 North Maplewood Avenue.

Board of Education, Decatur, Ill., is said to be planning installation of manual training department in new three-story junior high school on John's Hill, estimated to cost $300,000. Brooks, Bramhill & Dague, National Bank Building, are architects.

Wyoming Carbonizing & Briquetting Co., Kemmerer, Wyo., C. D. Stafford, president, has plans under way for a new coal briquette manufacturing plant at Conroy, near Kemmerer, with capacity of about 150 tons per day, reported to cost close to $150,000, with machinery.

Kelly Mfg. Co., 131 South Fifth Street, Clinton, Iowa, manufacturer of furniture, will soon take bids for a new three-story plant on Eighth Avenue, near Third Street, to cost about $65,000. A. M. Morrell, Weston Building, is architect.

Buffalo

BUFFALO, May 15.

PLANS are being arranged for a merger of United States Light & Heat Corporation, Niagara Falls, N. Y., manufacturer of electric storage batteries, car lighting equipment, etc., and Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment. It is proposed to continue both plants in service, as well as present branch factories, with expansion program for increased output. Last-noted company plans to increase capital from 250,000 to 1,000,000 shares of stock, no par value, and to dispose of preferred stock to an amount of about $10,000,000, portion of fund to be used for development program. C. O. Miniger is president of Electric Auto-Lite Co.

A. J. Grad, Buffalo, operating an automobile body plant at 718 Broadway, has organized a new company under name of A. J. Grad Sons' Body Corporation, capitalized at $35,000, to take over and expand present works, including additional facilities for body manufacture. New company is headed by Anthony J. and Frank A. Grad.

Yingling-Martin Brick Co., Johnsonburg, Pa., is carrying out an expansion and improvement program, including installation of conveying and other mechanical handling equipment, buckets, etc. William H. Signor is superintendent.

Following recent acquisition of chain block, electric hoist and crane division of Chisholm & Moore Mfg. Co., Lakeside Avenue, Cleveland, by Columbus-McKinnon Chain Co., Tonawanda, N. Y., officials of last-noted company have formed a new subsidiary under name of Chisholm-Moore Hoist Corporation, with capital of $200,000, and 14,000 shares common stock, no par value, to take over and expand the purchased division. The plant will be continued in Cleveland, as heretofore. Another company has been formed, independently, under name of Chisholm-Moore Malleable Iron Co., to take over and continue production of foundry branch of company.

Spencer Kellogg & Sons, Inc., Niagara Square, Buffalo, operating crushing mills and refining plants for vegetable oil production at Buffalo, Edgewater, N. J., Minneapolis, Minn., and Superior, Wis., is disposing of a stock issue to total $2,041,000, a portion of proceeds to be used for expansion and improvements. Howard Kellogg is president.

Frederick W. Cheshire, 1718 James Street, Syracuse, N. Y., and associates have formed a new company to be known as F. W. Cheshire, Inc., to operate a local plant for manufacture of heating and cooking appliances.

Board of Education, Cooperstown, N. Y., contemplates installation of manual training equipment in new two-story addition to high school on Main Street, to cost about $175,000, for which it is expected to ask bids on general contract during summer. Kinne & Frank, 7 Hopper Street, Utica, N. Y., are architects.

Fairchild Amusement Machine Corporation, 404 S. A. & K. Building, Syracuse, N. Y., has been organized to manufacture automatic amusement machines and parts. At present equipment is manufactured by contract and company is not in market for materials. After Aug. 1 bids will be taken on certain types of equipment.

Morrison Railway Supply Corporation, Buffalo, has purchased railroad track material business formerly conducted by Morrison & Risman Co., Inc. Former company operated plants and warehouses at Chicago, Indianapolis, Pittsburgh and Harrisburg, Pa., and Buffalo and engaged in reconditioning of rails and of railroad track material.

Pittsburgh

PITTSBURGH, May 14.

OCCASIONAL single tool orders and fairly steady buying of repair parts are the dependence of machine tool dealers in this area. New inquiries are few. The Miller Saw Trimmer Co., which is to build a new plant for the manufacture of printers' machinery, is planning to move all of its present equipment to the new plant and it is reported will not have to have many new machines. Crane companies have a rather imposing pending list, but no orders of importance were closed in the past week.

The Miller Saw Trimmer Co., Point Building, Pittsburgh, builders of printers' machinery will build a new plant at Reedsdale and Walker Streets, North Side, Pittsburgh, at an estimated cost of $200,000. F. F. Nicola is president.

Contract has been let by Mine Safety Appliance Co., Braddock Avenue, Pittsburgh, to Taylor-Meyer Co., Keystone Building, for two new additions to plant, used for production of safety equipment for coal-mining service, each one and four-story and basement, 80 x 100 ft., to cost approximately $200,000 with machinery.

Dicks Aeronautical Corporation, Pittsburgh, care of George H. Lee, 451 Orchard Avenue, Bellevue, Pa., recently formed by Mr. Lee and associates, plans operation of local plant for assembling of aircraft and manufacture of airplane parts. James H. Reniers, 6609 Church Street, Ben Avon, Pa., is also interested in company.

Allied Power & Light Co., recently organized by officials of Stevens & Wood, Inc., 120 Broadway, New York, engineer, and other interests, will take over controlling interest in Penn-Ohio Power Co., Sharon, Pa.; Northern Ohio Power Co., and other utility properties in this section. New company is capitalized with 500,000 shares of preferred stock, and 2,000,000 shares of common stock. A bond issue will soon be sold, portion of proceeds to be used for expansion, including transmission line construction. R. P. Stevens is president.

Consolidated Gas Co., 821 Sixth Avenue, Huntington, W. Va., George I. Neal, president, is planning construction of 12-in. pipe line for natural gas service. A franchise has been secured.

John Miller, 575 Oxford Street, Pittsburgh, and associates have organized Lonsdale Brass Works, Inc., with capital of $50,000, to operate a local plant for production of brass pipe, couplings, etc. It is understood that new company will succeed to and expand Lonsdale East End Brass Works, with plant at 5708 Harvard Street. James H. Lonsdale, 5456 Kincaid Street, will be one of heads of new organization.

Erie Forge Co., Sixteenth and Cascade Streets, Erie, Pa., plans rebuilding of portion of pattern department destroyed by fire, May 7.

Indiana

INDIANAPOLIS, May 15.

BIDS will be asked early in June by Board of Education, Muncie, Ind., for one-story vocational training school on North Walnut Street, to cost about $150,000 with equipment. Houck & Smenner, 108 East Washington Street, are architects.

Rub-Tex Products Co., Indianapolis, has been organized to take over and expand plant and business of Rub-Tex Products, Inc., 3500 East Twentieth Street, manufacturer of rubber battery boxes and kindred products. Last-noted company has recently been in financial difficulty and property has been purchased at receivership sale by heads of new concern for $222,000. An expansion program will be carried out, with facilities for larger production. Edwin H. Emrich, formerly president, will continue with new organization in executive capacity. Fred G. White heads company.

Dean Forging Co., Muncie, Ind., manufacturer of drop forgings for automotive service, plans rebuilding of machine shop and other portions of plant destroyed by fire, May 5, with loss reported at close to $50,000 including equipment. Wilbur A. Full is manager.

Servel Corporation, Morgan Avenue and Illinois Street, Evansville, Ind., manufacturer of electric and gas-operated refrigerating equipment, has awarded general contract to M. J. Hoffman Construction Co., Furniture Building, for one-story addition, 65 x 130 ft., reported to cost about $30,000 with equipment.

J. Everett Jones, 936 West Eighth Street, Anderson, Ind., and associates have awarded general contract to James I. Barnes, Anderson, for new two-story and basement automobile service, repair and garage building, 85 x 124 ft., at Broadway and Third Streets, Logansport, Ind., reported to cost about $100,000 with equipment. E. F. Miller, Farmers' Trust Building, Anderson, is architect.

Receiver for Steinbrenner Rubber Co., Noblesville, Ind., is planning for early sale of plant and property of company, which is appraised at $275,000, including real estate and machinery.

Electric Shovel Coal Corporation, Clinton, Ind., operating coal mining properties under electric shovel stripping method, is disposing of a preferred stock issue to total about $2,900,000, a portion of proceeds to be used for expansion in property holdings and operations in Clay and Vermilion Counties. J. B. F. Melville is president.

Southeastern Indiana Power Co., Indianapolis, has made application for permission to acquire transmission lines and other property of Suburban Light & Power Co., in Fayette, Union, Johnson and Shelby Counties; and Eastern Light & Power Co., in Marion and Johnson Counties. New owner will consolidate with organization, and plans expansion in acquired territory, including transmission line construction.

Cincinnati

CINCINNATI, May 14.

MACHINE tool orders declined somewhat the past week with the result that sales in the first half of May were from 10 to 15 per cent less than the average of April. Important builders do not attach any special significance to the letdown in buying, attributing it to seasonal conditions. Few large inquiries are before the local trade, although the total volume of pending business is considered fairly good. Recent bookings have been well distributed among manufacturers in many industries, automobile companies having been a comparatively small factor in the market. The Union Pacific has closed for a 6-ft. Right Line radial drill.

The Metal Aircraft Corporation, Cincinnati, has been incorporated for $500,000 to manufacture an all-metal airplane. A factory will be constructed near Lunken Airport. Incorporators include T. Higbee Embry, John B. Hollister and E. F. Lunken.

The Chevrolet Aircraft Corporation, Indianapolis, has been incorporated to manufacture and sell airplanes and airplane motors. Plans will not be completed for several months and the type of motor to be manufactured has not been decided upon. Louis and Charles Chevrolet are the incorporators. The former is now associated with the Chevrolet Brothers' Mfg. Co., 410 West Tenth Street, Indianapolis.

The Howser Tool Mfg. Co. has moved its plant from LaPorte, Ind., to Nineteenth and Martindale Streets, Indianapolis, and is now in production at the latter location.

Arrangements have been completed by Mal-Gra Casting Co., Cambridge City, Ind., for purchase of plant and business of Mid-West Casting Co., Middletown, Ohio, and companies will be consolidated. Purchasing company will remodel and extend Middletown plant and proposes to remove present Cambridge City works here, concentrating production at one plant. Harry Bachman is one of heads of Mal-Gra company.

Kodel Radio Corporation, Cincinnati, has arranged for increase in capital from 62,500 to 100,000 shares of stock, no par value, a portion of proceeds to be used for expansion. Company has also arranged for change of name to Kodel Electric & Mfg. Co., and will increase lines of output.

Basic Products Co., Peebles, near Portsmouth, Ohio, is considering rebuilding of portion of stone-crushing plant, destroyed by fire, May 7, with loss reported at close to $90,000, with equipment.

Tennessee Eastern Power Co., Johnson City, Tenn., has made application for permission to construct and operate a hydroelectric generating plant on Holston River, Sullivan and Washington Counties, with initial capacity of 48,000 hp., reported to cost close to $5,000,000, with power dam and transmission lines. Company is operated by Henry L. Doherty & Co., 60 Wall Street, New York.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in proposed new baking plant to be erected by Linker Brothers, 1125-27 Market Street, Louisville, on adjoining site, reported to cost close to $100,000, with equipment. Harry Linker is head.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of cast iron and other sanitary ware, has plans for a two-story and basement factory branch and distributing plant, 100 x 100 ft., at Seventeenth and Church Streets, Nashville, Tenn., reported to cost close to $100,000, with equipment. Marr & Holman, Stahlman Building, Nashville, are architects.

General Electrical Supply Corporation, Memphis, Tenn., has completed negotiations for purchase of plant and business of Southeastern Electric Co., 429-31 Broad Street, Chattanooga, Tenn., with branch at 312 West Jackson Avenue, Knoxville, Tenn., and will consolidate with organization. Expansion is planned. George R. Hernstein is president of purchasing company.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until May 21, for 192 keyseat cutters, 192 pairs of jaws, steel rules, tinners' snips, open end wrenches, etc., circular 329. Until May 24, for 50 engine overhaul tilting stands, circular 292.

Southern Cities Utilities Co., operating Southern Cities Power Co., Provident Building, Chattanooga, Tenn.; Wheeling Public Service Co., Wheeling, W. Va.; Durham Gas Co., Durham, N. C.; Carolina Coach Co., and other electric light and power properties, is disposing of a bond issue of $10,500,000, a portion of proceeds to be used for expansion and betterments, including transmission line construction. Walter Whetstone is president.

Ashland By-Products Coke Co., Ashland, Ky., has made application for permission to construct coal and coke loading terminal at plant of Semet Solvay Co., near Dam 29, Ohio River, including mechanical conveying and handling equipment.

Cincinnati Gas & Electric Co., Cincinnati, recently organized, has secured permission to take over and consolidate local company of same name, Columbia Power Co., and Union Gas & Electric Co., all operating in this district, with combined assets totaling $92,580,000. New company plans expansion program, including transmission line construction.

Pacific Coast

SAN FRANCISCO, May 10.

IN connection with expansion program, Southern California Edison Co., Los Angeles, has work in progress on a new hydroelectric generating plant for Big Creek system, to be equipped for capacity of 107,200 hp.; new transmission lines will be built. Construction is in progress also on new steam-operated electric power plant at Long Beach, to be known as steam station No. 3, with initial unit of 125,000 hp. It is proposed to add other units to latter plant to develop a total rating of 1,000,000 hp. Projects will represent investment of more than $10,000,000.

John O. Rankin, Long Beach, Cal., local representative for Cadillac automobile, has leased a two-story building, 75 x 140 ft., to be erected at First Street and American Avenue, for a service, repair and sales unit, reported to cost close to $90,000, with equipment.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in connection with proposed rebuilding of baking plant of Torino Baking Co., 2801 Twenty-third Street, San Francisco, recently partially destroyed by fire with loss of about $100,000.

Seattle Lighting Fixture Co., Seattle, has leased a new one-story and basement factory, 97 x 105 ft., to be erected by Union Investment Co., at 829 Rainier Avenue, estimated to cost about $30,000, and will occupy for new plant. Fred B. Stephen, Thompson Building, is architect.

Bureau of Reclamation, Denver, Colo., is asking bids until May 25, for construction of 19.1 miles of 66,000-volt transmission line in vicinity of Adrian and Nyssa, Ore.

Centralia Lumber & Mfg. Co., Centralia, Wash., has acquired property at Ash and Pine Streets, and plans new mill with capacity of 75,000 ft. of finished lumber per day, reported to cost more than $85,000. Equipment will be electrically operated. W. C. Hamilton heads the company.

Ford-Nelson Motor Co., Ogden, Utah, has awarded a general contract to Vincent-Peterson Construction Co., 40 East Second Street, Salt Lake City, for a new one-story and basement service, repair and garage building, 100 x 165 ft., reported to cost about $90,000, with equipment, on site at 2222 Washington Avenue. C. D. Ford is head.

Board of County Supervisors, Salinas, Cal., has approved plans for one-story machine shop at county yard and mechanical plant, for repair of highway machinery, etc., estimated to cost close to $24,000, with equipment.

Hydrocarbon Apparatus, Inc., 405 South Hill Street, Los Angeles, has been formed to take over business of former Oil Engineering Co. and will engage in sale of mist extractors, steam separators, fractionators, scrubbers, stills, etc., for oil and chemical industries and power plants. Company will also handle products of Fisher Governor Co., Marshalltown, Iowa.

Canada

TORONTO, May 15.

PROSPECTS for business in machine tools were increased by several small lists which have just made their appearance. Included in current inquiries are lists from the Boards of Education at Welland and Toronto, Ont., which will purchase lathes, drills, woodworking equipment, etc., for vocational schools. The Canadian National Railways are purchasing tools and equipment for locomotive and machine shops under construction at Point St. Charles, Montreal, Que., while other small lists are appearing from time to time for replacement needs in other shops. The automotive industry is responsible for a steady flow of orders for single tools. Several industrial concerns are having lists prepared for tools and equipment required in connection with new plants and additions.

Niagara Falls Water Commission, Niagara Falls, Ont., is having plans prepared by F. A. Dallyn, 71 King Street West, Toronto, Ont., for the construction of a power house and filtration plant in Queen Victoria Park, to cost $400,000.

Canadian National Railways, McGill Street, Montreal, Que., have awarded contract to Anglin-Norcross, Ltd., 65 Victoria Street, for erection of the superstructure for the locomotive and machine shops at Point St. Charles. The project will cost approximately $1,000,000.

Gilmour Chair, Ltd., Coaticook, Que., is contemplating the erection of a factory there to cost $80,000.

Granby Elastic Web, Ltd., Granby, Que., has started excavation work in connection with a $50,000 addition to its plant there.

Hydro-Electric Commission, Tillsonburg, Ont., proposes to build a sub-station there and to instal larger transformers.

General Metal Devices, Ltd., Oakville, Ont., recently formed with a capital stock of $200,000, is calling for tenders for the erection of a factory building on Kerr Street, to be 60 x 300 ft., cement block and steel construction. Thomas Strachan, Toronto, is president.

T. J. Eansor & Sons' Structural Steel & Ornamental Iron Works, Windsor, Ont., is making arrangements for the building of a new manufacturing plant on property recently acquired.

Western Canada

City Council, Nelson, B. C., has started work on a power development plant at Bonnington Falls, B. C., to cost $230,000. The Canadian General Electric Co., has the contract for machinery and equipment.

Town Council Assiniboia, Sask., has provisionally accepted the offer of $120,000 for the local power plant made by the Dominion Electric Co. It is the intention of the company to start work immediately on the construction of a 900 hp. electric plant.

Substitution of electric current development in the low grade coal fields of Saskatchewan for the present power system is now engaging the attention of the Montreal Engineering Co. The first unit of a project to cost $1,000,000 is being constructed in the Estevan, Sask., field. It is the intention of the company to build five such units, and similar units will be built at four points in Alberta.

Crow's Nest Pass Coal Co., Ltd., Fernie, B. C., has decided to electrify its Coal Creek plant and is erecting the necessary buildings. A new power plant is under construction at Coal Creek, which will be equipped with three Bellis Morcham 300-ft. compressors and four Ingersoll-Rand 1200-ft., 4-stage compressors.

Foreign

PLANS are being arranged by Maudal Karftanlegg (Maudal Power Works), Stavanger, Norway, for a new hydroelectric power project at Maudalsfallene (Maudal Falls), with initial development to cost about $300,000. Project will require about 24 months for completion. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Norway No. 275041; also at American Consulate, Stavanger, F. C. Sigmond, vice-consul.

Davis Gelatine Pty., Ltd., Melbourne, Australia, has secured permission for construction of new glue factory at Flemington, about six miles from city, to cost in excess of $200,000 with machinery.

Russian Soviet Government, Petrograd, is planning construction of aluminum plant near Zaporozhie, vicinity of Dnieprostroy hydroelectric power development, now in progress, and which will furnish service for works. Initial plant will be equipped for capacity of 10,000 tons per annum, and is estimated to cost approximately $10,000,000. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency in United States.

Pomerania Electric Co. (Ueberlandzentrale Pommern, A. G.), Stettin, Germany, operating throughout Province of Pomerania, is disposing of bond issue of $3,500,000 in United States, a portion of fund to be used for expansion and improvements in power plants and system.

P. Lyall & Sons, Ltd., Montreal, Que., contractor, has closed a contract with Government of Colombia, South America, for construction of new railroad line between Tunja and Belez, to cost about $20,000,000, including engine terminals, locomotive and car shops, etc.

Free Zone Committee, Government of Greece, Athens, is planning for extensions and improvements at Port of Saloniki, including construction of wharves and jetties, erection of silo, installation of crane equipment and other mechanical elevating and conveying machinery. Entire project is estimated to cost 400,000,000 drachmas (about $5,203,000).

Railroad Administration, Government of Argentina, Buenos Aires, is planning a call for bids in fall for construction of new railroad line from La Paz-Feliciano to San Jaime, including engine terminals and shop facilities. American Consulate, Buenos Aires, Alexander V. Dye, commercial attaché, has information regarding project.

Contract for an electric bulb factory at Tokio, Japan, for Tokio Electric Co. has been awarded to H. K. Ferguson Co., Cleveland. Cost of building and equipment is estimated at $500,000. Building will be 120 x 205 ft., of two- and three-story reinforced concrete construction. Part of structure will have concrete roof with steel trusses.

Officials of Fox Brothers International Corporation, 33 Rector Street, New York, specializing in construction of light and power utilities, waterworks, sewage plants and other similar projects in foreign countries, have organized French subsidiary under name of Société Franco-Americaine d'Entreprises et de Travaux Publics, with headquarters at 33 Rue Cambon, Paris, to carry out such contracts in France, Roumania, Turkey, Greece and Poland. Branch offices will be opened at Constantinople and other points. John J. Teal is president of parent company.

Municipality in State of Coahuila, Mexico, is planning installation of municipal waterworks, including pumping machinery and other power equipment, estimated to cost $150,000, and is interested in using American-made equipment. Catalogs and information desired; it is purposed to begin work during summer. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Mexico No. 274425; also, at American Consulate, Piedras Negras, Mexico, Oscar C. Harper, vice-consul.

National Railways of Mexico, Mexico City, Mexico, have authorized an increase in monthly appropriation for extensions and improvements in lines, shop facilities and other mechanical expansion work, from 50,000 pesos (about $25,000) to 300,000 pesos (about $150,000).

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THE IRON AGE

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Bonus System for Foremen

Controllable Burden and Labor Expenditures Feature Information Given to Minor Executives of A. O. Smith Corporation

BY ROGERS A. FISKE*

THE blanks reproduced on the next two pages indicate how a foreman's monthly bonus is calculated. They cover the cases of both so-called productive and non-productive departments.

With a perfect record, the bonus amounts to 30 per cent of the foreman's salary for the month. One-fifth of the bonus, or 6 per cent on the salary, covers performance for which he alone is held responsible. The remainder, or 24 points, is an allotment measuring the perfect performance of his department. The percentage of these 24 points that the foreman realizes is equal to the percentages his department reaches of the standards set for its production schedules, its standard of controllable burden expenditures, etc.

SPECIAL information in respect to both the cost and economy of plant operation, combined with the policy of taking each foreman into its confidence in so far as controllable burden and labor expenditures in his department are concerned, are features of a foremen's bonus system used by the A. O. Smith Corporation, Milwaukee. Results obtained are high-grade workmanship, low-cost production and a broadened viewpoint on the part of the foreman, which makes him fill his present position in a more satisfactory manner than otherwise and develops his natural ability so that he will be prepared for further advancement as opportunities occur.

This system has now been in operation for several years. It has served its purpose as an incentive to high-grade work on the part of those men who have been entrusted with the responsibilities of minor executive positions. It is at once apparent that the aim of this bonus system is to secure the best possible results for the company and at the same time to reward, in direct proportion to the good results from these efforts, those who are active in that accomplishment.

In this plant, as in most others, men who step up into positions of foremanship, or assistant foremanship, are practical men from the ranks. They are good workmen with a natural ability to control and direct the efforts of others. Previous to the time of their promotion, however, they have not had, in most cases, any training in the matter of operating costs economies, and as a result do not have a keen realization of just what the expenditures in a department amount to, aside, possibly, from those involved directly in production.

To these men the details of operation as presented under the bonus system come as something new and something interesting. They soon learn that burden is an active factor in the matter of the cost of production, and that it is impossible to manufacture without it. The problem of trimming this burden to the minimum and holding it there becomes of special interest to the man when he shares in the savings.

It is the policy of the A. O. Smith Corporation to take its foremen into its confidence in the matter of controllable burden and labor expenditures. The company does not confine itself to presenting a list of these expenditures after the bonus has been figured, but actually furnishes, day by day, a statement of these expenditures, so that the foreman may be in a position to head off unsatisfactory conditions as soon as they appear. The company records are so kept that additional information desired by a foreman along special lines in which he may be interested can be had on short notice.

The company does not in any way stress to the foreman the matter of non-controllable expenses, but as a matter of general education does give him some idea of what they are and what they amount to. He is also given an approximate idea of the value of the equipment under his control. In short, each foreman is put in the position of a well-posted executive, as far as his own work is concerned, and is made a participant in the benefits accruing from his efficient management.

The maximum, or 100 per cent monthly bonus earnings of a foreman, amount to 30 per cent of his regular monthly salary. Eighty per cent of the bonus is based on finding of fact, while 20 per cent is reserved for arbitrary rating. The policy has been adopted that this arbitrary rating shall belong fully to the foreman, unless there shall have been some particularly glaring shortcoming on his part, in which case deductions may

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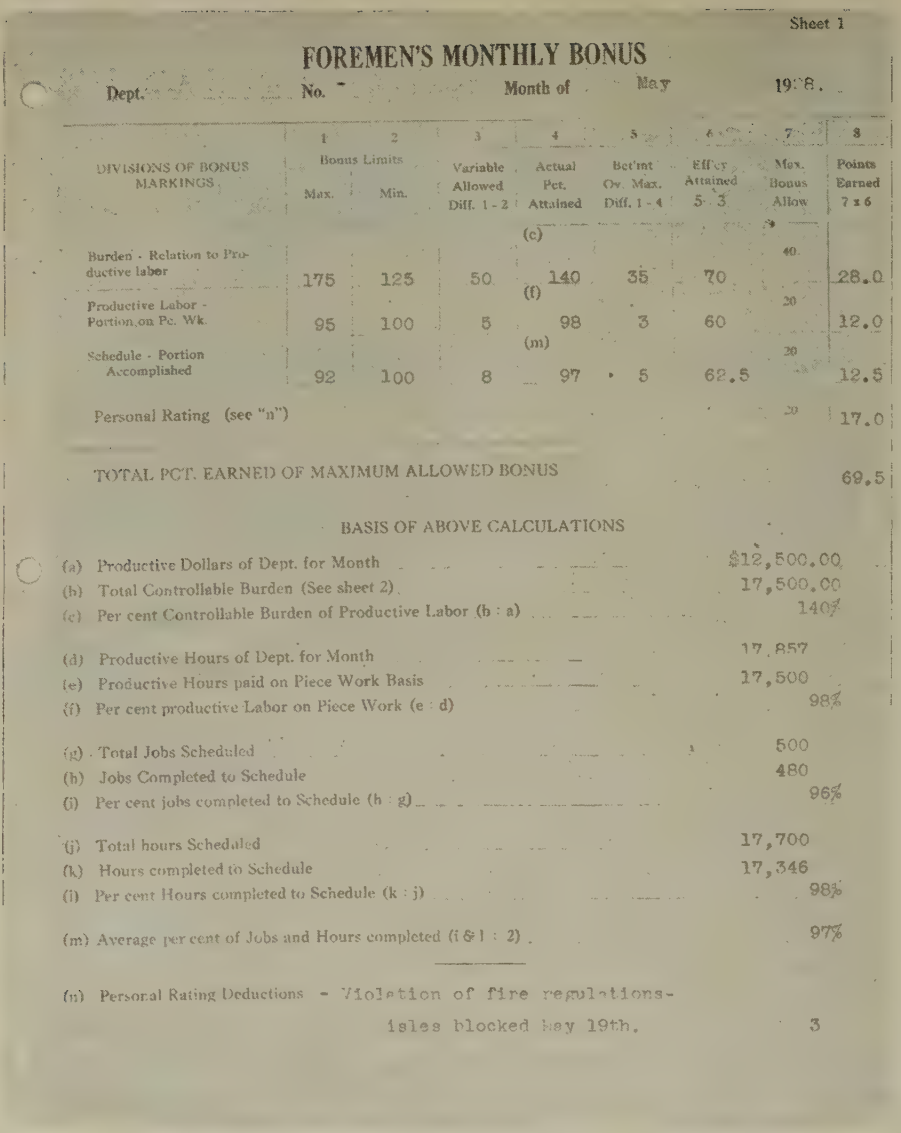
*Western editor THE IRON AGE, Chicago.



Sheet 1

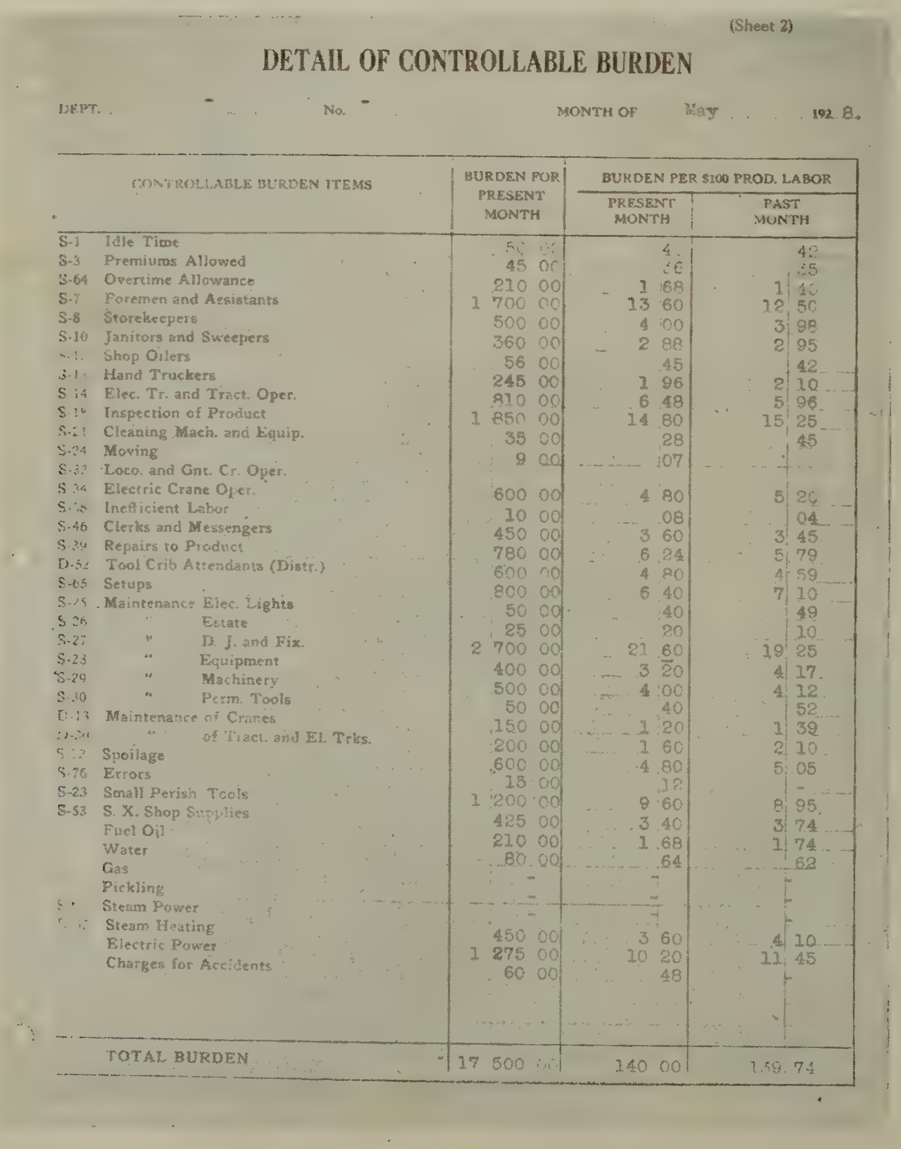
FOREMEN'S MONTHLY BONUS

Dept. No. Month of May 19 8.

DIVISIONS OF BONUS MARKINGS	1 Bonus Limits Max.	2 Min.	3 Variable Allowed Diff. 1 - 2	4 Actual Pct. Attained	5 Bet'mt Ov. Max. Diff. 1 - 4	6 Eff'cy Attained 5 ÷ 3	7 Max. Bonus Allow	8 Points Earned 7 x 6
Burden - Relation to Productive labor	175	125	50	(c) 140	35	70	40	28.0
Productive Labor - Portion on Pc. Wk.	95	100	5	(f) 98	3	60	20	12.0
Schedule - Portion Accomplished	92	100	8	(m) 97	5	62.5	20	12.5
Personal Rating (see "n")							20	17.0
TOTAL PCT. EARNED OF MAXIMUM ALLOWED BONUS								69.5

BASIS OF ABOVE CALCULATIONS

(a) Productive Dollars of Dept. for Month	$12,500.00
(b) Total Controllable Burden (See sheet 2)	17,500.00
(c) Per cent Controllable Burden of Productive Labor (b : a)	140%
(d) Productive Hours of Dept. for Month	17,857
(e) Productive Hours paid on Piece Work Basis	17,500
(f) Per cent productive Labor on Piece Work (e : d)	98%
(g) Total Jobs Scheduled	500
(h) Jobs Completed to Schedule	480
(i) Per cent jobs completed to Schedule (h : g)	96%
(j) Total hours Scheduled	17,700
(k) Hours completed to Schedule	17,346
(l) Per cent Hours completed to Schedule (k : j)	98%
(m) Average per cent of Jobs and Hours completed (i & l : 2)	97%
(n) Personal Rating Deductions - Violation of fire regulations- isles blocked May 19th.	3



(Sheet 2)

DETAIL OF CONTROLLABLE BURDEN

DEPT. No. MONTH OF May 192 8.

CONTROLLABLE BURDEN ITEMS		BURDEN FOR PRESENT MONTH	BURDEN PER $100 PROD. LABOR PRESENT MONTH	 PAST MONTH
S-1	Idle Time	50 00	4	42
S-3	Premiums Allowed	45 00	36	35
S-64	Overtime Allowance	210 00	1 68	1 40
S-7	Foremen and Assistants	1 700 00	13 60	12 50
S-8	Storekeepers	500 00	4 00	3 98
S-10	Janitors and Sweepers	360 00	2 88	2 95
[illegible]	Shop Oilers	56 00	45	42
[illegible]	Hand Truckers	245 00	1 96	2 10
S 14	Elec. Tr. and Tract. Oper.	810 00	6 48	5 96
S-19	Inspection of Product	1 850 00	14 80	15 25
S-21	Cleaning Mach. and Equip.	35 00	28	45
S-24	Moving	9 00	07	
S-33	Loco. and Gnt. Cr. Oper.			
S 34	Electric Crane Oper.	600 00	4 80	5 20
[illegible]	Inefficient Labor	10 00	08	04
S-46	Clerks and Messengers	450 00	3 60	3 45
S-39	Repairs to Product	780 00	6 24	5 79
D-52	Tool Crib Attendants (Distr.)	600 00	4 80	4 59
S-65	Setups	800 00	6 40	7 10
S-25	Maintenance Elec. Lights	50 00	40	49
S 26	" Estate	25 00	20	10
S-27	" D. J. and Fix.	2 700 00	21 60	19 25
S-23	" Equipment	400 00	3 20	4 17
S-29	" Machinery	500 00	4 00	4 12
S-30	" Perm. Tools	50 00	40	52
D-13	Maintenance of Cranes	150 00	1 20	1 39
[illegible]	" of Tract. and El. Trks.	200 00	1 60	2 10
[illegible]	Spoilage	600 00	4 80	5 05
S-76	Errors	15 00	12	-
S-23	Small Perish Tools	1 200 00	9 60	8 95
S-53	S. X. Shop Supplies	425 00	3 40	3 74
	Fuel Oil	210 00	1 68	1 74
	Water	80 00	64	62
	Gas	-	-	-
	Pickling	-	-	-
[illegible]	Steam Power	-	-	-
[illegible]	Steam Heating	450 00	3 60	4 10
	Electric Power	1 275 00	10 20	11 45
	Charges for Accidents	60 00	48	-
	TOTAL BURDEN	17 500 00	140 00	139 74

be made up to the extent of the full 20 points.

In the productive departments of this corporation the work is of a highly repetitive nature and is paid for almost wholly on a piece work schedule. This situation is ideal for establishing bonus earnings based on fact finding in three clean-cut divisions; namely, the operation of the productive work wholly on a piece work basis; accomplishment of the schedule as laid down by the production department, and maintenance of controllable burden expenditures at the practicable minimum.

The forms, D-202, sheets 1 and 2, shown on this page, indicate the details of the bonus of a regular productive department. The details of the controllable burden, as shown in Fig. 2, are merely a summary of the departmental expenditures for the month, with an extended column figured to a cost per $100 of productive labor, which is equivalent to a percentage rating. Against this last column is also shown the rating of the preceding month. In the upper form, on this page, under "Basis of Above Calculation" this burden is shown to be equal to 140 per cent of the productive labor. This figure is then entered in column 4, "Burden Relation to Productive Labor" and the calculations made as indicated, resulting, as shown in column 8, with 28 points earned out of a possible 40.

By items *d* and *f*, under "Basis of Above Calculations," is shown the method of calculating the relation of piece work to total productive work. The 98 per cent shown as the mark attained here is then entered on the schedule at the top of the sheet, and it results, after the indicated calculations have been made, in a 12-point bonus earning under column 8.

In like manner items *g* through *m* indicate the method by which the accomplishment of the department against its schedule is measured. It will be noted that this work is rated on a double basis, that is, by hours and by jobs. This is done so that the department head will be tempted to pile

THE forms shown on this page are used when computing foremen's monthly bonus in production departments. Total points earned under column 8 (upper form) represent the per cent earned of the maximum possible bonus.

The lower form gives the detail of the controllable burden as tabulated both in productive and non-productive departments.

p credits neither solely in the
atter of hours, by running all
ng jobs, nor in the matter of
obs by running all short jobs.
his rating is then carried to the
chedule at the top of the page and
ecessary calculations made.

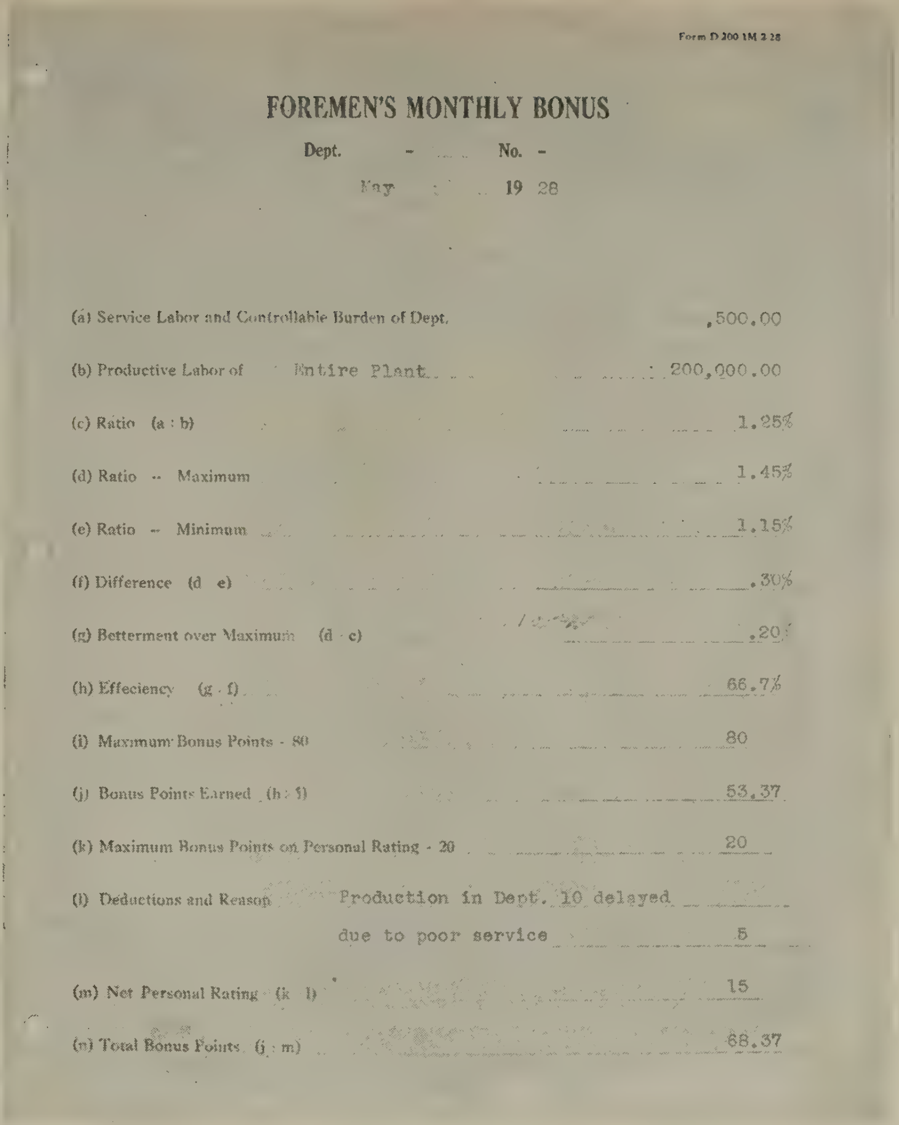
Item *n* indicates that the fore-
an has been lax in the enforce-
ent of fire regulations, and is
erefore penalized 3 points of his
ossible 20 personal marks.

The sum of his points earned,
s shown in column 8, amounts to
9.5 per cent. If this foreman re-
eived a salary of $300 per month,
is maximum possible bonus would
e 30 per cent of that amount, or
90. His bonus rating for the
onth would entitle him to receive
9.5 per cent of $90, or $62.55.

Calculations for the non-pro-
uctive departments are made as
ndicated on forms D-200 and
)-201, shown on this page. In
he upper form under *a*, is entered
he amount paid in this depart-
nent for service to the plant plus
he amount expended in the de-
artment for any items of expense
which may be within the control
f the foreman. Service of an un-
sual nature, and work on items
f capital investment, are not in-
luded in this calculation.

The lower form is used where
department carries a fair-sized
verhead in connection with the
articular line of service rendered.
n the top line is figured the de-
artmental standing on the basis
f the amount of service or mainte-
ance labor performed as against
he productive labor of the depart-
nents served. In the second line
s noted the standing attained by
he department in the matter of
ts controllable burden to its par-
icular productive labor.

The maximum and minimum
imits set for a bonus of this kind
re determined only after a care-
ul study. These limits must be
quitable both to the company and
he men. If the limits are too
asy of accomplishment, the com-
any can gain little. If they are
oo hard, the foreman will only be
iscouraged. The top limit must
e attainable for the man who de-
ivers exceptionally well. It has
roved interesting to see what an
nspiration and spur it is to the
est when the information goes out
hat so and so has made a perfect
mark.



Form D 200 1M 2 28

FOREMEN'S MONTHLY BONUS

Dept. - No. -

May 19 28

(a) Service Labor and Controllable Burden of Dept. ,500.00

(b) Productive Labor of Entire Plant 200,000.00

(c) Ratio (a : b) 1.25%

(d) Ratio -- Maximum 1.45%

(e) Ratio -- Minimum 1.15%

(f) Difference (d e) .30%

(g) Betterment over Maximum (d c) .20%

(h) Effeciency (g f) 66.7%

(i) Maximum Bonus Points - 80 80

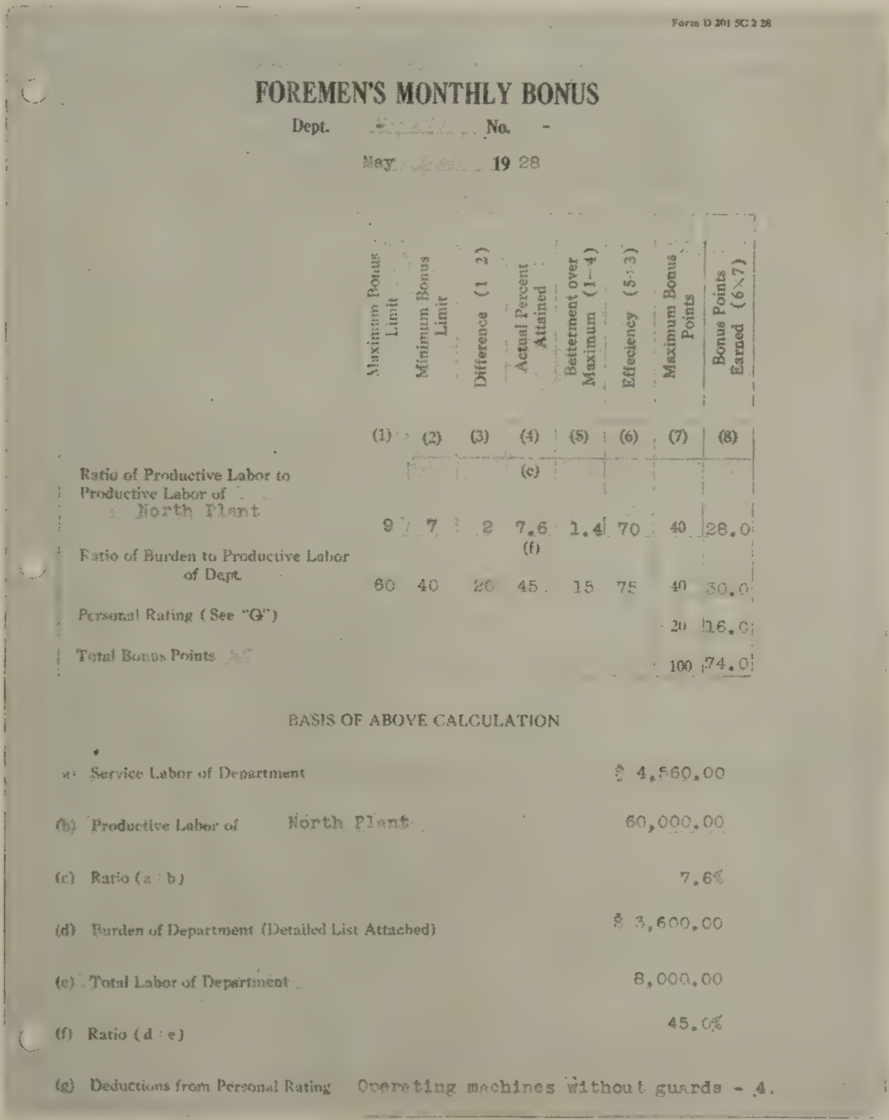
(j) Bonus Points Earned (h × i) 53.37

(k) Maximum Bonus Points on Personal Rating - 20 20

(l) Deductions and Reason Production in Dept. 10 delayed due to poor service 5

(m) Net Personal Rating (k l) 15

(n) Total Bonus Points (j m) 68.37



Form D 201 5C 2 28

FOREMEN'S MONTHLY BONUS

Dept. No. -

May 19 28

	Maximum Bonus Limit (1)	Minimum Bonus Limit (2)	Difference (1 2) (3)	Actual Percent Attained (4)	Betterment over Maximum (1—4) (5)	Effeciency (5÷3) (6)	Maximum Bonus Points (7)	Bonus Points Earned (6×7) (8)
Ratio of Productive Labor to Productive Labor of North Plant	9	7	2	(c) 7.6	1.4	70	40	28.0
Ratio of Burden to Productive Labor of Dept.	60	40	20	(f) 45.	15	75	40	30.0
Personal Rating (See "G")							20	16.0
Total Bonus Points							100	74.0

BASIS OF ABOVE CALCULATION

(a) Service Labor of Department $ 4,560.00

(b) Productive Labor of North Plant 60,000.00

(c) Ratio (a : b) 7.6%

(d) Burden of Department (Detailed List Attached) $ 3,600.00

(e) Total Labor of Department 8,000.00

(f) Ratio (d : e) 45.0%

(g) Deductions from Personal Rating Operating machines without guards - 4.

THESE sheets are for the bonus system as extended to small non-productive departments.

In the case of major non-productive departments the bonus summary is recorded on the lower form. Burden details similar to those shown on page 1446 are furnished with this statement.

Foundrymen Meet in Birthplace

Hold Reunion of Living Organizers—Much Interest Displayed in Technical Sessions—Exhibition Large and Successful

MEETING in the city of its birth 32 years later, the American Foundrymen's Association held a general meeting and exhibition last week in Philadelphia, May 14 to 18. It was in 1896 that the concerted effort of a few live foundrymen brought to a culmination a movement which has grown to its present very large proportions. The gathering this year was both a reunion and a celebration and resulted in one of the most successful conventions of recent years. It was the fourth one held in Philadelphia, others falling in 1907 and 1919.

A feature was the very decided interest manifested in any session associated with gray iron. And a new development was four sessions on cupola operation, which attracted much attention. Attendance at most of the sessions was remarkably large. At 17 sessions nearly 45 papers and several committee reports were presented by leaders in each important field. Total registration was about 6000, which is a record. Of these, about 1200 were representatives of exhibitors.

The exhibition of equipment, while not the largest the association has conducted, was eminently successful. Notable was its compactness, housed under one roof of the Commercial Museum. It is discussed in some detail in this report.

Commemorating the birthplace of the organization of the A. F. A., a special dinner was given to as many of the living organizers as could be present.

Dinner Tendered to Living Founders

AN entirely informal and convivial occasion was made of the dinner tendered by the association to members who were present when the foundrymen's association was formally organized in Philadelphia in May, 1896. Over 30 signified their intention to be present and nearly all of these were able to attend. A list of those who sent acceptances will be found on another page.

On Tuesday evening, May 15, at the Manufacturers' Club, which stands on the site of the old building in which the A. F. A. was formed, these original organizers, together with some of the officers, directors and past officers of the association—in all about 50—gathered around tables presided over by S. T. Johnston, chairman of the committee which planned the reunion. Many greetings and reminiscences were exchanged previous to the dinner by men who had not seen one another in many years.

No formal post-prandial addresses were scheduled, but the chairman, on each side of whom sat Howard Evans and Walter Wood, who were considered as specially honored by this occasion for their pioneer work and their continued activity to the present day, called on various foundrymen to speak.

Walter Wood traced the early steps in the formation of the A. F. A. in 1896, pointing out that it was due to the efforts of the Philadelphia Foundrymen's Association in interesting the Western group and others to come to Philadelphia in May, 1896, and form a national organization. He emphasized the fact that in those days only a spade and a shovel were the molder's tools, but today an inspection of the modern exhibition revealed how machinery was revolutionizing the foundry. Mr. Wood stressed his belief that coordination of research was the next step which the foundry industry most needed to take.

Howard Evans, still secretary of the Philadelphia local organization, said that the Philadelphia Foundrymen's Association, when it started the A. F. A., really laid the foundation for many other technical, business, and trade associations. He said that one inspiration leading to the formation of the national organization was a consideration of business ethics and of the demoralization of price cutting.

By special invitation, John A. Penton, one of the association's founders and its first secretar addressed the old-timers. He sai that if he had been fortunate i any way in his early associatio with the A. F. A., he attributed i to the character of the men h worked with. Recalling some o the circumstances surrounding th first meeting, which was the resu of a call sent out by the Philade phia Foundrymen's Association, h mentioned the first officers, onl three of whom are still living, an pointed out that the Philadelphi meeting in 1896 was really th foundation of two large societies– the A. F. A. and the Nationa Founders' Association. Looking t the future, Mr. Penton said tha those industries that are going t survive are the ones having th most forward-looking policy, an added that research must mo and more be a factor. In this h hoped the newly formed Gray Iro Institute would be influential.

The retiring president, S. W Utley, pointed out that Philade phia has become the birthplace so many important organizatio that the mayor may need a soci secretary to keep track of the He paid a warm tribute to Secr tary Hoyt for the success of th association in recent years.

Other speakers were W. H. M

Fadden, Ponca City, Okla.; C. E. Hoyt and George C. Davies. When the question was asked if any were present who had attended every convention, John J. Hill, president Hill & Griffith Co., Cincinnati, arose.

Gray Iron Topics at Three Sessions

THREE sessions were held on the general subject of cast iron. The first one, under the chairmanship of R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, was devoted to cupola developments in the founding of cast iron and was featured by three papers. The second cast iron session, under the chairmanship of J. W. Bolton, Lunkenheimer Co., Cincinnati, dealt with cupola metal, temperature measurements, test bars, and the influence of carbon and silicon variations. The third cast iron session, under the chairmanship of Dr. H. W. Gillett, Bureau of Standards, Washington, was devoted primarily to research questions and was concluded by a report of the committee on gray iron.

Test Bar for Testing Hardness

IN the absence of the author, M. Dudouet, foundry manager Société Métallurgique de Normandie, Paris, France, his paper was read by Willard H. Rother, Buffalo. Its title was: "Study on the Use of a Hardening Test for Cast Iron with Medium Silicon Content," and it was presented on behalf of the Association de Technique de Fonderie de France. The paper was devoted largely to the development of a form of test piece for making hardening tests with medium and high-silicon content in the iron. The author traced the influence on the depth of hardening produced by the thickness of the test piece, its width, the character of the chill used and its temperature, the humidity of the sand, the temperature of pouring, etc. Variations in these properties were traced by means of diagrams.

To insure comparability of results, it is necessary that all the factors affecting the hardening should be maintained strictly constant. With such precautions the author concludes that it is unquestionable that two test pieces, cast from the same metal at the same temperature, will show practically similar depths of hardening.

In opening the discussion on this paper, John Shaw, Southsea, England, expressed the opinion that the test as outlined is not sufficiently practical for foundry purposes. The time required for making it was believed to be too great. He described briefly his own methods of making a wedge 6 in. long, 4 in. wide, and varying in thickness from 2 in. at one end to a point at the other. By means of this wedge a rough idea can be obtained of the silicon and carbon contents at various points and the depth of the chill can be measured. The chill described in the paper was characterized by Mr. Shaw as too complicated for ordinary shop purposes. He believes that the whole question gets down to one of economics, in utilizing the method which can be handled to best advantage and at lowest cost.

Influence of Carbon and Silicon Variations

ORAL presentation was made by D. G. Anderson of the paper prepared by Mr. Anderson and G. R. Bessmer, foundry engineers Western Electric Co., Chicago. The title was "Influence of Carbon and Silicon Variations in Gray Cast Iron." The paper was brief, consisting in presentation of results from 23 heats melted in an induction electric furnace with magnesia lining. Several curves and tables were given, showing results on the 1.10 per cent silicon series, the 2 per cent silicon series, and the 2.20 per cent silicon series. Broken test specimens were exam-

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Men of the 1896 Convention Who Sent Acceptances for the Reunion Dinner

C. W. Asbury,
Enterprise Mfg. Co. of Pa.,
Philadelphia.

Arthur E. Barlow,
Barlow Foundry Co.,
Newark, N. J.

William J. Coane,
Ajax Metal Co.,
Philadelphia.

Capt. James L. Crawford,
Philadelphia.

J. M. Darke,
General Electric Co.,
West Lynn, Mass.

George C. Davies,
Pilling & Co.,
Philadelphia.

William J. Devlin,
Philadelphia.

Henry Drinkhouse,
Elkins Park, Pa.

Howard Evans,
Philadelphia.

A. I. Findley,
The Iron Age,
New York.

George W. French,
J. J. Mohr & Son,
Philadelphia.

William E. Fulton,
Waterbury Farrel Foundry & Machine Co.,
Waterbury, Conn.

John Hill,
Hill & Griffith Co.,
Cincinnati.

George T. Johnson,
George T. Johnson & Co.,
Philadelphia.

S. T. Johnston,
S. Obermayer Co.,
Chicago.

E. J. Lame,
R. D. Wood & Co.,
Philadelphia.

John A. Logan,
Atlas Steel Casting Co.,
Buffalo

George C. Matlack,
Wm. Cramp Ship & Engine Bldg. Co.,
Philadelphia.

John A. Penton,
The Foundry,
Cleveland.

Charles Pettinos,
New York.

George T. Pettinos,
Philadelphia.

G. R. Rebmann,
Philadelphia.

Harry F. Rebmann,
Mt. Airy, Philadelphia.

Frederick A. Riehle,
Riehle Brothers Testing Machine Co.,
Philadelphia.

Bartlett M. Shaw,
Walker & Pratt Mfg. Co.,
Watertown, Mass.

S. D. Sleeth,
Cambridge Springs, Pa.

James S. Stirling,
Wilmington, Del.

H. R. Valentine,
M. D. Valentine & Brothers Co.,
Woodbridge, N. J.

Van Loan Whitehead,
Buffalo.

Walter Wood,
R. D. Wood & Co.,
Philadelphia.

J. A. Steinmetz,
Morris Building,
Philadelphia.

ined and photomicrographs were shown.

The authors concluded that the total carbon content of gray cast iron of 2 per cent or higher in silicon may be somewhat reduced without materially increasing the amount of combined carbon in the casting. This reduction of carbon for these irons was reported as resulting in some improvement of physical properties.

Opening the discussion, James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, referred to the deflection calculations shown in one of the author's tables. Mr. MacKenzie had calculated roughly the modulus of elasticity from the deflection figures given for the various tests. He found that these varied considerably, going as high as 25,000,000 for test No. 5 in the 1.10 per cent silicon series and as low as 9,800,000 for test No. 11 in the 2 per cent silicon series. He recommended the use of this calculation showing modulus of elasticity in studying the properties of cast iron.

Another speaker reported the practice of molding with the heavy section at the top instead of the bottom, and using appropriate gating so that the light sections at the bottom would be properly filled. He reported getting far better results in his castings by this means than by any other which he had used. In response to a question as to the entire accuracy of the colorometric method of determining the amount of combined carbon in the iron, Mr. Anderson agreed that it is not thoroughly accurate, but stated that it had the advantage of being inexpensive and of giving results which might be relied upon as sufficiently accurate within the practical limits of foundry operation.

Heat Losses from Hot-Metal Ladle

DETERMINATION of the heat losses from a 75-ton hot metal car of the Pollock type were reported in a paper by William F. Roeser, consulting physicist Bureau of Standards, Washington. The car was divided into seven zones and temperature measurements were made at various places around each zone. It was found that the cooling rate varied considerably during the course of a single determination. One table shows a loss of temperature in the molten metal of 63 deg. C. in the first hour and only 78 deg. in the succeeding 10 hours. In fact, the second hour showed only 12 deg. and there was a gradual reduction hour by hour until the last four showed 6 deg. each.

Calculations were made of the radiation losses from the surface of the ladle, as well as convection losses and conduction of heat through the lining. The average value of the heat losses worked out at about 140 B.t.u. a second.

Calculation of the specific heat for molten iron was made from the determinations in the test. This was placed at about 0.23. This value, it was stated, may be in error, due to the fact that the weight and rate of cooling of the slag were not known and that some of the iron was freezing in with the slag.

It was concluded finally that metal tapped from a blast furnace at about 1500 deg. C. (2732 deg. Fahr.) can be held for 40 hr. before freezing. As a matter of fact, one case was cited where a ladle of metal went off the track and it was not possible to pour it until 36 hr. after it had been cast. While there was a large skull left in the ladle, it was successfully poured after that interval.

Temperature Measurements of Molten Cast Iron

OPTICAL pyrometers were given a rather poor bill of health in a paper by H. T. Wensel and W. F. Roeser, Bureau of Standards, Washington. Many comparisons were cited in the paper between the readings of the optical pyrometer and those of the thermocouple, in which a wide variation was shown between the two, resulting in necessity for a considerable correction to optical pyrometer readings before they can be accepted as accurate. If this correction were uniform, or reasonably so, this might not cause trouble, but as a matter of fact they varied considerably, being greatest not only actually, but proportionately, at highest temperatures. In one table these variations ranged from 3 per cent at a temperature around 1200 deg. C. to 8 per cent at a temperature around 1500 deg. C. A difference of more than 10 per cent was shown in one case, where the thermocouple gave about 1600 deg.

One explanation of the variance was given as a change in the surface emissivity around 1375 deg. C. on cast irons. It was conjectured that this transition might be from liquid to solid oxide or from liquid to solid slag. While the melting points of the various oxides of iron are higher than this, it is believed by the authors that the solid oxide formed below that temperature is comparatively insoluble in molten iron, while the molten oxide formed above that point goes into solution as fast as it forms.

Discussion on this paper centered largely on whether the alloy additions in the heat were made in the ladle or before. It developed that some of the additions were made in the ladle or at the spout, while others were made in the furnace before the heat was poured.

Recent Developments in Cupola Metal

POINTING out that our object in foundry practice is primarily to make a better and a cheaper gray iron, John D. Miller, of the Cresson-Morris Co., Philadelphia, read a paper entitled "Some Recent Developments in Cupola Metal." The engineer is continually demanding stronger irons with higher tensile strength, and at the same time demanding a refinement in the irons for pressure work and a high machinability. In his plant the author stated that some cupola metal had been poured into bars giving as high as 65,000 lb. to the square inch in tensile strength. This is about three times the strength of what formerly was considered a regular foundry metal and it costs only a few cents more a ton to produce it.

Regarding iron made in the electric furnace it was pointed out that the additional strength over cupola metal is about 10 to 25 per cent, but it costs 25 to 50 per cent more to produce this result. Consequently the comparison of the two metals is not fair to the cupola, unless the difference in the cost is indicated at the same time.

There are other qualities besides tensile strength which are important in iron. There is unquestionably a demand and a place for cast iron of the usual grades. Nevertheless the speaker advocated an extension of the use of high-strength cast iron.

Castings of High Strength

IN the discussion P. T. Bancroft, superintendent John Deere Harvester Works, East Moline, Ill., stated that the gray iron foundry is not slipping back very far, despite the lugubrious statements of some critics. The strength of our metals in general is getting better. Formerly it used to be believed that 5 or 10 per cent of steel scrap in the charge was the limit which could be used satisfactorily in foundry practice. Now, however, it is found that a charge of all steel can be used under proper precautions and control.

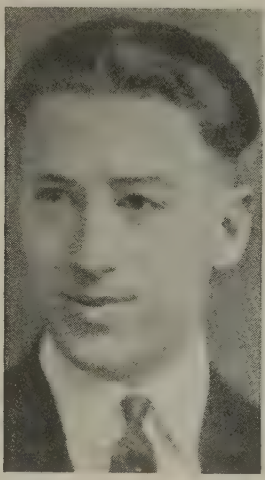
Lots of castings are made, according to James T. MacKenzie, where fluidity is the paramount consideration, rather than a strength of 65,000 lb. to the square inch. Along this line David McLain, Milwaukee, stated that, when it was found possible to attain a strength of 45,000 lb., there was no demand discovered for such a cast iron. As a matter of fact, he said that his company had not yet been asked for it.

For high-tensile cast iron, one speaker reported using a charge including 96 per cent of steel rails. His practice is to add ferromanganese and 75 per cent ferrosilicon to the charge, getting from the spout a metal containing 0.65 per cent manganese and from 1 to 1.25 per cent silicon. Additions in the spout were made to get a silicon up to 2 or 2.5 per cent and other additions for nickel from ¾ to 1¼ per cent.

In obtaining these results it is found desirable to melt with a very high coke bed—up to 48 in.—thus resulting from the start in a very hot metal. Readings with the optical pyrometer show this metal to run from the cupola at 2700 to 2800 deg. Fahr. Equally good results were reported from a 36-in. and a 60-in. cupola. The maximum

Contributors to Gray Iron and Non-Ferrous Programs

L. E. GILMORE


W. F. ROESER

J. D. MILLER

E. F. HESS

test showed 69,800 lb., with an average running around 65,000 lb. Only a half dozen heats were made, all experimental and each resulting in about 1500 lb. of castings.

Not better iron but better castings is what we are after, according to R. F. Harrington. This opinion was voiced also by other speakers in discussing the paper. Unless the castings will do what is expected of them the quality of the iron going into them is a secondary consideration.

Research and Practice in Gray Iron

OPENING the session on research methods and plans, Doctor Gillett pointed out that the term "research" is applicable only when we do not know what we are going to find out. He compared it with the old-time navigation, particularly that of the day of Columbus and immediately afterward. Cartographers put continents and islands on old maps in a haphazard way and eventually the map assumed a form which made it possible for the navigator to reach any predetermined destination with the least possible loss of time and effort.

Enlarging upon this theme, Doctor Gillett said that the gray iron industry needs charts showing all the data available, if it is to make progress. Only by filling in the unknown territory and thereby eventually producing a completed whole can this result be achieved.

Theory or Practice in Gray Iron Foundry

SPEAKING extemporaneously and covering a considerable field not carried in his paper, John Shaw, of Southsea, England, presented a paper on the above topic. He dealt in his paper largely with the theoretical side of cupola practice and the relationship of the various elements to the resulting iron characteristics. Melting temperatures and investigations of the effect of the size of the test bar were discussed.

The author took up a large number of Maurer's results, with the aid of three lantern slides in which he had segregated into groups the Maurer tests. These groups were based on certain uniformity of results under varying sets of conditions.

Working from these diagrams Mr. Shaw expressed himself as very much opposed to using as a base the sum of the total carbon and the silicon for comparative work, unless the total carbon is practically uniform and other conditions are unchanged. Otherwise, he said, the variations will result in giving discordant conclusions.

Another practice which Mr. Shaw deplored was the use of the pearlitic theory. He said that it is perfectly possible to obtain pearlitic iron which is exceedingly poor in its practical qualities, and equally possible to obtain excellent pearlitic iron. From this he argued that pearlite alone is no criterion as to the suitability of the iron for any given purpose.

Discussing Mr. Shaw's paper, J. W. Bolton stated that the sum of the total carbon plus a percentage of the silicon gives a much better base to work from than the total carbon plus total silicon. Formerly one-fourth or one-third of the silicon had been used by different investigators. Using 30 per cent of the silicon as an addition to the carbon was recommended. Under this arrangement the strength results, according to Mr. Bolton, fall into proper relationships with the reported carbon and silicon contents found on analysis.

Research Problems of the Gray Iron Foundry

ORGANIZED research can be applied with advantage to the engineering properties of gray iron, according to J. W. Bolton, who read a paper on the topic carried in the crosshead. It is known that the properties of the metal depend largely on the absolute and the relative amounts of graphitic and cementitic carbon and on their distribution and size. The silicon and total carbon content are the most important composition factors influencing these carbon forms.

Mr. Bolton classified gray iron into 40 groups, according to their silicon and carbon content. The latter ranged from 2½ to more than 3½ per cent and the silicon from ¾ to more than 2½ per cent. He gave a large amount of tabular material from tests and showed correlation among these several groups of irons. In particular, he showed a certain correlation between castings and test bars made from the same ladle of metal. A number of specific cases of castings came up for discussion in this connection.

Interpretation of test results and discussion of his data were given in considerable detail. He concluded that extension of systematic research will furnish foundrymen with proper information on the properties of their product. It was admitted that the job of obtaining this information is going to be large, but the author believed that progressive foundrymen would undertake the task.

Consideration of pouring temperature or the original superheat in the metal, in addition to composition and cooling rate of the metal, must be had, according to Dr. Richard Moldenke, Watchung, N. J. He cited this as a third important factor in our study of con-

Chairmen of Three Technical Sessions

N. K. B. PATCH

A. E. HAGEBOECK

J. W. BOLTON

ditions. He expressed the opinion that it is impossible to correlate results from a test bar with those from the casting. This was in direct opposition to Mr. Bolton's findings.

That there are several difficulties in this correlation was pointed out by John Shaw. He questioned the use of the shear test in this connection. Discussing the testing, James T. MacKenzie referred to transverse strength, as well as tensile and shear strength, as being due largely to the size and character of graphitic inclusions in the metal. Deflection of the test piece, on the other hand, representing ductility, is based on the amount of these inclusions.

Committee Reports

PRESENTING the sub-committee report on refractories for the gray iron foundry, James T. MacKenzie told of sending out questionnaires to about 200 selected foundries and receiving replies from 56. In general, the data obtained were disappointing. Refractory costs, including labor, were reported as varying all the way from 5c. to the ton of castings to $1.68 a ton. These two extreme figures were reported from two foundries of about the same size. Relations of stack area to tuyere area are varied in the different cases from 1½ to 1 as a minimum, to 9.9 to 1 as a maximum. Charges on a 72-in. cupola varied from 3600 lb. to 12,000 lb.

Analysis of the slag is something which apparently is outside the knowledge of nearly all foundrymen. Very few reported on this. Heats obtained for each lining of the cupola varied from a single heat in a foundry which relines after every heat to a run of six months, representing perhaps 150 heats, in another case. The hours of operation on the melting zone on each lining varied similarly, from 9 in the case of the single heat to 3600.

Following the presentation of the two papers, Mr. MacKenzie presented, in the absence of Mr. Jones, the chairman, the report of the committee on gray iron. An investigation is under way, in conjunction with the American Ceramic Society, on the enameling of cast iron. One of the items on the program of the committee is a fluidity test, involving among other things viscosity, which is important in connection with filling of the mold. Another problem is that of liquid shrinkage. This is particularly important in connection with high-test cast irons, while wear tests and machinability are of value as affecting the usefulness of gray iron castings.

Determination of the gases in the iron is a problem now being worked on by the Bureau of Standards. Relationship of the iron-carbon alloys is to be studied by the committee, in conjunction with a committee of the American Iron and Steel Institute and other interested groups.

Automatic Air Control for Cupolas

THE necessity of close control of air in the melting operation in a foundry cupola and the arrangement of equipment intended to assure such control, were dealt with in a paper on "Automatic Blast Gate Control for Cupolas," by H. V. Crawford, industrial department General Electric Co., Schenectady, at a session devoted to cupola developments.

Air should be charged by weight, not by volume, said Mr. Crawford. Only 23 per cent of standard air is oxygen; therefore only this portion fulfils the purpose for which the air is introduced, and the other 77 per cent works against the melting operation. The total weight of air used during any heat is more than the combined weight of the coke and iron, which fact emphasizes the importance of air control.

In discussing the amount of air required it was pointed out that for a 10 to 1 fuel ratio, 24,000 cu. ft. of air instead of 30,000 cu. ft., is all that is required to melt a ton of iron. This is based on good coke having about 88 per cent fixed carbon, and takes account of carbon taken up by carbon dioxide, also of air leakage, etc. If the 30,000 cu. ft. figure is used 25 per cent too much air, or 25 per cent too much oxygen, is introduced to exist as free oxygen and oxidize the iron. Also, 25 per cent more inert gas is introduced to help retard the melting operation. More coke can be added, he said, but this decreases the ratio and slows up the melting rate.

Calculations in the paper were based on the weight of air at standard conditions of 14.7 barometer and 60 deg. Fahr. temperature. It was pointed out that these conditions were not always standard because the air temperature will vary from zero to 100 deg. in some localities and the barometer will also vary. The weight of a given volume of air will therefore change with the temperature and barometer, and therefore blowers should be operated to give constant weight, rather than constant volume.

The effect of temperature, barometer and humidity were briefly discussed, and in concluding this section of his paper Mr. Crawford said: "The above figures show that a serious error is made if the air required is figured on the old basis of 150 cu. ft. of air per pound of coke, or 30,000 cu. ft. for a ton of iron for all conditions of the intake air. At the minimum conditions of 0 deg., 15.2 barometer and no humidity, the excess of air or oxygen will be the difference between 30,000 and 20,500 cu. ft., or 46.5 per cent.

The effects of too much and too little oxygen, and the part that air pressure plays in the melting operation were outlined, and the apparatus for automatically assuring the supply of a constant weight of air to the cupola, irrespective of atmospheric conditions and the resistance through the cupola, were described in detail. This is an electrical control system connected with the line supplying the current to an electrical motor which operates the centrifugal compressor. This control operates a blast gate placed in the pipe between the blower and the cupola. Details of the system, such as the hand and automatic blast gates, control panels, meters, etc., as well as test and operating curves, were shown by means of lantern slides. The equipment was also demonstrated at the booth of the General Electric Co., during the exposition.

Describes Manufacture and Properties of Cupola Blocks

"CUPOLA Refractories," by C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio, was another paper at the session devoted to cupola developments. The clays used were described and the manufacture of the blocks by hand, by machine and by dry press method were outlined and pictured by lantern slides. A section of the paper was devoted to the properties of various types of cupola blocks.

Steel Foundry Problems Reviewed

THREE sessions were devoted to steel foundry subjects. Eight papers and several important committee reports were presented. One session was given over largely to alloy castings and to heat treatment, another to foundry practice and a third to general topics. W. J. Corbett, Steel Founders' Society of America, Pittsburgh, was the chairman of two of the sessions, and J. Fletcher Harper, Allis-Chalmers Co., Milwaukee, presided over the other. In the following account it is possible to touch on only a few of the papers.

A PAPER which attracted considerable attention was the fourteenth in a series of exchange papers between the Institute of British Foundrymen and the A. F. A. It was contributed by F. A. Melmouth, manager of steel foundry, Thos. Firth & Sons, Ltd., Sheffield, England, and entitled "Variables in Steel Foundry Practice." In the absence of the author it was presented in abstract by George Batty, director of research Steel Castings Development Bureau, Philadelphia, an old friend and co-worker of the author.

British View of Foundry Practice

Mr. Melmouth's paper is quite long and deals with many phases of the subject. Briefly he says that factors influencing to the largest extent the production of a steel casting are: The human element; various molding operations; metallurgical behavior of the steel in the form of a sand casting, and heat treatment. Each one of these factors are treated in detail.

Castings have been described, says the author, as "badly designed ingots" and with this he is quite in agreement. Considerable research is still necessary to produce an ideal or "perfect" steel casting which is also true of the ingot. The lower the carbon content, the more difficult to produce a casting free from unsoundness of the porosity type. In normal quantities silicon has very little effect on physical properties, but high silicon in mild castings tends to produce coarse ferritic structures with lower strength and impact resistance. Serious variations in manganese, Mr. Melmouth says, should be avoided. As to sulphur, 0.06 per cent can be taken as a perfectly safe upper limit. As to processes it is not true that theoretically steels of equal general composition should behave similarly, irrespective of process. Based on their comparative ability to produce steel with a degree of fluidity high in proportion to the temperature, the author places the convertor first, the single slag electric furnace second, the open-hearth third and the double slag electric fourth.

Various deoxidizers such as aluminum, ferrotitanium and calcium carbide are discussed as is also heat treatment. The great majority of specifications for mild steel castings can be met by a straight annealing, cooling either in the furnace or in the air, depending on the type of casting being handled. Faults directly attributable to incorrect manipulation during treatment are due to too low a temperature, too high a temperature or too short a period at temperature.

In the discussion Major R. A. Bull, research director Electric Steel Founders' Research Group said that the author's views on sulphur and phosphorus correspond closely to those in this country, so far as they have been determined. Interest was displayed in the question of tarring steel casting molds, and this was explained by Mr. Batty as resulting in a casting with a better surface and one more easily cleaned, also one less liable to burning in.

Many opinions were expressed in the use of deoxidizers, particularly aluminum. It was generally agreed that this deoxidizer must be used to offset the bad effect of green sand molds, but no more should be used than necessary. The use of silicon-zirconium was suggested as being both a deoxidizer and a diffuser of sulphur.

Less New Sand Needed

NEW information on steel foundry sand problems is contained in a paper "Reducing New Sand Consumption in the Steel Foundry" by H. A. Mason, assistant to superintendent Gould Coupler Co., Buffalo. The author, who presented the paper, described a new system of reclaiming sand by which economies far beyond their expectations were realized. New sand consumption has been reduced from 1200 lb. to 300 lb. per ton of good castings. Clay consumption has dropped from 150 lb. to 80 lb. per ton. Savings made have averaged $3,500 per month. Thus the original investment of $3,000 for the sand reclaiming unit and the small additional cost for a high grade bonding clay is considered as money well spent.

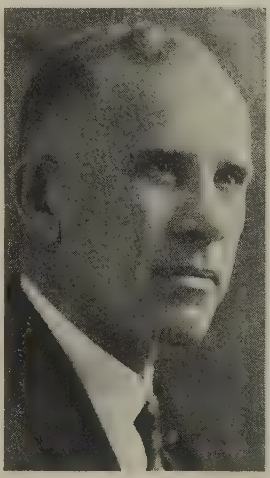
Three Kinds of Alloy Castings

A PAPER of considerable interest is entitled "General Characteristics of Alloy Steel Castings," by J. W. Frank, chief metallurgist Chicago Steel Foundry Co., Chicago. A statement which met with a cordial response was to the effect that foundrymen have all seen a tendency to advertise extensively steels with fancy names or even numbers, steels with varying contents of carbon and manganese, which cannot be compared to the real alloy steels which carry, in addition, nickel, chrome, vanadium and molybdenum.

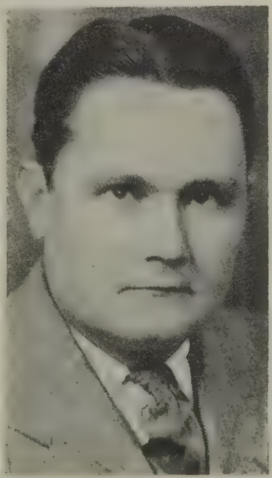
Mr. Frank divides alloy steel castings into three distinct classes. First are those having high physical properties; second, those with extraordinary properties such as resistance to corrosion and magnetic permeability, and in the third classification he puts heat-resisting alloys. Manganese, nickel, nickel-chrome, chrome-vanadium and molybdenum alloy castings are then discussed in some detail.

As to molybdenum, he says straight molybdenum steel is not common in castings at the present time, the molybdenum usually running 0.20 to 0.40 and sometimes as high as 0.80 per cent. The main advantage in this alloy is the relative ease in welding such castings to other parts in fabricating.

Authors of Steel Foundry Papers



H. P. EVANS



H. A. MASON

G. O. CARTER

Molybdenum in conjunction with chromium produces a steel, the use of which is increasing by leaps and bounds, says the author. The addition of molybdenum to nickel-chrome steel results in a metal that should be of particular interest to foundrymen. It retains all the good quality of the nickel and the chromium, the ease of machining of the chrome-molybdenum steel and, in addition, has the peculiar characteristic of hardening almost as hard by air quenching as if a liquid medium were used.

Special Heat Treatment for Castings

AN interesting description of a heat treatment plant for miscellaneous steel castings was presented by A. W. Lorenz, metallurgist Bucyrus-Erie Co., South Milwaukee, Wis. It is a modern plant, uniquely equipped for the full quenching and tempering of miscellaneous steel castings. With this plant an output of over 500 tons per month may be obtained at a cost of about ½c. per lb. It has been found, said the author, that when certain types of alloy steel castings are subjected to quenching treatment, their physical properties may be improved from 50 to 100 per cent. When such results can be obtained at a relatively small increase over the cost of casting, the subject of heat treatment becomes a lively issue, suggesting many applications which would otherwise be prohibited.

The author's statements are based upon his company's experience with heat-treated castings for over a period of 18 years and it is interesting to note that at the present time approximately one-third of the entire foundry output is a fully quenched and tempered product.

In the discussion in which the author answered numerous questions, it developed that all castings are annealed first before quenching and tempering.

Economies in Oxyacetylene Cutting

LARGER risers and more pouring gates are now used than in earlier steel foundry practice, because an ample reservoir capacity above the casting is essential to compensate for shrinkage and thus prevent pipes and blowholes. This is made possible by economies in oxyacetylene removal of such risers, said G. O. Carter, consulting engineer Linde Air Products Co., New York, in a paper entitled "Economies in Oxyacetylene Cutting for Riser Removals." In this way the foundry is sure of getting a good casting when small risers and gates are used.

Other Papers

OTHER papers presented at the steel foundry sessions were "Manganese Steel," by H. P. Evans, metallurgist Pettibone Mulliken Co., Chicago, describing in some detail the metallurgy and heat treatment of high-manganese steel castings, as well as their uses, and a description of an interesting new research steel foundry laboratory contributed by W. C. Hamilton, research director American Steel Foundries, Indiana Harbor, Ind., entitled "Research Laboratory —American Steel Foundries."

Specification Controversy Unsettled

AT the close of one of the sessions the chairman of the committee on steel castings, A. H. Jameson, Deemer Steel Casting Co., New Castle, Del., made a report, the discussion of which consumed much time. It dealt with the old controversy concerning the specifications for flanges, valves and fittings of carbon steel castings for high temperature use. Reference was made to the action which was taken a year ago at the A. F. A. convention in Chicago and at the annual meeting of the American Society for Testing Materials when the serious differences of opinions which existed were referred back to the committee.

Mr. Jameson then related the attempts that have been made to effect a compromise by the appointment of an arbitration committee. Failure resulted in the formation of this committee, as suggested by the A. S. T. M., but a compromise was suggested by those interested which did not meet with the approval of the A. F. A. committee. The compromise was to the effect that the words "other approved processes" should be used in the specification, instead of eliminating the names of the converter or

Flew to Convention

AIRPORT facilities as well as railroad connections may soon play an important part in the selection of sites for future A. F. A. conventions if the experience of W. F. Piper, E. O. Beardsley and L. W. Kreicker (reading from left to right) of the Beardsley & Piper Co., Chicago, maker of sandslingers and other foundry equipment, may be taken as a precedent. These men went to Philadelphia from Chicago by airplane in order to save time in transit and be present at the opening of the exhibit. Messrs. Beardsley and Piper have retained confidence in airplane travel in spite of the fact that about six weeks ago they went into a nose dive near Sharpsville, Pa., the crash resulting in injuries which for a time threatened Mr. Piper's life.

the crucible process. It was also suggested as a compromise that the sulphur limits be raised from 0.05 per cent to 0.06, but the stipulation of definite limits for carbon, manganese and silicon were still to stand.

R. A. Bull presented a lengthy minority report, urging the adoption of the so-called "Cleveland compromise" as the only solution to a controversy which had lasted altogether too long and which was doing harm to the producers of this particular grade of castings and to the making of specifications in general. After many opinions had been expressed by various members present, Mr. Jameson offered a resolution that the sense of this meeting is opposed to the suggested compromise and also is opposed in principle to the inclusion of chemical limits where physical results are stipulated. The final vote showed a decided majority in favor of the resolution, although the total attendance at that time was but 26. Among those who took part in the discussion were John Howe Hall, one of the members of the committee and L. W. Spring, Crane Co., Chicago.

Progress Made in Sand Control

EMPHASIS on the progress that is being made in sand conservation, in making successful synthetic sands and in developing satisfactory tests both in the laboratory and under practical shop conditions were brought out in the one session on sand control. Five papers and several committee reports were scheduled.

Ferric Oxide Film on Sand Has Influence on Bond Strength

ALTHOUGH it has been recognized that colloidal ferric oxide films might have an important influence on the bond strength of sands, no quantitative data have been available to show the effect of the films. Such data, showing the relation of colloidal ferric oxide absorbed on the sand grains and on the clay bonding material to the strength of bond in the molding sand, and the successful preparation of synthetic molding sand, were presented in a paper entitled, "The Influence of Ferric Hydrogel in the Bond of Natural Molding Sands." G. G. Brown, professor of chemical engineering University of Michigan, Ann Arbor, who was joint author with C. C. DeWitt, professor of chemistry Michigan College of Mining and Technology, read the paper.

To investigate the cause of bond in natural molding sand, a sample of fresh Albany molding sand was adopted for testing and analysis. This sand was tested for permeability and compression, and was then separated into silica, iron oxide and clay. It was found that the presence of the natural film of colloidal ferric oxide has a measurable effect on the strength of the base sand. It was also ascertained that the absence of bond material or "clay substance" causes a marked decrease in the strength of the natural molding sand.

Synthetic molding sand was made of pure silica, kaolin and ferric hyrosol in quantities approximating the base sand, bond and ferric oxide in the natural sand. Numerous other constituents of natural molding sand that have been identified were not found essential. The synthetic sand virtually reproduced the properties of the natural molding sand. Similar results were obtained by making a synthetic bonded molding sand, using clean Michigan City beach sand as a base.

Why Bond Strength Decreases

"CAUSE of the Decrease in Bond Strength on Heating Molding Sands to 600 Deg. Fahr." was the title of another paper by the same authors. The loss in bond on heating, at least to 600 deg. Fahr. for 3 hr., is not due to any change in the ferric hydrogel absorbed on the silica, the experiments disclosed. On the other hand, heating the bond material before mixing with the silica base material causes the mixture to lose practically all of the strength lost on heating the mixture. This clearly indicates that the loss in bond on heating is due entirely to changes in the clay bond as distinct from the sand or colloidal ferric hydrogel.

New Machine to Test Sand

"An Automatic Precision Strength Test for Sand," the title of a third paper by these two authors, describes a new machine for making compressive tests of sand. The device was built with the following considerations in mind:

1. No initial loading of sample.
2. Freedom from impact forces.
3. Constant rate of loading.
4. Automatic operation, stopping and indication of breaking load.
5. Accuracy and sensitiveness to less than 1 gm.

With this machine the compressive strength of sands is ascertained with an accuracy of plus or minus 1 per cent. Although such accuracy is probably not necessary in industrial routine testing, it is valuable in careful research work. The machine was used in the investigation of the influence of ferric hydrogel on the bond of molding sands.

Bank Sand Additions to Core Sand

"SURFACE Conditions of Castings as Affected by Core Sand Mixtures," was the title of a paper by H. L. Campbell, associate professor of metallurgical engineering, University of Michigan, Ann Arbor. To obtain definite information on the effects of different core sand mixtures on the surfaces of metal castings, a special mold was designed which permitted a test specimen to be cast in contact with dry sand cores. The mold was formed from two cores which were clamped together in a vertical position.

The investigation showed that the most desirable properties of dry sand cores are obtained when the core sand contains grains of uniform size and of sufficient fineness to produce the required smoothness on the surfaces of the cores.

The smoothness of castings formed by contact with cores will be practically the same as the smoothness of the cores, provided the metal is sufficiently fluid when it is poured to fill the minute cavities on the cores. In all cases where smooth surfaces are required on castings, the cores which form these surfaces must be smooth.

The additions of bank sand or other finely divided materials to core sand mixtures within reasonable proportions do not improve, to any appreciable extent, the smoothness of the surfaces of castings made in contact with these cores.

Sand Control for Gray Iron

"SAND Control and Sand Conservation in a Gray Iron Jobbing Foundry" was the title of a paper by T. F. Kiley, metallurgist Brown & Sharpe Mfg. Co., Providence, R. I. Various tests used in reclamation of sand are described. The company has used clay in rebonding spent molding sand since June, 1925, and shortly after that sand tests were adopted as a guide to the proper use and treatment of this material. The character of clay was found to have considerable influence over the rate of drying out of reclaimed sand. The more colloidal the clay, the less the rapidity of the drying out of the reclaimed sand.

Tests indicated that clay-treated sand bakes as strong as one of the natural sands used to a large extent on medium work; that a fine sand weaker in the green state than a coarser sand with the same amount of clay present in each case seems to bake stronger than the latter, possibly because of less rapid destruction of clay bond in the fine sand.

Fines or silt tend to accumulate in the heap when sand is repeatedly used. However, this tendency is not serious because no attempt is made to reclaim sand that adheres strongly to castings, which is removed at the cleaning room. The addition of new sand to piles on lessening in quantity, sharp sand additions on rebonding, unavoidable core droppings in reclaimed sand, formation of compound grains in casting into the sand; all these probably have their influence in preventing such an accumulation of silt as to cause concern.

After about two and one-half years of reclaiming, light foundry reclaimed sand showed practically the same screen tests as it did in the initial stages. After the same length of time heavy foundry facing sand was found to be more open than the facing formerly used.

It was found that the best method of distributing clay in rebonding is by means of a muller type of mixer. Coarse sands rebond more readily than fine sands.

Permeability Decreased by Clay

Clay decreases the permeability of sand on rebonding to an extent depending on the amounts of clay used. Rebonded sands seem to increase somewhat in permeability and get coarser on using, probably on account of the clay's baking in grains and forming compound grains, and, to some extent, because of core droppings or shot accumulations in the heap. The removal of shot, remulling and rebonding seems to fine the sand down again. In fact, facing sand would get entirely too fine without silica sand additions.

Troubles attributed to the use of clay and rebonded sands in the experimental stage were found on investigation to be due either to molding practice, improper mixing or some deficiency in temper, bond or permeability.

No unusual difficulty is noted in cleaning castings made in sand rebonded with lower fusing, more colloidal clays and the life of this sand is apparently as long as higher fusing clays.

The more colloidal clays seem to give reclaimed sand more of the velvety feel of a natural sand, and the rapidity of drying out seems lessened on both heaps and molds. Higher permeabilities with the same strengths are obtainable with the more colloidal clays because of the smaller quantity used. It seems safe to assume that the less rapid the drying out, the better will the bonding agent withstand the heat action of molten metal which causes decomposition of the clay bond. Decomposition of clay bond, according to some authorities, is responsible in certain cases for cuts, washes and scabs.

Sand treated with very high colloidal clay takes very little water without getting muddy when the slicking tool is applied. Apparently, in swabbing, most of the water is absorbed near the surface and, when a slight excess of water is present, this is quickly brought to the surface by slicking. A molder has to be careful in the use of a swab when using sand rebonded with this type of clay.

When asked whether it is possible to "overmull" sand, Mr. Kiley said his company tried to keep mulling time down to a minimum. Reclaimed sand is ordinarily mulled dry for 1 min. and then for 3 min. during tempering.

Authors of Sand and Cost Papers

J. J. EWENS

M. A. BLAKEY

T. F. KILEY

A. A. Grubb, Ohio Brass Co., Mansfield, Ohio, interposed that it is not necessary to mull so long with colloidal clays as with other rebonding materials.

Sand Control in Light Castings Foundry

METHODS of testing and controlling sand in a light castings foundry of the mechanical handling type were outlined in a paper by W. G. Reichert, metallurgist Singer Mfg. Co., Elizabethport, N. J. Natural sands submitted for trial are subjected to the following tests to determine their suitability:

1. Tensile strength test.
2. Permeability test.
3. Grade test.
4. Dry strength test.
5. Durability test.
6. Relative fusion test.
7. Microscopic examination.

A sand possessing a low fusion point has a tendency to adhere to the casting, especially in the corners where its cost of removal is sometimes very large. It is also the experience of the Singer company that sand with a low fusion point tends to produce an inferior surface.

Mulling tends to bring out the latent strength value of the sand to a marked extent, depending on the time mulled and the clay content.

To determine the effect of using heavier rolls in mulling sands, rolls weighing 1 and 2 tons were compared under identical conditions for a 10-min. mulling period. The heavier rolls also had a 40 per cent larger face surface than the lighter rolls. The heavier rolls were found to give a better distribution of clay, as indicated by an increase in strength, and also have a greater tendency to break down the grain clusters.

Sand deteriorates considerably because of the coarsening of the sand from the balling of the fine grain particles of clay. Sand that is moistened and remains for at least several hours before cutting over, allowing the moisture to distribute uniformly, as in floor molding, will ball up very slowly. It is generally known that sand becomes coarser through handling, and this effect is of greater magnitude with mechanical handling.

Observations in the Singer plant indicate that the balling of sand is due to the movement of the sand containing a critical moisture content, together with an uneven distribution of moisture, and that the balling effect is increased by an excess clay content.

Balling may be counteracted by the addition of a fine sand, a lower clay content sand, mulling, improvement in handling conditions, or a combination of these.

Moisture variation was reduced and a uniform facing sand was insured by attaching a water meter to the muller, as well as by constantly checking the sand with a laboratory moisture tester.

The Singer company first attempted to reclaim sand from tumblers, which consisted of about 4 per cent iron dust, by converting the iron dust into ferric oxide by an "aging" process; the sand later being made into a substitute for natural sand by mulling with the proper addition of clay. After a long period of use the surface quality began to deteriorate and at the same time the fusion point declined because of the gradual accumulation of iron oxide. For this reason the experiment was discontinued.

Now the company is successfully reclaiming the burnt sand that clings to the sprues and gates, which is not contaminated with iron.

In the discussion of Mr. Reichert's paper the question was raised whether the fusion point or the vitrification point in sand is the more important. (The vitrification point is where the sand will not take bond). It seemed to be the consensus of opinion that both high vitrification and high fusion points are essential. M. A. Blakey, International Harvester Co,. Milwaukee, pointed out that the amount of organic matter in the sand has a great deal to do with its propensity to burn on a casting. Organic matter helps his company to make good castings, he said. The reclaimed sand contains considerable core oil, pitch binder, cereal binder, etc. Better results are obtained with such sand than with new sand, he said. Scabs are overcome with organic matter. It can be done with flour and with sea coal.

Authors of Papers on Foundry Management

J. H. MARKS A. D. LYNCH J. D. TOWNE

A Test for Durability

"TESTING Molding Sands for Durability" was the subject of a paper by M. A. Blakey, International Harvester Co., Milwaukee. A small simple mold was made in the laboratory of each sand tested, and was taken to the foundry and poured with regular iron from a hot hand ladle. This was repeated several times with each sample of sand, but before each cast the bond strength and permeability were determined. When the tests were started it was expected that five casts would show the characteristics of sand quite well, and for natural molding sands they have done so. For synthetic sands, however, at least 10 casts were necessary, as the durability of the synthetic sands was much greater.

Although the original purpose of the tests was to determine the relative effect of use on the bond strength and permeability, it was soon found that other information obtained through them was of equal or greater importance. Examination of the castings made during the test indicated what could be expected in the foundry if a particular sand were used. Some sands burned on and some peeled nicely, some gave a smooth finish and some a rough finish, some cut and scabbed easily and some did not. Some shook out of the mold with little effort, while others became as hard as a dry sand core.

Subcommittee on Tests Makes Report

A NEW pamphlet, incorporating additions to and modifications to sand tests recommended in a report issued in June, 1924, has been completed by the subcommittee on tests, according to an announcement by the chairman, Dr. H. Ries, Department of Geology, Cornell University, Ithaca, N. Y. The pamphlet has been divided into two parts: (1) "Tentative Standard Methods of Testing," and (2) "Foundry Control Methods."

Among the recommendations of the committee is that the compressive test be the standard strength test of the association, in preference to tensile and shear tests.

In connection with the refractories test, the point was raised whether it is more important to determine the melting or sintering point, and the decision was in favor of the latter. In determining the sintering point, a specimen is rammed and a ribbon of platinum is placed on it. A current is run through the ribbon, and an optical pyrometer is used to ascertain the temperature at which the grains cling to each other and to the ribbon. That temperature is regarded as the sintering point.

In connection with the fineness test the committee recommends that sieves Nos. 30 and 50 be added to the series now in use.

After an investigation of four new shaking machines which gave results that checked very closely, the committee recommends that a milk shaker stirrer can be used instead of a rotary shaker.

A sub-subcommittee was appointed to test cores. This body recommends that test specimens be packed by mechanical ramming instead of hand ramming.

To determine the permeability of a mold it was recommended that a tube ½ in. in diameter and a standard rubber tip be used.

The committee is making bond clay tests, to evaluate the various bond clays used, but is not yet ready to report.

Other subjects now being studied include the following: Determining the hardness of molds; shortening the fineness test; a rapid method of colloidal determination; flow of sand in the mold, and sea coal.

Much Bond Clay Bought

PURCHASES of bond clay to rebond sand or to make synthetic molding sand are increasing rapidly, according to a report presented by R. F. Harrington, Hunts-Spiller Mfg. Corporation, Boston, chairman of the subcommittee on sand conservation and reclamation. One producer of bond shipped 30,000 tons in 1927, compared with 15,000 tons in 1926, and expects to ship 50,000 tons this year. One of the largest producers of motor cars used 25 carloads of rebonding material in 1927 and would have used it 100 per cent, so it reported, if it had had the equipment to do so.

Report on Grading Sand

THE system of grading sands tentatively adopted by the association has made definite, although slow, progress, according to a report by the Sub-Subcommittee on Grading, of which A. A. Grubb, Ohio Brass Co., Mansfield, Ohio, is chairman. There is still a strong tendency to cling to the old grade numbers, which differ widely among themselves for the same grades; in some cases the same sand is sold under two or three different numbers—these numbers being the ones with which their customers have been acquainted.

The subcommittee has proposed the terms "angular," "sub-angular" and "rounded" as descriptive of grain shapes and has prepared photographs of typical sand grains of each class.

The addition of the 30 and 50 mesh sieves to the original standard set recommended for foundry sands raised the question as to what multipliers should be used for these sieves when calculating grain fineness. The sub-subcommittee recommends that the weight or percentage of sand on each sieve be multiplied by the "approximate mesh number" of the sieve through which it passed. Inasmuch as mesh numbers differ among the testing sieve makers for sieves of approximately the same opening, "approximate mesh numbers" or multipliers have been listed along with the actual mesh numbers of both the Tyler Standard and the United States Standard openings.

In connection with the tentative standard A. F. A. dye adsorption test, the term "colloidal properties" is suggested rather than "quality of clay." The latter term implies that a sand of low dye adsorption value has poor quality clay, which is not a fact. A sand of low colloid content is actually superior for some purposes. Colloidal properties are also a factor in the behavior of core sands. Sands of low dye adsorption value require less oil binder, and produce cores that bake hard but can be knocked out of castings readily.

These considerations point to the advisability of grading sands according to their colloidal properties, and it is hoped that this can be made an active matter in the near future.

Progress in Cost, Apprenticeship and Other Subjects

AT sessions devoted to foundry costs, management and apprenticeship, as well as materials handling, a notable array of papers was provided. Some of the features of these programs are reviewed in the following.

Uniform Cost System for Steel Foundries

FOUNDRY costs and management problems occupied two afternoon sessions, one under the chairmanship of A. E. Hageboeck and the other of H. Cole Estep, as well as cropping up in many other sessions supposedly devoted to technicalities of production or metallurgy.

Mr. Hageboeck has been chairman of a committee on foundry costs which after some extensive work has produced a report on "Cost Finding Practice for Steel Foundries." In this 36-page publication may be found a classification of accounts within the various operating departments, and supplementary notes indicating where border-line operations are to be allocated. General overhead and special charges are described in such a way that, when any foundry adopts the recommendations of the committee, the management will be assured that all items of expense are included.

It is hoped by the American foundrymen's committee that this report will form the basis of a uniform accounting system for steel foundries. This will enable all such organizations to compete on a better basis, each knowing its real costs. Lack of such data usually results in one sales organization, ignorant of its costs, following another equally ignorant one down to rock bottom in an effort to get or hold business, and to the general disorganization of business in the entire region. In view of such situations, the cost committee recommends that foundry managers in various localities should meet with the avowed purpose of adopting this uniform system, making only such rare modifications as are clearly necessary for local conditions, and perhaps jointly engaging some reputable accountant to supervise the installation of the system in all the plants.

It was also emphasized that overhead and general charges should be carried on estimate sheets on the basis of *average* production. This will enable a plant which is fortunate in being able to operate now at a rate considerably higher than the average (which is now about 60 per cent of capacity for the whole industry) to build up a reserve against the expected swing to a low productive rate.

Selling by Schedule Vicious

IF foundries had been working under such a system the vicious practice of selling by schedule would never have gained headway, in the opinion of J. J. Ewens, of the George H. Smith Steel Casting Co., Milwaukee, Wis. In a paper, entitled "The Schedule Fallacy," he says that whatever justification there may have been in the days when labor was cheap to sell heavy castings at a lower rate per ton than light castings, it has vanished in these days when general overhead may be as much as twice the metal cost. Any organization which accepts work on the schedule basis will eventually find that it is making the difficult varieties at a ruinous price, while the easy ones (weighing the same per piece) are retained in the buyer's own foundry or are placed with some other which knows its costs and estimates each pattern separately.

It was pointed out from the floor that the schedule system of sales would remain as long as manufacturing costs were not known in detail and as long as the purchaser insisted on buying by weight rather than by units. Even the latter could be circumvented if the foundry would, after figuring the cost per piece, translate this into a cost per ton *for that particular pattern only*, and then absorb any profit and loss due to variation from computed weight (a matter of almost vanishing importance).

Bonus Paid to Reduce Scrap

AT the Ohio Brass Co., bonus for low scrap losses is paid only to the molder supervisors called "instructors," according to R. A. Greene, assistant manufacturing superintendent. Each instructor is in charge of no more than 18 molders, who are paid piece rates and consequently are penalized directly for defective castings. Every day the production of each molder is counted up, and the defectives classified and inspected. If by the end of the week any particular molder or any particular pattern seems to be running consistently bad, it is discussed in regular Saturday meeting of the various foremen and technical representatives interested. Any loss greater than 5 per cent is given immediate attention. By this system of daily posting of records, constant watch of difficult castings, cooperation of all manufacturing departments and especially the competition between the instructors, scrap losses in the malleable foundry have been reduced to 5.3 per cent, a grand average since 1924, as compared to 9.8 per cent for a similar previous period. This amounts to about 465,000 lb. of castings a year saved from the remelt. No special clerical help is needed for the system of instructor bonus. All basic information is gathered in order to compute molders' pay. Extra work making up totals and posting records on bulletin boards amounts to a few hours per week.

Payment Methods to Increase Production of Salable Castings

A MANAGEMENT problem was considered in two papers before a session on malleable iron. In one "An Incentive Bonus Plan for Molders Based on Scrap Control" was described by R. J. Teetor of the Cadillac Malleable Iron Co., Cadillac, Mich. His is a rather young organization, set up in a region where little foundry work had previously been done. The biggest problem had been to educate the workmen to the fact that it was possible to melt iron, to make castings, and to make them at a good rate. At first piece rates were set which would give theoretically 50c. per hour to molders, and a bonus of 100 per cent of excess earnings over 50c. per hour paid. This increased the number of molds made, but increased the scrap losses at a greater rate. The bonus plan was then changed to apply on the percentage of good castings, but while this reduced the scrap losses it slowed down production.

A compromise plan was adopted early in 1926, and has operated successfully since. The molder's regular pay envelope contains his piece rates plus a bonus for production. Suppose for instance he is expected to make 100 molds daily and the rate is 5c., but his actual set up is 120. He gets 120 pieces at 5c. or $6 plus 100 per cent bonus on his surplus of 20, that is: 20 at 5c. or $1 more. His total pay for the day is $7.

In addition to this he gets twice a month a separate envelope containing a bonus for the number of good castings made and his regularity at work. No supplemental bonus is paid if he fails to get at least 91 per cent of good castings, or is absent more than a day and a half. If 91 per cent of his castings are good, this supplemental bonus is 10 per cent of his piece rate money; if 92 per cent his bonus is 12 per cent; if 93 per cent of good castings his bonus is 14 per cent and so on. Only full time for two weeks entitles the molder to this entire supplementary bonus; a half-day's absence cuts one-third off it; a full day's absence is penalized two-thirds.

Experience shows that the production bonus amounts to 8 per cent of the piece rate pay, and the supplemental bonus amounts to 10 per cent of the piece rate pay. Therefore instead of paying, say, 5c. for a mold, the average cost is 5.9c., but these bonuses amount to only 2 per cent of the total cost of the castings. While this scheme apparently runs counter to the principle that a bonus should decrease the molding price per piece, it is felt that it is justifiable on the ground that it has reduced the remelt, the hand trimming, inspection and general overhead. It has also reduced the labor turnover and is in line with the sound principle that it allows the workman to participate in the savings he is responsible for.

Horse Sense in Cutting Costs

AN interesting paper on "Stabilizing Labor and Cutting Costs by Horse Sense" was read by A. D. Lynch, personnel manager Ohio Brass Co., Mansfield, Ohio. Mr. Lynch said he was a cost accountant first and a personnel man second, consequently he knew that the greatest waste in industry today is in labor turnover. To stabilize labor it is necessary to give them working conditions so that they will wish to stay. Many managers fail to regard the workers as human beings, as part of the selling and manufacturing organization which must profit from the business if it is to endure. Most so-called personnel work, like athletic fields and loan associations, are frills; the essentials are rather the following:

a. Clean buildings and attractive surroundings.
b. Machinery, tools and equipment in good condition.
c. Fair pay.
d. Continuity of employment.
e. Correct leadership.

The last is regarded by Mr. Lynch as most important. He believes that the foremen can do more to create a contented working force than any one else. But they must be well selected and trained. Several essentials of good foremanship were mentioned, such as skill and knowledge of the work, honesty, fairness, sympathy, good judgment and open mindedness. It would be the greatest mistake to interpose a so-called personnel manager between such a foreman and his men. The manager's part is rather to see to it that the foremen are kept well informed about the company's policy, and given all facts and figures regarding the status of the business which will enable him to bring the workmen into his confidence and build up in their minds the thought that they are partners, essential to success, or contributors to failure, and will gain or lose as the business prospers or languishes.

JOHN SHAW
Prominent British foundryman, who presented an important paper on gray iron

Apprentices Trained Through Community Effort

A SMALL but interested audience participated in a discussion of apprentice training on Thursday morning, under the chairmanship of E. S. Sparks, secretary Metal Manufacturers' Association of Philadelphia. Hardly a member of the audience but was actively engaged in organizing or supervising apprentice training, or was employing them. As one Southern foundry superintendent put it: "If you'd take away my boys, there would be nothing left in my foundry worth working for." His is the type of organization in the smaller community where the entire burden of selecting and training new workers falls upon the manager; he is the type of man who enjoys working with young men more than with things, and he is able therefore to enter and influence their lives even in their play time.

Many other communities are following the lead started by Milwaukee so successfully over 20 years ago, and since developed into the most comprehensive and successful system in the United States. Even yet, with 905 indentured apprentices in various mechanical trades, the supply of skilled workers from this source is hardly half the number continually needed. The fundamental ideas are cooperation of the employers through a metal trades association, chamber of commerce, or some other similar organization, looking toward uniformity of shop training, rates of pay, and (if necessary) interchange of apprentices in order to round out the experience. Essential mental training of from four to eight hours weekly is arranged by the public school system. Proper coordination of school and shop work cannot be neglected.

System Used in Nine Centers

In at least nine industrial centers such a system for machine shop and foundry apprentices is in successful operation. Details vary with the local necessities. The cost generally is shared by the employing plants (in the form of wages paid), the public school system (through funds for continuation schooling) and by the United States Government. Returns to the student are very great. It has been computed that the added pay which a well trained mechanic receives above that of an ordinary one is the equivalent to interest on a $12,000 investment. To the community the advantage is greatest in keeping a young man from acquiring vicious or idle habits during the two years between the age of 16, when his compulsory education is finished and 18, the minimum age which most compensation laws permit his employment in regular work.

Before any success may be attained in apprentice training, the managers of the industry or group of industries, must be thoroughly awake to the desirability of replacing the natural mortality in skilled workers with younger men, trained not only in the manual trade, but of considerable intelligence and loyalty to the community.

Mechanical Handling of Materials

FOUR papers on materials handling in the foundry were read at a session devoted exclusively to this subject. The attendance was small, but those present showed keen interest. L. L. Anthes, managing director Anthes Foundry, Ltd., Toronto, Ont., was chairman.

In a paper on "Materials Handling and Its Relationship to Building Plans," E. F. Scott, engineer of layout, design and equipment of foundries for the Austin Co., Cleveland, went into details regarding the layouts for the varying conditions of foundry plant development. Yard handling, charging, hot metal transportation, mold conveying, sand handling and distribution, return of flasks, etc., to the molding machine, conveying cores, shakeout, knockout, conveying of castings to the cleaning room all demand some sort of material handling, said Mr. Scott, and he pointed out the best available methods for these foundry operations.

Some interesting data on the results that may be expected from the installation of mechanical handling equipment in the foundry

Amount That May Be Spent for Each $1 per Ton Reduction in Cost, Using 20 Per Cent per Year Fixed Charges

Annual Earning in Percentage	Annual Production in Tons									
	1,000	2,000	3,000	5,000	10,000	20,000	30,000	40,000	50,000	60,000
100	$833	$1,660	$2,493	$4,165	$8,330	$16,660	$24,990	$33,320	$41,650	$49,980
50	1,428	2,856	4,284	7,140	14,280	28,560	42,840	57,120	71,400	85,680
33⅓	1,875	3,750	5,625	9,375	18,750	37,500	56,250	75,000	93,750	112,500
25	2,222	4,444	6,666	11,110	22,220	44,440	66,660	88,880	111,100	133,320
20	2,500	5,000	7,500	12,500	25,000	50,000	75,000	100,000	125,000	150,000

were given by J. J. Hartley, engineer Link-Belt Co., Chicago. The most startling economies have been made in the "continuous process" foundries, Mr. Hartley said, but by proceeding with discretion and sound judgment the "intermittent foundries" have successfully applied materials handling equipment and have also effected savings. Definite methods of computing the economies of labor-saving equipment have been worked out by the materials handling division of the American Society of Mechanical Engineers, but Mr. Hartley suggested the accompanying table for determining the amount that may be spent for each $1 per ton reduction in cost, using 20 per cent per year fixed charges.

Jobbing Foundry Can Save by Mechanical Handling

IN his paper on "What Materials Handling Equipment Can Do for the Jobbing Foundry," W. B. Marshall, sales engineer Chain Belt Co., Milwaukee, gave the following specific experiences in support of his contention that jobbing foundries can reduce costs by the correct application of materials handling equipment:

"A jobbing steel foundry, after installing for its central sand conditioning unit materials handling equipment consisting of elevators, overhead sand bins and electric lift trucks for distributing sand to the molders, accomplished direct labor savings amounting to over $10,000, the sand handling labor having been reduced from 120 hr. to 59 hr. per working day. Two 10-hr. shifts of six men each were formerly required. Now, five men working days only, plus 3 hr. for three men on the night shift, is all that is necessary. In other words, this has meant a saving of $2 per ton of castings produced.

"This same saving has been accomplished in other foundries and it is conservative to assume that at least 15 per cent per ton of sand handled can be saved by the use of materials handling equipment.

"In another instance the problem was of a different nature and increase in capacity was secured in the existing plant by the application of suitable sand handling equipment and production was increased 300 per cent. This was made possible by providing an overhead supply of sand for the molding machines, shakeout conveyors and a central sand conditioning unit."

Adaptability of Electric Trucks

"THE Application of the Electric Truck to Materials Handling in the Foundry" was the subject developed by Harold J. Dorus and C. S. Schroeder of the Yale & Towne Mfg. Co., Stamford, Conn. The value of the electric truck lies in its ability to reduce costs of operation, said the authors, who pointed out specific examples of such savings. In several foundries a relatively new use for the electric industrial truck has been found in carrying melted metal from the cupola to the molding floor. In one malleable foundry four electric industrial charging trucks carry 2500 tons of boxes and castings over a period of 24 hr. The haul varies from 80 to 300 ft., and the loads vary from 3000 to 4000 lb. each. In another annealing furnace, having a capacity of 36 tons, it has been found that the furnace may be unloaded by one truck and one driver in 1 hr. and loaded in ¾ hr., or a total of 1¾ hr. per charge carrying the pots approximately 600 ft. This represents 21 tons per hour for one truck.

In the discussion it was pointed out that a danger of mechanization is a too complete reliance on the equipment. Representatives of equipment manufacturers stressed the necessity of the human element and of not making the mistake of assuming that even the most automatic equipment does not require constant watchfulness. The humanitarian aspect of mechanization of foundries was also emphasized as a means of taking some of the drudgery out of foundry work.

No Royal Road to Malleable Iron

ONE technical session on malleable iron founding was held under the chairmanship of F. M. Robbins, Ross-Meehan Foundries, Chattanooga, Tenn. A round-table discussion at luncheon (which lasted until late in the afternoon), under the direction of F. L. Wolf, Ohio Brass Co., Mansfield, Ohio, brought the technologists again together for informal chat over production problems.

WHILE the round-table meeting was not reported, it is understood that a valuable interchange of opinion was had on such problems as the effect of small amounts of alloy in white cast iron, the cause and correction of brittle malleable, the short annealing cycle reported from some quarters, and duplex melting with cupola and electric furnaces.

Oxidation Phenomena

A PAPER, interpreting Dr. Schenck's exhaustive investigations, recently published in Germany, which developed a series of curves showing the relationship among temperature, carbon, oxygen, and iron, was prepared by H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland, Ohio. Much iron and steel metallurgy is condensed into these diagrams; within certain areas representing particular temperatures and CO:CO_2 ratios, iron ore is reduced to iron, as in a blast furnace; under other temperatures and gas concentrations the opposite reaction occurs. Other fields in the diagram represent case carburization. Mr. Schwartz pointed out that the surface conditions on malleable iron destined for high-speed machining or threading operations are of the utmost importance.

The foundryman must avoid a surface of decarbonized iron, and also a steely surface with undecomposed iron carbide. This means that the atmosphere of gases in the annealing pots, in contact with the castings, must be maintained within fairly narrow limits, and fortunately iron silicate is a substance which keeps this balance correct automatically. It was brought out that air furnace slag is a good raw material for packing, far better than roll scale.

Gas-Tight Annealing Boxes

W. R. BEAN, president Grindle Fuel Equipment Co., formerly with the Eastern Malleable Iron Co., said the latter company had abandoned scale filling for annealing boxes ten years ago. In his opinion, temperature variations during the annealing cycle are responsible for much more unsatisfactory iron than are chemical variations in the cast iron itself, and for this reason hand firing of furnaces is being abandoned. Mr. Schwartz said that if white iron castings are placed in an empty, gas-tight box, the reactions between the enclosed air and hot iron are such that a satisfactory anneal and surface will result, but emphasized that brickwork or muffles are by no means gas tight in the above sense.

Effects of Various Elements

L. E. GILMORE, of Crane Co., Chicago, in a paper on the "Effect of Various Elements on Malleable Cast Iron," after recounting the specific effects of each of the common elements, all the rest being constant for the time being, emphasized the view that malleable iron should be thought of, not so much as an alloy in which each element has a fixed and individual function, but more as a mixture of compounds and interacting elements which, when properly balanced with each other, will produce the highest quality iron. It is in the manner in which the elements unite in compounds and the relative proportions of certain elements as well as the total percentage of any one element that determines the degree of success in producing good malleable castings.

Brass Foundrymen Discuss Melting

ONLY one session was devoted to non-ferrous foundry subjects. It was presided over by G. H. Clamer. Five papers were scheduled and in part are briefly reviewed below. A round table luncheon, under the leadership of N. K. B. Patch, secretary Lumen Bearing Co., Buffalo, attracted close to 100. Many phases of brass foundry problems were informally discussed.

IN a paper entitled "Science in the Foundry," E. F. Hess, Ohio Injector Co., Wadsworth, Ohio, emphasized the thought that scientific control and persistent research could be done in any foundry, even without a staff of special workers. Rather it required a certain desire on the part of all the principal employees to find out the way to do things right. Such an attitude of mind would quickly lead the melting department to adopt ingot metal rather than compound alloys from virgin metal because it makes for uniformity in castings, reduces the number of analyses thought to be necessary, and also cuts down the inventory.

Control of pouring temperature is another essential in order to get the largest number of molds from one pot, none poured either too hot or too cold. One man should do this work in order to reduce the chances of personal error. Sand control gives good dividends on a small investment. One man working over the various heaps during the night is sufficient for a moderate sized foundry. Correlation of the various records is also necessary in order that they may be interpreted by the manager.

Furnace Lining

"Refractories for Brass Foundry Furnaces," by H. M. St. John, metallurgist Detroit Lubricator Co., Detroit, contained some data in addition to the report of a committee presented in September, 1926. A number of firms had reported the average life of furnace linings. When classified according to types of furnace it was found that in each group will be found a half dozen or more plants which get from two to three times the general average number of heats. In part this is due to more continuous operation, but in oil or gas crucible furnaces, open flame furnaces, and indirect-arc furnaces the following important factors also contribute to a high average:

1. Preheat thoroughly.
2. Glaze lining before using first time.
3. Inspect daily and hot patch.
4. Cold patch weekly.
5. Use a mild cleaner, or a slice bar in careful hands to remove accumulated slag.

Some discussion about carborundum brought out that its conductivity did not cause irregularities in electric furnace operation, as might be suspected. Red brass is likely to pick up enough silicon from carborundum to cause unsound castings, but the low zinc alloys containing lead and tin do not react in this manner with carborundum. Mr. St. John also emphasized that many good refractories are spoiled by the bond used, which contracts, cracks, and allows penetration of metal and general derangement of the lining.

Overheated Aluminum Alloys

It is the general impression that metals should not be greatly overheated, although many alloys show no deterioration if cooled to the correct temperature before pouring. In a paper on the "Effect of Melting and Pouring Conditions Upon the Quality of No. 12 Aluminum Alloy Sand Castings," T. W. Bossert, Technical Direction Bureau, Aluminum Co. of America, New Kensington, Pa., said that high melting temperature, or long soaking increases the grain size in the casting, even when poured from a proper temperature. Increasing the pouring temperature causes even more coarsening. This effect also exists in the aluminum-silicon casting alloys now so much used. Fortunately, however, if such overheated metal is merely cast into ingots and remelted at a correct temperature the proper fine grained structure is restored, and the detrimental effects, which formerly caused drawing and cracking, are removed.

Lead in Complex Brass

O. W. Ellis, Westinghouse Electric & Mfg. Co., East Pittsburgh, investigated "The Effects of Lead on the Properties of a Complex Brass"—a yellow brass containing iron, manganese, aluminum and tin. Lead percentages from zero to 3.5 were studied. As little as 0.04 per cent could easily be seen in the microstructure, and had pronounced effects on the fracture; this result is at variance with certain French authors who claim that nearly 1 per cent of lead can be taken into solid solution. Mr. Ellis concludes that while such leady brasses are of some value, a lead-free brass has the best physical properties, especially for cold rolling, and where high strength and good ductility are desired.

Report of A. F. A. Committee on International Relations

DURING the past winter this committee has been engaged mainly on preliminary arrangements for the Third International Foundrymen's congress which will be held in London, June 11 to 15, 1929, under the auspices of the Institute of British Foundrymen. The first International Foundrymen's congress was held in Paris in September, 1923; the second was held in Detroit in September, 1926.

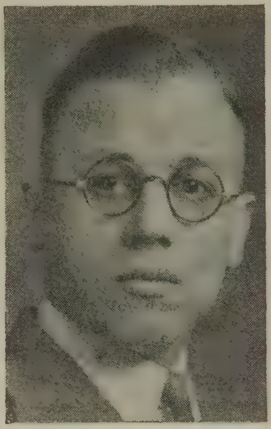
The plans, which have now been agreed upon, provide for the American delegation leaving New York about May 15, 1929, in order to arrive in England in time for a three weeks' preconvention tour of England and Scotland, which will include several days in London prior to the opening of the Third International Congress on Tuesday, June 11.

On the preconvention tour such important British foundry centers as Birmingham, Manchester, Glasgow, Newcastle, Sheffield and Derby will be visited. Elaborate arrangements will be made by the different branches of the Institute of British Foundrymen for the entertainment of the visiting foundrymen from overseas on this tour.

The program will include plant inspections and many sightseeing excursions. The latter will include points of great historic interest such as Warwick Castle, Shottery, Stratford-on-Avon, Guys Cliffe, Kenilworth Castle, Loch Lomond, Scotch Highlands, the Dukeries,

Chairmen of Cupola Practice Meetings

DR. RICHARD MOLDENKE


H. W. DIETERT

E. J. LOWRY

Haddon Hall, Windsor Castle, etc. After the international congress, various continental postconvention tours are contemplated.

The details of the preconvention tour can be obtained from H. Cole Estep, chairman.

During the week of the congress itself in London, what is expected to be the largest exhibition of foundry and shop equipment ever held in Europe will be staged under the auspices of the prominent British foundrymen's organizations. At the sessions of the congress, papers will be read and discussed by some of the world's most prominent foundrymen. The committee on international relations of the A. F. A. expects that at least 200 American foundrymen will attend.

The committee on international relations now consists of H. Cole Estep, Penton Publishing Co., chairman; L. L. Anthes, Anthes Foundry, Ltd.; G. H. Clamer, Ajax Metal Co.; Vincent Delport, Penton Publishing Co., Ltd.; Stanley G. Flagg, Jr., Stanley G. Flagg Co.; and Verne E. Minich, American Foundry Equipment Co. The personnel of the committee will be considerably enlarged during the next few months.

New and Improved Equipment at Foundry Exposition

THIS exhibit, which has taken on the proportions of a local industrial exposition, is in itself a striking object lesson in the foundry progress that has marked the past 11 years in the United States. Last year at Cleveland, in what was considered a remarkable showing of the appliances and equipment of the modern foundry, 40 firms were represented. This week's exhibition at Philadelphia has no less than 70 firms. . . . To one who attended the meeting of 1896 the evolution into the conditions of the present convention is simply amazing.—**From The Iron Age of May 23, 1907.** Foundry progress in the 21 years since was clearly emphasized by the exhibition last week, a brief general account of which follows:

SEVERAL new and many definitely improved forms of equipment for all departments of the foundry were to be seen at the exposition held last week at the Commercial Museum, Philadelphia. With more than 240 companies, each showing a number of products, for the most part in operation and supplemented in many cases by cut-away views, moving pictures and detail plans of actual installations, there was enough of interest to warrant more than one visit during the week of the convention.

The great progress made in the development of foundry equipment since the 1907 Philadelphia convention and exposition, the report of which is quoted in part above, undoubtedly was impressive to those who could recall the earlier exhibits. On the whole, this progress has been perhaps more or less gradual, until today time and labor saving devices for the foundry are not only more numerous but the equipment is being built to high standards of design. Machine tool standards are being followed and ball and roller bearings, steel cut gears and automatic lubrication are being extensively employed. Frames are of strong and of rigid design, bearings are thoroughly protected from dust and dirt, and facility of operating control is a major consideration.

Some of the new and improved equipment at this year's exposition is reviewed below:

Improved Mold and Core Making Equipment

MOLDING machines of more than 15 companies were on view. In addition to recent models of sand straddler molding machines, portable roll-over jolt equipment, and a jolt stripper with adjustable stripping pins, one company featured a working installation of a continuous molding unit. The system included sand treating and sand and mold handling equipment, and molds were made at the rate of one a minute. The conveyor was arranged to handle comparatively small squeezer molds, alternating with drags and copes of medium size. Of interest also was the provision for power handling of the cope and closing the larger size mold.

Another exhibit that attracted attention included a 13 x 18-in. multiple-molding machine making molds for pipe fittings, the cope and drag being made at the same time. This machine has an electric pattern heater. It is rammed by velocity and the drag pattern is drawn by return. The cope draw is by a central plunger, air and oil operated, the yoke being also air and oil operated. The same company had in operation a shockless jarring roll-over and pattern drawing molding machine equipped with new air clamps and air wedges, and a new four-point suspension equalizing device, all of which are intended to increase production by saving steps and eliminating lost motion.

Air-operated jolt, clamp, leveler, roll-over and pattern draw were features of a new jolt roll-over machine shown by another company. No clamps or wedges are required for the roll-over operation, and no unclamping nor leveling of the bottom board is required for the draw. The machine has two-roll-over cylinders and one oil cylinder for controlling the roll-over operation. An improved base-type jarring machine, with automatic lubrication, was shown by another well known builder. Another large exhibit included portable and stationary squeeze strip machines with a 14-in. squeeze cylinder. Provision is made for pattern draw and flask lift and automatic vibrators are employed.

Jolt squeezers with a cast steel squeeze head which swings horizontally and may be readily adjusted up or down to the proper height to require a minimum amount of air to make the mold was another new machine. Other companies showed stationary and portable jolt squeezers of late design. A large motive type Sandslinger on jobbing work and tractor type Sandslinger making molds with stripping plate machines were centers of interest. The "Sandblower," a compressed air sand-ramming machine of German design, also attracted attention. There was also a working demonstration of the making of gray iron castings in permanent molds, a small electric furnace being used in conjunction with a single head hand-operated permanent molding machine.

Core Making Machines

AMONG core making machines was a new hinged roll-over unit exhibited by a large builder of molding machines. This machine, said to cut machine time 38 per cent and increase production correspondingly, has no clamps to handle, no leveling device to lock or unlock and requires no foot work. The standard machine is for core boxes up to 14 in. wide, 24 in. long, 7 in. deep and with 4-in. draw. It can also be had for boxes up to 16 in. wide, with 8-in. draw. A rockover type core machine with 12 x 16-in. table, 8-in. pattern draw, and accommodating a core box and bottom plate 10 in. high was featured by another company.

A rollover core machine, with air jolt, shown by another molding machine manufacturer, has a 14 x 14-in. table and a draw of 8 in. The jolt cylinder is 3 in. in diameter.

A new machine for grinding cores was a feature of the exhibit of a manufacturer of core knockout machines, shakeout bales, etc. This unit is said to be the first standard core grinder shown at these exhibits. It employs a 12-in. cup wheel, which is driven by a ½-hp. electric motor, the wheel and motor being mounted on overhead ways and arranged to travel 3 ft. longitudinally. The cores to be ground are placed in fixtures mounted on the bed of the machine.

Large Showing of Materials Handling Equipment

MATERIALS handling equipment, consisting of cranes, hoists, overhead track systems and switches, mold conveyors, belt conveyors and elevators for sand, cupola charging machines, hot metal carrying and pouring devices, overhead chain conveyors, industrial trucks and trailers, and accessory equipment, was again an outstanding feature. More than 25 companies were represented, and the equipment shown was for the most part under power.

Industrial trucks, included electric and gas-powered elevating platform, crane and other types. One company exhibited a new "sand digger," which is equipped with a hopper bucket and scoops, lifts and carries its load of sand, ashes or other material. The machine carries 9-ft. buckets on low and high lifts, and is adapted for foundry clean-up work. The load can be scraped up, elevated and dumped over the side of a motor truck or a gondola car. Another company showed a special oven charger, and others, special trailers for foundry use.

J. J. HARTLEY

Contributors to the Materials Handling Program

E. F. SCOTT

Among a number of new items announced by one company was an electric ladle-pouring device with push-button control on the handle of the ladle, the operating triggers directly under the fingers of the man who pours. Unusually smooth up and down movements is a feature of the device. The same company exhibited a chain-driven overhead conveyor for the first time, as well as a new overhead trolley track of special section, having a 3-in. flange at the top and a 2-in. flange at the bottom. Of interest also was a new trussed crane with span of 36 ft. 10 in., capacity 2000 lb., which may be pushed by one man. The device combines maximum strength with minimum weight, and is intended to supplement the larger electric cranes. Push-button pouring devices and turntable pouring were also shown by other companies. Crane trolleys with herringbone gears and roller bearings was a new feature of one large equipment maker.

Something of the history of electric hoist development was to be noted from one of the older manufacturers of this equipment, who had on exhibition five electric hoists, the first of which was developed in 1889.

Sand Blast Equipment

INDIVIDUAL exhibits of sand blast equipment were large. An unnamed cascading blast mill unit, featuring quick loading and unloading, less than 1 min. for each operation, was a center of interest at one booth. The device consists of an inclosed apron conveyor that travels from front to back. One thousand or more pounds of castings may be cascaded continuously into position in front of the three nozzles. At the conclusion of the operation the conveyor travel is reversed and the load fed out on to an unloading belt or into a receptacle. Other new equipment shown by the same company included an oscillating pan "downdraft" room with rotary table.

An automatic continuous-operating rotary sand blast table, 18 ft. in diameter, said to be one of the largest of its type, shown by another company, was a center of interest. This new equipment, available also with 12-ft. table, is for small work in large quantities or for large single pieces such as sinks, bath tub bases, etc. It employs a blast unit of direct pressure type.

Tumbling mills of improved design were exhibited, and a number of companies exhibited abrasives for the cleaning of castings and forgings.

New sand preparing machinery included a portable unit which cuts, screens and piles foundry sand in heaps. The same company introduced improved gas-driven and electric-driven sand cutters. A variety of sand sifting, riddling and conditioning equipment for core and molding rooms was demonstrated by several companies. One of these was a counterflow screen, for material from 6-in. opening to 300-mesh, operating on the rotary principle. The screen is operated by eccentrics which give it rotary motion, vibrating the screen both horizontally and vertically. It is stated that this action not only cuts the sand, but cleans the screen as well. An improved core and facing sand mixer, with tapered roller bearings, speed-reducer drive and hexagonal screen, improvements said to result in much higher speed, was shown by another company.

Cupolas and Blowing Equipment

ONE new cupola, with a heavy bottom plate of boiler plate and structural shapes, to eliminate cracking and distortion, was exhibited. Other improvements included wrought steel cylindrical columns filled with concrete and a safety opening of fusible lead plate which is tightly clamped in a vertical position so that it will not become covered with coke, etc.

Cupola blowers with characteristics that permit the use of a blast gate and control board so that the blast gate may be controlled to deliver a constant weight of air to the cupola irrespective of atmospheric conditions or resistance through the cupola was a new item of this year's exposition.

A preheated blast cupola arrangement and a continuous melt cupola were shown in blueprint form by one company. The preheated blast arrangement is intended to economize coke and increase the melting ratio. Roller bearing cupola blowers were demonstrated by another company.

Electric furnace exhibits included units for steel, gray iron, copper, brass and bronze melting. Core ovens of a variety of sizes and types, including drawer, rack, continuous, tower and other types of core ovens were demonstrated by several companies.

Exhibits of woodworking machines for pattern and flask work featured a number of recent models. Sanders, saw tables, band saws, planers, borers, pattern lathes and jointers were among the 17 tools shown by one company, an inside sander being the newest item.

Sand testing and control equipment, optical and other types of pyrometers, microscopes, photomicrographic apparatus, hardness, transverse and other physical testing equipment were exhibited.

Pneumatic and Electric Tools

DISPLAYS of pneumatic tools were, as in previous years, attractive. Several companies were represented and late models of all types of equipment, including sand rammers, core breakers, hammers, chippers, riveters, grinders, drills and sanders, were demonstrated. Air hoists were shown, and compressors of various types were under power. Portable electric drills, tappers, screw drivers, nut setters, grinders and sanders, including high-frequency tools, and flexible shaft equipment were also on display.

Grinding and snagging equipment was exhibited by several companies. High speed swing frame grinders and snagging stands, in one case operating at wheel speeds of 9000 ft. per min., were centers of interest.

Welding and cutting equipment was demonstrated by three companies and an improved special sprue cutting band saw for soft metals was shown by another. Apparatus which, in melting, atomizing and applying coatings of any of the commercial metals on metal surfaces, may be regarded as a "putting-on" tool, was a center of interest. Paint spray equipment was shown at another booth.

Several manufacturers of flasks, pouring jackets and similar equipment were represented and there were working demonstrations of shakeout apparatus by other companies.

Lubricating devices, including automatic systems, were demonstrated by two companies. The application of automatic lubrication from a central point on overhead cranes was a feature of one exhibit.

Companies supplying pig iron, alloys, coke, fluxes, refractories, molding, core and blast sands, facing and parting materials, core oils and core binders and other raw material were represented.

Large Educational Exhibit of Castings

AN exhibit sponsored by the A. F. A. and intended to show the engineering possibilities of gray iron, malleable and steel castings was a center of interest. The steel exhibit was gathered through the efforts of the Steel Founders' Society of America and the malleable exhibit was secured by the Malleable Iron Research Institute.

Among the gray iron exhibits, which were collected by a special committee of the A. F. A., were specimens showing the possibilities through the use of nickel. There were automotive cylinder castings of intricate design, and intricate small parts made possible by the fluidity of the iron. A number of ornamental castings showing possibilities as to finish were also to be seen. Passenger car air brake equipment, including a universal valve requiring 133 cores, each cored passage being subjected to 165-lb. air pressure, were among other cast iron displays.

Malleable iron exhibits included castings for automotive and railroad use. A water base formerly made up of five castings was shown and there were a number of specimens illustrating the ductility of malleable iron. Machinability was demonstrated in malleable iron clutch castings and other pieces. Of interest was a malleable iron casting of ⅝-in. section which had a 1½-in. hole in the center, the hole having been drifted from a ¾-in. punch hole. Another casting, ½ in. thick, had a number of ⅝-in. cold punched holes, the distance between the punched holes being, in some cases, ⅛ in., no sign of fracture being shown.

The steel exhibit contained a number of interesting castings, some of very intricate design. A cast steel combination chain sheave and gear served to illustrate the accuracy obtainable in castings of this nature. Good surface appearance and uniformity of metal was shown in a cast steel automobile headlight bracket. A cast steel hub, on which 10 machining operations are performed and in which even minute defects are objectionable, was also of interest. Another exhibit was a cast steel gear housing, formerly made of several parts, but now cast as a single piece to eliminate machining and assembling operations.

Steel hitch castings, used in a trailer hitch, were a center of interest. This piece, formerly built up of steel shapes, wood blocks, etc., comprised 54 parts. The steel castings now employed eliminate machine work and minimize assembly. The castings are of thin section, which reduce the weight.

Another exhibit was a baggage truck wheel which has replaced a similar wheel made up of 77 pieces that required 119 machining operations. Use of the steel casting has eliminated all assembly work and reduced machining from 119 to four operations. A cast steel dipper stick for an excavator was shown as an illustration of the replacement of a number of assembled parts by a single casting. A cast steel crawler side frame for a steam shovel, another casting shown, was said to have replaced 350 welded and riveted parts, eliminating assembly costs and permitting marked reduction in machining costs. Another exhibit was a one-piece cast steel boom which replaced an assembled boom made up of 35 pieces of plates, angles and castings and which required 376 rivets. The steel casting was featured as eliminating loose joints, repair parts and adjustments, and as being lighter and stronger than the built-up boom.

The Course in Cupola Operation

AMONG the best attended sessions were those on cupola operation. The time of each of the four sessions was set at 4 p. m. and they lasted over two hours, were extremely lively and interesting and the value derived was such that doubtless a considerable extension will be given these practical discussions in future conventions.

Dr. Richard Moldenke presided over the first meeting and introduced the subject of the cupola melting process by outlining the principles involved. He explained the combustion of coke and the heat generated by means of two diagrams, the first showing the interior of a slagging-producer in colors, under heat—this being in effect a cupola charged with coke only. The second diagram showed the location of the metal as charged into the zone of maximum temperature of such a slagging producer, making it the cupola operation. The desired objectives of cupola melting were next explained and how these are best attained, with many practical points on successful cupola melting.

In the general discussion which followed, a wide range of subjects was touched upon, questions of uniform layering of the charges, the desirability of small charges, extent of the melting zone, cutting of the lining, the advantages of bucket charging for mechanical operation, and many other matters came in for a thorough analysis. Over 250 members of the convention attended each of these sessions.

The second session was in charge of E. J. Lowry, who outlined the cupola construction details which must be watched by the foundryman for successful operation. He discussed the installation of blast pipes and tuyeres, height of charging door and other details.

The discussion went far into the subject of upper and lower tuyeres, the shape of tuyeres, oblique versus straight drop mechanical charging, blast preheating with successful developments and also failures. In these discussions, the foundrymen present gave their difficulties and much interchange of information and advice for overcoming troubles resulted.

The third session, under the chairmanship of David McLain, was opened by the presentation of a paper by him describing the ideal method of charging a 42-in. cupola. The complete sequence of operations was fully gone into, and later discussed at greater length. Many problems in the correction of defective work were brought up, most of them hinging on working with too low a bed and giving oxidized iron.

The final session, in charge of H. W. Dietert, was on cupola improvement. This consisted of a series of papers, or presentation of new cupola developments. The first was the description of the Vial Hot Blast Cupola, presented by F. K. Vial, Griffin Wheel Co., Chicago. This has been described in THE IRON AGE, Oct. 20 and 27, 1927. The discussion brought out a number of details as well as the present status of the use of these cupolas in daily work. From 165 down to 135 lb. of coke per ton of iron melted is the record of achievement.

The second paper was presented by Nat. Skelly, on the somewhat phenomenal results in melting in the ordinary way obtained at the Maytag Foundries. Considering that 1 to 16 down to 1 to 14 for the fuel ratio is claimed, a stormy discussion ensued. This brought out some pertinent reasons for the figures in question, in that the sprues are charged at about 800 deg. Fahr., the melting done very low in the bed with a probable oxidation of much silicon and heat thus derived. Nevertheless there was brought out the fact that, by careful supervision of every phase of the charging and melting operation, a very economical process resulted.

The next paper was by Dr. Fritz Meyer, who presented the results of the powdered-coal fired cupola—that is supplementing the coke used by adding powdered coal (burned in external combustion chambers) by way of the tuyeres. This paper was also very interesting, the claim being 120 lb. fuel per ton of iron melted. Much discussion ensued, notably on the temperatures produced.

Mr. Dietert then gave some curves showing that the velocity of the gases passing through the melting zone affected the melting rate. Mr. Skelly also gave the diameters of tap-holes for different melting rates. This concluded the cupola operation course and showed also that preheated air cupolas have come to stay.

CHICAGO'S INDUSTRIAL MUSEUM

Reconstructed Fine Arts Building of 1893 World's Fair to Be Used

AN industrial museum, occupying 400,000 sq. ft. of floor space, is to be located in the Fine Arts Building, Jackson Park, Chicago. This building, having a total floor space of 7 acres, was erected in 1893, at the time of the Columbian World's Fair. Notwithstanding that it was of a more permanent character than most buildings erected for similar purposes, it will require $5,000,000 to rehabilitate it. This sum has been provided by a bond issue voted by the South Park commissioners. Julius Rosenwald, chairman board of directors, Sears, Roebuck & Co., Chicago, is sponsor for the industrial museum, which has been incorporated as the Rosenwald Industrial Museum. Through his generosity a sum of not less than $3,000,000 has been made available for the purpose of purchasing, building and installing exhibits.

The South Park commissioners estimate that it will require two years to reconstruct the building, which consists of a center portion and two wings. In order to make use of the basement it will be necessary to raise the main floor. The height of the ceiling in the main section will be reduced by building in it a second floor. Much of the structural steel work and the brick walls will be retained. The exterior finish, which originally was done in plaster, will now be overlaid with either limestone or marble.

Mr. Rosenwald, after making a study of industrial museums in Europe, has determined on a course in installing exhibits which will show the effects upon, and the progress made by, civilization through the invention, use and development of mechanical devices. Replicas will be used where originals cannot be obtained. It is hoped that many originals of developments made wholly or in part in this country will be made available through the cooperation of American industries. Where possible, exhibits will be full size, supplemented by panoramas, in an effort to tell a complete story. Many models will be set up to be operated by push buttons that will be accessible to visitors.

Waldemar Kaempffert, at present scientific editor, New York *Times*, has been appointed executive director. As plans for the museum take more definite form, the directors will consult leaders in each of the various fields to be covered. The plan is to call on one man actually engaged in a given industry and also some academic man who is interested in the same field. These men will cooperate with the board of directors in laying plans and shaping the exhibit for that industry. This museum is being given the support of the Commercial Club of Chicago. The board of directors is as follows:

William Rufus Abbott, president Illinois Bell Telephone Co.; Sewell L. Avery, president United States Gypsum Co.; Edward F. Carry, president Pullman Co.; Rufus C. Dawes; T. E. Donnelley, president R. R. Donnelley & Sons Co.; John V. Farwell, chairman J. V. Farwell Co.; Robert P. Lamont, vice-president American Steel Foundries; Charles H. Markham, chairman Illinois Central Railroad; Charles Piez, chairman Link-Belt Co.; Theodore W. Robinson, vice-president Illinois Steel Co.; Julius Rosenwald, chairman Sears, Roebuck & Co.; Joseph T. Ryerson, president Joseph T. Ryerson & Son, Inc.; Albert A. Sprague, director Sprague, Warner & Co.; Robert W. Stewart, chairman Standard Oil Co. of Indiana; Harold H. Swift, vice-president Swift & Co.; Charles H. Thorne; Frank O. Wetmore, chairman First National Bank of Chicago, and Leo F. Wormser.

The Center Portion of the Field Columbian Museum, Remaining from the World's Fair at Chicago in 1893, Will House the Rosenwald Industrial Museum. An auditorium, to be located in one wing, will seat 4500. Photograph copyrighted by A. M. McGregor, Chicago.

Piercing Billets for Making Tubes

Rounds of a Few Sizes, Small Rather Than Large, Advocated for Plug-Mill Process—Expanding Mills for Extending Range of Tube Sizes

THE automatic or plug mill process of making seamless tubes was discussed at length at the Pittsburgh meeting of the American Society of Mechanical Engineers, May 14-17. Comparisons were made with the pilger process but the paper which was the subject of the discussion was devoted almost wholly to the plug mill system and argued for a small range of sizes of round billets, perhaps three or four, and small rather than large, for the whole range of sizes of seamless tubes. The paper was contributed by R. C. Stiefel and George A. Pugh, both of the Aetna Standard Engineering Co., Ellwood City, Pa. It was an unusually lucid explanation of the design of piercing mills and covered recent developments in the use of expanding mills calculated to produce the seamless product up to 24 in. in diameter. Generous extracts from the paper are given in the following, together with various points developed in the general discussion:

Pilger and Plug Mill Processes Compared

The pilger process is in use chiefly in Europe and the automatic or plug-mill process chiefly in the United States. Experience with both processes has established the following comparable economic features between the two methods:

1 The output in tons with the plug-mill process is two or three times more than with the pilger process.

2 The cost of installation is about the same for either process or is rather less for the plug-mill process.

3 The cost of tool equipment, such as rolls and mandrels, is several times greater with the pilger process than with the plug-mill process.

4 Rolls and mandrels must be of the best grade of alloy steel in the pilger process, and in the plug-mill process they are of similar composition to those used in other steel working methods.

5 Maintenance of plant and tool equipment is much less costly and more simple with the plug-rolling method than with the pilger method.

6 The quality of the tube produced with reference to evenness of wall thickness and smoothness of outside and inside surface is better and more uniformly reliable with the plug rolling process than with the pilger process.

7 Tube lengths obtained with the pilger process are currently 40 ft. to 60 ft., and exceptionally up to 80 ft. or 90 ft. With the plug-rolling process, lengths obtained today are 30 ft. to 40 ft.; with slight modification of the heretofore usual equipment, it will be possible to produce 50-ft. lengths.

8 The largest tubes produced with the pilger method are 20 in. in diameter and with the plug-mill process about 14 in. diameter. A recent development (expanding) will permit the production of 24 in. diameter and larger with the plug-rolling method.

Modern Plug-Mill Unit

In the typical modern plug-mill steel billets are charged into the piercing-mill furnaces, and from there into piercing machine *A* or piercing machine *B*, either of which can be operated as a piercer, or the first piercer for piercing only and the second piercer for enlarging the pierced billet.

From either of the piercing machines the billet is conveyed to the plug mill *C*. Here the billet is passed through the rolls two or more times for the purpose of reducing wall thickness and elongating it. All of the movements of the billet are performed mechanically on the plug mill with practically no hand labor.

From the plug mill the tube is conveyed to either of the reeling machines *D*, in which it is acted upon by oblique rolls on the outside and a cylindrical mandrel on the inside, for the purpose of equalizing the wall thickness and smoothing its outside and inside surfaces. In the reeling operation the diameter of the tube is slightly increased, resulting from a slight reduction of the wall thickness.

After the reeling operation, the tube is passed through the sizing machine *E* for the purpose of reducing it to the required diameter. This machine usually contains several pairs of grooved rolls. The tube, after leaving the sizing machine, is shifted on to a conventional type of cooling table consisting of a number of slowly moving conveying chains, rolling the tubes on a slightly inclined table.

Advocates Using Smallest Possible Billets

Referring to Fig. 2, it will be understood that the piercing mandrel over which the billet is forced explores, so to say, the inside of the solid billet on its full length for defects. An annular outside volume of the solid billet, represented in dotted lines, equal to the volume of the pierced billet, has remained unexplored by the mandrel. Any defect *d* in the explored section *S* of the solid billet, in the shape of what is commonly called a lamination, resulting from a blow hole in the ingot

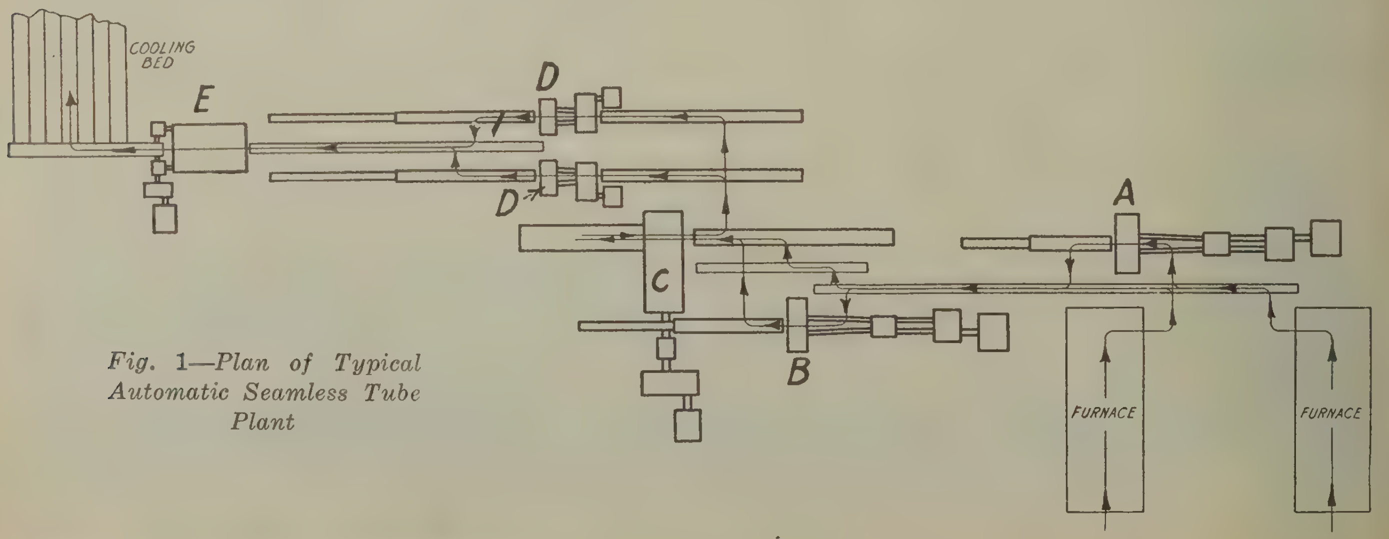


Fig. 1—Plan of Typical Automatic Seamless Tube Plant

from which the billet was rolled, is laid out or exposed on the inside surface of the pierced billet in the shape of a tear, seam, or lap, while any such lamination *l* existing in the unexplored annular section of the solid billet will remain practically undisturbed in about the same relative location in the annular section of the pierced billet. Therefore, the smaller the unexplored section is in relation to the full section of the solid billet, the fewer such laminations may be contained in the displaced central volume of the billet and consequently fewer or no tears, seams, or laps may be obtained on the inside of the pierced billet.

This condition again points in the direction of using as small a solid billet as possible for the production of a given size tube.

Design of Piercing Pass

Until lately there has been no good and reliable procedure established to determine the most favorable size of solid billet from which to produce a given size tube; it has been largely a matter of "rule of thumb." A common practice was to choose a solid billet of a diameter approximately the same, or somewhat smaller, than the desired tube. The correct method to determine the most favorable size of solid billet is as follows:

The piercing diagram illustrated in Fig. 3 is arranged in such a manner that the converging pass *CA* formed between the rolls establishes enough grip on the billet, by the time the latter has progressed to point *D*, to force it over the point of the mandrel. The elongation of the billet, that is, the reduction of its cross-sectional area, should be done only in the converging pass from *C* to *A* with a minimum draft or reduction of the billet. The diverging pass, from *A* to *B*, between the rolls and the mandrel is arranged so that the cross-sectional area of the billet at *A* is equal to that at *B*. In a piercing pass established to fill these conditions, the billet is subjected to expansion only in the diverging pass and to elongation in the converging pass.

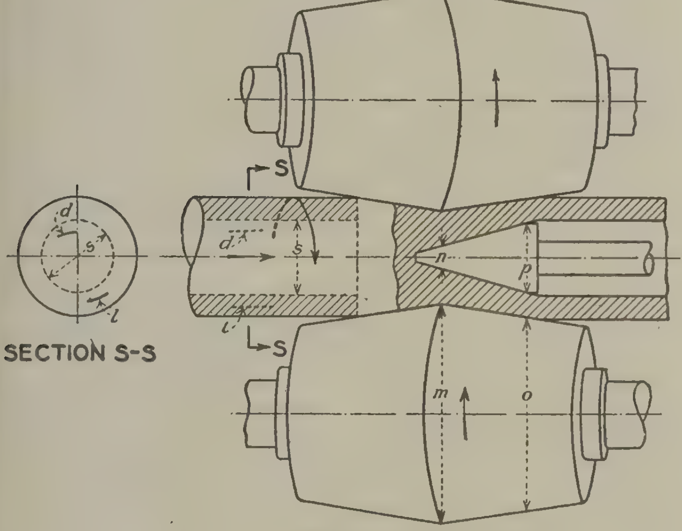


FIG. 2

It will be clear from a closer study of Fig. 3 that the metal of the billet has a fair chance to flow lengthwise (or the billet has a chance to elongate) in the converging pass, where it is gripped between the two roll faces forming a comparatively large included angle *a* between them. But where the metal is gripped between the two diverging roll faces and the two corresponding mandrel faces, it becomes almost impossible for it to flow lengthwise between the respective roll and mandrel faces which form a smaller flow angle *g* for the metal than is the case in the converging pass.

On the other hand, it is evident from the cross-section at *yy* of Fig. 3 that the flow angle in the transverse direction is greater than in the longitudinal direction, from which it follows that in the diverging pass the metal meets less resistance to flow in the transverse direction (expansion) than in the longitudinal direction (elongation). From this analysis it becomes clear that the diverging pass should logically be determined, as described, so as to compel expansion, and no elongation of the billet, instead of by using a mandrel the shape of which is determined by guess work.

Function of Piercing Rolls

It will be noted from Fig. 3 that, at the first contact *C* established between the billet and the rolls, the diameter of the roll is small while the billet is large; as the billet progresses from *C* to *A*, the diameter or circumference of the billet decreases while that of the roll increases; from *A* to *B* the reverse takes place, that is, the diameter or circumference of the billet increases while the corresponding diameter or circumference of the rolls decreases.

This irrational relation between corresponding diameters, and consequently speeds, of the rolls and billets at different contact points during the progress of the billet through the piercing pass, results in the setting up of the injurious stresses in the billet heretofore referred to; it also results in the breaking up of the center of the billet before it reaches the point of the mandrel, thereby favoring the penetration of the mandrel into the center of the billet; but it also has the effect of producing enormous friction or slippage between the rolls and the billet on the outside as well as between the mandrel and the billet on the inside. When considering that the metal pressure exerted by the rolls on the billet may amount to several hundred thousand pounds, it will be evident at once that much slippage under such great pressure will result in enormous waste of power.

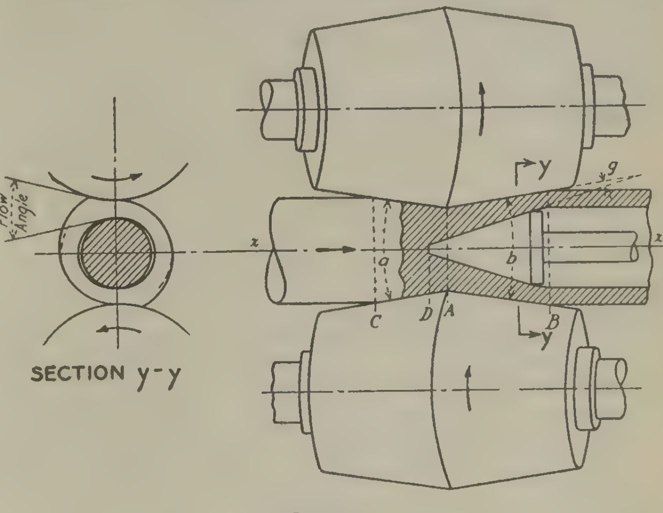


FIG. 3

Function of Piercing Mandrel

The peculiar functioning of the mandrel in the pass of the now customary piercing machine also greatly contributes to the setting up of injurious stresses in the billet. Referring to Fig. 2, it is apparent that the rolls, being obliquely disposed in relation to the axis of the billet or pass, tend to rotate the billet and feed it forward over the mandrel. The axis of the billet and the axis of the mandrel being the same, it is clear that the mandrel has no forward feeding effect on the billet; the billet therefore is fed or pulled or pushed forward on the outside by the rolls while the mandrel on the inside tends to prevent it from moving forward.

Furthermore, it will be noted that to the large diameter *m* (Fig. 2) of the roll is opposed the small diameter *n* of the mandrel, while to the small diameter

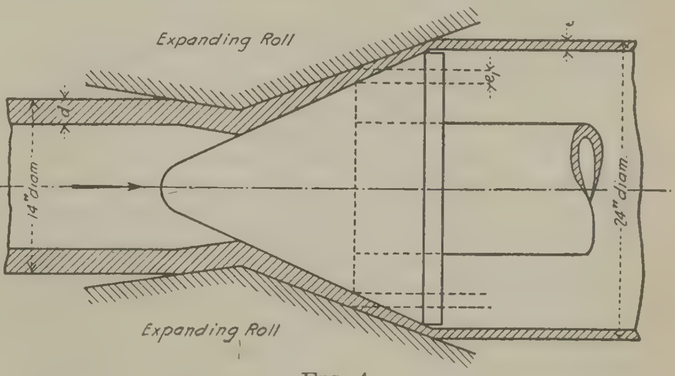


FIG. 4

o of the roll is opposed the large diameter *p* of the mandrel. The torsion and slippage stresses to which the outside of the billet is subjected by the speed differences of the rolls, as explained before, are therefore being repeated for the same reasons on the inside by speed differences of the mandrel. All this occurs under the heavy pressure on the metal necessary to displace it from under the contacting surfaces between it and the rolls and mandrel.

What has been stated heretofore with reference to power absorption by slippage or friction by the rolls on the outside of the billet, also applies in connection with the similar great friction or slippage occurring between the mandrel and the inside of the billet.

Piercing Power and Small Billets

The total power necessary in piercing consists of three main divisions:

1 Power absorbed by machine friction

2 Power absorbed by roll and mandrel friction on the metal

3 Power absorbed by metal displacement.

A careful analysis of the three power divisions would probably prove that, in many cases, the power absorbed by roll and mandrel friction on the metal is far greater than the power absorbed by actual metal displacement.

From the foregoing it becomes evident that the power required in piercing is of injurious character to the steel and that the amount of power required to produce a tube of a given size in a given time represents the measure of punishment imparted to the billet.

The tendency, therefore, should be to reduce the power in piercing to a minimum in the manner described and rather spend a little more power in the bar mill to produce billets of smaller diameter, the additional bar-mill power required being of a beneficial character to the steel, refining it to a higher degree. Thus a three-fold advantage will be obtained; better steel, less power consumption, and less punishment of the steel in piercing.

The conclusion should not be drawn that these difficulties are constant and standing in the way of producing seamless tubes as cheap or cheaper than lap-welded tubes. Good yields, varying between 80 per cent and 90 per cent from solid billet to finished tube, are now being obtained when producing lengths of about 30 ft. to 35 ft., which is a creditable result when considering crop-end losses and about 3 per cent furnace loss.

Expanding for Tubes as Large as 24 In.

Another inconvenience inherent in the now usual seamless plants lies in the fact that, when it is necessary to change production from one size of tube to another, considerable time, five hours or more, is lost in making the necessary shift in the machine equipment and size of solid billet.

Great advantages can be obtained in this respect by replacing the now commonly used reeling machine with an expanding machine, which may function the same as the present reeling machine or may be used to expand the tubular body coming from the plug mill, or from the piercing machine, into larger sizes of correspondingly thinner walls. Sufficient experimental work has been done to justify the assumption that this expanding method will permit the production of large size tubes up to about 24 in. diameter at comparatively little additional power requirement and with an initial plant cost equal to the cost of a plant for the direct production of tubes with the now usual plug-mill process up to about 14 in. diameter. Allowance for additional cost of larger finishing equipment will, of course, have to be made.

The benefits obtained from the expanding mill will become evident by a study of Fig. 4. A tubular body of 14 in. diameter and wall thickness *d*, coming from the plug mill or from the piercing mill, is expanded to 24 in. diameter of corresponding wall thickness *e*. If a tube of less than 24 in. diameter should be required, for instance, of a diameter as shown by dotted line, it could be produced without changing the setting of the rolls of the expanding mills by simply using a smaller expanding mandrel, as shown by dotted lines. This smaller tube, however, would have a wall thickness e_1, in the same proportion greater than *e* as its diameter is less than 24 in. Should the wall thickness of the smaller tube have to be less than e_1, then it could be obtained by simply preparing a tubular body at the plug mill or piercing mill of the same diameter (14 in.), but of correspondingly less wall thickness than *d*. On the other hand, if the wall thickness e_1 should be required to be greater than shown, then the wall of the entering tube would have to be correspondingly greater than that shown and designated by *d*.

Wide Range in Sizes from Few Sizes of Billets

The same advantages with reference to simplification in the production of different sizes which are described in the foregoing grouping of sizes from 14 in. to 24 in. obtain when grouping other sizes as, for instance, all sizes from 8-in. to 14-in. diameter and all sizes from 5-in. to 8-in. diameter.

It must be noted here that the indicated division of all sizes of tubes from 5 in. to 24 in. in diameter into only three groups, each to be produced from only three different tubular bodies of constant diameters, was given as an illustration only, and that it will be advisable to arrange the working program for more than only three groups in order to obtain the best possible piercing condition for one size of tube of each group and not too much deviation from the best piercing conditions for all the other sizes of each group.

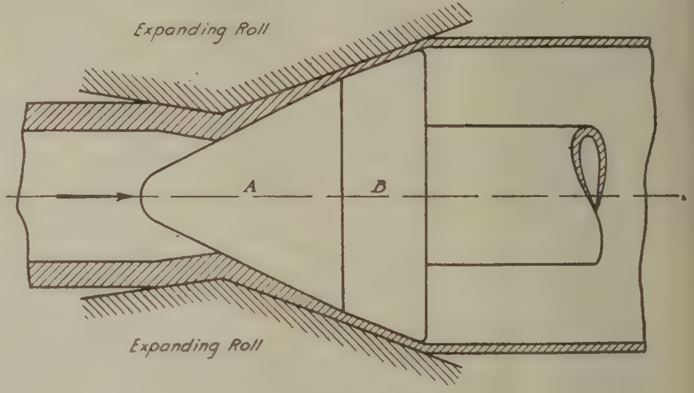


FIG. 5

This great flexibility in sizes obtainable from an entering tube of constant diameter dispenses with changes of guide and roll settings at the plug mill and at the piercing mill. The variation required in the wall thickness *d* of the entering tubular body can be obtained at the plug mill and piercing mill by a simple change of mandrels. At the expanding mill a change in the setting of the outlet guides would be required to accommodate the varying diameters from 14 in. to 24 in. of the outgoing tubes, but no change of the inlet guides would be required, the entering tube being of constant diameter. Changes in the settings of the reeling machine and sizing machine would have to be made in the same way as in the present installations.

Referring to Fig. 5, a modification of Fig. 4, the expanding mandrel is provided with two different cones *A* and *B*. Cone *A* forms a converging pass for the entering tube wall between it and the expanding rolls, and cone *B* forms a parallel pass for the tube wall between it and the expanding rolls. On cone *A*, the entering tubular body has its wall reduced and its diameter enlarged, and on cone *B* the wall is smoothed out in exactly the same manner as is now the case in the customary reeling machine. By the use of this modified mandrel, the expanding and reeling operations may be performed simultaneously in the thus-formed expanding-reeling pass. The expanding method referred to forms the subject of United States patents.

Output, Cost and Quality

The output in a modern plug-mill plant in tubes of 5 in. diameter and larger is about 200,000 tons per year.

The cost of production of seamless tubes of usual sizes is the same as, or less than, that of lap-welded tubes. Inasmuch as the seamless-tube industry is comparatively new, it is reasonable to assume that more progress will be made with reference to cost of production.

The method of manufacturing seamless tubes permits the use of high-carbon steel or alloy steel, resulting in a product of superior quality, with reference to strength and usage. It is also applicable to other metals, such as copper, brass, aluminum, etc., all of which are impossible by the welding process.

Better Steel Needed for Automatic Process

Among those who discussed the Stiefel-Pugh paper at length was J. B. Wharton, Standard seamless tube plant of Spang, Chalfont & Co., Economy, Pa. He said in part:

"For the pilger process cast round ingots are used. The ingots are always considerably larger than the finished tube to be made. These ingots are reheated and pierced with a heavy wall. The inside diameter of the pierced blank is approximately the same as will be the inside diameter of the finished tube. The outside diameter, however, is 3 to 4 in. larger than will be that of the finished tube. The pierced blank is then forged down in the pilger mill to the desired outside diameter. This operation tends to forge out and cover up any defects developed in the piercing operation.

"For the automatic mill process, rolled rounds are used. The diameter of the round is much smaller than the finished tube. The initial piercing is with a heavy wall comparable to the pierced blank for the pilger mill. The diameter of the pierced blank is still much smaller than the finished tube. In the second piercing operations the pierced blank is expanded 30 to 40 per cent in diameter, elongated 50 to 100 per cent and wall thickness reduced to a thickness of about 50 per cent greater than the finished tube. The second piercing operation therefore not only aggravates any defects developed in the first piercing operation, but uncovers others which may have been in the steel and not brought out in the first piercing.

"As opposed to a reduction in diameter in the pilger process, there is an expansion in diameter in the automatic mill process. It would therefore seem clear that a better quality of steel is required for the automatic process than for the pilger.

"We have been able to secure very consistent results on the power required to expand a pierced billet. The calculation was the power required to displace a given volume of metal per second. The table shows that the number of kilowatts per cubic inch of metal displaced per second varies from 11.5 to 14.2. This result is reasonably close when we consider the fact that no attempt was made at temperature control, other than the furnaceman's judgment."

Comparison with Lapwelded Tube Conditions

H. H. Murray, superintendent Babcock & Wilcox Co., Beaver Falls, Pa., also discussed the paper. "The authors state," said he, "that the difficulties experienced in seamless tube manufacture should not lead us to draw the conclusion that seamless tubes cannot be produced as cheaply or cheaper than lapwelded tubes. All of us who manufacture seamless tubes are looking forward to the time when this will be accomplished, but at the moment, excepting perhaps a few individual cases, this has not generally been the case. Most of the seamless tube mills at present in existence were designed to take care of a more or less general business of varying sizes and types of tubes, whereas lapweld mills as a rule, due largely to the enormous requirements of the oil industry, are built to give a maximum output on a narrow margin of sizes processed in large quantities. When hesitancy of capital has been overcome, perhaps we may have seamless mills built along these latter lines. When that time comes, we should be well able to meet the lapweld man on his own ground."

Ingots Cast for Piercing

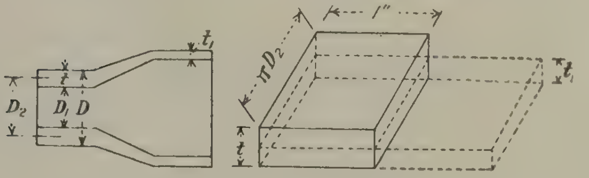
W. M. Selkirk, chief engineer, Pittsburgh Steel Products Co., said that cast steel ingots pierced with heavy walls have been used in Germany in connection with the plug mill but this involves as many as 18 passes in the plug mill and also reheating and the sawing off of the rolled billets between certain passes in order to produce hot finished tubes of commercial size and quality—a procedure not considered economical in the United States.

"It is apparent from the paper," said he, "that a pierced billet with a much heavier wall would be necessary for the production of all classes of seamless tubes —a condition favorable to the use of cast ingots for the plug as well as the pilger mill. A great deal of equipment could be eliminated, especially with the pilger process." Tubes over 130 ft. in length have been produced in the pilger process in this country, he added, and while he admitted these display certain economies in the matter of scrap losses, reduced cropping, etc., the commercial value of such lengths was questionable in the light of handling and transporting difficulties.

An investigation of freight rates in the Chicago switching district opened May 15 at Chicago before J. B. Campbell, chairman of the Interstate Commerce Commission. The present hearings, which have extended into this week, cover I. C. C. Docket 19610, which provides for a general investigation of Chicago district switching rates, and also I. C. C. Docket 2900, under which the commission suspended an advance in rates published by the railroads. These tariffs called for a rate of 3c. per 100 lb. for a one-line haul, and 3½c. for a two-line haul, and 4c. for three or more. The old rates are 2c., 2½c. and 3c., respectively.

In a proposed report by Examiner W. M. Carney to the Interstate Commerce Commission it is held that rates on spelter, in carloads, from points in Arkansas, Oklahoma, Missouri and Kansas to Newport, Ky., are not unreasonable, but are unduly prejudicial to the extent they exceed the rates to Chicago, which are 11c. per 100 lb. lower.

Determination, as Explained by J. B. Wharton, of Amount of Power Required to Displace Metal in Piercing Operation



The volume of metal displaced per unit of feed of billet is equal to

$$\frac{\pi}{4}(D^2 - D_1^2) - \pi D_2 t_1$$

The table gives the results of the observed power for the cases cited.

Size of finished pipe, in.	9	9⅝	11¾	13⅜
Pierced billet:				
Weight, lb.	1345	1060	1712	1825
Outside dia., in.	7¼	7½	9	10½
Wall, in.	1½	1⅝	1⅝	2½
Area, sq. in.	27.1	29.99	37.65	62.84
Mean dia., in.	5¾	5⅞	7⅜	8
Mean circum., in.	18.06	18.45	23.17	25.13
Expanded billet:				
Outside dia., in.	9½	10⅛	12	13⅞
Wall, in.	11/16	11/16	⅞	¾
Mean circum., pierced billet and thickness exp. billet	12.4	12.7	20.4	18.9
Displaced metal per in. length pierced billet	14.7	17.29	17.25	44.04
Feeding speed, in. per sec.	12.35	7.50	9.4	4.8
Displacement, cu. in. per sec.	182	130	162	212
Total kilowatts	2100	1850	2250	2600
Kw. per cu. in. per sec.	11.5	14.2	13.9	12.3
Angularity of rolls, deg.	10	11	10	10

Supply Associations May Combine

Manufacturers' and Two Distributers' Organizations Approve Consolidation Plan at Nashville Convention—"Business at a Profit" Slogan of Meeting

ACTION leading toward consolidation of the National Supply and Machinery Distributers Association, the Southern Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association, was taken at the joint convention of these organizations at the Hotel Hermitage, Nashville, Tenn., May 15, 16 and 17. A committee of nine, consisting of three representatives from each of the three associations, will confer within a short time to see if it is possible to work out an arrangement whereby a common secretariat can be established and the activities heretofore carried on separately can be coordinated.

The unusually large attendance testified to the interest of the mill supply industry in the striking slogan of the convention, "Business at a profit rather than profitless prosperity," and the sessions were planned so as to give ample opportunity for discussion of this subject. The convention consisted of separate business meetings of each association as well as joint sessions. At the latter the union of the associations was the main topic.

To consider plans for consolidation, the American Supply and Machinery Manufacturers' Association appointed a committee the members of which are D. S. Brisbin, Columbus-McKinnon Chain Co., Columbus, Ohio; J. Harvey Williams, J. H. Williams & Co., Buffalo, and S. P. Browning, Ohio Valley Pulley Works, Maysville, Ky. This committee will confer with a similar group from the National Supply and Machinery Distributers' Association, consisting of E. P. Welles, Charles H. Besly & Co., Chicago; George Puchta, Queen City Supply Co., Cincinnati, and H. W. Strong, Strong, Carlisle & Hammond Co., Cleveland, and a group from the Southern Supply and Machinery Dealers' Association, composed of D. D. Peden, Peden Iron & Steel Co, Houston, Tex.; W. W. Doe, Alabama Machinery & Supply Co., Montgomery, Ala., and T. C. Keeling, Nashville Machine & Supply Co, Nashville.

Proposals for amalgamation were first made by the American Supply and Machinery Manufacturers' Association, which extended invitations to the other two associations to join with it in the formation of a new body to take the place of the three existing organizations. If the committees from the associations agree upon a plan for a union, each of the bodies will conduct a referendum vote of its members to ascertain whether a majority is in favor of consolidation.

Remedial Trust Legislation Favored

Declaring that the present administration and interpretation of the Sherman and Clayton anti-trust laws operate in such manner as to prohibit competitors from entering into agreements and exchanges of information, regardless of the reasonableness thereof, the three associations adopted resolutions urging Congress to pass remedial legislation giving equal weight to the interests of capital and labor with that of the consumer. To bring attention of members of Congress to this situation, committees from each of the three associations were named.

At the first joint session of the convention, E. P. Welles, president of the Mill Supply Council, related the history of that organization and told about its activities in the past year.

"Business at a Profit" and Maintenance of Resale Prices

AT the opening of the twenty-third annual convention of the National Supply and Machinery Distributers' Association, President E. P. Welles reviewed the history of the association. In his annual presidential address he stated that a repetition of the unsatisfactory business conditions in 1927 could be avoided by members insisting upon dealer distribution, by the suggestion and maintenance of resale prices by manufacturers with a spread sufficient to cover modern cost of distribution, by determination to have business at a profit and by members following the association's national program for 1928.

The tendency of some manufacturers to place their lines with numerous distributers, and particularly with those engaged in other businesses, such as plumbing supply houses, pipe jobbers and hardware retailers, was deplored by George A. Fernley, secretary-treasurer, in his annual report. Mr. Fernley emphasized the fact that manufacturers are giving more serious thought to the prosperity of the distributer and are urging industrial users to make purchases through him.

Among the topics discussed by Mr. Fernley were the Mill Supply Council, National Wholesale Conference, overhead expense reports, local and sectional associations, direct competition of manufacturers with distributers, resale price legislation, price cutting, overstock and goods wanted bulletins, simplification, collection bureau of the association, inadequate margins of profit allowed distributers, tax reduction, keeping salesmen informed of price changes, analyses of costs and sales, inventory discrepancies or concealed losses and motor truck deliveries.

During the past year the association added 35 new members.

Average Distribution Cost 22.54 Per Cent

Accomplishments of the association were set forth in a brochure distributed at the convention. In the brochure is a summary of overhead expense reports of members for the past six years. This shows that in 1927 the average expense was 22.54 per cent, the average gross margin 22.83 per cent and the average turnover 4.13 times. Turnover has risen gradually and consistently to that figure from 3.52 times in 1924. The brochure also contains the 1928 platform of the association. In regard to salesmen, the platform states that "we believe it is an erroneous policy for the distributer to give salesmen cost figures or to permit salesmen to make prices. All selling prices should be determined by a responsible executive in the house and no deviation from such selling prices should be made, except with the consent of the sales manager."

Statistics prove that it is impossible to distribute goods on a margin of 12 or 15 per cent, declared B. H. Ackles, Rayl Co., Detroit, in discussing "business at a profit rather than profitless prosperity." The only way to make the manufacturer realize this fact is through educational work on the part of each individual member cooperating with the association. H. O. Wentworth, Vulcan Copper & Supply Co., Cincinnati, in a paper suggested that the slogan of distributers should be "business at a profit or no business at all." He likewise stressed the point that operating for volume and cutthroat competition are synonymous. He cited the fact that expense sheets of the past three years, tabulated by the association's office, show a net profit for the distributer of less than 0.5 per cent. This situation can be corrected by arriving at an average basis of selling prices that will meet the present-day cost of doing business plus a further allowance representing a profit at the end of the year. Much can be done by the distributers to bring about this correction, but in six or eight lines an adjustment is dependent upon manufacturers. Here the desired results can best be accomplished by urging manufacturers to fix consumers' resale prices on their products. The same procedure followed by the bolt and nut makers should be followed in drills, files, taps, wrenches, cap and set screws and other commodities.

Knowledge of Costs Necessary for Profits

Distributers can conduct their businesses so as to get maximum profits by having an exact knowledge of the cost of doing business, by keeping a careful check of general expenses and by proper cooperation from all departments or divisions of the company, stated P. O. Boylan, W. M. Pattison Supply Co., Cleveland. Mr. Boylan said that every order must carry a profit and that the setting of a low price does not mean good service and does not insure a repeat order. He declared that "where the low-priced house has one chance for business, the house insisting on a profit commensurate with the service given has nine."

From a local point of view, asserted A. E. Douglas, E. A. Kinsey Co., Cincinnati, simplification of the following lines would be beneficial by enabling the company to carry a smaller inventory: machinists' tools, pipe threading tools, goggles, drill chucks, abrasive wheels, paper and cloth disks. In fact, these are but a few of the lines which should be simplified. While simplification will reduce burden in stock carrying, if sales are affected, resulting in loss of profit, caution should be exercised. Mr. Douglas stated that standardization means the elimination of variety, which is one of the most potent selling arguments. He said that the solution for simplification is for each distributer to have an arrangement with his source of supply whereby items in his line may be returned for credit or exchange for items which will move more rapidly.

Benefits of simplification were listed by Lawrence G. Puchta, vice-president Queen City Supply Co., Cincinnati, in a paper read at the convention, while W. A. Slack, president Torchweld Equipment Co., Chicago, brought out the value of a one-price policy.

E. P. Welles Reelected President

E. P. Welles was reelected president of the association, while H. H. Kuhn, Hardware & Supply Co., Akron, Ohio, will serve as first vice-president, and H. E. Ruhf, Cleveland Tool & Supply Co., Cleveland, as second vice-president. Members elected to the executive committee were T. E. Hazell, William H. Taylor & Co., Allentown, Pa.; Arthur Yorke, Hanson & Yorke Co., Inc., Scarsdale, N. Y.; Charles E. Allinger, Charles A. Strelinger Co., Detroit, and William Todd, Jr., Somers, Fitler & Todd Co., Pittsburgh. In addition, E. B. Hunn, C. S. Mersick & Co., New Haven, Conn., and Louis A. Clark, Samuel Harris & Co., Chicago, will serve on the committee, their terms not expiring until next year.

Uniform Accounting for Distributers Recommended

"A SCIENTIFIC and uniform accounting system is the common language by which we can discuss our problems and measure our proficiencies and deficiencies," stated T. C. Keeling, in his annual address as president of the Southern Supply and Machinery Dealers' Association. Having put into operation a modern system of accounting, the dealer must next seek to interpret the data it reveals. Mr. Keeling emphasized the fact that laws governing the cost of distribution in the mill supply industry have not been formulated, and that "we have all acted blindly on the assumption that costs will decrease, or at least remain stationary, as volume increases. There are good reasons for believing that it is a fallacy when applied to all units, regardless of their volume of sales. If it be true, how can we account for the fact that overhead expenses of all companies reporting for the Southern and the National associations have been steadily climbing year after year, when commodity prices in general have been decreasing?"

Mr. Keeling stated the principle that distribution costs are a function of the volume of goods produced, and the greater the volume the greater will be the unit cost of distribution. He further declared that distributers must prove conclusively to manufacturers that the latter can get their goods into the hands of consumers at the lowest possible costs by distributing solely through distributers.

"As long as we suffer from a feeling that price, and price only, will secure us business, and that any effort, worthy or unworthy, made to get this business is a proper way to get it, just so long should we refrain from any criticism of manufacturers who sell direct and do not protect the distributers, or from criticism of other distributers who may enter our field and meet the conditions created by us," stated the executive committee, of which L. J. Larzelere, Farquhar Machinery Co., Jacksonville, Fla., is chairman, in its annual report.

Unprofitable Sales Should Not Be Made

The executive committee asserted that "more important even than the establishment of a resale price and the adherence to it is the determination to refuse to make a sale that does not carry a decent margin of profit." It indorsed the stand taken by the United States Chamber of Commerce in regard to national tax relief, and expressed the opinion that members of Congress do not realize that the great mass of business in this country is composed of small corporations. The committee deplored the fact that railroads serving the South have announced a policy of cancelling all less-than-carload commodity rates, substituting higher rates.

Alvin M. Smith, Smith-Courtney Co., Richmond, Va., secretary-treasurer of the association, referred in his annual report to the district meetings held during the past year at Huntington, W. Va., Nashville, Memphis, New Orleans, Dallas, Birmingham, Charlotte, N. C., and Jacksonville, Fla. He declared that, while 1927 was not a particularly good year in either volume of sales or extent of profits, it could have been much better if manufacturers and distributers had made the proper effort to secure a living margin of profit. He said that "it is just as easy to get a profit as it is not to get one, and when our practice is to indulge in 'fear-mindedness' and, wherever we can find the opportunity, to cut below the other fellow's price, it is time for us to retire from business." Mr. Smith also discussed the increased freight rates put into effect by Southern railroads, the functions of a trade association, relations with manufacturers and other association activities.

W. W. Doe was elected president of the Southern association. Officers who will serve with him are D. D.

Peden, first vice-president; C. J. Salm, Dixie Mill Supply Co., Inc., New Orleans, second vice-president; T. C. Keeling, chairman of the executive committee; L. J. Larzelere, Philip Pidgeon, Pidgeon-Thomas Iron Co., Inc., Memphis; C. W. Beckner, West Virginia-Kentucky Hardware & Supply Co., Huntington, W. Va., and W. M. Given, Young & Van Supply Co., Birmingham, members of the executive committee.

Manufacturers Reiterate Belief in Distribution by Dealers

ROBERT B. SKINNER, Skinner Chuck Co., New Britain, Conn., in his message as president of the American Supply and Machinery Manufacturers' Association, called attention of the members to the report on "The Mill Supply Situation" of the delegates of the organization to the Mill Supply Council. This report already had been approved by the association's executive committee and advisory board. It pointed out that the council in its meetings had established a code of business ethics, had induced the National Supply and Machinery Distributers' Association to abolish its manufacturer membership and had received assurance from the American Supply and Machinery Manufacturers' Association that it would drop from its roster those members who have not expressed themselves as favoring distribution of mill supplies through dealers, wherever possible. Incidentally, the National Supply and Machinery Distributers' Association and the Southern Supply and Machinery Dealers' Association voted at the convention to discontinue the practice of accepting manufacturers as associate members, this policy to become effective May 31. At the same time they reiterated the belief that the association should continue to indicate "by deed as well as by word our sincere belief in dealer distribution and our function to lend all aid possible to that result, but on a basis of nothing less than absolute equality." It is as a result of this stand taken by the association that it proposed a United Mill Supplies Association to take the place of the three present associations.

Dixon C. Williams Chosen President

At the annual election Dixon C. Williams, Chicago Nipple Mfg. Co., Chicago, was chosen president. Other officers to serve the coming year are S. P. Browning, Ohio Valley Pulley Works, Maysville, Ky., first vice-president; C. O. Drayton, Graton & Knight Co., Worcester, Mass., second vice-president; B. F. Ruether, Mechanical Rubber Co., Cleveland, third vice-president; W. C. Allen, Black & Decker Co., chairman executive committee; David C. Jones, Lunkenheimer Co., Cincinnati; K. G. Merrill, M. B. Skinner Co., Chicago; Eugene Grant, Dodge Mfg. Co., Mishawaka, Ind., and K. W. Atkins, E. C. Atkins & Co., Inc., Indianapolis, members of the executive committee.

STEEL TREATERS ELECT

Officers and Executive Committees Are Named by Several Chapters

F. F. Lucas, Bell Telephone Laboratories, Inc., New York, has been elected chairman of the New York chapter of the American Society for Steel Treating. E. C. Bain, Union Carbide & Carbon Corporation, has been named vice-chairman, and T. N. Holden, E. W. Bliss Co., secretary-treasurer. The new executive committee is as follows: J. J. Crowe, Air Reduction Sales Co.; J. B. Romer, Babcock & Wilcox Co.; F. C. Langenberg, Climax Molybdenum Co.; F. B. Coyle, International Nickel Co.; E. P. Gaffney, Crucible Steel Co. of America; J. T. Wyzalek, Hyatt Roller Bearing Co., and Gordon Bell, Central Alloy Steel Corporation.

Chicago Chapter

A. M. Steever, metallurgical engineer Great Lakes Forge Co., Chicago, has been elected chairman of the Chicago chapter, and Donald Colwell, metallurgist Stewart Die Casting Co., will serve as vice-chairman. J. A. Comstock, assistant metallurgist People's Gas, Light & Coke Co., continues as secretary-treasurer. Those elected to serve on the executive committee are Ray Mau, district manager Vanadium Alloy Steel Co.; W. A. Scheuch, metallurgist Western Electric Co., Inc.; Harry Hardwicke, vice-president Atlas Steel Corporation; F. R. Jeffries, superintendent of heat treating for Templeton Kenly, Ltd.; E. J. Gossett, president Bell & Gossett Co., and A. T. Clarage, president Columbia Tool Steel Co.

Detroit Chapter

The Detroit chapter has named the following officers: F. P. Zimmerli, metallurgist Barnes-Gibson-Raymond, Inc., chairman; C. Upthegrove, associate professor of metallurgy University of Michigan, vice-chairman, and Joseph G. Gagnon, metallurgist Hudson Motor Car Co., secretary-treasurer. The executive committee is made up of E. J. Hergenroether, metallurgist Cadillac Motor Car Co.; A. L. Grinnell, district representative General Alloys, Inc.; H. O. Lang, sales engineer Halcomb Steel Co.; J. W. Robinson, sales engineer Higgins-Bothwell Co.; E. H. Stillwell, metallurgist Dodge Brothers, Inc.; E. C. Wahl, district representative Leeds & Northrup Co.; F. C. Young, metallurgist Ford Motor Co.; Charles Foreman, metallurgist Buick Motor Car Co., Flint, Mich.; Gordon A. Stumpf, metallurgist Reo Motor Car Co., Lansing, Mich., and Leo L. Vasold, metallurgist Willys-Overland Co., Toledo, Ohio. These men will take office at the annual outing to be held June 9.

Rochester, N. Y.

C. F. Wattel has been named chairman of the Rochester, N. Y., chapter; E. S. Roscoe, vice-chairman, and I. C. Matthews, secretary-treasurer. These men, together with G. E. VanVechten, F. W. Arvine, H. J. LeClaire, C. E. Codd, R. F. Kimber and D. I. Harrison, will serve on the executive committee.

Golden Gate Chapter

At a meeting of the Golden Gate chapter held on May 9 at the Athens Athletic Club, Oakland, Cal., Dr. W. J. Crook was elected chairman for the coming year. Clyde Williams was named vice-chairman and H. E. Morse secretary-treasurer. The following executive committee was elected: C. Hawley, G. E. Batten, J. S. Fowler, D. H. Grubb, W. Grothe, Ivan Johnson, H. J. F. Niemann, E. E. Fess, J. V. Coulter, S. H. Edwards, C. M. Henderson and J. R. Gearheart.

The meeting, which was held jointly with the American Welding Society, was also the occasion of talks on the selection of automotive steels, by Edgar E. Jamison; on the selection of tool steels, by S. H. Edwards, and on the selection of methods for steel castings, by Ivan Johnson. K. V. Laird presented an illustrated paper on "Welds at High Temperatures."

Syracuse Chapter

At the annual meeting of the Syracuse, N. Y., chapter, held on May 8, J. J. Driscoll, Crucible Steel Co. of America, was elected chairman; S. P. Peskowitz, Halcomb Steel Co., vice-chairman, and K. J. MacKenzie, Brown-Lipe-Chapin Co., secretary-treasurer. W. R. Frazer, Halcomb Steel Co.; C. B. Smith, Crucible Steel Co. of America; Earl Houghton, Brown Lipe Gear Co.; William F. McNally, New Process Gear Corporation, and R. L. Manier, Syracuse Lighting Co., were chosen members of the executive committee.

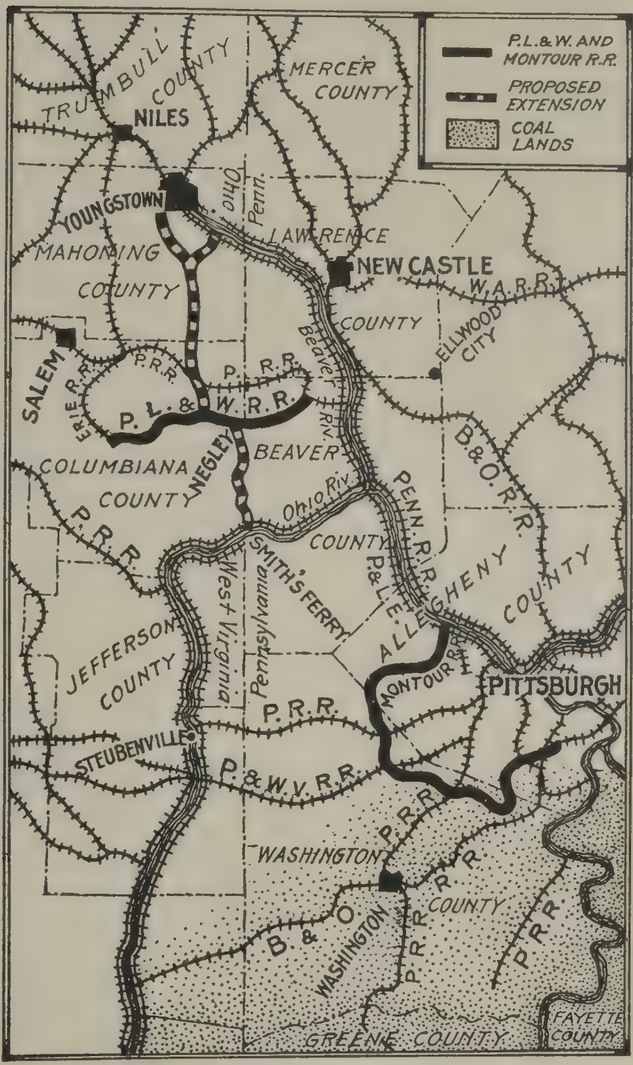
Orders for electric hoists during April, according to reports by members of the Electric Hoist Manufacturers' Association, decreased 29.44 per cent as compared with the previous month. The value of such orders decreased 23.91 per cent as compared with March and shipments were 11.73 per cent less.

CARNEGIE LIBRARY OF ATLANTA

Valleys Seek Ohio River Outlet

Youngstown Steel Makers Say P., L. & W. Extensions Would Open Ohio Valley Markets and Lower Freight Rates on Incoming Coal

WASHINGTON, May 22.—Iron and steel interests of the Mahoning and Shenango Valleys are awaiting with interest the outcome of the application of the Pittsburgh, Lisbon & Western Railroad to construct two branch lines which would connect the Valleys with water transportation through the Ohio River. Hearings on the application before C. V. Burnside, assistant traffic director of the Interstate Commerce Commission, were concluded last Thursday. The hearings also covered an application of the Montour Railroad, a subsidiary of the Pittsburgh Coal Co., to acquire control of the P., L. & W. stock.



Map of Proposed P., L. & W. Extensions

Trunk Line Carriers Oppose Plan

Opposition to the proposed construction was offered by Trunk Line carriers, including the Baltimore & Ohio, the Pittsburgh & Lake Erie and the Pennsylvania. Counsel for these lines contended that the proposed branches would not be in the public interest and would not further public convenience as required by the Transportation Act, under which the applications were made. It was argued that the Trunk Lines already have ample capacity to meet the requirements of the Valleys, and it was implied that the desired river-and-rail service would be given by the P. & L. E. through connection at Monaca, Pa., on the Ohio River, and by the Pennsylvania through connection at Beaver, Pa., at the junction of the Beaver River and the Ohio, at rates as low as those suggested by the P., L. & W. over its proposed branches.

Youngstown District Slipping

Witnesses supporting the proposed construction program pointed out that they have appealed in vain to these carriers for river-and-rail service for many years and declared they had lost faith in them. They stated also that the proposed branches of the P., L. & W. would serve their interests best. In the meantime, they asserted, the iron and steel industry in the Valleys has reached a point of little or no profits, with no prospect of further development and every evidence that this industry, as well as other industrial activities of the district, will continue to decline. High freight rates were assigned as the reason for this situation. Unless the river service is made available, some witnesses went so far as to say, the very existence of the iron and steel industry in the Valleys will be threatened. A. E. Adams, Youngstown banker, testified that Youngstown has been strangled by high freight rates and has been able to live during the past 10 years only by past prosperity. He strongly urged lower rates to meet competition with rail-and-water service from the Pittsburgh and Wheeling districts, saying this was necessary to save the Valleys from industrial stagnation.

The proposed extensions would make Ohio River transportation available for coal coming from western Pennsylvania, thus affording water traffic for all but about 40 miles. This movement of coal into Youngstown was placed at 6,000,000 tons annually. It was declared that the Pittsburgh and Wheeling districts have access to much all-water service for both incoming shipments of raw materials and outgoing shipments of finished products.

The Valleys also see in the proposed branch lines a chance to put their products on the river with only about 40 miles of rail service and, by so doing, find it easier to compete with Pittsburgh and Wheeling producers in the markets of the Ohio and Mississippi Valleys which may be reached by reshipment of products from concentration warehouses located along the two rivers. Frank Purnell, assistant to the president of the Youngstown Sheet & Tube Co.; Richard Jones, Jr., counsel for the Republic Iron & Steel Co.; E. R. Griffith, traffic manager of the Sharon Steel Hoop Co.; H. D. Rhodehouse, traffic manager of the Youngstown Chamber of Commerce, and Mr. Adams testified that the Valley interests have been trying for many years to get relief from the so-called disruption of their competitive relationship with the Pittsburgh and Wheeling districts, which resulted, they said, from freight rate increases during the war.

Sheet & Tube Company Would Cooperate

It was stated by Mr. Purnell that the interests of the Youngstown Sheet & Tube Co. and the Pittsburgh, Lisbon & Western Railroad are identical. He further said that Youngstown shippers must be assured of a permanent arrangement and that the proposed 60c. rate from Beaver, Pa., to Youngstown on coal from Pennsylvania would have to be subject to future adjustments as competitive conditions arose. He admitted that the Pennsylvania and the P. & L. E. have adequate capacity to handle the tonnage that would develop between Youngstown and Beaver and could afford probably a rate of 90c. on coal delivered from western Pennsylvania into Youngstown, as against the present rate of $1.42.

In the course of further cross-examination, Mr. Purnell said that the proposed branch of the P., L. & W. would connect with the Youngstown Sheet & Tube plant at Struthers, Ohio.

Mr. Purnell said that the Youngstown Sheet & Tube Co. expects to acquire all the equipment necessary to operate in connection with the branch line, including coal yards, etc., at Smith's Ferry. The company, he said, has no financial interest in the P., L. & W., but has promised to encourage operation of the line. He said the principal products the Sheet & Tube company would ship by rail and water via the proposed line would be steel pipe, wire, sheets and perhaps bars and plates. On redirect examination Mr. Purnell said the chief handicap suffered by Sheet & Tube company relates to fuel.

Freight Rate Handicaps

In his direct testimony Mr. Purnell said that the Youngstown district is the third largest producer of iron and steel products in the United States and, until comparatively recently, was the second largest, having been superseded by the development in the Chicago district. It was declared that output of iron and steel in the Youngstown district last year declined materially and that, had it not been for the Chicago properties of the Sheet & Tube company, it would have made scarcely any showing in the way of profit. This was attributed to the alleged handicap Youngstown suffers in the way of high freight rates, as compared with lower rail-and-water rates enjoyed by the Pittsburgh district.

Mr. Purnell complained that Youngstown had suffered because of the high freight cost of assembling raw material. He quoted rates and costs showing the advantage which, he declared, is now enjoyed by the Pittsburgh district in assembling costs of raw materials. Assembling costs of the basic raw materials for the blast furnace at Youngstown were said to be $4.44 per ton, as against approximately $2.59 for Aliquippa, Pa., and $3.11 for the Pittsburgh district. He said that the additional cost needed to make and finish the steel is from 75c. to $1.25 per ton, depending on how highly finished the steel is. These additional costs, it was stated, come as a result of additional steam coal and gas coal required beyond production of pig iron.

Pittsburgh Said to Have Profited

In 1923, Mr. Purnell stated, the Youngstown company purchased the Steel & Tube Co. of America at Chicago because of high freight rates into Youngstown, and future growth of the company, he added, will be in the Chicago district. In the Youngstown district, he said, it is not expected to expand in pig iron and steel production, "but only spend such sums as may be necessary to lower costs of production unless and until we obtain material reductions on costs of transportation of our raw materials." Pittsburgh mills, he said, have established distributing points at Cincinnati, Louisville, Memphis, Tenn., and New Orleans in comparatively recent years and are shipping on their own barge lines and distributing from their warehouses at these points. Youngstown, he said, is denied use of the river and its fair share of business in the Mississippi and Ohio valleys, together with many points distant from the river. He cited instances of much business lost to the Youngstown district because of what he said were higher costs of production due to the so-called handicap in freight rates.

Traffic Increase on Ohio River Emphasized

It was brought out that iron and steel traffic on the Ohio River has trebled in the past six years. On the Allegheny and Monongahela rivers, it was testified, much of the through and local traffic, both in raw materials and finished products, arises from the iron and steel industry.

The entire P., L. & W. application, it was suggested in the testimony, is apparently based upon the fact that the Government has made a statutory declaration that its policy is "to promote, encourage and develop water transportation, service and facilities." Witnesses supporting the application made it evident that they have taken this declaration at its face value and have taken this way to show that the declaration of Congress and the many millions of dollars spent by the Federal Government on inland waterway development are not merely for the benefit of properties and industries located directly on rivers.

It was estimated that the through rate on coal from western Pennsylvania to Youngstown would range from 50c. to 75c. per ton by way of the proposed branch lines, while the existing rate from the Pittsburgh district is $1.34 and from the Connellsville district it is $1.43.

Say Cost Would Not Be High

Engineers for the Trunk Line carriers sought to show that the estimated cost of the proposed branch lines, $5,500,000, was much too low. They placed the figure at $8,500,000. This was combatted by proponents of the proposed line, who declared that the Trunk Line carriers had based the cost on much heavier and long lines, heavier bridges and greater right-of-way charges than would be involved, and had used their own construction costs as a basis. The plan, it was pointed out, was to adopt standards such as those existing on the Montour Railroad, which is engaged largely in transporting low-grade products, such as would be hauled by the proposed branches.

MACHINERY EXPORT AGENCY

Cooperative Sales Office for India Established by 26 American Companies

A GROUP of 26 American machine tool and supply manufacturers has arranged for cooperative selling effort in India. C. Warren-Boulton of Calcutta, India, has been appointed exclusive representative for a term of years, and after spending several months in the United States at the works of the companies he will represent, he is now on his way to India.

The cooperating companies are: Niles-Bement-Pond Co. and Pratt & Whitney Co., 111 Broadway, New York; Warner & Swasey Co., Osborn Mfg. Co., W. W. Sly Mfg. Co., Standard Tool Co. and National Acme Co., of Cleveland; E. W. Bliss Co., Brooklyn; Cushman Chuck Co. and Jacobs Mfg. Co., Hartford, Conn.; Landis Machine Co. and Landis Tool Co., Waynesboro, Pa.; Yates-American Machine Co., Rochester, N. Y.; L. S. Starrett Co., Athol, Mass.; Kearney & Trecker Corporation, Milwaukee; Barnes Drill Co., Rockford, Ill.; Monarch Machine Tool Co., Sidney, Ohio; Simonds Saw & Steel Co., Fitchburg, Mass.; Morton Mfg. Co., Muskegon Heights, Mich.; J. G. Blount Co., Everett, Mass.; Cincinnati Shaper Co., Cincinnati; J. H. Williams & Co., Buffalo; C. C. Bradley & Son, Inc., Syracuse, N. Y.; Racine Tool & Machine Co., Racine, Wis.; Adams Co., Dubuque, Iowa; Gallmeyer & Livingston Co., Grand Rapids, Mich.

These companies cover a wide field of machine tools and accessories. While the group is not definitely and finally closed for membership, it is not the intention to expand it materially. Non-competing manufacturers of machine tools may obtain information on this group from R. M. Derby, manager foreign department, Niles-Bement-Pond Co. and Pratt & Whitney Co., 111 Broadway, New York, or from C. J. Stilwell, sales manager, Warner & Swasey Co., Cleveland.

Central Iron & Steel Co. Entertains Engineers at Plant Inspection

The Central Iron & Steel Co., Harrisburg, Pa., Robert H. Irons, president, was host on Wednesday afternoon, May 16, to a large group of engineers from the Susquehanna section of the American Society of Mechanical Engineers. Following a buffet luncheon, the engineers were taken through the plant on cars and were given an opportunity to inspect all departments, a particular object of interest being the Fuller-Lehigh coal pulverizing plant. At the time of the inspection, one of the mills was rolling floor plate to be laid in one of the new buildings of the Ford Motor Co., Detroit.

Press for Lower Freight Rate to Coast

Mid-West Steel Interests and Illinois Central Railroad Petition for Reduced Water-and-Rail Rate—Question Commission's Jurisdiction

WASHINGTON, May 22.—Struggles within the iron and steel industry of the United States to recover, maintain or build up markets through desirable freight levels have been particularly marked since the decision of the Interstate Commerce Commission in April, 1925, in the so-called Jones & Laughlin case, which readjusted rates on a mileage basis from Pittsburgh and Chicago. Succeeding conflicts between various districts of the industry have followed through a number of important proceedings, some of which have been decided, such as the Consolidated Southwestern cases, Central Freight Association pig iron cases, long-and-short haul cases and the export rate case, in which rates for shipment of iron and steel abroad were reduced by 20 per cent. Meanwhile there is pending the broad investigation under the Hoch-Smith resolution which proposes readjustment of the entire iron and steel rate structure throughout Official Classification territory. Also an important bearing on the situation is given by the application of the Pittsburgh, Lisbon & Western Railroad to connect the Mahoning and Shenango valleys with the Ohio River.

Most recent is the proposal of the Illinois Central Railroad to join with the Redwood steamship line and equalize the Chicago district with Pittsburgh and other Eastern producing sections in iron and steel rates to Pacific Coast ports. The Illinois Central tariff proposes a reduction of 8.5c. per 100 lb. on iron and steel moving from the Chicago district through New Orleans, the schedules, filed to become effective May 31, ranging from 56c. to 86c. per 100 lb. Producers and railroads in the East are offering spirited opposition to the proposed tariff, while Middle Western producers and the Illinois Central are making equally strong efforts on behalf of the new rates. Each side stoutly maintains its position in petitions filed with the Interstate Commerce Commission. The substance of claims of some protestants, including Pittsburgh district producers and Eastern carriers, was published in THE IRON AGE of May 10, page 1328.

Petitions to permit the new rates to become effective were filed subsequently by Middle Western independent steel interests, the Illinois Central Railroad and others. Among those joining the Middle Western producers is the Youngstown Sheet & Tube Co. The United States Steel Corporation strongly opposes the Illinois Central tariff, as does its subsidiary, the Elgin, Joliet & Eastern Railway. Among its steel producing companies, the American Sheet & Tin Plate Co., the Carnegie Steel Co., the American Bridge Co. and the National Tube Co. charge that the proposed rates would deprive them of their natural advantages in reaching the Pacific Coast markets through Atlantic ports and the Panama Canal. The Illinois Steel Co., Steel Corporation subsidiary in the Chicago district, has filed no petition.

Independent steel producers in the latter district have pointed out in their petitions that the E. J. & E. not only has refused to concur in the proposed rates but that, acting under the direction of the Steel Corporation, has asked for their suspension "all to the detriment of the Middle West and Chicago producers of iron and steel articles and railroads serving said districts, including the Elgin, Joliet & Eastern." Separation of the Isthmian Steamship Line from ownership by the Steel Corporation is asked the commission. It is requested to reverse its decision approving such ownership of this line, which operates through the Panama Canal. Despite the commission's finding, it is charged that ownership of this water line by the Steel Corporation is in violation of the Clayton act, it being alleged that it does away with competition between the water carrier and the E. J. & E. The petition seeking this action was filed by Clayton, Mark & Co. and the Acme Steel Co., and is signed by Robert Hula, traffic manager and assistant sales manager of the former company, and J. B. O'Rear, traffic manager of the Acme company.

It is charged that the ownership of the steamship line by the Steel Corporation results in a policy of having the railroads maintain high rates on iron and steel from the Chicago district to Pacific Coast ports. The claim is made that the Steel Corporation desires to serve this market from its Pittsburgh district mills by way of the Atlantic ports and the Isthmian line. The declaration is made that prior to the development of the Isthmian line, the E. J. & E. favored low rates from the Chicago district to the Pacific Coast, and that this was also true regarding the Steel Corporation itself as reflected, it is maintained, in a petition of the Illinois Steel Co., in 1922, supporting a fourth section application to obtain low rates from the Chicago district to Pacific ports. Middle Western producers, it is asserted, have been virtually excluded from the Pacific Coast market by reason of the lower rail-and-water rates from the Pittsburgh district through the canal.

Other independent iron and steel interests in the Chicago and adjacent territory, together with the Chicago Association of Commerce, the Peoria Association of Commerce, the Rockford Manufacturers' and Shippers' Association, the Bloomington Association of Commerce, the Louisville Board of Trade, the Evansville Chamber of Commerce, the Indiana Chamber of Commerce, the Springfield Chamber of Commerce, the Illinois Manufacturers' Association and additional organizations and concerns, filed a joint petition supporting the Illinois Central tariff. They called attention to the fact that the protestants had referred only to the great disparity in land distances from Chicago to New Orleans, on the one hand, and the land distances from Pittsburgh to Baltimore, on the other hand. Instead of confining their calculation to this basis they turn to the relative distances by rail-and-water from the Middle West and Pittsburgh to the Pacific Coast, stating that the average distance from the Middle West is 242 miles less than from Pittsburgh.

"It is ridiculously absurd for the protesting producers in the Pittsburgh and Valley district," said the petition, "to contend that they will be unable to meet Middle Western competitors in a given market when they now have the advantage in price of from $2 to $4 a ton, and it will therefore be readily seen that the mere equalization of freight rates will in no wise impair the ability of Eastern producers to market their products in Pacific Coast markets. In fact, it is the Chicago and Middle Western producer who will be obliged to absorb such disadvantages in price if they expect to participate in the Pacific Coast business."

It is also declared to be ridiculous for the Eastern shippers to contend that the Eastern carriers will be obliged to reduce their rates to a relative basis, and it is stated that the assertion by the Eastern carriers of an impending rate war is entirely unfounded and absurd under these conditions.

"The proposed tariff holds out the first ray of hope of allowing the Middle Western manufacturer and shipper to retrieve a loss occasioned by construction of the Panama Canal," it is stated. "This tariff will have the effect of bringing back to the Middle Western shippers the opportunity to compete on traffic which they formerly enjoyed and to which they are justly entitled."

The Illinois Central Railroad in its petition laid down two broad principles. First, it was stated that the commission has no power to establish the proposed

(*Concluded on page* 1512)

GRAY IRON INSTITUTE

New Organization Elects Directors and Officers at Philadelphia Meeting

THE Gray Iron Institute held its first general meeting at Philadelphia, May 18, on the occasion of the convention of the American Foundrymen's Association. A certificate of incorporation, by-laws and a report of a committee on merchandising were adopted, and officers and directors were chosen. At the conclusion of the meeting numerous applications for membership in the institute were received.

A board of directors nominated by a committee headed by Walter Wood, R. D. Wood & Co., Philadelphia, was elected unanimously as follows:

Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland
A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.
J. H. Bruce, Bowler Foundry Co., Cleveland
J. L. Carter, Barlow Foundry Co., Newark, N. J.
H. S. Chafee, Builders Iron Foundry, Providence, R. I.
A. E. Clarke, Des Plaines Foundry Co., Des Plaines, Ill.
J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.
Horace R. Culling, Carondelet Foundry Co., St. Louis
Fred Erb, Erb-Joyce Foundry Co., Detroit
W. J. Grede, Liberty Foundry Co., Milwaukee
A. J. Hartman, United Engineering & Foundry Co., Pittsburgh
John Hartman, Atlas Foundry & Machinery Co., Tacoma, Wash.
B. H. Johnson, Cresson-Morris Co., Philadelphia
Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio
Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

The board of directors elected the following officers: Walter L. Seelbach, president; B. H. Johnson, first vice-president; A. E. Hageboeck, second vice-president; H. S. Chafee, treasurer. These officers, with J. L. Carter, Newark, N. J., compose the executive committee. Dan M. Avey, editor *Foundry*, Cleveland, who has been temporary secretary since the preliminary organization of the institute, will continue in that capacity until a secretary-manager is chosen by the executive committee.

The Gray Iron Institute is the outcome of two movements, one of which started in Philadelphia and the other in the Central West, which recognized the need of cooperative effort to improve the quality of gray iron castings through research and to perfect merchandising methods. At a conference held in Philadelphia, Feb. 13, the two groups decided to pool their efforts, and on March 13 a meeting was held at Pittsburgh, where a temporary organization was effected.

Purpose of the Institute

The purpose of the institute is to promote the interests of the gray iron foundry industry by all lawful means, such as—

1. The promotion of sound business ethics in the industry, based on honor and integrity in manufacturing and selling gray iron castings by its members.
2. The collection and distribution of information relative to the manufacture of gray iron castings.
3. To study new methods for merchandising gray iron castings, to strengthen present markets, to develop new markets and to discover new uses for gray iron castings.
4. The promotion of uniformity in methods of cost accounting.
5. Research work to improve further the quality of gray iron castings and to increase their utilization in industry, cooperating with other research agencies toward that end.
6. The stimulation, by cooperative effort, of the use and sale of gray iron castings.
7. The establishment and maintenance of standards of quality for gray iron castings.

The officers elected at Philadelphia will hold office only until the first annual convention, which will be held this fall.

A feature of the Philadelphia meeting was an inspiriting address by Charles F. Abbott, executive director American Institute of Steel Construction, New York. Businesses, he said, differ only in details; in principles they are all alike. Current economic problems cannot be solved by the individual. Unorganized industries have lost the aggressive and are being told by buyers what they can expect. The new competition is not between individuals but between industries for a share of the consumer's dollar. We find reinforced concrete arrayed against structural steel, electric refrigeration against ice, oil against coal, Florida against California, lumber substitutes against lumber, etc. Incidentally, the lumber industry has appropriated $25,000,000 to regain lost markets.

The difficulties confronting an industry are national, not local, in scope. An individual plant is solely dependent on the fortunes of the industry to which it belongs. It has been argued that the small company should be eliminated, but such elimination would not be a cure for a condition characterized by excess capacity, since a new crop of small plants would spring up to take the place of those that went out of business. A spirit of "live and let live" should control the policy of each industry. It is better, said Mr. Abbott, to operate at 60 per cent at a profit than to run full at cost or less than cost. The problem of a given industry is also the problem of the nation at large. If industries cannot find a way to operate profitably, the unemployment problem is bound to grow worse. If companies cannot make profits in fairly active times, what can be expected if a depression sets in?

MECHANICAL ENGINEERS

Nominees for Officers of American Society—Award of Holley Medal

ELMER A. SPERRY, of gyroscope fame and the organizer recently of the Sperry Rail Service Corporation for investigating such matters as transverse fissures or other defects in steel rails, came in for special honors at the meeting last week in Pittsburgh of the American Society of Mechanical Engineers. He was awarded the Alexander Holley medal and was nominated as president of the society for the year beginning in December. Mr. Sperry is chairman of the Sperry Gyroscope Co., Brooklyn, which has manufactured gyroscopic compasses and also gyroscopic stabilizers, as for shipboard, and searchlights of high candle-power.

The Holley medal was presented to Mr. Sperry by George I. Rockwood, Rockwood Sprinkler Co., Worcester, Mass., who instituted and endowed the medal in 1924. The medal is bestowed "for some great and unique act of genius of an engineering nature that has accomplished a great and timely public benefit," and Mr. Rockwood characterized the invention of the gyroscopic compass as a brilliant, valuable achievement.

Charles M. Schwab, past-president of the society, was also present at the banquet and gave one of his characteristic talks. George S. Davison, past-president American Society of Civil Engineers, was toastmaster, being introduced by A. N. Diehl, vice-president Carnegie Steel Co., who was general chairman of the subcommittees for the 1928 spring meeting.

The other nominees for office, as presented by the regular nominating committee of the society are given below. Election will be by letter ballot of the membership, closing on Sept. 25.

Vice-presidents, William Elmer, special engineer, Pennsylvania Railroad, Philadelphia; Robert L. Daugherty, professor mechanical and hydraulic engineering, California Institute of Technology, Pasadena, Cal., and Charles E. Gorton, chairman, American Uniform Boiler Law Society, New York.

Managers, Charles M. Allen, professor of hydraulic engineering, Worcester Polytechnic Institute, Worcester, Mass.; Robert M. Gates, manager, industrial division, Superheater Co., New York, and Ely C. Hutchinson, president and general manager, Pelton Water Wheel Co., San Francisco.

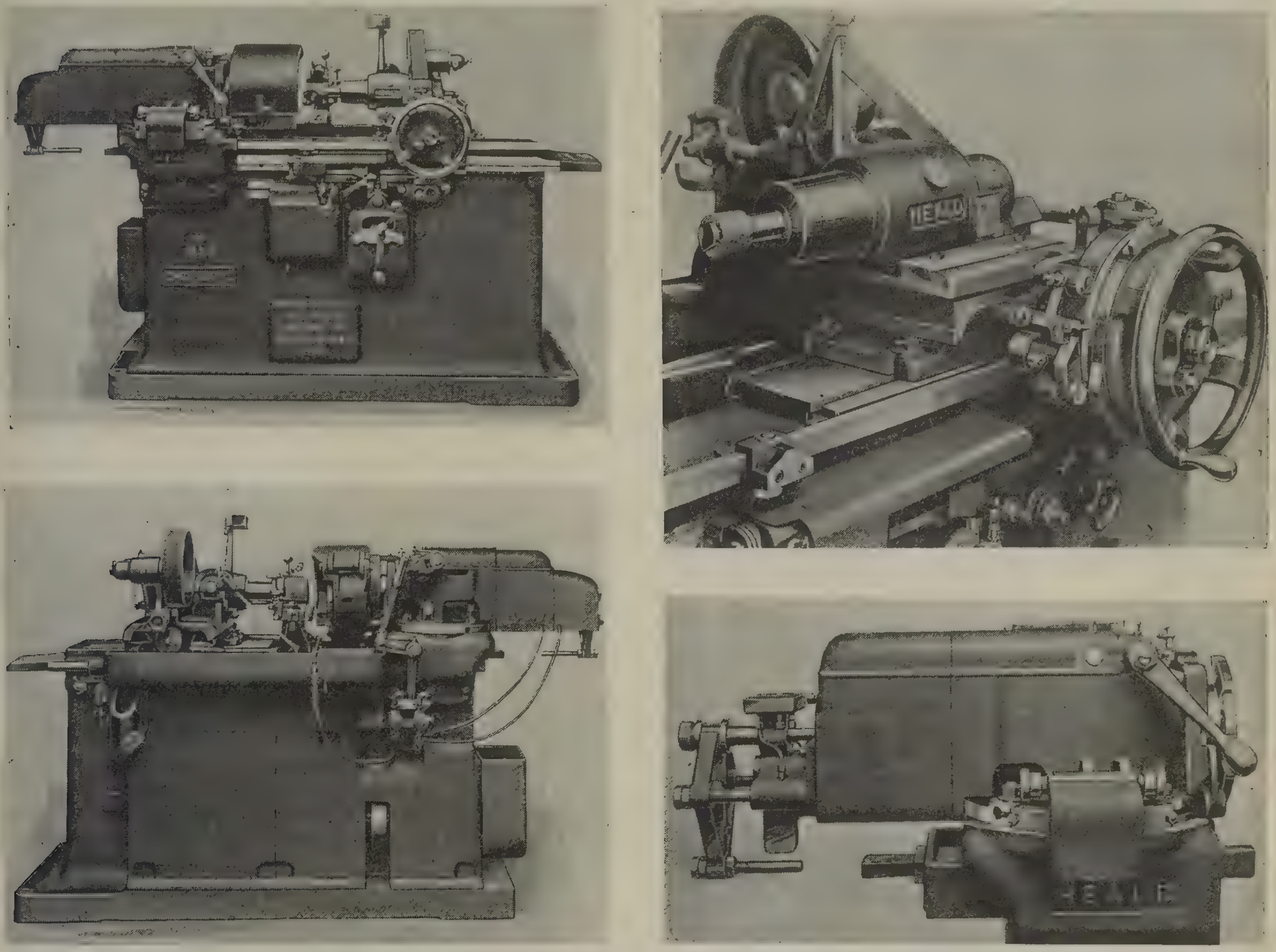
Delegates to the American Engineering Council: Elmer A. Sperry, Brooklyn; E. O. Eastwood, University of Washington, Seattle; Dean E. Foster, Tulsa; W. P. Hunt, president Moline Tool Co., Moline; O. P. Hood, Bureau of Mines, Washington; Charles Penrose, Day & Zimmermann, Philadelphia; Frank A. Scott, Warner & Swasey Co., Cleveland; Max Toltz, St. Paul; E. N. Trump, Solvay Process Co., Syracuse; and D. Robert Yarnall, Yarnall-Waring Co., Philadelphia.

NEW HEALD INTERNAL GRINDER

Gage-Matic Unit Offered for Continuous Production of Straight Open-End Work

THE Heald Machine Co., Worcester, Mass., has brought out a new internal grinding machine, named the Gage-Matic, for continuous production of straight open-end work, such as ball bearings, bushings, gears and similar parts.

The machine was made possible when the company acquired the internal grinding machine line of the Giddings & Lewis Co., Fond du Lac, Wis., which purchase embraced not only the machines but also all patent rights, including the McDonough automatic gaging device patents. The latter device is an essential element of the Teromatic internal grinder, and is likewise a fundamental mechanism in the Gage-Matic. Its positive sizing plug permits consistent sizing even where the limits are unusually close, and only slight attention is demanded of the operator.



After the Work Is Chucked and the Starting Lever Thrown, the Cycle of Operation, Including Gaging, Is Automatic. Arrangement of the cross-slide is shown at upper right, and a close-up view of the work-head at the lower right

The gaging device on the new machine differs from that on the Teromatic in that a single disk is used, which controls the sizing and permits the grinding of fairly short work. The control for short stroking the table at the proper time to enable the wheel to be trued is on the cross-slide, where a single electric contact point performs the operation. The cross-slide is similar to that of the company's Size-Matic, to which the Gage-Matic is a companion machine, using the same base with hydraulic drive for the table, the same wheelhead, the same wheel-truing device and with the same motor and belt main drives.

When the operator has chucked the work and thrown over the starting lever, the cycle of operation is entirely automatic. The wheel enters the work and rough grinds at roughing speed and feed until only a predetermined amount of stock is left. Then a contact is made on the cross-slide, the table short strokes, changes to truing speed and the diamond drops into position, truing the wheel. The wheel again enters the work and grinds with finishing feed and speed until the gaging plug enters the hole, when a second electric contact causes the wheel to withdraw and the entire machine to come to the rest position. The work is chucked from the front and is held by quick-acting fixtures, oil-operated to give a quick, positive and flexible movement with no effort on the part of the operator.

The workhead is mounted on a rigid bridge which in turn is bolted directly to the base. The swivel circle has been enlarged to 16 in. in diameter, and movement is obtained through knurled knobs on the front of the bridge. The work spindle runs in large, self-adjusting ball bearings. A multiple-disk clutch on the inside of the work spindle provides positive drive, and a separate multiple disk brake arrangement is provided to stop the work spindle as the pulley clutch is released. The brake works automatically while grinding is in progress, but it may also be operated by hand.

Working in conjunction with the workhead is the size gage mechanism. This consists of a gage mounted on the end of a rod which revolves with the work spindle, concentric with it and reciprocating in synchronism with the main table in such a manner that as the front end of the wheel clears the back of the hole, the gage is firmly pressed against the piece at this point. The sizing is complete as soon as the gage enters the hole, when an electric contact is made and the machine comes to rest.

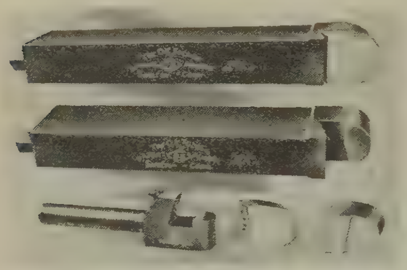
The cross-slide, which carries the flexible idler and wheelhead, is mounted on the table. Coarse feed for the wheel may be set for rough grinding up to within a desired limit of finish size of hole, when the roughing feed changes automatically to a finishing feed. The change is mechanical and positive, taking place just before the diamond trues the wheel.

Wheel-truing is controlled from a cross-slide by a slip ring carrying a stop, which at a set point engages a finger. This forms an electric contact that permits current from a generator on the back of the machine to energize a magnet which operates the various levers and dogs necessary to short stroke the table and drop the diamond to position. The same slip ring after engaging with the finger permits the handwheel to progress further on each successive work piece by an amount approximately equal to the reduction of the wheel due to grinding and dressing, thus compensating for wheel wear.

Shankless Tool Bits and Holders for Wheel and Other Heavy Turning

Shankless tool bits and tool holders for locomotive tire and other heavy turning operations have been placed on the market by the O. K. Tool Co., Shelton, Conn.

The tool bits are retained in the holder by a double-tapered groove as shown in the illustration and are, in effect, self-locking in the direction of the feed, although the usual rear locking arrangement is used in the holder. The tool may be adjusted sidewise for wear in the direction of the feed merely by moving the lock forward, which makes the bit project farther out of the side of the holder.



The Tools Are Made in Right- and Left-Hand Types. The small holder, in the foreground, is for use in grinding the tool bits

In having no shank, manufacture of the tool bit is simplified and the cost is reduced. Another advantage emphasized is that in having no hole through it, the tool holder is stronger.

Tool bits may be removed, reground and replaced conveniently, a hand grinding holder, shown in the foreground of the illustration, being available to facilitate grinding of the bits. The tool bits are of drop forged high-speed steel, carefully heat treated. The holder is of forged chrome-nickel steel, heat treated. The tools are available in a number of sizes and in right- and left-hand types.

Light, Rugged Construction Features Portable Conveyor

Built light enough so that one man can move it easily and quickly, the "Jax" portable conveyor has been brought out by the Link-Belt Co., Chicago, for unloading packages, bags, coal, rock, etc., on wharves, from or to box cars, both indoors and out. Mounted on agricultural-type wheels of 14-in. diameter and 2-in. face, this 12-ft. conveyor complete, with ¾-hp. motor, weighs but 640 lb. The 15-ft. conveyor, complete, with motor, weighs 710 lb.

The wheels are movable to practically any point along the frame, which consists of two heavy pipes tied together at head and foot ends by electric steel castings. A pipe handle at the foot end facilitates handling. The casting at the head end provides a base for the motor and a grease-tight inclosed housing in which the cut reduction gears operate.

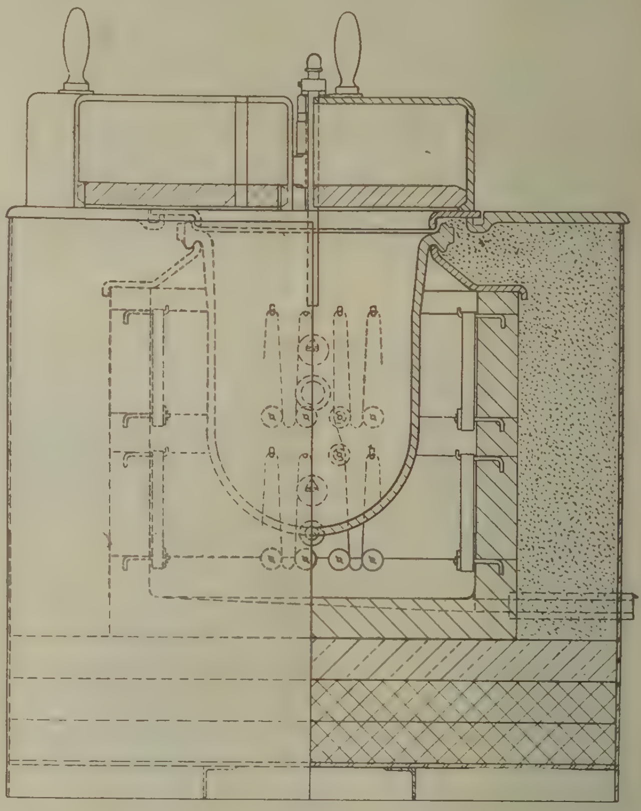
The height of the discharge point of the conveyor can be adjusted by moving the wheels forward or backward along the conveyor frame. The wheels are provided with three positions for vertical adjustment. Lubrication is seldom necessary, as all bearings are of the anti-friction type and all gears run in a bath of grease.

Designed for a speed of 200 ft. a minute, the three-ply rubber belt, with ⅛-in. rubber cover, is 12 in. wide. Steel skirt boards, forming a belt trough, are arranged for endlap into additional units, if required.

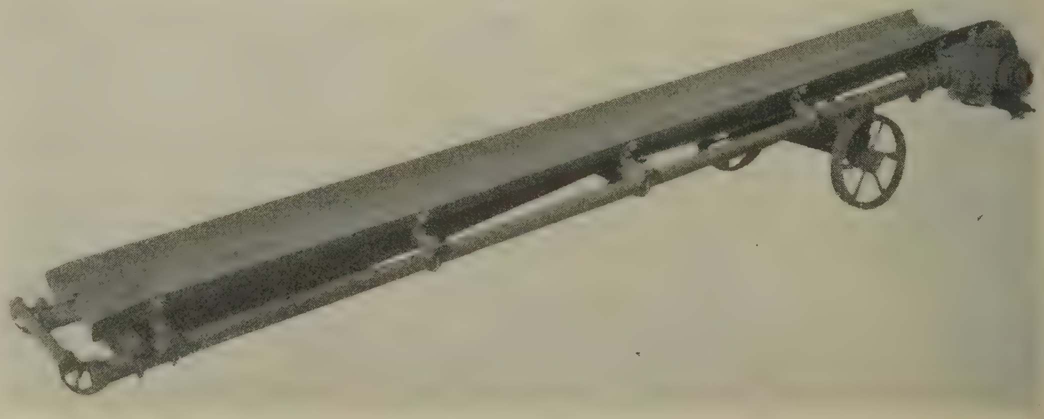
Electrically Heated Lead Pots

A series of electrically heated lead pots has been designed by General Electric Co., Schenectady, N. Y. The pots range in size from 8 in. in diameter by 12 in. deep to 16 in. in diameter by 24 in. deep. The smallest will heat 75 lb. of steel per hour to 1500 deg. Fahr. When working at this rate it uses 11 kw. of single-phase power at 75 volts. The largest will harden 250 lb. steel per hour, using 29 kw. at 220 volts.

Pots are of special alloy, and rest on an alloy collar built into the fire brick casing. The upper flange of the pot is separated by a ring of insulation from the cast iron drip plate; thus heat losses by conduction are reduced to the minimum. Heating units are ranged on the inside walls of the cavity surrounding the pot.



Heating curves have been worked out showing that a small furnace, for instance, will cool to 750 deg. in a 13.5-hr. overnight shutdown, following which it will require 70 min. on power to reach 1500 deg. After a 43-hr. week-end shutdown, the furnace will be at 250 deg. Fahr. and will require 2 hr. 10 min. to reach heat.



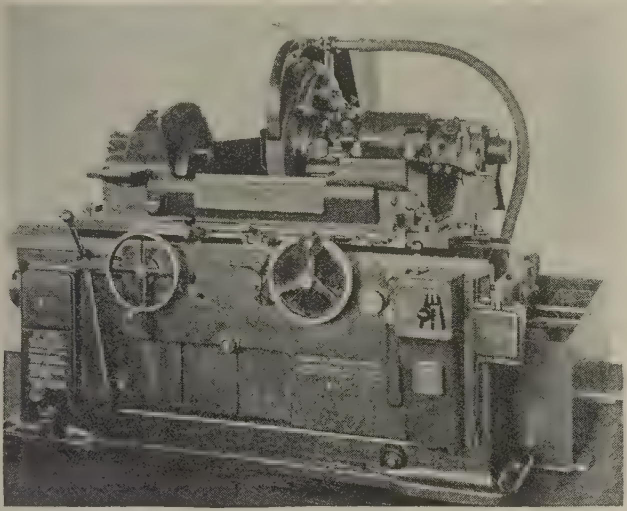
The Conveyor Can Be Moved Easily by One Man. The wheels are movable to any point along the heavy pipe-form frame

HEAVY-DUTY PLAIN GRINDERS

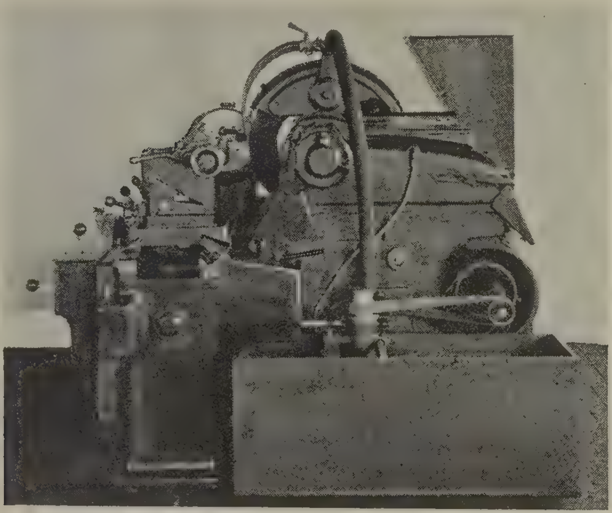
Massive Design, Wide Range of Speeds and Ease of Control Are Features of New Production Units

SMOOTH operation, increased speed, and facility of control are features of a new series of plain grinding machines for heavy-duty production work, which is being placed on the market by the Brown & Sharpe Mfg. Co., Providence, R. I.

Three sizes of the machine, designated as the No. 30, 32 and 33, respectively, and of similar design except for length of bed, are available. Two modified forms of each size of machine, for work not requiring all of the automatic features, can also be furnished. The capacity is for work 18, 36 and 48 in. long respectively, between centers. The centers will swing 12 in. in diameter with 24-in. wheels having from 2 to 10 in. width of face, and 6 in. in diameter with 30-in. wheels having 2 to 6 in. face.



The No. 30 Plain Grinder With Belt Drive Is Shown Above. The rugged construction may be noted from the view of the right-hand end of the machine, below

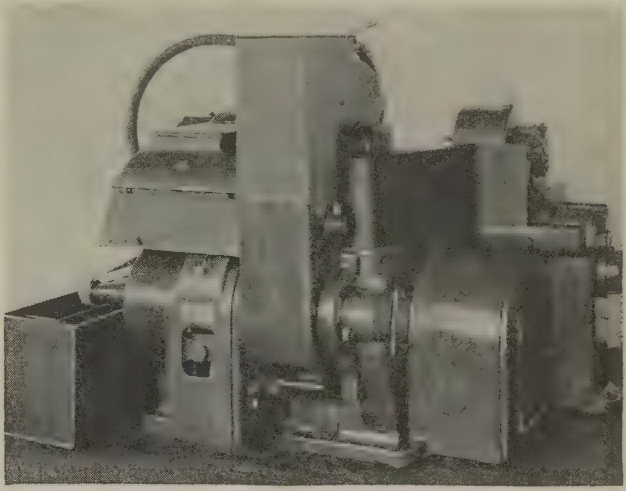


The machines are essentially production units and have an unusually wide range of table and work speeds. Because of a table dwell, which is provided at each end of the table, and a shock absorber in the reversing mechanism, high table speeds may be used without affecting the finish on the work. In this connection it is stated that the table dwell permits unusual finish on the work.

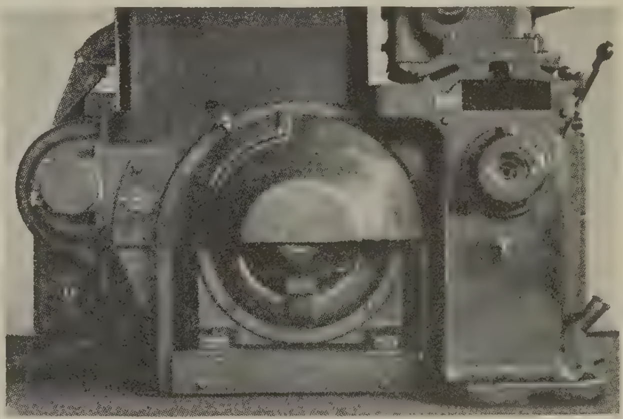
Operating controls are grouped so that they may be reached conveniently from the normal operating position. Changes of speed of the work drive and table movement, which are entirely independent, are made through sliding gears by means of individual levers. Cross feed controls, both for automatic and hand operation, are located on the right-hand feeding wheel. Adjustment for the table dwell is located at the extreme right. Both spring-lever and screw-and-handwheel operation of the footstock are provided.

The machines are of heavy construction to assure high degree of accuracy. Special care is said to have been taken to make the work drive smooth and vibrationless, this being accomplished by the combination of a torsion shaft and balanced belt drive from within the machine. The wheel-slide and wheel-slide base are heavy and of rugged design, and have long automatically lubricated ways which assure accurate alinement and full support to the wheel spindle. The bed is of ample length to support the sliding table at all points in its travel. All moving parts and scraped surfaces are well guarded in all positions.

Lubrication of the wheel spindle and all main mechanisms is by gravity flow of filtered oil from a reservoir which is kept filled with oil by means of a geared pump. The wheel-slide incloses the oil filters which are conveniently accessible for cleaning. The few necessary oiling stations are clearly marked with the necessary instructions as to the intervals at which oiling is required. The coolant tank is separate from the machine, but is arranged to come within the floor space limits, as shown.



A Compartment in the Base Accommodates the Driving Motor, Which Is Protected by a Hood, but Is Accessible for Lubrication. Arrangement of the rear of the machine may be noted from the view above



Either overhead countershaft or motor drive arrangement is available. One main motor drives the entire machine. When motor equipped, the motor, of 15 to 40 hp., depending upon the work to be ground, is inclosed in a compartment in the base of the machine. The compartment is hooded, as shown, which protects the motor but permits easy access for lubrication. The control equipment may be mounted on a stand close to the base of the machine and within the floor space limits.

One of the modified machines, designated as the "A" machine, is provided with hand operation for the table, with one power table feed for wheel truing, and is adapted particularly for straight-in-feed grinding, using either power or hand cross-feeds. The second modified machine, the "B," has only hand table and cross-feeds. This unit is also for straight-in-feed grinding, using hand cross feed only.

Coke Production Continues at Exceptionally High Rate

WASHINGTON, May 19.—The rate of production of by-product coke in April was the highest, except for that of March, in the history of the industry, according to the Bureau of Mines. Total output in the 30 days of April was 3,925,195 net tons, against 4,064,940 tons in March. The decrease of 0.2 per cent in the daily output in April reflected a decline in the demand for house-heating fuel with the coming of milder weather. There were 79 by-product plants active in April, and these plants produced about 84 per cent of their capacity. The output of beehive coke was 377,000 tons in April as compared with 449,000 tons in March, a decrease of 16 per cent. The total production of all coke was 4,302,195 tons, of which 91.2 per cent was contributed by the by-product plants and 8.8 per cent by the beehive ovens.

Taking its figures from THE IRON AGE, the bureau shows that the output of pig iron in April was 3,185,504 gross tons, or 106,183 tons a day, an increase of 2.9 per cent over March in daily rate, but a decrease of 7 per cent when compared with April of last year.

Total production of coke during the first four months of 1928 was 17,202,404 tons, a decline of 4.1 per cent from the production of the corresponding period of 1927. By-product coke output during the first four months, however, with a total of 15,610,404 tons, showed a gain over 1927, when the four-month total was 14,727,829 tons. Beehive production made a sharp decline to 1,592,000 tons, as against 3,210,000 tons. Pig iron production during the first four months of 1928, amounting to 12,155,065 tons, was 6.1 per cent under the output of the first four months of last year, when the total was 12,950,087 tons.

In response to requests for information on the relative rate of increase in the output of domestic and of metallurgical coke, the bureau has prepared a table giving data for the period 1915-1926. The highest production of all coke for this period was in 1918, aggregating 56,611,766 tons, of which 50,002,988 tons was consumed in the blast furnace and 3,861,208 tons in the foundry cupola. Of these tonnages 21,901,043 tons of the furnace coke was made at by-product plants and 28,101,945 tons at beehive plants, while 1,631,052 tons of the 72-hr. fuel was made in by-product plants and 2,230,156 tons in beehive ovens. In 1926 total production of all coke was 56,420,484 tons—within ⅛ per cent of the maximum—of which 45,019,560 tons was consumed by blast furnaces and 3,331,677 tons by foundry cupolas. Of the metallurgical coke, 35,028,461 tons and 2,168,017 tons respectively were by-product fuel and 9,991,099 tons and 1,163,660 tons beehive coke.

Sharp Drop in Foundry Equipment Orders

Orders for foundry equipment in April are reported by the Foundry Equipment Manufacturers' Association at 107.7 per cent of the average monthly shipments for 1922, 1923 and 1924. This is a decline of nearly one-fourth from the 138.6 reported for March, and represents the lowest figure for any month so far this year. It compares with 130 in April, 1927, and with 113.2 in April, 1926. It represents the lowest April figure since 1922.

Shipments in April are given at 112.5 and unfilled orders at 126.1, on the same base as for new orders.

Wholesale Prices Up in April

The index number for wholesale prices reported by the Bureau of Labor Statistics, on the base of 100 as the average for 1926, was 97.4 for April, 1928. This is a substantial increase from the 96 of the preceding month and is still further above the 93.7 of April, 1927. Of the 10 major groups, five showed increases, two decreases and three remained stationary. Metals and metal products, at 98.4, did not change from the March figure. Both were slightly above the 97.8 of a year ago. Iron and steel under this heading showed a slight decline, with non-ferrous metals slightly higher. Agricultural implements and automobiles did not change.

Heavy Decline in Steel Corporation Unfilled Orders

Unfilled orders on the books of the United States Steel Corporation showed a decline in April of 463,073 tons, or nearly 11 per cent of the 4,335,206 tons reported at the end of March. The figure on April 30 was 3,872,133 tons. While this is higher than the corresponding figure at the end of April of 1927 or of 1926, it is the lowest figure reported since Nov. 30, last. However, the four months preceding April, 1928, and the figure for the last day of 1926, are the only ones in more than two years which have been higher than the current figure. One year ago the unfilled orders amounted to 3,456,132 tons, or 11 per cent under the recent figure, while two years ago, at 3,867,976 tons, the recent figure was closely paralleled. The table gives the reported figures for the past 28 months.

	1928	1927	1926
Jan. 31.......	4,275,947	3,800,177	4,882,739
Feb. 28.......	4,398,189	3,597,119	4,616,822
Mar. 31.......	4,335,206	3,553,140	4,379,935
April 30.......	3,872,133	3,456,132	3,867,976
May 31.......	....	3,050,941	3,649,250
June 30.......	....	3,053,246	3,478,642
July 31.......	....	3,142,014	3,602,522
Aug. 31.......	....	3,196,037	3,542,335
Sept. 30.......	....	3,148,113	3,593,509
Oct. 31.......	....	3,341,040	3,683,661
Nov. 30.......	....	3,454,444	3,807,447
Dec. 31.......	....	3,972,874	3,960,969

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Smaller Production of Commercial Steel Castings

Production in April of commercial steel castings is reported by the Department of Commerce at 83,795 tons. This is the smallest monthly total since December, comparing with 92,806 tons in March. In April, 1927, the output was 94,677 tons. For the first four months of the year the total was 338,006 tons, comparing with 373,514 tons a year ago. Both the railroad specialties and the miscellaneous castings participated in the decline. Each was approximately 10 per cent lower in the first four months of this year than last year.

New orders in April were only slightly lower than in March, being reported at 81,835 tons against 82,536 tons. This compares with 81,044 tons in April, 1927. For the first four months the total was 346,120 tons against 373,547 tons last year. The reduction was less than in production and both classes of castings were influenced in about equal proportions.

Railroad specialties ordered in April were 32,722 tons, or 49 per cent of capacity, comparing with 32,279 tons a year ago—also 49 per cent of capacity. Miscellaneous castings ordered in April amounted to 49,113 tons, or 63 per cent of capacity, comparing with 48,765 tons a year ago—also 63 per cent of capacity. Orders for railroad castings in April showed a gain over March, which recorded 30,992 tons, but miscellaneous castings fell below March, in which 51,554 tons were ordered.

Heavy Production of Steel Barrels

Steel barrels manufactured in April are reported by the United States Department of Commerce at 667,827—a gain of 5 per cent over the high production of March and the highest total which has been reported since these figures were first compiled, in 1923. In April, 1927, the total was 599,771—a figure which was exceeded by only one month that year. Shipments in April fell 1 per cent behind production; in March, shipments were somewhat above production. Unfilled orders declined about 70,000 units during the month. As of April 30, they called for 357,131 units for delivery within 30 days and 919,863 units for later delivery.

Shipments of members of the Steel Barrel Manufacturers' Institute in April totaled 370,960 units, with 457,832 unfilled orders on hand on May 1. Capacity was engaged during the month to the extent of 57 per cent, rating 22.6 per cent for I.C.C. barrels and 66.5 per cent for light barrels.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output may hold large for several weeks more, but a sharp and prolonged decline is likely to follow.

Unfilled orders showed a heavy decrease in April but remained higher than at the same time for two years past.

Pig iron production continues moderate compared with ingot output; prices are decidedly low.

Finished steel prices are almost in line with the general level of commodity prices and no early change is indicated.

IT may be said that the most notable general development in the iron and steel industry is the negative one that the industry is not gaining in activity or prosperity. Prices are rather weak. If industries in general were expanding and prosperity were on the increase, the upward trend would probably be reflected in growing activity in iron and steel and strong prices for those products. The absence of this condition is an unfavorable indication.

Ingot Production Above Requirements

AS nearly as it can be measured the position of the steel industry at the beginning of May can be summed up as follows:

(1) Steel ingot production showed an average rate about 19 per cent above normal.

(2) The production of steel ingots was in excess of the indicated current requirements of the chief consuming industries.

(3) Production had increased over the March rate, in spite of the fact that there is usually a seasonal decline in April—in short, the *trend* was upward.

(4) The trend of the unfilled orders of the Steel Corporation was downward, which presumably represents the situation in general.

(5) The volume of unfilled orders, after making due allowance for the merely seasonal changes, was 89 per cent of the average for the years 1923-1927.

(6) The average price of finished steel was holding barely steady, the April average, according to THE IRON AGE composite index, being 2.359c. against 2.361c. in March. It compares with 2.360c. a year ago.

This list of facts can hardly be called "bullish" as regards the outlook for the industry during the next few months. If we make allowance for the slow normal growth in the country's requirements, the production of steel ingots is found to have been the highest last month that has existed since the middle of 1923. *It represented an annual rate which the experience of recent years shows cannot be long maintained.* However conditions may seem, the cold statistical facts indicate that steel production is excessive.

This is the clearer in that the high production is not warranted by the volume of forward buying. There was a decrease of 463,000 tons in the unfilled orders of the Steel Corporation, substantiated by trade reports of a decreasing volume of new business. This indicates that current activity in steel making must be justified, if at all, by current requirements of steel-consuming industries. But in our analysis of demand last week reasons were presented for believing that such requirements are likely to decline, if they are not already pointed downward.

The trend of steel prices is certainly not upward. The response to the gain in unfilled orders during the first few months of the year was very limited and it may even be doubted if the price concessions that have been made have not quite counterbalanced most of the small advance.

Steel production will probably hold large through May—perhaps even through June—but under the foregoing circumstances a fairly sharp and prolonged decline seems probable thereafter. Steel prices can hardly advance. At the same time, they can hardly decline much from such a low level as now exists. It seems probable, therefore, that there will be approximate stability for another month or two.

Pig Iron Output Low in Relation to Steel

PRODUCTION of pig iron continues very moderate compared with the steel output. In April the daily average was about 106,000 tons, against 103,200 tons

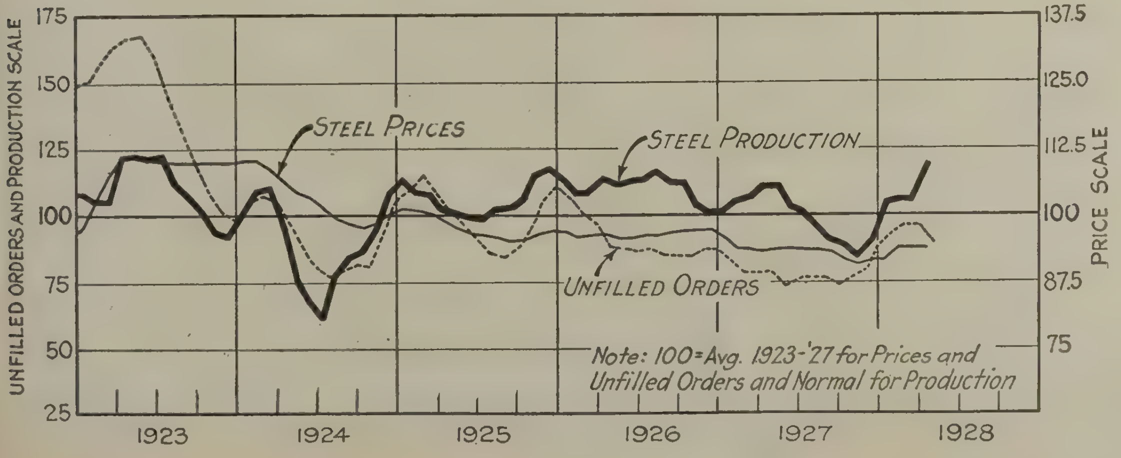


Fig. 1—Steel Production Appears to Be Well Above Normal Requirements. Prices have held fairly steady. Unfilled orders are much lower, showing declining demand

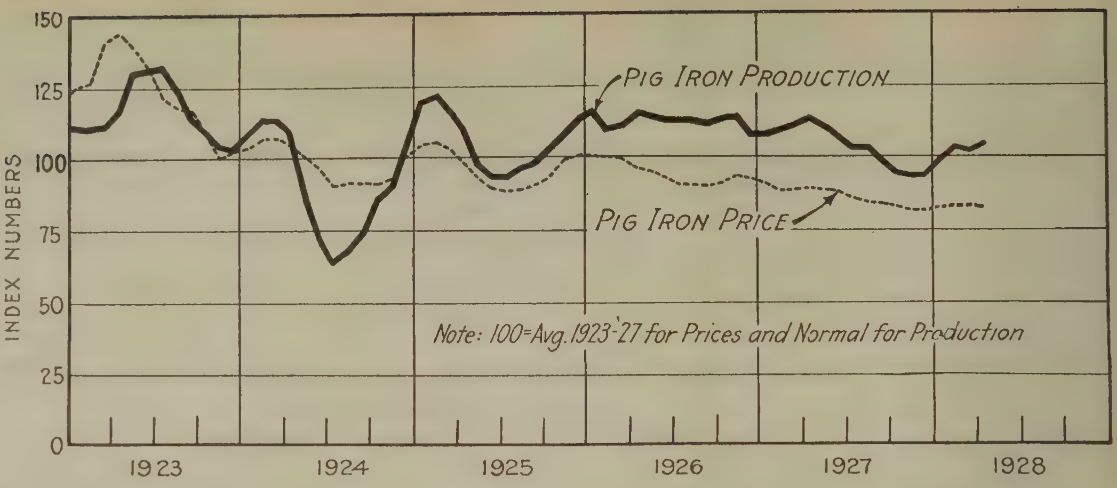


Fig. 2—Firmness in Pig Iron Prices Would Be Logical, with Pig Iron Output So Low Relatively to Steel. Pig iron today is decidedly cheap

in March. This is only 5 per cent above our estimate of the normal trend of pig iron production. Usually little change occurs in the average daily figure between March and April—if anything, a slight reduction being common. The April increase in production, therefore, represents a real upward trend, bringing our adjusted index to 105 against 102.1 in the preceding month. A year ago, however, the index was 113.9. Though so much below April, 1927, the pig iron output last month was at the highest annual rate, allowing for the small seasonal changes from month to month, that has appeared since last June.

Yet the April iron output was small compared with the steel figure, which, it will be remembered, showed an index of 119. The ratio of pig iron production to steel production, allowing for their respective normal trends, is the lowest found since 1922. In fact, if we are to assume any justification for the present level of steel production, it is hard to see why the pig iron output may not be called low and equally difficult to understand why pig iron prices should be so weak.

None the less, pig iron prices have continued to decline. The April average was $17.67, which compares with $17.73 in March and $19.21 last year. At the present writing THE IRON AGE composite index is $17.42, which is the lowest in a good many years. Pig iron is decidedly cheap. Perhaps there are two possible explanations for this condition. It may be that the steel situation is not so strong as the current high rate of ingot production would suggest—that the decline in new business and the weakness in steel prices is reflected in the price of the raw material. Or it may be that the pig iron market is particularly influenced by competition, including foreign competition.

In any event, it must be admitted that the trend of pig iron prices casts a rather unfavorable light on the present condition of industry in general. That prices of this basic commodity are so weak, in spite of so moderate a level of production, is a sad commentary on demand. Possibly it indicates the existence of considerable stocks of pig iron remaining over from the second half of 1927, when pig iron output was excessive in comparison with steel making. In our opinion, the normal thing would be to find greater strength develop in the pig iron market in the near future. If such a development does not occur, that fact will be good evidence of fundamental weakness in the industry. It is significant that there has yet appeared no sign of strength. Even a 12-month moving average of pig iron prices continues to show a declining trend.

Steel About on Par with General Prices

COMPARED with the general level of commodity prices, the average of finished steel appears to be quite reasonable. As measured by the Bradstreet index, the curve of commodity prices shown in the third chart is very close to the steel price curve and the two are running nearly parallel, with steel prices only a little below their average relationship to the general level. There is thus no indication given by this chart of any considerable early change in steel prices.

The most pronounced change shown in the chart is the rise in heavy melting scrap at Pittsburgh. This material averaged $15.31 in April, against $14.81 in March. At this writing the price is $15.50. Nevertheless, we do not think that this temporary strength in the scrap market can be maintained. The decline in unfilled steel orders is significant in this connection. Also there is the relative cheapness of pig iron. The ratio of steel production to pig iron production is quite high, considering the level of steel prices, which is a condition that generally precedes a weakening in the scrap market. Finally, scrap is not particularly cheap in comparison with finished steel. Apparently there has been some covering of short sales made by scrap dealers, and this has affected the Pittsburgh market temporarily. A good many other markets show no strength.

In the case of finished steel, the weakness in sheets, strips and nails is noteworthy. Rarely is there such a decline in sheets and nails without weakness develop-

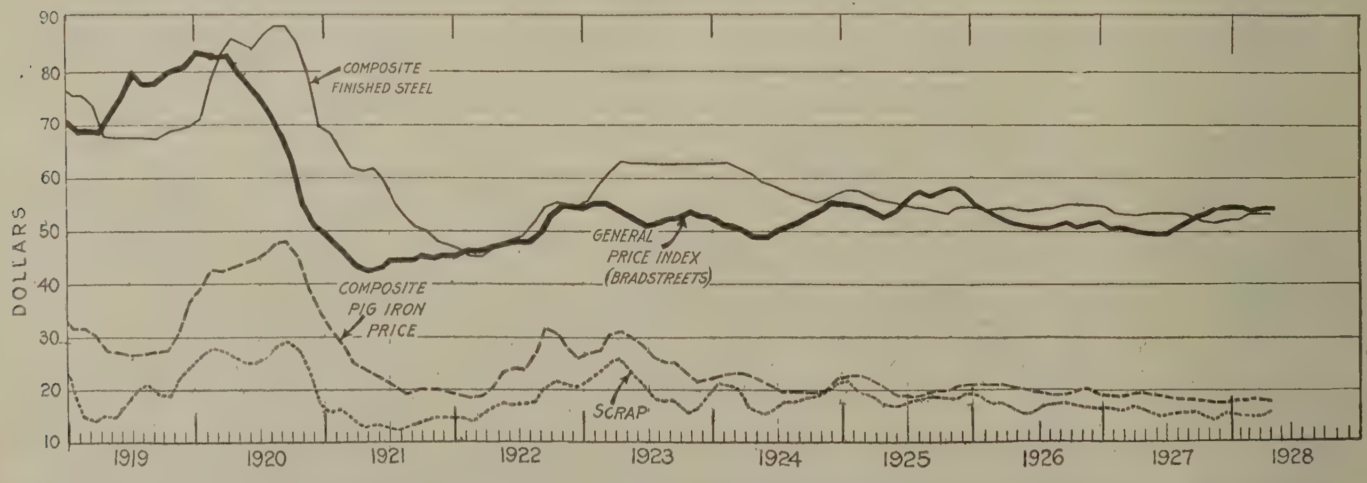


Fig. 3—Commodity Prices Have Been About on a Level With Finished Steel for Some Time. Finished steel price declines recently have been moderate. Pig iron prices may be unable to move upward so long as fuels and scrap remain low

ing also in steel bars. Billets, too, are likely to be affected unfavorably, and it seems that sheet bars can hardly escape the effect of the reduced demand and lower prices for sheets. It thus seems probable that, sooner or later during the next few months, price concessions on steel products will become more general, and that quoted prices when next tested by any large volume of buying will show declines.

Eastern Steel Foundries Form Research Group

Realizing the importance of organized research work and in order to cooperate more closely with users of steel castings, a group of prominent eastern foundries has recently formed an association known as The Steel Castings Development Bureau, with offices in the Stock Exchange Building, Philadelphia. George Batty, a practical foundryman and metallurgist of many years' experience, has been appointed research director, and he will be assisted by J. V. McCrae, who, for some time, has been working as a research associate of the United States Bureau of Standards, Washington. The following are active members of the new organization:

Atlantic Steel Casting Co., Chester, Pa.
Crucible Steel Casting Co., Lansdowne, Pa.
Deemer Steel Casting Co., Newcastle, Del.
Dodge Steel Co., Tacony, Pa.
Empire Steel Casting Co., Reading, Pa.
Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa.
Pennsylvania Electro Steel Casting Co., Hamburg, Pa.
Riverside Steel Casting Co., Newark, N. J.
Treadwell Engineering Co., Easton, Pa.

The bureau comprises manufacturers of steel by the open-hearth, converter and electric furnace processes, each having its own particular application in the steel foundry field.

Practical research work is already in progress on improvements in the process of manufacture, greater efficiency, and better castings; on possibilities in the use of alloy steel castings; heat treatment, resulting in improvement of physical properties, and general betterment of quality. Arrangements are also being made whereby users or probable users of steel castings can consult with the technical advisors of the bureau on any problems relating to the use or application of castings.

The research director, George Batty, will be available at the bureau's office for personal consultation on Fridays and Saturdays, and correspondence at any time is invited. The hearty cooperation and active help of the Bureau of Standards, Washington, has been secured and arrangements have been made, through the courtesy of the Bureau, for the group to have a permanent research associate stationed in Washington, where the full facilities of the Government's unique scientific appliances will be available.

New Export Machinery Company

To aid American machinery manufacturers in the development of foreign markets, Paul H. Peterson, Inc., has been established with offices in the Graybar Building, New York. Through contact with dealers and distributers in foreign countries, the company will act as representative of American machinery builders, furnishing, when necessary, the finances to meet demands for long-term credits.

The new company will specialize in machine tools, railroad equipment, road building, textile, laundry, baking, shoe and sugar machinery and electric and hydraulic equipment. Paul H. Peterson, president, is an engineer, and was formerly export manager for Joseph T. Ryerson & Son, Inc., Chicago.

$12,000,000 FOR EXPANSION

Canadian Steel Company Plans to Develop Michipicoten Mines—Bounty and Higher Tariff Expected

The Lake Superior Corporation, Sault Ste. Marie, Ont., expects to spend approximately $12,000,000 in the next two or three years, according to Robert Dodd, president of the corporation. The conversion of Michipicoten Harbor into a large coal distributing port by the building of coal docks, from which coal arriving by water can be distributed both east and west, and the building of a smelter at Michipicoten, were announced as part of the building program of the next two years. Other construction work will include the erection of a benzol plant, a skelp mill and a sheet mill. Construction work on the benzol plant will be started within two weeks, and the outlay will be approximately $500,000. On improving the Michipicoten Harbor and erecting docks $5,000,000 will be spent.

To fully complete the program the corporation has in view, Mr. Dodd said, some concessions were expected from the Canadian Government in the way of a better tariff and an iron ore bounty. One hundred million tons of ore have been blocked out at Michipicoten. At present it costs $1 a ton more to treat the Michipicoten ore than is the case with the United States product, hence a large ore treatment plant will have to be built, and a fleet of vessels will be required to handle the Michipicoten business. Mr. Dodd further stated that $5,500,000 will be spent on improvements and enlargements to the rail mill and merchant mills of the Algoma Steel Corporation.

"Everything will develop gradually," Mr. Dodd said. "If we get a tariff half as large as that enjoyed by the United States steel interests, we will have 10,000 people employed at the Soo within the next five or six years. Just now we are operating some of our branches at a loss, and others at a very small profit. We must get into competition with American steel, and just now we are endeavoring to hold our business until we can do so. We are losing money on merchant bars, alloy bars and splice bars, and are about breaking even on pig iron. The profits on rails are not large. The lack of a proper tariff is ruining the Canadian steel industry. A readjustment of the Canadian steel trade is coming within the next five years; commodities will be made where they can be manufactured the cheapest."

Bethlehem Steel Co. Producing 33-In. Beams and Girders

The Bethlehem Steel Co. has added to its line of wide-flanged structural shapes a series of 33-in. beams and girders, said to be the deepest sections ever rolled in the United States. The beams are available in four weights, ranging from 125 to 152 lb. per ft., and with section moduli respectively of from 394.3 to 478.4. The girders also are being rolled in four weights, of from 202 to 230 lb. per ft., and with section moduli respectively of from 676.0 to 778.0. These sections are designed to afford the maximum strength per pound of metal. They have the same contour as other Bethlehem sections.

The first of an eight-unit steam station on the Catawba River in Gaston County, N. C., has been started by the Duke Power Co. When completed, the station will be the largest in the Southeastern part of the United States. Each unit will develop 75,000 hp. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will furnish for the first unit two steam turbo-generators.

*Schedule of the next instalments of the **Business Analysis and Forecast**, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: **June 14**—Activity in Steel Consuming Industries; **June 21**—Position of Iron and Steel Producers.*

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This Issue in Brief

Obtains better castings by molding with the heavier section at the top, instead of at the bottom. Appropriate gating is used so that the light sections at the bottom will be properly filled.—Page 1450.

Initiate your foremen into the mysteries of overhead and thereby cut your costs. Automotive equipment manufacturer gives foremen in both productive and non-productive departments a daily statement of items of controllable burden and labor expenditures. A bonus is paid for maintaining expense at a minimum.—Page 1445.

Pearlitic iron is over-rated, British foundry authority believes. Pearlite alone is no criterion of the suitability of the iron, he says. It is perfectly possible to obtain excellent pearlitic iron, and equally possible to obtain pearlitic iron poor in quality.—Page 1451.

Plug mill superior to Pilger mill in making seamless tubes, say equipment builders. Plug mill's output is two or three times higher; quality of product is better; equipment costs less, and maintenance costs are lower, they declare.—Page 1466.

Keeping labor contented depends largely upon the foreman. Correct leadership is the most important factor in low labor turnover. Workers want to be treated as human beings. Most so-called personnel work consists of frills and is ineffective, says personnel manager.—Page 1459.

Foundry authorities differ on value of test bars. They reveal what the casting will be, J. W. Bolton contends. Not so, says Doctor Moldenke, for cooling rate of the metal is an important factor.—Page 1451.

Scrap losses in malleable foundry cut almost in half by supervisory system. Each supervisor has about 18 molders under him. Every day each molder's output is counted, and defective castings inspected and classified. At the end of the week any molder or pattern with a bad record is discussed at the Saturday meeting of foremen.—Page 1458.

Paying a bonus on percentage of good castings cut down production, so this foundry installed a better system. Now, molders are paid piece work rates, plus a bonus for production. An extra bonus is paid monthly for the number of good castings made. Average must be at least 91 per cent to earn the extra bonus.—Page 1458.

To improve your cupola operation, measure your air by *weight* rather than by volume, says equipment builder. Weight of a cubic foot of air changes with temperature, and therefore blowers should be operated to delivers constant weight rather than constant volume. Too much air retards the melting operation.—Page 1452.

Mill supply houses' average distribution cost is 22.54 per cent. Their average net profit is only 0.5 per cent. To help raise this figure they want manufacturers to fix consumers' resale prices. Turnover has risen gradually and is now 4.13 times annually.—Page 1470.

Very existence is threatened, say Valley iron and steel producers, unless river transportation is made available. They urge Commerce Commission to permit P. L. & W. Railroad to build extensions down to Ohio River, to widen markets for Ohio Valley steel and to lower freight rates on incoming coal. Trunk line railroads fight the proposal.—Page 1473.

Sand reclaiming unit more than pays for itself in one month. It cost $3,000, and is saving steel foundry $3,500 a month, reducing new sand consumption from 1200 lb. to 300 lb. per ton of good castings.—Page 1453.

Molding sand's latent strength value is brought out by mulling, says metallurgist. Heavier mulling rolls give better distribution of clay, increase strength, and also break down the grain clusters.—Page 1456.

Don't permit salesmen to make prices. Distributers of mill supplies urge that selling prices be determined by a responsible executive in the house, and that cost figures be kept from salesmen.—Page 1470.

Condemns practice of selling castings by weight schedule. Knowledge of manufacturing costs will eliminate the schedule system, says foundryman. If the purchaser insists upon buying by weight rather than by units, quote a cost per ton *for that particular pattern only.*—Page 1458.

Fight to regain share of Pacific Coast business. Middle Western producers want rail rates cut, so that they may regain Coast business lost to Eastern producers when the Panama Canal was opened. Illinois Central Railroad is agreeable to reduction, and proposes to join with a steamship line, so that shipments may be made by way of New Orleans. Eastern producers offer spirited opposition.—Page 1475.

Doctor Haney sees no early change in finished steel prices. They are almost in line with the general level of commodity prices, and can hardly advance. Nor can they decline much from such a low level as now exists.—Page 1481.

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Schwab and Baldwin Are Right

SPEAKING in London last week Premier Baldwin dwelt on a note which Mr. Schwab had struck with force in his acceptance of the Bessemer medal at the hands of the Iron and Steel Institute a fortnight before. The great steel industry, with its immeasurable contribution to human progress in every land, with its long roll of triumphs in mechanical and metallurgical invention, is wrestling with poor success with the problem of winning an adequate return on its capital.

Mr. Baldwin, it need not be said, had the more doleful tale to tell. For himself, he had to say that for the vast investment he had made in the iron and steel properties of Baldwins, Limited, which are outstanding in the British industry, he had today only a penny for every shilling he had put in. Mr. Schwab, repeating in effect what he told the American Iron and Steel Institute last October, said that the great aim of the future, for steel producers, would be not the perfecting of costs of manufacture but of methods of distributing the steel so as to get a better price.

We draw attention now to these utterances of two men who are in the forefront in steel in Britain and America, to emphasize again what was said in an IRON AGE editorial of April 19 of the need of more and better publicity for steel. Premier Baldwin, with even an American sense of the remedy to which British steel makers must turn, said this:

> It does look as though business and industry are groping toward a position in which businesses making the same kinds of goods will have to combine, at least for the purpose of pushing and advertising those goods and bringing new orders home. They are trying to do it in the coal trade. They will doubtless have a try at it in the steel trade.

At one and the same time steel producers on both sides of the water are seeing that if their industry is to make any real headway it must adopt marketing methods that will be as much ahead of the old as its production methods are ahead of those of 25 years ago. There is no real salesmanship in getting an order by the brute argument of a lower price than a competitor made. Too long has the idea survived that steel is just steel, in the way that "pigs is pigs." The public, that has so much of its life tied up with things made from steel, that is moving every day in a world built of steel, eating nothing and wearing nothing that does not require equipment made from iron or steel for its production or transportation, must not go on believing that the industry to which it owes so much cannot win a fair reward for its unparalleled labors.

Steel makers should do much more to glorify their product and their service to modern life. The very psychology of all such effort would be of vast help in displacing the thought now uppermost in the public mind that the chief characteristic of steel today is its low and unprofitable price.

We firmly believe that President Schwab could raise no more enduring monument to his administration than by leading the American Iron and Steel Institute in this campaign to put steel in the high place which it has every right to hold in American life.

Publicity Works for Both Old and New

ATTENDANTS at the foundrymen's convention in Philadelphia last week had differing views of the outlook for the industry. One quoted Census statistics showing a consistent gain in the number of workers and the value of output. A. F. Jensen of Hanna Engineering Co., Chicago, speaking on behalf of the Foundry Equipment Manufacturers' Association, said that, while steel and malleable production per capita of population had increased largely in 25 years, gray iron founding had decreased 14 per cent in the same period. Apparently one's opinion depends upon the point of view; on whether the industry as a whole is visualized; whether one section appears to be backward; whether other groups are over-expanded; whether selling prices are low and return on investment unsatisfactory.

This condition within the foundry trade strikes such a parallel to that in the whole steel industry that Mr. Jensen's analysis of the conditions and recommendations of remedies may be applied to the broader field. He says that those business groups which have studied their fields intensively, adopted a sound merchandising plan and backed it with correct publicity, have been the ones to get a goodly share of the profitable business. But it is essential to know the field, know the product, and tell the world about it.

This matter of publicity will bear more emphasis. It has helped establish so many new things in the market. Yet seldom does any one think it may be used effectively to retain the market position of the old favorites. Refrigeration is a case in point. Where would Frigidaire, G. E., Kelvinator and the other refrigerating units be if their manufacturers had not taken pains to tell the world about the new idea? The ice men were first amused, then interested; and now, worried, they are campaigning (with publicity as a principal weapon) to impress the public with the obvious fact that a block of ice never gets out of order, and it doesn't cost very much.

In this age of rapid changes and easy money, a novelty is quickly seized upon. The old fashioned is readily replaced. New products, new uses, new operations are widely discussed and get much attention because of the novelty. In the competition between metals, iron and steel has suffered at the hands of aluminum. Aluminum—the "metal from clay"—and its many light strong alloys, is always interesting. Any one would read or listen to the story of making a railroad car of aluminum. Making it of steel is an old, outworn tale. Yet it is very important that railroad men especially and the public generally be reminded frequently that *steel* is the material from which railroad cars are being built; steel in passenger coaches has saved thousands of travelers' lives; steel in freight cars has handled America's trade.

Sound publicity about steel and iron is needed by all branches of the industry, and by the industry as a whole. Some few branches have made a start, are pointing the way. A broader, more intensive effort is necessary. Sound publicity includes not only the dissemination of information about the new uses for steel and iron but participation in society and trade meetings where competing materials are likely to be discussed. Parallel data should be presented by competent persons to show comparative qualities of the old reliable materials. Conferences, lecturers and data sheets for engineering and technical colleges, for trade and manual training schools, are of greatest importance in teaching the coming generation about the excellencies of steel and iron.

These are a few of the things included in publicity, as well as an effort to feed out through every available channel appropriate, well written and attractive matter about the strength, reliability, and honorable history of iron and steel—iron, the most important material underlying our present mechanical civilization.

This is a big job—too big for anything but the united effort of the entire industry.

IT might well have been stressed at the reunion of the charter members of the American Foundrymen's Association at Philadelphia last week that the association has been peculiarly fortunate in its secretaries. John A. Penton, the first of the four, was a master promoter and organizer. Then came Dr. Richard Moldenke, master technician, who in his 14 years made the A. F. A. influential at home and throughout the foundry world of Europe. A. O. Backert, whose untimely death was widely lamented, showed himself a master builder whose boundless energy and unflagging industry were always at the association's command. And now for a decade C. E. Hoyt, master manager and developer, conserving all that his predecessors had wrought, has been opening up new fields, bringing the association to an eminence beyond the liveliest imaginings of the founders.

Automobile Demand in Future

A FEW years ago it was merely a pastime to attempt to guess the future of automobile demand. Now, with an accumulation of annual statistics of production and registration, and a reasonable assumption as to the cars scrapped, there is some definite light. Considering only the statistics of production, an editorial in THE IRON AGE of April 26, 1928, concluded that "the figures suggest that large gains in automobile production disappeared quite a while ago."

The complication produced by the cessation of Ford production was largely eliminated by comparing production in twelvemonth periods ended March 31 instead of Dec. 31. The largest twelvemonth was that ended March 31, 1926.

Now we have a very interesting table for study in "Facts and Figures," 1928 edition, just published by the National Automobile Chamber of Commerce, page 24. This covers passenger cars and trucks for the United States. Production is given, exports deducted, and the United States market thus ascertained. Then registration is given, and finally there is a computation of the number scrapped.

These columns of figures, 1913 to 1927 inclusive, increase in quite different ways. They all move more by geometrical than arithmetical progression. In percentage, production increased rapidly, but registration still more rapidly, as cars were piling up, so to speak, while scrapping increased still more rapidly, because there were more and more cars to wear out. Taking 1919 and 1926 as convenient years for the illustration, production increased 112 per cent, registration 190 per cent and scrapping 346 per cent.

The "Facts and Figures" table is accompanied by a diagram, which shows average car life to have been about five years in the early period, to have increased to seven years afterward, and to have remained at just seven years for about five years past. On an average cars pass through two or three ownerships and it is hard to believe that the average life will remain at only seven years.

To avoid being misled by figures, on the geometrical scale, going up faster in registrations than in production, and faster still in scrapping, we make another computation, which shows a slow increase, the percentage scrapped in a given year to the production of that year, thus:

Cars and Trucks Scrapped in Percentage of Production

	Per Cent		Per Cent
1920	17.4	1924	34.6
1921	32.6	1925	43.5
1922	34.3	1926	46.9
1923	22.9	1927	68.1

The last named figure is not significant, as the scrapping had to be one-half estimated, while the number was put in relation to a light production.

With the percentage failing to increase sharply of late, the stimulus to production fails to increase as formerly. These geometrical progressions, so impressive for years, have really disappeared long enough ago for the disappearance to be visible in the statistics if sufficient study is made. The question is whether there will be even much arithmetical increase in production after the probable large Model T mortality has been offset.

Capital In Carrying Stocks

COMMENT on the large amount of brokers' loans used in the carrying of securities has been chiefly to the effect that the amount is excessive and something ought to be done about it. Last week's report (on Wednesday) showed that these loans amounted to four and a half billion dollars, and then on Thursday the New York Federal Reserve Bank raised its rediscount rate from 4 to 4½ per cent.

The phenomenon is worthy of consideration from another standpoint, that of capital. Margins are large, and assuming for convenience that they are one-third, we have two and a quarter billions involved in margins, or a total of six and three-quarter billions. Whether or not the share market has a big slump, the four and a half billions of capital will be intact. As to the other two and a quarter billions, it is capital now and may remain as such. The holders on margin expect to do one of two things—either to sell out to others, who thereupon would be investing capital, or gradually to pay off the loans so as to be outright owners of the shares. In either case the existence or creation of additional capital is presupposed.

Then there are our loans abroad, constantly growing and presumed to represent investment of capital newly created. Like the brokers' loans, they have been widely criticized, and in both cases the inference is clear that the capital goes where it does because it has less inducement to go elsewhere. Capital has been in process of creation in excess of the requirements of commerce as commerce has lately been conducted.

In the past, advances in the share market have run into scarcity of loanable capital, whereupon it appeared that the needs of commerce called for the available capital. We seem to have before us a situation in which the pressure will be in the opposite direction, capital calling upon commerce to expand to provide a use for it, instead of an expansion in commerce calling for capital to come out of the stock market.

That commerce as a whole does need a stimulus has been obvious. By growing efficiency in the old lines of manufacture and service, labor has been released and new lines of activity are needed. In the past as such things came out they sought capital. The tendency now is for capital to seek them.

The human element is not to be disregarded. Many observers claim that people have been speculating because it was easier, and seemed more profitable, than productive work. They may find it is better to work. That will be the case if share values continue advancing, for dividends as a rule are not increasing and yields accordingly would decrease. With more disposition on the part of such people to work, and with capital calling for new work to be done, there are auguries for commercial expansion in the next few years. By no means, of course, is this the whole story, or the greater part of it, but these clear points may be set against such auguries as are considered unfavorable.

CORRESPONDENCE

"Too Many Engineers?"

To the Editor: I regard the editorial under the above title in THE IRON AGE of May 17 as the ablest presentation and analysis of this very debatable question I have ever read. I believe a great deal of the difficulty lies with the technical universities, in that they regard engineering as the alpha and omega of the careers of all the students they graduate. If they would more frankly expound the idea that engineering is one of the best stepping stones to higher executive positions, we would not have the unfortunate situation of men hesitating to accept opportunities with greater possibilities, merely because it means scrapping the direct application of their detailed engineering education which they have been taught to value so highly.

Engineering principles and methods of reasoning and analysis, rather than detailed application of formulas and rules, are the real heritage of an engineering education. If the universities will thus amend their attitude, the graduation of engineers into higher executive positions not directly concerned with engineering will be tabulated as a gain rather than a loss in statistics regarding former students.

It is unfortunate that practically all engineering societies are more concerned with the advancement of the technical knowledge of their profession rather than with the financial advancement of their members. To say that any concerted effort to better the financial rewards of engineers is unprofessional, as some societies do, puts their officers in an embarrassing light, in that the eminent engineers who head these societies are by virtue of their own standing the very men who are likely to be the direct employers of the junior engineers who seek this financial advancement. It is much better to correlate this "proper reward for services rendered" program with the professional program of the existing engineering societies than to permit it to organize as a separate movement with increased remuneration as its sole objective.

If this situation is forced upon the rank and file of engineers, such an independent movement may unfortunately pattern itself too closely after labor union organizations. If, however, it is sincerely fostered by the engineering societies now in existence, it will not be likely to be conducted in an unprofessional or unethical manner, or be overemphasized, but will be a coordinated part of a real engineering program.

JOHN F. HARDECKER.

Philadelphia, May 18.

A Compelling Reason for Larger Use of Structural Steel

To the Editor: Your editorial on "Over-Capacity and Competition" is a pleasing contrast to the usual articles of pure economists, who apparently assume that the supply and demand can be represented by two tanks partly filled with water which can be equalized by simply turning off a valve.

You make the point more clearly than I have ever seen it stated elsewhere that capitalization of enterprise must be kept going and that the economic corrective is delayed on that account and it is this continued excess capacity that is the most serious element of the situation.

The one additional step that can be taken by an industry finding itself in an over-capacity situation is to increase the use of its products, a point which has been emphasized many times by THE IRON AGE.

Recently in our own structural shop I saw some large 14-in. rolled H columns weighing about 300 lb. per lineal ft. with flanges 2¼ in. thick being fabricated in lengths of 70 ft. without a splice. Prior to the use of this rolled H section it was the practice to order a 14-in. web plate, four flange angles and four 14-in. cover plates, each of which had to be punched and painted and finally assembled and riveted to give the same final section that we now get in a rolled shape from the mill. This is a fair sample of increased capacity in fabricating shops that has developed almost unconsciously, and the only solution is a larger use of structural steel such as you have long advocated.

H. H. COSLEY,
Contracting Engineer
Mississippi Valley Structural Steel Co.

Chicago, May 15.

Mechanization of Industry Has Helped Social Life

Magnus W. Alexander Tells National Industrial Conference Board That Our Progress Has Been Other Than Economic—America's Position in World Finance

AMERICA has been leading the world in the intensive mechanization of industry and its national prosperity is due in large measure to that circumstance, declared Magnus W. Alexander, president National Industrial Conference Board, when he addressed the members of the Conference Board at its twelfth annual meeting at the Hotel Astor, New York, last week. The great increase in national income and wealth in recent years, the high wage levels and particularly the high purchasing power of American wages he attributed to standardized, highly mechanized production, emphasizing that the substitution of power and machines for hand labor, far from reducing employment, in the long run increases the opportunities for employment.

Great significance was attached by Mr. Alexander to the beneficial effects of the mechanization of industry upon social life. The resulting economic gain, which has made it possible to combine a high wage level with relatively low price levels, he declared, accounts for high standards of living and shorter working hours. The resultant high wage earnings and increased leisure, he pointed out, enable the American wage earner to devote more time to cultural pursuits than workmen in most other countries are able to do. Mechanized industry's increasing demand for men and women with more knowledge and training and the correlative desire for more education among all classes, he declared, is not only developing a new type of workers, but also tends to evolve a more homogeneous population. Even the content of the immigration stream during recent years, he pointed out, reflected the greater demand in the United States for persons with professional training, while there had been a marked falling off in the influx of common labor.

Mr. Alexander deplored the wide publicity given to unemployment estimates during recent months. Asserting that the wide discrepancy of various estimates, ranging from less than 2,000,000 to 8,000,000 unemployed persons, in itself was evidence of the unreliability of estimates of unemployment and of the inadequacy of the available statistical material for such calculations, he warned against accepting as fact pure assumptions, the propagation of which is exerting a definitely deterrent influence on business progress.

America's Position in World Finance

Discussing the bearing of the international creditor position of the United States upon American industry and trade, Virgil Jordan, chief economist of the Conference Board, said that "in view of the vast responsibilities which rest upon the United States in international finance and trade, it is not safe or wise to rely altogether upon one or the other of the conflicting answers which economic theory gives to the difficult questions of the future, or upon the naive hopefulness that everything will come out right in the end. It has been wisely said that the best road to bankruptcy is a good tip and a fat pocketbook, and both of these the United States has in abundance today.

"Being the world's greatest creditor nation involves a great deal of hard work and constant worry, some of which is done for us by the Government, but most of which necessarily falls upon private citizens and groups of citizens of many different kinds. This does not mean that we are doomed to work like the devil to collect our foreign debts or to worry about how they will be paid back. Only very naive people trouble themselves about things like that, for of course these debts will never literally be paid back. They are not debts or loans but investments, and even in the case of war loans and reparations, the problem that faces us is not how to collect them but how to scale them down so that they can safely be absorbed by private investors and converted into sound public investments. They will be funded and refunded and spread over the investing public of the world, but no one wants them paid back 'til Judgment Day, when it will no longer matter whether they are or not.

"All that we are interested in is the stability of their value and their yield; and this means simply that we are interested in the business operations of which they are the basis. The so-called creditor position of the United States means simply that we have engaged on a large scale in foreign enterprise. Being the largest creditor nation implies the obligations and responsibilities of running the largest international business, which is the most difficult kind of business to conduct successfully. Historical precedent and current opinion are not reliable guides in a situation so new, vast and complex as that which now faces us. We shall have to approach these problems with an open mind and with a desire to know fully the facts, conditions and tendencies as they exist. Above all, we must be on our guard against the uplifting sentimentality about the duties and responsibilities of the United States in relation to the welfare of the rest of the world, an attitude which is widely prevalent today in America in connection with these questions."

Overhauling of Anti-Trust Laws May Be Demanded

Diminishing profits and the increasing difficulty of many small and medium-sized manufacturers and distributers to maintain themselves, in the face of the mass production and the mass distribution of their stronger competitors, are developing a feeling of unrest that politically may translate itself into a concerted demand for overhauling all of our present anti-trust laws, according to Gilbert H. Montague, member of the New York bar, who addressed the Conference Board. He said:

"Prosperity, so long as it continued at high tide, temporarily took the anti-trust laws out of politics, and kept them out of politics longer than anyone could have anticipated, but disappearing profits on the part of a growing number of small and medium-sized manufacturers and distributers, and increasing clamorous criticisms on the part of a growing number of particular groups and interests, may soon bring the anti-trust laws back into politics again."

Considerable Obsolete Machinery Still in Use

In spite of the rapid and radical progress made particularly during the past decade in automatic machinery, which has helped to reduce production costs in many instances to a fraction of what it is when obsolete machinery is used, approximately 44 per cent of machine equipment used in the metal-working field today is more than 10 years old, declared K. H. Condit, editor of the *American Machinist*. Labor saving machinery, Mr. Condit said, will return its purchase price in from five years to as many weeks and sometimes less, yet many makers of such machinery find it difficult to make profits.

Iron and Steel Markets

Steel Production Tapering

Mill Operations in Greater Pittsburgh District Decline to 75 Per Cent—Valley Basic and Bessemer Pig Iron Drop 50c.

MILL operations are tapering, but the gradual character of the decline is testimony to the large volume of steel passing directly into consumption. With prices no longer buoyant, consumers are ordering sparingly and, in some instances, are delaying purchases in the hope of buying more advantageously later. This spirit of caution is reflected not only in new business, but in a reduction in the average size of individual specifications. Shipping orders in the aggregate, however, show surprisingly little change.

Steel output in the Greater Pittsburgh district has dipped to 75 per cent, compared with a recent rate of 80 per cent of capacity. At Chicago, where production has been holding at 95 per cent, there has been virtually no curtailment to date. Average operations of Steel Corporation subsidiaries are now placed at 85 per cent, a decline of three or four points in the past week.

The volume of tonnage still reaching the mills is all the more impressive when the uneven tendencies of consumption are considered. Makers of wire products are feeling the overstocked condition of jobbers, particularly in nails. Business in steel pipe is making a poor showing compared with recent years. The decline in demand for oil country pipe is marked, even in comparison with last year, when first quarter shipments satisfied most of the first half requirements. Railroad equipment orders are disappointing, and the consumption of hot-rolled bars by makers of cold-finished bars and bolts, nuts and rivets has declined, bolt and nut output being 10 per cent lower than a month ago.

On the other hand, tin plate demand remains active, supporting mill operations well above 90 per cent of capacity. Specifications for automobile steel are undiminished and, with the exception of one or two companies, there has been no slowing down in motor car output. Ford's bar requirements now exceed the capacity of his own mill, and an increasing tonnage is being bought in the open market. At Chicago new business in soft steel bars is equal to shipments and alloy steel bar mills are running at capacity.

Specifications for automobile body sheets remain heavy. Some interruption in the flow of steel to motor car plants is expected, however, in about 30 days, when new models will be brought out.

The structural steel outlook continues good, although awards of fabricated work for the week were light. At New York fully 90,000 tons of new work will come up for bids before mid-summer, and at Chicago 50,000 tons for a single project will probably be placed by the middle of June.

Prices of finished steel, in view of the small amount of new business, show little change. Recent minimum prices on black and blue annealed sheets are becoming more general, and galvanized sheets have dropped another $1 a ton to 3.55c., Pittsburgh. On 6 to 12-in. hot-rolled strip 1.75c., Pittsburgh, or $1 a ton under the recent base, is more commonly quoted.

Alloy steel bar mills have increased the differential on Series 3200 nickel chromium steel bars $7 a ton. The advance represents a readjustment to bring a particular grade more nearly in line with other grades.

Prices of primary materials continue to give ground. Basic and Bessemer pig iron have declined 50c. a ton in the Valleys and Cleveland malleable and foundry grades have receded 25c. to 50c. for delivery to competitive districts. The Michigan market on foundry and malleable iron, which has held at $18 a ton, furnace, for some time, is now represented by a range of $17.50 to $18. At Pittsburgh heavy steel scrap has dropped 50c. a ton.

The Virginian Railway has bought 1000 hopper car bodies, and the Erie Railroad has ordered 35 locomotives. The Wheeling & Lake Erie has placed a supplementary order for 1000 tons of rails, and a Western road has bought 4000 tons. Rail mills at Chicago continue to operate at 90 per cent, but diminishing backlogs point to an early curtailment.

Merchant producers of pig iron are encountering increasing competition from steel company furnaces as steel output tapers. Weakness in scrap prices, by stimulating the use of old material in open-hearth furnaces, has also released more steel works pig iron for the open market. The drop of 50c. a ton on basic and Bessemer pig iron in the Valleys brings these grades to the lowest levels since the fall of 1915. The reduction in Valley basic was brought out by a 25,000-ton inquiry from a steel company.

At Chicago, pending third quarter business in foundry iron totals 30,000 tons, and smaller amounts are under consideration at other points. The pig iron situation in the Chicago district is being watched anxiously, following the arrival of cargoes of hematite iron from England and foundry iron from Lake Erie ports.

Bookings of fabricated structural steel fell off in April from March in the ratio of 69 per cent of capacity for March to 63 per cent for April. Fabricated steel plate work, on the other hand, bulking roughly one-fourth the volume of fabricated structural steel, showed an increase from 57 per cent of capacity in March to nearly 61 per cent in April.

For the third successive week THE IRON AGE pig iron composite price has reached a new low level. It is now $17.34 a ton, the lowest figure since 1915. Finished steel remains for a third week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 22, 1928	May 15, 1928	Apr. 24, 1928	May 24, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.19	19.19	19.69	21.69
No. 2, Birmingham	15.50	15.50	16.00	18.00
No. 2 foundry, Chicago*	18.00	18.00	18.50	20.00
Basic, del'd eastern Pa	19.00	19.00	19.50	20.75
Basic, Valley furnace	*16.00*	16.50	17.00	18.00
Valley Bessemer, del'd P'gh	*18.76*	19.26	19.26	20.76
Malleable, Chicago*	18.00	18.00	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	100.00	95.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	33.50
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 22, 1928 Cents	May 15, 1928 Cents	Apr. 24, 1928 Cents	May 24, 1927 Cents
Sheets, black, No. 24, P'gh	2.70	2.70	2.75	2.90
Sheets, black, No. 24, Chicago dist. mill	2.80	2.80	2.85	3.10
Sheets, galv., No. 24, P'gh.	*3.55*	3.60	3.65	3.75
Sheets, galv. No. 24, Chicago dist. mill	3.70	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh.	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.15	2.35
Wire nails, Pittsburgh	2.55	2.55	2.65	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$15.00*	$15.50	$15.25	$15.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	13.00	13.00	13.00	12.25
Carwheels, Chicago	13.50	13.50	13.50	13.75
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.50
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	15.50
No. 1 RR. wrot, Phila.	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	11.75	11.75	11.50	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2,60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.62½**	14.37½	14.25	12.87½
Electrolytic copper, refinery	**14.25**	14.12½	14.12½	12.43
Zinc, St. Louis	**6.15**	6.05	5.82½	6.07½
Zinc, New York	**6.50**	6.40	6.17½	6.42½
Lead, St. Louis	*5.97½*	6.00	6.00	6.15
Lead, New York	6.10	6.10	6.10	6.50
Tin (Straits), New York	*51.50*	52.50	52.62½	67.75
Antimony (Asiatic), N. Y.	*11.00*	11.25	10.12½	13.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Basic and Bessemer Pig Iron 50c. Lower —Steel Output Tapers Slightly

PITTSBURGH, May 22.—Not much change is noted in the aggregate rate at which steel orders and specifications are coming to local manufacturers, as a slowing up in the demand for some products is quite fully compensated by gains in others. Wire products are not doing nearly as well this month as they did last month, but it is quite uniformly reported by strip makers that this month's business is running about 10 per cent ahead that of last month. The past week's releases against orders for bars, plates and shapes ran a little ahead of those of the week before. Tin plate is holding to a high rate of production and movement, but pipe business, although enjoying occasional spurts, appears to be gradually decreasing in volume. The automobile steels still are doing well, car builders being rather anxious to obtain shipments to complete production schedules on present models and get ready for the new series, which will begin to reach the market in the next 60 days. But whether it is automobile steel or steel for other uses, the tonnage moving is chiefly against old orders.

As strictly new steel business is very light, order books have dwindled to a point where some curtailment of ingot production has been found necessary. The average this week for this and nearby districts is closer to 75 per cent than to 80 per cent, the rate of a week ago.

Steel prices show no particular change, inquiries being too few and small to furnish real tests. Pig iron prices, however, have yielded, for which merchant producers are inclined to blame the steel makers, who have been consuming iron rather sparingly, using scrap freely, thus having rather sizable surplus supplies of iron which they have been forcing on the market.

Pig Iron.—The Valley-Pittsburgh market clearly is weaker and 50c. per ton lower on the steel-making grades. On the large basic iron inquiry which appeared about 10 days ago, $16, Valley furnace, has been quoted, a drop of 50c. a ton from the recent nominal quotation. Incidentally, that price was not interesting to the company seeking the iron, as it has an even lower delivered price than $16 at any of the Valley furnaces would mean. Moreover, a Pittsburgh district steel maker has bought within the week a good-sized lot of this grade at close to $17, delivered, and the iron carries a freight rate that will mean a price at the furnace, from which it is believed the iron is coming, of about $15.25. Bessemer iron is offered at $17, Valley furnace, also a drop of 50c. a ton from its recent price, which, while still being quoted, is sustained only by carload lots. Foundry and malleable grades are holding at recent prices, being somewhat freer of steel company competition than is true of the steel-making grades. Steel company production of pig iron is large by comparison with consumption. The pig iron market also is affected by the weakness of scrap prices, which stimulates the use of old material and makes steel company pig iron available for the market. Except for the activity in basic iron, the business again in the past week has been chiefly for one and two carload lots. The Richmond Radiator Co., Uniontown, Pa., is in the market for 5000 tons of foundry iron for third quarter shipment.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.00
Bessemer	$17.00 to 17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—British makers of ferromanganese appear to have written a good deal of business for delivery during this quarter prior to the recent advance to $105, and with consumers generally well covered at the old price to the end of July and able to enter specifications for August shipment at $100, there has been no urge to sign second half contracts. Except for steady deliveries on contracts, there is little of interest in the other commonly used ferroalloys.

Fluorspar.—Although the price of gravel spar is higher at mines than it was earlier in the year, the delivered price in this district is substantially the same. The company which has obtained most of the recent business is shipping it by river barge, the rate being $3 a ton, against $5.25 per ton by rail. It is estimated that close to 10,000 tons has been booked in this district and will move by river to destinations, the sales including one of 3700 tons. This company now is quoting $16.25 on barge, the price including a handling charge of 25c. a ton. Companies obliged to ship by rail would have to make a price of $14, mines, to match a barge delivered price of $19.25.

Semi-Finished Steel.—Makers of sheet bars here and in Youngstown are making an effort to establish firmly a price of $34 on contracts; while that price has long been the open quotation, producers were not always rigid in their insistence upon the full amount. Most companies making sheet bars for sale also roll sheets and the firmer stand on sheet bars is believed to be prompted by the desire to stop the decline in the latter. There is only moderate activity in sheet bars, but rolling mills are specifying rather well for billets and slabs. Skelp is also moving steadily on contracts. The prevailing price on wire rods is $42, base Pittsburgh, although a good many contracts have been written at $44, base, and there is some specifying against contracts for high carbon and acid open-hearth rods carrying the latter base.

Bars, Plates and Shapes.—Releases against old orders are making a creditable showing in the aggregate, but new business is not equaling completed orders. Backlogs, principally of bookings made late in March, are dwindling. It requires sales effort to bring in specifications as well as new business, because consuming demands are not as large now as they were earlier in the month. Bars are affected by the recession in bolt, nut and rivet business and in the demand for cold-finished bars. Plate tonnage is not heavy and fabricated steel inquiries, though fairly numerous, are small individually and in the aggregate. In the territory dominated by Pittsburgh district mills through favorable freight rates, the market is firm at 1.85c., base Pittsburgh, on these products.

Rails and Track Supplies.—Steady deliveries on old orders do not help the outlook much, since there is a dearth of new buying. Inquiries for light-section rails are usually for single carloads. The market for small spikes still waits on some definite improvement in coal mine operations. Prices are steady.

Wire Products.—Makers still find business slow, although there is some evidence of a larger movement into consumption. Scarcely enough business is being quoted on to establish prices definitely, but the larger manufacturers continue to regard the market as $2.65, base, per keg, Pittsburgh, for nails and $2.50, base, per 100 lb. on plain wire. However, the report continues, nails can be bought at $2.55, base; seemingly, some makers are content with that price plus the new card of extras, which produces a price of $2.77½ per keg for 20 to 60 pennyweight nails, making allowance for the 10 per cent discount on the extras for carload lots.

Tubular Goods.—Pipe business is running behind the volume at this time last year and is making a rather poor showing compared with the average of the past few years to this date. Standard-weight pipe is going out fairly steadily, but there is not much activity in line pipe, and there are suggestions that the demand for gas does not indicate the need of the laying of some of the long lines that have been talked of for some time. The deficiency in oil country pipe business, even compared with that of a year ago, is fairly marked, and it will be recalled that last year the first quarter shipments proved sufficient for most of the first half's requirements. A revision of lapwelded steel boiler tube prices is in the making.

Sheets.—Automobile body sheets still are moving actively, but there seems to be some doubt that the demand will continue much longer at the present rate, since the releases now are against present series models and new models of most cars are due to appear in the next 60 days. While the new cars will call for the ordering of sheets, a gap in specifications usually occurs when the engineers make their last minute changes in designs. Metal furniture sheets are doing well. The ordinary finishes are slow. The flexibility in prices has not stimulated buying. The market on galvanized sheets is very weak. Those for uses other than roofing and siding can be fairly quoted at 3.60c. to 3.65c., base Pittsburgh, but lower figures are coming out on roofing and siding sheets, particularly in the South, where exists the largest market for them.

Tin Plate.—Makers are well satisfied with the way contracts are being specified. That releases are large is indicated by the fact that mill operations of leading producers are well above 90 per cent of capacity. Counting in its Pittsburgh works, which probably will not be operated again, the American Sheet & Tin Plate Co. is running at 91 per cent of capacity.

Cold-Finished Steel Bars and Shafting.—Orders are

THE IRON AGE Composite Prices

Finished Steel

May 22, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.355c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 22, 1928, $17.34 a Gross Ton

One week ago	$17.42
One month ago	17.67
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.34,	May 22
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.25c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.90c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	3.02c. to 3.12c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.55c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.80c.
No. 24, del'd Cleveland	3.64c. to 3.69c.
No. 24, del'd Philadelphia	3.87c. to 3.97c.
No. 24, f.o.b. Birmingham	3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
	Chromium Nickel Vanadium	1.50	4.15
	Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, $\frac{9}{16}$ in. and larger	$2.80
Spikes ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	28	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	28	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

numerous, but are usually for small lots. The volume is not as large as it was a month ago. Some pressure is being exerted against prices, but does not appear to have brought about any marked weakening.

Hot-Rolled Flats.—Very narrow strips and hoops and bands hold well at 2.20c., base, and the market is fairly steady on strips from 3 in. to 6 in. in width. In wider material, prices show irregularity, owing to competition from sheets and plates. Specifications generally are well up to the April rate, and with some companies they are exceeding those of a month ago by as much as 10 per cent. Strictly new business is moderate.

Cold-Rolled Strips.—New business is light, but buyers are taking shipments freely on old orders. Prices are steady, but the absence of large new business precludes a real test.

Bolts, Nuts and Rivets.—Some makers having a considerable share of railroad business are doing well, but the industry as a whole averages at least 10 per cent less active this month than last month. Prices are steady.

Coke and Coal.—No material change in general market conditions is noted. The demand for spot tonnages of both furnace and foundry coke is limited and the principal outlet for furnace grade is still to water gas plants. Foundries are getting ample supplies in shipments against contracts. Some tendency is noted to scale down coke production in preparation for a larger demand for coal. The Baltimore & Ohio Railroad has not followed the Pennsylvania and New York Central in reducing rates on coal for the Lake trade, and as a number of industrial consumers along the Lake front will not benefit from the reduction, which is to apply only on Northwestern shipments, there is some doubt that the Interstate Commerce Commission will approve it. However, if it does it would sustain a former decision establishing a differential of 45c. per ton between rates from Southern and Northern mines. The matter is before the commission and a decision is yet to be made. Meanwhile, there is not much Lake business, and demands from other directions are light. If much Lake business develops, it probably would mean a firmer coke market, since the coal prices, which are expected to run from $1.65 to $1.75, at mines, would be much more profitable than coke at its present prices.

Old Material.—A recession in consuming demand and smaller interest in the market by dealers have weakened the steel works grades, heavy melting steel being down 50c. a ton from its range of a week ago. Dealers are picking up tonnage for one or two points at as low as $14.50 and the market is quotable up to $15.50 for strictly No. 1 railroad steel. Prices have receded rather sharply on steel foundry grades, demand for which is extremely limited on account of a low rate of operations of such foundries. Blast furnace scrap also has given ground, as have also machine shop turnings.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.50
Scrap rails	15.00 to 15.50
Compressed sheet steel	14.75 to 15.00
Bundled sheets, sides and ends	13.75 to 14.00
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.75 to 11.00
Cast iron borings	10.75 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 12.00
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	16.00 to 16.50
Malleable Grades:	
Railroad	15.00 to 15.50
Industrial	14.50 to 15.00
Agricultural	14.00 to 14.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

New Vanadium-Titanium Pig Iron

A vanadium-titanium pig iron made in Norway from ore containing the vanadium and titanium has been put on the market in this country by Rogers Brown & Crocker Brothers, New York, who have been appointed exclusive agents in the United States and Canada. The iron is made in electric furnaces, using Norwegian charcoal as a reducing agent. Production is by the Bremanger Kraftselskap (Bremanger Power Co.), Bergen, and the Christiania Spikerverk (Christiania Nail Works), Oslo, associated companies. The latter has an annual capacity of 2000 tons, and the former, after July 1, will be able to make 20,000 tons a year.

The standard analysis of the pig iron is as follows: Carbon, about 4 per cent; phosphorus, 0.025 per cent maximum; sulphur, a maximum of 0.025 per cent; silicon, 0.5 to 2.0 per cent, as desired; manganese, a maximum of 0.2 per cent; vanadium, a minimum of 0.5 per cent; titanium, about 0.5 per cent. The sulphur content can be reduced to 0.015 per cent, if stipulated.

Ordinarily vanadium acts as a "scavenger" and only a fraction is left in the metal for alloying effect, but in this instance, it is said, the titanium acts as the scavenger and the vanadium content is left virtually intact. At the same time the loss in titanium is only 20 per cent, it is stated. The titanium is also recommended for its graphitizing effect, acting in the same manner as silicon, only in a greater degree.

The iron is said to be particularly effective, when added to the cupola mixture, in making cylinders and other castings exposed to wear. It is also recommended for the manufacture of tool steels and other alloy steels, particularly by the crucible process. Good results are said to accrue from use of the iron in making malleable iron and electric steel castings. The pig iron is offered at $40 per ton, duty paid, Atlantic ports.

The Fort Worth Structural Steel Co. has been established at Fort Worth, Tex. It has taken over by lease the structural steel and tank department of the Fort Worth Steel & Machinery Co., but there is no financial connection between the two companies. J. H. Brillhart is president and general manager, C. H. Brillhart, vice-president, C. A. Fischer, treasurer and G. A. Brightwell, secretary.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.05 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex, head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Demand Tapering Gradually—30,000 Tons of Pig Iron for Third Quarter on Inquiry

CHICAGO, May 22.—The Chicago district steel market, though giving definite signs of tapering to summer output and demand, is nevertheless undergoing this change gradually and at a much slower pace than has been the experience of mills in recent years.

The leading producer, having made a week ago a switch in furnaces at South Chicago and at Gary, has actually increased pig iron output for the reason that the blast furnace added at Gary is of larger capacity than the one put out at South Works. Ingot production, while now a shade below 95 per cent of capacity, is holding remarkably steady in view of the fact that rail mill schedules are expected momentarily to taper.

The possibility of a sustained demand for structural shapes is indicated by unusual activity on the part of architects and the well scattered and large aggregate tonnage that is actually on inquiry. The site is being cleared for the Mercantile Mart, and it now seems probable that the 50,000 tons or more of steel that will be required may be purchased by the middle of June. The development of air rights over the Randolph Street terminal of the Illinois Central is being considered.

Water shipments of steel to Chicago are assuming larger proportions and give promise of being a definite factor in this market during the open season of navigation.

The price situation remains unchanged except for a more clearly defined weakness in wire nails. In heavy tonnage products, quotations on narrow plates show the least stability.

Pig Iron.—This week has marked the arrival at Chicago of about 2000 tons of English hematite iron for delivery to a Milwaukee melter. A cargo of Northern iron has arrived at Milwaukee from a Lake Erie port. The trade is anxiously watching the effect of the new $18 price at Chicago on the movement of iron from Lake furnaces by boat. Several cargoes are under contract and are expected to arrive here early in June. Shipments from local furnaces are steady, but sales are confined to spot business, which in the aggregate is not heavy. On the other hand, the outlook is favorable because not less than 30,000 tons for third quarter and last half delivery is being openly asked for. One user will take 5000 tons of malleable iron. Like tonnages of Northern foundry iron are being sought by two other foundries. Miscellaneous lots of charcoal iron are moving at the full prices. Several small inquiries are out for low phosphorus iron.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	21.51
Southern No. 2 (barge and rail)	20.68
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The advance of $5 a ton on ferromanganese has not brought out business, as had been expected by some. It is clearly indicated that many users will exercise first half contracts to lay in a supply which will carry well into the second half. Several inquiries for 200 to 300 tons each of spiegeleisen are before the trade.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—It is reported that a Western producer has obtained the contract for pipe for a gas line that will extend from the Southwest into Kansas City, but financial arrangements have not been completed and the 100,000 tons of plates required has not been inquire for. Two orders for tank plates totaling 2500 ton have been placed by two Texas oil producers. Inquir is small, but steel producers are led to believe tha additional business will come out soon. Chicago district plate mills are engaged at not far from capacit in practically all sizes up to the extreme widths. I some quarters it is believed that new railroad busines is developing. Some car inquiry, it is said, is waitin only on official sanction. In the meantime, howeve Western car builders continue to reduce their orde books and it is not improbable that curtailment of sho operations will be necessary before new business get under way, even if orders are placed in the next fe weeks. Specifications to mills from car builders ar in fair volume, and there still remains a moderat amount of steel to be ordered against car contract that have been taken in recent weeks. Prices for plate in the immediate Chicago territory are moderatel steady at 2c., Chicago, the greatest unevenness appearing on scattered sales in narrow widths.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material. — Miscellaneous structura awards in the week total about 5500 tons. Individual orders are not large. Going business is much t the liking of some fabricators, who are in need of sma work to fill in shop schedules for economical operatio The American Bridge Co. has taken 950 tons for building for the Crane Co., Chicago, and the Wisconsi Bridge Co., Milwaukee, has been awarded 600 tons fo a school at Fond Du Lac, Wis. Previous bids on th Austin High School, Chicago, which requires close t 3500 tons, were thrown out, and it was disclosed i opening the new bids that the Great Lakes Constructio Co., Chicago, is low. Bids on the restoration of th Fine Arts Building, Jackson Park, Chicago, have over run estimates by $500,000. The South Park Commissioners have not made public the course that will no be taken. Prominent among new inquiries are 160 tons for an office building in Chicago, a like tonnag for a theater in San Antonio, Tex., and 800 tons fo the Delco-Remy Corporation, Anderson, Ind. Prices fo structural material remain unchanged at 2c., Chicag except where producers are influenced to make lowe quotations on specific projects.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Rails and Track Supplies.—A Western railroad ha ordered 4000 tons of standard-section rails for deliver in the early summer months. Inquiry is small. Miscellaneous orders for track supplies total 3000 tons, an only a small amount of business is before the trade A few carlot orders for light rails have been placed Although the aggregate tonnage is not large, it is th heaviest for any like period in several months. Ra mills are operating at close to 90 per cent of capacit this week, but shipping instructions and order book are such that output will begin to taper at an earl date. Track accessory departments are busy an changes in tonnage produced will lag a measurabl time behind the cut in rail mill output. The iron ti plate market is quiet.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—The only new order of note thi week was placed by St. Clair Shores, Mich. This business, which went to the National Cast Iron Pipe Co called for 19 miles of 6 and 8-in. centrifugal pipe. Contractors in the immediate Chicago territory are busy but on pipe that was ordered some time ago and whic has been on the ground awaiting favorable weathe New orders from that source are close to the low poin in two years and this situation is causing some concern to pipe sellers, who sense a condition wherein it i not improbable that subdivision and suburban work having been rushed for many months, is now actuall ahead of demand. It is believed that pipe laying programs will be curtailed for some time to come, that i until the growth in population more than makes use o the pipe that is already in the ground. Orders by th railroads are small and little new tonnage is comin from public utilities, which in many instances have already placed contracts for the pipe needed in thei spring and summer programs. With pipe foundries working on an average of a single 8-hr. turn, deliveries are about 30 days in most sizes. Foundry stocks of cast iron pipe are reported as not being overly large for this time of the year. Prices for going tonnages are steady at $31 to $33, Birmingham, for 6-in. and larger diameters.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

Sheets.—Lack of orders has forced Chicago hot mills to cut operations to 50 per cent of capacity. Summer weather, of which several days already have been experienced, is now close at hand and will have its usual bearing on the willingness and ability of labor to produce sheet products. In some respects sellers are reconciled to small orders at this time of the year, for they point to the fact that the period from May 15 to June 15 or a little later is normally a low point in purchases of sheets in this territory. Sheets are moving out of warehouse in fair tonnage, but stocks have been well built up, and the result is that few orders come from that source to producers. The roofing trade is quiet because of the lack of interest in districts where farmers are busily engaged in the fields. A fair tonnage is still coming from the Northwest, where the season has been backward. Prices, unchanged from a week ago, lack strength.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.95c.; No. 24 galvanized, 3.75c. to 3.85c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bars.—Specifications and also new sales in soft steel bars are on a parity with shipments, as miscellaneous buyers in an ever widening circle continue to find use for large tonnages of this commodity. Judged by orders to Chicago mills, there is little or no change in demand from the automobile trade, although adjustments up or down are going on at individual plants. Ford's requirements have already gone beyond the capacity of his own steel mills and many of his parts makers are free to buy steel in the open market. Alloy steel bars are being shipped at mill capacity, and prices are steady. Backlogs in iron bars are the best in months, but after a short run of heavier specifications there is a lessened demand for shipments. Both specifications and new purchases in rail steel bars have climbed well above the rate of output and Chicago Heights mills have completed a two and a half year period without an interruption in double turn operation. Fence post shipments are heavier. Producers will announce fall terms on this commodity before June 1. Hard steel bars are steady at 1.85c., local mills.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Coke.—Chicago district users of by-product foundry coke are expecting a steady demand. Ovens are all lighted. Prices are firm at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Bolts, Nuts and Rivets.—Specifications for these commodities are measurably lower, though release orders on makers' books are of such size that output remains close to 65 per cent of capacity. Prices for rivets are steady.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Reinforcing Bars.—New business in reinforcing bars is confined almost wholly to a great number of small tonnage sales and inquiries. Heavy tonnage projects are moving slowly, though many of them seem assured. New price schedules are holding. Warehouses are quoting 2.30c. to 3c. on billet stock bars and 2c. to 2.70c. for the rail steel commodity. Warehouse extras are the same for both hard and soft steel bars, being $3 a net ton for trucking, $8 for beam and slab bending, $20 for stirrup and column tie bending and $5 for engineering service. Many small orders are largely responsible for a higher rate of bending shop operations. Books are small, however, and output can be sustained only by a steady flow of new business.

Wire Products.—Little change is noted in this market. Nail business is dull. Sellers are quoting prices on small lots from $2.55 to $2.60, base per keg, Chicago. The overstocked condition of many jobbers is still an unsettling factor throughout this territory. In the larger centers, prices for manufacturers' wire are holding firmly at $2.55, Chicago, but this price has been shaded at St. Paul. On the whole, the volume of business being booked is good for this time of the year and production is at an undiminished rate. Prices for wire and wire products are given on page 1493.

Old Material.—A Chicago steel mill has arranged to take direct from a Milwaukee producer not less than 35,000 tons of heavy melting steel. Purchasers of specialties are insistent on deliveries on old orders, but they are not interested in new purchases. Prices have changed little since a week ago. Some dealers feel that the market has strengthened because certain signs point to a shortage of scrap. However, buyers are taking the opposite viewpoint and are insisting upon, and in most instances are getting, the grades sought. The Rock Island has sold 5000 tons of scrap and the Chicago & Alton will dispose of 1000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	16.75 to 17.25
Railroad leaf springs, cut apart	16.75 to 17.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	6.75 to 7.25
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft	15.25 to 15.75
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Shipments of Steel Fairly Good, but New Orders Are Restricted

PHILADELPHIA, May 22.—A good volume of steel tonnage is being shipped to consumers on second quarter contracts, but new business is decidedly small. As prices show no tendency to advance, hand-to-mouth buying has again set in. Mills are maintaining a fair rate of operation, but current bookings are apparently of insufficient size to assure continuation of the present production schedules. Prices of plates and bars are not strong, but 2c. per lb., Coatesville, on plates and 1.85c., Pittsburgh, on bars are apparently the minimum as well as maximum quotations to consumers in this district. Shape prices show more irregularity than those on other products, and the tendency of fabricated steel prices is still downward.

Automobile body builders, especially manufacturers of commercial bodies, are active consumers of sheets, but the market generally continues unsteady. Eastern Pennsylvania producers of blue annealed sheets are still endeavoring to maintain 2.10c., Pittsburgh, despite a growing volume of sales at 2c. Concessions of $1 a ton from 2.70c., Pittsburgh, on black sheets are appearing on desirable business. The minimum price on galvanized sheets is apparently 3.60c. per lb., Pittsburgh, and this is seldom exceeded, except on less than carload lots.

Ferromanganese.—Consumers are beginning to inquire for small tonnages for third quarter and second half, but contracting is not expected for another week or two. Both domestic producers and importers of ferromanganese are quoting $105 per ton, seaboard.

Billets.—No large buying is reported. Prices are unchanged at $33 per ton for rerolling billets and $38 per ton, Pittsburgh, for forging quality.

Bars.—Except on orders for less than carloads, 1.90c., Pittsburgh, or 2.22c., delivered Philadelphia, has disappeared, and 1.85c., Pittsburgh, or 2.17c., Philadelphia, applies.

Pig Iron.—An increase in the number of foundry iron inquiries is reported, with buyers showing some interest in third quarter requirements. Furnaces are maintaining prices on foundry grade at $20, furnace, which is apparently firm on the small volume of current business. Foundries are operating at a fair rate, and are consuming most of the iron shipped to them on second quarter contracts and have only small stocks of iron on their yards. There is very little inquiry for low phosphorus iron and sales are limited to occasional carloads. Buffalo foundry iron, sold prior to the opening of canal navigation for delivery by water and rail to eastern Pennsylvania consumers, is beginning to arrive, but no new business of consequence is reported for this delivery. Virginia iron prices are unchanged at $20 to $20.50 per ton, furnace, but Virginia cast iron pipe producers are expected to be in the market within the next week to 10 days for 10,000 tons or more of foundry iron, and with Birmingham furnaces quoting $15.50 to $16 per ton, furnace, a reduction by the Virginia interest is expected.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

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*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Shapes.—Based on current quotations of 2c. per lb., Pencoyd, and 2c. per lb., Bethlehem, delivered prices are quotable at 2.06c. to 2.13c. per lb., Philadelphia. While 2.06c., delivered Philadelphia, has been shaded occasionally, such concessions have apparently been granted only on large orders. Current fabricated steel projects are small, and prices show continued weakness. The Phoenix Iron Co. has recently increased its range of sizes to include 6-in. H-beams. Two bridges in Philadelphia will require about 250 tons of steel and an apartment building at Rittenhouse Square calls for 2000 tons.

Old Material.—Prices show a slight tendency toward recession on certain grades of scrap, as reflected by recent purchases. No. 1 blast furnace scrap has been bought at $10.50 per ton, delivered Steelton, Pa., the amount totaling about 2000 tons. A consumer at Phoenixville has paid $11.75 for a fair tonnage of stove plate, and a Harrisburg user of stove plate has bought at $11.50 per ton. No contracts for machine shop turnings are reported, but $10.50 to $10.75 per ton is being paid on current shipments of carload lots to eastern Pennsylvania consumers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)	10.50 to	10.75
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)		10.50
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	11.50 to	12.00
Stove plate (for steel works)	11.50 to	11.75
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
No. 1 blast furnace scrap		10.50
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Steel rails for rolling	14.75 to	15.25
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00

Plates.—The market is fairly firm at 2c. per lb., Coatesville, or 2.10c. per lb., delivered Philadelphia. This price applies even on small tonnages, which represent practically all of current purchases by plate consumers. Mills are still maintaining a fair rate of operation, but new business is small, so that unless there is a good volume of contracting for third quarter some curtailment of present production seems likely. Oil company consumption of plates is reported fairly good. The Baldwin Locomotive Works has received an order from the Erie Railroad for 35 locomotives.

Sheets.—Eastern Pennsylvania producers of blue annealed sheets are still endeavoring to maintain 2.10c. per lb., Pittsburgh, or 2.42c. per lb., delivered Philadelphia. This price still applies on less than carload lots, but 2c. and 2.05c. per lb., Pittsburgh, are commonly quoted on the more desirable tonnages. Black sheets are quiet at 2.70c., Pittsburgh, and 2.65c. is obtainable on desirable specifications. Galvanized sheets are quoted at 3.60c., Pittsburgh.

Warehouse Business.—Jobbers report a fair volume of small orders, which should, at the present rate, bring the total for May well up to the April shipments. Quantity differentials on bars, bar-size shapes, cold finished steel, hoops and bands are now being applied throughout the local warehouse territory and prices apparently are firm.

Imports.—A total of 537 tons of pig iron arrived at this port in the week ended May 19, 497 tons coming from India and 40 tons from Norway. Steel imports consisted of 326 tons of skelp, 155 tons of steel bars, 177 tons of shapes and 63 tons of bands from Belgium, and 42 tons of shapes and 9 tons of bars from France.

New York

Steel Buying at a Slower Pace—Pig Iron Less Active

NEW YORK, May 22.—Pig iron buying dropped sharply during the week, possibly because of the foundry exhibition at Philadelphia, and sales in this district totaled only 7000 tons. A New Jersey company, which was in the market for 1000 to 2000 tons of No. 1X, has bought, but otherwise sizable transactions have been lacking. The Worthington Pump & Machinery Corporation, New York, is inquiring for 125 tons of Bessemer and 225 tons of foundry iron for early delivery at Harrison, N. J. The General Electric Co. is asking for prices on 400 tons of No. 2X for shipment to Schenectady, N. Y. Two New England inquiries call for 1000 tons of foundry each. A buyer in this district has not yet taken action on an inquiry for 2000 tons of malleable. Eastern Pennsylvania producers continue to quote $20, base furnace, on foundry iron without getting much business in this district. Buffalo foundry iron remains unchanged at $16 to $16.50, base furnace, with the occasional waiving of silicon differentials on large purchases. The Standish, N. Y., furnace, which had been expected to blow out, is still in blast.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—Some sellers of ferromanganese report fairly heavy contracting for the second half at the new quotation of $105, seaboard. There have also been some sales of carload and larger lots for delivery before July 1 at the new price. Business in spiegeleisen is confined to frequent orders for carload and small lots, but specifications on contracts are satisfactory. Consumers of ferromanganese are specifying liberally on their first-half contracts and this is also true of ferrosilicon and ferrochromium under contracts made for the year.

Finished Steel.—The tendency in the local steel market is toward a slower pace. Consumers are ordering on a hand-to-mouth basis again whether in the form of specifications against contracts or otherwise. Some buyers who were, for example, taking lots of 100 tons at a time are now ordering in 10-ton lots. In the aggregate, however, business is fairly good, excepting such products as plates, sheets and wire nails. Eastern plate mills have distinctly felt a falling off in business in the last few weeks and their operations are slightly lower. Demand for sheets seems to have declined along with the drop in prices, while the situation in wire nails is that jobbers' stocks are still ample to take care of demands from their trade and not much new business is developing. In nearly all lines individual orders are too small to bring about much of a test of prices. Sheets continue weak, but there have been no further declines. Galvanized sheets are more easily obtainable at 3.55c., Pittsburgh, while most of the business in black sheets is at 2.70c. Blue annealed sheets continue at 2c. to 2.10c., Pittsburgh. Fabricated structural lettings are light, but the amount of work in prospect is constantly growing. An inquiry is out for an office building on John Street calling for 4000 tons. Approximately 90,000 tons is involved in the following projects which will probably be up for bids before mid-summer: Reynolds Building, Forty-second Street and Lexington Avenue, which has been postponed for two months, 17,000 tons; hotel at Lexington Avenue and Forty-eighth Street, 2500 tons; ninth unit of Tudor City, 5000 tons; Tietjens warehouse for Baltimore & Ohio and Lehigh Valley railroads at Eleventh and Thirteenth Avenues and Twenty-sixth and Twenty-seventh Streets, 16,000 tons; building for News Syndicate, Inc., at 216-224 East Forty-second Street, 8000 to 10,000 tons; Western Union Building, 6000 tons; New Yorker Hotel, 9000 tons; Lincoln Building, Madi-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

son Avenue and Forty-second Street, 15,000 tons; loft building for H. Uris at Thirty-eighth Street and Seventh Avenue, 5000 tons. Manhattan Towers Hotel and church at Broadway and Seventy-seventh Street, 2100 tons, and Market Plaza Hotel in Newark, 3000 tons. An apartment hotel at Thirty-ninth Street and Park Avenue has been postponed indefinitely.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Although most producers are only moderately well provided with orders, prices are being maintained with considerable firmness by both Northern and Southern makers. Northern foundries are quoting $38.60 per ton, delivered New York, on the smaller sizes of pipe, while Birmingham makers are maintaining $31 and $33 per ton, base, which with a $9.25 per ton freight rate to New York brings the delivered prices above the market here. Hartford, Conn., opens bids June 4, on about 400 tons of 6 to 16-in. water pipe. Bids have been opened by Belmar, N. J., on a contract including about 700 tons of pipe. A Trenton, N. J., contractor is understood to have been low bidder. There are some export inquiries in the market, one of which calls for about 2300 tons of small sizes for shipment to the Dutch East Indies.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—A building for the New York Dock Co. in Brooklyn will require about 2500 tons of bars; 700 tons will be needed for a section of the subway in that borough. About 500 tons has been placed recently for subway work in Manhattan and a slightly larger tonnage has been let for road work in New Jersey. The somewhat more active market has had little effect on the price situation. Distributers are quoting 2c., Pittsburgh, but 1.95c. is more common on sizable jobs. Warehouse prices are unchanged.

Warehouse Business.—Orders are smaller and less numerous than earlier in the month, and jobbers in this district are beginning to doubt that the total for May will be as large as the April figure. Small concessions are still being offered on black and galvanized sheets, and there are occasional reports of shading of about $1 a ton on structural material.

Coke.—Another special brand of foundry coke has been reduced to a basis of $4.85 per net ton, so that the market on these brands is now $4.85 to $5 per ton, ovens. Only occasional carload lots are being booked for prompt shipment. The New England producer of by-product coke has opened its books for second half, contracting on a basis of price prevailing at time of shipment. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 to $8.71 per net ton; to New York and Brooklyn, $9.44 to $9.49 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, N. J., and from $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—Mixed borings and turnings are being bought by brokers at $10 per ton, delivered Steelton, Pa., on the basis of a recent purchase by a consumer at $10.50 per ton. On old contracts for borings and turnings, $10.50 per ton is still being paid in a few cases. Stove plate for steel mill use is being bought at $11 per ton, delivered to a Harrisburg, Pa., user and at $11.25 per ton, delivered to Phoenixville, Pa. All grades of scrap are lacking in strength, and there is apparently no scarcity of material, even at the present level of the market.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.25 to 7.50
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.25 to 7.25
Short shoveling turnings	6.25 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.25 to 7.25
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.00 to 8.50
Forge fire	6.50 to 6.75
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.85
No. 9 galvanized wire, per 100 lb.	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Cleveland

May Steel Business Holds Up Fairly Well—Sheets Continue Weak

CLEVELAND, May 22.—Specifications for steel bars are coming out in fair volume, largely from the automotive industry, but there is not much new demand and this is limited to small lots for early needs. Structural material is moving fairly well, but plates are very dull. While the market as a whole is not very active, the volume of business in May will show up well as compared with April, when specifications fell off sharply, following the heavy volume of orders late in March against expiring contracts. One large producer reports that its orders so far this month show a gain of more than 50 per cent over the same period in April.

The Otis Steel Co. has taken 1000 tons of plates for 35 Erie Railroad locomotives awarded to the Baldwin Locomotive Works. However, little work is developing in this territory requiring round lots of plates. Some new steel bar business is coming from the Michigan territory, but consumers are not buying very far ahead. Some seem to feel that they may be able to buy at lower prices later.

A small order for steel bars for water shipment to Detroit was taken by a Cleveland mill. With a saving in freight rate, the steel will cost the consumer approximately 2c., delivered, compared with 2.14c. when shipped by rail from a Pittsburgh district mill.

Reports from Detroit indicate that, with only one or two exceptions, there has been no slowing down in the automotive industry.

The Wheeling & Lake Erie Railroad has placed 1000 tons of rails with a Pittsburgh district mill, this order being supplemental to its original order for 1928 requirements.

No deviations are reported from regular quotations of 1.85c., Pittsburgh, for steel bars, plates and structural material and 1.85c., Cleveland mill, for steel bars.

Pig Iron.—The market has a slightly weaker tone on foundry and malleable grades. For shipment in competitive sections, the recent minimum Cleveland furnace quotation of $16.50 is being shaded 25c. a ton and a local producer is reported to have gone as low as $16 on one large lot for the last half. The Michigan market, which has held firmly at $18, furnace, for some time, is now represented by a price range of $17.50 to $18. For Cleveland delivery, $18 is still quoted. Cleveland interests sold 18,000 tons during the week. Not much inquiry is pending, as few consumers are showing an interest in the last half. Among inquiries is one for 1000 tons from an Akron manufacturer of heating equipment. The Corrigan, McKinney Steel Co. placed a furnace in blast May 18 and is now operating all four of its Cleveland stacks. Shipments are holding up to recent volume, but a slowing down in the demand from the automotive industry is looked for shortly.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	$21.50 to 22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	16.00
Standard low phos., Valley furnace	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—There is very little activity in the ore market. Furnaces consumed 4,781,205 tons of Lake ore in April, a decrease of 26,870 tons, compared with March. During April, last year, the consumption was 5,018,834 tons. The amount of ore on hand at furnaces May 1 amounted to 14,387,793 tons. The amount at furnaces and Lake Erie docks on that day was 19,570,181 tons, compared with 20,752,613 tons on the same date a year ago. Central district furnaces consumed 2,364,779 tons last month, an increase of 44,218 tons over April consumption, and Eastern furnaces consumed 76,949 tons, an increase of 2012 tons. Lake front furnaces used 2,220,256 tons, a loss of 68,847 tons, and all-rail furnaces consumed 119,221 tons, a decrease of 4343 tons. On April 31 there were 168 furnaces in blast using Lake ore, a gain of one for the month. The vessel rates for carrying ore prevailing last year have been reestablished for this season. The rates are 70c. a ton from the head of Lake Superior and 63c. from Marquette to Lake Erie and Lake Michigan ports, 52½c. from Escanaba to Lake Erie ports and 42c. from Escanaba to Lake Michigan ports.

Sheets.—The demand for auto body sheets, from the Detroit territory particularly, continues in good volume. While there has been a slowing down in orders from some sources, this seems to have been offset by larger specifications from the Ford Motor Co. In this territory, the demand is rather slow. Some of the mills have specifications to keep them operating at close to capacity for three or four weeks, but others need orders, and there has been some curtailment in operations. Prices continue weak except on auto body sheets, which are holding to 4c., Pittsburgh. While minimum quotations are no lower than during the previous week or two, the lower prices have become more general. Black sheets are being freely offered at 2.65c., Pittsburgh, and 2.70c. to 2.75c., Valley. Blue annealed sheets are commonly quoted at 2c., both Pittsburgh and Valley base. A quotation of 1.90c., Pittsburgh, appears occasionally, but this is evidently for wide material that competes with hot-rolled strip and plates. On galvanized sheets, there are quotations of 3.50c., Pittsburgh, and 3.55c., Valley. One Cleveland jobber has reduced its price to 3.60c., Valley, for car lots.

Strip Steel.—Specifications for hot-rolled strip are fair, but new business is light. The base price is not well defined, as net prices are often being quoted. However, 1.75c., Pittsburgh, appears to be commonly recognized as the base price for material 6 in. to 12 in. and wider. On strip narrower than 6 in., there is a range of from 1.85c. up to 2.10c. On cold-rolled strip, 2.75c., Cleveland, is the ruling price for large lot buyers. Fender stock has settled down to 4.10c., Cleveland.

Reinforcing Bars.—New inquiry is slow. It has developed that the Union Terminals work, Cleveland, for which bids were taken today, will require 1600 to 1700 tons instead of 800 tons as previously reported. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—The demand is slow from all consuming industries. Price concessions appear occasionally on structural shapes, these being attributed to fabricators who are moving surplus stocks. The seasonal demand for galvanized sheets is not up to normal.

Nails and Wire.—Manufacturers' wire is moving well to consumers engaged in automotive work, and the market is firm at 2.50c., Cleveland. Nail specifications continue rather light. The regular $2.65 price is being maintained in the northern Ohio territory for most consumers.

Semi-Finished Steel.—While there has been some talk in the Valley district of an advance of $1 a ton on sheet bars for the third quarter, a local mill continues to quote these at $33, Cleveland. Billets and slabs are the same price. Specifications continue heavy, but there is little new business.

Alloy Steel.—Makers have advanced series 3200 nickel chromium steel $7 a ton to 4c. per lb. by increasing the differential on the grade from 1c. to 1.35c. The price of this grade was 4.75c. before the adoption a few weeks ago of the new method of quoting prices with a base and a differential, and it is claimed that the 3.65c. net price that has been prevailing since the revision was out of line with the prices on other grades. Orders from the autmotive industry continue at about the recent volume.

Bolts, Nuts and Rivets.—The demand for bolts and nuts from the automotive industry is holding up well and considerable business is coming in for oil tank work. The demand is only slightly below that during April. Rivets are in light demand and manufacturers are unable to accumulate a backlog. Current orders are scarce. Prices are well maintained on both lines of products.

Coke.—New demand is very light. Shipments on contracts are only fair. The present price of $7.75, f.o.b. Painesville, for Ohio by-product foundry coke probably will be named for June shipments. Connellsville foundry coke ranges from $3.85 to $4.85 for standard brands.

Old Material.—A Cleveland mill has purchased 15,000 tons of scrap, including heavy melting steel and blast furnace grades, paying about the prices that have been prevailing recently. Dealers are paying $13 and $12.50 respectively for Nos. 1 and 2 heavy melting steel to fill their new orders from this mill. Blast furnace scrap is weaker. Considerable tonnage has been placed by dealers at $9.10 to $9.35, although this material in some cases is still bringing $9.50. No. 1 cast scrap is 25c. a ton lower.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.00 to	$13.25
No. 2 heavy melting steel	12.50 to	12.75
Compressed sheet steel	12.50 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	11.50 to	11.75
Machine shop turnings	7.00 to	7.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	9.15 to	9.35
Mixed borings and short turnings	9.15 to	9.35
No. 2 busheling	9.15 to	9.35
Cupola Grades		
No. 1 cast	16.25 to	16.75
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Exports and Imports Continue at High Daily Rate

WASHINGTON, May 22.—Exports of iron and steel products from the United States in April totaled 215,184 gross tons, a decrease of 6750 tons from March, and imports aggregated 72,329 tons, a decline of 1799 tons from the preceding month, according to preliminary figures of the iron and steel division, Department of Commerce. The average daily export total for April, however, was 7173 tons, as against 7159 tons in March, while the average daily import movement in April was 2411 tons, as compared with 2391 tons in March.

The principal products exported, in point of tonnage, were scrap, 40,616 tons; heavy rails, 23,513 tons; tin plate, 19,809 tons; and plain shapes, 13,653 tons. The largest imports were pig iron, 20,845 tons; shapes, 16,577 tons; cast iron pipe, 6566 tons; and "other" pipe, 6211 tons, consisting chiefly of seamless tubes.

San Francisco

Sheet Prices Reduced $3 a Ton—Structural Awards 1500 Tons

SAN FRANCISCO, May 19 (*By Air Mail*).—Buying of iron and steel products during the past week was by no means heavy, most consumers ordering only for their immediate needs. Structural shapes were again the most active product, though awards did not exceed 1500 tons. Included among lettings were 600 tons of shapes for the Smith River bridge in California, placed with the Virginia Bridge & Iron Co., and 445 tons of plates for a pipe line at Monrovia, Cal., secured by the Western Pipe & Steel Co. Sheet prices were reduced $3 a ton this week.

Eugene G. Grace, president Bethlehem Steel Corporation, has been on the Coast for the past 10 days and among other things that he has taken under consideration is the advisability of establishing steel warehouses in Los Angeles, San Francisco, Portland and Seattle. The leading interest for some years has maintained large stocks at San Francisco, Los Angeles and Seattle.

Pig Iron.—Sales of foundry iron were confined to small lots. Inquiry is negligible. Foundry operations, especially among the jobbing class, have shown little or no improvement. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars totaled less than 1300 tons, the largest booking being secured by the Northwest Steel Rolling Mills and calling for 1000 tons for the Peck & Hills Furniture Co. warehouse in Seattle. Distributers report a fair volume of small-sized inquiries, but few large lots are up for figures. Approximately 1500 tons is involved in the Wildcat and Sequoia aqueducts at Oakland and will be purchased by the Lock Joint Pipe Co. of Ampere, N. J., general contractor. The price situation in the bay district continues unsettled, and lower than 2c. on out-of-stock material is being quoted in many instances.

Plates.—Coast plate fabricators have received two severe setbacks during the past 10 days. The aqueducts in Oakland for the East Bay Municipal Utility, which would have required more than 8000 tons of plates had steel pipe been purchased, will be built of reinforced concrete, and the city of Tacoma just placed an order with the Western Concrete Pipe Co. for 54 and 66-in. pipe, alternate bids having been taken on riveted steel pipe involving 1600 tons of material. The Moore Dry Dock Co. took 250 tons for a dredger for the Harbor Commission at San Francisco, the Birchfield Boiler Co. secured 115 tons for 48-in. pipe for Tacoma and the Pittsburgh-Des Moines Steel Co. booked 445 tons for the Horseshoe and Morrison Canyon siphons of the Yakima project in Washington. Pending business includes two car floats, one for the Santa Fe and the other for the Western Pacific, each requiring 700 tons. In addition, 1500 tons of No. 14 gage blue annealed sheets for the steel lining of the Wildcat and Sequoia aqueducts are pending. Prices remain firm at 2.30c., c.i.f.

Shapes.—Structural bookings totaled less than 1500 tons. Inquiries include 300 tons for an office building at Long Beach, Cal., and 200 tons for a school warehouse in San Francisco. Working drawings on a large number of office buildings and apartments in Los Angeles and San Francisco are being prepared.

Warehouse Prices f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Cast Iron Pipe.—Several fair-sized cast iron pipe awards were reported this week. The United States Cast Iron Pipe & Foundry Co. booked 1050 tons of 4 to 12-in. class B pipe for Monrovia, Cal. Livingston, Cal., placed 275 tons of 2 to 10-in. class 150 pipe with James Currie, Burlingame, Cal. Pasadena, Cal., placed 333 tons as follows: to the National Cast Iron Pipe Co., 182 tons of 8-in., class 150, and to the Pacific States Cast Iron Pipe Co. 151 tons of 6-in., class 350. Inquiries consist of 634 tons of 4 to 10-in. class B or centrifugal pipe for the Monte Vista (Cal.) County Water District, 127 tons of 4 and 6-in. class B for Redwood City, Cal., bids on which open May 21, and 229 tons of 4 to 10-in. class B for Inglewood, Cal., bids May 21. Prices continue around $35 to $36 a ton, delivered, on 6-in. and larger.

Standard Pipe.—Demand for standard tubular products and oil country goods is quiet, especially so for this time of the year. Few inquiries for line pipe are before the trade for figures. The Standard Oil Co., San Francisco, has recently come into the market for a number of small lots of standard pipe, but individual inquiries have seldom exceeded 50 or 60 tons. The Grinnell Co. secured 625 tons of 6-in. seamless pipe for the city of Los Angeles, quoting 55.88c. per ft. The Ducommun Corporation, Los Angeles, was low on 193 tons of ½ to 4-in. standard pipe. The Monte Vista County Water District, Cal., is taking bids on several hundred tons of 2 to 10-in. lapweld and standard pipe, the principal item being 78,000 ft. of 2-in. standard.

Sheets.—Prices have lost some of their recent strength, and 4.25c., 3.45c. and 2.62c., c.i.f., are now being quoted respectively on No. 24 gage galvanized, No. 24 gage black and No. 10 blue annealed sheets. The previous levels were $3 a ton higher. Demand has improved somewhat but consumers continue to order in small lots.

Birmingham

Pig Iron Shipments Improve—Steel Buying Continues in Good Volume

BIRMINGHAM, May 22.—Shipments of pig iron have increased. Two producers are now shipping more than their make, while in the case of a third shipments are keeping pace with production. May production to date is approximately the same as for the corresponding period in April. From the standpoint of new business, the pig iron market is no more active than it has been in the last few weeks. Soil pipe makers are expected to come into the market in two or three weeks. For this immediate district, quotations on foundry iron remain at $16, base, and furnace interests are confident of a steady market for the remainder of the quarter. Eighteen furnaces remain in blast, 11 on foundry iron, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$15.50 to $16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.00 to 16.50
Basic	15.00

Finished Steel.—Consumers showed more tendency toward closing contracts during the past week, and sales in several lines were slightly in excess of those of the preceding week. No change is seen in the volume of inquiries. The market for sheets is still dull. Supplemental tonnage on railroad accessories is playing a large part in maintaining the volume of new business. The Ingall Iron Works Co. has an order for 1500 tons of fabricated structural steel for a new textile plant at Waycross, Ga. Structural steel fabricators and bar manufacturers report business dull. Open-hearth operations are the same as for the past four weeks; the Tennessee company is operating seven at Ensley and four at Fairfield, and the Gulf States Steel Co. has four on at Alabama City.

Cast Iron Pipe.—Pressure pipe buying during the past week dropped back to a nominal amount of small-order business. Inquiries on important municipal tonnage are developing from time to time. Plants are operating at about 80 per cent capacity, and shipments are in keeping with production. In some instances pipe has been moved from stock. The base prices of $31 to $33 show a tendency toward firmness.

Coke.—The lack of demand is attributed to seasonal dullness and previous bookings by important consumers. Shipments against contracts are fair. Quotations remain at $5.

Old Material—Following the recent reduction of prices on several lines, a somewhat improved demand is noticeable. New business is confined to small orders. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.00 to $9.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.50 to 8.00
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.25
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

St. Louis

Pig Iron Weakened by Reduction at Chicago—Steel Operations High

ST. LOUIS, May 22.—The reduction of 50c. a ton on Northern pig iron made by Chicago interests to meet the competition of Lake Erie iron has caused a weakness in the market here, although the St. Louis Gas & Coke Corporation still is selling at $19, Granite City furnaces. One Southern maker has reduced its price 50c. a ton, but this cut has not been met by the leading interest in that section. The melt in the district is being curtailed by several of the larger mills. There is renewed activity among stove foundries, now that they have decided on their patterns for the next season. The Granite City maker sold 4600 tons during the week, including 600 tons of malleable to one northern Illinois melter and 500 tons to another. The remainder was foundry grades, including two 300-ton orders for Illinois melters and 250 tons to a western Missouri concern.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.16
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.16
Northern basic, delivered	20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—With a reduction in the melt of pig iron has come a lessening in the demand for industrial grades of coke in this district. Dealers have been buying fairly well of domestic grades.

Finished Iron and Steel.—A slight improvement in the demand for galvanized sheets is reported by the Granite City Steel Co., and it is this producer's belief that the demand will increase during the next few weeks. The company continues well fortified with backlog tonnages on virtually all of its other products, and in the case of tin mill sheets sufficient business is booked to warrant 100 per cent operation for several weeks. Demand in the oil fields is at a low ebb. No large lots of freight cars are being inquired for, but it is understood that some roads may buy freight equipment in the near future. Reinforcing bar awards for the week totaled 185 tons, and the only project of consequence pending is a sewer, which will require 300 tons.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/16-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material.—A leading East Side interest bought about 4000 tons of specialties and melting rails from several dealers to average down the price of its raw materials, and it is understood would have bought more, but dealers considered the offers too low. Interest by some mills in No. 1 machinery cast, and railroad malleable, brought dealers' prices up 50c. a ton, and for the same reason No. 1 busheling is up 25c. a ton. No. 1 railroad cast is off 50c. a ton and miscellaneous rails are 25c. a ton lower. Railroad lists include: Chicago & Alton, 1000 tons; St. Louis & Hannibal, 600 tons; Louisville & Nashville, 440 tons of cast iron and 533 tons of bridge material; Pullman Co. (St. Louis), 6 carloads; Chicago, Rock Island & Pacific, 180 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.25 to $11.75
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	13.75 to 14.25
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	13.00 to 13.50
Stove plate	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Buffalo

Pig Iron Firmer for Outside Shipment —Galvanized Sheets 3.55c.

BUFFALO, May 22.—Extreme dullness marked the week's pig iron business. No sizable inquiries are before the makers. All report having taken a few 100-ton lots of foundry and malleable. Some business was placed at Auburn, N. Y., and Warren, Pa. The outstanding development of the week was the decision of one of the local makers, who has been active in Eastern business, to advance the base price on foundry iron for all delivery points to $17, Buffalo furnace.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations continue at the rate of recent weeks. New commitment on bars,

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire base per 100 lb.	3.90

shapes and plates are fair. The ruling price appears to be 2c., Lackawanna, with 1.95c. on sizable tonnage. Sheet business is off somewhat, most of it coming in on contracts. Black sheet prices are fairly firm at 2.80c. to 2.85c. The lowest price hereabouts has been 2.75c. on occasional lots. The automobile body sheet price is firm at 4c. On galvanized, most of the business is being taken at 3.55c. Bolt and nut demand is not quite so heavy. A third quarter price list, it is expected, will be announced soon. Reinforcing bar business is active; close to 2000 tons in sizable lots is pending. A fabricator took 200 tons of structural for a Binghamton concern. The new Rand Building, plans for which are awaited, will require 4500 tons of structural steel.

Old Material.—There has been a dearth of new buying and the market is soft and quiet. One of the principal consumers continues its order suspending shipments. Another large mill is receiving boat shipments of scrap from Detroit at the rate of at least one a week. This mill is consuming heavily. Machine shop turnings are off 25c.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $14.75
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	13.50 to 14.00
Hydraulic compressed sheets	12.50 to 13.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.00 to 8.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.00 to 15.50
Low phosphorus billet and bloom ends	16.50 to 17.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.25 to 9.75
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.50 to 13.75
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00
Agricultural	15.00
Industrial	15.00

Boston

Pig Iron Inquiry for Third Quarter—Scrap Market Weaker

BOSTON, May 22.—Although pig iron sales the past week dropped off noticeably, general sentiment among brokers is that improved buying will develop soon. A Vermont foundry is inquiring for 1000 tons of No. 1X for third quarter, and a Massachusetts melter wants 500 to 1000 tons, half No. 2 plain and half No. 1X, also for third quarter. These are the first important open inquiries in many weeks. In addition, sellers are negotiating with various foundries for sizable lots of iron, mostly No. 2X and No. 1X. Sales of pig iron in New England so far this month have approximated 25,000 tons, of which the Mystic Iron Works has taken more than 15,000 tons. In the past week that furnace booked an order for 2000 tons No. 2X and No. 1X for third quarter delivery, and about 1000 tons in small lots. Other furnaces did not do so well.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Importations.—Pig iron importations during the first half of May were limited to 198 tons of Indian No. 2X. During the first half of April imports were 809 tons, while in the first half of May, last year, they were 641 tons; the first half of May, 1926, 1994 tons, and the first half of May, 1925, 2574 tons. A small amount of Belgian cast iron pipe, 92 pieces, was received in the first half of May, the first importation of this product in many weeks.

Coke.—On May 21, New England by-product foundry coke makers opened their books for last half contracts. As formerly, these contracts are subject to a sliding scale of prices, the price to be fixed on the first day of each month. Anticipating the opening of books, brokers rounded up regular customers, and consequently both the New England Coal & Coke Co. and the Providence Gas Co. have approximately 50 per cent of the consumers signed up. The current demand for coke is a little heavier than a week ago, indicating a gain in the New England melt of iron. The price remains at $11 a ton, delivered within a $3.10 freight rate zone.

Cold-Rolled Strip.—May will pass out a comparatively lean month with the cold-rolled strip makers. Buying during the first quarter was sufficiently heavy to carry consumers through most of the second three months. Better business is expected in June for third quarter delivery. Prices are holding at 3c. to 3.15c. per lb., base Pittsburgh, on 1 to 3 ton lots.

Shapes and Plates.—Bridge jobs predominate in the fabricated steel market. The State of Vermont and the Boston & Maine Railroad have inquired for a large number of such structures, though the tonnage of steel involved in each is not large. The market for standard shapes is 1.80c. to 1.90c. per lb., base Pittsburgh, depending on the tonnage involved. Buying of plates is on a hand-to-mouth basis, with prices steady and unchanged.

Cast Iron Pipe.—Open municipal inquiries for pipe are few. Quincy, Mass., has closed with the Warren Foundry & Pipe Co. for 100 tons of 6-in. pipe. Attleboro, Mass., instead of buying 100 tons of 6-in. pipe, bids for which were recently opened, took a car lot from an unnamed foundry. Private bookings are quite satisfactory. The market for 4-in. pipe is holding firm at $46.10 to $47.10 a ton, delivered common Boston freight rate points, and for 6-in. to 16-in., at $41.10 to $42.10. On larger sizes concessions are still obtainable. The usual $5 differential is asked on class A and gas pipe.

Old Material.—Old material is moving more freely, but mostly at easier prices. Local exporters of yard steel have again lifted their price, this time 25c. a ton to $9.75, making a total advance of 75c. within a fortnight. Two steamers have just departed for Danzig with approximately 8000 tons of scrap, and another is loading 4000 tons this week. In addition, a steamer is

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, rot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

taking on 250 tons at Providence, R. I., mostly automobile steel, at $9 a ton on dock, also for Danzig. Sales of No. 1 heavy melting steel for Pennsylvania delivery are reported at $9.10 on cars, shipping point, but some business was taken in the past week at $8.60, indicating further weakness in that material. Prices paid for No. 1 railroad wrought, steel mill borings and forge flashings are lower, while inside prices are paid more often than outside for other grades of scrap. The best offer made recently on shafting is $11 a ton on cars, shipping point. Textile machinery cast sells at either $13.75 or $14 a ton, delivered, but the most some brokers will pay is $13.50. No. 1 machinery cast continues to sell at a premium over textile cast.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.60 to $9.10
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 10.00
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.50 to 6.00
Cast iron borings (steel works and rolling mill)	5.50 to 6.00
Bundled skeleton, long	5.50 to 6.00
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.25
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.50 to 8.00
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

Cincinnati

Steel Demand Slows Up—Pig Iron Quiet —Coke Shipments Fall Off

CINCINNATI, May 22.—Pig iron sales in the week amounted to less than 3000 tons. Inquiries are scarce. Buying for third quarter is not yet under way, partly because there is no incentive in the price situation to justify forward purchasing and also because many consumers have not taken all of the tonnage on present contracts. Reports of low prices on both Northern and Southern iron are current, but in most instances are difficult to substantiate. Alabama and Tennessee makers insist that they are holding to $16, base Birmingham, but iron has been offered to large consumers at 50c. under that figure. Northern Ohio iron is being sold at $16.50, base furnace, and in several instances sellers are understood to have dipped as low as $16. Contract users of Jackson County silvery iron are specifying against present requirements at a moderate rate, and prices are firm at $25, base furnace, for 8 per cent. There has been no change in southern Ohio foundry, which remains at $19, base Ironton. The Niles Tool Works Co., Hamilton, Ohio, is asking for 500 tons of Northern foundry, and a Mt. Vernon, Ill., melter is inquiring for a like amount of malleable. The furnace of the Hamilton Coke & Iron Co., Hamilton, Ohio, was blown in on basic iron May 21.

Warehouse Prices, f.o.b Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes. 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.19 to 19.69
Alabama fdy., sil. 2.25 to 2.75	19.69 to 20.19
Tennessee fdy. sil. 1.75 to 2.25	19.19 to 19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—There has been a curtailment of buying in the past week. Specifications against second quarter contracts have not been placed in the volume expected, and many sellers are directing their main efforts toward the correction of this condition. Numerous structural steel jobs scheduled to appear about this time have been indefinitely postponed, with the result that fabricators have little work on which they are figuring. Despite the slowness of the general market, bars, structural shapes and plates are firm at 1.85c., base Pittsburgh. The weakest spot in finished steel is wire products, which are being sold at low prices by an Ohio River producer. Common wire nails are reported to be bringing $2.50 per keg, Ironton, and plain wire $2.40 per 100 lb. This seller is now delivering to lower Ohio River points approximately 50 carloads of wire and nails by barge. In the sheet market, specifications and orders continue at a fairly good rate. Releases of substantial tonnages by automobile manufacturers have strengthened the situation somewhat, while the call for electrical sheets also has been active. Mill operations are holding up well and in some cases approach 90 to 95 per cent of capacity. There is no indication of a stiffening of prices, which remain at 2c. to 2.10c., base Pittsburgh, for blue annealed, 4c. for automobile body sheets, 3.65c. for galvanized and 2.75c. to 2.85c. for black stock.

Warehouse Business.—Jobbers report a moderate movement of bars, structural shapes and plates, but sheets and wire products are lagging. Prices in all commodities are showing strength.

Coke.—Declining specifications from automobile foundries have resulted in lessened shipments of by-product foundry coke, and indications are that the volume in May will fall off 10 per cent or more from that of April. Dealers are encouraged by the somewhat liberal movement of by-product domestic coke, which is considerably greater than in the spring of 1927. New River beehive foundry coke is steady at $6.50 to $7, ovens.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Shipments to district steel plants have fallen off slightly, and dealers are of the opinion that the market during the next 30 days will be quiet. Demand for foundry grades has been slack. While quotations have not been changed, several of them are merely nominal.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

The American Sheet & Tin Plate Co. has completed a loading pier at its National (tin plate) works, Monessen, Pa., and has loaded a barge of tin plate for southern delivery, which will move in the next tow of steel products of the United States Steel Corporation taken south by the Carnegie Steel Co.

Canada

Pig Iron Melters Showing More Interest—April Output Declined

TORONTO, ONT., May 22.—Production of pig iron in Canada during April amounted to 74,736 gross tons, a decline of 5 per cent from the 78,390 tons reported for March, and 4 per cent below the output of 77,240 tons in April, 1927. April figures show that the production of foundry iron advanced to 21,539 tons, from 5151 tons in March, while the output of basic iron declined to 52,346 tons from 67,162 tons in March, and malleable iron dropped to 851 tons from 6077 tons in March.

For the four months ended with April, the cumulative production of pig iron in this country totaled 282,823 gross tons, an increase of 12 per cent over the 255,289 tons produced in the first four months of last year, and 24 per cent over the 227,248 tons produced in the first third of 1926. This year's output consisted of 217,817 tons of basic iron, 54,411 tons of foundry iron, and 10,565 tons of malleable iron.

Production of steel ingots and castings in Canada during April amounted to 112,780 tons, compared with 118,258 tons in the previous month and 109,107 tons in April, 1927. For the four months ended with April, the total output of steel ingots and castings was 414,153 tons, or 26 per cent greater than the 330,659 tons produced in the first four months of last year, and 59 per cent above the 260,394 tons produced in the first third of 1926. This year's output consisted of 398,788 tons of ingots and 15,365 tons of direct steel castings.

The Dominion Bureau of Statistics price index for iron and its products (1913—100) remained unchanged at 141.7.

The Canadian Furnace Co., Port Colborne, Ont., has completed improvements at its blast furnace and ore docks and will put its furnace in blast on May 24. This is Queen Victoria's Day in Canada, and as the company's product is known as Victoria iron and the furnace is called the Victoria furnace, it was decided to begin operations on that day. The company's sales office is at Hamilton, Ont. George A. Simpson is sales manager.

Pig Iron.—Melters are beginning to show more interest in the market. During the past few days inquiries have been received by local dealers ranging from 500 to 1000 tons for delivery up to the middle of August. Current sales are chiefly for spot delivery and range from 50 to 200 tons. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Business was slightly better during the past week or 10 days. A number of good tonnage orders were included in recent sales. Current demand is chiefly from consumers who buy as demands dictate. The market, however, is spotty.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Detroit

No Slackening in Automobile Production Yet Discernible

DETROIT, May 22.—While it is yet too early to get a close estimate on what May automobile production will total, indications reveal no slackening of the pace established last month.

The Employers' Association index shows a further increase in industrial employment of 2662, which brings the figure for the current week to 256,497. This figure indicates the number of persons on the combined payrolls of representative manufacturers, which account for two-thirds of the city's working population. A year ago the index figure stood at 226,228, or 30,269 less than at present.

W. S. Knudsen, president Chevrolet Motor Co., announced a final total of April production at 135,832 units, which sets a new all-time record and is approximately 2000 units ahead of the previous month and approximately 17,000 units ahead of February.

Changes in plant and equipment at the Hudson Motor Co. are being made to accommodate greater production. It is reported that an output of 2000 units per day is expected when alterations have been completed.

Willys-Overland began the current month with 35,000 unfilled orders on the books.

Retail sales for General Motors cars and trucks for April developed a new record of 209,367 units, against 183,706 for March and 180,106 for April, 1927. Retail sales for the first four months of the current year total 632,380 units, compared with 509,416 units in 1927 and 361,363 in 1926.

Edward G. Budd Mfg. Co. has been awarded about $1,500,000 worth of work from Europe. Domestic contracts with the same company will run probably to about $500,000 a month additional. Shipments for the first quarter of 1928 were $7,955,000.

Hayes Body Corporation estimates deliveries for May, June and July at 60,000 bodies, against 26,000 for the same period of 1927.

Melters in this district are taking out their pig iron very close to the amounts contracted for, so it is expected there will be a buying movement of considerable proportions for the third quarter. Several inquiries involving a large tonnage have developed, but no sales have been made.

Prices on old material are the same as quoted a week ago.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Ashland Steel Co. to Be Sold at Public Auction

The property of the Ashland Steel Co., Ashland, Ky., two-thirds of which is owned by the Belfont Steel & Wire Co., Ironton, Ohio, will be sold at public sale on order of the court, June 7. The property is being sold as the result of foreclosure proceedings brought by the bondholders as represented by the Ashland National Bank. O. D. Hayes of Ironton and T. A. Field of Ashland have been appointed receivers and special masters by the court and the sale will be made by them.

Rail Steel Bar Association to Meet May 25

The Rail Steel Bar Association will hold its semiannual meeting May 25 in New York, coincident with the spring meeting of the American Iron and Steel Institute. The former organization comprises a group of rolling mills in the United States and Canada producing rail steel reinforcing bars and other products. As an association its activities have been directed toward extending the use of reinforced concrete for construction.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 22	May 21	May 19	May 18	May 17	May 16
Lake copper, New York	14.62½	14.62½	14.62½	14.62½	14.62½	14.50
Electrolytic copper, N. Y.*	14.25	14.25	14.25	14.25	14.25	14.12½
Straits tin, spot, N. Y.	51.50	51.37½	....	51.75	51.75	52.32½
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	5.97½	5.97½	6.00	6.00	6.00	6.00
Zinc, New York	6.50	6.50	6.45	6.42½	6.42½	6.40
Zinc, St. Louis	6.15	6.15	6.10	6.07½	6.07½	6.05

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 22.—Sales of copper continue large, with prices advancing. Tin has been exceedingly quiet, but quotations are steady. Dullness in the lead market persists at unchanged values. Higher prices for zinc have followed an advance in ore.

Copper.—So heavy has been the buying of copper the past two weeks that electrolytic copper is regarded by many as scarce, and most producers are sold up through June. Some buyers are attempting to obtain June copper and are having some trouble as well as anxiety, and some producers have been requested to anticipate June shipments thus early in May. Sales for export have been large in the last week, and it is safe to say that the total for the first three weeks of 65,000 to 70,000 tons is larger than any monthly total in the past. Foreign consumers must still buy metal for June and domestic consumers are not all covered even for July. The price of electrolytic copper was advanced about May 17 to 14.50c., delivered in the Connecticut Valley. No metal can be bought below that today and higher prices are being talked about. Copper Exporters, Inc., also advanced its quotation last week from 14.62½c. to 14.75c., c.i.f. European ports, this being the second increase in less than 10 days. If the present pace of buying continues, only an increase in production can meet the situation. Lake copper is active and higher at 14.62½c. to 14.75c., delivered.

Tin.—Only about 600 tons changed hands in the last week and the market has been exceedingly dull. Trading between dealers was at a minimum and consumers were waiting for lower prices. Their expectations were met yesterday and today and their entry into the market may be expected shortly. The spot and May positions are still under close control and command a premium of about ½c. per lb. over May-June. It is figured that consumers still have considerable metal to buy for July-August. London prices today were considerably lower than a week ago, with spot standard quoted at £227 15s., future standard at £227 2s. 6d. and spot Straits at £232 5s. per ton. The market here today was not particularly active, with spot Straits tin quoted at 51.50c., New York. Arrivals thus far this month have been 5935 tons and 4585 tons is reported afloat.

Lead.—Buying continues in only moderate volume and the stability of the market is the only feature. Quotations are a little weaker in the West at 5.97½c. to 6c., East St. Louis, for the outside market, but the leading interest continues to maintain its contract price at 6.10c., New York.

Zinc.—Ore producers at Joplin advanced the price to $40 per ton last week and sold over 17,000 tons, thus reducing stocks materially. They are also limiting output and some refiners in the East are predicting still higher prices. The advance in ore has had some effect on the price of prime Western, which today is quoted at 6.15c., St. Louis, or 6.50c., New York. It is generally admitted that 6.25c., St. Louis, would be none too high with ore at $40, and higher prices are naturally expected. Demand from consumers is light and producers, outside of taking care of their regular customers, are not pressing the market.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—With Chinese exchange higher and

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.00c. to 54.00c.
Tin, bar	55.75c. to 56.75c.
Copper, Lake	15.50c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.25c. to 34.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.25c.
Copper, cold rolled, 14 oz. and heavier	25.50c.
Seamless Tubes—	
Brass	23.87½c.
Copper	24.75c.
Brazed Brass Tubes	27.00c.
Brass Rods	16.75c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on copper products except copper tubing were advanced ¼c. on May 17. A corresponding advance on copper tubing and brass products was made on May 15. Zinc sheets and lead full sheets are unchanged.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.25c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.87½c.
Copper	24.75c.
Rods—	
High brass	16.75c.
Naval brass	19.50c.
Wire—	
Copper	16.25c.
High brass	19.50c.
Copper in Rolls	22.25c.
Brazed Brass Tubing	23.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.00c.
Copper, hot rolled	23.25c.
Copper, cold rolled, 14 oz. and heavier	25.50c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.37½c.
Copper	26.25c.
Brazed Brass Tubes	27.00c.
Brass Rods	16.75c.

firm, Chinese metal is quoted steady at 11c. to 11.25c. for all positions. Buying is only in moderate volume.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

Chicago, May 22.—This market is moderately active and prices for copper and zinc have advanced. Quotations on tin are lower. Fair activity is noted in the old metal market and prices are steady.

Prices, per lb., in carload lots: Lake copper, 14.62½c.; tin, 52.50c.; lead, 6.10c.; zinc, 6.25c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 5375 Tons—Inquiries for 7750 Tons Include One Lot of 2500 Tons

A NUMBER of small projects made a total of reinforcing steel jobs awarded during the week of 5375 tons. The total of new projects now under negotiation is about 7750 tons, of which 2500 tons is for a building for the New York Dock Co. in Brooklyn and 1000 tons is for a building for the Continental Can Co. at Chicago. Awards follow:

New York-Vermont, 1000 tons, Lake Champlain bridge, to unnamed Middle West company.

Boston, 100 tons, Falkner Hospital, to C. S. Henry & Co.

Boston, 150 tons, foundations for Boston & Maine warehouse, to Kalman Steel Co.

State of Connecticut, 150 tons of road mesh, to Concrete Steel Co.

Mamaroneck, N. Y., 125 tons, water filtration plant, to Joseph T. Ryerson & Son, Inc.

New York, 200 tons, one section of subway; from Moranti & Raymond, Inc., general contractor, to Concrete Steel Co.

New York, 350 tons, terminal warehouse for Central Railroad of New Jersey; from White Construction Co., general contractor, to Concrete Steel Co.

Jones Beach, Long Island, 150 tons, causeway paving for New York State Highway Department; from Conners Brothers, Long Beach, N. Y., general contractor, to Concrete Steel Co.

State of New Jersey, 250 tons, road work in Monmouth and Mercer counties, to Igoe Brothers.

Chicago, 100 tons, building for General Tire & Rubber Co., to Concrete Steel Co.; previously reported at 500 tons to an unnamed bidder.

Corwith, Ill., 200 tons, building for Crane Co., to Jones & Laughlin Steel Corporation.

Chicago, 200 tons of rail steel bars, laboratory at University of Chicago, to Inland Steel Co.

Chicago, 125 tons of rail steel bars, building for Republic Food Products Co., to Calumet Steel Co.

Chicago, 190 tons of rail steel bars, Fair Oaks garage, to Calumet Steel Co.

State of Illinois, 400 tons of rail steel bars for roadwork, to Calumet Steel Co.

Milwaukee, 400 tons, St. Mary's College, to Concrete Engineering Co.

State of Wisconsin, 100 tons, road work, to Olney J. Dean & Co.

St. Louis, 175 tons, warehouse for Independent Plumbing Supply Co., to Laclede Steel Co.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.25c.	13.75c.
Copper, heavy and wire	12.00c.	13.125c.
Copper, light and bottoms	10.25c.	11.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.75c.
No. 1 yellow brass turnings	8.00c.	9.25c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Granite City, Ill., 110 tons of billets and bars, high school, to Laclede Steel Co.

Seattle, Wash., 1000 tons, Peck-Hills Furniture Co. warehouse, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

New York, 300 tons, Lee Brothers warehouse; Turner Construction Co., general contractor.

Brooklyn, 2500 tons, building for New York Dock Co.; Russell G. Cory, architect.

Brooklyn, 700 tons, subway section 2-A, route 109; Rodgers & Hagerty, Inc., general contractor.

Binghamton, N. Y., 500 tons, Ansco Building; Turner Construction Co., general contractor.

State of New Jersey, 100 tons, road work; D. H. Winans, Elizabeth, general contractor.

Buffalo, 278 tons, School No. 81; bids taken.

Buffalo, 800 to 1000 tons, five-span bridge over Cazenovia Creek; bids June 5, city engineer's office.

Buffalo, 125 tons, Cornelius Creek drain.

Buffalo, 500 tons, road-bed and canopy, New York Central station; bids asked.

Chicago, 1000 tons, building for Continental Can Co.; Wells Brothers, general contractors.

Chicago, tonnage not stated, reconstruction of Fine Arts Building; Great Lakes Construction Co., low bidder on general contract.

Chicago, 120 tons, Nurses' Home for the city of Chicago; Great Lakes Construction Co., low bidder on general contract.

Chicago, 270 tons, steam tunnel for University of Chicago.

Urbana, Ill., 160 tons, testing laboratory for University of Illinois.

St. Louis, 300 tons, Rocky Branch sewer for Board of Public Service.

Railroad Equipment

Erie Railroad has ordered 35 2-8-4 type locomotives from Baldwin Locomotive Works.

Boston & Maine is inquiring for two eight-wheel switching locomotives.

Ferrocarril de Pacifico, Colombia, S. A., has ordered 10 4-8-0 type locomotives from Baldwin Locomotive Works and Ferrocarril de Antioquia, Colombia, has ordered four Mikado-type locomotives from same company.

Detroit & Toledo Shore Line has withdrawn its inquiry for 100 gondola bodies.

North American Car Co. has purchased 500 used tank cars. This does not affect company's inquiry for 500 new tank cars. This company is also inquiring for 50 to 100 steel underframes.

Chicago, Milwaukee, St. Paul & Pacific will build 10 baggage cars in its own shops.

Virginian Railway has ordered 1000 hopper car bodies from Virginia Bridge & Iron Co.

Hainesport Mining & Transportation Co. has ordered four 50-ton steel hopper cars from American Car & Foundry Co.

Central of Brazil has ordered eight sleeping cars, two buffet baggage cars and 10 steel passenger cars from American Car & Foundry Co.

Chicago, South Shore & South Bend has purchased 10 rail motor cars from Standard Steel Car Co.

Northern Pacific has ordered three gas-electric rail motor cars from Standard Steel Car Co. and one from J. G. Brill Co.

Guayaquil & Quito Railroad, Ecuador, has ordered 50 box cars from American Car & Foundry Co.

Cincinnati Street Railway Co. has ordered 100 electric passenger cars from Cincinnati Car Co.

FABRICATED STRUCTURAL STEEL

Small Jobs Predominate in Week's Awards of 23,500 Tons—26,750 Tons On Inquiry

STRUCTURAL steel awards during the week, as reported to The Iron Age, were about 23,500 tons, of which 5800 tons of miscellaneous work in New York is outstanding. For a building in Minneapolis, 2000 tons was awarded, and 1700 tons was let for a lift bridge at Chicago. Among inquiries totaling 26,750 tons, those of largest size are 4000 tons for an office building in New York, 3500 tons for a high school building in Chicago and 3000 tons for an office building in Buffalo. Awards follow:

Biddeford, Me., 800 tons, Boston & Maine Railroad bridge, to Phoenix Bridge Co.

Boston, 1000 tons, Boston & Maine Railroad terminal building, to Levering & Garrigues.

Lowell, Mass., 700 tons, Boston & Maine Railroad bridge, to Boston Bridge Works, Inc.

Holyoke, Mass., 400 tons, Boston & Maine Railroad bridge, to Boston Bridge Works, Inc., and Phoenix Bridge Co., jointly.

Quincy, Mass., 200 tons, mercantile building, to New England Structural Co.

State of Massachusetts, 322 tons, Boston & Maine Railroad bridges at Graniteville, North Littleton, Brookside and Westford, to Boston Bridge Works, Inc.

Binghamton, N. Y., 200 tons, new plant for Agfa Ansco Corporation, to Kellogg Structural Steel Co.

New York, 5800 tons in the following awards reported to the Structural Steel Board of Trade, Inc.: St. Paul's Baptist Church on West 132nd Street, warehouse at 153 East Eighty-seventh Street and restaurant and loft building at 977 Eighth Avenue, to George A. Just Co.; loft building at 259 West Thirtieth Street, apartment building at Ninety-third and Ninety-fourth Streets and Park Avenue and addition to building 85 of Western Electric Co. at Kearny, N. J., to McClintic-Marshall Co.

State of New Jersey, 110 tons, five highway bridges, to American Bridge Co.

Philadelphia, 500 tons, theater, to McClintic-Marshall Co.

Philadelphia, 125 tons, Goldfine Garage, to Shoemaker Bridge Co.

Pennsylvania Railroad, 250 tons, bridges, to American Bridge Co.

Pottsville, Pa., 150 tons, high school, to McClintic-Marshall Co.

Newark, Del., 130 tons, University of Delaware extension, to Jones & Laughlin Steel Corporation.

Standard Oil Co. of Louisiana, 600 tons, various projects, to an unnamed fabricator.

Waycross, Ga., 1500 tons, plant for Troy Cotton & Woolen Manufactory, Fall River, Mass., to Ingalls Iron Works Co., Birmingham.

Dayton, Ohio, 100 tons, Oakwood Manon Apartments, to Massillon Bridge & Structural Co.

Troy, Ohio, 232 tons, building for Advance Aircraft Co., to Massillon Bridge & Structural Co.

State of Michigan, 100 tons, highway bridges in Genesee County, to Massillon Bridge & Structural Co.

Logansport, Ind., 400 tons, Pennsylvania Railroad bridge, to Bethlehem Steel Co.

Fort Wayne, Ind., 400 tons, building for International Harvester Co., to McClintic-Marshall Co.

Chicago, 200 tons, Simon Building, to Mississippi Valley Structural Steel Co.

Chicago, 200 tons, building at 234 South Wabash Avenue, to American Bridge Co.

Chicago, 180 tons, building for American Can Co., to McClintic-Marshall Co.

Chicago, 400 tons, building for Harris Brothers Co., to McClintic-Marshall Co.

Chicago, 225 tons, building at 226 South Wabash Avenue, to unnamed bidder.

Chicago, 1700 tons, lift bridge for Baltimore & Ohio Railroad, to Mount Vernon Bridge Works.

Chicago, 950 tons, building for Crane Co., to American Bridge Co.

Chicago, Burlington & Quincy Railroad, 150 tons, I-beam spans, to an unnamed bidder.

State of Illinois, 440 tons, highway bridges, to Milwaukee Bridge Co.

Minneapolis, 2000 tons, Foshay Tower Building, to Duffin Iron Co., Chicago; this in addition to 2000 tons recently awarded to Minneapolis Steel & Machinery Co. for first four floors.

Fond Du Lac, Wis., 600 tons, St. Mary's School, to Milwaukee Bridge Co.

Denver, Colo., 445 tons, plates, siphons for Horseshoe and Morrison Canyon, Yakima project in Washington, to Pittsburgh-Des Moines Steel Co.

San Francisco, 140 tons, apartment, Pine near Gough Street, to McClintic-Marshall Co.

San Francisco, 250 tons of plates and 250 tons of shapes, dredger for State Harbor Commission, to Moore Dry Dock Co.

San Francisco, 125 tons, barge for Shasta-Butte Gold Dredging Co., to Dyer Brothers.

San Francisco, 120 tons, warehouse, Fifteenth and Vermont Streets, to Schraders Iron Works.

Sacramento, Cal., 600 tons, bridge over Smith River in Del Norte County, to Virginia Bridge & Iron Co.

Monrovia, Cal., 445 tons, plates for 12 to 20-in. pipe, to Western Pipe & Steel Co.

Tacoma, Wash., 115 tons, plates, 48-in. pipe line, to Birchfield Boiler Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Vermont, 580 tons, 18 bridges.

Boston, 100 tons, Diocesan House, 1 Joy Street.

Boston, 100 tons, Community House, Roxbury district.

Boston & Maine Railroad, 1000 tons, bridges.

New York, 4000 tons, office building on John Street; Starret Brothers, general contractors.

New York, 400 tons, building for Rockefeller Institute on Avenue A.

Philadelphia, 150 tons, highway bridge at Abbottsford Avenue; Jaffola & Mark, Inc., low bidder on general contract.

Philadelphia, 105 tons, highway bridge at Cottman Avenue; Horridge, Elcock & Hall, Inc., low bidder on general contract.

Philadelphia, 2000 tons, apartment building at Nineteenth and Locust Streets.

Pennsylvania Railroad, 300 tons, bridges.

Baltimore, 500 tons, Y. M. C. A.

Washington, 400 tons, train shed for Pennsylvania Station.

Buffalo, 3000 tons, office building for Marine Trust Co. at Washington Street and Lafayette Square; John W. Cowper Co., general contractor.

Detroit, 1000 tons, research laboratory for General Motors Corporation.

Chicago, 3500 tons, Austin High School; Great Lakes Construction Co., low bidder on revised quotations.

Chicago, 1600 tons, office building to be erected by Patterson estate.

Chicago, tonnage being estimated, building for Bowman Dairy Co.

Gary, Ind., 600 tons, court building; A. Bolter's Sons, Chicago, low bidders.

Rock Island, Ill., 500 tons, 40 steel pontoons for United States Engineers Corps; Midland Barge Co., Midland, Pa., low bidder.

Anderson, Ind., 800 tons, foundry for Delco-Remy Corporation.

Urbana, Ill., 450 tons, Lincoln Hall at University of Illinois.

Louisville, Ky., 1500 tons, highway bridge.

San Antonio, Tex., 1600 tons, theater.

Marinette, Wis., 350 tons, Interstate bridge to Menominee, Mich.; bids close June 8.

Portage, Wis., 160 tons, new Dewitt Street bridge; Worden-Allen Co., Milwaukee, low bidder.

Milwaukee, 200 tons, St. Mary's College buildings; bids about July 1; Herbst & Kuenzli, 130 Wisconsin Avenue, Milwaukee, architects.

Milwaukee, 300 tons, new Lincoln Avenue span; general contract to Klug & Smith Co., Milwaukee.

San Francisco, 200 tons, school warehouse on Harrison Street.

Oakland, 1500 tons, No. 14-gage blue annealed sheets for Wildcat and Sequoia aqueducts; sub-bids by Lock-Joint Pipe Co., Ampere, N. J.

Tacoma, Wash., 1600 tons plates, 51 to 66-in. riveted pipe, to Western Concrete Pipe Co. on basis of reinforced concrete pipe.

Long Beach, Cal., 300 tons, office building, Pine and Ocean Avenues; bids being taken.

Orders for Fabricated Steel Plates Gain

Washington, May 22.—Orders for fabricated steel plates in April totaled 48,493 tons, or 60.7 per cent of the capacity of the 51 firms reporting to the Department of Commerce. This compares with 45,505 tons, or 57 per cent of capacity, in March.

April orders were distributed as follows: Oil storage tanks, 21,330 tons; refinery materials and equipment, 2370 tons; tank cars, 4344 tons; gas holders, 4654 tons; blast furnaces, 619 tons; stacks and miscellaneous, 15,176 tons.

Orders for the first four months of the present year aggregated 179,605 tons, as against 198,251 tons for the corresponding period of last year.

PERSONAL

Loyall A. Osborne, president Westinghouse Electric International Co., was reelected chairman of the National Industrial Conference Board, Inc., at its twelfth annual meeting last week at the Hotel Astor, New York. The following were among the vice-chairmen named: Irenee du Pont, chairman of finance committee, E. I. du Pont de Nemours & Co., Wilmington, Del., and Herbert F. Perkins, International Harvester Co., Chicago. The executive committee will include the following: William D. Baldwin, Otis Elevator Co., New York; Cornelius F. Kelley, Anaconda Copper Mining Co., New York, and William H. Nichols, Jr., General Chemical Co., New York.

L. A. OSBORNE

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Norman E. Craig has been made district manager at New York for Hickman, Williams & Co., succeeding Charles S. Garland, who recently resigned. Mr. Craig has been identified with Hickman, Williams & Co. since February, 1917, and was in the company's Pittsburgh office until June, 1926, when he was transferred to the New York office.

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Frank M. Beeson, for several years in charge of the Los Angeles branch of the Luitweiler Pumping Engine Co., has been placed in charge of a new office which has been opened at 808 Pacific National Bank Building, Los Angeles, by the Graver Corporation, East Chicago, Ind. The Luitweiler company had formerly been Pacific Coast distributer of the Graver organization.

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John R. Williams has been elected president of the Electric Storage Battery Co., Philadelphia, succeeding Herbert Lloyd, who has been made chairman of the board.

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E. F. Entwisle, who has been assistant general manager of the Steelton plant of the Bethlehem Steel Corporation, has been appointed superintendent of the Saucon plant, Bethlehem, Pa., succeeding S. J. Cort, who has been appointed assistant general manager of the Maryland plant. R. B. Gerhardt, who has been assistant general manager of the Maryland plant, becomes assistant general manager at Steelton.

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C. F. Niemann, president Parkersburg Iron & Steel Co., Parkersburg, W. Va., has been elected a director of the Colonial Trust Co., Pittsburgh.

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T. P. Gaylord, vice-president Westinghouse Electric & Mfg. Co., has been reelected president of the Chamber of Commerce of Pittsburgh.

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W. S. Unger, who has been assistant superintendent Carrie furnaces, Carnegie Steel Co., Rankin, Pa., has been appointed superintendent, succeeding J. E. Lose, recently appointed assistant general superintendent Homestead works.

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Louis T. Lott has rejoined the Weirton Steel Co., Weirton, W. Va., and will serve as assistant general manager of sales in the strip steel department.

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B. I. Ashmun, since 1893 associated with the Armstrong Mfg. Co., Bridgeport, Conn., manufacturer of pipe stock, dies, cutters, etc., has been made president of the company, and his son, Frederick S. Ashmun, has been named secretary-treasurer. The latter is a grandson of Frank Armstrong, who founded the business in 1869. Coincident with the change in the company's management the New York sales and general export offices were removed to larger quarters at 27 Cleveland Place at Spring and Lafayette Streets, which will be shared with the Self Propelling Nozzle Co. Leslie H. Taylor, for many years sales manager for the Williams Pipe Threading Machine Co., Erie, Pa., has been placed in charge of sales in the Middle West for the Armstrong company and has opened an office at 9 South Clinton Street, Chicago.

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B. R. Sausen, since 1918 associated with the Binks Spray Equipment Co., Chicago, at first in charge of the design and development of spray equipment and subsequently as general sales manager, has been placed in charge of the paint spray equipment department of the Alexander Milburn Co., Baltimore. He is a graduate in mechanical engineering from the University of Minnesota and gained his early mechanical experience with the Westinghouse Electric & Mfg. Co., East Pittsburgh.

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H. R. Sykes has been made manager of sales in the locomotive division, Cincinnati Car Co., Winton Place, Cincinnati. The company makes Diesel, gasoline, electric and gas-electric locomotives for industrial uses.

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Robert M. Derby, manager of foreign sales for the Niles-Bement-Pond Co. and Pratt & Whitney Co., 111 Broadway, New York, sailed May 11, for a trip of several months in European countries. The day of his departure was the occasion for a luncheon given him by the members of his department to commemorate the fifteenth anniversary of its establishment and his 25 years of service with the Niles-Bement-Pond Co.

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W. W. Lower, who has been secretary and treasurer of the National Association of Sheet and Tin Plate Manufacturers and of the recently organized National Association of Flat Rolled Steel Manufacturers, has resigned and his duties have been assumed by E. T. Sproull, who has been commissioner of the Cold Rolled Strip Steel Institute and who has been affiliated with the Flat Rolled Steel organization as head of the Cold Rolled Strip division. The sheet steel statistical work heretofore handled by Mr. Lower will also be under Mr. Sproull's direction.

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Clayton L. Patterson, who for nine years has been secretary of the Bureau of Labor of the National Association of Sheet and Tin Plate Manufacturers, and for the past four years secretary of the Sheet Steel Trade Extension Committee, has tendered his resignation of both positions, effective May 31.

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W. P. Bradley, Wheeling Mold & Foundry Co., Wheeling, V. Va., has been nominated for president of the Pittsburgh Foundrymen's Association, L. W. Mesta, Mesta Machine Co., West Homestead, Pa., for vice-president, and William J. Brant, for secretary-treasurer. C. D. Carey, American Steel Foundries, Verona, Pa.; L. V. Stevens, Standard Stoker Co., Pittsburgh; W. J. McMillen, Mackintosh-Hemphill Co., Pittsburgh; L. A. Glaser, McKenna Brass & Mfg. Co., Pittsburgh, and Robert N. Cook, Eclipse Pattern Co., Pittsburgh, have been nominated for members of the executive committee. They will be elected at the annual meeting to be held at the Chamber of Commerce of Pittsburgh, Thursday evening, May 24.

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John F. Tinsley, vice-president and general manager Crompton & Knowles Loom Works, Worcester, Mass., and Mrs. Tinsley are visiting Italy. Later they expect to visit France and England, returning late in June.

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W. D. Moore, president, and J. T. MacKenzie, chief chemist and metallurgist of the American Cast Iron Pipe Co., Birmingham, will speak on "Centrifugal Testing of Cast Iron Pipe," before the Quad-City Foundrymen's Association, May 28, at the Davenport, Iowa, Chamber of Commerce.

H. O. Coe has been appointed manager of the Cleveland office of the United States Electrical Tool Co., with quarters at 403 Erie Building. For the last eight years he has been identified with the sales department of the W. Bingham Co., Cleveland jobber, and previously was engaged in the retail hardware business.

J. V. Moore, formerly with the Simonds Saw & Steel Co., Fitchburg, Mass., is now representing the Billings & Spencer Co., Hartford, Conn., in Pennsylvania, Delaware and New Jersey. His headquarters are at the Leister House, Huntingdon, Pa.

L. V. Quigg, superintendent of the Franklin plant at Johnstown, Pa., of the Bethlehem Steel Co., has resigned to become general superintendent, effective June 1, of the Colorado Fuel & Iron Co., at Pueblo, Colo.

H. J. G. Rudolf has been placed in charge of the factory and laboratory of the Winslow Boiler & Engineering Co., Galesburg, Ill., following a reorganization of that company's plant and personnel. William H. Rehm, president of the company, has taken over the duties of general manager, and T. C. Kyle has been appointed sales manager.

C. A. Heiser, formerly assistant sales manager of the Southwest General Electric Supply Co., Dallas, Tex., has been appointed district manager at Dallas by the Oliver Iron & Steel Corporation, Pittsburgh. He will represent the line material and the bolt, nut and rivet departments of the Oliver corporation and will have headquarters at 409 Browder Street.

David Thomas has been appointed manager of bar iron sales for the Reading Iron Co., Reading, Pa., manufacturer of wrought iron tubular and bar iron products.

F. W. Hawkins has resigned as superintendent of the blooming and bar mills of the Trumbull Steel Co., Warren, Ohio, now being absorbed in the Republic Iron & Steel Co.

E. D. Pike, for 26 years associated with the Wagner Electric Corporation, St. Louis, most recently in charge of the company's Pacific Coast service operations, has been appointed manager of the San Francisco branch sales office, 457 Ninth Street. He is a graduate of Washington University, St. Louis, and has served the company in various capacities at New York, Philadelphia, St. Louis and San Francisco.

E. E. Gregg has been placed in charge of the new hoist and body division of the Commercial Shearing & Stamping Co., Youngstown. Ward Beecher, heretofore connected with sales engineering activities, has been placed in charge of all sales promotional enterprises.

John P. Hubbell, until May 1 assistant chief of research for the New Jersey Zinc Co., has become a partner in Singmaster & Breyer, 420 Lexington Avenue, New York, chemical engineers and metallurgists. He is a graduate of Williams College and Columbia University, and, prior to his nine years' connection with the Zinc company, he was with the General Chemical Co. and in the gas defense division of the United States Army.

Alfred H. Wilson, Jr., formerly assistant metallurgist in charge of the laboratory and special heat treating department of Henry Disston & Sons, Inc., has become associated with Horace C. Knerr, consulting metallurgical engineer, Philadelphia.

Boyd Nixon has become associated with the Louis G. Henes organization, distributers of machine tools and supplies, with offices in San Francisco and Los Angeles. Mr. Nixon, who will be connected with the San Francisco office, was with Harron, Rickard, McCone Co., San Francisco, from 1905 to 1914; with the Niles-Bement-Pond Co. and Pratt & Whitney in Cleveland from 1915 to 1919; he was sales manager of the St. Paul office of Niles-Bement-Pond Co. and Pratt & Whitney from 1919 to 1924; and sales manager of the Philadelphia office of the two companies since that time.

William W. Neckerman, superintendent of tube mills of the Youngstown Sheet & Tube Co., was appointed general manager of the Republic Iron & Steel Co. He succeeds J. W. Deetrick, who recently resigned. Mr. Neckerman has been with the Sheet & Tube company 21 years and is regarded as one of the country's foremost authorities on steel pipe mill operations, controlling important patents in his own name. The Republic company has also named W. J. Mossman, who has been with the Chicago offices of the Sheet & Tube company, as general purchasing agent, succeeding Sidney H. Hedges.

Clyde MacCornack, general manager and chief engineer of the Phoenix Bridge Co., Phoenixville, Pa., has been appointed treasurer and general manager, being succeeded as chief engineer by J. R. Lambert, his assistant. William T. Hodge, sales manager, has been elected secretary of the company, a position which has been unfilled since the death of George Gerry White about a year ago.

J. H. Brillhart, formerly vice-president Fort Worth Steel & Machinery Co., Fort Worth, Tex., has resigned his position with that company, and with the assistance of some friends, has organized the Fort Worth Structural Steel Co. He is a graduate of Lehigh University, was chief engineer for Guerber Engineering Co., Bethlehem, Pa., from 1906 to 1912, then chief engineer and consulting engineer for Mosher Mfg. Co., Dallas and Houston, until 1922, since which time he has been vice-president and manager of the structural steel and tank departments of the Fort Worth Steel & Machinery Co.

H. B. Carpenter, for the past four years general superintendent Colorado Fuel & Iron Co., has resigned, effective June 1, to become assistant to the general manager Republic Iron & Steel Co., Youngstown, Ohio. Mr. Carpenter was graduated from the University of Michigan in 1906 and before going with the Colorado company in 1916 he had been with the Cambria Steel Co., Johnstown, Pa., and the Jones & Laughlin Steel Corporation, Pittsburgh. He was assistant superintendent of the coke plants at Johnstown, and his first position with the Colorado company was superintendent of the coke works. Subsequently he became assistant to the vice-president and general manager, and in 1924 general superintendent.

H. G. O'Brien, since 1922 general manager department of special products Trumbull Steel Co., Warren, Ohio, has resigned. Previously for three years he had been general superintendent of the strip mill department of the company and was the designer of the three mills of that unit.

D. W. Wilson has been elected vice-president and general manager of the Dry Quenching Equipment Corporation, which is a subsidiary of the International Combustion Engineering Corporation, and was organized to exploit in this country the Sulzer system for the dry quenching of coke. Mr. Wilson has been intimately associated with the coke oven and gas industries. Previous identifications have been with the Wilputte Coke Oven Corporation and the Iroquois Gas Corporation. He was also assistant professor of chemical engineering at the Massachusetts Institute of Technology.

O. S. Sleeper has been appointed engineer in charge of special development work for the Buffalo Foundry & Machine Co., Buffalo. Mr. Sleeper, who is an authority on vacuum dryers and chemical plant equipment, has for the past seven years conducted the O. S. Sleeper Co., manufacturing similar equipment. Prior to that, for 15 years he was associated with the Buffalo Foundry & Machine Co. as engineer in charge of engineering.

L. G. Gorman, who has been purchasing agent of the Trumbull Steel Co., has been appointed assistant purchasing agent of the Republic Iron & Steel Co.

Dr. Fridtjof Andersen, Bremanger Kraftselskap (Bremanger Power Co.), Bergen, Norway, recently arrived in New York, and is assisting Rogers Brown & Crocker Brothers, New York, in introducing a vanadium-titanium pig iron, made by his company, to the American trade.

Howard W. Foote, chairman of the board of the North Western Expanded Steel Co., Chicago, was seriously injured, May 21, when he was hurled from the steps of a north shore electric train at Glencoe, Ill.

Salvage Conference to Be Held in Wilmington, Del.

Representatives of large industrial corporations and public utilities have been invited to meet in Wilmington, Del., June 6 and 7, for a conference to consider problems connected with the disposal of their waste materials, obsolete equipment and surplus material. A preliminary conference was held in New York in December, and sufficient interest was shown to justify a further conference, as well as the organization of a Salvage Division, operating in connection with the National Association of Waste Material Dealers, Inc.

A dinner will be given by the Dupont company at the Dupont Hotel, and some of the speakers on that occasion will be Lammot Dupont, president Dupont Co.; Col. William C. Spruance, who will speak on "Twenty-one Years of Salvage and Reclamation Service in the Dupont Co;" William B. Foster, director of the company's service department, who will speak on the "Benefits of Salvage and Reclamation from a Service Rendering Standpoint;" and Dr. Charles M. Stine, chemical director of the company, who will discuss "Chemistry as an Aid in the Disposition of Industrial Wastes."

Press for Lower Freight Rate to Coast

(*Concluded from page* 1475)

joint rail-and-water rates and therefore should not suspend them. Secondly, the Illinois Central declared that it is not doing anything arbitrary or undertaking to give the territory from which the rates would apply an advantage, but, on the contrary, is merely undertaking to restore that territory to its place in the markets on the Pacific Coast it once held. The railroad company said it would welcome a hearing, suggesting the week beginning May 20, but said it should precede consideration by the commission of applications for suspension of the tariff. It is declared to be of the greatest significance that the protesting (Eastern) carriers have not alleged that the proposed rates would violate the act to regulate commerce and it is added that such a charge cannot be justified. The Illinois Central pointed out that the law specifically exempts from the minimum rate power of the commission joint rates where one of the carriers is a water line.

The Illinois Central petition said that it is not so much a question of comparative distances from Chicago and Pittsburgh through the Panama Canal as it is a question of placing the shippers of Chicago and the Middle West on a rate parity with their powerful competition in the United States.

"And they are entitled to at least a parity, bearing in mind that the overland short distances from Chicago are to Los Angeles, 2217 miles; San Francisco, 2260 miles, making a producer in Chicago, typical of the Middle West, 400 miles closer to the consumer in California than the Pittsburgh man, and, if there are rights constituted by difference in distances, those rights in this case accrue to Chicago and other midwestern points," said the petition.

The Bethlehem Steel Co., protesting against the tariff, contended that the present basis of charges to Chicago on business moving to Pacific ports is already more favorable than the basis accorded the Bethlehem company. The latter, it was pointed out, is subjected to charges based upon the full combination of the local rates to port of transshipment and beyond, whereas from Chicago to New Orleans the proportional rates are materially lower than the local rates contemporaneously prevailing.

OBITUARY

L. H. COOPER, secretary Crosby Co., Buffalo, manufacturer of sheet metal stampings, died suddenly on May 14.

WILLIAM WALLACE EWING, civil engineer and most recently representative in Japan for the Jones & Laughlin Steel Corporation, Pittsburgh, died on May 17 at the home of his son, in Syracuse, N. Y. He was born at Rochester 62 years ago. After some years of experience with the New York City department of building, he spent three years in engineering work at Barcelona, Spain. Later he was special agent in South America for the bureau of foreign and domestic commerce of the United States Department of Commerce. As representative of the Jones & Laughlin company he had traveled widely in Europe and Asia and had returned from Japan only two weeks prior to his death.

FREDERIC R. C. BOYD, president Power Equipment Co., Boston, died on May 15 at the Deaconess Hospital in that city, following an operation. He was born at Hartford, Conn., and after graduating from the Massachusetts Institute of Technology in 1901 he became associated with the General Electric Co., Lynn, Mass., in the turbine department. Subsequently he was connected with the Power Equipment Co., having become president four years ago.

EDWARD C. SMITH, president and founder of the Edward C. Smith Co., Chicago, plumbing supply manufacturer, died May 15.

JOSEPH RITER, formerly associated with the Riter-Conley Co., of which his father, Thomas B. Riter, was one of the founders, died May 16 in London, where he had made his home since 1916. He was 46 years old.

CAPT. THOMAS E. CLARK, president Marine Mfg. & Supply Co., Pittsburgh, died at his home in Bellevue, Pa., May 8. In 1885 Captain Clark entered the boat building industry and a short time later established a firm of steam engine builders, which later was merged with the Pittsburgh Valve, Foundry & Construction Co. In 1901 he established the Marine Mfg. & Supply Co. For 10 years he was president of the Allegheny River Improvement Association.

Automobile Production in April Highest, Except for March, in 20 Months

WASHINGTON, May 22.—Production of motor vehicles in the United States in April totaled 409,948, of which 364,877 were passenger cars and 45,071 were trucks. This compares with 413,379 vehicles in March, of which 371,821 were passenger cars and 41,558 were trucks, according to the Department of Commerce. The figures are based on reports from 160 manufacturers, 49 making passenger cars and 129 making trucks, 18 making both passenger cars and trucks. For the first four months of the present year production of passenger cars and trucks in the United States totaled 1,378,829 units, against 1,342,892 for the corresponding period of last year. Of the output in the current year, 1,233,425 were passenger cars, compared with 1,166,741 for the four months of 1927, and 145,404 were trucks, against 176,151 a year ago.

Except for March, the April production of passenger cars and of all vehicles was the greatest since August, 1926, when 426,606 vehicles were turned out, of which 382,651 were passenger cars. Three months in the spring of 1926—March, April and May—are the only other months since October, 1925, showing greater production than March or April, 1928.

European Prices Still Advancing

Upward Movement Based on Higher Production Costs—British Secure Contracts on Foreign Construction Projects

(By Cable)

London, England, May 21.

PIG iron is quiet, but Cleveland makers' stocks are now less than 10,000 tons and prices are firm. Export demand for East Coast hematite is improving as prices are low and makers are desirous of clearing off surplus stocks. Foreign ore is quiet.

The steel makers' association has reaffirmed the minimum quotations on plates and shapes and export inquiry is improving, but domestic business is generally poor, especially in shipbuilding materials.

Welsh tin plate bars are officially £5 17s. 6d. ($28.61), but some sellers are asking £6 ($29.22) and up to £6 2s. 6d. ($29.83) per ton is talked of because of the scarcity of scrap and the heavy demand. Tin plate is consequently strong for early delivery and the market is quite active with consumers covering steadily. Most makers are sold up to the end of August.

Galvanized sheet makers have advanced the agreed minimum price for No. 24 gage corrugated sheets 5s. ($1.22) per ton to £13 5s. per ton (2.88c. per lb.), mainly because of higher cost Continental steel. Inquiry is reviving, especially from India, but not much actual business has been done. Black sheets are dull and prices are unchanged.

Recent rail orders have included 7000 tons for the Central Argentine Railway placed with Bolckow, Vaughan & Co. Braithwaite & Co. are to build a Calcutta, India, bridge involving 17,000 tons of steel. Sir William Arrol & Co. have been awarded the contract for the Benue River bridge in Nigeria.

Continental iron and steel prices are strong as a result of the continued upward trend of Continental costs. Foreign sheet bars have sold at £4 18s. 6d. ($23.99) per ton, f.o.b. to Welsh consumers. Merchant bars are quoted up to £5 16s. per ton (1.28 per lb.), f.o.b. works, and good tonnages are reported to have been sold prior to the recent advance.

British Pig Iron Active; Tin Plate Mills Well Booked

London, England, May 11.—There have been few features of interest in the British iron and steel trade during the past two weeks. Production figures for April, which have just been released, show a decline of 37,600 tons in pig iron and 149,200 tons in steel, the decrease being due mainly to the Easter holiday. At the end of April, 149 blast furnaces were operating, a net decrease of one furnace. New inquiry for pig iron has been light, with the result that the Tees shipments in April were only 8053 tons. Cleveland makers, while having practically regained the home market, are striving to reestablish themselves in Continental markets, but there is a difference of 2s. 6d. (61c.) in the prices abroad, so that Continental producers are the gainers. Buying by domestic consumers is small. There has been a tendency to refrain from buying in the belief that makers would be obliged to give way on prices, but values are quite stable and purchasing is still of a hand-to-mouth character.

There is no improvement in the hematite market and, as stocks are large, producers are obliged to shade prices to secure orders. The slack market is due to the poor demand from foreign steel-producing countries, and East Coast makers have to compete with foreign producers on the Continent.

In semi-finished material there has been considerable strength in the market on Welsh tin plate bars, and, because of an acute shortage of heavy steel scrap, makers have been obliged to advance their quotations by 2s. 6d. (61c.) to £5 17s. 6d. ($28.50) per gross ton, and higher prices are expected. At the same time the Continental price has been advanced, so that the margin between the two remains about the same. There has been, however, a heavy demand for Welsh sheet bars by Welsh tin plate makers, who are now experiencing a revival of activity. Foreign demand for tin plate has developed, and makers have withdrawn the

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.		$4.27	
Bilbao Rubio ore*	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 5		15.83	
East Coast mixed	3 9	to £3 10s.	16.81	to $17.05
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up	7 15	to 8 0	37.75	to 38.96
Billets	6 0	to 6 10	29.22	to 31.66
Ferromanganese	13 15		66.97	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	5 17½		28.61	
Tin plate, base box	0 18¼	to 0 18⅓	4.45	to 5.02
Black sheets, Japanese specifications	13 5		64.53	
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 2½	to 9 12½	1.98	to 2.09
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 5		2.88	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.		$15.34	
France	3 3		15.34	
Luxemburg	3 3		15.34	
Basic pig iron (nom.)				
Belgium	3 0	to £3 1s.	14.61	to $14.85
France	3 0	to 3 1	14.61	to 14.85
Luxemburg	3 0	to 3 1	14.61	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 15		23.14	
France	4 15		23.14	
Merchant bars:			C. per Lb.	
Belgium	5 14	to 5 16	1.26	to 1.28
France	5 14	to 5 16	1.26	to 1.28
Luxemburg	5 14	to 5 16	1.26	to 1.28
Joists (beams):				
Belgium	4 18	to 5 0	1.08	to 1.10
France	4 18	to 5 0	1.08	to 1.10
Luxemburg	4 18	to 5 0	1.08	to 1.10
Angles:				
Belgium	5 10		1.21	
⅛-in. plate:				
Belgium (a)	6 12		1.45	
Germany (a)	6 12		1.45	
$\frac{3}{16}$-in. ship plate:				
Belgium	6 8		1.41	
Luxemburg	6 8		1.41	
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

restriction on output and mills are sold to normal capacity for many weeks, in some cases well toward the end of the year.

The heavy steel trade is still depressed. The makers' rebate scheme is not operating entirely satisfactorily, as merchants are dissatisfied with their treatment and are continuing more than ever to place orders on the Continent. Shipbuilders are receiving very few new orders, so that the plate mills are suffering from a lack of demand for ship steel. Domestic business in engineering and structural material contributes a fair tonnage, but export demand is negligible and plants can operate only on a part-time basis.

Trade with Far East Curtailed by Warfare in China

NEW YORK, May 22.—Export trade with the Far East is quiet, partly as a result of the warfare in China and partly because of the recent decline in the exchange value of the Japanese yen. There has been some inquiry from Japan for tin plate, one specification calling for about 10,000 base boxes of canning sizes. The Welsh price, however, is still lower than the quotations of American mills, although exporters to Japan express the opinion that the present range of $5.25 to $5.30 per base box, c.i.f. Japanese port, might be shaded to about $5.15 per base box if actual business were in sight.

Light-gage black sheets are quiet, British, German and Japanese domestic sheets being several dollars below the current offers of American mills, which are about $77 per ton, c.i.f. Japan. Recently the Kawasaki Dockyard Co., Japan, has been quoting prices equivalent to about $73.25 per ton, c.i.f. Japan.

Steel importers in New York report continued activity in steel hoops and bands and a moderate volume of business in structural material. Demand for bars, both plain and deformed, is rather light, and prices of the foreign product are high. Plain steel bars, following recent Continental advances, are quoted at 1.78c. to 1.80c. per lb., duty paid. Prices on foreign shapes are stronger, with the minimum at about 1.68c. per lb., duty paid, Atlantic port. There are some outstanding quotations on reinforcing bar projects, including an inquiry from the Ambursen Contracting Co., Grand Central Terminal, New York, for about 3000 tons of bars for work in Mexico.

Steel Dwelling Construction Being Hastened in Germany

With an estimated shortage of 800,000 dwellings in Germany, the development of steel house construction in that country is being hastened, according to a statement prepared by the iron and steel division, Department of Commerce, Washington, which is based on a report from Hugh S. Fullerton, consul at Cologne. Replacement of existing structures is fixed at 200,000 dwellings annually. It is estimated that between 150,000 and 200,000 houses will be built in the Cologne district alone, which supports a population in excess of 12,000,000, and that the average dwelling will accommodate 4.6 persons.

Widespread publicity pointing out the advantages of steel houses is being engaged in by manufacturers of these structures. Some of the most effective arguments relate to the simplicity and rapidity of this method of construction, its practicability, low price, hygienic character, durability, fireproof character, conservation of space in congested municipal areas and the general layout to provide for ample gardens and backyards. The prejudice against the steel house is traditional in the Cologne area and is based principally upon aesthetic grounds. Steel house manufacturers emphasize their durability and economy, thus appealing to the poorer and middle classes. At the same time attention is being given to steel houses of more pretentious and ornate construction. Steel houses constructed by various entities of the Vereinigte Stahlwerke in plants at Duisberg, Kettwig, Wuerenburg and Bochum in the Cologne district, as well as in such cities as Munich and Berlin, range in price between $1,428 and $2,380.

SWEDISH IRON AND STEEL

Poor Conditions Have Prevailed for Some Years —Production Only Half of Maximum

WASHINGTON, May 22.—Difficulties faced by the Swedish iron and steel industry, and its trade movement since 1920, are traced in a report prepared by A. Crenshaw Thompson of the iron and steel division, Department of Commerce. It is pointed out that it was not until 1924, however, that the situation became grave, due to competition with European countries, including Germany, France and Belgium-Luxemburg, with their depreciated currencies. Efforts to reduce wages developed labor troubles in the iron ore fields and in the steel industry. In 1925 vain attempts were made by the Government to bring about a merger of seven companies, but in the succeeding year four of the principal companies were consolidated through the efforts of the Svenska Handelsbanken, a large shareholder in each of the concerns affected. On Jan. 1, 1927, the new organization began operations, with production so apportioned that each company would make its own specialties.

Pig iron output in 1913 amounted to 730,300 metric tons, or approximately 100,000 tons less than that of the peak year of 1917. A steady decline from the latter year was experienced until the low mark of 264,300 tons was reached in 1922. While production of pig iron has recovered somewhat from the 1922 level, it is still only about 55 per cent of the last pre-war year.

Steel produced during 1913 totaled 749,400 tons, the peak output. It reached its lowest point in 1921, with 236,000 tons.

Of the 121 blast furnaces in the country only 33 were operated in 1927, when production was 413,500 tons, while of the 162 Lancashire open-hearth furnaces and 81 Martin furnaces only 54 and 31 respectively were active, producing 516,200 tons of steel.

Due largely to heavy shipments of scrap in the early months, exports of iron and steel in 1927 aggregated 287,700 tons, against 242,600 tons in 1926. Imports of iron and steel in 1927 increased to 333,200 tons, compared with 299,900 tons the preceding year. Exports of iron ore showed a large increase to 10,726,000 tons in 1927, compared with an estimated movement of 9,000,000 tons in 1926. Swedish iron ore deposits are calculated at 250,000,000 metric tons of high-grade material.

South African Railroads Use More Steel Ties

The South African Railway Administration, during the past four years, has been using steel ties in increasing quantities, according to a report received by the Department of Commerce, Washington, from the assistant trade commissioner at Johannesburg. It is stated that steel ties have been found to be more economical on light branch lines and on certain sections of the main system than wood ties. Present plans, the report says, are not to use steel ties to the exclusion of wood, but it is known that the administration favors the former whenever conditions are suited to their use. Purchases of steel ties from 1924 to 1927 were valued at £574,843, of which £414,991 worth come from Germany, £140,707 worth from France and £19,145 from Belgium.

Polish Steel Output Increases 64 Per Cent in 1927

Reflecting an increase of 361,316 metric tons, or 64.3 per cent, production of rolling mill products in Poland last year totaled 923,383 tons, compared with 562,067 tons in 1926, according to a report received by the Department of Commerce, Washington, from the assistant trade commissioner at Warsaw. The largest production of any single commodity was in structural shapes, of which 292,568 tons were rolled in 1927 and 189,303 tons in the preceding year. Next came black sheets, of which 211,151 tons were rolled last year, compared with 153,474 tons in 1926.

Machinery Markets and News of the Works

MARKETS ARE QUIETER

Sales Drop Off in Some Centers—Conditions Now Somewhat Spotty

Cincinnati Reports Only Slight Falling Off from April Rate but at Cleveland Decline Is 25 Per Cent

SPOTTY conditions are developing in machine tool business. At Cincinnati, the volume is described as "only slightly behind that of April," but at Cleveland the decline is as much as 25 per cent in some cases. Elsewhere, business is somewhat quieter.

Several of the Detroit automobile manufacturers are figuring on small lots of tools, but generally the peak of automobile buying for the first half of the year has been passed. Railroad buying continues disappointingly small, especially in the heavier tools. The Santa Fe has the only large list now before the trade. Some of the small tools inquired for have been bought, and orders for others are expected shortly.

Farm implement manufacturers are the principal support of trade in the Chicago district. New England looks to the development of the manufacture of airplanes and parts as an encouraging sign. In the New York district, the Wright Aeronautical Corporation is one of the most active buyers, its purchases last week including two engine lathes and other tools. The General Electric Co. has bought a few tools for service stations. Additional inquiries from this company are pending.

New York

NEW YORK, May 22.

THERE is very little new inquiry for machine tools, but some sizable business is still pending. The General Electric Co., Schenectady, has closed on a few of the tools for service stations and has additional inquiries for equipment in various plants. Further purchases of service station equipment are not planned until next month when a new appropriation is received. The Wright Aeronautical Corporation, Paterson, N. J., is still a buyer of machine tools and closed last week on several, including two engine lathes. The New York Central Railroad has inquiries out for a few small tools for the Collingwood shops at Cleveland and for shops of the Indiana Harbor Belt Railroad, Indiana Harbor, Ill.

The railroads continue inactive in purchases of tools. The list of the New York, New Haven & Hartford Railroad has not yet been closed and other railroad purchases have been decidedly small in the past week. There are two railroad shop equipment inquiries from foreign markets, however, which may develop into business sometime this year. One of these calls for a list of tools for export to Colombia and the other is for equipment of shops on the new Turkish railroads.

Plans are being arranged by Transogram Co., Inc., 215 Fourth Avenue, New York, manufacturer of toys, etc., for one-story plant at Haskell, N. J., to cost more than $70,000 with equipment. Missac Thompson, 191 Joralemon Street, Brooklyn, is architect.

Ward Leonard Electric Co., South Street, Mount Vernon, N. Y., manufacturer of electrical resistance products, has superstructure in progress for a one-story addition, 115 x 116 ft., to cost in excess of $85,000 with equipment.

Brislin Lumber Co., Jamaica Avenue, Brooklyn, has purchased former smelting and metallurgical works of Williams-Harvey Corporation, Mill Basin, Jamaica Bay, L. I., and will install conveying, elevating, loading and other equipment for a new storage and distributing plant.

Hugo F. Magnuson, 420 Lexington Avenue, New York, architect, has filed plans for a five-story automobile service, repair and distributing building, to cost close to $200,000 with equipment.

Quartermaster, Mitchel Field, Long Island, is asking bids until June 6 for motor-driven deep-well pumping station, with complete auxiliary apparatus.

Associated Gas & Electric Co., 61 Broadway, New York, operating electric light and power utilities in different parts of country, is disposing of bond issue of $35,000,000, a portion of proceeds to be used for expansion in properties, power lines, etc.

M. Raubvogel Co., 206 East 104th Street, New York, manufacturer of bakers' equipment and fixtures, has purchased factory at 413-15 East 109th Street, 50 x 100 ft., and will remodel for new plant.

Board of Trustees, Museum of Natural History, Columbus Avenue and Seventy-seventh Street, New York, is considering new power and service station to cost more than $500,000 with equipment. Trowbridge & Livingston, 527 Fifth Avenue, are architects.

Brooklyn Union Gas Co., 176 Remsen Street, Brooklyn, has filed plans for a one-story by-products plant, to cost close to $500,000 with machinery.

A. J. Thomas, 2 West Forty-seventh Street, New York, architect, has plans for two-story addition to automobile service, repair and garage building to cost approximately $100,000 with equipment.

Board of Education, Plattsburg, N. Y., plans installation of manual training equipment in new two-story high school to cost $200,000, for which bids will soon be asked on general contract. A. Irman, 35 Clinton Street, is architect.

New York Dock Co., 44 Whitehall Street, New York, has asked bids on general contract for a multi-story factory, storage and distributing plant at 336-74 Furnam Street, Brooklyn, to cost $2,200,000 with equipment. Russell G. Cory, 30 Church Street, New York, is architect and engineer. L. E. Driver is chief engineer for company.

Lidgerwood Mfg. Co., Lidgerwood Avenue, Elizabeth, N. J., manufacturer of hoisting machinery, etc., is reported planning early construction of one-story foundry at new plant, where production recently has been concentrated, to replace unit on Frelinghuysen Avenue, now in service for production of castings, which are being machined at Elizabeth works.

Bayway Terminal Co., Bayway, Elizabeth, N. J., operating a cotton storage and distributing plant, has filed plans for new five-story unit, 240 x 260 ft., to cost $200,000 with equipment. George F. Bial is company architect.

J. H. Gautier Co., 1 Greene Street, Jersey City, N. J., manufacturer of crucibles, refractories, etc., will rebuild portion of plant destroyed by fire May 17, with loss reported upward of $75,000 with equipment; boiler house was destroyed.

Western Electric Co., Kearny, N. J., has filed plans for new six-story unit, 200 x 300 ft., to cost $1,200,000 with equipment. Executive offices are at 195 Broadway, New York.

Plant and property of Sloan & Chace, Inc., Sixth Avenue and Thirteenth Street, Newark, manufacturer of machinery and tools, will be offered at a public sale May 28 by Oliver

The Crane Market

INQUIRY for overhead traveling cranes is small, but interest in purchases of locomotive cranes continues fairly active. The Amtorg Trading Corporation, 165 Broadway, New York, has appeared again as a prospective buyer for export to Russia, with an inquiry for five electrically driven locomotive cranes, capable of lifting 11,000 lb. at 92 ft. This would require a capacity of about 65 tons each. The New York Central Railroad has revived an old inquiry for two 20-ton locomotive cranes, which are to be used at Cleveland.

Among recent purchases are:

Empire Architectural Iron Works, 530 Truxton Street, New York, 5-ton, 47-ft. 6-in. span, 3-motor, overhead crane from Northern Engineering Works.

Lorain Steel Co., Johnstown, Pa., 20-ton, 66-ft. span overhead electric traveling crane from Alliance Machine Co.

W. Hopkinson, receiver, including good will and name of company as going concern.

Art Metal Works, Inc., has been organized under State laws to take over and expand company of same name with plant at 7 Mulberry Street, Newark, manufacturer of metal goods, including toys, novelties, etc. New company plans construction of addition for which adjoining site recently was acquired. A preferred stock issue to total $1,180,000 is being sold, portion of fund to be used for expansion.

Carrier Engineering Co., 750 Frelinghuysen Avenue, Newark, manufacturer of air-conditioning machinery and devices, has asked bids on general contract for one-story addition, to cost approximately $70,000 with equipment. R. DeVere Hope is company architect.

Board of Education, Paterson, N. J., will soon begin work on three-story addition to vocational school on Ellison Street, 60 x 100 ft., to cost in excess of $75,000.

Henry L. Crowley & Co., Inc., 545 North Arlington Avenue, East Orange, N. J., has been organized to manufacture synthetic ceramic products, particularly Crolite. Factory is in operation but company will be in market for additional equipment, especially machine tools similar to those used in metal works.

Buffalo

BUFFALO, May 21.

WORK is scheduled to begin soon by Great Lakes Portland Cement Co., Marine Trust Building, Buffalo, on new mill near Cleveland to cost more than $2,000,000. Company is affiliated with Lehigh Portland Cement Co., Allentown, Pa.

Niagara, Lockport & Ontario Power Co., Buffalo General Electric Building, Buffalo, has asked bids on general contract for one-story equipment storage and distributing plant, with repair facilities, at Angola, N. Y., to cost about $40,000.

Cheektowaga Crushed Stone Corporation, Cheektowaga, N. Y., recently organized by Mark Kyler, North Tonawanda, N. Y., and associates, has secured permission to construct and operate stone quarrying and crushing plant near Bennett and Union Roads, to cost $100,000, of which about one-half will be expended for machinery.

Board of Education, Lackawanna, N. Y., is considering installation of manual training equipment in new two-story high school to cost $250,000, for which plans are being drawn by Bley & Lyman, 505 Delaware Avenue, Buffalo, architects.

Gordon Motor Parts, Inc., Rochester, N. Y., recently organized by Simon Gordon, 240 Rosedale Street, and associates, with capital of $150,000 contemplates early operation of local plant for manufacture of automobile accessories and parts. Max Gordon, 350 North Main Street, Elmira, N. Y., will be one of heads of company.

New York Power & Light Corporation, Northampton, N. Y., will construct transmission lines to Hope, Wells, Bemson and vicinity, Hamilton County, about 25 miles, and install automatic substation equipment, etc.

Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of iron castings, etc., is carrying out an expansion and betterment program, including installation of mechanical sand-handling equipment and other apparatus, to cost about $45,000.

Rochester Brass & Iron Works Co., Rochester, N. Y., has sold building at 76 Exchange Street to Barr & Creelman Co., 74 Exchange Street, which will raze structure preparatory to erecting an addition. Brass & Iron Works company will remove to new location at Mount Hope and South Avenues where new building containing 20,000 sq. ft. of floor space is planned.

General Railway Signal Co., Rochester, N. Y., will distribute in United States and Canada Kuprox railroad rectifier, a device used in connection with changing of electric current from alternating to direct, which is being manufactured by Kodel Radio Corporation, Cincinnati.

New England

BOSTON, May 21.

AT least two local machine tool dealers the past week did a very good business, running into several thousand dollars each. Details are withheld, but it is understood that large tools were involved. In addition, final papers were closed on the sale of two floors of used equipment at the plant of the General Shoe Machinery Co., South Boston, including radial drills, milling machines, American shapers, planers, lathes, miscellaneous metal-working tools and wood-working equipment. A Jones & Lamson turret lathe, from another source, went to a Massachusetts shop, and drilling machines, small lathes, a fairly good sized power press, shear and miller made up a representative used tool market.

None of the so-called active new tool prospects were closed, and aside from additional requisitions for equipment from the Boston & Albany Railroad, new inquiries have been scarce. This railroad has a prospective list of more than 15 tools, mostly lathes, running from 14-in. to 24-in., and drilling machines. It is reported that the company will buy one or two tools each week, until the list is completed.

Small tools are still selling freely, with a majority of orders for immediate shipment.

New England has established a footing in the aircraft industry, and machine tool interests are watching its growth as a possible outlet for metalworking equipment. Most important of new industries is Pratt & Whitney Aircraft Co., Hartford, Conn., an offspring of Pratt & Whitney Co., which began in a small way in summer of 1925. Today it has 150,000 sq. ft. of manufacturing space, and this is expected to be greatly expanded within the next year. So far it has confined itself to supplying needs of Army, Navy and Marine Corps and Canadian Air Force, but it is gradually expanding its field. At Monson, Mass., in former Rubwood Wheel, Inc., plant, under secret environment, is being manufactured an airplane of unusual construction. It is reported that this plant is turning out planes molded from various materials by means of hydraulic pressure, quite a departure from recognized standards of today. Definite specifications and other important data are expected any day. Bourdon Aircraft Co., East Greenwich Bay, Chepiwanoxet, R. I., is producing planes. In several other New England localities companies are working either on airplane engines or superstructure, and as trend of superstructure is toward all metal, involving welding and other methods of construction, it is felt that New England has a potential undeveloped machine tool field.

Western Electric Co., West Haven, Conn., will erect plant for manufacturing and storage, to cost, without equipment, $100,000.

International Silver Co., Meriden, Conn., has acquired E. G. Webster & Sons, Inc., Brooklyn, and will remove business to Meriden. Parent company has under consideration purchase of new equipment, especially presses.

Alden Mfg. Co., Springfield, Mass., radio products, has leased manufacturing quarters on Plain Street, Brockton, Mass. Installation of equipment will start this week, and production will begin about July 1.

The Barker Steel Co., Boston, reinforcing steel, has moved from 19 Congress Street to 250 Stuart Street, room 310.

Plans have been filed by Koppers Co., New Haven, Conn., for one-story machine shop, 82 x 110 ft.; power substation, 35 x 70 ft., and booster shop, 31 x 42 ft., at its new gas and coke plant now in course of building. New structures will cost about $100,000 with equipment. Company is said to be concluding arrangements for purchase of substantial interest in Massachusetts Gas Companies, Inc., Boston, to be followed by construction of a second gas and by-products coke plant, to cost more than $4,000,000. Headquarters of Koppers Co. are in Union Trust Building, Pittsburgh.

Stone & Forsyth Co., 67 Kingston Street, Boston, paper products, has awarded general contract to Blake & Pope Co., 38 Chauncy Street, for a two-story addition to cost close to $50,000 with equipment.

Bullard Machine Tool Co., Bridgeport, Conn., has awarded general contract to Hewlett Co., 886 Main Street, for a two-story foundry addition, 100 x 200 ft., to cost in excess of $85,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, is architect and engineer.

Consolidated Lamp Co., Danvers, Mass., manufacturer of electric lamps, radio tubes, etc., has acquired factory of Albert M. Creighton Shoe Co., Lynn, Mass., and will remove present works to new location. Additional equipment will be installed.

Camire & Gauthier Welding & Machine Co., Lawrence, Mass., has leased old Boston & Lowell depot property, and will operate a new works at that location, including machine and parts, and welding divisions.

Ames Shovel & Tool Co., Seavey Street, Westbrook, Me., is considering rebuilding portion of plant destroyed by fire May 12, with loss reported close to $45,000 including equipment. Headquarters are in Ames Building, Boston.

Uppercu-Cadillac Co., 532 Fairfield Avenue, Bridgeport, Conn., representative for Cadillac automobiles, has filed plans for one- and two-story service, repair and garage building, 100 x 250 ft., to cost upward of $160,000 with equipment.

State Board of Education, Hartford, Conn., has awarded general contract to Wise & Upson, Inc., 7 Forest Street, for three-story State trade school at 10 Washington Street, and foundations will soon be laid. Equipment will be secured later, including machine shop, wood-working and carpenter shop, plumbing and electrical shops, automobile shop and other mechanical departments. Carl J. Malmfeldt and T. Merrill Prentice, Hartford, are associated architects.

St. Louis

St. Louis, May 21.

PROPERTY near Leeds, Mo., has been acquired by Chevrolet Motor Co., Detroit, for new assembling plant, comprising three main units, one-story, 462 x 480 ft.; one-story, 161 x 200 ft.; and three-story, 43 x 208 ft., to cost more than $1,000,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

Harrison Smith Co., 711 North Broadway, Oklahoma City, Okla., manufacturer of automobile accessories, has awarded general contract to Charles E. Huffman & Son, 224 West Twenty-third Street, for new two-story plant, 140 x 150 ft., to cost about $80,000 with equipment. Harry Reynolds, 915 North Hudson Street, is architect.

Poter Oil Refining Co., 1434 Whittenberg Avenue, St. Louis, is considering new oil storage and distributing plant, to cost in excess of $45,000 with equipment.

Southern Malleable Iron Co., Twenty-first and Bond Street, East St. Louis, Ill., has awarded general contract to St. Louis Structural Steel Co., Amherst Street, East St. Louis, for one-story foundry addition, 85 x 280 ft., to cost $40,000 with equipment.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has acquired municipal electric light and power plant at Elmore City, Okla., and plans expansion in that section, including transmission lines. Company has acquired municipal property at Calera, Okla., and will make similar extensions.

Leland I. Shumway, Alexander Building, Tulsa, Okla., architect, has completed plans for six-story and basement automobile service, repair and garage building, 100 x 140 ft., to cost close to $100,000 with equipment.

Imperial Casket Co., 1415 St. Louis Avenue, Kansas City, Mo., has asked bids on revised plans for two-story plant to cost close to $45,000 with equipment. W. J. Kosh, Mutual Building, is architect.

E. R. Porter, Brandeis Theater Building, Omaha, Neb., and associates will soon have plans drawn for three-story automobile service, repair and garage building, to cost about $160,000 with equipment.

Burlington Ice, Refrigeration & Express Co., Omaha, Neb., is planning early rebuilding of ice-manufacturing and cold storage plant destroyed by fire May 8, with loss reported in excess of $40,000 with equipment.

Laclede Power & Light Co., Eleventh and Locust Streets, St. Louis, has plans for a two-story power switching station, 20 x 145 ft., to cost about $45,000 with equipment.

Independent Plumbing & Heating Co., 1119 Chestnut Street, St. Louis, has awarded general contract to McCormack-Combs Construction Co., Columbia Building, for one and two-story storage and distributing plant, with pipe fitting and repair department, 110 x 281 ft., to cost about $125,000 with equipment. D. R. Harrison, Ambassador Building, is architect.

City Council, Campbell, Mo., is asking bids until June 5, for one-story municipal electric light and power plant, to cost approximately $40,000 with equipment. A. C. Moore, Joplin National Bank Building, Joplin, Mo., is consulting engineer.

Chicago

Chicago, May 21.

SALES the past week were widely scattered and usually in small lots. From the viewpoint of inquiries, the railroads are in need of little machine tool equipment. The Santa Fe has the only large list before the trade and it is moving very slowly, although there is some promise of more activity soon. The Chicago & North Western will buy an 18-in. x 2½-in. double-wheel grinder. Among industrials, farm implement manufacturers are the most active, the outstanding business before the trade being the list in preparation by Deere & Co. A plating equipment maker has ordered a 14-in. x 6-ft. lathe, and a tool and die shop has purchased a 3-ft. radial drill. Dealers are having little trouble in disposing of used tools in good condition.

Huguelet Brothers, 911 Ernst Court, Chicago, will build a four-story garage, 50 x 200 ft., to cost $150.000.

Northwestern Barb Wire Co., Sterling, Ill., suffered a $300,000 loss by fire on May 18.

Minnesota Steel Co., Duluth, is enlarging its steel fence post department 40 per cent.

Contract has been let by Link-Belt Co., 329 West Thirty-ninth Street, Chicago, to P. M. Tilley, Inc., 844 Rush Street, for one-story plant unit, 120 x 220 ft., to cost about $60,000 exclusive of equipment. H. Jacoby, 329 Pershing Road, is architect.

Duro Metal Products Co., 2649 North Kildare Street, Chicago, has awarded general contract to Austin Co. for one-story addition, to cost $50,000 with equipment.

American Gas & Power Co., Minneapolis, Minn., operating Minneapolis Gas Light Co. and other electric light and power properties, is disposing of bond issue of $6,500,000, a portion of proceeds to be used for expansion and acquisition of properties, transmission lines, etc.

City Council, Willmar, Minn., is asking bids until May 28 for equipment for municipal electric light and power plant, including one 1000-kw. engine generator and turbine generator set, one surface condenser, one cooling tower, with complete accessories. Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, Minn., is engineer.

Dominion Electric Co., 116 First Avenue, North, Minneapolis, Minn., manufacturer of electrical equipment and supplies, is reported planning two new units to cost close to $100,000 with equipment.

Hudson Mfg. Co., 324 Third Avenue, North, Minneapolis, Minn., manufacturer of pumping equipment for farms, barn equipment, etc., is said to be considering construction of new plant at Waukesha, Wis.

Cooper Mfg. Co., Marshalltown, Iowa, manufacturer of automobile parts and equipment is contemplating construction of one-story branch plant at Cedar Rapids, Iowa, to cost approximately $50,000 with equipment.

Dry Zero Corporation, 130 North Wells Street, Chicago, R. S. Phillips, head, manufacturer of dry ice under special process, is said to be planning a new plant to cost in excess of $60,000 with equipment.

Super Maid Corporation, Chicago, has been organized to take over and consolidate Super Maid Cook-Ware Corporation, 2742 West Thirty-sixth Place, and Advance Pattern & Foundry Co., with plant on adjoining site, manufacturer of aluminum cooking ware products. Work is in progress on a new unit of 65,000 sq. ft. floor space, providing a total of 120,000 sq. ft. in two plants. New company will dispose of stock issue to approximate $1,925,000, a considerable portion of fund to be used for expansion.

Common Council, Sleepy Eye, Minn., is asking bids until June 5 for new stoker suitable for 305-hp. boiler unit, now installed in municipal power station, with complete accessories. Charles Baugatz is superintendent of electric light and water works.

Ovens, power equipment, conveying and other machinery will be installed in new two and four-story plant to be built by Zinsmaster Baking Co., Sherburne and Park Streets, St. Paul, Minn., at Minneapolis, Minn., to cost $180,000. Charles W. DeJarnett, Hubbell Building, Des Moines, Iowa, is architect.

Union Furnace Co., Columbus, Ohio, has purchased Marshalltown Heater Co., Marshalltown, Iowa, and will continue manufacture of furnaces. Transaction will not affect Marshalltown Mfg. Co., which has been operated by same interests and which is now beginning expansion program to double plant production.

Blackhawk Foundry & Machine Co., Clark Street and Telegraph Road, Davenport, Iowa, manufacturer of aluminum and gray iron castings, has let contract for foundry, 42 x 90 ft., adjoining its present group of buildings. It will contain equipment for mixing, handling and conditioning sand for molding.

Rockford Metal Specialty Co., 700 Cedar Street, Rockford, Ill., manufacturer of metal stampings, has let contract for a two-story factory, 50 x 100 ft., to cost $100,000. It will be constructed to carry two additional floors. Company expects to occupy new building in about three months and will abandon old plant at 616 Cedar Street.

H. K. Porter Co., Pittsburgh, has removed its Chicago office from 447 Monadnock Building to Engineering Building at Wells Street and Wacker Drive. George Kirtley is district manager.

Manganese Steel Forge Co., Philadelphia, maker of manganese steel products, has removed its Chicago office from Old Colony Building to Builders Building, LaSalle Street and Wacker Drive. W. H. Potter is in charge.

Philadelphia

PHILADELPHIA, May 21.

PERMIT has been taken out by Philadelphia Rapid Transit Co., Broad and Locust Streets, Philadelphia, for a one-story repair shop to cost $115,000 with equipment.

Williams Brothers, Inc., 3078 Helen Street, Philadelphia, automotive engineer, has asked bids on general contract for one-story shop, 36 x 100 ft. Benjamin Shulman, 1722 Arch Street, is architect.

Cohn Brothers, 137 South Eleventh Street, Philadelphia, manufacturer of metal specialties, has leased three-story building at 1225 Race Street and will occupy for new plant.

Machinery and equipment of Eagle Charger Corporation, 121 North Eighth Street, Philadelphia, bankrupt, will be offered at public sale May 28, by Abraham Goldman, receiver.

Department of Wharves, Docks and Ferries, Municipal Pier No. 4, foot of Kenilworth Street, Philadelphia, Richard Weglein, director, will receive bids until May 28 for steel rolling doors for Cherry Street Pier No. 9, North Delaware Wharves, schedule D.

I. W. Levin, 1011 Chestnut Street, Philadelphia, architect, has asked bids on general contract for two-story automobile service, repair and garage building, 100 x 110 ft., to cost about $90,000 with equipment.

Niles-Bement-Pond Co., Meadow and Mifflin Streets, Philadelphia, Niles crane division, has filed plans for a one-story addition to cost about $19,000 with equipment.

Norman B. Mathieu, Philadelphia, has purchased three-story factory at 96 Collom Street, with L-extension, and will remodel for a woodworking plant.

Atlantic City Electric Co., Atlantic City, N. J., is negotiating for purchase of municipal electric light and power plant at Beach Haven and plans expansion, including transmission line construction.

Board of Education, Camden County Vocational School, Pensauken Township, N. J., has plans for two one-story additions to institution, 36 x 51 ft. and 25 x 26 ft. Lackey & Hettel, 5 Hudson Avenue, Camden, N. J., are architects.

Borough Council, West Chester, Pa., will receive bids until June 13 for equipment for pumping station and filtration plant for municipal waterworks, including motor-driven centrifugal pumps, electrical equipment, switchboard, filter equipment, etc., and one 3,000,000-gal. capacity steel reservoir piping and accessories. Remington & Vosbury, 509 Cooper Street, Camden, N. J., are engineers.

Board of School Control, Scranton, Pa., will take bids in about a month for four-story technical high school, with manual training division, to cost about $500,000 with equipment. A. J. Ward, Scranton-Lackawanna Office Building, Scranton, is architect.

Delaware Electric & Supply Co., Shipley Street, Wilmington, Del., is carrying out an expansion and improvement program, including new two-story equipment storage and distributing plant, pipe fitting and cutting shop, 90 x 90 ft.

City Garage, 718 Main Street, Towanda, Pa., operated by J. R. Overton and W. Smith, will take bids soon on general contract for new two-story service, repair and garage building, to cost in excess of $80,000 with equipment. H. C. Child, 501 South Keystone Avenue, Sayre, Pa., is architect.

Danville Structural Steel Co., Danville, Pa., has begun foundations for one-story addition to No. 2 plant, 95 x 250 ft., to develop tube mill to total length of 600 ft. Plant No. 1 is being rebuilt and additional equipment will be installed for increased output in brake beam division. Entire project will cost more than $300,000 with equipment.

South Atlantic States

BALTIMORE, May 21.

PLANS are being arranged by Bowker Chemical Co., First Street and Tenth Avenue, Baltimore, for rebuilding fertilizer manufacturing plant recently partially destroyed by fire, to cost upward of $45,000 with equipment. Engineering department, American Agricultural Chemical Co., 419 Fourth Avenue, New York, in charge.

Carolina Cement Co., New Bern, N. C., recently formed by J. A. Acker, Port Huron, Mich., identified with New Egyptian Portland Cement Co., has plans nearing completion for local mill on property acquired about five months ago, to consist of main kiln unit, 110 x 500 ft.; one-story grinding mill, 100 x 460 ft.; one-story machine shop, 50 x 155 ft.; storage and distributing plant, 180 x 580 ft.; power house with capacity of 5000 kva., and other structures, for output of about 4000 bbl. per day, to cost close to $2,000,000 with equipment. Samuel E. Flexner is consulting engineer.

Chemical Warfare Service, Edgewood Arsenal, Md., is asking bids until May 31 for taps, dies, reamers, cutters, mandrels, emery wheels, drills, etc., circular 109.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will take over plant and property of Northern Maryland Power Co. at Havre de Grace, Md., and vicinity, and plans expansion including transmission line construction.

Mount Airy Canning Co., Mountain Lake Park, Md., has plans for an addition to power house, to include installation of two 50-hp. boiler units, engine and auxiliary equipment.

Julian Friez & Son, Baltimore and Central Avenues, Baltimore, manufacturer of scientific instruments, etc., plan early call for bids for two-story addition, 67 x 85 ft., to cost approximately $75,000 with equipment. E. H. Glidden, Jr., American Building, is architect.

Georgia Power Co., Atlanta, Ga., has acquired municipal power plant at Winder, Ga., for $300,000 and plans expansion, including installation of additional equipment and construction of transmission lines.

Burwell-Harris Motor Co., 229 North Tryon Street, Charlotte, N. C., is completing plans for four-story addition to service, repair and garage building, totaling about 32,000 sq. ft. floor space, to cost in excess of $100,000 with equipment. Lockwood, Greene & Co., Charlotte, are architects and engineers.

Lindsay-McMillan Co., 93 South Water Street, Milwaukee, manufacturer of refined oils, has begun work on new branch plant at Savannah, Ga., where 5-acre tract was recently secured, for production of heavy oils from rosin under special process. It is reported to cost about $60,000 with equipment. Other units are contemplated later.

Virginia Electric & Power Co., Richmond, Va., plans expansion in vicinity of Quantico, Va., including construction of power transmission line from that place to Occoquan, to cost $150,000. Robert Throckmorton is manager of light and power division.

Board of Education, District of Columbia, District Building, Washington, is said to be planning installation of manual training equipment in new two-story junior high school in Brightwood district to cost close to $500,000, for which bids will be asked on general contract early in June. A. L. Harris, District Building, is architect.

General purchasing officer, Panama Canal, Washington, will receive bids until May 29, for 60 metal-cutting band saws, boiler punch dies, 200 chain shackles, six double-acting pumps, eye bolts and other equipment, Panama schedule 2458; until June 7 for gasoline section cars, split pulleys, wire cloth, gate valves, blower, tie plates, etc., Panama schedule 1878.

National Garages, Inc., 1432 Buhl Street, Detroit, has awarded general contract to Carr Construction Co., Candler Building, Atlanta, Ga., for five-story service, repair and garage building at Atlanta, 90 x 133 ft., to cost approximately $275,000 with equipment.

Board of Education, Atlanta, Ga., will receive bids until June 15 for mechanical and other equipment for all school buildings now authorized, to cost about $150,000, including addition to commercial high school, for which bids are being received on general contract until May 28. R. R. Ritchie is assistant superintendent.

Sterling Motor Truck Co., West Allis, Wis., has completed plans for a merger with Corbitt Truck Co., Henderson, N. C., and will carry out an expansion program. Both plants will be continued in service with provision for parts for Sterling trucks at Henderson works.

Semmes Motor Co., 613 G Street, Washington, has plans for four-story service, repair and garage building to cost about $200,000. George N. Ray, 1219 Connecticut Avenue, is architect.

Pittsburgh

PITTSBURGH, May 21.

MACHINE tool business still is disappointingly light. Inquiries create hopes that only infrequently are realized, and with most firms this month will probably be as lean in sales as April. A good many steel plant improvements are under way or in prospect, but they are not developing many machine tool inquiries, the call being chiefly for cranes and other heavy equipment.

In connection with proposed rayon mill at Meadville, Pa., Viscose Co. of America, Inc., Marcus Hook, Pa., plans purchase of pumping machinery, hydraulic filter presses, cast iron vessels, tin-lined steel vessels, bronze valve and fittings and other equipment. Information at purchasing department, Marcus Hook.

Fairbanks, Morse & Co., Law and Finance Building, Pittsburgh, are completing a new factory branch at Fortieth and Butler Streets, comprising repair works, storage and distributing departments. Headquarters are at 900 South Wabash Avenue, Chicago. R. J. Ray is district manager.

McKinney Mfg. Co., Metropolitan and Liverpool Streets, Pittsburgh, manufacturer of shelf hardware, builders' hardware, etc., has disposed of a stock issue to total $390,000, portion of proceeds to be used for expansion. Facilities will be provided for production of new line of hardware specialties.

Morrison, Gross & Co., Elkins, W. Va., operating a hardwood mill, are planning purchase of narrow gage industrial locomotive, 20 to 24 tons capacity.

Erie Railroad Co., Meadville, Pa., will make improvements in local west yards, including installation of ash-handling system, to cost close to $100,000. Engineering department, 50 Church Street, New York, in charge.

Baltimore & Ohio Railroad Co., B. & O. Building, Baltimore, has plans for rebuilding engine house and repair department at Connellsville, Pa., recently damaged by fire. H. A. Lane is chief engineer.

Norman Allderdice, 5727 Wilkins Avenue, Pittsburgh, and associates have organized Chromium Co. of Pittsburgh, Inc., and plan operation of local factory for manufacture of metal-plated goods. Mr. Allderdice will be treasurer; Edward C. McHugh, 747 Union Trust Building, is also interested in company.

Joseph Greenspon's Sons Iron & Steel Co., 3130 Hall Street, St. Louis, has taken title to plant of Sharon Pressed Steel Co., Sharon, Pa., idle for about four years, and will remodel for branch works for production of oil and gas well pipe.

Cleveland

CLEVELAND, May 21.

MACHINE tool business and inquiry is rather light. Orders with some manufacturers so far this month show a falling off of 25 per cent as compared with the corresponding period in April. An Ohio manufacturer outside of the automotive industry purchased five machines the past week and has a few more tools to place. Several Detroit automobile manufacturers are figuring on small lots of tools. In the Cleveland territory the market is dull with only a few scattering sales of single machines.

Contract has been let by United States Air Compressor Co., 5300 Harvard Avenue, Cleveland, to J. L. Hunting Co., Guarantee Title Building, for one-story addition, 140 x 150 ft., to cost approximately $65,000 with equipment. G. S. Rider Co., Century Building, is architect and engineer.

Eaton Axle & Spring Co., East 140th Street and New York Central Railroad, Cleveland, has leased a building at Bridgeport, Conn., for a new branch plant exclusively for manufacture of automobile bumpers, for which company has secured a contract totaling more than $1,200,000.

Board of Directors, Young Men's Christian Association, Central Branch, Cleveland, Robert Lewis, secretary, has plans for a four-story technical nad vocational school, 50 x 120 ft., to cost $200,000. Hubbell & Benes, 4500 Euclid Avenue, are architects.

Ohio Public Service Co., Lorain, Ohio, will carry out an expansion and improvement program at local Edgewater generating plant, including installation of new generating equipment and auxiliary machinery to cost close to $450,000. Work has been started on new power sub-station. Executive offices are in Hanna Building, Cleveland. Plans are nearing completion for one-story equipment storage and distributing plant, with repair facilities, at Elyria, Ohio, to cost approximately $80,000 with equipment. R. S. Silsbee, Elyria Savings & Trust Building, is architect for latter structure.

J. F. Steffens, Fidelity Mortgage Building, Cleveland, architect, has revised plans for two-story automobile service, repair and garage building, to cost in excess of $100,000 with equipment.

Electric Public Utilities Co., Findlay, Ohio, operating electric light and power and railroad properties, is disposing of a note issue of $3,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction.

J. T. Seaver, Inc., Fairmount Cedar Building, Cleveland, has been appointed representative in that district for American Hoist & Derrick Co., St. Paul, Minn.

Steel Improvement & Forge Co., Cleveland, recently at 5003 Windsor Avenue, has completed new shop on Addison Road which it will occupy shortly. Company manufactures drop forgings and does general jobbing business. Considerable new equipment has been purchased.

Gulf States

BIRMINGHAM, May 21.

PLANS are being arranged by Valley Bonded Warehouse Co., Brownsville, Tex., for a two-story cold storage and refrigerating plant, 100 x 235 ft., to cost about $250,000 with equipment. J. A. Taylor, 2302 Indiana Street, Houston, Tex., is engineer.

Sweetwater Refining Co., Sweetwater, Tex., has been acquired by new interests, headed by J. A. Johnson, Tulsa, Okla., which will reorganize company and operate under name of Sweetwater Oil & Refining Co. Plans are under way for extensions and improvements in local refinery to more than double present capacity, to cost upward of $80,000 with machinery.

Saxet Co., Houston, Tex., operating Saxet Gas Co., with natural gas properties in south central section of State, and Saxet Sand & Gravel Co., operating plants in same district, is disposing of bond issue of $1,850,000, a portion of proceeds to be used for expansion and installation of additional equipment.

Continental Wirebound Box Co., 1909 Campbell Street, Houston, Tex., has purchased plant and business of Republic Box Co., 4100 Leeland Avenue, and will consolidate with organization. Plans are being arranged for expansion.

Alabama Power Co., Birmingham, has begun excavations for new steam-operated electric power plant on Warrior River, near Gorgas, Ala., with initial capacity of 80,000 hp. It is proposed to have station ready for service early next year. Provisions will be made for later installation of three additional generating units of same size. Extensions will be made in transmission lines. Entire project will cost more than $15,000,000.

Burford Oil Co., Shreveport, La., recently formed by F. W. Burford, vice-president and general manager Crystal Oil Refining Corporation, Shreveport, and associates, with capital of 200,000 shares of stock, no par value, has acquired property at Pecos, Tex., and plans early construction of new oil refinery with capacity for handling about 5000 bbl. crude oil per day; department will be installed for refining of gasoline. A pipe line will be constructed from Hendricks field, Winkler County, to new refining unit. Entire project will cost in excess of $600,000.

United States Hammered Piston Ring Co., 611 First Avenue, St. Petersburg, Fla., W. T. Baynard, manager, is having plans prepared for new one-story factory to cost close to $50,000 with machinery. Edgar Ferdon, Sumner Building, is architect.

Clarence W. King, Giddens-Lane Building, Shreveport, La., architect, will take bids on general contract early in June for four-story automobile service, repair and garage building, to cost close to $100,000 with equipment. Same architect also has plans for three-story and basement garage unit, 115 x 150 ft., to cost approximately $95,000 with equipment.

Following recent sale of note issue for $2,500,000, Texas Cities Gas Co., El Paso, Tex., operating natural and artificial gas properties, is arranging for additional financing and will dispose of bonds in amount of $5,400,000, a considerable portion of fund to be used for expansion and betterments in plants and systems.

Common Council, Mangham, La., is asking bids until May 31 for equipment for municipal waterworks, including pumping machinery and accessories and elevated tank and tower F. P. Joseph, Glenmora, La., is consulting engineer.

Swift & Co., Union Stock Yards, Chicago, has awarded general contract to R. S. Gillespie, 111 West Ashley Street, Jacksonville, Fla., for multi-story lard and vegetable oil refinery at Jacksonville, 100 x 200 ft., to cost approximately $240,000 with machinery.

State Building Commission, Jackson, Miss., O. J. Turner, Belzoni, Miss., member in charge of budget, is arranging fund of $225,000 for construction of new power plant, ice-manufacturing and cold storage plant at East Mississippi Hospital for Insane; and fund of $225,000 for new structures at Alcorn Agricultural and Mechanical College, including mechanical trades building.

Mississippi Power Co., Gulfport, Miss., is planning extensions and improvements in vicinity of Richton and Hattiesburg, Miss., including construction of about 44 miles new power transmission lines, installation of automatic substation equipment, etc., to cost upward of $80,000.

Town Council, Wiggins, Miss., is asking bids until May 29 for equipment for municipal waterworks, including motor-driven centrifugal pumping unit and accessories; elevated tank on 100 ft. tower, 100,000-gal. capacity, etc. Morgan & Co., Edwards Building, Jackson, Miss., are engineers.

Cincinnati

Cincinnati, May 21.

SALES held up fairly well the past week, and the amount of business placed with local machine tool builders is running only slightly behind that in April. The market is somewhat spotty, however, with some manufacturers reporting a moderate volume of orders and others stating that activities are quiet. A pick-up in sales of heavy tools is a development worthy of note. The Santa Fe, which recently purchased some of the small machines on its list, is now closing for large equipment on which bids were taken several weeks ago. The Southern Pacific has bought a 30-in. x 14-ft. heavy-duty engine lathe, while the Department of City Transit, Philadelphia, has contracted for a No. 2 carwheel lathe, a 48-in. carwheel borer and a combination journal turning and axle lathe.

Metal Aircraft Corporation, Cincinnati, recently incorporated, will begin construction of a one-story building containing 35,000 sq. ft. for manufacture of an all-metal monoplane. Thomas E. Halpin is third vice-president and general manager.

Contract has been let by National Broach Co., Third and June Streets, Dayton, Ohio, to J. C. Gohn, Dayton, for one-story addition to cost approximately $27,000 with equipment. Oscar M. Pook is president.

Hedges, Walsh & Weidner Co., Chattanooga, Tenn., has been organized to take over and consolidate Walsh & Weidner Boiler Co., West Main and Sycamore Streets, and Casey-Hedges Co., Chestnut and Twenty-sixth Streets, manufacturer of boilers, tanks and other plate products. Present plants will be continued in operation, and plans are being arranged for expansion in production. M. M. Hedges will be president of consolidated company.

City Council, Paducah, Ky., is considering installation of a municipal electric light and power plant, to cost in excess of $75,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Board of Education, Mount Healthy, Ohio, is considering installation of manual training department in new two-story high school to cost close to $170,000, for which bids have been asked on general contract. Samuel Hannaford & Sons, Dixie Terminal Building, Cincinnati, are architects.

An industrial committee at Columbia, Tenn., headed by Dr. J. B. Hardison, chairman, is in negotiation with a company, name temporarily withheld, for establishment of local foundry for production of stove castings. Initial unit, to be provided by city, will be one-story, 70 x 320 ft., with adjoining site for expansion.

Henry Fischer Packing Co., 1860 Mellwood Avenue, Louisville, will erect one-story and basement cold storage and refrigerating plant, 70 x 93 ft., to cost approximately $50,000, with equipment.

Schuler Axle Co., N and Jones Streets, Louisville, is planning for one-story addition to cost close to $20,000 with equipment.

Dayton Power & Light Co., Dayton, Ohio, is completing plans for new auxiliary steam-operated electric power plant, to cost in excess of $300,000 with equipment. Extensions will be made in transmission lines.

Emery Candle Co., Cincinnati, has changed its name to Emery Industries, Inc.

Indiana

Indianapolis, May 21.

PLANS are being drawn by Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Cincinnati, for new engine house and shops at Beach Grove, Ind., to cost more than $200,000 with equipment.

Board of School Trustees, Sheridan, contemplates installation of manual training equipment in two-story and basement high and grade school to cost $250,000, for which bids will be asked on general contract in July. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Central Indiana Power Co., 2 West Washington Street, Indianapolis, is disposing of note issue of $3,000,000, a portion of proceeds to be used for expansion, including transmission line construction. Company is affiliated with Middle West Utilities Co., 72 West Adams Street, Chicago.

Enos Coal & Mining Co., Oakland City, has plans for one and two-story equipment storage and distributing plant, with repair facilities, to cost approximately $50,000 with equipment. H. D. Boyle, Furniture Building, Evansville, Ind., is architect.

Board of Trustees, Edinburg, is asking bids until June 4 for a municipal electric light and power plant. Donald Graham, Hume-Mansur Building, Indianapolis, is architect. Roy Porter is city clerk.

Delco-Remy Corporation, Anderson, manufacturer of automobile starting and lighting equipment, division of General Motors Corporation, is completing plans for one-story addition to plant on Noble Street, 250 x 270 ft., to cost upward of $100,000 with equipment. Portion of structure will be equipped as foundry.

Indiana Electric Corporation, Indianapolis, has arranged for a bond issue of $3,268,000, portion of proceeds to be used for expansion in power facilities and transmission lines.

Hoosier Gas & Light Co., Greensburg, is completing arrangements for purchase of natural gas properties and systems in this vicinity, including Zoller Gas Co., Muddy Fork Gas Co., Citizens' Gas Supply Co., and Hoosier Public Utilities Co. Permission has been asked to dispose of bond issue of $500,000, and stock issue of 10,000 shares, no par value, proceeds to be used in part for acquisition of properties and extensions in facilities, pipe lines, etc.

Shadberg Co., 4048 North Pennsylvania Avenue, Indianapolis, has been organized to take over patents on shallow well water pumps, line shaft clutches and rights on certain automobile brake inventions. Company will probably grant rights for manufacturing these products to other companies

Milwaukee

Milwaukee, May 21.

ORDERS for machine tools are being maintained at a fairly even rate, and judging by inquiry, prospects are for a continuance of moderate activity. There has been an improvement in opinion concerning the future, due largely to the fact that business has held up considerably better than had been expected. Few users are undertaking or contemplating plant expansion, but there is more than the usual effort to make replacements to keep shops at the highest efficiency. Business is coming from widely diversified sources, and the aggregate of orders is relatively satisfactory.

City Commission, Kenosha, Wis., is asking for bids until June 1 for construction of a municipal filtration plant designed by Alvord, Burdick & Howson, consulting engineers, Chicago, and estimated to cost $95,000. Proposals are solicited on any or all of these contracts; (a) Filter plant structures; (b) filtration equipment, 6,000,000 gal.; (c) steel wash water tank, 100,000 gal. C. M. Osborn is city manager, and P. J. Hurtgen, director of public works.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., has accepted bid of J. H. Findorff & Son, local, for general contract to erect a ten-story headquarters building, including motor bus terminal, garage and maintenance plant. The total cost will approximate $500,000. E. J. Kallevang is chief engineer. Architects are Law, Law & Potter, Madison.

Racine Electric Co., Bridge and Ontario Streets, Racine, Wis., manufacturer of fractional horse-power motors for household and industrial appliances, has changed its name to Racine Universal Motor Co., and increased its capitalization from $75,000 to $120,000. Enlargement of plant and production is contemplated, but details have not been divulged.

Wisconsin Knife Works, Clinton, Wis., manufacturer of high-speed steel knives, carbon steel cutters, molding blanks, etc., has been taken over by a group of Beloit, Wis., capital and will build a new plant in Beloit, 40 x 250 ft., part two stories and basement, costing about $50,000. Construction contracts have just been awarded. P. G. Farrow, 902 Wisconsin Avenue, Beloit, is president and general manager.

Tobin Tool & Die Co., 220 Ruggles Street, Fond du Lac, Wis., has broken ground for a one-story addition, 50 x 75 ft., designed by Frank J. Stepnoski, local architect. An investment of about $20,000 in building and equipment is contemplated.

Badger Metal Products Co., Milwaukee, has been organized with $20,000 capital stock to manufacture metal and wood products, forms, dies, etc. The principals are Russell W. and John K. Stambaugh, 683 Fiftieth Street, and W. E. Browne. Plans for manufacturing will be made public shortly.

Loeffelholz Co., 170 Clinton Street, manufacturer of brass castings, has started work on erection of a shop extension costing about $25,000.

Eastman Mfg. Co., 1002 North Eleventh Street, Manitowoc, Wis., manufacturer of hose couplings, is building a $20,000 manufacturing addition.

George H. Smith Steel Casting Co., 500 Clinton Street, Milwaukee, has increased its capitalization from $450,000 to $810,000, to accommodate growth of business. Some new construction is contemplated, but details are not yet ready.

Hudson Mfg. Co., Minneapolis, Minn., steel barn equipment, farm pumps, vents, hay loaders, etc., is negotiating with Association of Commerce of Waukesha, Wis., with a view of building a new plant in which its operations will be consolidated. It now maintains factories in Minneapolis and at Oshkosh and DePere, Wis. Annual output is valued at $2,000,000.

Detroit

DETROIT, May 21.

AN expansion program is being arranged by O. L. Anderson Co., Inc., 1347 East Fort Street, Detroit, manufacturer of sheet metal parts for automobiles, including gasoline tanks and fenders, to include installation of additional equipment, to cost more than $35,000.

Wilder-Strong Implement Co., First Street and Kentucky Avenue, Monroe, Mich., is said to have plans under way for rebuilding portion of plant recently destroyed by fire, with loss in excess of $35,000 with equipment.

Public Lighting Commission, 172 East Atwater Street, Detroit, is having plans drawn for extensions in municipal electric lighting plant with installation to include a 20,000-kw. turbo-generating unit, condenser, boilers, stoker, pumping machinery and accessories, to cost about $550,000. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

General Motors Truck Corporation, Flint, Mich., is planning for early removal of its yellow taxi-cab manufacturing division from Chicago to new main plant at Flint, recently completed, where increased capacity will be developed. Production will be concentrated at local works for motor trucks, parlor coaches and taxi-cabs.

Grand Rapids Sash & Door Co., Grand Rapids, Mich., is considering rebuilding portion of millwork plant destroyed by fire May 13, with loss reported at $100,000 including machinery.

Chevrolet Motor Co., Flint, Mich., is said to be planning early call for bids for new branch plant at Saginaw, Mich., consisting of several two-story units to cost more than $5,000,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect.

Consumers Power Co., Jackson, Mich., will soon begin work on a one-story addition to steam-operated electric generating plant at Grand Rapids, Mich., 80 x 100 ft., to cost more than $400,000 with equipment.

Kinsey Motors, Inc., 105 Sheldon Street, S. E., Grand Rapids, Mich., has filed plans for one-story service, repair and garage building, 100 x 170 ft., to cost close to $90,000 with equipment.

Chrysler Motor Corporation, Highland Park, Detroit, has plans for a new four-story unit, largely for assembling, to cost upward of $450,000 with machinery. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Accuralite Co., Terrace Street, Muskegon, Mich., manufacturer of piston rings and kindred products, will soon begin erection of one-story plant, 80 x 200 ft., to cost approximately $40,000 with equipment.

Fisher Body Corporation, General Motors Building, Detroit, manufacturer of automobile bodies, is reported planning construction of new plywood mill in vicinity of Longview, Wash., where site is being secured, to cost more than $350,000 with equipment.

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, has leased property at Muskegon, Mich., for new oil storage and distributing plant, including pumping facilities for loading tank cars, to cost close to $100,000 with equipment.

Michigan Clay Products Co., Williamston, Mich., manufacturer of brick, is considering an expansion program to double present capacity, including installation of presses, conveying machinery, power equipment and other apparatus to cost more than $85,000.

Allis-Chalmers Mfg. Co., Milwaukee, has removed its Grand Rapids, Mich., branch to 310 Building & Loan Building. G. C. Culver is in charge.

Pacific Coast

SAN FRANCISCO, May 16.

CONTRACT has been let by Magnavox Co., Emeryville, Cal., manufacturer of radio equipment, to H. J. Christiansen, Syndicate Building, Oakland, Cal., for one-story addition to cost close to $25,000 with equipment. B. J. S. Cahill, 357 Twelfth Street, Oakland, is architect.

H. C. Smith Co., Los Angeles, manufacturer of oil well equipment and supplies, has awarded general contract to Union Iron Works for new plant, consisting of main machine unit, one story, 70 x 225 ft.; one-story welding works, 60 x 100 ft.; warehouse and distributing unit, 60 x 125 ft.; office and administration building, 45 x 80 ft., to cost approximately $100,000 with equipment.

Fred D. Colby, 215 Currier Building, Los Angeles, has filed plans for a one-story battery and electrical equipment repair works, 50 x 120 ft., to cost close to $20,000 with equipment. J. T. Zeller, Currier Building, is architect.

City Council, Ellensburg, Wash., is considering extensions and improvements in municipal electric light and power plant, including installation of equipment, to cost more than $35,000.

Binder & Curtis, 35 West San Carlos Street, San Jose, Cal., architects, have plans for two-story automobile service, repair and garage building, to cost $150,000 with equipment.

Celite Products Co., 1320 South Hope Street, Los Angeles, manufacturer of insulating products, is planning extensions and improvements in plant of National Magnesia Co., Redwood City, Cal., recently secured. Work will consist of new buildings and installation of machinery for mining raw material, refining, etc., to cost approximately $200,000.

Uttley & Kleindenst, 354 Hobart Street, Oakland, Cal., engineers, have plans for a cold storage and refrigerating plant for company whose name is temporarily withheld, to cost upward of $400,000 with equipment.

City Water Board, Eugene, Ore., is asking bids until June 5 for construction and equipment for municipal hydroelectric power project, comprising Leaburg unit with power dam, penstocks, tailrace, headworks, etc., one-story power house, 48 x 83 ft., for ultimate output of 210,000 hp.; 30-ton traveling crane switchboard and auxiliary apparatus. Stevens & Koon, Spalding Building, are engineers.

Richfield Oil Co., Seattle, has leased waterfront property and plans early construction of oil storage and distributing plant, to cost close to $200,000 with equipment.

Royal Crystal Salt Co., Salk Lake City, Utah, care of I. A. Clayton, Jr., 201 Regent Building, an official of Inland Crystal Salt Co., has plans for a new refinery on tract of salt deposits about 12 miles from city, to cost close to $400,000 with machinery.

Firestone Tire & Rubber Co., Akron, Ohio, has acquired property, 140 x 200 ft., at Phoenix, Ariz., and plans construction of factory branch and distributing plant to cost in excess of $100,000 with equipment.

Los Angeles Gas & Electric Corporation, Los Angeles, has purchased site at Alhambra, Cal., for new equipment storage and distributing plant, with repair department, to cost $50,000 with equipment.

Portland Bolt Co., Fourteenth Street, Portland, has plans for a two-story addition, 80 x 85 ft., to cost about $27,000 with equipment. Edmund T. Bidwell, Corbett Building, is architect.

Winner Tool Co., Puyallup, Wash., is in the market for two No. 3 double Lapointe broaching machines; two No. 1 single or double Lapointe broaching machines; one No. 0 single Lapointe broaching machine; two No. 7 H Becker

Lincoln type millers; one five or six-spindle sensitive high-speed drilling machine ½-in. or ⅜-in. capacity.

Pure Iron Culvert & Mfg. Co., Portland, Ore., has been appointed distributer in Oregon and western Washington for wire fence and highway guard products of Page Steel & Wire Co., Bridgeport, Conn. Eugene W. Gibson is manager of Portland company.

Earl Aircraft Corporation, Portland, Ore., is receiving machinery for plant to manufacture an airplane motor designed by Harry W. Earl, president of new company.

Woodbury & Wheeler, 55 Second Street, Portland, Ore., and Cunningham Electric Co., 2123 Pacific Avenue, Tacoma, Wash., have been appointed representatives in their respective districts for Foote Brothers Gear & Machine Co., Chicago.

Canada

TORONTO, May 21.

BOTH dealers and builders report a good demand for machinery and tools, manufacturers also having a considerable volume of unfilled orders on their books. Sales the past week were somewhat better than those for the first two weeks in May, and business for the month promises to compare favorably with any month so far this year. A small list of machine tools and woodworking equipment has been closed by the local Board of Education for a technical school, and some fair sized inquiries are out for new industrial plants.

Backus Brooks Co., Minneapolis, Minn., through its subsidiary, Great Lakes Paper Co., Ltd., will erect a newsprint paper mill at Fort William, Ont., to have an annual capacity of 100,000 tons, with provision for increasing this to 200,000 tons. First unit of mill will be started within a month.

Robert Mitchell Co., Ltd., Montreal, has purchasel local plant of National Bronze Co., Ltd., and will carry on manufacture of architectural bronze, fittings, etc.

Electric light and power plant at St. Jovite, Que., was totally destroyed by floods several days ago, causing loss to plant and equipment of $30,000.

Public Utilities Commission, Picton, Ont., will proceed with construction and installation of waterworks plant and system to cost $50,000. New pump house will be erected and auxiliary gas engine and other equipment will be installed.

Suspended-Air-Tires, Ltd., 1089 Bathurst Street, Toronto, will build a factory at Orillia, Ont., one story, 100 x 100 ft.

Eastern Cement Products, Ltd., 111 Princess Street, East St. John, N. B., will start work immediately on erection of a factory. John Flood & Sons have general contract.

Sandwich Foundry Co., 400 Bloomfield Avenue, Sandwich, Ont., has awarded several contracts in connection with erection of a one-story addition to its foundry, to cost $20,000. New equipment will be purchased.

Foundation Co. of Canada, Ltd., 745 Sherbrooke Street West, Montreal, has the general contract for addition to Three Rivers, Que., paper mill of St. Lawrence Paper Mills, Montreal. Engineer, H. S. Taylor, 1111 Beaver Hall Hill, Montreal. Addition will be one story, reinforced concrete construction.

Ratepayers of Gore Bay, Ont., have authorized expenditure of $15,000 for erection of an electric light plant.

Canadian Salt Co., Sandwich, Ont., will build addition to its plant to cost $300,000.

St. Jerome Light & Power Co., St. Peter Street, Quebec, has awarded contract to Ferland & Laliberte, for construction of a hydroelectric power plant at Metabetchouan, Que.

R. T. Gee Co., 173 Dundas Street, London, Ont., has let contract to C. Hubbell, Thamesville, Ont., for erection of a factory at Thamesville, to cost $32,000. It will consist of four buildings, each 40 x 120 ft.

Western Canada

W. J. Cunningham, superintendent, Edmonton, Alta., has recommended purchase of $34,000 worth of new machinery for city power plant. While the machinery proposed will meet present needs, a larger program will have to be considered within two years.

Crow's Nest Pass Coal Co., Fernie, B. C., has started work on a power plant, 35 x 102 ft., at Coal Creek to cost $25,000. B. Caulfield is engineer.

Bartholomew, Montgomery & Co., Standard Bank Building, Vancouver, B. C., have contract for building hydroelectric power development plant at Whitewater Mines, B. C., to cost $20,000 for Whitewater Mines, Ltd., Vancouver and Retallack, B. C.

With granting of licenses by Provincial Government of British Columbia permitting use of Nimpkish River for power purposes, Canadian Forest Products Ltd., an organization backed by International Harvester Co. of Chicago will erect a paper mill and power development plant on east coast of Vancouver Island. Plans have been completed for construction of a dam 200 ft. high.

Foreign

PLANS are being arranged by Stewarts & Lloyd of Australia, Ltd., Sydney, for new mill for manufacture of welded steel pipe and tubing under lap-weld process, to cost close to $4,750,000. Company is branch of English concern of same name, with plants at Birmingham, England, and Glasgow, Scotland.

Standard Oil Co. of New Jersey, Inc., 26 Broadway, New York, is reported planning early construction of new plant in Ruhr district, Germany, for production of glykol, a substitute for glycerin, for which process patents were secured from German Dye Trust several months ago. Initial units are expected to cost more than $500,000.

Brown Coal Industrial Corporation Zunkunft, Dortmund, Germany, manufacturer of brown coal briquettes, is disposing of bond issue of $2,000,000 in United States, portion of fund to be used for expansion and improvements. Company also operates power properties, and is controlled by Rhine-Westphalia Electric Power Corporation, with plant and system in Westphalia district.

Corn Products Refining Co., 17 Battery Place, New York, is planning for new refinery at Sao Paulo, Brazil, to cost close to $1,000,000 with machinery. Similar plant is contemplated in Japan, work to begin early next year.

Officials of State of Hessen and City of Frankfort, Germany, have organized Hefrag Corporation, to construct and operate a coal distillation plant and power station at Wolfersheim, Wetterau district, utilizing brown coal deposits in that section. Project will include by-products units for tar and tar products, and benzine factory, with coal-preparing works, drying plant and other divisions. Entire enterprise is estimated to cost 10,000,000 m. (about $2,380,000) with machinery. American Consulate, Frankfort-on-Main, Germany, Hamilton C. Claiborne, consul, has information regarding project.

Durant Motors, Inc., 250 West Fifty-seventh Street, New York, has purchased property through its president, William C. Durant, now abroad, from Deutsches Werke at Havelhost, suburb of Berlin, Germany, consisting of group of buildings on about six acres. Structures will be remodeled for branch plant and will be ready for service in about 90 days.

New Trade Publications

Regenerative Air Preheater.—Blaw-Knox Co., Pittsburgh. Folder of 6 pages, illustrated, describing a method of holding air at 1500 deg. Fahr. without the use of checkers. Some of the illustrations show applications.

Reducing Gears, etc.—Winfield H. Smith, Inc., Springville, N. Y. Booklet of 16 pages illustrating and describing speed reducers of various types, together with pulleys, pillow blocks, hangers, etc.

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Vertical and Overhead Core Ovens

Greatly Increased Capacity from Removing Old Ovens from Floor—Continuous Conveyors Handle Cores Through Ovens

BY ROGERS A. FISKE*

HEMMED in on all sides so that an extension to the foundry building was impracticable, the Nash Motors Co., Kenosha, Wis., has taken advantage of its air-rights between the floor and the roof of the foundry building, with the net result that, where formerly it appeared that all available production space was in use, there now stands equipment that has increased production by 50 per cent and has halved direct labor cost. Furthermore, in laying out the new plan it was found that the saving in floor space was such that the new units can be duplicated, thus doubling the present output. Not one square foot has been added to the foundry building, nor will any increase be necessary when the present equipment is duplicated.

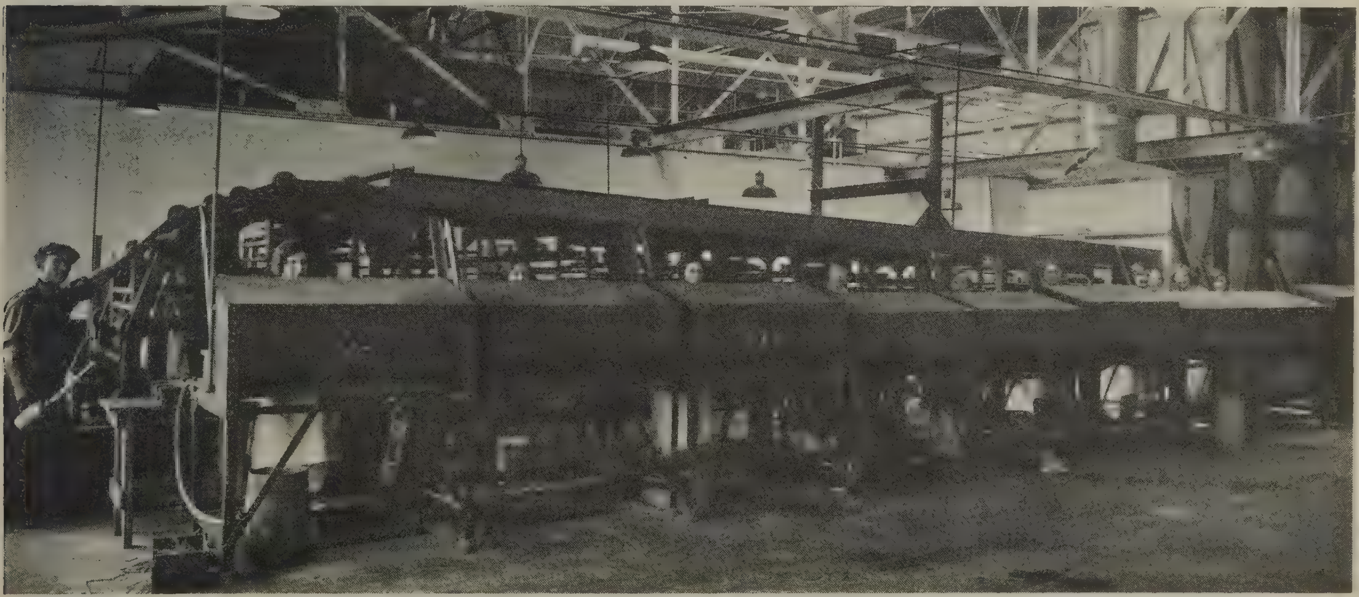
Early in 1926 truck conveyors and sandslingers were installed for the production of cylinder, cylinder head and transmission case castings. The capacity of this equipment was never fully utilized for the reason that core-making facilities, limited by the floor space in the foundry, were inadequate. This situation led to the installation of three continuous core ovens, two of the vertical type and the third arranged overhead, so that molders may now use the space formerly occupied by the old core ovens. One oven is used for baking small cores, another for large core work, and the third is a drying oven for cores that have been pasted

The small core oven is used for work up to 3½ in. in diameter by 2½ in. thick. It is of the vertical type and was made by the Mahr Mfg. Co., Minneapolis. It is 6 ft. wide by 9 ft. long and 45 ft. high. It rests on the main floor and extends through a steel and concrete mezzanine floor sufficiently large to accommodate a duplicate unit.

Core sand, delivered to the mezzanine floor by an overhead crane, is loaded into two-wheel buggies, from which it is shoveled to bins mounted on the core-making tables. The conveyor for core baking comes up through the mezzanine floor and then runs horizontally between two rows of core benches. Ten girls work on each side of the conveyor, permitting it to be loaded from both sides.

Conveyor Speed Adjusted to Suit Baking Time

Each conveyor basket is provided with three trays, which are adjustable as to height. The trays are made of ¼-in. grating, which permits core plates to be laid



AFTER Coming Up to the Mezzanine Floor the Small Core Oven Conveyor Makes a Horizontal Run Over What Is Known as the Loading Station and Enters the Oven, Which Extends Through the Roof of the Building. A core sand bin is mounted at the back of each core bench in any position desired and insures good circulation of hot gases through the baskets, thus baking the cores uniformly and without burning them. The basket travel speed may be varied from 0.51 ft. to 2.53 ft. a minute. Under present operating conditions of 1.10 ft. a minute each basket is in the baking zone 56 min.

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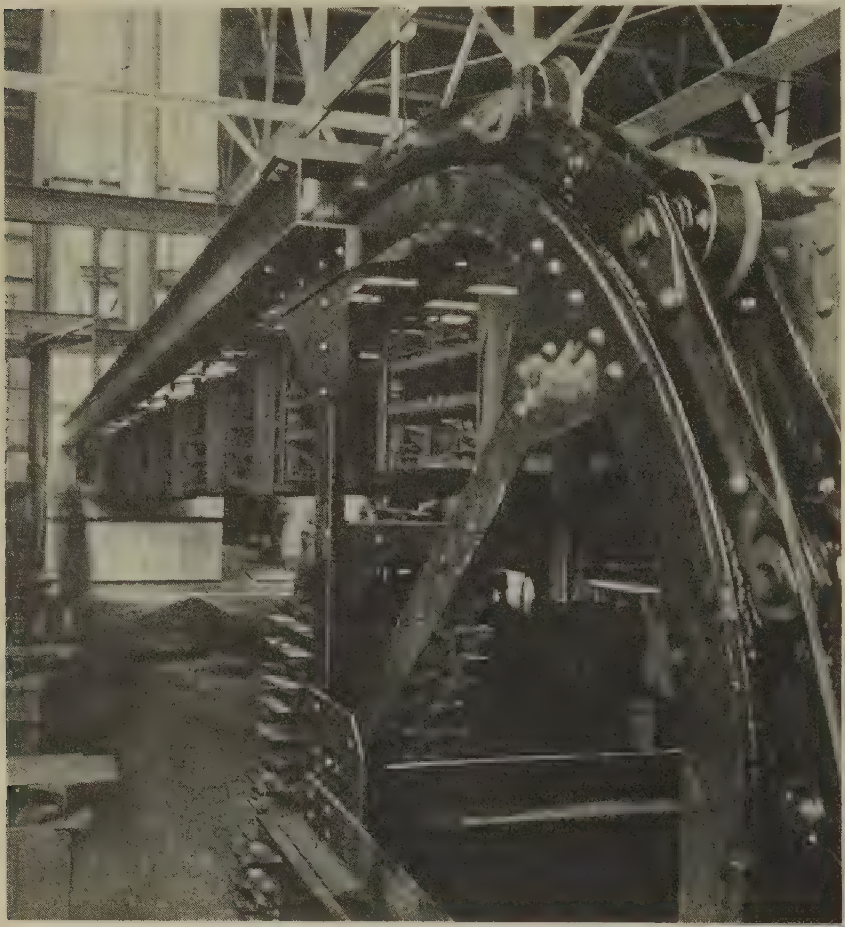
*Resident editor at Chicago for THE IRON AGE.

Entering the oven at the mezzanine floor level the conveyor passes upward and over sprocket wheels near the top of the oven. It then passes downward to sprocket wheels near the bottom of the oven, where it turns to a horizontal run and leaves the oven at the main floor level, to turn up again later to the mezzanine floor. The lower horizontal run is the unloading station, where one man unloads the cores made by 20 girls. He removes the cores from the conveyor and places them in boxes which are moved on roller tables. It is stated that core breakage is almost unknown. The drive is from a 7½-hp. motor.

A single combination oil or gas burner is mounted in the side of the oven. The brick combustion chamber, which is built with open slots in its roof, extends the full width of the oven and is mounted between the two vertical conveyor runs. A baffle extends from the combustion chamber to a point near the upper sprocket wheels. Products of combustion escape through the roof of the combustion chamber and travel up along the down-coming conveyor run. They pass over the top of the baffle and turn down, following the path taken by the conveyor. Gases escape to the atmosphere through a stack mounted at the loading end of the oven. The gas flow is counter to the direction of travel of the conveyor. The loaded conveyor enters the coolest part of the oven and gradually approaches the point of highest temperature, after which it passes to a recuperative chamber and then out of the oven to the unloading station.

The products of combustion are tempered with cold air at a point just above the combustion chamber. This method and the automatic control of the burner operation are used to fix baking temperatures. The mixture of air and gases first encountered by the cores has a temperature of 330 deg. Fahr. As the cores travel farther into the baking zone the temperature of the hot air and hot gases increases to 470 deg. Fahr. This maximum temperature is encountered at the end of the baking zone, which is located about 4 ft. above the mezzanine floor, and on the downward travel of the cores. From this point on, the cores pass through the cooling and recuperative zone, encountering cold, induced, atmospheric air, which cools them to permit their unloading. This also saves and carries back into the oven a large proportion of the heat of the cores, core plates, core driers, baskets and the conveyor.



TWENTY Girls, Ten on Each Side, Work on the Mezzanine Floor (Left) and Load the Conveyor Which Serves the Small Core Oven. The oven is shown in the background. Empty baskets come up through the hatch (lower right) from the unloading station below

CONTINUOUS, Vertical-Type Drying Oven Standing Near the Pasting Benches. It occupies a floor space 7 ft. 4 in. x 4 ft. 8 in. Blower, gas burner, recording and controlling cabinets and stack show in the picture

Temperatures are controlled by a Leeds & Northrup Co. four-point recorder-controller. The conveyor was furnished by the Palmer-Bee Co., Detroit.

Large cores are baked in an overhead oven made by Young Brothers Co., Detroit. It is built in three parallel sections, and is served by a Palmer-Bee Co. conveyor 980 ft. long. At the core-making stations,

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which are on the main floor, the conveyor is suspended from an overhead track which forms a large U. The baskets, each designed with eight trays, hang from the conveyor chain. These baskets, in following the U-turn, pass between three rows of core machines. Fourteen machines stand immediately outside of one of the straight runs, and 10 machines have been placed along the outside of the opposite straight run. Between the conveyor runs are 12 machines with work benches placed back to back.

Freshly made cores are placed on the baskets by the workmen at any convenient point along the U-bend. The conveyor then pitches up and enters the first overhead oven unit, which is 200 ft. long and which has a baking chamber 16 ft. 1 in. wide and 10 ft. 8½ in. high. It returns through the second section, which is 200 ft. long, and then turns into the third section, which is about 100 ft. long. In the preheating section are five single gas burners, then follow 16 double burners and finally two single units. Burners are not used in the third section. Leeds & Northrup Co. control equipment regulates temperatures, which range from 375 deg. Fahr. near the entering end of the furnace to 600 deg. at the hottest point.

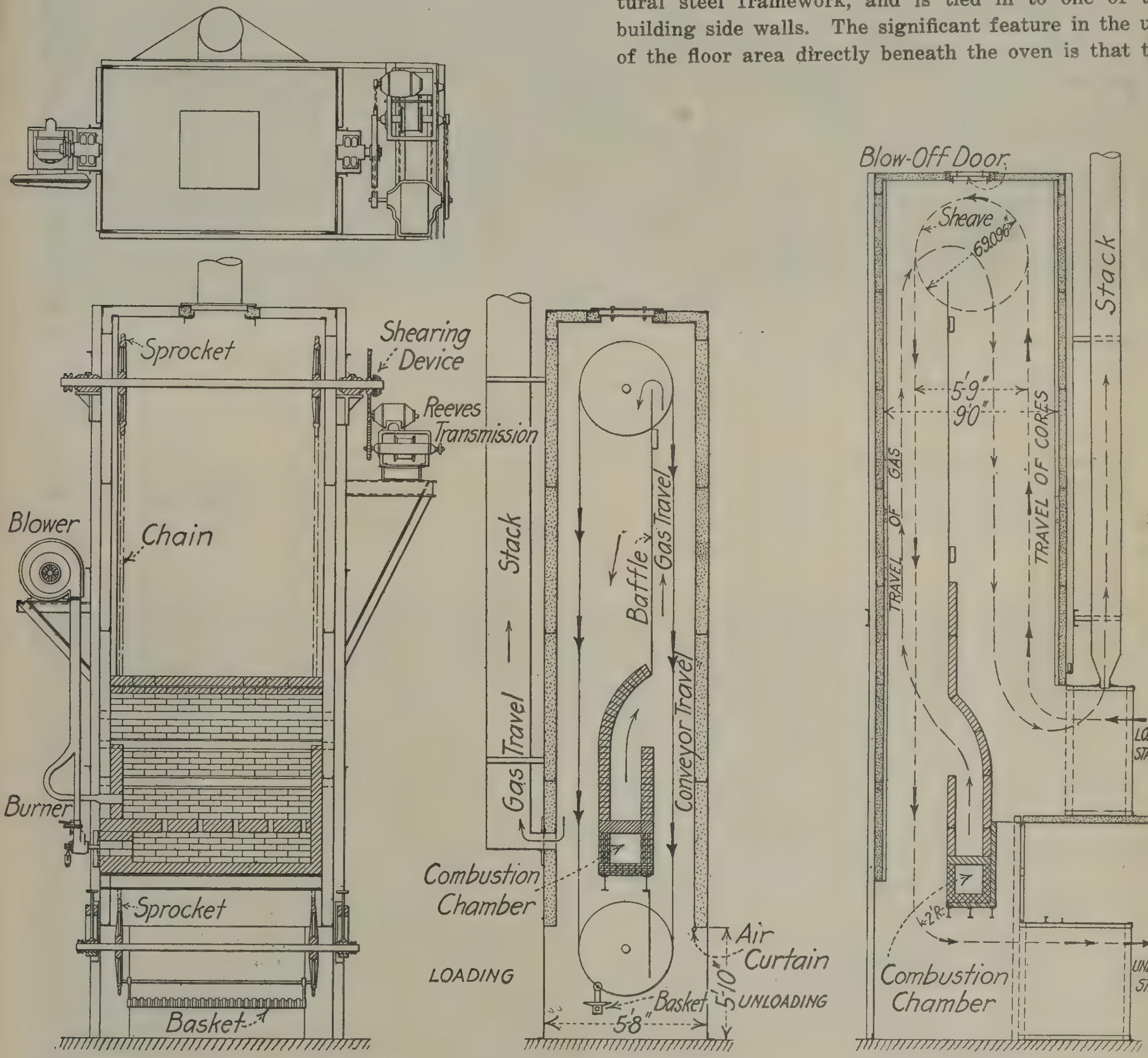
At the end of the third section of the furnace the conveyor returns to the foundry floor level, where it is unloaded by the men who perform operations such as rubbing and pasting. Slack adjustment in the chain is made at this end of the conveyor. From this point a horizontal run brings the baskets back to the U-turn at the core-makers' station.

Space remains for a second unit of this kind. Since the oven is mounted above the foundry floor, it will be practicable, if need be, to spot several rows of molding machines on the main floor beneath the ovens.

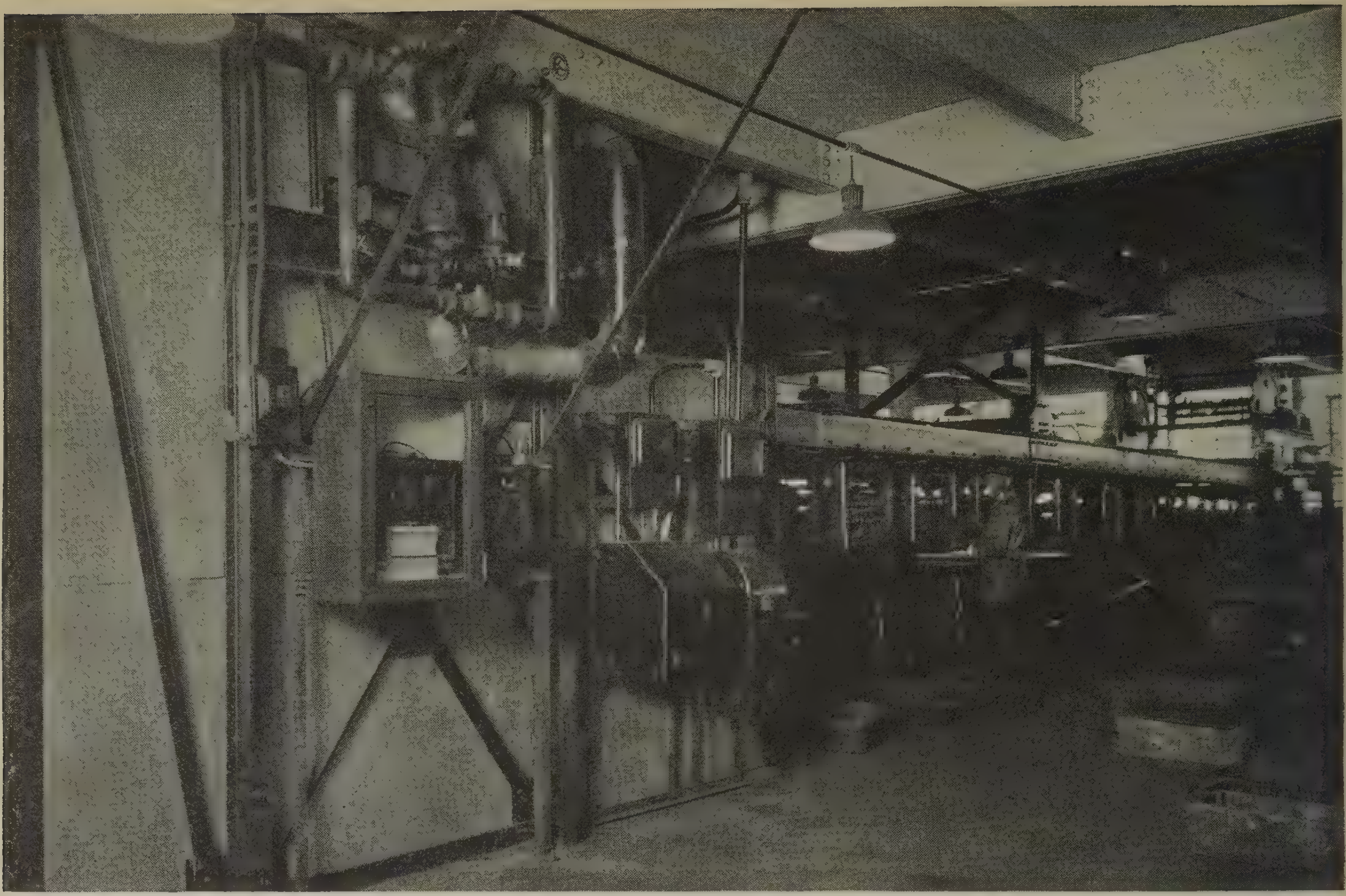
Except under its entrance and exit inclines, this conveyor has a clear height of 8 ft. from floor level to the bottom of the oven supporting beams. The oven shell is composed of standard insulated steel panels, held heat-tight and rigid by a boltless telescopic joint. The body of the oven is carried on structural steel framework, and is tied in to one of the building side walls. The significant feature in the use of the floor area directly beneath the oven is that the oven temperature in no way inconveniences the workmen there. The insulation on the oven floor is such that normal room temperatures beneath it are not changed when the oven is in operation.

The conveyor carries 144 core racks, spaced 5 ft. 6 in. on centers. Operating at 36 in. a minute, it will carry 3240 sq. ft. of shelf area into the oven each hour. While the maximum speed has not yet been used in this installation, it probably will be when peak production loads are required.

Although the final refinements of the installation



GAS Flow Is Counter to the Direction of the Conveyor Travel (Baking Oven, at Right). In the small core oven a baffle extends from the combustion chamber to the upper sprocket wheels. The drying oven (left) is self-contained. That is, the conveyor and sprocket wheels are inclosed in the oven casing



Unloading Station, Where the Conveyor Leaves the Small Core Oven at the Foundry Floor Level. In the horizontal run beneath the mezzanine floor one man removes all the cores made by 20 girls. Gas burner, automatic temperature control valve, recorder and recorder controller and starting equipment for both blower and conveyor are shown here

have not been fully completed, a preliminary test developed the following:

Production rate in racks an hour....	22
Number of racks an hour...........	26.2
Total time in oven..................	2 hr. 41 min.
Shelf area per hour (not counting unused area)	2,200 sq. ft.
Wet sand per rack..................	410 lb.
Wet sand per hour..................	10,700 lb.
Plates and driers per hour..........	21,750 lb.
Weight of rack and chain per hour..	24,900 lb.
Total iron per hour................	46,650 lb.
Iron to sand ratio..................	4.36
Water evaporated from cores........	640 lb.
Maximum baking temperature.......	450 deg. Fahr.
Gas required per hour..............	5,800 cu. ft.
Gas required per pound wet sand....	0.54 cu. ft.

In the test above referred to, the oven was operating at about half capacity in terms of core tonnage. Subsequent to the test the wet sand load for the same chain speed was doubled, and, while no accurate readings were taken of the gas consumption under these conditions, it was estimated roughly at below 0.4 cu. ft. per pound of cores.

The oven is gas fired, using a high-pressure gas system, the pressure being sustained at 5 lb. per sq. in., with a positive action blower. The pressure is distributed to 24 burners located along the oven floor, each burner equipped with a special inspirator which entrains the proper amount of air for combustion. From eight to 16 special burner tips are mounted on each burner, the number depending on the amount of heat desired at the several points. The burners fire horizontally in a direction counter to the movement of cores through the oven—thus facilitating the ventilation system used. The flame from each jet impinges at a sharp angle upon a fire brick surface which aids in heat distribution and eliminates the possibility of any single burner being temporarily smothered by air poor in oxygen. Each burner has an individual pilot light fed from an independent gas supply, as another operating safeguard.

With the heating and control elements so disposed, the cores in their passage through the oven are heated evenly and gradually until the moisture in the core binder is driven off. From the point at which the volatiles are entirely removed from the cores only sufficient heat is added to maintain a baking temperature.

Large and Small Cores Run Through Same Oven

Although the oven was designed to handle only one certain class and size of cores, both large and small cores are being baked simultaneously. The baking time for this mixed load is the same as that originally expected for the smaller cores alone. The cores vary in size from 60-lb. units 10 to 12 in. in thickness to small cores 1 in. in thickness.

The conveyor in this oven is of the malleable iron universal jointed trolley type. The trolleys are fitted with two 6-in. diameter cast iron, chilled-tread, single-flanged rollers fitted with two Timken tapered roller bearings. These wheels are, in turn, mounted on a high-grade steel shaft from which the load is suspended by means of a portion of the double-jointed trolley link. The other half of this link forms the double joint which allows bending in a horizontal plane. The trolleys are spaced 6 ft. 2¼ in. centers and are capable of carrying a suspended load of approximately 2000 to 2500 lb. each. The trolley track, as installed consists of two 4-in. x 3-in. x ⅜-in. angles supported at approximately 5-ft. centers. This conveyor was furnished by Palmer-Bee Co., Detroit.

A Mahr Mfg. Co. continuous vertical-type drying oven stands near the pasting and blacking benches. This unit is 7 ft. 4 in. long, 4 ft. 6 in. wide and 24 ft. high. It is self contained, in that the basket conveyor chain passes over sprocket wheels located at the bottom and at the top of the oven. The pasted cores are placed on the baskets at one side of the oven and removed from the opposite side.

This unit is fired by a single combination gas or oil burner. The change over from one fuel to the other can be made in 15 min. The combustion chamber is 13 in. square and extends the full width of the oven. Products of combustion escape through slots in the roof of this chamber and, after having been tempered with cold air, are guided up by a baffle through the down-coming line of baskets. This unit, like the other vertical unit previously described, is a two-pass oven with the air-gas mixture flowing counter to the direction of travel of the conveyor chain. The air-gas mixture is taken from the oven by a stack which is located at a point just above the loading opening. Temperatures, which range from 100 deg. Fahr. to 475 deg. Fahr., are automatically controlled.

An analysis of the value of this equipment is shown by the fact that core-making methods formerly employed in this foundry limited output to the equivalent of about 350 cars per 16-hr. day. The new layout steps this up to 500 cars and, if duplicate units are installed, for which there is ample room, the output of this foundry, expressed in cars per 16 hr., will be close to the 1000 mark.

Flywheel Production Unit

Another example of savings resulting from the use of modern equipment in foundries is the new flywheel production unit recently installed at the Nash foundry. It consists essentially of an elliptical Palmer-Bee Co. conveyor, 310 ft. in circumference and carrying 138 flask tables. A Beardsley & Piper Co., Chicago, sand-slinger is mounted inside the conveyor and at one end. Molds are made in four machines, mounted on a turntable. Electric hoists remove the drags and copes from the molding machines and mount them on the conveyor tables.

The completed molds are poured along one side of the conveyor and then travel around to the opposite side to the shake-out station. The rough castings are removed from the sand and placed on an inclined conveyor that elevates them to an overhead platform on which are mounted three tumblers. This platform stands inside the area bounded by the flask conveyor. The cleaned flywheels are rolled down a chute to the main floor level.

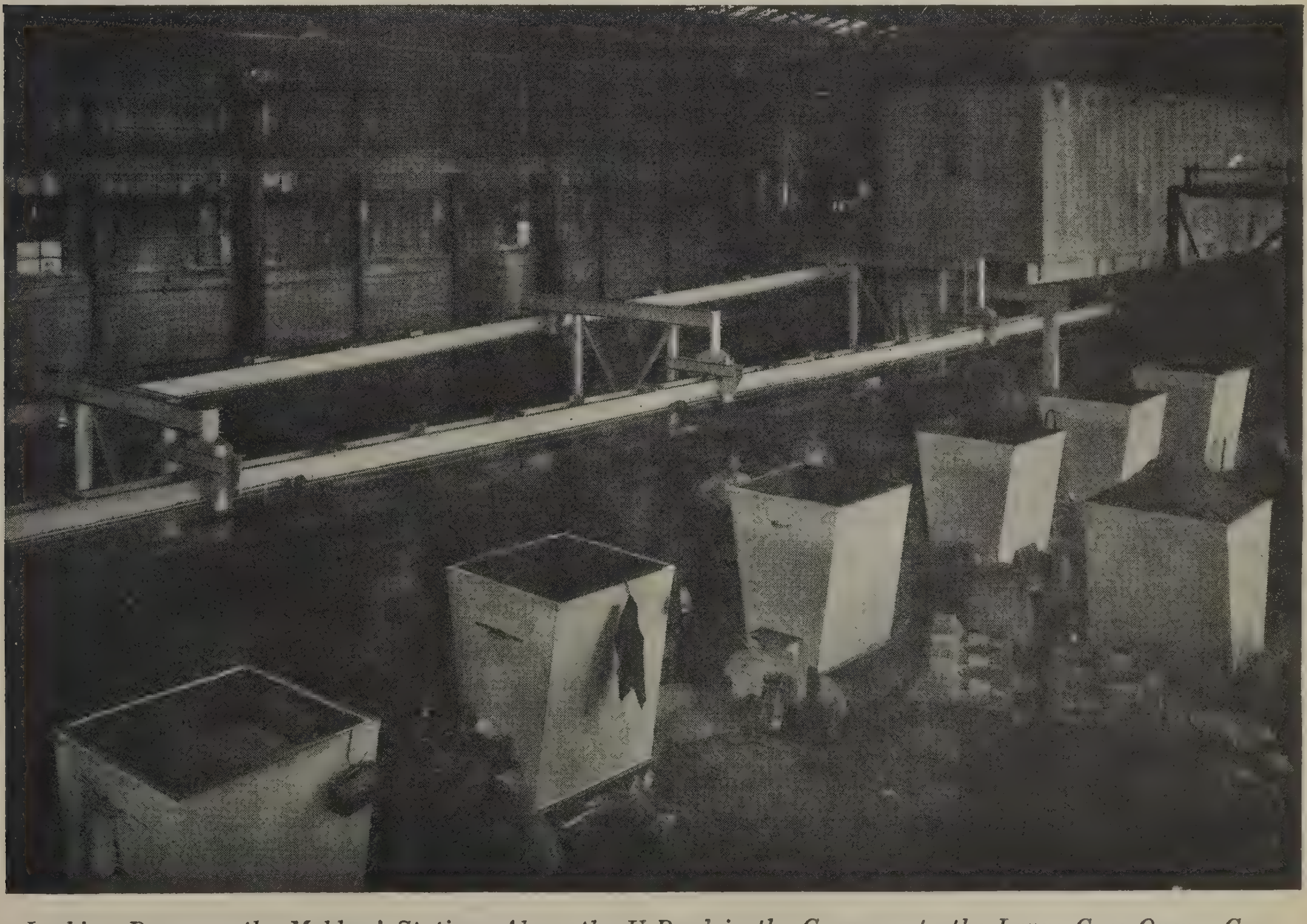
With former practice 400 flywheels were made in a 10-hr. day on a floor space of 2700 sq. ft., which does not include the area required for tumbler equipment, located in another part of the building. Molding, pouring and cleaning operations on 1200 flywheels are now performed in a 10-hr. day on a floor area of 3915 sq. ft. This figures 6.75 sq. ft. per flywheel by the old method and 3.26 sq. ft. required by the new method. Cost per flywheel by the new method is only 48 per cent of the cost of producing by the old method.

Worcester Engineering Society Organized

Worcester, Mass., sections of the various national engineering societies have come together to establish the Worcester Engineering Society, the membership of which will include all accredited engineers of the city and vicinity. While the identity of the various sections will not be disturbed, all members of the new society will receive the benefits of participation, when desired, in the deliberations of the American Society of Mechanical Engineers, American Society for Steel Treating, American Institute of Electrical Engineers, American Chemical Society, American Society of Civil Engineers and the Society of Automotive Engineers.

Officers elected on a mail ballot are: President, Admiral Ralph Earle, U. S. N., retired, president of Worcester Polytechnic Institute; vice-presidents, Lester W. West, Albert J. Gifford and Clifton F. Hood; secretary, Fred B. Crosby; treasurer, Stuart M. Anson; counsellors—Prof. Arthur W. French, for civil engineers; Dr. Lowell H. Milligan, for chemical engineers; Robert E. Bigelow, for steel treaters; Roger G. De La Mater, for mechanical engineers, and Edward H. Bauer, for engineers not affiliated with the national societies.

The Indianapolis chapter, American Society for Steel Treating, will hold its first annual June frolic June 2 at Idlewold Park, near Pendleton, Ind. Frank J. Oakes, Link-Belt Co., is chairman of the committee on arrangements.



Looking Down on the Molders' Stations Along the U-Bend in the Conveyor to the Large Core Oven. Core-carrying baskets pass to the left along the far side of the bend and toward the oven on the near side. The sand bins are filled by an overhead crane. The elevated oven is in the background

Need Amended Laws to Cut Waste

Uneconomic Distribution Cannot Be Corrected Without Changes in Statutes, Says President Schwab at Institute Meeting—Suggests Committee to Study Problem

STEEL manufacturers were urged to seek a change in existing laws as a step toward eliminating economic waste by Charles M. Schwab, president of the American Iron and Steel Institute, in an address opening the thirty-third general meeting of that organization, held at Hotel Commodore, New York, Friday, May 25.

He recommended to the directors that a committee of expert steel men be appointed "to study this problem with a view frankly to recommend to the public and to the proper public authorities a constructive plan which may result in such modification of existing law as will enable the factors in the steel industry to achieve those economies which are so important, and at the same time suggest such plan of Government knowledge and possibly supervision of such measures as may be proposed to be taken as will adequately and thoroughly protect the public interest."

The steel industry, Mr. Schwab stated, has gone about as far as can be expected in the reduction of costs, and, under present competitive conditions, "its low margin of profit is not conducive to sustained national prosperity." Higher prices would be helpful to the industry and fair to customers, but even with no change in prices there remains a possibility of reducing costs further by eliminating wasteful methods of distribution. Cross hauling of steel is one of the most glaring examples of waste in distribution.

Laws Force Uneconomic Conditions

"The steel industry is a law-abiding industry and the members of it are law-abiding citizens. But surely where laws force uneconomic conditions into existence one may well consider whether the laws should not be changed. It is obviously in the public interest that every industry should be conducted upon the most economical basis possible. It is equally important that the public interest should at all times be protected against agreements affecting prices or trade conditions which might themselves become a burden upon the public. But surely between these two horns of the dilemma there must be middle ground which would be in the interest alike of the manufacturer and the consumer, and of national prosperity as a whole."

Proposed Changes to Be Submitted to Government

In commenting on his proposal that a committee study the problem of the industry in relation to existing statutes, Mr. Schwab said:

"Business in these days must be done in the full light of day. None of us has any thought of entering into agreements or arrangements along these lines which shall be other than in the broadest public interest. We are perfectly willing, therefore, and we should be perfectly willing, that competent Government authority should be thoroughly advised as to all that we propose to do along such lines. We should be equally confident that competent public authority, acting under the influence of an enlightened public opinion, would sanction all such measures as were so obviously in the general interest. Here is a problem of practical business statesmanship to which I feel the American Iron and Steel Institute may wisely and constructively address itself, and I am confident that the ability in this industry is capable of developing measures that will commend themselves to the American people."

"No one can view the steel industry today without reaching the conclusion that this fundamental American business is apparently content with a profit on its investment amounting to little more than the interest one can earn from a savings bank deposit," asserted Mr. Schwab in emphasizing the poor earnings of steel companies.

"Here is a business which provides the essential elements of practically all industrial, manufacturing and transportation effort. It pays its workers higher wages than are paid in almost any other line of manufacture. In manufacturing efficiency it is second to no other industry in the world. Capital investment in the steel business is greater today than it ever was. Our output reaches record volume. We are wonderfully well equipped and organized to perform the enormous service which the development of a growing country demands of this basic industry.

"I do not think, however, that this country intends to demand the service we are rendering for the small return which the steel industry is currently receiving. I do not mean to imply that the steel industry expects large returns. But we have a right to expect, and it is in the public interest, that we earn enough to provide for the expansion, modernization, and development of our plants which the country's ever-growing needs constantly require.

"The economic ills of the steel industry are well known and have been much discussed so that I need refer only briefly to the outstanding facts. The total investment in the steel industry of this country is approximately five billion dollars, of which approximately one and one-half billion dollars has been added during the last 14 years. The rate of return upon this investment of five billion dollars has been approximately 5 per cent, and virtually no return at all has been earned upon the additional one and one-half billion dollars last invested, the total earnings in the industry today being only slightly more than they were 15 years ago, before the additional investment in plant had been made. The rate of return upon investment in our industry is almost, if not quite, the lowest return earned in any of the principal manufacturing industries.

Low Profits Imperil Wage Scale

"Low profits, besides depriving security holders of a fair return upon their investment, also tend to imperil the general wage scale of the country, affording as they do a constant temptation to the management of industries to reduce wages, as the only solution of their economic difficulties. Everyone agrees that the prosperity of our country is intimately connected with the liberal wage scale now prevailing, and no serious-minded man would argue that a reduction of wages in this country is a desirable thing to do if it can possibly be avoided.

"Assuming the general acceptance of my plea that the rate of return in the steel industry is inadequate, let us consider for a moment what remedies can be suggested. The two most obvious remedies are, of course, reductions in cost or an increase in prices. To the first suggestion I would say that the steel industry has already gone very far in reductions in cost, the experience of our own company showing a total reduction of $7.27 per ton in the average cost of production between 1923 and 1927."

Cross Hauling a Burden on Producer and Buyer Alike

In commenting on the economic losses through cross hauling of steel, Mr. Schwab said:

"It is manifestly uneconomic for a steel manufacturer in Chicago to ship 100,000 tons of steel to Pittsburgh at a time when a Pittsburgh manufacturer is shipping a like quantity of like material from Pittsburgh to Chicago. The sales in each case must be made at prices prevailing in the districts where the steel is sold and consequently the sales price nets less to the manufacturer in each case than they would have netted if the Chicago manufacturer had supplied the Chicago market and the Pittsburgh manufacturer the Pittsburgh market.

"The example that I have used of cross hauling between Pittsburgh and Chicago is an extreme case which, in actual practice, probably seldom occurs, but is illustrative of cross hauling which does occur in very large quantities from various districts. This is a problem in which the buyer of steel, as well as the producer, is, or should be, vitally interested. It must not be assumed that all of the cost of this cross hauling is borne by the producer. It is obvious to everyone that there is an economic waste in permitting the cross hauling to exist and it should be obvious that this waste is paid for jointly, although perhaps indirectly, by the consumer as well as the producer of steel products."

To Award Medal as Memorial to Gary

Mr. Schwab expressed his appreciation of the high honor paid him and to the American Iron and Steel Institute at the recent meeting of the Iron and Steel Institute of Great Britain, when the Bessemer medal was conferred on him. He also stated that a decoration sent him by the King of Roumania was, in his belief, intended as an expression of gratitude to the American Iron and Steel Institute for its enthusiastic reception of Dowager Queen Marie on her visit to this country.

Referring again to the British honor, he asked the approval of the membership, which was given unanimously, of a change in plan regarding the Gary Memorial. In place of a commemorative tablet, it is now proposed to found an "Elbert H. Gary Medal," which will be to the American institute what the Bessemer medal is to the British society, namely, an annual award to that person who has contributed most notable services to the iron and steel industry in any of its branches. A secondary medal in bronze was also approved, to be awarded in the name of the institute to the author of the best paper for a given year. Definite rules covering these awards are yet to be formulated.

British Institute to Meet Here in 1932

An invitation to the Iron and Steel Institute of Great Britain to meet in this country in 1932 was very warmly received, said Mr. Schwab, who was the bearer of the invitation on his recent visit to England. Later it was disclosed that the invitation to the British association had been accepted, and that the British Institute of Metals would meet in the United States at the same time as the guests of the American Society of Mining and Metallurgical Engineers.

Industry Must Unite to Solve Distribution Problem

At the conclusion of his address Mr. Schwab called upon a number of directors for remarks. "The great problem of today," said George M. Verity, president American Rolling Mill Co., Middletown, Ohio, and a new member of the institute directorate, "is intelligent distribution. That problem will not be met until we attack it as an industry, not as individuals. Only when we think in terms of the industry will we begin to make progress."

Eugene J. Buffington, president Illinois Steel Co., Chicago, spoke briefly in a similar vein.

Col. Thomas Cantley, chairman of the board Nova Scotia Steel & Coal Co., and one of the two Canadian directors of the American Iron and Steel Institute, characterized Canada's tariff policy as unwise, saying that steel imports by his country last year totaled $248,000,000 and would probably reach $300,000,000 this year.

An amendment to the constitution increasing the number of institute directors from 24 to 30 was unanimously carried. The six additional directors, however, are still to be chosen. James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown, has succeeded Willis King of the Jones & Laughlin Steel Corporation, Pittsburgh, as one of the vice-presidents of the institute, Mr. King having been made an honorary vice-president.

Sir William Ellis and General Lord Speak at Banquet

The attendance at the banquet, held in the Grand Ball Room of Hotel Commodore, Friday evening, was 1635.

Before introducing the speakers, Mr. Schwab read a cablegram from James J. Farrell, president United States Steel Corporation, conveying best wishes for a successful meeting. Mr. Farrell, who has spent several weeks on the Continent, is visiting the home of his ancestors in Ireland. Mr. Schwab also related how Marshal Foch, whom he recently met in France, asked that the institute be apprised how highly he prized the honor it bestowed on him some years ago.

The first speaker of the evening was Sir William Ellis, managing director of John Brown & Co., London, England. Sir William is an honorary member of the American Iron and Steel Institute and is a past president of the Iron and Steel Institute (of Great Britain) and the Institution of Civil Engineers. He is a knight of the Grand Cross of the Order of the British Empire, a doctor of engineering and, for four years during the war, was Master Cutler of Shipping for his country. He paid tribute to American hospitality and engineering genius, being particularly impressed with our railroads. He recalled that his firm had supplied the first steel rails to be laid between St. Louis and Kansas City. He concluded with a plea for still closer relations between the English-speaking countries.

Gen. H. M. Lord, director of budget, Washington, effectively outlined the great savings that have been achieved since the Government has had a balanced budget.

Technical Program Shows Progress in Quality of Output

The papers presented at the technical sessions, abstracts of some of which follow, were impressive because they indicated the steady progress being made in improving the quality of steel, notwithstanding high records in the quantity produced.

Basic Open-Hearth Steel Practice

BY DR. G. B. WATERHOUSE

THE process has now developed to be the most important steel-making process, not alone here but in most countries. This paper is devoted to a development of this theme along three directions:

1. To point out that the basic open-hearth process is the most important of the steel-making processes.
2. To discuss briefly some of the reasons for this.
3. To point out some of the methods by which this standing can be maintained.

Present Position of the Process

The best way of bringing out the present position of the basic open-hearth industry is by means of statistics, and in the appendix are given tables of the steel production of the United States, Great Britain, Germany and France since 1900.

To consider our own country first, the proportion has steadily risen from 25 per cent in 1900 to more than 82 per cent in 1926 and 1927. It has been more than 80 per cent for the last four years, so that more than four-fifths of all the steel we make is produced by this process.

In the case of Great Britain the proportion has risen from 7 per cent in 1901 to a maximum of 64.2 per cent in 1925, dropping slightly in 1926 to 62.8 per cent. Since 1921 it has been about 60 per cent or above.

There has been a marked increase since 1920 in Germany. More than 50 per cent of the steel made in

BORN in Sheffield, England, Dr. G. B. Waterhouse was graduated from the University of Sheffield in 1901, *where he did post-graduate work until* 1903. *He received his Ph.D. degree from Columbia University in* 1907. *Coming to the United States in* 1903, *he became a naturalized citizen in* 1910. *For* 18 *years he was associated with the Lackawanna Steel Co., Buffalo, as metallographist, metallurgist and as metallurgical and inspecting engineer until* 1922. *In the fall of* 1922, *he was called to the head of the department of metallurgy at the Massachusetts Institute of Technology, Cambridge, Mass., which position he still holds. He has already contributed papers to the American Iron and Steel Institute and his translated abstracts from the German and French in* THE IRON AGE *have been a feature for a number of years. He is a member of the American Iron and Steel Institute, the Iron and Steel Institute (British), the American Institute of Mining and Metallurgical Engineers, and the American Society for Testing Materials. To most of these societies he has contributed papers, as well as discussions.*

Germany is made by the basic open-hearth process. In 1923 the proportion was 63 per cent but in the last few years appears to be somewhat stabilized at 53 to 54 per cent. It must be remembered this is for ingots alone; if castings made by this process could have been included, the percentage would have been higher. The production curve for basic open-hearth steel is rising in France, but the basic Bessemer is still the predominant process.

Reasons for This Supremacy

In order to supplement the conclusions of the first part of this paper, it may be well to consider some of the reasons for the supremacy of the basic open-hearth process, particularly in the United States. One of its outstanding advantages is the ability to deal with raw materials that vary greatly in chemical composition, particularly as to the amount of phosphorus contained. This is well known and the exhaustion of much of the low-phosphorus iron ores has required methods that will make good steel from pig iron with varying amounts of phosphorus above the Bessemer limit. For many years the basic open-hearth process was considered to be the method by which to handle raw materials that lay between the acid Bessemer limit of phosphorus and the limit for basic Bessemer practice, but it is now being increasingly recognized that this process through certain modifications can successfully handle pig iron very high in phosphorus.

Another reason for the growth of the basic process is its well-known ability to successfully deal with the large amounts of scrap. This scrap varies greatly in kind and composition. However, it is not so generally recognized how flexible this process is in regard to the percentage of scrap that can be in the charge. Depending upon the amounts of pig iron and scrap available and economic conditions, also to some extent upon the kind of steel that is to be made, the percentage of scrap can vary from 100 to 0 per cent. The amount of scrap usually runs about 40 to 50 per cent, but there are plants that have regularly used far higher scrap percentages than this. This flexibility in regard to the kind of metallic charge has added to the growth of the process.

A brief mention should also be made of the size of the furnaces. This can vary over very wide limits, much wider limits than is generally supposed. Furnaces of small capacity are operating successfully, even down to ½-ton size. There is a so-called 1-ton furnace running with splendid results in a plant near New York. From this small size, stationary furnaces range in all capacities up to the big Weirton furnaces generally called 250-ton capacity, but often tapping two heats together weighing 300 tons. One-hundred-ton stationary furnaces are now very common and this size furnace is more or less of a standard. The so-called Talbot, tilting or rolling furnaces, are built in many sizes from those of moderate capacity up to furnaces holding more than 300 tons. One such furnace in the Pittsburgh district usually gives three 100-ton heats that follow each other as quickly as the ladles can be brought to the furnace.

Variety of Steels Possible

Attention should also be drawn to the great variety and kind of steels successfully made by the basic open-hearth process. In regard to carbon percentage open-hearth steels cover a very wide range. On the low side we have material with practically no carbon, often called ingot iron, then the large tonnage of rivet steels and sheet steels very often with less than 0.10 per cent, the next great class is probably structural steel with carbon varying from about 0.15 to 0.30 per cent. Many forging steels have from 0.35 to 0.45 per cent carbon. Rail steel, of which about three million tons is made each year, varies from about 0.60 to 0.90 per cent, and spring steels and steels for special purposes are made with carbon reaching as high as 1.4 per cent in some cases. It is a remarkable range of steels, but this does not tell the whole story because it does not in-

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Volume of Business Promises to Exceed That of 1927

IN speaking on business conditions, Mr. Schwab stated that he was presenting the joint views of all of the Institute directors. His remarks, in part, follow:

"America is enjoying an amazing period of prosperity as to volume. The past winter has been one of the most prosperous periods we have ever known, and though this is a Presidential year, the moderation in business which a Presidential year usually brings about has been less manifest this year than has been the case in other years when political uncertainties hovered over the horizon. The seasonal conditions are favorable, more so than at this time last year, and there is every justification for our anticipating that the business of the calendar year will, in volume, be in excess of the business of last year."

clude many special steels nor the alloy steels. A list of such steels would be impressive.

In common with the acid open-hearth process a great variety of fuels can be used. Producer gas is still the main fuel for the basic process, natural gas is still a favored fuel when it can be obtained, and coke oven gas is being used in increasing amounts.

The process can be successfully combined with other methods of steel making. For instance, under certain economic conditions, together with a plentiful supply of liquid pig iron, the combination of the acid Bessemer process with the basic open-hearth is to be recommended. This is usually spoken of as the duplex process, the steel being marketed as basic open-hearth steel.

Methods to Maintain This Supremacy

One of the main methods now being used to maintain this supremacy of the basic open-hearth process is to keep conversion costs low and make every effort to reduce them. This is being striven for in many different ways.

The refractory question is a very vital one and one phase of it has somewhat escaped general attention, namely, the widespread and increasing use of "prepared dolomite" for refractory purposes, particularly hearth repairs. Dead burned magnesite, imported from abroad, is still the standard material for putting in new bottoms.

Each year sees an increasing amount of "prepared dolomite" being used at the expense largely of this imported magnesite and of single-burned dolomite. Some of the trade names of this prepared material, arranged alphabetically, are: Kendymag, Magdolite, Magnefer, Magnite and Syndolag. A good deal of this class of material is being used. No accurate figures are collected but estimates of those qualified to judge believe a low figure of 200,000 net tons annually, is correct, and that it may be as high as 300,000 tons.

The question of the amount of fuel consumed in the basic open-hearth process is constantly receiving much attention. There has been a splendid series of papers presented before the institute, starting with Mr. Whigham's paper in 1913, dealing with the questions of the various fuels used, port design, regenerator design, waste heat boilers, gas producer practice, thermal efficiency and studies of the heat balance of the process. Fuel problems were gone into rather fully in Mr. Forbes's paper, last October, so need not be considered here. However, mention should be made of the fact that coke oven gas alone is being successfully used. More of it is becoming available from year to year. A battery of coke ovens is being built at one steel plant that will be heated with blast-furnace gas so that all the coke-oven gas will be set free for other uses. The use of this fuel for the open-hearth furnace will simplify certain features of design. No regenerators are needed nor should be used for the fuel, and the port design will approach that used for another high value gaseous fuel, natural gas.

Another method to maintain supremacy is to pay the most careful attention to furnace design. This is constantly followed. Almost every time a furnace is rebuilt some change is made which it is hoped will improve its efficiency, speed up the time of operation, improve quality and reduce costs. The present tendency is to go to larger furnaces, particularly in the case of stationary furnaces, and experience has shown that quality has not suffered by growth in size of the heats.

[The author gives at this point a rather detailed discussion of the tilting furnaces, which is an important part of the paper.]

Study the Reactions Which Take Place

One of the main ways in which the supremacy of the basic open-hearth process will be maintained will be by further study of the reactions that take place in steel making, the reactions in the slag, and the interreactions between slag and metal. All of these are profoundly affected by temperature and by the concentration of the various reagents in both slag and metal. It is now the custom to call this whole subject the physical chemistry of steel making, very properly so, for the reactions obey the laws of physical chemistry. This wide subject will provide a most fruitful subject for research for many years. It will undoubtedly show us how to make more steel in a given time, thereby reducing costs; and how to make better steel, thereby improving quality.

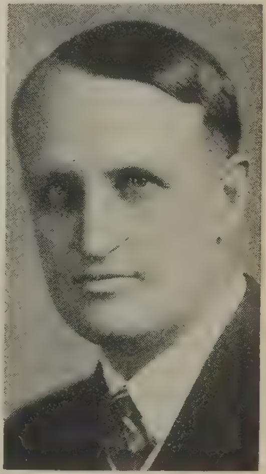
The importance of the slags in the steel-making processes is not yet fully recognized by the steel makers. All the recent scientific work teaches and demonstrates that the question of slags is of the greatest importance, and it should be the effort of those interested in the basic open-hearth process to take every advantage of this information. Before many years, it is believed, regular tests will be taken of the slag during the working of the heat, sent to the laboratory and analyzed in similar ways to the steel samples. When open-hearth men are agreed as to the prime importance of slag volume and composition, then systematic tests will be worked out by which the volume can be determined at any time during the working of the heat and the composition found out in regard to the elements or compounds that are important.

Another element that could readily be determined in the slag is the manganese, and the results might be of value in estimating the slag volume. If the manganese in the charge were known, and no manganese had been lost in run-off slags, the determination of this element in both bath and slag might be of value, because we are learning a good deal about the laws governing distribution of manganese between bath and slag, and the effects brought about.

Determination of Slag Volume Valuable

A fairly accurate method for determining slag volume would be of great value. All open-hearth men realize the need of keeping this as low as possible in order to speed up the transfer of heat from flame to metal, save fuel and increase production. On the other hand the volume must be great enough so that enough lime, oxide of iron, etc., may be present to carry on

BORN at New Brighton, Pa., E. C. Smith was graduated from Ohio State University, Columbus, in 1913, where he spent an additional year in special work before becoming connected with the Gary plant of the United States Steel Corporation. Later he entered Columbia University for further special training, following which he became an instructor in Ohio State University. During the war he was connected with the aircraft production office in Pittsburgh. In 1919 he joined the Central Steel Co., Massillon, Ohio, as chief inspector. Since then he has successively held the positions of mill metallurgist and chief metallurgist and is now assistant general superintendent of the Central Alloy Steel Corporation. He is a member of the American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Society for Steel Treating, American Chemical Society, Iron and Steel Institute (British), and the Institute of Metals (British).



the reaction with the bath and to be sure that the impurities are not so concentrated in the slag that they are readily reduced back into the bath. The present tendency is often to carry too large a slag volume, as shown by the high percentage of limestone charged, so as to be on the safe side and help make the process fool-proof.

Another of the main methods by which the supremacy of the basic open-hearth process can be maintained is by the production of still better steel than at present, that is, steel of improved quality. This calls for constant attention to metallurgical practice and increased care at every step of the process. For most of the steels made, it demands the greatest possible freedom from the non-metallic impurities, the "sonims" of Mr. Hibbard's excellent paper presented here in 1919.

The Manufacture of Alloy Steel

BY E. C. SMITH

WITHOUT attempting legal exactitude, an alloy steel may be defined as a steel whose special properties are dependent upon one or more alloying elements. This leads to the conclusion that alloy steels must be special steels and that chemical composition is hardly the vital factor.

If it is true that the special product of today will be the standard product of tomorrow, it will be well to consider trends of alloy steel manufacture. It may be of more interest to consider the advancing knowledge of steel working. The increased study of routine requirements is establishing the brand type of specification. An alloy steel must meet a very specific set of requirements. If this type of specification is liable to become more widespread, an inquiry into alloy practice conditions will be of interest.

Control of Charge Necessary

All the commercial methods of conversion are responsible for some of the tonnage. Essentially the tonnage comes from two sources—open-hearth and electric furnaces. By far the greatest tonnage is basic open-hearth material.

Of the secondary processes, the arc type of electric furnace appears most nearly to meet the requirement of a unit that can successfully melt all combinations which are not commercially satisfactory for basic open-hearths. The study should, therefore, cover the essentials of the two dominating processes.

As operated in this country, the essential of the industry is blast furnace pig iron. The problem is not to convert the most pig iron into steel, but to use the necessary pig iron to convert steel scrap into special steel products. The production of the alloy steels is actually a scrap conversion process in which pig iron is not so dominating as in primary steel production.

The tendency is to favor pig iron with about 1 per cent silicon, which has sulphur well under 0.05 per cent. The addition of manganese ores to carry the manganese to about 2 per cent in the iron is apparently becoming standard practice.

There is no outstanding metallurgical reason which indicates the necessity of remelting pig iron. The industry is essentially dependent upon hot metal melting practice, with a limited production of cold melt steels. The usual production from cold iron is limited to chemical combinations that require special iron as high-carbon low-manganese bases of peculiar sulphur requirements.

The other essential of the special steel business is the steel scrap. Special steels are based upon the melting of heavy melting scrap. Railroad scrap might be considered the most desirable and is a standard material. It should be carefully separated into definite ranges of composition and physical characteristics; thus rail steel should be a distinct scrap, structural steel another. Balanced charges designed to melt properly can be made up only of definite lots of chosen material. It is rather startling to find that certain special steels are successfully made only with light scrap.

The auxiliary materials such as ferroalloys, bottom materials, lime, fuel material, etc., should be carefully inspected for more reasons than are apparent at a glance. All melting practice, whether open-hearth, electric or crucible, is actually a fine art. If the raw materials are kept very uniform, the variables are more nearly constant.

Furnaces and Fuels Used

It may be assumed that alloying will be simpler if the physical constants of the metals to be alloyed are similar. Iron, the essential base, is a body centered cubic over its workable ranges except from 1400 to 900 deg. C. Iron may therefore be expected to alloy more naturally with body centered materials: chromium, molybdenum, tungsten and vanadium. Gamma iron may also be expected to alloy with certain face centered cubic materials and we find nickel, cobalt, copper and aluminum in this group.

A more important grouping is whether the alloying materials oxidize in melting. Nickel, molybdenum and copper are stable, and chromium, manganese and vanadium are not. We thus find the alloy steels sharply divided into two groups.

We may expect the oxidizing open-hearth process to be the main source of alloys of nickel, molybdenum and copper, while we would expect the chromium, vanadium and similar steels to be made in electric furnaces or under conditions as nearly neutral as it is possible to obtain in open-hearth furnaces. The open-hearth for alloy steel is of conventional design.

Probably the most satisfactory fuel is coke oven gas with enough liquid fuel tar or oil to give the proper flame conditions. Liquid fuel, such as tar or oil alone, is very desirable.

No ore is charged with the lime and in fact ore is rather sparingly used. This characteristic guarding against over oxidation would appear the essential difference between tonnage practice and special practice.

The elapsed time from last ore feed to clean up is usually two hours and the clean up and alloy period is usually one and one-half hours more.

Burnt lime, silicon pig (both 10 and 15 per cent), spiegel and silicomanganese, pig iron or billets, are used for slag shaping. It is customary to indicate the materials to be used in shaping and finishing the heat even more carefully than the choice of scrap used in the charge.

Many Intangibles Included in Customer's Demands

Essentially coarse-grained or fine-grained steels, steels that anneal under certain conditions, steels that machine, forge, or roll certain ways are all characteristic requirements of the industry. The user of the future will desire the privilege of incorporating intangibles into the requirements. That this is the trend has been well shown in the spread of specification for carbonizing steels with intangible physical requirements.

It is of importance to the maker of tonnage steel to recognize that the intangible physical requirements are a detriment to tonnage production and any attempt to combine will result in compromise of quality of the special steel and cost of the commercial tonnage steel. These intangibles are usually intimately associated with the finishing stage of the heat and are so intimately connected that the judgment of trained melters usually cannot be relied upon and certain specific routines are set up. The average result is safer than individual judgment.

As an example, we might mention an order for bar stock for differential gear forgings. The order may read as simply as "Ten tons of 2-in. Rd. S. A. E. 2315." The intangibles of this specific order may be as follows: "Two-inch round S. A. E. 2315, for John Doe & Co., is regularly used for spiral bevel driving pinion on model X. Forging produced by upset process; bar ends make smaller gear; size must be accurate; length important but not vital. Chemistry must be low aim carbon 0.11 to 0.14 per cent. Stock will be checked for McQuaid-Ehn rating, two to five desired. Stock will

(*Continued on page* 1578)

Machine Tool Sales Problems Discussed

Confidence in Future of Industry Expressed by President Bliss of Builders' Association—Best Policy in Establishing Prices and Appraisals of Used Tools for "Trade-Ins" Considered

REVIEW of problems encountered and appraisal of opportunities in the machine tool industry held the close attention of 140 who were in attendance at the twenty-sixth spring convention of the National Machine Tool Builders' Association, which was held May 22 and 23, at the Hotel Stevens, Chicago. Papers on price making and on appraisals for trade-in deals were read at a general session which followed the business meeting. Interest in the 24 group meetings was clearly shown by the fact that discussion ran to such length that difficulty was experienced in adhering to schedule.

Report of the exposition committee favored holding a machine tool exhibit in 1929. Benefits to be derived from uniformity in cost analysis and methods and also standardization were presented in a report by Ernest F. DuBrul, general manager of the association. Confidence in the future of the machine tool industry was expressed in an address by the president of the association, P. E. Bliss, the Warner & Swasey Co., Cleveland. He said, however, that many problems are still to be solved. A tremendous amount of free service is being demanded, and many have recited how heavy are the costs of engineering service both for special adaptation of standard machines and for the invention and design of special fixtures and tools.

Opportunities were divided by Mr. Bliss into two general classes. First are those which afford chances to better the general situation as a result of individual efforts. Undoubtedly economies of many sorts can be effected and probably no one of these is more likely to result in substantial savings than that of reequipping and retooling machine builders' shops. Impartial studies of individual companies would also show opportunity for either reduction in selling cost or a more profitable use of the money spent in that direction. A second general class of opportunities arises, first, from cooperative activities, and, second, through those activties which may best be organized and promoted through group meetings.

How Selling Prices Should Be Established

The best policy on selling prices is to set a figure that will bring the highest continuous returns, said R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., in a paper entitled, "What Is the Best Basis for Executive Policy in Making Prices." Primarily the low limit in pricing is set by the cost of production and distribution, said Mr. Flanders. If the price is below the normal cost (by normal cost is meant the cost averaged over a full period of good and bad times) the manufacturer will eat up his surplus and go out of business unless he has other more profitable lines. It is a common, even a usual, experience for a new machine to be introduced at an optimistically low price, based on faulty cost figures or estimates. Over a period of years this price is slowly raised to the point where real trial balance profits begin to appear. But meanwhile, there have been perhaps several years of losses to make up.

Any one of several factors may set the top limit of price which may successfully be asked for a given product, Mr. Flanders pointed out. If several competing machines are of equal value in the eyes of the average customer, price is likely to be the deciding factor. But if the customer can be shown that the more costly machine has a greater earning power, the top limit of selling price may be raised for this particular product. Value is therefore the second factor which sets the top limit. At this point the machine tool builder is often out of sympathy with the purchaser. The latter, it was said, frequently makes exaggerated demands in profit earning before he will consider the purchase of new and expensive production machinery.

New Designs Complicate Situation

The situation is complicated by the industry's activities in bringing out new designs which render old ones obsolete. If competition is going to force customers to purchase new machinery—as yet undesigned—in two or three years, they must realize quickly on that which they purchase now. The machine tool builder cannot guarantee not to render purchases of today obsolete tomorrow.

Patents may also have an effect in raising the top limit of prices, said Mr. Flanders. They cannot raise it above the limit set by productive value, but they may raise it above that set by free competition, if they prevent other manufacturers from reaching the higher productive value. If patents give too high a margin of price difference, however, their tendency is to stimulate the ever ready American inventive genius.

Sheer selling ability may sustain a price above competing machinery of equal value. Old established reputation may do the same. More legitimately, a reputation for prompt, intelligent and continuous service and scrupulous fairness of dealing will have the same profitable result.

There must appear in the cost a sufficient item to carry on necessary development work, to maintain a company's competitive position. The selling price must also be high enough to provide legal interest through good times and bad on that part of the net worth of the company which is actively engaged in the business. This excludes, for instance, more or less permanently invested resources, which should carry themselves.

Good Management as Essential as Good Prices for Profit

When the manufacturer examines his position from the standpoint of profits, he will find himself in one of two conditions, and he will have to solve one of two problems. He may find himself without profits, and have to decide how to get them. Or he may find a profit margin, and have to decide how much of it he will take. To raise prices is only half the answer. Good management in general must be a first factor, not a secondary one, in producing profits. One of the severest cost handicaps is excessive plant capacity. Raising prices is a legitimate remedy if it can be done. The assumption is, however, that the top line, as determined by outside conditions, is too near the cost line to permit a profit. To raise prices, therefore, something will have to be done besides sending out a new price list.

If competition sets the top limit, the manufacturer must consider whether or not his competitors are prospering. If the distressed individual manufacturer cannot arouse the trade as a whole, he has still the recourse of so raising the value of his product and rendering such service to his customer that he can obtain profitable prices above the general level.

If existing conditions offer a considerable profit, then,

1. The manufacturer should settle on a certain percentage as a fair profit to add to the cost of manufacture.
2. The sale price should be set so that the profit is a certain percentage of it.
3. The sale price should be set to provide certain ideal dividends and reserves in relation to the capital stock.

4. The ideal profit should bear a certain relation to net worth.

5. Or to the book value of the investment.

6. Or to the replacement value of the total assets.

7. Profits should bear a percentage relation to conversion cost (as suggested by Mr. Churchill at the Providence meeting in 1926).

8. Or, finally, the price may be "all that the traffic will bear."

Concluding, Mr. Flanders said:

"Costs are not rigid things. They may be manipulated by engineering and managerial skill. Selling prices are not inflexibly fixed by competition or by arbitrary printed lists. They may be raised and justified in the purchaser's mind by increased service and greater profit return to him. The highest profits are not to be obtained by setting arbitrary standards, but by applying to the business every available ounce of engineering, manufacturing, selling and financial ability, and applying it to render a maximum of service to the customer."

In a paper on "Trading Old Tools for New," J. R. Porter, president Marshall & Huschart Machinery Co., Chicago, urged either (1) the hiring of an appraiser, or (2) making use of a reliable second-hand house which will not only make appraisals but actually take in used equipment that is to be replaced by new machine tools. In Chicago, he said, these ideas are being generally accepted by the trade as good business and have largely eliminated the necessity of the mechanical department arguing with the purchasing department on account of the allowance for the second-hand trade-in. Some of the advantages of the appraisal plan were said to be that it eliminates the necessity of salesmen dickering with the customer on the price of second-hand machinery, thus saving time and energy. It also eliminates the former custom of the salesman endeavoring to sell his own sales manager second-hand machines at prices higher than could be obtained for them, with allowance for a profit.

Field Engineers Appointed to Promote Structural Steel Industry

In an effort to promote sound engineering practice and the welfare of the structural steel industry, the American Institute of Steel Construction has recently organized, and will soon place in active service, a staff of ten district field engineers. These men will establish contact with engineers, architects, contractors, public officials and technical schools throughout the United States. Data concerning the latest developments in steel construction, leading to a more effective and economical use of the material, will be made available to all charged with the selection of materials and to all responsible for proper design and construction. The bringing about of a wider use of structural steel for bridges and buildings will be one of the chief objectives of the field representatives of the institute.

A training school was opened in Cleveland on May 15, under the direction of Lee H. Miller, the institute's chief engineer. There the engineers will be instructed in the aims and policies of the institute before taking up work in the territories assigned to them. Their activities in the field will be supplemented by a more extensive preparation of educational literature to be distributed from the New York office.

The country has been divided into ten districts, with one field engineer assigned to each. Below are given the districts, the names and former connections of the engineers who will cover them, and the cities in which they will make their headquarters:

District No. 1—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut; E. N. Adams, formerly consulting engineer in private practice and construction engineer with George W. Harvey, Boston; headquarters, Worcester, Mass.

District No. 2—New York City, northern New Jersey and Long Island; J. N. Keenan, formerly field engineer, American Institute of Steel Construction; headquarters, New York.

District No. 3—New York State (outside of Metropolitan District), Pennsylvania, southern New Jersey, Maryland, District of Columbia and Delaware; B. J. Hastings, formerly associate professor Department of Architecture, Carnegie Institute of Technology, and consulting engineer, Janssen & Cocken, architects, Pittsburgh; headquarters, Philadelphia.

District No. 4—Ohio, Michigan, Indiana (with exception of extreme northern part), Kentucky and West Virginia; Alexander Miller, formerly field engineer, American Institute of Steel Construction; headquarters, Cleveland.

District No. 5—Virginia, North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi and Louisiana; J. G. Allen, formerly structural engineer with Stone & Webster, Boston; headquarters, Birmingham.

District No. 6—Northern Illinois and Indiana; Henry Penn, formerly assistant professor of civil engineering, Armour Institute of Technology, and with Sargent & Lundy, Chicago; headquarters, Chicago.

District No. 7—Wisconsin, Minnesota, North Dakota, South Dakota, Montana and Wyoming; C. C. Tracy, formerly structural engineer with Densmore, LeClear & Robbins, Boston; headquarters, Milwaukee.

District No. 8—Missouri (with exception of western part), Illinois (with exception of northern part) and Arkansas; G. E. Doyen, formerly structural engineer with Dwight P. Robinson & Co., New York; headquarters, St. Louis.

District No. 9—Kansas, Oklahoma, western Missouri, Iowa and Nebraska; Jack Singleton, formerly chief engineer and general manager, Capital Iron Works Co., Topeka, Kan.; headquarters, Topeka, Kan.

District No. 10—Washington, Oregon, Idaho, Utah, Nevada, Arizona and California; W. E. Emmett, formerly structural engineer with Moore Dry Dock Co., Oakland, Cal.; headquarters, San Francisco.

Research in Alloys of Iron Launched

A conference of representatives of makers and users of irons and steels, of technical societies, of Government bureaus and of universities was held in New York, Thursday, May 24, in response to an invitation from the American Institute of Mining and Metallurgical Engineers, to consider a proposition formulated by Engineering Foundation, New York, for a cooperative research project in the broad field of alloys of iron. About 40 representatives were present, with J. V. W. Reynders as chairman. It was announced that Engineering Foundation had set aside $10,000 for the project and it was finally decided that a committee of ways and means be appointed to obtain additional funds.

The project has these as its aims: To make more readily available all reliable information published in various languages; to publish the information thus collected in two forms, one suited to industrial plants and engineering offices and the other to researchers and teachers; to discover and correct errors in the data on iron and its alloys; to increase the precision of data no longer adequate to the refinements of present-day industrial processes; to obtain new fundamental knowledge by research in the laboratories of universities, Government bureaus and the industries, and, finally, to take up these objects in the order named, the first two to be followed by the others as work develops.

The conference, after discussion and deliberation, registered its agreement in these aims. It also went on record by resolutions to the effect that it recognizes the need for the proposed work and the benefits accruing to the makers and users of iron and steel which are of sufficient magnitude to justify the expenditure of effort and funds. The conference recommended that Engineering Foundation proceed at once with the development of the project under the sponsorship of the A.I.M. and M.E. and, further, that corporations making or using irons and steels and others interested be asked to cooperate by contributing funds, data, facilities or personnel. It was also recommended that all corporations and other organizations participating in the project contribute whatever information they can, consistent with their business policies.

Warehouses Seek Reasonable Profit

Establishment of Quantity Differentials, Better Cooperation with Mills and Less Focusing on Sales Volume Are Aiding Iron and Steel Distributers

REFLECTING the experience of the iron and steel industry as a whole, the warehouse distributers of its products have also been victims of "profitless prosperity." But, as brought out at the annual convention of the American Steel and Heavy Hardware Association, held at the Copley Plaza Hotel, Boston, May 22 to 24, the establishment of warehouse quantity differentials in such lines as bolts, nuts and rivets and cold finished steel bars, the setting up of better cooperation with the mills and a growing tendency to show more interest in net profits rather than volume of sales are all factors which seem to indicate considerably improved conditions in the near future.

Although the competition of foreign steel was recognized by distributers on the Atlantic seaboard as a serious problem, unrestrained competition within the industry itself was characterized as just as destructive, and strong pleas were made for a more enlightened policy. One of the most tangible arguments favoring such cooperation was the success of the recent efforts of the Bolt, Nut and Rivet Manufacturers' Association in securing the almost universal adoption of a new card of quantity differentials by both warehouses and mills.

National Conference on Adequate Profits

AS a means of carrying the principles successfully introduced by the bolt and nut makers into other fields of industry, Charles J. Graham, president Bolt, Nut and Rivet Manufacturers' Association, Pittsburgh, outlined a plan proposing a meeting of manufacturers of diversified lines of products and distributers from all parts of the country to consider the situation. Mr. Graham said that such a meeting was practically assured and would probably be held in New York during the last week of June. He said that manufacturers should be made to realize that distribution problems are practically the same in nearly all lines and that this proposed meeting would provide opportunity for establishing a community of interests by which both the mills and warehouses would certainly profit.

Mr. Graham stated that he had taken the plan of the proposed meeting before the Department of Justice and had secured its entire approval. He further stated that full approval had been given by the National Association of Purchasing Agents. Purchasing agents, he said, were beginning to realize that lasting prosperity could not be maintained with ruinous competition for low prices and that any stabilization plan must fail if it is forced to meet the competition of price cutters and seekers after bargain quotations.

In discussing the quantity differential plan which has been introduced by the bolt, nut and rivet makers, Mr. Graham stated that practically unanimous acceptance had been secured in all parts of the country except certain centers in the Middle West. William E. Hansen, Hansen & Yorke, Inc., New York, chairman of the Steel and Heavy Hardware Association's bolt and nut committee, reported that members were making an adequate profit in these lines for the first time in a number of years.

How Foreign Steel Competition Is Being Met

THAT the warehouses have been able to do very little to compete with foreign steel, which is being imported in increasing amounts into the Atlantic seaboard and Gulf ports, was evidenced by the discussion of this subject. R. H. Sanderson, E. P. Sanderson Co., Boston, stated that the situation was not improving in Boston and that a solution rested largely with the mills. He stated that competition was keenest in structural shapes and that warehouses were being forced to do their own fabricating in order to meet it. This enabled them to compete on a reasonably profitable basis on small orders, but the speaker pointed out that the plan had not been in operation long enough to prove its success or failure.

T. C. Morris, Morris, Wheeler & Co., Philadelphia, stated that he felt a gradual strengthening of European steel prices would result in decreasing importations and the problem would thus adjust itself. Speaking of the New York territory, into which foreign importations are largest, J. B. Carse, Ogden & Wallace, New York, stated that importations of nearly 100,000 tons of shapes and bars at that port last year had taken away a considerable amount of business which might have gone directly to the mills. However, he admitted that the warehouses had suffered also, in many cases because of the purchase of foreign material which had proved unsatisfactory.

T. J. Foster, National Bridge Works, Long Island City, N. Y., offered a solution to the problem by suggesting the drawing up of a code of standard practice to be followed by both mills and warehouses and which included a clause forbidding the mills to sell to any firms which were financially, physically and mentally unfit to use this steel properly. It was also suggested that the code might be extended to prevent the mills from selling to any distributer using foreign steel.

Increasing Margin of Profits

A DISCUSSION on increasing the net margin of profits in warehouse distribution brought out a number of constructive suggestions. E. J. McCarthy, Beals, McCarthy & Rogers, Buffalo, stated that his company had been securing better cooperation from the mills by asking the mills to make fewer direct shipments to its own customers, particularly in small quantities. He also stated that a price committee had been formed which went through the firm's catalog twice a year and carefully analyzed every price and cost. Adjustments made as a result of this, he said, had saved considerable money. Representatives of other companies reported similar plans which had met with success.

"Ask your price and get it," was the suggestion offered by R. H. Welton, Chase, Parker & Co., Boston. He offered cooperation with local competitors as an essential to profits and urged members not to worry about all the inquiries which came out, but only about the orders which might be taken with a reasonable profit. The sales manager, he pointed out, should be given to understand that the company is interested in net profits and not in sales volume.

G. K. Conant, Sligo Iron Store Co., St. Louis, emphasized concentration upon sales first. The small competitors, he said, will become a decreasing factor in the business of a company which has an active sales organization and is able to get business. R. H. Sanderson stated that the expense ledger as well as the sales catalog should be gone over frequently with a resultant cutting in expenses. A. J. Dietrich, Dietrich Brothers, Baltimore, stated that the mills are not always to blame for competition with warehouses and were usually willing to cooperate if properly advised of conditions. W. J. Holliday, Jr., W. J. Holliday & Co.,

(*Continued on page* 1582)

Universal Grinder of Intermediary Type Adapted for Multi-Purpose Use

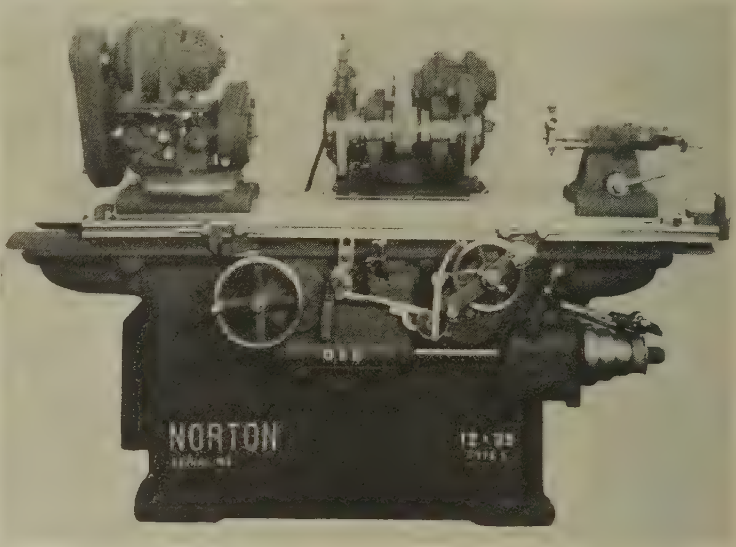
Simplicity of construction and complete power control within itself are features of an improved 12 by 36 in. universal multi-purpose grinding machine announced by the Norton Co., Worcester. The machine is designed an intermediary equipment between the tool grinder and the heavy production machine, permitting the handling of small lots of pieces too heavy for the tool grinder and not of sufficient quantity to warrant employment of the heavier machines. Its range insludes accurate external, internal and face grinding.

The machine is entirely self-contained, three separate motors driving the headstock, wheel and the work-table and pump respectively. The wheel drive is from a motor mounted on the wheelslide, the table drive is from a backshaft driven by a motor directly on the rear of the machine, and the work drive is by a motor mounted on the headstock. Each motor is individually controlled. A generator operated by the table traverse motor may be provided for the work drive motor when direct current is not available.

Use of the three motors eliminates overhead shafting and gearing and shafting and belting within the machine. Virtually all important mechanisms are on the outside and are easily accessible. Although essentially a light machine, it is rigidly built and will swing work up to 14 in. in diameter and grind pieces up to 37 in. in length. The design of the headstock and wheel-head permit a wide variety of pieces to be ground.

Both the headstock and the wheel head are of swivel type and are graduated in degrees on the base. Positions on the headstock are provided for face grinding. The wheel-head may be swiveled through an angle of 180 deg. to bring into position the internal grinding spindle, which is fixed on the double-ended wheel-head. Intermediate position for external angular grinding are also possible. The headstock is equipped with a chuck which may be attached to the spindle for small work which cannot be handled on centers. Provision is made so that the center may be live or dead for plain cylindrical grinding.

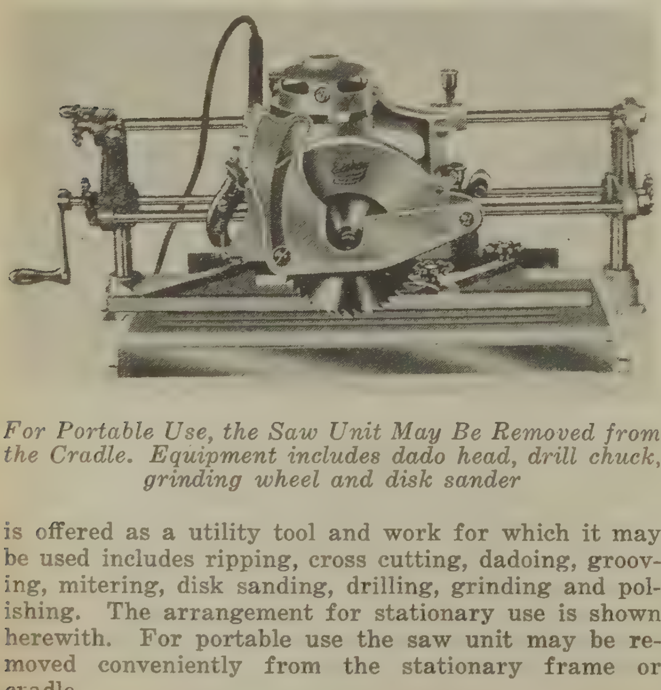
The footstock is of combination lever and screw type for quick changing of work on centers. A diamond tool holder is provided. The work-table is made in two parts, the top pivoting on a stud in the center, and may be clamped at both ends. The table is graduated in degrees for taper grinding and also in ft. per min. Eight speeds, ranging from 21 to 111 in. per min., are available. The wheel feed, both automatic and by hand, operates regardless of the position of the cross-slide relative to the work-table. The wheel may be fed at any angle at any time. An automatic stop arrests the feed when the work is to size. The reverse mechanism is of the type used on all Norton cylindrical grinding machines and permits accurate grinding close to shoulders. The pump is on the outside of the tank and is operated from the backshaft connected to the table traverse motor. Ample supply of water or compound is available.



The Range Includes External, Internal and Face Grinding. The machine is entirely self-contained, with three separate motors for the headstock, wheel and work-table and pump"

Woodworking Saw for Both Stationary and Portable Use

A combination portable and stationary motor-driven saw, which, with attachments, may be used for a number of separate operations, is being marketed by the Esskay Mfg. Co., Minneapolis, Minn. The machine is offered as a utility tool and work for which it may be used includes ripping, cross cutting, dadoing, grooving, mitering, disk sanding, drilling, grinding and polishing. The arrangement for stationary use is shown herewith. For portable use the saw unit may be removed conveniently from the stationary frame or cradle.



For Portable Use, the Saw Unit May Be Removed from the Cradle. Equipment includes dado head, drill chuck, grinding wheel and disk sander

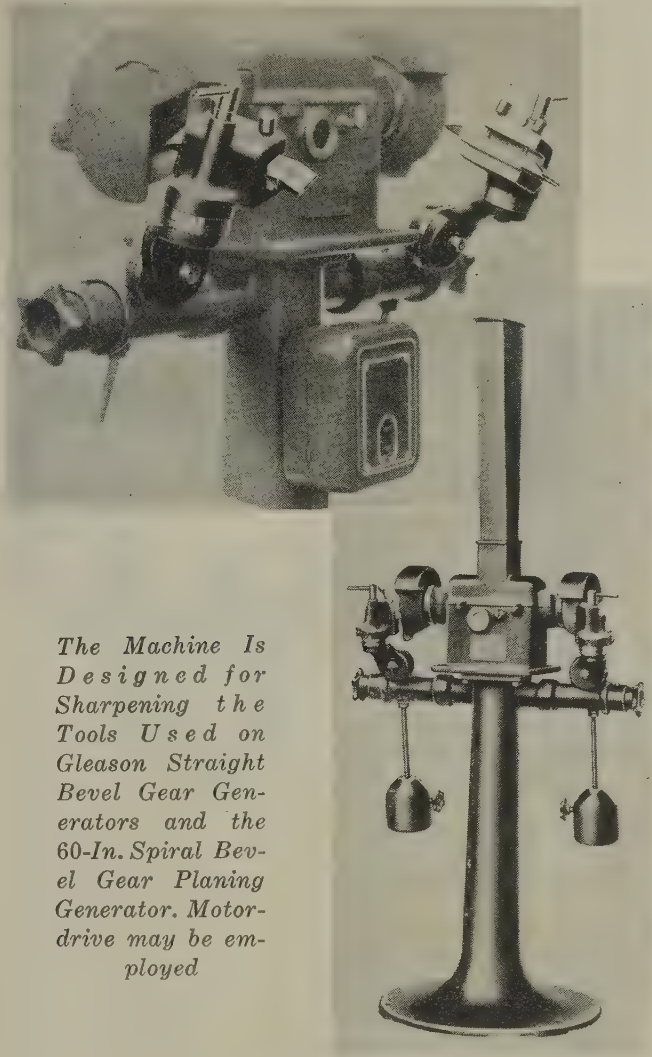
The machine is equipped either with a ½-hp. or ¾-hp. universal motor arranged to take power from the lighting circuit. Gears are of hardened steel and operate in grease. All rotating parts are mounted in ball bearings. The frame or bench base of the machine is of steel and aluminum and has lugs for attachment to the bench by screws. The bench base is arranged to permit cross cutting of lumber up to 12 in. in width, the saw being pushed back and forth on the rods. The ripping gage can be adjusted to rip strips from ¼ in. to 7 in. in width and for ripping, the saw is locked in place. Depth adjustments are made conveniently by means of the crank shown at the left-hand end of the machine; when the adjustment is made the saw may be locked at the depth desired. Depths of cut regularly range from ⅛ to 2½ in., but a larger saw is available for cuts up to 3½ in. deep. The saw can be swung to any angle up to 45 deg. from vertical for mitering. A scale is provided to facilitate angular settings and the saw may be locked in position for continuous work. The machine is also equipped with an angle device which is attached in the same position as the ripping gage and which, in connection with the tilting device, permits cutting of double angles.

The saw guard is adjustable and is equipped with a sliding device that follows the work and protects the operator. The weight of the power saw and bench complete is 104 lb. and the weight of the saw alone 27 lb. The length overall is 36 in.; the width is 14 in.; and the height is 19¼ in. Attachments available include a drill chuck, a 4-in. emery wheel; a dado head for work up to 1 in.; an abrasive wheel for cutting metal tubing and hard rubber, and a 12-in. disk sander. An elevating device for regulating the depth of cut is available for use on the portable saw.

New Tool Grinder for Gleason Bevel Gear Generators

Tools used on any of the straight bevel gear generators and the 60-in. spiral bevel gear planing generator built by the Gleason Works, Rochester, may be sharpened on the generator tool grinder illustrated, which is a recent addition to the Gleason line.

The machine is equipped with two grinding wheels, one of which is for sharpening the upper tools and the other for the lower tools. The grinding is always against the cutting edge of the tool, which eliminates the possibility of burning the edges. Tools can be ground to any side rake angle by loosening the clamp on the top of the tool holder and turning the tool to the desired angle, as marked on the collar. The desired front rake angle can be obtained by a similar setting at the point where the holder is attached. Adjustable weights on the opposite end of the tool holders serve to keep the holders away from the wheel in a convenient position for changing the work or settings. The work is pushed across the wheel by hand, and is fed in by a hand nut on the end of the shaft which carries the tool holders and work.



The Machine Is Designed for Sharpening the Tools Used on Gleason Straight Bevel Gear Generators and the 60-In. Spiral Bevel Gear Planing Generator. Motor-drive may be employed

The grinding wheels are mounted on a spindle which runs in oil on precision ball bearings. One main oil cup supplies lubricant to the spindle and bearings, the quantity of oil being indicated on a conveniently located oil sight. Sturdy construction combined with simple design is a feature of the machine. In the case of the belt-driven machine, the only moving part is the spindle on which the wheels are mounted. On the motor-driven machine the motor is mounted on the side of the column and the power is transmitted from the motor to the spindle by a belt which runs within the standard or column of the machine.

Three different pairs of tool holders are available for use with the machine, but only one pair is furnished as standard equipment. One pair of heads holds the tools for the company's 60-in. spiral bevel gear planing generator, another holds the tools used on the 25-in. bevel gear generator and the third for the 6-in., 11-in. and 18-in. bevel gear generators, 8-in. manufacturing bevel gear generator and 12-in. bevel gear generator tools.

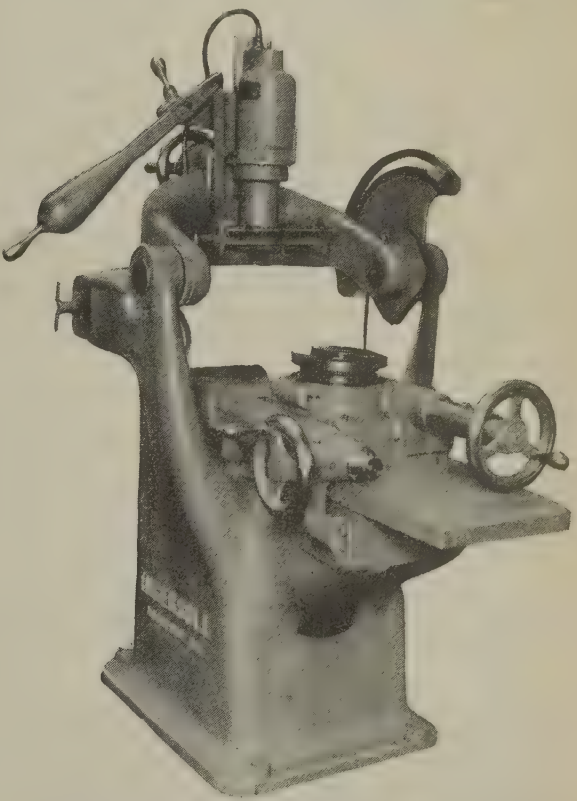
Standard machines are belt-driven. A ¾-hp. 1800-r.p.m. constant-speed motor is required for the motor drive arrangement. The floor space occupied by the machine is 18 x 21 in. The weight net is 375 lb.

Simplifies and Extends Range of Milling Cutter Grinder

The Ingersoll Milling Machine Co., Rockford, Ill, has placed on the market a simplified and improved model of its milling cutter grinder. The range of the machine has been increased, it now being possible to grind cutters up to 30 in. in diameter and 7-in. face at one setting. The cutter spindle has a ground taper hole to accommodate solid shank cutters with shanks as large as the Ingersoll "M" taper, 3¼ in.

New drive arrangement to the wheel spindle is a major improvement. The spindle is now driven by a motor mounted directly above, instead of through the system of belts previously employed. The motor and spindle are mounted in ball bearings and inclosed in a single dust-proof housing. In addition to being simpler, the new drive is safer and more efficient. Change has been made in the front of the machine and the high rim, which is unnecessary for dry grinding, has been removed, permitting of clearer view of the work.

The outstanding feature of these machines is that after the cutter has been fastened on the spindle, ready for grinding, the face, periphery and corners of the teeth are ground at a single setting. Cutters with angular faces may be ground at any angle within the range of the machine, and the corners on all cutters may be ground square, angular or with a radius—all at a single setting of the cutter. This is made possible because the grinding wheel spindle is always in the same plane with the axis of the cutter, and at the same time can be set at different angles to that axis, or can be rotated in an arc over the cutter. A 12-in. cutter showing average wear can be ground in approximately 20 min.



The Wheel Spindle Is Now Driven by a Motor Above the Spindle. The motor and spindle are mounted in ball bearings

The spindle has a maximum travel of 7½ in. and an adjustment of 2½ in. is provided to compensate for wear of the grinding wheel and to set the wheel for grinding different radii. The grinding wheel employed is 10 in. in diameter, ½ in. thick, 1 in. hole, and of Ingersoll shape. The shipping weight of the machine is 1650 lb.

Butt Welder for Miter Welding

Machines for making miter welds in angle or zee-bars have been constructed, some of which called "corner welders" make but one weld at a time. Other machines are known as "four-way welders." Both have found application to the manufacture of steel sash, automobile doors, wind-shield trimming and many similar uses. Some difficulties have been experienced in making a weld uniform throughout its length, caused largely by the method of applying the current to the weld. Usually the electrode dies have been placed on the inside of the corner, and the welding line then presents very unequal paths for the current to travel. The result is that the weld receives too much current on the inside and not enough travels out to the point, the major portion of the electrical flow naturally taking the shorter path.

Miter Welder Set at Angle So Work Can Remain Horizontal

These objections have been overcome, it is stated, in the Federal Machine & Welder Co.'s type 60 automatic butt welder by fixing the dies inside the corner, making them of steel and insulating them so they receive no current. Movable copper clamping dies are placed on the outside, and are made to act as the electrodes. With this arrangement, the current will take a path square across the corner joint and the entire welding line is subjected to a uniform flow of current, with subsequent even heating and uniform welding.

Type 60 welder is equipped with a 65-kw. transformer, and an auto coil which provides 60 per cent voltage regulation. It will weld a cross-section of about 1 sq. in., and can be adapted to larger sections by increasing the transformer capacity. Clamping and releasing the work, as well as starting the motor, is done by means of respective foot levers. A mechanical brake stops all motion at the end of the welding cycle. This machine requires 7 sec. for the welding cycle; to this, time for clamping and releasing the work must be added. In practice an average of 240 welds per hour is attained, varying with the kind of work and jigs used.

Clamping of right and left-hand members is done individually by air at 80 lb. pressure acting through cylinders mounted at the rear, and actuated and released by valves set on the floor and operated by foot levers. The "flash and push-up" operation is produced by a cam, motor driven through a worm gear reduction placed under the table at the right. Depressing the foot lever at the right causes the motor to start, continue until the welding cycle is completed, and then stop. Thus the operator is relieved from physical strain and is thereby enabled to turn out more product.

All gibbed and sliding members have been done away with, it having been found in practice that they will not stand the severe operating conditions imposed upon a flash welder. Movable dies are carried on hinged members, and the fulcrum points are well beyond the flashing zone.

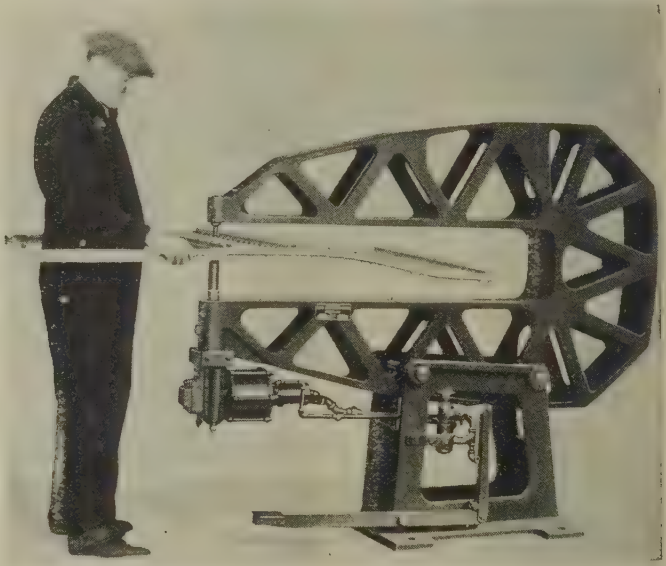
As the outside movable electrodes operate in a plane making a considerable angle with the inside dies, it is necessary to construct the machine on an angle, so the work can be held in a horizontal plane while welding, a very desirable feature when welding long sash.

Machine for Driving Duralumin Rivets

The increasing use of duralumin rivets in aircraft and motor coach body construction prompted the development of the riveter shown in the accompanying illustration, which has been made available by the Hanna Engineering Works, 1765 Elston Avenue, Chicago, in a range of sizes for portable and stationary use.

The machine illustrated has a reach of 48 in., gap of 10 in., die stroke of 1½ in. and when operated at 100 lb. air pressure is capable of driving ¼ in. diameter duralumin rivets. Ram speeds up to 60 strokes per min. are obtainable. The pressure exerted by the ram is predetermined and the arrangement for uniform pressure for a considerable portion of its stroke is said to result in well driven rivets regardless of variations in the thickness of the parts being riveted.

With the machine arranged with the dies vertical, cylinder down, as shown in the illustration, the rivets are headed on the underside. Rivets may be inserted well in advance of the riveting, and operation of the riveter may be almost continuous. The machine is operated by a foot-actuated valve, which permits the workman to use both hands in handling the work.

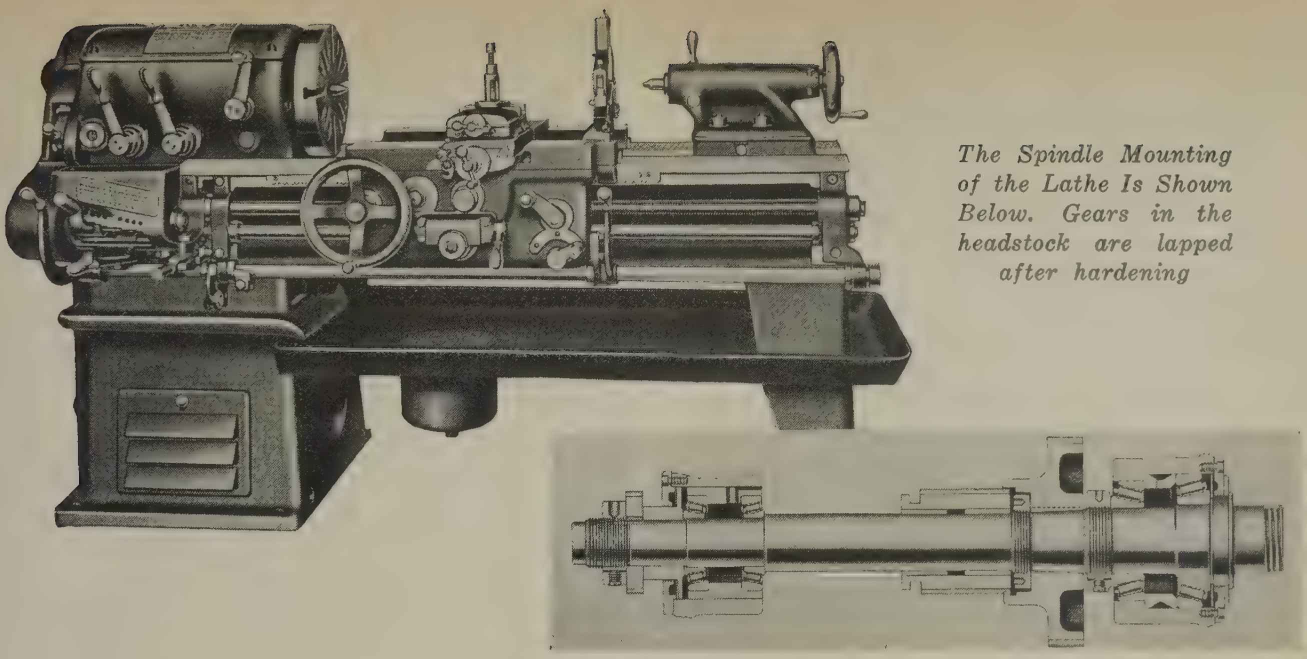


Duralumin Rivets Up to ¼ In. in Diameter Are Driven Rapidly. Rivets may be inserted well in advance of riveting and the machine operated continuously

Knife Switches for Panel Boards

To meet the demand for safety in switching operations of the low-voltage class, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering a new line of type BB back-of-board knife switches. They are mounted on steel panels of the dead-front type, with only the operating handle passing through the panel. Complete accessibility of the switch and fuses from the front of the switchboard is provided by means of a fuse door. This is interlocked with the switch handle so that the switch must be in the full-open position before the fuse door can be opened, and the switch cannot be closed while the door is open. These switches are made for 250 volts direct current and 500 volts alternating current, for capacities ranging from 30 to 800 amp., and can be obtained in one, two, three or four-pole units, fused or unfused, and with or without quick-break attachments.

The Western Society of Engineers, Chicago, has removed its headquarters from 1735 Monadnock Block to room 1200, Engineering Building, 205 West Wacker Drive.



The Spindle Mounting of the Lathe Is Shown Below. Gears in the headstock are lapped after hardening

Sliding Gear Head Lathe With Tapered Roller Bearing Spindle Mounting

The sliding gear head engine lathe shown in the illustration, one feature of which is the use of tapered roller bearings for the spindle, has been added to the line of the Reed-Prentice Corporation, Worcester, Mass. These machines, available in 14 and 16-in. sizes, 6 ft. between centers, are designed to meet both production and toolroom requirements.

The spindle runs in a four-bearing precision Timken mounting, the thrust being taken on the front bearings. The headstock is equipped with sliding gear transmission of simple design, nine gears being used to give a range of eight spindle speeds. The gears are of nickel-chromium steel, cut and burnished before hardening, and lapped afterward. The main drive pulley is provided with disk clutch and brake. The motor is mounted within the cabinet leg on a hinged bracket, which is adjustable through nut and screw for proper belt tension. The apron consists of a one-piece box casting of double-support type. All bearings are bronze-bushed. One lever operates a double disk clutch for either cross or longitudinal feeds.

The eight speeds of the machine range in geometrical progression from 18 to 432 ft. per min., and 41 changes of feed range in inches per revolution from 0.0035 to 0.112. The net weight of the 14-in. lathe is 2450 lb. and of the 16-in. machine 2675 lb.

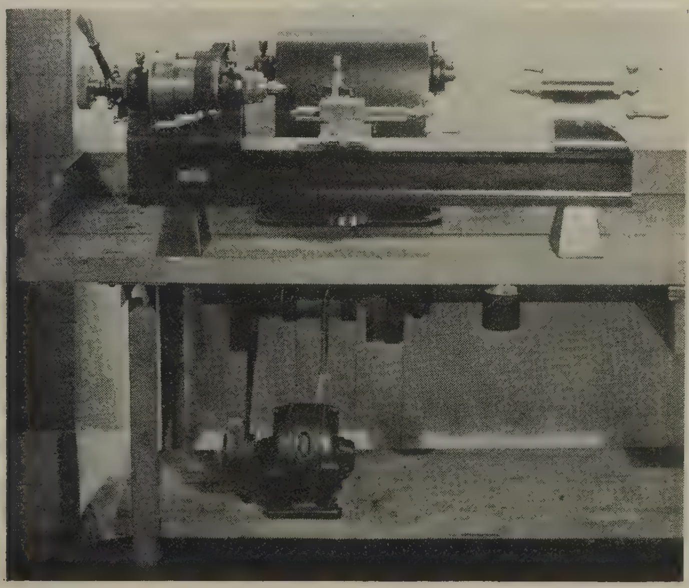
Compact Horizontal Safety Belt Drive for Bench Lathes

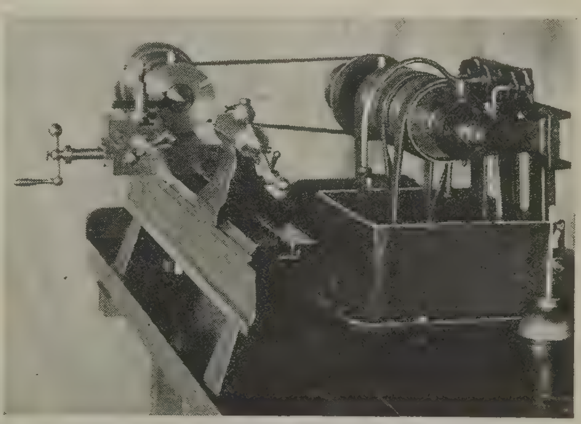
The Rivett Lathe & Grinder Corporation, Brighton, Boston, Mass., has brought out a horizontal safety drive for bench lathes, the arrangement of which may be noted from the accompanying illustrations. This drive is adapted for use on bench lathes of the Rivett company's or other manufacture and advantages claimed include the elimination of countershaft vibration and saving in length of belts.

The device is made up of a heavily ribbed countershaft base, that has bolted to it countershaft brackets, which are mounted on a fulcrum rod that extends through the sides of the heavy cast-iron bench guard. A rod, carrying adjusting nuts which bear against the front face of the bench guard, provides means for drawing forward the lower edge of the countershaft base and consequently swinging back the upper part of the base which carries the countershaft brackets. This swinging motion of the countershaft serves to tighten the horizontal belt which drives the lathe headstock, and also to tighten the vertical belt from the motor jackshaft mounted under the bench. When the tension adjustment has been made by the tightening rod, a nut on the end of the fulcrum rod is tightened, thus clamping together the sides of the bench guard against the countershaft base. A rigid countershaft mounting is thus effected.

The enameled sheet iron belt guard shown in the second illustration extends from the front edge of the bench guard over the countershaft pulleys and belts, and is attached by two thumbscrews to the top edge of the countershaft base. The belt guard is designed to permit full swing of the countershaft without interference with the countershaft pulleys.

The horizontal safety countershaft obviates the necessity of mounting the lathe countershaft in the





The Arrangement of the Horizontal Belt Drive for Bench Lathes May Be Noted from View Above. The belt guard, motor and new motor jackshaft are shown in view at left usual overhead position. In addition to elimination of countershaft vibration and savings in lengths of belting, danger from breakage of belts is a feature stressed. The adjustment feature of the safety drive permits the use of endless cemented belts, which is said to be particularly advantageous because of the high speeds at which bench lathes may be driven. Bench lathes are commonly mounted against windows, and the saving in light by eliminating the overhead countershaft belts is another advantage emphasized.

The motor jackshaft shown in the illustration is also of new and simplified design. The individual motor is controlled by a simple switch which is conveniently mounted under the front edge of the bench as shown. Patent application has been made on the safety drive described.

IMPROVED GEAR GENERATOR

Higher Production of Gears, Including Continuous Tooth Herringbone—Cluster Gears Cut Simultaneously

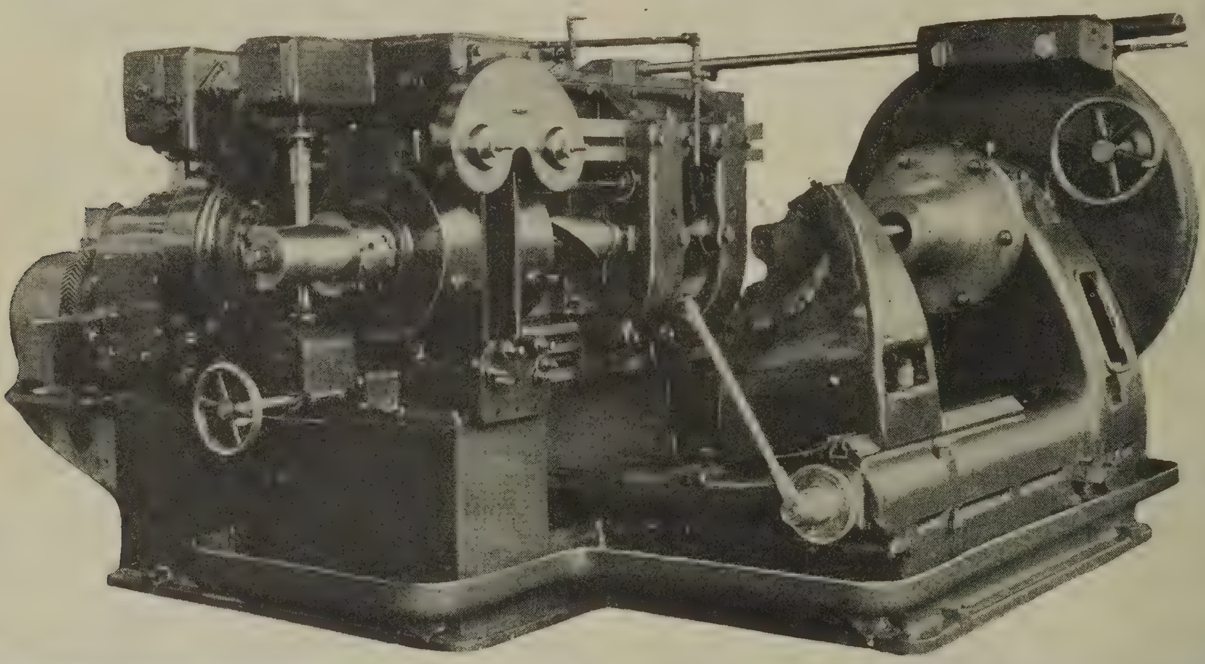
THE Farrel-Birmingham Co., Buffalo, which acquired the American patent rights of the Sykes gear generator in 1922, has brought out a new size of the machine having many improvements in design. These improvements enable continuous tooth herringbone, single helical and straight tooth gears to be cut in much less time than previously taken, and it is claimed that the finish on the teeth and the accuracy of tooth contour and division is of unusually high grade.

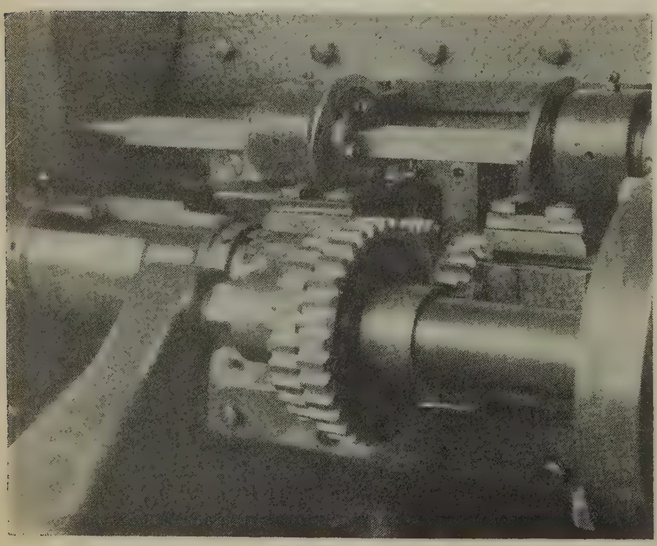
The general principle of operation of these machines was described at length in THE IRON AGE of Oct. 29, 1925, page 1189, and a brief description of new features of the size No. 2-A was given in the issue of Jan. 27, 1927, page 293. A diagram of the generating mechanism, illustrating the simplicity of the machine, is now available, and is reproduced herewith.

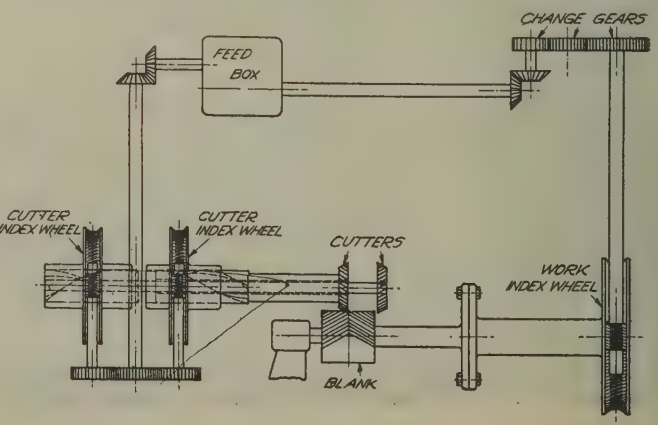
It will be noted that the principle adopted is that of the generating molding process, which is the basic principle of all gear generating machines. The utmost simplicity of operation is claimed for these machines, since there is only one set of change wheels used and since they have a ratio equal to the ratio of the number of teeth in the cutter to the number of teeth in the wheel to be cut, complicated calculations are avoided. These wheels regulate the speed of rotation of the cutters and of the gear blank so that they revolve at the relative speeds they would have if the cutter were a pinion and the blank already had the teeth cut.

Rotation of cutter and blank is continuously in one direction and there is no intermittent indexing. Therefore, the cutters and blanks may be revolved until all errors are removed from the teeth. Simultaneously with the slow rotary movement of the cutters, the reciprocating carriage, on which they are supported, is reciprocating longitudinally, thus imparting the cutting action to the cutters. The cutters are attached to guides which may be either straight or helical, depending upon the type of gear to be cut. When helical guides are used they give to the cutter a helical twist which generates the helices of the teeth of helical or double helical gears.

A feature of the machine commented upon in the previous descriptions is its ability to generate the continuous tooth herringbone gear which has no tool clearance in the center of the face width. It is stated by the builders that prior to the invention of the Sykes gear generator, double helical gears had not been used







New Sykes Machine for Cutting Double Helical Gears, of Either Continuous or Staggered Tooth Design, from 1 to 49 In. in Diameter. The arrangement of the generating mechanism is shown below, and the cutting of cluster gears at the left extensively in the smaller sizes because the tool clearance for the hobbing process detracted seriously from the strength of the gear and decreased the bearing surface. These objections to the small double helical gear are said to have been removed, small gears of this type now being used in planers, lathes, drills, milling machines, shapers, vertical boring mills and other standard and special machine tools. Other applications include herringbone speed reducers, which are said to be more compact, stronger and more durable than their spur gear predecessors. The smaller gears are also used to a certain extent on gasoline engines, airplanes and on rotary pumps.

Cuts Cluster Gears Simultaneously

The new machine, designated as the No. 4-A, will cut double helical gears of either continuous or staggered tooth design from 1 to 49 in. in diameter, from 1 to 18 in. in face width, and from 10 to 1½ diametrical pitch. It will generate straight tooth or single helical gears up to 10 in. in face width between the limits of diameter and pitch given above. It will cut cluster gears simultaneously, which operation, it is thought, has never been performed before. The accompanying illustration shows cluster gears having 33 and 29 teeth, 5/7 pitch, 1 in. face, being cut simultaneously, thus assuring, it is claimed, that the teeth of each gear in the cluster are concentric to each other, and halving the time of production.

The operation is effected by having two cutters with different numbers of teeth, the difference in number of teeth being equal to the difference between the teeth of the two gears in the cluster. They are rotated at different speeds by using a compound gear train in the cutter dividing mechanism.

In general design, the new machine is the same as the No. 2-A, previously described, but, since it cuts larger and heavier gears, the problems of production have been solved in a slightly different manner.

The bed of the machine is similar, but the work saddle ways are extended forward so that at all times they are beyond the point where the cutters are operating on the blank. This causes any deflection of the blank to be away from the cutters. The back of the work saddle has been raised and the bracket supporting the work mandrel is now seated on V-ways which are raised and are radial to the gear center. This is intended to provide more rigid support to the mandrel, permits heavier cuts to be taken and minimizes deflection. The bracket supporting the outer end of the mandrel is bored to a simi-circular form so that pinions with large extended shafts up to 9 in. in diameter can be fitted in bushings and held rigidly.

For setting up the blank a quick power traverse is provided to the work saddle. And for truing of the blank the worm driving the dividing wheel is lifted out of mesh, the work spindle being rapidly rotated by a hand wheel. Cutter brackets are heavier than on the smaller machine and two locking screws instead of one are used.

An adjustable pair of rim supports for the wheel blank is an important feature of the new machine. These are operated quickly by means of a handwheel on the side of the machine and the same system of equalizing screws as used for the cutter heads is employed to assure each support being in its proper position on the rim of the wheel. The point of contact of each support is just above the cutting point. When small gears are being cut the supports may be removed from the machine.

The machine is direct driven, through Sykes herringbone gears, from a 10 hp. motor. Unusually high production is claimed.

MACHINABILITY OF STEEL

Machine Tool Equipment, Small Tools, Material, Coolant Factors Discussed

INTERESTING data relating to the "Machinability of Metals" were presented by A. H. d'Arcambal, consulting metallurgist of the Pratt & Whitney Co., Hartford, Conn., at the May meeting of the New York chapter of the American Society for Steel Treating, New York, May 14.

Five factors that must be considered in discussing the machinability of steels were said to be the machine tool equipment used, the quality of the metal cutting tools employed, the type of material being machined, the cutting fluid or coolant used, and the human element.

In connection with the machine tool equipment factor, the great strides made by the machine tool industry in the past few years were briefly reviewed, the use of heavy-duty cutters and other tools at maximum speeds and feeds, with high-speed steel tools being operated at speeds and feeds much higher than dreamed of years ago, being emphasized. For maximum production, satisfactory finish and size, the best of cutting tools must of course be used, said Mr. d'Arcambal in discussing the second factor. It is not unusual today, he pointed out, to find ground thread taps of high-speed steel being operated at drilling speeds, and heavy-duty cutters removing chips that are dead blue in color. Small tools are also called upon to machine material of 300 Brinell or higher hardness, good production being expected.

Steels used in the small tool, gage, machine tool and aircraft divisions of the Pratt & Whitney plant were briefly described in discussing the material factor of machinability. It was stated that such steels as S.A.E. 1020 and 1045 are being rapidly supplanted by the high-manganese type of acid open-hearth steels, the latter not only having better physical properties but also much freer machining qualities. No difference is noted in the machinability of medium carbon alloy steels, such as 6150, 3145, 2345. These alloy steels are, of course, considerably more difficult to machine than the plain carbon steels of the same carbon content, said Mr. d'Arcambal, and it has been found that the Brinell limits must be fairly well controlled if maximum production is to be obtained from parts made from the medium carbon alloy steels.

The high-carbon high-chromium type of steel, with approximately 0.25 per cent carbon and 12 per cent chromium, was said to be the most difficult to machine of the higher carbon materials. Although much more difficult to machine than high-speed steel, because of its excellent wearing qualities steel of this analysis is becoming increasingly popular for many special jobs.

Sulphur Base Coolant Used on Most Jobs

In connection with discussion of the coolant factor, Mr. d'Arcambal said that a sulphur base oil mixed with a good grade of machine oil or paraffine oil is being used on the majority of jobs at the Pratt & Whitney plants. At times special oils are found desirable, such as a mixture of kerosene and machine oil for aluminum and other light non-ferrous alloys; a good grade of machine oil on many thread milling jobs; and soluble oil on some turning jobs. The sulphur base product, however, is used on the majority of work.

The human factor was emphasized as one that cannot be overlooked. Many machine operators shy at new steels that may be introduced from time to time, even if the new material is more easily machined. "Just change the name of the regular steel being used and note the complaints from the operator regarding the machinability of the supposedly new material," said Mr. d'Arcambal.

A large number of specimens showing the results obtained by the use of different types of cutting oils were exhibited, as well as samples illustrating the difference in finish obtained from different types of steels which were subjected to the same machining operations. Slides showing the effect of microstructure on machinability were also presented, as well as several views of the electric equipment now being used in the small tool and gage hardening room of the Pratt & Whitney company.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. The commodity price indexes rose in April.

2. Building contracts recovered a little in April and appear to have held up well during May.

3. Automobile production is well maintained, considering the season.

4. Improvement continues in the copper and oil industries.

5. Farm purchasing power gained in March and probably in April, as farm prices averaged higher in that month.

6. Business failures decline in number.

7. Continued strong financial position of most leading companies.

8. Light mercantile inventories.

Unfavorable Factors

1. The P-V line falls a little lower, indicating the general supply of commodities to be too large in comparison with the demand at current prices.
2. Decline in unfilled steel orders.
3. Business expansion checked and halting, as seen in car loadings and factory employment.
4. Commodity price average turns downward in May; pig iron and steel scrap lower.
5. Retail trade slumps below normal.
6. Prolonged unseasonable weather; poor condition of some crops.
7. April merchandise exports decline.
8. Severe competition; narrow profits.
9. Tightening money, due to large gold exports, excessive brokers' loans, decline in Federal Reserve ratio, and policy of Reserve Banks in liquidating Government securities.
10. Excessive speculation in stocks; yields below money rates.

BOTH in number and importance, the unfavorable factors exceed the favorable ones and indicate the not distant approach of a moderate recession in business. We say "moderate," because such excesses and maladjustments as now exist are mostly confined to the stock market. The declines in the best business barometers are small, and the supplies of commodities in general are not sufficiently in excess of the demand to make a prolonged or severe readjustment necessary. There seems to be little probability of any severe or prolonged tightness in money, and lower rates may be expected, following the liquidation in stocks, which is probable. While a severe decline in the stock market would affect business unfavorably for a time, it would not be taken as a forecast of prolonged business recession, since the stock market has long been out of touch with the realities of business trends.

Bank Debits Far Out of Normal

OUR first chart illustrates the extraordinary and abnormal condition prevailing at present. It shows at a glance that bank debits are at record-breaking levels, far above any conceivable line of normal trend. Also it shows our best index of the volume of primary distribution of commodities at a relatively low level, much below any line of normal trend. In April, bank debits, or the volume of checks drawn against individual accounts, increased sharply and stood at 167 per cent of the average for 1921-1926. In the same month,

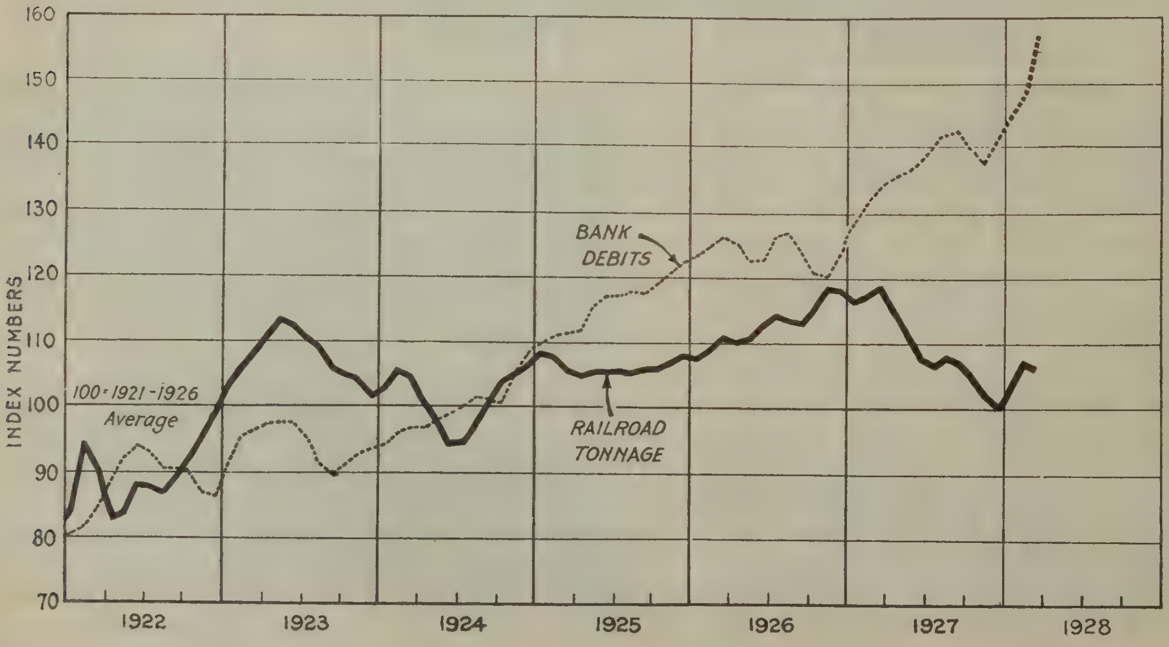


Fig. 1—Freight Traffic Has Recovered Since the End of the Year, But Is Far Below Its Normal Relation to Bank Debits. These have made the highest record ever known, but it is largely speculative

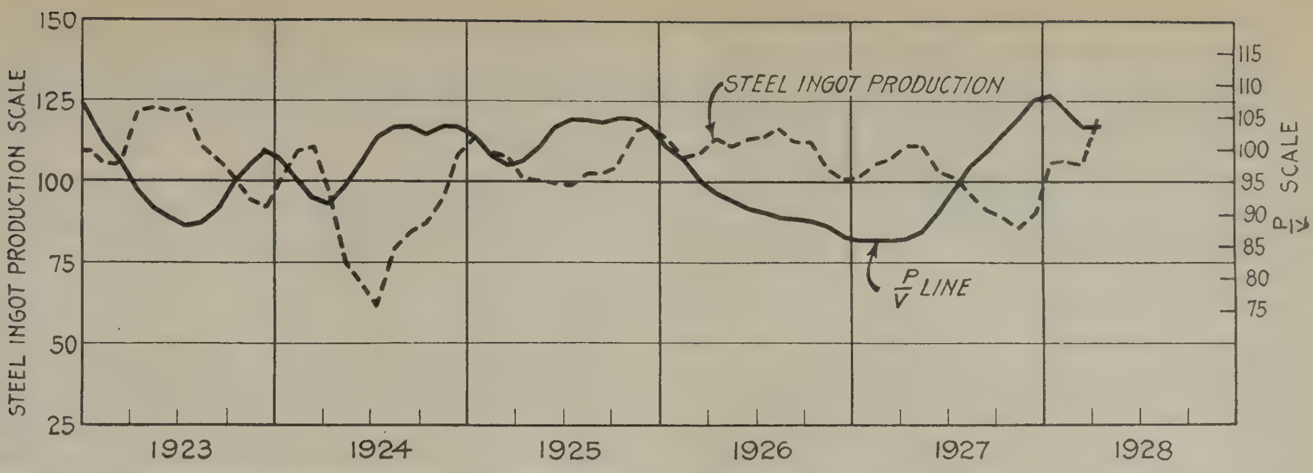


Fig. 2—Downward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Continued in April, Though More Slowly. Steel production (adjusted) has risen for five months and heavy tonnages may be expected for another month or two

railroad freight tonnage originated by the Class 1 roads of the country declined, and stood at only 101 per cent of the average for the same period. The nearest approach to this condition was found in July last year, but never in our history has so great a divergence appeared. What does it mean, and what portend?

It means that the volume of financial transactions, largely speculation in securities, has been carried to great excess. If the volume of checks drawn had been in proportion to the physical volume of trade (and certainly no rise has occurred in commodity prices that would justify any large divergence between the two), the bank debits curve would have been somewhere close to the railroad tonnage curve. Payrolls have not shown any such divergence and retail trade has declined considerably since the middle of last year. Thus there is no explanation other than excessive speculation.

Such a position portends a readjustment, and as there is not the slightest indication that such readjustment will come through expansion of business activity, we must infer that there will be a sharp recession in bank debits. This is likely to attend a reduced volume of speculation in securities and commodities, in which the chief factor will be a decline in the price of securities.

Ingot Output May Hold High Through June

As anticipated by us over a month ago, steel production increased quite sharply in April, considering the season, and in this followed even more closely than expected the precedent set by April, 1923, both in the rise and in the relationship with the P-V line. (See Fig. 2).

The P-V line (a general business barometer based on the ratio of commodity prices to the physical volume of trade) has now declined for three months in succession, though not sharply. This decline follows a rise in the barometer that lasted for from seven to eight months following May, 1927. Probably steel production is still under the influence of conditions forecast by this preceding rise, and, as the steel curve has risen for only five months, it may be expected to climb a little further, or at least to hold at the high April level for a month or two.

Apparently it has done this in May—remembering that we refer only to movements which are greater or less than seasonal, and do not count those changes which are merely the ordinary occurrences year after year. For example, a decline of 2½ per cent in May is the normal seasonal variation in the average daily ingot output, and a recession of that extent would leave our adjusted curve unchanged.

Of course, if we assume the validity of the relationship between the P-V line and ingot production, much will depend on the future trend of the former. At present it does not seem probable that this barometer will show an uninterrupted and prolonged decline as it did in 1923, for the simple reason that now there is no such oversupply of commodities to be worked off as then existed. But already the decline has been sufficient to warrant a forecast of a more than seasonal recession in steel production by July or August, at the latest.

This forecast applies also to business in general.

Automobiles and Buildings Normal Again

It is interesting to note that the curves of automobile production and building contracts, as shown in the third chart, have come together again, each being based on its own average for the last seven years. This is normal. It is the result of a decline in building activity and a recovery in automobile production, which has brought the two into touch at a point about halfway between the average for 1921-1927 and the peaks reached at the end of 1925.

Floor space in building contracts increased in April to 94,481,000 sq. ft., which is considerably above the preceding month or April, 1927. A good part of the increase, however, represents a usual seasonal gain. Our adjusted index is 124.5, against 118.6 in March, 144.1 in February, and 110.2 a year ago. (The average for 1921-1927 equals 100.) Thus building activity is much below the peak of the year.

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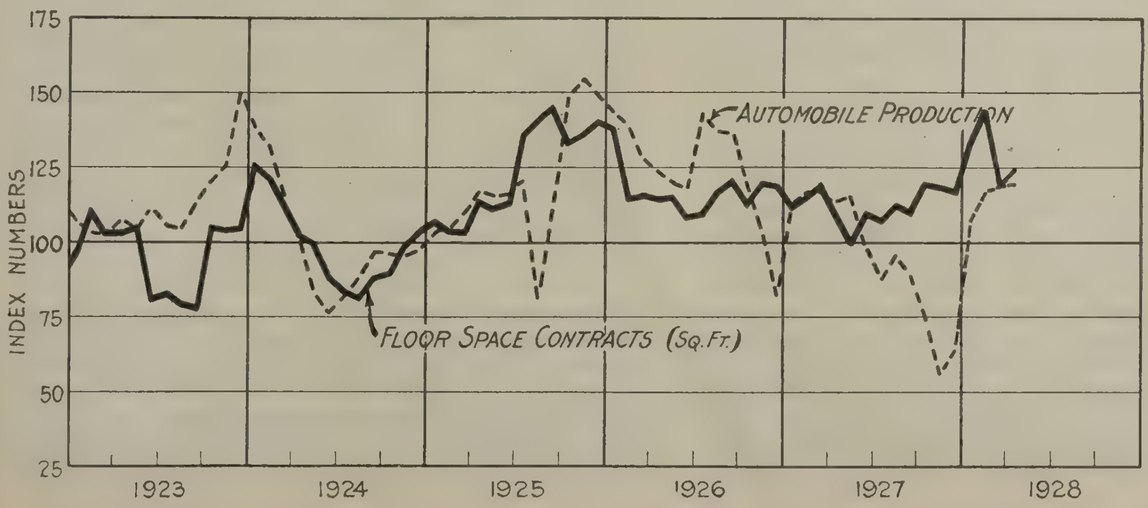

Fig. 3—Building Activity and Automobile Output Remain in Normal Relationship. Both appear to be ready for a decline

Koppers Co. Discontinues Negotiations for Massachusetts Gas Companies

Announcement has been made that negotiations for the purchase of the Massachusetts Gas Companies, Boston, by the Koppers Co., Pittsburgh, have been abandoned for the time being. This announcement was made just prior to the sailing of James L. Richards, president of the Boston company, for Europe and the departure of the Koppers Co.'s representative from Boston.

In Boston financial circles it is reported that the Koppers Co. has actually agreed to purchase terms and that upon Mr. Richards' return from abroad in about two months details will be announced. Officials of the Boston company will not affirm or deny the report. It is also reported the Massachusetts Gas Companies have negotiated the sale of some of their property to a New Jersey company and that a new industry will be established at Everett, Mass. Details are withheld, however.

When interviewed, an officer of the Koppers Co. stated that all negotiations regarding this matter had been discontinued and that there is no agreement between the companies for the purchase of the property.

The Massachussetts Gas Companies control the Mystic Iron Works, Boston Consolidated Gas Co., Citizens Gas Co., Quincy, Mass., New England Fuel & Transportation Co., New England Coal & Coke Co., Mystic Steamship Co., Caster, Curren & Bullitt, Inc., Providence, R. I., and the C. C. B. Smokeless Coal Co.

The Koppers Co., through its subsidiaries, is a large producer of coal, coke and gas.

Benefits Expected from Operation of Merchant Marine Law

WASHINGTON, May 26.—The iron and steel, machine tool, foundry and numerous other industries in the United States are expected to receive almost immediate stimulus from enactment of the Jones-White merchant marine law. Already Henry Herbermann, president Export Steamship Corporation of New York, has notified the Shipping Board that his company will apply at once for a loan out of the revolving fund, provided in the law, for the construction of four combination passenger-cargo ships to be operated between north Atlantic ports of the United States and ports on the Mediterranean-Black Sea route.

At the same time he submitted preliminary plans for the ships. These vessels will supplement the 21 cargo ships bought by the Export Corporation from the Shipping Board. The four new vessels, 450 ft. long, will have an average speed of 14 knots, with a tonnage of 9500 deadweight. cargo capacity for 5500 tons and space for mail. It is proposed to build four ships every two years for six years. Announcement of the application of Mr. Herbermann was made by Chairman O'Connor of the Shipping Board, who said that other private operators are expected shortly to avail themselves of the benefits of the new law.

"This means busy shipyards, and busy shipyards increase security and local payrolls in many seacoast and interior States," he said. He declared that, fine and fast as foreign ships are, "finer and faster American ships will be launched as a result of the Jones-White law. The United States is on its way to a new merchant marine which will carry us back to our old place of dominance."

Under the new law ships and materials for them, when built from money from the construction fund, must be of American production. It is also required that the vessels be built of steel. While permitting continued Government ownership and operation of lines which have not become self-sustaining, the act looks to eventual creation of a privately owned and operated merchant marine.

It provides a revolving construction fund of $250,000,000, and authorizes loans through the Shipping Board up to three-fourths of the cost of the vessel at a low rate of interest—the Government rate—for construction of vessels to be used in overseas trade. For vessels to be used in the coastwise trade a higher rate, 5¼ per cent, applies. The law also liberalizes the postal subvention and, it is estimated, will provide $7,500,000 annually to American ship operators in carrying mails under contract with the Post Office Department. Ships now Government-owned may be sold when approved by a vote of five of the seven members of the Shipping Board.

Republic District Sales Managers Appointed

H. T. Gilbert, vice-president in charge of sales, Republic Iron & Steel Co., and Wilbur B. Topping, general manager of sales, have largely completed the work of consolidating the district sales offices of that company, and the Trumbull Steel Co., recently merged with the Republic Co. In all cities where there were two offices, except Detroit, the Republic company district sales manager continues in that capacity, and the former Trumbull company manager becomes assistant manager. The Pittsburgh district sales manager is Frank M. Welsh, formerly assistant manager under Charles T. Johnston, who has resigned.

The district office personnel now is as follows:

New York, Whitehall Building: W. H. Oliver, district sales manager, A. R. Johnson, assistant district sales manager.

Philadelphia, Packard Building: C. S. McKinley, district sales manager, J. B. DeWolf, assistant district sales manager.

Pittsburgh, Oliver Building: Frank M. Welsh, district sales manager.

Detroit, Buhl Building: W. J. Hanna, district sales manager, C. S. Powers, assistant district sales manager.

Chicago, McCormick Building: H. W. Craig, district sales manager, L. J. Simmonds, assistant district sales manager.

Cleveland, Hanna Building: W. E. Collier, district sales manager.

The Rochester, N. Y., office of the Trumbull Steel Co. has been closed, and R. V. Jones has been transferred to the Republic company's Buffalo sales office, which is under Allan Hills. The consolidation of the Republic and Trumbull Cincinnati offices is yet to be completed.

Chapters of Steel Treating Society Name Officers

Harrison B. Parker, Trimont Mfg. Co., Roxbury, Mass., was elected chairman of the Boston chapter of the American Society for Steel Treating, at the annual meeting held recently. Dr. Robert S. Williams, Massachusetts Institute of Technology, was named vice-chairman, and Howard E. Handy, Saco-Lowell Shops, was re-elected secretary-treasurer. Mr. Handy recently changed his headquarters from Lowell, Mass., to Biddeford, Me., where the metallurgical laboratory of the company is now located.

The Canton-Massillon, Ohio, chapter of the society has named the following officers: E. C. Smith, assistant general superintendent Central Alloy Steel Corporation, chairman; R. G. Roshong, metallurgist Hoover Co., vice-chairman; R. Sergeson, metallurgist Central Alloy Steel Corporation, secretary, and R. L. Wilson, metallurgist Timken Roller Bearing Co., treasurer. The new executive committee is made up of John Edward Fick and L. D. Cable, metallurgists for the Timken Roller Bearing Co.; E. W. Hanna, general manager American Sheet & Tin Plate Co.; T. W. Hardy, chief metallurgist Timken Roller Bearing Co.; W. M. Lindsey, mill metallurgist Central Alloy Steel Corporation, and Martin H. Schmid, assistant manager of sales Central Alloy Steel Corporation.

Patents for the hollow seamless metal balls formerly manufactured by the Hollow Ball Co., Baltimore, and described in THE IRON AGE of Dec. 11, 1924, have been acquired by J. Harry Gruver, 210 West Lexington Street, Baltimore, the original patentee. A plant is being equipped for the manufacture of this product, which will be marketed for pump, valve and other uses.

Knowing Costs Has Many Advantages

Promotes Efficiency Within the Plant and, with Uniform Classification of Accounts, Serves to Tone Up Individual Industries

BY DR. ARTHUR E. SWANSON*

TOO many men lose sight of their ultimate goal in the rush and distractions of the daily task. Too many forget that they are in business for profit and profit only. We hear much about "service," but firms have crashed for lack of service just as they have failed by supplying too much service. A proper cost system correctly used can be of the same value to the firm as can the radio beam to the aviator. We may have fine plants, good sales organizations, able executives, but without the guidance of the cost system, the radio beam of industry, there is great danger, especially when too many distractions tend to cloud and fog the main issue. Only by the guidance of the cost system can the organization be kept on the right route to reach its true destination of *profits*.

Profits are the only criterion of success; the only way to be fair with your employees is to grow and supply them with the opportunity of growing with you. A firm in which employees must wait for dead men's shoes for advancement is not being fair to its employees.

Indicates Efficient and Inefficient Methods

Knowledge of costs enables you to make clear cut decisions as to what price to take business or to leave it alone. But costs have a much wider significance, knowledge of costs is most important in promoting efficiency. The cost system should be the best tool of the manufacturer. It should tell you where you are efficient and where inefficient. Even in a matter like scrap, you may have assumed that 5 per cent is the average. Often a study of costs will show you that 2 per cent can be aimed at, and once this idea goes through the shop the scrap begins to drop,—why should it drop, before, wasn't 5 per cent all right? You can not expect your men to aim at any different target from the one you aim at. If you know what to aim at, your men will come to know.

With a knowledge of costs, departments can be checked and developed. In too many plants, through lack of knowledge of what is going on, the superintendent goes by what the foreman says, the foreman goes by information from the man at the machine, who has only a narrow view of the problem. With a knowledge of costs, the trouble can be located or the possible source of saving picked out. This also means that the deserving men can be selected on their ability as workmen rather than on their ability as talkers.

Again, costs show which products should be developed and pushed, and which should be dropped or rated as of minor importance.

Once an executive actually realizes what the proper use of costs can mean it will seem incredible to him that so little attention is paid to them.

Full Significance Cost Knowledge Not Realized

Since costs are so important, why are there any who do not make the fullest possible use of them?

First, because their full significance is not appreciated.

Second, because many plants have started in a small way, say by a mechanic or two, who knew how to make an article and make it right. Then came the necessity of knowing how to sell; then burden began to develop. At first much of the cost was direct and could be seen, but as burden began to develop, as machines began to wear out and as new types of machines came in, the indirect costs began to mount up, without being recognized as a part of real costs. As this indirect cost began to grow in importance its significance was not realized, it was not seen that all this was part of the cost of every article produced.

Another reason is that the securing of costs is not an easy job. We tend to think of the things we know about, and avoid those with which we are not familiar.

Every manufacturer should get deep into this matter himself, not necessarily to operate the system, but to know how it works and to master its principles. This is a matter of study and reflection. Once into it, the matter becomes more interesting,—at every point there is a challenge. The mastery of the principles will be well worth while.

Some do not go further into this matter because of a bad experience, perhaps because the problem was not properly developed or explained. But two wrongs do not make a right,—regardless of the experience, there are too many manufacturers whose success depends upon their cost system for anyone to say that this can be overlooked or treated lightly. Like a bad experience one may have with a doctor or a dentist, even like your own bids—you don't quit bidding because you may have made a bad bid.

Sometimes the expense of the cost system seems out of proportion to the advantages secured. This is only because you do not see all the benefits and have a wrong idea of the expense. But it does cost money—the question is not what it costs, but what it is worth.

Then again there are many firms which could know their costs, but which are helpless on account of competition. Some seem forced to disregard costs and do what they know is good business. Here at least they should know the dead line,—it is one thing to know that you may be forced to be doing bad business and another to think you are doing good business when you are not.

Uniform Cost Methods Benefit Individual Industries

This brings up the newer development and attitude of management,—its relation with others in the same business. Not only is present-day management interested in its internal and its selling problems, but in the entire industry of which it is a part. If an industry is to be in a healthy state, every member of that industry must be strong. It is the selfish duty of those more fortunate to help those not so well off, since the weakness or lack of knowledge of conditions disturbs the whole industry. Selfishly it is good business, since several weak unposted organizations may think they are doing good business, and helping them set themselves right helps everyone.

If every member of a group knows his costs accurately, it is easier to secure a fair margin of profit. With uniform classification of accounts, comparative ratios can be secured so that the proper firms can locate the points on which their efficiency is challenged. This will tone up the entire industry and make it a more efficient portion of the industrial machine of today.

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*Swanson & Ogilvie, consulting engineers, Chicago. From an address made at the general meeting of the Screw Machine Products Association, held at the Great Northern Hotel, Chicago, May 17.

With a uniform classification, differences in quotations can mean only differences in efficiency.

Three Stages in Group Cost Work

In group cost work there are three stages:

1.—There are many members who do not know costs, who do not realize what their costs can do for them. This requires propaganda, a pointing out of what it would mean to know costs.

2.—Education, study of different methods, needs, what the cost system should do for each, and a plan for each one.

3.—Adoption of a system which will allow for comparisons between plants. There may be many different methods, each good, but one of the main values of a cost system is lost if comparisons cannot be made.

The first step may take months, or years; the second step should not take more than months; and the third is almost a matter of weeks.

The final result is the uniform classification, uniform accounting, and is also most desirable since many items of cost like depreciation, obsolescence and normal working time can make a vast difference in apparent costs with differing policies. With a uniform system these matters of judgment and combined experience can be compared and checked.

It must be remembered that the teacher doesn't educate—he only supplies the materials with which the student educates himself. Just so here, it is the duty of the industry to supply materials with which each member can educate himself, and to do this there must be a common language.

There is no time to discuss some of the fundamental elements of costs, but I will touch on some of them:

1.—Burden and Its Application. As industry advances, burden increases. Robinson Crusoe had nothing but direct labor, but his costs were very high. As an industry developed, direct labor tended to lower, and burden, indirect labor and overhead increased. These are actual elements of costs no matter how disguised.

As tools developed this burden increased, and it may not have occurred to you that the ideal is no direct labor and *all burden*. Of course we will never reach this, but, as you think of the developments in industry, you will realize the trend.

2. — Depreciation and Obsolescence. These will grow as the burden grows. Here are two items, obsolescence particularly, which will have to be given more attention as we develop. Just as you are interested and gratified to see how some new machine or method in some other line will reduce costs to you, so the general public is interested in anything which will reduce costs to them. This means accelerating obsolescence if there is to be increased efficiency, and, while it hurts the industry in one sense, yet, since it helps industry, new developments must be welcomed—even sought.

In conclusion, the good executive is a good teacher. While the main idea of business is profit, the greatest profit comes from the development of men and to develop men requires performance records.

Salesmen's and Purchasing Agents' Association Elects Officers

At a recent meeting of the Salesmen's and Purchasing Agents' Association of America, A. H. Jones, Bryant Electric Co., Bridgeport, was elected president and R. T. Phipps, Bullard Machine Tool Co., Bridgeport, was chosen vice-president for the coming year. W. B. Osborne, Erie Malleable Iron Co., is secretary and W. H. Bradley, Hunter & Havens, Bridgeport, is the new treasurer.

The service of the retiring president, H. J. Behn, Hunter & Havens, Bridgeport, was recognized by a unanimous vote of thanks, and R. T. Phipps, past treasurer, was the recipient of a gold watch and chain in recognition of his work in promoting the first exhibition of the association, which was held in Bridgeport, Feb. 24 and 25. It is expected that a second exposition will be held in Bridgeport early in 1929.

An outing of the association has been planned for June 23, at Champs Farm, Bridgeport. Following a brief business session at 1.30 p.m., there will be a program of sporting events, and dinner will be served at 6 p.m. An attendance of more than 200 is anticipated.

Mining Engineers Form Iron and Steel Division

At a meeting of the iron and steel committee of the American Institute of Mining and Metallurgical Engineers, held in New York Thursday evening, May 24, the suggestion which was made at the general meeting of the institute in February, namely, that the iron and steel activities of the institute be concentrated in the form of a division of the organization, was formally adopted. This feature of the work of the institute will now be conducted by what will be known as the Iron and Steel Division, similar to the Institute of Metals Division for the non-ferrous activities.

Ralph H. Sweetser, assistant to first vice-president American Rolling Mill Co., Columbus, Ohio, was elected chairman. Three vice-chairmen were named as follows: Dr. F. C. Langenberg, vice-president Climax Molybdenum Co., New York; W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, New York, and Dr. George B. Waterhouse, professor of metallurgy Massachusetts Institute of Technology, Boston. Dr. T. T. Read, assistant secretary A. I. M. and M. E., was made secretary-treasurer.

The chairmen of the nine technical committees of the iron and steel division were named as the executive committee. They are Charles B. Murray, Crowell & Murray, Cleveland; C. A. Meissner, United States Steel Corporation, New York; William H. Blauvelt, consulting engineer, New York; H. T. Morris, Bethlehem Steel Co., Bethlehem, Pa.; Arthur H. Jameson, Deemer Steel Casting Co., New Castle, Del.; F. C. Langenberg, Climax Molybdenum Co., New York; L. F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio; A. L. Feild, Electro Metallurgical Co., New York, and Bradley Stoughton, professor of metallurgy Lehigh University, Bethlehem, Pa.

Consideration was given to a proposal that the division hold a joint meeting with the Lake Superior Mining Institute, possibly late in August.

Institute of Metals to Meet in Liverpool in September

The council of the Institute of Metals has just issued a preliminary program of the four-day annual autumn meeting which is to be held this year in Liverpool. In the course of the 20 years of the institute's existence most provincial centers and many foreign cities have been visited, but this is the first occasion on which Liverpool has received the members of this body of metallurgists and engineers. The proceedings will begin on Sept. 4 with a lecture on "Non-Ferrous Metals in the Shipping Industry," by F. G. Martin. The mornings of Sept. 5 and 6 will be devoted to the reading and discussion of papers and the afternoons to visiting works of interest in the neighborhood. On the evening of Sept. 6 there will be a reception at the town hall by the Lord Mayor (Miss Margaret Beavan). The meeting will conclude on Sept. 7 with an all-day motor trip to North Wales.

CLOSES HIGH-COST MINES

Consolidation Coal Co. Takes Steps to Correct Oversupply of Bituminous

THE Consolidation Coal Co., in closing down six of its mines in the Fairmont, W. Va., field and four in the Somerset, Pa., field, these operations being the least efficient of its many mines, has taken a step which, if followed by other large soft coal producing companies, cannot fail to have a beneficial effect upon the bituminous coal situation. The suspensions mean the throwing out of employment of 2500 men, or 20 per cent of the company's employees in the two districts, but according to Robert C. Hill, chairman of the company, steadier work will be provided for the other 10,000 miners, who may have full time instead of the part time employment they have had for some time.

George J. Anderson, who was elected president of the company just prior to the suspension order, in an open letter to other coal producers, observed that his company believed that the present plight of the bituminous coal industry would not be remedied by forcing unwanted coal upon an unwilling market. It sees no relief, either to the industry or to any producing company, by cutting prices below a level that permits a mine to remain in production, with its natural overhead unabsorbed in its average realization.

"No present useful purpose nor any contribution to future stability," continues Mr. Anderson, "is to be gained by further cutting wages below a sound economic level. Whatever may be the temporary relation of labor costs to selling prices, the primary object of both mine labor and mine management must be the most regular work-time possible under a proper wage base.

"If the industry is to progress rapidly toward its rightful economic recovery, the Consolidation Coal Co. believes each and every producing unit must make some sacrifice to that end. We speak only for ourselves and only in the spirit of friendly cooperation. The retention of the most economic mines, and the present elimination of the least efficient, adopted voluntarily as a general program, seems to offer the speediest and most effective relief for all."

Trade Commission Holds Hearing in Aluminum Company Case

A hearing in the Federal Trade Commission's suit against the Aluminum Co. of America, held at Pittsburgh, May 21, 22 and 23, and then adjourned until June 13, was featured by the refusal of A. V. Davis, president of the Aluminum Co., and other company representatives, on the advice of their counsel, to answer the questions propounded by R. P. Whitely, who, as in previous hearings, appeared as counsel for the commission. P. J. Urquhart, chief auditor, and I. W. Wilson, superintendent, were the other company officials who declined to answer questions, on advice of counsel, that the subjects were irrelevant and were not within the scope of the complaint against the company.

One of these matters was an allegation by George D. Haskell, Boston, president of the Baush Machine Tool Co., Boston, that he had an arrangement with the late James B. Duke, tobacco magnate, relative to their going into the aluminum business on the Saguenay river in Canada, which Haskell alleged had been interfered with by the aluminum company.

Another was Haskell's allegation that the aluminum company had been guilty of price cutting in competition with the Baush Machine Tool Co.

Still another was the Government's allegation that the aluminum company had entered into price-fixing agreements with certain foreign aluminum manufacturing companies.

Counsel for the company made it clear that the objections to this testimony were based solely on the contention that it was outside the complaint and was irrelevant.

The same position was taken on questions relating to bauxite ore holdings of the aluminum company in Dutch Guiana and elsewhere, which the witnesses also declined to answer, on advice of counsel, as being outside the complaint.

The commission charged that the company, seeking to remove scrap aluminum from the market, engaged in unfair practices in violation of the Clayton act. The company was alleged to have sold virgin sheet aluminum to certain manufacturers of automobile bodies and cooking utensils at lower prices than were charged other consumers for the same material and bound them, in return for the concession, to sell it all of their scrap material.

As a result, it was charged, scrap aluminum had disappeared from commerce, although 32,000,000 lb. of it was sold in 1922.

OPPOSE PIPE RATE ADVANCE

Southwestern Consumers' Committee Asks Further Hearings

WASHINGTON, May 28.—Estimating that the proposed freight rate increases on wrought iron and steel pipe provided for in the decision of the Interstate Commerce Commission in the Consolidated Southwestern cases, effective July 8, would amount to $2,000,000 annually, and would throw the burden on the public in the Southwest consuming gas and oil, the Southwestern Pipe Consumers' Committee has petitioned the commission to postpone the date of the order and grant further hearings on it. It is pointed out that the commission did reopen the cases for further hearing as to the rates on wrought iron and steel pipe and cast iron pipe, and postponed the effective date of the latter, but left the order in effect on wrought pipe. It is requested that the commission give ample opportunity to the public to defend the present level of rates and to show that if any revision in the grouping or general rate structure is to be had it should be in such a manner as not to increase the general burden on this commodity.

Reference is made to an exhibit submitted by the Chamber of Commerce of Dallas, Tex., showing prevailing and ordered rates from St. Louis, Kansas City, Pittsburgh and Birmingham to representative points in the Southwest. This exhibit shows 66 increases and 12 reductions in rates. The aggregate of the 66 increases is placed at $5.54, or an average of 8.4c. each, while the aggregate of the 12 reductions is fixed at 43c., or 3.6c. each.

The petition also states that the average carloading of pipe is 81,000 lb., and the earnings per car-mile substantially greater than those upon numerous other commodities, including almost the entire general list of iron and steel articles. Contention is made that wrought pipe should not be classed with iron and steel articles, but should have a commodity basis somewhat lower.

The petition also says that the commission has reopened the case and postponed its order indefinitely as to ocean-rail and rail-ocean-rail carriers employing routes between Trunk Line and Eastern territories and the Southwest by way of the ocean, but has prohibited the all-rail routes through the river crossings from meeting the competitive rates of the former. As a result, it is declared, the commission has substantially increased the all-rail rates but has left the water carriers free with their connections to continue the present rates or to establish others.

The present all-rail rate from Youngstown to Houston, Tex., it was pointed out, is 67c. per 100 lb., while the rail-ocean-rail rate is 64.5c., a difference of 2.5c., which, the petition declared, just about equalizes the rates. Effective July 8, the rate from Youngstown will be increased to 96.5c., so that it will be almost 50 per cent higher than the rail-ocean rate, which will be continued. McKeesport, Pa., and other important producing points, it was stated, show a similar situation. At the same time, it was added, Chester, Pa., and other nearby points, enjoy rates ranging from 36c. to 41.5c. by water. Chicago was declared to be permitted to reach Houston on a rate of 49c., but the rate will be increased to 85c., or more than 70 per cent, while Seaboard points will still have their low rates.

SWEDISH DUTIES UNCHANGED

Tariff Bill on Steel Abandoned—Ore Company Declares Large Dividend

STOCKHOLM, SWEDEN, May 14.—It is understood that the Ministry of Trade has decided to abandon a proposed bill in the Riksdag, to increase the tariff on iron and steel. The ministry has pointed out that some of the difficulties of the iron and steel industry of Sweden must be regarded as temporary and further that the proposed increase in duties suggested by the commission of inquiry would be insufficient to equalize the difference between domestic prices and those of foreign sellers. Other measures are suggested, including combinations of producers and dealers.

Although iron and steel consumers and farmers have opposed higher duties, the decision of the ministry was unexpected. The commission of inquiry found that iron and steel production of the country was lower than before the war and importation of steel had doubled. Other countries, particularly Germany, Poland and Czechoslovakia, were found to be exporting to Sweden at prices 30 to 40 per cent below those on domestic products. The proposed duties amounted to 10 to 20 kr. ($5.37) per metric ton on rolling mill products, 10 kr. ($2.68) per ton on sheets and 25 kr. ($6.70) per ton on rails, which are now duty free. There were also increases in the duties on iron, iron alloys, nails, screws, rivets, bridge and elevator material of about 6 kr. ($1.60) per ton.

The Grangesborg Co., the largest iron ore producer in Sweden, showed gross profits of 42,980,000 kr. ($11,533,534) in 1927, which was 7,360,000 kr. ($1,974,688) more than in 1926. Net profits were 20,380,000 kr. ($5,467,954) compared with 21,860,000 kr. ($5,865,038) in 1926, but from a surplus of 30,190,000 kr. ($8,100,977) a 17 per cent dividend was paid. Ore stocks declined 792,000 metric tons. At present, as a result of the protracted strike of the miners, there is practically no stock available. During the year the Grangesborg Co. acquired 23,621 shares in the North African Hematite Co. and bought iron ore deposits from the Stora Kopparberg Co.

Bauxite Output in 1927—Heavy Exports

WASHINGTON, May 27.—Reflecting a decrease of 18 per cent in both quantity and value, production of bauxite in the United States in 1927 was 320,940 gross tons, valued at $1,988,780 as against 392,250 tons, valued at $2,415,200 in 1926, according to a statement prepared by J. M. Hill, Bureau of Mines. Imports of bauxite in 1927 totaled 356,580 tons, valued at $1,572,236 as against 281,644 tons, valued at $1,187,497 in 1926. Exports of bauxite and bauxite concentrates have also increased, particularly in the last two years, because of the large increase in aluminum manufacture in the Canadian and Norwegian plants of the Aluminum Co. of America. In 1927 the exports amounted to 121,858 tons, valued at $7,800,491, as compared with 87,770 tons, valued at $4,741,260 in 1926. Producers of domestic bauxite reported sales during 1927 at prices ranging from $5 to $6.50 per gross ton.

Mined 748,420 Tons of Iron Ore Without a Lost-Time Accident

From Herbert Hoover, Secretary of Commerce, has come national recognition of the safety work being done at the Bristol mine, Crystal Falls, Mich. The mine is operated by Oglebay, Norton & Co., Cleveland. The award, "Sentinels of Safety" trophy, is in recognition of the mine's having won first place in the national safety competition. In addition to the trophy each employee is given a certificate of honor.

Crispin Oglebay, president, says: "The mine operated throughout 1927 without one lost-time accident. During that period we took 375,265 tons of iron ore from the ground and used 434,916 man-hours in doing so. However, the actual non-accident record of the mine started May 12, 1926, and continues to date. In the two-year period we mined 748,420 tons of ore and employed 868,944 man-hours."

In his letter announcing the award, Secretary Hoover says: "Your record is one in which you and your employees may feel a just pride. It represents a definite contribution to the personal welfare of industrial workers, and marks a forward step in the elimination of unnecessary accidents in American industry."

Chicago to Pacific Rail-and-Water Rates Effective May 31

WASHINGTON, May 28.—The Interstate Commerce Commission today voted not to suspend the Illinois Central-Redwood steamship tariffs equalizing rates on iron and steel products from the Chicago district to Pacific ports by way of New Orleans with those from the Pittsburgh district to Pacific ports by way of Atlantic ports.

The Illinois Central-Redwood rates therefore will become effective May 31. They range from 56c. per 100 lb. on tin plate to 86c. on numerous iron and steel products. A rate of 61c. will apply to most of the products in the list.

Pig Iron Rates from Erie and Johnstown, Pa., Reduced

WASHINGTON, May 28.—Passing upon a complaint by the Perry Iron Co., the Interstate Commerce Commission in a decision announced today ordered rates on pig iron from Erie, Pa., to the New York rate group reduced from $5.42 to $4.90 and to the Boston rate group from $5.92 to $5.10 per gross ton. The new rates are to become effective Aug. 4.

In a simultaneous opinion, the commission held that the rate of $5.54 per gross ton on pig iron from Johnstown, Pa., to Westfield, Mass., is unreasonable to the extent it exceeds $5.04 per ton, with a minimum carload of 56,000 lb. The new rate, growing out of a complaint by the H. B. Smith Co., Westfield, is to become effective July 20.

The commission also held that the present rate from Erie to Boston is unduly prejudicial to the Perry Iron Co. and unduly preferential of shippers of pig iron from DuBois and Punxsutawney, Pa., to the extent that the Erie-Boston rate exceeds the rate from DuBois and Punxsutawney to Boston. Inasmuch as the rate from DuBois and Punxsutawney to Boston is $4.91 the railroads either will have to reduce the Erie-Boston rate to this basis or increase the rate of $4.91 to $5.10. it is expected the latter course will be adopted.

Deoxidation with Silicon in the Open-Hearth Furnace

One of the primary factors in the rate of elimination of silicates from open-hearth steel is the size of the particle formed on deoxidation. If excess silicon is added to a medium or high-carbon steel, very small glassy particles are formed which rise slowly out of the steel. On the other hand, if there is sufficient iron oxide or manganese oxide to flux the silica, a rapid increase in rate of elimination is found due to the increased size of the silicate particle.

From the results of laboratory work on deoxidation with silicon performed by the United States Bureau of Mines, it is possible to predict just what type of inclusion will be formed with any silicon addition to any type of open-hearth steel, provided manganese is not added at the same time. Predictions from the laboratory work have been checked on various open-hearth heats and, out of 67 steel samples studied, only six samples showed types different from that predicted. These results make it possible to designate the optimum amount of silicon to add to any open-hearth heat in killing in the furnace and show that, if clean steel is desired, certain grades of steel should be killed in the furnace with silicon and manganese rather than silicon alone. Investigation of the properties of the manganese silicates thus formed is now in progress.

GERMAN STEEL PRICES RISE

Higher Coal a Factor—Profits Smaller as Exports Expand and Domestic Trade Contracts

BERLIN, GERMANY, May 11.—As a result of the rise in the price of Ruhr coal following the decision of the arbitration court for an 8 per cent increase in miners' wages, the iron and steel market has advanced to a considerably higher level. Increases in coal prices averaging about 1 m. (24c.) a ton were sanctioned by the Reichskohlenverband (National Coal Union) and the Reichskohlenrat (Federal Coal Council). Permission was given to distribute this increase among the different qualities of coal. As higher prices can be made effective only in the so-called non-competitive districts, where British, Polish or Dutch coal cannot be sold, the advances will probably average about 2 m. (48c.) per ton, or about 14 per cent in such territory, leaving the market substantially unchanged in the sections where there is competition. Coke prices are unchanged.

Pig Iron Prices Unchanged

As many blast furnaces have no coal mines or coke ovens and can buy coke in the open market at unchanged prices, no advance was announced in pig iron prices. The dullness of the iron market militated against an upward revision of prices at this time. On products controlled by the Ingot Steel Syndicate the following changes in prices per metric ton were made:

	New Price		Former Price	
Ingots	104.00m.	($24.89)	100.00m.	($23.93)
Blooms	111.50	(26.68)	107.50	(25.72)
Billets	119.00	(28.48)	115.00	(27.52)
Slabs	124.00	(29.67)	120.00	(28.72)
Steel bars				
f.o.b. Oberhausen	141.00	(33.74)	137.00	(32.78)
f.o.b. Neunkirchen	135.00	(32.30)	131.00	(31.35)
Structural shapes				
f.o.b. Oberhausen	138.00	(33.02)	134.00	(32.07)
f.o.b. Neunkirchen	132.00	(31.59)	128.00	(30.63)
Steel bands				
f.o.b. Oberhausen	164.00	(39.25)	158.00	(37.81)
f.o.b. Neunkirchen	160.00	(38.29)	154.00	(36.85)
Heavy sheets	158.00	(37.81)	151.00	(36.13)
Wire rods	159.30	(38.12)	152.30	(36.49)

Although these prices have been accepted by the organized consumers, many manufacturers are objecting to the advances, claiming that they cannot be passed on to domestic buyers. The new prices will have no effect on manufacturers for export, as the price rebates granted to exporting manufactures will be increased. Steel producers, however, point out that domestic business has been declining, except for a brief buying movement that preceded the rise in the market. They further point out that decreased domestic sales and increased export sales have reduced profits. A few months ago 75 per cent of all business was domestic and 25 per cent was export. Today the proportion of domestic business has declined to about 60 per cent of the total and exports represent about 40 per cent.

Steel Cartel Reports Increased Output

The report of the International Steel Cartel for the first quarter shows increased production in the four principal member countries, compared with the output in the corresponding period in 1927. The following comparison is in metric tons:

	First Quarter 1928	First Quarter 1927
Germany	4,212,940	3,956,405
France	2,295,000	2,005,350
Belgium	923,860	899,570
Luxemburg	638,382	582,518

British steel output showed a decline of about 8 per cent compared with the first quarter of 1927.

Recent demonstration of an American track-laying tractor at a road building exhibition in Durban, Natal, South Africa, created a favorable impression, according to a report received by the Department of Commerce from Edward B. Lawson, assistant trade commissioner at Johannesburg. Adoption of such equipment is reported as being contemplated by South African municipalities, which are making extensive road expenditures.

BELGIAN PRICES ADVANCING

Mills Well Booked with Tonnage and Exporters Seeking to Cover on Sales at Low Prices

ANTWERP, BELGIUM, May 11.—The market is developing greater firmness, and, with makers well booked, in many cases through July and August, further advances in prices are expected. An added factor for market strength is the lack of serious competition from Germany or France, producers in both countries being well occupied with domestic business. Exporters in London and Hamburg are now seeking to place tonnage for export which they had been withholding in hope of securing lower prices. Makers point out that, based on actual costs of production, the price level is not high, and are confident that the market will remain active for some time. Few are willing to give options or contract for future deliveries except at sharp advances in prices.

Pig Iron.—Domestic demand continues good, and inquiry from foreign consumers is improving. No. 3 phosphoric foundry iron is quoted for export at £3 2s. to £3 2s. 6d. ($15.10 to $15.21) per ton, f.o.b. Antwerp. British competition in foreign markets is keen. Basic iron is quoted at £2 16s. to £2 18s. ($13.64 to $14.13) per ton, f.o.b. Antwerp. Demand for iron and steel scrap is better. Heavy melting steel for open-hearth furnaces is quoted at 460 fr. ($12.80) per ton, and blast furnace scrap at 450 fr. ($12.50) per ton.

Semi-Finished Material.—Demand for billets, blooms and sheet bars is in excess of the available supply and prices have advanced. Blooms range from £4 4s. ($20.45) per ton for 8-in. to £4 12s. ($22.41) per ton for 4-in.; billets from £4 13s. ($22.65) per ton for 3-in. to £4 16s. ($23.38) per ton for 2-in. Sheet bars are quoted at about £4 17s. ($23.63) per ton, f.o.b. Antwerp.

Finished Material.—Prices are irregular, but with a decided upward tendency. Despite higher quotations, transactions are numerous, with a large number of exporters and merchants seeking to cover on sales made when the market was less buoyant. Prices are higher on most products and promise to advance further. Demand for hoops is greater than for some time, with prices rising rapidly.

New German Plant to Produce Magnesium Metal

HAMBURG, GERMANY, May 5.—While duralumin is the principal raw material used in the manufacture of aircraft in Germany, partial use of steel, wood and other materials having practically ceased, magnesium metal is being introduced and promises to increase in use for this purpose.

Following numerous experiments the I. G. Farben Co. is erecting a new plant for the manufacture of Electron or magnesium alloyed with fractional percentages of aluminum, zinc and magnesium by a new process. Costs of production are said to have been materially reduced and lower selling prices are apparently in prospect. The tensile strength of the magnesium alloy is also said to have been increased.

In the past, this metal has been produced with a tensile strength of 36 to 42 kg. per sq. mm. maximum (approximately 60,000 lb. per sq. in.) and it had a Brinell hardness test of 60 to 70. The weight was about one-third less than the weight of duralumin, but the price was much higher. It is believed that with the greater strength of the new alloy aircraft builders may construct planes to carry more powerful motors and more passengers. Production at the new plants of the I. G. Farben Co. is expected to begin by the end of the year.

A classified directory of 208 pages has been issued by *Engineering*, London, made up from advertisements appearing in that publication. It is covered in English, French, Spanish, Italian and German, and gives telegraphic addresses, codes, trade names and a wide variety of details of the products of the advertisers.

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This Issue in Brief

Ignorance of costs is an important cause of price-cutting. Manufacturers with the best cost systems seem to have the most backbone in maintaining prices which insure a fair profit.—Page 1584.

Skill of the maker is more important than quantitative chemistry in manufacturing alloy steels, says speaker at Steel Institute meeting. Intangible physical properties demanded by customers are usually intimately associated with the finishing stage of the heat, and are so intimately connected that the judgment of trained melters usually cannot be relied upon and certain specific routines are set up.—Page 1578.

In fixing your selling price do not overlook the fact that it must be high enough to provide a satisfactory profit over a period of years, lean and fat. Too many manufacturers price a new product at an optimistically low figure, based on faulty cost data, only to find that a fair profit can not be made without an advance, allowing nothing for losses accumulated during the time the product was under-priced.—Page 1533.

Even though less machinable than high-speed steel, the high-carbon, high-chromium steels, with about 2.25 per cent carbon and 12 per cent chromium, are becoming increasingly popular, says metallurgist, because of their excellent wearing qualities.—Page 1541.

In seeking to eliminate waste in your plant, it is better to aim too high than too low. Many manufacturers who assume, for example, that 5 per cent waste is unavoidable, will find that 2 per cent can be attained without a great deal of trouble.—Page 1545.

Coolant made of sulphur-base oil mixed with machine oil or paraffine oil gives good results. Machine-tool builder uses it on majority of work.—Page 1541.

Need ingot molds be tapered? It is questionable whether taper is needed for ease in stripping, says steel maker. Another declares that decreasing the taper improves the quality of the steel.—Page 1580.

Foundry doubles production and halves direct labor cost by utilizing overhead space. Vertical and overhead core ovens release floor space for molding and pouring. Continuous conveyors carry cores through ovens. The gas flow is counter to the direction of travel of the conveyors.—Page 1523.

Moderate decline in business is not far distant, Dr. Haney indicates. But a prolonged or severe readjustment is unlikely, owing to the fact that commodity supplies in general are not sufficiently in excess of demand to warrant it.—Page 1542.

High-pressure distribution is wasting the money saved by scientific, low-cost product. "Competition is *not* the life of trade," says distributer. Competitors should cooperate. It is nearly as essential to be on good terms with one's competitors as with customers.—Page 1583.

Delve into your costs, and you will be surprised at the reductions you can achieve. Too few plants know their costs as well as they should. In most instances the foreman takes the word of the man at the machine, and the superintendent takes the word of the foreman, without actual investigation. If the workmen do not know what to aim at, costs are bound to be much higher than they should be.—Page 1545.

More steel is coming into the United States and less steel is leaving it. Exports for first four months of 1928 were almost 3 per cent below same period of 1927, while imports gained more than 9 per cent.—Page 1575.

Will security prices be forced down by readjustment of abnormal volume of bank credits? Credits are at record-breaking levels, without equivalent volume of business. The difference is due to excessive speculation, and Dr. Haney believes readjustment will bring about a decline in security prices.—Page 1543.

Pays salesmen on a profit-sharing basis. Distributer reports successful experience with plan of paying each salesman a fixed percentage of his sales, out of which salary and expenses are drawn, the remainder being retained by the salesman as a commission.—Page 1583.

Sellers are as much to blame as buyers for beating down prices, is decision arrived at in conference of buyers and sellers. Few sellers quote their lowest price first, so buyers can hardly be blamed for "testing the market." A one-bid policy would greatly simplify matters for both buyer and seller.—Page 1584.

Unless "existing laws are modified" low margin of profits in steel industry will continue, C. M. Schwab believes. Wants a committee of steel men appointed to study the problem and recommend changes in statutes.—Page 1528.

Machinability does not depend solely upon the material itself. There are four other factors, and one of the most important is the human element. The machine operator will shy at the new steel, even if it be more machinable than the old.—Page 1541.

ESTABLISHED 1855

THE IRON AGE

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A Gary Medal of Steel

A UNANIMOUS vote applauded the resolution of the directors of the American Iron and Steel Institute to establish a medal rather than a memorial tablet to the late Elbert H. Gary. Many tablets to him will doubtless be erected by his friends at fitting places to commemorate his impress on the life and industry of a community. But no tablet could perpetuate the memory of his organizing ability and general influence so well as an award given yearly by the whole industry to that man, irrespective of age or nationality, who has done most for the advancement of the steel and iron business—either by technology, organization, humanitarianism, selling, or contribution to international relations.

Now, before the plans are entirely perfected, and the artists' conception approved, is the time to urge upon the committee in charge the fitness of making the award in *Steel*.

A medal is an enduring evidence of gratitude for services of outstanding value. It is eminently fitting that in centuries gone by such medals should have been struck in gold. Donors strove thus to compress the highest value by expending great artistic skill in design and execution, and employing the most valuable material.

But the best reason for continuing to make medals in gold today is custom. There are other good metals. Gold has no longer the virtue of being the most valuable metal. Platinum costs more and is equally permanent. Had Judge Gary been an eminent jeweler, it would be fitting to make the award of materials in which he worked in his lifetime — a gem-inlaid plaque of gold or platinum would be most appropriate. But he was a man of steel. What more fitting than that this award in his honor should be of steel?

An objection that steel tarnishes, gets ugly, and finally rusts entirely away is no longer tenable. For we have stainless iron and steels, of beautiful silvery color and luster. These alloys too are malleable. Doubtless the United States Mint would fail if it tried to strike a medal of stainless steel, using the routine for a double eagle, but drop forgers know how to do it. For that matter, if forging could not develop the clean-cut outlines desired by the artist, his cast might be used as a master pattern and the award engraved from a flat disk, not only giving each one the virtue of an unreproducible original, but also recognizing the fact that machine shops are as essential to the conversion of iron ore to useful tools as are furnaces and forge.

That a stainless steel medal does not have any bullion value is more of a virtue than a fault. Gold medals are so tempting to light-fingered bystanders that a bronze replica is usually donated for show purposes, the real medal being locked up in a safe deposit vault, in the dark, where it does no one any good. (An economist would even say that this practice violates sound law.)

The Gary Medal to its owner will be a priceless thing, no matter how it is made. No doubt the committee will see to it that the artistic creation is beautiful and appropriate. It is most fitting that it should be cut from steel. There is no more valuable metal.

Gains in Rolled Steel and in Castings

SOME recent references to the growth of the steel industry have seemed in conflict with more general references to the iron and steel industry as a whole. The disparity has been due to the fact that iron and steel castings have grown much less than rolled steel, while rolled iron has decreased.

A broad statistical view, covering a period of 20 years, should be of interest, and to cover temporary fluctuations three-year averages are taken. It chances that 1905, 1906 and 1907 were all active years, and so likewise have been the past three years. There are precise statistics of production of steel castings, steel ingots, finished rolled steel and finished rolled iron. Production of iron castings may be estimated with sufficient accuracy for the purpose by adding one-fourth to the reported production of foundry pig iron, malleable pig iron and ferrosilicon. It must be well understood that such estimates are only very rough, although presumably quite adequate for comparative purposes. The comparison is made below. Steel ingots are included but do not of course enter into the total:

Production at 20-Year Interval

	1905-6-7 Gross Tons	1925-6-7 Gross Tons	Change Per Cent
Iron castings.....	7,058,000	9,117,000	+29.2
Steel castings....	712,530	1,256,271	+76.3
Steel ingots......	(21,549,029)	(44,951,253)	+108.6
Rolled steel......	16,615,557	33,271,137	+100.2
Rolled iron	2,148,878	649,491	— 69.8
Total	26,535,000	44,294,000	+66.9

We see that in 20 years rolled steel doubled, whereas the total product of the iron and steel industry increased by a shade more than two-thirds. By the general comparison steel castings more than held their own in rate of growth, iron castings did not, and rolled iron almost disappeared.

By such a comparison one sees that rolled steel has had quite a gain directly at the expense of rolled iron and it has gained at what might be said to be the expense of iron castings. That is, had there been no rolled material consumers no doubt would have tried in many cases to fill their wants with castings. The material might not have been as serviceable and the tonnage increase might have been all the larger. By the same token, alloying and heat-treating steel and other improvements tend to restrict steel tonnage growth.

Rolled steel, being now by far the preponderating material, constituting 75 per cent in the last three years against only 62.5 per cent 20 years earlier, is thus largely deprived of one source of tonnage increase; yet the public is given greater service and frequently the producer of the better steel fails to collect money for the increased value.

For Better Steel Earnings

IN his institute address last week Mr. Schwab pursued his familiar and appropriate line, that the steel industry needs and deserves a better return upon its capital. He said that the present investment in steel making is five billion dollars, about a billion and a half having been put in during the last 14 years, while earnings are now only slightly more than they were 15 years ago; i. e., the additional investment is bringing in practically nothing.

One comment on Mr. Schwab's remarks is suggested by the general character of the steel market in the last few years as compared with its character before the war. Taking the steel market of the past five years, since the culmination of the general advance in finished steel prices, with one upward movement in 1922 and an additional one in the early months of 1923, totally different behavior is seen in these years from that in all the market movements preceding.

The familiar course formerly was for all steel products to advance or decline together, not exactly *pari passu,* but quite in harmony. Steel was steel, and that was about all there was to it. In the last five years one steel product has had no decline, two have had a single decline each, not large, and some have tumbled and tumbled. It has not been a matter of demand relative to capacity, for some lines with little surplus capacity have declined more than others, with greater surplus. It has been largely a matter of the particular circumstances in the individual line. In other words, if one were permitted to indulge in personalities he would tell certain groups in the steel trade to take pattern after certain other groups.

Mr. Schwab's complaint of cross hauling as a dissipation of profits in unnecessary transportation has a real foundation. The issues involved here are highly complicated and are by no means confined to the steel industry, though undoubtedly the embarrassments of steel producers have been much increased by the abolition of Pittsburgh basing. That order has been followed by a series of drives for a recasting of the freight rate structure that has sharply accentuated the competition of district against district for the trade of consumers in zones more remote from the centers of steel production.

In saying that the situation in respect to the steel industry's profits raises the question "whether the laws should not be changed," Mr. Schwab recalls the like attitude of Judge Gary in his presidential address at the institute meeting of October 23, 1925. Judge Gary then asked whether it would not be "advisable to make another effort to stabilize the business" in case the Department of Justice would be willing to participate. In commenting on that proposal THE IRON AGE said that price stabilization was a question on which the Government and the public were not likely to see eye to eye with the leaders of the steel industry. In the two and a half years that have intervened the pressure of the farming community for legislative remedy for its disabilities has increased to a degree that has made farm relief a foremost political issue, and in like measure the possibility of Department of Justice cooperation in a stabilizing movement in steel has become more remote.

The increasing reasonableness of the Government's attitude toward business, as expressed by its judicial and executive departments, has been ground for satisfaction to the steel industry and to all industry. The question may well be raised, indeed, in view of the Supreme Court decisions in the Maple Flooring and Cement Association cases in June, 1925, whether the remedy for the present unsatisfactory conditions is not largely within the reach of the steel producers themselves, without further aid of Federal authority.

Have Mergers Brought Stabilization?

STABILIZATION in steel prices in recent years is revealed by the record. The fact has not been generally apprehended because the stabilization has been at a low level and, if anything, has served to accent the claims of low returns on capital invested in the steel industry.

Meanwhile there is abroad the view that the steadiness arises from the fewer companies now in competition—the result of mergers and acquisitions. If that be true, a stiffening as well as stabilization ought to be the outcome. Instead prices in recent years tell the story of a buyers' market, while the reduction in wave heights shows how the mass of economic statistics now available has helped to flatten the curves of the business cycle.

Now as to the record: The price swing in 1912, as indicated by THE IRON AGE composite price for finished steel, was 0.331c. a pound, between high and low, or $6.62 a net ton. The next year it was $6.54. Yet in 1925 it was $3.26; in 1926, $0.74; in 1927, $2.66 and, so far this year, $1 a ton. When referred to the average price for the year, the swings for the two years just preceding the war were over 20 per cent of the average, while they fell from about 12 per cent of the average in 1923 and 1924 to 1½ per cent in 1926, 5½ per cent last year and 2.1 per cent for 1928 to date. Very long swings occurred in the years following the war, $17.06 (or 23.2 per cent of the year's average), for high-pressure 1920 and $19 (or 37½ per cent of the average price) for calamitous 1921.

Similar showings may be made in the case of specific commodities. Steel bars changed $8 a net ton in 1919 ($28 in 1920), but for 1925, 1926 and 1927 the fluctuations were $4, $2 and $5, respectively. Plates, which had a range of $10 in 1919, changed $4, $2 and $3 in the last three years. So it was with shapes. In sheets, a volatile product market-wise, the swing was $63 in 1920 and $32 in 1921, while for the last three years it was $10, $5 and $6. Plain wire suffered a change of $17 a net ton in 1919, but only $3 in 1925, nothing in 1926 and $2 last year.

There are now one-third fewer companies making the bulk of the bars, plates, shapes, sheets and wire than five years ago. Yet, while price changes have occurred less frequently and therefore have made for shorter swings in a given year, the finished steel composite price has dropped from $54.76 a ton, the 1923 average, to $47, the average for the first third of 1928, a difference of $7.76 a ton. No wonder there have been marked economies in manufacturing. Market conditions compelled them and at the same time the savings in production cost contributed to the decline.

It thus appears that amalgamations have not lifted steel prices, whatever they may have done to forestall more drastic reductions, with possible receiverships. While the problem is primarily the producers' rather than the buyers', yet if it be true, as is widely asserted, that buyers are disposed as never before to pay fair prices because they are good for industry in general, both sides of the market are interested in giving widest publicity to the facts shown above.

Consumers appreciate that they are getting steel of a quality superior to that of a few years ago; at the same time, they cannot be blamed for applying pressure where weak selling is in evidence. Plainly much is yet to be done in the direction of better selling and in creating new outlets for the products of the steel mill, also in bringing the buyer to a right appraisal of basic things that are fully as important as price.

Dropping Absentees from the Payroll

IT is the common practice, where an employee of an industrial plant is sick or injured or for other reason is absent from his work, even for a protracted period, to keep his name on the payroll unless, of course, there is no intention of taking him back. Although he is not producing and is receiving no pay envelope, he is still considered as a member of the working force. Some employers have found this plan to have its disadvantages and have dropped it. Where the number of workers is large and the return of absentees to their places is accompanied by no numerical change in the employee list there is confusion as to the relation of output to working force that it is desirable to avoid.

One manufacturing company employing a large working force has had in effect for some time the rule that at the end of two weeks' absence, for any cause whatever, the worker's name shall be removed from the payroll. The man's chance at his job has not been jeopardized, however, if his services have been satisfactory. When he is ready to return he will be taken back. But he must re-enter through the employment office, making application as if he were a new man. The worker who is hired to operate his machine goes on the roll, but as a substitute and not as a permanent employee. When the first man returns to work, after passing through the employment office, his substitute turns the machine over to him, and reports back to the employment office. It often happens that another job is found for the substitute, but the company had assumed no obligation to keep him continuously employed.

An important reason for the automatic dropping of absent employees grows out of the system of compulsory physical examination which the company in question maintains. The returning employee presents himself at the employment office and submits to reexamination, which is a good thing for him as well as for the company, especially where absence has been due to disease or injuries.

CORRESPONDENCE

Recent Progress in Special Steels in England and Sweden

To the Editor: You have asked for my impressions of the progress of steel manufacture in Sweden and in Sheffield, England, where I have recently spent some time. I had the opportunity of visiting several of the steel works and manufacturing plants in Sweden, as well as in Sheffield. I came into close contact with some of the leading metallurgists of Sweden and England and my observations brought home to me the fact that the steel industry in both of these countries is on the mend and that they are making very rapid progress in new metallurgical developments.

While there has been some industrial trouble in Sweden in the iron mines and in the wood pulp mills, all of the steel works have sufficient stocks of pig iron and ore to continue operations for many months. So that this strike, unless it is protracted, will not affect the output of steel in Sweden.

Several of the works in Sweden, notably Forsbacka and Sandviken, have been very successful recently in securing large orders, particularly from the Continent, for ball-bearing steel, both hollow and solid. Whereas some years ago they ran into serious competition with the German mills, the quality of the steel from these Swedish mills is such that they are now firmly established and are selling some of the leading manufacturers of bearings on the Continent, as well as makers of automobiles.

These mills are also enjoying good business in their hollow drill steel, being the only mills making hollow drill steel by the so-called mandrel process. I understand one other works has developed a successful drill steel, particularly in the South African mining field, by rolling the steel by the sand-core process, inserting a mild steel tube into the billet after it is drilled. The claim is that the mild steel wall on the inside of the hole is less subject to corrosion than high-carbon steel, and therefore drill steel made by this process retains a smoother and more uniform hole after use than the ordinary sand-cored hollow drill steel. This is the Gimo-Osterby works.

At one of the mills visited, namely, Forsbacka, they are also making some very interesting experiments for producing rustless or stainless steel direct from the ore, producing this steel in a small electric furnace by a new process patented in Sweden. I understand that Forsbacka, having done the initial experimenting, has free use of the original patent. While steel made by this process is still in the experimental stage, results have shown that the process is practicable, and it is only a question of further developments and experiments until stainless steel can be produced successfully by this method. By this process the cost of manufacturing stainless steel will be greatly reduced, possibly by one third, which of course will tremendously widen the field for it. Making steel by this process will require a large use of electricity, but this can easily be supplied in Sweden because of the cheap water-power available in that country. I understand that the patent has been granted to other works in Sweden and that one of them has already started the erection of a furnace.

During my visit to Sheffield I visited several of the largest and best known manufacturers of high quality steel. The steel business in Great Britain is in very good shape, and at some of the works they are now melting somewhat more steel than in war time.

At the Imperial Steel Works I had an opportunity of seeing high-speed steel made by the new so-called "wireless" process. This is really a crucible furnace heated electrically, purely by induction. It is an entirely new process and as far as I know the Imperial Steel Works has the only plant in the world making steel by this process. By this so-called "wireless" method, they are able to make about 1100 lb. of steel, which is a cast, in about 1 hr., and because of the design of the furnace they are able to get an absolutely perfect and thorough dead melt. By applying a patented nozzle, a direct and clean pour is made into the ingot molds without any sputtering and splashing, which sometimes occurs by teeming the ordinary crucible. Furthermore, by using this furnace they can easily pour ingots up to 300 lb., which, of course, is not possible with the old clay pot crucible without "doubling." The metallurgists with whom I talked said they felt very sure that by this method they could produce finer and more uniform steel than they ever had been able to get in the clay pot crucible, and this I consider quite an admission when you realize that Sheffield is the home of crucible melting.

It is rather unfortunate that the high American tariff, particularly on tungsten steels, will almost prohibit the sale of this very special steel in this country, or will make the price so high to the American user.

They are continually developing in Sheffield new steels for special purposes—airplane motors, turning tools, etc. Furthermore, their stainless steel business is very large, which is easy to understand, as the original patent for stainless steel was developed in Sheffield.

One of the mills in Sheffield has developed a new alloy steel giving rustless properties, especially adapted for faucets, taps, etc. Judging from tests, it appears that this steel can compete very favorably with brass and copper for various household and plumbing uses.

The works in Sheffield all appear to be busy and I noticed a tremendous difference in their attitude in Sheffield since my last visit there seven years ago.

They have now made some new and interesting developments in rolling hollow drill steel, which has met with great success in South Africa, their principal market. Whether the American tariff will permit the importation of these steels is a question. The tariff has hurt the Sheffield trade in the United States.

The manufacturers of cutlery steel and the cutlers are busy, and it is interesting to note that the fine makers of cutlery in Germany are once more going to Sheffield, and particularly to Wardlow, to get their cutlery steel.

J. KING HOYT, JR.,
A. Milne & Co., New York.

New York, May 17.

Stainless Qualities of Iron and Steel

To the Editor: It appears from reading the extracts of the writer's talk at the heat treating conference at Purdue University published in THE IRON AGE of May 17, that there are some errors in the report of what was said. For example, we refer to the following sentence: "From the standpoint of commercial use the stainless qualities of iron and steel are among those least desired by users." That statement is incorrect and what the writer did say was to the effect that the stainless qualities, having been exploited to the extent they have, have led users to overlook the remarkable engineering properties of stainless iron. The writer did not intend, under any circumstances, and he is sure he did not convey, the impression that the stainless properties were not of tremendous importance to industry.

We also want to call your attention to a sentence under the heading "New Alloys Developed by Krupp" that begins, "It is subject to grain growth at higher temperatures, so that annealing must be limited to the range of 1800 to 2200 deg. Fahr." What the writer said was to the effect that it could be annealed between that range of temperatures, but that, due to the fact that it was subject to grain growth, annealing with best results should be done at 1800 deg. Fahr.

We want to call to your attention also the fact that in speaking of the new alloy V-2A, developed by the Krupps in Germany, the writer mentioned that this same product is produced in England under the name of Stabrite and in this country by the company with which the writer is associated, under the name of Allegheny metal.

C. B. CALLOMON,
Metallurgical Engineer,
Allegheny Steel Co.

Brackenridge, Pa., May 23.

Greatly Augmented Output of Airplanes in 1927

Sixty-one establishments in the United States engaged primarily in the manufacture of aircraft in 1927 built 1857 airplanes, valued at $12,024,085, and 105 seaplanes and amphibians, valued at $2,226,520, according to data collected by the Bureau of Census at the biennial census of manufactures taken in 1928. The production in 1926 was 1125 airplanes, valued at $7,448,679, and 61 seaplanes and amphibians, valued at $1,422,348. The increase in 1927 was 65.4 per cent in the number of aircraft built and 60.6 per cent in the value. A similar comparison for 1925 and 1927, based on a production of 789 aircraft, valued at $6,673,659, in 1925, shows increases of 148.7 per cent in number and 113.5 per cent in value.

Of the 61 establishments reporting for last year, 15 were situated in New York, nine each in California and Michigan, four each in Illinois, Missouri and Ohio, three each in New Jersey and Pennsylvania, two in Maryland and one each in Colorado, Connecticut, Iowa, Kansas, Nebraska, Virginia, Washington and Wisconsin.

Ohio River Iron and Steel Shipments Break Record in April

Shipments of iron and steel products on the Ohio River in April, as reported by the Pittsburgh office United States Engineer Corps, were 110,356 net tons, which was a new high monthly record.

Ohio River shipments reflect the movement to distant points and the effort of Pittsburgh district manufacturers to reach markets to which they would be barred if solely dependent upon rail deliveries.

For the first four months of the year, Ohio River shipments amounted to 345,686 tons, compared with 134,766 tons in the same period last year.

Since 1921 the foreign commerce service of the Department of Commerce has increased from 23 offices with 51 foreign representatives to 51 offices with 148 foreign representatives. Local offices in industrial centers in the United States, for supplying information collected abroad and by the commodity divisions in Washington, have grown from seven in 1921 to 23 this year.

Iron and Steel Markets

Further Decline in Production

Steel Output at Chicago Recedes to 92 Per Cent—Bars, Plates, Shapes Advanced $1 a Ton for Next Quarter—Divergent Price Tendencies in Pig Iron

WITH new business light and unfilled tonnage declining, steel production has given further ground. A low rate of demand from the railroads and the oil industry and a gradual decline in business from motor car builders have been offset to some extent by the requirements of miscellaneous users.

Specifying remains in fair volume, but, with new buying on a hand-to-mouth basis, there have been no additional recessions in finished steel prices. On the contrary, leading makers of plates, shapes and bars have opened their books for third quarter at 1.90c., Pittsburgh, an advance of $1 a ton.

Further weakness has appeared in pig iron. Foundry iron in the Valley has declined 25c. a ton, and Cleveland producers of foundry and malleable grades continue to reach out into competitive districts at the expense of prices. On the other hand, Southern producers are again quoting $16, base Birmingham, following recent sales at $15.50.

Steel mill operations, although receding, are still on a high plane. The average output of Steel Corporation subsidiaries is estimated at 82 per cent, compared with 84 to 85 per cent of capacity a week ago. The production of the leading Eastern steel company is holding without change at an 80 per cent rate. Among the producing districts, the Greater Pittsburgh area remains on a 75 per cent basis, but Chicago mills have curtailed their operations, which now average 92 per cent against 95 per cent recently. Rail mills there are approaching the end of their backlogs.

The automobile industry is not taking steel quite so freely, and motor car production is expected to slow down in June, when some manufacturers will discontinue their present models. One builder of low-priced cars is now reducing operations and has curtailed specifications for steel.

Building promises to call for a heavy tonnage of steel during the summer, notwithstanding that current structural steel lettings are light. Among new projects up for bids is a Louisville bridge, requiring 14,000 tons. Grade elimination work at Cleveland for the Nickel Plate railroad may take 20,000 tons.

Depression in the oil industry is holding down the volume of business in steel pipe. However, jobbers in standard-weight pipe are finding it necessary to replenish stocks, and mills report no difficulty in securing the higher prices announced at the beginning of April. Some of the large oil and gas pipe lines that have been in prospect for several months are maturing. The Texas Co. has placed a line calling for 25,000 tons of electrically welded pipe.

Unabated demand for tin plate is reflected in production, which averages well over 90 per cent of mill capacity, or considerably above the rate of other classes of finishing mills.

The price situation among steel products, despite recent weakness in some lines, has its encouraging side. The ruling Pittsburgh base price of plates, shapes and bars is now 1.85c. on both specifications and spot business, an advance of $2 a ton or more over the low point reached in the fourth quarter of last year. A leading mill has announced a third quarter contract price of 1.90c. on plates, shapes and bars, and an independent has taken similar action on bars. Consumers are not yet ready to commit themselves for that period, but, if the advance operates like those previously made this year, it will drive in heavy specifications against expiring second quarter contracts.

Demand for the heavier finished products, especially bars, is holding up unusually well at Chicago. Bar specifications received by Chicago mills this month are 30 per cent in excess of those in April. Orders from farm implement works show little decline in the face of approaching inventories, and some of these plants have planned heavy manufacturing schedules for July.

The amount of business from miscellaneous consumers is surprisingly large. Makers of steam shovels and locomotive cranes are taking substantial tonnages of plates, as well as other material, and Chicago mills look for still larger demands from them as a result of the passage of the Mississippi flood control bill.

Price reductions on pig iron in the Valleys covered foundry, Bessemer and gray forge grades. On the other hand, an opposing tendency may be indicated by the marking up of quotations on Southern iron and efforts of Buffalo furnaces to strengthen prices for Eastern shipment. Weakness in the Chicago territory, following receipts by boat of Lake Erie iron, has extended as far as St. Louis. Chicago producers may retaliate for Lake Erie shipments by sending their iron to Cleveland by water.

The outstanding purchase of the week was 25,000 tons of basic iron for a Butler, Pa., steel works. Detroit and Cleveland report a decline in the melt of pig iron for automobile castings, but Cleveland sales in the week were large at 36,000 tons, mostly for third quarter.

THE IRON AGE composite price for pig iron is $17.39 a ton, against $17.34 last week. The finished steel composite remains for the fourth week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 28, 1928	May 22, 1928	May 1, 1928	May 31, 1927
No. 2, fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	*17.00*	17.25	17.25	18.50
No. 2, Southern, Cin'ti	**19.69**	19.19	19.69	21.69
No. 2, Birmingham	15.50	15.50	16.00	18.00
No. 2 foundry, Chicago*	18.00	18.00	18.50	20.00
Basic. del'd eastern Pa	19.00	19.00	19.50	20.75
Basic, Valley furnace	16.00	16.00	16.50	18.00
Valley Bessemer, del'd Pgh	18.76	18.76	19.26	20.76
Malleable, Chicago*	18.00	18.00	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	*18.26*	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	100.00	90.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	33.50
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.14
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 28, 1928 Cents	May 22, 1928 Cents	May 1, 1928 Cents	May 31, 1927 Cents
Sheets, black, No. 24, P'gh	2.70	2.70	2.75	3.00
Sheets, black, No. 24, Chicago dist. mill	2.80	2.80	2.85	3.10
Sheets, galv., No. 24, P'gh.	3.55	3.55	3.60	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.70	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh.	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.15	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh.	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.00	$15.00	$15.25	$15.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	*12.75*	13.00	13.00	12.25
Carwheels, Chicago	*13.25*	13.50	13.50	13.75
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.50
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	15.00
No. 1 RR. wrot, Phila.	15.00	15.00	15.00	16.50
No. 1 RR. wrot, Ch'go (net)	*11.50*	11.75	11.50	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.87½**	14.62½	14.25	12.75
Electrolytic copper, refinery	**14.50**	14.25	14.00	12.37½
Zinc, St. Louis	*6.12½*	6.15	5.85	6.07½
Zinc, New York	*6.47½*	6.50	6.20	6.42½
Lead, St. Louis	**6.07½**	5.97½	6.00	6.02½
Lead, New York	**6.20**	6.10	6.10	6.37½
Tin (Straits), New York.	*51.00*	51.50	51.12½	67.00
Antimony (Asiatic), N. Y.	11.00	11.00	10.50	13.25

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Order Books Shrinking and Production Again Declines Slightly—Foundry Iron Lower

PITTSBURGH, May 28.—The past week has made a less favorable showing in specifications and orders for steel products than the first three weeks of the month. The motor car builders are not taking steel quite so freely as they did recently, and the loss of tonnage in that direction is not being made up by larger wants of other consuming sources.

Fabricated steel inquiries are more numerous than they have been, but among the other major consuming sources no appreciable increase in demand is noted, this being especially true of the railroads and the oil and gas industry.

As the great bulk of the shipments of steel over the past month has been against contracts and new buying has been moderate, order books have been shrinking and some curtailment of steel production has been necessary. None of the companies in this district now is making as much steel as two weeks ago, and 75 per cent of capacity is a fair estimate of production as the month draws to a close. The principal loss has been in the Youngstown district, but some of the independent Pittsburgh companies are producing less heavily than they were as recently as a fortnight ago.

The leading producer of plates, shapes and bars has stated that its third quarter price is to be 1.90c., base Pittsburgh, and one independent maker of bars also has announced the same price for that period. There is not much interest yet in third quarter supplies or prices. Some of the motor car builders have sought prices on third quarter tonnages of sheets and strips, but do not find makers very anxious to quote at this time. The sheet market is weak, and, except on the very narrow widths of strips, prices of that product are flexible.

Pig Iron.—The American Rolling Mill Co. has closed against its 25,000-ton inquiry for basic iron for delivery to its Butler, Pa., works. The iron will come from Valley furnaces and the price is approximately $16, furnace. Foundry iron has settled to $17, Valley furnace for No. 2 grade, a decline of 25c. a ton. The Richmond Radiator Co., Uniontown, Pa., has not yet closed for 5000 tons of No. 2 and No. 2X iron for third quarter shipment. This is the only important foundry iron inquiry in the market. Recent sales of malleable iron have been at $17.25, Valley furnace. Small lots of Bessemer iron have been moved at $17.25.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	$16.00
Bessemer	$17.00 to 17.25
Gray forge	16.50 to 16.75
No. 2 foundry	17.00 to 17.25
No. 3 foundry	16.50 to 16.75
Malleable	17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Some of the smaller consumers of ferromanganese have signed contracts covering their requirements for the last half of the year, but the larger users are taking their time, although the price, as has been the case for the first half, is guaranteed against a decline. Specifications on contracts are large, for while actual requirements are less with lighter steel works operations, there is some tendency to stock against the higher price that becomes effective on contract deliveries after July 1. There is a good movement of spiegeleisen on contracts. Ferrosilicon is being specified steadily.

Semi-Finished Steel.—There is no rush on the part of non-integrated sheet makers to sign contracts for third quarter tonnages, and the effort of producers to firmly establish $34, Pittsburgh or Youngstown, has not been seriously tested. Billets and slabs are fairly active in point of specifications, while the movement of skelp is all that could be expected in view of a rather slow market in pipe. There is only moderate releasing of shipments of wire rods on second quarter contracts, as there were few users which did not have stocks or tonnage due them on older agreements. Some shipments have been made on $44 contracts, but most of the tonnage has carried a lower figure.

Rails and Track Supplies.—Shipments of standard-sections rails on 1928 contracts are heavy, and there is a good movement on old orders for track fastenings. New business is quiet. Light-section rails are not showing much activity, but makers are holding firmly to $36, base, for those rolled from billets. Old rails are becoming more highly valued for melting, and in this connection there is a report that makers of standard-section rails are considering selling on a basis of an allowance for the old rails, such a plan now being used by carwheel and rolling mill roll makers.

Wire Products.—Business of all producers this month suffers by comparison with that of last month and the month before. The market is in a digestive period, owing to the fact that during the first four months of the year mill shipments ran ahead of actual consumption. Since all wire products are higher now than during the early part of the year, there is a natural tendency on the part of distributers and consumers to keep down new takings. In this territory makers are holding firmly to $2.65 per keg, base Pittsburgh, on nails.

Tubular Goods.—Jobbers are beginning to find it necessary to replenish stocks of standard-weight pipe and makers report no great difficulty in securing the higher prices announced at the beginning of April. In a general way, pipe business is making a poor showing compared with the average of the past three years, largely because of the depression in the oil industry and in oil prices, which discourages new development work. The several gas pipe line projects discussed earlier in the year have become quiescent.

Tin Plate.—Specifications against contracts still are ample to sustain mill operations at well above the rate of other classes of finishing mills. The leading producer has more than 90 per cent of its mills in operation and some of the independent companies are running full. Container manufacturers still talk cheerfully about the outlook for the pack of fruits and vegetables.

Cold-Finished Steel Bars and Shafting.—Specifications are numerous, but individually are for smaller tonnages than was the case a few weeks ago. Parts makers serving the Ford Motor Co. and the Chevrolet division of the General Motors Corporation constitute the backbone of the demand. No deviations from 2.20c., base Pittsburgh, are reported, although there is some pressure against prices on the part of large consumers.

Hot-Rolled Flats.—The market is holding well on cooperage stock, which is commanding 2.30c., base. On narrow bands, makers rarely have to go under 2.20c., base. But on strips prices are largely of buyers' making, particularly on widths of 6 in. or more. Strictly new business is light, and as specifications against old orders are depleting order books, selling pressure is increasing.

Bars, Plates and Shapes.—The leading producer has notified its sales offices that the third quarter contract price on plates, shapes and bars is 1.90c., base Pittsburgh. One of the independent companies also has announced the same figure on third quarter bar tonnages. There is not much inclination among consumers to commit themselves for that period, and the mills are more bent on getting specifications on contracts for this quarter than in soliciting orders for the following three months. Steel mills generally are more in need of early shipment business than they were a few weeks ago, and the ruling price on both specifications and new prompt delivery business is 1.85c. Fabricating companies report inquiries to be more numerous than they have been, but that the tonnage involved is rather small. Bar requirements of cold-finished steel bar and bolt and nuts makers continue to decrease.

Sheets.—The market still is irregular on the common finishes, but not as weak in the natural markets of Pittsburgh district mills as it is in some other consuming sections. Galvanized sheets for roofing and siding are going practically at buyers' valuations in the South, which is the principal market for that grade. Mills not only have to meet the competition of substitute material, but buyers are helped by something of a struggle between mills favored by freight rates in serving that territory. On flat galvanized sheets, producers say they do not have to go under 3.65c., base. Blue annealed sheets of the widths most commonly used are commanding 2c. to 2.10c., base, and lower prices refer to wide strips. Black sheets usually sell from 2.70c. to 2.75c., but occasionally 2.80c. is obtained. Business is lighter than it has been. Mills have had chances to quote against third quarter inquiries but are not anxious to do so.

Cold-Rolled Strips.—Incoming orders have shown shrinkage in the past week, but most makers still have some business to work on. Prices are fairly steady at 3c. to 3.15c., base Pittsburgh, for 1 to 3 tons.

Bolts, Nuts and Rivets.—There is a fairly steady demand for these products, but individual specifications run lighter than those of last month. Prices are firm.

Coke and Coal.—Interest in coke on the part of blast furnace and foundry operators still is light, and the coal market also lacks activity, as industrial demands are moderate. Pending a decision in the matter of the rail rates of Lake cargo coal, buyers in the Northwest are not actively seeking tonnages. Prices are unchanged.

THE IRON AGE Composite Prices

Finished Steel

May 28, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.355c.
One year ago	2.374c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 28, 1928, $17.39 a Gross Ton

One week ago	$17.34
One month ago	17.59
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.34,	May 22
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
o.b. Pittsburgh mill	1.85c. to 1.90c.
o.b. Chicago	2.00c.
l'd Philadelphia	2.17c. to 2.22c.
l'd New York	2.19c. to 2.24c.
el'd Cleveland	2.04c. to 2.09c.
o.b. Cleveland	1.85c.
o.b. Lackawanna	1.95c.
o.b. Birmingham	2.05c. to 2.15c.
i.f. Pacific ports	2.35c.
o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

o.b. Pittsburgh mills	1.95c. to 2.00c.
o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

o.b. mills east of Chicago district	1.75c.
o.b. Chicago Heights mill	1.85c.

Iron

ommon iron, f.o.b. Chicago	2.00c.
efined iron, f.o.b. P'gh mills	2.75c.
ommon iron, del'd Philadelphia	2.12c.
ommon iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
o.b. Pittsburgh mills	1.85c. to 1.90c.
.o.b. Chicago	2.00c.
o.b. Birmingham	2.05c. to 2.15c.
el'd Cleveland	2.04c. to 2.09c.
l'd Philadelphia	2.10c. to 2.15c.
.o.b. Coatesville	2.00c. to 2.05c.
.o.b. Sparrows Point	2.00c.
.o.b. Lackawanna	1.95c.
el'd New York	2.17½c. to 2.22½c.
.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
.o.b. Pittsburgh mills	1.85c. to 1.90c.
.o.b. Chicago	2.00c.
.o.b. Birmingham	2.05c. to 2.15c.
.o.b. Lackawanna	1.95c.
.o.b. Bethlehem	2.00c.
el'd Cleveland	2.04c. to 2.09c.
el'd Philadelphia	2.06c. to 2.18c.
el'd New York	2.14½c. to 2.19½c.
.i.f. Pacific ports	2.35c.

Iot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
rom 3 in. to 6 in., P'gh	1.85c. to 2.10c.
in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
rom 3 to 6 in., Chicago	2.10c. to 2.20c.
in. and wider, Chicago	2.00c. to 2.10c.
otton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according o gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.25c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.90c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	3.02c. to 3.12c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.55c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.80c.
No. 24, del'd Cleveland	3.64c. to 3.69c.
No. 24, del'd Philadelphia	3.87c. to 3.97c.
No. 24, f.o.b. Birmingham	3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
	Chromium Nickel Vanadium	1.50	4.15
	Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Old Material.—As a whole, the market is soft, but there is no occasion to materially change prices from those of a week ago. The steel producers are not much interested in supplies, and some of them, on account of lighter production, find scrap stocks getting ahead of steel production and are holding down shipments on old purchases. The steel foundries cannot be persuaded to buy, since their needs are limited, and that also is the case with the gray iron foundries in this district. Heavy melting steel takes a range of $14.50 to $15.50, the lower figure representing small lots that dealers can pick up and the higher price is the idea of dealers on a round lot of No. 1 railroad steel or its equivalent. In a general way, $15 is representative of the market on this grade, as no considerable tonnage appears available at less, while dealers are not pressed hard enough for shipments on old orders to be inclined to pay more.

The June scrap list of the Baltimore & Ohio Railroad amounts to 18,040 gross tons, including 4200 tons of No. 1 heavy melting steel and 7200 tons of No. 1 rails.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$14.50 to	$15.50
Scrap rails	14.50 to	15.00
Compressed sheet steel	14.75 to	15.00
Bundled sheets, sides and ends	13.75 to	14.00
Cast iron carwheels	14.50 to	15.00
Sheet bar crops, ordinary	15.50 to	16.00
Heavy breakable cast	12.50 to	13.00
No. 2 railroad wrought	15.00 to	15.50
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings		10.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	16.00 to	16.50
Railroad coil and leaf springs	16.00 to	16.50
Rolled steel wheels	16.00 to	16.50
Low phosphorus billet and bloom ends	19.00 to	19.50
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	10.75 to	11.00
Short mixed borings and turnings	10.75 to	11.00
Cast iron borings	10.75 to	11.00
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.00 to	19.00
No. 1 railroad wrought	11.00 to	12.00
Sheet bar crops	17.00 to	17.50
Cupola Grades:		
No. 1 cast	14.50 to	15.00
Rails 3 ft. and under	16.00 to	16.50
Malleable Grades:		
Railroad	14.50 to	15.00
Industrial	14.00 to	14.50
Agricultural	13.50 to	14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

More Than 230,000,000 Hp. Installed in United States

Total capacity of all the power-generating equipment installed in the various industries in the United States in 1923, from the highest type of steam turbine and internal-combustion engine down to the erratic windmill and the farm-work animal, was 230,514,000 hp., exclusive of the power of pleasure automobiles. The total horsepower capacity of the internal-combustion engines of pleasure automobiles is nearly twice as much as that used in all the industries, according to the Department of the Interior. The total power capacity for 1923, including pleasure automobiles, was 684,044,000 hp.

This great capacity, if converted into man power, would furnish about 60 able-bodied servants for every man, woman and child in the United States. The horsepower of industrial prime movers in 1923 was distributed as follows: Manufactures, 9 per cent; mines and quarries, 2 per cent; agriculture, 17 per cent; electric central stations and electric railroads, 11 per cent; steam railroads, 32 per cent; ships, 4 per cent; work animals not on farms, 1 per cent; automobiles not classed as pleasure cars, 23 per cent; miscellaneous, 1 per cent.

While the population of the United States increased 45 per cent from 1899 to 1923, the capacity of industrial-power equipment increased 260 per cent. In 1849, 66 per cent of the total industrial power equipment of the country was installed in farms; in 1923, only 17 per cent. The greater part is now utilized by steam railroads, manufactures, central stations, electric railroads and working automobiles.

Desulphurization of Iron by Blast Furnace Slags

The viscosity, as well as the composition, undoubtedly is a factor in determining the relative desulphurizing powers of blast furnace slags. Few investigators have attempted to measure the viscosity of such slags, due to difficulties encountered in making such determinations at temperatures existing in the blast furnace. Feild and Royster, in Bureau of Mines Technical Paper 157, described the torsion viscometer used by them in their investigation of viscosities of blast furnace slags. In order to have another method for determining viscosities of such slags to check results obtained by means of the torsion viscometer, investigators at the north central experiment station of the Bureau of Mines, Minneapolis, Minn., constructed a capillary viscometer entirely of graphite. The results obtained on a number of slags indicated that the capillary type of viscometer is more accurate within certain ranges than the torsion viscometer.

Blue Book of Southern Progress

Continuing a series of annual volumes devoted to a survey of the progress of the Southern States, *Manufacturers Record*, Baltimore, has put out the 1928 edition of "Blue Book of Southern Progress." This is a volume of 324 pages filled with a wealth of statistics and other data covering all phases of industrial and other business activities in the 16 States listed as Southern. Comparisons are made in most cases with the total United States figures for the same commodities.

The present edition depicts the growing use of machinery in the South in agriculture, the expansion of public utilities in that section, and the greatly augmented products of manufacturing. It shows a growth in manufacturing value in that area from $3,000,000,000 in 1909 to more than $10,000,000,000 in 1925. Wages paid in the latter year aggregated more than $1,550,000,000, or about one-seventh the total for the United States.

A topical index has been added to this year's edition, making it easy for anyone to find the particular information sought.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.85 to $11.00
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.05 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 f.o.b. Works	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	.70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex, head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Ingot Output Continues Downward Trend—Steel Specifications Gain in the Week

CHICAGO, May 28.—Downward trend in ingot output noted a week ago is still in evidence, and the average for this district is now close to 92 per cent. The change is slow, but may be accelerated when rail mill production is cut, a development which is not far in the future. Specifications for finished steel products have gained, owing to unusually large releases for bar mill products. The structural market remains brisk, with good prospects. It is now definitely known that the American Bridge Co. has been awarded 2000 tons for the Holmes Garage, Chicago.

Steel producers expect lighter specifications from car builders following the ordering out of the bulk of steel required for the last freight car business taken by Western shops. The Southern Pacific has ordered 46 passenger cars, of which at least 25 will be built in Western shops. The Galesburg, Ill., shops of the Burlington are again busy on new car construction, the program calling for 250 stock cars.

Pig Iron.—Sales of Northern foundry iron totaled not less than 25,000 tons in the last seven days, and new inquiry has developed for a like amount. A melter in western Michigan will take 6000 tons of foundry and malleable iron. Contract buyers have been little disturbed by recent price changes, some of them extending their purchases to the end of the year. Carload sales are less numerous since the cut of 50c. a ton. A cargo of Lake Erie iron is due in Chicago in the next day or two and another boat will unload here a few days later. Several consumers have ordered small lots of charcoal iron, which is steady at $24 a ton at furnaces.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25		$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75		18.50
Malleable, not over 2.25 sil.		18.00
High phosphorus		18.00
Lake Superior charcoal, averaging sil. 1.50		27.04
Southern No. 2 fdy. (all rail)		21.51
Southern No. 2 (barge and rail)		20.68
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to	29.00
Silvery, sil. 8 per cent		29.79
Bessemer ferrosilicon, 14 to 15 per cent		46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Odd lots of ferromanganese are being sold at $105, seaboard. The spot market for 50 per cent ferrosilicon is moderately active at $87.50, delivered Chicago. New purchases in spiegeleisen are few, but specifications are in fair volume.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—Specifications for plates show improvement from many sources this week. The largest single item, which helps to account for tonnage that has run nearly 40 per cent over the third week in May, was the ordering out of the bulk of the steel required for the Chicago, Milwaukee, St. Paul & Pacific cars. The Chicago market is unusually dull from the viewpoint of railroad equipment business. Specifications for tankage steel are large, but only a moderate tonnage of new business is in sight. A Pacific Coast oil producer is in the market for 500 tons of tankage material. Shipments of plates have eaten heavily into mill backlogs. The delivery situation is slowly improving and producers are now able to make promises of three to four weeks on practically all sizes. Prices in Chicago and nearby territory are steady at 2c. to the general run of users, but $1 a ton lower is commonly named to the east and south and special concessions are being offered fabricators in practically all parts of the Chicago territory.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—It has been months since the steel-frame building outlook was more favorable than it is now. This is owing, not alone to the number and tonnage of inquiries that are actually before the trade, but also to the fact that several large projects, for a time dormant, are now taking on renewed life. The outstanding award this week is for 2000 tons for a garage in Chicago. The American Bridge Co. has been awarded close to 600 tons for a hotel at Anderson, Ind. Among new projects is 1700 tons for miscellaneous highway bridges in Illinois and Kansas. Bids are being tabulated on the proposals for the reconstruction of the Fine Arts Building, Chicago, and an inquiry for a local apartment building, requiring 1250 tons, has been revived. Although there appears to be every indication that shops will have a substantial volume of business during the early summer months, it is noticeable that competition is no less keen and prices have dipped to lower levels because of the willingness of mills to allow special concessions in prices for specific jobs.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Rails and Track Supplies.—New buying in standard-section rails is dull. Inquiry for 4000 tons noted last week is still open; it is now reported that only half of the tonnage will come to Western mills. Several railroads have ordered a total of 1100 tons of angle bars, 2000 kegs of spikes and 4000 kegs of bolts. Fresh inquiry is promising, with 10,000 kegs of spikes and bolts and a sizable tonnage of the plates now before the trade. Orders for light rails are scarce.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—This commodity continues to mark time. The United States Cast Iron Pipe & Foundry Co. has taken 180 tons of 30-in., class C lugged pipe and 3 tons of special fittings for Milwaukee. The Alabama Pipe & Foundry Co. is low bidder on fittings for Chicago and the American Cast Iron Pipe Co. is low on 120 tons of 6-in., class B pipe at Detroit. The inquiry for 1100 tons of 5 to 16-in. pipe at St. Paul is still being held open until figures are prepared to show the relative cost between laying 12-ft. and 16-ft. length pipe. To the west and south of Chicago, public utilities appear to have covered for their early summer requirements, but companies operating in Wisconsin are fairly active in the cast iron pipe market. Prices for 6-in. and larger diameters are steady at $31 to $33, Birmingham, or $38.20 to $41.20, delivered Chicago.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

Sheets.—Prices continue weak under pressure to sell. Orders in the last few days are heavier than during the low point a week ago, but business is not of the character that affords mills either satisfactory schedules or assurance as to what rate of operations will be maintained in the next seven days. The most pronounced falling off in business is in galvanized and black sheets. On blue annealed sheets, deliveries range from four to five weeks and mill backlogs are not far from 50 days. As a general rule, manufacturing consumers are busy and are taking their full share for this time of the year. On the other hand, jobbers are finding turnover relatively slow. Chicago delivered prices are 2.85c. to 2.95c. for black, 3.75c. to 3.85c. for galvanized, and 2.20c. to 2.30c. for blue annealed.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.95c.; No. 24 galvanized, 3.75c. to 3.85c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Hot-Rolled Strip.—Chicago mills are heavily engaged. Deliveries are now at an average of three weeks. Prices are steady at 2c., Chicago, as the minimum on strips 6 in. and wider.

Bars.—Specifications for mild steel bars show further improvement and for the week now closing are fully equal to the average so far this year. Deliveries have lengthened, being not far from six weeks. Total specifications for May are fully 30 per cent heavier than those in April. Orders from agricultural implement manufacturers show little decline, notwithstanding that the inventory period is near at hand. It is believed that July manufacturing schedules for some farm machinery plants are heavy and that steel being taken now is added to stock to serve for the summer months. Prices for mild steel bars are steady at 2c., Chicago, except to the east and south. New orders for alloy steel bars are undiminished in number and size and local mills continue to produce at capacity. New buying is not far in advance and backlogs are holding steady at 30 to 45 days. The iron bar market is quiet. Output at rail steel bar mills has been increased, following several weeks in which specifications have topped production by a comfortable margin. Backlogs are of fair size and show little change for the reason that new sales are about equal to shipments. Farm implement manufacturers are taking larger quantities and barn equipment makers are finding business more brisk than is to be expected at this time of the year. Hard steel bar prices are steady at 1.85c., local mills.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Bolts, Nuts and Rivets.—Specifications for these commodities show further decline and are now affecting output, which for the industry as a whole is not above 65 per cent of capacity. Sellers plan to send out third quarter contracts during the second week in June. Prices for all of these commodities are steady.

Wire Products.—This market remains steady except for a slackening in demand from the Northwest, where lack of rain and the necessity for reseeding have changed the crop outlook of several weeks ago. Jobbers in the Central States are enjoying a fair volume of business and shipments of woven wire fencing and barbed wire to the Southwest are large for this time of the year. A feature of this market is the steady demand from the manufacturing trade. As a usual thing these buyers are not committed far in advance, but orders received from them are steady and provide satisfactory schedules at mills. Nails still remain the least active of all wire mill products; prices are unchanged at $2.60 to $2.70 per keg, base Chicago. Quotations on bright plain wire are steady at $2.55 per 100 lb., Chicago.

Coke.—Users of by-product foundry coke who contract by the half year are showing interest in this commodity, which is steady at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district. Shipments in May will vary little from the average in April, indicating uniformity in foundry melt. Producers plan to open second half books about June 15.

Reinforcing Bars.—A decided upturn both in orders and fresh inquiry for reinforcing bars has developed within the past week. Outstanding among awards is 1008 tons for a building for the Continental Can Co., Chicago, and new inquiry now before the trade calls for 600 tons for a warehouse and 400 tons for a bank building, both in Chicago. Small purchases are more numerous and shop operations are well sustained. New price levels are holding, though not a few projects on which protection was given at lower quotations are still being held up by contractors and owners. In fact, it is estimated in some quarters that fully 10,000 tons in low priced quotations is still to be placed. New awards and fresh inquiry are shown on page 1570.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Old Material.—Dealers are showing less confidence in the Chicago scrap market and they are now willing to take prices that they refused a week ago. Changes in quotations, for the most part, are downward, the heavy tonnage grades being more affected than specialties. On dealer trade, $12.75 to $13 is common for heavy melting steel, following refusal by a large buyer to take a tonnage at $13.25 a gross ton, delivered. Shipments by producers and deliveries at points of consumption are heavy, thus adding further stress to the price situation. In late weeks rejections of heavy melting steel have been light, but this is owing to the fact that sellers have learned that buyers insist on the grade specified and it in no way indicates that melters are hungry for scrap and must take whatever is offered. The supply of cast iron borings is well above demand and prices are weak. A Detroit broker is reported to have entered the Chicago market with a tonnage that will be shipped from that city. Stocks in the hands of purchasers are not large, but they are sufficient in most cases for the current rate of operations. Railroad lists include 4000 tons by the Burlington, 5000 tons by the Illinois Central and a small list by the Big Four.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.75 to 16.25
Railroad tires, charging box size	16.25 to 16.75
Railroad leaf springs, cut apart	16.25 to 16.75
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	6.75 to 7.25
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.50 to 16.00
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.25 to 13.75
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The Wisconsin Steel Founders' Research Group will meet at the University Club, Milwaukee, June 13, to hear a report of its sand committee on the results of a survey of steel foundry molding sands.

Reduction to $1.89 per gross ton in the rate on pig iron, effective on or before July 10, from Ironton, Ohio, to Point Pleasant, W. Va., was ordered by the Interstate Commerce Commission in a recent decision. The present rate is $2.27.

New York

Pig Iron Sales 7000 Tons—9000 Tons of Steel Wanted for Subway

NEW YORK, May 28.—Sales of pig iron in this district, at 7000 tons, equaled those of the previous week. From one-quarter to one-third of the tonnage bought was for shipment before July 1, indicating that melters' stocks are low. Shipping instructions from foundries are also heavier than for several weeks. There has been little change in pig iron prices realized, but one Buffalo furnace has advanced its quotations on foundry iron to $17, base, and another producer is asking $16.50, base. Sales at $16, base Buffalo, are still reported, however. A few sales of Virginia foundry iron in small lots have been made at $20, base furnace. Eastern Pennsylvania producers continue to quote foundry iron at $20, base furnace, without obtaining much business in this territory. Furnaces in eastern New York and New England continue to meet delivered prices from Buffalo. Makers of pig iron regard a recent 5 per cent advance by three leading radiator manufacturers as an indication of improvement in building prospects. The Richmond Radiator Co., New York, has not yet closed on 5000 tons of foundry for its Uniontown, Pa., works. The Ingersoll-Rand Co., New York, is understood to have closed, at least in part, against an inquiry for 2000 tons of malleable and foundry iron. Fairbanks, Morse & Co., St. Johnsbury, Vt., have placed 500 tons of No. 2X. The Crompton & Knowles Loom Works, Worcester, Mass., is in the market for 1000 tons of No. 2 plain, No. 2X and No. 1X for third quarter delivery.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Market conditions in this territory have changed little in the last week, although the gradual decline in business which has been apparent for two or three weeks, has continued. Specifications are coming in at a fair rate, but new buying is on a hand-to-mouth basis, a condition which in some cases enables the mills to get slightly better prices than would be possible on large orders. Sheets continue weak in price, while the volume of new business is very light. On galvanized sheets, 3.55c., Pittsburgh, is easily obtainable on attractive tonnages and little, if any, business is being placed at more than 3.60c. Black and blue annealed sheets are available at 2.70c. and 2c. respectively, with occasional sfall orders going at slightly higher figures. The strip market is quiet, with no further decline in prices. Plain wire and nails are quoted at 2.50c. and 2.65c., Pittsburgh, respectively, but these prices are not always adhered to, shading amounting to $1 or even $2 a ton in some cases. Demand for oil country pipe is showing improvement, and one large project for the Texas Co., involving 22,000 to 25,000 tons, is reported to have been awarded. Fabricated structural steel business has not been large in the last week. An office building in Manhattan, requiring 4000 tons, was the outstanding award. A section of the subway, on which bids will be taken June 15, calls for 9000 tons.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Shading of prices on black and galvanized sheets continues, but the concessions of 10c. to 20c. per 100 lb. are usually available only on certain gages. The larger jobbers carrying complete stocks occasionally meet this competition, but on most transactions maintain the market price of 4c. per lb., base, on black and 4.70c., base, on galvanized. Demand for structural material is good, but competition is keen and small concessions from the quoted schedule of prices are not uncommon.

Cast Iron Pipe.—Bids will be taken on June 1 on 3160 tons of 4 to 16-in. class B pipe for a water district near New Brunswick, N. J. This is the only project of importance which has come out in the last week, and the market is unusually quiet. Prices, however, are well maintained by both Northern and Southern makers. The former are quoting $38.60 per ton, delivered New York, while Southern foundries are asking $31 per ton, Birmingham, for less than 200 tons and $31 for larger orders.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—Several fair-sized jobs, involving about 1200 tons of bars, have been let in the last week. No inquiries of outstanding size have come before the trade, but distributers are figuring several sizable projects, which are expected to be placed in the early sum-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

mer. Competition with foreign steel continues rather severe, and the imported material has now become a factor in road work. Prices are unchanged.

Coke.—All the special brands of Connellsville foundry coke have now been reduced to $4.85 per net ton at ovens. Occasional small lots for spot shipment are being sold, but the market is comparatively inactive. New England producers, which last week opened their books for the second half, are reported to have made contracts for approximately 100,000 tons. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per ton, New York or Brooklyn.

Old Material.—An eastern Pennsylvania consumer of blast furnace scrap, which has been offering $10 per ton, delivered, on a low freight rate is reported to have made a small purchase at this price. A Phoenixville plant is still offering to buy machine shop turnings at $10.50 per ton, delivered, but is not yet reported to have closed on a tonnage. Specification pipe is being purchased at $12 per ton, delivered Lebanon, Pa., and occasionally as high as $12.50 per ton is paid for this delivery. Blast furnace scrap is still being shipped to Swedeland, Pa., brokers paying $10 per ton, delivered. Shipments of No. 1 heavy melting steel to Conshohocken, Pa., are still suspended.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to	$10.85
Heavy melting steel (yard)	6.75 to	7.25
No. 1 heavy breakable cast	11.25 to	12.00
Stove plate (steel works)	7.25 to	7.50
Locomotive grate bars	7.50 to	8.00
Machine shop turnings	6.25 to	7.25
Short shoveling turnings	6.25 to	7.25
Cast borings (blast furnace or steel works)	6.25 to	7.25
Mixed borings and turnings	6.25 to	7.25
Steel car axles	15.00 to	15.50
Iron car axles	23.75 to	24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought	10.00 to	10.50
No. 1 yard wrought long	8.50 to	9.00
Rails for rolling	10.00 to	10.50
Cast iron carwheels	11.00 to	11.50
Stove plate (foundry)	8.50 to	9.00
Malleable cast (railroad)		10.00
Cast borings (chemical)	10.75 to	11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to	$14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to	11.50

Cleveland

Present Prices on Hot-Rolled Strip and Alloy Bars Named for Third Quarter

CLEVELAND, May 28.—A manufacturer of hot-rolled strip steel has announced its willingness to take business for the next quarter at present prices. An effort to advance the price of hot-rolled strip for the second quarter did not meet with much success. An Ohio mill has taken some business in blue annealed sheets for the third quarter at the current prices, but others have not opened their books and it is not expected that many consumers will show an interest in contracts until well along in June. Present prices on alloy steel bars have been reestablished for the third quarter. The volume of business in steel bars and structural material is fair, but orders generally are for small lots and many buyers are pressing mills for deliveries. New business is light. Plates are moving very slowly.

While specifications from the automotive industry show some decline, they are still good. There will be considerable slowing down in production of motor cars in June, when some of the manufacturers will discontinue their present models. One builder of low-priced cars is reducing operations and has curtailed specifications.

Structural inquiry is light. Grade crossing elimination work in connection with the Cleveland Terminal development will require a round tonnage of steel, but inquiry for this may not be out for some time.

Prices are firm at 1.85c., Pittsburgh, for steel bars, plates and structural material. Cleveland mills quote steel bars at 1.85c., Cleveland. Another Ohio mill names 1.90c., mill, for forging bars.

Pig Iron.—Business increased in the past week, during which Cleveland interests sold 36,000 tons of foundry and malleable iron, largely for the third quarter. With local production of merchant iron in excess of the demand in this territory, local furnaces continue to reach out into competitive districts. An inquiry for 6000 tons of foundry and malleable iron is pending from Benton Harbor, Mich., and on this a Cleveland producer is understood to have quoted $16, furnace, or the same price at which it recently sold a round block of iron in Indiana. Boat shipments from Cleveland to Chicago and efforts to take business at a western Michigan point in the Chicago territory have caused talk that Chicago furnaces will adopt retaliatory tactics and compete with Cleveland furnaces by offering iron in this city to be shipped by water. The local market has settled down to a maximum of $16.50 for outside shipment, although one Lake furnace interest is holding to a $17 minimum. The Michigan range is unchanged at $17.50 to $18. An inquiry is pending from a South Bend, Ind., consumer for 2000 tons.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25		$18.50
Southern fdy., sil. 1.75 to 2.25	$21.50 to	$22.00
Malleable		18.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace		16.00
Standard low phos., Valley furnace		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Alloy Steel.—Present prices on alloy steel bars, which became effective March 16, and which have been well maintained since that time, have been reaffirmed for the third quarter. Specifications are good, although not as heavy as a few weeks ago.

Semi-Finished Steel.—Prices for the third quarter have not yet been named. Specifications for sheet bars continue heavy, but the demand for slabs and billets is rather slow. The current price on the three products is $33, Cleveland.

Sheets.—Specifications are fair, but there is very little new business. Prices remain at about recent levels, being so low on black and blue annealed sheets that mills are not inclined to make further reductions. On blue annealed sheets, 2c., Pittsburgh, is the common price, although some mills are going to 1.90c. for material carrying good extras. Black sheets range from 2.65c. to 2.70c., Pittsburgh, and 2.70c. to 2.75c., Valley. Further weakness has developed in galvanized sheets in some sections, where jobbers are offering car lots at 3.50c., Valley mill, although 3.55c. is the more common minimum price.

Strip Steel.—An Ohio producer has opened its books for hot-holled strip for the third quarter at present prices. Most consumers have recently specified rather heavily and specifications have since slowed down. New business is light. The price is unchanged at 1.75c., Pittsburgh, for 6-in. and wider material. There is little activity in cold-rolled strip. The price is unchanged at 2.75c., Cleveland, except for small lots.

Warehouse Prices, f.o.b. Cleveland

		Base per Lb.
Plates and structural shapes		3.00c.
Soft steel bars		3.00c.
Reinforcing steel bars	2.25c. to	2.75c.
Cold-finished rounds and hexagons		3.65c.
Cold-finished flats and squares		4.15c.
Hoops and bands		3.65c.
Cold-finished strip		*5.95c.
Black sheets (No. 24)		3.75c.
Galvanized sheets (No. 24)	4.40c. to	4.50c.
Blue annealed sheets (No. 10)		3.25c.
No. 9 annealed wire, per 100 lb		$2.85
No. 9 galvanized wire, per 100 lb		3.30
Common wire nails, base per keg		2.85

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*Net base, including boxing and cutting to length.

Warehouse Business.—Sales are light, the May volume falling somewhat below that of April. There is some irregularity in galvanized sheets but other prices are fairly firm.

Coke.—One Connellsville district producer has reduced its price from $5.10 to $4.85 per ton for its premium brand of foundry coke, and the latter is now the maximum price. This brand is being offered for the last half at the reduced price. Some grades of Connellsville foundry coke are available at $3.50. The price of Ashland by-product foundry coke has been set at $6, Connellsville basis, for June shipment, or the same price that was in effect this month. Foundry coke specifications are holding up well, but there is very little new business.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues fair, but May business will fall slightly below that of April. Rivets remain dull. Prices are well maintained on both lines of products.

Old Material.—No new consumer demand developed during the week and activity was confined to buying by dealers to cover old orders. Steel-making scrap is plentiful at quoted prices. Dealers are paying up to $9.50 for blast furnace grades. The market has a weaker tone in the Valley district, where dealers are now paying $14.50 for heavy melting steel and $14 for compressed steel scrap for Youngstown delivery. Small lots of cast scrap have moved locally at $16.50. The scrap lists of the Michigan automobile companies for June are about the same size as last month, except the Chevrolet list, which aggregates 10,000 tons, being much larger than usual. Other lists include: Chrysler, 2000 tons; Buick, 2500 tons, and other General Motors units, 1500 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.00 to	$13.25
No. 2 heavy melting steel	12.50 to	12.75
Compressed sheet steel	12.50 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	11.50 to	11.75
Machine shop turnings	7.00 to	7.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	9.15 to	9.50
Mixed borings and short turnings	9.15 to	9.50
No. 2 busheling	9.15 to	9.50
Cupola Grades		
No. 1 cast	16.25 to	16.75
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Philadelphia

Prices Easier on Sheets and Bars—Scrap Market Weaker

PHILADELPHIA, May 28.—Mill operations are beginning to show a slight recession, but there is a fair tonnage of steel moving to consumers against contract. Prices continue irregular, with a slight downward tendency on desirable business. On most steel bar orders, 1.85c., base Pittsburgh, is maintained, but this is reported by buyers to have been shaded occasionally by $1 a ton. Plates are being maintained at 2c., Coatesville, and shapes are quoted at 2c., Pencoyd and Bethlehem. Sheet prices are still unstable, with black and galvanized decidedly weak.

Pig Iron.—Inquiry for third quarter delivery has been small, consumers evidently preferring to delay in making commitments, covering requirements as they arise. Foundry iron is unchanged at $20, base furnace, and there is no apparent inclination on the part of sellers to recede from this level. The fact that Buffalo iron is offered to consumers in this market at lower delivered prices and yet is not being sold to any extent gives rise to the belief that lower eastern Pennsylvania prices would develop little business. Occasional carload lots of low phosphorus are being sold. A recent sale of basic to a Harrisburg consumer was made by an eastern Pennsylvania furnace interest at $19.25 per ton, delivered. Virginia iron prices are unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to	25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to	25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese.—Large consumers have shown little interest in second half requirements, but there have been a few contracts for 100 to 200 tons for delivery in the next quarter at $105 per ton, seaboard.

Bars.—For prompt delivery of current small orders, 1.85c., Pittsburgh, applies. Buyers claim, however, to be able to buy at $1 a ton lower, when any considerable tonnage is involved.

Shapes.—Fabricated steel projects are limited. Plain material prices are low, ranging from 2c., Pencoyd, or 2.06c., delivered Philadelphia, to 2c., Bethlehem, or 2.13c., delivered Philadelphia. On the small specifications, mills are firmer than on the larger sizes, in which competition from special beams is encountered. The building for the Y. M. C. A., which will require about 2400 tons of steel, is reported to have been awarded to Bethlehem Fabricators, Inc.,

Plates.—Greater strength is evident in prices of plates than in those on bars and shapes. In the eastern Pennsylvania territory, 2.05c., Coatesville, is being obtained on small orders for prompt shipment and 2c., Coatesville, on more desirable business. Delivered prices are 2.10c. to 2.15c. per lb., Philadelphia. Although new business is limited to orders scarcely larger than the usual warehouse transactions, shipments on contracts are still in good volume and mills are maintaining a fair rate of operation.

Sheets.—Eastern Pennsylvania producers of blue annealed sheets are still seeking to maintain 2.10c. per lb., Pittsburgh, but 2c. is becoming more common, except on orders for less than carload lots. Black sheets have developed further weakness and the market is quotable at 2.65c., Pittsburgh, or 2.97c., delivered Philadelphia, the former quotation of 2.70c., Pittsburgh, applying only on small lots. Galvanized sheets are still quoted at 3.60c., Pittsburgh, or 3.92c., delivered Philadelphia, but concessions of as much as $2 a ton are reported to have been made on orders that are slightly larger than usual.

Warehouse Business.—Shipments from stock during the past month have compared favorably with those of April and there is a fair volume of current buying. Quantity differentials are being successfully maintained and some jobbers are of the opinion that an advance in prices would be possible if it were not for the softness of mill quotations.

Imports.—In the week ended May 26, a total of 249 tons of pig iron arrived at this port, 198 tons from India and 51 tons from the Netherlands. Iron ore receipts from Algeria totaled 5800 tons. Steel imports consisted of 365 tons of structural shapes from Belgium and 82 tons from Germany, 26 tons of iron bars from Sweden, 12 tons of steel bars from Belgium and one ton of strip steel from Sweden.

Old Material.—Prices of most grades of scrap are showing weakness, but the dearth of transactions renders it difficult to establish actual values. While there has been no purchase of blast furnace material at $10 per ton, a leading consumer has been offered 2500 tons at this price. Consumers of stove plate at Harrisburg and Phoenixville, Pa., have bought tonnages at $11.50 per ton, delivered, encountering no difficulty in obtaining all they required. Recent contracts for machine shop turnings have been made at $10.50 per ton, delivered, but these order have been small; the last large transaction was at $10.75 per ton, delivered Phoenixville.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50 to 10.75
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	10.50
Heavy breakable cast (for steel works)	15.50 to 15.75
Railroad grate bars	11.50
Stove plate (for steel works)	11.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	15.50
Rolled steel wheels	15.50
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00
Steel rails for rolling	14.75 to 15.25

New Portable Tinning Pot

The General Electric Co. announces a portable tinning pot as the latest addition to its line of electric heating equipment. This is described as being a convenient device for small tinning and soldering operations. The device is built on the same principle as the larger General Electric melting pots. The heating unit, which is of the cartridge type, dissipates 150 watts. It is placed in a boss cast on the bottom of the crucible and is readily removable. The crucible and base are made of cast iron and the jacket is made of sheet steel. The connecting lead is a heavy, Deltabeston heater cord and the plug is of the armored type.

This pot is particularly designed for solder and tin, having a maximum operating temperature of 500 deg. Fahr. About 15 min. are required to reduce the full contents of the pot to working temperature. While the pot is normally designed for operation on 110-volt circuits, it can be supplied for operation on 100, 120, 240-volt circuits if desired. It has an approximate shipping weight of 6 lb. and its dimensions are as follows: 2½ in. diameter and 1 in. deep inside, and 5 in. diameter and 4½ in. deep outside.

For seven consecutive weeks not a shipper anywhere in the United States has asked for a freight car without getting it on time, according to *Railway Age*. During the first 17 weeks of the year the average weekly unfilled requisitions was only 14 cars.

VENTILATED FURNACE BASES

Air Ducts Under Insulation Proposed in Open-Hearth Construction

A SUGGESTION that there should be ventilation of the region immediately below the hearth of an open-hearth furnace with a concrete base featured the discussion of a paper on the flow of heat through furnace hearths presented at the Pittsburgh meeting on May 14 of the American Society of Mechanical Engineers. The paper itself was contributed by J. D. Keller, private assistant to Prof. W. Trinks, Carnegie Institute of Technology, and covered calculations of the heat flow for several forms of furnaces, with particular emphasis on the need of insulation under the hearth and also in the junction masonry between hearth structure and the walls.

Assuming possibly that the bed of rails commonly used in furnaces bases could be made the supporting structure of the insulating stratum, there would be under the layer of rails a number of parallel air ducts or slots. For example, these might be 5 x 5 in. in cross-section separated by concrete piers of the foundation structure with the piers on 14-in. centers, making the piers 9 in. thick. With a velocity of air through the slots of 1 ft. a sec., the temperature of the top of the concrete piers would be reduced, it was calculated, from 1500 deg., with the furnace at 2200 deg., to 800 or 900 deg.

Of course the discussion covered the normal use of such furnaces in substantially continuous operation, which without means of keeping down the temperature is likely to reduce the concrete to a mass of powder. As Professor Trinks contended, ventilation is warranted in the face of slightly increased heat losses by the minimizing of troubles with the foundation. It was added also that narrower piers and narrower slots might be advisable to reduce temperature further in the upper part of the piers.

Structure of Pure Iron Is Revealed by Microscope

Iron forms the basis of so much of the metallic material used in engineering that a knowledge of its structure and properties is of very considerable importance. Ferrite, as pure iron is termed by the metallographer, is usually considered to have a simple microstructure but it sometimes shows some rather unusual structural features. These are described in a recent publication of the United States Bureau of Standards and it is shown that they are of three general kinds and are related to the three allotropic forms in which iron can exist, according to its temperature.

Two of these structural features of ferrite are associated with the condition in which iron exists at high temperatures. By means of the tiny inclusions of foreign materials which invariably exist in iron, to some extent, a record of the structure as it exists at the high temperature is preserved in the structure at ordinary temperatures. The usual mechanical properties of iron are not believed to be affected by these two structural features but there are indications that the "hot-shortness" or brittleness of iron in certain high-temperature ranges probably is.

The grains which constitute iron, as seen under the microscope, often show, when etched in the usual metallographic manner, the appearance of having been subdivided by a branching network, or "veining," into small subdivisions. Were this an actual subdivision, the strength and hardness of the metal would undoubtedly be appreciably increased. It has been shown, however, that the apparent change in the grain size is not a real one and that the veining has no appreciable strengthening effect on the iron. On the other hand, neither has it any detrimental effect. The real nature of veining is still somewhat obscure. It has been shown, however, that it is definitely related to the allotropic change which occurs in iron as it is heated to approximately 900 deg. C (1650 deg. Fahr.). Forging the iron at or slightly below this temperature develops this feature exceptionally well.

San Francisco

Steel Demand Slowing Down—Cast Iron Pipe Firmer

SAN FRANCISCO, May 26 (*By Air Mail*).—Demand for steel on the Pacific Coast during the past week showed evidence of slowing down. Plate, structural shapes and bar bookings fell off and very little new business developed. The largest letting was 685 tons of I-beams for the city of Los Angeles, placed with an unnamed interest.

Building permits issued in Los Angeles during the first 15 days of May were on a par with those for the corresponding period a year ago. Permits issued numbered 1692, with an estimated valuation of $4,518,721, compared with 1700 permits and a valuation of $4,274,535 for the same period in 1927. The total so far this year is $38,389,122, about $3,000,000 below the total last year to May 15.

Pig Iron.—Sales of foundry pig iron continue in moderate volume, the majority of bookings consisting of small lots. Operations of sanitary ware and stove foundries are on a larger scale than those of jobbing foundries. Prices remain unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Only one award in excess of 100 tons was reported this week. An unnamed interest booked 225 tons for a loft building on Santee Street, Los Angeles. New inquiries, with one or two exceptions, involve small lots. Bids were opened this week on 155 tons for piers for the West Waterway bridge at Seattle. About 120 tons is required for a bridge for the California Highway Commission over Cache Creek in Lake County. Demand for merchant bar material is spotty and current bookings are for small lots. Out-of-stock prices on reinforcing bars in the San Francisco district continue weak, and 2c. or lower has been named recently.

Plates.—Demand for plates is exceptionally quiet. Only three projects are before the trade for figures. These projects include 1500 tons of blue annealed material for the Wildcat and Sequoia aqueducts in Oakland and 700 ton car floats for the Western Pacific and Santa Fe railroads. Tank business so far this year has been confined to small containers and elevated water towers. There is little indication that oil storage tanks will be in demand this year. Prices are firm at 2.30c., c.i.f.

Shapes.—Structural steel shape bookings in which more than 100 tons of material were involved were confined to two projects. In addition to the I-beam tonnage for Los Angeles, mentioned above, an unnamed fabricator took 110 tons for a building for the University of Southern California in Los Angeles. The only new inquiry is for 470 tons for a bridge over the Umpqua River, near Scottsburg, Ore. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe prices appear somewhat firmer this week. Market quotations now range from $36 to $37 a ton, delivered, on 6-in. and larger class B. David H. Ryan, San Diego, was awarded 231 tons of 4 and 6-in. class B pipe for the improvement of San Diego Avenue, San Diego. Pending business exceeds 5700 tons. Bids have been opened on 229 tons of 4 to 10-in. class B pipe for Inglewood, Cal., and on 127 tons of 4 and 6-in. class B pipe for Redwood City, Cal. Bids were also opened on 1560 tons of 4 to 12-in. class B pipe for street improvement work at Oceanside, Cal.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Boston

Pig Iron Business Mostly in Small Lots—Scrap Prices Easier

BOSTON, May 28.—A Vermont foundry is reported to have purchased 1000 tons No. 1X third quarter iron from a New York State furnace, but details as to price are lacking. Another report is that the lot was split two ways, the Mystic Iron Works taking 700 tons and a New York State stack the remainder. A Worcester, Mass., foundry probably will close this week on 1000 tons of No. 2 plain and No. 1X, and the Rhode Island Malleable Iron Co., Phillipsdale, R. I., on 450 tons of malleable. Aside from the Vermont purchase, business in pig iron in the past week was confined to small tonnages, with the aggregate falling below that of the previous week. There is considerable prospective business under cover, however; consequently, a more active market within the near future is expected. Prices are still unsettled, with Buffalo iron competing actively against New York State and Mystic.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—New England foundries are signing up rapidly last half contracts for by-product foundry coke. It is estimated that approximately 70 per cent have done so. Current shipments of fuel continue to show an increase. Indications are no change will be made in June in the price, which is $11 a ton, delivered within a $3.10 freight rate zone. Owing to cold wet weather, shipments of domestic coke in May by ovens have run well head of those for the corresponding month last year.

Steel Fabricating Work.—The General Electric Co. is erecting two plant units, one at Bridgeport, Conn., and the other at Pittsfield, Mass. All structural work will be arc welded instead of riveted. A strike by iron workers in Boston for $1.50 per hour is holding up sev-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

eral large jobs. According to union officials, 600 men left their work. Fabricators have not given their estimate of the number of strikers. The labor trouble has tended to slow up prospective fabricating jobs around Boston, but not elsewhere in New England.

Shapes and Plates.—Consumers of plates are still buying in limited quantities and only as needs dictate. There is a little better demand for standard shapes and light structural steel, according to mill representatives. Standard shapes are still selling at 1.80c. per lb., base Pittsburgh, for large tonnages and at 1.90c. for small.

Warehouse Business.—The movement of iron and steel out of warehouses is of fairly large proportions, but individual shipments generally are small, which raises the cost of doing business. Price shading is still in evidence, the result of keen competition. An advance of 10 per cent has been made on flat, round and fillister-head machine screws of brass to correspond with one recently made on the iron products. Flat and round head screws, formerly at 50 and 10 per cent discount, are now 40 and 10 per cent off; and fillister-head screws, which were 30 per cent discount, are now 25 per cent off.

Old Material.—With buying of small proportions and consumers more discriminating than ever as regards quality and prices, the old material market is unsettled and generally easier. For heavy melting steel, $9 a ton on cars, shipping point, is the peak of the market, and some sales have been made at less. Small tonnages of No. 2 steel are moving to Weirton, W. Va., for which $7.50 to $7.75 a ton is paid here. The range on railroad wrought is now $9 to $9.50 a ton, with most sales at $9.35. On mixed borings and turnings this market is 25c. a ton lower. Reductions are also reported in prices paid for steel turnings, rolling mill borings, long bundled skeleton and specification pipe. No. 1 steel for export, however, is stronger at $9.50 to $10 a ton on cars at dock here. A slackening in the call for both textile and No. 1 machinery cast has resulted in somewhat lower quotations.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.60 to $9.00
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.50 to 5.85
Cast iron borings (steel works and rolling mill)	5.50 to 5.75
Bundled skeleton, long	5.50 to 6.25
Forge flashings	5.60 to 7.00
Blast furnace borings and turnings	5.50 to 5.75
Forge scrap	6.00 to 6.25
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton delivered consumers' yards:

Textile cast	$13.25 to $13.50
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

Canada

Steel Industry Holds to High Operations —Pig Iron in Fair Demand

TORONTO, ONT., May 28.—The iron and steel industry of Canada continues to hold its high position with regard to productive operations. New business is appearing in sufficient volume to bring forth statements from officials of leading iron and steel mills that present operations will be continued for the next four or five months. Both the Algoma Steel Corporation, Sault Ste. Marie, Ont., and the Dominion Iron & Steel Corporation, Sydney, N. S., have large tonnages of unfilled business on their books, the greater part, however, being for rails. Other rail orders are expected to appear in the course of the next few weeks. The Steel Co. of Canada, Ltd., Hamilton, Ont., is well supplied with orders of a diversified character and its plant is running almost at capacity.

Pig Iron.—Some fair-sized tonnage orders for third quarter delivery are still pending. Melters who are interested in placing tonnage are specifying water delivery, on which freight charges are much lower than by rail. Current inquiries range from 50 to 200 tons. The total volume of new business appearing weekly, however, shows no signs of falling off and is said to be much better than that of a year ago. The prevailing price of $23.10, Toronto, for foundry iron is the lowest point Canadian iron has reached since post-war days.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—The better demand for old material that featured local business during the past couple of weeks was of short duration. During the period of activity many melters replenished depleted stocks and the majority now have sufficient scrap ahead to keep them going for several weeks. Sales of the week were mostly confined to small tonnages, but these were fairly numerous. Prices are weak. Large accumulations are being thrown on the market, much of which is going at bargain prices.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Birmingham

Some Third Quarter Pig Iron Sold— Steel Inquiries Increase

BIRMINGHAM, May 28.—Furnace interests report no evidence of change in the pig iron market. One merchant producer has booked a small third quarter tonnage at $16, which is a reaffirmation of the second quarter price. Other producers have confined sales to second quarter iron, maintaining a $16 base. Inquiries on third quarter iron are slow in developing, and indications are that the quarter will enter with buying confined to quiet negotiations, as was the case with the second quarter. Specifications against contracts are at a fair rate. The month will close with little or no iron piled. Furnace operations have been the same during the past two weeks, 18 being in blast. Of this number, 11 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Inquiries show a favorable increase over the preceding week and new business continues satisfactory in several of the more important lines. Bookings during May have been slightly in excess of the corresponding period in April. Small tonnage inquiries continue to rule the fabricated structural steel market. Bar manufacturers are enjoying a fair amount of new business, with inquiries good. Prices remain unchanged. The Tennessee company has increased its active open-hearth furnaces at Fairfield from four to five. Seven are still in operation at Ensley. The Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—A fair volume of contract business is being received and pressure pipe manufacturers are gradually increasing their backlogs. Small orders constitute the larger portion of the new business. Stocks in the yards are being kept low and production is being increased slightly. Soil pipe business is still dull, though improvement is expected within the next two or three weeks. Quotations show no change from $31 to $33 on 6-in. and larger diameters.

Coke.—Activity in the coke market continues to dwindle. Specifications on contracts are holding up fairly well. Prices are unchanged from a $5 base.

Old Material.—The market is marked by small orders and indifferent buying. Quotations are unchanged, but are more or less nominal owing to lack of transactions.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.00 to	$9.50
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Buffalo

Pig Iron Market More Active—Large Sales of Steel Scrap

BUFFALO, May 28.—The pig iron market showed more activity in the past week than for some time. The Worthington Pump Corporation placed 325 tons of Bessemer and foundry iron for its Harrison, N. J., plant; 500 tons of foundry was bought by a district foundry, and 600 tons of foundry was placed by a Geneva, N. Y., foundry. The Central Foundry Co. purchased between 3000 and 5000 tons of foundry iron for Baltimore delivery. The Fairbanks-Morse Co. inquired for 1000 tons of foundry for Vermont. There has been quite a volume of small-lot buying. The price for eastern delivery is firmer. One producer, who has taken considerable iron for shipment to points eastward at lower than $17, is now firm at $17 for all shipments. This price applies to the base grade of foundry iron. Considerable of the iron sold in the week is to be delivered by barge. The melt is increasing, and furnacemen believe the outlook for June business is very good.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25		$17.00
No. 2 foundry, sil. 2.25 to 2.75		17.50
No. 1X foundry, sil. 2.75 to 3.25		18.50
Malleable, sil. up to 2.25		17.50
Basic	$16.50 to	17.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—Bar and shape business continues in fair volume. Prices are steady at 2c., Lackawanna, for carload lots and 1.95c. for more important tonnage. No third quarter prices are yet being quoted. Current sheet business is being placed at 2.75c. to 2.85c., Pittsburgh, for black, 3.55c. for galvanized and 4c. for automobile body sheets. Specifications are fair. Bolt and nut specifications continue in about the recent volume.

Old Material.—One of the local mills has made a large purchase of heavy melting steel, No. 1 and No. 2 grades, and hydraulic compressed sheets. Dealers report obtaining $14.50 on the No. 1 steel, $13 on the No. 2 steel, and the same on hydraulic compressed. One lot of 5000 tons of No. 1 heavy melting brought $14.75. There has been a further softening in prices.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$14.75
No. 2 heavy melting steel	12.50 to	13.00
Scrap rails	13.50 to	14.00
Hydraulic compressed sheets	12.50 to	13.00
Hand bundled sheets	8.50 to	9.00
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.25 to	13.75
Heavy steel axle turnings	12.50 to	12.75
Machine shop turnings	8.00 to	8.50
Acid Open-Hearth Grades		
Railroad knuckles and couplers		15.50
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.00 to	15.50
Low phosphorus billet and bloom ends	16.50 to	17.00
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.25 to	9.75
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	16.00 to	16.50
Iron axles	21.00 to	22.00
No. 1 railroad wrought	12.00 to	12.50
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.00 to	13.25
Locomotive grate bars	12.00 to	12.50
Steel rails, 3 ft. and under		16.50
Cast iron carwheels	12.50 to	13.00
Malleable Grades		
Railroad		15.00
Agricultural		15.00
Industrial		15.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Youngstown

Valley Steel Production Tapering—Now Between 70 and 75 Per Cent

YOUNGSTOWN, May 28.—Steel production in this district is averaging between 70 and 75 per cent of capacity, a drop of about five points from its rate of the middle of the month. While a good deal of steel still is moving from the district to the automobile builders, it is in smaller volume than it was recently and there has been no compensating increase in the demand from other directions to sustain mill and steel works operations. The Republic Iron & Steel Co. has taken off one blast furnace. Sheet mill schedules are lower and so are bar mill operations. No particular change is noted in pipe mill engagement. Tin plate and strip mills keep going well, although in the case of the latter, price flexibility is a factor. Makers need orders more urgently than consumers require supplies and the result is acceptance of business at or close to the low levels made late last year on first quarter contracts.

Prices of bars and plates are holding well at 1.85c., base Pittsburgh, and it is commonly expected that when local producers open their books for third quarter contracts they will name 1.90c., base, on these products. No heavy structural steel is rolled in this area. There are no indications of an early opening of books for third quarter sheet business. If the market were on a more profitable level, sheet makers might be interested, but to open books now would mean taking forward tonnage at prices that every mill regards as too low. It might be hard to convince buyers that they should pay more than 2.70c., base, for black sheets, or more than 3.55c., base, for galvanized. In the South, corrugated galvanized sheets are going at very low prices because of a keen struggle between mills having favorable freight rates to that territory. Also, to meet the competition of substitute roofing materials, low prices have had to be made. One of the local makers is affected by this situation, as it maintains a stock at one of the southeastern Atlantic ports.

Strip makers have a problem in getting higher prices on tonnages for shipment after July 1, because of the weakness that has developed in the past few weeks. The advance in standard pipe made at the beginning of April is holding and has had some test.

Pig iron is weak and even at $16, furnace, for the basic grade, the market is narrow, since Pittsburgh reports sales of that grade at around $17, delivered, to meet which local furnaces would have to go to about $15.25. Declining steel works operations are reflected in a lighter demand for scrap and also in lower prices, most recent sales of heavy melting steel having been at $15, while compressed sheets have gone at $14.50, in both cases, a drop of 50c. a ton as compared with prices on the last previous transactions.

St. Louis

Pig Iron Weakness Delays Buying —Steel Business in Fair Volume

ST. LOUIS, May 28.—The weakness in the pig iron market caused by the sale of a tonnage of Lake Erie iron in the Chicago territory is still felt in this industrial district, and it has had the effect of causing melters to delay purchases until conditions become more settled. The sales of the St. Louis Gas & Coke Corporation during the week totaled less than 2500 tons, including two sales of malleable, 500 tons and 200 tons respectively, and the remainder was foundry grades in lots of a carload up to 500 tons, the latter to a Moline, Ill., jobbing foundry. This maker has not changed its price in the St. Louis district, although it is meeting Chicago competition in that territory. April sales of the reporting stove foundries in the Eighth Federal Reserve District were 1.7 below the preceding month and 5.7 per cent less than in April, 1927, while April business of the reporting jobbing foundries was 7.1 per cent below the preceding month and 4.5 per cent lower than a year ago.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.		$19.00
Northern No. 2 fdy., delivered St. Louis		20.16
Southern No. 2 fdy., delivered	$19.92 to	20.42
Northern malleable, delivered		20.16
Northern basic, delivered		20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of foundry coke continues only on a fair scale, with consumers in the district getting the fuel from by-product ovens as they require it. Buying by dealers of domestic coke is light.

Finished Iron and Steel.—The Granite City Steel Co. reports that new business continues to reach it in fair volume, and it has sufficient backlog tonnage, particularly of tin mill products, to assure full operation for several weeks. Although specifications for galvanized sheets have not been keeping pace with those for other products, a gradual increase is noticed in the number of incoming orders. Buying by the railroads is light. No reinforcing bar contracts were made during the week, and again it was a week without any new structural steel business, and none is in sight.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material.—A leading East Side mill bought 10,000 tons of melting steel for delivery in the next 60 days at unchanged prices. Another East Side mill is expected to be in the market shortly for a considerable tonnage. Dealers' prices on melting steel, heavy shoveling steel and railroad springs are 25c. a ton lower and are 50c. a ton lower on No. 1 machinery cast. Railroad lists: Chicago, Burlington & Quincy, 4920 tons; Union Pacific, 2955 tons; Big Four, 1350 tons; Baltimore & Ohio, 250 tons; Missouri Pacific, 124 tons; Chicago & Alton, 100 tons; New Orleans Great Northern, 80 tons; Frisco, 63 carloads; Mobile & Ohio, 46 carloads; Nickel Plate, 21 carloads; Chicago, Milwaukee, St. Paul & Pacific, 10 carloads; Pullman Co., 1 carload.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.00 to	$11.50
No. 1 locomotive tires	12.00 to	12.50
Heavy shoveling steel	11.00 to	11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to	13.00
Railroad springs	13.50 to	14.00
Bundled sheets	8.75 to	9.25
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	9.75 to	10.25
Cast iron borings	9.00 to	9.50
Iron rails	13.00 to	13.50
Rails for rolling	13.00 to	13.50
Machine shop turnings	7.00 to	7.50
Steel car axles	17.50 to	18.00
Iron car axles	23.50 to	24.00
Wrought iron bars and transoms	21.00 to	21.50
No. 1 railroad wrought	10.00 to	10.50
Steel rails, less than 3 ft	15.00 to	15.50
Steel angle bars	12.00 to	12.50
Cast iron carwheels	13.50 to	14.00
No. 1 machinery cast	13.00 to	13.50
Railroad malleable	11.50 to	12.00
No. 1 railroad cast	13.00 to	13.50
Stove plate	12.00 to	12.50
Agricultural malleable	12.00 to	12.50
Relaying rails, 60 lb. and under	20.50 to	23.50
Relaying rails, 70 lb. and over	26.50 to	29.00

Cincinnati

Southern Irons Reestablished at $16—Steel Business Quieter

CINCINNATI, May 28.—Pig iron buying has been almost at a standstill, sales in the past week having totaled less than 3000 tons. The largest was 1000 tons of malleable for a Kokomo, Ind., consumer. Since the market is practically devoid of inquiries, no improvement is expected in the immediate future. Despite the lack of interest on the part of users, Southern makers are reported to have restored the former price of $16, base Birmingham, and it is stated that neither Alabama nor Tennessee furnaces will accept orders under that figure. In southern Ohio, foundry iron remains nominally at $19, base Ironton, although this quotation is too high to secure current business in competition with makers in other districts. There has been no change in Jackson County silvery iron, which is selling at $25 for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25		$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery, 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The amount of new business in the last week has been light, while specifications against second quarter contracts also have been less numerous, especially in the heavy steel products. The dearth of structural steel jobs has been partly responsible for the sluggish condition of the market. Fabricators have a fair volume of small projects on hand, but have not been able to maintain normal operations on account of the slowness with which major proposals are coming out. Furthermore, consuming industries in general are in need of less material than a few weeks ago owing to a slight slowing down of production schedules. Bars, structural shapes and plates remain firm at 1.85c., base Pittsburgh. The situation in sheets has not changed materially. There are numerous isolated cases in which new low levels of prices have been reached, but these are not looked upon as sufficiently representative to establish a market. As a general rule, blue annealed sheets are being sold at 2c. to 2.10c., base Pittsburgh, black at 2.75c. to 2.85c., galvanized at 3.65c., and automobile body stock at 4c. District sheet mills are operating at about 90 per cent of capacity. More liberal specifications have come from the automobile industry, indicating that automobile production in June is likely to be sustained at a good rate. Common wire nails are quoted at $2.50 per keg, base Ironton, or $2.64, delivered in Cincinnati. Some sellers are unwilling to meet this price and consequently are practically excluded from markets along the Ohio River which can be reached by barge. Plain wire is selling at $2.40 per 100 lb., base Ironton.

Reinforcing Bars.—Bids are being taken on 200 tons of bars for the athletic stadium of St. Xavier College, Cincinnati. Prices are firm, with new billet bars at 1.85c., base Pittsburgh, and rail steel stock at 1.80c., base mill.

Warehouse Business.—From the standpoint of tonnage, sales this month have been somewhat disappointing and have declined about 5 per cent from April. Nevertheless, prices in all lines are steady and unchanged.

Coke.—There has been a further recession in specifications for by-product foundry coke, caused largely by the abatement in demand from automobile foundries. Producers at Ashland, Portsmouth and Indianapolis have announced that by-product foundry coke will remain at $7 per net ton, f.o.b. ovens, or $9.02, delivered Cincinnati, during June. The price of domestic grades also will be undisturbed, with egg size selling at $4.50, ovens, walnut at $3.50 and No. 2 nut at $3. One beehive coke maker in the Wise County district has reduced foundry and furnace coke 25c. a ton.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Steel plants in this district are taking less material on contract, but blast furnace grades are more active because of the blowing in of the reconstructed furnace of the Hamilton Coke & Iron Co. Cast iron scrap is sluggish, while malleable grades also are moving slowly. Prices have not changed.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Pig Iron Melt for Automobile Castings Declines; Scrap Weak

DETROIT, May 28.—During the past week there has been a noticeable dropping off in the melt in the district by some of the producers of automobile castings owning to changes in models which will come out about the middle of the year.

There has been no activity in the market on old material. Prices lean toward the low side.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Lead Output Declined Last Year

WASHINGTON, May 27.—Production of primary lead in the United States from domestic ore amounted in 1927 to 668,320 net tons, according to reports made by producers to the Bureau of Mines. The output was nearly 2 per cent less than in 1926 and the value was 23 per cent less. The production of refined lead from foreign ore, principally from Mexico, amounted to 128,210 tons, an increase of 8 per cent over the production in 1926. Consequently the decrease in the total output of primary lead from domestic and foreign sources was only about 0.3 per cent. Over 30 per cent of the lead produced from domestic ore was derived from Missouri; nearly 23 per cent was derived from Utah and about 22 per cent came from Idaho. The apparent consumption of refined primary lead in the United States in 1927 amounted to about 663,000 tons, as compared with about 718,000 tons in 1926.

Company Activities

The Columbia Steel Co., Butler, Pa., purchased last year by the American Rolling Mill Co., has registered its trademark, Stripsheets, No. 240,563, in the United States Patent Office.

The Otis Steel Co., Cleveland, placed a new 125-ton open-hearth furnace in operation at its Riverside plant recently. The company now has six open-hearth furnaces at this plant, all operating.

The Stahlwerk Becker A. G. at Willich, Kreis Krefeld and Rheinoldhütte, Germany, maker of special tool and alloy steels, has appointed the Foreign Traders Co., 17 Battery Place, New York, agents for the United States and Canada.

The Kuhn-Lowry Co., Pittsburgh, doing a warehouse business in iron and steel products, has been succeeded by Kuhn Brothers, Inc., of which George H. Kuhn is president and Mark D. Kuhn, Jr., vice-president. The new company has opened a warehouse at Twenty-eighth and Liberty Streets, Pittsburgh.

The Cincinnati offices of the Trumbull Steel Co. and the Republic Iron & Steel Co. have been combined at 1303 First National Bank Building.

Poldi Steel Corporation of America, New York, representative in the United States of the Poldi Steel Works, Prague, Czechoslovakia, has removed its offices and warehouse to 245 West Eighteenth Street.

G. Haarmann & Co., Inc., Holyoke, Mass., structural steel fabricator, has changed its name to the Haarmann Steel Co.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 28	May 26	May 25	May 24	May 23
Lake copper, New York	14.87½	14.87½	14.87½	14.75	14.75
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.37½	14.37½
Straits tin, spot, N. Y.	51.00	....	51.37½	51.62½	51.62½
Lead, New York	6.20	6.20	6.20	6.10	6.10
Lead, St. Louis	6.07½	6.07½	6.05	6.00	5.97½
Zinc, New York	6.47½	6.47½	6.47½	6.47½	6.47½
Zinc, St. Louis	6.12½	6.12½	6.12½	6.12½	6.12½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 28.—Copper grows steadily stronger and prices have advanced sharply. The tin market continues dull, but quotations are firm. Lead prices have been advanced for the first time in nearly two months. Demand for zinc is only moderate, but quotations are steady.

Copper.—Prices have advanced all along the line. Electrolytic is now 14.75c., delivered in the Connecticut Valley, the highest price since Nov. 16, 1925. Copper Exporters, Inc., has boosted its quotation to 15c., c.i.f. European ports. Lake copper is now quoted at 14.87½c., delivered. Demand from foreign consumers continues unabated and sales have been large each day. Domestic consumers are not buying much, apparently being well covered through July. There are a few, however, who still need some July and even June metal, which is scarce and difficult to find. There is some talk of premiums for spot and June metal, particularly spot. Some attempts have been made by consumers to buy metal for August delivery but it is believed very few producers are willing to commit themselves for that position.

Tin.—Sales for the week ended Saturday, May 26, were about 1200 tons. Consumers bought a little, but most of the business was done among dealers. There was no pronounced activity or buoyancy on any day. Spot tin is still closely controlled, but there is little demand for it, what there is coming from those who had to have it, mostly in small lots. Buying interest centers in June and July delivery, particularly June. In one or two cases a little metal has been sold for December delivery. London markets are closed today, Monday, because of the Whitsuntide holiday, but cables give the Singapore price today as £232 10s., which is the same as on May 22. Private estimates indicate a slight increase in the world's visible supply at the end of May. It is expected that the data for May will show Straits shipments at between 7000 and 7500 tons, with American deliveries approximately 7000 tons. The market today was very inactive with spot Straits tin quoted at 51c., New York. Arrivals thus far this month have been 6210 tons, with 4310 tons reported afloat.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.00c. to 54.00c.
Tin, bar	55.75c. to 56.75c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.25c. to 34.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.25c.
Copper, cold rolled, 14 oz. and heavier	25.50c.
Seamless Tubes—	
Brass	23.87½c.
Copper	24.75c.
Brazed Brass Tubes	27.00c.
Brass Rods	16.75c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets open	10.50c. to 11.00c.

Lead.—After remaining unchanged since April 2, the lead price of the leading interest was advanced May 25 from 6.10c. to 6.20c., New York, as its contract price. Quotations in the outside market are correspondingly higher at 6.07½c. to 6.10c., East St. Louis. Demand from consumers is a little more active because of the higher prices.

Zinc.—Ore prices were unchanged at Joplin last week, still standing at $40 a ton, with sales at nearly 12,000 tons and production close to 11,000 tons. Prices for prime Western zinc have remained steady all week at 6.12½c. to 6.15c., St. Louis, or 6.47½c. to 6.50c., New York. Attempts of producers a week ago to obtain 6.15c., St. Louis, were successful in some cases. One statement is that more metal was sold last week at 6.15c. than at 6.12½c., St. Louis. Demand is moderate and not very much business has been done because of the attitude of sellers at the present level of prices.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—The market is quiet and Chinese metal is quoted at 11c., New York, duty paid, for all po-

Non-Ferrous Rolled Products

Mill prices on copper wire were advanced ¼c. on May 23, the quotation on this product now being 16.50c. Prices are unchanged on other copper, and on bronze and brass products. Zinc sheets are being quoted at 9c., base, and lead full sheets at 9.75c. to 10c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.25c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.87½c.
Copper	24.75c.
Rods—	
High brass	16.75c.
Naval brass	19.50c.
Wire—	
Copper	16.50c.
High brass	19.50c.
Copper in Rolls	22.25c.
Brazed Brass Tubing	23.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

sitions. Sales during the first part of the month were particularly heavy.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is available at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, May 28.—Non-ferrous metals are quiet in the Chicago market and prices generally are easier. The old metal market shows moderate activity in all grades except lead.

Prices, per lb., in carload lots: Lake copper, 14.62½c.; tin, 52c.; lead, 6.10c.; zinc, 6.20c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Chicago, Burlington & Quincy Will Build 250 Stock Cars—84 Passenger Cars Ordered

AN order for 250 stock cars placed with its own shops by the Chicago, Burlington & Quincy was the outstanding transaction of the week. The Barrett Co. has ordered 100 tank cars. Orders for 84 passenger cars were placed by three roads. Details of the week's business follow:

Erie Railroad has ordered 25 suburban coaches from Standard Steel Car Co. and five baggage-express and three mail compartment cars from Pullman Car & Mfg. Corporation.

Barrett Co. has ordered 100 tank cars from American Car & Foundry Co.

Chicago, Burlington & Quincy will build 250 stock cars in its Galesburg, Ill., shops.

Chicago, Rock Island & Pacific has purchased five horse cars from American Car & Foundry Co.

International Railways of Central America have ordered 50 gondola, 25 flat and five tank cars from Magor Car Corporation.

Southern Pacific has ordered 46 passenger cars, 25 of which will be built by American Car & Foundry Co.

American Rolling Mill Co. has ordered three 300-hp. oil-electric locomotives for its Ashland, Ky., plant to be built jointly by Ingersoll-Rand Co., General Electric Co., and American Locomotive Co.

Indianapolis Union has ordered one eight-wheel switching locomotive from Baldwin Locomotive Works.

Mississippi Central is inquiring for one Mikado locomotive.

Cotter Pin Prices Advanced

Leading manufacturers of cotter pins have issued a new price list, in which advances ranging from 10 to 20 per cent are made. The new list, effective from May 24, replaces one that was adopted Oct. 5, 1922.

A new list of extras on Tobin bronze sheets and circles has been issued by the American Brass Co., Waterbury, Conn., effective May 15. Until a new catalog is issued, the extras on pages 62 and 63 of the company's present list are canceled and the extras given on a new price list apply.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.25c.	13.875c.
Copper, heavy and wire	12.25c.	13.25c.
Copper, light and bottoms	10.50c.	11.75c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.875c.
No. 1 yellow brass turnings	8.25c.	9.25c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

REINFORCING STEEL

Railroad Warehouse at Boston Takes 1600 Tons —Awards Total 5900 Tons

INCLUDING a terminal warehouse at Boston for the Boston & Maine Railroad, which took 1600 tons, awards of concrete reinforcing bars reported to THE IRON AGE in the last week amounted to 5900 tons. Inquiries totaled only 2200 tons. Awards follow:

BOSTON, 1600 tons of rail steel for Boston & Maine Railroad terminal building, to Truscon Steel Co.

BOSTON, 150 tons, Falkner Hospital, to Barker Steel Co.

WEST HAVEN, CONN., 100 tons, building for Western Electric Co., to Concrete Steel Co.

NEW YORK, 300 tons, warehouse for Lee Brothers; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

NEW YORK, 350 tons, Edroyal warehouse, from White Construction Co., general contractor, to Concrete Steel Co.

GREAT NECK, N. Y., 135 tons, high school, to Joseph T. Ryerson & Son, Inc.

BINGHAMTON, N. Y., 500 tons, Ansco Building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 500 tons, Brashear Reservoir, to Carlem Engineering Co., Pittsburgh.

PITTSBURGH, 100 tons, Miller Saw Trimmer Co. plant, to Truscon Steel Co.

PITTSBURGH, 200 tons, West Unit garage, to Metzger & Richardson Co., Pittsburgh.

PITTSBURGH, 400 tons, County trade school, to Metzger & Richardson Co.

SALISBURY, N. C., 100 tons, American Telephone Co. exchange, to Connors Steel Co.

CRAWFORDVILLE, GA., 175 tons, American Telephone Co. exchange, to Connors Steel Co., Birmingham.

CHICAGO, 100 tons, Jaques Building, to Concrete Engineering Co.

CHICAGO, 1008 tons, building for Continental Can Co., to Joseph T. Ryerson & Son.

LOS ANGELES, 225 tons, loft building at 1022 Santee Street, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

STATE OF CONNECTICUT, 300 tons, road work.

NEW YORK, 200 tons, building for Alno Realty Co.

NIAGARA FALLS, N. Y., 175 tons, addition to plant of Carborundum Co.; bids out.

CINCINNATI, 200 tons, athletic stadium for St. Xavier College.

CHICAGO, 400 tons, Hyde Park Bank Building.

CHICAGO, 585 tons, warehouse for Horder's stationery stores; S. N. Crowen, architect.

CHICAGO, 300 tons, garage for Glen E. Holmes, Inc.

Fulton Iron Works Buys Foos Engine Co.

The Fulton Iron Works, St. Louis, has purchased the Foos Engine Co., Springfield, Ohio, and latter company's plant will be operated as branch of St. Louis concern. The Fulton company manufactures Diesel engines of high horsepower, while the Foos organization makes similar units ranging from 60 to 300 hp. The deal will enable the Fulton company to offer engines ranging from 60 to 2000 hp. The company also manufactures machinery for the sugar refining industry.

FABRICATED STRUCTURAL STEEL

Bridge at Louisville Will Require 14,000 Tons—Awards Decline to 19,300 Tons

STRUCTURAL awards reported during the last week amounted only to 19,300 tons, one of the lowest weekly totals of the year. Included was 4000 tons for an office building in New York. A bridge across the Ohio River at Louisville, requiring 14,000 tons, and a section of the subway in New York, taking 9000 tons, brought the total of new projects to 31,000 tons. Awards follow:

State of Vermont, 220 tons, eight bridges, to McClintic-Marshall Co.

Bristol, N. H., 140 tons, bridge, to Berlin Construction Co.

New York, 4000 tons, office building on John Street to be built by Starrett Brothers, reported let to an unnamed fabricator.

New York, 500 tons, store building for Hilton Co., to Hedden Iron Construction Co.

Jamaica, N. Y., 700 tons, Passionist Monastery, to McClintic-Marshall Co.

Syracuse, N. Y., 1500 tons, Onondaga Building, to Taylor-Fichter Steel Construction Co.

Asbury Park, N. J., 1350 tons, casino, to A. E. Norton, Inc.

Pennsylvania Railroad, 800 tons, bridges; 500 tons to McClintic-Marshall Co., and 300 tons to American Bridge Co.

Philadelphia, 2400 tons, Y. M. C. A. building, reported to Bethlehem Fabricators, Inc.

Atlantic City, N. J., 500 tons, apartment building, to American Bridge Co.

State of Michigan, 100 tons, bridges for State highway department, to Massillon Bridge & Structural Co.

Fort Wayne, Ind., 1500 tons, building for International Harvester Co., to McClintic-Marshall Co., previously reported as 400 tons.

Anderson, Ind., 570 tons, hotel, to American Bridge Co.

Cleveland, 400 tons, East Thirty-seventh Street bridge for Nickel Plate Railroad, to McClintic-Marshall Co.

Cleveland, Cincinnati, Chicago & St. Louis Railroad, 225 tons, bridge work, to American Bridge Co.

Delta, Ohio, 500 tons, bridge for Detroit & Ironton Railroad, to American Bridge Co.

Lima, Ohio, 175 tons, building for Ohio Steel Foundry Co., to Massillon Bridge & Structural Co.

Chicago, 2000 tons, Glen E. Holmes, Inc., garage, to American Bridge Co.

Union Pacific Railroad, 350 tons, bridge, to American Bridge Co.

Chicago, Burlington & Quincy, 200 tons, bridge, to American Bridge Co.

Los Angeles, 685 tons I-beams for city, to unnamed interest.

Los Angeles, 110 tons, science building, for University of Southern California, to an unnamed interest.

San Francisco, 800 tons, four hangars for United States Army, to Belmont Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Boston, 250 tons, continuation school.

Providence, R. I., 1300 tons, Washington Bridge.

Stamford, Conn., 500 tons, building for Southern New England Telephone Co.

New York, 9000 tons, subway section 2, route 109 in Brooklyn; bids June 15.

Brooklyn, 1000 tons, theater in Williamsburg section.

Garden City, N. Y., 600 tons, building for Adelphi College.

Syracuse, N. Y., 500 tons, power station.

Camden, N. J., 200 tons, building for Horn & Hardart Restaurant Co.

Pennsylvania Railroad, 300 tons, bridges.

Holtenwood, Pa., 600 tons, building for Pennsylvania Water & Power Co.

Louisville, Ky., 14,000 tons, bridge across Ohio River for city of Louisville; bids in about 30 days.

Cook County, Ill., 975 tons, highway bridges for Sanitary District.

Joliet, Ill., 100 tons, building for Public Service Co. of Northern Illinois.

Chicago, 450 tons, Hyde Park State Bank.

Wichita, Kan., 800 tons, highway bridge.

Scottsburg, Ore., 470 tons, bridge over Umpqua River; bids May 29.

EXPORT TRADE QUIET

Low Value of Yen Limits Japanese Buying—New York Importers Unable to Sell at Present European Prices

New York, May 28.—Export trade with the Far East continues small and is not expected to show much improvement until there is a recovery in the exchange value of the Japanese yen. There have been some small inquiries for tin plate from both Japan and China, but British offers are still lower than the quotations of American makers of about $5.25 per base box, c.i.f. Japanese or Chinese port. There are occasional inquiries for small tonnages of light-gage black sheets from Japanese consumers, but British sellers are quoting about £14 17s. ($72.33) per gross ton, c.i.f. Japan, and usually secure the orders not placed with the domestic producer, the Kawasaki Dockyard Co., at about $73.25 per ton. Recently, however, a few hundred tons of light-gage sheets are reported to have gone to American makers, although their prices are higher. Most American mills are asking $77 per ton, but exporters believe that with actual business in sight this price would be shaded $1 or more per ton. Earlier shipment is said to be obtainable from American mills and the quality is considered slightly better.

Practically no new business is being booked by importers of steel in New York. Continental prices show still further advances, and most importers are not inclined to make sales at the present market level of European material, in the belief that a reaction may ensue. Sales of foreign shapes are being made to consumers, but these were all purchased several weeks ago when the market abroad was lower. Current quotations range from 1.70c. to 1.80c. per lb., delivered, on shapes and from 1.80c. to 1.90c. per lb. on bars. The price on foreign steel hoops is equivalent to the current domestic market, and Continental mills are offering three to four months' delivery.

Tests made on European beams by the testing laboratory of Columbia University are reported to have shown that the material submitted compared satisfactorily with domestic steel. The domestic steel submitted by the importer was of open-hearth quality, purchased from stock in New York, while the foreign steel was of Thomas grade, taken from a shipment recently arrived.

British Non-Ferrous Metallurgists May Visit United States

At a general meeting of the Institute of Metals, held in London on May 8, the following invitation was presented on behalf of the American Institute of Mining and Metallurgical Engineers, by W. M. Corse, honorary corresponding member to the council for the United States:

> Having in mind the close similarity in field of the Institute of Metals and of the Institute of Metals and Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers, and believing firmly that science knows no boundaries and that by additions from many sources to the common pool of knowledge is the latter extended and deepened to the mutual benefit of all contributing, and that by international visits, personal and professional bonds are built up that enhance the usefulness and prestige of professional men at the same time that they operate to strengthen the natural ties of history and ancestry between our two peoples.
>
> Now, therefore, on behalf of this institute and by authority of its board of directors, I take pleasure in extending to you a most cordial invitation to visit and meet with us in this country at such time in 1932 as may be mutually found to be convenient.
>
> (Signed) George Otis Smith,
> President, A. I. M. and M. E.

The president of the institute of metals, Dr. W. Rosenhain, suitably acknowledged the receipt of the invitation, and indicated that it would be gladly accepted. The council is endeavoring to arrange for an inclusive fare of about £100 to cover the entire cost of the trip. This, it is expected, will be of about five weeks' duration, and will take place in the autumn, both Canada and the United States to be visited.

PERSONAL

Robert Montgomery Bird has been appointed New York district sales manager for the Midvale Co., Philadelphia, succeeding Ward A. Miller. Mr. Bird was graduated in mechanical engineering from Lehigh University, Bethlehem, Pa., in 1902. During the next 22 years he was identified with the Bethlehem Steel Co., serving successively as superintendent of the heat treatment department, superintendent of the Lehigh mills, during the war in the metallurgical and heat treating division of the ordnance department and later as chief metallurgist and engineer of tests at the Bethlehem, Pa., plants. Since 1924 he has been associated with George F. Pettinos, Philadelphia, as production and operating manager of sand operations and graphite mills along the Atlantic Coast. He served as president of the American Society for Steel Treating in 1926 and is also a member of the American Iron and Steel Institute, Iron and Steel Institute (British), American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials and Society of Automotive Engineers.

R. M. BIRD

F. J. Fitzgerald, purchasing agent of the Monarch Forge & Machine Works, Portland, Ore., has been elected secretary of the Oregon Purchasing Agents' Association.

Louis E. Nelson, until recently division superintendent of the Warner Corporation, Muncie, Ind., is now associated in a sales engineering capacity with the City Machine & Tool Works and the National Broach Co., both of Dayton, Ohio. He will specialize on the companies' Peerless gear tooth chamfering machine and Bolender gear grinding chuck.

C. H. Heist, formerly furnace superintendent Mayville Iron Co., Mayville, Wis., subsidiary of the Youngstown Sheet & Tube Co., has been appointed superintendent of the Campbell, Ohio, furnaces of the latter company, succeeding H. S. Braman, resigned.

J. R. Redhead has been elected president and treasurer of the Chisholm-Moore Malleable Iron Co., Cleveland, which has been formed to conduct the malleable foundry business of the Chisholm-Moore Mfg. Co. As previously announced, the chain hoist and crane manufacturing departments of this company have been merged with the Columbus-McKinnon Co., Tonawanda, N. Y., and the Cleveland branch of this company will be operated as the Chisholm-Moore Hoist Co., a division of the Tonawanda company. Mr. Redhead is vice-president and general manager of the Columbus Malleable Iron Co., Columbus, Ohio, and was formerly connected with the National Malleable & Steel Castings Co., Cleveland. Other officers of the Chisholm-Moore Malleable Iron Co. are A. H. Chappelka, vice-president, and David L. Johnson, secretary, both having been connected with the Chisholm-Moore company, in similar capacities.

Dr. R. P. Heuer, instructor in chemical engineering at the University of Pennsylvania, has resigned to become director of research for the General Refractories Co., Philadelphia. In addition to directing the company's research laboratories at Baltimore, he will devote much time to field work among refractories users on technical problems relating to the company's general products and specialties.

Charles E. Tullar has been appointed manager of the patent department of the General Electric Co., Schenectady, N. Y., succeeding the late A. D. Lunt. Mr. Tullar has been assistant manager of the department since December, 1927.

R. D. Scamehorn, who has been vice-president and purchasing agent of the Kawneer Co., Detroit, has resigned to become general manager and treasurer of the Compound & Pyrono Door Co., St. Joseph, Mich.

W. M. Corse, consulting metallurgist, Washington, and secretary of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, attended the meetings of the Institute of Metals of Great Britain in London during the week of May 8. He visited France, England, Sweden and Norway, and addressed the Society of Scientific and Industrial Research at Stockholm, on industrial research in the United States.

L. Citroen, G. Braud, H. Nogue and W. Simon, officials of the Citroen Cie., French automobile producer, were visitors last week at several Worcester, Mass., plants.

Harold V. Engh has been elected president of the Inland Wire & Cable Co., succeeding Arthur D. Gochenour, resigned. Mr. Engh has been engaged in the insulated wire manufacturing business for 18 years.

I. Patrick, has been made president and chief engineer of the Rockford Iron Works, Rockford, Ill., which has recently been reorganized. J. W. Holstead has been named vice-president and works manager, and J. L. Patrick, secretary and treasurer. The Rockford line of presses will be extended to include all types of presses and sheet metal working equipment.

William M. Neckerman, whose appointment as general manager of the Republic Iron & Steel Co., Youngstown, was mentioned in The Iron Age last week, will continue an association of many years with E. T. McCleary, recently elected president of the Republic company, who also came from the Youngstown Sheet & Tube Co. Mr. Neckerman has been with the Sheet & Tube company for 21 years and previously was identified with the National Tube Co. In both these positions he was active in many of the large mill installations of the companies.

W. M. NECKERMAN

Frederick W. McIntyre, vice-president and sales manager, and Anton Schneider, works manager, have been elected to the board of directors of the Reed-Prentice Corporation, Worcester, Mass.

Harry G. Stoddard, treasurer and general manager of the Wyman-Gordon Co., Worcester, Mass., manufacturer of crankshafts and other automotive forgings, is in Europe making a tour of automobile plants.

Dr. Fritz Meyer, American Radiator Co., New York, will deliver an address on the pulverized fuel cupola of that company, now in operation at Springfield, Ill., at a meeting of the Wisconsin Foundrymen's Research Group, June 6, at the Republican House, Milwaukee.

E. C. Gainsborg has been appointed district sales representative at Pittsburgh for the SKF Industries, Inc., succeeding A. A. Van Pelt, who has resigned. The company's Pittsburgh headquarters are at 1608 Benedum Trees Building.

G. S. Cook has been elected president of the C. Lee Cook Mfg. Co., Inc., Louisville, Ky., succeeding the late C. Lee Cook. F. D. Durham will continue as general manager of the company.

William H. Yawger, for many years vice-president and treasurer of the Weston Electrical Instrument Corporation, Newark, N. J., has resigned from active duty. He became associated with the Weston company in 1892, just four years after it was organized, and will remain on the board of directors with title of vice-president. Mr. Yawger was born in Lockport, N. Y., and was first associated with the Cowles Electric Smelting & Aluminum Instrument Co.

Louis C. Bihler, who has been traffic manager of the Carnegie Steel Co. since Jan. 1, 1904, has been made assistant to the president and general traffic manager, and William S. Guy, who has been assistant traffic manager, has been appointed traffic manager. Mr. Bihler has been with the Carnegie company since 1895, and Mr. Guy, who was with the old firms of Carnegie Brothers & Co. and Carnegie, Phipps & Co., dates his connection with the company to May 27, 1891. G. W. Seaman and C. W. Trust have been made assistant traffic managers.

L. C. BIHLER

R. A. Mulholland, for the past two years works manager of the Cummins Engine Co., Columbus, Ind., builder of Diesel engines, has resigned and will act as consulting production engineer for the Mulholland Sales & Engineering Co., Indianapolis.

Leigh B. Block, identified for the last four years with the Inland Steel Co., Chicago, has been appointed purchasing agent of the company, with headquarters at its Indiana Harbor, Ind., plant. He succeeds J. E. Stafford, who has resigned after 16 years with the Inland company and will be identified with the sale of refractory materials in the Chicago district.

Fred Teal, resident manager at Cincinnati for the M. A. Hanna Co. during the past two years, has joined Eaton, Rhodes & Co., Cincinnati, pig iron and coke dealers. Mr. Teal was connected with Rogers, Brown & Co. for a number of years previous to his association with the Hanna company.

Robert D. Sinclair, formerly president of Mudge & Co., Chicago, railroad equipment manufacturers, has been made president of the Fairmont Railway Motors, Inc., Fairmont, Minn., which has acquired Mudge & Co.

Robert M. Dunlap, formerly western sales manager for Holorib, Inc., Cleveland, manufacturer of insulated steel roof decks, has been appointed general sales manager for that company. J. L. Stewart, formerly with the Federal Cement Tile Co., has been made Chicago district manager.

F. H. Lewis, who has been assistant manager of the order department, Jones & Laughlin Steel Corporation, Pittsburgh, has been transferred to the sales department and made assistant district manager of sales, Pittsburgh district. Mr. Lewis has been with the company for about nine years and previously had been with the Carnegie Steel Co., Pittsburgh, and the Midvale Steel & Ordnance Co., Philadelphia.

F. C. Allen, Jr., founder and former president of the Allen & Billmyre Co., Inc., has severed his connection with that organization, and is now president of the Allen Air Appliance Co., Inc., making his headquarters at the New York office of this company in the Grand Central Terminal Building. The main office and plant of the Allen company are at Glens Falls, N. Y., and the plant includes a pattern shop and foundry as well as a machine shop and assembly departments.

Carl W. Peirce, open-hearth superintendent at Mansfield, Ohio, for the Empire Steel Corporation, has resigned. A portion of his duties has been taken over by William Hanst. Mr. Pierce was a large factor in the design of the open-hearth plant of what then was the Mansfield Sheet & Tin Plate Co., more than eight years ago, and has been in charge of its operation ever since. This plant was described in THE IRON AGE of Jan. 5, 1922, in an illustrated article signed by Mr. Peirce. His previous experience had included several years with the Jones & Laughlin Steel Co. (now, Corporation) at the South Side works in Pittsburgh, where he was in charge of operation of four large tilting open-hearth furnaces, working on the Talbot process; some time with the former New York State Steel Co., Buffalo, and in several of the units of the United States Steel Corporation. He is a graduate of Oberlin College, Oberlin, Ohio.

John A. Calahan has been elected president of the Federal Metal Hose Co., Buffalo. During the World War he was with the Curtiss Airplane Co. at Buffalo, as general manager. Later he went with the Martin-Parry Corporation, York, Pa., builder of commercial bodies, and is now vice-president and general manager of the latter concern.

James A. Farrell, president United States Steel Corporation, who has been in Europe several weeks, is now returning and is expected at his offices at 71 Broadway, New York, on June 4. While in Belgium, Mr. Farrell had an audience with King Albert.

Sheet & Tube Operating Personnel Changes

YOUNGSTOWN, May 28.—Vacancies in the operating personnel of the Youngstown Sheet & Tube Co. created by the resignations of Elmer T. McCleary and of W. M. Neckerman, who have become president and general manager respectively of the Republic Iron & Steel Co., will probably remain unfilled. Duties of Mr. McCleary will be assumed by W. C. Reilly, vice-president in charge of the western district plant, who, however, has been spending part of his time in Youngstown, and by Frank C. Farrell, Youngstown district manager. Mr. Neckerman's duties in connection with operations of the tube works will be taken over by his chief assistants in Youngstown and the manager of the company's western pipe works is to come to Youngstown. The company has not yet named a successor to W. J. Massman, who has been in charge of purchases for the Chicago district plants and who resigned recently to become purchasing agent Republic Iron & Steel Co., succeeding Shaler H. Hedges, resigned.

Eastern Steel Co. Settles Government Tax Claim

The Department of Internal Revenue has agreed to a compromise offer of the Eastern Steel Co., Pottsville, Pa., to pay $150,000, instead of the original claim of the department for taxes of $634,000. Receiver's certificates covering the $150,000 have been issued and are understood to have been liberally subscribed for in Pottsville. As a result of this settlement, the court will probably direct the bondholders and other creditors of the company to bring about a reorganization, fixing a time in which it is to be completed.

OBITUARY

Moses Taylor

Moses Taylor, who was chairman of the board of the Lackawanna Steel Co., Buffalo, at the time of its merger with the Bethlehem Steel Corporation, died on May 26 at his country home at Mount Kisco, N. Y. He was 57 years old. Mr. Taylor arrived in New York from Europe on May 15, having been taken ill in March while abroad. His death was caused by a stroke of apoplexy following a long illness of phlebitis.

Following his graduation from Yale University in 1893, Mr. Taylor became connected with the Lackawanna Steel Co., rising by various advancements to vice-president, and later he was elected chairman of the board. When in May, 1922, the Lackawanna company was taken over by the Bethlehem Steel Corporation, Mr. Taylor became a director of the latter company. Among his other business connections, Mr. Taylor was a trustee in Witherbee, Sherman & Co., Port Henry, N. Y., owners of ore properties and blast furnaces, in which the Bethlehem Steel Corporation has a one-third interest, acquired with other assets of the Lackawanna Steel Co. Mr. Taylor was formerly a member of the New York banking firm of Kean, Taylor & Co.

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James Sheriffs Llewellyn, first vice-president of the Chicago Malleable Castings Co., West Pullman, Ill., died of pneumonia May 27. He was born in Milwaukee in 1887 and attended the University of Michigan. In 1907 he became secretary of the Chicago Malleable company.

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George A. Newett, for many years editor of *Iron Ore*, a weekly newspaper published at Ishpeming, Mich., died on May 26, aged 72 years. He had long been a prominent figure in Lake Superior iron mining and was an authority on mining practice and ore values. What he wrote 35 to 40 years ago on developments on the Mesabi range and the place its ores would take in relation to those from the Michigan and Wisconsin ranges attracted much attention from mine owners, as well as from blast furnace operators in the Central West. In that time of divergent views on the future of the Mesabi range he was a strong partisan of the ores from the older ranges.

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Charles G. Washburn, founder of the Wire Goods Co., now the Washburn Co., Worcester, Mass., and for nearly half a century identified with the wire industry of central Massachusetts, died suddenly at Lenox, Mass., on May 25. He was born in Worcester, Jan. 28, 1857, and was graduated from Worcester Polytechnic Institute in 1875, and from Harvard College in 1880. He then took up the study of law in the evenings, proposing to specialize in patent practice. Immediately after leaving college he also entered the manufacturing field, becoming associated with his father, Charles F. Washburn, in the wire plant which the latter had established at Quinsigamond, Mass. He participated in the plant's management until its consolidation with I. Washburn & Moen as the Washburn & Moen Mfg. Co., which is the nucleus of the present South Works, Worcester District, American Steel & Wire Co. The Wire Goods Co. was established in 1880 and grew rapidly and later Mr. Washburn took his brother, Reginald, into the business. In recent years, the younger brother, as treasurer and general manager, has been the active head, while Charles G. had continued to serve in an advisory capacity and maintained an office at the factory. In 1882 he became treasurer and manager of the Worcester Barbed Wire Fence Co., afterward sold to Washburn & Moen. In 1884 he entered the Washburn & Moen management and remained a part of it until 1891, some of the time as a director of the corporation. There followed a period during which he practised patent law, but continued his active interest in the affairs of his Wire Goods Co. Mr. Washburn represented his district in Congress from 1907 to 1911, and was particularly active in legislation having to do with the anti-trust laws, railroads and other measures affecting industry. He was for many years a trustee of the Worcester Polytechnic Institute, and was president of the board until a change in by-laws vested that office in the president of the Institute. In 1922 the institution conferred upon him the honorary degree of Doctor of Engineering. He was well known as an author on economic, political and historic subjects, and, most conspicuously, as a biographer of his Harvard classmate and friend, Theodore Roosevelt.

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Sanford B. Belden, vice-president of the Jeffrey Mfg. Co., Columbus, Ohio, died at the Hotel Chatham, New York, on May 15. The day before his death, Mr. Belden had gone to New York on a business trip and had appeared to have been in good health. He joined the Jeffrey organization in 1896, shortly after having been graduated from the School of Mines of Ohio State University. After serving some time in the sales department he was made manager of the Jeffrey Pittsburgh office, which position he held for 12 years. In 1909 he was promoted to the position of vice-president and manager of the mining division and he continued in this position for 17 years. In 1926 he took a year's vacation, returning to the company as a vice-president and director, and in addition, he was made chairman of the board of the British Jeffrey-Diamond, Ltd., the Jeffrey British plant located at Wakefield, England.

Business Analysis and Forecast

(*Concluded from page* 1543)

In view of the facts that building permits declined sharply to a low level in April, and that a rising trend in the money markets is tending to curtail speculative building operations, it seems probable that the April upturn in building contracts will prove to be temporary and that some further recession will be seen. April bookings of fabricated structural steel fell sharply.

In April, 434,200 motor cars and trucks were produced in the United States and Canada—an average daily output of 17,370, which compares with 15,670 in March and 16,510 a year ago. Here, again, the increase is largely an ordinary seasonal occurrence, April usually being the peak month of the year. If we deduct an allowance for the merely seasonal variation, we get an index of 119.8, against 118.3 in March and 113.9 a year ago. Thus in reality there was only a very slight upward trend.

We think that automobile production is rounding off for a decline. The first two weeks of May have doubtless shown a continued large volume of production. Also Ford is probably gradually increasing his output. But we note that General Motors sales to dealers declined in April, which is unusual.

The fact remains that these two key industries in April were operating at an annual rate of between 20 and 25 per cent above average.

The unfilled orders barometer continued sharply downward in April. From December on, the rate of increase fell off, and finally a month ago came the large decrease of approximately 463,000 tons. This trend plainly reflected, if it did not anticipate, a decrease in new business. The unfilled orders curve is an excellent barometer of general business and its decline confirms the forecast of the P-V line. Both barometers are further supported by the recent renewed weakness in steel scrap, the decline of 50c. in heavy melting steel at Pittsburgh last week indicating that the scrap price curve for May will show a decline from the April level.

A course in porcelain enameling is to be given at Cleveland, July 9 to 23, by the Ferro Enameling Co., of that city. The course will be under the direction of J. E. Hansen and the porcelain enameling industry will be studied from both the technical and practical standpoint. Some of the subjects that will come up for discussion will be, "Dry Process vs. Wet Process Enameling," "Sand Blasting," "Enamel Shop Management," and "Diagnosing Enamel Shop Troubles."

Exports and Imports Above Last Year

Gain of 11 Per Cent in Four Months of Exports Due Mainly to Scrap—Finished Steel Falls Off

WASHINGTON, May 26.—Based on daily movement, exports and imports of iron and steel in April were at almost the same rate as in March. April showed a daily average of 7173 tons exported and 2411 tons imported, increases of only 14 tons and 20 tons respectively over March. For the month, the totals of exports and imports in March exceeded those of April by about 3 per cent. As stated in THE IRON AGE of May 24, exports in April aggregated 215,184 gross tons, against 221,935 tons in March, while imports in April were 72,329 tons, compared with 74,128 tons in March.

Both exports and imports for April and for the four months ended April 30 showed gains over the corresponding periods of last year, the increases being most marked in exports. Compared with the outgoing shipments of April, 1927, which amounted to 192,369 tons, exports last month showed an increase of 22,815 tons. For the four months ended with April, exports totaled 828,800 tons, an increase of 82,980 tons over the 745,820 tons exported during the corresponding period of 1927. With imports in April, 1927, amounting to 60,374 tons, the current increase was 11,955 tons. For the four months ended with April, imports were 252,720 tons, an increase of 17,667 tons over the 235,053 tons imported during the corresponding period of last year.

Of the April exports, 85,316 tons, or 39 per cent, went to Canada; for the four months ended with April, Canada took 315,644 tons, or 38 per cent of the total. Japan took 21,294 tons in April and 113,178 tons during the four months. Belgium led as the principal source of imports in April, providing 19,219 tons; the United Kingdom ranked second, with 12,378 tons; France was third, with 11,645 tons, and Germany was a close fourth, with 10,789 tons.

Scrap constituted the greatest single item of exportation in April, with a total of 40,616 tons. Of this amount, 13,555 tons went to Canada, 11,540 tons to Japan, 9317 tons to Poland and Danzig and 4951 tons to Italy. Steel rails represented the second greatest item, the outgoing shipments aggregating 24,449 tons. Chile was the largest buyer, taking 6817 tons, while Brazil ranked second, taking 4629 tons, and another South American country, Colombia, was third, with 3771 tons. Canada took 3410 tons, and China, 3387 tons; Japan took none. Of the 19,809 tons of tin plate (the third largest item) exported in April, 4483 tons went to Canada, 3602 tons to Argentina, 2477 tons to Japan and 1409 tons to Italy.

Exports of casing and oil line pipe in April were 7366 tons, 2525 tons going to Venezuela and 1024 tons to Argentina. Exports of welded black pipe amounted to 3795 tons, widely scattered over the world markets in comparatively small lots. Canada took 597 tons, the United Kingdom, 508 tons, and Mexico, 368 tons. Of the 13,653 tons of structural shapes exported during the month, 11,611 tons went to Canada, and that coun-

Exports of Iron and Steel from the United States

(In Gross Tons)

	April		Four Months Ended April	
	1928	1927	1928	1927
Pig iron	3,701	3,753	15,954	13,561
Ferromanganese	1,324	10	3,463	117
Scrap	40,616	24,425	126,120	51,725
Pig iron, ferroalloys and scrap	*45,641*	*28,188*	*145,537*	*65,403*
Ingots, blooms, billets, sheet bar, skelp	7,657	7,978	32,909	20,074
Wire rods	2,711	770	10,160	5,922
Semi-finished steel	*10,368*	*8,748*	*43,069*	*25,996*
Steel bars	12,660	9,209	43,226	40,713
Alloy steel bars	1,543	445	4,339	1,840
Iron bars	613	365	1,405	1,732
Plates, iron and steel	10,043	14,954	44,034	44,301
Sheets, galvanized	12,534	14,947	50,481	59,309
Sheets, black steel	11,681	11,724	55,816	60,371
Sheets, black iron	1,417	1,259	4,673	6,011
Hoops, bands, strip steel	4,161	3,660	16,595	17,212
Tin plate; terne plate	19,809	18,159	80,361	115,627
Structural shapes, plain material	13,653	13,380	52,019	38,526
Structural material fabricated	6,908	5,303	23,637	21,232
Steel rails	24,449	13,919	78,852	69,763
Rail fastenings, switches, frogs, etc.	3,786	2,999	22,939	10,222
Boiler tubes, welded pipe and fittings	15,385	26,402	77,086	106,726
Plain wire	3,163	3,019	15,233	10,194
Barbed wire and woven wire fencing	7,240	5,289	24,271	13,160
Wire cloth and screening	84	142	558	725
Wire rope	267	481	1,746	1,584
Wire nails	1,790	627	5,477	2,372
Other nails and tacks	1,046	758	3,402	2,664
Horseshoes	30	78	142	149
Bolts, nuts, rivets and washers, except track	1,062	1,081	3,992	3,777
Rolled and finished steel	*153,324*	*148,200*	*610,284*	*628,210*
Cast iron pipe and fittings	1,605	1,644	10,814	8,378
Car wheels and axles	861	1,347	4,421	4,214
Iron castings	938	1,102	4,602	4,491
Steel castings	731	1,206	3,248	2,616
Forgings	819	493	2,298	1,757
Castings and forgings	*4,954*	*5,792*	*25,383*	*21,456*
All other	897	1,441	4,527	4,755
Total	215,184	192,369	828,800	745,820

Imports of Iron and Steel into the United States

(In Gross Tons)

	April		Four Months Ended April	
	1928	1927	1928	1927
Pig iron	20,845	8,923	54,514	30,158
Ferromanganese*	2,566	2,153	13,441	8,749
Ferrosilicon†	367	1,179	1,212	4,320
Ferrochrome‡	36	11	224	370
Scrap	1,953	5,500	11,168	21,180
Pig iron, ferroalloys and scrap	*25,767*	*17,766*	*80,559*	*64,777*
Steel ingots, blooms, billets and slabs	1,635	617	6,100	4,652
Iron blooms, slabs, etc.	....	....	4	....
Wire rods	1,075	707	6,474	4,614
Semi-finished steel	*2,710*	*1,324*	*12,578*	*9,266*
Rails and splice bars	1,230	852	5,501	5,737
Structural shapes	16,577	11,796	58,238	48,532
Boiler and other plates	80	1,336	460	2,176
Sheets and saw plates	992	1,191	9,482	4,569
Steel bars	8,212	8,840	34,889	31,827
Bar iron	355	659	815	1,965
Hoops, bands and cotton ties	1,586	1,837	7,938	8,884
Tubular products (wrought)	6,211	3,575	14,157	15,118
Nails, tacks, staples	688	532	2,334	1,788
Tin plate	97	38	166	100
Bolts, nuts, rivets and washers	22	13	87	86
Round iron and steel wire	478	456	1,439	1,279
Barbed wire	272	328	1,258	2,210
Flat wire; strip steel	153	277	741	938
Steel telegraph and telephone wire	....	1	46	25
Wire rope and strand	92	361	498	925
Other wire	43	98	231	203
Rolled and finished steel	*37,088*	*32,190*	*138,280*	*126,362*
Cast iron pipe	6,566	8,733	19,842	33,402
Castings and forgings	198	356	1,461	1,246
Total	72,329	60,374	252,720	235,053
Manganese ore*	14,151	29,704	54,528	92,791
Iron ore	224,841	239,570	868,251	862,733
Magnesite (dead burned)	5,362	7,785	17,777	20,244

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*Manganese content only.

†Silicon content only.

‡Chromium content only.

United States Imports of Iron and Steel Products in April

(In Gross Tons)

Austria	25
Belgium	19,219
Czechoslovakia	32
France	11,645
Germany	10,789
Italy	39
Netherlands	5,357
Norway	3
Poland and Danzig	441
Sweden	2,379
Switzerland	22
United Kingdom	12,378
Total Europe	*62,329*
Canada	3,721
Mexico	70
Cuba	12
British India	4,196
Japan	1
New Zealand	2,000
Total	72,329

try took 8129 tons of the 12,660 tons of steel bars exported, while the United Kingdom took 1285 tons. Canada also took the greater part of the 10,043 tons of plates exported during the month, shipments to that country being 7728 tons. Of the 11,681 tons of black sheets exported, Canada took 7074 tons and Japan, 2953 tons.

Amounting to 20,845 tons, imports of pig iron in April showed a gain over those of March, which totaled 16,155 tons. The United Kingdom, providing 8897 tons, was the chief source of the incoming shipments. The United Kingdom also led as the source of ferromanganese imports, furnishing 1374 tons out of the total of 2566 tons, Canada providing 1079 tons. Of the 14,151 tons of manganese concentrates imported, 6305 tons came from Brazil and 3592 tons from Soviet Russia.

Of the 16,577 tons of structural shapes imported, 11,447 tons came from Belgium, 2851 tons from France and 2205 tons from Germany. Belgium supplied 3422 tons of the 8212 tons of steel bars imported; France, 2744 tons, and Germany, 1221 tons. Of the 6566 tons of cast iron pipe imported, 4896 tons came from France and 1578 tons from Belgium. "Other" pipe imports—mostly seamless tubes—amounted to 6211 tons, Germany supplying 3306 tons and the United Kingdom, 1317 tons.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Desination	April, 1928	January Through April 1928	January Through April 1927
North and Central America and West Indies	*104,063*	*392,787*	*352,109*
Canada and Newfoundland	85,500	316,985	270,838
Cuba	4,836	21,636	27,757
Mexico	4,393	24,395	26,952
Guatemala	493	4,857	3,209
Panama	1,631	6,138	6,099
Salvador	135	866	1,771
British West Indies	692	2,454	5,453
Other West Indies	4,829	9,588	4,920
Other Central America	1,554	5,868	5,110
South America	*39,508*	*143,747*	*138,697*
Argentina	7,033	30,601	30,379
Brazil	10,626	30,837	31,511
Chile	8,143	26,263	9,187
Colombia	6,849	23,674	25,563
Peru	1,775	10,044	9,758
Uruguay	1,265	3,064	5,141
Venezuela	3,154	17,124	26,320
Other South America	663	2,140	838
Europe	*23,846*	*63,630*	*55,668*
Belgium	1,326	5,025	1,304
France	599	1,416	1,179
Greece	33	150	933
Italy	6,450	10,461	13,036
Netherlands	92	888	1,308
Russia	138	1,360	2,065
United Kingdom	3,337	16,599	25,655
Other Europe	11,871	27,731	10,188
Far East	*47,168*	*223,687*	*192,767*
British Malaya	731	2,652	4,817
China	11,007	43,964	25,056
Dutch East Indies	2,869	9,272	15,991
India and Ceylon	1,249	10,869	13,245
Japan and Chosen	21,294	113,178	92,689
Kwangtung	44	1,914	6,910
Philippine Islands	8,126	33,610	16,439
Australia	865	5,343	11,225
New Zealand	354	850	590
Other Asia and Far East	629	2,035	5,805
Africa	*599*	*4,949*	*6,579*
British South Africa	281	2,421	2,527
Egypt	156	1,575	1,681
Mozambique	100	308	1,854
Other Africa	62	645	517
Total	215,184	828,800	745,820

Heavy Increase in Iron Ore Imports

Imports of iron ore in April are reported by the Department of Commerce at 224,841 gross tons. This is about equal to the February imports of 229,578 tons. It represents an increase of 39 per cent over the 162,654 tons coming in in March. Compared with April of last year, however, there has been a reduction of nearly 6 per cent, the figure a year ago having been 239,570 tons.

For the first four months of the year imports have been slightly greater than a year ago, the totals having been 868,251 tons this year and 862,733 tons last year. More than half of the total in each case came from Chile, with French Africa in second position this year, whereas Cuba was in second position last year.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	April		Four Months Ended April	
	1928	1927	1928	1927
Canada	3,288	478	42,133	1,844
Cuba	26,086	44,000	120,786	173,000
Chile	120,000	130,300	482,900	453,500
Spain	....	196	5,250	3,919
Sweden	13,231	19,934	19,614	57,050
French Africa	57,622	38,925	159,646	149,765
Other countries	4,614	5,737	37,922	23,655
Total	224,841	239,570	868,251	862,733

An annual municipal number has been issued by *Motor Transport*, Dorset House, London. It is devoted largely to bus traffic, but other business uses of motor cars are covered. Its editorial policy follows American lines when it says: "The future efficiency of municipal motor transport would benefit by weeding out old vehicles, the operating costs of which are greater than the corresponding costs of new machines, including depreciation allowance and interest on the capital expended upon them."

Steel Furniture and Shelving Orders Up 13 Per Cent in First Four Months

WASHINGTON, May 26.—Steel furniture stock goods to the value of $2,915,344 were ordered in April, according to reports received by the Department of Commerce from 33 manufacturers in the "business group." This compares with $3,283,329 in March. Shipments were valued at $3,065,637 and $3,169,351 respectively, while unfilled orders amounted to $2,359,877 in April as against $2,511,518 in March. Orders in this group for the first four months were valued at $12,742,699, compared with $11,431,084 for the corresponding period of last year. April orders of steel shelving were valued at $740,658, against $841,098 in March, according to reports received from 15 companies. Shipments were valued at $716,104 and $831,607 respectively, while unfilled orders were $793,903 and $774,947. For the four months ended with April orders in this group were valued at $3,091,814, against $2,546,062 for the corresponding period of 1927.

Malleable Castings Tonnage Considerably Lower In April

Production of malleable castings by 133 plants in April is reported by the Department of Commerce at 56,667 tons, compared with 63,322 tons in March, from the same 133 plants. Except for March and February, the April tonnage was the largest since last June. It compares with 59,225 tons in April, 1927.

Shipments held very close to orders, both in April and in March. In April the total was 56,964 tons. Orders booked, with a few reports missing, amounted to 53,849 tons. Capacity was operated during the month at the rate of 62.3 per cent.

Production for the first four months was 233,852 tons, against 234,469 tons a year ago.

BRITISH TRADE RECEDES

April Shows Decline in Exports and Imports —Iron and Steel Output Also Less

WASHINGTON, May 25.—British imports and exports of iron and steel decreased in April, according to a radiogram received by the Department of Commerce from the American commercial attaché in London. Imports dropped from 269,526 tons in March to 252,677 tons, a decline of 6.3 per cent. Exports were 344,333 tons in April, against 409,297 tons in March, a decline of 15.9 per cent.

Output of pig iron and steel ingots also declined in April. Pig iron production showed a decrease of 6.3 per cent, dropping 37,600 tons to a total of 555,000 tons for the month, and steel ingot output receded 149,200 tons to 644,100 tons for the month, a decline of 16.8 per cent. At the end of April there were 149 furnaces in blast, compared with 150 at the end of March. During the month 18 open-hearth furnaces were removed from the active list, leaving a total of 259 in operation.

The decline of imports in April was reflected in 11 classes; eight showed increases. Of the 22 classes of materials in the export list, 16 showed smaller shipments in April and six registered gains.

Orders for Fabricated Structural Steel Decline

Actual returns on new orders for fabricated structural steel in April amounted to 186,024 tons, or 63 per cent of the capacity of the 200 reporting firms with a monthly capacity of 293,750 tons, according to the Department of Commerce. Orders in March totaled 204,588 tons, or 69 per cent of the capacity of 213 firms with 298,580 tons capacity. Computed bookings in April were 236,250 tons, against 258,750 tons in March, while computed shipments in April were 243,750 tons, or 65 per cent of capacity, compared with 232,500 tons, or 62 per cent of capacity, in March.

Except for January, no lower computed tonnage of new orders had been reported since last June. Compared with April, 1927, the shrinkage was 10 per cent. Shipments, on the other hand, made the highest showing since last November and were 5 per cent ahead of April, 1927.

Stoker Sales Fall Sharply

Mechanical stokers to the number of 88, with aggregate rating of 31,043 hp., were sold in April, against 123 with 43,435 hp. in March, according to reports received by the Department of Commerce from 12 establishments. Of the stokers sold in April 21 with 3081 hp. were installed under firetube boilers and 67 with 27,962 hp. under watertube boilers.

Except for January, the April sales were the smallest of the year. They compare with 77 units and 26,249 hp. in April, 1927, but the average month of 1927 provided 105 units and 38,577 hp. In 1926 the average was 113 units and 45,519 hp.

Austrian Steel Works Had Larger Output in 1927

VIENNA, AUSTRIA, May 10.—The report of the Austrian Alpine Montangesellschaft for 1927 shows an improvement compared with 1926, but no dividend was declared. Iron ore production increased about 46 per cent as a result of an agreement made last year for an exchange of ore for Westphalian coke. Output of ore in 1927 was 1,584,672 metric tons, compared with 1,087,086 tons in 1926. Pig iron production in 1927 totaled 430,256 tons, compared with 330,665 tons in 1926; steel ingot output was 365,117 tons, compared with 323,618 tons in 1926; and production of rolled products was 220,308 tons, compared with 195,857 tons in 1926.

The year showed a gross profit of 16,196,440 schillings ($2,287,747.15), which was 2,086,858 schillings ($294,768.69) more than in 1926. Total net profits for the year, however, were only 79,581 schillings ($11,240.82). The increase in gross profits is attributed partly to larger business, and partly to reductions in production costs. During 1927 the company employed an average of 12,033, compared with 14,687 in 1913.

Pig Iron Imports Increase Again

Imports of pig iron in April are reported by the Department of Commerce at 20,845 gross tons. This is an increase of 29 per cent over the 16,155 tons of March and is considerably more than double the incoming movement in April, 1927, which was 8923 tons. The current figure is the largest for any month since December, 1926. More than one-third of the total came from the United Kingdom and the Netherlands.

For the first four months of the year the imports have been 54,514 tons, compared with 30,158 tons last year. Most of the increase is from the United Kingdom, which has gained more than 20,000 tons during the interval. There was an increase of more than 10,000 tons in incoming shipments from India and a decrease of almost 7000 tons in pig iron from Germany, which has dropped to only 40 tons this year. The table shows the April tonnage in 1928 and 1927 and the first four months of each of those years.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	April		Four Months Ended April	
	1928	1927	1928	1927
United Kingdom	8,897	2,048	23,445	3,298
British India	4,196	2,149	16,962	6,723
Germany	....	285	40	6,881
Netherlands	5,204	3,636	10,733	9,281
Canada	54	271	378	575
France	....	....	....	298
Belgium	5	200	202	300
Norway	....	....	....	....
All others	2,489	334	2,754	2,802
Total	20,845	8,923	54,514	30,158

Trend of 1928 Profits

Net income of 225 general business corporations for the first quarter of 1928 was $341,000,000, compared with $318,000,000 in the first quarter of 1927, according to a statement prepared by the National Bank of Commerce, New York. This represents a gain of 7 per cent. The advance, however, is cut to 5 per cent when the United States Steel Corporation and General Motors Corporation are excluded. The significant advances in the first quarter in the individual groups were:

Number of Companies	Group	Advance (Per Cent)
18	Motor	28
8	Copper	28
13	Chain stores	18
9	Chemical	7
15	Motor equipment	6
23	Food manufacturing and allied	4

Among the groups whose earnings declined in the first quarter of this year from the first quarter of 1927 were:

Number of Companies	Group	Decline (Per Cent)
22	Petroleum	43
5	Railroad equipment	43
18	Iron and steel	20
11	Building materials	16

Earnings of 27 public utilities during the first quarter amounted to $88,000,000, compared with $77,000,000 last year, a gain of 14 per cent. The net operating income of 186 class I railroads during the first quarter was $217,000,000, a decline of 4 per cent from the $226,000,000 of the first quarter of 1927.

The Interstate Commerce Commission has dismissed the complaint of the Federated Metals Corporation, Newark, N. J., which alleged that the joint sixth-class rate of 22.5c. per 100 lb. on spelter from Newark to Sparrows Point, Md., is unreasonable.

The Interstate Commerce Commission has dismissed the complaint of the Virginia Pig Iron Association relating to rates on iron from Virginia furnaces to points in New England and other destinations north and east.

The Manufacture of Alloy Steel

(Continued from page 1532)

be checked for non-metallic inclusions by microscope and evenness of structure by hot acid etch, and must cut and harden satisfactorily."

Methods of Adding Alloys

The finishing stages of the heat are carefully checked by chemical methods, but the bulk of the work remains for skilled melting practice. The alloy heat is usually run at higher temperatures than commercial steels. The clean up is more thorough and the type of clean up is selected with relation to final use.

Conventional practice would be to add nickel as pig nickel with the scrap, while molybdenum is added after melting as ferromolybdenum or calcium molybdate. The oxidizable alloys—chromium and manganese—are added after deoxidation through the slag in the furnace as ferrochrome and ferromanganese. The vanadium, silicon and aluminum are added to the stream as it leaves the furnace going into the ladle.

Ingot Practice Must Be Good

To the writer the pouring of steel has always seemed the orphan of the steel business. The factors of temperature, nozzle size, pouring speed, mold design, solidification rate, sinkhead design and their relation to the various chemical compositions are very vaguely known.

Alloy steels are almost without exception killed steels. As such they are cast in sinkhead ingots. Considerable tonnage is cast in the big-end-up ingot. The volume of sinkhead is nearly 15 per cent of the gross volume of the liquid steel.

Extremes of care in pouring are well repaid. The ingot surfaces of special steels are unquestionably supersensitive and all precautions of clean molds and proper pouring practice are amply repaid in freedom from defects.

Slow Rolling in Smooth Rolls

The varied composition of alloy steels imposes on the rolling mill crew the definite routine of rolling from predetermined temperatures. The rate of conductivity is low and the heating time is long. Experienced optical pyrometer operators furnish temperatures to heaters both at pits and at bar mill furnaces. Specified time temperature cycles are furnished the heaters with the rolling order. These are checked and the 400 deg. Fahr. variation encountered daily in the various special alloy rolling indicated to the heaters. This method has found favor with the heater, since it insures him assistance in establishing himself without watching each lot during the rolling in order to judge temperature.

Smooth blooming mill rolls are essential. Reductions are lighter by half due to both lack of ability to bite the ingot and for the protection of the material.

The preliminary working breaks up the ingot structure and the subsequent rolling can be carried out under nearly normal commercial rolling practice. The skin of the ingot is sensitive and when broken the rupture has no tendency to heal. Every break in the surface means a defect to be removed from the billet by chipping or grinding.

On the whole, the most serious problem in the rolling mills is the wide variation of sizes that must be produced and the extremely small average quantity. The average tonnage order of alloy steel is less than ten tons. This entails a multitude of roll changes. The small average size of an order, coupled with the wide variations of characteristics, entails considerable scrap loss in starting orders.

Alloy Steels Like Old "Branded" Products

The skill of the maker is more important in the present stage of knowledge of the art than the quantitative chemistry. This means that alloy steels are really produced under routines, as were the old brand-named products. Engineering standards are gradually providing guides to replace the brands of old, but many years must elapse before technical knowledge will be competent to insure the producer of alloy steels that his product can be produced to specifications.

Fine Alloy Steels from Basic Open-Hearth

In discussing the above paper, W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, New York, emphasized the fact that an alloy is by no means a plain carbon steel to which one or more metallic elements have been added. In his opinion, the chemical composition is a minor matter; the manufacturer of the best alloy steels now must know the use to which the metal is to be put and works backward in order to plan a manufacturing routine which will give the necessary physical requirements such as strength, soundness, cleanliness, machineability, and responsiveness to heat treatment. This involves so many modifications in melting practice, alloying, casting and rolling routine, finishing temperature and annealing that alloy steel making is very much an art.

Mr. Priestley cited several changes in basic open hearth practice for making alloy steels which he believes brings the product much nearer to that of the acid open-hearth today than it was 15 years ago, particularly in reference to its freedom from laminations and transverse weakness. Among these are the use of higher manganese pig iron (1½ to 2 or even 2¼ per cent) and selected, clean, heavy, high-manganese scrap, thus insuring considerable residual manganese after melting and consequently metal with lower oxygen. Low iron oxide in the metal is also insured by melting with a heavy slag, high in lime and low in iron oxide. Further deoxidation is now more thoroughly accomplished by simultaneous additions of manganese (as spiegel or ferro) and silicon (as 10 or 15-per cent sili-

Born in Harvey, New Brunswick, Canada, early in 1878, Mr. Watson moved to Massachusetts in 1888. He was educated in the New Brunswick and Massachusetts public schools and in the Lawrence Scientific School of Harvard University, where he obtained the degree of B. S. in mining and metallurgy in 1900. After graduation he was employed in the Bessemer department of the Maryland Steel Co., Sparrows Point, Md., and in 1902 joined the metallurgical department of the Carnegie Steel Co. at the Homestead Works in Munhall, Pa., later becoming chief metallurgist of the department. He became second assistant general superintendent in 1908 and superintendent of the open-hearth department in 1911. While serving in this position he spent a winter in India in an advisory capacity to the Tata Iron & Steel Co. On his return from India in 1914, he was made assistant general superintendent, and in April of this year he became general superintendent.

con pig) which forms by reaction a fluid manganese silicate slag floating readily to the top. After such deoxidation, most alloys can be added directly to the metal in the furnace with very little loss by slagging or by changing into oxides entrapped in the metal. The latter are most dangerous to quality.

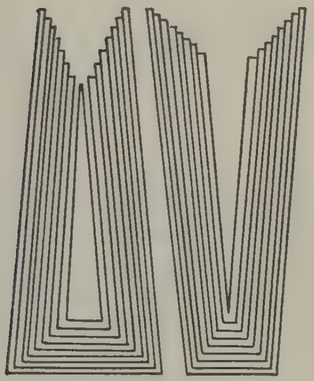
He is of the opinion that ferrochromium added in the ladle cannot make good steel. If added in the furnace after proper deoxidation of the bath, a high recovery *as metal* will be had. At least 25 min. should then be allowed before tapping. Final manganese for alloying should be made 10 to 15 min. before tapping. This stage of the heat cannot be hurried if steel of high quality is expected. Ferrozirconium and ferrosilicon are added in the ladle for protection during tapping and teeming.

Trend in Ingot Mold Design

BY RALPH H. WATSON

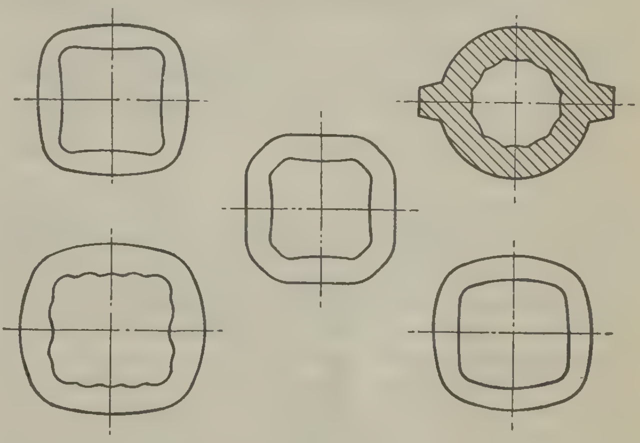
MOLTEN steel poured into an iron mold freezes in three distinct phases. The first is a very thin skin of fine-grained crystals. This is followed immediately by the well-known columnar crystals approximately perpendicular to the mold wall, which grow inward as long as influenced by the chill of the mold. They end rather abruptly, and the third phase, the formation of equiaxial crystals, completes the solidification. This crystallization, as well as the other two phases, takes place, as would be expected, roughly parallel to the walls of the mold and stool.

Crystal growth, both in the case of the columnar and the equiaxial crystals, is by the process of selective crystallization. The purer crystals separate out first, causing the mother liquor to be progressively enriched until the last to freeze carries a considerable enrichment of carbon, phosphorus, manganese, sulphur and other constituents of steel. This is segregation. Molten steel takes up more room than the metal solidified. The outer wall of the ingot is formed approximately at its final size while the interior of the ingot is still molten. The freezing is progressive from the outside. The final deficit in volume occurs along the central axis. This is pipe.



Theoretical Effect of Taper in Molds With Big End Down and With Big End Up (at Left)

Designs of Rolling-Mill Ingot Molds in Present Use (at Right)



How Taper Affects Freezing Conditions

The influence of taper on the freezing of the ingot is the starting point of any discussion of mold effect. A characteristic sketch (Fig. 1) shows the theoretical effect of taper in both the big-end-up and big-end-down mold. It is obvious that the converging lines of freezing metal will in the first shut the gate to the flow of metal from above, while in the second the larger mass of metal, and therefore the last to cool, is at the top where it can feed the shrinking mass below, and prevent pipe formation. There are modifying influences, otherwise the pipe in the ordinary ingot would be deeper than is actually the case.

Taper is given the mold for ease in stripping and to prevent the hanging of the ingot in the mold. An ingot suspended in the mold will often crack from its own weight or from being held by a fin between the mold and the stool. Formerly it was thought that a mold 70 to 76 in. long required a taper of 2 or even 3 in. Molds with this maximum taper are in present use.

Progressive mold manufacturers now recognize that good workmanship and rigid foundry equipment will permit them to make a mold with very little taper, which will successfully strip and not cause an ingot to hang. A difference of 1 in. in top and bottom dimensions is considered liberal, and full-length molds are in successful use with taper as low as ½ in., i.e., ¼ in. to the side.

Indeed, the necessity of any taper whatever is questionable. Shrinkage of the ingot and expansion of the mold will permit easy stripping without taper, unless the cross section is very small or the mold is more irregular than is now permissible. If a defect develops in the mold no amount of taper will avail, for the steel entering the defect must clear the point immediately below it. And the increase in cross section at this point, however great the taper, is infinitesimal.

Big-end-up molds for rolling mill ingots have been given considerable taper. This is undesirable from a rolling standpoint, and of doubtful necessity. One reason advanced for large taper is that the ingot through vertical shrinkage settles down nearer the mold walls, and receives more chilling effect from the mold. When the time required for full vertical shrinkage is considered, and also the fact that the ingot should never make complete contact with the mold and cause a hang, the chilling effect becomes doubtful.

A hot top should have heat insulating qualities sufficient to keep the contained steel molten for the necessary period. It should either release the ingot or itself sink with the contracting ingot, to prevent hanging. It should be made of a material which will not flake or spall when subjected to the heat of the stream when top pouring, thus introducing foreign matter into the ingot. It should leave on the ingot nothing that will subsequently melt in the soaking pits, and run down over the surface of the ingot. It should be easily applied to the mold, and not too costly. None of the tops in present use altogether meets these requirements.

[The author detailed several types and sections of molds in use, or with which he had experimented. He illustrated his paper with a number of charts showing (a) cooling effects of varying wall thicknesses in molds and (b) segregation in ingots poured in molds of varying sections and differing wall thicknesses. He paid particular attention to the question of corner radius for the ingot, mentioning "a rule adopted by Mr. Morris of Bethlehem for rectangular molds, to make the corner radius equal 13 per cent of the longest side, and for large molds somewhat less." Stools came in for discussion, particularly the dished stool, as making a lighter bottom crop.]

Avoiding Picking Up Dirt

HANDLING of the steel between the furnace and the ingot was referred to by R. S. Poister, metallurgical engineer, Pittsburgh, as a source of much trouble.

It is necessary to avoid such inclusions in the metal as are given by dirty runners or ladles. Steel picks up dirt by mechanical action and by chemical reaction. Splashes of metal on the side of the molds, which cannot be cleaned or melted off, were charged with responsibility for many snakes and scabs on the steel.

Carelessness in steel pouring, he said, is more in evidence than carelessness in steel making. Rapid pouring gives rise to oxidized steel. Splashing is worst in inverted molds. It is best to open up the stream slowly and then to give a full stream.

Sinkheads with volume at least 12 per cent of that of the ingot were advocated. This is for the purpose of keeping all of the pipe, and most or all of the segregation, above the junction between ingot and sinkhead.

Life of Molds vs. Pipes in Ingots

Large tapers on molds which are to be used with the small end up are designed for ease of handling, said Leo F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio. This gives long life to the mold, but a maximum of pipe to ingots of 0.30 per cent carbon and up. Decreasing the taper improves the quality of the steel.

Alloy steel makers have led in improvements along this line, because they do not dare risk heavy loss of their product, from cropping, rejections, etc., to save a smaller loss on the ingot mold. In general, it does not pay to sacrifice the surface of the ingot in lengthening the life of the mold. The mold is a useful addition to the open-hearth charge—its salvage value is large—and the expenses of chipping billets might easily prove a much greater loss.

Some of the Problems of Hot Tops

Referring to hot tops, Mr. Reinartz said that the ingot with the large end down, and with the hot top, is merely a compromise, even when the hot top holds 15 per cent of the steel. It contains more internal defects than are found in an ingot poured with large end up. Even with that method, however, for the soundest steel, hot top should be provided. Brick tops are easy to apply, but some of the brick follow the ingots into the soaking pits and cause trouble. Slag tops, if the steel happens to be pretty hot, are apt to fuse into it. Sand tops, in an iron mold, are the best form. But even these, on an ingot with the big end up, are not a panacea for all the steelmaker's ills. They cannot overcome or offset bad furnace or pouring practice.

Rimmed steel contains much more in the way of segregation than killed steel. But this does not necessarily mean poor steel. Many thousands of tons of perfectly satisfactory rimmed steel has been made, free from objectionable surface and other defects and suitable for deep-drawing sheets. With thin-walled molds, however, the blowholes are much closer to the surface on this steel than when it is poured into molds of more conventional wall thickness.

[*Abstracts of other papers will be published in later issues of* THE IRON AGE.]

Causes for Expanded Market for Stainless Iron

St. Louis Steel Treaters Hear Non-Technical Talk on Commercial Aspects and Uses of High-Chromium Irons and Steels

STAINLESS steel and iron was thoroughly discussed by J. C. C. Holding, manager American Stainless Steel Co., at a meeting of the St. Louis chapter, American Society for Steel Treating, held May 18. Under three major headings—history, characteristics and applications—the speaker made out a strong case for stainless iron and steel, emphasizing its resistance to corrosion and its growing use as indicated by an increase of 600 per cent in consumption in the past three years. He also stressed the desirability of a thorough understanding between producer and consumer about the use to which the material was to be put. The former must know not only the manufacture of the material, but also its properties, and he is in a favorable position to offer advice on the grade to supply for a stated need.

"It is foolish to think of stainless steel or stainless iron as an alloy of fixed chemical analysis which must, without modification, fit the requirements of all the various applications which enthusiasm for corrosion-resisting material suggests as desirable," said Mr. Holding. "In other words, instead of one fixed alloy, the stainless steel industry offers a range of alloys of varying physical, chemical, mechanical and corrosion-resisting properties. An article in a recent issue of THE IRON AGE (March 15, page 729) by Frank R. Palmer, of the Carpenter Steel Co., emphasized this point very strongly.

"As an illustration, a certain manufacturer was experimenting with stainless steel for carpenters' hand saws. It contained 0.70 per cent carbon, and he found that, while meeting certain tests admirably, the material was too brittle to permit setting the teeth of the saw without breaking. I had no hesitancy in suggesting that the material he was using was entirely too high in carbon. It should be understood that the introduction of chromium into the alloy makes it unnecessary to run the carbon as high as in ordinary carbon steel to produce the same hardness effects.

"The stainless characteristics also vary with varying conditions. The higher chromiums are more resistant than the lower chromiums, but this is not so simple, as it seems that the carbon present in the alloy has a direct effect both upon corrosion resistance and physical properties. If the carbon is above 0.12 per cent, the material should in all probability be heat treated to bring out its stainlessness.

"The whole theory of corrosion is very complicated. One theory holds that the particles known metallurgically as free double carbides of iron and chromium, which are not in solid solution in the iron, are responsible for a corrosive tendency, setting up electrolysis with the crystals of pure iron in which they are embedded. It thus appears that if the carbides are all in solution, in the presence of a sufficient amount of chromium, there is no electrolytic action causing corrosion. In a chromium steel containing upward of 0.12 per cent carbon the carbides are not all in solution unless the steel has been heated to certain high temperatures and quenched. That is why heat treatment of stainless steel improves its stainlessness. On the other hand, if the carbon content of the chromium steel alloy is low enough—under about 0.12 per cent—there are no free carbides of iron and chromium present even in its air-cooled conditions and, therefore, the material is practically stainless without heat treatment.

"The question arises, what makes stainless iron (low-carbon stainless steel) sometimes rust if the carbides are all in solution? In the heating and rolling operations more or less scale is always formed, and this is rolled into and embedded in the surface of the bar, plate or sheet as the case may be. The presence of this scale, in contact with metal underneath, produces a galvanic action similar to that described in untreated high-chromium steel. Therefore, when complete immunity to rust or stain is required, all scale must be removed from the surface and then the surface must be polished.

"It may be wondered why polishing is necessary, either in the high-carbon heat-treated material or the low-carbon untreated material, since neither is supposed to contain the injurious free carbides, and I am frank to say that this has not been fully or satisfactorily explained.

"One cause of occasional failure of stainless steel and iron to give satisfaction is the inclusion, during manufacture, of particles of slag, cinder or dirt. These impurities, when in contact with the iron, in the presence of moisture or other corrosive agencies, have the same tendency as the free carbides to set up electrolytic corrosion. It is, therefore, important that extreme care be taken in manufacture. At least one manufacturer has found it advisable to immerse his finished product in a dilute solution of nitric acid after fabrication.

"If stainless iron is subjected to severe fabricating operations, such as drawing or bending, the internal stresses set up are likely to cause corrosion unless these conditions are relieved after fabrication by suitable heat treatment. Some such treatment as this should also be resorted to after sand blasting."

Turning to the characteristics of a standardized grade containing approximately 0.30 per cent carbon and 12 to 14 per cent chromium, known commercially as stainless steel, Mr. Holding noted that this type was discovered by Harry Brearley, and its corrosion resistance, when properly hardened and free from scale, is remarkably perfect. But even this will not resist hydrochloric, sulphuric, sulphurous and hydrofluoric acids.

Continuing, he said, "The cutlery manufacturers find that it can be forged by the same general methods as used for high-speed steel. The technique is usually worked out by each fabricator in the light of his own experience. The same is also true of subsequent heat treatment to produce certain definite desired results. It is often stated that stainless steel cutlery will not hold an edge, and it is true that much of the stainless cutlery on the market does not hold its edge. The trouble is that many manufacturers do not realize that stainless steel cannot be treated exactly as carbon steel.

"The second type, known as stainless iron, contains less than 0.12 per cent carbon. It has a much broader application in industry and is the grade which has shown the largest growth in tonnage. This material, even in the annealed condition, is highly resistant to the most common corrosive agents. Its tensile strength at room temperature is approximately 80,000 lb. per sq. in., or very considerably higher than that of ordinary mild carbon steel. It also retains its high physical properties at elevated temperatures.

"Because of its toughness, stainless iron machines more slowly than ordinary steel, and speeds and tools must be adjusted accordingly. Automatic screw machines will turn out products of stainless iron without difficulty, but of course at reduced speed. When pressing stainless sheet steel, its toughness and high physical properties require adjustment in pressures and die clearances. In other words, a manufacturer cannot change over from ordinary sheet steel, sheet copper or sheet brass to stainless iron and expect it to run through his fabricating processes without change or adjustment in the details of his operations. Deep drawing or spinning requires maximum softness and a more careful anneal than ordinary hot-rolled sheets get.

"Another characteristic is comparative freedom from scale when heated to high temperatures. Stainless iron will lose very much less weight from such oxidation than straight carbon steel."

Proposed Increase in Rod Rates Not Justified, Says Examiner

WASHINGTON, May 29.—Proposed increased rates on iron and steel rods in carloads between points in Official Classification territory were held to be not justified and a recommendation was made that the schedules be canceled, in a proposed report by Burton Fuller, examiner of the Interstate Commerce Commission, announced last Thursday. Rates on steel bars in carloads from Pittsburgh and Johnstown, Pa., Youngstown, Ohio, Buffalo and North Tonawanda, N. Y., to Pawtucket and Valley Falls, R. I., were held to be reasonable, while rates on rectangular and hexagonal steel rods in carloads from McDonald, Ohio, to Pittsburgh, Carnegie and Economy, Pa., were found inapplicable to the extent they exceeded the billet rate and reparation was awarded in the latter case to the Carnegie Steel Co., the complainant.

The proposed report covers a number of cases and largely revolved about the question as to the classification of rods. The report placed them on the billet basis. Many iron and steel makers and consumers appeared in the case and joint hearings were held by the Interstate Commerce Commission with the State commissions of New York, Pennsylvania, Ohio, Indiana and Illinois. The examiner said that under recent decisions it is immaterial whether the rods, as described in the governing tariffs, be round, rectangular or hexagonal in cross-section. In what is known as the Standard Nut & Bolt Co. case the commission, in a decision of May 10, 1927, found that the rates from Pittsburgh, Johnstown, Youngstown, Buffalo and North Tonawanda to Pawtucket and Valley Falls on steel bars, variously described in the report and order as steel rods, wire rods, and hot-rolled unfinished steel, in straight lengths, in carloads, were not unreasonable but unjustly discriminatory and unduly prejudicial to the extent that they exceed the contemporaneous rates on the same commodity (rods) when shipped in coils. The railroads thereupon, by schedules filed to become effective Dec. 10, 1927, and later dates, proposed to increase the rates on the rods to the manufactured iron and steel basis, not only between the points involved in the Standard cases, but from and to all producing and consuming points in Official Classification territory.

Upon protest of numerous shippers and receivers of bars and rods these schedules were suspended as to interstate commerce until various dates ranging from July 9 to Aug. 24, 1928. Complainants in the Standard cases took the position that their raw material, when in straight lengths, not having been drawn through a die, comes within the tariff description of rods except that it is not in coils, and that the rates should be reduced to a basis lower than applies on their finished products and no higher than applies on their raw material when in coils. The railroads contended that under the decision they could no longer make a distinction between rods and bars and that their only alternative, if they were to avoid "appalling" losses of revenue, was to increase the rates on the rods to the manufactured iron and steel basis. The protestants maintained that there was no necessity for applying the same rates on the two commodities either by reducing the rates on bars or increasing the rates on the rods. They asked that the decision in the Standard cases be modified accordingly and that the schedules proposed by the carriers be found not justified and ordered canceled.

Examiner Fuller pointed out that about 4,000,000 tons of rods are produced annually, of which about 3,670,000 tons are used in the manufacture of wire and wire products, chains and rivets, and about 330,000 tons in the manufacture of bolts and nuts. Of the total production, about 2,000,000 tons, he said, are manufactured into finished products at point of origin, and about 2,000,000 tons moved by rail to some other point for such manufacture. The increases proposed by the carriers average about 35 per cent and amount to over $600,000 a year, it was stated. They would fall heavily on manufacturers who are not self-contained, the examiner said.

Standard samples issued or in preparation are covered by an eight-page supplement to circular No. 25 of the United States Bureau of Standards. This supplement replaces the one issued July 1, 1927, and includes 78 different samples.

Warehouses Seek Reasonable Profit

(*Continued from page* 1535)

Indianapolis, stated that his company had been able to cut out 700 small and unprofitable accounts without affecting its sales volume in dollars and consequent net profits.

Profits Lower in Southeastern States

As shown in the accompanying table, the net profits of 34 members of the association amounted to only 2.06 per cent in 1927 as compared with 2.42 per cent in the previous year. In presenting these figures, A. L. Philbrick, Congdon & Carpenter Co., Providence, R. I., chairman of the committee on the cost of doing business, pointed out that costs were higher in the district comprising New England, New York and New Jersey. In these States the net profits averaged 1.46 per cent in 1927 as against 1.20 per cent in 1926, while in the district made up of Pennsylvania and the States south of the Ohio and east of the Mississippi River profits amounted to 0.14 per cent last year and 0.49 per cent in 1926. In Ohio, Indiana, Illinois, Michigan and the States between the Mississippi and the Rocky Mountains, profits aggregated 3.88 per cent in 1927 and 4.96 per cent in 1926.

R. H. Welton, reporting for the adequate margins committee, pointed out that such low profits are largely the result of a number of slow moving lines for which warehouses do not ask a satisfactory price. Although most of the member companies were able to do a fairly satisfactory business on such lines as bars, shapes, plates, sheets, bands and bolts, nuts and rivets, other lines including concrete reinforcing bars, machine screws, twist drills, reamers, machine tools and hacksaw blades usually resulted in little or no profits.

Slight Improvement in Iron and Steel

THE report of the iron and steel committee, prepared by A. J. Bragg, Egleston Brothers & Co., Inc., Long Island City, N. Y., but read in his absence by the secretary, pointed out that competition with mills and with foreign steel had affected business adversely during 1927, but that business had improved during the last four months and seemed likely to be somewhat better during the greater part of the present year. Mr. Bragg stated that the establishment of quantity differentials by a number of warehouses in the East had improved conditions considerably and that a wider adoption of these principles would lead to continued betterment. He stated that sales methods were responsible for the unsatisfactory conditions in both warehouse and mill business and that a firm sales policy was the thing most needed to restore business to a paying basis.

A. J. Lockwood, Edgar T. Ward's Sons Co., Newark, N. J., chairman of the cold finished steel committee, said that the past year had been comparatively satisfactory in that line. He said that a new card of extras introduced last October on cold finished steel bars had been successful in a number of Eastern cities and might well be extended to include other lines. He added that some warehouses had allowed these differentials to apply on orders for various products, depending upon the total tonnage, rather than upon the tonnage of single products. He made a strong plea for cooperation among the warehouses in bringing about these improvements and stated that it was nearly as essential to be on good terms with one's competitors as with customers. Group meetings in large centers, Mr. Lockwood said, aid greatly in accomplishing this.

Further thought on this same subject was offered by Charles S. Clark, sales manager Burden Iron Co., Troy, N. Y., in a talk on "The Futility of Competition Within an Industry." Mr. Clark stated that science had created a new ethical situation in business and that such old slogans as "competition is the life of trade" are no longer applicable. "Competition," said Mr. Clark, "is war, and war is destructive." He emphasized the fact that competition in the form of high pressure distribution was robbing industry of the gains made possible through scientific low cost production.

Mills Willing to Aid Jobbers

STATING that one of the purposes of the National Association of Flat Rolled Steel Manufacturers is the establishment of better relations between the mills and jobbers, George H. Charls, president of this recently formed organization, pointed out that much of the present misunderstanding may arise from a lack of understanding as to who are jobbers and who are dealers. He admitted the need for strong jobbing companies in the steel industry and asked for their support in simplification work and other activities which his association is undertaking in an effort to place the flat rolled steel industry on a firmer basis.

The steel industry, said Mr. Charls, is facing one of the most serious crises in its history, and if prices are not soon stabilized on a profitable basis, a cut in wages would seem to be the only way out. Such a move would probably be extended to other industries

Profit and Loss Details per $100 of Sales of Iron and Steel Warehouses

	1927	1926	1925	1924	1923	1922
Sales	$100.00	$100.00	$100.00	$100.00	$100.00	$100.00
Less: Discount allowed	.83	.69	.74	.61	.59	.52
Net sales	$99.17	$99.31	$99.26	$99.39	$99.41	$99.48
Cost of goods sold	$74.82	$74.82	$75.66	$74.84	$73.94	$73.76
Discount on purchases	.99	.96	.99	.85	.89	.80
Net cost of goods sold	$73.83	$73.86	$74.67	$73.99	$73.05	$72.96
Gross profit	$25.34	$25.45	$24.59	$25.40	$26.36	$26.52
Deduct:						
Administrative expense	$7.70	$7.59	$7.53	$8.57	$7.21	$7.89
Warehouse and handling expense	5.30	5.09	4.95	5.93	5.39	5.07
Selling expense	6.42	6.37	7.13	6.89	5.75	6.88
Fixed charges	2.62	2.83	2.58	3.03	2.54	3.07
Miscellaneous expense	.62	.55	.65	.70	.57	1.02
Interest on borrowed money	.82	.83	.77	.53	.46	.69
Loss from bad debts	.72	.59	.51	.79	.63	.68
	$24.20	$23.85	$24.12	$26.44	$22.55	$25.30
Less: Interest received from customers on overdue accounts	.27	.19	.24	.21	.19	.21
TOTAL EXPENSE	$23.93	$23.66	$23.88	$26.23	$22.36	$25.09
Profit without miscellaneous income	1.41	1.79	.71	.83*	4.00	1.43
Add miscellaneous income	.65	.63	.70	.87	.67	...
Net profit	$2.06	$2.42	$1.41	$0.04	$4.67	$1.43
TURNOVER	3.17	3.08	3.35	2.87	2.84	2.69
Per cent of returned merchandise to sales	2.41	2.33	2.33	2.51	2.25	2.07
Number of members reporting	34	39	42	40	30	27

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*Loss.

and seriously undermine the country's prosperity. The industry, he said, has often attempted to establish profitable prices, but seems to lack the courage to hold to them.

The need for standardizing cutting charges on steel from warehouses was voiced by W. J. Holliday, Jr. He stated that many warehouses are using a system of cutting charges established 18 years ago and that the warehouses are not being properly compensated for the work at present. Now, the speaker pointed out, the cutting charges on small orders are less than those on large purchases, a condition which should be reversed. There is little profit on small orders and therefore the cutting charges should at least pay for themselves. Mr. Holliday advocated the placing of cutting charges on a uniform charge basis, and as a result of his talk it was moved that a committee be formed to draw up such a plan. The committee will report at the next meeting of the convention.

Hope for Warehouses in Differential Movements

The need for establishing quantity differentials by mills as well as warehouses was emphasized by Walter S. Doxsey, editor *Daily Metal Trade*, Cleveland. In a talk on "The Value of the Service Rendered by the Warehouse Distributer," he pointed out that the mills have already introduced quantity differentials on hot and cold-rolled strip steel and are giving serious thought to the extension of this scheme to other lines. "On the other hand," said Mr. Doxsey, "if the warehouses are to enjoy the sizable orders which they consider as justly theirs, because these orders are smaller than the theoretical minimum package of the mills, then the prices applying to these larger quantities should approach the mill price as the size of the order approaches the size of the smallest order the mill can handle effectively." In taking definite steps to establish these quantity differentials, the speaker stated that the warehouses, particularly in the East, have shown more aggressiveness and initiative than the mills.

Mr. Doxsey's paper followed the growth of the use of extras and discounts in various Eastern distributing centers during the last year. "Surely, with plans designed to make each order share its portion of the overhead," he went on, "in practice at Boston, Philadelphia and New York, no one can deny that the movement among jobbers to obtain a just return on the expenditures they are making for service is growing and expanding rapidly."

Compensating Salesmen

A plan for the compensation of salesmen on a profit-sharing basis, which is used by the Congdon & Carpenter Co., Providence, was outlined by G. M. Congdon. He stated that a straight salary basis gave salesmen little incentive to get business and that in many cases they only got credit for sales actually placed and not for preliminary efforts. Under the plan used by his company, the sales of each man were analyzed to find out what part was salary and what expenses and what part profits. Each salesman was then given a fixed percentage of his sales out of which his salary and expenses must be drawn. The remainder of this percentage is given to the salesmen as commission. Mr. Congdon stated that percentages were fixed individually according to territory and other conditions, and since the plan had gone into effect in 1922 not a percentage rate had had to be adjusted. In every case also the salesmen had been able to increase their incomes.

H. A. Sadler Made President

H. A. Sadler, Sioux City Iron Co., Sioux City, Iowa, was elected president of the association for the coming year. He served as first vice-president last year.

A. J. Lockwood, Edgar T. Ward's Sons Co., Newark, N. J., was named first vice-president; Robert H. Sanderson, E. P. Sanderson Co., Boston, second vice-president, and B. R. Sackett, Philadelphia, was reelected secretary-treasurer.

A. J. Dietrich, Dietrich Brothers, Baltimore, and L. S. Roehm, Roehm & Davison, Detroit, were made members of the executive committee for three years, and A. J. Bragg, Egleston Brothers & Co., Inc., Long Island City, was reelected to this committee for two more years.

Trends in Industry

April production of motor vehicles in Canada, as reported by the Dominion Bureau of Statistics, included 20,546 passenger cars and 3694 trucks. This compares with 7478 passenger cars and 2246 trucks in March and with 20,890 passenger cars and 3721 trucks in April of last year.

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Steel boilers to the number of 1325, with 1,295,170 sq. ft. of heating surface, were ordered in April, against 1247 with 1,337,116 sq. ft. in March, according to reports received by the Department of Commerce from 72 manufacturers. Of the April orders, 1301 boilers, with 1,246,852 sq. ft., were of the stationary type and 24, with 48,318 sq. ft., were marine boilers.

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Shipments in April of fire-extinguishing equipment are reported by the Department of Commerce at 84 motor-driven pumping engines, compared with 85 in March and with 89 a year ago. Except for March, the April shipments were the largest since last August. Seventeen pieces of motor apparatus, other than pumping engines, were shipped in April, the smallest number in more than a year.

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Industrial employment in Illinois declined 3.5 per cent in April according to statistics reported by the Illinois Bureau of Labor. Employment on building construction gained 15.2 per cent, and on road construction work 97.3 per cent. Foundries, furniture factories, printing shops, clothing establishments and meat packing plants employed fewer workers than in March.

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Industrial production showed a slight increase in April over March, as measured by consumption of electric energy by manufacturing plants. Figures gathered by *Electrical World* place April at 119.3, compared with 118.2 in March and with 116.9 a year ago. The base of 100 is the average for 1923-1925. For the first four months, 1928 showed 120.9 against 116.5 for 1927.

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Total apparent consumption of babbitt metal in April is reported by the Department of Commerce at 4,842,656 lb. This is slightly below the 4,927,634 lb. of March, but is a little above the 4,812,045 lb. of April, 1927. There has been a drop of 10 per cent in the first four months compared with last year. The recent total was 19,169,175 lb., against 21,330,334 lb. a year ago.

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Improvement in employment is recorded by the monthly labor barometer of the National Metal Trades Association. For April 632,663 employees were reported, compared with 619,966 in March and with 613,979 for April, 1927. The current figure is the highest for some months and is higher than for any of the early months of last year. Wages in February were slightly higher than in January.

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Estimated production of bituminous coal in the week ended May 19 is given by the National Coal Association as 8,200,000 net tons. This compares with Bureau of Mines figures of 8,392,000 tons in the preceding week and 8,174,000 tons in the first week of May.

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Production of electric power by public utility power plants in the United States in March is estimated by the Geological Survey at 7222 million kwhr. This compares with 6880 in February and 7265 in January. Except for January it is the largest total on record. About 61 per cent of the total in March was provided by the consumption of fuel, and 39 per cent by water-power, compared with 37½ per cent by water-power in January.

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Beehive coke produced in the week ended May 19 is estimated by the Bureau of Mines at 80,000 net tons, compared with 154,000 tons a year ago.

PURCHASING METHODS

Comments on the Recent Conference Between Buyers and Representatives of Sellers

IN a bulletin to members of the National Machine Tool Builders' Association, E. F. Du Brul, general manager, comments in part as follows on the recent conference in New York between purchasing agents and representatives of various industries which sell to them:

"All present at the conference were unanimous in condemning misrepresentations, deceit, lies, fraud, etc., used by some purchasing agents to beat down prices. The National Association of Purchasing Agents frowns upon these practices and does what it can through the promotion of business ethics to eliminate such illegitimate practices.

"One point strongly emphasized by all the purchasing officials present was that anxiety of sellers to get an order has more influence in the making of unprofitable prices than any act of purchasing agents. Often the purchaser does nothing more than to lay aside all proposals without saying a word to any of the would-be sellers, well knowing that some anxious seller is almost certain to make a reduction in the price previously quoted, even though his price was the lowest at the outset.

"A very common alibi of purchasing agents is to tell salesmen who have lost on the deal that their price was too high. It is also a very common alibi for a salesman who has lost an order to make the same statement in excuse for his losing it. The only remedy for this situation is for a development of actual facts concerning different transactions.

"The primary function of a purchasing agent is to procure goods that are needed by the company he represents. His secondary function, which, of course, is important, is to get the goods needed at the lowest price at which he can buy them. Of course both these things should be done in a strictly legitimate and honest fashion. For sellers, it is a painful and unpleasant fact that it is none of the buyer's immediate concern whether the seller is selling his goods at a loss or at an inadequate profit. Only in a remote and distant way need the buyer worry about the continuance on the seller's part of an unprofitable series of transactions, as long as there are other sellers ready to take the place of the one who puts himself out of business. The buyer might feel sorry to see the sellers do this, but the buyer cannot be expected to run the seller's business.

"Sellers very frequently feel that buyers ought somehow or other to insist on giving a price that would give the seller an adequate profit. This is letting personal feelings run away with common sense. The buyer certainly cannot be fully informed of the adequacy of profit of thousands of manufacturers making thousands of different articles with which the buyer has to deal.

"It was also brought out that buyers very frequently overstep the bounds of propriety when they argue that the seller's profit is too high. If the seller's losses are none of the buyer's business, as the conferees practically all agreed, then the size of the seller's profit is none of the buyer's business. The buyer should either take the seller's price or leave it, whether that price produces a large loss or a large profit. But if a given seller told some buyers that the size of his profit was none of their business, many buyers would allow their hurt feelings to influence them to cross such a seller off their lists. Of course, in doing this they are just as illogical and unbusinesslike as the seller who thinks that the buyer ought to be concerned with keeping the seller in business.

Facts the Best Basis for Buying or Selling

"The conferees agreed that facts form the best basis for sound conclusions in either buying or selling. The buyer must test the market. He cannot simply take the first offer that is made and be sure that it is the lowest possible price. It is unfortunate that few sellers give their best prices immediately, and then stand pat on that price. Consequently the buyer cannot be blamed for trying any fair means to learn the actual price that he will have to pay for goods of a given quality.

"If sellers were to adopt a one bid policy and stick to it, both the buyer's and seller's jobs would be greatly simplified. Transactions would be conducted with much more speed and less expense than is now necessary due to jockeying and testing. It was recognized that it is up to the sellers to adopt a policy and that the buyers can only recommend it.

"The conferees all agreed that reliable information as to prices at which transactions are made is extremely desirable to both parties. The conferees generally were of the opinion that if the sellers of a given commodity were to have post mortems after deals were closed, they would develop the actual facts of a transaction. Post mortems would be good for sellers and certainly would be good for the fair purchasing agent. All the facts of price, terms, statements of purchasing agents as to other prices, etc., should be laid on the table at such post mortems. The sellers would then discover which purchasing agents were indulging in illegitimate practices and the sellers' whole industry could be put on their guard against such men. The sellers would also have actual prices on closed transactions.

"It was the general opinion that if manufacturers, wherever possible, were to establish list prices for their goods and were to stick to their published lists and discounts, without deviation, as is done in many cases, the situation would be vastly improved. The purchasing agents would be saved much time that they now spend checking and rechecking prices under the system where the seller himself puts in a later bid lower than his original bid. When one seller has done this, the purchasing agent must necessarily further test the market to see which others had not given him the best price in the beginning of the transaction. All of this takes time and money for sellers, as well as buyers.

"It is also recognized that one great difficulty comes from sellers who do not have definite information regarding their own costs. Sellers who have the best cost systems also seem to have the most executive backbone when it comes to making or maintaining their prices. The price cuts of competitors do not greatly affect the price policy of the well-informed executive."

Comparative Tests on Hollow Staybolt Bars

Tests made on hollow staybolt bars of electric steel, recently made by the Old Dominion Iron & Steel Corporation, Richmond, Va., afford a comparison between carbon steel bars and nickel steel bars. The averages in tensile strength gave the nickel steel an advantage of about 6 per cent over the carbon steel, with a slightly greater advantage in the elastic limit. This was at the expense, however, of elongation, in which the carbon steel showed an advantage of about 7 per cent over the nickel steel.

Nickel steel, however, gave a greatly increased resistance in the vibration test, in which 89,248 vibrations were withstood, against only 53,923 in the carbon steel. In both cases of vibration tests, which were made under as nearly the same conditions as possible, the bolt was subjected to a longitudinal pull of about 4000 lb., which is about 12 per cent of the pull required to develop the elastic limit. The number of vibrations represents in each case complete revolutions.

Particulars of the two steels and of the test results are shown in the table. The bars were nominally of 1 in. outside diameter, with a 3/16-in. hole rolled in them. Each bar was a trifle over-size.

RESULTS OF TESTS ON STAYBOLT BARS

Averages	Carbon Steel	Electric Steel
Elastic limit, lb. per sq. in....	41,555	44,405
Tensile strength, lb. per sq. in.	58,165	61,445
Elongation in 8 in., per cent...	31.5	29.75
Reduction of area, per cent...	55.2	55.85
Vibrations withstood.........	53,923	89,248
Chemical analysis (percentages)		
Carbon	0.10	0.09
Manganese	0.32	0.28
Phosphorus	0.065	0.044
Sulphur	0.060	0.055
Nickel	...	1.59

Machinery Markets and News of the Works

SALES ON THE DECLINE

Machine Tool Business in May Will Fall Below That of April

Chicago Trade Expects Release of Orders Against Deere & Co. List Before June 1—General Electric Co. Inquires for 16 Tools

THIS week there is further evidence of the decline in machine tool sales. The falling off has been gradual, but with three-quarters of the month gone it is now certain that the total volume will be 10 per cent or more on the average below that of last month.

In the Chicago district it is estimated that sales for the month will not be more than two-thirds of the April total, but there is a possibility that orders may be released before June 1 by Deere & Co. against their recent large inquiry. Cincinnati machine tool builders report a decline for May of not less than 10 per cent.

In the East, the outstanding inquiry is that from the General Electric Co. for 16 tools. The Wright Aeronautical Corporation continues to buy.

Much of the current activity is in purchases by industrial companies in diversified lines. The automobile industry and the railroads are contributing a relatively small proportion of the month's business. Changes in models by some of the Michigan automobile companies have not yet created any special demands for machine tools, other than one order totaling about $50,000 placed with a Cincinnati company.

Evidence of the large use of existing machine tool equipment is reflected by a steady stream of orders for repair parts.

New York

NEW YORK, May 28.

INQUIRY for machine tools is smaller than for some time, but there is still a fair volume of business not yet closed. In addition to its inquiries for various service stations, the General Electric Co., Schenectady, has issued a list of about 16 tools, including turret lathes, punches and other plate working equipment for Schenectady, Pittsfield and Chicago. The Wright Aeronautical Corporation, Paterson, N. J., continues active in the purchase of tools, both new and used.

No further railroad inquiries have appeared to add to the lists from the New York, New Haven & Hartford, New York Central and Erie railroads. The New Haven is reported to be awaiting an appropriation before taking further action. The list of the Erie Railroad, which includes planers, lathes, shapers and drills for Meadville, Pa., and Port Jervis, N. Y., is still pending. The New York Central has a number of separate inquiries in the market and has closed on several tools in the past week.

Contract has been let by Bayonne Steel Ceiling Co., 223 West Nineteenth Street, New York, to Wilcox Construction Co., Inc., 1 Bridge Plaza, Long Island City, for new two-story plant at Long Island City, to cost about $85,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect.

Bids will be received by superintendent of lighthouses, Staten Island, N. Y., until June 6 for approximately 7000 lb. steel castings as required during period July 1-Dec. 31, 1928, proposal 27089; also for about 20,000 iron castings required during same period, proposal 27095; until June 11 for 37 acetylene buoy bodies, proposal 27040.

Glick & Duma, 400 East Fordham Road, New York, architects, have filed plans for two-story automobile service, repair and garage building, 100 x 131 ft., to cost about $100,000 with equipment.

National Carbon Co., Inc., 30 East Forty-second Street, New York, manufacturer of electric batteries, etc., will expand production to include radio receiving sets and kindred apparatus at Long Island City and Cleveland plants.

Board of Contract and Supply, City Hall, Albany, N. Y., has approved plans for municipal airport at Colonie, with hangars, repair shops, oil storage and distributing buildings, and other structures, to cost in excess of $80,000 with equipment.

Packard Motor Car Co., Broadway and Sixty-first Street, New York, plans removal of its central service, repair and distributing plant at Long Island City to new eight-story structure on Eleventh Avenue, between Fifty-fourth and Fifty-fifth Streets, for which plans were recently drawn. New building will total about 360,000 sq. ft. floor space and will cost close to $1,000,000.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, have completed plans for two-story automobile service, repair and garage building, 130 x 132 ft., to cost close to $140,000 with equipment.

Erie Railroad Co., 50 Church Street, New York, will make extensions and improvements in engine house, shop facilities and coach shop and yard at Cleveland, to cost close to $200,000. R. S. Parsons is chief engineer.

Board of Education, Ticonderoga, N. Y., is considering installation of manual training equipment in new two-story high school to cost close to $300,000. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Stern & Peyser, 12 East First Street, Mount Vernon, N. Y., architects, have filed plans for a two-story automobile service repair and garage building, to cost $100,000 with equipment.

Board of Education, City Hall, Paterson, N. J., will take bids at once for three-story addition to vocational school at Ellison and Summer Streets, to cost approximately $115,000.

International Safety Razor Corporation, Lester Avenue, Bloomfield, N. J., is disposing of stock issue to total $1,900,000, a portion of proceeds to be used for expansion.

Refractory Engineering Co., 50 Church Street, New York, manufacturer of high temperature cements, etc., with plant at Red Bank, N. J., has leased a building at Bayway, Elizabeth, N. J., for new factory, and will remove works from Red Bank to new location and increase capacity.

Whittier Lumber & Millwork Co., 415 Adams Street, Newark, has leased three-story and basement building at 27-49 Haynes Avenue, totaling about 40,000 sq. ft. floor space, and will remodel for manufacture of sash, doors, cabinet work, etc.

Automotive Standards, Inc., 2061 Broadway, New York, manufacturer of automobile equipment, has purchased plant at Newark, comprising group of buildings on 4-acre tract of waterfront property, and will occupy at once for new works.

A. R. Newcombe Corporation, 683 Broadway, Kingston, N. Y., A. R. Newcombe, president, oil products, plans construction of new oil storage and distributing plant at New Hamburg, N. Y., to cost approximately $80,000 with equipment.

Hartmann Corporation, 81 West Main Street, Somerville, N. J., has been formed to do repair work of Hartmann Hardware & Supply Co. at same address. Plant is fully equipped and activity is being confined to heating, plumbing and sheet metal work.

Wendel Co., Inc., 155 Badger Avenue, Newark, has been organized to make wood and steel curb signs under special patent. Company has fully equipped plant, but is in market for tubing, flat bands, cap nuts and bolts.

Aerocrete Products Co., Inc., Albany, N. Y., has been formed to manufacture aerocrete fireproof building materials under patents of Aerocrete Corporation of America, 51 East Forty-second Street, New York. Company is planning erection of factory in Albany and construction work will be under direction of Russell S. Greenmen, 108 Steuben Street, Albany. Frank M. Williams, Standard Building, Albany, is president of new company.

Eagle Metal Products Co., 508 North Eleventh Street, Newark, has been formed to manufacture sheet metal products, principally radiator cabinets and shields. It has fully equipped plant where all construction and laquering is handled.

McMyler-Interstate Co., Bedford, Ohio, builder of locomotive cranes, hoisting and conveying machinery, has moved its New York sales office from 233 Broadway to room 1710, Grand Central Terminal. George T. Sinks continues as New York district sales manager.

Utica Drop Forge & Tool Co., Utica, N. Y., has acquired business of Arrow Wrench Co., Hammondsport, N. Y., and will remove equipment to Utica plant.

J. H. Gautier & Co., 1 Greene Street, Jersey City, manufacturer of crucibles, refractories, etc., whose plant was recently reported damaged by fire to extent of $75,000, states that this figure is considerably exaggerated. Very little equipment was lost, the boiler house was not touched by fire and no loss was sustained in crucible department. Company has resumed operations.

Chicago

CHICAGO, May 28.

SALES of machines tools in this district show a further decline and it is now generally estimated that the total volume of business in May will not exceed two-thirds of that booked in April. One bright spot, however, is the possibility of a release of orders before June 1 against the large list prepared by Deere & Co. for its Illinois and Iowa plants. Fresh inquiry from the railroads includes a butt welder from the Missouri Pacific and 16 12 x 3 x 1¾-in. duplex motor-driven floor grinders from the Rock Island.

Orders against the Santa Fe list have not been numerous and have not been received in as large a volume as had been anticipated by the trade a week ago. Among machine tools bought the past week by this railroad are two engine lathes and several hydraulic presses. A pump manufacturer has closed for a 16-in. x 6-ft. lathe. Taken as a whole, this has been a dull spring from the standpoint of railroad purchases. On the other hand, manufacturers of farm machinery have taken an unusually large number of tools and a fair number of orders have come from automobile and radio parts manufacturers who have need of punch presses. Many shoppers are looking for used equipment, but sales are not in proportion to inquiry.

Plans are being considered by Nehring Electrical Works, Inc., DeKalb, Ill., for rebuilding of portion of factory recently destroyed by fire, with loss reported in excess of $125,000 including equipment.

Commonwealth Utilities Corporation, Colorado Springs, Colo., is planning construction of 44,000-volt transmission line to municipal airport and vicinity, to cost more than $30,000.

Northwestern Barb Wire Co., Sterling, Ill., is considering rebuilding portion of plant recently destroyed by fire, with loss close to $300,000 including equipment.

Deere & Co., Inc., Third Avenue, Moline, Ill., manufacturer of agricultural and farming machinery, will soon take bids on general contract for six-story branch plant at Waterloo, Iowa, to cost about $175,000 with equipment. M. Sklovsky, company engineer, address noted.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of corrugated boxes and containers, has purchased local paper board plant of Robert Gair Co., known as Chicago Coated Board Co., East North Water Street, and will operate in connection with expansion program.

Signal Corps., Procurement District, Chicago, will receive bids until June 5 for electrical supplies, including magnet wire, 1000 cable racks, 1000 hot galvanized hooks, etc., circular 104; 100 electric soldering irons, switches and cable terminals, circular 103.

Board of Education, 650 South Clark Street, Chicago, plans installation of manual training equipment in new junior high schools, each to cost $1,500,000, located at Essex Avenue and Eighty-second Street; Carmen and Christiana Avenues; Fullerton and Linder Avenues, and Foster Avenue and North Robey Street, respectively, for which plans are being drawn by John R. Christensen, school architect, address noted.

W. L. Soens, Durango, Colo., and associates have applied for permission to construct and operate a hydroelectric power plant in this section for service at Bayfield, Ignacio and vicinity, to cost upward of $200,000 with equipment.

W. M. Oates, secretary, Northern Normal and Industrial School, Aberdeen, S. D., is asking bids until June 8 for one 375-hp. boiler and auxiliaries for proposed boiler plant; specifications on file at Builders' Exchange, Minneapolis and St. Paul, Minn., and at school, Aberdeen.

Board of Education, Fairmont, Minn., is considering installation of manual training equipment in new three-story high and grade school to cost $300,000, for which bids will soon be asked on general contract. George Pass & Son, Ekle Building, Mankato, Minn., are architects.

Hudson Mfg. Co., Minneapolis, manufacturer of sheet metal products, farm equipment and garden tools, has purchased the William Warhock tank manufacturing plant at Sioux City, Iowa.

Philadelphia

PHILADELPHIA, May 28.

CONTRACT has been let by Walker Brothers, 620 South Delaware Avenue, Philadelphia, manufacturers of electrical equipment and supplies, to F. G. Stewart, 1520 Locust Street, without competition, for a one-story factory at Spring Mill, Pa., to cost about $70,000 with equipment.

Eugene A. Stopper, 10 South Eighteenth Street, Philadelphia, architect, has awarded general contract to Murphy-Quigley Co., 1518 Sansom Street, for two-story and basement service, repair and garage building, 70 x 130 ft., to be occupied under lease by Sentman Motor Co., Fifty-eighth and Walnut Streets, to cost about $100,000 with equipment.

Board of Education, Keystone Building, Philadelphia, will receive bids until June 5 for steel lockers and other school equipment. William Dick is secretary and business manager.

Max Levy & Co., 220 Roberts Avenue, Philadelphia, manufacturers of photo-engravers materials and supplies, have plans for three-story addition, to cost more than $45,000 with equipment. LeRoy B. Rothschild, 215 South Broad Street, is architect.

American Feldspar Co., Toughkenamon (Chester County), Pa., is considering rebuilding portion of plant destroyed by fire May 21, with loss reported at $50,000 with equipment.

Bellanca Aircraft Corporation, Tottenville, Staten Island, N. Y., plans to remove local plant to new works now in course of construction near New Castle, Del., and will provide considerable additional equipment. Staten Island works will be entirely discontinued. New Castle plant is reported to cost more than $75,000 with equipment.

Hahn Motor Truck Co., 40 East Walnut Street, Allentown, Pa., has asked bids on general contract for a new two-story service and repair works at Shamokin, Pa., to cost approximately $45,000 with equipment.

Board of Education, Manheim, Pa., is considering installation of manual training equipment in two-story and basement senior and junior high school to be erected at Neffsville, to cost in excess of $200,000 with equipment. H. Y. Shaub, 20 North Queen Street, Lancaster, Pa., is architect.

Pennsylvania Power & Light Co., Allentown, Pa., has organized nine subsidiary companies to construct and operate transmission lines and stations in different parts of Lycoming and Dauphin Counties.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines and parts, will develop maximum capacity at plant. Contract has been secured from Stewart Motor Truck Co., Buffalo, for motor requirements for period of a year. Company has been carrying out expansion program to cost more than $350,000.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has work in progress on new engine house and additions to locomotive and car repair shops at Wilmington, Del., and is scheduling completion in August. It is proposed to remove present car repair shops at Pavonia yard, Camden, N. J., to new location, with additional equipment. Trenton, N. J., shops are also being considered for similar removal to Wilmington plant, where repairs will be concentrated for this district in future. Entire program is reported to cost more than $175,000 with equipment. R. J. Bennett is general superintendent of motive power.

Board of Education, Trenton, N. J., has plans nearing completion for new central senior high school to cost more than $2,500,000, and contemplates manual training department. Bids will be asked on general contract soon. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Hanover Engineering Co., Hanover, Pa., manufacturer of isolated electric lighting equipment, etc., is arranging for early erection of one-story addition, 125 x 200 ft., to cost in excess of $50,000 with equipment.

Giant Mfg. Co., Muirheid Avenue, Trenton, N. J., has been formed to manufacture playground apparatus, swimming pool and bathing beach equipment, flood light projectors and other products. Company will be in market for pipe, angles, tees, channels and bar stock and black and galvanized sheets.

Detroit

DETROIT, May 28.

PLANS are being completed for two-story manual arts building at central high school, Pontiac, Mich., for Board of Education, to cost close to $100,000 with equipment. Childs & Smith, 720 North Michigan Avenue, Chicago, are architects.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has filed plans for five-story addition, 180 x 365 ft., to cost more than $130,000 with equipment.

Unit Corporation of America, Inc., Milwaukee, recently organized to take over and consolidate a number of companies in heavy machinery lines, is planning for removal of plant of Universal Power Shovel Co., 15841 Second Avenue, Detroit, one of its subsidiaries, to works of Fuller & Sons Mfg. Co., Kalamazoo, Mich., manufacturer of automobile gears, etc., another unit in merger, where new buildings will be made available. Production will be increased at new location.

Burroughs Adding Machine Co., 6701 Second Avenue, Detroit, has awarded general contract to Corrick Brothers, Owen Building, for a one-story top addition to factory unit on York Street. Albert Kahn, Marquette Building, is architect and engineer.

Sparks-Withington Co., Jackson, Mich., manufacturer of automotive appliances, radio equipment, etc., is planning for new preferred stock issue to total $1,000,000, a portion of proceeds to be used for expansion.

City Council, Pontiac, Mich., will establish a municipal airport, with hangars, repair and reconditioning shops, oil storage and distributing plants, etc., for which an appropriation of $180,000 has been approved.

Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, architects, are preparing plans for six-story automobile service, repair and garage building, to cost in excess of $400,000 with equipment.

Perfection Stamping Co., Inc., 743 Beaubien Street, Detroit, has been organized to manufacture steel stampings for automotive industry. Company is already producing stampings and expects to build its own plant within six months.

Consolidated Brass Co., Detroit, has been formed as merger of American Carburetor & Brass Co. and Sterling & Skinner Mfg. Co., both of Detroit, to manufacture brass goods. No new equipment will be required.

Gulf States

BIRMINGHAM, May 28.

PLANS are being arranged by Texas Co., Houston, Tex., for extensions in pipe lines to cost more than $3,000,000, including 50-mile line between Dallas and Corsicana, Tex.; new line from Louisiana-Arkansas fields to Port Arthur, Tex., and 150-mile line from Gray County field to Electra, Panhandle, Tex., and vicinity. Company will increase facilities at Port Arthur oil refining plant to handle 10,000 bbl. additional per day. Headquarters are at 17 Battery Place, New York.

Gentile Brothers Packing Co., Haines City, Fla., plans construction of cold storage and refrigerating plant in connection with proposed fruit canning factory, entire project to cost approximately $100,000 with machinery.

Clarke Garage Co., Inc., New Orleans, care of Favrot & Livaudias, Hibernia Bank Building, architects, has plans for four-story service, repair and garage building, 90 x 120 ft., to cost about $165,000 with equipment.

United Gas Co., Houston, Tex., operating Houston Gulf Gas Co., Dixie Gas & Utilities Co., South Texas Gas Co., and other natural gas properties, is disposing of a new stock issue to total $2,500,000, a portion of proceeds to be used for expansion and improvements.

Beaumont Import & Export Co., Perlstein Building, Beaumont, Tex., is planning construction of lumber and wood-working mill on 14-acre tract in Van Wormer district, to cost $80,000 with equipment. John W. O'Shaughnessy is general manager.

Texas Gas Utilities Co., Gunter Building, San Antonio, Tex., is planning construction of pipe line, about 35 miles, to cost approximately $100,000. It is purposed to install additional lines later totaling about 200 miles. Earl Camp is construction engineer for company.

Common Council, Collinston, La., is asking bids until June 12 for waterworks machinery, including pumping equipment and accessories, elevated steel tank and tower, steel water pipe and fittings, etc. Henry A. Mentz, Hammond, La., is consulting engineer.

United States Engineer Office, Fourth Mississippi District, New Orleans, will receive bids until June 6 for one electrically-operated air compressor, complete with accessories, circular 265; until June 4 for two electric-driven winches with special controls for remote operation, circular 259.

Texas-Louisiana Power Co., Pecos, Tex., has arranged for bond issue of $1,700,000 and preferred stock issue of $1,000,000, a portion of proceeds to be used for expansion, including acquisition of plants and properties of Texas-Gulf Power Co. An extension program will be carried out at Pecos power plant, including installation of three 1250-hp. generating units and auxiliary equipment, and further additions later; extensions will be made in transmission lines.

Board of Education, San Angelo, Tex., will soon begin superstructure for two-story vocational school, to cost about $70,000 with equipment; portion of structure will be used as cafeteria for students. Phelps & Dewees, Gunter Building, San Antonio, Tex., are architects.

Board of Education, Montgomery, Ala., plans installation of manual training equipment in new three-story high school to cost about $950,000, for which bids will be asked on general contract early in June. Frederick Ausfeld, Shepherd Building, is architect.

Cleveland

CLEVELAND, May 28.

MACHINE tool business was light the past week and there is not much new inquiry. Sales by most manufacturers and dealers during May will show a little falling off, as compared with April. Orders are from scattered sources and few are for more than single machines. The market is very dull in Detroit, where there was some activity recently. Summer changes in models by several automobile companies do not seem to have caused much of a demand for new equipment.

The Standard Tool Co., Cleveland, has purchased two 2¼-in. automatic lathes. The recent inquiry from the Erie Railroad included a 90-in. journal turning lathe for its Meadville, Pa., shops. This railroad is also inquiring for material-handling equipment.

Ohio Steel Foundry Co., Lima, Ohio, has placed a contract with the H. K. Ferguson Co., Cleveland, for a foundry addition 53 x 253 ft., to cost $75,000. A 10-ton electric traveling crane a jib crane and additional equipment will be installed.

Paper & Textile Machinery Co., Sandusky, Ohio, will erect an addition 40 x 200 ft., of steel and concrete, at an estimated cost of $200,000. It will be used for demonstration of new Millspaugh suction roll process of making paper, which is stated to be a radical departure from present paper manufacturing methods.

Plans are being drawn by Board of Trustees, Case School of Applied Science, Cleveland, for four-story and basement laboratory, 50 x 220 ft., with machine shop and other mechanical divisions to cost about $250,000. Wilbur Watson & Associates, 4614 Prospect Avenue, are architects.

Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, has plans under way for new units to cost close to $1,000,000 with machinery. Lockwood, Greene & Co., Hanna Building, Cleveland, are architects and engineers.

Williams Alloy Products Co., Elyria, Ohio, manufacturer of automobile bearings, recently reorganized, is completing plans for one-story addition, to cost about $30,000 with equipment. New furnace and accessory apparatus will be installed.

Superior Gas Engine Co., Springfield, Ohio, has merged with National Supply Co., Toledo, Ohio, manufacturer of gas and oil well equipment and supplies. Both companies will continue plants as heretofore and there will be no change in identity of either organization.

Crane Co., 836 South Michigan Avenue, Chicago, will soon take bids on general contract for new factory branch and distributing plant at Cleveland, to cost about $75,000 with equipment. Howell & Thomas, 3868 Carnegie Avenue, are architects.

Monitor Sad Iron Co., Big Prairie, Ohio, manufacturer of gas and gasoline irons, will rebuild portion of plant destroyed by fire May 22, with loss reported at more than $25,000 including equipment.

Thomas Stoker, Inc., Cleveland, recently formed to manufacture automatic furnace stokers, will operate a plant at 5906 Park Avenue, S. E. Charles Thomas is head.

Indiana

INDIANAPOLIS, May 28.

CONTRACT has been let by Truck Engineering Co., East Pontiac Street, Fort Wayne, Ind., manufacturer of motor truck equipment, to Buesching-Hagerman & Co., 402 East Superior Street, for one-story addition, 60 x 100 ft., to cost close to $24,000. Guy Mahurin, Standard Building, is architect.

Evansville Ice & Storage Co., 10 North Eighth Street, Evansville, will ask bids early in June for new two-story cold storage and refrigerating plant, to cost about $65,000 with equipment.

Board of Trustees, Indiana University, Bloomington, has approved plans for extensions and improvements in three-story power plant, 21 x 50 ft., to cost about $50,000 including equipment. Robert F. Daggett, Continental Bank Building, Indianapolis, is architect.

Meridian Service Co., 52 West New York Street, Indianapolis, is completing plans for one-story service, repair and garage building, to cost about $40,000 with equipment. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

Board of Works, Hobart, Ind., is said to be planning installation of pumping machinery and other power equipment, tank, etc., in connection with proposed municipal water plant to cost about $200,000. J. Gregg, Hobart, is engineer.

Hoosier Lamp & Stamping Corporation, Evansville, has been organized and has purchased plants of F. W. Goedeke Metal Stamping Works, 213 Goodsell Street, and Hoosier Lamp Works, Eighth and Division Streets, both at Evansville. New company will operate both plants separately, manufacturing steel stampings, particularly pressed steel stove parts, at Goedeke works, and metal lamps and occasional wrought iron furniture at Hoosier plant. Additional floor space will soon be required at Goedeke works and new equipment will probably be needed. F. W. Goedeke, former owner of plant bearing his name, is retiring from active management but retains interest in new firm. T. J. Morton, Jr., is president of new company; C. Nelson Smith, vice-president; Daniel Wertz, secretary, and R. J. Morton, Sr., treasurer.

St. Louis

ST. LOUIS, May 28.

BIDS are being asked by Board of Public Service, St. Louis, O. D. Tillay, secretary, until June 5 for installation of pneumatic conveying system in coagulent station, Missouri River plant, municipal waterworks, contract 3197.

N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of plumbing equipment and supplies, has engaged P. J. Bradshaw, 718 Locust Street, architect, to prepare plans for new unit largely for storage and distributing service, to cost close to $200,000 with equipment.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., has plans for power plant at Emporia, Kan., 60 x 92 ft., to cost upward of $50,000 with equipment. E. A. Harrison, company headquarters, 80 East Jackson Boulevard, Chicago, is architect.

Board of Education, Board of Education Building, St. Louis, contemplates installation of manual training equipment in two-story central high school to cost $700,000, for which plans will be drawn by R. M. Milligan, Board of Education Building, architect.

Missouri Power & Light Co., Kansas City, Mo., has applied for permission to issue bonds for $1,500,000, a portion of proceeds to be used for expansion, including transmission lines.

Laclede Packing Co., Prairie Avenue and Lucky Street, St. Louis, will soon begin construction of power house, 48 x 55 ft., to cost close to $30,000 with equipment. Koerner Engineering Co., Syndicate Trust Building, is engineer.

Ward Furniture Mfg. Co., 1200 North First Street, Fort Smith, Ark., has awarded general contract to John R. Murphy, 1504 South P Street, for two-story addition, 40 x 100 ft., to cost about $45,000 with equipment.

Empire District Electric Co., Joplin, Mo., has applied for permission to construct and operate a hydroelectric generating plant on White River, to cost more than $650,000 with transmission system.

Associated Motors Terminal, Inc., 117 South Broadway, St. Louis, will soon begin erection of six-story service, repair and garage building, 80 x 105 ft., to cost $225,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in three-story and basement plant, 130 x 132 ft., to be erected by General Baking Co., 342 Madison Avenue, New York, at Oklahoma City, Okla., to cost upward of $150,000. Archer & Gloyd, Pioneer Trust Building, Kansas City, Mo., are architects.

Parsons Foundry & Machine Works, Sterling, Kan., is completing plans for one-story and basement addition, including improvements in present plant to cost close to $19,000.

Cincinnati

CINCINNATI, May 28.

SOME machine tool builders report that this month's business has closely paralleled that of April, but others state there has been a slight recession. In the volume of fresh orders for the entire market, however, May probably will show a decline of about 10 per cent. Operations in local plants continue on a moderate scale and not much change is anticipated in the near future. The New York Central has bought two engine lathes from a Cincinnati company, while an automobile maker has placed an order for special machines, amounting to more than $50,000, with a manufacturer in this district. Several machine tool executives have commented on the increased demand for repair parts.

Dayton Airplane Engine Co., 1246 Leo Street, Dayton, is now in production on air cooled airplane engines. R. R. Grant is president and chief engineer, and George A. Funkhouser is secretary and treasurer. Company expects soon to increase its output to 10 motors a day.

Contract has been let by E. M. Hulse Furniture Co., 153 West Fulton Street, Columbus, Ohio, to E. Elford & Son, 55 Park Street, for three-story and basement factory, 100 x 260 ft., to cost approximately $275,000 with equipment. Carmichael & Millspaugh, 7 East Long Street, are architects.

Board of Education, Oxford, Ohio, is considering installation of manual training equipment in senior and junior high school to cost $165,000, for which plans will be drawn by Roman & Ingleson, 1614 North High Street, Columbus, Ohio, architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until June 4 for one portable grinder, one sand blast machine, two universal and tool grinding machines, one band saw and one bench shears, circular 338; until June 5 for 275 generator units for one type and 395 such units of another type, circular 333; for one 3-ft. radial drill, circular 338; until June 7 for propeller parts, including 24 sleeve assemblies, split hub, circular 342; until June 8 for 428 starters, electric inertia, 244 starters, hand inertia, and 176 electric and hand inertia, circular 332.

Atlantic Ice & Coal Co., Atlanta, Ga., plans new ice-manufacturing and cold storage plant at Knoxville, Tenn., to cost upward of $90,000 with equipment.

Athens Stove Works, Athens, Tenn., has plans for a one-story addition for molding and kindred service, to cost more than $21,000.

United States Foil Co., 2900 Grand Avenue, Louisville, will soon begin work on new one-story unit, to cost more than $35,000 with equipment.

Mills-Lupton Co., Chattanooga, Tenn., has been appointed representative of South Bend Lathe Works, South Bend, Ind.

New England

Boston, May 28.

SALES of local machine tool houses the past week were less encouraging and even companies reporting good business a week ago say sales have dropped off in both new and used tools. Bids are in for the 25 tools wanted by the Boston & Albany Railroad and it is expected that purchases will begin soon. That and other prospective business from industrial plants gives a more cheerful outlook. Among sales reported were a new small speed lathe and floor grinder with 7-in. wheel, some new and used drilling equipment, one small new tool room lathe and a used lathe. New inquiries are few and many ask an exchange of some old tool as part payment.

Small tools continue to sell well and May probably will be the best month so far this year.

Barbour Stockwell Co., 205 Broadway, Cambridge, Mass., has awarded contract for a one-story, 38 x 70 ft. brass foundry.

C. Hammond & Son, 179 North Water Street, New Bedford, Mass., closes bids June 7 for a two-story and basement vocational school on Park Street, to contain machine and electrical shops.

Plant of Albert M. Creighton Shoe Co., Lynn, Mass., has been sold to Consolidated Lamp Co., Danvers, Mass., radio tubes and incandescent lamps. A new corporation will be formed to occupy structure.

Land and plants of Rhode Island Crucible Steel Co., Inc., 604-612 South Main Street, Providence, R. I., will be sold at public auction June 1. Property is to be sold subject to a first mortgage of $10,875, overdue interest and taxes.

Narragansett Airways, Inc., has completed negotiations for erection of a hangar at Portsmouth, R. I. Walter A. Hahn is treasurer. Company has plans for a small machine shop to be erected at some future date.

Compressed Steel Shafting Co., 1587 Hyde Park Avenue, Boston, is making alterations to its plant.

Bird & Sons, Walpole, Mass., roofing materials, is building a coal pocket for which handling equipment will be required. Monks & Johnson, 99 Chauncy Street, Boston, are architects.

Production schedules of Goss & Deleeuw Machine Co., Hartford, Conn., are being increased and company has under consideration plans for further extensions.

City of Providence, R. I., will erect a junior high school addition at 56 Pleasant Avenue to contain a manual training department. T. J. Hill Pierce, City Hall, Providence, is architect.

Peerless Pressed Steel Corporation, 14 Electric Avenue, Brighton district, Boston, is going ahead with its new manufacturing plant at 24 Arlington Street, Watertown, Mass. Plans are private.

L. G. Morphy, company engineer, has completed plans for a round house at Rutland, Vt., for the Rutland Railroad Co.

American Bosch Magneto Corporation, Springfield, Mass., has leased local mill of Birnie Paper Co., with option to purchase, for branch works for assembling radio equipment, etc.

Western Electric Co., 195 Broadway, New York, has awarded general contract to T. J. Pardy Construction Co., Seaview Avenue, Bridgeport, Conn., for two-story factory branch and distributing plant, 103 x 209 ft., at West Haven, Conn., to cost $175,000 with equipment.

Patterson Chevrolet & Buick Co., 1145 Stanley Street, New Britain, Conn., representative for Chevrolet and Buick automobiles, has filed plans for one-story service, repair and garage building, to cost about $120,000 with equipment.

Watertown Electric Co., 7 Main Street, Watertown, Mass., has plans for a one-story service and repair building, 90 x 100 ft., to cost close to $70,000 with equipment.

New York, New Haven & Hartford Railroad Co., New Haven, Conn., has acquired property at New London, Conn., heretofore held by Connecticut Power Co., and is reported planning power plant on site to be erected later. Power company has plans for new equipment storage and distributing plant at Waterford, to cost more than $65,000 with equipment.

Beaudette & Graham Co., 915 Boylston Street, Boston, manufacturer of electric household appliances and equipment, is disposing of stock issue to total about $250,000, a portion of proceeds to be used for expansion.

Portland Water District, 16 Casco Street, Portland, Me., has filed plans for a two-story service and shop building, 50 x 320 ft., to cost more than $70,000 with equipment. J. C. and J. H. Stevens, 477 Congress Street, are architects.

Pratt & Whitney Aircraft Co., Capitol Avenue, Hartford, Conn., has filed plans for a one-story addition for testing airplane motors.

Peoples' Light & Power Corporation, Burlington, Vt., has acquired Burlington Light & Power Co., and Burlington Gas Co., and plans expansion including transmission line construction for connection with its other properties in this section.

Noyes-Buick Co., 857-67 Commonwealth Avenue, Boston, local representative for Buick automobiles, will soon begin superstructure for new two-story and basement service, repair and garage building, 154 x 180 ft., to cost close to $250,000 with equipment.

Buffalo

Buffalo, May 28.

CONTRACT has been let by Agfa-Ansco Corporation, Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, to Turner Construction Co., Graybar Building, New York and Buffalo, for new two, four and eight-story plant unit, 200 x 700 ft., to cost in excess of $1,000,000, with equipment. Otto S. Schlick, 136 Liberty Street, New York, is engineer.

Wiesner-Rapp Co., Inc., Buffalo, will occupy a building at 186-88 Fourth Street, for which plans have been filed, for manufacture of sheet metal and ventilating equipment.

Edmund F. Doty, 185 Vandervoort Street, North Tonawanda, N. Y., and associates have organized E. F. Doty Pump Co., with capital of $50,000, to operate local plant for manufacture of pumping machinery and parts.

New York Central Railroad Co., Buffalo, has let general contract to William M. Ballard, City Bank Building, Syracuse, N. Y., for two one-story shop units at North Yards repair plant, Buffalo, to cost more than $65,000 with equipment. F. B. Freeman, company headquarters, 466 Lexington Avenue, New York, is chief engineer.

William H. Weston, 574 Woodbine Avenue, Rochester, N. Y., and associates have formed Metal Welders Co., to operate a local welding works and plan early production.

Curtiss Aeroplane & Motor Co., Buffalo, recently placed orders for $1,000,000 worth of equipment as first step in an expansion program. Production of present plant will not only be increased, but a new plant for assembling both planes and motors will be erected.

South Atlantic States

Baltimore, May 28.

BIDS will be asked early in June by Chesapeake Paper Board Co., Key Highway and Baltimore & Ohio Railroad, Baltimore, for new one and two-story mill, to cost in excess of $250,000 with equipment, for which revised plans are being prepared by Karl A. Lefren, 171 Madison Avenue, New York, engineer. J. E. Smith is president.

Union Brothers, 37 West Cross Street, Baltimore, manufacturer of furniture, is having plans drawn for three new one-story units, each about 50 x 400 ft., to cost more than $85,000. Benjamin Frank, 517 North Charles Street, is architect.

Lykes Service Co., 35 Market Street, Asheville, N. C., has leased a three-story building, 84 x 100 ft., to be erected at Coxe and Commerce Streets, for a new service, repair and garage building, to cost close to $100,000 with equipment. V. W. Breeze, Castanea Building, is architect.

United Coast and Geodetic Survey, 205 New Jersey Avenue, S. E., Washington, is asking bids until June 22 for construction of steel Diesel electric propelled survey ship, about 770 tons displacement, with separate bids for main propelling machinery, auxiliary machinery, pumps, windlass, capstan, boat hoist, etc.

Clinchfield Sand & Feldspar Corporation, Hearst Tower Building, Baltimore, is said to have plans for new feldspar grinding mill at Brookneal, Va., to include installation of pulverizing and grinding machinery and auxiliary equipment, to cost about $40,000.

Board of Trustees, Virginia Polytechnic Institute, Blacksburg, Va., has approved plans for new electrical engineering building, to cost about $125,000 with equipment. Carneal & Johnston, Electric Building, Richmond, Va., are architects.

Reference made recently in these columns to contract award for proposed plant of Procter & Gamble Co., Gwynne Building, Cincinnati, at Baltimore, is premature and company states that no contract has been let. Harry Manley, 5 East Fifty-third Street, New York, is engineer, and bids will be asked from that office within five to six weeks. Project is reported to cost close to $4,000,000 with equipment.

American Oil Co., American Building, Baltimore, is planning early call for bids for new oil storage and distributing

The Crane Market

PROSPECTIVE buyers of overhead and locomotive cranes are slow to place business and but little new inquiry is appearing in the market. Among future purchases of locomotive cranes, seven for Dwight P. Robinson & Co. for use in Argentina and five electrically driven for the Amtorg Trading Corporation for use in Russia are outstanding lists. The Mullaney Iron Works, West New York, N. J., is reported to have closed on a 10-ton, 60-ft. span overhead crane. The Lynn Gas & Electric Co., Lynn, Mass., has closed on about 18 hand power hoists for a new plant being erected by Stone & Webster, Inc., Boston, and will probably be in the market in a few months for a 100-ton power house crane. The British-American Metals Co., Plainfield, N. J., is expected to be in the market soon for four 5-ton, 100-ft. span, electric traveling cranes. The Scullin Steel Co., St. Louis, is in the market for an electric traveling crane.

Among recent purchases are:

Pennsylvania Railroad, Philadelphia, a 20-ton, 95-ft. span electric crane for Wilmington, Del., shops from an unnamed builder.

James A. Coe Co., Newark, N. J., 8-ton, 43-ft. 6-in. span, double I-beam crane from the Chisholm-Moore Hoist Corporation.

Breen Iron Works, 276 Badger Avenue, Newark, N. J., four 2-ton, underhung hand power cranes from Chisholm-Moore Hoist Corporation.

Maine Steel Products Co., Portland, Me., 5-ton, 3-motor overhead crane and a 5-ton, 2-motor, monorail hoist from Chisholm-Moore Hoist Corporation.

Ketler Elliott Co., Chicago, 15-ton, 57-ft. span, 3-motor, overhead crane from Western builder.

Phoenix Utility Co., 71 Broadway, New York, 5-ton, 28-ft. span, 1-motor, overhead crane for Houston, Tex., from Box Crane & Hoist Corporation.

Wheeling Steel Corporation, Steubenville Works, one 60-ton, one 40-ton and four 25-ton overhead cranes from Alliance Machine Co., and two stripper and one hot metal cranes from Morgan Engineering Co.

Carnegie Steel Co., McDonald, Ohio, works, two overhead cranes from Morgan Engineering Co., and one from Alliance Machine Co.

Heppenstall Forge & Knife Co., 5-ton, 47-ft. span crane for Pittsburgh works from Alliance Machine Co., and two 5-ton, 31-ft. span cranes for Detroit works from Northern Engineering Works.

Fort Pitt Bridge Works, Canonsburg, Pa., one 10-ton, 63-ft. spane crane and two 10-ton trolleys from Northern Engineering Works.

Pittsburgh Plate Glass Co., Creighton, Pa., 10-ton, 60-ft. span crane from Northern Engineering Works.

Danville Structural Steel Co., Danville, Pa., one 5-ton and one 10-ton cranes from Northern Engineering Works.

Webb Engineering Co., for George & Shearard Paper Co., Wellsburg, W. Va., five 1-ton hoists from Northern Engineering Works.

plant in vicinity of Bridgeton, N. J., to cost more than $60,000 with equipment. T. J. O'Connell is company engineer.

Harper Motor Co., Federal Street and Government Avenue, Hickory, N. C., has plans for two-story service, repair and garage building, 60 x 130 ft., to cost close to $75,000 with equipment.

Virginia Public Service Co., Richmond, Va., is negotiating with city council, Staunton, Va., for purchase of municipal electric light and power plant, and plans expansion, including transmission line construction.

General Outdoor Advertising Co., 24 Fallsway, Baltimore, manufacturer of signs, electric displays, etc., has leased one-story building, 134 x 146 ft., to be erected on local site, and will equip for a new plant, to cost close to $100,000 with equipment. A. L. Blatchley, Baltimore, is architect.

McGowan-Motes Motor Co., Augusta, Ga., has plans for one-story service, repair and garage building, 135 x 137 ft., to cost close to $85,000 with equipment.

Pittsburgh

Pittsburgh, May 28.

MACHINE tool business has shown some improvement the past week. Several orders have been closed against which original bids were made as long ago as last October and November. Single item orders predominate. New inquiries are fairly numerous.

Bids have been asked on general contract by Star Ornamental Iron & Wire Co., 2319 Forbes Street, Pittsburgh, for a one-story addition, to cost in excess of $32,000 with equipment. Another unit of like size is contemplated.

Heppenstall Forge & Knife Co., 4620 Hatfield Street, Pittsburgh, has filed plans for a one-story addition, 100 x 190 ft., to cost close to $60,000 with equipment.

Board of Education, Fulton Building, Pittsburgh, has awarded general contract to J. G. Fullman Co., East End Trust Building, for new Clifford B. Connelly trade school, on bid of $1,081,800. Entire project will cost in excess of $1,600,000 with equipment.

Armstrong Electric & Mfg. Corporation, recently formed under Delaware laws, will take over and consolidate Armstrong Mfg. Co., Huntington, W. Va., manufacturer of electric ranges, parts, etc., and New Era Range Co., operating in same vicinity. Consolidated organization plans increased production.

Pennsylvania Transfer Co., 298 Duquesne Way, Pittsburgh, is having plans drawn for a one-story automobile service, repair and garage building to cost approximately $100,000 with equipment. J. F. McWilliams, 127 North Highland Avenue, is architect.

Fred C. Houston, Ben Avon, Pa., and George E. Matthews, Mount Lebanon, Pa., have formed Riverton Steel Co., to operate an iron and steel works in vicinity of Ben Avon.

Allegheny Metal Products Co., 1902 Brighton Road, Pittsburgh, P. C. Gasparin, president, is contemplating construction of a new plant at Verona, Pa., and will soon select architect.

Pacific Coast

San Francisco, May 23.

BIDS will soon be asked by Willys-Overland Co., Toledo, Ohio, for automobile assembling plant on 20-acre tract recently acquired near Los Angeles, with main one-story unit, 220 x 880 ft., and smaller buildings, to cost close to $1,000,000 with equipment. J. A. Sheldon of company engineering department has established temporary offices at Biltmore Hotel, Los Angeles, to carry out awards, etc.

Union Ice Co., 354 Pine Street, San Francisco, will soon take bids for new ice-manufacturing plant at San Jose, Cal., to cost approximately $200,000 with equipment. Company engineering department is in charge.

Union High School District, Huntington Park, Cal., plans construction of manual training unit in connection with new group of high school buildings, to cost $500,000. George M. Lindsey, 601 Union Insurance Building, Los Angeles, is architect.

Sure Safe Signal Co., 920 Narrows Street, Sumner, Wash., H. J. Trubshaw, secretary and treasurer, recently formed by Mr. Trubshaw and associates, is planning establishment of local plant to manufacture signal systems and devices, initial unit reported to cost about $25,000 with equipment.

City Council, Centralia, Wash., is said to be planning construction of municipal hydroelectric generating plant on Skookumchuck River, to cost about $300,000 with transmission system. Mayor D. O. Nugent is in charge.

O. L. Cowan, San Bernardino, Cal., representative for Ford and Lincoln automobiles in San Bernardino County, is having plans drawn for a one-story service, repair and garage building, 130 x 300 ft., to cost about $160,000 with equipment. John Paxton Perrine, Lincoln Building, Los Angeles, and Howard E. Jones, San Bernardino, are architects.

Fresno-Madera Ice Co., Fresno, Cal., will soon begin construction of one-story ice-manufacturing plant to cost more than $60,000 with equipment.

W. R. Ames Co., 450 Irwin Street, San Francisco, has filed plans for a one-story sheet metal-working plant, to cost about $22,000 with equipment.

North Corona Land Co., 528 South Hill Street, Los Angeles, has plans for one-story steam-operated electric power plant at Norco, Cal., to cost about $160,000, of which nearly $100,000 will be used for mechanical equipment. Ralph E. Phillips, 816 West Fifth Street, is engineer.

Barde Steel Co. of California, 531 Security Building, Los Angeles, has been formed to engage in jobbing business of steel and wire products, such as nails, barbed wire, wire netting, fencing, pipe, etc.

Portland Chain Mfg. Co., Portland, Ore., manufacturer of heavy logging and lumber chains, has removed its plant from 114 North Bradford Street to larger quarters at foot of Burlington Street.

Canada

TORONTO, May 28.

WHILE no outstanding orders for machine tools were placed the past week, single sales ran into a good total and included tools for practically all lines of industrial activity. Some large orders have been closed recently and others are in prospect for equipment for waterworks and sewage disposal plants. Demand for electric power plant machinery continues and builders of this class of equipment report a large volume of orders on hand. In general, the Canadian market shows a satisfactory volume of business and the majority of machine tool builders report operations almost at capacity.

According to J. J. Ashworth, general manager of Peterborough, Ont., plant of Canadian General Electric Co., it has been decided to extend operating facilities. Two new buildings will be erected this year at a cost of $300,000, for which equipment costing about $500,000 will be required. Company also has still further extensions in view, but these will not be undertaken until 1929 and 1930.

Kilgours, Ltd., 21 Wellington Street West, Toronto, has acquired a site, 133 x 200 ft. on Fleet and John Streets, and will erect a factory to manufacture paper bags, etc. It will be seven stories and contain 140,000 sq. ft. of floor space.

Fire, May 17, caused $18,000 damage to plant of Ontario Malleable Iron Works, Oshawa, Ont. Owners propose to rebuild immediately. John Dyer is manager.

Arthur E. Purvis, Montreal, president and managing director of Canadian Industries, Ltd., states that his company will build a plant at Winnipeg for the manufacture of explosives, etc. It will be first of its kind in western Canada and will cost $1,000,000.

Foreign

A company in Scotland is completing plans for construction of new plant at Newcastle, New South Wales, Australia, for manufacture of steel pipe, steel tubing, etc., to cost in excess of $4,500,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Australia No. 66540, also at American Consulate, Sydney, Australia, H. R. Buckley, trade commissioner.

Unterelbe Power & Light Co., Altona, near Hamburg, Germany, is disposing of bond issue of $5,000,000 in United States, close to one-half of which will be used for extensions and improvements in power plants and system, including completion of electric generating project now under way.

Electric Bond & Share Co., 2 Rector Street, New York, has purchased Companhia Carris Porto Alegrenses and Companhia Energia Electrica Rio Grandense, both operating electric power properties in State of Rio Grande do Sul, Brazil, and will operate in conjunction with other utilities in that section, under direction of American & Foreign Power Co., an affiliated organization. Purchasing company is said to be arranging an expansion and improvement program for South American light and power properties to cost more than $20,000,000.

Kaliny (Potash) Trust, Solikamsk, Russia, is planning construction of a new chemical plant in conjunction with potash and salt properties, with capacity of about 400,000 tons a year; also for electric generating station with initial output of 4500 kw. Work is now under way on development of potash mines. Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, has information regarding project.

Allgemeine Elektricitats Gesellschaft (General Electric Co.), Berlin, Germany, known as AEG, is disposing of bond issue of $10,000,000 in United States, a portion of proceeds to be used for expansion. Company is affiliated with General Electric Co., Schenectady, N. Y.

Company in Sweden is planning construction of power plant on Lagan River, vicinity of Bohult, with initial capacity close to 100,000 hp., to include transmission lines and distributing facilities. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Sweden No. 276297; also at American Consulate, Stockholm, Sweden, John B. Osborne, consul general.

Milwaukee

MILWAUKEE, May 28.

FOR a majority of makers, machine-tool business this month has kept the pace set in April, but a few have experienced a falling off. However, the number and character of inquiries is becoming more satisfactory and the situation is relatively favorable for summer business. Production of tools is proceeding without let-down. Foundry and machine shop labor generally is well absorbed and it is not always possible to obtain skilled help when needed.

Nekoosa-Edwards Paper Co., Nekoosa, Wis., has plans for new construction and acquisition of equipment costing in all approximately $2,000,000. Plans are being drawn for a new finishing room, wet room, recovery room, alkali room, a new diffuser, and wash rooms. E. P. Gleason is in charge as consulting engineer. J. A. Alexander is general manager.

Racine Screw Works, 1501 Clark Street, Racine, Wis., is considering bids from contractors for erection of a new automatic screw machine plant to replace shop destroyed by fire in February, with a loss of nearly $200,000. New plant will probably require new equipment throughout.

Berwind Fuel Co., St. Louis Bay, Duluth, Minn., has plans by Roland C. Buck, consulting engineer, Superior, Wis., for a new machine shop at its docks in Superior to cost about $45,000.

Weber Life-Like Fly Co., 106 Ellis Street, Stevens Point, Wis., manufacturer of fishing tackle and sporting goods, is planning erection of a new factory, 90 x 120 ft., two stories.

Appleton Machine Co., 618 South Oneida Street, Appleton, Wis., manufacturing paper mill machinery and equipment, expects to take bids after June 10 for construction of a new brick and steel foundry costing about $75,000. Plans are being completed by W. F. Dolke, consulting engineer, 1841 Asbury Avenue, Evanston, Ill.

Great Lakes Coal & Dock Co., 529 South Seventh Street, Minneapolis, Minn., is about to ask bids for construction of an additional screening unit to cost about $30,000, at its docks at Superior, Wis.

West Bend Products Co., West Bend, Wis., closes bids June 4 for erection of a manufacturing building, 30 x 85 ft., one story, and 30 x 33 ft., two stories.

Merrill Machinery & Supply Co., Merrill, Wis., has increased its capital stock from $25,000 to $75,000 for enlarging its plant and production. Details are not yet ready.

Jambor Tool & Stamping Co., 1261 Thirtieth Street, Milwaukee, has placed contracts for construction of a two-story machine shop addition, 60 x 75 ft., and a second story on a portion of the present main shop. Work will cost about $40,000 with additional equipment.

Board of Education, Superior, Wis., has plans by Roland C. Buck, local engineer, for a $125,000 addition to the Central High School, to be devoted largely to vocational shops. Bids probably will not be taken until after July 1. L. A. Nichols is secretary of board.

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NEW TRADE PUBLICATIONS

Automatic Pumps.—Electric Controller & Mfg. Co., Cleveland. Folder of four pages devoted to motor-driven pumps with automatic control. Stress is laid upon the economies resulting from lack of attendants.

Specifications for Celite in Concrete.—Celite Products Co., Los Angeles. Bulletin 337 of two pages gives specifications for the use of architects and engineers, and covers the use of Celite in concrete. Directions are given in some detail, varying with the makes of concrete employed.

Unit Heater.—Bayley Blower Co., Milwaukee. Bulletin giving illustrations and information regarding the use of a unit heater for a wide variety of applications. A capacity table is given and clearance diagrams for various sizes.

Steel Industrial Floors.—Irving Iron Works Co., Long Island City, N. Y. Folder devoted to industrial floors of steel armored concrete, being of steel mesh with concrete or other plastic material poured in. This means a floor continuous in all directions.

Portable Conveyor or Loader.—George Haiss Mfg. Co., 141st Street and Park Avenue, New York. Catalog 428 of eight pages deals with a Fordson loader for digging into a pile of material and loading a truck or other carrier. It may be equipped with caterpillar tread or with wheels as required. The capacity is stated at 1 cu. yd. a minute.

Unit Air Conditioner.—Carrier Engineering Corporation, Newark, N. J. Folder of four pages announcing a new air conditioner which humidifies, washes, heats or cools air, and creates a controllable, uniform air circulation.

Renewable Fuse.—Trico Fuse Mfg. Co., Milwaukee. Folder 206-B illustrates and describes renewable fuses for electric circuits. It gives results of tests on 60-amp. and 100-amp. fuses.

Recording Liquid Level Gages.—Bristol Co., Waterbury, Conn. Catalog 1800 describes instruments working on the principle that a submerged bulb is compressed according to the amount of liquid above it, and this pressure is then transmitted by tubing to a recorder nearby. Records are transmitted any distance by three-wire electrical circuit operating an induction balance. Spherical floats are also utilized to actuate a recording pen through a suitable pulley and lever system. The water level inside boilers is gaged by a series of thermo-electric pyrometers wound on a vertical metal tube. Automatic devices may be included for maintaining levels by starting and stopping pumps, control gates or ringing alarms. Electrical clocks or telechrons can be installed in all recorders if preferred to spring-wound motors.

Grab Buckets.—Owen Bucket Co., 6200 Breakwater Avenue, Cleveland. Bulletin of 20 pages illustrating and describing clamshell buckets of wide variety for use in many types of materials. Some are fitted with interlocking teeth, while others have straight edges.

Mill Motors.—General Electric Co., Schenectady, N. Y. Folder GEB-63 of 16 pages reviews standardization of type MD-400 motors, designed primarily for steel mill use. These range from 5 to 275 hp. on 230 volts direct current, using only 11 frames.

Starting Device.—Monitor Controller Co., Baltimore, Md. Bulletin 112 of 12 pages is devoted to thermaload starters for electric motors. It is well illustrated.

High-Temperature Cement.—General Refractories Co., Philadelphia. Booklet of 24 pages devoted to Grefco, a cement with chrome base reported highly resistant to corrosion by slag, metallic oxides and ash. Many applications are suggested, while instructions are given for applying the cement.

Overhead Cranes.—Morgan Engineering Co., Alliance, Ohio. Bulletin 31 of 40 pages, illustrating and describing the standard line of Morgan cranes for steel mill and other manufacturing and heavy handling services. The illustrations are largely from installations, showing a considerable variety of uses. Some of those illustrated cover spans of more than 100 ft., while others run as high as 250 tons in capacity.

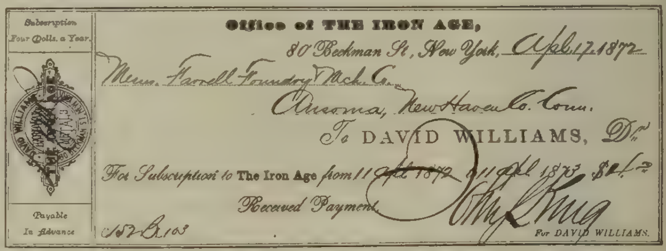
Turbo-Compressors.—Spencer Turbine Co., Hartford, Conn. Bulletin of 8 pages illustrating and describing turbo-compressors for foundry cupolas. Operating by electric motors, close control of blast is claimed for these units.

THE LAST WORD

(Contributed by the Reader Service Department of The Iron Age Publishing Co.)

"Yes," said a salesman, speaking of a certain domineering individual in a Middle Western machinery building firm, *"He's the man nobody no's."*

WHEN cleaning out some old files. Mr. C. E. Bouton of the Farrel-Birmingham Co., Ansonia, Conn., ran across this 56-year old subscription bill:



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To DAVID WILLIAMS, Dr.
For Subscription to The Iron Age from 11 Apl. 1872 to 11 Apl. 1873 $4.00
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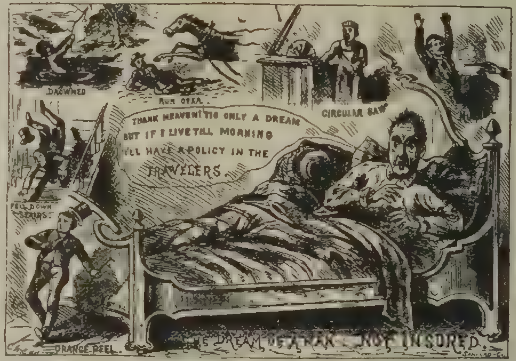
152 B. 103
For DAVID WILLIAMS.

The Farrel firm is one of our oldest, if not our oldest, continuous subscriber. If the 2916 copies of THE IRON AGE mailed to that company since this bill was issued were piled one on top of the other, they would in all probability topple over.

TO find out what kind of service we were giving the Farrel people along about 1872, we dived through a foot of dust and dragged some old copies out of the safe. The small type of the reading pages looked dull and uninviting to our myopic eyes, but in the advertising pages we found romance and adventure. Here were self-righting cuspadores (sic), self-weighing cheese knives, deadly looking *seven*-shot revolvers, bung hole borers, jolly sleigh bells, bird cages, boot jacks, murderous rat traps, and mince pie meat choppers. But the *pièce de résistance* (French for piece de resistance) was this quiet advertising gem:

BEST INSURANCE FOR IRON MEN.

Accident Insurance.


DROWNED
RUN OVER.
CIRCULAR SAW
THANK HEAVEN! TIS ONLY A DREAM BUT IF I LIVE TILL MORNING I'LL HAVE A POLICY IN THE TRAVELERS.
FELL DOWN STAIRS.
ORANGE PEEL.
THE DREAM OF A MAN NOT INSURED.

Try a Yearly Policy.

TRAVELERS INSURANCE COMPANY,

OF HARTFORD, CONN.

That was when bare-handed methods were used in selling life insurance. Instead of suggesting politely that you "create an estate," and appearing wholly innocent of the fact that man is mortal, the go-getting insurance salesman of those days barked at you, "Do you want the wife and kids to go to the poorhouse when you croak?"

In his thoughtful way, Mr. Dun, the big financial register man, informs us that "condensed smoke" is the product of the E. H. Wright Co., Ltd., Kansas City, Mo. Our ignorance of condensed smoke is equaled only by our curiosity. Some kind of a reward is under consideration for the best essay on what it is, how you capture it, and what you do with it after you capture it.

A. H. D.

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THE IRON AGE

New York, June 7, 1928

ESTABLISHED 1855

VOL. 121, No. 23

Cupola Fired with Powdered Coal*

High Temperatures, Greater Strength and Lower Total Fuel Consumption Claimed—Less Absorption of Sulphur and Close Control of Carbon

THE use of powdered coal in the cupola, described in this article, is the third major development introduced in recent years to improve the efficiency of this melting unit. Some interesting results and claims are made. The Schuermann side-blast cupola, a German invention, was described in THE IRON AGE, *Oct.* 19, 1922, *page* 991, *and Nov.* 22, 1923, *page* 1377. *Among the claimed advantages was a fuel saving of* 25 *per cent and hotter iron. The Vial hot-blast cupola was discussed in* THE IRON AGE, *Oct.* 20 *and* 27, 1927. *With this a fuel saving of at least* 20 *per cent was among the advantages enumerated.*

UNTIL very recently cast iron foundries have used the old-fashioned cupola almost exclusively as a melting unit with satisfactory results. Progress in casting design, however, has demanded strength as a prime characteristic of cast iron, so it has behooved the foundrymen to meet this requirement.

Obviously, many changes calculated to produce a grade of iron having superior strength have been tried out, and, doubtless, many improvements have been made already in a normal cupola of the conventional type.

The main advantages of the old cupola over each new system of melting and over the different specially-built cupolas are the low melting cost and the simple manner of operation. Usually these advantages more than offset the disadvantages of inaccurate control of the carbons, the picking up of sulphur from the foundry coke by the iron and the possibility of oxidation.

To eliminate these disadvantages and still retain the reduced melting cost and the simple manner of operation is the problem that must be solved before any basic development can survive competition with the old style cupola.

Principle of the Powdered Coal Cupola

About a year and a half ago, D. H. Meloche, of the American Radiator Co., conceived the idea of using powdered coal as a fuel, in connection with a minimum coke charge, by burning the coal under pressure outside of the shell proper and allowing the products of combustion to pass directly to the melting zone at a velocity insuring penetration.

Under average conditions, the cost of a ton of coal is only one-half that of a ton of coke, and, because, of this, it is a fact that running on coke with the same melting ratio, namely, iron to total fuel, is more expensive than replacing a portion of the coke with coal.

The powdered coal cupola, which is operated in the Springfield, Ill., plant of the American Radiator Co., has proved that through the use of powdered coal fuel it is possible to reduce the ratio of total fuel consumed to the amount of iron melted.

In a normal cupola there is a large loss of heat because of the reaction between the carbon dioxide and the carbon of the coke above the melting zone. The complete combustion of one pound of carbon and pure oxygen to carbon dioxide sets free 14,544 B.t.u., whereas burning the same amount of carbon in an insufficient supply of oxygen to carbon monoxide sets free only 4450 B.t.u. In this reaction, part of the carbon of the coke forms CO_2, and there is a first loss of practically 10,000 B.t.u. Besides this, the breaking up of the CO_2 requires 10,094 B.t.u. These figures show very clearly the enormous amount of wasted heat, which should be free for superheating the iron charges in a normal cupola. As before mentioned, because of the small coke charges in the pulverized coal cupola, it is natural that the amount of CO_2 dissociated by the carbon of the coke above the melting zone is much lower.

In the powdered coal cupola system, the pulverized fuel comes to complete combustion in the chambers outside of the stack and the hot gases alone are blown into the melting zone, so that the full amount of B.t.u. of the coal is retained for melting the iron. The ratio between the amount of air for combustion and the amount of powdered coal is so regulated that the atmosphere in the melting zone is either mildly reducing or neutral. Due to this fact, the bed coke does not get burned out so rapidly as it does in a normal cupola. Therefore, it is possible to hold up the bed and melt on a charge of coke of only 2 to 4 per cent of the iron melted.

Accurate Control of Carbon Content

Because of the more accurate control of combustion in the powdered coal cupola, we obtain more accurate carbon control and, as we use less coke, the total carbons are likewise decreased. As the combustion of the coal takes place in the chambers and the hot gases pass into the zone of the charge, they do not pick up any of the sulphur of the powdered coal and only a very small amount of the sulphur from the coke, because, as already mentioned, only 2 to 4 per cent of coke between charges is used.

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*From an address delivered before the Wisconsin Foundrymen's Research Group, Milwaukee, June 6, by Dr. Fritz Meyer, American Radiator Co., New York.

At the Illinois plant we ran for comparison the same iron mixture with the same grade of coke in both the powdered coal cupola and in a normal cupola and found that the sulphur in the iron melted in the powdered coal cupola was from 20 to 30 per cent lower than in the iron produced from the normal cupola, and that the total carbon decreased approximately 20 per cent. In addition to these advantages, there was less oxidation, as the air control is so regulated that a neutral or mildly reducing atmosphere is produced during the entire operation of the heat.

The two samples of iron which I will pass through the audience will show the advantageous influence of melting in the powdered coal cupola.

A cupola was running into trouble with oxidized iron. As can be seen from sample No. 1, the iron shows a dark, dead structure typical of oxidized iron. The cast iron was brittle and, consequently, had a very low transverse strength with practically no deflection. This iron was sent to our plant to be melted in the powdered coal cupola. Sample No. 2 shows the structure of this iron after having been remelted. Inspection of these samples clearly proves the influence of this new cupola. The iron was deoxidized.

Graphite Precipitation Very Fine

Microscopical research work on the product of the powdered coal cupola shows, with each kind of mixture, a very fine graphite precipitation. As a reducing atmosphere has no direct influence on the fineness of the graphite precipitation, we tried to find an explanation for this. It is as follows:

There must be, in this cupola, a zone of extremely high temperatures (a powdered coal flame shows an average temperature of 3100 deg. Fahr.). The iron drops going through this zone become highly superheated and, because of this, have a tendency to solidify with a fine graphite precipitation.

In papers and technical literature of the last three years much information has been published regarding the influence of melting temperatures on structure and quality of either high or low-carbon cast iron. Therefore, I need not go into details regarding this.

Physical Properties Compared

Comparative physical tests made on test bars, from normal cupola and powdered coal cupola, have shown that transverse strength and deflection are about 10 to 15 per cent higher on the bar from the new cupola. On the 1-in. square test bar with a bearing distance of 12 in., we found, for instance, that the same mixture, averaging 2900 lb. breaking strength with a deflection of 0.245 in. for the bar from the normal cupola, averaged 3300 lb. transverse strength with a deflection of 0.255 in. from the powdered coal cupola.

A recent test made with low-carbon iron showed a transverse strength averaging 4468 lb. with a deflection of 0.250 in., which is, you will agree, a high test for cast iron.

As before mentioned, iron from the powdered coal cupola shows 20 to 30 per cent less sulphur content than the same mixture melted in a normal cupola. Remelting our own remelt iron showed that, by replacing a sufficient amount of the coke with coal, the picked-up sulphur is practically negligible. Remelt iron with an average of 0.085 to 0.090 per cent sulphur did not show an average increase in sulphur content of more than 0.020 per cent.

How do we account for the iron not picking up sulphur? It is our theory that the sulphur passes off in the form of either sulphur dioxide, sulphurous acid or sulphuric acid. The question naturally arises: What is the source of the hydrogen? The answer lies in the fact that a coal is used with approximately 35 per cent volatile matter, which is comprised partly of hydrogen. In addition to this, the fuel carries a certain percentage of moisture, up to about 3 to 3.50 per cent. It is not necessary to dry this fuel before it is pulverized.

Equipment Necessary

The cupola stack is an ordinary straight stack and does not differ in any way from the stock Whiting cupola without the wind belt. The powdered coal cupola now in use has a melting zone diameter of 40 in. and shows an hourly output of about 6 to 7 tons. It has four combustion chambers parallel to the cupola stack. On the top of each chamber is the burner and on the bottom of each one is the entrance for the hot gases from the combustion chambers to the stack. This entrance is at the same elevation as the tuyeres in a normal cupola and replaces them.

Life of Refractories

Before starting the experiments, the present operators of the powdered coal cupola were of the opinion that the lining of the combustion chambers would not withstand the temperature, but experience has shown that the lining does not give any trouble. To date, the cupola has been running over six months without relining the combustion chambers, and from all appearances they look the same as when installed, except that the bricks are well glazed throughout.

As for the patching operation in the stack after heats, figures have been compiled which prove that it costs no more to maintain linings in this cupola than in the normal type.

Economies and Advantages Claimed

For an average heat it takes 130 lb. of fuel to melt one ton of iron, coke averaging 60 per cent of the fuel:

$$\begin{array}{lrl} 0.60 \times 130 \times \dfrac{\$10.36}{2000} = & \$0.40 & \text{Cost of coke per ton of metal} \\ 0.40 \times 130 \times \dfrac{\$5.07}{2000} = & 0.13 & \text{Cost of coal per ton of metal} \\ \text{Overhead} & 0.14 & \\ \cline{2-2} & \$0.67 & \text{Cost of fuel per ton of iron} \end{array}$$

Assuming that an 8 to 1 melting ratio is an average for coke melting, it would take 250 lb. of coke to melt a ton of iron.

$$\begin{array}{lr} 250 \times \dfrac{\$10.36}{2000} = & \$1.29 \\ \text{Overhead} & 0.06 \\ \cline{2-2} & \$1.35 = \text{Cost of melting with coke} \end{array}$$

Subtracting $0.67 from $1.35 shows a saving of $0.68, or 50.4 per cent.

The overhead for a powdered coal installation is estimated from the experience of the Whiting Corporation with Grindle pulverizers in connection with malleable iron furnaces. The costs of coal and coke are those at the Illinois plant.

Other Metallurgical Benefits

Additional benefits estimated from a metallurgical viewpoint cannot be given in dollars and cents. It is easy to understand that, with the metallurgical advantages of the use of powdered coal, a larger amount of scrap can be used in the mixtures with beneficial results.

In recent tests the fuel ratio, coke to coal, has changed in our favor, which means that we have been able to change the fuel consumption to 60 per cent coal and 40 per cent coke. Theoretically it is possible to fire the cupola with powdered coal alone, provided a sufficient refractory material can be found to support the charge. The present installation does not permit such operation, but this paper is not intended to state that the powdered coal cupola has been perfected.

Temperatures of the iron at the spout of the powdered coal cupola compare favorably with those of the normal cupola. They can best be judged by the light metal type of castings which are being poured and which have to be tested at from 400 to 1000 lb. hydraulic pressure and at 300 lb. air under water. The temperature at the spout averages between 2650 and 2700 deg.

Summarizing the advantages claimed for the powdered coal cupola:

First: Avoidance of picking up sulphur in the iron from the coal fuel.

Second: Better control of carbon in the mixture because of the more accurate control of combustion, and higher strength because of superheat.

Third: The possibility of extensive reduction in price of various mixtures.

Fourth: Saving in melting cost because of smaller amount of fuel required.

Accidents Fewer and Less Severe in Metal Industries

Frequency Rate Dropped from 35.45 to 26.59 Per Cent and Severity Rate from 2.44 to 1.85 Per Cent

MARKED decrease in both the severity and frequency of industrial accidents in the metal industries during 1927 as compared with 1926 is shown in the annual report of accident experience of members of the National Safety Council, just published by that organization. The average accident frequency rate, or number of lost-time personal injuries per one million hours' exposure, of 450 metal-working establishments reporting in 1927 was 26.59, as compared with 35.45 in 318 plants in 1926 and with an average for the five years ended with 1926 of 36.06. The accident severity rate, or loss in working days per 1000 hr. of exposure, was 1.85 in 1927, against 2.44 in the preceding year and a five-year average of 2.23. The frequency rate in 208 establishments, or 46 per cent of the total reporting in 1927, was below the previous year's figure, while 321 plants, or 71 per cent of the total, had lower severity rates in 1927 than in 1926. Thirteen establishments completed 1927 without a lost-time injury.

As the accompanying table shows, eight of 13 groups into which the metals section has been classified reported a decrease in accident severity rate in 1927 as compared with 1926. Those showing an increase were structural steel fabricators, gray iron foundries, makers of machinery and machine tools, railroad car builders and manufacturers of tubular goods. Increases in frequency rates were reported by bolt and nut manufacturers, malleable iron foundries, machinery and machine-tool makers and steel foundries, while the remaining nine groups showed decreases.

Metal Industries Close to Average

That the accident record of the metal industries approximates that of manufacturing industries as a whole is shown by the fact that 2089 establishments reported to the national council an average accident frequency rate in 1927 of 25.95 in 1927, as compared with 31.87 in 1926, and a severity rate of 1.88 last year, as against 2.50 in the preceding 12-month period. The automotive industries had a frequency rate of 21.51 in 1927 and 23.60 in the previous year, while the severity rate in this field was 1.01 in 1927 and 1.37 in 1926. The construction and petroleum divisions reported a higher rate in both severity and frequency last year than in 1926, while the frequency rate was higher in the rubber group. All the other industries reported a decrease in both the severity and frequency of accidents in 1927.

Comparison of Accident Experience in Metals Industries in 1927 and 1926

Group	No. of Companies	Average No. Employees	Total Hours Worked	No. Lost-Time Accidents	No. Days Lost	Frequency Rate	Severity Rate
Coke plants:							
1927	7	2,858	8,462,907	157	35,390	18.55	4.18
1926	7	3,228	9,266,885	401	59,947	43.27	6.47
Bolt and nut makers:							
1927	9	5,135	12,312,166	328	11,881	26.64	0.96
1926	2	1,790	4,561,011	70	7,529	15.35	1.65
Structural steel fabricators:							
1927	29	9,556	23,256,531	1,161	92,111	49.92	3.96
1926	19	7,216	17,725,475	1,423	64,732	80.30	3.66
Gray iron foundries:							
1927	28	14,794	37,140,703	1,923	91,473	51.78	2.46
1926	31	19,038	48,551,841	3,132	103,588	64.52	2.13
Malleable iron foundries:							
1927	14	4,739	12,487,244	593	17,761	47.49	1.42
1926	20	10,101	26,465,019	1,103	44,484	41.68	1.68
Machine shops with foundries:							
1927	73	90,165	216,161,972	4,444	294,441	20.56	1.36
1926	40	38,509	94,560,087	2,521	166,581	26.67	1.76
Machinery and machine tool:							
1927	101	38,353	89,315,238	3,234	175,905	36.21	1.97
1926	77	51,010	128,918,842	3,706	219,568	28.75	1.70
Railroad car makers:							
1927	15	6,966	13,055,266	465	59,708	35.61	4.57
1926	6	3,935	9,870,834	415	16,445	42.04	1.67
Steel plants:							
1927	82	107,474	294,855,220	6,230	522,952	21.13	1.77
1926	58	89,416	252,275,354	8,093	750,018	32.09	2.97
Steel foundries:							
1927	21	7,747	20,136,896	1,039	52,450	51.60	2.60
1926	15	6,690	17,383,530	836	69,423	48.10	3.99
Tubular goods makers:							
1927	23	12,612	35,171,683	1,151	91,110	32.73	2.59
1926	9	7,845	20,794,330	684	38,628	32.90	1.82
Wire manufacturers:							
1927	32	22,009	45,348,061	725	58,213	15.99	1.28
1926	21	15,593	37,880,332	1,424	71,077	37.59	1.88
Miscellaneous:							
1927	16	3,946	10,914,285	314	12,510	28.77	1.15
1926	15	7,070	17,960,452	520	62,205	28.95	3.46
Total 1927	450	326,362	818,618,172	21,764	1,515,905	26.59	1.85
Total 1926	318	261,441	686,213,992	24,328	1,674,225	35.45	2.44

Enlarging Steel Mill Possibilities

Greater Flexibility and Increased Range of Product for Timken Plant—Unusual Electric Melting Furnace

STEEL manufacturing capacity of the Timken Roller Bearing Co., Canton, Ohio, will be considerably enlarged by the carrying out of its announced expansion program. Not only will the output both in steel making and rolling of alloy steels be materially increased, but the plant will produce a wider range of finished bar sizes than heretofore. It is expected that, with the new mill equipment and with the rearrangement of the old units, the cost of steel making will be reduced considerably and at the same time a higher quality product will be produced. The enlarged plant will have a capacity of 24,000 tons a month. Construction is now under way and it is expected that the new units will be completed by Nov. 1.

Additions will include an electric melting furnace of unusual design, two 100-ton open-hearth furnaces, a 28-22-in. bar mill, a 16-stand merchant mill which will have various interesting features, reheating furnaces, new hotbeds and tables and other auxiliary mill equipment. Several new buildings are being erected to house the new equipment and for storage. The arrangement of the mills and the tables and cooling beds provides for wide flexibility in operation. There will be a range in sizes of finished bars, from 8-in. rounds at the first finishing stand down to ¼-in. rounds at the last merchant mill stand.

Exceptional Electric Melting Unit

The new electric melting furnace, which is of the Héroult type, will doubtless attract considerable interest because it will be elliptical instead of circular in plan. In place of the usual three electrodes, it will have six electrodes arranged in two groups of three electrodes each. Power for each group will be supplied through two separate 10,000-kva. transformers housed in brick compartments, one at each side of the furnace. The dimensions of the oval furnace shell will be 20 x 29 ft. The electric furnace will be charged, with the open-hearth charging machine, through two 4-ft. 6-in. doors. There will be two additional working doors on the spout side.

Waste-heat boilers will be erected to utilize heat from the two new open-hearth furnaces. Space for these and for the new electric furnace will be provided in a 240-ft. extension to the steel plant building, which, with leanto, is 153 ft. wide. New handling equipment to be installed in the electric furnace and open-hearth departments will include a 165-ton ladle crane, a 30-ton crane over the charging floor and a 5-ton open-hearth charging machine. The stock house will be enlarged by a 105-ft. extension.

Melting equipment in the enlarged steel making plant, with the additional units, will include the new oval-type electric furnace, two 25-ton and one 7½-ton electric furnaces and three 100-ton open-hearth furnaces. In addition, there are two 6-ton electric melting furnaces in another building.

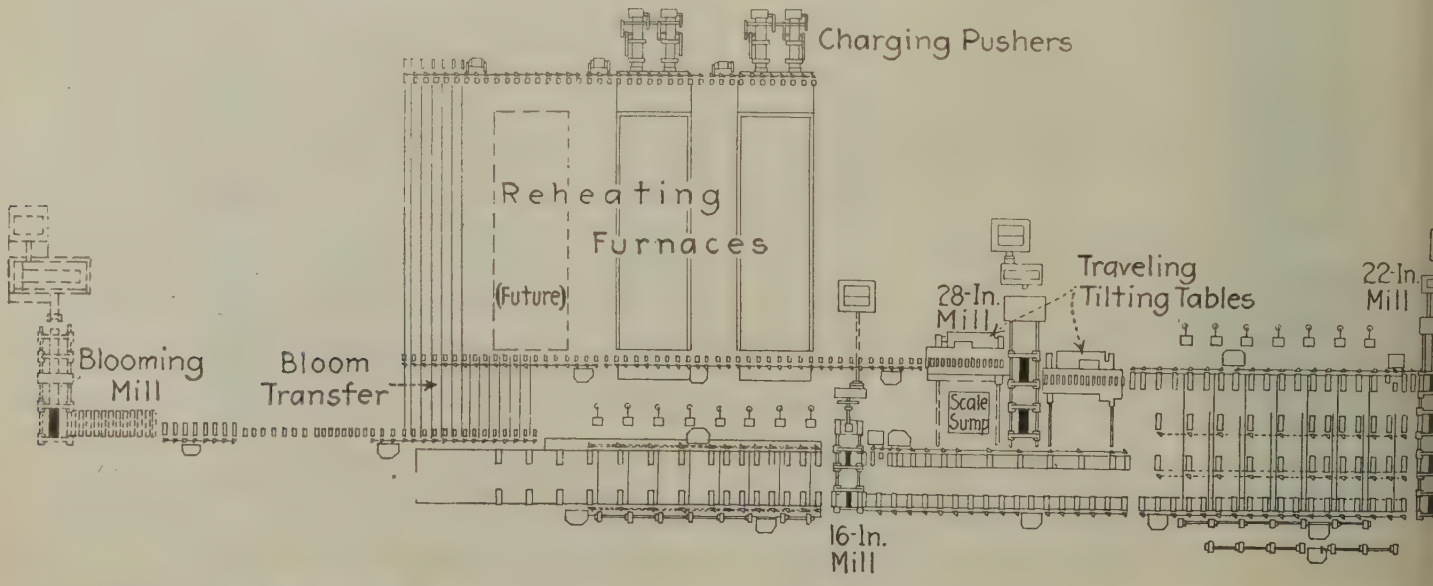
A new ingot stripping and hot top storage building, 89 x 98 ft., is being erected. This will be equipped with a 5-ton combination stripping and soaking pit crane, which will be moved from the old soaking pit building. There will also be a new mold storage building, 80 x 160 ft., equipped with a 30-ton electric traveling crane.

As the increased steel-making capacity necessitates additional soaking pits, a new soaking pit building, 80 x 165 ft., is being erected. This will have three two-hole soaking pits, each hole being 6 ft. 6 in. x 14 ft. The new pit furnaces will be served by a 7½-ton soaking pit crane.

Changes in Rolling Equipment

In the present rolling mill layout there is a 35-in. three-high blooming mill and a 22-in. four-stand bar mill, but no table connections between the two mills. As rearranged, with the new mill tables and other equipment, the blooms will pass from the 35-in. mill to a 10-in. x 10-in. shear, over a runout from the shear and on to a bloom transfer table. From this they will be transferred either to the runin table to the new 28-in. mill or to the charging end of two 40-ton continuous reheating furnaces.

These furnaces will have end charge and end discharge. They will be 20 ft. wide, approximately 70 ft. long, and natural gas fired. The charging table to



the furnaces will be 114 ft. long, accommodating space for a third (future) furnace. The furnaces will be charged directly from the 35-in. mill or with cold blooms from the chipping yard. They will be charged with double pushers electrically operated.

Direct Run to 28-In. Mill

If the blooms are not reheated, they will go directly to the 28-in. mill, which will consist of two three-high stands with rolls 84 in. long. This mill will be served by two traveling tilting tables driven by worm-gear speed reducing sets. The entering table will be equipped with manipulators. The mill will be driven by a 1500-hp. induction motor through a gear drive provided with flywheels. The runin table to the mill will be 150 ft. long. Bars in finished 6-in. to 8-in. sizes will be made on this mill. The 6-in. to 8-in. finished sections will be transferred from the mill runout table by rope transfer and past the 22-in. mill to the first hot bed.

However, most of the product is reduced to smaller sections, and the usual operation of this mill, which will be applied in rolling the smaller sections, will be to use the 28-in. mill as a roughing mill for the 22-in. mill. The latter mill, which is being rebuilt, will consist of three three-high stands and one two-high stand. The first two three-high stands will have rolls 66 in. long and the last three-high and the two-high stands will have rolls 60 in. long. This mill will be equipped with tables having solid standings and with rope transfers both at the front and back sides. This will permit giving the steel any number of passes through the rolls.

Finished bars in sizes from 7½-in. down to 1¾-in. rounds or their equivalent will be produced on the 22-in. mill. When rolls are to be changed, the mill housing and rolls will be picked up as a unit by an overhead 50-ton crane and transferred to another section of the mill building.

New Structures Necessary

The 28-in. and the 22-in. mill will be located in a new building 288 ft. long and 100 ft. wide, which will connect the old 35-in. and 22-in. mill buildings, being located in a heretofore unoccupied space between these two buildings. New structures will include also a bloom building, 385 ft. long and 100 ft. wide, to be served by two 15-ton cranes.

There will be cooling pits in this building for the slow cooling of some grades of alloy steel which have a tendency to crack when cooled in the open air. These steels, after leaving the blooming mill, will remain in the cooling pits about 24 hr. before going to the reheating furnaces. Cooling pits will be provided also for cooling bars of certain alloys after leaving the 22-in. mill.

Leaving the 22-in. mill, the bars will pass on a runout table 260 ft. long to the first of two hot saws, located in front of the hotbed. Two hot saws working together will be provided, to increase the rapidity of handling the steel. From the hot saws the larger sections from the 28-in. and 22-in. mills will go to a new hotbed 109 ft. long and 40 ft. wide. This will be of the flat skid type with dog pullovers. The hotbed table will be equipped with two motor-operated gage stops. Bars will be handled from the hotbed with a magnet, or pushed over the table, from which they will pass to a cold shear at the end of the hotbed.

Smaller sections coming from the 22-in. mill will not go to the hotbed referred to above, but will pass over a runout table at one side of this hotbed on to a smaller notched bar type hotbed, 120 ft. long and 20 ft. wide, which was a part of the old equipment and has been relocated. This will have a cold shear at the discharge end.

Making Smaller Sections

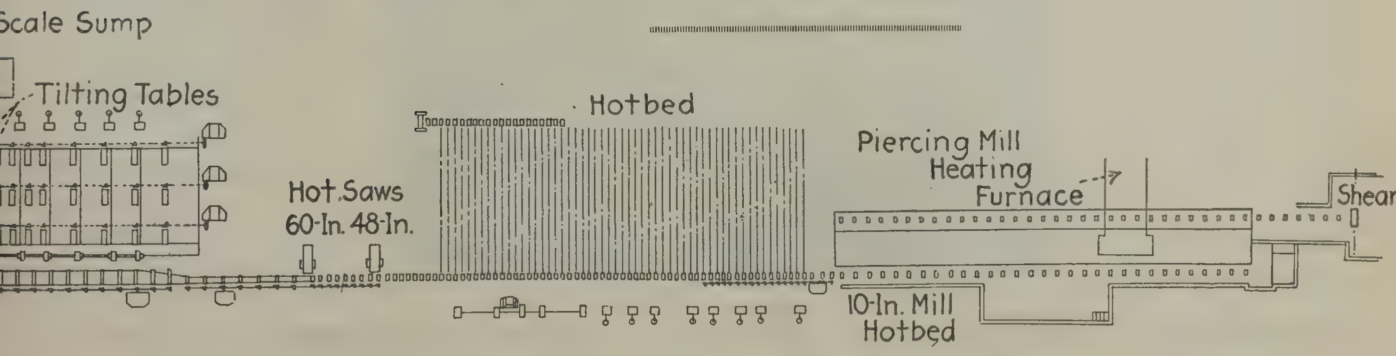
If the steel is to be further reduced after leaving the 22-in. mill, it will go to the 16-stand merchant bar mill, located back of the 22-in. mill. This mill will consist of three 18-in. two-high roughing stands, five 16-in. continuous stands and two 16-in. three-high, four 12-in. and two 10-in. stands. On this mill 3-in. x 3-in. or 4-in. x 4-in. billets rolled on the 22-in. mill, and taken from an adjoining billet storage yard, will be reduced to a range of ¼-in. to 2¼-in. round bars or equivalent sizes in other sections. From this mill the finished bars will pass to a mechanical hotbed, 240 ft. long.

All mills, mill drives, tables and cranes will be equipped with Timken tapered roller bearings.

The two 28-in. three-high mill stands and three new 22-in. mill stands and pinions, hot saw, transfer, tilting and roller tables, furnace pusher and bar shear will be supplied by the United Engineering & Foundry Co., Pittsburgh. The Wheeling Mold & Foundry Co., Wheeling, W. Va., will furnish the traveling tilting tables for the 28-in. mill. The Mesta Machine Co., Pittsburgh, will build the new merchant mill complete, and will furnish the furnace skid bed with runin table and pusher, billet shear, mill transfer and delivery tables, flying shear and the mechanical pack annealing cooling bed.

The two open-hearth furnaces will be built by Alex Laughlin & Co., Pittsburgh. The shear approach table will be furnished by the Mackintosh-Hemphill Co., Pittsburgh. The Morgan Engineering Co., Alliance, Ohio, will build the hotbed. The James Criswell Co., Pittsburgh, will build the new soaking pits. The Rust Engineering Co., Pittsburgh, will supply the three reheating furnaces. The waste-heat boilers will be furnished by the Babcock & Wilcox Co. The drive for the 28-in. mill will be furnished by Gears & Forgings, Inc., Cleveland. The American Bridge Co. will build the 20- x 29-ft. electric furnace.

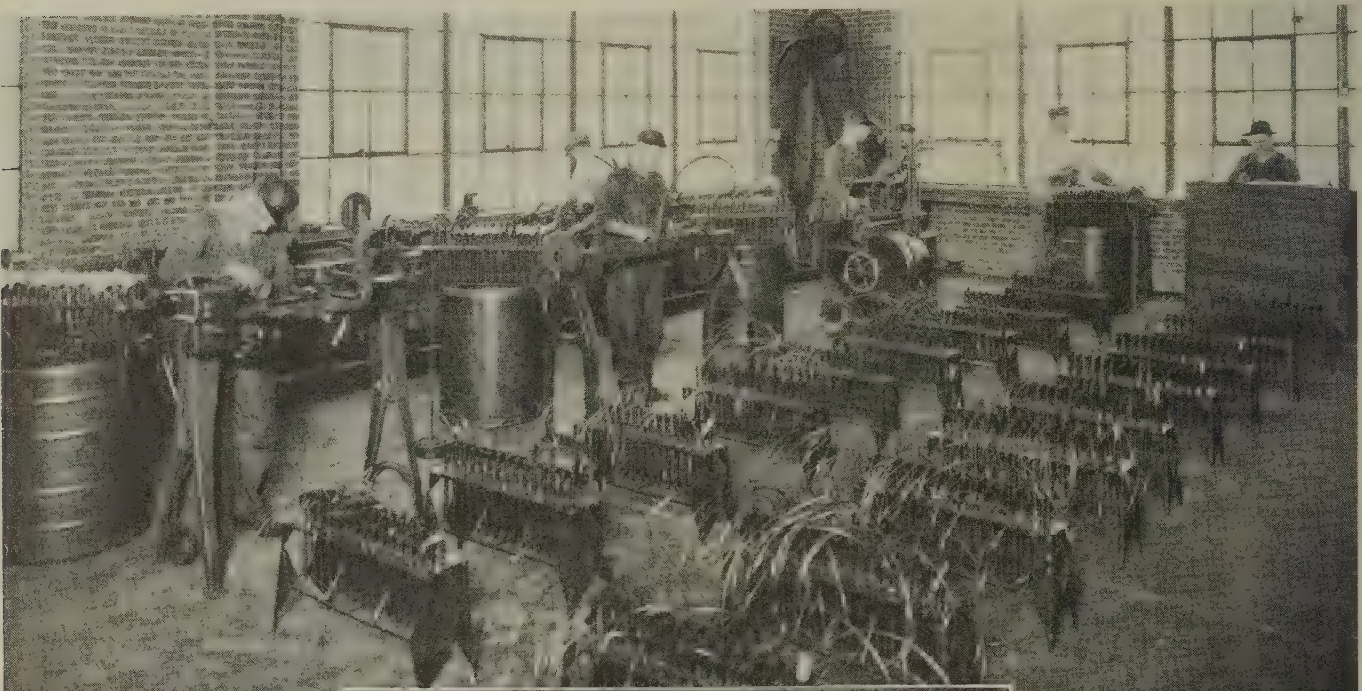
LAYOUT of the New Rolling and Intermediate Handling Equipment of the Timken Plant, from the (existing) Blooming Mill to the Shear Beyond the Hotbeds. Flexibility is a feature, it being possible to run given bars through any one of several mills in the progressive stages of breaking down the steel to finished size



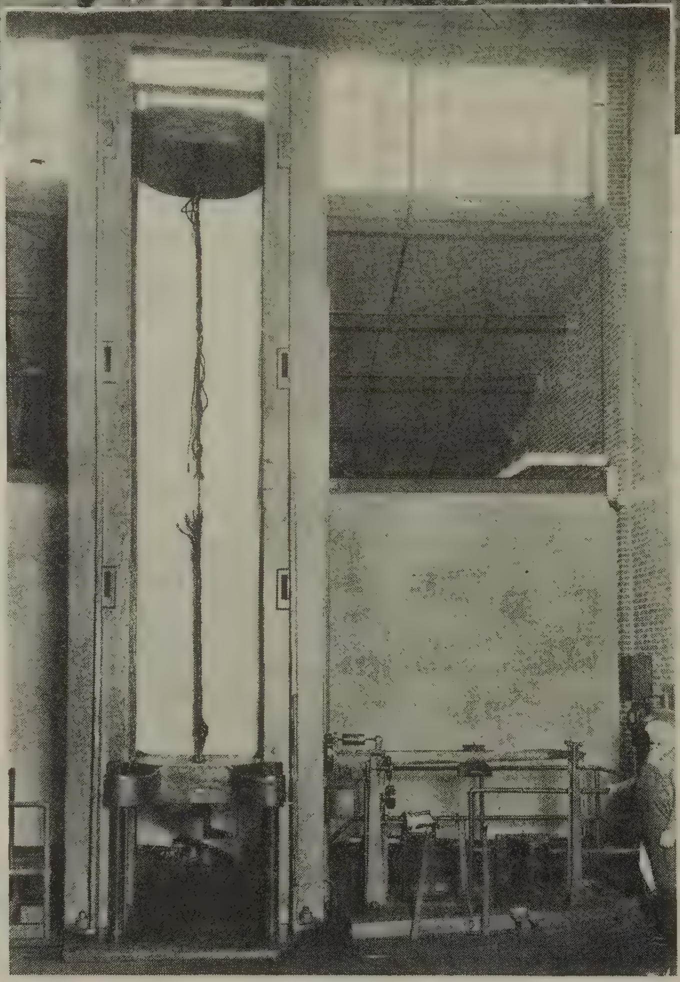
Big and Little Machines for Testing Wire Rope

MANUFACTURING plants where operations are based on the principle of quality as opposed to mass production require meticulous care in the testing of materials. An interesting example is to be found in the factory of A. Leschen & Sons Rope Co., St. Louis, manufacturer of wire rope. Research work has enabled it to ascertain the correct combination of properties of wire in order to produce rope for various exacting demands. To make sure that each individual wire meets the necessary specifications, the testing laboratory samples and tests each bundle of wire as it comes from the mill for strength, elongation, torsion and bending.

The laboratory is adjacent to the receiving department and occupies a space 168 ft. long and 77 ft. wide. It is equipped with Olsen torsion and tension machines, as well as with other special equipment. In order to avoid confusion in identifying wire which is being tested, portable holders shown in the view have been built. Each consists of 30 metal tubes, into each of which may be placed a sample of wire, the extra length dangling.



ABOVE Is Shown a Corner in the Testing Department With a Battery of Machines for Studying the Properties of Each Wire. Note the portable holders in the foreground for maintaining the identity of samples without error. They straddle waste barrels alongside machines and thus prevent accumulation of litter



NOT Only Must Every Wire Be Strong But the Cable Maker Must Be Sure That Fabrication Methods Produce a Rope of Correct Strength. At center is shown an 800,000-lb. Olsen tension testing machine, the largest ever built expressly for wire rope testing

Bronze Bearings for Heavy Duty

New Conditions Being Met by Proper Design and Crystal Structure—Some Common Errors in Design—How to Select the Right Material for Bearings

BY N. K. B. PATCH*

DURING the last few years there has been a marked development in improved materials for the manufacture of mechanical units, and this has not been confined to the steels and irons alone. The application of alloy steels, especially hardened steels, to shafts or journals in mechanical units has enabled the engineer to use new types of bronze bearings that would have been disastrous in the days of the old steels. Under present conditions of heavy duty, neither the old steel nor the old bronze would have stood the present punishment. Either or both would have been subject to condemnation not truly their due, but most assuredly the fault of the lack of knowledge on the part of the designer.

With the advent of improved materials in the shafts or journals, improved methods of obtaining accuracy in machining such rotating parts were also available. This improved accuracy no longer calls for a bronze bearing that has as one of its characteristics a conformability or plasticity to compensate for the irregularity in the workmanship of machining the journal itself. Through the elimination of this requirement of conformability, it is now possible to use the harder steels for the shafts or journals and the harder bronzes for the mating bearings. These bronzes, through their hardness, have less conformability but are, in wearing capacity in conjunction with the harder steels, a vast improvement.

Bearing Is a Mixture of Hard and Soft Crystals

A bearing bronze is essentially a mixture of hard and soft crystals, the hard crystals being the supporting media for the load and the softer crystals being the matrix in which the harder crystals are embedded. When subjected to wear, as in a bearing, the softer crystals abrade first, forming microscopical pockets in which the oil film is tenaciously held. The hard crystals, being harder than the surrounding matrix, do not abrade as fast, but to have satisfactory results from bearing bushings or other types of bearings, the hard crystal in the bronze must not be out of proportion to the hardness of the material in the shaft or journal; otherwise, the shaft or journal is scratched by these hard crystals in the bearing, friction is increased with a consequent temperature rise, which may, in turn, destroy lubrication, with disastrous results

To lay down a law relative to the relationship between the crystal hardnesses in the bearing and those in the journal or shaft is impossible in the light of present knowledge. It has, however, been definitely proved that, with the advent of the harder steels and the increased accuracy of manufacture of these shafts and journals from these steels, harder bronzes are not only an improvement but are essential to long life and satisfactory maintenance of accuracy in the fit of journal and bearing.

It is interesting to note at this point that a bronze of a given chemical analysis, such as many of those which are now used for bearings, may, if intelligently manufactured, when examined under the microscope, show a diversity of structures, each of which would have a definite hardness by reason of the difference in the amount of the hard crystals present therein.

Laboratory Control Is Essential

It is therefore apparent that laboratory control of the manufacture of the bearings or bushings from these alloys is essential to insure a uniformity of structure that may be relied upon to maintain the standard of the relationship between the hardness of the bearing and the hardness of the journal.

After an engineer has decided upon a certain kind of steel for shaft or journal, which is to have a certain heat treatment and will consequently be of a definite hardness, he will, in turn, need a definite hardness of bearing bronze to mate with it, and all of the parts so mating with the steel in the several machines must be exactly alike and uniform.

Many designers are not aware of the improved service to be derived from bronzes in which the crystal structure has been carefully controlled. Such a structure is, of course, more important where extreme accuracy is one of the governing factors, but it is also essential from the standpoint of long life and uninterrupted service of a given mechanical device.

It should be borne in mind that, with the advent of the harder steels and the use of a mating harder bronze, improved precision in workmanship on these two mating parts is imperative. This is, however, a much easier matter today by reason of the improved precision of modern machine tools as compared with those in use but a few years ago.

Too Many Oil Grooves a Common Error

Many of the plain bearings that have been condemned have not been at fault, but the workmanship in their manufacture should have been more thoroughly investigated. Take the common error of cutting quantities of oil grooves in the face of a plain bearing. Every oil groove in a bearing reduces the bearing area, not only by the amount of the area so removed by grooving, but also reducing the load-carrying capacity per unit of area of the bearing so grooved.

Examine some of these grooves and it will be found that the corners are so sharp as to become actual knife edges, cutting and destroying the necessary oil film, even though the best possible oiling mechanism is available to keep re-establishing the oil film. An oil groove should be well chamfered at its edges, so as to help the oil film to develop rather than to scrape the film from the journal.

Other Errors in Design

Again, consider the erroneous practice on the part of many manufacturers who, in order to save a small amount of money in the first cost of the bearing or bushing, recessed the back of the bushing so as to save the weight, thereby making the bushing thin enough in spots actually to weaken the bushing to a point where the load is not supported sufficiently. Thus the actual supporting area of the bearing is materially reduced, frequently to a disastrous point, causing condemnation of the bearing material, when in reality it was a case of faulty design.

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*Secretary Lumen Bearing Co., Buffalo, N. Y.

Examine the clearances allowed between the journal and the bearing. In many instances the allowance for oil films between the two mating parts is insufficient to permit a satisfactory film to be present, and consequently some part of the bearing is dry. Obviously, plain bearings or the materials therein get a black eye here, when, as a matter of fact, the design should be held at least partly responsible.

Such errors as the few outstanding ones mentioned above are not infrequent ones, and yet the bearings, if properly manufactured from the right materials, would have given satisfactory service.

It is true that, in the production of the modern plain bearing, not only the correct bronze must be present, but the bronze must have the proper crystal structure within it to be a fit mate for such steel journals as are now available and are coming into more and more common use.

Then, too, both the steel and the bronze must be accurately machined and, if they are to give the best results, they must be properly housed in the machine itself and held in place by such means as to preclude local pressure at any one point in the bearing, and thus avoid distortion.

Vital Factors in Design of Bearings

Designers who understand the application of modern steels to modern bronzes for such bearings recognize that many factors must be borne in mind. Among these are the following:

1. Accuracy of machining.
2. Proper allowance for oil film.
3. Proper oil grooving.
4. Consideration of the heat developed by friction, and its proper radiation and control.

These, of course, are the important factors after the proper materials have been decided upon for the service intended. Such factors as speed and pressure per unit of area are, of course, the prime ones. Obviously, these have been considered since engineering has been considering the design of bearings, but now that the users of a machine or other mechanical device expect to double or triple, or frequently increase by many fold, the production from a given machine, the factor of safety in such bearings can be increased only by the use of the best bearing material for the service in conjunction with the right kind of material in a journal mating with it.

Correct Manufacture Essential

Here enters the problem of the correct manufacture of the bronze for the service. A few years ago a bronze of a given analysis would have been considered satisfactory if the chemical analysis proved to be true to formula. Today not only the chemical analysis must be correct but the crystal structure must also conform to that best suited for the service intended. Makers of bearings and bushings should be equipped to handle a bronze so as to deliver a uniform crystal structure as well as a uniform chemical analysis.

Modern Worm Gears Cited

Look at the improvement in the service of the modern worm gear as a result of the control of the crystal structure therein, so as to mate with the hardened and ground worm, giving a resulting maximum of life. Here the punishment is frequently most extreme. Lubrication is frequently inadequate, yet such gears are proving eminently satisfactory for this service and are demonstrating conclusively that the relation between the crystal structure in the bronze and that in the steel must be carefully considered to give maximum satisfaction.

Crystal structure in bronze is important from the standpoint of life under bearing service, but is also important in such materials in other types of service. Witness the leaky valve or pump body, subject to hydrostatic tests, which, if cast of the identical alloy but having proper crystal structure would develop no leaks. Here, again, one sees the importance of scientifically controlled castings for modern industrial needs.

In the preceding remarks, in using the term "new bronzes" reference is made to bronzes as produced today. They may not differ in chemical analysis from those which have been made for many years but in uniformity of structure and uniformity of analysis they are far superior. In some cases the physical characteristics of the bronze may mean heat treatment; in others, the scientific control of temperatures or the scientific control of the cooling from the liquidus to the solid. The term "new bronzes" may also refer to new applications of the bronzes, which have been well known for years, but were considered too hard for service before the advent of modern steels and modern precision in machining.

Selecting the Right Bronze for the Service

No doubt, many readers of this article will ask what is the proper crystal structure for mating with a given steel and how can this be best determined? In the writer's opinion, this is a subject for specialists to decide and each individual case must have individual consideration. To make a decision of this kind it is necessary to know many details which heretofore have been somewhat passed over as negligible. Some of the factors that must be borne in mind today are as follows:

1. Horsepower transmitted by shaft.
2. Revolutions per minute of shaft.
3. Load per square inch of bearing area.
4. Character of workmanship in machining of journal and bearing.
5. Type of material and hardness thereof in shaft.
6. Is shaft to be ground to accurate measurement after hardening or not?
7. Kind of lubrication to be used.
8. Lubricating device.
9. Type of service (whether intermittent or continuous).

These and other minor factors all have much influence on the decision as to the right bronze for the service. Further, the question of impact in service is very important. It is thus apparent that the use and application of plain bearings have advanced today to a case where a specialist in their application is quite as essential as is a specialist in many other fields.

Conference and Exhibition of Industrial Advertisers

Industrial advertisers will hold their annual conference at St. Louis, June 11, 12 and 13, with headquarters at the Hotel Chase. The speakers include J. G. Pollard, Jr., Harvard Graduate School of Business Administration; Arthur E. Little, Thew Shoved Co., Lorain, Ohio; Sherman Perry, American Rolling Mill Co., Middletown, Ohio; John K. Blitz, Detroit Steel Products Co.; George C. Miller, president Dodge Mfg. Co., Mishawaka, Ind.; G. W. Morrison, Ingersoll-Rand Co., New York; and Fred R. Davis, General Electric Co., Schenectady, N. Y.

There will be an exhibition covering industrial advertising campaigns, placed in competition for eleven different awards.

The meeting is held under the auspices of the National Industrial Advertisers Association, of which H. von P. Thomas, Bussman Mfg. Co., St. Louis, is secretary-treasurer.

East Chicago Trains Apprentices

Chamber of Commerce Organizes Group of Manufacturers and Local School System Into Cooperating Unit—Desirable Students Rapidly Recruited

BY H. R. PACKARD*

ONE million young men should be in training in our industrial plants, according to the National Industrial Conference Board; yet less than 10 per cent of this number is now being trained through formal apprenticeship. Only a few establishments maintain apprenticeship programs, because only the larger ones can set up and maintain adequate training facilities. It is difficult to realize that less than one-half of one per cent of all manufacturing establishments employ over 1000 men; more than 85 per cent employ less than 100 men. Some plan must be evolved by means of which the smaller industries can participate and do their proportionate share of the training.

About a year ago the Chamber of Commerce of East Chicago, Ind., realizing the importance of such an industrial training activity, directed its attention to the evolution of an adequate plan for its industries. It was discovered that the "community plan" for training skilled personnel was not only feasible but that it had been proved a success in other districts.

Apprentices Attend Special Classes Weekly

With the beginning of the current year, paper programs were translated into realities. At the present time 85 indentured apprentices are at work learning the essentials of their respective trades and attending school one-half day per week for the related or technical training so essential in their apprenticeship. During this period, for which they are paid apprentice wages, they attend a high school class set aside for their particular needs and conducted by the vocational educational department of the local school system.

This "continuation" plan was decided upon as being the most practical and best suited to local conditions. Apprentices are indentured to individual plants and are schooled through the essential operations of their trade at actual shop work. This portion of the plan is continuous and is distinctly different from the "cooperative" plan of education, wherein the students work and attend school in alternate periods of equal length.

Thus the two essentials of modern trade training are adequately met. The manual or craft portion of their training is provided by detailed schedules of shop work covering all essential operations. The educational phases of the trade work, which cannot be provided on the job, are supplied by class room and study. An order of studies suited to each trade is carefully pursued. In general, these cover the following four main divisions: English, mathematics adapted to the trade, technical or related studies and, finally, a general division including shop economics, safety and hygiene.

An advisory committee administers this program. Its personnel consists of representatives from each participating plant and from the local school system. The policies and general direction of the program rest with this main committee. Various sub-committees are as follows:

Apprenticeship Administration Committee deals with training programs, not only within individual plants, but also a community program where details are common to all plants.

School Methods Committee is the link between the industries and the local school organization.

Shop Schedule Committee provides an interchange of apprentices wherever complete programs are impossible in any one plant, owing either to a lack of diversity or quantity of production and manufacturing operations. In this manner adequate shop schedules can be presented to every apprentice.

Wage Scales Committee has general jurisdiction over apprentices' rates of pay. Obviously it is essential that all establishments pay the same rate of pay in any given trade.

All prospective apprentices are interviewed by the apprentice training department of the Chamber of Commerce. A complete and adequate file enables us to provide young men, as apprentices are required in the cooperating industries. Routine machinery to arrange a school program satisfactory to both shop and school, the parents and the apprentices, has been set up by the Apprenticeship Administration Committee.

Interchange Between Shops Gives Rounded Experience

Unless adequate schedules of shop work comprising the essential operation of each trade are provided in any apprentice training program, it must of necessity fail sooner or later. To insure this in the East Chicago plan, ideal schedules for each trade were prepared. Each participating plant for those trades next prepared the schedule of operations best suited and possible to its own manufacturing operations. These schedules were then compared with the ideal to insure that no large discrepancies might creep into any individual plant program.

However, where it has been impossible for an individual plant to conform quite closely to the ideal schedule, interchange of apprentices has been agreed upon. Accordingly, the apprentice from such an organization will be able to complete his training in a larger plant in the community or at least in one which can provide such operations as are lacking in his original schedule.

The apprentice, however, is indentured to an individual plant and remains the employee of that plant throughout his apprenticeship. While at work in another plant participating in the program, he comes under the immediate jurisdiction of that plant and is paid by the plant for which he is working.

Apprentices are paid at a rate which insures the possibility of supporting themselves. Rates increase every six months until at the end of the four years' training the apprentice is receiving about 75 per cent of a mechanic's rate. Changes in these schedules, which differ slightly for the various trades, can be made only under the direction of the Wage Scale Committee, whenever such revisions seem necessary. All participating plants pay the established rates.

Grade School, High School or College Graduates Accepted

The minimum educational requirement which has been set is a grade school education. A boy leaving grade school must spend four years in trade training. A young man who has completed high school is given one year's credit and will therefore complete the same shop schedule in three years. A college graduate must devote two years to the same program.

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*Secretary-manager East Chicago Chamber of Commerce, East Chicago, Ind.

The program both as regards shop and school work has been prepared to meet the needs of these three classes, since the related school portion of this apprentice training is entirely on an individual basis. Each apprentice pursues a course of studies adapted to the trade he has entered, and he proceeds at his own pace unhampered. Instruction is devoted entirely to assistance and guidance for the individual. This is necessary, not only because of the varied previous educational experience, but also because apprentices must necessarily be inducted at any time throughout the year. The student is given 4 hr. per week on the employer's time for class room work; he is also required to spend an equal amount of time in home study.

All of the essential factors in this program are incorporated into an apprentice indenture or agreement, to which the employer and the apprentice, with his parents or guardians, are parties. The indenture sets forth in detail the shop and school schedules, as well as the rates of pay according to which the apprentice will work throughout his term of training. The employer agrees to provide employment approximately according to this schedule, and the apprentice is assured of employment regardless of business conditions, except in the case of complete shutdown. The apprentice and his parents in turn agree that he is to remain in training throughout the term specified. Each month the apprentice and his parents receive a report setting forth the shop and school grades attained.

Eighty-five apprentices now attend classes at the local high school. They are divided into five groups, one of which is in school Monday, another Tuesday, and so on, thus utilizing the teaching facilities to good advantage. Approximately 125 apprentices are employed in the eight manufacturing establishments now participating in this program. The extra 40 were previously employed and had progressed to the point where it was thought inadvisable to arrange for related classroom instruction.

More than 115 applications are on file in the Chamber of Commerce, a source of excellent recruits. Information about the plan is spread through the schools, parent-teachers' associations, and civic and social organizations in the community.

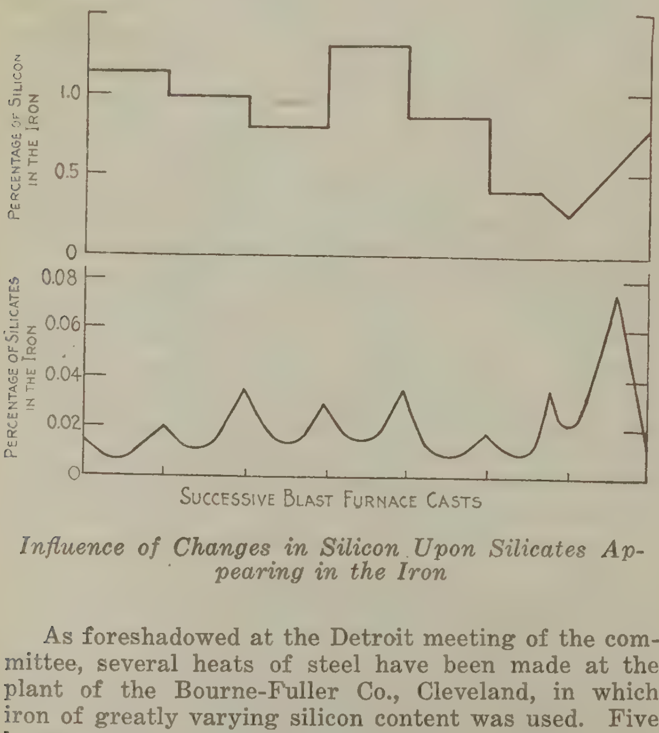
From a survey made about a year ago, it would appear that between 350 and 400 apprentices can be placed in training in the industries in East Chicago, on the present basis of employment. This maximum number will be approached gradually. New manufacturing establishments are being added to the program at intervals, thus allowing the administration of this plan to expand in a safe and reasonable manner.

The East Chicago industrial community has determined to place itself on a firm foundation as regards the skilled personnel necessary for its continued industrial well being. The plan as adopted by the Chamber of Commerce has some successful experiences in other communities to justify it. Some adaptation naturally was necessary to meet the needs of this community, but thorough preliminary study and careful organization has surmounted such difficulties as have arisen.

SOLUBILITY OF IRON OXIDE

Results of Special Heats Made to Check Up on Blast Furnace Conditions

AT the last technical session of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers, held at the Hotel Ohio, Youngstown, May 4, the discussion of open-hearth problems was closed by the presentation of an informal paper dealing with the solubility of iron oxide in iron and with the influence of changes in silica upon the silicates appearing in the iron.



Influence of Changes in Silicon Upon Silicates Appearing in the Iron

As foreshadowed at the Detroit meeting of the committee, several heats of steel have been made at the plant of the Bourne-Fuller Co., Cleveland, in which iron of greatly varying silicon content was used. Five heats were reported by C. H. Herty, Jr., two with iron at about 1 per cent silicon, two in which the silicon was coming down to a low figure, and one at about 0.30 per cent silicon. These were rolled into billets and rounds and into galvanized sheets, the latter including some from the low-silicon iron as well as the normal.

It was found that, so long as the silicon in the pig iron remains approximately uniform, good results are obtained in the steel. When a change occurs in the blast furnace, however, resulting in a change in the silicon content, up come the silicates in the iron. This occurs whether the silicon content of the pig iron is increasing or decreasing. And the good results come with uniform silicon, whether it is high or low.

Very little trouble is experienced in open-hearth practice, according to Doctor Herty, unless the iron gets above 0.10 per cent in silicates. All of the steel made from these special heats was rimming steel of about 0.10 per cent carbon and 0.40 per cent manganese. On the low-silicon irons the slags were much higher in iron oxides all the way along the heat.

Four of the heats were made in about 11½ hr. each. The last one, from the low-silicon iron, took 17 hr. Doctor Herty expressed the opinion that, for 0.10 per cent carbon steel, the iron oxide in the slag ought not to run over 22 per cent. He stated that an addition of 200 deg. to the furnace temperature would get rid of three-fourths of the iron oxide content in the slag or in the steel.

Second International Conference on Bituminous Coal

Eleven different countries, represented by 60 to 70 scientists and fuel technologists, are expected to participate in the second international conference on bituminous coal. This will be held at the Carnegie Institute of Technology, Pittsburgh, in the week of Nov. 19. The list includes about 40 men from Europe, including England, France, Germany, Italy, Austria, Denmark, Belgium and Russia. Japan and Canada will be represented also.

The forty-eighth annual dinner and meeting of the Cleveland Engineering Society will be held June 12. The principal speaker will be Elmer A. Sperry, president of the Sperry Gyroscope Co., Brooklyn, whose subject will be "The Engineering Contributions of the Gyroscope."

Powdered Coal in Steel Furnaces

Thirteen Years' Experience of Eastern Steel Co.—Between 500 and 600 lb. Per Ton of Ingots and 200 Heats to One Roof

THE use of pulverized coal in basic open-hearth furnaces, covering the experiences at the plant of the Eastern Steel Co., Pottsville, Pa., was discussed in a brief paper contributed to the Pittsburgh meeting last month of the American Society of Mechanical Engineers by E. L. Herndon, receiver for the Eastern Steel Co. The experience supplies the record of 13 years' use of the fuel without any word of advocacy or otherwise for such a plant. What discussion developed on the presentation of the paper left the impression that pulverized coal for the metallurgical furnace had no particular friends among those at the Pittsburgh meeting.

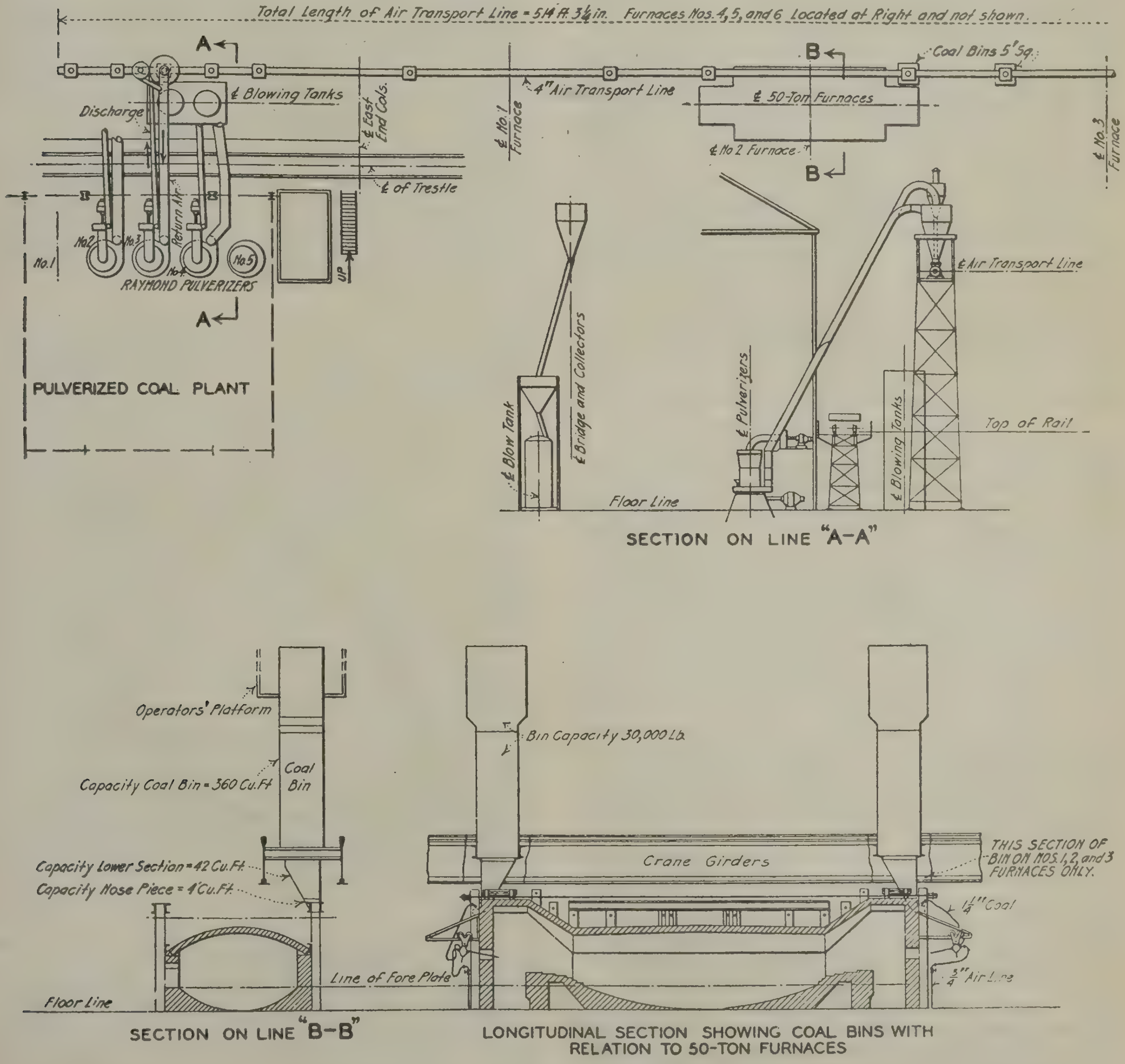
However the facts and figures of the case were generously contributed by Mr. Herndon, as shown in the following, which is the paper substantially in full. The use of the powdered coal, the author mentioned at the outset, came about as the result of the continued advance in the price of fuel oil.

The open-hearth-furnace plant consists of four 50-ton furnaces and two 80-ton furnaces. All have basic bottoms, all are stationary, and all are of the ordinary design.

When the pulverized coal was first used in the furnace, it was found that the checkers were filling up with ash. It was realized that this could not be prevented, and therefore arches were substituted for the checkers because of the greater space. The arches are placed about 18 in. apart in rows, one above the other, with about 3 ft. between the rows.

The furnaces are reversed by two dampers, one placed in each flue between the checker chamber and the stack. This gives the products of combustion a direct path to the stack.

The slag pockets are equipped with removable structural-steel boxes which fill up in about 15 days. The time ordinarily required to pull two boxes and get the fuel on the furnace again is about 5 hr. The boxes used for the 50-ton furnaces are 15 ft. x 10 ft. x 2 ft. 5 in. deep; for the 80-ton furnaces, the dimensions are


Total Length of Air Transport Line = 514 ft. 3¼ in. Furnaces Nos. 4, 5, and 6 Located at Right and not shown.
A
B
Coal Bins 5' Sq.
℄ Blowing Tanks
Discharge
℄ East End Cols.
℄ No. 1 Furnace
4" Air Transport Line
℄ 50-Ton Furnaces
℄ No 2 Furnace
℄ of Trestle
℄ No. 3 Furnace
No. 1
No 2
No 3
No 4
No 5
Return Air
RAYMOND PULVERIZERS
UP
PULVERIZED COAL PLANT
℄ Blow Tank
℄ Bridge and Collectors
℄ Pulverizers
℄ Air Transport Line
℄ Blowing Tanks
Top of Rail
Floor Line
SECTION ON LINE "A-A"
Operators' Platform
Capacity Coal Bin = 360 Cu. Ft.
Coal Bin
Capacity Lower Section = 42 Cu. Ft.
Capacity Nose Piece = 4 Cu. Ft.
Line of Fore Plate
Floor Line
SECTION ON LINE "B-B"
Bin Capacity 30,000 Lb.
Crane Girders
THIS SECTION OF BIN ON NOS. 1, 2, and 3 FURNACES ONLY.
1¼" Coal
¾" Air Line
LONGITUDINAL SECTION SHOWING COAL BINS WITH RELATION TO 50-TON FURNACES

Coal Pulverizing Plant Is at One End of the Open-Hearth Plant and the Coal Is Carried by Compressed Air to Bins at the Furnaces

18 ft. x 10 ft. x 2 ft. 5 in. All four sides of these boxes are tapered, and the boxes are lined with a 9-in. lining of old bricks laid up in common clay.

Each furnace is supplied with two storage bins for pulverized coal, which have capacity sufficient to operate a 50-ton furnace for 18 hr. and an 80-ton furnace for 15 hr. The coal is supplied to the furnace from the bins by compressed air siphons. On the 50-ton furnaces the air jet is ⅜ in. in diameter and on the 80-ton furnaces, 9/16 in. in diameter. The air pressure used is 80 lb. per sq. in.

Each furnace is supplied with the necessary equipment for using fuel oil in case of emergency. The oil supply is stored in the usual way, in a tank of considerable capacity, and is at all times on tap.

The plant for pulverizing the coal is situated near the end of the open-hearth building. Preparation of the coal consists of crushing, drying, and grinding. At various times lump, run-of-mine and slack have been used. The equipment consists of three Raymond five-roller mills and one Raymond four-roller mill. Each mill is connected to a motor. There are in addition two Cummer driers and one Jeffrey single-roll coal crusher.

When the coal is received, the railroad car is placed over a pit and the load dumped into the pit. From this it is hoisted to the top of the building, a height of about 100 ft., by an Otis automatic dump-bucket elevator. There are two buckets, which are operated in the manner of the usual blast-furnace skip.

When it reaches the top of the skip, the coal is dumped into a storage bin which has a capacity of about two carloads; thence it passes to the crusher, located directly below the bin. The crushed coal is dropped into another bin for storage before sending it to the driers. The compartments for storing dried coal are quite small because it is thought unsafe to keep any considerable quantity of dried coal in storage. Each storage compartment is situated directly over one of the pulverizing mills, and the height of the drier above these compartments is just sufficient for a steel tube to lead to each individual compartment so arranged that there is no possibility of holding any considerable amount of dried coal over the mill. The coal is ground to pass 80 per cent through a 200-mesh screen.

After the coal has been pulverized, it is conveyed to the furnaces by a Quigley compressed-air system. There are two steel tanks, each tank permanently fixed upon a scale by which the coal is weighed. The dial on the scale shows the amount of coal in the tank when it is being filled, and also shows the amount when the coal is being discharged, so that the readings show the weight of the amount taken to the furnaces. Compressed air is used for transporting the pulverized coal through a 4-in. pipe which connects the tanks just mentioned with the coal boxes over the furnaces. The distance from these tanks to the box at the farthest furnace is 450 ft. Each furnace supply box is furnished with a valve so that any box may be refilled as needed.

At a 12-in. mill located at about the same distance from the tanks as the farthest open-hearth furnace, pulverized coal is used in a continuous furnace. The same method of transport is used for this supply.

The average analysis desired for coal suitable for pulverizing for open-hearth purposes is about as follows: Volatile, 36 per cent; fixed carbon, 52 per cent; moisture, under 1.25 per cent; ash, 6 to 8 per cent; sulphur, under 1.25 per cent.

The operation of the open-hearth furnaces does not now present more difficulty than with producer gas, though it is not as simple as with oil. All-cold charge is used, and the time for charging is about 4 hr. The scrap is, in general, quite light and the percentage of pig iron is kept as low as possible because of cost. One heat in 12 hr. is considered as 100 per cent, and it is usually possible to keep fairly near this through the campaign. The life of furnaces is about 200 heats for one roof. Usually a second roof can be put on without disturbing any other part of the furnace, and then an additional 100 to 150 heats can be obtained with this second roof.

The coal required runs as low as 500 lb. and as high as 600 lb. per ton of ingots. The wide variation is partly due to character of coal, partly to the charge, to the analysis required in the product, and a little to the age of the furnace, although the time from tap to tap varies less than was formerly thought possible. The temperature maintained in the furnaces is essentially the same as that with producer gas.

There have been infrequent explosions, one in which one life was lost and considerable damage to property resulted. The others were not of consequence. The cause of the serious explosion is not known, although reasonable theories and some conjectures are held, but no proof. The experience during thirteen years does not seem to indicate extra-hazardous occupation.

WELDING ON BUILDINGS

Detroit Architect Speeds Erection with Welding and Cutting Equipment

WELDING of structural steel was discussed by Joseph Matte, Jr., of Albert Kahn, Inc., Detroit, at a meeting of the Cleveland section of the American Welding Society held at the rooms of the Cleveland Engineering Society, May 31. He cited various operations which, because of more rapid work and reduced costs, could, in his opinion, be done more advantageously by arc welding than by riveting. Field work, he said, offers opportunities for the larger welding operations, since many structural conditions are best met by that process. In a little while, he believes, there will not be many structural jobs on which an arc welder is not employed.

Comment to the effect that welding in its operation is in about the same place as riveting was 20 or 30 years ago was made by J. F. Lincoln, vice-president and general manager Lincoln Electric Co., Cleveland, who also predicted that great progress will be made in this industry.

Mr. Matte said that one of the most common objections to welding is that it depends on the human element and is not subject to inspection like riveting. However, there has not been a single failure of welding in the structural field. Welders use a factor of safety of five, and welds have been made that carry loads up to 600,000 lb. in shear. While the human element has much to do with welding, the same is true of the manufacture of the best steel. To assure good work the supervisor of welding must be a welder and should test the ability of his men, so that no one insufficiently trained is put on the job. In addition, numerous safeguards can be provided. Good welders can be secured as well as good riveters.

Some structural jobs require welding, declared the speaker. Referring to specific operations, he mentioned the erection of a large house having a complicated hip and valley roof with intricate framing. Drawing up elaborate details would be a waste of time. Instead, he would have the various sections cut to mill lengths and the welder would do the job about the way a carpenter would if wood construction were used. The real way to attach bar joist floor supports to the steel structure is by welding. The right way to build a steel swimming tank is to weld it, he said. Welding and cutting is of great assistance in factory construction for placing mechanical equipment and pipes.

Another place where welding fits in, said Mr. Matte, is when the owner of a building under construction decides on changes, which would stop the work and require new drawings and new shop fabrication. With the application of welding, beams of the right length are sent and welded in the field, an the job goes right along without delays. Mr. Matte spoke of one building where new elevators are being put in, new mezzanine floors are being erected and other changes are being made, all the work being welded.

Production of electric power by public utility power plants in the United States in April is reported by the Geological Survey at 6847 millions of kwhr. This compares with 7234 in March and with 6871 in February. It was about 5 per cent ahead of last year. Water-power provided nearly 43 per cent of the total, against 39 per cent in March.

Power and Other Steel Mill Problems

Waste-Heat Boilers, Power Plant for Steel Mills and Basic Open-Hearth Practice Discussed by American Iron and Steel Institute

ABSTRACTS of two of the papers read at the spring meeting of the American Iron and Steel Institute, New York, May 25, are given below, supplementing the abstracts of three of the papers published in THE IRON AGE of May 31. There is also published on the following pages the discussion of Dr. George B. Waterhouse's paper, "Basic Open-Hearth Steel Practice" (abstracted last week), offered by Carl W. Peirce, until recently open-hearth superintendent Empire Steel Corporation, Mansfield, Ohio, and also some of the discussion offered by H. B. Hubbard, superintendent, open-hearth department, Inland Steel Co.

Waste-Heat Boilers in the Steel Mill

BY R. H. STEVENS

OUTSIDE of a few instances, the steel industry paid little attention to conservation of waste heat until about 15 years ago, when it made a determined start to recover the enormous losses in coke-making, and to conserve heat wasted at almost all kinds of furnaces, by installation of waste-heat boilers, recuperators, etc. Of course, the waste-heat boiler had been in use for many years on puddling furnaces as the principal supply of steam for rolling and hammering the puddled iron.

[Consideration is given by the author of gas temperatures involved, composition and heating value of the gases, proper location of the boiler (s) with relation to the open-hearth furnace and the electric power-generating plant, steam pressures obtainable, possibility of explosion at valve reversal, fans for draft, superheaters and economizers, air infiltration, draft requirements, heat losses and type and design of boiler.]

It is no doubt apparent that the foregoing presentation has been based entirely upon conditions existing in the manufacture of steel and that the conclusions formed apply more particularly to that industry.

Reclamation vs. Improving Primary Unit

Periodically, in the past, we have been confronted with the reclamation problem in some form or another. Generally the first conclusion has been to install something directly for reclamation; whereas waste reduction by improving the primary unit becomes a consideration only after repeated failures at reclamation. Some years ago, smoke consumers engaged the attention of many engineers and for a while seemed destined to reimburse the manager for the losses from poor combustion.

At one time, instead of trying to reduce the coke consumption per ton of pig iron, it was considered wise by some to increase this amount, so that more blast furnace gas would be available, and thus return a profit in excess of the expenditure. The low-pressure steam turbine, in conjunction with wasteful high-pressure reciprocating engines, was once to be the true remedy for steam power wastes. Within a comparatively short time, all of these proposals have been advocated, applied and displaced by a reversion to the primary unit and the development of its possibilities.

To Obtain Better Economy

These incidents indicate that increased economies most likely can be obtained by improving the primary unit, and when that fails, the primary unit itself must be displaced. Extraordinary savings effected by a waste-heat boiler might well be accepted as a warning to improve the combustion or furnace design rather than as a cause for rejoicing.

Generally speaking, when the steam generated by the recovery of heat is returned to or utilized by the primary unit, the waste-heat boiler can possibly be advantageously and economically used. But when the steam so generated is not thus required, or when it is in excess of those demands, study of the returns from such installation costs is very apt to decide against such recovery.

Conclusions

1—While the generation of steam is in general a very feasible way of recovering waste-heat energy, an installation for the purpose is apt to be one of the most expensive, and the ultimate results no better than those possible with a less costly scheme.

2—Metallic recuperators are now capable of receiving the hot burned gases as high as 1600 deg. Fahr., or higher. This seriously affects the justification for waste-heat boilers and, when used in connection with regenerators, may exclude the necessity for installing a steam generating unit.

3—Increased knowledge and more careful observation of the laws of heat generation and absorption apparently lead to the elimination of divided or multiple systems of heat utilization, to effect maximum economy.

4—Complete utilization of heat by the primary heating unit promotes economies in excess of those represented by the performance of the boiler.

5—Apparently the field wherein the waste-heat boiler can make the best showing is the one wherein the reclaimed energy is not required directly by the process from which it came.

Comparison of Results in Practice

Five operating installations, figured from actual yearly results and costs, were compared, by W. N. Flanagan, Carnegie Steel Co., in discussing Mr. Stevens's paper. These waste-heat boiler plants were equipped as follows:

I—Fifteen horizontal fire-tube boilers, with small economizers.
II—Two Yarrow boilers with large economizers.
III—Twelve Babcock & Wilcox boilers, with no economizers.
IV—Twelve Stirling boilers with no economizers.
V—Ten Erie City boilers, with no economizers.

Of these five groups, the fire-tube boilers gave the greatest output of steam to the ton of steel made and the greatest output for each million B.t.u. furnished them. They showed 31.6 per cent of the fuel returned

IN 1888 R. H. Stevens entered the machine shop of the Edgar Thomson plant of the Carnegie Steel Co. at Braddock, Pa., as an apprentice, serving until 1891, *when he entered the drawing room of the Homestead Steel Works of the same company. In* 1898 *he became assistant mechanical engineer and in* 1902 *chief engineer, which position he held until he became chief engineer of the Midvale Steel & Ordnance Co., at Philadelphia, in* 1915. *This position he retained, except for one year as works superintendent at Coatesville, Pa., until* 1923, *when the Bethlehem Steel Co. took over the Cambria plant. Then he was transferred to his present position, that of chief engineer of the Bethlehem company at Johnstown, Pa.*

as steam, against an average of some 22 per cent for the others. Their initial installation costs, based at 100, compared with much higher costs, up to 260, for the others. Their total operating costs, again at 100, were compared with 236 for the best of the others, and 286 for the poorest.

Steel Works Power and Blowing Plant

BY WILFRED SYKES

IN 1923 the Inland Steel Co. began construction of a new power and blowing plant adjacent to the blast furnaces, to use the blast furnace gas to better advantage and to supplement the existing electric supply. The newer mills were electrically driven, power being obtained from a 20,000-kw. turbo-generating station, supplied with steam from coal-fired boilers. Extensive additions were then being made to the plant and electrification of the older steam-driven mills was contemplated.

Total power generated............		172,676,400 kwhr.
Total power cost..................		$761,826
Pig iron produced, gross tons......		811,417
Total cost of blowing.............		$397,895
Cost of blowing per ton iron produced		$0.49
Credit for gas used from blast furnaces at power house	$956,925	
Credit for gas used under boilers for steam used for other purposes.......	$105,585	
Total credit to blast furnaces for gas		$1,062,510
Credit per ton iron produced.......		$1.31
Net credit to blast furnaces, after deducting cost of blowing........		$0.82
The gas credit to the blast furnaces was based on being the equivalent of 278,874 tons of coal, the value of which was $3.81 a ton.		
Average operating cost per kwhr...		4.41c.
Capital cost per kwhr.............		1.91c.
Total cost per kwhr...............		6.32c.

There were installed three 12,500-kva. turbo-generators and five turbo-blowers for the four furnaces. In addition to supplying a. c. power for general plant use, the station also supplies direct current for the operation of the docks, blast furnaces and coke plant. For this purpose four 1000-kw. 250-volt rotary converters were installed.

[After detailing, with illustrations, the principal features in the new development, the author gave a series of interesting figures as to operating results achieved. His table showing operating costs for 1927, with some additions made in his oral presentation, appears at left.]

Economies Along Several Lines

In discussing Mr. Sykes's paper, O. Needham, Westinghouse Electric & Mfg. Co., pointed out the great economy in erection of the Inland plant, costing $58.50 for each kilowatt of installed power, against $80 to $125 for installation costs in public utility stations.

He called attention, also, to the considerable reductions in weight of turbo-generators and other units as now made, compared with the practice of only a few years ago. As much as 30 per cent of the total weight of a turbine is cut off, due to the use of welded members, instead of castings, for frames and other parts.

Quality Factors in Basic Open-Hearth*

BY CARL W. PEIRCE

YEAR by year the demand for better steel has been growing stronger but never have the products for which it was made required the care in the steel plant that they do today. The advent of the motor car and airplane, the use of high-speed tools and a thousand different uses call for steel able to withstand heavier dynamic strains. We live in a specialized age. The users of steel, being in close competition, are constantly adopting new practices in fabrication which subject the steel to harder and harder treatment. Day by day the steel manufacturer is confronted with the problem of doing something to meet this new demand.

This discussion will be confined to the three points, (1) the charge, (2) the working and (3) the casting of the heat, emphasizing the need of more supervision and closer attention to details.

The Charge

QUALITY steels cannot be made from inferior raw materials. In making up a charge for a basic heat, materials of a known composition should be used, to avoid soft and raw melting heats. When a heat is properly charged it is half made. A charge which melts soft, or high and raw, is apt to show defects in the finished product, no matter how carefully it has been worked. For this reason, the utmost care should be

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*Discussion of paper by Dr. G. B. Waterhouse on "Basic Open-Hearth Steel Practice."

EDUCATED at Melbourne University, Melbourne, Australia, in electrical and mechanical engineering, Mr. Sykes was engaged in engineering work in that country from 1901 *to* 1906. *From* 1907 *to* 1909 *he was employed as an engineer by the Allgemeine Elektricitäts Gesellschaft in Berlin, Germany. He was an engineer with the Westinghouse Electric & Mfg. Co., East Pittsburgh, in* 1909 *to* 1920, *in charge of steel mills and other engineering work. He was also an engineer with the Steel & Tube Co. of America from* 1920 *to* 1922, *and has been with the Inland Steel Co., Chicago, from* 1923 *to the present time. He is now assistant general manager of the company.*

used in properly proportioning the materials making up the charge. Materials unloaded in the stock house should be segregated according to their analysis and physical appearance.

A definite amount of carbon in the charge is necessary to melt and refine it. Less than this gives a soft melting heat and an inferior product; more than this requires extra time to reduce, with the added danger of over-oxidizing the metal while doing it. Uniform charges containing a definite amount of each material should be used, with the proportion of iron and scrap to be governed by the speed and working of the individual furnace.

Sulphur and phosphorus can be removed from the bath in small amounts only, so that care should be used in limiting the quantity going into the charge. In one open-hearth which uses a large amount of machine shop turnings, a sulphur determination is made of each car before it is placed in the stock house, and a set amount of high-sulphur turnings is used in each heat, the stockhouse foreman keeping the number of pounds of sulphur below a given amount. In this way, 95 per cent of all heats finish below 0.030 per cent sulphur.

Too high a percentage of silicon in the pig iron being the main cause of high and raw melting heats, the amount going into the charge should be closely watched. Where cold iron is used it should be segregated according to its silicon content in at least three piles. The large pile would contain all iron ranging from 0.85 to 1.15 per cent silicon, the other two, all casts below 0.85 per cent and above 1.15 per cent. In loading for a charge, the greater amount should be taken from the 0.85 to 1.15 per cent pile, with a magnetful or two from each of the other two piles to keep them balanced.

Keeping Tabs on Mixer Iron Characteristics

In open-hearth furnaces where hot metal is used, a silicon and sulphur determination of the mixer iron should be figured after each cast from the blast furnace is poured in. This is done on the basis of averages. Over a considerable space of time mixer men have been able to check with the laboratory within seven points of silicon and three of sulphur.

Adding	Units
100 tons in mixer of 1 per cent Si=........	100
100 tons from blast furnace of 0.75 per cent=	75
200 tons into..............................	175= 0.875 per cent Si.

The sulphur content is averaged the same way. When the next cast from the blast furnace arrives, the amount of metal drawn out since the previous cast is subtracted from the 200 tons, the remainder multiplied by 0.875 per cent and the new cast and analysis added as before, checking the analysis once a day with the laboratory. To carry out this practice, the iron samples from casts should go promptly to the laboratory, to permit the analyses to reach the mixer shortly after the cast.

This arrangement gives the melter accurate knowledge at all times of the mixer iron. When the silicon runs abnormally low, the scrap should be reduced and extra iron added. As the silicon increases above 1.10 per cent, the amount of hot metal should be reduced and, when reaching 1.30 per cent, can be cut 8000 or 10,000 lb. on a 100-ton charge. By following this practice more uniform melts, with a proportionate increase in tonnage and a better quality of product, are produced.

Working of the Heat

IN setting the specifications on steel, engineers have fixed on carbon, manganese, sulphur and phosphorus as the principal elements which determine the class of the steel. The effect which a small amount of carbon has is one of the wonders of metallurgy. The whole range of steel products from the softest sheet to that of files and cutlery can be made by the combination of not to exceed 30 lb. of carbon to the ton of steel. Manganese, because of its hardening and toughening qualities and its ability as a scavenger, is important. Sulphur and phosphorus, elements detrimental to the physical properties of the steel but in some cases useful, are given fixed limits. Another element omitted from the list, but having a very determining effect on the quality of the steel, is oxygen. Composing nearly one-half of all matter, oxygen is the cause of many of the slag inclusions and cavities and blowholes in the ingots.

Great Affinity of Oxygen for Iron

Not enough consideration in the open-hearth is given to the metallurgical law that "oxygen combines readily with iron at all temperatures," and, of course, the higher the temperature the more rapid the combination. One of the chief causes of inferior heats from the open-hearth is that these heats are worked and tapped too hot, for at high temperatures iron has a stronger affinity for oxygen than does carbon. That this is true, open-hearth men agree, since it is known that a heat worked down hot will take twice the amount of ore to reduce the carbon as one worked cooler, the oxygen from the extra ore remaining in the steel as an iron oxide.

In working a heat with a charge containing sufficient carbon to permit the use of ore, the air and gas should be cut back as the line is coming up, to give a reducing instead of an oxidizing flame, and to keep the metal from getting too hot. Only enough flame should be kept in the furnace to keep the bath in a good boiling action. When the line is free from the bottom, and the heat ready for ore additions, the flame should be further reduced. The feeding of ore should be stopped while the carbon in the bath is still high enough to permit the proper shaping of the slag and attaining the correct pouring temperature. A creamy slag, rather than one too heavy or too thin, with plenty of action to the bath, is to be desired, with a tapping temperature that will leave a saucer skull in the bottom of the ladle.

To illustrate better the importance of a proper charge and the working of the heats in making good steel, I wish to relate an experience of some 14 years ago. The open-hearth shop in which I was a foreman was shut down, and I was sent to the other open-hearth as a practice inspector. It was the policy in this shop to charge the heats to melt close. The superintendent gave as his reason for this that it saved the time of feeding ore, and the extra "drink" of metal which many heats took increased the tonnage. When the quality of the steel was questioned, he did not think it made any difference.

Acting on this suggestion, during my spare time I went over the charge sheets of all rail heats, 1338 in number, made during a period of seven months. Rail heats were taken as a basis because on this type of steel it was possible to get an accurate report of the faulty steel produced. Heats that melted soft, requiring an extra drink of metal for finishing, averaged 7.1 per cent second and condemned rails, against 4.2 per cent of those using ore in the working. The report also disclosed that heats melting close, using neither ore nor extra metal, averaged as high in defective rails as those melting soft, because the furnacemen had handled their furnaces in both cases the same.

Effect of Skulls and Molds Charged

In compiling this report several interesting points were developed. Of 95 heats finishing over 10 per cent seconds, 53 melted soft, 16 were soakers or burn-out heats where brick repairs were made to the furnace while the gas-house flues were burned out, and 13 had broken molds and blast furnace ladle skulls of more than 30,000 lb. each. Of 39 heats losing the top rail or more, on account of pipe or breakage at the drop test, 15 melted soft, seven had molds and blast furnace skulls of more than 30,000 lb. each and two were soakers or burn-out heats. On one whole heat, rejected on account of the drop test, the entire iron part of the charge was made up of molds and blast furnace skulls: four molds, 27,500 lb.; broken molds, 35,260 lb.; blast furnace skulls, 15,760 lb.

Perhaps the most interesting point brought out was the difference in the quality of the steel as made by different furnacemen. A list of consecutive rail heats made during the same period on one furnace whose helpers worked their heats very hot, and used probably twice the amount of ore necessary, ran six times as high in defective rails as those made on another furnace, whose helpers worked their heats cooler and were more careful about their slags and tapping temperatures.

Furnace No. 6		Furnace No. 10	
Seconds, Per Cent	Condemned, Per Cent	Seconds, Per Cent	Condemned, Per Cent
22.1	3.5	0.0	0.7
5.6	0.0	0.0	0.0
2.1	25.7	0.0	0.0
13.3	2.8	0.0	0.0
1.6	0.0	0.0	0.0
1.4	0.0	0.0	0.0
7.4	0.7	3.1	0.0
0.8	1.5	1.1	0.0
2.5	0.0	1.2	0.0
0.7	0.0	1.8	0.6
3.3	2.6	3.5	0.6
15.0	2.5	0.0	0.6
8.3	3.0	5.3	0.0
3.0	1.5	2.7	0.0
14.2	0.7	1.9	1.9
3.3	0.0	4.4	0.9
5.3	0.0	3.3	0.8
22.6	11.3	0.0	0.0
0.8	0.8	0.0	0.0
0.0	0.7	0.8	0.0
2.3	0.8	0.0	0.0
14.5	0.0	1.5	0.0
13.0	1.5	0.0	0.0
4.3	0.7	1.2	0.0
8.3	0.6	3.6	0.6
1.7	0.6	0.7	0.0
1.3	0.0	0.0	0.0
13.9	2.9	0.0	0.0

In the larger open-hearth plants it has been customary to have two melters on each turn, handling six or seven furnaces each. If an extra melter were added to each turn, giving each man charge over not more than four furnaces, better supervision could be given to the temperatures and working of each heat. The melter would then have time for observing his steel as it was being poured, and could give more attention to repairs to bad bottoms—one of the principal causes of bad heats. On a monthly output of 60,000 tons or more, the added expense for the three extra melters would be less than 3c. a ton, which could be saved many times by the better quality of the steel and the general operation of the furnaces.

Casting of the Heat

In general, throughout the United States, not enough attention has been given to the proper handling of the steel after it is tapped into the ladle. Care is given to a proper charge going into the furnace, and to the working of the heat, and high-priced deoxidizers are used to finish cleansing the steel. Then it is tapped into the ladle and sent to the platform for a foreigner to pour. Molds often are placed at the pouring platform only a few minutes before being used, no time being given for inspection or cleaning. Much more attention is given to this part of the work abroad than here.

In a paper read before the (British) Iron and Steel Institute in May, 1918, by J. N. Kilby, entitled "Causes of Defects in Steel Ingots," the author states that "teeming speed is the most important factor at any time in the process of steel making," and that top-pour ingots can be made as free from cracks as bottom-pour, provided the same length of time is taken to pour them." In another place, commenting on the practice in one open-hearth of pouring a 7200-lb. ingot in 1 min., he gives it as his experience that, if ingots of this size are poured in less than 3 min., 80 per cent will show cracks at rolling, and that the safety line is actually 6 min. He gives a table showing the effect of slow pouring of ingots of 5600-lb. weight from 40-ton heats.

Time in Minutes	Ingots Cracked in Mill, Per Cent	Bars to Chip
2	100	Nearly all
3	50	40 Per Cent
3½	40	30
4	10	8
5	5 slightly	4
6	2 very slightly	2
7	Nil	Nil

He does not state how these ingots were poured, but from the length of time consumed it is evident that most of them were either bottom-cast or through secondary ladles. Mr. Kilby also gives it as his experience that teeming speed is really of greater importance than temperature; that heats alleged to be on the hot side may produce ingots free from cracks, provided the period of filling the ingot be prolonged to the correct extent by the use of correct nozzles or secondary ladles; that the casting of heat after heat with a slight skull left behind, at the same time getting cracked ingots at the mill, points to the great importance of correct teeming speed.

Advantages of Slow Teeming

Experiments in different plants in our country point to the same experience. Slow pouring allows the metal to cool and free itself of gases, giving better rolling qualities and a superior grade of product. In an experiment carried on in the American Rolling Mill Co. in 1926, ingots of different lengths and with various speeds of pouring were cast from the same heat, and then split to determine the location of the blowholes. In the ingot poured to full length and at normal speed, the blowholes came up about 28 in. and were on the average ¾ in. from the surface. The blowholes in the ingot slowly poured, to full length, came up to the same height, but were from 1 in. to 1¼ in. from the surface.

In another open-hearth plant in which considerable trouble was being experienced with pipe in the rail steel, the A-rails of all heats cast on one 12-hr. turn being lost, the suggestion was made to hold the heats in the ladle 5 min. before opening. Instead of doing this, 5 min. extra time was taken in pouring the heats, 15 sec. being taken to pour the last foot of each ingot. The pipe trouble disappeared.

The size of pouring streams has been gradually reduced for the past 20 years. From a 2¼-in. stream on heats of 30 to 50 tons, many plants are now using 1½-in. streams for heats of 100 tons. One plant is using 1⅜-in. streams for casting soft steel of 100 tons and, with a temperature which will leave a saucer skull, heats are poured cleanly, averaging 65 ingots each.

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The use of this size nozzle instead of the 2-in. increases the pouring time of each ingot 112 per cent; over the 1½-in. nozzle, 20 per cent.

Good Practice Demands Clean Molds

Another important detail to secure better ingots is attention to clean mold condition. Molds should be warm, insuring that they are dry, and should be wire brushed and graphited before being used. All cracked molds which will make a fin on the side of the ingot should be scrapped. To guarantee a straight stream that will not hit the side of a mold, a piece of gas pipe with an insert which fills the nozzle hole, and extending up through the goose-neck, should be used while the nozzle is being tamped. In casting, the nozzle should be long enough to permit the pourer to open up and pour the first foot of the ingot slowly, without having a spreading stream.

The use of magnesite nozzles for pouring low-carbon steel, to eliminate the excessive erosion incident to the employment of fire-clay nozzles, is recommended by one foreign writer who states that, with this type, the rate of casting progressively decreases from the first to the last ingot, because the nozzle does not erode and the head of metal in the ladle grows constantly less. I do not know that this type has been used in this country, but that there is a demand for such a nozzle no one will deny.

Other Departments May Bear Watching

Nor should the close attention to details be confined to the open-hearth department. Some heats of steel, because of a poor charge, will produce only a fair ingot, although the utmost care has been given to the working and casting of it. Many of these heats are made practically worthless by being washed in the soaking pits, and reduced too rapidly in the blooming mill. An inspector checking and reporting on the temperature and condition of ingots as they are drawn from the pits will pay big dividends in producing cleaner steel.

At the blooming mill, the number of passes which is given an ingot should depend on the quality of the ingot, and not on the amount of tonnage to be produced that turn. If the ingot shows a tendency to tear, the draft of the first few passes should be reduced until the ingot has a solid surface. Here, again, another inspector.

Tilting Furnaces

Because of their valuable assistance in controlling the working portion of the steel-making operation, tilting furnaces are exceptionally useful. Doctor Waterhouse brought this out clearly in his paper. Not only is the tilting furnace of great metallurgical value in permitting flushing off early slags, full of impurities from the charge, but it has large mechanical advantages as well. Holes developing on the banks may be uncovered readily and patched up with the greatest ease in a tilting furnace, with but a fraction of the delays occasioned by the same incidents in stationary furnaces. The furnace may be overcharged without the same danger of breaking out. The furnaceman has always at his hand the possibility of working a recalcitrant heat as his judgment, metallurgically, dictates, without being handicapped by considerations of close limitation on the amount of additions he can make to his bath.

Discussion by Mr. Hubbard

H. B. Hubbard, superintendent open-hearth department, Inland Steel Co., noted the following developments which were improving the furnace efficiency: The sloping back wall, larger uptakes, the suspended roof, and basic materials used in walls and roofs. In his opinion, many heats were melted with too much lime; this was supposed to cover a multitude of sins in dirty scrap. Usually it would be better economy to segregate the scrap better and throw the bad stuff back on the seller.

FACTORY TRANSPORTATION

Overhead and Ground Conveying at Westinghouse and General Electric Plants

THE materials-handling activities of the Westinghouse Electric & Mfg. Co. were described in a paper presented at the Pittsburgh meeting of the American Society of Mechanical Engineers by C. A. Fike, supervisor of transportation of the Westinghouse company at East Pittsburgh, Pa. The paper dealt with system developed under Mr. Fike's direction, detailing methods of control, the wage-incentive plans used in payment of employees of the plant transportation department, and some of the economies that were effected.

Mr. Ashman, occupying a similar position to Mr. Fike in the Schenectady works of the General Electric Co., indicated quite a difference in the systems of the two companies. Operation of the cranes and elevators at Schenectady is under separate control from the ground conveyors, although both are under one general supervisor. Internal and external plant movements are conducted separately. Mr. Ashman thought the use of tractors and trailers offered the greatest means of economies among the various kinds of vehicles used in plant transportation. At Schenectady, the plant is laid out in five zones with shuttle service to a central classification station, with each crew making six or seven collections and a like number of deliveries each day. Payment was on a straight day basis.

At East Pittsburgh, the plan is for group payment, with each member of the group, including the director of each group, sharing in pooled pay based upon time and distributed on the basis of the number of hours worked by each. There are penalties for failure to make schedules, damaged goods, etc., but no workman can be penalized more than the bonus accruing during one pay period.

Mr. Ashman thought that Mr. Fike's estimate of $130 per month as the cost of the operation of a truck was low, stating that at Schenectady it ran in labor charges alone to $220, for a two-man crew, and total charges were close to $275 per month. Mr. Fike said in answer that his costs were based upon one-man operation of trucks, and that the industrial trucks were electrically motivated, with very low upkeep and depreciation charges, some trucks having been in service 16 years, while charging of batteries was with current costing 8 mills per kwhr.

Mr. Fike also declared, in answer to a question, that the system did not require a big clerical force, since the use of stubs of routing tags took care of payments and the dispatching was done by the group leaders.

Morehead Medal Committee to Receive Papers on Acetylene

The award of the Morehead medal by the International Acetylene Association for contributions of outstanding merit toward the progress of the acetylene industry is always one of the most important events on the program of the annual fall meeting of the association. The award can be granted for technical papers which promise to be of special value in furthering the use of acetylene for any purpose. Persons who desire to submit papers of this sort should send them to the committee on the Morehead medal, International Acetylene Association, 30 East Forty-second Street, New York, before Aug. 1.

Steel & Tubes, Inc., to Build New Plant

Steel & Tubes, Inc., Cleveland, plans erection of a new plant at Ferndale, Mich., a Detroit suburb, on Grand Trunk Railroad. Negotiations are being closed for a 20-acre site. Plans provide for a building containing 105,000 sq. ft. of floor space and plant will have a capacity for making 3,000,000 ft. of welded steel tubing per month. The estimated cost of the new plant, including the site and equipment, is $700,000.

Safety in the Machine Shop

Greater Care Urged in Inspection of Chains and Cables—Need for Goggles—Education of the Men

BY WILLIAM J. FISHER*

PROGRESS in safety matters in any factory is undoubtedly in proportion to the extent to which the superintendent first, and through him the foremen, are "sold" on the idea. Most of our plants are too small to be able to employ full-time safety engineers, or to maintain a full-time safety organization, whose sole duty is to look after the safety and general welfare of its employees. Due to the lack of such an organization, continually devising new ways and means of keeping the safety idea forward, "Safety, first, last and all the time" presents a problem for the smaller factories.

It has been my observation that, unless methods of presenting safety and of handling safety matters are changed from time to time, proper observance of safe practices cannot be maintained. The small shop is thus dependent to a more or less degree upon the State Department for suggestions as to ways and means of maintaining continued interest in safety matters.

Educating the Employee

The first and most important idea to be instilled into an employee, for the elimination of accidents, is that it is his duty to his family and his home to work safely at all times. The National Safety Council is doing a great work in putting this idea across to the workman. The picture bulletins issued are attractive, are read by the employees and have a good effect.

We are living in an age when there is a continuous demand for something new. The great force back of our prosperity is the putting forth of new things to attract and thereby create a desire and demand, which in turn means more work for our factories and our employees. The ultimate objective of all safety programs is that employees may acquire the safety habit. Picture bulletins, safety meetings and the many other methods used to attract attention to safety matters are means to that end; namely, habit.

Third of importance in elimination of accidents is a common understanding between employees and management of each other's attitude toward safe practices and necessary changes, to make the plant a safe place in which to work.

Mechanical Safeguards

Modern machine tools have solved a large safety problem by having necessary guards and safety devices built into the tool itself. The continued use of old-type machines, however, necessitates the inclosing of open belts, open gears, etc. When this is found necessary I believe the open-type guard to be the most practical. Employees will keep the open-type guard in place more readily than the closed type. I have been unable to assign any reason for this except, perhaps, that men naturally want to see moving parts.

It is the duty of the management to see that mechanical safeguards are thrown around employees. Gears should be guarded, no matter how remote their location. Some of the most serious finger accidents occur in gears in which it was thought impossible for a workman to get caught. Any foreman or manager who argues against covering gears, because they may be quite a distance above a man's head or in a remote place, under or back of a machine, is arguing from lack of experience.

Motor-driven machines have solved the hazard found in the overhead belt. Practically all machine shops, however, continue to use a great many overhead belts. While they present a more or less hazardous condition, it is a difficult situation to cope with. About the only thing which can be done is to put guards under the larger and heavier belts, which, if they should tear, may cause injury to a workman. These guards must be properly designed and supported, or they may create a greater hazard than existed with the open belt. Another precaution is to inspect the belts periodically and remove any that have worn thin, or show signs of weakness.

Chains and Cables Need Care

Another hazard in the machine shop which is difficult to handle is from the chains and cables used on cranes and hoists. Especially is this true in shops where heavy work is handled. Cables should be inspected at regular intervals and, when broken strands are found, should be replaced. Chains present a more difficult problem. They likewise should be inspected periodically and, if stretch has been set up in the links, the chain should be replaced.

Chains used continuously should be annealed at regular intervals. There seems to be great difference of opinion as to how long a chain should be used before annealing, but we believe that they should not be used longer than one year.

Inspection of chains does not reveal defects so readily as in cable. A link may be defective on the inside, or it may have a defect which only the trained eye can detect. A good plan is to send the chains occasionally to the chain manufacturers and have them inspected and tested and a report rendered on the maximum load it is safe to lift with the chain.

These safety precautions are necessary to prevent accidents from breaking chains. An important point in maintaining chain efficiency is instruction to the workmen in the proper way to apply and hook up a chain to a load. Nothing contributes so much toward rendering a good chain useless as allowing a sharp edge of a heavy load to come against a link in somewhat of a shearing position. If this is done a chain may carry the load at the time and at some future time break on a light load.

Keeping Adequate Aisles Open

Another matter of importance is that of fixed and open gangways. Nothing is so conducive to good housekeeping and prevents more foot accidents than well-kept gangways. If trouble is experienced in keeping gangways open, I know of no better method than to paint lines where the aisle is to be. The painted line in itself establishes definiteness of purpose and location. While it may be necessary to replace the line two or three times, after a while the employees get the habit of maintaining a gangway and the painted line is no longer necessary.

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*Superintendent A. B. Farquhar Co., York, Pa. This is abstract of a paper presented before the Pennsylvania State Safety Congress, in Philadelphia.

Another important factor in accident prevention is the maintaining of morale through adequate and good tools with which to work. When a workman is disgusted or discouraged, due to poor or insufficient tools, he is most liable to have an accident. In this mood, his mind is not directed to safe ways of working, but is rather concentrated on the thing which causes the discouragement.

Fatigue likewise causes accidents which would not otherwise occur. Discouragement and disgust bring on fatigue, while keeping the workman in the proper frame of mind maintains his poise and happiness—and fatigue is not brought on nearly so soon.

The items I have enumerated are some of the things which lie wholly within the power of management to do to prevent accidents. All accident prevention does not rest with the foreman or the workman. It starts with those of us who have to do with management, and we carry a definite responsibility toward creating a spirit of safety, first, last and all the time.

Elimination of Eye Hazards

Goggles provided by practically all shops are for the men to wear to prevent eye accidents. It seems to be difficult, however, to get employees to wear them. After years of patience and insistence and improvement in goggles, we have succeeded in getting the employees who do chipping to wear them rather willingly. On other operations you will invariably find the goggles in the tool box or some other place of storage. Even in grinding operations the foremen must continue to insist that they be worn, as men have not reached the place where they feel it is entirely necessary.

One problem of the machine shop is to determine in which operations goggles must be worn. All agree they should be worn in the pouring of metal, chipping, grinding and similar operations, where the hazard of flying particles is the result of the operation. But what about the lathe, drill press and some of the other machine tool operations?

One of the most serious eye accidents which ever came to my notice was when a lathe operator had trouble truing up a job in the lathe chuck. In a fit of impatience he attempted to hit it a severe blow and, instead, hit the corner of the chuck jaw. A steel chip flew into his eye, which later caused the removal of the eye. This was an unusual accident, but it is not unusual to see flying chips in lathe operations, and especially in the turning of non-ferrous metals.

Screens and many types of contrivances have been suggested, designed and used. But almost all of them are inconvenient and to most mechanics are impractical. The only safeguard against this hazard is the wearing of goggles. Practically all machine shop employees are more or less subject to eye hazards, but goggles have not reached such a stage of personal comfort that we are willing to insist upon their general use. It seems, therefore, that up to this time we have been content to see that they are worn on those operations which present glaring eye hazards. For the rest, we insist that the men go to the first aid room, rather than to a fellow employee, to have particles removed from the eyes.

It is a continuous up-hill job to get men who are compelled to wear glasses to remove them and wear goggles. For these men we are seriously in need of goggles which can be used over their own glasses, and they do not seem to be available. And to remove glasses and put on goggles creates a hazard through improper vision.

Other Causes of Accident

Then we have the hazard of the accumulation of slivers on the heads of chisels, wedges, etc. The prevention of accident from this source likewise belongs to the individual employee. But the foreman has the responsibility of instructing the employee not to use tools with improper heads.

With overhead traveling cranes we have the hazard of workmen walking under, or failing to get away from under, overhead loads. This likewise is an employee's personal responsibility, provided, of course, a warning bell is used on the crane.

Many other instances could be cited where the employees' personal responsibility is a factor in accident prevention. Our human frailties are the greatest contributors to accidents, and the greatest of these is thoughtlessness. Safety codes are a great help, as they are text books through which certain hazards are called to our attention and the methods for remedying them are suggested and established. All these mediums are important and necessary, but it seems to me our future progress is centered around "education."

As the children of today will be our people in industry tomorrow, safety education should begin with childhood. Definite programs in our public school system, which would establish indelible safety impressions, would be a great help toward creating the safety habit and eventually have its effect upon safety in industry.

Responsibility of Foremen

A great deal has been said concerning the responsibility of the foreman toward accident prevention. Some leaders have indicted the foremen as lacking the proper interest in safety matters. I question whether this criticism is just, when viewed from the broader aspect of the subject.

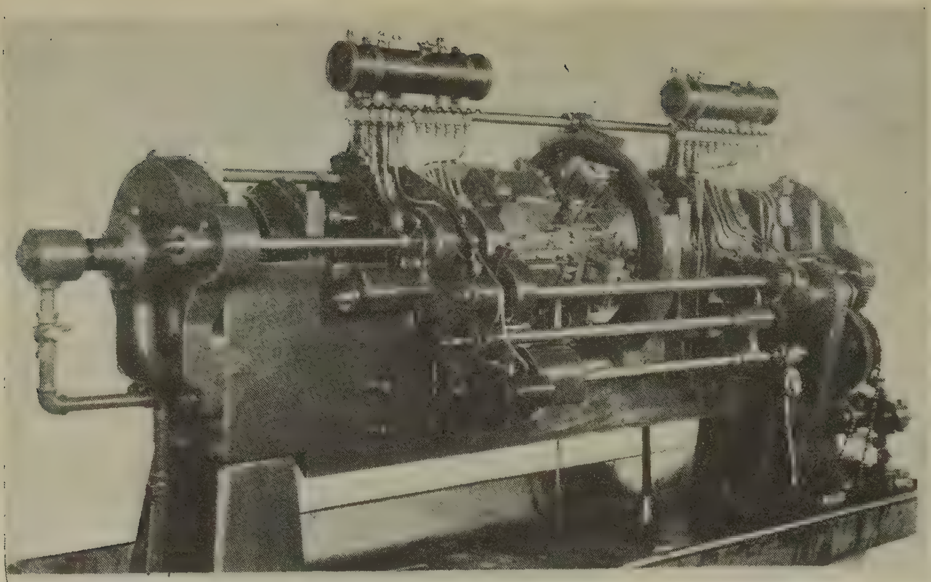
The first duty of the foreman, and rightly so, is to maintain production schedules. But I believe he realizes to its fullest extent that, to do so, he must have a steady and trained working force. He further realizes that it is to his best interest to prevent accidents which cause loss of time and serious interference in the results he desires to obtain.

Shipyard Conducts Intensive Safety Campaign

Comprehensive preparations have been made to make June a "no accident month" at the plant of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. A series of meetings has been held and extensive use has been made of posters, placards and bulletins to awaken interest in the drive.

A unique flag arrangement will be used to advertise the status of each department in lost-time accidents during the month. This consists of a safety flag which will be flown by each department every day, until a lost-time accident occurs, when the safety flag will be replaced by a black flag as a mark of demerit. Score boards will show the daily rating of all departments. Penalties will be based upon accidents that necessitate sending the injured employee home, with the result that he is unable to report for work again on his next regular shift, but penalties will not be imposed for minor injuries.

The campaign includes prize contests for the best slogan placards dealing with safety, and using letters that spell the name of the employee's own department to start the line. A silver medal will also be awarded to the employee, below the rank of supervisor, who is considered to have done most to promote safety during the month of June.



The Operator Merely Places the Hinges in the Fixture, the Work Being Located and Clamped Automatically

Hinges Drilled and Countersunk at Rate of 1200 Per Hour

The drilling and countersinking of three holes in an automobile door hinge is accomplished on a high production basis on the machine illustrated, the output being given as 1200 hinges per hour. The machine is the "non-stop" automatic drill of the Davenport Machine Tool Co., Inc., Rochester, N. Y., arranged to permit the use of five sets of work-holding fixtures and drilling heads, which revolve continuously while the cutting and clamping operations are being performed. The operator merely places the work in the fixtures and, as the fixture unit revolves, the work is automatically located and clamped.

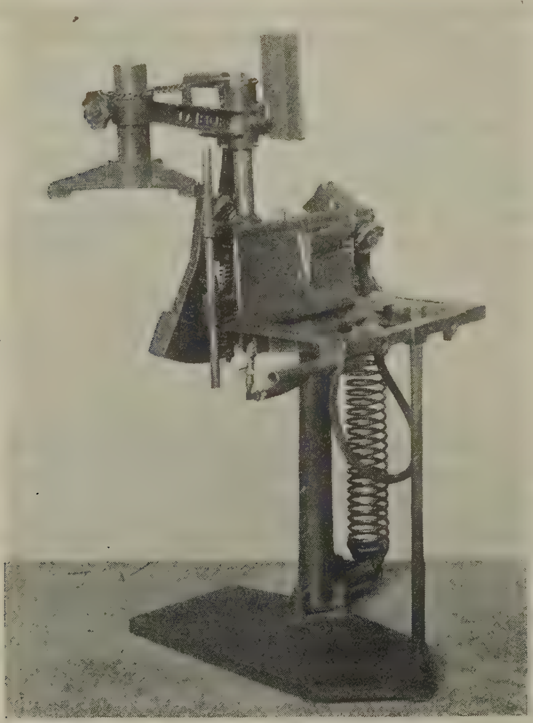
Three spindles in a cluster box on the left-hand end of the machine drill and countersink the holes simultaneously, after which they are withdrawn and three more spindles on the right-hand end approach and countersink the other side of the hinge. The clamping device is then released automatically and the work is dropped into the pan, leaving the fixture open ready to receive a new piece of work.

Although the center distance of the spindles is close, the gears that drive the spindles are of good size. Both the gears and spindles are hardened. The drill spindles are fed by cams located at each end of the machine. Ample cutting compound is supplied to the tools by a geared pump.

The production, quoted at 1200 per hour, is said to be limited only by the ability of the operator to place the work into the fixture during one-fifth of the time required to revolve the fixture holder. Although the fixtures, etc., employed make the machine a single purpose unit, it is stated that the basic principle permits a variety of work to be machined.

Core Machine Eliminates Unnecessary Moves by Operator

Elimination of unnecessary moves on the part of the operator is a feature of a core machine built by the Tabor Mfg. Co., Philadelphia. A core box is filled and the core plate placed in position in the usual manner. The clamping head is then swung into position over the core box and the draw lever, shown at the back of the picture, is pulled down one-half turn. This clamps and automatically levels in one move. The machine is then rolled over and the same draw lever reversed one-half revolution, which unclamps, draws the core and swings it out to a convenient position for the operator to carry away. This dispenses with the need for walking around the machine and any operations of handling independent clamps. In general clamping and unclamping leveling devices are eliminated.



The Machine Is for Core Boxes Up to 14 In. Wide, 24 In. Long, 7 In. Deep, With 4-In. Draw

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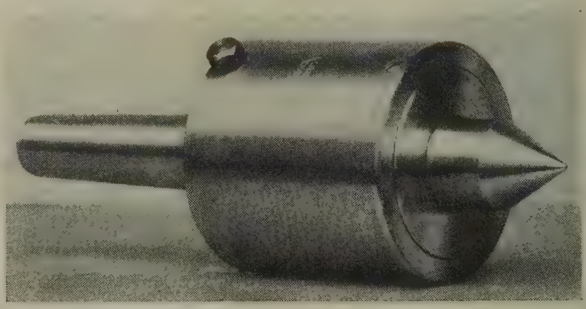
Anti-Friction Center for Heavy Loads

An anti-friction center, designated as the Supercenter and available in load carrying capacities up to 3 tons, has been added to the line of the Snellex Mfg. Co., Rochester, N. Y.

Features of the device, which is illustrated herewith, include automatic takeup of the expansion of the work by means of a hardened steel cushion. Lubrication is not required at the center point because two tapered roller bearings eliminate the wear between the point and the work. Wear of the roller bearings is taken up automatically. A strainer at the bottom of the oil hole serves to remove solids from the oil. Shanks can be made to any taper and any type of center point, for turning car axles, crankshafts, gears and other work, can be furnished.

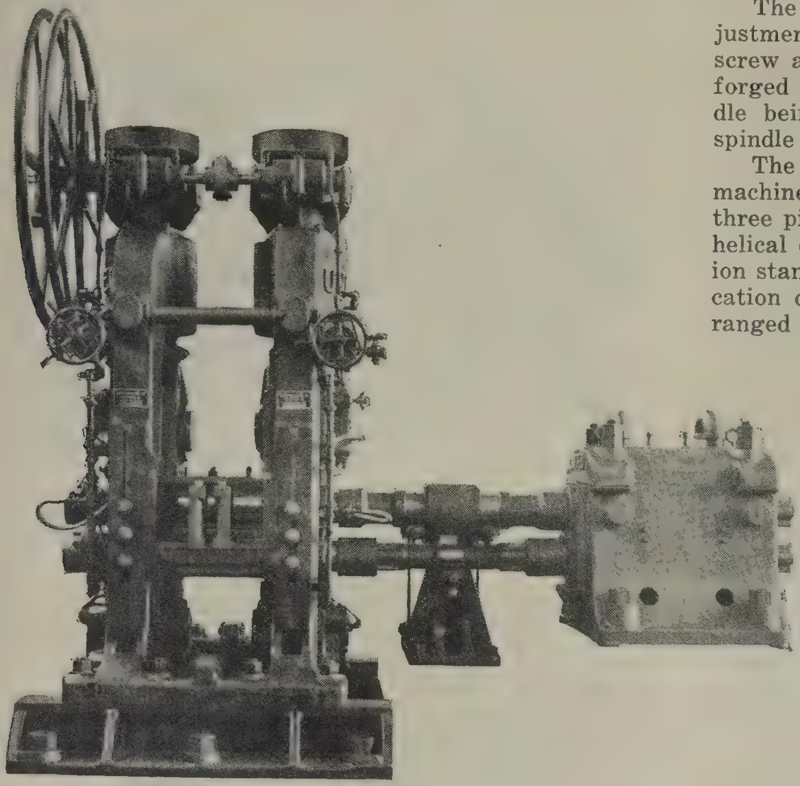


Roller Bearings Eliminate Wear Between the Center Point and the Work

TWO-HIGH HOT STRIP MILL

Large Roller Bearings Resemble Backing-Up Rolls—Better Production

SOMETHING different in hot strip mills has been developed by the United Engineering & Foundry Co., Pittsburgh. It is a two-high mill, which looks like a four-high mill because the roll necks are practically a continuation of the body and run on the large roller bearings, which give the appearance of backing-up rolls, as in four-high mills.



Large Roller Bearings in Each Half of the Housing, Above and Below the Rolls, Give the Appearance of Backing-Up Rolls. Fine screwdown adjustment, for rolling hot strip steel within narrow limits, is another feature

Side thrust is taken care of also by roller bearings. These side roller bearings are pivoted from the housings of the large roller bearings and are adjusted against the roll neck by large bolts, the heads and locknuts of which may be seen on the edge of the mill housings. The mill rolls are thrust against the large roller bearings by hardwood wedges, which are fed in between them by large center adjusting bolts, also showing on the edge of the housings.

Equipping the mill throughout with adequate roller bearings materially reduces power consumption, while maintenance of gage is made easier. Upkeep is reduced, as roller bearings do not wear appreciably, and production is speeded up. The mill is a 10½-in. by 18-in. hot strip mill and is guaranteed to roll 4 in. wide by 0.035 in. thick, hot, high-carbon steel with a variation from center to edge of not over 0.0005 in. in thickness.

The hand-operated screwdown is built for fine adjustment, has a separate handwheel for each housing screw and has drum-type indicators. The spindles are forged steel with machined wabbler ends, the top spindle being of the Flynn patented friction type. The spindle carriers are of the spoon type, spring balanced.

The pinion housing is a one-piece casting with machined windows and cast iron babbitted bearings in three pieces. The pinions are forged steel, with double helical cut teeth and machined wabbler ends. The pinion stand is fitted with oil baffles to insure proper lubrication of the pinion teeth, while the bearings are arranged for either oil or grease lubrication.

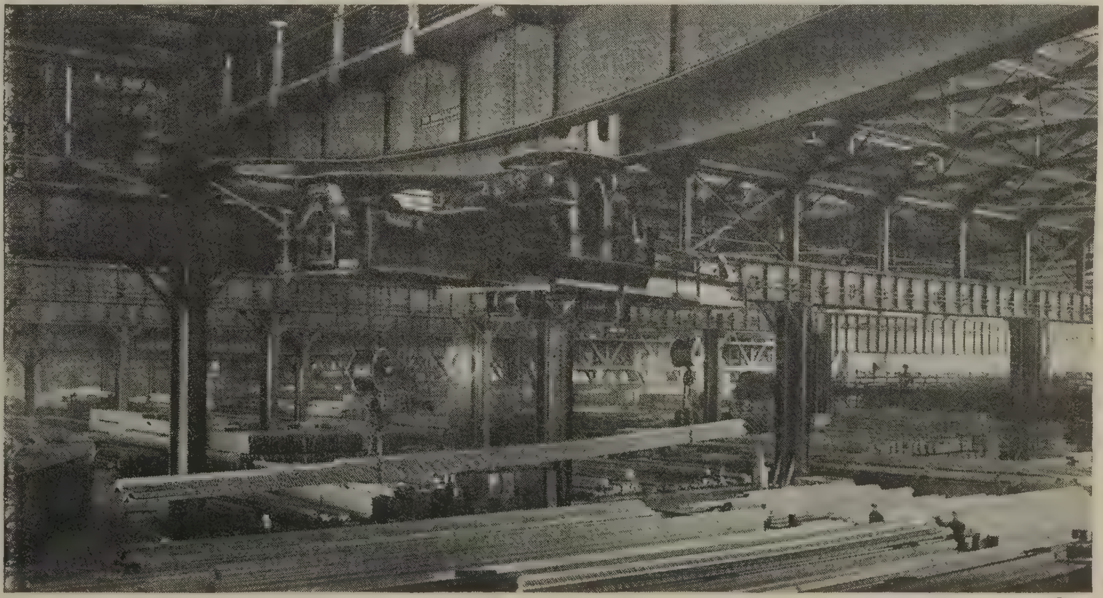
The roll stand is equipped with a large grease gun on each housing, with leads to all bearings, flexible hose being used for all parts which have not a fixed location. The mill is fitted also with adjustable entering and delivery guides, and altogether makes a compact and complete unit.

Swiveling Crane of Unusual Type

To accommodate mill shipping conditions in the new structural mills of the Carnegie Steel Co. at the Homestead works, Munhall, Pa., three 20-ton overhead traveling cranes of unique design are in use. Each crane has a rotating arm or beam with a 10-ton hoist at each end. The beam is swiveled from a turntable on the trolley and is under easy control of the operator. It is rotated with the full 20-ton load, and either end may be used to its capacity of 10 tons, without any load at the other end, and without upsetting the equilibrium of the beam. This quality is important where a load is to be picked up in a bay adjacent to that in which the crane operates.

Steel from both the 36-in. structural mill and the 52-in. mill rolling the new Carnegie beams approaches the shipping bay on a line running east and west. The

Swiveling Crane in the Shipping Yard, Serving Both the Standard Beam Mill and the H-Beam Mill. There are three of these cranes, each of 20 tons, having a 10-ton hoist at each end of the swiveling beam



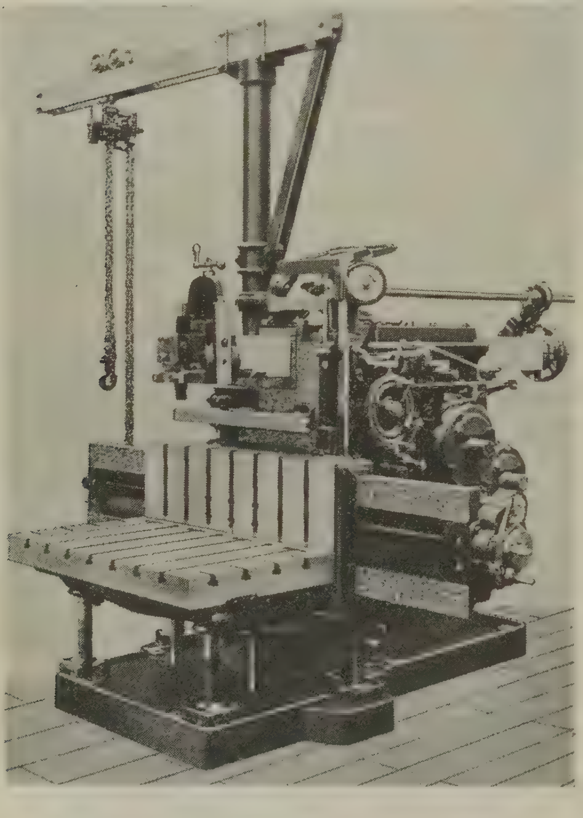
car tracks in the shipping bay, however, because of space conditions and other limitations, are on a line running north and south. Consequently, all beams have to be turned through an angle of 90 deg. for loading. That is the reason for the swiveled arrangement on the cranes in that bay.

Some of the steel shipped from that location goes out in the new 65-ft. gondola cars which were described briefly in THE IRON AGE of April 19, page 1090. These are used primarily to avoid the expensive blocking required in shipping long lengths of steel on two adjacent cars. A general description of the new Carnegie beam mill was carried in THE IRON AGE of May 17, page 1380.

Draw-Cut Planer for Railroad Work

For machining the frame fits in guide yoke tie braces and cross tie braces, the Morton Mfg. Co., Muskegon Heights, Mich., has brought out the high-duty draw-cut planer here illustrated. In addition to the special purposes for which it was designed, the planer is offered also for the machining of the guide fits on back cylinder head blocks, locomotive deck castings, the casting units between cylinders and other railroad work.

The machine has a cutting stroke of 38 in., horizontal or side feed of 60 in., and vertical feed of 21 in. Rapid traverse, both horizontal and vertical, are provided and all feeds are automatic and may be changed while the machine is in operation. The machine is of the four-screw type which permits convenient handling of large and bulky castings. It has a rotating arbor for slotting and finishing driving boxes and will accommodate all of the company's special attachments for railroad work.



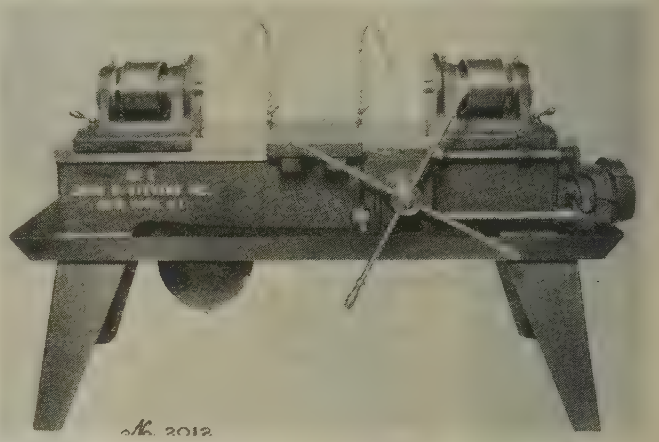
Draw-Cut Planer for Machining Frame Fits in Guide Yoke Tie Braces, and Other Work

To Exhibit Steel Mill Novelties

The Westinghouse Electric & Mfg. Co. exhibit, at the exposition in connection with the annual convention of the Association of Iron and Steel Electrical Engineers, will feature a new definite time-limit steel mill controller to be operated in connection with a type MC mill motor. An animated, electrically lighted diagram will show graphically the operation of the contactors and the motion of the armature during acceleration and plugging. Another feature will be an electrically motivated roll table, which will be operated and reversed automatically by having the billet interrupt the passage of a ray of light to a photo-electric cell.

Double-End Drill with Ball-Bearing Mounting of Spindles and Shafts

Ball bearing mounting of the spindles and other revolving parts is a feature of a No. 2 Duple horizontal drilling machine, for drilling, boring, beveling, chamfering, reaming, facing and for some classes of threading and tapping, which has been placed on the market by John B. Stevens, Inc., 27 Cleveland Place, New York. Maintenance of original accuracy of alinement, ease of operation and added power, due to the use of ball bearings, are claimed for the machine.



Construction of the Bed, Heads and Other Units Is Intended to Provide Lasting Accuracy of Alinement

The bed is deep and massive, has four wide cross braces, and Vees are of large proportions to assure maintenance of spindle alinement. The heads are also of massive design and are gibbed to the bed-Vees with adjustable taper gibs. The spindles revolve in ball bearings which take both radial and thrust loads. Cross slots engage the tangs of drills, which may be ejected by means of a knock-out rod.

Each head is fed by means of a 1½-in. diameter square-thread screw, the screw being mounted in ball bearings beneath the heads. A cross-shaft, also provided with radial and thrust ball bearings, carries a helical bevel gear, which meshes with two helical bevels, one on each of the head driving screws. The front end of the cross-shaft carries a bronze worm gear which is driven by a hardened steel worm on the worm shaft. The latter, which extends to the right as shown in the illustration, is through gears by means of a belt drive from the right-hand countershaft. Four change gears are furnished to permit three different feed changes. A safety shear pin is provided, as well as hand and automatic trips for the feed and a positive stop. Two countershafts, one for each head, are furnished.

Plain or back-geared heads may be provided on the machine. The swing over the Vees is 14 in. and the distance between spindles is 36 in., maximum, and 10⅜ in., minimum. The drilling capacity of the plain head machine in cast iron is 1⅛ in. and in steel, ⅞ in., the capacity of the back-geared head unit being 1½ in. in cast iron and 1⅛ in. in steel. Feeds of 0.003, 0.0065 and 0.014 in. per revolution of the spindle are obtainable on the plain head drill, and 0.0045, 0.0105 and 0.014 in. on the back-geared head machine. The floor space occupied is 24 by 80 in. The weight of the back-geared head unit is 2600 lb.

Electrically Welded Chain for Hoist

Great strength and great ability to withstand wear are demanded of the chain in a chain hoist. It must not stretch under heavy loads. A high-carbon, electrically welded chain is now being made for the Tribloc hoist of the Ford Chain Block Co., Second and Diamond Streets, Philadelphia. Every link is proof tested. When the chain is assembled it is again tested and must show an overload of 50 per cent above its rated capacity. Hoists are built in capacities from ¼ ton to 20 tons.

RACKS FOR SHOP RECORDS

Folds, Wrinkles and Other Damage Eliminated in Loose Leaf System

BETTER preservation of drawings, maps, records, etc., has been obtained by hanging up or suspending such sheets in specially constructed racks which have been developed by the Globe-Wernicke Co., Cincinnati. Adoption of this system has reduced sheet friction to a minimum, has eliminated unequal and extending edges and has made folds and wrinkles much less frequent and less detrimental. One system was inspected recently which had been in daily use for over 40 years. The sheets were exceptionally well preserved and the only replacement was due to thumbing the corners.

The usual method of suspension is accomplished by consolidating sheets between binders so as to form a book which is hung from a rack, mechanism being employed that permits the removal of any book. Binders, however, have not been found entirely satisfactory because of the labor in gaining access to individual sheets which must necessarily be thumbed in the process.

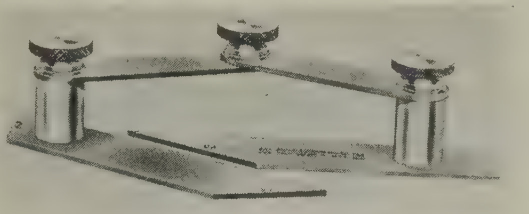
Ready Accessibility of the Filed Drawings Is Shown in This Illustration

Binders and all such accessory equipment are eliminated by the application of a loose leaf clip to the individual sheets, the clips being attached to the sheets by adhesion. The clips are snapped over horizontal rods, as shown in the accompanying illustration, and are thicker than the sheets so that there is an air space between adjacent sheets. Dust does not adhere readily to the vertical sheets and there is no sheet friction to rub into the sheets the dust that may have accumulated when the sheet was out of the file. A feature of the system is the fact that the entire surface of every sheet can be exposed for reference without removal from the file.

Suspended individual sheet filing lends itself to the application of a time-saving index. A numerical index is made possible by suspending guide cards by means of two loose leaf clips. A guide with green angle tabs is hung every 100 sheets and guides with yellow angle tabs mark the 25, 50 and 75 subdivisions. The visibility of the colored guides leads the seeker directly to the group of 25 drawings in which the desired sheet is located. If the consecutive drawing numbers are placed in the location, the sheet may be "flared" and a series of numbers exposed for the quick selection of any sheet. When drawings are removed from the files, cards bearing the word "out" can be used to replace the drawings.

Improved Combination Bevel

Unobstructed view of any angle at which the blades may be set, because of the height of the two posts, is a feature of an improved combination bevel for tool and pattern makers, which has been placed on the market by the Brown & Sharpe Mfg. Co., Providence. The posts give clearance for scribing or drawing lines the full length of the blades and also make possible the use of the blades on alternate sides of a projection up to ⅞ in. high.



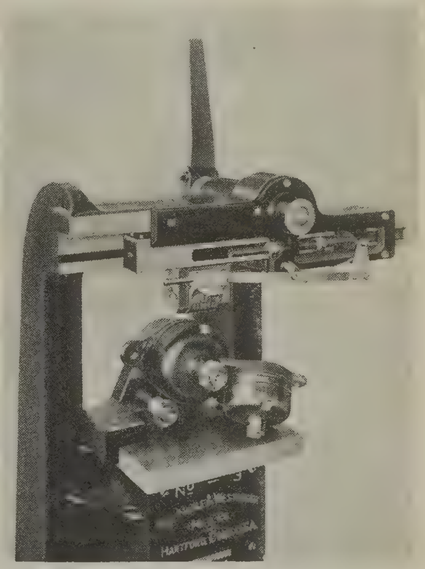
The Angle at Which the Blades Are Set May Be Seen Conveniently

The back of the tool is flat and the tool can be laid directly on the work. The clamp nuts are designed so that the blades may be moved freely without looseness, or locked securely by tightening the clamp nuts. The blades, ground on all sides, are of steel, and the ends are ground accurately to angles of 30, 45, 60 and 90 deg. To decrease the weight of the tool the posts are made of a light metal. The tool is designated as the No. 502.

Numbers Parts with Curved Surfaces

Marking equipment developed by the Noble & Westbrook Mfg. Co., East Hartford, Conn., for the serial numbering of pieces having curved surfaces is shown in the accompanying illustration. The equipment consists of one of the company's standard hand-operated marking machines equipped with a special work-head and work-holder. The machine illustrated is being employed in marking hydraulic shock absorber parts.

A Special Work-Head and Work-Holder Are Used. Change of numbers is by an automatic tripping device

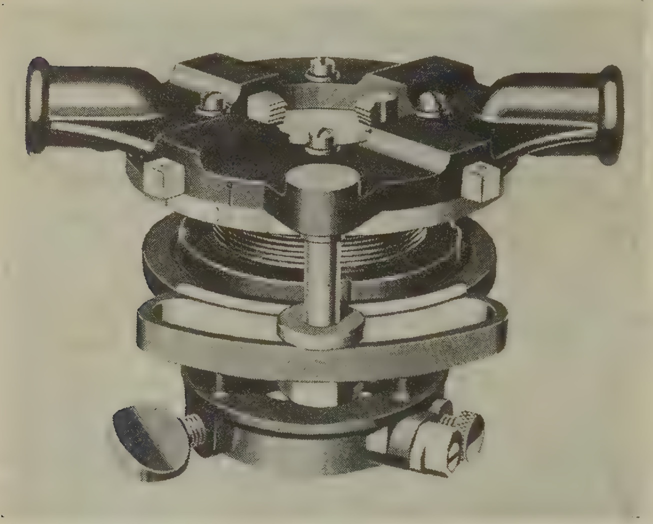


The numbering head is fitted with a special shank to adapt it for use in the marking machine, and an automatic tripping device attached to this head serves to change the numbering device to the next highest number after a mark is made. The marking of the serial number is accomplished by the forward stroke of the numbering head over the part to be marked, this part revolving on its own center on roller bearings. The wheels in the numbering head may also be operated independently by disengaging the tripping device, in case duplicate numbering is required.

Self-Contained and Adjustable Die Stocks

The Borden Co., Warren, Ohio, is bringing out two new self-contained and adjustable 1 to 2-in, die stocks, designated as the No. 11 Beaver plain tool and No. 11A Beaver ratchet tool, respectively. The former supersedes the previous No. 25 Beaver plain tool; and No. 11A supersedes the No. 26 ratchet tool. Although of as durable construction, the new die stocks are lighter in weight than the previous models and are easier working and of simpler design.

One set of dies can be rapidly set to thread 1, 1¼, 1½ or 2-in., and, being in the tool, ready for use, the dies cannot become lost or mislaid. Dies are quickly adjusted to thread under or over standard sizes, without affecting the length of the thread. Special dies are not required for threading brass pipe.

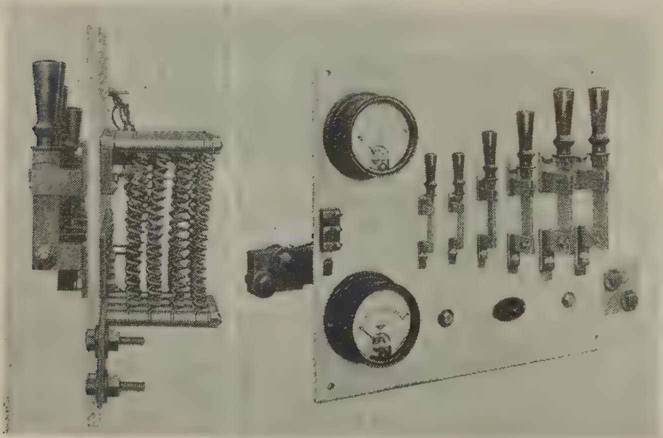


One Set of Dies Can Be Set Quickly to Cut 1, 1¼, 1½ *or 2-In. Threads*

The threading dies in the new tools are of alloy steel, and are heat treated. The die-head and threaded barrel of the tool are separate parts. The work-holder or pipe-gripping device is of new design and is said to center the pipe with unusual accuracy. Two knurled screws, which serve to hold firmly to pipe size, can be set quickly, leaving only the thumb screw to be tightened after the die stock is placed on the pipe. Loose bushings have been eliminated. After the work-holder has been set to size only a straight thread can be cut, although the holder may be adjusted conveniently for cutting crooked or drip threads if desired. It will also grip any size coupling for threading short nipples. All parts of the die stock are made on the interchangeable basis, facilitating renewals of parts.

Improved Plating Tank Rheostat

An improved type of plating tank rheostat, named the "Optimus," has been placed on the market by the Hanson-Van Winkle-Munning Co., Matawan, N. J. The rheostat is intended to facilitate the regulation of plating baths, and simplify the operation of chromium, nickel, copper, brass, cadmium, zinc, tin and other plating solutions.



Mounting of the Plating-Tank Rheostat Resistance Coils on Studs Back of the Panel Board Is Intended to Provide Better Ventilation and Eliminate Loosening of the Coils

The construction is according to power apparatus standards. Mounting of the resistance coils on studs back of the panel board is intended to provide better ventilation, increase the overload capacity and eliminate loosening of coils. Standard knife switches are employed. The type REI rheostat is equipped with voltmeter and ammeter mounted on the rheostat panel, and the instruments and shunt are said to be arranged to prevent distortion of meter readings. The voltmeter permits the plater to read, not only the line voltage, but also the voltage drop from anode to cathode directly at the tank, the latter reading being of importance in determining the conductivity of the solution. The ammeter provides visual indication of the total current passing through the solution, so that with a known cathode surface exposed the current density may be calculated readily. With this calculation made, the amount of deposit in a given time is easily and definitely determined.

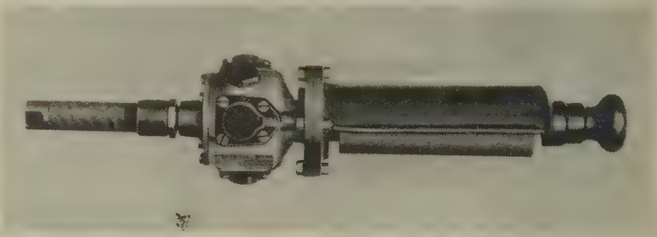
Electrical ratings of the Optimus rheostats have been developed around the standard electrical ratings of single-pole knife switches, and the resistance steps controlled by the knife switches are designed so that in normal service neither the resistance step itself nor the knife switch carries more than its rated capacity. These tank rheostats are mounted on asbestos panel boards of sturdy construction.

Portable Pneumatic Rod Grinder

For grinding and polishing locomotive side and main rods and valve motion rods, the Ingersoll-Rand Co., 11 Broadway, New York, has made available a portable pneumatic rod grinder designated as the size 63. The tool is designed to use a 6-in, grinding wheel and is provided with an outboard bearing and hand grip.

Other applications in the railroad shop include grinding welds on side rods, grinding brasses to fit main rods, grinding jaws in main rods to smooth them up for new brasses, grinding frame jaws for reseating wedges and grinding holes in frames for refitting brake pins.

In general design, the machine is similar to the other grinders manufactured by the company. The motor has three cylinders spaced about the center line of the spindle, all delivering power to one crankpin. This arrangement, together with a counterweighted crank, is intended to minimize vibration and assure a steady torque at the spindle. Each of the three cast-iron cylinders is separate from the aluminum case. The cylinders are interchangeable and may be removed readily for replacement.



Although Designed for Use on Locomotive Side Rods and Brasses, the Tool Is Adapted for Any Wide Surface That Is to Have Smooth Finish

The valve, crank and spindle are of one piece and the crank spindle is supported by three sets of ball bearings. The grinding wheels employed are 2½ in. in diameter and the average free speed is 6000 r.p.m. The length overall is 23¼ in. and the weight of the machine is 23¼ lb.

Dealer-manufacturer relations, standardization of price sheet sizes, and the appraisal system of handling the used tool problem were discussed by 34 members of the Associated Machine Tool Dealers at a three-day meeting held May 23, 24 and 25 at Granville, Ohio.

NEW FINISHING MILLER

Bearing Surface, Fillets and Ends of Car Journal Bearings Machined in One Operation

FOR finishing the bearing surface, fillets and ends of car journal bearings in one operation, after being babbitt lined, the Morton Mfg. Co., Muskegon Heights, Mich., is offering the new finishing miller here illustrated.

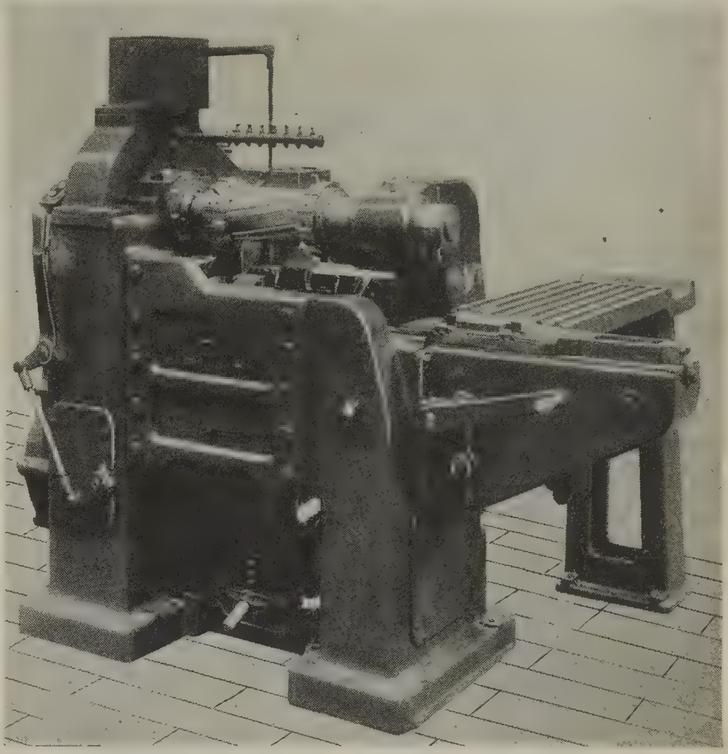
The column, of box construction, is designed with fixed center distance for the shaft and gear journal bearings in order to assure alinement at all times. The chuck for holding the brasses has rotating jaws, which open and close automatically as the chuck is raised and lowered to and from the cutter. It is fitted to a trunnion bearing between the columns and the side plates. The chuck is raised and lowered by a quill which is threaded at its lower end and is provided with locknuts for raising and lowering the connecting members for the purpose of adjustment when setting bearings of different sizes. The steel jaws furnished for various sizes of bearings may be mounted and removed conveniently. The locknuts on the quill have eight slots for the spanner wrench and when making vertical adjustment the movement from the center of one slot to another is 1/64 in.

Power for raising and lowering the chuck to and from the cutter is applied through levers and adjustable connections and through a shaft. The cam employed for raising the work to the cutter is designed so that the work moves up quickly until it comes in contact with the cutter, when it feeds the cutter in the normal manner. At the finish of the cutting operation the chuck lowers rapidly, automatically releasing the jaws and leaving the work free to be removed. Power is transmitted to the cam from the arbor through gears.

The eccentric adjustment applied to the trunnion provides means for raising the work for a second cut, when required. The controlling quadrant has three notches, each giving 0.026 in. adjustment. When because of shrinkage the bearing does not clean out perfectly in the first cut, the lever may be adjusted a notch as the chuck returns to its down position, and a second cut made without removing the work. The lever may be adjusted for third and fourth cuts where necessary.

The main driving arbor is hollow and has adjustable bronze bearings. The cutter arbor is fitted and feather keyed, permitting adjustment sidewise for alining with the work. The arbor and shafts are ground true where required. Bearings are bronze bushed and those in the main column are oiled automatically. Gears are cut from the solid and both gears and pinions are inclosed and run in oil. Lubrication of the cutter is by a gravity system.

A bearing loading column attached to the right-hand column of the machine enables the operator to place the work on the outside, eliminating any chance of injury from the cutter. The arbor journal bearing is secured to the side extension of the column, as shown, which arrangement provides a clear opening for loading and unloading the work. The bearing is on a sliding plate, and by moving a lever provided for the purpose, to left, it is set in operating position and centered with the cutter. After the cutting cycle has been completed, the lever is moved to the right and the bearing positioned for unloading.



The Loading Carriage on the Right-Hand Column Eliminates Danger to the Operator From the Cutters. With the chipping and inspection bench, only one lifting of the bearing is necessary during the entire finishing process

A chipping and inspection bench with interchangeable V-blocks for bearings of various sizes can be attached to the loading bracket, the arrangement being as shown in the illustration. The machine may be driven by constant-speed motor with starting and stopping controlled by a push button. The motor is mounted on a bracket at the rear of the machine.

High-Frequency Electric Grinders

A series of high-frequency electric grinders for speeds of 5400 to 10,800 r.p.m., and designed to use wheels ranging from 1 to 5 in. in diameter, has been added to the line of Forbes & Myers, Worcester, Mass.

One of the machines, the No. 204, a 5400-r.p.m. double-end unit with ¾-hp. motor, for operation on 180-cycle current, and designed to carry 3 to 4-in. wheels, is shown herewith. The spindle is ¾ in. in diameter at the wheels and is 23 in. long. Four ball bearings are used, with a large reservoir for grease between the two bearings in each arm. The wheel flanges are 2 in. in diameter. The motor is of the squirrel-cage induction type, fully inclosed and, except for the necessary changes in winding, is exactly like the usual induction motor for 1800 and 3600 r.p.m.

A ¾-Hp. Motor for Operation on 180-Cycle Current Is Employed. Wheels 3 to 4 in. in diameter may be used

Grinders of similar design but with the arm on one end only, or without the supporting arms, are also being offered. In the higher speeds the machines can be furnished with a threaded hole in the end of the spindle for attaching the grinding wheel. They are available in sizes from ¼ to 2 hp., for any high-frequency current.

An advantage emphasized in connection with the use of high frequency motors is that suitable speeds are secured without the use of belts or gears. The wheels are mounted directly on the motor spindle.

Bituminous coal mined in the United States in the week ended May 26 is estimated by the National Coal Association at about 8,300,000 net tons. This compares with 8,183,000 tons reported by the Bureau of Mines for the preceding week and 8,392,000 tons for the week ended May 12.

Montreal, New Haven and Cleveland Steel Treaters Name Officers

At the annual meeting of the Montreal chapter of the American Society for Steel Treating, held on May 19, Robert Job, vice-president Milton Hersey Co., was elected chairman; Fred H. Williams, assistant test engineer Canadian National Railways, vice-chairman; Gordon Sproule, assistant professor at McGill University, treasurer, and Duncan G. MacInnes, associate editor *Engineering Times*, secretary. The following were made members of the executive committee: Robert J. Noakes, superintendent Canadian Pneumatic Tool Co.; T. C. McConkey, vice-president B. J. Coghlin Co.; W. J. Hall, Montreal manager Production Materials, Ltd., and John K. Schofield, secretary-treasurer Edgar Allen & Co., Ltd.

The New Haven, Conn., chapter has elected officers as follows: Harold Fish, secretary and treasurer Ready Tool Co., Bridgeport, Conn., chairman; Thomas H. Chamberlain, metallurgist New Haven Clock Co., New Haven, vice-chairman; Fred E. Stockwell, lubricating engineer Standard Oil Co. of New York, New Haven, secretary, and Walter G. Aurand, metallurgist R. Wallace & Sons Mfg. Co., Wallingford, Conn., treasurer. The new executive committee is made up of Benjamin T. Baker, superintendent of heat treating, Bellis Heat Treating Co., Branford, Conn.; Robert L. Baldwin, metallurgist American Tube & Stamping Co., Bridgeport; Julius E. Brooks, foreman heat treating, Sargent & Co., New Haven; Percy L. Clark, master mechanic Bridgeport Brass Co., Bridgeport; Fred J. Dawless, district sales manager Crucible Steel Co. of America, New Haven; W. Paul Eddy, Jr., metallurgist Geometric Tool Co., New Haven; Rolland G. Hall, assistant superintendent R. Wallace & Sons Mfg. Co., Wallingford; James T. Kemp, metallurgist American Brass Co., Waterbury; Henry G. Keshian, metallurgist Chase Cos., Inc., Waterbury; Arthur Phillips, assistant professor of metallurgy Yale University, New Haven; Raymond T. Porter, superintendent heat treating Heppenstall Forge Co., Bridgeport; Carl J. Sauer, general manager Heppenstall Forge Co.; and Russell S. Young, metallurgist O. K. Tool Co., Shelton. W. Paul Eddy, Jr., has been made delegate to the national nominating committee; Walter G. Aurand, alternate.

The Cleveland chapter has elected D. M. Gurney, metallurgist Warner & Swasey Co., chairman; W. H. White, manager Cleveland branch, Atlas Steel Corporation, vice-chairman, and J. S. Ayling, sales manager Case Hardening Service Co., secretary-treasurer. W. E. Benninghoff, Cleveland Electric Illuminating Co.; W. T. Donkin, metallurgist Cleveland Wire Spring Co.; A. Jenkin, Case School of Applied Science; E. M. Slaughter, metallurgist National Acme Co., and H. H. Smith, superintendent of open-hearth for the Bourne-Fuller Co., have been named members of the executive committee.

Slight Reduction in Steel Works Employment

Employees in 196 iron and steel establishments in April numbered 264,386, compared with 264,526 in the same establishments in March, according to a report of the United States Bureau of Labor Statistics. The reduction is less than 0.1 per cent. There was a reduction of 2.4 per cent in the weekly payroll, which fell from $8,444,983 to $8,239,876.

An increase is reported both in employment and in wages in 990 establishments listed as foundries and machine shops. Employees went up from 229,425 to 231,801, or 1 per cent, while the payroll per week advanced 0.4 per cent, from $6,919,257 to $6,948,964. Machine tool plants, numbering 150, showed a gain of 2.7 per cent in employees and 3.3 per cent in payroll. Employees advanced from 28,835 to 29,609 and one week's payroll from $939,173 to $970,290.

For the entire number of establishments reporting in all industries, there was a reduction in employment from 3,019,966 to 3,005,964 in 10,788 establishments. The weekly payroll declined from $82,463,420 to $81,116,831.

Foundry Research Fund Established in Wisconsin

A fund of $15,000 for research in foundry metallurgy has been established by a group of Wisconsin foundries for the use of the college of engineering of the University of Wisconsin at Madison, and the board of regents has signified its acceptance. The foundries participating are: Falk Corporation, Bucyrus-Erie Co., Harnischfeger Corporation, Sivyer Steel Casting Co., Wehr Steel Co., National Brake & Electric Co., George H. Smith Steel Casting Co., and Milwaukee Steel Foundry Co., all of Milwaukee; and the Racine Steel Castings Co., Racine, Wis.

The research committee of the group, of which Harold S. Falk, vice-president and works manager Falk Corporation, is chairman, made the offer. Under its terms, the manufacturers will contribute $5,000 annually for three successive years. Each company is giving an equal share and all will benefit equally from the results.

A problem in metallurgy already has been suggested for the university to work out. It is expected to require a large part of the three years for completion, but if it should be finished before that time, another problem will be submitted. If the plan works satisfactorily and the results are encouraging, it probably will be continued after the three years. The research group of the nine concerns will meet regularly in Milwaukee to discuss shop problems and to confer with professors from the university on the progress of their experiments.

Announcing the acceptance of the gift, M. E. McCaffrey, secretary of the regents, said that just as the college of agriculture is assisting farmers in research work, so will the college of engineering aid manufacturers.

Chemical Properties of Crystals

The annual May lecture was delivered before the Institute of Metals in London on May 8 by Prof. C. H. Desch, on "The Chemical Properties of Crystals." After referring to the light thrown on the mechanical and physical properties of crystals by modern ideas as to the atomic structure of matter and the internal structure of the atom, the lecturer discussed the various ways in which atoms may be held together in a crystal by the simple exchange or sharing of electrons or by residual forces. In rock salt the molecule has disappeared, but there are many substances which are built up of molecules in the solid as well as in the liquid state. In a few simple cases it has been found possible to calculate the forces of attraction in a particular face of a crystal, and in that way the differing chemical properties of different faces possibly are explained. Such differences account for the varying habit of crystals of the same substance grown under different conditions.

When a metal is attacked by an acid, the surface is not dissolved uniformly, but distinct "etch-figures" are produced, and the shape of those must be intimately related to the internal structure of the metal crystals. The figures may vary in the most curious way when the solvent is changed, and that is shown most clearly by large single crystals of copper.

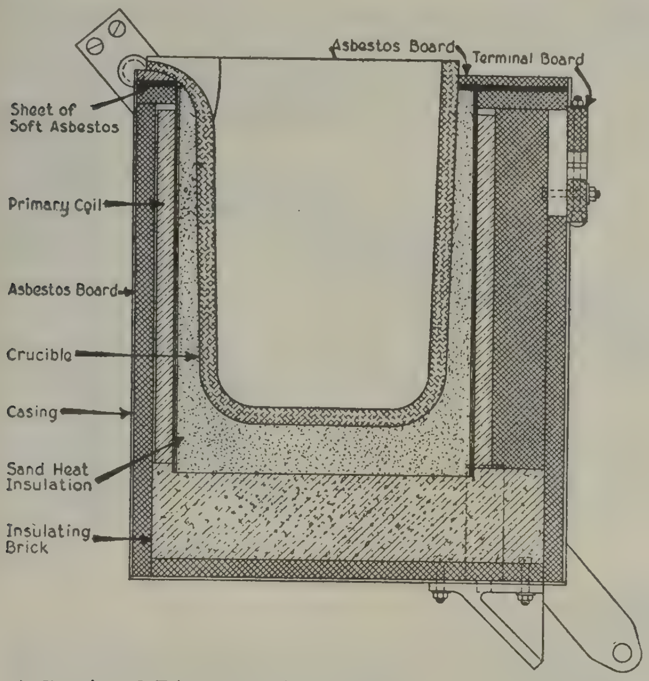
The compounds of metals with one another have puzzled chemists, as they do not follow the ordinary rules of valency, and have many anomalous properties. The modern view of the constitution of the atom makes it possible to explain them, and the relations which have been found between the forces of cohesion and of chemical affinity make it likely that there is a gradual transition from the simplest solid compounds, such as salts, through intermetallic and other compounds, to solid solutions which are regarded as mixtures.

The chemical properties of crystals are most easily illustrated by substances which do not consist of closely packed atoms, but have an open structure, such as graphite. Looseness of structure is also important for diffusion in solids, on which many technical processes depend.

New High-Speed Steel Made in Induction Furnace

British Firm Markets Tool Steels Made in Ajax-Northrup Furnace on Production Basis in 450-Lb. Heats

AN Ajax-Northrup high-frequency electric induction furnace with a capacity of 450 lb. per heat has been installed at the Imperial Steel Works of Edgar Allen & Co., Inc., Sheffield, England, and has replaced the crucible furnaces formerly used for the production of high-speed tool steels. The electrical installation consists of a 150-kva. motor-generator set, running at 3000 r.p.m. and delivering current at 1200 volts at a frequency of 2200 cycles. In order to improve the overall power factor a bank of condensers is installed to balance the current taken by the furnace. The furnace is said to take up to 900 amp. at a low lagging power factor, and the condensers are cut in by suitable switch gear to take a similar leading current. Circuit voltage is controlled by means of field rheostats at about 1200 volts.



A Sectional Diagram of a Coreless Induction Furnace

The high-frequency current passes through a water-cooled copper coil in the walls of the furnace and is efficiently insulated from the hot contents by asbestos linings. The clay crucible is also surrounded with sand. Very little heat can therefore be radiated from the crucible except through the cover. (A cross section of a coreless induction furnace of this general type is shown in the illustration taken from a recent issue of *General Electric Review.*)

One Hour Completes 450-Lb. Heat

Operation of the furnace is roughly as follows: The pot is warmed up by placing a piece of steel in it and turning on the electric current. The current passing through the copper coil induces eddy currents in the piece of steel in the pot. The currents heat the steel rapidly. When the heating is considered to be sufficient, the current is turned off, and the pot is allowed to absorb some of the heat. After this has been continued in brief alternations until the crucible is at a good temperature, the rest of the material to be melted is charged into the pot. Current is turned on, and in about an hour a full heat of 450 lb. of steel (which is the capacity of the furnace) is melted and ready to be cast into ingots. The current consumption for the first heat is at the rate of about 950 kva. per ton of ingots, and for subsequent heats at about 850 kva. per ton.

As soon as the metal contained in the pot is molten it circulates rapidly in a vertical plane, so its composition is maintained constant in all parts. Furthermore it is uncontaminated by gases of combustion or by carbon from electrodes. It is said that this vigorous mixing in a gas-free atmosphere has led the Ajax-Northrup furnace to be favored for laboratories for the ease with which experimental steels of definite analyses can be made up and cast. There is obviously no wear on the outside of the clay pot, which is so severe in the crucible steel furnace, but the circulation of the molten metal has a pronounced scouring action on its interior. Comparative figures taken from operation of a Heroult arc furnace operating on tool steels at the Sheffield steel plant show that electrode expense and cost of clay pots will be about the same.

Advantages Over Crucible Process

According to S. J. Hewitt, chief metallurgist Edgar Allen & Co., the advantages of the new furnace "over the crucible furnace are the smaller space necessary for its installation and its lower estimated cost of production, although the latter has not been finally proved yet, owing to the furnace's not having been worked to its full capacity. The resultant steel is also free from outside impurities, such as are common to the crucible process. The quickness of melting combined with the ease of control make it a remarkably useful and convenient method of melting."

It is interesting to note that this British firm, which has had extensive experience in fine steel making by both Huntsman's crucible process and Heroult's electric furnace, have issued trade literature claiming that the Ajax-Northup induction furnace produces steel of conventional analyses much superior than either of its predecessors. To quote them:

"The explanation is simple.

"(1) There is no contamination of the steel by gases, fuel or carbon electrodes. Sulphur and phosphorus, those deadly enemies of the steel maker, are eliminated to a greater extent than has ever before been possible.

"(2) Furthermore, there is a violent stirring of the molten metal electrically, which results in a thorough diffusion of the ingredients throughout the entire mass. This gives the steel greater homogeneity."

High-Speed Steel of Extra Durability Made in Induction Furnace

Special qualities are also claimed for a new brand of tool steel (called "Stag Major") made in this furnace. Whether it is substantially different in analysis from the tungsten-chromium-vanadium high-speed steels which are most favored in America, or from the English maker's other brands, is not clear from the description given. At any rate, it is said to be heat treated exactly as other high-speed steels.

Tests on single roughing lathe tools made by the Sheffield testing works gave the following results:

All tests:
Speed, 65 ft. per minute.
Depth, 3/16 in.
Feed, 1/16 in.
Lubricant, none.
Steel cut: 0.71 per cent carbon, normalized bar, Brinell hardness 235.

Time for failure:

14 per cent "Tungsten High-Speed Steel"	4 min. 30 sec.
18 per cent "Tungsten High-Speed Steel"	8 min. 12 sec.
"Special Super High-Speed Steel"	14 min. 6 sec.
"Stag Major High-Speed Steel"	23 min.

The Youngstown Sheet & Tube Co. has called a special stockholders' meeting for June 25 to approve a new issue of 250,000 shares of $100 par value preferred stock. Of this number, it is proposed to issue at this time 150,000 shares, to be designated as "Series A" bearing an annual dividend rate of 5½ per cent, and subject to redemption of $105 per share upon 30 days' notice. Present outstanding 7 per cent preferred has been called for redemption July 1, 1928.

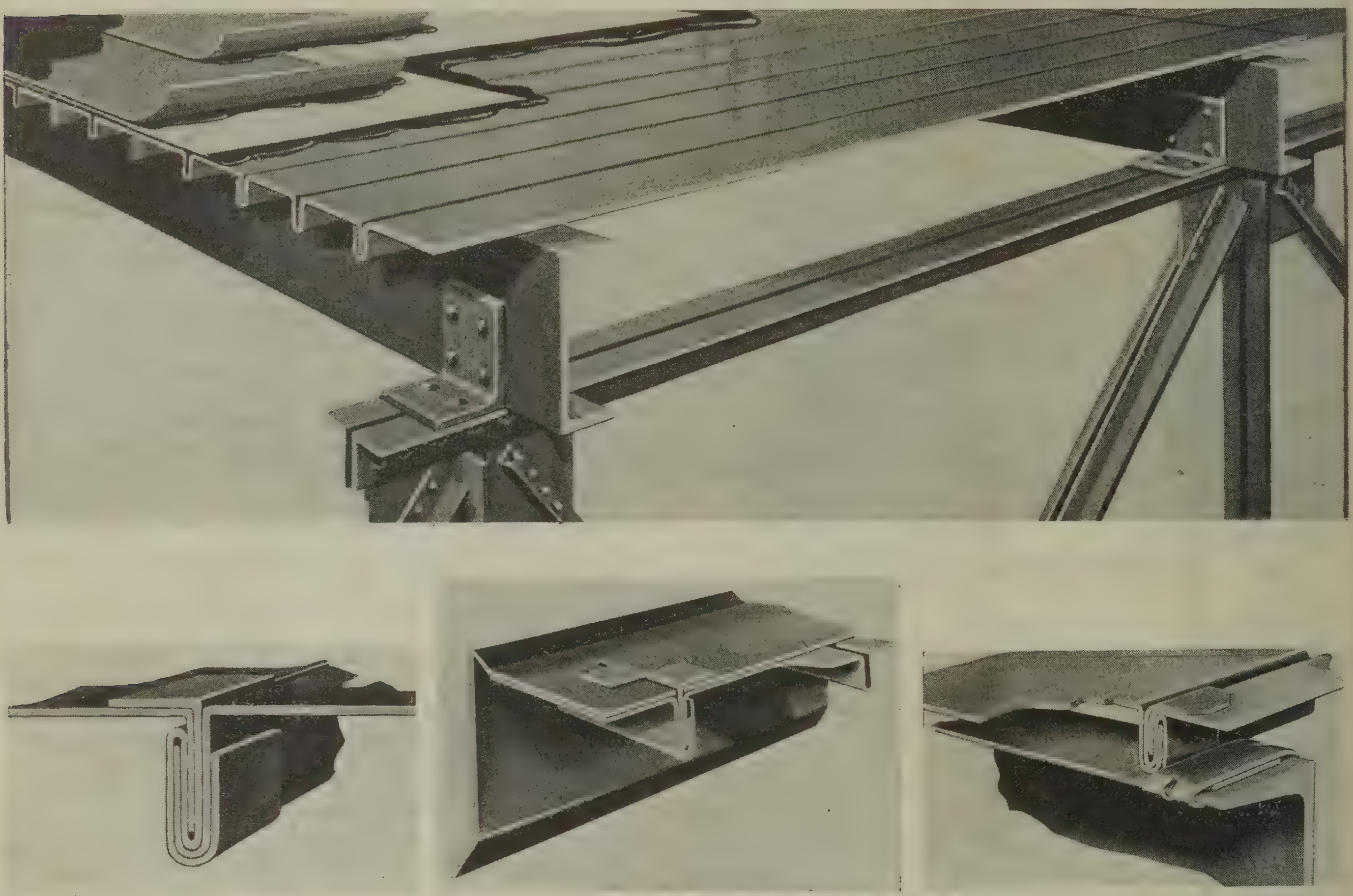
Steel Roofing System Erected with Standard Clips

A STEEL roof deck placed on the market by the R. C. Mahon Co., Detroit, and designed to be covered with water-proofing materials, is put out in standard sections with three standard clips, respectively for attaching to the purlins, for locking the plates together between purlins and for attaching flashings. Details of the attachments and of the standard plate are shown in the illustration.

All lap joints occur directly over the purlin, there being no end fittings in the installation. It is stated that the only tool needed to apply this deck is an ordinary hammer. The deck plate is furnished in copper-bearing steel No. 18 and 20 gage, painted a standard light gray. It can be furnished also in galvanized steel. The company has established No. 20 gage as the minimum thickness for satisfactory service.

When completed the deck functions as a single steel plate, as the separate units, when assembled, become an integral part of one interlocking whole. The end lap over purlins is standardized at 2 in., the plates being 12 in. wide with an intermediate rib 1½ in. deep. Every second rib, where adjacent sheets interlock, provides three thicknesses of metal. Each plate is locked with clips to the adjoining plate, to prevent sagging of individual plates from local loads. This feature avoids loosening of bond between the deck and the insulation or finish above it.

Included in the design are arrangements for taking care of saddles, flashings, fill, etc. Details have been worked out for a considerable variety of cases, including those in which ventilator openings go up through the roof, also where strainers and sumps are provided in the saddle, and where monitors, sawtooth construction and other roof types are used.



FOUR Standard Members Form the Entire Roof Above the Purlins. In the assembly view at top the ribbed deck plates are shown; below are the three forms of clips. That at left is the "intermediate" clip, used for locking the roof deck plates together midway between purlins. In center is the "flashing" clip, for attaching flashing to the deck plates. At right is the "beam" or "purlin" clip, for attaching the deck plates to the purlins, in this case a channel

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Birmingham Producers Protest Consolidated Southwestern Decision

WASHINGTON, June 5.—A protest against the decision of the Interstate Commerce Commission in the Consolidated Southwestern cases has been filed by the Alabama Iron and Steel Shippers' Conference, Birmingham, an association of iron and steel producers, which contends that the relationships prescribed on manufactured iron and steel from Alabama producing points are not justified. The petition asks that the commission modify the decision to prescribe the same scale from Birmingham and other Alabama producing points as from Chicago and other points in Central territory. It suggests that this be done by providing a maximum scale from the Alabama points and, if necessary, a minimum scale from producing points in Central territory. It is further urged that the commission revise the grouping of the Southwestern destinations so that there will be a uniformity of the relationships, distance for distance, between the Alabama producing points on the one hand and the producing points in Central territory on the other.

The decision, which has been protested by Northern iron and steel producers also, changed the long existing adjustment of iron and steel rates to the Southwest territory, and applied a grouping arrangement based on a mileage scale which, from Birmingham and other Alabama producing points, is different and on a higher level than from producing points in the competing territory on and north of the Ohio River. The commission, when considering this point previously, declared that the differences "are no greater than necessarily result from the application of river crossing allowances at crossings south of Cairo."

CARNEGIE LIBRARY OF

Machinery Exports Continue Heavy

Four-Month Total Over $10,000,000 Ahead of Last Year—Imports About Same as in 1927

WASHINGTON, June 2.—Exports of machinery of all kinds from the United States in April were valued at $37,375,868, compared with $42,372,463 in March and with $39,771,065 in April of last year. For the four months ended with April the value was $151,951,340, against $141,739,716 for the corresponding period of last year. Exports of industrial machinery in April, 1928, were valued at $17,412,396, against $19,026,074 in March, while the value for April of last year was $18,940,682. For the four months ended with April exports of industrial machinery were valued at $68,901,637, compared with $67,986,656 for the first four months of 1927.

Exports of all power-driven metal-working machinery in April were valued at $1,827,938, against $1,960,407 in March and $1,796,305 in April of last year. For the first four months of the present year and 1927 the values were $7,818,034 and $5,737,327, respectively. Exports of power-driven metal-working machinery listed in THE IRON AGE table totaled 696 units, valued at $998,344, in April, against 740, valued at $1,103,000, in March.

Total imports of machinery and vehicles in April were valued at $2,427,259, against $2,433,564 in March and $2,667,832 in April of last year. For the four months of 1928 and 1927 the values were $8,977,710 and $9,649,088, respectively. Imports of machinery listed in THE IRON AGE table were valued at $1,935,751 in April, against $1,819,672 in March and $1,840,203 in April of last year. For the four months of the current year the value was $6,709,473, against $6,683,006 for the corresponding period of last year. Imports of industrial, office and printing machinery in April were valued at $1,378,840, against $1,404,786 in March and $1,416,598 in April of last year. For the four months of the present year and 1927 the values were $5,227,413 and $5,372,970 respectively.

German Firm Now Offering 15 Types of Steel Dwellings

WASHINGTON, June 5.—Steel dwelling houses are now offered for sale by a firm in Gleiwitz, Upper Silesia, Germany, where they are manufactured, according to a special circular just issued by the iron and steel division, Department of Commerce, and based on a report prepared by Lester L. Schnare, consul, Breslau. The circular is one of a number circulated by the division regarding the growth of steel house construction in Europe. The Gleiwitz firm has published a catalog describing 15 types of steel dwelling houses which it is prepared to sell and is attempting to introduce in southeastern Germany. So far it is the only firm in Silesia to undertake construction of dwelling houses of steel. The circular details specifications of the types of houses built, and it is stated that they are so constructed that they may be taken down and moved quickly and easily, thus making them suitable for use on construction jobs and for similar purposes where permanence is not a requisite.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	April		Four Months Ended April	
	1928	1927	1928	1927
Locomotives	$147	$90	$779	$3,542
Other steam engines	71	104	232	818
Boilers	62	135	323	669
Accessories and parts	127	233	550	750
Automobile engines	1,685	1,591	5,163	4,733
Other internal combustion engines	624	656	2,328	1,919
Accessories and parts	365	298	1,184	1,414
Electric locomotives	61	312	571	438
Excavating machinery	632	467	2,596	1,547
Concrete mixers	98	100	328	408
Road-making machinery	178	251	620	621
Elevators and elevator machinery	388	423	1,161	1,626
Mining and quarrying machinery	986	1,520	4,108	4,743
Oil well machinery	1,141	2,861	4,518	7,553
Pumps	479	628	1,720	2,134
Bending and power presses	131	123	531	382
Machine tools*	1,042	1,103	4,529	3,494
Forging machinery	44	53	255	278
Other metal-working machinery and parts	484	453	1,881	1,511
Textile machinery	979	950	4,350	3,512
Sewing machines	692	926	2,880	3,258
Shoe machinery	145	148	626	470
Flour-mill and gristmill machinery	40	38	166	134
Sugar-mill machinery	118	281	1,570	910
Paper and pulp mill machinery	301	220	1,252	739
Sawmill machinery	64	230	303	1,688
Other woodworking machinery	164	84	596	415
Refrigerating and ice-making machinery	797	645	2,445	1,177
Air compressors	488	709	1,982	1,916
Typewriters	1,736	2,070	7,426	7,179
Power laundry machinery	82	147	334	575
Typesetting machines	335	444	1,443	1,355
Printing presses	268	431	1,911	2,056
Agricultural machinery and implements	8,388	8,049	33,575	26,911
All other machinery and parts	14,036	12,996	57,315	50,863
Total	$37,376	$39,771	$151,951	$141,739

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*Principal items detailed in another table.

Exports of Power-Driven Metal-Working Machinery

	April, 1928		March, 1928	
	No.	Value	No.	Value
Engine lathes	39	$78,449	95	$143,373
Turret lathes	41	56,602	29	93,995
Other lathes	125	159,525	33	34,295
Vertical boring mills and chucking machines	8	7,720	12	23,125
Thread-cutting and automatic screw machines	64	78,357	90	124,902
Knee and column type milling machines	19	36,746	33	97,243
Other milling machines	43	109,522	47	115,442
Gear-cutting machines	30	64,481	26	59,044
Vertical drilling machines	62	38,491	75	23,423
Radial drilling machines	8	39,574	16	53,337
Other drilling machines	71	32,241	80	14,715
Planers and shapers	46	84,802	37	64,787
External cylindrical grinding machines	59	143,088	81	159,396
Internal grinding machines	37	43,956	38	69,356
Metal-working tool-sharpening machines	44	24,790	48	26,567
Total	696	$998,344	740	$1,103,000

Imports of Machinery into the United States

(By Value)

	April		Four Months Ended April	
	1928	1927	1928	1927
Metal-working machine tools	$46,690	$20,735	$215,078	$165,152
Agricultural machinery and implements	598,332	758,635	2,072,033	2,588,110
Electrical machinery and apparatus	229,651	180,885	757,495	513,457
Other power-generating machinery	3,767	2,252	32,070	22,187
Other machinery	836,875	630,358	2,712,028	2,649,450
Vehicles, except agricultural	220,436	247,338	920,769	744,650
Total	$1,935,751	$1,840,203	$6,709,473	$6,683,006

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This Issue in Brief

Accident rate in metal industries drops 25 per cent. In 1927 the number of accidents per million hours of exposure was 26.59, as compared with 35.45 in 1926. Severity rate was sharply reduced also. — Page 1595.

Improves quality of gray iron castings and cuts fuel cost 50 per cent by firing cupola with powdered coal. Sulphur is reduced 20 to 30 per cent; total carbon is about 20 per cent less, and transverse strength and deflection of castings are about 15 per cent higher. The powdered coal is burned outside the cupola shell proper and the hot gases are fed to the melting zone.—Page 1594.

Too many oil grooves spoil the bearing, says bearing manufacturer. Every groove reduces the bearing area. Groove edges should be chamfered; otherwise the sharp edges will scrape the oil film off the shaft.—Page 1599.

Joint apprentice-training system is operating successfully in East Chicago. Under the supervision of the Chamber of Commerce, eight manufacturers conduct a community training program, which provides for shop, shop school, and high school instruction.—Page 1601.

Open-hearth difficulty with silicon comes not from high or from low silicon in the pig iron, but from a *change* in silicon content, either up or down. When the silicon content is approximately stable, good results are obtained in the steel.—Page 1602.

Production cost of high-speed steel will be lower in new electric furnace, metallurgist believes. In new high-frequency electric induction furnace, the current passes through a water-cooled copper coil in the walls, and is insulated from the hot contents by asbestos linings. A heat is completed within one hour.—Page 1619.

Machinery exports fall 7 per cent. April shipments out of country were valued at 37.4 million dollars. But shipments for first four months of year were more than 6 per cent above same period of 1926. — Page 1621.

Arc welding will soon be used on most structural jobs, structural engineer believes. Field work offers opportunities for the larger welding operations, he says, since many structural conditions are best met by that process.—Page 1604.

Perhaps it will be more economical to improve or replace the primary unit rather than to buy equipment to convert the waste heat into steam. When steam thus generated is not required, or when it is in excess of demands, study of returns from waste-heat recovery installation costs is apt to decide against such recovery.—Page 1605.

To guard against accidents, hoisting chains should be annealed at least once a year, says manufacturing executive. In addition, it is a good plan to have them tested at intervals by the chain manufacturer.—Page 1610.

You can not make good steel from inferior raw materials, says open-hearth man. A definite amount of carbon in the charge is necessary to melt and refine it. Sulphur and phosphorus can be removed from the bath in small amounts only, so that care should be used in limiting the quantities going into the furnace.—Page 1607.

Improved accuracy in machining operations removes the need for plasticity in the bearing metal, says bearing manufacturer. Harder steels call for harder bearings, giving longer life, he says. To get the right bronze for the particular application requires a careful study of all factors.—Page 1599.

Open-hearth furnaces heated with pulverized fuel are operated with no more difficulty than with producer gas, but not so simply as when oil is the fuel. By substituting arches for checkers, Eastern steel maker has solved the difficulty of checkers filling up with ash.—Page 1603.

"Teeming speed is the most important factor in steel-making," says British steel man. Slow pouring allows the metal to cool and to free itself of gases. Minimum satisfactory pouring time of 7200-lb. ingots is 6 min., he believes.—Page 1608.

New electric melting furnace will be elliptical in shape, 20 x 29 ft. Timken furnace will have six electrodes instead of three, in two groups of three each.—Page 1596.

"Competition never seriously presses those concerns which are distinguished by superior productive ability." By failure to utilize low-cost equipment and methods, many concerns find themselves "profitless" even in times of good business. As they continue to ignore improved methods, they not only stand still but really go backward, relative to the advance of their more progressive competitors.—Page 1625.

Accident rate among foreign-born employees proves six times that among native born workers. Examination of records of large plant reveals also that accident rate is less with newly employed men than with those of longer service.—Page 1625.

Lathe builders will charge for service on each machine sold. When service charges are included in the price of the machine, the buyer who makes unreasonable demands profits at the expense of the fair buyer, the lathe builders say.—Page 1627.

ESTABLISHED 1855

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Flying Apace

TRULY the aviation industry goes at a breathless pace. In the morning's paper is first-page news about a trans-Pacific flight, trans-Atlantic flyers, and Lindbergh's surveys for the air-rail transcontinental passenger service. In the morning's mail is a news release from Carnegie Institute of Technology announcing extensive plans for an aeronautical engineering branch of the Department of Mechanical Engineering, in which more than half the sophomore class wishes to enroll. The same mail brings the "Aeronautics Trade Directory" from the United States Department of Commerce, and in it we see that there are already ten universities and engineering colleges which have preceded Carnegie in the new educational fashion.

Or, if you prefer to study at home, one of 17 correspondence courses is at your service. If you only want to know how to fly, without being bothered with theory of fluid flow and such abstruse matters, why then the addresses of ground and flying schools run to seven columns; they are found in every State in the Union.

After learning to fly you can get advice from 19 consulting aeronautical engineers and one consulting meteorologist; 18 insurance companies will write your policies; you can belong to 8 associations or subscribe to 23 magazines. You may buy a plane from any one of 113 manufacturers who are represented by an appropriately long list of distributers and dealers. You can buy special aeronautical first-aid kits from no less than three houses; and parachutes from the same number; also accessories and specialties too numerous to mention.

But, of course, you need a metal hangar. Forty-four firms specialize in such constructions. If you come to grief, 56 general service and repair firms (possibly for major operations) will patch you up; minor adjustments may be done at hundreds of airports.

Perhaps you want your flying done for you. Very well; there is a list which takes up 19 columns, of men and firms who will carry your mail or parcels, who will taxi you about or conduct sightseeing parties, who will advertise and sky-write for you, spray your orchards or dust your crops, do stunts and loop the loops, take your photographs from above, or survey and map any region on the earth's surface in which you are interested.

Who wants to walk?

Exit the "Vicious Circle"

COMMENT on the economic aspects of business often used to employ terms like "vicious circle" or "ascending spiral" or "descending spiral." It is noteworthy that in recent years such references have not been made and would have been quite unfitting, for the steadiness of trade has been at once a satisfaction to business men and a cause of confusion among cyclical forecasters.

In the former time the railroads now and then called for higher freight rates, alleging higher wage costs, whereupon comment promptly arose that higher freight rates would mean higher living costs and fresh labor demands. Or a time would arise when employers in general were disposed to reduce wages, alleging low selling prices, and then would arise criticism that lower wages would mean decreased buying power, lower commodity prices still, and then fresh wage reductions, all in a "descending spiral."

The period of relative stability has now lasted so long that there is good reason to believe we are in a new order of things. The changes are largely associated with wage rates, but in more than one respect. Employers have come to recognize the general economic advantage of wages being maintained. Thereby buying power is sustained. Labor turnover is diminished. Employers in selecting men have improved on the old way of retaining the best in the periodic shaking out. On the other hand there has been no labor shortage to bring about unduly high wages or unsound competition between employers, necessitating shortly a downward readjustment.

The increasing mechanization of industry has played an important part in steadying both wage rates and prices. The competitor can see little advantage in reducing wages, for the relation between labor cost and capital cost is reduced and the importance of manning the machinery well is increased. While employers are to be commended for becoming more enlightened, no small part of the change is due simply to the march of events.

The comparative stability of wages in recent years furnishes its own testimony to there being no spiral, ascending or descending, in operation. The commodity price indexes furnish other testimony. The composites have fluctuated but little, and every time there has been an upward or downward swing some individual commodities have moved in the opposite direction, whereas those spirals of the old days involved everything moving more or less together. Also the building records have been showing a stability quite beyond the average prediction. Nobody nowadays seems to hasten a building project to escape a higher cost or to delay one to secure the benefit of a decline.

The Supply of Scrap

HEAVY melting steel scrap prices of late have been at their lowest levels since 1921; and as liquidation falls heavily upon scrap a more illuminating comparison is that scrap prices are but a shade above their pre-war level. Freight rates are much higher and were there not improvements in the handling of scrap it would be impossible in many cases to move it at present realized prices.

Several factors combine to cause such cheapness. Production statistics show that the proportion of works scrap to mill shipments of product has increased. We need not here consider how much progress has been made in producing sound ingots or how much more cropping must be done to supply present day steel quality, or whether mills carry their steel to a greater degree of finish than formerly. It is sufficient to observe from the statistics that, taking pairs of years to secure more representative averages, the proportion of rolled steel to ingots was 76.4 per cent in 1905-6, 76.2 per cent in 1912-13, and 74.0 per cent in 1925-6. Deducting a uniform scale loss there is represented about 11 per cent increase in works scrap per ton of ingots in about 20 years. Of course there is the important offset that production of Bessemer steel, which supplies scrap for associated open-hearth furnaces, has greatly decreased by the long-range comparison, but the large decrease occurred a good while ago, there being very little decrease in the last few years.

There is an increase in scrap supply, for somebody, by the decadence in production of rolled iron, which averaged 649,491 tons a year in the last three years against 2,148,878 tons 20 years earlier, when production of forge pig iron ran 669,468 tons a year and some of it was used in foundry work. Accordingly one may take it that over a million tons of scrap has been released by the iron rolling mills.

Then we have this very important principle, that if material returns as scrap a certain number of years after its production, the outcome of the latter has been increasing lately more rapidly than formerly, relative to the rate of steel production. Assume, for instance, that certain scrap arises after 20 years. Production of rolled iron and steel in 1895-6-7 was 33.3 per cent of that in 1905-6-7, but production in this second group of years was 55.3 per cent of that in 1925-6-7. Thus in the last 20 years there has been an increase in scrap relative to production of new material.

Finally, as the country becomes better filled with iron and steel the layer is denser, so to speak, and it is correspondingly easier to get at the scrap. But here arises the point that with higher freights and wages it may not pay to gather the scrap even though physically it is more accessible. It would seem therefore that the market price can go only so low and that thereupon the offerings of miscellaneous material would diminish.

The Devil Taking the Hindmost

DIFFERENT percentages of net profit are found among active producers in every competitive line of business. The prosperity of some is chronically "profitless," while others seem able to make money at all times. The production costs of the former are at or above the general level of net sales prices, while the latter are able to produce at costs low enough to afford them at least a reasonable percentage of profit. The two groups are marked off by the zone of marginal cost. As market conditions change, a few producers in the marginal zone move in one direction or the other, passing out of it into a situation of profit or of loss.

Better location or equipment and the use of better methods characterize the industrials which occupy the positions above the marginal cost line. As improved equipment and methods are continually developed, it follows that, by failing to acquire these, some producers must in due course find profitable competition impossible. By standing still they have gone backward. Yet, as we have heretofore pointed out, an enterprise once capitalized must generally be kept going and thus, to the hurt meanwhile of average competitors, the law of the survival of the fittest may work but slowly.

Aging equipment is rightly depreciated in book value; unprogressive management ought in some way to be written off also in the capital accounts. The depreciation allowance should be used to acquire better means of production just as fast as these become available.

Industries are almost always "overbuilt," if all plants possible of operation at any cost are included in the count. On the other hand, concerns which are distinguished by superior productive ability are never seriously pressed by competition.

A Study in Industrial Accidents

AN analysis has been made of disabling accidents which occurred in a year in a metal-working plant employing about 5000 men. Chief among the conclusions drawn are these: That the accident rate was much higher among foreign born workers than among native born; that newly employed men had a lower rate than those of longer service; that the blame for 87 per cent of the accidents rested with the injured man; and that machines in motion were responsible for less than one-fourth as many accidents as were caused in the handling of material.

In the year this plant had 68 disabling accidents, including two fatalities. The total of lost time was 3600 days, reckoning nothing where death resulted. This excellent record was due, to a large extent, to years of persistent training of employees in accident prevention and in use of all possible safeguards. It was considered that the victims were to blame in 59 accidents, only four being due to negligence of fellow employees, while four were classed as unavoidable. Machines in motion caused 9 accidents, and the handling of material 38, to which might be added 4 caused by material falling. Of the injuries sustained, 19 were fractures, 10 eye injuries, 8 contusions, and 7 that bane of workmen's compensation, strained back, which occurs in genuine form, naturally, but is also a favorite excuse for protracted malingering.

The wide difference in hazard between native and foreign born was astonishing. Of the 5000 employees 35 per cent or 1750 are native born. Of these only 5 suffered a disabling accident, making the rate 0.3 per 100 workers. The 3250 foreign born had 63 accidents, making their rate 1.9 per 100 or more than six times that of the native born. However, the foreign workers on the average have the more hazardous tasks. Also, a certain percentage of them had inadequate knowledge of English, which was a handicap in the training given them with the purpose of reducing their hazard.

A study of the accidents in their relation to hours of the working day brought out an anomalous situation. In the year 9 accidents occurred between 7 and 9 a. m., or 4½ per hour, and 21 accidents between 9 a. m. and 12 m., or 7 per hour. Such an increase is commonly attributed to increasing fatigue. In the 12 months there were 8 accidents between 1 and 3 p. m., or 4 per hour, and 13 between 3 and 6 p. m. or 4 1/3 per hour. It will be noted that the accident frequency in the concluding period of the day was less than in the opening morning period, when fatigue is not supposed to exist.

Men employed less than one year, numbering about 500, had 6 accidents, or 1.2 per 100; those with length of service from one to ten years, numbering about 2000, had 36 accidents, or 1.8 per 100; those whose service was more than ten years, constituting about one-half the entire force, had 26 accidents, or a trifle over 1 per 100. The rate for all men with more than one year of service was 1.32 per 100. The conclusion, if the ratios may be considered to prevail year after year, is that the novice in a plant is inclined to be careful and to take few unnecessary chances. In the following years he is not so safe a risk. Then, with maturity, comes caution.

Industry and the Graduate

FROM the head of an important Indiana company in the metal trades the request came recently to The Iron Age for copies of editorial comment which our correspondent had seen in these columns on the relationship between the college and industry. Various clippings were sent from this office and in acknowledging them this executive writes:

> I find that the editorial I wanted was in the Oct. 14, 1926, issue and was entitled "What Industry Wants in the Graduate." This is so good that I think it ought to printed again. There must be other fathers who have sons at college and many of these sons are doubtless groping for the right path. I am sure if the editorial could be reprinted it would benefit many sons and fathers, for the father does not always know and has to go through the experience of learning how to deal with a son.

Seeing that in the next fortnight thousands of young men are to go out from American colleges, it is appropriate to give our readers again the expressions which this Indiana manufacturer finds of value, and we are glad to comply with his request by reprinting the editorial of Oct. 14, 1926, herewith:

What Industry Wants in the Graduate

At recent meetings of the Mining and Metallurgical Engineers and the Steel Treaters there have been gatherings of men interested in metallurgical education. A large majority of those who attended the sessions devoted to this subject are actively engaged in teaching and doubtless this visible interest by college faculties is in part due to the investigation of engineering education now in progress under the direction of Mr. Wickenden. From the discussions one would gather that the uppermost question in educators' minds is, "What does industry want us to teach engineering students?"

A clew to the answer might be found in the audience which listens to these discussions. If the metallurgical industries were suffering from a lack of educated men, no doubt there would be a greater representation of industrialists at these conferences. No evident interest in the matter is equivalent to saying: "We have no constructive suggestions to offer; the average college graduate is good raw material."

As a matter of fact, are not the college authorities placing the wrong emphasis upon their industrial contacts? They should have learned by this time that a school of learning cannot produce specialists for industry. Each position is unique; only broad fundamentals are common to all. Hence this call upon the graduates and employers to consider details of the curriculum is of only passing significance. The colleges eventually will view the task primarily as the production of cultured citizens and secondarily as the production of high-salaried executives.

Some time back a committee was appointed by the American Institute of Mining and Metallurgical Engineers to canvass the situation and arrive at an answer to the question, "What does our industry look for in the college graduate?" Numerous prominent managers replied to the questionnaire. Their requirements of the technical subordinate were something like this: He must have integrity and loyalty. He must be clean and a good citizen; he must be energetic; he must be well grounded in the fundamentals of science. Not a word about special courses in mine timbering, flotation, steel refining, heat treatment. The answers are undoubtedly typical of those which would be given by any large employer in any line: the junior members must be men of character and ability.

College faculties will find, therefore, that the requirements of the industries are no different from the requirements of the professions, of the arts or of the state. All want men of character and ability. Whenever a college is so managed that it builds these two attributes, it is fulfilling its mission admirably.

The live questions are not specialization in the courses of study so much as wide discretion in electives and numbers of "snap" courses; not so much what the XYZ Mfg. Co. thinks of the testing laboratory as what the attitude on the campus is toward cribbing in quizzes; not so much the success of the football team as an atmosphere which encourages work, study and clean living.

This does not mean that we advocate a return to the excessive Greek and Latin of a half century ago. Science, of course, is the foundation of all engineering curricula. Agricultural students will undoubtedly spend much time on plant and animal life; the architect will be more interested in external form, and the civil engineer will learn about the strength of materials. Such specialization is obvious. But a good undergraduate spirit, an inspired faculty and a president with vision are far more to be desired by industry than special courses leading to this, that or the other degree.

Lathe Builders to Guarantee Tools and Exact Service Charge

The National Machine Tool Builders' Association announces that the lathe group of the association has decided that each manufacturer shall give a six months' guarantee with each machine sold and will charge for services of erectors and demonstrators, this charge to be on a daily rate and to include railroad fare, hotel bills and other incidental expenses.

"The machine tool builders recognize that competent users of machine tools are not given to making unfair demands," says a statement by the association, "but so many careless or unfair buyers have been making demands for service, repairs, etc., that it has been found necessary to make a charge as a reasonable restriction on such unfair buyers. It is recognized that, if the satisfying of unfair demands is included in the cost of all lathes produced, the fair buyer is unfairly discriminated against and is expected to pay for a service rendered to other people who should pay for the service they themselves exact."

The rate to be charged for service men is to be a matter of individual decision by each lathe manufacturer, the usual charge being $15 a day and expenses. A similar plan may be adopted by other groups of machine tool manufacturers.

The six months' guarantee of each machine sold is restricted to the original purchaser and provides that it is binding only if the machine has been subjected to "normal and proper usage."

Preparing to Build American Passenger Steamers and Motorships

WASHINGTON, June 5.—Taking advantage of the recently enacted Jones-White merchant marine act, Atlantic and Pacific Coast operators are preparing for the construction of fast combination passenger and cargo ships, at a total cost of approximately $66,000,000, according to E. C. Plummer of the Shipping Board. He said he had been informed that three operators on the Pacific Coast and one on the Atlantic are about to make application for loans aggregating $50,000,000 from the construction fund of $250,000,000 carried in the new law.

Pacific operators include the Oceanic Steamship Co., the Oregon Oriental Line and the American Hawaiian Steamship Co. They plan to have at least six ships, and possibly more, built. Under the law, all must be constructed in American shipyards. The Export Steamship Co. already has made application for a loan to build four vessels to be operated between Atlantic and Mediterranean ports.

Mr. Plummer said that the United States lines, which operate the only exclusive passenger service of the 21 Shipping Board lines, are not in a salable condition and that private owners could not, with these vessels, compete successfully with foreign ships. This is because of the slow speed of the American ships in the fleet, with the sole exception of the Leviathan, which has a cruising speed of 23 knots. Mr. Plummer added, however, that when the steamers Monticello and Mount Vernon, which are to be reconditioned and equipped to travel 20 knots, are fitted up, they will be in a position to compete with the finest vessels on the North Atlantic, and could be turned over to private operators with reasonable assurance that the service could be continued, and with the Leviathan would make a balanced fleet of the United States lines.

Electrical Transmission Apparatus Makers Are Merged

The National Metal Molding Co., Pittsburgh, has acquired the American Copper Products Corporation, Bayway, N. J., and the British American Metals Co., Plainfield, N. J., and the three companies have been merged into the National Electric Products Corporation. The companies entering the combination make electrical transmission apparatus, but their products are noncompetitive and the merger is essentially one of companies producing supplementary lines. Control of the Habirshaw Cable & Wire Corporation, with plants at Yonkers, N. Y., and Bridgeport, Conn., is held by the new company.

Officers are W. C. Robinson, chairman; Wylie Brown, president, and I. A. Bennett and H. H. Robinson, vice-presidents. These men and O. F. Felix, C. F. Holdship, A. L. Robinson, A. Jerome, H. C. Carpenter and C. J. Gleason constitute the board of directors.

A. O. Smith Corporation Books Order for 24,000 Tons of 8-In. Pipe

With the beginning of deliveries on an order for 21,000 tons of 16, 18 and 20-in. electrically-welded steel pipe to the Magnolia Gas Co., Latex, Tex., the A. O. Smith Corporation, Milwaukee, announces that it has booked an order for 24,000 tons of 8-in. pipe from the Texas Co. for the transportation of oil. While the Smith company has made welded pipe up to 24 in. in diameter, this is its first order for pipe as small as 8 in. It also is the first time that electrically-welded steel pipe is to be used for transportation of oil. The Magnolia order requires 800 cars, and the Texas order 1000 cars. Shipments are being handled by special trains over the Chicago, Milwaukee, St. Paul & Pacific Railroad.

Hydro-Hoist and Heil Companies Are Consolidated

The Hydro-Hoist Co., Milwaukee, manufacturer of hydraulic hoists, control of which passed several years ago to the Heil Co., Milwaukee, manufacturer of steel dump bodies, tank bodies, tanks and stacks, has now been consolidated with the Heil Co. by an exchange of stock. Capital structure of the Heil Co. has been changed from $200,000 to 75,000 common shares of no par value, and 59,892 shares are now outstanding. The Hydro-Hoist Co. was capitalized at $100,000. Julius P. Heil, founder of the business, and since its organization serving as vice-president and treasurer, as well as general manager, has been elected president and treasurer. Clement C. Smith, formerly president, has been elected chairman of the board. Herman W. Falk, who is president of the Falk Corporation, Milwaukee, is the new vice-president. W. M. Chester has been reelected secretary, and William George Thwaits has been added to the board.

Year Book of American Engineering Standards Committee

An advance copy of the 1928 Year Book of the American Engineering Standards Committee carries a foreword signed by James A. Farrell, chairman of the advisory committee on industrial executives. The book, which is of 88 pages, lists 275 projects which were under way during the year and 111 which have been approved. The general objective of the committee is "to further the development and use of national industrial standards."

Twenty-nine organizations or groups of organizations have representatives on the committee. Sponsors for projects under way include 64 organizations. Trade, technical and governmental bodies cooperating through representatives on committees number 353 and there are 2135 individuals on the various sectional committees. Total receipts during the year aggregated $58,733 and disbursements were $61,267.

May Iron Output Close to April Rate

Daily Production Declined Only 252 Tons or About ¼ of 1 Per Cent from April—Net Gain of Three Furnaces

NET operations of blast furnaces in May changed but little from those in April. Actual data from all furnaces except one show the daily rate last month to have been 105,931 gross tons, as compared with 106,183 tons per day in April, a net loss of only 252 tons per day, or about 0.25 per cent.

Total May production of pig iron was 3,283,856 tons, or 105,931 tons per day for the 31 days. This compares with 3,185,504 tons, or 106,183 tons per day for the 30 days in April. The loss of 0.25 per cent in the May daily rate compares with a gain of 2.9 per cent in April over March. The May output last year was 3,390,940 tons, or 109,385 tons per day—or about 3 per cent larger than May this year.

Net Gain of Three Furnaces

Eight furnaces were blown in and five were shut down during May, a net gain of three. Of the furnaces blown in, five were independent steel company stacks, two were merchant and one is credited to the Steel Corporation. Three merchant furnaces, one Steel Corporation and one independent steel company stack were shut down last month. Most of the net gain for the month was by independent steel companies.

There was no change in the number of possibly active furnaces, which still stands at 343.

Capacity Active on June 1

There were 198 furnaces active on June 1 having an estimated operating rate of 106,145 tons per day, as compared with an operating rate of 104,015 tons per day for the 195 furnaces blowing on May 1. The gain of three furnaces, with a slight loss in daily rate in May as compared with a net loss of two furnaces and a gain in daily rate in April, is largely explained by the irregularity in furnace operations in various months, some being pushed faster than others.

Manganese Alloy Output

Ferromanganese output in May was 29,940 tons, the largest this year and the largest since January,

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	......
½ year....	95,794	105,039	109,660	107,351	......
July	57,577	85,936	103,978	95,199	......
Aug.	60,875	87,241	103,241	95,073	......
Sept.	68,442	90,873	104,543	92,498	......
Oct.	79,907	97,528	107,553	89,810	......
Nov.	83,656	100,767	107,890	88,279	......
Dec.	95,539	104,853	99,712	86,960	......
Year	85,075	99,735	107,043	99,266	......

Pig Iron Production by Districts, Gross Tons

	May (31 days)	April (30 days)	March (31 days)	Feb. (29 days)
New York and Mass.	212,333	205,556	216,224	204,744
Lehigh Valley.......	77,195	81,140	80,058	75,394
Schuylkill Valley ...	53,162	60,062	51,325	44,861
Lower Susq. and Lebanon Valleys ..	32,019	31,522	33,301	29,387
Pittsburgh district ..	700,880	663,784	639,693	597,543
Shenango Valley ...	114,779	100,073	101,946	90,179
Western Penna.	126,790	116,405	101,365	86,725
Maryland, Virginia and Kentucky	100,508	102,678	103,857	89,803
Wheeling district ...	124,948	115,284	133,764	118,108
Mahoning Valley....	309,842	310,227	296,491	261,837
Central and Northern Ohio	357,900	336,200	330,176	294,427
Southern Ohio	26,380	25,548	25,729	24,773
Illinois and Indiana.	694,636	693,271	715,439	639,763
Mich., Minn., Mo., Wis., Colo. and Utah	137,987	134,163	139,101	130,586
Alabama	207,045	199,487	223,314	207,108
Tennessee	7,452	10,104	7,891	4,888
Total	3,283,856	3,185,504	3,199,674	2,900,126

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchants* Iron	Total
May, 1927	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928.........	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

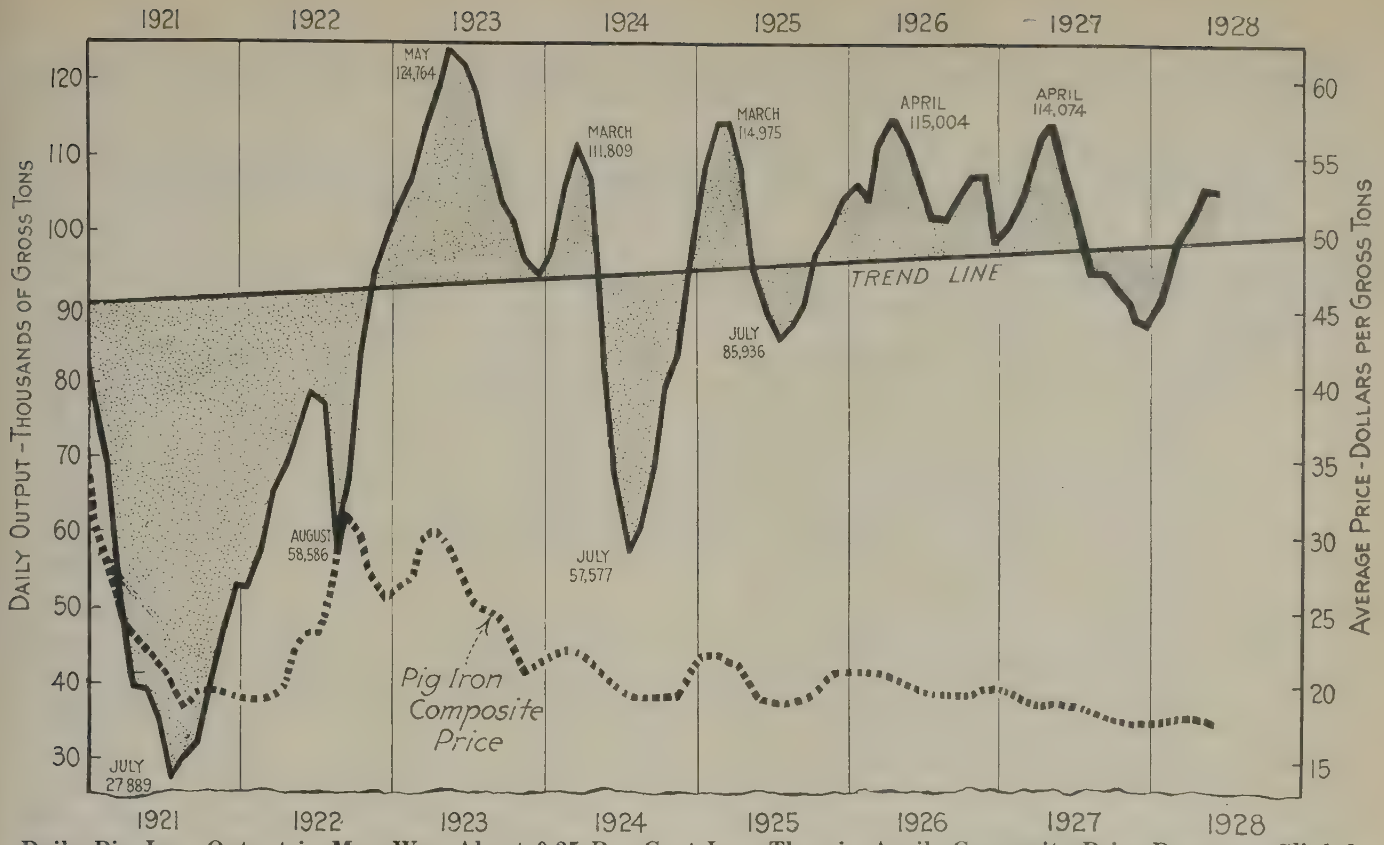
Furnaces	June 1 Number in Blast	June 1 Capacity per Day	May 1 Number in Blast	May 1 Capacity per Day
New York:				
Buffalo	12	5,700	12	5,695
Other N. Y. and Mass.	2	870	3	1,155
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,490*	5	2,600*
Schuylkill Valley ..	4	1,710	4	1,600
Susquehanna Valley.	2	1,020	2	980
Ferro. and Spiegel	0	....	1	240
Lebanon Valley	0	....	0	....
Ferromanganese ..	0	....	0	....
Pittsburgh District..	36	22,200	35	21,500
Ferro. and Spiegel	3	530	3	490
Shenango Valley ...	7	3,700	7	3,550
Western Pennsylvania	6	3,795	7	3,500
Ferromanganese ..	2	290	1	220
Maryland	5	2,590	5	2,520
Wheeling District	8	4,400	6	3,670
Ohio:				
Mahoning Valley ...	17	9,735	18	10,410
Central and Northern	19	11,500	18	10,700
Southern	4	1,200	3	850
Illinois and Indiana...	33	22,200	34	22,440
Mich., Wis. and Minn.	6	2,680	6	2,565
Colo., Mo. and Utah...	4	1,765	4	1,710
The South:				
Virginia	1	230	1	220
Ferromanganese ..	1	80	0	....
Kentucky	1	345	1	370
Alabama	17	6,775	16	6,600
Ferromanganese ..	1	100	1	95
Tennessee	2	240	2	335
Total	198	106,145	195	104,015

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	....
½ year........	19,848,461	19,430,678	....
July	3,223,338	2,951,160	....
Aug.	3,200,479	2,947,276	....
Sept.	3,136,293	2,774,949	....
Oct.	3,334,132	2,784,112	....
Nov.	3,236,707	2,648,376	....
Dec.	3,091,060	2,695,755	....
Year*	39,070,470	36,232,306	....

*These totals do not include charcoal pig iron. The 1927 :production of this iron was 164,569 tons.



Daily Pig Iron Output in May Was About 0.25 Per Cent Less Than in April; Composite Price Decreases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. Its position has been revised in the light of the showing of the last few years and shows an average yearly increase in consumption of about 415,000 tons

1927. Two companies made spiegeleisen in May, but the data cannot be published.

Furnaces Blown In and Out

During May the following furnaces were blown in: One Aliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Oriskany furnace of the Lavino Furnace Co. in Virginia; one La Belle and one Riverside furnaces of the Wheeling Steel Corporation in the Wheeling district; one River furnace of the Corrigan, McKinney Steel Co. in northern Ohio; the Hamilton furnace of the American Rolling Mill Co. in southwest Ohio; one Gary furnace of the Illinois Steel Co. in the Chicago district, and one Woodward furnace of the Woodward Iron Co. in Alabama.

Furnaces blown out or banked during the month included the following: the Standish furnace in northern New York; the Marietta furnace of the Lavino Furnace Co. in the lower Susquehanna Valley; one Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley, and one South Works furnace of the Illinois Steel Co. and one Federal furnace in the Chicago district.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1927		1928	
	1927	1928	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan. ...	2,343,881	2,155,133	31,844	7,486	22,298	†....
Feb. ...	2,256,651	2,274,880	24,560	7,045	19,320	†....
Mar. ..	2,675,417	2,588,158	27,834	7,650	27,912	†....
Apr. ...	2,637,919	2,555,500	24,735	12,907	18,405	†....
May ...	2,619,078	2,652,872	28,734	9,788	29,940	†....
June ..	2,343,409	....	29,232	10,535	....	....
½ year.	14,876,355	....	166,939	55,411	....	....
July ...	2,163,101	....	26,394	9,350	....	....
Aug. ...	2,213,815	....	21,279	9,104	....	....
Sept. ..	2,090,200	....	20,675	6,037	....	....
Oct. ...	2,076,722	....	17,710	6,129	....	....
Nov. ...	1,938,043	....	17,851	6,521	....	....
Dec. ...	1,987,652	....	20,992	6,816	....	....
Year..	27,345,888	....	291,840	99,368	....	....

*Includes output of merchant furnaces.
†Data not available for publication.

Large Increase in Exports of Aircraft and Parts

WASHINGTON, June 5.—Aircraft engines, parts and accessories to the value of $815,490 were exported from the United States during the first quarter of 1928, according to the aeronautics section of the transportation division, Department of Commerce. This represents an increase of approximately 250 per cent over the corresponding quarter of last year. The percentage increase for aircraft alone, which includes both airplanes and seaplanes, was much greater than that of the total valuation of aeronautical products exported. There were 49 aircraft, valued at $509,419, exported during the first three months of the present year, compared with five units, valued at $84,576, exported during the corresponding period of 1927.

Peru was the principal market during first quarter of the current year, taking 18 units valued at $120,970. Canada was second, taking nine aircraft valued at $89,670, in addition to an old unit from the war surplus stock. The total value of aircraft parts exported during the first quarter of 1928 was $197,308, more than 130 per cent greater than this class of exports for the first quarter of last year, when the value was $83,310.

Navy Auction Includes Scrap and Machine Tools

An auction of surplus material held at the Navy Yard, New York, and the Naval Supply Depot, Brooklyn, June 5, included about 3500 tons of iron and steel scrap, 400,000 lb. of non-ferrous metals and smaller lots of pipe fittings, boat and ship fittings, electrical material, hardware and hand tools, plumbing equipment and machinery. The machine tools included one 10-in. and two 14-in. turret lathes, belt driven; two monitor lathes; one 7-in. x 3-ft. bench lathe; one 16-in. x 8-ft. engine lathe, motor driven; one 18-in. x 8-ft. engine lathe, belt driven; one 42-in. x 30-in. engine lathe, motor driven; two 18-in. crank shapers; one 12-ft. x 36-in. x 38½-in. bridge planer; one drilling machine, and one hydraulic riveter.

Iron and Steel Markets

Sharp Break in Basic Pig Iron

Valley Iron Drops to Lowest Price Since October, 1915—Gain of Three Active Blast Furnaces in May—Record Steel Production Assured for First Half

THE trend of steel production still is downward, but the rate of recession is gradual and will not prevent the first half of 1928 from establishing a new six-month record by a margin of several hundred thousand tons. While pig iron output has not been on a proportionate scale, falling considerably short of the volume of recent years, the daily rate in May showed a decline of less than ¼ per cent from that of April.

Price developments are featured by a break in basic pig iron in the Valleys from $16 to $15.37 a ton, the lowest price reached since October, 1915. It is too early to ascertain whether this decline will have a sentimental effect on the steel market. In recent years, owing to the increasing integration of steel companies, the influence of merchant pig iron prices on the finished steel market has been of diminishing importance.

The situation in steel prices, meanwhile, is mixed. Most independents have followed the lead of the Carnegie Steel Co. in announcing an advance to 1.90c. per lb., Pittsburgh, on third quarter contracts in plates, shapes and bars, but so far comparatively little business has been done on that basis. The initial effect will probably be to drive in tonnage on second quarter contracts from buyers whose specifications have fallen short of their quotas.

Weakness in sheets has not been checked and there has been another dollar a ton recession in the galvanized and black finishes to 3.50c. and 2.65c. per lb., Pittsburgh, respectively. Tin mill black plate has dropped to a maximum 2.90c., Pittsburgh, with sales reported at 2.80c.

New business in finished steel is light and specifications in many lines are diminishing. Buyers are taking little interest in committing themselves for next quarter, for which several mills have announced prices. Following the advance of $1 a ton on bars, plates and shapes, some makers of hot-rolled strip have indicated a willingness to accept third quarter business at present minimum quotations, while others aim to reestablish the prices originally announced for the current quarter. Prevailing quotations on cold-rolled strips and alloy steel bars have been reaffirmed for next quarter.

Steel mill operations, although receding, are higher than a year ago. In the Pittsburgh district ingot output is a shade below 75 per cent, against 70 per cent 12 months ago. In Chicago a slackening of rail output has caused the general average to decline to 90 per cent, which, however, is 5 to 10 points higher than in early June, 1927.

The automotive industry continues to specify liberally for bars, sheets and strip steel, indicating that motor car output in June will hold up rather well. Forge shops in the Cleveland district are operating at capacity, many of them being filled with work recently placed by the Ford Motor Co.

The expected decline in specifications from the farm implement industry is slow in materializing, according to reports from Chicago, and it is now believed that the interruption of production for inventory taking will be very short.

In the structural steel market political uncertainty is becoming more of a factor as the national conventions draw near. Fabricating awards are light and there is delay in financing new projects. An unusually large amount of work, however, is either up for bids or ready to be released for figuring, New York and Chicago alone accounting for fully 150,000 tons each.

Railroad equipment buying is almost negligible, but an Illinois Central inquiry for 3000 cars is in prospect. Rail orders for the week total 11,000 tons, but rail mill backlogs are on the down grade, as indicated by 85 per cent operations at Chicago, compared with 90 per cent a week ago. The Pennsylvania has entered the market for 12,000 tons of track accessories.

Two steel companies sold the tonnage of basic pig iron which brought a drop of 65c. a ton in the price of that grade in the Valley, a development which emphasizes the growing dominance of the steel industry in merchant pig iron business. In foundry iron there has been some covering for third quarter, but no buying movement of importance has set in. Weakness in pig iron prices extends to foundry, malleable, gray forge and Bessemer in the Pittsburgh and Ohio districts, while efforts to strengthen prices in New England and in the New York district have met with no decided success. Two cast iron pipe producers have bought a total of 15,000 tons of foundry grade from a Virginia furnace at a concession of 50c. a ton.

Pig iron production in May, as computed from returns to THE IRON AGE, averaged 105,931 tons a day, compared with 106,183 tons in April. This was the lowest May rate since 1925. The month showed a gain of three furnaces in blast, following a loss of two stacks in April. The rate of production June 1 for the 198 furnaces in blast was 106,145 tons per day, against 104,015 tons May 1 for the 195 furnaces then active.

Both of THE IRON AGE composite prices have declined. That for pig iron, at $17.23, is at the lowest level since late in 1915. Finished steel is 2.341c., against 2.348c. last week and a low for 1928 of 2.314c. on Jan. 3.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	June 5, 1928	May 28, 1928	May 8, 1928	June 7, 1927
No. 2, fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	*16.75*	17.00	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.19	21.69
No. 2, Birmingham	16.00	16.00	15.50	18.00
No. 2 foundry, Chicago*	18.00	18.00	18.50	20.00
Basic, del'd eastern Pa	19.00	19.00	19.00	20.75
Basic, Valley furnace	*15.35*	16.00	16.50	18.00
Valley Bessemer, del'd P'gh	18.76	18.76	19.26	20.76
Malleable, Chicago*	18.00	18.00	18.50	20.00
Malleable, Valley	*17.00*	17.25	17.25	18.50
Gray forge, Pittsburgh	*18.01*	18.26	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	100.00	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	33.50
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	*42.00*	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.09
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	June 5, 1928 Cents	May 28, 1928 Cents	May 8, 1928 Cents	June 7, 1927 Cents
Sheets, black, No. 24, P'gh	*2.65*	2.70	2.70	3.00
Sheets, black, No. 24, Chicago dist. mill	2.80	2.80	2.85	3.10
Sheets, galv., No. 24, P'gh	*3.50*	3.55	3.60	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.70	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	*2.10*	2.15	2.15	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$14.75*	$15.00	$15.50	$15.00
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	12.75	12.75	13.00	12.00
Carwheels, Chicago	13.25	13.25	13.50	13.50
Carwheels, Philadelphia	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh	*14.25*	14.50	14.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	14.50
No. 1 RR. wrot, Phila	15.00	15.00	15.00	16.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.50	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.87½	14.87½	14.25	12.87½
Electrolytic copper, refinery	14.50	14.50	14.00	12.50
Zinc, St. Louis	6.12½	6.12½	5.95	6.25
Zinc, New York	6.47½	6.47½	6.30	6.60
Lead, St. Louis	**6.17½**	6.07½	6.00	6.10
Lead, New York	**6.30**	6.20	6.10	6.45
Tin (Straits), New York	*49.25*	51.00	51.37½	68.00
Antimony (Asiatic), N. Y.	*10.50*	11.00	11.25	12.75

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Sharp Break in Basic Pig Iron—May Steel Orders About Equal to April's

PITTSBURGH, June 5.—Weakness in pig iron, with a sharp break in the price of the Valley basic grade, overshadows in interest the steel market this week. Meeting a delivered price of $17.01 on a large tonnage for delivery to Butler, Pa., a Youngstown steel company has driven the furnace base on this grade to $15.35, a drop of 65c. from what has been considered the market price. Not since October, 1915, has the market been that low, and in view of the fact that assembling costs are considerably higher now than then, the present price is being compared with the $13 market in the middle of 1914.

Since there is a relation between the prices of the several grades of iron, the break in basic has unsettled the whole pig iron market, and some other grades have given ground. Foundry and malleable are quotable at 25c. a ton lower.

While steel prices have not for some time been based upon the prices of merchant pig iron, the possible effect of this latest break in iron upon the efforts of steel producers to obtain higher third quarter prices for plates, shapes, bars and other finished products will no doubt be closely watched by consumers.

A check-up of May bookings and shipments of steel in this and nearby districts discloses that in aggregate tonnage the month was well up to the total of April, which is commonly rated as a good month. With the turn of the last month of the first half, there has been a considerable contraction in new buying and in specifications against contracts. Consumers are now ordering only what they must have for immediate use, and future requirements are largely being left for later consideration. There is the suggestion that some large projects are being held up to await the results of this month's Presidential nominating conventions.

Steel ingot production is a shade below 75 per cent of capacity. The gradual character of the recession in steel business is commented upon favorably, and satisfaction is derived from the fact that business is better than it was at this time last year.

Prices are no lower on those products which lately have shown weakness than they have been. Independent companies quite generally are going along with the Carnegie Steel Co. in naming 1.90c., base, on plates, shapes and bars for third quarter. Makers of wire products and strip steel, in opening books for that period, are reaffirming second quarter prices, which are somewhat above what has been commonly realized on shipments lately.

Pig Iron.—Further details of the purchase of basic iron by the American Rolling Mill Co. for delivery to its Butler, Pa., works disclose that instead of a price of approximately $16, Valley furnace, the iron amounting to about 20,000 tons, was sold at $17.01, delivered. Half of the iron was sold by a Youngstown independent steel company, which has a freight rate to Butler of $1.64. This means a furnace price of $15.37. The remainder was sold by a western Pennsylvania steel company, having a freight rate of $1.76 to Butler, resulting in a price of $15.25 at the furnace. The latter had previously sold a round block of this grade to a Pittsburgh district steel company at $17, delivered, and named the same price on the American Rolling Mill Co.'s inquiry. This price was met by the Youngstown company. Thus the market on Valley basic iron, which long has been in doubt, becomes clearly defined and may be quoted at $15.35. This represents a break of 65c. a ton from what has been regarded as the market price and has unsettled the prices of all other grades. On foundry iron, $17, Valley furnace, for No. 2 grade has become the top instead of the bottom of the market, and no small part of the week's business has been at $16.75. Bessemer still is quoted at $17, but a spread of $1.25 between these grades is exceptional and few expect it to be maintained long. Malleable iron has been sold in small lots at $17.25, but also at $17. Consumers generally do not rate this grade to be worth more than Bessemer iron and formerly it took about the same price as No. 2 foundry. The furnace of the Sharpsville Furnace Co. was blown out June 4.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.35 to $15.50
Bessemer	17.00
Gray forge	16.25 to 16.50
No. 2 foundry	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Malleable	17.00 to 17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys—Some of the larger users of ferromanganese still are slow about signing last half contracts. They seem to doubt that the recent advance to $105, with freight from Atlantic ports, will hold, but the more plausible explanation, in view of the fact that the price is guaranteed against a decline, is that consumption has been decreasing in keeping with lighter steel works operations, and there is a possibility of a fair-sized carryover of first half material. All of the important users of spiegeleisen are under cover for the last half of the year. Current specifications for this alloy are heavy.

Semi-Finished Steel.—Makers of sheet bars have not had much success in securing third quarter contracts following the effort to stiffen the price. Non-integrated sheet producers, in the absence of signs of improvement in the prices of their products, are disposed to hold off. The open price of $34, Pittsburgh or Youngstown, for sheet bars, has been subject for some time to shading. Large billets and slabs are selling at $33, but the movement reflects the fact that strip steel sales are lighter than they have been. Most of the shipments of wire rods are priced a $42, although the open quotation is $44, base. Pipe skelp is moving fairly steady at unchanged prices.

Bars, Plates and Shapes.—Most of the independent producers have followed the advance recently made by the Carnegie Steel Co. to 1.90c., base Pittsburgh, for third quarter contracts. Some makers have succeeded in getting a very fair amount of third quarter contract business at the new price, but the more general condition is that manufacturers are not pressing for such business and few consumers want to sign up now for that period. The advance appears to apply only on third quarter business, as it is still possible for consumers to place orders for early delivery at 1.85c. May tonnage of these products was little if any behind that of April, which was rated as a good month, but now the demand is governed strictly by known requirements, with future needs being held in abeyance, presumably to await the outcome of the presidential nominating conventions this month.

Rails and Track Supplies.—The local standard-section rail mill is beginning to work on a shorter schedule, as the bulk of the 1928 orders have been completed. New business is light, not only in rails but in track supplies. Light-section rails still suffer in demand from a low rate of soft coal mine operation.

Wire Products.—Several makers have reaffirmed second quarter prices for third quarter contracts, which means $2.65, base, per keg, Pittsburgh, for nails and $2.50, base, per 100 lb., for plain wire. In the quarter now drawing to a close, these prices prevailed on a comparatively small amount of the total shipments, owing to the fact that distributers became heavily stocked through liberal takings on first quarter contracts carrying lower prices, while the movement into consumption was delayed by a backward spring. Some elasticity in connection with low-priced contracts also helped to defeat the effort to secure the prices announced. As the movement into consumption lately has improved, makers are hopeful of better business and also of getting the full quotations.

Tubular Goods.—Standard-weight pipe is moving steadily, but volume still is below normal. No appreciable improvement is noted in the demand from oil and gas producers, nor do pipe makers express much optimism as to the prospect for the remainder of this year. Makers still are waiting for developments in connection with the gas pipe lines that have been so often mentioned since the first of the year. Mill operations are reported as ranging from 60 to 65 per cent, but the rating is against economically workable units rather than against standing productive capacity.

Sheets.—General business is tapering and producers are drawing rather heavily on backlogs. Sheets for metal furniture and refrigerators are doing well in point of demand, but automobile body sheets are moving with less freedom and the common finishes reflect in sales the uncertainty in prices. Blue annealed sheets are fairly firm, and in this immediate area, 2.10c., base, is frequently done, it being necessary to go to 2c. only on strip mill widths.

Tin Plate.—Mill operations remain at 90 per cent or higher. The belief still is that the packing crops will be large, although over much of the country the spring has been two to three weeks late and the crops are that much behind in development. Tin plate specifications are coming along steadily, but container manufacturers are not urging deliveries.

Cold-Finished Steel Bars and Shafting.—Reports that books had been formally opened for third quarter contracts do not refer to producers in this area, who

THE IRON AGE Composite Prices

Finished Steel

June 5, 1928, 2.341c. a Lb.

One week ago	2.348c.
One month ago	2.348c.
One year ago	2.374c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

June 5, 1928, $17.23 a Gross Ton

One week ago	$17.39
One month ago	17.50
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.23,	June 5
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, up to 18½ in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65
	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c. to 2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.85c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.95c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.75c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.75c.
No. 24, del'd Cleveland	3.64c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.80c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium		1.50	4.15
Carbon Vanadium		0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			
Lap Weld					
2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			
Butt Weld, extra strong, plain ends					
⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			
Lap Weld, extra strong, plain ends					
2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

find little interest on the part of consumers for such coverage, and they also want to see how fully the recently announced third quarter price of 1.90c. on hot-rolled bars is maintained. Current business is steady, but individual orders are small and for early shipment. In a general way 2.20c., base Pittsburgh, is well held.

Hot-Rolled Flats.—Several makers have opened books for third quarter contracts and are naming 2.20c. to 2.30c., base, for widths under 3 in., 2.10c. for 3 in. to 6 in., and 1.90c. for 6 in. to 12 in. These are the prices named on second quarter contracts, but they ruled most commonly on the smaller tonnages, since preferred trade had the benefit of some extension of first quarter arrangements. May business with makers in this area was equal to and in some instances in excess of that of the month before. Demand now is lighter.

Cold-Rolled Strips.—A number of makers have reaffirmed second quarter prices for third quarter contracts, quoting 3c., base, for 1 to 3 tons to large users and 3.15c., base, to smaller and more exacting customers. Not much contracting has been done. Current demands are lighter than they were last month, which proved to be almost as good as April.

Bolts, Nuts and Rivets.—Orders and specifications are fairly numerous, but individually are small and volume is well under what it was earlier in the year. Prices are firm and makers are expected to continue present quotations for third quarter contracts.

Warehouse Business.—There have been no changes in the regular warehouse price schedule, but some shading of prices, on the heavier steel items is charged to mill supply houses. Business last month registered a good increase and still is fairly active.

Coke and Coal.—Some furnace coke released through the blowing out of a Valley blast furnace has been absorbed without affecting prices. General production of beehive coke has been scaled pretty closely to actual requirements and the market is fairly steady. Soft coal production is down close to 8,000,000 tons a week, but that fact has brought no real strength to prices. An order for 3000 tons of coking coal per week for an indefinite period, placed by a Cleveland interest whose mine suffered an accident, was readily placed at recent prices. Slack coal is plentiful and weaker.

Old Material.—The market is weak and very dull. A dealer, who is short at one point in the district, has been paying $14.75 to $15 for the better grade of heavy melting steel, but for delivery at other points dealers are covering at as low as $14.25. Railroad lists closing this week will probably go at much under the prices of last month, because the steel companies do not need as much scrap as they did recently and dealers with unfilled orders are not being pressed to ship. The market is weaker on the foundry grades than on the steel works grades. Blast furnace scrap has eased off another 25c. Machine shop turnings are very weak and have been sold at as low as $9, following sales at $9.50. The June list of the Norfolk & Western Railroad offers 8000 tons of scrap.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.25 to $15.00
Scrap rails	14.00 to 14.50
Compressed sheet steel	14.50
Bundled sheets, sides and ends	13.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	14.50 to 15.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	9.00 to 9.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 10.75
Short mixed borings and turnings	10.50 to 10.75
Cast iron borings	10.50 to 10.75
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	16.50 to 17.00
Cupola Grades:	
No. 1 cast	14.25 to 14.75
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	14.25 to 15.00
Industrial	13.75 to 14.50
Agricultural	13.25 to 14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

FRENCH SCRAP EXPORTS LARGE

Retention of Embargo Urged—Comite des Forges Report Reviews Progress in 1927

PARIS, FRANCE, May 18.—At its annual meeting, May 10, the Comite des Forges de France made public a report on the situation of the French metallurgical trades in 1927. The report describes the successful efforts made last year to increase business and reduce unemployment, which had reached about 80,000 in February. Despite higher prices, in gold, than in 1926, French producers of metallurgical products increased their exports by 1,300,000 tons, from 3,623,000 metric tons in 1926 to 4,921,000 tons in 1927. This was offset slightly by the fact that French consumers used 66 per cent of the total output in 1926 and only 53 per cent last year.

The report points out that world production of pig iron has increased from 78,000,000 tons in 1913 to about 84,000,000 tons in 1927, and that the Russian and Chinese markets are of little consequence at present. Costs, says the report, have been reduced and, as a result, the domestic selling prices in 1927 did not average more than 70 to 80 per cent of the corresponding pre-war market prices.

Considerable attention was given to the high level of French exports of iron and steel scrap, and the report expresses the opinion that the official statistics are lower than the actual exports. It is suggested that nearly as much as is reported to the Government as scrap is being sent abroad under other classifications. "The comparison of French and foreign statistics on scrap exports and imports," says the report, "does not permit of much doubt that this is the case, and this is a point to which we have drawn the attention of the Government, because we have noticed that in some districts and at certain periods of the year, prices of scrap have been rising to high levels. Reduction of our reserves of scrap may have, as regards the national defense in war time, very serious consequences, and this it is our duty to prevent. Therefore, we have followed with anxiety the debates of the international conference for abolition of import and export embargoes held in Geneva in October and November, 1927, in the course of which, at our suggestion, the French Government declared its intention to maintain the present restriction on scrap exports for at least a period of three years."

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.85 to $11.00
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 *f.o.b. Works*	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex, head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Shipments in May Break Record —Operations Decline Slightly

CHICAGO, June 5.—Finished steel shipments from Chicago mills in the month just closed were the heaviest for any May in the history of local production. Output in the first five months of this year is well ahead of a year ago at this time and orders now on the books indicate that steel mill shipments during the first half of 1928 will be measurably ahead of the first six months of last year.

A reduction of about five points in the rate of rail mill production accounts for a slowing of ingot output to 90 per cent of capacity. Although close to 11,000 tons of rails were purchased in the week, a further downward revision in rolling schedules is to be expected.

Local producers have not officially opened books for third quarter. Purchases by miscellaneous users bulk large, the total for the week being the best in the last five. Official announcements of third quarter prices are being withheld for the time being, though it is commonly believed that 2c., Chicago, will be named on plates, shapes and bars. If there is a tendency one way or the other in the matter of price levels, it is a leaning toward the firmer side, though concessions are still to be had on attractive business and where the steel desired fits advantageously into rolling schedules.

The Omaha lines of the Chicago & North Western have ordered 200 flat cars and will buy 250 stock cars. The Rock Island will purchase 250 gondola car bodies. The trade expects the Illinois Central to enter the market for about 3000 cars in the next 60 days.

Pig Iron.—Shipments of Northern pig iron from local furnaces in May fell short of the total in April, but this situation is looked upon by the trade simply as evidence of the nearness of an expected slowing down in the summer months. Looking back over the first five months of this year, the picture is more encouraging because in that period release orders were fully 20 per cent heavier than in the corresponding months of 1927. A 6000-ton inquiry for Northern iron is still open in Michigan. New buying is slowing down. Southern iron is selling at $16, Birmingham, or $22.01, delivered all-rail to Chicago.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.51
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—It is not uncommon to find dissatisfaction among buyers over the advance in the price of ferromanganese, and it is somewhat doubtful whether third quarter coverage has been as widespread or as heavy as might reasonably be expected. Several carloads of 19 to 21 per cent spiegeleisen have been sold at $32, Hazard, Pa., and two small inquiries are before the trade. There is little interest in new buying of ferrosilicon, but specifications for this commodity are in good volume.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—In the past 10 days new orders and specifications for plate mill products have been in larger volume. Ordering out of tankage materials has been steady, and in addition the general manufacturing trade has been purchasing liberally and asking for early delivery on such tonnage as is required to piece out the remainder of the second quarter. Not taking into account wide sizes, local mills are engaged at close to capacity, and it is significant that the universal and sheared commodities are about balanced as to shipments. Prices on the bulk of going business remain at 2c. per lb., Chicago, although 1.95c. is heard of locally and still lower quotations are being made for delivery into the Southwest. Orders for oil storage tanks total 2500 tons and fresh projects will take 1500 tons. Of 112 passenger cars recently placed by Eastern and Western railroads, not less than 99 will be constructed in shops that are tributary to Chicago mills, which will benefit to the extent of 1500 tons of steel. New business in cars is small and fresh inquiry is stagnant. The Illinois Central will take figures on two 20-ton air dump cars and the Omaha lines of the Chicago & North Western will open bids June 8 on 250 stock cars.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—From the viewpoint of sales, this market is the dullest in weeks, but this situation affords time for fabricators to busy themselves in preparing estimates on new projects that have recently come out. Shops, for the most part, are well supplied with work and fabricating schedules are better balanced as to large and small tonnage orders than in many months. In some cases orders have been taken that cannot be executed on the delivery schedules demanded and a fair tonnage in structural projects has been farmed out to shops other than those operated by the successful bidders. The report is that the upper floors of the Mercantile Mart will be constructed of reinforced concrete. The Agricultural Mart, once reported as requiring close to 80,000 tons, is now in new hands and there is some probability that the project may again go forward. The Petroleum Iron Works has taken 1700 tons for a theater at San Antonio, Tex. New bids are being taken on the South Bend, Ind., station of the New York Central. Interest among fresh inquiries is 1000 tons for a highway bridge at Manistee, Mich.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bolts, Nuts and Rivets.—Producers are submitting contracts for the third quarter at the prices which have held for several months. Specifications from practically all sources are lighter, though as yet output has been changed only slightly. Heavier release orders from manufacturers of farm implements are expected soon after June 15.

Reinforcing Bars.—Orders for this commodity are numerous, and though users' requirements are usually in small lots, the aggregate tonnage is of good size. Shop operations are being maintained at 80 per cent of capacity. Specifications are large against orders placed earlier in the spring, and benders are having some difficulty in maintaining delivery schedules. Dry weather and moderate temperatures have contributed to extra speed in building construction throughout most of the Central West. Illinois State road programs are well under way, and heavy shipments of hard steel bars are going forward to contractors. Prices for billet and rail steel reinforcing bars are steady. Recent awards and new inquiry are shown on page 1648.

Cold-Rolled Strip.—Demand for this commodity is undiminished and shipments represent close to capacity output at mills. Although some readjustment is reported in automobile manufacture, it is not yet noticeable in specifications from that source for cold-rolled strip. Chicago delivered prices for all widths up to and including 18½ in. are steady at 3.30c. to 3.45c., in 1 to 3-ton lots.

Bars.—Bar mill products are still in heavy demand and again this week, as was the case the week before, new orders are equal to shipments. Diversity of consumer demand is a feature of this market, as is also the steadiness with which automobile manufacturers and parts makers continue to take steel, notwithstanding reports of some curtailment in automobile production. The expected drop in specifications from farm implement plants has not materialized to any great degree, and it now appears that the inventory period in that industry will be passed with an extremely short halt in production. Most of the new sales of mild steel bars are at 2c., Chicago. Individual orders are not large and indicate caution on the part of consumers, who are closely watching tendencies in prices. Although no official announcement has been made concerning third quarter prices, there is little doubt in buyers' minds that producers will now book in advance at current price levels. Specifications for iron bars are in small volume. Producers have opened books for the third quarter at 2c., Chicago, which is the price that has been maintained throughout the present quarter. Purchasers have not yet shown interest in midsummer requirements. Specifications for alloy steel bars are taxing local mills to capacity production, though deliveries are somewhat better now than in late May. Some producers have opened books for the third quarter. Prices are steady. Quotations on rail steel bars are strong at 1.85c., Chicago Heights. It is not improbable that the spread of $3 a ton between prices of hard steel and billet stock bars will be reduced to $2 if the makers of soft steel bars succeed in holding third quarter prices at 2c. per lb., Chicago. Specifications for hard steel bars are steady and afford continuance of double-turn operations at both local mills. New buying is lagging only a trifle behind shipments.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago: common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Demand for wire and wire products is steady for this time of the year. Jobbers, particularly to the west, are taking out larger quantities and shipments to the manufacturing trade are undiminished. There is evidence of unsettling in prices for plain wire in the Northwest and at St. Louis. Shipments of wire nails are in small volume, and with mill stocks well balanced, production is at low ebb, in some instances being not above 30 per cent of capacity. Crop reports throughout the Middle West are more encouraging. The season is less backward than it appeared in May. Rains over much of the Mississippi River territory have materially improved conditions.

Rails and Track Supplies.—Two railroads, one operating east and the other west from Chicago, have closed for a total of 11,000 tons of standard-section rails. New business in track supplies is for fully 5000 tons. Specifications for track fastenings this week were the largest in many months. The Pennsylvania Railroad is inquiring for 12,000 tons of track accessories, about half of which is expected to come to Chicago mills. The bulk of the rail rolling schedule is now past and production at Chicago district mills has been reduced to 85 per cent of capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—This market is drifting. Hot mills are engaged at 60 per cent of capacity. Fresh orders are in unusually small lots and from a narrowing circle of users, who are experiencing a seasonal drop in their business and who appear to be well convinced that this is not the time to make heavy purchases. Prices for black sheets are weak, and as low as 2.80c., Chicago, has been done. Recent sales of black and galvanized sheets show that the spread between maximum and minimum prices has been narrowed to $1 a ton. Notwithstanding that total orders to mills are small, there is an insistent demand in the immediate Chicago territory for blue annealed sheets by manufacturers of furnaces, tanks, lockers, road strips and farm machinery.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.90c.; No. 24 galvanized, 3.75c. to 3.80c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	**60**
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire per 100 lb	$3.30
Common wire nails base per keg	3.10
Cement coated nails, base per keg	3.10

Cast Iron Pipe.—A feature of this market is the sudden activity on the part of contractors, who have taken not less than 5000 tons of cast iron pipe in the last seven days. Public lettings have not been large, but fresh inquiry is promising. Chicago will open bids June 11 on 1600 tons of 6 and 8-in. class B pipe. Jackson, Mich., and Cynthiana, Ind., are in the market for small tonnages. At Toledo, Ohio, an unnamed bidder secured a fair-sized order at a price somewhat better than $32, Birmingham. The railroads and public utilities are again in the market for miscellaneous current requirements.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $40.20 to $41.20; 4-in., $44.20 to $45.20; Class A and gas pipe, $4 extra.

Coke.—Demand is steady and prices are firm. All Chicago by-product ovens are lighted.

Old Material.—Tendencies in the local scrap market are mixed. Prices for some specialties are steady under the influence of moderate buying by melters, who hesitate to carry stocks and who are finding business moderately good. Cast iron borings have sold off 25c. during the week and 1000 tons of hydraulic compressed sheets have been taken by a user at 25c. above last week's price. Five large lists prepared by Eastern railroads have been offered to dealers. Local scrap yards are not carrying heavy stocks, but they are being operated rather actively.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.75 to 16.25
Railroad tires, charging box size	16.50 to 17.00
Railroad leaf springs, cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	7.25 to 7.75
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.50 to 16.00
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.25 to 13.75
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Shapes and Sheets Still Weak—Bar and Plate Prices Maintained

PHILADELPHIA, June 5.—Since the leading interest has reaffirmed 1.90c. per lb., Pittsburgh, for plates, shapes and bars for third quarter contracts, bar and plate mills have adopted a slightly firmer attitude. Consumers show no inclination to enter into third quarter commitments and sellers are not pressing for contracts.

The eastern Pennsylvania market on shapes is unchanged, despite the firmer position taken on bar and plate prices. Shapes are still quoted at 2c., Pencoyd, and Bethlehem, Pa., and these prices are shaded occasionally on desirable tonnages. Operating rates of eastern Pennsylvania mills have receded slightly from the schedules of the earlier months of the year, but are still at a fairly high level in most cases.

Blue annealed sheet prices have developed a wide spread as a result of the determined stand of eastern Pennsylvania producers, who are endeavoring to maintain 2.10c., Pittsburgh. Blue annealed sheet mills are quoting 2c. to 2.10c. per lb., Pittsburgh, and producers of continuous mill sheets have sold 1.90c. to 2c., Pittsburgh. Galvanized sheets are only moderately firm at 3.50c., Pittsburgh, but small lots bring up to 3.60c.

Pig Iron.—No contracts of size have been closed for third quarter delivery. The foundry iron price continues at $20, base furnace. The American Engineering Co., Philadelphia, has been buying No. 1X iron in 100-ton lots and in the past fortnight has placed 200 tons or more with eastern Pennsylvania producers. The Sun Shipbuilding & Dry Dock Co., Chester, Pa., is in the market for a small tonnage of foundry iron. The Virginia furnace interest has sold 15,000 tons of foundry iron to two Virginia cast iron pipe makers, 10,000 tons to the Lynchburg Foundry Co. and 5000 tons of the Glamorgan Pipe & Foundry Co. The Birmingham price was met by a concession of 50c. a ton from the $20 base. On carload lots $20 is now being quoted. The demand for low phosphorus iron is quiet.

Prices per gross ton at Philadelphia:

East, Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain 1.75 to 2.25 sil.		24.54
Virginia, No. 2X 2.25 to 2.75 sil.		25.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

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*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

Bars.—Most sellers are endeavoring to reestablish 1.90c. per lb., Pittsburgh, or 2.22c., delivered Philadelphia, as the third quarter contract price, but consumers show no inclination to enter into future commitments. Orders for prompt shipment are small, and on such business quotations range from 1.85c. to 1.90c., Pittsburgh, or 2.17c. to 2.22c., Philadelphia. Consumers who have been using foreign steel are reported as buyers of small lots of domestic bars, the price of foreign steel being too high at present to offer much of a saving.

Shapes.—Despite the reaffirmation of 1.90c., Pittsburgh, last week as a current and third quarter contract price, the eastern Pennsylvania market is unaffected and still ranges from 2c., Pencoyd, or 2.06c., Philadelphia, to 2c., Bethlehem, or 2.13c., Philadelphia. There are a number of local building projects that will require fair tonnages of steel, but in general the market is inactive and competition is keen.

Plates.—Eastern Pennsylvania producers are quoting 2c. to 2.05c., Coatesville, which, with occasional exceptions on the more desirable current business, has been the range on new business since the beginning of the quarter. With 2.05c., Coatesville, as the third quarter contract price, buyers are not showing much interest in future requirements.

Ferromanganese.—Contracts for third quarter and second half delivery are still confined to the smaller consumers and seldom exceed 200 or 300 tons. Prices are reported firm at $105 per ton, seaboard.

Sheets.—Eastern Pennsylvania producers of blue annealed sheets are still seeking 2.10c., Pittsburgh, on current orders, but the market ranges from 2c. to 2.10c., Pittsburgh, or 2.32c., to 2.42c., Philadelphia, with the lower price prevailing on all but the smallest lots. Occasional sales have been made ignoring the 25c. extra for deep drawing material. Continuous mill sheets are being sold at 1.90c. to 2c. per lb., Pittsburgh, or 2.22c. to 2.32c., Philadelphia. Automobile body builders and other consumers in this market are moderately busy. Black sheets are quiet, and prices range from 2.60c. to 2.65c. per lb. Galvanized sheets are quoted from 3.50c. to 3.60c. per lb., Pittsburgh.

Old Material.—With a plentiful supply of scrap and in the absence of any substantial buying, prices still show a tendency toward weakness. Shipments of No. 1 heavy melting steel are principally to plants at Bethlehem and Steelton, Pa. A Phoenixville mill is paying $10.50 per ton for machine shop turnings, but has not bought a substantial tonnage. Blast furnace scrap is going to Swedeland and Steelton, Pa., on $10.50 per ton contracts. Couplers and knuckles and rolled steel wheels have recently sold at $15 per ton, delivered eastern Pennsylvania.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to	$14.00
Scrap T rails	13.00 to	13.50
No. 2 heavy melting steel	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)	10.50 to	10.75
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)		10.50
Heavy breakable cast (for steel works)	15.50 to	15.75
Railroad grate bars		11.50
Stove plate (for steel works)		11.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	15.00 to	15.50
Rolled steel wheels		15.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.50 to	18.00
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00
Steel rails for rolling	14.75 to	15.25

Warehouse Business.—May sales were slightly larger than the April volume of business, but orders are small, seldom exceeding one or two tons of material. Prices are unchanged and the quantity differentials are apparently being maintained by jobbers.

Imports.—In the week ended June 2, 1140 tons of ore arrived at this port, 640 tons of chrome ore from

Portuguese Africa and 500 tons of manganese ore from India. Pig iron arrivals totaled 2301 tons from the United Kingdom and 1400 tons of ferromanganese from the same source. Steel arrivals consisted of 554 tons of shapes, 23 tons of steel bands, 5 tons of bars and 319 tons of steel skelp from Belgium and 469 tons of steel slabs and 500 tons of steel bars from France.

New York

Pig Iron Sales Increase—16,000 Tons of Steel Let for Building

NEW YORK, June 5.—Pig iron sales in this district, at over 12,000 tons, showed a gain of 5000 tons over the total for the previous week. There were few outstanding purchases; in fact, individual sales were rather small on the average and in many instances June delivery of part of the iron was asked for, indicating that melters' stocks are low. Foundry operations are spotty but, on the whole, appear to be holding at an unchanged rate. The Foran Foundry & Mfg. Co., Flemington, N. J., has closed for 1500 tons. The Ingersoll-Rand Co., New York, has bought 1000 tons of malleable for Phillipsburg, N. J., and 750 tons of malleable and 250 tons of foundry iron for Painted Post, N. Y. It is still in the market for 1000 tons of iron for delivery during the remainder of the year. The General Electric Co. has issued inquiries for 700 tons of No. 2X and No. 1X for Bayway, N. J., and 1100 tons of No. 2 plain and No. 1X for its New England plants. It also wants several hundred tons for Elmira, N. Y., and Erie, Pa., and is still in the market for 400 tons of No. 2X for Schenectady, N. Y. The Richmond Radiator Co., New York, has not yet closed on its inquiry for 5000 tons for Uniontown, Pa. Buffalo producers are trying to obtain a minimum of $16.50, base furnace, on foundry iron and have succeeded in making some small sales at that figure. Eastern Pennsylvania makers continue to quote $20, base furnace. The Standish, N. Y., furnace, maker of copper-free low phosphorus iron, was blown out May 31.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Viewed by the tonnage booked and shipped in May, steel business in the New York district left little to be desired, but in the last week the tapering off in buying, both as regards contract specifications and new orders, has been marked. In some products, notably sheets, strip steel and hot-rolled bars, there are clear indications of lessened requirements. Some consumers did not fully specify their May quotas on contracts. Jobbers are taking in a fairly good tonnage of pipe to replace that going out on building jobs, and in tin plate there is a satisfactory degree of activity, but elsewhere the market has its dull spots. In structural steel, recent lettings have not been large, but the outlook for the summer continues bright, considering that a total of close to 150,000 tons is in the market or will be shortly. Steel for the Lincoln Building to be built on East Forty-second Street, requiring 16,000 tons, has been awarded, and the award of 10,000 tons for the New Yorker Hotel may come within a week or two. Local fabricators of steel pipe are figuring on 3500 tons of steel required for pipe, on which the borough of Brooklyn last week received general contract bids. A pipe job in the Bronx, amounting to 1300 tons of steel, has been awarded to the East Jersey Pipe Co. The announcement of the leading steel interest of a third quarter contract price of 1.90c., Pittsburgh, on plates, shapes and bars, though followed by some of the independent steel companies, has caused scarcely a ripple in this market. Its effect may be to stimulate specifications before the end of this month on 1.85c. second quarter contracts, but few, if any, third quarter commitments have been entered into. On current business the chief price developments are on sheets. Galvanized sheets have weakened further, so that 3.50c., Pittsburgh, is now the usual quotation to jobbers, and other trade is being asked to pay 3.55c. Black sheets have been sold at 2.65c., though 2.70c. is the more common price on the small lots that are being bought. Blue annealed remain at 2c. to 2.10c.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Small lots of structural steel are in demand and there is some activity in galvanized sheets. Sheet prices are still being shaded by $1 to $2 a ton, but not on all gages, as jobbers offering such concessions apparently do not always have complete stocks. The recently adopted quantity differentials are being generally applied on warehouse purchases in this district and consumers are beginning to take advantage

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8 in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of the reductions in price for larger quantities by waiting to accumulate larger orders than in the past.

Cast Iron Pipe.—Prices are unchanged, with Northern makers of pressure pipe quoting delivered prices of $37.60 to $38.60, base, and Southern foundries quoting $32 to $33, Birmingham. Interest of consumers in centrifugally cast pipe continues to increase, and on the basis of recent sales the price per foot is slightly less than that for sand cast pipe. The low bidder for a contract in Raritan Township, N. J., requiring about 3000 tons of 4 to 16-in. water pipe, was W. G. Fritz, West Orange, N. J. The Department of Purchase, New York, opens bids June 8 on a small tonnage of special castings. Wethersfield, Conn., has been taking bids on about 320 tons of 10-in. pipe. A recent inquiry from a company in New York for water pipe to be delivered to Los Angeles, Cal., specifies 36,000 ft. of 4-in., 10,000 ft. of 8-in. and 14,000 ft. of 20-in. pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—A large volume of road work has been closed recently and the tonnage involved in small miscellaneous projects seems to be increasing. New business continues to come out at a fair rate and there is promise of considerable activity during the summer months. The general contract has not yet been let on the proposed building for the New York Dock Co. in Brooklyn, which will require approximately 2500 tons, and bids will be taken this week on a post office at Long Island City, involving about 275 tons, and on a printing building at Greenwich, Conn., requiring 250 tons. Competition with foreign steel is increasingly keen, but price advances by European mills seem to indicate a falling off in the volume of imported bars. On the general run of business 2c., Pittsburgh, is generally adhered to, but on large jobs concessions of $1 and occasionally $2 a ton are not infrequent. The Youngstown warehouse price is unchanged at 2.20c., or 2.57½c., on cars at New York, and out of New York warehouses distributers are quoting 2.80c. for lots of 5 tons or more, 2.95c. for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Coke.—Most consumers have covered their requirements for the third quarter on both furnace and foundry coke. Standard furnace coke is being quoted at $2.75 per net ton, Connellsville. Special brands of foundry coke are $4.85 per ton at the ovens and delivered prices are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per net ton, New York or Brooklyn.

Old Material.—Buying prices of No. 1 heavy melting steel, delivered to Bethlehem, Pa., have been reduced to $13 per ton and blast furnace material is now quoted by dealers at $9.50 per ton, delivered to Bethlehem or Swedeland, Pa. Machine shop turnings are quoted at $10 to $10.50 per ton, delivered. An auction sale of surplus material at the Brooklyn Navy Yard held today included about 3500 gross tons of iron and steel scrap and a small tonnage of non-ferrous metals. In addition, material at Lake Denmark, Dover, N. J., was offered, consisting of 956 tons of damaged structural steel and about 200 tons of shell steel.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.35
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.25 to 7.50
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.25 to 6.75
Short shoveling turnings	6.25 to 6.75
Cast borings (blast furnace or steel works)	6.25 to 6.75
Mixed borings and turnings	6.25 to 6.75
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to 8.75
Forge fire	6.50 to 6.75
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.85
No. 9 galvanized wire, per 100 lb	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Cleveland

Mill Books Open for Third Quarter But Consumers Are Slow to Contract

CLEVELAND, June 5.—Most of the independent mills have followed the leading interest in a $1 a ton advance on steel bars, plates and structural material to 1.90c., Pittsburgh, for the third quarter, and others are expected to fall in line. Local mills will advance steel bars to 1.90c., Cleveland, if the Pittsburgh advance is maintained. Few consumers are taking any interest in the third quarter, and it may be two weeks or more before the new price is well tested. One or two consumers have made unsuccessful attempts to add additional tonnage to their second quarter contracts at 1.85c. and have them extended through the third quarter. However, as the latter price is still in effect for current business, buyers can place orders at that price for deliveries that might extend into July. The price advance is expected to drive in considerable tonnage on second quarter contracts, as quite a few consumers have been falling behind on specifications against these contracts.

Steel bar bookings held up well through May, but orders for structural material and plates fell off. Specifications for these products have been moderate the past week and new business was very light. Good specifications for steel bars are coming from forge shops in this territory that are all operating at full capacity, many of them being filled up with work recently placed by the Ford Motor Co. Good specifications also for sheets and hot and cold-rolled strip have come from the automotive industry for June, indicating that production by that industry will hold up quite well this month. However, with the expected general slowing down of the demand from this source, makers of these products see little chance for getting better prices for the next quarter.

Some of the strip steel manufacturers are willing to take contracts for the third quarter at present prices and some of the sheet mills are ready to take more business for that delivery if they can get somewhat better prices than the minimum quotations now prevailing. The reaffirming of alloy steel bar prices for the third quarter has not yet resulted in any buying for that delivery.

In the structural field considerable inquiry is coming out for small lots, but little work of any size is pending. Lake shipyards have received an inquiry for a boat requiring 1500 tons of steel. Mount Clemens, Mich., has placed a contract for a steel intake pipe for its waterworks department, requiring 350 tons of plates, which will be supplied by the Biggs Boiler Works.

Pig Iron.—Sales of foundry and malleable iron continue in fair volume, although no large tonnages are being placed. Cleveland interests during the week sold 22,000 tons, mostly in small lots covering June shipment and the third quarter. As large consumers in the automotive and other industries are not yet showing much interest in third quarter contracts, an active buying movement is not in immediate prospect. One round-lot purchase made recently by an Indiana melter was for the entire last half, but with that exception sales have been restricted to the third quarter. Prices are steady at the recent levels, with a general range by Cleveland furnaces of $16.25 to $16.50 on foundry and malleable iron for business in competitive territories, although a little tonnage has been taken at $17 for delivery in this immediate territory. For Cleveland delivery, local furnaces are holding to $18, furnace, but a small amount of business for Cleveland shipment has been taken by an outside producer at a delivered price that figures a few cents a ton lower than the local delivered price. In Michigan the price range is unchanged at $17.50 to $18, furnace. The 6000 tons of malleable iron inquired for by a Benton Harbor, Mich., consumer, on which a Cleveland producer figured, will probably be supplied by a Chicago furnace. It has developed that the basic iron recently purchased for a Butler, Pa., plant was bought at $17, delivered, a large block of it being placed with a Mahoning Valley furnace, the furnace price being $15.37. This indicates a further 50c. decline on basic, the Valley basic price no longer being above $15.50. An Ohio steel maker will purchase 10,000 tons of basic this month. Pig iron shipments by Cleveland interests in May held up to the April volume and June shipping orders are starting out well.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25		$18.50
Southern fdy., sil. 1.75 to 2.25	$21.50 to	22.00
Malleable		18.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace	15.35 to	15.50
Standard low phos., Valley furn'ce		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The late start in Lake navigation is reflected in the figures showing the water movement of iron ore for the first two months of the season. The total movement to June 1 was 5,368,761 tons, a decrease of 3,943,796 tons or 42.35 per cent, compared with the corresponding period last year. The May movement was 5,362,815 tons, a decrease of 2,389,656 tons, compared with May last year. The ore market is virtually at a standstill.

Coke.—A moderate amount of activity has developed in contracts for Connellsville foundry coke for the third quarter and some of the foundries are combining orders for their June requirements with these contracts, having already taken all the coke covered by their second quarter contracts. Prices are unchanged at $3.50 to $4.85 for standard Connellsville foundry coke and $7.75, Painesville, for June shipment of Ohio by-product foundry coke.

Semi-Finished Steel.—A sheet mill in the Central Western district has purchased 22,000 tons of sheet bars for the third quarter from a Cleveland maker subject to the price that is eventually established. Some non-integrated producers are urging the naming of third quarter prices, but producers are holding off. Specifications are keeping up to the recent good volume against $33, Cleveland, contracts for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—Present discounts on bolts and nuts will probably be reaffirmed for the third quarter, as some of the bolt and nut manufacturers plan to open their books late this week for contracts for the next quarter at the prevailing discounts. Orders are keeping up in fair volume. The demand for rivets is still slow.

Sheets.—Mills having contracts with automobile manufacturers have received liberal specifications for June shipment, but otherwise the demand in this territory is light. The market continues weak and irregular. Blue annealed sheets are rather freely offered at 1.90c., Pittsburgh, and some of the mills are waiving the 10c. extra for 40-in. and wider material. However, one important producer is refusing to shade 2.10c. Black sheets are available at 2.65c., Pittsburgh. Galvanized sheets are quoted at 3.50c., Pittsburgh and Valley. Shading to 2.80c., Pittsburgh, is reported on tin mill black plate. Some consumers are willing to place third quarter contracts at present minimum prices, but mills are unwilling to go that low for contracts. Auto body sheets are firm at 4c., which probably will be reestablished as the price for the third quarter. One producer has already opened its books at that price and will take blue annealed sheets at 2c., Pittsburgh, for the next quarter.

Strip Steel.—Mills continue to get good specifications against contracts from the automotive industry, but there is very little new demand. Hot-rolled strip is fairly steady at 1.75c., Pittsburgh, for 6-in. and wider material and at 1.85c. for 3-in. to 6-in. material. Cold-rolled strip is firm at 2.75c., Cleveland, for 3 tons and over. In the face of a decreased demand for the third quarter, producers see little chance of getting better prices and some are willing to take contracts for the quarter at the above prices.

Wire Products.—One producer has opened its books for the third quarter at the present regular quotations of $2.65 per keg for nails and 2.50c. per lb. for wire. Wire nails appear slightly firmer than recently and have a price range of $2.55 to $2.65 per keg.

Cold-Finished Steel Bars.—Specifications against contracts are good, but there is little new buying. The market is firm at 2.25c., Cleveland.

Warehouse Business.—The demand continues rather slow and orders generally are small. Regular prices are being well maintained.

Old Material.—A Cleveland consumer, who has been securing considerable scrap from Detroit, has purchased 10,000 tons of steel-making scrap for water shipment from that city. This is the only activity reported on the part of consumers. Dealers are buying very little scrap, as they have all the material they need to fill mill orders, on which shipments are still restricted. The market shows no price tendency in either direction. Scrap is plentiful at the quoted prices.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.00 to	$13.25
No. 2 heavy melting steel	12.50 to	12.75
Compressed sheet steel	12.50 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	11.50 to	11.75
Machine shop turnings	7.00 to	7.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	9.15 to	9.50
Mixed borings and short turnings	9.15 to	9.50
No. 2 busheling	9.15 to	9.50
Cupola Grades		
No. 1 cast	16.25 to	16.75
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

New York Structural Engineers Organize

The Structural Engineers Society of New York has been formed in that city by a group of structural engineers specializing in building work. The object of the society as set forth in the constitution is the "creation of a better understanding and bond between individuals engaged in the profession, the elimination of practices which are injurious and the promotion of those which are beneficial to the true service of the structural engineer and the upholding of proper standards for the engineer in his relation to other members of the building industry."

The officers of the society are: F. A. Burdett, president; L. A. Ball and N. A. Richards, vice-presidents; E. E. Seelye, secretary; and H. H. Burroughs, treasurer. These men, together with Charles Mayer and A. N. Van Vleck, constitute the board of directors. Headquarters are at room 1111, 101 Park Avenue, New York.

San Francisco

Structural Steel Bookings Large but Other Steel Buying Declines

SAN FRANCISCO, June 2 (*By Air Mail*).—Demand for steel products generally on the Pacific Coast has fallen off, although structural steel bookings this week were the heaviest in over 10 weeks. Most of this tonnage, however, developed in the Los Angeles district. The price structure is not as firm as it was a month ago; plate prices have been shaded $2 a ton by one independent producer.

Outstanding developments include the placing of 1600 tons of blue annealed sheets, 1800 tons of reinforcing bars for the Wildcat and Sequoia aqueducts in Oakland with the Columbia Steel Corporation, the award of 1400 tons of shapes for a theater at Avalon, Cal., and 1300 tons for the Willys-Overland factory in Los Angeles with the Llewellyn Iron Works. The Southern Pacific Co. has inquired for material for 100 cars and eight locomotives, requiring about 5000 tons of plates and shapes.

The Southern Pacific Co. has approved preliminary plans for a bridge across the Carquinez Straits to supplant the present train ferry service. This project will require between 12,000 and 20,000 tons of steel. There will be 10 480-ft. spans, one 750-ft. steel viaduct, and one deck and one lift span totaling a little over 5500 ft. The total cost will be about $10,000,000.

Pig Iron.—No outstanding sales or inquiries are reported. Imports during March totaled 2350 tons, compared with 974 tons for the same month last year. Most of this iron came from British India. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards were more numerous this week, the total exceeding 3000 tons. In addition to the 1800 tons for the Oakland aqueducts, mentioned above, 325 tons for a warehouse in San Francisco and 250 tons for the Veterans' barracks at Yountville, Cal., were placed with San Francisco distributers. With few exceptions, pending business is confined to lots of less than 100 tons. Out-of-stock prices in the bay district are extremely low, in some cases 1.80c. has been quoted. On less desirable lots 2c. is being obtained. Importations of bars during March totaled 6875 tons, compared with 3678 tons for March last year. Belgian mills sent in 5179 tons and French producers 1393 tons. San Francisco interests took 3814 tons of the total, Los Angeles users 1679 tons and Portland concerns 1206 tons.

Plates.—Few plate awards of size have been made during the past two weeks. The Southern Pacific Co. has taken bids on about 1100 tons of firebox, boiler and sheared plates for eight locomotives and 18 tenders and on 250 tons of material for 50 caboose and 50 gondola cars. Awards are expected next week on two car floats, one for the Santa Fe and one for the Western Pacific, each requiring 700 tons. Prices have weakened; as low as 2.20c. has been quoted, though on the general run of orders 2.30c. still applies.

Shapes.—The structural shape market continues the most active on the Coast; the week's awards totaled 5868 tons. Lettings, other than those mentioned above, included 400 tons for the second unit of the Firestone tire plant in Los Angeles and 300 tons for a grade crossing in the same city, both booked by the Llewellyn Iron Works, and 480 tons for three apartments in San Francisco, taken by McClintic-Marshall Co. Central Works. New and pending business exceeds 13,000 tons. Prices on plain material remain firm at 2.35c., c.i.f. Imports of shapes during March were 4366 tons, compared with 4528 tons for the same month in 1927. San Francisco interests took 1759 tons, Los Angeles users 1517 tons, Portland and Seattle consumers each about 550 tons. Belgian mills shipped 2500 tons and French producers 1550 tons.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles under 3/16-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Cast Iron Pipe.—Demand for cast iron pipe has fallen off during the past month, and little new business is up for figures. The National Cast Iron Pipe Co. took 229 tons of 4 to 10-in. class B pipe for Inglewood, Cal. San Diego, Cal., placed 227 tons of 4 and 6-in. class B for the improvement of the Otay district with the Miracle Construction Co. of San Diego and 131 tons of 10 and 14-in. class B pipe for a sewer at Pacific Beach with Frank Doran of San Diego. The United States Cast Iron Pipe & Foundry Co. took 100 tons of 4 and 6-in. class 150 pipe for Redwood City, Cal. Bids have been opened on 224 tons of 4 to 10-in. class C pipe for Wells, Nev. The Holdener Construction Co., Sacramento, Cal., was low bidder on 887 tons of 10 to 14-in. class 150 pipe for Lovelock, Nev. Imports in March totaled 2522 tons, compared with 3107 for March last year.

Sheets.—Sheet demand remains spotty. Most of the sales and inquiries involve lots seldom exceeding a carload. The Columbia Steel Corporation took 1600 tons of No. 14 gage blue annealed sheets for the Wildcat and Sequoia aqueducts in Oakland, securing the business from the Lock-Joint Pipe Co., Ampere, N. J., general contractor.

Coke.—Activity in this market reflects the quiet condition noted in the market for pig iron. Melters continue to order in small lots. Imports in March amounted to 7121 tons. English beehive coke is quoted from $15 to $16 a net ton, delivered at dock, while by-product coke ranges from $11.50 to $13 a ton.

Birmingham

Steel Business Keeps Up at Good Rate —Pig Iron Dull

BIRMINGHAM, June 5.—Consumers are showing very little interest in third quarter pig iron. Less than a half dozen inquiries have been sent out. One company reports sales for the week to be smaller than for some time, while others notice no change in the volume, all orders being for small tonnage. Shipments are equal to the weekly average for May, which was sufficient to take care of production during the month. A base of $16 is being maintained on foundry iron. The Tennessee company changed furnace No. 5 at Ensley from foundry to basic on May 26. No other changes have been made. Eighteen furnaces are still in blast, 10 on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—New business booked during the week showed a marked increase over the previous week. Demand is good in the majority of the lines, and sales officials foresee an extension of current production and shipping levels into the next quarter. Two good-sized orders for railroad equipment were reported. The Ingalls Iron Works Co. received an order for 2300 tons of fabricated structural steel for the E-Z Opener Bag Co. plant at Tuscaloosa, Ala. Other new business in this line was made up of small orders. Reinforcing steel fabricators experienced a light week from the standpoint of sales, though inquiries were fair. Prices are substantially the same, with the exception of a few slight changes in sheets. The Tennessee company is now operating seven or eight open-hearths at Ensley and five at Fairfield. The Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—Sales during the week were confined to small tonnages, the largest 225 tons for Talladega, Ala. Bids were opened on a small job at Kings Mountain, Tenn. Recent inquiries have been unimportant in size, but demand from small projects is supporting the market fairly well. Quotations for pressure pipe have strengthened considerably during the past few weeks, and the base prices are now given as $32 to $33 on 6-in. and larger sizes. Shipments during May were the heaviest for several months. Plant operations are unchanged.

Coke.—Current sales of foundry coke are slightly less than a week ago. Fair specifications are being issued by foundries for coke under contract. Quotations remain at $5.

Old Material.—Prices on heavy melting steel have dropped 50c. Other prices continue low and unchanged. Demand is spotty, and sales are in small lots for immediate needs. Shipments are light.

Prices per gross ton delivered Birmingham district consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings chemical	13.50 to	14.00

Buffalo

Larger Inquiries for Pig Iron—Steel Operations 80 to 85 Per Cent

BUFFALO, June 5.—The General Electric Co. has sent out an inquiry for 3650 tons of foundry and malleable pig iron for delivery to Erie, Pa., Schenectady and Elmira, N. Y., and Bayway, N. J. A Syracuse foundry wants a tonnage of foundry iron, but did not specify the exact amount. Two New Jersey inquiries are in the market, one for 350 tons and the other for 1500 tons of foundry iron. One 200-ton lot of foundry was sold to an eastern New York melter. Miscellaneous inquiry for the week, coupled with the above mentioned, brings the total of pending business to between 6000 and 10,000 tons. Furnaces report that shipments of iron are large.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operations continue at about 80 to 85 per cent. Bar and shape business is fair at previously quoted prices. Reinforcing bar business has been brisk. The new Riverside High School, Buffalo, requires 150 tons of bars and 250,000 sq. ft. of wire mesh, which have been placed. The Cazenovia Creek bridge, previously estimated at 800 to 1000 tons, will require 600 tons. The Agfa Ansco Co., Binghamton, placed 450 tons of bars. An addition to the Great Lakes Cement Co.'s plant requires 100 tons. The new Rand Building will require 200 tons. Sheet business is fair. Bolt and nut business is being placed in fairly good volume.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finishing flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Old Material.—There has been very little new buying. Dealers are busy filling the order reported last week, which now develops to have been for 30,000 tons of No. 1 and No. 2 heavy melting steel and hydraulic compressed sheets. This buyer is also receiving boatload shipments of scrap from Detroit at the rate of about two a week. One of the larger foundries is holding up shipments and another foundry is on a quota basis. A small tonnage of short borings and turnings was sold at $10.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$14.75
No. 2 heavy melting steel	12.50 to	13.00
Scrap rails	13.50 to	14.00
Hydraulic compressed sheets	12.50 to	13.00
Hand bundled sheets	8.50 to	9.00
Drop forge flashings	12.00 to	12.50
No. 1 busheling	13.00 to	13.50
Heavy steel axle turnings	12.50 to	13.00
Machine shop turnings	8.00 to	8.50
Acid Open-Hearth Grades		
Railroad knuckles and couplers		15.50
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.00 to	15.50
Low phosphorus billet and bloom ends	16.50 to	17.00
Electric Furnace Grades		
Heavy steel axle turnings	12.75 to	13.25
Short shoveling steel turnings	10.75 to	11.25
Blast Furnace Grades		
Short shoveling steel turnings	10.50 to	11.00
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.25 to	9.75
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	16.00 to	16.50
Iron axles	21.00 to	22.00
No. 1 railroad wrought	12.00 to	12.50
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.00 to	13.25
Locomotive grate bars	11.50 to	12.00
Steel rails, 3 ft. and under		16.50
Cast iron carwheels	12.50 to	13.00
Malleable Grades		
Railroad		15.00
Agricultural		15.00
Industrial		15.00

St. Louis

Pig Iron Melt Declining and Buying Is Light

ST. LOUIS, June 5.—Buying of pig iron in this market continues light. Sales of the St. Louis Gas & Coke Corporation totaled less than 2500 tons. The market is still unsettled as a result of the recent decline of 50c. a ton in the price of Northern iron at Chicago because of Lake competition, and the melt has declined, so that most consumers have sufficient stocks to last them through the second quarter. Buying for third quarter has been light, but makers expect there will be renewed activity in the latter part of June. The principal sale of the Granite City maker was 125 tons of malleable

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized Sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

to an Illinois jobbing foundry. An Iowa implement maker took 500 tons of foundry iron. The Granite City maker has not changed its prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.16
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.16
Northern basic, delivered	20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Consumption of foundry grades has fallen off as a result of the smaller melt of pig iron, and takings from the ovens are below contract obligations.

Finished Iron and Steel.—The Granite City Steel Co. reports that the slight improvement in the demand for galvanized sheets, which manifested itself a week or two ago, continues and its volume is quite a bit greater than it was a few weeks ago. The tonnage booked during May was above that taken in April, although not quite as heavy as March specifications. While figures are not complete, warehouse business for May is expected to run about the same as in April, but about 20 per cent less than in May, 1927. Structural awards during the week totaled 650 tons, all to the Mississippi Valley Structural Steel Co., and the only reinforcing bar project of consequence, a waterworks reservoir at Evansville, Ind., 600 tons, went to the Laclede Steel Co.

Old Material.—The market for old material is quiet. The only price change is a reduction of 50c. a ton on stove plate. Consumers bought very little during the week, and about the only activity is among dealers, who are buying to cover recent heavy orders for heavy melting steel. Railroad lists follow: Pennsylvania, 45,630 tons; Baltimore & Ohio, 18,045 tons; Atchison, Topeka & Santa Fe, 5945 tons; Chicago & Western Indiana, 14 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.00 to $11.50
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.00 to 11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	13.50 to 14.00
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	13.00 to 13.50
Stove plate	11.50 to 12.00
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Youngstown

Steel Production Continues This Week at 70 to 75 Per Cent

YOUNGSTOWN, June 5.—Steel production in the Youngstown district continues for the first week in June at 70 to 75 per cent. The Steel Corporation properties are averaging somewhat higher than those of the independents. Production of the Valley plants of the A. M. Byers Co., Pittsburgh, is being accelerated. Finishing mills of the Byers properties are operating three shifts of 8 hr. each continuously from Sunday night until the following Saturday morning. Puddle mill departments operate five days per week, two turns daily, which is considered close to capacity. This production rate compares with an operation of 50 per cent at the beginning of the year and reflects the larger demand for wrought iron by the company's finishing mills.

Of 53 independent open-hearth furnaces in the Mahoning Valley, 34 are melting, a rate little changed from that of preceding weeks; 108 of 127 sheet mills are under power; tin plate output averages 70 per cent with the independents and 80 per cent with the district plants of the American Sheet & Tin Plate Co.; independent bar mills are at 60 per cent, with Steel Corporation units at 75 per cent. There has been a moderate decrease in steel pipe schedules, but 12 of 20 mills are rolling.

It is the opinion of President Elmer T. McCleary of the Republic Iron & Steel Co. that independents will be able to maintain a fairly satisfactory production rate during the summer. He bases this belief upon the fact that important consumers have been keeping purchases at a minimum for some time and their stocks of steel in consequence are low. In order for them to maintain manufacturing operations, he believes they will come into the market in a fairly active way during the mid-summer months. The usual summer recession in the industry, he feels, will not be so pronounced nor of such long duration this year.

Cincinnati

Melters Slow to Buy Third Quarter Pig Iron—Sheet Orders Heavier

CINCINNATI, June 5.—While third quarter pig iron inquiries have appeared in slightly greater volume, sales have been negligible. The largest order in the past week called for 500 tons of Southern foundry for a consumer in the Cincinnati district. Pending business includes 750 tons of malleable for a Richmond, Ind., foundry, 500 tons of Northern foundry for a Hamilton, Ohio, company and 500 tons of foundry for a central Indiana melter. Dealers estimate that only a small percentage of the iron required for third quarter has been purchased by users in this territory. The hesitancy in forward buying is attributed to the uncertainty regarding the turn which business is likely to take and also to the rather weak price situation. There has been no change in quotations. Alabama and Tennessee irons remain firm at $16, base Birmingham, southern Ohio foundry at $19, base Ironton, and Jackson County silvery at $25, base furnace, for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy. sil. 1.75 to 2.25	19.69
Alabama fdy. sil. 2.25 to 2.75	20.19
Tennessee fdy. sil. 1.75 to 2.25	19.69
Southern Ohio silvery 8 per cent	26.89

Freight rates $1.89 from Ironton and Jackson Ohio; $3.69 from Birmingham.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire per 100 lb	$3.00
Common wire nails base per keg	2.95
Cement coated nails base 100 lb. keg	2.95
Chain per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes 2-in.	19.00
4-in.	39.00

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Finished Material.—The situation is more encouraging than a week ago, the favorable turn having been caused by heavy specifications and orders for steel sheets received by district sheet mills. The activity in this line, however, is in contrast with the dullness which continues in bars, structural shapes and plates. Demand for structural steel is still lagging below normal for this time of the year, and prospects for the immediate future are not good. The only major project pending at the moment is 400 tons for airplane hangars at Wright Flying Field, Dayton, Ohio, but a highway bridge across the Ohio River at Louisville, requiring about 14,000 tons of steel, is expected to come out for bids before the end of June. Meanwhile, fabricators are moderately busy on numerous small jobs. Bars, structural shapes and plates are firm at 1.85c., base Pittsburgh, and indications are that an attempt will be made to secure $2 a ton more for third quarter, although practically no inquiry for that delivery has developed. In wire goods, shipments have been about equal to those in the same period of 1927. Common wire nails are reported to be bringing $2.50 per keg, base Ironton, plus a barge rate for delivery to Ohio River consuming points. Plain wire remains at $2.40 per 100 lb., base Ironton. Releases of contract specifications for sheets have been heavy and in the case of one district mill, bookings have been the second largest in the company's history. For blue annealed stock, sellers are getting 2c., base Pittsburgh, on the average run of material, but this is shaded possibly $2 a ton on large orders. Black sheets range from 2.70c. to 2.80c., base Pittsburgh, while automobile body sheets are steady at 4c.

Reinforcing Bars.—Despite the scarcity of major projects, the number of jobs ranging from 25 to 100 tons is large enough to keep the volume of sales up to a fairly good level. New billet bars are quoted at 1.85c. base Pittsburgh, and rail steel bars at 1.80c., base mill.

Warehouse Business.—Shipments of reinforcing bars out of local warehouses have been liberal in volume, while orders for soft steel bars, structural shapes and plates also have been well sustained. Sales of steel sheets, however, have been rather light. There has been no change in prices, which are firm.

Coke.—Shipments of by-product foundry coke have fallen off sharply in the past week, and one important dealer declares that specifications have declined almost to the low point reached last fall. There also has been a lessened interest in domestic grades, although sales have been fairly well maintained. The slowing down in the demand for by-product foundry coke is reported to be responsible for plans to lower prices at Detroit. Just how much of a cut will be made has not yet been determined, but some dealers believe that it may amount to $1 a ton.

Foundry coke prices per net ton delivered Cincinnati: By-product coke $9.02; Wise County coke, $7.09 to $7.59: New River coke, $9.09 to $9.59 Freight rates $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel has declined 25c. a ton and other items reflect the weakness of the market. Curtailment of steel plant operations and the dullness in foundry grades are the immediate causes of the decrease. The Norfolk & Western is taking bids this week on its monthly list totaling approximately 10,000 tons, while the Louisville & Nashville has put out a special list consisting of 12,000 tons of No. 1 steel rails.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to	$11.25
Scrap rails for melting	11.25 to	11.75
Loose sheet clippings	8.25 to	8.75
Bundled sheets	9.25 to	9.75
Cast iron borings	7.75 to	8.25
Machine shop turnings	7.25 to	7.75
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.00 to	10.50
Short rails	15.75 to	16.25
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.25 to	15.75
No. 1 railroad cast	12.75 to	13.25
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.00 to	11.50

Boston

Heavy Scrap Exports to Danzig—Pig Iron Competition Keen

BOSTON, June 5.—The Mystic and Champlain furnaces have taken most of the pig iron business placed in New England during the past week. The competition between these furnaces is very keen. Their combined sales in the last two weeks were about 10,000 tons. The price situation has shown no improvement. Buffalo iron is still being offered at $16, base furnace, and the Mystic and Champlain stacks are meeting the Buffalo delivered prices when necessary. Buffalo malleable iron has been offered in this market at $16.50, furnace. The Rhode Island Malleable Co., Phillipsdale, R. I., bought 450 tons of malleable iron at a reported delivered price of $21, and may take about 450 tons additional. The Mystic furnace sold 1200 tons to a Worcester melter, making a total of 1500 tons, whereas the foundry's original inquiry was for 500 to 1000 tons. Another Worcester plant has bought 300 tons. There is only one open inquiry in the market, that being for 500 to 1000 tons of No. 1X for third quarter, with an option on fourth quarter delivery on part of it.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.91
Buffalo, sil. 2.25 to 2.75	21.41 to	22.41
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Virginia, sil. 1.75 to 2.25		25.71
Virginia, sil. 2.25 to 2.75		26.21
Alabama, sil. 1.75 to 2.25	22.91 to	24.77
Alabama, sil. 2.25 to 2.75	23.41 to	25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Importations.—Importations of pig iron here in May, at 248 tons, were the smallest for any month this year. Importations for the first five months of this year totaled 4731 tons, compared with 13,487 tons in the corresponding months of last year. Imports of ore in May amounted to 16,828 tons.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. report that 100 per cent of regular customers have signed contracts for last half by-product foundry coke requirements. Current foundry requirements are larger than a month ago and a year ago, yet are below normal. June shipments are being made at $11 a ton, delivered within a $3.10 freight rate zone. Domestic coke is moving in large volume, almost exclusively, however, to dealers who are stocking up for fall and winter.

Shapes and Plates.—The naming of 1.90c. per lb., base Pittsburgh, on shapes and plates by leading mills has failed so far to force third quarter contracting. The largest consumers are still protected to a degree on

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

prospective tonnages, and owing to the labor situation there is little incentive to anticipate steel requirements.

Steel Fabricating Work.—The Boston iron workers' strike situation is deadlocked. Except on one local job, operating on cost plus, striking workers are still out. Intimations are that fabricators propose to establish themselves on an open shop basis. The strike has spread to outside points. In addition, other branches of the building trades are striking for higher wages, and automobile truck drivers employed by fabricators are on "vacation." The construction situation is decidedly unsettled at the moment. Members of iron workers' unions employed on bridges in western Massachusetts, New Hampshire, Vermont and Maine are still working.

Bars.—Most of the large mills have advanced steel bars to 1.90c. per lb., base Pittsburgh. Regardless of the stiffer mill prices, all local jobs on reinforcing bars are going at less than 2.90c. per lb., base, from stock.

Cold-Rolled Strip.—Cold-rolled strip makers have opened their books for third quarter. Orders are coming in very slowly. The American Steel & Wire Co. quotes 3.30c. per lb., base Worcester, for 1 to 3 ton lots, while other rollers ask 3.15c. per lb., base Pittsburgh. Less than 3.30c., Worcester, can be done on large lots.

Old Material.—Exports of scrap from this port to Danzig continue to feature the market. A steamer with 5000 tons left Boston May 30, the fourth shipment this year. Another steamer finished loading 4500 tons June 2 and sailed the following day; still another will complete loading approximately 4500 tons this week; and another with about 5000 tons is due to sail July 5. For export, $9.50 to $10 on cars, dock, is paid for No. 1 steel, and around $7.25 for good yard steel. Total exports on this movement, according to report, will approximate 50,000 tons and will, it is believed, be used in the production of structural steel. Small tonnages will have been exported from other New England ports. The scrap market, aside from export business, is dull. Apparently there has been some modifications in prices on a few materials, but no significance is attached to such changes. Sales of railroad malleable to New England consumers at $13.50 a ton, delivered, were made. Machinery cast sales were few and far between at former prices.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.60 to $9.00
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.50 to 5.75
Cast iron borings (steel works and rolling mill)	5.75 to 6.25
Bundled skeleton, long	5.50 to 6.25
Forge flashings	5.60 to 7.00
Blast furnace borings and turnings	5.50 to 5.75
Forge scrap	6.00 to 6.25
Shafting	13.00 to 13.50
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in. diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton delivered consumers' yards:

Textile cast	$13.25 to $13.50
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

Canada

Blowing in of Port Colborne Furnace May Curb Pig Iron Imports

TORONTO, ONT., June 5.—Pig iron sales show very little change from those of a week ago. Some inquiry for forward delivery is appearing, but producers and consumers appear to have difficulty in reaching a satisfactory price level, and as a consequence business of this kind is delayed. The demand for prompt shipment, however, is holding to the recent level. Local blast furnace representatives report a steady flow of orders ranging from 50 to 200 tons. The blowing in of the Victoria furnace of the Canadian Furnace Co., Port Colborne, Ont., on May 24 brings the total number of active stacks in Canada to seven. The blowing in of the Port Colborne stack will, it is expected, have a tendency to curb imports of foundry and malleable iron in the Niagara peninsula, as it is ideally located to supply the local market as well as other districts in Ontario, especially on the Great Lakes. Canadian pig iron prices are unchanged, although shading continues in some districts.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Sumerlee	33.50
Carron	33.00

Old Material.—Current demand is confined to small tonnages. Mills are receiving deliveries against old contracts and in some instances are placing orders for special grades. Foundries are responsible for the greater part of current demand. Electric furnace requirements are large. Prices are unchanged but are weak.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Detroit

May Automobile Production Gained and Outlook for June Is Good

DETROIT, June 5.—The May totals of automobile production thus far available include those for Dodge Brothers, Hudson-Essex, Hupp, Packard and Reo, and show a combined total of 71,431, as against 68,226 for April, or a gain of nearly 5 per cent. Dodge Brothers' May production dropped 2716 units below that of April, the May total being 19,717 units. This is the only case, from the figures now at hand, of a decline from April.

The merger of the Dodge and Chrysler companies gives a potential output in existing plants of the two companies of 1,000,000 cars a year. Construction is just being started at the Jefferson Avenue plant of a building 150 x 1600 ft. for the manufacture of the Chrysler 62. Three Chrysler models will be built at the Jefferson Avenue plant; the Fargo truck will be built in the Highland Park plant, and the Dodge Brothers' models and Graham trucks are to be continued in the Hamtramck plant. The total number of units produced by Dodge Brothers in the first five months of this year ran 102,560, against 83,781 in the corresponding period of 1927, or a gain of 22.4 per cent.

Production of Hudson and Essex cars during May amounted to 32,450 units, or an increase of more than 12 per cent over that of April. Total shipments to June 1 were 151,886, compared with 145,252 in the corresponding period of 1927. The first five months of this year were the largest five-months' period in Hudson-Essex history. June is scheduled at approximately 30,000 cars.

Hupp also made a record in May, with shipments of

(*Concluded on page* 1652)

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	June 5	June 4	June 2	June 1	May 31	May 29
Lake copper, New York	14.87½	14.87½	14.87½	14.87½	14.87½	14.87½
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	49.25	49.50	....	49.75	49.87½	50.55
Lead, New York	6.30	6.30	6.30	6.30	6.30	6.30
Lead, St. Louis	6.17½	6.17½	6.17½	6.17½	6.17½	6.17½
Zinc, New York	6.47½	6.47½	6.47½	6.47½	6.47½	6.47½
Zinc, St. Louis	6.12½	6.12½	6.12½	6.12½	6.12½	6.12½

*Refinery quotation; delivered price ¼c. higher.

New York, June 5.—The holiday last week slowed up activity somewhat. Copper continues strong, but not so active. Tin prices have fallen quite sharply, with buying fairly large. Lead has been advanced again, but quotations for zinc have remained practically unchanged for nearly two weeks.

Copper.—Sales of copper for May are estimated by the trade at not less than 415,000,000 lb., and approximately half of this was for export. Sales to foreign consumers in May were therefore a record for all time. Naturally the market is not as active as it has been. Domestic consumers are not buying much, but sales to foreign users continue in good volume. June metal is scarce, although a premium has not yet been asked for spot or June. Electrolytic copper is quoted at 14.75c., delivered in the Connecticut Valley, and Copper Exporters, Inc., continues to maintain its quotation unchanged at 15c., c.i.f. European ports. Lake copper is obtainable at 14.87½c., delivered.

Copper Averages.—The average price of Lake copper for the month of May, based on daily quotations in The Iron Age, was 14.50c., delivered. The average price of electrolytic copper was 14.19c., refinery, or 14.44c., delivered in the Connecticut Valley.

Tin.—With two holidays, one in London and one in New York, this market has had a short week. Total sales for the week ended June 2 amounted to about 700 to 800 tons. The feature of the market has been a sharp decline in prices, which has been caused by declarations of 800 to 1000 tons of tin available for June delivery thus early in the month. This has caused spot prices to fall, with the situation for this delivery changing from a premium to a discount. On May 29 spot tin was sold at a premium of about ¼c. over August, but on June 1 it dropped to a discount of ⅜c. from the August position. Deliveries into consumption in May were 5335 tons, which is much smaller than for some time, and the amount of tin in stock and landing on May 31 was 3708 tons, which is much the largest in many months. The increase in stocks in store was large, but this metal could have been shipped away if consumers had needed it. The visible supply in the United States on May 31 was 10,282 tons, regarded as ample, and the increase in the world's visible supply was 2063 tons, bringing it to 17,064 tons. The most active day in the past week was May 29 when 400 to 500 tons changed hands. Yesterday, Monday, about 250 tons changed hands and today the market has been quite dull, with spot Straits tin quoted at 49.25c., New York, the lowest since Oct. 9, 1924. London prices today were: Spot standard, £223 15s.; future standard, £232 5s., and spot Straits, £226 5s. The Singapore price today was £226 5s.

Lead.—On May 29 the American Smelting & Refining Co. advanced its contract price for the third time recently from 6.20c. to 6.30c., New York. In the outside market prices are correspondingly higher and firm at 6.17½c. to 6.20c., St. Louis. Consumers have been buying in good volume, but demand is not so large as in the early period of the advance. Some desire to buy for August, but producers are not eager to sell for that position.

Zinc.—Producers report a fairly good demand each day with specifications on contract eminently satisfactory. Most of them are asking and obtaining 6.15c., St. Louis, at which level most sales are being made, but some prime Western zinc is still available at 6.12½c., St. Louis. The market is quotable at 6.12½c. to 6.15c., St. Louis, or 6.47½c. to 6.50c., New York. Ore prices were unchanged last week at $40 per ton,

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.50c. to 13.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, traits pig	54.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	58.00c.
Solder, ½ and ½	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are still being quoted at the advance of ¼c. announced on May 25. Quotations on lead full sheets were advanced ¼c. on May 29, the price now being 10c. to 10.25c., base. Zinc sheets are unchanged at 9c., base.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

with sales of about 13,500 tons and production about 11,000 tons.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—The market is dull with a tendency to weakness and Chinese metal is quoted nominal at 10.50c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is available at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 5.—Price advances are noted in lead and zinc and quotations are lower on tin. Sales in this district have been in fair volume. Old metal prices are steady in a moderately active market.

Prices, per lb., in carload lots: Lake copper, 14.62½c.; tin, 51.50c.; lead, 6.35c.; zinc, 6.25c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Order for 200 Flat Cars and Inquiry for 250 Stock Cars

THE Chicago, St. Paul, Minneapolis & Omaha has purchased 200 flat cars and has come into the market for 250 stock cars. An inquiry from the Chicago, Rock Island & Pacific calls for 250 gondola bodies. Distribution of the Southern Pacific's order for 62 passenger train cars has been announced.

Class I railroads installed 561 locomotives in the first four months this year, according to reports filed by the carriers with the Car Service Division of the American Railway Association. This was a decrease of 73, as compared with the corresponding period last year, and of 198 compared with the corresponding period in 1926. During April the railroads placed in service 96 locomotives, compared with 187 in April, 1927. Locomotives on order on May 1 totaled 137, compared with 217 on May 1, 1927.

Freight cars installed in service in the first four months of 1928 totaled 15,635, compared with 22,066 for the same period in 1927 and 31,980 in the first four months of 1926. Freight cars installed in April this year totaled 5571, compared with 6270 in April, 1927. The railroads had 22,242 freight cars on order May 1, compared with 26,675 on the same date last year and 48,762 on May 1, 1926.

Details of the week's business follow:

Chicago & Illinois Midland is in the market for two Mikado locomotives.

Vancouver Harbor Commission, Vancouver, B. C., has ordered one locomotive from American Locomotive Co.

Chicago, St. Paul, Minneapolis & Omaha has ordered 200 flat cars from Pullman Car & Mfg. Corporation. This road has also made definite inquiry for 250 stock cars.

Illinois Central will purchase two 20-ton air dump cars.

Chicago, Rock Island & Pacific is in the market for 250 50-ton gondola car bodies.

Missouri-Kansas-Texas expects to buy six baggage-mail cars.

American Oil Co., Baltimore, has ordered two three-compartment tank cars from General American Tank Car Corporation.

Southern Pacific's order for 62 passenger cars, mentioned in this column last week, was distributed as follows: Six dining cars and five compartment coaches with Pullman Car & Mfg. Corporation, 10 baggage cars and 10 coaches with Standard Steel Car Co., 25 steel coaches with American Car & Foundry Co., and six baggage and mail cars with Bethlehem Steel Co.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.25c.	13.875c.
Copper, heavy and wire	12.25c.	13.25c.
Copper, light and bottoms	10.50c.	11.75c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.875c.
No. 1 yellow brass turnings	8.25c.	9.25c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Columbus & Greenville has ordered two 73-ft. gas-electric rail motor cars and two 73-ft. passenger trailers from J. G. Brill Co.

Southern Cotton Oil Co., Savannah, Ga., has ordered 10 8000-gal. tank cars from American Car & Foundry Co. and 10 from General American Tank Car Corporation.

REINFORCING STEEL

Chicago Mercantile Mart Will Take 6000 Tons —1800 Tons in California Aqueducts

AWARDS of 6300 tons included 1800 tons for two aqueducts at Oakland, Cal. The Chicago Mercantile Mart, requiring 6000 tons, and an apartment development in the same city, calling for 1600 tons, made up the bulk of new projects reported for the week, the total being 8300 tons. Awards follow:

STATE OF NEW JERSEY, 600 tons, road work, to Igoe Brothers; 250 tons from C. H. Winans Co., Elizabeth, general contractor, and 350 tons from Ross & Taylor, Trenton.

BUFFALO, 100 tons, addition to plant of Great Lakes Cement Co., to a local maker.

BUFFALO, 150 tons and 250,000 sq. ft. of mesh, Riverside High School, to a Buffalo maker.

EVANSVILLE, IND., 600 tons of rail steel, reservoir for municipal waterworks, to Laclede Steel Co.

EVANSTON, ILL., 280 tons of rail steel bars, apartment building at Hinman Avenue and Grove Street, to Calumet Steel Co.

STATE OF ILLINOIS, 200 tons of rail steel bars, road work, to Calumet Steel Co.

CHICAGO, 130 tons, St. Michaels High School, to an unnamed bidder.

CHICAGO, 160 tons, Hugoelet apartment building, to Concrete Steel Co.

CHICAGO, 100 tons, Wabash Avenue Exchange for Illinois Bell Telephone Co., to Jones & Laughlin Steel Corporation.

CHICAGO, 250 tons, Shiller Park viaduct, to Jones & Laughlin Steel Corporation.

CHICAGO, 700 tons, building for Cuneo Printing Co., to Truscon Steel Co.

SAN FRANCISCO, 325 tons, warehouse, Third and Paul Streets, to Badt-Falk Co.

OAKLAND, 1800 tons, Wildcat and Sequoia aqueducts, to Columbia Steel Corporation.

SACRAMENTO, CAL., 166 tons, paving in Marin County, to Hanrahan Co., San Francisco.

SACRAMENTO, 100 tons, five bridges in Sacramento County, to unnamed company.

IONE, CAL., 125 tons, three school buildings for Preston State School, to San Francisco jobber.

YOUNTVILLE, CAL., 350 tons, State Veterans' Barracks, to San Francisco jobber.

SEATTLE, WASH., 155 tons, piers for West Waterway bridge, to Puget Sound Bridge & Dredging Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

GREENWICH, CONN., 250 tons, printing building for Condé Nast Publications, Inc.; bids June 5.

LONG ISLAND CITY, N. Y., 275 tons, post office; bids June 7.

BUFFALO, 200 tons, Rand Building.

CHICAGO, 1600 tons, apartment community development by Marshall Field Estate.

CHICAGO, 6000 tons, Mercantile Mart.

CARNEGIE LIBRARY OF

"OVERCAPACITY NO ALIBI"

O. H. Cheney, Banker, Tells Flat Rolled Steel Executives It Does Not Excuse Price Cutting and Low Profits

White Sulphur Springs, W. Va., June 5.—Declaring that excess producing capacity is the chief alibi of steel companies in cutting prices and that this factor cannot justly be held accountable for the unsatisfactory profits which have ruled recently, O. H. Cheney, vice-president American Exchange-Irving Trust Co., New York, at the opening business session this morning of the first annual meeting of Flat-Rolled Steel Executives at the Greenbrier Hotel suggested that it is the fear of excess capacity that has contributed to the present unhealthy situation. Mr. Cheney emphasized that research and education will play the largest parts in maintaining and extending markets as well as in stabilizing conditions in the flat-rolled steel industry and that the trade association is the legitimate and logical means for promoting this work.

Charles O. Hadly, vice-president Alan Wood Iron & Steel Co., Philadelphia, presided at the session, and on behalf of the sheet industry welcomed the executives of the hot and cold-rolled strip industry to the meeting. F. C. Gifford, vice-president Acme Steel Co., Chicago, responded as the representative of the strip industry.

At a meeting of the executive committee of the National Association of Flat-Rolled Steel Manufacturers this morning, B. E. Kibbee, vice-president Sharon Steel Hoop Co., Sharon, Pa., and C. G. Thomas, president Thomas Steel Products Co., Warren, Ohio, were added to the board of directors, which now has 18 members.

Wednesday morning's session will be devoted to a discussion of trade extension work and the final session on Thursday to association activities. The program also includes group meetings of the sheet steel, hot-rolled strip and cold-rolled divisions.

FABRICATED STRUCTURAL STEEL

New York Office Building Takes 16,000 Tons—10,000 Tons Needed for Hotel

With an office building in New York taking 16,000 tons, awards reported during the week amounted to 32,900 tons. New projects totaled only 14,600 tons, 10,000 tons of which will be required for a New York hotel. Awards follow:

Stockbridge, Mass., 100 tons, bridge, to Palmer Steel Co.

New York, 16,000 tons, Lincoln Building on East Forty-second Street, to an unnamed fabricator.

New York, 4000 tons, office building on John Street, from Starrett Brothers, general contractors, to Hedden Iron Construction Co.; reported last week to unnamed fabricator.

Buffalo, 200 tons, stand pipes for Western New York Water Co., to Pittsburgh-Des Moines Steel Co.

Philadelphia, 510 tons, Pennsylvania Railroad warehouse at Venango and D Streets, to Belmont Iron Works.

Philadelphia, 200 tons, building for Kensington Trust Co., to Bethlehem Steel Co.

Reading Railroad, 140 tons, two single track girder spans on Shamokin division, to Phoenix Bridge Co.

Pennsylvania Railroad, 600 tons, bridges, to Bethlehem Steel Co.

Nazareth, Pa., 450 tons, kiln building and turbine room for Nazareth Cement Co., to Bethlehem Construction Co.

Imperial, Pa., 130 tons, bridge work, to McClintic-Marshall Co.

Southern Railway, 900 tons, bridges, to American Bridge Co.

Tuscaloosa, Ala., 2300 tons, E-Z Opener Paper Bag Co. plant, to Ingalls Iron Works Co.

San Antonio, Tex., 1700 tons, theater, to Petroleum Iron Works, Beaumont, Tex.

Cleveland, 600 tons, Parkhurst and Nathan Hale schools, to Wellman-Seaver-Morgan Co.

Cleveland, 975 tons, Lake Shore Hotel, to Forest City Structural Steel Co.

Toledo, Ohio, 325 tons, Toledo Hospital extension, to American Bridge Co.

Marietta, Ohio, 110 tons, bridge for State of Ohio, to Pittsburgh-Des Moines Steel Co.

Middletown, Ohio, 167 tons, storage runway, to McClintic-Marshall Co.

Gary, Ind., 700 tons, Lake County Court House, to A. Bolter's Sons, Chicago.

State of Illinois, 260 tons, highway bridge, to Lakeside Bridge & Steel Co.

South Chicago, Ill., tonnage not stated, frame work for coke handling plant for Youngstown Sheet & Tube Co., to Vierling Steel Works, Chicago.

Chicago, 215 tons, store building at Diversey Boulevard and Broadway, to Duffin Iron Co., local.

Milwaukee, 200 tons, new Lincoln Avenue bridge, to Milwaukee Bridge Co.

St. Louis, 650 tons, girders and columns for warehouse for J. C. Penney Co., 350 tons; columns for Lennox Hotel, Ninth and Washington Avenues, 300 tons, to Mississippi Valley Structural Steel Co.

Manhattan, Kan., 260 tons, State highway bridge, to St. Joseph Structural Steel Co.

San Francisco, 150 tons, office building, Pine and Leisdorff Streets, to California Steel Co.

San Francisco, 480 tons, three apartment buildings, to McClintic-Marshall Co.

Oakland, 140 tons, office building, Fourteenth and Webster Streets, to Pacific Coast Engineering Co.

San Jose, Cal., 100 tons, laundry building, to Herrick Iron Works.

Los Angeles, 400 tons, second unit Firestone Tire & Rubber Co. plant, to Llewellyn Iron Works.

Los Angeles, 300 tons, grade crossing, Riverside Drive, to Llewellyn Iron Works.

Los Angeles, 1300 tons, Willys-Overland automobile plant, to Llewellyn Iron Works.

Los Angeles, 250 tons, apartment building, Kenmore and Wilshire Boulevards, to Llewellyn Iron Works.

Los Angeles, 140 tons, apartment building, Union and Ingram Streets, to Union Iron Works.

Avalon, Cal., 1400 tons, theater, to Llewellyn Iron Works.

Westwood, Cal., 348 tons, steel stage for Fox Film Corporation, to Baker Iron Works.

Glendale, Cal., 260 tons, First Methodist Church, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Maine Central Railroad, 400 tons, bridge at Lunenberg, Vt.

State of Vermont, 775 tons, highway bridges.

Boston & Maine Railroad, 400 tons, bridges.

Westchester County, N. Y., 250 tons, highway bridge.

New York, 500 tons, loft building on East Sixty-first Street.

New York, 10,000 tons, New Yorker Hotel at Eighth Avenue, Thirty-fifth and Thirty-sixth Streets.

Cleveland, 100 tons, addition for Ohio Foundry Co.

Toledo, Ohio, 500 tons, building for Libbey-Owens Glass Co.

Dayton, Ohio, 400 tons, airplane hangars at Wright Flying Field; bids in.

Manistee, Mich., 1000 tons, highway bridge.

Janesville, Wis., 125 tons, Center Avenue overhead bridge; bids about June 15.

Powerton, Ill., 150 tons, stack and supports for Super Power Co.

Sheet Mill Wage Scales Reaffirmed

Youngstown, June 5.—The sheet and tin plate wage scale will be continued for 12 months, beginning July 1, on basis of present agreement, following conference just concluded at Atlantic City. The old scale was largely reaffirmed. Representatives of workers had requested that tonnage rates be based on average selling price of tin plate, rather than on Nos. 26, 27 and 28-gage black sheets.

This week, the conference over the bar iron scale is under way at Atlantic City.

PERSONAL

George C. Scott has been elected president of the United States Steel Products Co., 71 Broadway, New York, succeeding E. P. Thomas, who was recently elected vice-president of the United States Steel Corporation. Mr. Scott started work with the St. Louis Wire Mill Co., under John W. Gates. This company was absorbed by the Consolidated Steel & Wire Co., at which time he was transferred to the latter company's Cleveland office, in charge of export business to the Far East. The company merged with the American Steel & Wire Co. of Illinois in 1898, and Mr. Scott was then transferred to New York, where he was associated in handling the export business with James A. Farrell, then manager of the export department. On the formation of the United States Steel Products Co. in 1903, Mr. Scott became a departmental manager in charge of sales to the Far East, Australia and South Africa. He has traveled extensively and has visited most of the important markets throughout the world.

GEORGE C. SCOTT

—

F. H. Frankland, who has been supervising structural engineer, specializing in steel work, for Dwight P. Robinson & Co., New York, has been made head of the engineering service bureau created by the American Institute of Steel Construction, New York. This bureau will direct and coordinate the work of the ten field engineers recently appointed by the institute. After attending the Sheffield Scientific School of Yale University, Mr. Frankland was engaged in structural engineering work in New Zealand and Australia. Later he returned to the United States and was identified with the design of bridges and industrial structures in California and Louisiana. He was for four years managing engineer for Waddell & Son, New York, and later was general manager and chief engineer in charge of design, estimating and production for the Bancroft-Jones Corporation, Buffalo.

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Dr. J. M. Lohr, formerly in charge of melting for the Hoskins Mfg. Co., Detroit, and who later installed and managed the department of melting and hot rolling of nickel chromium and various other nickel alloys for the Electrical Alloy Co., Morristown, N. J., is now plant metallurgist for the Driver-Harris Co., Harrison, N. J. He received his doctor's degree from Cornell University and for many years has made an intensive study of the melting and manufacture of nickel and nickel-chromium alloys.

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J. R. Allison, most recently identified with the construction department of the Homestead works, Carnegie Steel Co., has been appointed Pittsburgh district manager for the C. O. Bartlett & Snow Co., Cleveland, with headquarters at 406 Bessemer Building. He was graduated in mechanical engineering from the University of Pittsburgh and was first employed as field engineer for the Edgewater Steel Co., Pittsburgh. Later he was engaged in the mechanical department of the Pennsylvania Railroad, and during the war served as a first lieutenant in the engineers corps, United States Army.

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William H. Page has resigned as head of the bureau of public relations of the American Institute of Steel Construction, New York, and has been succeeded by V. Gilmore Iden, most recently one of the editors of the *United States Daily*, Washington, and previously identified with the *Journal of Commerce*, New York, and the Penton Publishing Co., Cleveland. A. T. North has also resigned as head of the institute's bureau of architectural relations.

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Howard C. Yost, most recently associated with the Lewis Bolt & Nut Co., Minneapolis, and previously in the metallurgical department of the Carnegie Steel Co., Pittsburgh, has become identified with the St. Paul, Minn., district sales office of the Inland Steel Co., Chicago.

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W. Parker, director of sales for British Furnaces, Ltd., representative in Great Britain for the Surface Combustion Co., Toledo, Ohio, has been traveling in the United States during the last few weeks studying the new types of furnaces being used by various industries. He has given particular attention to the use of automatic heat control equipment and automatic furnaces used extensively in blast furnaces and steel mills, automotive plants and the chemical industry.

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D. J. Hanna has been appointed district sales manager in Michigan for the Jessop Steel Co., Washington, Pa., and will have offices at 2208 Fort Street, Detroit.

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J. E. McLain, who has been Pittsburgh district manager of sales for the Bethlehem Steel Co., has been appointed special representative in the Pittsburgh district, and will devote his attention to the company's larger accounts in the territory. His successor as Pittsburgh district manager of sales is James P. Kratzer, who has been assistant manager of sales in the bar department at the general offices of the company in Bethlehem, Pa. Mr. McLain has been identified with the steel industry since 1897, the year following his graduation from Princeton University, when he became an assistant to his father, then Pittsburgh district sales manager Cambria Steel Co., Johnstown, Pa. He succeeded his father upon the latter's retirement in 1911, and continued in the position when the company was acquired during the World War by the Midvale Steel & Ordnance Co., and was reappointed when the latter was absorbed by Bethlehem Steel Co. in 1923. Mr. Kratzer has been identified with the Bethlehem company since 1912, and except for a brief period in the open-hearth department in Bethlehem, has spent all of that time in the general sales department.

J. E. McLAIN

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A. H. Deute, Borden Co., New York, has been made vice-president of the Billings & Spencer Co., Hartford, Conn., to succeed the late Arthur W. Fox.

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Luke E. Fichthorn, president of the Peck, Stow & Wilcox Co., Southington, Conn., has resigned, and George S. Case, Lamson & Sessions Co., Cleveland, has been elected to succeed him. Mr. Fichthorn has been president of the Southington company since 1919. Charles F. Treadway, New Haven, Conn., a director of the company for several years, has been made treasurer.

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Spencer Allen, associated for the past two years with the scrap department of the Cincinnati office of Hickman, Williams & Co., has resigned. Previously he had been connected with the company in its St. Louis office.

Gilbert S. Sank, formerly in charge of the Philadelphia office of E. Arthur Tutein, Inc., has become associated with Hickman, Williams & Co., Inc., at its Philadelphia office. Mr. Sank will specialize in coke, both domestic and foundry.

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William G. Christy, for the past two years executive secretary of the Citizens' Smoke Abatement League, St. Louis, has tendered his resignation, effective July 1. As chairman of the St. Louis Section of the American Society of Mechanical Engineers, he was active in the organization of the league, which, under his direction, ran a campaign to raise $250,000 by popular subscription to carry out a three years' smoke abatement program. He was formerly superintendent of the St. Louis Boat & Engineering Co. and during the war was district manager of the United States Shipping Board. He will continue for the present to maintain his offices in the Railway Exchange Building, St. Louis, as mechanical engineer.

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A. C. Kingston has been appointed assistant general manager in charge of sales of the Boston Woven Hose & Rubber Co., Boston, and also elected a member of the board of directors. J. W. Fellows, factory manager, has also been elected to the board.

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Samuel A. Curry has been appointed superintendent of inspection and test at the South Philadelphia Works of the Westinghouse Electric & Mfg. Co., succeeding the late John T. Snyder. U. A. Taddiken, formerly in the condenser engineering department, has been named to succeed Mr. Curry.

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Dr. Walter Cross has become associated with the Babcock & Wilcox Co., New York, as consulting chemical engineer. While his duties will necessitate his spending some time in New York, he will make his headquarters in Kansas City as heretofore.

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Works Manager George N. Jeppson having been advanced to vice-president in charge of production, and Howard W. Dunbar to the position of works manager of the machine division of the Norton Co., Worcester, Mass., several other changes have been made in that organization. Hugo H. W. Beth has been made production manager of the wheel division and Dwight C. Daniels production manager of the machine division. Clarence R. King has been appointed consulting engineer and Duane E. Webster engineer of organic products, and Irving B. Loud has been assigned to the supervision of the silicate wheel department in addition to his other departments. W. La Coste Neilson, vice-president and general sales manager, announces these changes in the wheel division sales organization: Ralph M. Johnson, district manager at Hartford, Conn., made district manager at Philadelphia; W. Earle Shumway of the sales engineering department made manager of Connecticut district; H. K. Clark of the Chicago office made sales manager of the Deutche Norton Gesellschaft, the company's German subsidiary.

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J. L. Jennings, vice-president and director of sales of the Lamson & Sessions Co., Cleveland, sailed May 31 for a two-months' trip to Europe.

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Julius A. Dyblie, for many years chief engineer at the Joliet works, Illinois Steel Co., and associated with the company for 29 years, retired from active service on June 1. He was born in Norway 76 years ago, but has been in this country since 1879. During his long association with the steel industry he has been credited with the invention of many furnace devices, particularly a rotary reversing gas valve and an air check valve for blowing engines.

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Charles P. Perin, Perin & Marshall, consulting engineers, New York, has returned from an extended trip to India, South Africa and Spain.

BACKED-UP STRIP ROLLS

Predicted That They Will Wholly Supplant Two-High Sets Now Common

STEEL mill engineers, operating officials and steel company executives took advantage, in large numbers, of an inspection tour under the auspices of the Association of Iron and Steel Electrical Engineers on Saturday, June 2, visiting the Salem, Ohio, works of E. W. Bliss Co. and seeing a new set of cold-rolling mills built by that company. They saw also a demonstration of cold-rolling by an electrically-driven cluster-type mill. More than 200 men interested in the cold-rolling mills and their product were present.

The mills are to be installed at the new plant of the Sharon Steel Hoop Co., and are expected to be in operation late next month or early in August. They comprise eight stands of cluster mills and 16 stands of two-high mills. These attracted much attention and there was much favorable comment on the clean grain surface of the roll housing castings.

At a gathering of the visitors in the auditorium of the Elks Club, J. H. Van Campen, chief engineer E. W. Bliss Co., read a paper: "General Characteristics of Cold-Rolling Mill Equipment." In this he pointed out the important features of the backed-up working roll mills, and described the mills and the auxiliary equipment later seen on the tour of the plant. He predicted that the mill in which small working rolls are backed up by larger rolls would one day supplant the two-high mill, now so commonly employed in cold rolling. He said that close grained cast iron housings reduce the springing tendency of the rolls, and that the use of anti-friction roller bearings eliminates the heating of roll necks and permits higher speed in rolling, while the use of universal spindles prevents back-lashing.

High Speed on Continuous Run

He mentioned the possibility of a speed of 375 ft. a minute on low-carbon steel on 16-in., 18-in. and 20-in. mills of four stands. The first mill would be used to take out irregularities in the strip and, in addition to making a light reduction, would deliver a constant supply to the other stands. On the second stand a reduction of 30 to 40 per cent was the objective and on the third stand one of from 25 to 30 per cent, with a fourth stand to be used for planishing and a reduction of about 10 per cent.

In the demonstration of the electrically-driven cluster-type mill, which followed the inspection of the mills for Sharon Steel Hoop Co., strips 15 in. wide by about 6 ft. long and 0.095 in. thick were successfully reduced in four passes to a thickness of 0.031 in. The reduction in the first pass was 30.9 per cent, in the second pass 25 per cent, in the third 23.4 per cent and in the final pass 13.8 per cent.

Among Those Present

Severn P. Ker, president Sharon Steel Hoop Co., who recently returned from a trip to Europe; T. P. Draper, vice-president and general manager of that company; James Lippincott, president and general manager, and Charles S. Todd, assistant to the president, West Leechburg Steel Co.; C. H. Hunt, chief engineer Weirton Steel Co.; Frank Flynn, assistant to the general manager Trumbull Works, Republic Iron & Steel Co., Warren, Ohio; and David Pride, superintendent Superior Steel Corporation, Carnegie, Pa., were among the interested spectators at the demonstration of the cluster-type mill.

Meeting of Blast Furnace and Coke Oven Association

B. F. Fairless, president Central Alloy Steel Corporation, Massillon, Ohio, will be the principal speaker at the summer meeting of the Eastern States Blast Furnace and Coke Oven Association to be held at the Edgewood Country Club, Edgewood, Pa., June 12. His subject will be "The Importance of Coke and Pig Iron in the Production of Quality Steel." At this meeting officers for the ensuing year will be elected.

OBITUARY

IRA H. SPENCER

Ira Hobart Spencer, founder and president of the Spencer Turbine Co., Hartford, Conn., whose recent death was mentioned in The Iron Age of May 10, was one of the country's leading authorities on blowers and exhausters and had more than 100 patents registered in his name. His interest in mechanics developed at an early age, and in 1892, at the age of 18 years, he constructed a water motor for use in pumping church organs. A number of these motors are still in use. In 1895 he organized the Spencer Motor Co., which later was sold to the L. E. Rhodes Co. and some time afterward became the Organ Power Co., maker of some of the first practical electrically operated organ blowers. In 1904, Mr. Spencer began experiments with stationary exhausters for cleaning buildings by the vacuum method, and in 1907 he organized the Spencer Turbine Cleaner Co. to exploit this cleaner. In 1918 this company was consolidated with the Organ Power Co. as the Spencer Turbine Co., with Mr. Spencer as president. He continued his experimentations with air machines and produced the line of Spencer turbo-compressors used for operating oil and gas-fired furnaces and ovens and for cupolas.

Edward Allen Whitworth, formerly general superintendent of the Bourne-Fuller Co., Cleveland, and widely known in the steel making industry, died suddenly at his home in Buffalo, May 31. For some time he had been prominently identified with the organization of open-hearth superintendents and for two years had served as chairman of this organization, which holds conferences to discuss open-hearth problems as an extension of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers. Mr. Whitworth was connected with the Bourne-Fuller Co. about eight years, first as open-hearth superintendent, and later as general superintendent. On leaving the Bourne-Fuller Co. in 1925 he became affiliated with the Gathmann Engineering Co., Baltimore. At the time of his death he was connected with the Federal Concrete Co., in Buffalo, where he had made his home for several months. He was 45 years of age and had graduated from Pennsylvania State College in 1904.

Michael Rosenberg, president Rosenberg Iron & Metal Co., Chicago, dealer in scrap metals, died May 31.

Frank L. Wells, president and treasurer Frank L. Wells Mfg. Co., Kenosha, Wis., died Monday, May 28, after a brief illness. He was widely known in machinery and general manufacturing circles.

John Seymour Bycroft, Sr., in charge of purchases for the Stewart Furnace Co., Sharon, Pa., died suddenly June 1, aged 65 years. He had been associated for 30 years with the Stewart company.

Maurice N. Landay, president M. N. Landay Co., Pittsburgh, dealer in scrap iron and steel, died at his home in that city May 31. He was born in Washington, Pa., 42 years ago and attended Washington and Jefferson College. For many years he had been Pittsburgh representative of the Hyman, Michaels Co., Chicago, and when that company discontinued its Pittsburgh office he organized his own company, which became the Pittsburgh representative of the Hyman, Michaels Co. and of the Perry-Buxton-Doane Co., Boston.

Jacob Trautman, Pacific Coast manager for the Colonial Steel Co., Pittsburgh, and for several years general sales manager of that company, died at Los Angeles June 2. He was born in Pittsburgh 53 years ago, and had been identified with the Colonial company for 35 years, all of that time in the sales department. He had been an active member of the Pittsburgh chapter of the American Society for Steel Treating.

Alfred G. Smith, president and formerly general manager of the American Shipbuilding Co., Cleveland, a leading shipbuilder on the Great Lakes, died June 5, after a four months' illness, aged 53 years.

Detroit Iron and Steel Market

(*Concluded from page* 1646)

8361 cars, which is 279 units greater than April figure, and considerably greater than the 3516 units built in May, 1927. Hupp production during the first five months of this year was also a record, totaling 33,313 units, compared with 19,431 units in 1927, an increase of 13,882, or 71 per cent. It is reported that Hupp goes into June with 2180 unfilled orders.

Packard built 4782 cars in May, an increase of 2681, or 127 per cent, over the May, 1927, figure, and 348 units above the April output. The first nine months of Packard's fiscal year show a production of 33,930 units, compared with 24,265 units for the same period in the previous fiscal year, an increase of 9665, or about 40 per cent.

The Reo Motor Car Co. developed a new high record in May, with a production of 6121 units, or an increase of 576 units over that of May, 1927, and an increase of 844 units over the output of April, this year, and had 6400 unfilled orders on June 1.

Ford production is still increasing. During the week ended May 23 employment by the Ford Motor Co. totaled 112,683 men, a record at that time in the history of the company. The previous peak occurred in 1926, with 110,000 men at work. Figures on Ford employment released June 1 showed an addition of 2748 men, bringing present operating strength to 115,431 men, of whom 77,924 are working at Fordson, 32,795 at Highland Park and the remaining 4712 at the Lincoln plant. Production on the Ford Fordor sedan was started about 10 days ago. Thus far, the Ford Co. of Canada has produced somewhat in excess of 12,000 model A cars, and output at present runs about 325 cars a day, or 66 per cent of capacity.

The Willys-Overland plant is maintaining peak production, shipments of 11,583 units establishing a new weekly figure. The previous high mark for a week was 10,850 cars. The company is reported to have about 30,000 unfilled orders on the books. Employment at the Toledo plants continues at 22,000 men.

The Lakey Foundry & Machine Co. has received a contract for cylinder castings amounting approximately to $700,000. This, with other recent orders, is expected to double the output of the plant for the fiscal year ending Oct. 31.

Shipments for the first 15 days of May by the Hayes Body Corporation totaled approximately $1,400,000 worth of product, compared with $815,000 worth during the like period of 1927. Production now stands at about 800 bodies a day.

Rate on Non-Ferrous Scrap from Texas to St. Louis Upheld

Affirming a previous decision, the Interstate Commerce Commission, upon reconsideration of a complaint of the Southern Metal Co., in a recent opinion, held that the carload rate of 66.5c. per 100 lb. on non-ferrous scrap metals from Beaumont, Galveston and Houston, Tex., to St. Louis, is not unreasonable. It held that the rate is unduly prejudicial in certain instances.

European Prices Continue to Advance

German Consumers Oppose High Domestic Market to Aid Export—British Mills Discuss Central Selling Agency

(*By Cable*)

LONDON, ENGLAND, June 4.

CLEVELAND pig iron is still quiet, but makers are well booked and prices are being maintained. The hematite market is dull and values have an easy tendency, as unsold stocks at furnaces are still large. Foreign ore is quiet and consumers are well covered.

Finished steel mills are resuming after the holidays with only a few orders for heavy material. Negotiations for the formation of a central selling agency for steel have been resumed, but the outcome is uncertain as there is little unanimity among makers. It is understood, however, that arrangements may be made to combine in competing for large orders in certain overseas markets.

Welsh tin plate bar makers have raised the official price to £6 ($29.22) per ton delivered and some sellers are not inclined to enter into forward contracts because of the uncertain scrap situation. Foreign sheet bars are offered at £5 10s. ($26.79) per ton delivered, but buyers prefer the Welsh product. Tin plate is firm as a result of the steel situation and a good general demand.

Galvanized sheets are quiet but prices are steady because of increased foreign steel costs. There is a good demand for black sheets from the Far East in both heavy and light gages. Japanese specification thin gage sheets have been advanced.

Clyde shipbuilding in May totaled 28 vessels of 49,500 tons.

The Continental market is quiet in trade with British buyers, but prices are generally maintained. In Belgium 55 furnaces were in blast on April 30. Production in April was 313,300 tons of pig iron and 295,700 tons of steel ingots. April production in Luxemburg was 227,000 tons of pig iron and 202,600 tons of steel ingots. The Polish output in March was 58,000 tons of pig iron, 118,200 tons of steel ingots and 91,000 tons of rolled products.

German Steel Prices Unchanged—Good Machinery Trade

(*By Radio*)

BERLIN, GERMANY, June 4.

ALL syndicate prices for May have been retained for June. The domestic steel market is weaker and production is declining, but the syndicates report satisfactory business to be assured for the coming two and a half months.

The pig iron market is quiet. Foundries report an increasing volume of orders. Export trade is continuing to improve and prices are firm, particularly in bars, bands, heavy and light gage sheets and wire. Export activity in wire rods and tubes has decreased. Domestic prices on all wire products have been raised by 15 m. ($3.59) per ton.

The domestic machinery market is satisfactory, except in textile machines. All home prices of machinery have been raised as a result of the rise in steel prices last month. Foreign orders for textile and paper-making machinery are increasing.

Steel Cartel Fines Represent Small Loss

HAMBURG, GERMANY, May 12.—The advantage of penalty payments in the International Steel Cartel has been discussed recently in the steel industry. In the past quarter French mills, for the first time since organization of the cartel, exceeded their allotment by 12,000 tons. Austria, Luxemburg and the Saar, which have been below the full quota in the past, also exceeded their allotments. All members are fined for overproduction but, after refunding by the cartel, have only slightly less than they have paid in to the treasury. Germany, for example, receives about 97c. of every dollar paid and other countries receive 93c. to $1.11 for each dollar. With the total financial advantage or disadvantage so small, it is argued that fines

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17¾s.		$4.33		
Bilbao Rubio ore*	1 2½		5.48		
Cleveland No. 1 fdy.	3 8½		16.56		
Cleveland No. 3 fdy.	3 6		16.07		
Cleveland No. 4 fdy.	3 5		15.83		
Cleveland No. 4 forge	3 4½		15.71		
Cleveland basic (nom.)	3 5		15.83		
East Coast mixed	3 9	to £3 10s.	16.81	to	$17.05
East Coast hematite	3 10½		17.17		
Rails, 60 lb. and up	7 15	to 8 0	37.75	to	38.96
Billets	6 5	to 6 10	30.44	to	31.66
Ferromanganese	13 15		66.97		
Ferromanganese (export)	13 0	to 13 5	63.31	to	64.53
Sheet and tin plate bars, Welsh	6 0		29.22		
Tin plate, base box	0 18¼	to 0 18⅓	4.45	to	5.02
Black sheets, Japanese specifications	13 7½		65.14		
			C. per Lb.		
Ship plates	7 12½	to 8 2½	1.66	to	1.77
Boiler plates	9 0	to 10 10	1.95	to	2.28
Tees	8 2½	to 8 12½	1.77	to	1.99
Channels	7 7½	to 7 17½	1.60	to	1.71
Beams	7 2½	to 7 12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to	1.69
Steel hoops	9 0	to 10 0	1.95	to	2.17
Black sheets, 24 gage	9 15	to 9 17½	2.12	to	2.14
Galv. sheets, 24 gage	13 5		2.88		
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3s.	to £3 5s.	$15.34	to	$15.83
France	3 3	to 3 5	15.34	to	15.83
Luxemburg	3 3	to 3 5	15.34	to	15.83
Basic pig iron (nom.)					
Belgium	3 0	to £3 1s.	14.61	to	$14.85
France	3 0	to 3 1	14.61	to	14.85
Luxemburg	3 0	to 3 1	14.61	to	14.85
Coke	0 18		4.39		
Billets:					
Belgium	4 15		23.14		
France	4 15		23.14		
Merchant bars:			C. per Lb.		
Belgium	5 15	to 5 17½	1.27	to	1.29
France	5 15	to 5 17½	1.27	to	1.29
Luxemburg	5 15	to 5 17½	1.27	to	1.29
Joists (beams):					
Belgium	4 18½	to 5 0	1.08	to	1.10
France	4 18½	to 5 0	1.08	to	1.10
Luxemburg	4 18½	to 5 0	1.08	to	1.10
Angles:					
Belgium	5 10	to 5 12½	1.21	to	1.23
⅛-in. plate:					
Belgium (a)	6 12½		1.45		
Germany (a)	6 12½		1.45		
3/16-in. ship plate:					
Belgium	6 9		1.42		
Luxemburg	6 9		1.42		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

are not particularly effective, and it is further pointed out that, despite the penalties exacted for overproduction since formation of the cartel, production has continued at apparently as high a level as possible in the individual countries which are members.

GERMAN COSTS INCREASING

Wages, Freight Rates and Unemployment Insurance Are Factors—Arbitration Law Opposed

Hamburg, Germany, May 19.—Steel mills report that considerable difficulty is being encountered in the introduction of the three-shift schedule, or 8-hr. day, which the Government has ordered to be in effect within six months after Jan. 1 of this year. They claim that production costs have been greatly increased, Thomas steel producers being forced to increase the number of their workmen by 15 to 20 per cent and open-hearth plants by 10 to 15 per cent.

Costs are estimated to have increased 12m. ($2.87) per ton since March, 1927. Since then, there have been increases in wages, overtime pay, unemployment insurance costs, railroad freight rates and water transportation rates on the Rhine. Still further increases are expected if shorter working days are introduced at blast furnaces, sheet mills and wire mills in the next two months.

The recent rise in domestic prices on steel, averaging 3 to 7m. (72c. to $1.67) per ton, was necessary, according to the steel producers to offset losses on the 40 per cent of their production that is exported. Further increases in costs of production and distribution, however, cannot be passed on to the consumer, as prices are now practically as high as in Great Britain. World market prices are at a high level today, but, should there be a decline in export quotations, German mills, with additional costs of production, would be at a decided disadvantage.

This situation has resulted in a demand from the steel industry, which is supported by the machinery builders and non-ferrous metal producers, that compulsory arbitration be abandoned. It is claimed that immediate losses by strikes and lockouts would be preferable to the loss of trade over a long period through inability to meet competition.

GERMANS OPPOSE PRICE RISE

Consumers Object to Paying High Prices to Aid Export—Elimination of Tariff Suggested

Berlin, Germany, May 19.—Announcement has been made by the Minister of Industry that the controversy over the recent increase in prices by the steel syndicate will be considered by the cabinet immediately following the general election May 20. The advance of 3 to 7m. (72c. to $1.67) in domestic prices of steel has resulted in considerable opposition from consumers and the liberal press. The Frankfurter *Zeitung* has characterized the domestic syndicate system as a ruthless monopoly, under which the domestic consumer bears the losses suffered by the mills as a result of selling for export to enable them to avoid reducing their production quotas.

The opposition to the price increase is also directed toward the International Steel Cartel. It is pointed out that the purpose of Germany's participation in the cartel originally was to aid in bringing the level of world market prices up to the domestic market. In general, however, the difference in prices quoted in these two markets has increased. The producers of steel argue that their costs have advanced since entry into the cartel because of the heavy fines they have been forced to pay for overproduction.

Some consumers are urging the complete abolition of import duties on steel, to compel German mills to sell in their home market at the world market level. The present duties are as follows: Ingots, 10 m. ($2.39) per ton; blooms, 10 m. ($2.39); billets, 15 m. ($3.59); slabs, 15 m. ($3.59); structural shapes, bars, bands and wire rods, 25 m. ($5.98); heavy sheets, 55 m. ($13.16).

In support of their present price policy, steel producers point out that the latest rise in coal prices increased production costs of steel 4 to 7 m. (96c. to $1.67) per metric ton. On semi-finished products, it is claimed, production costs have advanced 7.25 m. ($1.73) per ton, on steel bars 5 m. ($1.19) per ton, on bands 9.66 m. ($2.32), on structural shapes 4.65 m. ($1.11), and on heavy sheets 10 m. ($2.39). Using steel bars as an example, the mills claim that the average export price has declined since last December from 121 m. ($28.95) per ton to 119 m. ($28.48), but that it costs 125 m. ($29.91) per ton to produce bars, even in the most modern mills. Furthermore, this does not include the cost of price rebates to exporting manufacturers or penalties for overproduction exacted by the International Steel Cartel.

Price rebates to exporting manufacturers are becoming an increasing burden to the mills, as the exports of finished products, on which such rebates are paid, are rapidly increasing. These rebates in May are: blooms, billets and slabs, 19 m. ($4.54) per ton; structural shapes, 35 m. ($8.36); bars, 28 m. ($6.70); bands, 35 m. ($8.36); wire rods, 21.50 m. ($5.14), and heavy sheets, 22 m. ($5.26). These rebates are less than at the end of last year, as a result of the advance in world market prices, but, unless export prices show a further increase, larger rebates will be paid next month because of the advance in the domestic market.

JAPANESE MARKET UNSETTLED

Prices Show Tendency to Advance Despite Political Conditions—Tin Plate Output Higher

Uncertainty of the political situation continues to exercise a depressing effect on business, says the report for April of A. Cameron & Co., Kobe, Japan. There is discussion of a second dissolution of the House of Representatives. Prices of various commodities, however, have shown a decided tendency to advance during the past month. The yen weakened considerably in foreign exchange under pressure from New York and Shanghai, as a result of the unstable political situation in China and the dispatch of Japanese troops to the war zone. The Fifteenth Bank has reopened and the money market is weak, showing signs of a further decline. There are reports that the gold embargo will be abolished soon, but the foremost financial authorities consider a return to a gold basis unsafe unless special arrangements have been granted by the Bank of Japan for recovery of its readjustments with the closed banks.

Flotation of a large loan for the Tokio Electric Light Co. is in prospect. A good sign is the gradual reduction of the large excess of imports in the past few years. The total of Japanese credit and capital invested in foreign countries at present is estimated at Y. 2,138,000,000, exclusive of private investments. Against this is the debt of the Japanese Government and private companies to foreign countries, including foreign capital invested in Japan, given as Y. 2,131,000,000, which shows an actual credit balance in Japan's favor. Japanese loans and investments in China total Y. 1,112,000,000, and these are yielding no interest or profit at present. About the only profitable investments in China are in the spinning plants.

During March, says the report, imports of black sheets totaled 19,951 tons, of which 9927 tons came from the United States, 8546 tons from Great Britain, 1322 from Germany and 156 tons from Belgium. This total exceeded the February imports by 8200 tons. The Kawasaki Dockyard Co. reduced its selling prices on black sheets by about Y. 5 ($2.34) per ton to meet the threatened competition from foreign mills, and this was followed by an advance of Y. 2 (94c.) per ton later in April when the yen began to decline. The market is at present overstocked with large supplies of sheets purchased when it was believed that the tariff might be increased.

Imports of tin plate last year were larger than in 1925 or 1926, but, with a continued increase in the tin plate output of the Government works, the total for this year is not expected to be so large. The following shows the imports and the production of the Government works in metric tons for the past five years:

	Government Works	Imports
1923	795	55,343
1924	4,850	71,434
1925	7,037	58,367
1926	11,366	49,995
1927	14,390	61,051

Improvement in the wire rod market, which began in March, has continued, and prices have advanced, about the middle of the month reaching Y. 98 ($45.82) per ton and at the end of April Y. 102 ($47.69) per ton. However, replacement prices of German wire rods are Y. 92.50 ($43.24) per ton and of American Y. 94.50 ($44.18) per ton.

STEEL IMPORTS DECLINE

Continental Prices Too High to Interest Consumers Here—Japan Inquires for Gas Pipe

NEW YORK, June 5.—The volume of business being done by importers of steel in New York is rapidly diminishing as the Continental steel market continues to rise. Steel bars have reached a prohibitive level, following a further advance last week which brought the delivered price, Atlantic port, to 1.90c. per lb., duty paid, for Thomas grade. On this basis, open-hearth steel bars would be 2c. per lb., duty paid, or about 2.10c. per lb., delivered to the local consumer from the dock, representing a saving from the domestic price on the basis of 1.80c. per lb., Pittsburgh, of less than $1 per ton. Steel hoops and bands are at the domestic level, representing no saving to the consumer here, and on some sizes of hot-rolled strip steel the European delivered price is only about 80c. a ton less than the delivered price from American mills.

Structural shapes of Thomas grade are quoted at about 1.80c. per lb., duty paid, which is still a small reduction from the domestic market level, but deliveries on all Continental steel products are rather extended, ranging from three to four months in most cases, so that it is difficult to do business. A fair tonnage of Continental steel continues to arrive on old orders placed with foreign mills prior to the recent price advances, but only a small tonnage of new business is being placed for future delivery, importers not being inclined to risk a possible decline in the European market, which might result in cancellation of orders by their customers here.

Export business continues quiet. Japanese demand is confined to small lots of special materials, with the exception of an occasional inquiry from a large consumer. The Tokio Gas Co. is in the market for about 900,000 ft. of ¾-in. and 75,000 ft. of ½-in. black gas pipe. Recent sales to the Far East have included about 5600 boxes of odd-sized tin plate to a consumer in Takow, Formosa, as well as some small tin plate orders from China.

German Freight Rates on Copper Reduced

HAMBURG, GERMANY, May 19.—The freight rates on imported copper from German frontier points or ports to Danube River ports have been reduced by the German Railroad Directory. The reduced rates will be effective for nine months. It is believed that this will serve to increase the sale of American copper to Austria, Hungary, Jugoslavia and Czechoslovakia by way of Germany.

Sheets of various standard and special types, including monel metal sheets in different finishes, a complete line of sheet metal forming and fabricating equipment and various supplies used by the sheet metal contractors were exhibited by the J. M. & L. A. Osborn Co., Cleveland, at a sheet metal show held at its plant in conjunction with the joint convention of the National Association of Sheet Metal Contractors and the Ohio Sheet Metal Contractors' Association held in Cleveland May 22-25.

FRENCH STEEL TRADE GOOD

Domestic Market Active and Foreign Projects Promise Future Business—Prices Advancing

PARIS, FRANCE, May 18.—Business is satisfactory, and the revival of buying expected as a result of the elections is beginning to develop. Large consumers are buying, no longer expecting a recession of prices. In addition, there are important public projects in course of execution in the East and in South America, for which bridge and building materials, rails and rolling stock will be required. Recently it was decided by the French railroads that all freight cars should be equipped with continuous brakes.

This flow of new business is favorably influencing the market, and deliveries are becoming more extended. Mills show no inclination to commit themselves for distant shipment.

Pig Iron.—Producers of pig iron met last week and decided to make no change in the tonnage and prices for June. A total of 38,000 tons of phosphoric foundry iron and 40,000 tons of hematite iron will be available to domestic consumers in June. Negotiations for formation of an association of hematite iron producers are continuing and a successful conclusion is expected.

Semi-Finished Material.—The comptoir controlling semi-finished material and beams has decided to make no change in prices. Most French consumers are fairly well covered. Blooms range from £4 4s. to £4 12s. 6d. ($20.46 to $22.53) per metric ton, billets from £4 12s. to £4 15s. 6d. ($22.41 to $23.26) per ton, and sheet bars from £4 16s. to £4 17s. ($23.38 to $23.63) per ton, f.o.b. Antwerp.

Finished Material.—Except on beams, prices are higher. Most French consumers of beams built up sizable stocks early in the year, when prices were lower, and are not seeking supplies at present. For export, beams are quoted at £4 16s. to £4 16s. 6d. per ton (1.06c. to 1.07c. per lb.), f.o.b. Antwerp. Steel bar prices continue to advance in both the domestic and export markets. Sheet prices are firm, with the market active. Boiler plates have been advanced in the domestic field, and some mills are quoting deliveries up to three months.

Foreign Trade.—Imports of iron and steel in March totaled 14,712 metric tons, compared with 8295 tons in February. Exports were 382,131 tons in March and 422,160 tons in February. Imports of iron and steel scrap were only 2225 tons in March and 1471 tons in February, but exports totaled 39,950 tons in March and 32,610 tons in February. The largest exports were in semi-finished products, shapes and bars, totaling 242,351 tons in March, while shipments of pig iron were only 57,534 tons.

American Lock Maker Reported to Have Bought German Company

HAMBURG, GERMANY, May 12.—The Yale & Towne Mfg. Co., Stamford, Conn., which recently acquired Damm & Ludwig, Velbert, Germany, is reported to have purchased Boge & Kastens, another large German lock manufacturer. Negotiations are reported for acquisition by the Yale & Towne Mfg. Co. of a third German lock company.

Boge & Kastens are large exporters of door locks and with Damm & Ludwig formerly produced about 88 per cent of the total German output of locks. Apparently the new ownership plans no expansion of production, as it is reported that, after May 10, these plants will operate only three days a week, although other German lock manufacturers are on a full six-day week. It is suggested in the German hardware trade that the purpose of buying these companies was to eliminate competitors, and it is pointed out that the largest German hinge and strap producer, Carl vom Bruck, Velbert, is now the property of the Stanley Works of New Britain, Conn.

Machinery Markets and News of the Works

MAY BUYING DECLINED

Machine Tool Orders Generally Fell Off—June Prospects Good

Chicago Market Is the Most Active—Deere & Co. Placing Large Orders Against Recent Inquiry

MACHINE tool buying declined in May from the April volume, but a good deal of business is pending, so that prospects for June appear fairly promising. The outstanding activity is at Chicago, where orders have been placed by Deere & Co., manufacturers of agricultural implements, against a recent large inquiry. Further purchasing of tools by the J. I. Case Threshing Machine Co. and the Monarch tractor plant of the Allis-Chalmers Mfg. Co. will probably come soon.

The General Electric Co., Schenectady, N. Y., has issued additional inquiries for about 20 tools, bringing its list of pending requirements up to nearly 40 items. Most of this equipment is to be bought for its electric refrigeration department.

Automobile manufacturers have made scattered purchases, but in the aggregate they constitute only a small part of current machine tool buying.

Railroad inquiry is usually limited to single machines. At Chicago, purchases are still to be made by the Santa Fe against recent inquiries. Orders are expected at Boston from the Boston & Albany, Boston & Maine and New York, New Haven & Hartford railroads. Few of the recent inquiries of the New York Central have developed into purchases.

An export order totaling about $50,000 for a European country has been booked by a Cincinnati company.

New York

NEW YORK, June 5.

MACHINE tool sales in this territory in May fell off considerably from the April volume, not less than 10 or 15 per cent in most cases and as much as 40 or 50 per cent in a few instances. However, the amount of business pending, plus the day-to-day inquiries, gives promise that June business may exceed that of last month. Additional inquiries have been sent out by the General Electric Co. for about 20 machines, making a total of close to 40 that this company may buy within the near future. The week's sales included seven 13 x 30-in. lathes and two 16 x 36-in. lathes to one company and two 13 x 30-in. lathes to another company; two 14-in. vertical surface grinders to one company and two No. 2 Pratt & Whitney die sinkers to another. A manufacturer bought four Ransom No. 43 grinders. Some makers of grinders and multiple spindle drilling machines have announced an advance in prices of about 10 per cent.

Yonkers Electric Light & Power Co., Yonkers, N. Y., has filed plans for a four-story equipment storage and distributing plant addition with repair shop, including improvements in present unit on adjoining site, to cost about $200,000.

Abraham Baxter, 638 Coster Street, New York, plumbing and heating equipment, has plans for a one-story factory, 50 x 100 ft., to cost about $28,000 with equipment. S. F. Oppenheim, Inc., 156 East Forty-second Street, is architect.

William Shary, 41 Union Square, New York, architect, will soon take bids for a two-story automobile service, repair and garage building, 115 x 150 ft., at Corona, L. I., to cost close to $100,000 with equipment.

New York Edison Co., Irving Place and Fifteenth Street, New York, has plans for an addition to power station at 151-53 East Thirty-ninth Street, 81 x 138 ft., to cost in excess of $300,000 with equipment.

Automatic Musical Instrument Co., 15 East Fortieth Street, New York, manufacturer of coin-operated musical instruments, is disposing of stock issue to total $960,000, a portion of proceeds to be used for expansion, including manufacture of recently perfected selective automatic talking machine and parts.

American Smelting & Refining Co., 120 Broadway, New York, has acquired controlling interest in Silver Reef Mines Co., with properties in Utah. New owner plans extensive development and installation of additional equipment. H. A. Guess, vice-president of purchasing company, will be president of Silver Reef organization.

Charles Schaefer, Jr., 332 East 149th Street, New York, architect, has plans for two-story automobile service, repair and garage building, 100 x 100 ft., to cost approximately $100,000 with equipment.

A. J. Kolonics, 3 Knickerbocker Avenue, Brooklyn, manufacturer of harness and kindred products, metal trimmings, etc., has filed plans for new one-story plant, 75 x 105 ft., to cost about $22,000. Louis Berger & Co., 1701 Myrtle Avenue, are architects.

Board of Education, Ossining, N. Y., has engaged J. G. Rogers, 156 East Forty-first Street, New York, architect, to prepare plans for new high school with manual training facilities, to cost $750,000.

Franz Wolfgang, 535 East Tremont Avenue, New York, architect, is completing plans for a two-story automobile service, repair and garage building, to cost $100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 20 for ice-making and refrigerating equipment for naval air station, Lakehurst, N. J., Specification 5423.

Newark Compressed Steel Corporation, 457 Peshine Avenue, Newark, has filed plans for one-story addition, 31 x 50 ft. P. D. Ackerman is architect.

F. L. Smidth & Co., North Avenue, Elizabeth, N. J., engineers for cement mills, etc., operating Smidth's Foundry, Inc., same location, have plans for one-story foundry addition, 20 x 50 ft., and extension in crane runway. Bids will be asked soon. Headquarters are at 50 Church Street, New York.

Carrier Engineering Co., 750 Frelinghuysen Avenue, Newark, manufacturer of air conditioning machinery, has purchased former plant of General Electric Co., at Frelinghuysen and Evergreen Avenues, comprising four-story structure with 110,000 sq. ft. floor space on 6½-acre tract. Purchasing company will continue present factory and will use purchased plant for expansion.

Bayonne Bolt & Nut Corporation, Trask Avenue and Second Street, Bayonne, N. J., is reported planning early rebuilding of portion of plant destroyed by fire several weeks ago, with loss in excess of $75,000 including equipment.

Goodwin-Pray, Inc., 102 Murray Street, Newark, manufacturer of electrical products, with electrical repair works, has acquired two-story factory at 290-92 Chestnut Street, 50 x 151 ft., and will remove present works to new location and increase capacity.

The duPont Viscoloid Co., Arlington, N. J., subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del., will rebuild portion of plant destroyed by fire June 1, with loss in excess of $50,000 with equipment, tanks, etc.

Public Service Electric & Gas Co., Public Service Terminal, Newark, is said to be completing plans for two-story equipment storage and distributing plant, with automobile service and garage building, at West New York, N. J., to cost close to $200,000 with equipment.

Equipment at plant of E. V. Hartford, Inc. (Hartford Shock Absorber Co.), Carbon Place, Jersey City, will be sold at auction on June 26 and 27 by Industrial Plants Corporation, New York. Company formerly manufactured shock absorbers and wheel shimmy eliminators. Sale includes power presses, lathes, milling machines, grinders, drill presses, shapers, motors, screw machines, tappers, office furniture and equipment, tools and fixtures.

West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, has awarded contract for additions to its plant at Mechanicville, N. Y., to cost more than $500,000. Morton C. Tuttle Co., Boston is engineer and builder.

Contract for a $50,000 addition to sheet metal department of John Waldron Co., New Brunswick, N. J., has been awarded to H. K. Ferguson Co., Cleveland. It will be one story, with 20,000 sq. ft. of floor space and, with equipment, will cost about $75,000. A mono-rail crane will be installed.

Chicago

CHICAGO, June 4.

ORDERS released the last week in May against the list of Deere & Co., enlarged many dealers' books so that sales last month dropped only slightly below the total in April. Prospects for June appear favorable. The Santa Fe list is still only partly covered and Deere & Co. are placing new orders daily. The Allis-Chalmers Mfg. Co., Milwaukee, is in need of additional machine-tools for its Monarch tractor plant at Springfield, Ill. It is also probable that the remaining items on the list of the J. I. Case Threshing Machine Co., Racine, Wis., will be purchased this month.

Machine-tool inquiries of the Rock Island Railroad are still open. The Burlington is asking for a 30-in. x 14-ft. motor-driven engine lathe. The General Electric Co., Chicago, will buy a 72-in. vertical boring mill, a 48-in. x 18-ft. lathe and a 36 x 36 x 8-ft. open-side planer. A fair number of used tools is moving from dealers' floors.

Work will soon begin on two-story addition, 40 x 120 ft., to plant of Ingersoll Milling Machine Co., Rockford, Ill., for which general contract has been let to E. W. Schmeling & Sons, 1031 School Street, to cost close to $50,000 with equipment. A. G. Eliel, Stewart Building, is architect.

Huguelet Brothers, 908 North Huguelet Place, Chicago, have awarded general contract to Schmidt Brothers Construction Co., 22 East Huron Street, for four-story automobile service, repair and garage building, to cost $160,000 with equipment. Schmidt, Garden & Erickson, 104 South Michigan Avenue, are architects.

Great Northern Railway Co., St. Paul, Minn., is understood to be planning early call for bids for equipment for new engine house addition and shop, with power plant at Fargo, N. D. Work on superstructure has been begun. Entire project is reported to cost in excess of $90,000. T. D. McMahon is company architect.

Minnesota Power & Light Co., 30 West Superior Street, Duluth, Minn., will soon take bids on general contract for a new two-story equipment storage and distributing plant, to cost $140,000 with equipment.

Adams Co., 111 West Sixth Street, Dubuque, Iowa, manufacturer of milling machines and other machine-tools, has filed plans for a one-story addition to machine shop and foundry, to cost more than $40,000 with equipment.

Fairmont Railway Motors, Inc., Fairmont, Minn., manufacturer of railroad equipment, has merged with Mudge & Co., 80 East Jackson Boulevard, Chicago, manufacturer of kindred products. Consolidated organization will operate under first noted name; both plants will be continued in service and an expansion program carried out. New company will have capital of $400,000 and surplus of $650,000. H. E. Wade, president of Fairmont company, will be chairman of board of consolidated organization.

Public Service Co. of Colorado, Denver, Colo., in conjunction with Prairie Oil & Gas Co., Independence, Kan., and other interests, has plans for new gas compressor plant in vicinity of Devine, Colo., to cost more than $400,000 with equipment.

Des Moines Casket Co., 405 S. W. Eighth Street, Des Moines, Iowa, has plans for new two-story plant, 100 x 150 ft., to cost more than $45,000 with equipment.

West End Scrap Iron & Metal Co., 1920 West Michigan Street, Duluth, Minn., has plans for a two-story storage and distributing plant, to cost about $32,000 with equipment. Thomas J. Shefchik, Glencoe Building, is architect.

Blackhawk Foundry & Machine Co., Davenport, Iowa, has awarded general contract for one-story foundry addition, 42 x 90 ft., to Priester Construction Co., Davenport, to cost about $20,000 with equipment.

Midway Foundry Co., St. Paul, Minn., is completing an addition, 75 x 100 ft., which will increase output about 100 per cent.

Joseph J. Kovar Co., Owatonna, Minn., has been incorporated with capital stock of $200,000 to manufacture agricultural tools and equipment, continuing line of products manufactured by Joseph J. Kovar and successors for 14 years. Company has factory and necessary equipment.

Burgess Battery Co., 111 West Monroe Street, Chicago, maker of sound absorbing ceilings and sidings, has changed its name to C. F. Burgess Laboratories, Inc., and removed offices to Madison, Wis.

Lewis Signal & Alarm Corporation, 207 Commerce Building, Sioux City, Iowa, has been organized to manufacture burglar alarm equipment. Operations are being carried on in company's own shop and necessary equipment has been purchased, but it is in market from time to time for 14 to 20-gage black sheets, electrical wire, relays, gongs, batteries and other kindred equipment.

Philadelphia

PHILADELPHIA, June 4.

PLANS are being completed by Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of mechanical drying equipment, air conditioning apparatus, etc., for a two-story and basement addition, 50 x 146 ft., to cost in excess of $65,000 with equipment. Day & Zimmermann, Inc., 1600 Walnut Street, is engineer.

Architectural Steel Engineering Co., Philadelphia, has been formed with capital of $50,000 to take over and expand company of same name with plant at 1512-20 North Thirteenth Street, and will develop facilities for production of structural steel and ornamental iron products. Daniel Boyle and Joseph M. Thomas are heads.

York Ice Machinery Co., Belmont and Thompson Streets, Philadelphia, manufacturer of ice-making and refrigerating machinery, has asked bids on general contract for an addition, to cost more than $60,000 with equipment.

Philadelphia Coke Co., Richmond Street, near Orthodox Street, Philadelphia, an interest of Koppers Co., Pittsburgh, has taken out a permit for two two-story units to cost about $500,000.

Eugene A. Stopper, 10 South Eighteenth Street, Philadelphia, architect, has awarded general contract to Golder Construction Co., 1600 Arch Street, for two-story factory, 60 x 275 ft., to cost close to $80,000, to be occupied under lease by Welsbach Street Lighting Co. of America, Twentieth and Arch Streets, manufacturer and operator of gas-lighting equipment.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to Sinclair & Grigg, Sixteenth and Walnut Streets, for one-story and basement storage and distributing building, 90 x 460 ft., with elevating, conveying and other mechanical handling equipment, to cost about $390,000. William Cookman is company architect.

Vacuum Oil Co., 61 Broadway, New York, has awarded general contract to White Construction Co., Jefferson Building, Philadelphia, for two-story and basement addition to refinery at Paulsboro, N. J., 122 x 225 ft., with one-story extension, 31 x 46 ft., and wing addition, 32 x 40 ft., to cost in excess of $125,000. Portion will be used as a can factory, and for storage and distributing service.

Joint school boards of Westgrove, Avondale and Londongrove townships, Pa., C. E. Patton, Westgrove, chairman of building commission, plans installation of manual training equipment in new senior and junior high school to be erected between Westgrove and Avondale, to cost $250,000, for which bids have been asked on general contract. E. W. Martin, duPont Building, Wilmington, Del., is architect.

Pennsylvania Power & Light Co., Allentown, Pa., has applied for permission to take over and consolidate 35 electric light and power companies operating in different counties, and will carry out expansion and improvement program, including transmission line construction. Company also requests authority to secure a controlling interest in 11 other light and power utilities. It is under direction of Electric Bond & Share Co., 2 Rector Street, New York.

David E. and Alvin Street, 110 South Lehigh Street, Allentown, Pa., have organized Universal Safety Signal Mfg. Co., with capital of $100,000, to operate a local plant for manufacture of automobile signal and safety devices and systems. Alvin Street will be treasurer and representative.

The Crane Market

INQUIRIES for locomotive cranes continue, but the overhead crane field is still rather quiet. Most of the present activity in locomotive cranes is from contractors. The list of crawl-tread cranes and steam shovels for Dwight P. Robinson & Co., New York, has not yet been acted upon. Purchase of a 10-ton, overhead crane by the New York Central Railroad for its West Albany, N. Y., shops is expected soon.

Among recent purchases are:

Ford, Bacon & Davis, New York, 10-ton, 1-motor, overhead crane for Nazareth Cement Co., Nazareth, Pa., from Whiting Corporation.

Union Bag & Paper Co., New York, 16 chain blocks, 5 to 10-ton capacity, ranging up to 51-ft. lift, reported purchased from Harrington Co., Philadelphia.

Crucible Steel Co. of America, Pittsburgh, 25-ton overhead crane with 5-ton auxiliary for Park works, from a Western builder.

National Carbon Co., Inc., Keokuk, Iowa, 4-motor, 35-ft. span, 1½-yd. bucket gantry crane from Milwaukee Electric Crane & Mfg. Corporation.

Victor Chemical Works, Chicago Heights, Ill., 10-ton, electric crane from Whiting Corporation.

Bliss & Laughlin, Inc., Harvey, Ill., an electric traveling crane from Harnischfeger Corporation.

Shipbuilding division of American Brown Boveri Electric Corporation, New York, operating at former plant of New York Shipbuilding Co., Camden, N. J., has taken option on portion of former shipyards of William Cramp & Sons Ship & Engine Building Co., Philadelphia, and is said to be planning to use property for building ocean-going liners. Company will also expand operations at Camden yards, placing work in progress on several transoceanic liners, provided with airplanes and landings. Lawrence R. Wilder is head.

Metropolitan Edison Co., Reading, Pa., is arranging for increase in capital from 900,000 shares to 1,500,000 shares of stock, preferred and common, and will increase indebtedness from $50,000,000 to $100,000,000, a portion of proceeds to be used for expansion in plants and system, including acquisition of new properties in this district.

Interstate Supply Co., Commercial Trust Building, Philadelphia, has been appointed direct factory representative in Philadelphia and vicinity for Northern Engineering Works, Detroit, maker of cranes and hoists. W. H. Beyer of Interstate company, will have personal supervision of account.

Philadelphia Chain Block & Mfg. Co., Mascher and Norris Streets, Philadelphia, has been formed to manufacture chain blocks and trolleys. Plant is equipped to do all kinds of machine work and to furnish chain either hand, electric or die welded. Company will not be in market for additional material for three or four weeks. John A. Bailey, formerly superintendent Ford Chain Block Co., is president.

Detroit

DETROIT, June 4.

A NEW smelting furnace and auxiliary equipment will be installed by Calumet & Hecla Co., Calumet, Mich., in connection with expansion and improvement program under way. New unit will be 20 x 70 ft., designed for capacity of 225 tons of copper ore per day. Entire project will cost more than $1,000,000.

Board of Education, 1354 Broadway, Detroit, is reported planning installation of manual training equipment in two-story addition to Southeastern high school to cost $375,000, for which plans will be drawn by Malcomson & Higginbotham, 1257 Griswold Street, architects. McColl, Snyder & McLean, Penobscot Building, are mechanical engineers.

Detroit Edison Co., 2000 Second Avenue, Detroit, will install three 50,000-kw. turbo-generators, six boiler units and auxiliary equipment at its new Delray power plant No. 3, now in course of construction, scheduled to be ready for operation late in 1929. Work will be carried out in connection with recently approved $30,000,000 expansion and betterment program, which will include construction of four new automatic power substations, and extensions in present power substations at Grand River, Hart, Amsterdam and Cortland, with new transmission lines in these and other districts.

Detroit Motorbus Co., 14401 Dexter Boulevard, Detroit, has awarded general contract without competition to Bryant & Detwiler, Dime Bank Building, for one-story addition to service, repair and garage building, reported to cost in excess of $70,000 with equipment.

Valley Castings & Pattern Co., Bay City, Mich., has work under way on one-story addition, to be used largely as a brass foundry, which will more than double output in this department. Extensions will be made also in pattern shop.

Ex-Cell-O Tool & Mfg. Co., 1469 East Grand Boulevard, Detroit, has awarded general contract to Austin Co., General Motors Building, for new two-story unit, 130 x 190 ft., to cost close to $80,000 with equipment. It will be equipped primarily as machine shop and tool division.

Chrysler Motor Corporation, Highland Park, Detroit, has awarded general contract to Walbridge-Aldinger, Inc., Penobscot Building, for new assembling plant on East Jefferson Avenue, to cost close to $500,000 with machinery. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Accuralite Co., Terrace Street, Muskegon, Mich., manufacturer of piston rings and other precision products, has awarded general contract to Austin Co. for one-story addition, 80 x 200 ft., to cost about $40,000 with equipment.

Woodin & Day, 1085 Detroit Street, Flint, Mich., will build a one-story battery service and repair works to cost about $21,000.

Rich Products Corporation, Battle Creek, Mich., has been organized to take over former Rich Steel Products Co., manufacturer of automotive valves and tappets, with plants at Battle Creek and Marshall, Mich. Marshall plant is at present under construction and will partly take place of unit formerly operated in California which has been sold.

Melling Machine Co., Jackson, Mich., has been formed as subsidiary of Jackson Motor Shaft Co. to drill crankshafts for latter organization. Plant has been completed and no new equipment or materials will be required at present.

National Brass Co., Grand Rapids, Mich., has been purchased by S. D. Stanley and Samuel Silverman, who operate Stanley Foundry Co. of that city. National plant will be known as Stanley plant No. 2.

Gulf States

BIRMINGHAM, June 4.

PROPERTY is being acquired at Houston, Tex., by Eternit, Inc., 225 South Fifteenth Street, Philadelphia, manufacturer of asbestos shingles, etc., as site for branch plant, to cost close to $1,000,000 with equipment. It will include power house and machine shop.

Common Council, Stamford, Tex., is planning extensions and improvements in municipal electric light and power plant, including installation of additional generating equipment. Henry Cook, superintendent of water, is in charge.

Houston Oil Co., Petroleum Building, Houston, Tex., is disposing of a bond issue of $8,000,000, a portion of proceeds to be used for extensions and improvements, including pipe line construction.

Alamo Heights School Board, San Antonio, Tex., is considering installation of manual training equipment in new junior high and grade school to cost $250,000, for which superstructure will soon begin. Harvey P. Smith, National Bank of Commerce, is architect.

Gulf Fertilizer Co., Thirty-sixth Street, Tampa, Fla., has awarded general contract to Austin Co., Cleveland, for new one-story mill, 160 x 306 ft., with two wing extensions, each 80 ft. long, to cost close to $200,000 with machinery.

Southern Produce Co., Flatonia, Fla., has plans for one-story cold storage and refrigerating plant, to cost close to $40,000 with equipment.

Mississippi Power & Light Co., Jackson, Miss., is said to be planning construction of steam-operated electric power house at Myrtle, Miss., to cost about $35,000. Extensions will be made in transmission lines.

E. K. Ahler and H. L. Shaw, State National Bank Building, Corpus Christi, Tex., architects and engineers, have plans for a new cotton compress plant, 280 x 1400 ft., in vicinity of Agua Dulce, Tex., for company whose name is temporarily withheld, to cost about $170,000 with equipment.

Chalona Brothers, Buras, La., operating a local packing plant, are planning construction of an electric light and power plant for service in this district, to cost close to $25,000.

City Commissioners, City Hall, Orlando, Fla., are asking bids until June 13 for one airplane hangar for municipal airport, as per specifications on file, city engineer office.

Henry Brothers & Co., Tampa, Fla., plan installation of cold storage and refrigerating equipment in connection with proposed meat-packing plant, to cost close to $55,000.

Dallas Vocational School, Dallas, Tex., C. A. Jay, director, is arranging fund of about $500,000 for institutional buildings on Cedar Springs Road. It is expected to begin work late in fall. Chamber of Commerce is interested in project.

Commission Council, City Hall, Baton Rouge, La., is asking bids until June 26 for equipment for municipal sewage system, including two 2500-gal. per min. pumping units, with auxiliary equipment. L. J. Voorhies, City Hall, is consulting engineer.

Common Council, Greenville, Miss., is considering installation of municipal electric light and power plant, to cost in excess of $50,000 with equipment. Burns, McDonnell & Smith, Interstate Building, Kansas City, Mo., are consulting engineers.

Palm Beach County Board of Public Instruction, Palm Beach, Fla., plans installation of manual training equipment in new junior high school at South Palm Beach, for which tract of 20 acres has been purchased. Plans will soon be prepared. It is reported to cost in excess of $250,000.

State Board of Control, Austin, Tex., is asking bids until June 21 for highway equipment as follows: 20 60-hp. crawler-type tractors; 30 12-ft. engine hitch graders; 21 5-ton three-wheel rollers; 38 asphalt heating kettles, mounted on rubber-tired tractors, approximate capacity 300 gal.; 28 rotary steel broom street sweepers; five portable air compressors complete with 1-ton trucks; two portable crushing and sizing plants, approximate capacity 75 tons per day. Specifications at office of State highway department, Austin; R. I. Tennant, purchasing division, in charge.

Dedman Foundry & Machine Co., foot of Buffalo Street, Houston, Tex., has been formed to operate general jobbing shop, manufacturing gray iron, brass and aluminum castings and patterns and doing machine work of all descriptions. Company has building and equipment and does not contemplate any purchases at present.

Webb Tank & Tile Co., Baton Rouge, La., has been organized to manufacture patented septic tank and concrete drain pipe. Manufacturing building has been erected.

St. Louis

St. Louis, June 4.

PLANS are being drawn by United States Cold Storage Co., 500 East Third Street, Kansas City, Mo., for a new six-story cold storage and refrigerating plant, to cost about $1,000,000 with machinery. A. Epstein, 2001 West Pershing Road, Chicago, is engineer.

Following recent sale of its plant on Kingshighway, Valley Electric Co., St. Louis, manufacturer of electrical equipment and supplies, has leased a building at 4221 Forest Park Bouveland for new plant. Early occupancy is planned. Former plant has been acquired by Superior Oxy-Acetylene Co., for new works.

Underwood Compress Co., Hollis, Okla., is completing plans for one-story cotton compressing plant, 220 x 600 ft., to cost close to $150,000 with equipment.

Jean P. Fleming, 4460 Gibson Avenue, St. Louis, and associates are planning new three-story automobile service, repair and garage building, to cost more than $160,000 with equipment.

Public Service Co., Bartlesville, Okla., plans construction of power transmission line from Bartlesville to Nowata, Okla., with new power substation at latter place, to cost close to $50,000.

Long-Bell Lumber Co., R. A. Long Building, Kansas City, Mo., is reported planning early rebuilding of portion of mill at Oklahoma City, Okla., recently destroyed by fire, with loss reported upward of $175,000 including equipment.

Common Council, Stanberry, Mo., is considering installation of municipal electric light and power plant, and will secure estimates of cost soon.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has purchased local Belle Isle generating plant of Oklahoma Railway Co., with rated capacity of 13,000 kw., and has leased transmission lines owned by same company. Expansion will be carried out for service at Norman, El Reno and vicinity, including power line construction.

Consolidated School District, Normandy, Mo., has awarded general contract to I. L. Davis Construction Co., 707 Park Avenue, Columbia, Mo., for two-story vocational school, to cost $125,000 with equipment. W. B. Ittner, Inc., 911 Locust Street, St. Louis, is architect.

Best Brothers-Keene Cement Co., Medicine Lodge, Kan., has plans for a one-story addition, 80 x 100 ft., to cost more than $75,000 with equipment.

Foster-Hall Tire Co., 1221 Frederick Street, St. Joseph, Mo., is having plans drawn for a one-story automobile service, repair and garage building, with tire storage and distributing building adjoining, to cost upward of $125,000 with equipment. Walter Boschen, Tootle-Lacy Bank Building, is architect.

Oliver Iron & Steel Corporation, Pittsburgh, manufacturer of galvanized pole line hardware and construction specialties, has opened new warehouse at Nineteenth and Campbell Street, Kansas City, Mo., where a complete stock of pole line material will be maintained. W. M. Watters, district manager of Oliver corporation, formerly at 209 Baltimore Building, will be in charge.

Indiana

Indianapolis, June 4.

PLANS are being prepared by Anderson Stove Works, Anderson, for a one-story addition, to cost close to $45,000 with equipment.

Southern Indiana Gas & Electric Co., Evansville, will make extensions and improvements in power plant, with installation of new equipment, to cost in excess of $200,000. Expansion will be carried out also in central steam-heating system in vicinity of Eighth Street.

Dubois-Robineau Furniture Co., Dubois, is considering early rebuilding of two-story plant recently destroyed by fire, with loss reported at $100,000 including equipment. J. M. Schanaum is treasurer.

Indiana Hydro-Electric Power Co., Lafayette, has arranged for bond issue of $3,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction. Company has acquired properties of Tippecanoe Hydraulic Co., and Tippecanoe Electric & Power Co., including three power sites in vicinity of Monticello. E. Van Arsdel is president.

Major Brothers Packing Co., South Logan Street, Mishawaka, is considering installation of cold storage and power machinery in new three-story packing plant, to cost in excess of $300,000 with equipment. Packers' Architectural & Engineering Co., 431 South Dearborn Street, Chicago, is architect and engineer.

Martin-Parry Corporation, 1100 West Henry Street, Indianapolis, manufacturer of commercial automobile bodies, has arranged for sale of plant of Oakes Corporation on Roosevelt Avenue to Harris, Small & Co., for price in excess of $1,000,000. Plant has been used heretofore for production of metal stampings for automobile bodies, and this production will be carried on by Martin-Parry organization at its own plant.

Indianapolis Water Co., 113 Monument Circle, Indianapolis, is disposing of a preferred stock issue to total $704,700, portion of proceeds to be used for extensions and improvements in waterworks and system, including additional equipment.

Dean Forging Co., Muncie, is said to be arranging for immediate rebuilding of portion of plant recently destroyed by fire, with loss in excess of $50,000 including equipment.

Cleveland

Cleveland, June 4.

MACHINE-TOOL business and inquiry are slowing down, although some manufacturers and dealers report a fair volume of single tool orders. Larger types of machine tools are inactive. While orders are well scattered, there is more activity in the automotive than in other fields. Buying is rather light in the Detroit territory, as no large lists are coming from automobile manufacturers. Railroad inquiry is limited to small single machines. In the electrical field motors are moving quite well.

Midland Steel Products Co., Cleveland, will enlarge its Detroit plant by an addition of 48,000 sq. ft. of floor space and add considerably to its departments devoted to manufacture of automobile frames and other stampings. Some new equipment will be installed. An appropriation of $250,000 has been authorized by board of directors for these extensions. Entire building program for Detroit plant involves an estimated expenditure of $600,000, general plans having been approved for a large extension to department for manufacturing automobile brakes. Details of this part of extension program have not been approved.

Akron Lamp Co., 600 South High Street, Akron, Ohio, is planning new two-story plant, 60 x 75 ft., to cost in excess of $25,000 with equipment.

Henry & Murphy, Second National Bank Building, Akron, Ohio, architects, have revised plans for two-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, operating ice-manufacturing plants, is arranging for a preferred stock issue of $35,000,000 and increase in common stock from 1,000,000 to 3,000,000 shares, a portion of proceeds to be used for expansion, including acquisition of other ice-making and cold storage plants.

Ohio Public Service Co., Hanna Building, Cleveland, will soon take bids on general contract for a one-story equipment storage and distributing plant at Elyria, Ohio, to cost about $80,000 with equipment. R. S. Silsbee, Elyria Savings & Trust Building, is architect.

Seiberling Rubber Co., West Hopocan Avenue, Barberton, Ohio, manufacturer of automobile tires and tubes, is considering a three-story addition, to cost about $140,000 with equipment.

Plant and real estate of Warren Iron & Steel Co., Warren, Ohio, will be sold at auction during July by Industrial Plants Corporation, New York. Sale will include rolling mills, stamping plant, presses, shears, cranes, machine shop equipment, dies for circular saws, agricultural equipment, etc. Date of sale will be announced later.

Builders & Industrial Supply Co., 4090 Detroit Street, Toledo, Ohio, has been appointed distributer in Toledo and vicinity for products of Botfield Refractories Co., Philadelphia.

Detroit Steel Barrel Co., Toledo, Ohio, has been organized to succeed Detroit Range Boiler & Steel Barrel Co., and will continue manufacture of steel barrels and drums.

Cincinnati

CINCINNATI, June 4.

A MILD recession in machine-tool buying, largely of a seasonal character, is noted and indications are that June bookings will likely fall somewhat short of those in May. A number of builders, however, are fairly well satisfied with the volume of sales, which are made up mostly of orders from companies in many different industries. Automobile manufacturers have made scattered purchases, but in the aggregate, they constitute a rather small percentage of the total business. In the foreign field there has been one sizable transaction, negotiated by a local company, calling for machines amounting to from $50,000 to $60,000 to be shipped to a European country.

The United Engineering & Foundry Co., Pittsburgh, has bought a 30-in. x 24-ft. heavy-duty engine lathe, and an eastern Pennsylvania company has purchased a 24-in. slotter. Production in Cincinnati machine-tool plants is irregular, some shops having enough work ahead to sustain a good schedule of operations for fully 30 days, others being forced to curtail activities on account of the dearth of orders.

Bids will be received by State Department of Public Welfare, Columbus, Ohio, until June 14 for an ice-manufacturing plant at institution at Gallipolis, to cost about $45,000. H. B. Briggs, Hartman Hotel Building, is State architect.

Springfield Metallic Casket Co., Springfield, Ohio, is planning early call for bids on general contract for a five-story addition, to cost close to $100,000 with equipment.

Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Big Four System, Cincinnati, is having plans drawn for new locomotive and car repair shops at Bellefontaine, Ohio, to cost close to $160,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until June 12 for 268 airspeed indicators and 373 single throat assemblies, circular 17; until June 14 for 120 aircraft altimeters, circular 19.

Lexington Utilities Co., Main Street and Broadway, Lexington, Ky., operating electric light and power properties, is arranging for increase in capital to $5,250,000, a portion of proceeds to be used for expansion, including transmission lines.

Officials of Hope Engineering & Supply Co., Mount Vernon, Ohio, have organized Kentucky Fuel Gas Corporation, Ashland, Ky., to take over and expand natural gas properties of American Rolling Mill Co., in Greenup, Carter and Boyd Counties. New company is disposing of bond issue of $5,000,000, a portion of fund to be used for purchase of properties and for expansion. Company will be under direction of Hope Engineering organization. C. W. Sears is president.

City Council, Kingsport, Tenn., is asking bids until June 26 for equipment for municipal waterworks, including raw water pumping station and filtration plant of 2,000,000-gal. per day capacity, and 1,000,000-gal. steel storage tank, with accessories. Wiedeman & Singleton, Atlanta, Ga., are engineers.

Ramsey Mfg. Co., 143 North Fifth Street, Columbus, Ohio, manufacturer of vacuum cleaners, blowers, etc., is planning installation of additional equipment, including slitting power shears, forming machines and other tools.

House-Hasson Hardware Co., 759 Western Avenue, Knoxville, Tenn., has awarded general contract to A. H. Whisman, 422 Front Street, for new three-story storage and distributing plant, 50 x 170 ft., on adjoining site, to cost close to $50,000 with equipment. R. F. Graf & Son, Journal Building, are architects.

Board of Education, Newark, Ohio, plans installation of manual training equipment in new three-story junior high school at East Newark to cost upward of $200,000, for which bids will be received on general contract June 15. Vernon Redding, Walpark Building, is architect. O. J. Barnes is general superintendent.

Midwest Locomotive Works, Cincinnati, maker of industrial locomotives, has been taken over by owners of Columbia Machine Tool Co. and Ceramic Machinery Co., Hamilton, Ohio. Plant has been moved to latter city where locomotives from 3 to 15-tons capacity will be manufactured. Larger sizes will be added. Repairs for Burton friction drive locomotives, formerly built by Burton Co., predecessor of Midwest company, will be furnished as heretofore. Locomotive business will be operated as division of Columbia and Ceramic companies and equipment and space is available in plants of these companies.

Shartle Machine Co., 359 Dublin Avenue, Columbus, Ohio, maker of machinery and power equipment, is in market for one 175 to 225-hp. gas engine of modern design, preferably three-cylinder, and one 300-hp. engine direct connected to 200-kw., 250-volt generator.

New England

BOSTON, June 4.

JUNE opened with no increased activity in the machine-tool market. However, tools sold the past week, although few in number, were of more importance than those of the previous week and included three new radial drills and a new surface grinder to a Hartford plant; a used 24-in. Bullard vertical boring mill to a Worcester plant; a used No. 52 Bliss press to a Worcester company; a practically new 24-in. lathe to a Connecticut firm; a fairly large used planer and a large used shear to Massachusetts plants, in addition to a half-dozen smaller tools. A good volume of repair parts has also been sold.

An encouraging feature is the sizable amount of prospective business which is still considered active. This includes a list for the Boston & Albany Railroad, some tools for the New Haven and the Boston & Maine railroads, as well as a fairly long list of one, two, three or more items of equipment required by industrial plants. When these tools will be purchased is uncertain, but in all probability not until after the political conventions are over.

Small tools continue active. May was the best month for some in the trade so far this year.

Crofut & Knapp Co., South Norwalk, Conn., has plans for expansion, work on which will start about July 1.

Taunton-New Bedford Copper Co., 24 North Front Street, New Bedford, Mass., contemplates an addition for a new treatment of metals. Details will be announced later.

Bids have closed on a coal pocket to be erected by Staples Coal Co. at Warren, R. I., for which conveying equipment is required. O. Perry Sarle, 95 Franklin Street, Providence, is architect.

William Higginson, 101 Park Avenue, New York, architect, has plans for a one and two-story printing plant at Greenwich, Conn., for the Condé Nast Publishing Co. Motors and miscellaneous equipment are required.

Plans will be ready about Aug. 1 for a trade school at Westfield, Mass., to cost, without equipment, $80,000. Ralph M. Sizer, 12 Elm Street, Westfield, is architect.

Fletcher Thompson, Inc., 542 Fairfield Ave., Bridgeport, Conn., architect, closed bids June 4 on a one-story 100 x 150-ft. machine shop addition for Baird Machine Co., Stratford, Conn.

Dayton Mfg. Co., Torrington, Conn., automobile accessories and supplies will erect a two-story plant to meet needs of increasing business.

Package Machinery Co., Springfield, Mass., has purchased Furguson & Haas, Inc., New York, wrapping machinery, and will move raw material, unfinished work and equipment to

Springfield plant. Official staff and directors of Springfield company will remain as heretofore. Mr. Furguson and Mr. Haas will be actively identified with new owners.

Hartford Electric Light Co., Hartford, Conn., will increase capacity of steam-operated electric power plant on Commerce Street, to cost about $200,000 including equipment.

L. G. Balfour & Co., 25 County Street, Attleboro, Mass., manufacturer of plated jewelry products, metal novelties, etc., has plans for a two-story addition, to cost upward of $50,000 with equipment. F. B. Perry, 44 Franklin Street, Providence, R. I., is architect.

Kidder Press Co., Dover, N. H., manufacturer of printing presses, paper mill machinery, etc., has concluded merger with National Woodworking Machinery Co., of same place, and United Printing Machinery Co., 470 Atlantic Avenue, Boston, under first-noted name. It is understood that present plants will be continued as heretofore and expansion in manufacture carried out. Offices will be maintained at Boston, New York, Chicago and Toronto. Joel F. Shepard, formerly head of National company, will be vice-president and general manager of consolidated company.

Nashoba Cold Storage Co., Ayer, Mass., care of Haynes & Mason, 280 Main Street, Fitchburg, Mass., has plans for a two-story cold storage and refrigerating plant, 75 x 160 ft., to cost about $65,000 with equipment.

Colonial Air Transport Co., care of Springfield Airport Corporation, Springfield, Mass., has leased portion of Fisk Park airport and plans early construction of hangars, repair shop, tool house, and oil storage and distributing building.

A. F. Curtin Valve Co., 76 Ship Avenue, Medford, Mass., has awarded general contract to J. A. Ricker, 36 Dudley Street, for a one-story addition, to cost about $23,000 with equipment.

W. E. Louttit, 93 Cranston Street, Providence, R. I., has filed plans for a one-story automobile service, repair and garage building to cost close to $100,000 with equipment.

James Purdon, 50 Congress Street, Boston, architect, has completed plans for a two-story automobile service, repair and garage building, 100 x 150 ft., at Winchester, Mass., to cost about $100,000 with equipment.

Metal Craftsmen, Inc., 141 Georgia Avenue, Providence, R. I., has been organized to manufacture patented window ventilator. It contemplates enlargement of plant soon and will then probably be in market for materials and equipment.

Buffalo

BUFFALO, June 4.

BOARD OF EDUCATION, Genesee Building, Buffalo, will soon complete plans for two-story Burgard vocational school at Kensington and Fillmore Avenues, to cost approximately $1,000,000 with equipment. Ernest Crimi, Genesee Building, is architect.

Work has been started on new airport at LeRoy, N. Y., by Donald Woodward, LeRoy, and associates, to include hangar, 100 x 140 ft., repair shop, tool department, and oil storage and distributing building to cost more than $70,000 with equipment.

Roger D. DeWolf, 330 Barrington Street, Rochester, N. Y., and associates have organized DeWolf Furnace Corporation with capital of $25,000, to operate a local plant for manufacture of furnaces, parts, etc. Wirt D. Seeley, 24 Mayfield Street, is interested in company.

Laclede Mfg. Co., 1443 Niagara Street, Buffalo, manufacturer of paper goods, has asked bids on general contract for new one-story plant, to cost close to $100,000 with equipment. E. G. Speyer, Ellicott Square, is architect and engineer.

Lincoln Radiator Co., Utica, N. Y., has leased vacant plant of National Radiator Co., North Tonawanda, N. Y., and will occupy for new plant for production of cast iron radiators for domestic and other heating service.

George C. Rounds, White Building, Buffalo, is having plans drawn for a six-story automobile service, repair and garage building, to cost $230,000 with equipment.

City Council, Buffalo, is considering extensions in municipal airport, including new hangar units and repair shops. Lieut. Edwin M. Ronne is director.

Plant and real estate of Standard Turbine Corporation, Scio, N. Y., will be sold at auction during August by Industrial Plants Corporation, New York. Sale will include new machine shop and power house, boring mills, heavy-duty lathes, radial drills, open-side planers, shapers, grinders, turret lathes, drills, compressors, etc. Date of sale will be announced later.

Henry L. Kohlmetz Iron Works, formerly on North Water Street, Rochester, N. Y., manufacturer of stairs, grills, gates and other ornamental iron products, has removed its plant to larger quarters at Mill and Furnace Streets.

Border Metal Products, Inc., 1449 Niagara Street, Buffalo, has been organized to manufacture metal and allied products, particularly nickel stove pipe, furnace pipe and hot air registers. Company has plant at above address and will soon be in market for materials and equipment.

United States Hoffman Machinery Corporation, Syracuse, N. Y., has taken title to tract of 12 acres, northeast of the city, for erection of a new plant with 140,000 sq. ft. of floor space, to cost $500,000. Lockwood, Greene & Co., New York, are engineers.

South Atlantic States

BALTIMORE, June 4.

CONTRACT has been let by Bowker Chemical Co., First Street and Tenth Avenue, Baltimore, to Consolidated Engineering Co., 20 East Franklin Street, for rebuilding portion of plant recently destroyed by fire, including three two and three-story buildings, to cost more than $80,000. Engineering department of American Agricultural Chemical Co., 419 Fourth Avenue, New York, parent organization, is in charge.

DeLion Tire & Rubber Corporation, Eager and Fifth Streets, Baltimore, is reported considering one or two-story addition to cost approximately $35,000 with equipment. S. C. Cooke is company official in charge.

Plant and equipment of Hampstead Mill & Body Works, Inc., Hampstead (Carroll County), Md., will be sold at public auction, June 13, by L. C. Caltrider and C. R. Wattenscheidt, receivers.

Arrington Cold Storage Corporation, Arrington, Va., has awarded general contract to John P. Pettijohn, Lynchburg, Va., for four-story cold storage and refrigerating plant, 103 x 124 ft., to cost upward of $100,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Prudential Refining Corporation, Baltimore, formerly Prudential Oil Corporation, with refinery in Curtis Bay section, is disposing of bond issue of $2,000,000, considerable portion of fund to be used for extensions and improvements, including modernization of present refinery, to develop daily capacity for handling 10,000 bbl. of crude oil.

Carroll Independent Coal Co., Baltimore, has acquired site on Twenty-fifth Street, now used in part for company plant, and contemplates extensions in storage and distributing facilities, including one-story automobile service, repair and garage building, to cost $100,000.

City Council, Macon, Ga., has acquired tract of 250 acres for municipal airport, to be known as Miller field, and plans construction of hangars, repair shops and other buildings.

General purchasing officer, Panama Canal, Washington, is asking bids until June 19 for wire rope, chains, staybolt iron, shovels, chisels, hammers and other tools, Panama schedule 1881.

Georgia Manganese & Iron Co., care of Joel Hurt, Hurt Building, Atlanta, Ga., is planning development of manganese properties near Cartersville, Ga., including installation of mining and refining equipment for production of about 200,000 tons per annum. A large capacity mechanical washing plant will be provided, entire project to cost close to $1,500,000.

Public Improvement Commission, City Hall, Baltimore, is arranging fund of close to $6,500,000 for extensions and betterments in municipal waterworks, including new pumping plant for Mount Royal-Vernon section, to cost about $625,000 with machinery, and pumping station for Curtis Bay district, to cost approximately $70,000. Water department will be in charge.

Quartermaster, Fort Monroe, Va., is asking bids until June 16, for construction of two standard hangars at Langley Field, Va., units to be of steel type, with repair facilities.

In connection with proposed rayon mill on James River, near Richmond, Va., American Enka Corporation, 114 East Thirty-second Street, New York, contemplates construction of power house, machine shop and other mechanical units. Entire project is reported to cost more than $1,200,000.

Bureau of Fisheries, Washington, is asking bids until June 28 for one full Diesel heavy-duty, direct-connected, reversible type marine engine of 150 hp., for installation in vessel at Boothbay Harbor, Me.

Airport Committee, Chamber of Commerce, Marion, N. C., W. S. Shiflet, chairman, is considering early establishment of municipal airport, with hangars, repair shops and other mechanical units.

Chapman-Storm Lumber Corporation, Holly Hill, S. C., A. F. Storm, president, is planning purchase of steel water tank, about 25,000-gal. capacity.

Spartanburg Textile Machinery Co., Spartanburg, S. C., is said to have concluded arrangements for purchase of local plant of American Machine Shops and will equip for new branch plant.

Common Council, Vass, N. C., is asking bids until June 12 for municipal waterworks system, including 100,000-gal. capacity tank on steel tower, deep-well pumping station, etc. Carolina Engineering Co., Johnston Building, Charlotte, N. C., is engineer.

Superintendent of prisons, Department of Justice, Washington, will receive bids until June 11 for one gasoline power shovel and extra boom, with approximately 40-ft. two-way block and fall to convert shovel into crane.

Samuel H. Kennedy, Tunnel Hill, Ga., is organizing Samuel H. Kennedy Co., with $150,000 capital stock, to manufacture automotive and agricultural appliances, also builders' equipment designed by organizer.

Pittsburgh

PITTSBURGH, June 4.

MACHINE-TOOL sales in this district for May were fairly good. Betterment, which set in about the middle of the month, continued and sales during the last half were sufficient to bring the total above that of April and well up toward the average for the first three months of the year. Single tool orders have been the rule. The third quarter tool list of the Westinghouse Electric & Mfg. Co. is expected to be out about the end of this month, and as purchases against the first and second quarter lists were limited, a heavy third quarter inquiry is looked for.

Contract has been let by Miller Saw Trimmer Co., Penn Avenue and Water Street, Pittsburgh, manufacturer of printers' machinery and parts, to Hughes-Foulkrod Co., 421 Seventh Avenue, for a one and two-story addition, to cost close to $200,000 with equipment. Hunting, Davis & Dunnells, Century Building, are architects.

South Penn Oil Co., 541-49 William Penn Way, Pittsburgh, has completed plans for new oil storage and distributing plant at Wheeling, W. Va., to cost about $125,000 with equipment. J. F. Kuntz, Westinghouse Building, Pittsburgh, is architect.

Pittsburgh Parking Garage, Inc., 555 Sixth Avenue, Pittsburgh, J. Wilworth, president, will soon take bids on general contract for seven-story service, repair and garage building, to cost $175,000 with equipment.

City Controller, City-County Building, Pittsburgh, will receive bids until June 21 for furnishing and installing power house equipment at Pittsburgh city home and hospital, Mayview, Pa. (contract No. 7); water-softening equipment at same place (contract No. 8); steam lines and appurtenances (contract No. 2); power lines and auxiliary equipment (contract No. 3); and sewer, water and gas lines (contract No. 5). Plans and specifications at office of Morris Knowles, Inc., Westinghouse Building, engineer.

W. J. Burkart, 518 North Pennsylvania Avenue, Greensburg, Pa., and associates have organized Continental Boiler & Radiator Co., to operate plant in vicinity of West Newton, Westmoreland County, for manufacture of boilers, radiators, gas-fitting specialties and kindred equipment. J. A. Henry, Jeanette, Pa., will be an official of new company.

Board of Education, Washington, Pa., plans installation of manual training equipment in new high school to cost $850,000, for which C. L. Wooldridge, Fulton Building, Pittsburgh, engineer, will prepare plans.

American Instrument Works, 18 East Lacock Street, Pittsburgh, maker of jigs, fixtures, tools, etc., has changed its name to American Die & Instrument Works. E. A. Schurk is secretary and treasurer.

Milwaukee

MILWAUKEE, June 3.

MODERATE activity in new business is reported by manufacturers of machine-tools. In several instances, shops entered the month with more specifications than at the beginning of May, but as a rule, the May volume fell below April. Demand continues spotty, but a fair aggregate is being furnished by a widely diversified list of buyers. There has been an improvement in the foundry business, due mainly to a better call for automotive castings.

Business of Lang & Scharmann, foundry and machine shop, Marshfield, Wis., has been incorporated as Lang & Scharmann, Inc., with a capital stock of $50,000. George J. Lang and Otto T. Scharmann continue as principal owners and active managers. Some improvements in plant and equipment are being made.

Milwaukee assembling plant of Ford Motor Co., which closed down June 8, 1927, is expected to resume operation June 11. About 600 men are expected to be employed by July 1. Harry M. Buckley is branch manager.

Green Bay & Western Railway, Green Bay, Wis., is starting work on a warehouse and service shop at its terminal, 60 x 200 ft. With equipment cost is estimated at $50,000.

Hurd Lumber Co., Medford, Wis., is purchasing miscellaneous equipment for a cutting plant addition, 90 x 100 ft., costing about $40,000. H. M. Hurd is president and general manager.

Plans for a one-story addition, 74 x 80 ft., to gray iron shop of Armstrong Foundry Co., 1530 Junction Avenue, Racine, Wis., are being revised by J. Mandor Matson, local architect, and new bids will be taken about June 15.

Nash Motors Co., Kenosha, Wis., is pushing work on two one-story additions, 30 x 128 and 80 x 160 ft., to its branch factory at Racine, Wis., and is placing final orders for new equipment.

Beloit Box Board Co., Second Street, Beloit, Wis., is breaking ground for a two-story addition, 103 x 110 ft., to cost $60,000 with machinery.

Appleton Coated Paper Co., Appleton, Wis., has plans for a new finishing room addition, 104 x 240 ft., two stories, requiring super-calendering and sheet cutting equipment with electric motor drive. It is to be ready about Oct. 15. Charles S. Boyd is general manager.

Devereaux-Olson Construction Co., 716 Eleventh Avenue, South, Minneapolis, Minn., is low bidder at $29,000 for erection of a new central heat and power plant, 57 x 115 ft., at State Teachers College, Oshkosh, Wis. It will require three 150-hp. boilers with automatic stokers, 600 tons coal storage capacity, ash-handling equipment, and contain a general machine and repair shop. The total cost will be $80,000.

City of Waukesha, Wis., closes bids June 11 for construction of a municipal sewage disposal plant costing $190,000, designed by Alvord, Burdick & Howson, consulting engineers, Chicago. Bids are being asked on (a) sewage disposal plant construction, (b) tank equipment and accessories, (c) pumping equipment, and (d) cast iron pipe and fittings. A. R. Schuh is city engineer.

Drott Tractor Co., 123 Wisconsin Avenue, Milwaukee, distributer of Caterpillar tractors and equipment, has let general contract to Paul Riesen's Sons Co., 1018 Humboldt Avenue, local, for construction of a $90,000 headquarters building for sales, service and repairs. It will contain a complete machine and forge shop. Architects are M. Tullgren & Sons Co., 20 Prospect Avenue, Milwaukee.

Pacific Coast

SAN FRANCISCO, May 31.

PLANS are under way by California Wire & Cable Co., Orange, Cal., for one-story addition, 42 x 85 ft., to cost approximately $18,000 with equipment.

Apple Growers' Cold Storage Co., Watsonville, Cal., is asking bids on general contract for one-story cold storage and refrigerating plant, 300 x 500 ft., to cost $250,000 with equipment. Uttley & Kleindinst, 354 Hobart Street, Oakland, Cal., are engineers.

National Paper Products Co., 562 Battery Street, San Francisco, an interest of Zellerbach Co., same address, is considering construction of second unit at kraft paper mill at Port Townsend, Wash., where first unit is now being completed. New structure will double capacity, and is reported to cost more than $2,000,000 with equipment.

City Council, Idaho Falls, Idaho, is arranging bond issue of $100,000 for municipal hydroelectric power plant on Snake River.

Moreland Motor Truck Co., Twenty-fourth and Main Streets, Los Angeles, with plant at Burbank, Cal., is reported planning construction of branch assembling and distributing plant at Seattle, where site will soon be selected, to cost more than $80,000 with equipment.

Union Pacific Railroad Co., Omaha, Neb., has approved plans for an addition to engine house and shops at Ogden, Utah, to cost about $40,000 with equipment.

California Petroleum Corporation, 929 South Broadway, Los Angeles, has plans for a one-story storage and distributing plant at San Pedro, with pumping station, etc., to cost about $45,000.

Moran Co., Garland Building, Los Angeles, architect, is preparing plans for one-story mechanical shop and woodworking plant, 100 x 200 ft., for company whose name is temporarily withheld, to cost close to $35,000 with equipment.

Sellers & Stone, Yakima, Wash., have filed plans for one-story cold storage and refrigerating plant, to cost approximately $100,000 with machinery.

American States Public Service Co., Los Angeles, operating Los Angeles Gas & Suburban Water Co., South Coast Gas Co., and other utilities, is disposing of bond issue of $1,250,000, portion of proceeds to be used for expansion and improvements in plants and system.

Oregon Portland Cement Co., Portland, has filed plans for three-story and basement storage and distributing plant, 100 x 100 ft., to cost in excess of $60,000 with elevating, conveying and other equipment. L. L. Dougan, Kraemer Building, is architect.

Richfield Oil Co. of California, Inc., Los Angeles, has been organized to take over and consolidate company of same name, with local refineries, and United Oil Co., with similar plants. Amalgamated company will carry out expansion program and has arranged for note issue of $5,000,000, a portion of proceeds to be used for that purpose.

Southwestern Machine Co., 316 Azusa Street, Los Angeles, has been formed to succeed Western Machine & Mfg. Co. and will manufacture special machinery, double-end punches and shears, inclinable presses in plain, back-geared and combination and worm speed reduction units up to 7½ hp. Special machinery will be built under contract and materials and equipment for other lines have been contracted for.

Canada

TORONTO, June. 4.

WHILE the general demand for machine-tools is confined to single orders, several small lists of a half-dozen tools have recently appeared. The past week the Advisory Vocational Committee placed orders for tools for the Toronto technical school. Some good sized orders are in prospect for new works now under construction which are expected to appear within the next two or three weeks. While most of the automotive buying is for replacement needs, additions are under way for two or three plants for which equipment will soon be required. Garages and repair plants are steady buyers of single tools. The Canadian General Electric Co. will spend approximately $500,000 on machinery and tools for additions to its Peterboro, Ont., plant.

International Nickel Co. has started work on addition to its plant at Port Colborne, Ont., to cost $75,000, and expects to start work soon on a second unit of same size and cost.

Studebaker Corporation plans to re-equip its plant at Walkerville, Ont., for manufacture of Studebaker and Erskine cars from parts made in Canada. About 400 additional men will be employed.

Canadan I. T. S. Rubber Co., Toronto, has taken out a permit for erection of a $90,000 factory building at corner of Royce and Edwin Avenues.

Drury Co., Montreal, Que., has awarded contract for erection of a $2,500,000 cold storage plant at Halifax, consisting of a group of four buildings. Two units will be six stories.

Canadian General Electric Co., head office, Toronto, will build two extensions to its plant at Peterboro, Ont., 100 x 328 ft. and 90 x 100 ft. Buildings will cost approximately $300,000 and equipment about $500,000.

Smith Brothers, 188 Duke Street, Toronto, manufacturers of automobile and truck bodies, etc., have purchased a two-acre site for erection of a plant to cost $150,000.

Hill, Clarke & Francis, New Liskeard, Ont., have contract for the erection of a factory at New Liskeard for the Standard Diamond Drill Co., to cost $20,000.

Canadian Engine & Tool Co., Ltd., 10 Church Street, Windsor, Ont., has let contract to W. Pierce, 192 Partington Avenue, Sandwich, Ont., for erection of a one-story factory, 45 x 156 ft.

Nova Scotia Power Commission, Halifax, N. S., has awarded contract to Foundation Co. of Canada, Ltd., 746 Sherbrooke Street West., Montreal, for construction of a 30,000-hp., hydroelectric power development plant on Mersey River to cost $3,000,000.

Griswold & Co., Ltd., 1111 Beaver Hall Hill, Montreal, has been awarded contract for machinery, etc., for hydroelectric plant and dam to be built for Cie Electrique de Charlevoix, at Les Eboulements, Que. Tenders for power house and dam construction will be called later. Langlais, Ricard & Royer, 126 St. Peter Street, Quebec, are engineers.

London Shipping Containers, Ltd., 745 Yorke Street, London, Ont., manufacturer of corrugated paper boxes, wrappers, etc., is having plans prepared by John M. Moore & Sons, London, for erection of a plant at Windsor, Ont., to cost $50,000.

Atlas Construction Co., 37 Belmont Street, Montreal, has been awarded general contract for erection of a 2,000,000-bu. elevator with marine tower and grain conveyors, for Quebec Harbor Commission. It will cost approximately $1,000,000.

Anglin-Norcross, Ltd., Montreal, has contract for erection of locomotive and machine shops at Point St. Charles, Montreal, for Canadian National Railways. T. T. Irving, room 436, New Union Station, Toronto, is regional engineer.

Bates Valve Bag Co., Ltd., Cap de la Madeleine, Que., manufacturer of automatic bag filling and weighing machinery, etc., is having plans prepared for a 1½ story addition, 40 x 200 ft.

Otto Higel Co., Ltd., 680 King Street West, Toronto, is having plans prepared by G. M. Miller & Co., 71 Mutual Street, for a factory at St. Hyacinthe, Que., to manufacture piano actions, musical instruments.

E. G. M. Cape Co., 10 Cathcart Street, Montreal, has contract for an addition to plant of Simmons, Ltd., manufacturer of metal beds, 400 St. Ambrose Street, Montreal, to cost $240,000. Ross & MacDonald, 1 Belmont Street, are architects.

Bids are being received by B. H. & F. Prack, architect, 42 James Street North, Hamilton, Ont., for an addition to plant of Canadian Westinghouse Co., Ltd., Sanford Avenue North, Hamilton.

H. J. Heintz Co. is building a factory at Leamington, Ont., and will also erect a power plant.

Western Canada

Bids will be called soon by Hutton & Souter, architects, 6 James Street South, Hamilton, Ont., for erection of a distributing and assembly plant at Saskatoon, Sask., for General Motors of Canada, Ltd., head office, Oshawa, Ont. It will be one story, 80 x 300 ft., and cost $1,000,000.

Dominion Electric Co., Watrous, Sask., will build an addition to its power plant at Estevan, Sask.

Mid-West Utilities, Calgary, Alta., contemplates erection of a power plant at Nokomis, Sask., and power line from Nokomis to Watrous, Imperial and Simpson.

Dominion Electric Co., Watrous, Sask., is completing arrangements for construction of a power plant at Craik, Sask.

Plans are being prepared by J. A. Foester, City Hall, Prince Albert, Sask., for an addition to city power plant to cost $100,000.

General Steel Wares, Ltd., 305 Water Street, Vancouver, B. C., has started work on a one-story factory and warehouse, 125 x 250 ft.

Vulcan Iron Works, Ltd., Point Douglas, Man., will build an addition to its plant, one-story and three-story wing, 72 x 196 ft., steel and corrugated iron construction.

Bids are being received by J. C. Holden, District Engineer, Canadian Pacific Railway Co., Winnipeg, Man., for an addition to Weston freight car shops, Winnipeg, 305 x 317 ft.

Foreign

COMPANY manufacturing cutlery at Sheffield, England, has acquired site at Germiston, near Johannesburg, South Africa, and plans construction of branch plant. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference South Africa No. 66562; also at American Consulate,, Johannesburg, William L. Kilcoin, assistant trade commissioner.

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Electric Bond & Share Co., 2 Rector Street, New York, is reported considering plans for hydroelectric generating plant at Agos Falls, Agos River, Lanao, Philippine Islands, with initial capacity of about 25,000 kw., to cost more than $1,000,000 with transmission lines. Lyman B. Hammond is vice-president in charge.

Huff-Deland Dusters, Inc., subsidiary of Keystone Aircraft Corporation, 475 Fifth Avenue, New York, with plant at Bristol, Pa., has secured concession from Government of Peru for establishment and operation of passenger and mail air service between that country and United States. Planes will be constructed and landing fields arranged, including hangars, repair shops, oil storage and distributing plants, and other structures.

A company has been formed at Teschen, Silesia, Poland, to construct and operate a hydroelectric power plant on Sola River, for which concession has been granted by Ministry of Communications. Considerable portion of output will be used for operation of electric railroad line to be built from Oswiecim and Zywiec, Poland. Entire project is reported to cost more than $1,500,000. Information at American Consulate, Warsaw, Poland, Gilbert Redfern, assistant trade commissioner.

Imperial Chemical Industry, Ltd., London, England, is arranging for a stock issue to total about £4,300,000 (approximately $20,650,000), a considerable portion of fund to be used for expansion in manufacturing facilities.

Officials of Thomson-Houston Co., Paris, France, manufacturer of electrical machinery, associated with International General Electric Co., New York, and Societe Alsacienne de Constructions Mecaniques, manufacturer of similar equipment, with plant in Alsace-Lorraine, are organizing a new company to centralize production and distribution of both interests for electric and electro-mechanical equipment, and will develop expansion in both lines of manufacture. New company will be capitalized at 400,000,000 fr., of which about 150,000,000 fr. will represent working capital for production.

Koholyt Corporation, Berlin, Germany, manufacturer of sulphite pulp for paper manufacture, controlled by Inveresk Paper Co., Ltd., London, England, is arranging for sale of bonds in United States to total $4,000,000, a portion of proceeds to be used for expansion.

New Trade Publications

Oxyacetylene Welding in the Foundry.—Air Reduction Sales Co., 342 Madison Avenue, New York. Pamphlet of 12 pages, containing the text of a paper read by G. F. Wieser, engineering research department, before a recent welding conference at the University of Wisconsin. It emphasizes the ability to meet severe production schedules by reclamation of defective castings.

Woven Screens.—Ludlow-Saylor Wire Co., St. Louis. Booklet of 20 pages, illustrating and describing a line of woven screens with square holes, made of steel or other resistant materials. Larger openings are claimed for them than with round perforations in plates. Steel screens are listed with openings ranging from 4 in. square down to 1¼ in. and made of wire from 1 in. to No. 7 gage.

Sand-Conditioning Equipment.—C. O. Bartlett & Snow Co., Cleveland. Bulletin 61 of 20 pages illustrates and describes a variety of equipment for handling sand. Most of the illustrations are from installations, starting with the shake-out and going through the list to delivery of sand into flasks.

Concrete Floors.—Master Builders Co., 7016 Euclid Avenue, Cleveland. Booklet of 32 pages covering a survey of concrete floor conditions in industrial plants. A strong plea is made against accepting lowest bids on jobs, if a thoroughly satisfactory floor is to be obtained. Tested materials and skillful workmanship are needed for best wearing results.

Arc Welder.—General Electric Co., Schenectady, N. Y. Bulletin G. E. A.-874, of four pages, illustrates and describes an arc welder rated at 200 amp. furnished in both stationary and portable forms. It is driven by belt, motor or gas engine and has a current range from 50 to 300 amp. It is adaptable to metallic electrodes from 1/16 to ¼ in.

Ball Bearings.—New Departure Mfg. Co., Bristol, Conn. Dimensions and load data and price list in a pocket-size pamphlet of 40 pages. The sheets are punched for use in ring binder.

Material-Handling Equipment.—Elwell-Parker Electric Co., Cleveland. Catalog 150 of 40 pages illustrates and describes a wide variety of industrial electric tractors and trucks, including the units carrying cranes. The elevator tructor is featured.

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

LIKE the little Spartan boy who registered no sign of pain while the fox gnawed his vitals, the great bulk of our readers observed the resumption of "The Last Word" with disappointing stoicism.

But not all were mute. A few (two) tossed laurels. Others may have sighed and murmured something about being grateful that it did not take up a whole page.

Now, we like criticism, but it must be constructive. We should probably say we lean toward having it favorable. By far the pleasantest comment came in metrical form, written by Miss V. E. Atwell, of Arlington, Cranston, R. I., whose nom de typewriter is "Eva."

Greetings—Desert Song

WAS I the first from whom you heard
When discontinuing "The Last Word"?
As at that time I wrote to you,
My weekly task is to review
Items of interest, more or less,
Appearing in the trading press.
And as I waded, pen in hand,
Through much I could not understand,
Details which nothing could make plain
To my poor feeble woman's brain,
My energy was always spurred
By "Soon I'll come to 'The Last Word' "!
"The desert ship" of other lands
Must tramp Sahara's shimmering sands;
But does the thought occur to him
Of the oasis' shadows dim?
Of evening's rest, and safe retreat
Beneath the palm trees, cool and sweet?
Of voices singirg, soft and low
Where streams of living water flow?
If thus he dreams, I'm telling you
I likewise had my visions, too;
"Soon all this technique I will spurn,
And to 'The Last Word' gladly turn"!
But when you took that hope away,
My light went out, my sky was gray;
Things technical I had to read,
The palm trees all had gone to seed,
The shadows fled, the well ran dry,
(So were the *pages;* so was *I*)!
But now I look those pages o'er,
Lured by a bright hope, as before.
The camel now may drink his fill,
The palm trees wave, the night is still,
And up above the desert's rim
The rising moon appears to him.
Accept my thanks, good gentlemen,
"The Last Word" has appeared again!

EVA.

Thank you, Eva.

Extra! Extra! Foreign Visitor Mistakes the Iron Age for a Bar Room

Clipping from the New York *World:*

> *Believe It or Not!*
>
> "An English friend of mine who is visiting this country chanced to glance through a New York telephone directory while at my home recently," said A. L. Glasser. "He seemed unusually interested, and I inquired the reason.
>
> " 'Why,' he answered, 'I thought Prohibition was at least theoretically in force in New York, but here I find listed a number of barrooms.'
>
> " 'Impossible!' I exclaimed. 'You must be mistaken.'
>
> " 'Not at all,' he replied. 'Look here,' and he turned the pages rapidly, indicating the names Iron Age, *Judge,* the *New Yorker* and many others, next to each of which was the description 'a pub.' "

Mr. A. Steel is roll designer for the Judson Mfg. Co., San Francisco, Cal., steel producers.

And if the 231 million words, which have been printed in the copies of THE IRON AGE mailed to the Farrel-Birmingham Co. from 1872 to date, were placed end to end in a single line, including the marks of punctuation, nobody would read them. A. H. D.

THE IRON AGE

New York, June 14, 1928

ESTABLISHED 1855

VOL. 121, No. 24

Service Is Best Test of Steel

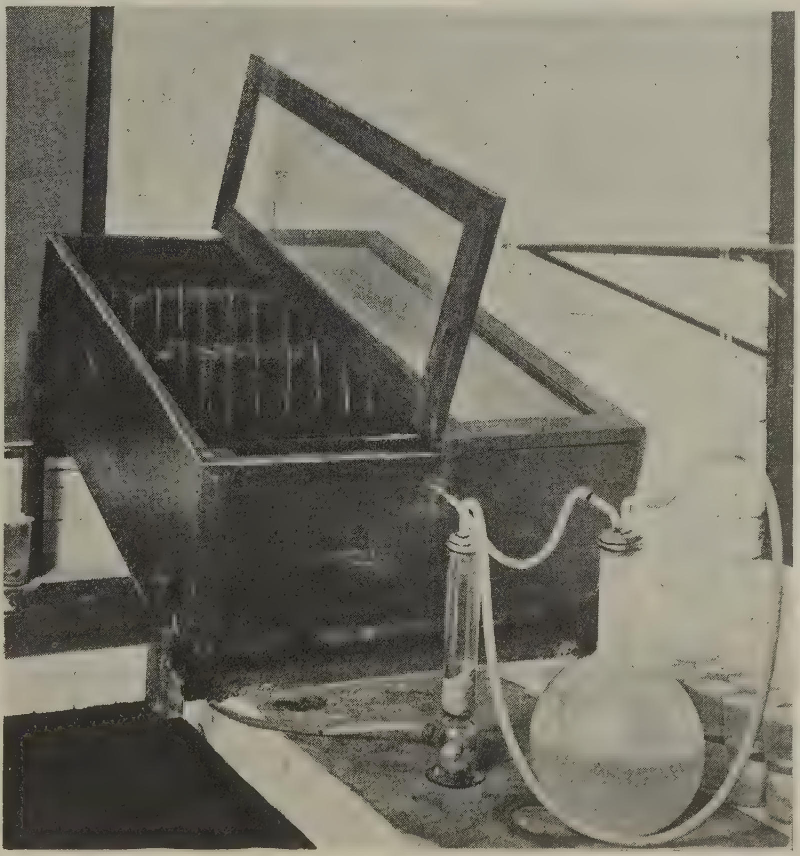
Accelerated Tests Not Conclusive—Many Acid Tests for Corrosion Are Misleading—Variables Which Discredit Are Numerous

BY H. M. BOYLSTON*

WHAT is the importance of the time element in testing metals? This question is a challenge to the chemist, the physicist, the engineer and the metallurgist—and one not easily answered.

The time element has but little effect in some of the important tests such as those for hardness and tensile strength. The metallurgist gages hardness with the Brinell testing machine by pressing a ball into the surface of the metal under known pressure and then measuring the resulting indentation. Since the load is applied for only a few seconds, elapsed time between tests does not affect the result. (Even in the case of tensile tests and Brinell tests it is well known that different results may be obtained if the tests are made immediately after the test bar has been machined or the metal has been quenched than will be obtained after waiting 20 min. to ½ hr. during which a so-called "aging" effect occurs.) A Brinell test made today will show the same result as one made next week.

Other tests, devised to determine the effect of corrosion upon iron and steel, are dependent upon time. Science has repeatedly conducted research investigations to determine some fair and accurate measuring stick by which relative corrosion resistance might be computed. All of this study has been conducted to make possible a prediction of the performance of a specific material under specific environment—thus enabling the purchasing public to select the material best adapted to particular needs.



The Salt Spray Test Is Helpful in Determining the Effect of Salt Spray upon Metals. It is not comparable with actual seacoast conditions—it is only an indicator

In an effort to make determinations in a short length of time, many tests have been conceived for iron and steel in which the action is speeded up. Laboratory conditions are closely noted and recorded, but the results remain inconclusive since true service conditions cannot be simulated by accelerated tests.

Observations have been made through artificial tests, but the many difficulties experienced have eliminated them as a true criterion of service.

Salt Spray Test Not Conclusive

An interesting test has been worked out in which iron and steel sheets are placed in a box and subjected to an accelerated salt spray. Exact records are kept as to the strength and amount of spray, the temperature, and the time during which the test is conducted.

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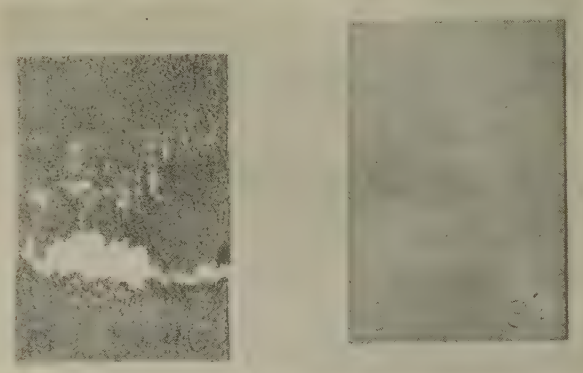
*Professor of metallurgy Case School of Applied Science, and metallurgical engineer, Cleveland.

These tests merely show that the particular samples used will withstand a given spray for a certain length of time—that's all. If a sheet deteriorates in this box, there is no assurance that it will do so in the same way or at the same rate if used as roofing on sea coast buildings where vastly different conditions prevail.

The ocean spray might be much more severe, or it might be only intermittent. The temperature would also vary. The spray test, therefore, cannot be looked upon as conclusive.



These Samples Were Exposed for Six Hours in 5 Per Cent Nitric Acid. At the left is a special iron to which other metals have been added; at the right is stainless steel

The Acid Test Often Misleads

Another instance in which the time element is an important factor is in the acid test. Two of the illustrations show the confusing results obtained by putting a special iron, to which other metals have been added and stainless steel, in acid solutions.

In the first acid tests, the two samples were submerged for 6 hr. in 5 per cent nitric acid. The special iron was practically destroyed, but the stainless steel suffered little deterioration. In the second test, samples of the same materials were immersed for two weeks in 10 per cent hydrochloric acid. The special iron remained in good condition, while the stainless steel was almost eaten away.

In other words, although other conditions remain the same, the results are reversed if the acid is changed. The test is mentioned, not to reflect discredit on the special iron or upon stainless steel, but to show that acid tests can be used to prove superior or inferior "corrosion" resistance of the same material, and are, therefore, unreliable.

Variables Which Discredit Tests

Such tests, of course, bear no relation to the actual corrosion of metals in service. Some of the variables which discredit these tests are:

1—**Temperature.** A varying temperature may change the results greatly.

2—**Time.** Shortening or extending the period during which the test is conducted changes the result.

3—**Strength of solution.** For each acid there is usually a particular strength of solution which has the most deleterious effect upon any particular metal. Hence comparison of different metals by means of an arbitrarily chosen acid strength is manifestly impossible.

4—**Agitation.** Movement of the sample in the solution brings more of the acid in contact with the metal and therefore increases the reaction.

5—**Aeration.** The presence of air in the solution often greatly increases activity. Naturally, it is practically impossible to have different locations in an "acid test" solution contain equal amounts of air.

6—**Kind of solution.** Different acids react differently, as the illustrations show. An acid test shows only that a certain piece of metal lasts a longer or shorter time in the particular acid and particular strength of acid used.

7—**Foreign or dust particles.** Such factors may have a retarding or accelerating effect upon the reaction.

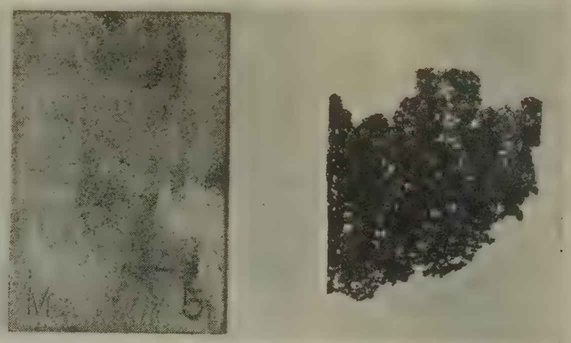
8—**Position of specimen.** A great deal depends upon whether the specimen is completely immersed, or only partly so. It is also important whether it is in a vertical or a horizontal position. Such minute details affect the rate of the acid corrosion.

9—**Surface area.** It is very important to compute the ratio between the surface area of the sample and the volume of the solution. A thick piece of metal with a comparatively small surface area will not lose, in any given time, as great a percentage of its weight in a corrosive solution as will a thinner piece of metal of the same weight with a comparatively larger surface. Therefore, the weight of all samples would have to be of exactly the same proportional ratio to the volume.

10—**Time of changing solution.** The strength of a solution is dissipated after a certain length of time. It may be changed and brought up to full strength. When this is done, the time of changing introduces a variable difficult to evaluate in comparing results of acid effect on different materials, since the acid is not consumed at equal rates with different metals.

11—**Surface of the metal.** In general, a polished surface is less subject to attack by a corroding medium than is a rough one.

And so on, almost without end, can uncontrollable factors in making comparisons by acid tests lead to erroneous deductions. Surface oxide, different annealing treatments, different processings in manufacture, surface density, and many more variables preclude the possibility of securing representative samples of different metals.



These Samples Were Exposed for Two Weeks in 10 Per Cent Hydrochloric Acid. Special iron at the left; stainless steel at the right. Change the acid and the results are reversed. Almost any desired performance can be demonstrated by accelerated tests

From a review of all these variables, it is apparent that an acid corrosion test is quite unreliable as a measure of atmospheric, water or soil corrosion.

Views of Testing Engineers

It is interesting and enlightening to note the stand taken by scientific bodies on the question of acid tests. The opinion of the American Society for Testing Maerials regarding such tests was given as early as the 1911 report, Vol. 11, page 100:

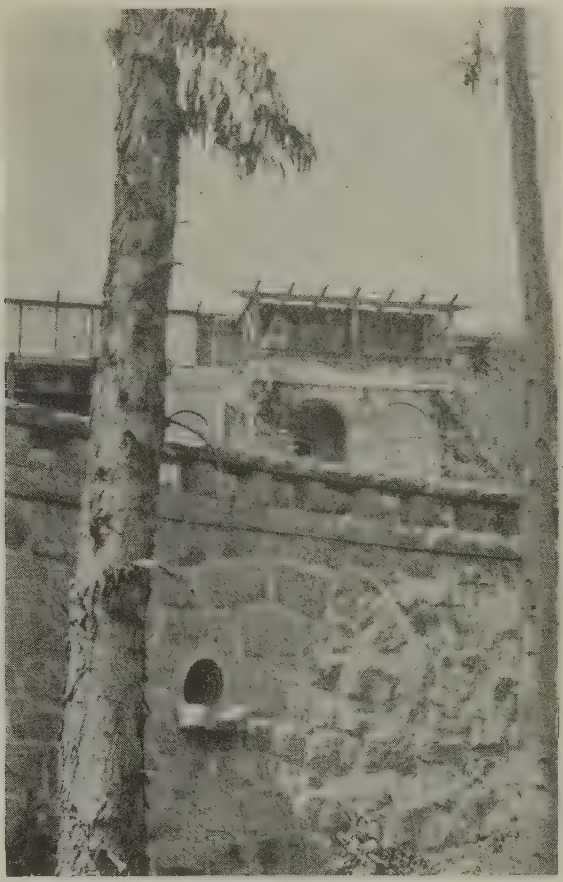
> The results of such tests are unreliable as truly measuring the tendency to natural corrosion. For this reason, the committee desires at this time to again disclaim any recommendation or indorsement of the acid test as a measure of natural corrosion.

In like manner, the British Institution of Civil Engineers faced the same question and went on record in 1920 by saying:

> Numerous attempts have been made to determine the relative corrodibility of various samples of metals by elaborate laboratory methods, known as "acceleration tests."
>
> A method held in high esteem by manufacturers within recent years consisted in exposing the metal to the action of dilute sulphuric acid for set periods of time, and noting the losses in weight due to solution. It was found, however, that results obtained in this way give no indication whatever of the relative resistance offered by metals to corrosion in actual practice.

Actual Service Proves the Durability of this Iron Culvert Installed on the Riviera at Santa Barbara, Cal. The picture below was taken in 1913 when the culvert was installed

The other view, taken in 1923, shows a eucalyptus tree that grew during the period of the culvert's service



The inaccuracies of such methods have been recognized by the United States Bureau of Standards, which has also gone on record regarding the value of accelerated tests. In Bureau of Standards Circular Letter No. 192 on corrosion tests, appears the following:

> Proof of superiority in service requires that the different materials shall have been used under the same conditions. . . .
>
> A common error in the consideration of corrosion tests is to assume that satisfactory or unsatisfactory performance under one set of conditions means that performance will be similar under another set of conditions. The relative standing of different materials is very often altered as the conditions are altered. . . .

A similar statement appeared in the *Chemical Age* (London) on Jan. 7, 1928:

> As for the "accelerated" tests, many firms of the highest repute have long since discarded them. It is pretty generally felt that they may mean anything or nothing and have hardly any practical value, except possibly for testing the "resistance to corrosion" of specific alloys required to be subjected to the action of specific acids. This is to make corrosion synonymous with solution, which may suit some chemists, but will not suit all. If we know anything at all it is that failure, when it comes, or begins, often occurs very suddenly, and that "simulated" time tests may often give the most misleading results.

Other Tests Questioned

In addition to acid tests, other forms of artificial tests have been used in an effort to simulate service conditions and still not wait the length of time that service usually necessitates before conclusions can be drawn. These tests do not escape the dangers which affect those mentioned above. They remain isolated examples and, due to unknown or unappreciated variables, can give and have given results which run entirely counter to the testimony of years of experience gained before and after such tests were run. In those cases, it would seem proper to question the value of the test rather than the material tested.

Among the most comprehensive tests of this nature were those run by the American Society for Testing Materials. Every effort was made to keep these on an absolutely scientific basis, but some of the results obtained showed a surprising variation with the facts established from many years of service life. The *Bulletin* of the society for November, 1925, makes the following comment that is of interest in connection with the foregoing:

> Paralleling the tests of uncoated steel sheets exposed to the weather, which have been in progress for several years, and on the same lots of samples, the committee has been observing the corrosion effect in water immersion tests at three locations representing mine, fresh and brackish water conditions. More recently, similar tests have been installed in two locations where true sea water conditions prevail. The results do not follow the path of the atmospheric tests; and they indicate the error of attempting to draw sweeping conclusions from a single set of conditions, and of supposing that the relative merit of materials for resisting one kind of corrosion will hold for service of a different character.

Scientists as well as practical engineers agree that the only true and sure method of forecasting the durability of materials is through the observation of service rendered by actual installations. If we turn to the field of service, we find what different metals will do.

"In studying corrosion as an economic problem, the experience of actual users of equipment is a phase of study occasionally overlooked, whereas in reality commercial usage is the final criterion as to the real worth of any materials," says Dr. D. J. Demorest, professor of metallurgy at Ohio State University, in the June, 1926, issue of *Chemical and Metallurgical Engineering.*

That's the question—what will it do? If an iron culvert, for example, lasts 40 years in its first location, it stands to reason that another iron culvert, similarly manufactured and installed under the same conditions, will last the same length of time.

Investigations have been made in which various types of culverts were compared as to service life, installation conditions, and so on. On the basis of such facts, one can estimate quite accurately how long culverts will last.

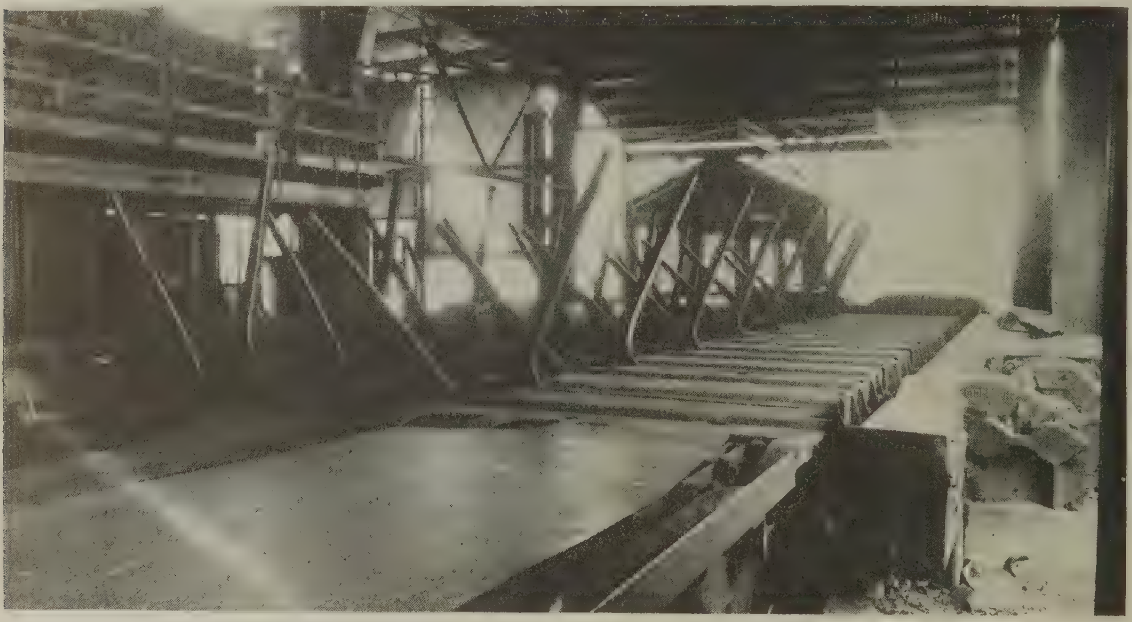
Service the Only Authoritative Guide

Metallurgists everywhere have come to the conclusion that service is the only conclusive and authoritative guide. They know that an accelerated laboratory test is theoretical, and further that, when a certain metal lasts for 15 or 20 years on the roof of a building where it is lashed by corrosive salt spray, this fact speaks volumes for its durability and carries complete justification as a sound basis of purchase.

Double Plate Turn-Over for Inspecting

Device for Turning Plate Twice, Permitting Examination of Both Sides Before Shearing

STEEL plates, after their final pass through the rolls, undergo a series of rigid inspections. A plant lacking proper equipment for such inspection usually suffers a heavy loss of time in the manipulation and handling of its product. This obstacle to production has been eliminated in the Lukens Steel Co., Coatesville, Pa., by a mechanical device for turning over steel plates from one side to another to facilitate inspection. Known as a "double plate turn-over," this equipment was designed and built by Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.



INSPECTION of Both Sides of the Plate Is Facilitated by the Use of This Double Turn-Over Device. After the second turn the plate travels back to the shears for trimming to shipping size

After leaving the rolling mill, steel plates are fed through an annealing furnace, where they are subjected to a heat treatment which also gives them their final coloring. From the furnace the plates pass through a leveler, a machine employed to straighten the plates, removing warps and flutes. Upon leaving the leveler, a chain conveyor takes the plates forward to the first inspection table. The rollers of this table are mounted on Hyatt roller bearings. On this table the plates receive their first examination for blemishes, excess scale, etc. Inspection of the plates is made here on one side only, and it is now that the turn-over device performs.

Between rollers on the inspection tables, every 5 ft., are movable arms of approximately 5-ft. length, resting beneath the roller surface in a recess cored in the table aprons. These arms are pivoted at one end on their own bearings, and operated through a corresponding arm, lying in opposite direction, with segment gears cast on to them and meshed with one another. The arms, whose position rests opposite those of the first inspection table, are operated by a main shaft on which they are keyed. This shaft is oscillated by a crank movement at one end through a gear reduction unit and a 20-hp. motor, compound wound, of 600 r.p.m.

As the operator works his controls, the shaft moves slightly, drawing the opponent arms together, with a scissor-like movement and in an almost vertical position, with a slight lean toward the second inspection table. The operator now returns the arms to their former position and the plate has been turned bottom side up, and rests on a platform of supported rails between the two tables.

A second inspection now takes place on the reversed side of the plate, after which it is ready for its final turn-over to the second roller table, which is identical with that of the first, with the exception of the direction of travel. A second tier of arms, operated like the first, by a second driving unit of the same power and reduction, grasps the plate and gently turns it over and on to the second table.

The turn-over operation is now complete and the plate moves backward over the rotary shear approach table to the shear, where its edges are trimmed. A final shearing, that of cutting the plate to a given length, completes the making of this steel product.

This double plate turn-over is capable of handling plates with maximum dimensions of 84 in. wide, ¼ in. thick and 37 ft. long. The minimum dimensions of plates handled are 30 in. wide, 1/16 in. thick and 8 ft. long. The turn-over has a capacity of 80 light plates an hour.

Iron Industry Facing Great Changes

First Period of Sharply Arrested Growth in 150 Years Puts a Premium on Operating Economies and Marked Departures in Processes—Ore Reserves Under No Strain

BY EDWIN C. ECKEL*

IN writing on the subject of world ore reserves in the early summer of 1914, it was possible to summarize† both the status and the prospects of our pre-war world as regards the iron industry, and to do so without laying excessive stress upon political or governmental influences on the future as it then promised. Writing in 1920, in a later attempt at a forecast,‡ it was necessary to give possible government actions first rank as future factors in iron development. Today, with the war 10 years behind us, the effects of such action on the iron industry can perhaps be estimated more closely. In the present brief study an attempt at such an estimate will be made.

Chief Factors in Trend of World Output

Looking back over the industrial trend of the past years, we can see now very clearly indeed that the broad effects have been about as follows:

(1) The demand for war supplies, an emergency demand practically without price limits, gave an unnatural stimulus to production in the few countries where raw materials and labor were still abundant, and whose output could be shipped into military zones.

(2) This forced demand in certain countries served to cover up the fact that, though these countries showed increased output in some lines, world demand and supply, taken as a total, had fallen off in almost every line of industry. For the first time in 150 years we are passing through decades in which the world iron industry, which for that long period had consistently expanded some 50 per cent each 10 years, is now merely holding its position.

(3) Boundary changes resulting from the war have markedly changed the relative importance of our leading European competitors, seriously crippling the former leader, but creating a new industrial center.

(4) Every nation in the world, urged both by financial necessities and by the outstanding lessons of the war, has embarked definitely upon a policy of protection—or of still higher protection, in case it was already a high tariff country. Wherever we look we find the definite idea, whether publicly expressed or not, that each country must for its own safety make everything possible in the way of necessary manufactured products.

(5) Meantime, world commodity prices are falling slowly, and are likely to fall irregularly for 20 years or so to come. Wages, which theoretically should fall concurrently, are not likely to do so, at least immediately, as the labor groups of all countries strengthened their position greatly during the war. Yet unless prices and wages do move together, the result will be a choice between extensive labor troubles and a very sharply reduced rate of profit.

Production Likely to Become More Decentralized

Each of these factors has been noted separately and independently. But it will be seen that all of them are working in the same direction, acting as brakes on increased output of heavy commodities. It seems difficult, if not impossible, to escape from accepting two conclusions. The first is that we are not likely to resume our normal or pre-war rate of world increase for a good many years to come. The second is that the world output of heavy commodities is likely to show increasing *decentralization*, rather than, as before the war, increasing *concentration* in certain countries and centers.

As against these factors we may, however, set another of far different type, to whose action in the near future we may look forward with entire confidence, even though we must admit that we cannot foretell exactly when that factor will intervene and exactly which industry will be favored first. This favorable factor, on which all progress ultimately depends, is technical improvement and invention. During a period of great prosperity there is no inducement to work out new processes, or to adopt them if they are invented. But during a long period of narrow profits, and especially with a relatively high wage level, there is every reason to search for improved methods and to adopt them promptly when they are found. So we may look forward with confidence to the fact that just as the hot blast and the Bessemer processes came out of the long post-Napoleonic depression, and the basic Bessemer and open-hearth processes out of the post-Civil War period, so some new epoch-making discovery will develop within the next two decades. It may be the success of our long-awaited direct process; it may be something entirely new and unforeseen in the way of new steels or alloys. We cannot tell what it will be, but we may be absolutely sure that the stage is being set for its appearance.

New developments of the sort suggested are far

THE iron industry of the world has temporarily stopped growing, not even keeping pace with increases in population.

World production of pig iron in 1920 *was* 8 *per cent lower than in* 1910. *This was the first decade to show a decrease since* 1780.

In 1913 *world output of pig iron reached a high point of* 78 *million tons; it took* 14 *years to regain that level.*

The need for economies in production and better marketing is more pressing than in the past, the incentive for new processes is greater and new epoch-making discoveries may be expected within the next two decades.

---

*Mining geologist, 1503 Decatur Street, Washington, D. C.

†"Iron Ores," New York, 1914.

‡"Coal, Iron and War," New York, 1920.

more likely to arise in Europe than in America, not because of any superiority in the European mind, but because the industrial strain is greater there than here, and because the industrial and financial units are smaller. The first condition is an incentive to search for new processes; the second condition makes it easier to get them adopted.

Europe was a continent with a vast amount of accumulated wealth, but with a very slow rate of increase of that wealth. The war swept away much of the accumulation. Europe is for the moment very poor, and barring another war may take a century to regain her pre-war position. During a very long period, in any case, the entire continent will have urgent reasons to work hard, to save, and to devise new methods for cutting costs or extending markets.

Within Europe itself the war and the post-war developments have changed the iron and iron ore situation very strikingly. The shift of greatest present and future importance is of course that which gave the ores of German Lorraine to France; and its exact effect on the European ore reserve status is summarized very simply in the few lines below:

Iron Ore Reserves of France, Germany and All Europe, 1913-1928

	Pre-War, 1913		Post-War, 1928	
	Millions of Tons	Per Cent	Millions of Tons	Per Cent
All Europe ...	12,000	100	12,000	100
France	3,300	27	6,000	50
Germany	3,900	33	1,200	10

Along with this tremendous gain in tonnage due to a boundary shift, France has gained another almost equally large increment through mere recognition of a geologic fact which seems obvious enough to us but which French geologists were very slow to realize—the fact that the iron ores of Brittany and Normandy are not mere surface patches but are very extensive sedimentary beds, exactly like our own Birmingham and Wabana deposits. So now, in place of a hundred million tons of reserve credited to western France in 1913, current estimates would probably be put around 1500 million tons or more for that neglected portion of the country. The first flat statement of the facts of the origin of these deposits was, I think, in my own book of 1914. The very obvious deduction had not permeated the intelligence of the French or British steel companies when I was there a year ago; and it may easily be that some of our own people will be first to take advantage of the situation. At present it is not much different from what the Birmingham field must have been up to 1905, when everyone was busily working the outcrop and overlooking the fact that if the ores were sedimentary they could be found under cover as well.

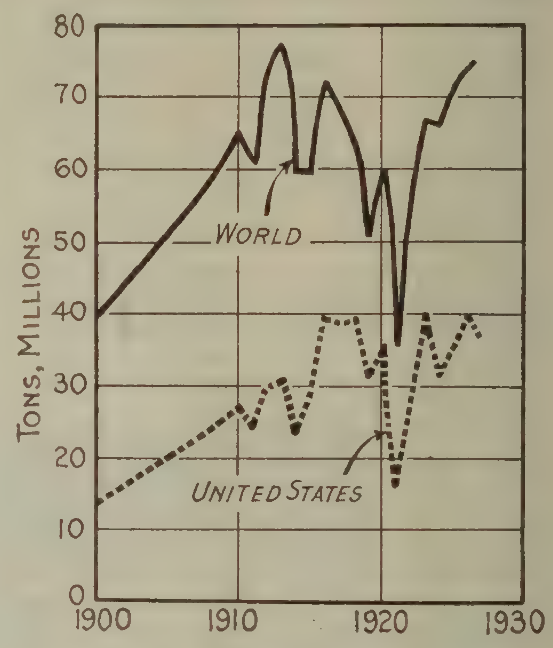
Franco-Belgian Industry Looms as Serious Competitor

The war, therefore, plus a slow recognition of geologic fact, has made possible a very serious Franco-Belgian industrial unit, to replace or compete with our old German adversary. It is true that efficiency has been decreased in the process, since the main coal fields were still left on the German side of the frontier. Under normal conditions we might feel that ultimately the ore would go to the coal fields for iron making. But, under the conditions which actually exist, this otherwise normal process may be reversed. Under the pressure of reparation payments there is far more necessity for Germany to sell coal or coke than for France to sell ore. And, if we look upon European furnaces and mills as chiefly export points, it is logical that the assembling point for ore and coke should be on or near the Atlantic or the Channel, rather than in the interior.

The other changes in Europe do not seriously affect our problem. Great Britain will still have to buy her main ore supply from Spain, Algeria, France or Scandinavia. Austria has disappeared as a unit, Czechoslovakia being her chief legatee so far as the iron industry is concerned. Italy has become a first-class political danger, but is still negligible in coal and iron. Russia is slowly coming back into industry, but can never become a serious exporter of steel. So the chief center for use of iron ores will still be west Germany, Belgium and Luxemburg, and northern and northwestern France. And here there are ample reserves of cheaply mined ores; the limiting factor will be coke and not ore.

Pressure on Lake Superior Ores Likely to Be Checked

Before saying anything about our own country and closely related areas, the other continents may be dismissed with brief mention. South America and Africa are still, and always will be, producers of raw material and consumers of manufactured products; so all the development of those continents makes for the advantage of European and North American mills. Australia, under a Socialist labor control, will be able to produce her chief manufactured necessities but will be unable to export heavily. In Asia, Indian iron output is growing at a healthy rate, but possible Chinese development has been dampened for 16 years by recurrent revolution and civil war. The very satisfactory iron ore development in Manchuria is Japanese in control; and the output will probably be limited to supplying Japanese necessities.



American and World Pig Iron Output, 1900-1927

In the United States, despite the fact that for 15 years it has been the one continuously prosperous portion of the world, ore reserves apparently have not fallen off proportionately to the tonnage mined. In part this stability is due to drilling which has put more ore into the estimates; in part, to increased concentration of ores, which is making use of grades earlier disregarded. This last factor has become important enough to check the slow falling off in average grade of Lake ore shipments, a gradual decrease which had been in progress for many years.

Within the United States the two matters which are likely to have most future bearing on iron ore use and reserves are the recent growth of Southern output and the decline in importance of the merchant furnace. The Southern growth tends to extend the average life of our ore reserves, because it increases the amounts taken from the vast red ore deposits, whose life has never been estimated in terms of decades or even centuries. If the process continues it will finally decrease also the strain on the Lake reserves, not necessarily by actually decreasing the annual draft on the Lake supplies, but by discouraging any large future increases in that draft. The second feature—the decline of merchant furnaces—bears to some extent also against the smaller merchant mines; and that effect is very directly an economic gain. The larger units can in general operate, through alternations of good and bad times, with less wastage of ore reserves.

Wabana and Mayari Ores Possible Sources of Alumina Cement

The two vast ore fields near our borders on the south and north, in Cuba and in Newfoundland, have not lived up to the expectations of pre-war days so far as growth in annual output is concerned; neither of them is as important today, relatively to other shipping fields, as it was in 1912-1913. In the case of the Wabana field the prostration of the Canadian and British steel industries has operated to restrict growth, the bulk of the 1928 shipments from this field being destined for German furnaces—where they will replace Breton and similar European ores. In the case of Mayari, the repressing influence seems to be that the ore itself does not fit in well with the technical policy of the chief owning company. But it may not be out of place to call the reader's attention to the fact that these high-alumina ores, difficult perhaps when looked on merely as sources of iron, assume very great importance when looked on as sources of alumina cement with iron as a by-product. Since the growth of these new cements is apparently just beginning, we may look to see Cuban north-coast ores brought back to the center of the stage in a new and very profitable way. It is one thing to use 2 tons of a difficult ore merely to make $15 to $20 worth of pig iron; it is obviously an entirely different matter if, while making that iron, we also make $40 worth of cement. And those are rather under-statements of the facts as prices run today.

Taking the North American continent as a whole, we may say therefore that the pre-war pressure on Lake ore reserves seems likely to be lessened as steel interest turns southward; but that the annual tonnage from the Mayari and Wabana fields has not grown as expected, so that these two great deposits are still doing little toward conservation of our Lake ore resources.

The Projected and Actual Trends of World Output

Meantime our chief concern is with regard to the probable future rate of iron and iron ore production, and here the past is of service merely as affording a basis for estimating the unknown years to come. In attempting this I will refer to some of my own earlier work on that subject, and I will take this occasion to admit frankly that, though my prophetic ability seems to shine by comparison with many other published forecasts, my estimates were still more optimistic than were justified by subsequent events. The full extent of the change that has overtaken the iron industry of the world does not seem, in many quarters, to be realized even now. It may be of service to put it into both statistical and graphic form, as I am doing here.

During the whole period of our modern industrial civilization based on steam and steel, say from 1780 down to recent days, the world has become so accustomed to a steady and rather high rate of progress that any slackening in the rate involves serious financial and social dislocations; and an absolute cessation of increase would suggest even more serious consequences. Yet some such cessation is what we have been experiencing for over a decade past. *It is the first such period of complete failure to progress that the world has seen in* 150 *years.* Yet in the face of it the stock exchanges register mad enthusiasm, the labor unions ask for still higher wages, and the politicians point with pride to this period of prosperity.

World Market Has Stopped Growing

The facts as to our own industry are easily stated. In the little table which follows I have noted the percentage of increase for each decade since 1800, shown by the iron production of the world. The table, except for the last lines, is that which I worked out and published in my 1920 book, when figures for 1920 were still unobtainable, but when I hazarded the prediction that we were likely to find the lowest rate of increase of any decade since 1800 I understated my case.

Increase of World Iron Output

Decade	Per Cent	Decade	Per Cent
1800-1810	38	1870-1880	52
1810-1820	33	1880-1890	49
1820-1830	83	1890-1900	46
1830-1840	71	1900-1910	62
1840-1850	57	1910-1920	8*
1850-1860	72	1920-1927	30
1860-1870	77		

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*Decrease.

From 1800 to 1910 the rate of increase of our industry was on the average 58 per cent in each 10 years, and everything connected with the industry was planned on the idea that some such rate of increase would continue. If that rate had held the world pig iron output of 1920 would have been around 100 million tons in 1920, and 140 million tons in 1927. It is somewhat over half that now, and the result is what one amiable commentator has called "profitless prosperity."

The high point in the industry was reached in 1913, with an output of some 78 million tons; it has taken us 14 years to regain that level. And, whether we look at the facts in tables or in diagrams, whether we consider world outputs or our own national production, we come back always to the same conclusions: That we are now passing through a stagnant period entirely unlike anything known to our industrial world in the past 150 years; that the world iron industry has temporarily stopped growing, not even keeping pace with ordinary population increase; and that we have no really sound basis for estimating when a new period of renewed growth is likely to commence. We have been looking on at a world-wide phenomenon, and giving it merely local explanations. In America we talk of foreign competition, in France of ruined mines, in Germany of lost ore-fields and reparations, in England of dear coke. Each of these explanations may be sound as for one country, but the final truth is that for almost two decades the total world market has stopped growing.

As for the re-commencement of growth, that is another matter. All we know is that it will come about from factors of world-wide importance, such as the intensive development and modernization of one of the backward continents—probably Africa, possibly South America. It could be delayed some years by world-wide depression, arising from poor crop seasons or other broad causes. It could be put off indefinitely by another great war.

In the meantime, pending resumption of growth at something like the old rate, there will be closer competition between and within the nations, serious incentives to rigid operating economies, and overwhelming reasons for rapid adoption of any improvements in basal methods of manufacture. Slackness and stupidity may survive in boom times, but they disappear, via the bankruptcy court, during periods of cramped world markets. The strain on ore reserves will not be so noticeable, but the necessity for economies in developing, mining and marketing the ores will be greater than in the past.

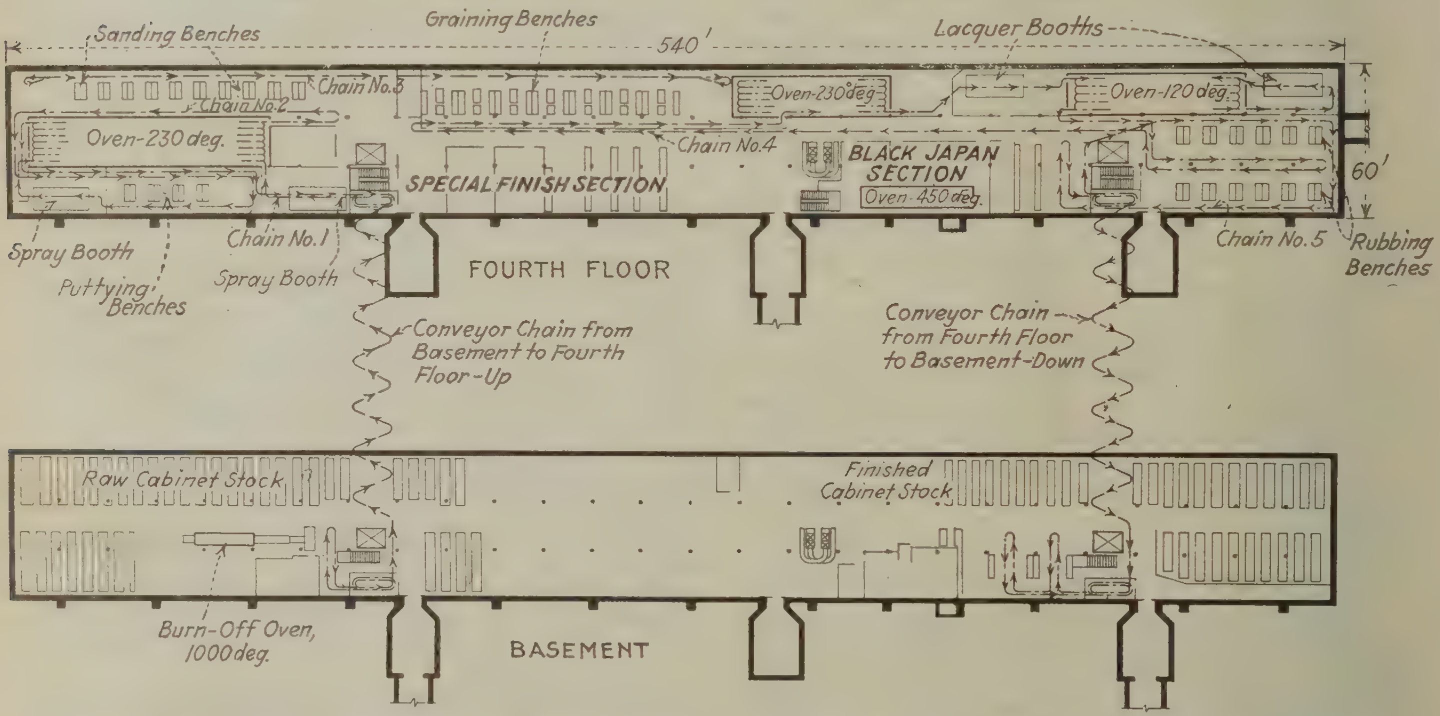
Larger Production at Lower Cost

Rearrangement of Enameling Department Reduces Floor Space Required, Handling Expense and Time of Process

BY E. D. SMITH*

FOURTEEN processes were required formerly in putting the enameled finish on cabinets and parts for cash registers. This made a great deal of handling, with the possibility of much potential damage to materials in process. The complexity of the problem may be realized from the fact that upward of 15,000 parts a day are put through, ranging in size from that of a 25c. piece to a full-size cabinet cover. The 14 processes were as follows:

Wash parts in suitable solution and dry.
Spray with first ground coat color.
Bake 90 min. at 230 deg. Fahr.
Putty, where necessary, to get perfectly smooth surface.
Spray with second ground coat color.
Bake 90 min. at 230 deg. Fahr.
Sand for smoothness.
Grain to produce natural wood appearance.
Bake 90 min. at 230 deg. Fahr.
Spray with first coat of lacquer.
Bake 45 min. at 110 deg. Fahr.
Spray with second coat of lacquer.
Bake 45 min. at 110 deg. Fahr.
Rub.


Sanding Benches
Graining Benches
540'
Lacquer Booths
Chain No.3
Chain No.2
Oven-230 deg.
Oven-230 deg.
Oven-120 deg.
Chain No.4
BLACK JAPAN SECTION
Oven-450 deg.
SPECIAL FINISH SECTION
60'
Spray Booth
Puttying Benches
Chain No.1
Spray Booth
FOURTH FLOOR
Chain No.5
Rubbing Benches
Conveyor Chain from Basement to Fourth Floor-Up
Conveyor Chain from Fourth Floor to Basement-Down
Raw Cabinet Stock
Finished Cabinet Stock
Burn-Off Oven, 1000 deg.
BASEMENT

Layout of the Fourth Floor, Where the Enamel Finish Is Applied, and of Its Conveyor Connection to the Basement for Movement, Upward, of Raw Cabinet Stock and, Downward, of Finished Parts

With that system in use the enameling department occupied an entire floor, 60 x 540 ft., and 2400 sq. ft. on another floor, an aggregate of 34,800 sq. ft. In handling a daily output of 600 cabinets 625 trucks were required, fitted with 8400 trays. These trucks occupied almost 4700 sq. ft. of floor space, or 15 per cent of the total area.

Raw stock parts, taken from the stock room at one end of the basement, were placed on trucks and carried by elevator to the enameling floor. After completion of enameling they were returned in the same manner to the finished stock room at the opposite end of the same basement. When maximum production was under way the elevators frequently were so congested with this cabinet traffic as to interfere wtih production in other departments of the building. The enameling department itself was badly congested at times, making it difficult to obtain the required production during periods of high output. A total of 58 handlings of parts was needed, at high labor cost.

How to Get Better Results

In studying means of alleviating this condition, the effort was made to obtain greater production without increasing the floor space; to reduce the cost for each unit of finished product; to reduce the inventory of material in process; to produce these results with a smaller amount of supervision, under conditions of a group bonus system for the whole department.

It soon became evident that a continuous-flow method of handling would effect a great reduction of the time each cabinet part was in the department. This would also correspondingly decrease the number of cabinets in process at any one time.

As there are 14 parts to each cabinet, a schedule of 800 cabinets a day means that 11,200 parts must pass a given point in 9 hr. A conveyor speed was therefore desirable which would be slow enough to permit the spraying operation, without removing the part from the chain. The speed at the same time should be such that parts might remain in ovens of reasonable dimensions for as long as 90 min.

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*Maintenance engineer National Cash Register Co., Dayton, Ohio. Abstract of a paper delivered at Philadelphia, April 24, before the national materials handling meeting of the American Society of Mechanical Engineers. The paper was illustrated by both lantern slides and a moving picture.

Sanding Room Showing, Left, Cabinet Parts Coming Out of Oven; Right, Parts Leaving for Next Operation

Much time and attention were given to the design of suitable hangers for the work, such that it could be grouped properly and conserve space on the moving chain. Some 75 or 80 different hangers were made and tested, but only nine were retained for permanent use. In studying this problem, a short length of chain was set up, in conjunction with a temporary spray booth, and many arrangements and designs were tried out before the present system was definitely adopted.

One of the first changes from the old procedure was the installation of a conveyor type of burn-off oven to take the place of the washing machine. This oven is installed in the raw stock room in the basement, whereas the washing machine was on the floor above the enameling department. The cabinet parts, taken directly from stock, are inspected and then put through the burn-off oven. This does away with placing them on trucks, hoisting them to the fifth floor for washing, and then lowering them to the fourth floor for enameling. It also saves the 2400 sq. ft. of space occupied by the former washing room.

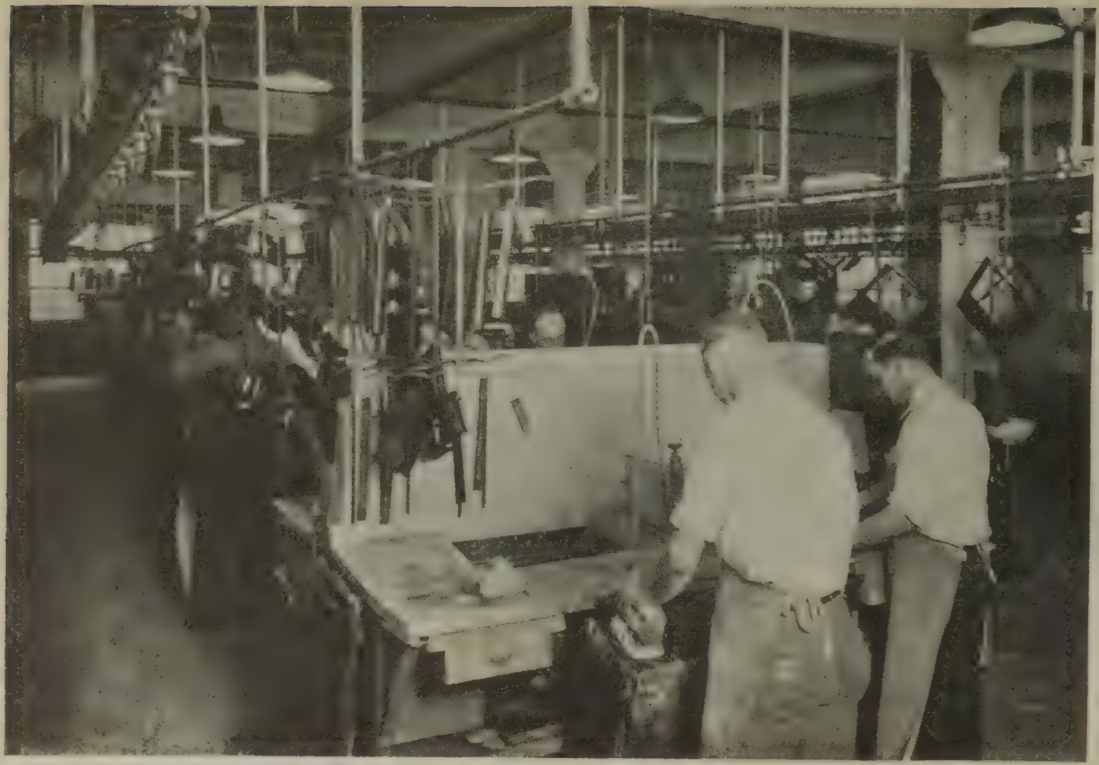
Chain Conveyor Replaces Elevators

After passing through the oven the parts are wiped off and hung on suitable hangers on a conveyor chain installed in a shaft back of the elevators. From this point they are carried to the fourth floor in a series of turns and risers, the angle of rise being 20 deg. Here they pass immediately through a spray booth, where the first ground coat color is applied without removing them from the chain. Still remaining on the chain, they are baked in the upper deck of an oven for 90 min. at a temperature of 230 deg. Fahr. This oven is 100 ft. long and about 20 ft. wide. Its size was determined by consideration of the chain speed as set for other operations, and the length of time the parts had to remain at the elevated temperature.

Leaving the oven, the parts are removed from the chain and receive on work benches whatever putty treatment may be necessary. They are then hung on another chain and, while in motion, are sprayed in a booth with the second ground coat color. They then pass through the lower deck of the same oven, without removal from the chain, and are baked for another 90 min. Again they are removed from the chain, for sanding on work benches, being immediately after hung on a third chain, which transports them to other benches where they are removed for graining.

After this operation they are hung on a fourth chain, passing through a second oven, where again they are baked at 230 deg. for 90 min. Leaving this oven, they are sprayed with the first lacquer coat while moving through a booth, and are then baked at 120 deg. for 45 min. in a third oven. Continuing their travel on the same chain, a second lacquer coat is ap-

Graining Room, Showing Conveyor at Left Delivering Cabinet Parts. At right, parts are being removed



RUBBING Section, Showing Chains Running Down Inside of Room Delivering Parts. Those at outside of room (reader's left) are removing parts and taking them down the spiral conveyor to basement

plied in another booth, after which they pass back into another section of the oven they have just left and receive another treatment at 120 deg. for 45 min.

Parts then are removed from the chain for rubbing. After this they are hung on a fifth chain, which carries them back to the other end of the basement by a descent in curves and inclines similar to that by which they came up from the raw stock department. Here they are inspected while still on the chain and then are packed in trays for taking to the different assembly rooms.

Conditions of Operation

Altogether there are five chain units, varying in length from 586 ft. to nearly 2200 ft., with an aggregate of about 6500 ft. The regular rate of travel of the chain, in operation, is 7½ ft. a minute. There are nine different patterns of hangers, each suspended from the chain on a swiveled hook. This permits the operator to turn the part around at will, which is particularly essential in the spraying booths, where all sides must be readily accessible for lacquer.

Between the five runs of chain are four stations where the parts are removed from the chains. As detailed above, these are the stations for puttying, sanding, graining and rubbing. At each of these locations racks are suspended from the ceiling to permit loaded hangers to be placed alongside the operators. This provides also a small temporary storage space at each side of the operator, so that he need never be without material. It also facilitates keeping together certain parts, when they must be grouped.

To eliminate fire hazard in the spray rooms, and at the same time to keep the atmosphere in those rooms in the best possible condition for the operators, each spray room is maintained under a slight static pressure. Filtered air is delivered into the room from a blower. To avoid drafts, the air leaves the end of the pipe through a large canvas bag. Fumes are removed from the spray booth by the exhaust system at the top of each unit. All paint or lacquer is removed from the air through a filter screen of excelsior before the air is discharged outdoors.

Each operator in each spray room has three spray

ONE of the Four Spray Booths, Where Cabinets Receive Either First and Second Ground Colors, or First and Second Lacquer Coats. For the first coat two men are employed, taking alternate pieces as the conveyor carries them past guns carrying that many different colors. Two operators are required to apply the first ground coat color. In regular procedure the first operator takes every alternate piece as it comes to him along the chain. The second man takes the pieces not taken by the first man. This provides even distribution of the work. One man can take care of the second ground coat color, and one man is provided for each of the lacquer coats. Thus five operators, altogether, apply four coats of material to 800 cabinets a day.

Heating of the baking ovens mentioned above is by air blast over steam coils. The burn-off oven, which carries a temperature of 1000 deg. Fahr., and in which the parts remain for 4 min., is gas fired, with burners both above and below the parts carried through.

Results Obtained Are Excellent

By the new process, the number of handlings has been reduced from 58 to 20. The number of trucks required has been reduced from 625 to 150. The length of time a part is in the enameling department has been cut from seven and a half days to one and a half days. The inventory of finished stock and stock in process has declined by 80 per cent. A greater uniformity in finish is obtainable by this method, partly because of the regularity and celerity of the movements.

After this system had been put into full production, it was found that the output had been increased from 600 complete cabinets a day to 800. The floor space required had meantime been reduced by 10,000 sq. ft., or nearly 30 per cent. It is estimated that the annual payroll for the enameling department, on the basis of an average of 700 units a day, has been reduced by $59,000.

Better working conditions have been obtained, partly by the air control systems mentioned and partly due to elimination of congestion at various points. Uniformity of baking, together with decreased handling, are credited with an improvement in the quality of the product. Elevator service, badly needed by other departments, has been almost wholly released so far as the enameling department is concerned.

CABINET Parts Coming Through Burn-off Oven in Basement and Being Hung on Conveyor, Which Delivers to the Enameling Department, Fourth Floor. This is the finish of the first operation the parts receive after coming from raw cabinet storage

Salvage Conference Plans Clearing House for Scrap Disposal

At a conference on salvage disposal held June 6 and 7 at the plant of E. I. du Pont de Nemours & Co., Wilmington, Del., and attended by about 50 representatives of industrial and public utility corporations, plans were made for the operation of a clearing house, through which members may dispose of surplus supplies and surplus or obsolete equipment.

The meeting was organized by the National Association of Waste Material Dealers, Inc., New York, and those in attendance were guests of the du Pont company. Among those who delivered addresses at the conference were Henry Lissberger, president Federated Metals Corporation, who is president of the National Association of Waste Material Dealers; Harry R. De Groat, A. M. Wood & Co., Philadelphia; G. H. Bangs, Western Electric Co.; Thomas A. Wright, Lucius Pitkin, Inc.; R. W. Phillips, E. I. du Pont de Nemours & Co.; C. H. Steel, Eastman Kodak Co.; Louis Birkenstein, S. Birkenstein & Sons, Inc.; John Y. Bayliss, chairman of Purchases and Stores division of the Engineering Association of American Electric Railway Association.

The new benzol plant of the Lake Superior Corporation at Sault Ste. Marie, Ont., will be operating by Nov. 1, according to J. D. Jones, general manager Algoma Steel Corporation. The contract, which has been awarded to the Wilputte Coke Oven Corporation, New York, calls for an expenditure of $250,000.

The plant of the Ashland Steel Co., Ashland, Ky., was sold at public auction June 7 to John Russell, Ashland, for $176,000. The sale was conducted by O. D. Hayes and T. A. Field, who had been appointed by the Federal Court as trustees of the property.

Incentives Aid Good Management

Bonuses for Quality, Quantity, Waste Elimination and Time Saved Promote Operating Efficiency—Proper Training of Foremen Also a Requisite of Good Supervision

THE relation of monetary incentives for both manual workers and supervisors of labor to the training of these classes of employees was clearly brought out at a meeting of the production executives' division of the American Management Association, held at the Hotel Statler, Buffalo, June 6 to 9. In a number of sessions given over to a consideration of such specific subjects as "Group versus Individual Incentives," "Extra Incentives for Supervisors and Indirect Labor," "The Training of Foremen" and "The Training of Manual Workers," it was made evident that incentive plans, particularly when applied to group labor, invariably lead to the better training in the ways of cooperation and increased and more economical production.

In the consideration of training methods, both as applied to foremen and manual workers, spirited discussion arose as to the best methods of approach, and it was brought out that two definite techniques of foreman training have sprung up. One of these emphasizes the value of a good theoretical foundation in the science of teaching, while the other tends to discard textbook practice and approach its individual problems without preconceived ideas as to how each one should be handled. Discussion led to a mutual acceptance of the fact that the training of foremen is one of the most important functions of industrial management.

Bonuses Should Not Nullify Savings Made

THAT incentives should grow more slowly than production and that group incentives should lead to autonomous production are principles in the establishment of bonus plans set forth by Walter N. Polakov, consulting engineer, New York. Speaking broadly, Mr. Polakov suggested the complexity of the problem of establishing incentive plans, dealing as they do with the organization of human energy, and thus involving situations that cannot be handled with the definite assurance of science. Human engineering, he stated, is growing more important in industry than engineering as applied directly to materials and equipment.

In outlining the establishment of a group incentive plan, Mr. Polakov stated that the group should be made up of men in the same sort of work or on the same job. Each function should then be analyzed and records kept both of individual performance and of the performance of the group. Further information on the working of individual and group incentive systems was brought out in papers describing the plans now being used by three large companies.

Paying Incentives on Dollar Basis

Reduced labor costs, lower inventory, better supervision of workmen and the establishment of group rather than individual effort were cited as the objectives of a group bonus plan installed by the National Cash Register Co., Dayton, Ohio. In describing this plan, R. F. Whisler, head of the company's rate and time study department, stated that at first the incentive standards were expressed in decimal hours. This system was not understood by the men in the plant and was soon discarded for one in which the standard was changed from hours to dollars. Definite control of rates on various types of work seemed necessary and standard rates were set up by the time study and job analysis departments. Under the dollar standard the foreman is given full supervision of the distribution of the cost of different articles and is required to turn out a certain number of pieces costing so much, the distribution of the cost and the consequent bonus earned by the group depending entirely upon him. In this manner cooperation within the group is obtained, as the bonus earned must depend entirely upon group effort.

Under this bonus plan the quality of the manufactured product went up, but to secure further precision a quality bonus is in use which entitles the group to an additional reward if there are no rejections of work above a certain fixed standard. Inventory costs are also reduced under the group bonus plan, as work in process is cleaned up by the workers, who are anxious to turn out as much production as possible. Budgetary control is also made more feasible by this plan, as it enables the management to know definitely the cost of work before it is scheduled.

Bonus Plan in Shipping Department

Introduction of an incentive plan in the shipping department of the Eberhard Mfg. Co., Cleveland, enabled the management to reduce the working force in that department 46 per cent, to reduce the payroll 33 per cent and to increase the wages of the remaining employees in the department 25 per cent. The plan, which was described by Brooks Shepard, production manager and secretary of the company, has placed the work done by the department upon a tonnage basis, the bonus being paid on tonnage got out above a certain fixed amount for which the men are paid on a day-work rate. The company has since applied the incentive plan to its foundry, the trimming and sorting and the annealing departments.

Paying Men for Time Saved

The Bridgeport Brass Co., Bridgeport, Conn., pays its men a bonus for time saved under the standard task rate set by its time study department. W. R. Clark, general works manager for the company, who outlined the plan, stated that he believed it could also be applied to continuous assembly work and that it is equally successful for group endeavor and individual piecework. The incentive is computed by dividing the actual production by the amount of time saved by the operator compared with the standard time set for the job. Mr. Clark stated that the earnings of employees under this plan are usually from 25 to 35 per cent above the base rate, particularly since they have become accustomed to its operation. He placed the readiness with which workmen are able to understand an incentive plan as one of its essential features, if not the chief requisite.

R. S. Perry, production manager Hudson Motor Car Co., Detroit, stated that his company has been able to apply incentive plans to very large groups with considerable success and thus is able to cut down greatly the cost of time study. The Hudson company also places a limit on the amount of bonus which can be earned, in that way preventing the cost of its incentives from nullifying the amount gained by increased production.

In discussing the difference between the group and individual bonus plans, Mr. Polakov stated that a group incentive is better when there is a difference in the functions performed by several men in one operation, while the individual incentive should be used when each worker performs a complete operation.

Application of Incentives Is an Art

In a paper upon incentives for workers and executives and their use in the training of new personnel, Carle M. Bigelow, president Bigelow, Kent, Willard & Co., Inc., Boston, emphasized the fact that, although science plays an important part in incentive plans, their actual application is an art. "In the application of incentives," he said, "the best results seem to be attained not by the application of any one theory or set of theories, but by the practical, intelligent, experienced application by an individual peculiarly fitted for such effort."

Mr. Bigelow stressed the instruction value of incentives and stated that the important considerations which should be made before placing a task or position upon an incentive basis are as follows: "Is a definite instructional procedure necessary for the proper accomplishment of this task or position, and is it essential that an incentive be paid in order to obtain the best effort of the individual?" He also expressed himself as being strongly in favor of direct financial incentives, based so far as possible upon individual accomplishment. This led to a consideration of individual as opposed to group incentives, and the speaker stated that he believed any attempt to establish group rates without a proper background of the application of individual rates or very carefully compiled past performance records would not lead to satisfactory results.

"In paying incentives to an executive," the paper stated, "it is necessary to determine the exact result over which he has individual control and that proportion of his reward he is to receive for control of his individual functions, as well as that proportion of the incentive which he is to be allowed for the results of the operations as a whole."

Eliminating Waste

When the raw material involves a large part of the cost of a product, incentives for eliminating waste are more important than production incentives. In introducing the subject of waste elimination bonuses, Francis T. Mack, production manager Mohawk Carpet Mills, Inc., Amsterdam, N. Y., stated that this sort of an incentive plan may usually be introduced by determining the method by which the best results may be obtained with a minimum of waste, thus setting up a standard upon which bonuses can be paid. In many cases waste elimination incentives may be consolidated with production incentives, but payment should be made separately to impress workmen with the importance of saving materials.

T. H. Blair, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., stated that his company had been able to eliminate many wasteful methods by asking for suggestions from the workers in a prize contest, and that since that time further suggestions had been taken care of under the organization's employee representation plan.

Quality and Attendance Bonuses

Quality incentives were suggested by Oscar Grothe, vice-president White Sewing Machine Corporation, Cleveland, as a means of bringing management's attention to poor quality of raw materials. Under a quality incentive plan, he pointed out, the machine operator is quick to report any defects in the materials given him to work, and thus the source of the trouble may be detected and checked.

A discussion of paying bonuses for regular attendance without tardiness brought out the suggestion that any group incentive plan makes for regular attendance, as each man knows that his absence from the job will penalize the earnings of the entire group. Mr. Perry of the Hudson company, however, questioned the worth of the attendance incentive idea, saying that there is no way to know whether or not it really pays for itself. "We know such a plan costs a certain amount," he said, "but we do not know whether it saves that much. Before instituting such a system we should know just how much absence and tardiness cost a company and then find out whether or not paying a bonus will offset that amount." In reply to this, W. J. Rhodes, works manager Carter's Ink Co., Boston, stated that he considered the attendance bonus really a part of the workman's wage and that, rather than an incentive, it was a method of penalizing labor for irregularity.

G. K. Wilson, Deere & Co., Moline, Ill., suggested a fallacy in the entire theory of incentives by stating that workmen are paid for producing a definite amount of goods of a certain quality, without any more waste than necessary, and that they are expected to report regularly for work. Why, then, should extra bonuses be paid? L. A. Hartley, educational director National Founders Association, Chicago, supplemented this question by asking whether or not bonuses are the tool of poor management. Mr. Polakov answered this by stating that if incentives are introduced by management merely as a hit or miss method of increasing production, quality or economy, this may be true, but if they are instituted with the definite aid of management, that is, with proper training and supervision, they become the tool of good management.

Incentives Develop Better Department Foremen

QUICKER deliveries, a lessening of the effects of hand-to-mouth buying, increased production, wider distribution of incentives, better service and improved quality of products were named as results of a foreman incentive plan used by the W. A. Jones Foundry & Machine Co., Chicago, in a paper by W. F. Coleman, treasurer and general superintendent of the company. On the other hand, the speaker pointed out, the plan did not increase the company's profits nor did it decrease the cost of foremanship per dollar of sales.

The foreman incentive plan was introduced, Mr. Coleman explained, when profits had declined during the post-war years and the need for greater volume seemed uppermost. As a result the total value of sales in one of the company's best quarters was set up as par, and an incentive of $25 was offered the foreman for each quarter this par was equaled. Further incentives were offered when the par was bettered. The bonuses are paid promptly and the men are notified regularly of their progress. Although the plan has been very beneficial in some respects, it has defects which have been recognized by the company. From its experiences with the plan, however, Mr. Coleman stated that the company has learned that any incentive should lessen the cost of the sales dollar in the division of the business in which the bonus happens to be paid. No incentive plan should allow a higher cost for the last of the units produced than for the average unit produced during ordinary operation. As the plan used by the Jones company does not reduce costs, the speaker pointed out that a change is contemplated, establishing an incentive plan for foremen which would combine reduction in cost of sales dollar with an increase in production.

In this connection W. S. Berry, Scovill Mfg. Co., Waterbury, Conn., asked if a comprehensive training program for foremen might not accomplish essentially the same results as a bonus system, particularly if the bonus system did not bring about a definite reduction of manufacturing expenses. Mr. Coleman replied that a foreman training plan is being introduced into the plant, and, although he did not believe it could ever be substituted for an incentive plan, it would undoubtedly become a valuable adjunct.

Incentives for Department Efficiency

In the plant of the Dahlstrom Metallic Door Co., Jamestown, N. Y., bonuses are paid to foremen upon a basis of their department's total production hours worked on bonus, combined with the average efficiency of the direct labor in the department. Under this system the performance of the department depends largely upon the foreman. Standard time rates are set for various operations and direct labor efficiency is found by dividing the total standard hours required for turning out work by the total actual hours worked. In describing the plan, Kenneth Anderson of the Dahlstrom company stated that it over-emphasizes the reduction of labor costs, but as the result of a budgetary control system recently introduced, other manufacturing costs are also brought to the attention of the foremen. Allotments for each product are listed, along with actual expense of turning it out by the department, and in this way the foremen are urged to distribute the costs evenly. Since introducing this feature, Mr. Anderson stated, the company has achieved a 25 per cent reduction in the amount of steel scrapped.

Incentives Which Benefit Customers

Customers as well as the company benefit directly from an incentive plan for foremen used by the Rome Wire Co., Rome, N. Y. This plan, which was outlined by M. A. Kent, the company's factory manager, provides for the payment of a bonus to foremen and department managers for the saving of labor and scrap, for delivering goods to customers when promised and for the quality of the products, based upon complaints or rejections by customers. Standards are set up for each of these factors and actual performance in each is compared with the standards, the foreman being able to earn a maximum of 10 per cent on each count as a bonus for the performance of his department. The plan has resulted in higher compensation for foremen, lower production costs, better quality and improved service. Decreased losses in scrap alone have more than offset the cost of the bonus, and during 1927 the company was able to make 98.9 per cent of its deliveries on time. At the same time complaints and rejections by customers declined 5 per cent.

How Shall Foremen Be Taught to Train?

THE underlying needs for and principles of teaching foremen how to train the workers under their direction were brought out in a paper by A. B. Gates, assistant manager of industrial relations for the Commonwealth Edison Co., Chicago. He outlined the assumptions upon which foreman training is based as "the importance of training the holder for any position, the fact that training is a definite function of supervision, and the further fact that improvements can be made both in the methods of training supervisors for their own jobs and for the jobs of training others." He further assumed that "supervisory training is a logical part of job training, because supervisors are holding a definite job which has many special features."

"In establishing a training program," Mr. Gates went on, "determination has to be made at the outset as to whether it shall begin from the bottom and go up or start at the top with a major executive and go down. Most training programs are, because of existing conditions, a compromise between these two. Before beginning training, an outline of procedure has to be prepared in order that points shall be considered in their logical order. This analysis needs to be made in order that proper stress shall be placed upon difficulties discovered. In all of this work the supervisors and other members of the line organization are drawn in, in order to cement their interests and connection with the program.

"Having collected the necessary material for training, the next step is to determine whether the instructions shall be individual or in groups, and, when this decision has been made, the training material may be set up for use. In divisions in which the turnover is very small, it is best to have the training done individually by a supervisor. In cases where the turnover is much larger, it may be preferable to carry on the work in group discussions. So far as is possible, some means of measurement should be devised to indicate to the management what benefits have resulted from the training given. The more definite this measurement can be the better.

"The training program should never become final, but should always be sufficiently elastic so that such changes as time and experience prove necessary may be made. Training is nothing more or less than keeping up with progress. The supervisors, as the key-men in industry, should be those who are trained most thoroughly, both for their own sake and so that they may better train those men for whom they are responsible."

Training Methods Lack Definite Technique

In a review of tendencies of foreman training during recent years, Dr. J. A. Randall, president Rochester Mechanics Institute, Rochester, N. Y., recognized the growth of well balanced training programs as well as the lack of a definite technique both in the planning and application of foreman training. In the discussion which followed, W. S. Berry stated that it is necessary to teach the foreman educational methods or the basic technique of teaching before he can be expected to train the men under him.

W. J. Donald, managing director American Management Association, took exception to this plan, saying that men could not be taught to train out of a textbook. Acceptance of academic training methods, he brought out, is one of the fallacies of industry, and the best results in foreman training may be obtained by urging the foreman to bring his individual instruction problems into a joint conference of foremen and management, where they may be dealt with separately. Such a plan would soon lead to the building up of a practical and workable training technique. Mr. Donald also took exception to the assumption made so generally in industry that the older foreman and workman cannot be taught new methods.

John G. Wegman, general foreman North East Electric Co., Rochester, N. Y., expressed the opinion that, while the foreman has usually been taught in the school of experience how to supervise the men under him, he is quick to absorb new methods of teaching and is eager to be given access, through schools, libraries and such, to additional information which will build up his background and enable him better to cope with training problems. Byron F. Field, Commonwealth Edison Co., Chicago, emphasized the need for tact and mutual effort in the introduction of better training methods to foremen. The training department will be successful, he stated, if it can put together the best methods now being used by foremen and develop the miscellaneous information into a unified and workable training technique.

Training Manual Workers Similar

Consideration of the problem of training manual workers brought out the fact that they are fundamentally the same as those of foreman training. Russell G. Keppel, Standard Oil Co. of New Jersey, Bayonne, N. J., reviewed the methods now being used for workers of different classes and in different stages of training. He stated that training work now is at about the same stage in industry as accident prevention work was 15 years ago, but that its importance has been recognized, with the promise of wide application and far-reaching results in the near future.

Training of Apprentices

Selection of the right type of boys and assuring their gradual progression by a definite program of work and study were cited as the most important factors in the success of an apprentice training program, in a paper by E. W. Kempton, educational director American Steel & Wire Co., Cleveland. In the choosing of prospective apprentices, Mr. Kempton stated, determination of the amount of previous scholastic training required should first be made. The boy should then be subjected to various examinations to determine his mechanical ability, general intelligence, scholastic progress and physical condition. His personal desires and ambitions should also be determined and the full understanding and cooperation of his parents should be assured.

Actual training, according to Mr. Kempton, should begin with a probationary period which should not be too short, lasting if possible for six months. During this period the progress of the apprentice should be checked regularly, with a view to determining his capacity and general ability or aptitude. It was brought out that the rate of pay at the beginning is not, or at least should not be, as important to the apprentice as his opportunity for advancement, and that a definite program of progression and added responsibility would help bring about this feeling. The general promotional policy of the company should also be stressed, and the boy should be made to understand that continued advancement depends entirely upon himself.

Regarding actual training in the shop, Mr. Kempton stated that, if the number of apprentices beginning at the same time is large, it is well to have a supervisor of apprentice training, to whom the apprentice may look for aid at all times and who fully understands the training program. However, the foremen in the different departments should cooperate fully and, if the number of apprentices employed is small, must necessarily be in charge of the training. In the Steel & Wire company foremen are required to report monthly the number of hours put in and the progress of each apprentice, and a more detailed report is required quarterly. Advances in wages should be regular and automatic, and the graduate apprentice should receive about the same compensation as the journeyman.

In a paper by George F. Kent, manager of industrial relations for the Bucyrus-Erie Co., South Milwaukee, Wis., it was brought out that the compensation of apprentices is not provided so much in his wages as in the valuable experience gained. The value of apprenticeship training to the company was emphasized by the fact that in the Bucyrus-Erie Co. the hourly rate of apprentices is only about half that of the journeymen, while their efficiency is only 15 to 25 per cent less than that of the older men. Labor turnover is also greatly reduced, and this company is able to draw most of its trained mechanics from its apprentice classes. Dependable foremen are also developed in this manner, and the company has been able to develop a higher standard of cooperation and loyalty.

New Competition Places Emphasis on Merchandising

Industries Must Organize to Hold Old Markets and Cultivate New Ones; More Intensive Advertising Essential, Says Charles F. Abbott

"THE problems of production and of financing industry have been largely solved," said Charles F. Abbott, executive director American Institute of Steel Construction, Inc., New York, in an address before the Rochester Ad Club, Rochester, N. Y., June 8. "We are now face to face with the problems of distribution, of scientific marketing and selling, and we must depend upon research to chart our course. Today, old markets, if we are to hold them, must be intensively cultivated. New outlets must be developed, in order that excess plant capacity may be fully absorbed.

"Increased competition to meet new conditions has developed and, to a large extent," asserted Mr. Abbott, "is responsible for most of our present-day difficulties. The transition we are witnessing is bringing with it a new competition which, in turn, calls for a radical readjustment of merchandising policies.

"We now find industry organized against industry for the purpose of encroaching upon the market of another by substitution of products."

As a consequence, Mr. Abbott added, the organization of industries, and their cooperation in advertising and selling, is becoming a leading issue of the day. The principles of sales management must be applied to an industry just as they are used by individual companies.

"The individual concern," stated the speaker, "has found itself totally unable to cope with the new struggle for markets. The vision to see that the individual concern can prosper only as the industry prospers offers the sole hope for survival.

Cooperative Advertising Needed

"Such cooperative activity, aimed primarily at better mechandising methods, offers the one assurance of prosperity during the period of transition that is bringing into the limelight, as the future problem, the locating of buyers to absorb what we produce and to make them want what we have for sale.

"To the sales and advertising manager this transition should prove of tremendous importance and interest. It opens a field for their activities large enough to satisfy their greatest ambitions. Whereas now they deal with many individual concerns, each with a limited appropriation for advertising, tomorrow they will be called upon to serve whole industries or great sections of the country.

"However slow they may be to act upon their knowledge, most business men can readily be brought to a realization of the value of research, particularly as it applies to markets or to standardization and its resulting economies. But as we approach the less tangible elements of modern business, we find growing confusion and increasing reluctance on the part of any individual to admit that he is in any way responsible for the unfortunate conditions as may exist.

"Owen B. Young, chairman of the board of the General Electric Co., has said that the solution of business problems lies in group action. Charles M. Schwab, chairman Bethlehem Steel Corporation, has made the statement that cordial cooperation among the various elements of the steel industry would be worth more than a billion dollars.

"Most of the executives of the steel industry have been trained to think in terms of tonnage output per man per day. Their experience covers a period when the market for steel products was not a serious factor. Today a large tonnage of steel is being displaced as competing materials are now offering aggressive competition.

"Undoubtedly officials in the steel industry will recognize the need of applying modern methods of selling and advertising and adopt the principles of organization to develop a public consciousness of steel and extend its use. The recognition of the producers' distributive industry and the extension of the desired cooperation and application of efficient selling policies would all go a long way toward improving conditions within the steel industry wherein prices and profits would be more in keeping with the results being displayed in other industries, the attention of which is being devoted to the necessary policies to meet present-day requirements.

"To broaden the market and encourage cooperative effort and the application of better methods will become the chief aim of each industry."

"Advertising and the application of the most improved methods of salesmanship supplemented by individual advertising and promotional effort will prove the most economical method of advancing the welfare of an industry," said Mr. Abbott in his concluding remarks.

The Merchandising Plan of the Future

"The merchandising plan of the future will call for the following requisites:

1. The development of new and original ideas.
2. The formation and adoption of sound selling policies to meet the present-day conditions.
3. The application of intensive and aggressive advertising and selling.
4. The program to be supported by constant research in the development of new uses and the exploitation of new markets.

Polish Essential fo

Details of Successful Methods fo Stamping, the Undercoat of Nickel

BY CHARL

Scratch Buffing Steering Knuckles Before a Heavy Chromium Deposit, Using Superior Tampico Brush

VERY often information about polishing metal surfaces before plating with chromium is promised by the title of an article appearing in the technical press. Usually such articles are disappointments. We are again told that the process is difficult, but no directions are given to overcome the difficulties.

In the following paragraphs is given some practical information on this difficult subject. These methods have been tried out in the Detroit plant of the General Chromium Corporation, and in the plants of many of its licensees. Some of the steps may turn out to be unnecessary on production work, but directions such as these are complete enough to prepare high-class job work.

Chromium Plate Reproduces Defects in Surface

Due to the special properties of chromium plate, the art of polishing and buffing metal surfaces before chromium plating has called for the development of special technique. The chief factor in the increased cost over nickel plate is the fact that the metal surface before chromium plating must be almost perfect in its finish. Such a "jewelry job"—and that phrase is often used—costs money. In no other line of electroplating is the magnifying glass so often called into service.

Chromium plate will not flow as do softer deposits, and cannot be depended upon to cover up polishing marks. It will not only exactly reproduce all the underlying polishing marks and scratches but seems to magnify them. A polished surface of nickel or copper plate that appears faultless will show many polishing marks, seams or pits after being chromium plated. In fact, a very important use of chromium plate for covering engraving plates depends upon this property of reproducing with great fidelity and added sharpness the fine details of the engraving. Pits, seams, sand holes, and such defects that nickel or copper plate will cover, must be completely polished out.

Speed of Lathes

The recommended speed of lathes is:

Grinding	1200 to 1800 r.p.m.
Polishing	1800 to 2200 r.p.m.
Buffing	2200 to 2700 r.p.m.
Chromium buffing	2700 to 3000 r.p.m.

These figures are important. A high speed combined with a light pressure will give the highest finish. In chromium buffing especially (that is, the final "coloring" of a chromium-plated surface), it is impossible to buff a flat surface at slow speed. Without high speed, the surface will show fine scratches or buff marks.

Since the widest application of chromium plating seems to be on automobile hardware, chiefly of steel, and on brass plumbing fixtures, the preparation of these surfaces will be discussed in detail. A high finish chromium plate directly on steel is but seldom used. Most preparation on the steel is for the copper and nickel put on before entering the chromium bath.

Preparation of Pressed Steel Sheet

On smooth steel pieces of various kinds the preparation differs but little. For pressed steel, such as radiator shells, the following is recommended for a very high class finish:

(a) Rough out on a rag wheel with No. 120 emery.
(b) Use No. 140 emery on a greased rag wheel.
(c) Use No. 160 emery on a greased sheepskin wheel.
(d) Use No. 180 emery on a greased sheepskin wheel.
(e) Finish on a Tampico brush with No. 180 emery cake.

For a production job a two-wheel finish with No. 140 and No. 180 emery on sheepskin wheels may be used.

Rough Cast or Forged Steel Needs Preliminary Smoothing

On rough steel, such as used for bumpers, forgings or castings, the above method must be preceded with emery for roughing out. A series starting with

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[*] Installation engineer General Chromium Corporation, Detroit.

hromium Plate

eparation of Rough Casting or d the Final Chromium Plate

LDRIDGE*

No. 36 emery, ranging to No. 60, No. 80 or No. 100, is recommended. A production job may need only two grades, such as No. 60 and No. 120, depending upon the requirements of the purchaser.

Forged iron and cast iron are prepared as above, although sometimes grinding is necessary before the polishing operation.

Steel surfaces prepared as outlined above are ready for copper plating, or for a duplex copper nickel, or nickel copper-nickel, plating before chromium plating.

Brass Castings Need Finer Finish

Preparation of cast brass is similar to the routine for a high-class preparation before nickel plating. More reliance must be given to a fine emery finish, and less to a cutting down and buffing operation. Pits, seams and sand holes in cast brass will drag out if buffing is overdone, and the final chromium-plated surface will not please. Contrary to general expectations, nickel plating of brass will not cover such imperfections sufficiently well to prevent flaws in the final chromium plate.

The following operations have been found to give good results:

(a) Rough out with No. 80 emery, using a felt or rag wheel.
(b) Use No. 120 emery on a felt or rag wheel.
(c) Use No. 150 emery on a greased felt or sheepskin wheel.
(d) Finish with No. 180 emery flour on greased felt wheel.
(e) Cut down, using a sewed buff with tripoli as an abrasive.

BUFFING Radiator Shells on Hall Curtis "Hi-Speed" Lathes. At left are two shells with a preliminary copper plate; at the right is the "coloring" operation on shells after chromium plating

Buffing Nickel Plate on Automobile Trunk Rack and Cowl Bars

(f) Color-buff on a soft linen buff, using a high-grade Vienna lime or other white finishing compound.

For a production job, (a) and (d) may be omitted.

Preparation of Nickel and Copper-Plated Surfaces for Chromium Plating

The buffing of brass and steel objects, after being nickel plated, and before being chromium plated, must be of the highest quality. As a rule, a soft linen buff is used, and such a buff is to be as small as the nature of the work will permit. The minimum of nickel plate is to be removed; at the same time a very bright luster is necessary. The surface before chromium plating must be as free from imperfections as possible, and to be free of all buff marks, leave-off marks and composition. Such a perfect surface calls for an extra operation called "color-buffing." For this operation a flannel buff is used with Vienna lime as an abrasive.

Copper-plated surfaces are treated in much the same way as nickeled surfaces. The copper plate must be of sufficient thickness to stand a good cutting down operation with a combination of tripoli or "white diamond." We have found Stevens' "double duty" compound to be highly satisfactory. A color-buffing must then follow.

Soft Die-Cast Metal, White Metal, and Nickel Brasses

For metal parts like die castings and pieces made of white alloys, such as nickel brasses (German silver), the following methods may be regarded as standard:

(a) Starting with the rough casting, according to its condition, use the following series: No. 140, No. 160, No. 180 to No. 200 flour emery. Use a sheepskin or a felt wheel—the former is preferred. Use grease freely on all wheels.

(b) Buff lightly on sewed buffs, using a greasy composition such as "white diamond" or tripoli.

(c) Color-buff on a soft linen buff, using "white finish" or "Acme" Vienna lime. In some cases Vienna lime dipped in kerosene will give to the above metals a high finish otherwise not obtainable.

Buffing the Final Chromium Plate

Unless the article comes from the chromium plating bath with a perfect finish, it is necessary to buff the surface. Often this is desirable to give an otherwise unattainable life or "snap" to the surface. This process is called "chrome buffing" or "coloring."

Chromium plate is unfamiliar to most buffers, and a humiliating (from the workman's viewpoint) educational stage must be gone through, but a good operator will become skillful at this class of work in a short time. This preliminary training is important, as a large percentage of success depends upon the buffer.

The lathe should run at a speed of from 2700 to 3000 r.p.m. A hard sewed buff is recommended, although in some cases a soft linen buff will be found to work satisfactorily. Green chromic acid compound has been found to be most useful as an abrasive. It can also be used to cut down burned edges and corners. Green compound is very hard to remove from threads and depressions and leaves the work in an unsightly condition, but on smooth surfaces that will wipe off readily, such as radiator shells and bumpers, green composition is hard to beat. A hot strong solution of whale oil soap (6 oz. per gal.) will readily loosen green compounds from corners and depressions; ordinary electrocleaners will not loosen it.

For irregular work, such as plumbing fixtures, a brown chromium oxide has been found most useful. Such a compound wipes out easily. Some white compounds made of levigated alumina are on the market, but no brand has made a lasting success.

What Sheet Industry Needs to Do

Go Into Cooperative Research and Education, as Through Advertising, and Forget Fear of Excess Capacity

THE low prices and low earnings of the steel trade in general and of the sheet and strip steel industry in particular came in for special attention in an address made last week at White Sulphur Springs, W. Va., at a meeting of the National Association of Flat-Rolled Steel Manufacturers by O. H. Cheney, vice-president American Exchange Irving Trust Co., New York. In a brief telegraphed statement from the meeting, given on page 1649 of THE IRON AGE of June 7, some of the high spots of the speech were reported. In the following are the main points substantially in full:

The Alibi of Excess Capacity

"The present condition of the steel industry cannot be blamed on anybody but the steel men. . . . You will tell me that the real trouble is the excess capacity of the flat rolled steel producers. 'Excess capacity' has become a favorite alibi for American business men—and as soon as an alibi becomes popular I begin to be doubtful about its significance. A large proportion of manufacturers are using it to justify price-cutting and extreme tactics of competition. Most of them sincerely believe their complaint—their very sincerity has blinded them to the truth. Excess capacity is not the cause of price-cutting—the real cause is fear of excess capacity.

"Many industries, including the automobile industry, are making money in spite of excess capacity. I cannot think of a single industry which is not overextended in plant. It is estimated that your industry has about 25 per cent excess capacity—it would not really matter if the excess were 10 per cent or 50 per cent.

"Of course, you know the answer—'mergers.' The idea has become part of our economic creed that business must grow bigger and the bigger the better. It is time we got over the notion that any merger is a good merger—that it immediately makes the combined plants more efficient, cuts the overhead and increases profits. There is too much talk of 'putting through a merger.' Mergers cannot be put through—they must be built up. Practically any business can improve itself by taking thought—but merely putting two businesses together, without thought, does not automatically improve them.

Establishing a One-Price Policy

"But how can this price-cutting be stopped? Only by casting out the craze for volume at any cost and the fear of not getting the volume. This means the scientific quoting of prices based on actual costs plus a reasonable profit. It means sticking to quotations. It means going after only a reasonable proportion of the total business, based on the average for previous years—and being satisfied with that volume. It means sticking as much as possible to your own economic territory instead of trying to flood the country. It means getting a reasonable volume of business by sane and ethical methods and making sure of a legitimate profit on it.

"The one-price policy revolutionized retail merchandising—it can revolutionize the steel industry. The best way to carry out a one-price policy is to forget competition. It should be much easier to do in steel than it used to be because steel is no longer just steel. An increasing proportion of steel is in the class which would be called special a few years ago.

"The only sound way to increase the volume of each company which deserves to exist at all is to increase the total volume of steel sold—to extend its use—to improve it so that its service may be extended.

Research and Education the Two Weapons

"Here are two definite programs which offer the only solution of the steel industry's problem—and both of them demand the form of close cooperation which is known as the trade association. I am sorry I cannot suggest some new remedy—something simple and exciting. The trade association is simple and exciting—but only with the simplicity and excitement of hard work.

"Any industry which does not wake up to the new competition may wake up to find itself dead. Your own line is in a constant state of flux—every day new pressures are changing its very nature, not only in production but in uses and markets.

"The two weapons in winning new markets are research and education. Certain of your member companies have already demonstrated what these weapons can accomplish. Some of those companies which have developed new products and intelligently promoted their use will be found heading the list of profit-makers. But if the industry as a whole is going forth to conquer new markets, should the burden be placed on two or three companies? Whose steel industry is it?

"Speaking of cooperative advertising, what kind of cooperative advertising would you call that which knocks steel—and is paid for by steel producers? Horrible examples of the defects of steel are graphically pictured in these advertisements—rusting and its cost and unsightliness. What is the effect on the consumer? Doesn't such advertising leave the reader with a growing feeling against steel in general? If your steel is better, say so, but keep on saying that all steel is good.

"But why should the steel producers pay to promote products which they don't make? You don't make furniture or shelving or roofing—but how much money you make depends vitally on how well your customers sell. The sales problem of the consuming industries is your sales problem and you are tied together by the unbreakable bonds of modern industry.

"This new cooperation as a weapon in the new competition extends to the other important phase of the new competition—the competition between the different factors in the industry. Just as your prosperity depends on that of the consuming industries, so does it also depend on the distribution machinery. Trying to beat the jobber is too much like knocking your head. Only a spirit of understanding and sound cooperation can make the steel industry one in its war against the other industries.

Mr. Cheney also touched at length on the inadequate returns from the steel industry and of the flat rolled steel industry in particular. An analysis of the records of nine of the member companies of the association, he said, shows that the per cent of earnings to capitalization was only 5.27 last year. The year before it was 7.76 per cent. One of the leading members last year suffered a decline in net profits, as compared with the preceding year, of 53.6 per cent. He pointed out that the steel industry in the last few years has spent hundreds of millions of dollars in improving methods and cutting costs. One company has spent $150,000,000 in five years and as a result has been able to cut the average cost of production per ton of finished steel by $7.27.

"What happened to that $7.27?" he asked. "The average billing price of this company per ton of its finished and rolled steel has gone down $8.60 in the same five-year period. This steel producer therefore paid $150,000,000 for the privilege of giving away $1.33 with every ton of steel.

"It is true that the steel consuming industries have made more money than the steel producers. Analyzing the operating finances of a group of over a hundred steel consuming companies in ten leading lines, we find a percentage of earnings to stockholders' investment of 15.3—three times as high as that of the steel producers. In the case of the companies manufacturing automobiles, trucks and airplanes, the percentage is 24.9; in farm implements and tractors, 10.6, and in office equipment, 15.7." (These figures were all given in THE IRON AGE of April 26.)

Training Minor Operating Executives

How the Problem in a Rapidly Growing Organization Has Been Met by American Rolling Mill Co.

THE problem of maintaining a trained working force in a rapidly expanding organization was discussed by A. J. Beatty, director of training, American Rolling Mill Co., Middletown, Ohio, at the recent Pittsburgh meeting of the American Society of Mechanical Engineers.

Formerly the company had a training course known as the Works' School, in which were enrolled men who were headed either toward minor executive positions in the operating division or toward the sales division. The course did not satisfy the operating management because the course was so frequently used by ambitious young operating men, with a leaning toward sales. To remedy this defect, two courses were organized to replace the Works' School; one known as the Operating Training Course, and the other, the Sales Apprentice Course.

In interviewing men who are candidates for the Operating Training Course, the following are some of the questions asked to determine their line of thought:

> What is ahead of you on your present job?
>
> What is the next job ahead?
>
> What efforts have you made to fit yourself better for your work?
>
> What study do you need to help you on your job?
>
> Are you prepared to handle a more responsible job just now?
>
> Has anyone ever been promoted over you? Why?
>
> What is your idea in applying for this course, and what do you expect to gain by it?
>
> What do you expect to be doing five years from now?
>
> What do you read?
>
> What do you do with your spare time?
>
> How much time are you willing to give to study to master the knowledge of the steel business?

These and other questions usually elicit answers which enable the interviewer to determine how intelligently and how seriously a candidate is considering the necessary means for his own progress. While his schooling is one of the determining factors in enrolling a candidate in the course, his experience and his record are given a good deal more weight than scholarship. Expert ability, knowledge of his job and his department, and ability to handle men are the important factors. Of the men who have taken this course about half have not been high-school graduates, about 25 per cent high-school graduates, and about 25 per cent college graduates. Several have been engineering graduates.

An outline of the operating training course follows:

Foremanship is a required subject for men enrolled in the operating training course; for all others it is optional. A new course is outlined and followed each year in order to encourage men to continue this study from year to year.

Each September the first step in organizing for the study of foremanship is to enlist a smaller group of leading foremen—six to ten in number—which is called the foremen's cabinet. The men selected for this cabinet are successful foremen, judged by their record of accomplishment in getting work done and in developing men.

The foremen's cabinet serves in an advisory capacity to suggest and outline topics for discussion consistent with the above general outline. The foremen's cabinet is not a fixed group. Each member is invited to serve for three or four weeks, at the end of which time he may be dropped to make room for another man who is selected to fill his place, generally on the basis of his interest and activity in discussion groups. This plan provides enough holdover men to give a degree of permanence to the cabinet and, at the same time, the addition of new members constantly introduces new blood and new points of view.

The outline for the year being set up, an announcement of the proposed course is sent to all foremen with an invitation to enroll. Those who enroll are grouped into classes of from fifteen to twenty for round-table discussion.

The conference method is used. By this is meant that the chairman or leader, while he has in mind just the ground he plans to cover and the conclusions he hopes to reach, undertakes to draw out from the group members the facts and the conclusions so that whatever conclusions are reached are the conclusions of the group. He must also keep the discussion from going too far afield, and lead the group to right conclusions.

The method of handling study groups in economics is the same as that outlined for the foremanship-management groups. Each group has a leader and an assistant leader, these being chosen partly on account of their previous training and interest in economics, and partly on account of their recognized leadership and stability.

The director of training has a regular weekly meeting of these leaders. Here he presents an outline of the next study topic with discussion-provoking questions. In this group leaders' class are worked out the plans and methods of presenting the various topics.

Most of these groups meet one evening each week on their own time, the sessions lasting from 1½ to 2 hr. The courses vary in length as follows:

Foremanship, 10 weeks	Business English, 16 weeks
Economics, 24 weeks	Public speaking, 16 weeks.
Business law, 18 weeks	
Metallurgy, 72 weeks.	

Another phase of the program for the development of minor executives is a course in company products, processes, and policies. This course is designed to give a complete picture of all departments of the plant and the part each department plays in producing the finished product. Groups taking this course are limited to fifteen to twenty, and one session of the course is given to each of ten departments, including the open hearths, the blooming and bar mill, the hot mills, the processing, the galvanizing, the finishing, the personal-service, the sales, the publicity, and the service-engineering departments.

The sessions in the production division include inspection trips through various departments, followed by discussions led by the superintendents of these departments. The sessions in the non-production departments are each in charge of a representative of that department.

Perhaps the most important part of this training course is the specific training which each man gets in the department in which he is most interested, or in which he is headed for promotion. An arrangement is made with his superintendent so that he is given special attention and opportunity to get all-round experience and knowledge of the department; he makes special studies, and finally writes a report on the department, and submits to a quiz to determine his mastery of the department, the department superintendent and the training department being the inquisitors.

Another means by which the company undertakes to develop executive talent is to keep its foremen posted on business conditions in general, and the company's business in particular. Whenever the management has any important message to get over to the organization relating either to company policies or to business conditions, or to any important change in working conditions, the entire foremen's group is called together in what is called, officially, "The Foremen's Forum."

Perhaps the one feature of the program for developing minor-executive talent that reaches the greatest number is the Armco Foremen's Bulletin. This is a one-page, mimeographed bulletin which is issued weekly by the training department and is sent to every foreman of the company and also to every man of higher rank than foreman.

Each bulletin is confined to a single topic of management, or of production, or of organization building, or of economics, or of personal development.

This bulletin is effective in these ways:

1. It serves as a means of carrying important announcements and items of information to foremen.
2. It is an effective forum for the discussion of organization problems such as: "What Is the Foreman Paid For?" and "Have You an Understudy?"
3. It presents new ideas, or old ones in new garb, to keep the foremen thinking outside and beyond their jobs. "How to Handle the Boss," and "Thinking in Dollars," are examples of this type.
4. It ties in with foremen's group discussions, some bulletins furnishing the topics for discussion, such as "Encouraging Suggestions," and "Why Men Like Their Jobs." Others summarize such discussions as "What Is Overhead?" and "How I Get Suggestions from My Men."

Classes in Morning on Company Time

R. G. Forbes, superintendent of instruction, National Tube Co., Ellwood City, Pa., in discussing the paper told of a class held some time ago in economics at the Ellwood Works of the National Tube Co. The class convened at 5.30 in the evening. Although a standard text book was used and the class was led by a competent instructor, the class terminated with but a fair measure of success due in large measure to a natural physical and mental reaction that set in after a hard day's work was done. It would seem then that the most advantageous plan would be to conduct all classes during the morning, rather than either in the afternoon or evening, on company time, since it is evident that the company is more interested in developing minor executives than it is in the quantity of production of any individual during his training period.

President Clyde of Carnegie Steel Co. Optimistic on Pittsburgh Future

PITTSBURGH, June 9.—In an interview given a local newspaper, William G. Clyde, president Carnegie Steel Co., said that his company had spent approximately $100,000,000 in improvements and betterments in the immediate Pittsburgh district, and emphasized the fact that this sum would not have been invested had the United States Steel Corporation's officials any doubts about the continuance of Pittsburgh as the center of iron and steel production.

"This more than $100,000,000 covers only such work as has been completed," said Mr. Clyde. "It does not take into consideration work that is in progress, for which many more millions have been appropriated. Neither does it consider the mills at Farrell and New Castle, Pa., and Youngstown and Mingo Junction, Ohio, nor does it take account of like expansion and reconstruction by other Steel Corporation companies in this district.

"In a little over three years the Homestead plant has undergone a complete reconstruction that has made it the last word in steel-making equipment. Today it is the most modern steel plant in the world. At this one plant more than $40,000,000 has been spent. At the by-product coke plant at Clairton more than $37,000,000 has been spent and there still is work in progress which we are not considering in this phase of the situation. Here we already had the largest by-product coke plant in the world. In four years it has been doubled. From something more than 700 coke ovens it has been increased to 1432 ovens, into which, every day, is fed 30,000 tons of coal.

"Carnegie Steel Co. has spent four years and $5,000,000 in building up a river fleet—an 'industrial navy'—for the transportation of our steel to Southern and Southwestern ports. This navy now consists of 14 steamers and between 300 and 400 barges, which number is being continually augmented.

"In this period of a little over four years Carnegie Steel Co. has shipped nearly 300,000 tons of steel down the Ohio and Mississippi rivers, and this shipping is growing in tonnage each month.

"The Edgar Thomson plant at Braddock has been making steel for 53 years, and just lately has broken a lot of production records," he said. "And I am absolutely convinced that 53 years from now these great Pittsburgh district plants will still be making steel—and breaking records doing it.

"The men and the organizations who helped to make Pittsburgh are not in any doubt as to her future."

William A. Hopple, Jr., secretary and treasurer of the Hall Safe Co., 3253 Spring Grove Avenue, Cincinnati, manufacturer of steel safes and vaults, has been appointed receiver of the company upon action filed with the local Common Pleas Court by Mrs. Anna S. Hall, widow of Edward C. Hall, founder of the company. Mrs. Hall, in her petition, stated that the company is solvent, but market conditions and inability to realize on its assets has placed it in a position where it is unable to meet maturing obligations.

To Increase Trade Extension Work

Flat-Rolled Steel Executives, Including Sheet and Strip Makers, Plan Widened Promotion Activities — Low Profits and Forced Production Called Menace to Industry

THAT manufacturers of flat-rolled steel will unite in promoting a program of trade extension activities and of market research was the most important development at the first annual meeting of Flat-Rolled Steel Executives, held at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 5, 6 and 7. The meeting was sponsored by the recently organized National Association of Flat-Rolled Steel Manufacturers, into which were merged the National Association of Sheet and Tin Plate Manufacturers, the Hot-Rolled Strip Steel Institute and the Cold-Rolled Strip Steel Institute.

Decision of the entire flat-rolled steel industry to cooperate in promoting the use of all flat-rolled steel products means that hot-rolled strip steel and cold-rolled strip steel manufacturers will contribute to the support of the movement, which heretofore has been financed exclusively by sheet steel companies. Furthermore, it assures the executives in charge of the movement of having at their command more adequate funds than in the past to help fabricators of flat-rolled steel in extending present markets and in finding new uses for their products, as well as to reach the ultimate consumer and to educate him.

Need for Adequate Profits Stressed

Prominent in the discussions at the business sessions was the need of getting on a profitable basis so that companies can obtain an adequate return on their capital investments instead of the meager profits which have prevailed in the past few years. In this respect the address of O. H. Cheney, vice-president of the American Exchange Irving Trust Co., New York, on "Whose Steel Industry Is It?" was a feature. It is published in this issue of THE IRON AGE on page 1682.

Metal Lath Manufacturers Increase Tonnage

At the session devoted to trade extension activities, W. W. Galbreath, president Youngstown Pressed Steel Co., Warren, Ohio, told of the way in which metal lath manufacturers, by means of advertising and other promotion work, have increased their consumption of steel sheets from 10,000 tons annually in 1918 to 100,000 tons in 1927. In the past year and a half they have emphasized "better plastering" and in this way have secured the active support of architects and of trade unions. Of the 100,000 tons of sheets now purchased each year, only 10,000 tons goes into building construction. Mr. Galbreath mentioned various products which are being made from pressed steel, the use of which is considered especially desirable because of its lightness of weight. He urged the flat-rolled steel manufacturers, in their trade extension program, to advertise to the ultimate consumer and to cooperate with present associations of companies using flat-rolled steel by paying a percentage of the cost of educational advertising. Furthermore, he suggested that salesmen of flat-rolled steel makers should not be used in the educational work.

Declaring that more work along the lines of market research is one of the most important matters to be pushed by the flat-rolled steel industry, J. J. Rockwell, vice-president of the Crosby-Chicago Co., Chicago, advertising counsel for the Sheet Steel Trade Extension Committee, pointed out that in the three-year period from 1925 to 1927, inclusive, the sale of steel sheets increased 2,500,000 tons as compared with the previous three years. At least a part of the increase is attributable to trade extension work, and the improved demand for steel roofing is almost directly traceable to the promotional program of the committee.

Mr. Rockwell stated that flat-rolled steel manufacturers have a splendid opportunity for broadening their markets in the agricultural field and that farm organizations and agricultural colleges have offered assistance in carrying on research work to provide rural sections with fireproof structures. He also declared that firms specializing in hardwood trim for the interior of buildings have complained about the inroads made upon their business by companies making interior trim of steel, much of which is supplied by strip steel manufacturers.

Market Extension Work Offers Possibilities

A. N. Flora, vice-president National Association of Flat-Rolled Steel Manufacturers, in an address at the session devoted to trade extension activities, stated that sheet metal contractors, of which there are about 32,000 in the United States, should be organized in regional groups working under the National Association of Sheet Metal Contractors and in this way can be made a tremendous force in carrying out the plans of the Trade Extension Committee. The committee is already in touch with a number of associations, the members of which are fabricators of flat-rolled steel, and it is the committee's purpose to cooperate with these agencies in market research and trade extension activities.

Referring to the possibilities for furthering the use of metal lath, Mr. Flora said that if one new house in 10 used this material, the output of light gage sheets would be increased 72,000 tons annually. He declared that if manufacturers of steel doors and trim for buildings could extend the sale of their products up to 50 per cent of the class of buildings they are now selling, approximately 200,000 tons of full-finished strip steel and steel sheets would be required in addition to the amount being produced today.

Another important product capable of immense development, according to Mr. Flora, is metal shelving, manufacturers of which estimate that its potential market would call for 250,000 tons of sheets and of hot and cold-rolled strips each year. With the advent of chain stores has come a desirable market for this class of material, while its possibilities in other fields are almost unlimited.

Low Prices Called Industry's Greatest Menace

In opening the convention, Charles O. Hadly, vice-president Alan Wood Iron & Steel Co., Philadelphia, cited the fact that, although the cost of materials going into flat-rolled steel, as well as taxes and expenses of production by new processes, is lower today than in 1924, the reduction is not in line with the decrease of

(*Concluded on page* 1728)

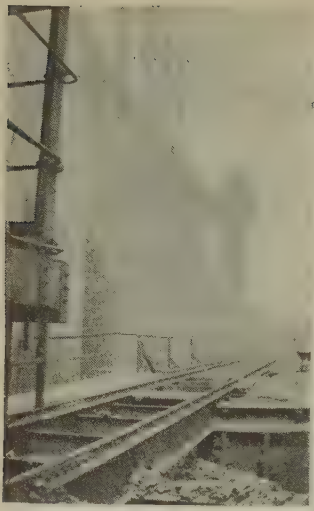

Fig. 1 — (Left) Vertical Hoist on Hand-Filled Furnace

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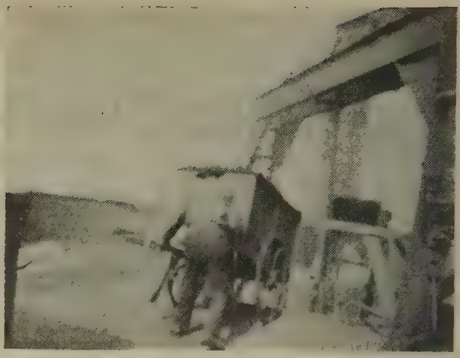
Fig. 2 — (Right) Loaded Coke Buggy Being Dumped on the Bell



Blast Furnace Gas as

THIS paper aims to present and interpret some practical features of blast furnace gas, and to show the relation that these features bear to the chemical and metallurgical reactions going on inside the furnace.

Although the operation of the blast furnace is a continuous process, the periodic casting of the furnace may be considered to divide the operations into separate units. Ordinarily, extreme or radical changes in conditions do not take place from one cast to the next. The changes which do occur are generally slow, steady movements which gradually emerge from one set of conditions into another set of conditions.

There is plenty of time during which ample warning is given as to which way the furnace is going, so that if the practical operating conditions are observed, and properly interpreted, the furnace may be kept entirely under control at all times. Occasionally, however, quick, radical changes do take place and prompt action is necessary to forestall even more aggravated conditions.

Irregular driving, slips, etc., decrease the tonnage and produce "off" iron, to say nothing of the hard physical labor necessary to clean up the iron and slag runners. Smooth operation is accompanied by good driving, large production and low fuel consumption. One of the practical indicators of great importance is the gas. The character of the gas may be observed at the following places:

1. The furnace top
2. The stove stacks
3. The bleeders
4. The boilers
5. The engines
6. The cinder notch
7. The tap hole

The old open-top furnace furnishes the best opportunity to study the quality and character of blast furnace gas. Every time the bell is lowered to drop in the charge, the gas escapes freely into the air, and burns with a flame which has special characteristics for each set of furnace conditions. When the furnace is hot, one kind of flame is seen; when the furnace is cold, there is a different kind of flame; and with each varying set of conditions the flame burns in a different manner.

Fig. 1 shows the stoves and the vertical hoist on a hand-filled furnace, and Figs. 2, 4 and 5, loaded coke, ore and stone buggies being dumped on the bell. Figs. 5 and 6 show coke on the bell. Note the difference in the way the coke lies on the bell in the two pictures. When the hopper is entirely open, as shown in Fig. 5, the coke has a tendency to distribute itself into four piles. When the hopper is partly closed the charge piles up around the bell rod.

Small square and round baskets of incandescent coke hanging at the side of the hopper are for the purpose of igniting the escaping gases when the bell is lowered. The bell is raised and lowered by a steam cylinder plainly seen in the foreground of Figs. 3 and 10.

Fig. 4—Loaded Limestone Buggy Being Dumped on the Bell. The large white pieces of limestone can be plainly seen

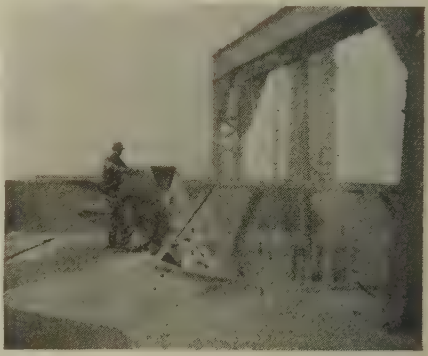


Fig. 10 shows the bell lowered and the burning flames of gas coming out of the top of the furnace. The character of this flame is especially valuable in interpreting the metallurgical reactions going on inside the furnace.

The "flame" is made up of two distinct parts, the actual burning flames, and the smoke. The burning flame may be yellow, orange, red, purple or blue, and the smoke may be a thin blue, heavy white, brick red, brown or black.

Great volumes of heavy, white smoke, and burning gas flames that are a bright yellow color, are found on a hot, limey furnace making low-sulphur foundry iron. The furnace was very hot all day. Heavy, white fumes could be seen at the stove stacks and boilers. The furnace was hot at the tuyeres. The heat could be felt at the eye latch. The steam was good all day and the steam pressure regular. The driving was smooth

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This article, written by Wallace G. Imhoff, metallurgical engineer, Sixty-second Street and Allegheny Valley Railroad, Pittsburgh, is the first of a series of three.

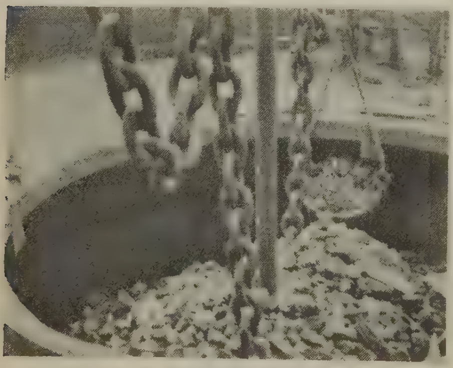

Fig. 6—(Left) Coke on the Bell, Hopper Partly Closed and Charge Piling up Around Bell Rod

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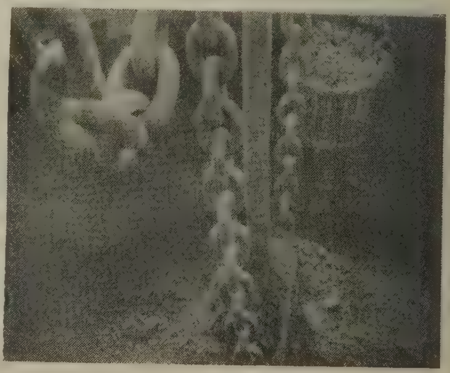
Fig. 7 — (Right) Charge of Ore on the Bell, Showing Basket of Burning Coke to Ignite Escaping Gases



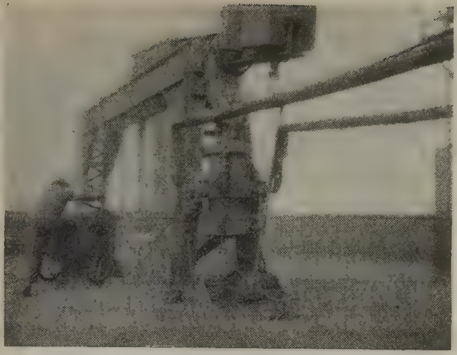
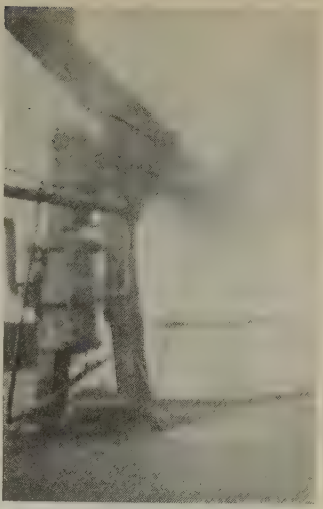


Fig. 3—(Left) Ore Buggy Being Dumped on Bell; Steam Cylinder in Foreground Raises and Lowers the Bell. At right (Fig. 10) the bell has been lowered and burning gas is issuing from the top of the furnace



Condition Indicator

and the furnace did not stick or slip. On the day turn 46 charges were put in, and 49 charges at night. At the 8 o'clock cast 16½ beds of iron were made; at 2 o'clock 21½ beds; at 7 o'clock 23½ beds; at 12 o'clock 24 beds; and at 5 o'clock 16½ beds. (A bed of iron is equal to slightly over 1½ tons.)

The 2 p. m. cast was a typical cast to illustrate the ideal conditions of lime combining with sulphur to form CaS. The gas in the furnace was clouded with great volumes of heavy, white fume and the burning gas was a bright yellow color, showing it to be carrying a large amount of fine carbon particles, similar to the yellow gas of a candle flame. The schedule of ores used in filling is given in Table I.

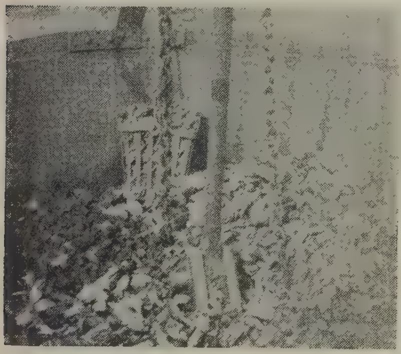


Fig. 5—Coke on the Bell, With Hopper Entirely Open, Permitting the Material to Settle Down into the Furnace

It is of particular interest to inspect the filling record to see how the furnace is driving when this heavy, yellow type of gas is being produced. The complete filling record in detail is given in Table II. It is important, also, to have the engine house record with this type of gas, as in Table III.

(*To be continued*)

Table I—Filling Schedule

1. Concentrates
2. Scale
3. Residuum and harmony ore
4. Scale
5. Concentrates
6. Concentrates
7. Heating cinder
8. Concentrates
9. Scale and nodules
10. Pyrites cinder
11. Concentrates
12. Harmony ore
13. Scale and knobling cinder
14. Concentrates
15. Puddle cinder
16. Scale and nodules

The charge was made up as follows:

2	Coke	2,840 lb.
2	Ore	3,600 lb.
1	Stone	3,100 lb.

The bell was lowered after 2 buggies of coke, 2 of ore and 1 of stone had been placed on it.

Pyrites cinder 4100 lb., when charged.

Knobling cinder was used on 13, in place of scale, after the 9 o'clock cast.

Table II—Filling Record on Furnace Producing Heavy Yellow Gas with White Smoke

Filling		Time	Time		
Start	Stop	Filling	Full	Charges	Total
6:25	7:00	35 min.	25 min.	5	5
7:20	7:35	15	20	2	7
7:55	8:20	25	20	3	10
8:40	9:20	40	20	4	14
9:45	10:10	25	25	3	17
10:30	10:40	10	20	1	18
11:05	11:25	20	25	3	21
11:40	12:05	25	15	4	25
12:35	12:55	20	30	3	28
1:20	2:10	50	25	6	34
2:35	2:50	15	25	2	36
3:15	3:35	20	25	2	38
4:05	4:20	15	30	2	40
4:45	5:15	30	25	3	43

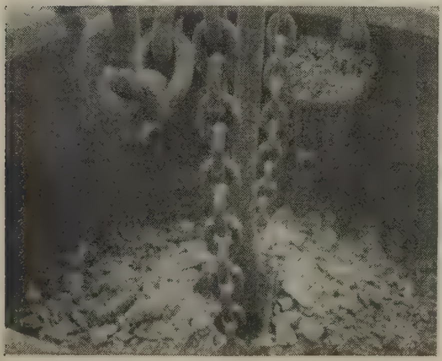
46 charges day turn.

Casts every 5 hr., at 9 a. m., 2 and 7 p. m., 12 night and 5 a. m.

Table III—Engine House Record with Heavy, Bright Yellow Gas and White Smoke

Hour	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	
R.p.m. ..	14	14	14	14	14	14	14	14	14	14	14	14,000	
Air	10.50	11.00	10.50	11.00	11.00	11.50	11.00	11.00	11.50	10.00	11.00	12.00	lb.
Steam	110	105	105	110	110	105	105	105	110	110	110	110	lb.
Stove Temp.	1,400	1,400	1,400	1,400	1,400	1,380	1,400	1,320	1,430	1,400	1,400	1,360	on
	1,200	1,180	1,200	1,220	1,180	1,160	1,180	1,160	1,220	1,200	1,160	1,170	off
Vacuum	27	27	27	27	27	27	27	27	27	27	27	27	in.
Top Heat	600	640	650	650	740	630	600	580	610	700	630	720	
Iron	....	....	16.50	....	....	....	....	21.50	....	....	....	....	

R.p.m., 14,000. Air, 10.50 to 12 lb. per sq. in.
Steam pressure. 105 to 110 lb. per sq. in.
Stove temperature, 1160 to 1400 deg. Fahr.
Vacuum, 27 in.
Top heat, 580 to 720 deg. Fahr.
Beds of iron, 16.50 and 21.50.

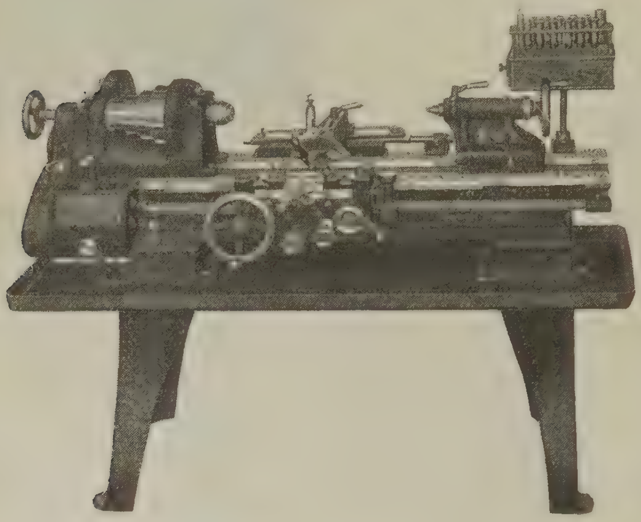


Figs. 8 and 9—Limestone on the Bell. There is a difference in the way the material lies on the bell, depending on whether the hopper is open as in Fig. 9 (right) or closed as in Fig. 8

New Precision Tool-Room Lathe

A 13-in. by 5-ft. tool-room lathe, a back-geared screw cutting tool with eight spindle speeds, has been added to the line of the South Bend Lathe Works, South Bend, Ind. Four of the speeds are obtained by belt and four through back gears. The lathe is intended for the machining of master gages, master screws, taps, dies, jigs, fixtures and other precision work.

Special attachments for the machine include a handwheel draw-in collet chuck, which may be used in the production of small metal parts as well as for general tool-room work. Round, square and hexagonal collets may be used, adapting the attachment for tubing and bar work up to ⅝ in. in diameter. The headstock spindle is hollow, which permits tubing, long rods and bars up to 1 in. in diameter to be passed through while being machined. Other attachments include a taper attachment, thread dial, oil pan, micrometer carriage stop and collet cabinet and bracket.



Attachments Include a Handwheel Draw-in Collet Chuck, Adapting the Machine for Production of Small Parts, as Well as for Tool-Room Work

The carriage of the lathe has power longitudinal and power cross feeds, which are obtained by a splined lead-screw and worm in the lathe apron, independently of the lead-screw thread. Instantaneous change in direction of operation of the lead-screw, for cutting right or left-hand threads and feeding the tool in either direction across the work, is obtained by means of a quick-acting latch reverse lever. The machine is arranged for drive from an overhead countershaft or by motor.

Vertical Float Friction Drive Chuck

For the multiple tapping of bottom holes, and holes in tough metals, the Apex Machine Co., Dayton, Ohio, is offering a new vertical float friction drive chuck.

The device is arranged so that if one tap sticks or strikes bottom, the friction will slip while the float takes care of the spindle travel. The quick-change collets, in which the tap is free to float, are the same as those in other types of the company's tapping chucks. The friction unit, consisting of a multiple-disk clutch, is the same as used in the standard Apex friction chuck and when adjusted will maintain the setting over a period of weeks. Thrust of the spindle does not affect the friction. Two sizes of the chuck are available, one of which, the type MA, has capacity for ⅜-in. taps and is of 1 5/16 in. outside diameter. The larger size, designated as the type MB, has capacity for ¾-in. taps and is 1⅞ in. in outside diameter.

Vertical Float Chuck Intended for Multiple Tapping of Bottom Holes

New Paint Spray Gun

Two new features are reported for a spray gun being put out by the Alexander Milburn Co., Baltimore. The first is a dialed head, which provides numerous spray adjustments, varying from a circular spray to a fan of a wider field than heretofore. The dialing permits the operator to obtain the desired spray without making preliminary tests.

The second is a series of indicator numerals on the paint valve plunger. Setting the pointer to the proper numeral produces the volume of spray wanted, without loss of time for testing. The operator thus sets his volume gage and his spraying adjustments and then proceeds.

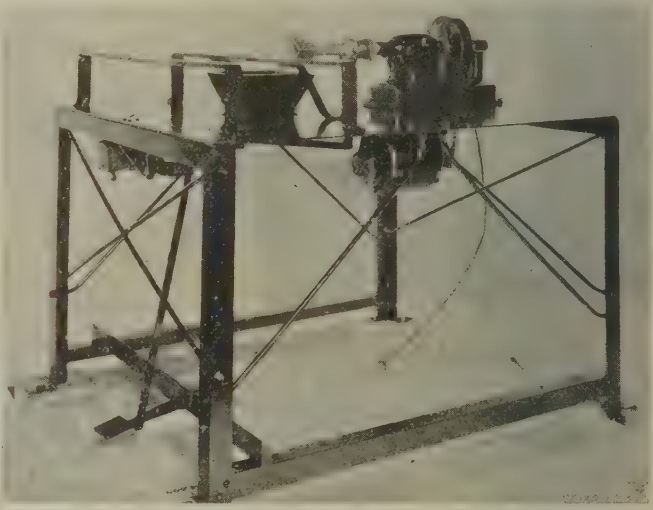
While this new spray gun is complete in itself, the new dialed air control valve and the plunger have been made interchangeable and can be inserted in the (older) type E unit. This change is made in the factory.

Machine for Driving and Removing Nuts

For driving and removing nuts from threaded work, the Procunier Safety Chuck Co., 18 South Clinton Street, Chicago, has developed the equipment illustrated herewith.

The machine comprises a bench tapping unit, which is mounted on a table equipped with a special socket wrench and a Procunier safety friction chuck. The drive is by individual motor, through sprocket and chain. The friction chuck slips when the nut is driven "home" and protection against damage from having the friction set too tight is afforded by an electrical overload switch that automatically breaks the electrical circuit when the machine is overloaded. In case the switch is thus thrown off, the machine may be restarted merely by throwing this switch back.

The particular machine illustrated is for handling large U-bolts, which are laid across the rack-bars on the table, thus bringing the nuts into a convenient position for application of the socket wrench. To back off the nut, the foot treadle is tripped, which engages the reverse clutch of the tapping unit. When the nut has been backed off, it drops through the hopper into a container placed beneath the table.



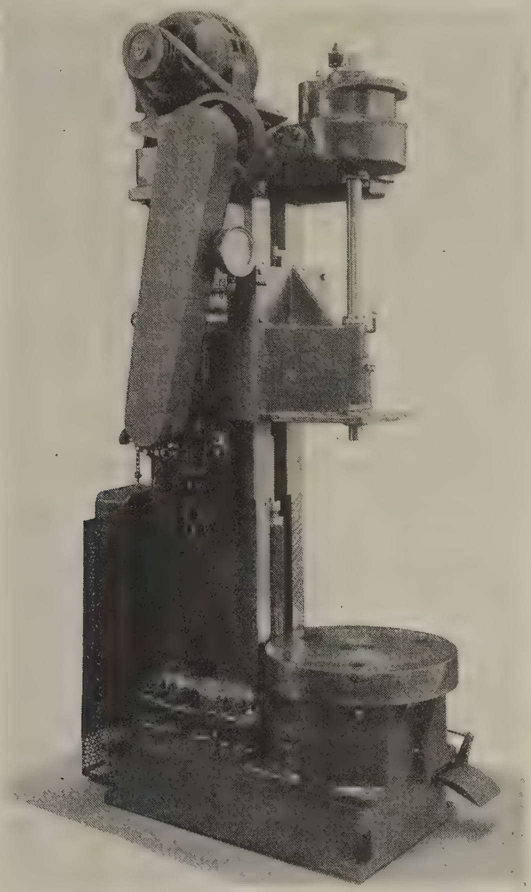
Nut Driving Unit Adapted for Driving or Backing Off Large U-Bolts

Pipe Nipple Standards

Acting upon a request from the Pipe Nipple Standards Corporation, representing the producers of this industry, J. J. Fairchild, commercial standards unit, Department of Commerce, Washington, has called a general conference of producers, distributers and consumers, for 10 a.m., Friday, June 29, at the department building, to consider the establishment of standards for steel and wrought iron pipe nipples. With the announcement were sent copies of proposed commercial standards for pipe nipples, dated April 17 and June 1 respectively, which will be used as a basis for discussion.

New Hydraulic-Feed Boring and Drilling Machine

Baker Brothers, Inc., Toledo, Ohio, has added to its line of hydraulic-feed boring and drilling machines the No. 10-H heavy-duty unit illustrated, which is intended for a wide range of work. The machine here illustrated is fitted with a flanged head for the application of a multiple-spindle head, but the design is such that any style of head, single-spindle or multiple-spindle types, can be attached, depending upon requirements. The machine can also be fitted with a plain table, for single-spindle work, or with a 24-in. indexing table, for successive operations, and any number of indexes can be provided. The saddle is mounted on carefully scraped ways of ample proportion to maintain alinement over a long period.



Single-Spindle or Multiple-Spindle Heads May Be Employed, as Well as Plain or Indexing Tables

The machine is furnished only as a motor-driven unit, with a 10-hp. 1200-r.p.m. or smaller motor, mounted on top of the machine and transmitting power by a Texrope drive, as illustrated. The drive for the Oilgear pump, which actuates the feeding mechanism, is by belt from the main drive shaft of the machine, only one motor being required both for the pump and the main drive of the machine.

Speed changes are made by means of slip change gears which may be changed quickly when desired. With the hydraulic feed mechanism a wide range of feeds is available, due to the ease of adjustment of the Oilgear pump. The hydraulic cylinder is mounted on the base and inside of the frame of the machine, providing a pull stroke to the head when in operation.

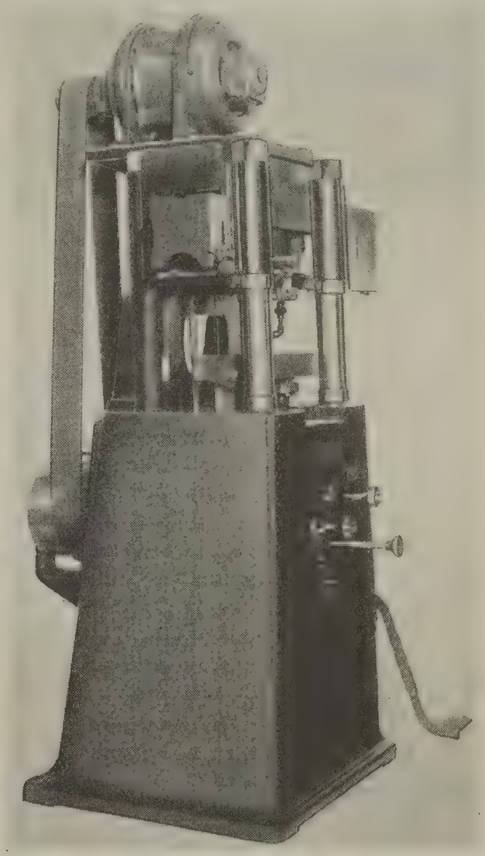
Rapid advance of the head to the work, automatic tripping to a predetermined feed and automatic rapid return of the head, with the mechanism stopping at the top of the stroke, are features of the machine. The point of change from rapid advance to feed and to rapid return may be changed conveniently by cams mounted on the side of the saddle.

Specifications are, in part, as follows: Range of speed of main vertical shaft, 165 to 245 r.p.m.; maximum distance from vertical shaft to face of frame, 14 in.; maximum distance from the lower edge of the saddle to the base, 50 in.; length of saddle, 20 in.; and travel of head, 16 in. Multiple spindle machines have spindles with vertical adjustment up to 3 in.

Hydraulic Marking Machine for Heavy Pressures

For the marking, knurling and scoring of articles of steel, iron, brass and other materials, the Martin Machine Co., Turners Falls, Mass., has brought out a new hydraulically operated roll-type marking machine designated as the No. 14. The principles of design are the same as those of the company's No. 12 machine, but the new unit is designed for higher pressures. A feature claimed for both machines is the ability to mark even and clear impressions on work which varies in thickness or diameter. Increase in life of dies is attributed to the hydraulic operation, which obviates hammer effect on the dies.

Work to be marked is placed in a suitable fixture on the table of the machine. For flat work a round die is used, the die being held in a holder that is fitted into the slide of the machine. Pressure on the foot treadle causes the table and work to rise to the die, and when in contact with the die the latter rolls across the work and thus marks it. The table then lowers to the starting position, the slide also returning to its initial position. The hydraulic system comprises an oil tank in the base of the machine, a small pump and suitable valves or cylinders for operating the table and slide.



Increase in Life of Dies Is Attributed to Hydraulic Operation

Features of the machine include the arrangement for stopping the slide at the left-hand end of its stroke, which provides more clearance than formerly for the insertion and removal of irregularly shaped pieces of work. The table can be arranged to stay in contact with the die long enough to permit several passes of the die, thus permitting making of heavier impressions when necessary. Adjustments for different pressures and speeds of operation are provided. Rigid construction is also a feature.

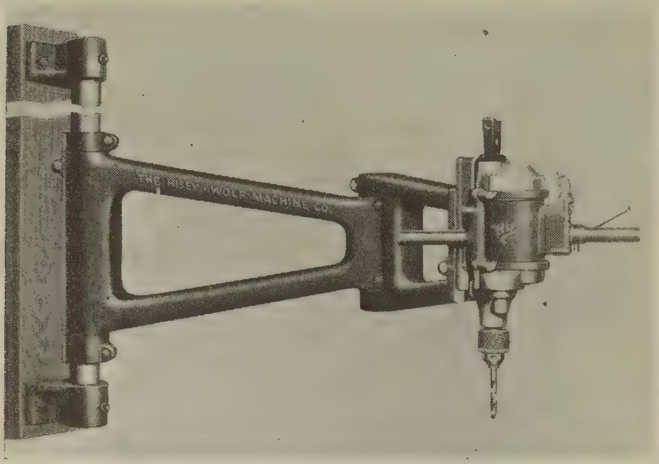
The machine is self-contained, the driving motor being mounted on the top as shown in the illustration. Floor space occupied is approximately 36 x 36 in. and the weight of the machine is 2000 lb.

The Ohio Electric & Controller Co., Cleveland, announces appointment of the following representatives: Charles L. Ward Co., 701 Midland Building, Kansas City, Mo., covering the territory of Kansas City, Omaha, Neb., and Dallas, Tex., and the territory adjacent thereto; J. Dale Reynolds, Apartado 428, Monterrey, N. L., Mexico, covering Mexico.

Radial Arm for Portable Electric Drills

A double radial arm for Hisey portable electric drills of ⅞ in. and smaller capacity has been made available by the Hisey-Wolf Machine Co., Cincinnati.

Arrangement of the device may be noted from the illustration. The lever feed is operated through rack and pinion, the same as in a drill press, permitting positive control. The motor-holding brackets are designed so that the portable drill unit can be attached without removing a single part of the machine, which saves time and prevents loss of parts. The radial arm is mounted on a ball thrust bearing, which is inclosed in a dust-proof housing, to minimize friction and facilitate adjustment. Either the long or the short arms can be locked independently, by means of individual clamps; if the work requires it, both arms may be locked in any fixed angular position.

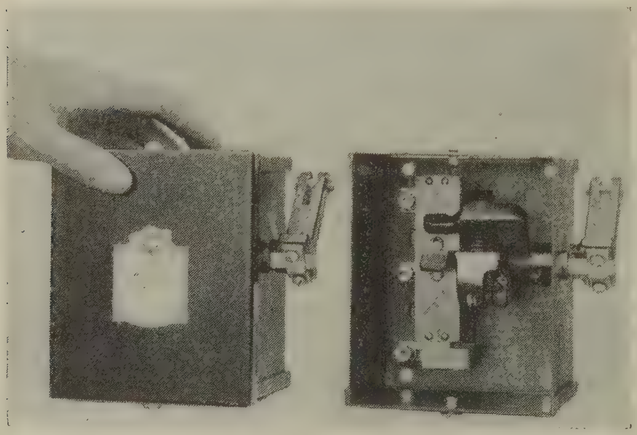


Lever Feed and Convenience of Attaching the Drill to the Arm Are Features

The vertical adjustment, without resetting, by means of the lever which actuates the rack and pinion, is 7½ in., and the vertical adjustment up and down the column is 25 in., which provides a total of 32½ in. vertical adjustment. The main column is 2½ in. in diameter. The double arm may be swung through an arc of 240 deg. and the short arm through an arc of 245 deg. The maximum reach from the drill spindle to the column is 36¾ in. The weight of the radial arm is 215 lb. net.

Lever-Operated Master Switch

A new switch, designed especially for splined shaft or shipper rod operation, has been put out by the Cutler-Hammer Mfg. Co., Milwaukee. This switch is for use as a pilot circuit control device on lathes, textile machinery and other equipment where starting and stopping of the machine is to be governed by a splined shaft, shipper rod or similar device. Low-voltage protection is an important feature. Should the motor stop, because of low voltage or for any other reason, it will not re-start until the switch has been operated again. Accidents and damage to machine caused by unexpected re-starts are thus eliminated.



Switch Designed for Splined Shaft or Shipper Rod Operation

Other outstanding features are: Non-stubbing contacts; shear pin to protect mechanism; few parts and simple construction; operating lever can be placed in any one of four operating positions, 90 deg. apart, to suit any installation requirement; long, steel-to-bronze main bearing with oil hole; small size; fully inclosed in heavy steel case; cover can be removed by loosening only two screws. The switch is designed especially for three-wire control, but can be used also for two-wire control on pilot circuits up to 550 volts.

Portable Lubricating Unit

For lathes, drill presses and other uses, a new portable cutting tool lubricator has been put out by the Curran Machine Works, 159 Newtown Road, Long Island City, New York. As shown by the illustration, the lubricant is supplied by the foot treadle as desired. This leaves the operator's hands free for his work. The device may be clamped anywhere that is convenient and the lubricant directed at the point where most needed.

This unit is a high-speed lubricator for use on all machines not equipped with their own lubricating systems. The amount of lubricant delivered at each stroke of the pump is adjustable by a finger nut. As the only attachment to be made is the quick-acting clamp which holds the pipe in position, the lubricator may be moved readily from one machine to another.

The Supply of Lubricant Is Controlled by the Foot Pedal

German Tests of Wire Rope

Recent wire rope tests conducted by the engineer in charge of the "Official Institute for Inspection of Steam Boilers, Cologne," are reported from Germany. Boiled down to its essence, this report and research mean that on an elevator carrying over 3000 lb. of dead weight, a preformed wire rope made nearly 10,000 round trips without a single break or fracture, while the ordinary twisted type of wire rope accomplished the same work only after a fracture of 8 wires in the rope attached to the cage and 17 wires in the rope working on the counterweight. In a second test, the preformed wire rope made a total of 18,600 round trips and suffered only one single broken wire, while the ordinary rope subjected to the same test suffered 44 fractures in the rope attached to the cage and 190 fractures in the rope working on the counterweight.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

High activity in chief consuming industries has been due largely to the way building construction has held up and automobile production has been maintained.

Car and locomotive buying have made slight improvement from their low levels, and surplus cars give little promise of early orders.

Automobile production is well sustained and has been a recent leader in upholding steel demand.

Building volume continues large, but appears to center on small operations; structural sales are declining.

Iron and steel exports decreased more than usual in April.

APRIL turned out to be a somewhat better month as to the activity prevailing among the chief steel-consuming industries than was anticipated. It held about level with March, and thus came nearer to justifying the ingot output of the month than seemed possible 30 days ago. As the ingot output curve rose considerably above the demand curve, however, the general conclusion reached last month still holds—namely, that steel production is at too high a rate, considering the season, to be maintained, and that as a result weakness in prices is likely to persist.

Demand Continued High in April

THE fairly good April showing made by the composite demand line was due chiefly to a recovery in building activity (which carried contracts awarded to 125 per cent of the 1921-1927 average, against 119 per cent in March). General manufacturing activity (excluding iron and steel and automobiles) also held about level and the machine tool business picked up considerably. Mining, including oil production, showed a slight gain. These developments offset declines in railroad transportation and in exports. The net result for April was a steel-consumer activity index of about 116 per cent of the 1921-1927 average, against 115.2 per cent in March.

Complete statistics for May are still lacking. We know that railroad freight traffic failed to make the usual seasonal gain, while, on the other hand, building activity and automobile production increased somewhat more than usual for the season. It seems probable that the *potential* requirements of the chief consuming industries increased somewhat last month, but that unfavorable financial and political developments probably prevented these from materializing in a proportionate gain in steel buying. More detailed comment concerning steel consuming industries follows:

Conditions in Particular Industries

The *building situation* is discussed below. The combination of higher interest rates and growing political uncertainty is tending to curtail speculative building activity, and a more than seasonal decline is to be expected within a month or two. It is notable that recent gains in building have not resulted in increased buying of fabricated structural steel or steel sheets. The sustained miscellaneous demand, however, is doubtless partly due to building activity, and the gain in May permits and contracts should find some expression in the steel business during June and July.

The demand for steel from the *railroads* is likely to continue disappointing. April figures show the gross revenue of the carriers to have been 4.9 per cent below a year ago and their net operating income to have been about 4 per cent lower. The average return on their total investment was only 4.07 per cent. Car loadings were about 7 per cent less than in April, 1927, and a large surplus of equipment exists. May traffic has run something like 5 per cent below a year ago and there is no prospect of early expansion in general business.

Automobile production was well maintained in May,

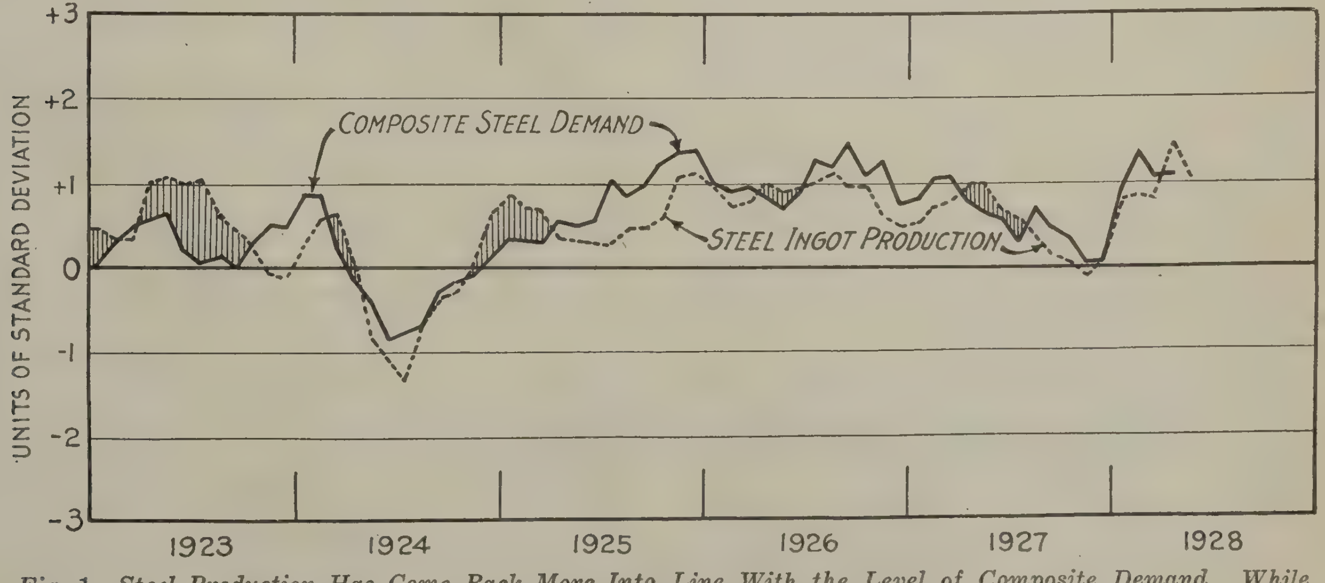


Fig. 1—Steel Production Has Come Back More Into Line With the Level of Composite Demand. While this curve declined in March, it made a moderate recovery in April

at least by several of the leading companies, and the Ford output has gradually increased. Preliminary estimates for the month indicate about 467,000 cars and trucks to have been produced in the United States and Canada, which gives an adjusted average daily index that is 20 per cent above the average for 1921-1927 and the highest since September, 1926. The period of seasonal decline, however, is now at hand and already appears to be reflected in a declining volume of sheet business, although up to date there is no indication of any unusual recession and the outlook seems fair.

General manufacturing activity continues in good volume and seems likely to furnish large miscellaneous steel business, notably in the case of agricultural implements and such items as electrical refrigerators. The volume of machine tool orders was unusually large in April, but apparently fell off in May.

Oil Drilling at Low Level

Our composite index of *mining and oil production* continues about sidewise at the average level for 1921-1927. Drilling activity in the petroleum industry is the lowest in many years, but production has been only slightly reduced, and increased a little during the last two weeks—a condition which indicates a poor demand for oil-well material and a fair demand for oil-tank material. Bituminous coal production continues below average. Copper production in April stood at the highest rate since February, 1927. In general, a moderately well sustained demand for mine material is indicated.

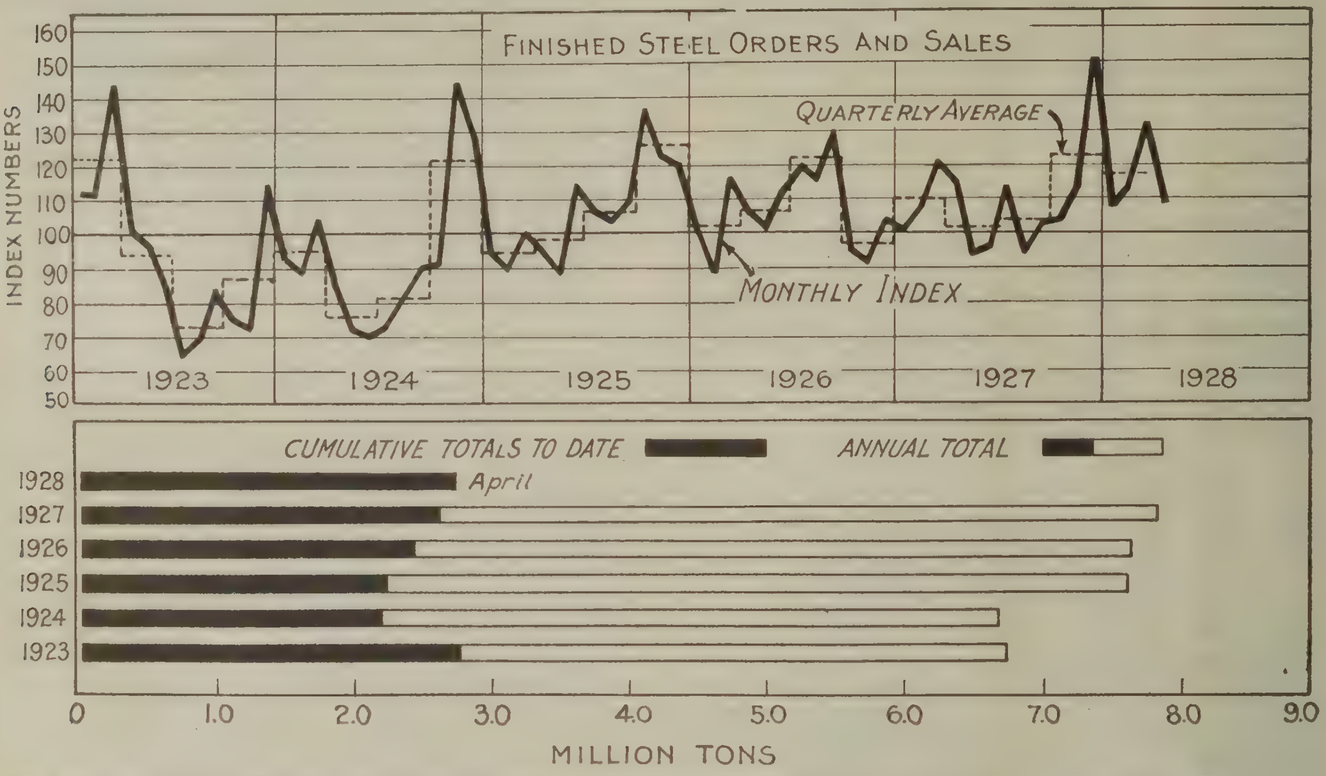


Fig. 2—Buying of Finished Steel Dropped in April After a Good Seasonal Increase in March. The cumulative total is the greatest since 1923 *and is only* 2 *per cent behind that year*

Farm prices advanced sharply between April 15 and May 15, with some decline since the latter date. The purchasing power of the farm dollar has increased and the total income from the sale of farm products was larger during the first four months of the year than in any recent similar period. Continued activity in agricultural machinery and implement production is indicated, and the sharp recovery in Chicago mail order sales during May is to be noted.

Exports of iron and steel decreased in April more than usual and were the lowest, considering the season, since January. Some recovery in May would be a seasonal occurrence and would probably be followed by a declining trend through September.

The general outlook for the steel requirements of the country seems fair. No large decline in general manufacturing and mineral production is in prospect; automobile production, while uncertain, has held up remarkably well through May; building activity has been large, though below peak levels (considering the season) and not finding expression in structural steel awards; a probability exists that the composite demand line will show a little rise in May, when the data for that month become available. As the adjusted curve of steel production declined in May, we may infer that the steel output of the country is in good balance with *potential* requirements. *But political uncertainties, the state of bank credits, and higher interest rates—to say nothing of low profit margins and increasing business failures—are all operating to keep the potentialities from becoming actualities during the near future.*

Four-Month Sales Largest Since 1923

APRIL orders and sales covering some of the chief items of finished steel fell off from March. This is a usual seasonal occurrence; but the decline was the sharpest for the month that has occurred since 1923. The April orders and sales also fell considerably below a year ago and were lower than the average for the first quarter. This is in accord with the sharp decline in unfilled orders. In each of the past five years, orders and sales in May have shown a considerable further decline, and in view of trade reports the past month apparently affords no exception. Probably the final returns will carry the curve of orders and sales well below the base line which represents the average for 1923-1926 (see Fig. 2).

The fact remains, however, that the first four months of 1928 brought the largest volume of finished steel business that has developed in this period since the year 1923, and that the second quarter of 1928, if not so good as in 1926, is likely to be up to the 1925 level.

The chief factor in the declining trend of our index of orders and sales was the particularly sharp recession in the sales of sheets—284,000 tons in April, against 399,000 tons in March, and 293,000 tons a year ago. This decline may reflect some let-up in the activity of automobile producers and possibly in certain classes of building. It is connected with the pronounced weakness in sheet prices. Bookings of structural steel, also, fell below March and were much under a year ago. A further decline in this item is indicated by the current trade reports. New business in steel castings held about steady at a low level. The buying of fabricated plates picked up a little, amounting to 48,500 tons in April, against 45,100 tons in March and 47,300 tons in April, 1927, making it the best April

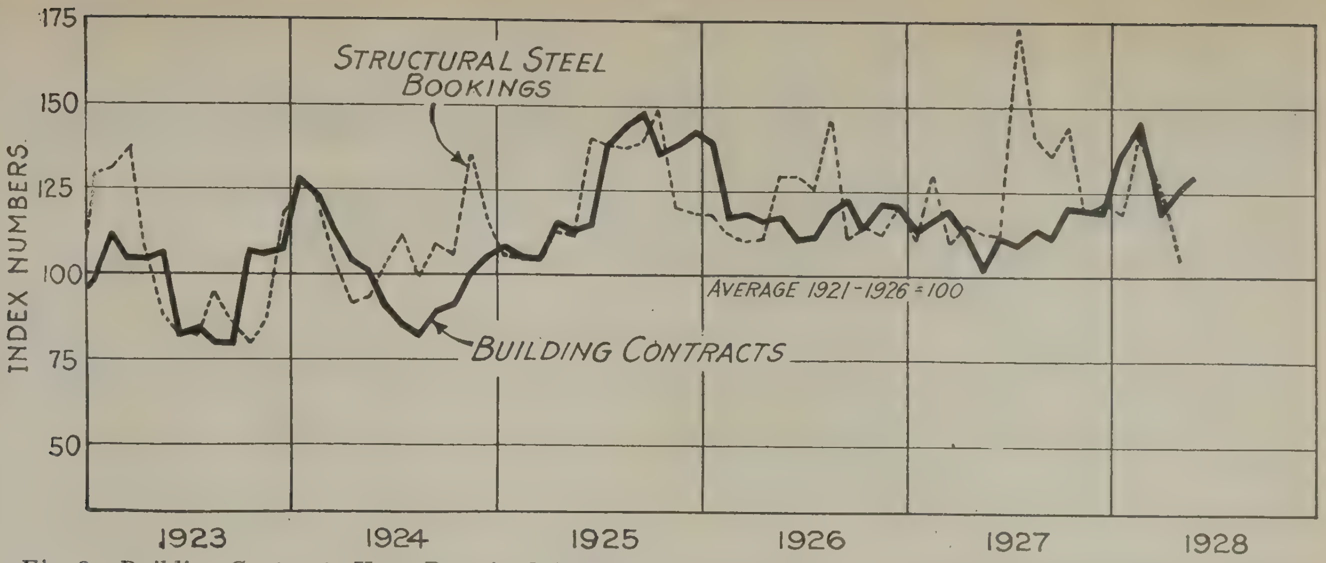


Fig. 3—Building Contracts Have Remained High, But the Slackening of Structural Steel Bookings Indicates That Much of the New Construction Is Residential

business since 1923. Plate buying for tank construction and general manufacturing purposes has been good.

Building Continues at Unusual Rate

ONE of the chief reasons for the well sustained current demand for steel is shown in the third chart, this being the better-than-seasonal activity in May building. Floor space in the total building contracts awarded in 37 States, as reported by F. W. Dodge Corporation, amounted last month to 95,256,000 sq. ft., which is a slight increase over April. Of course, April was a short month as to working days, while May was a long one, which may affect the total; but there is usually a decrease of over 2 per cent between the two months, and the actual gain of a little under 1 per cent brings our adjusted index of building contracts up to 128.7, against 124.5 in April and 100.1 a year ago—the average for 1921-1927 being 100. While, considering the season, this is much below the January-February peak, April and May represent the two largest building months on record.

Furthermore, building permits, after a long, sharp decline, took a turn for the better in May. On an average daily basis, with adjustments for seasonal variation, they ran 20 per cent above the average for 1921-1925, which is a better showing than in either March or April. Of course, permits may not be used. Also it is to be noted that most of the gain occurred in New York City.

The trend of permits suggests the possibility that the May building gains may have been largely in residential construction, a hypothesis that fits the fact that structural steel awards have declined so sharply. Be that as it may, our index of the bookings of fabricated structural steel, after adjustment for seasonal variation, fell in April to only 104 per cent of the average for 1921-1927, against 122 per cent in March and 115 per cent a year ago. This is the lowest point reached since August, 1924, and there is every indication from current reports that the May figure will show a further decline. Evidently recent construction, though increasing, has required less structural steel.

Little to Expect from the Carriers

RAILROAD equipment orders, while continuing poor in comparison with past years, have made a little improvement in recent months. The orders for freight cars in May amounted to only 2354, against 5683 in March, and 4378 a year ago. This is the lowest since January, but there is usually a sharp seasonal drop at this time of year, so it can be said that freight car orders are holding up fairly well. The rather pronounced decline in surplus freight cars since December is unusual at this season, but a further reduction will be required before the excess is sufficiently reduced to become the occasion for any large buying.

The locomotive business appears to have touched an irreducible minimum, and total shipments of all locomotives were the lowest in May since April, 1922. Domestic orders for steam locomotives, however, appear to be picking up, amounting to 52 in May, against 33 in April. The gain since January has been fairly steady, and the unfilled orders are the highest since the beginning of the year. The May orders were much below a year ago, but were about the same as in May, 1926, and in May, 1927.

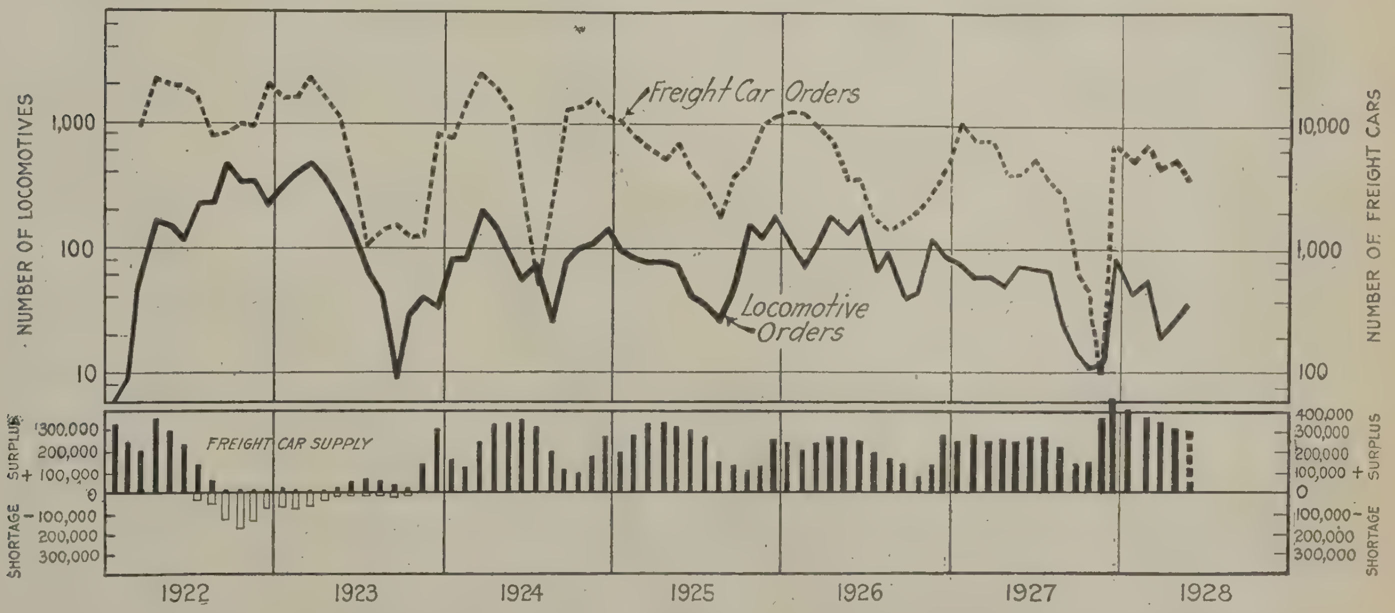


Fig. 4—Locomotive and Railroad Car Orders Continue Discouragingly Low. And the large surplus of cars does not indicate immediate need for heavy purchases

No Evidence of European Recession

Prices Firm and Deliveries Extended—American Mills May Increase Exports With Competitors' Prices Higher

(*By Cable*)

LONDON, ENGLAND, June 11.

CLEVELAND pig iron is dull with domestic and export users buying sparingly as the period of inventory is approaching. Cleveland prices are being maintained as a result of producers' well filled order books. Hematite is very quiet and further curtailment of output is considered as stocks are still large. Foreign ore continues quiet.

Finished steel business is inactive and plate mills particularly are pressing for business, but the association is unwilling to reduce prices, so that buyers continue scarce.

Welsh tin plate bar makers are well sold and some mills are asking 2s. 6d. (61c.) per ton more than the association price of £6 ($29.22) for forward deliveries. Continental sheet bars are quoted up to £5 12s. 6d. ($27.40) per ton, delivered, but sales are few because of the extended deliveries offered.

Demand for Welsh tin plate continues good and few supplies are obtainable from makers before the end of August or early September. Output is at about 95 per cent of capacity. Galvanized sheets are quiet. Japanese demand for light gage black sheets is well maintained and makers order books are well filled.

The Continental iron and steel markets are inactive so far as British traders are concerned, but prices are being maintained as the mills show less interest in booking new orders.

New Iron and Steel Exchange for London

LONDON, ENGLAND, May 24.—The London Iron and Steel Exchange enters upon a new phase in its existence on June 5, when a new exchange is to be opened at Imrie House, King William Street. This new exchange has been organized with a number of features which are not common to the majority of commercial exchanges. The new headquarters provide for the first time in the history of the British iron and steel trade a daily meeting place for manufacturers, merchants and others connected with the industry.

When the exchange was opened in 1919 it was thought that a weekly meeting would suffice to meet the demands of the trade, but it has now become apparent that a daily session is required. In the early days of its existence the weekly gatherings took place in the Great Hall of the Cannon Street Hotel, a much-used place for business conferences, but subsequently the exchange rented the rooms of the London Metal Exchange.

The new exchange is designed to provide a central London headquarters where buyers and sellers can get into touch quickly and easily. An unusual feature is that the new exchange is provided with a dining room and smoking room and a refreshment buffet and, in order to give these additional advantages, the new exchange has been registered as a business men's club.

Provincial and overseas members especially have experienced difficulty in the limited time afforded by their visits to London to transact business, which includes matters of freight and insurance.

Luxemburg Mills Well Booked and Export Business Is Fair

LUXEMBURG, May 26.—The market was rather weak during the early part of April, but toward the end of the month demand improved materially. The wage increases to German miners, followed by advances in the German iron and steel markets, have contributed to a firm and active market here. French mills are well booked with orders from their own domestic market, and Belgian producers, although not doing so large a volume of business, are well committed for several months.

Export business shows some slight improvement,

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17¾s.		$4.33	
Bilbao Rubio ore*	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 5		15.83	
East Coast mixed	3 9	to £3 10s.	16.81	to $17.05
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up	7 15	to 8 0	37.75	to 38.96
Billets	6 5	to 6 10	30.44	to 31.66
Ferromanganese	13 15		66.97	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	6 0		29.22	
Tin plate, base box	0 18¼	to 0 18⅛	4.45	to 4.47
Black sheets, Japanese specifications	13 7½		65.14	
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 0	to 10 10	1.95	to 2.28
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	9 0	to 10 0	1.95	to 2.17
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 5		2.88	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

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*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	$15.34	to $15.83
France	3 3	to 3 5	15.34	to 15.83
Luxemburg	3 3	to 3 5	15.34	to 15.83
Basic pig iron (nom.)				
Belgium	3 0	to 3 1	14.61	to 14.85
France	3 0	to 3 1	14.61	to 14.85
Luxemburg	3 0	to 3 1	14.61	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 15		23.14	
France	4 15		23.14	
Merchant bars:			C. per Lb.	
Belgium	5 15	to 5 17½	1.27	to 1.29
France	5 15	to 5 17½	1.27	to 1.29
Luxemburg	5 15	to 5 17½	1.27	to 1.29
Joists (beams):				
Belgium	4 18½	to 5 0	1.08	to 1.10
France	4 18½	to 5 0	1.08	to 1.10
Luxemburg	4 18½	to 5 0	1.08	to 1.10
Angles:				
Belgium	5 10	to 5 12½	1.21	to 1.23
⅛-in. plate:				
Belgium (a)	6 12½		1.45	
Germany (a)	6 12½		1.45	
$\frac{3}{16}$-in. ship plate:				
Belgium	6 9		1.42	
Luxemburg	6 9		1.42	
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

although British purchases seem to be limited to immediate requirements. Trade with Argentina is more active, but Brazil is quiet. There has been some small activity in the Chinese market, but Japanese business for the most part, is going to domestic producers, who are quoting low prices.

Luxemburg works have good bookings, with deliveries lengthening. Pig iron output in April was 226,983 tons, and the steel production, 202,586 tons. There were 39 furnaces in blast on May 1, out of a total of 47 in Luxemburg.

GERMAN EXPORTS INCREASING

Decline in Domestic Activity Foreseen—Machinery Output and Exports at High Level

BERLIN, GERMANY, May 30.—Decline in the total number of unemployed continues, but this circumstance is attributed to seasonal improvement, as business activity in general shows evidences of slackening. Railroad traffic, which was steadily above the figures for the same period of last year until the end of April, has suddenly begun to decline. Output of manufactured goods has decreased, and raw material demand is beginning to lessen. However, despite the apparent close of the long period of intense industrial activity that began with the British strike, there is as yet no indication of a serious depression.

Production of steel ingots and rolled products declined in April from the March figure, the first recession in output following a long upward movement. Steel ingot output in April was 1,161,405 metric tons, compared with 1,450,352 tons in March, and production of rolled material was 917,673 tons, compared with 1,149,997 tons in March.

Domestic business is quiet except among foundries. Pig iron prices were not raised when the steel market advanced early in May, and demand for pig iron is undiminished. The general business situation is not unfavorable, and at the recent meetings of the ingot steel, A-products and bar syndicates it was stated that the steel industry is in a satisfactory position for the next few months. This belief is evidently based upon the relatively large unfilled tonnages on the books of most mills and on increasing activity and rising prices in the export market.

Export prices are firm, and, in the Belgian market, steel bars have advanced since last November from about £4 10s. per ton (0.99c. per lb.) to the present market level of about £5 17s. per ton (1.29c. per lb.). There is a heavy demand for semi-finished material. "World market prices," which are determined by the German Steel Syndicate and the consuming manufacturers for the purpose of fixing price rebates on material made for export, have been advanced again for June. Steel ingots, which were 79 m. ($18.90) per ton in May, have been increased to 81 m. ($19.38) per ton. Blooms have been advanced from 84 m. ($20.10) to 86 m. ($20.58) per ton, billets from 93 m. ($22.25) to 95 m. ($22.73), slabs from 96 m. ($22.97) to 98 m. ($23.45), bars from 105 m. ($25.13) to 110 m. ($26.32), shapes from 92.50 m. ($22.14) to 97.50 m. ($23.33), and heavy gages of sheets from 125 m. ($29.91) to 128 m. ($30.63).

Deliveries from most mills have been extending. Only small stocks are on hand at producers' plants, and deliveries on steel bars are from four to eight weeks, with structural shapes at two to six weeks. Steel bands are in good demand both from domestic users and foreign consumers. There is a moderate volume of activity in heavy and medium-gage sheets, but thin sheets are inactive and there has been a decline in wire products. Following the recent increase of 7 m. ($1.68) per ton in wire rod prices by the International Wire Rod Cartel, the German Wire Syndicate advanced its quotations on wire products by about 15 m. ($3.59) per ton.

Export inquiry for machinery is better, but the domestic market is slightly quieter. The Verein Deutscher Maschinenbauanstalten has made public the result of an inquiry into German production and sales of machinery. In 1913 output was valued at 2,800,000,000 m. ($670,040,000), in 1925 at 2,900,000,000 m. ($693,970,000), in 1926 at 2,500,000,000 m. ($598,250,000) and in 1927 at 3,400,000,000 m. ($813,620,000). At present prices, the 1913 output would be worth 3,800,000,000 m. ($909,340,000), so that even in 1927 the pre-war value of production was not reached.

Statistics on the proportion of sales to domestic and foreign consumers show that in years of poor domestic business Germany forced export trade, and that in the poor year of 1926 exports advanced to 34 per cent of output, compared with about 28 per cent in 1927. Both in 1926 and 1927 the proportion of exports to production was larger than in 1913. In 1913, domestic sales were 2,050,000,000 m. ($490,565,000), and export sales, 750,000,000 m. ($179,475,000). In 1925 domestic sales totaled 2,140,000,000 m. ($512,102,000), and exports 760,000,000 m. ($181,868,000). In 1926 domestic sales were 1,660,000,000 m. ($397,238,000) and export sales 840,000,000 m. ($201,012,000), and in 1927 domestic sales totaled 2,440,000,000 m. ($583,892,000) and export sales 960,000,000 m. ($229,728,000).

FRENCH PRICES FIRM

Domestic Market Active—Steel Cartel May Fix Larger Quotas for Third Quarter

PARIS, FRANCE, May 28.—Prices are firm both in the domestic market and for export. Activity is well distributed among all steel products, and most mills have sufficient business to take an independent position for the next two to three months. There has been some improvement in demand for fabricated material, and a number of engineering projects are in prospect. Consumers of bolts, screws and hardware are active, and automobile builders report good business.

The decision of the French railroads to equip all freight cars with continuous brakes at a total cost of about 1,600,000,000 fr. ($62,880,000) includes 260,000,000 fr. ($10,218,000) to cover the cost of installing the brakes on the cars. The first part of the contract is to be placed at once, 300,000,000 fr. ($11,790,000) to be reserved for French bidders and an order for 50,000,000 m. ($11,935,000) to go to Germany on reparations account.

At the end of June the International Steel Cartel will hold its quarterly meeting in Düsseldorf to determine the production quota for the third quarter. It is rather generally believed that the total tonnage fixed by the cartel will be increased by at least 1,000,000 tons. France, Belgium and Luxemburg as a group probably will ask for an increase of about 2,000,000 tons, but Germany is expected to oppose such a large advance in production. There has been a decided gain in output during the present quarter, and further increases are in prospect, with four new blast furnaces under construction in Belgium. By the end of the present quarter it is believed that Polish producers will have become cartel members. It is reported that, prior to the next meeting of the cartel, Central European steel producers will hold a conference to discuss questions relative to their competition in European export markets.

At the meeting of the International Wire Rod Cartel, June 8, at Cologne, it is expected that the price of wire rods will be advanced from £5 15s. ($28) per ton to £5 17s. 6d. ($28.62) per ton. Such an increase seems necessary, as the present price, f.o.b. Antwerp, is the same as on merchant bars.

Pig Iron.—Export demand for pig iron has improved, despite British competition, and prices are firmer. Recent transactions in pig iron have been at about £3 4s. ($15.59) per ton, f.o.b. Antwerp, for phosphoric foundry iron. Prices of basic iron are still subject to negotiation, but there is a tendency toward greater strength. In the domestic field, foundry consumers are active, but castings prices are low, despite the higher level of the pig iron market. There is still considerable discussion of a projected association of steel foundries.

Semi-Finished Material.—The export market is firm, and prices continue to advance. Deliveries generally extend to the middle of August. Buyers, however, have evidently covered their immediate requirements and are not so active as a few weeks ago.

Finished Material.—Prices are firm but cover a rather wide range, depending upon the deliveries the mills are able to offer. Mills in a position to quote fairly prompt shipment obtain high prices, while those offering up to five or six weeks are on a lower price level. Open-hearth material is being quoted at an extra of 100 fr. ($3.93) per ton. Most finished products have shown advances within the past fortnight of 3 to 5 fr. (12c. to 20c.) per ton. Merchant bars are quoted at £5 15s. to £5 16s. per ton (1.27c. to 1.28c. per lb.), and beams at £4 18s. to £5 2s. per ton (1.08c. to 1.12c. per lb.), depending upon the specifications.

Sheets.—Export prices are firm, except on the lighter gages, in which British competition is encountered. Black sheets of 0.5 mm. thickness are quoted at £10 12s. 6d. to £10 15s. per ton (2.34c. to 2.37c. per lb.), f.o.b. Antwerp. Sheets 1/16 in. thick range from £6 17s. 6d. to £6 18s. per ton (1.51c. to 1.52c. per lb.).

BELGIAN PRICES STRONG

Buying Light But Mills Are Well Booked—British Light Sheet Competition Keen

ANTWERP, BELGIUM, May 25.—Advances in prices continue so rapidly as to cause some confusion as to the exact level of the market on many products. Mills are quoting a wide range of prices, depending upon how well booked they are in the sizes and products under consideration. Recently the number of orders in the domestic market has begun to decrease, but, as producers are booked with tonnage enough to carry them through July and well into August, there is no prospect of any immediate recession of prices. Speculative buyers of steel seem to have covered their immediate requirements of material for short sales and are no longer very active. Exporters are inactive. While there are continued offers from French mills seeking to sell into the Belgian market, their quotations are as high as the Belgian prices and their deliveries are also extended.

Pig Iron.—Prices and general market conditions are unchanged. Demand is fairly active in the domestic market, and export inquiry is evidently improving. For export recent quotations on phosphoric foundry iron have been £3 2s. to £3 2s. 6d. ($14.98 to $15.10) per ton, f.o.b. Antwerp. Bessemer hematite iron is offered at about 660 fr. ($18.25) per ton, f.o.b. Antwerp.

Semi-Finished Material.—Although demand is still active, available supplies are small and many mills are not interested in new business. In consequence, the market is firm with a tendency to advance. Nominally, blooms, which are scarce, are quoted at £4 6s. to £4 12s. 6d. ($21.05 to $22.65) per ton, f.o.b. Antwerp. Billet prices range from £4 13s. to £4 16s. ($22.80 to $23.50) per ton, f.o.b. Antwerp, for 2-in. to 3-in., and sheet bars are quoted at about £4 19s. ($24) per ton, f.o.b. Antwerp.

Finished Material.—With speculators and exporters covered on their immediate requirements and consumers' stocks fairly well replenished, the market is quiet. Prices, however, are quite firm, with most mills well committed for the next 60 days. Steel bars are scarce and premiums on the present price of £5 16s. per ton (1.28c. per lb.) are being asked in many cases. There are occasional reports of quotations by French and German mills of £5 15s. per ton (1.27c. per lb.), but these seem to be the exception rather than the rule. Prices of angles are firm and beam quotations are advancing. Current offers are £5 per ton (1.10c. per lb.) for beams and £5 7s. per ton (1.18c. per lb.), for angles. Wire rods are quoted at £5 15s. per ton (1.27c. per lb.) and hot-rolled hoops at £6 17s. 6d. per ton (1.40c. per lb.), f.o.b. Antwerp. The sheet market is firm, following the recent advances. Most mills are fully booked with business, even on the lighter gages. British competition for light-gage sheets is keen.

Shipments of electric industrial trucks and tractors in May are reported by the Department of Commerce at 116 units, of which 13 were for export. This compares with a total of 137 in April and with 106 in May last year. For the first five months the shipments have aggregated 615 this year, against 555 a year ago.

STEEL EXPORTS MAY GAIN

High European Prices Suggest Possibility of United States Mills Selling More in Foreign Markets

NEW YORK, June 12.—Prices of foreign steel have continued to advance, and plain steel bars of Thomas grade are now quoted at 1.88c. to 1.93c. per lb., duty paid, New York. Recently importers found it possible to do some business in concrete bars when the smaller sizes were specified, as European makers in a few cases were not fully booked. There is still a small tonnage of structural material being sold by importers, but most of this was purchased from the European mills prior to recent price advances. Even on large tonnages of hoops and bands, prices equivalent to the American mill quotations are being asked by Continental makers.

In the past few weeks, with Continental sellers quoting higher prices in foreign markets, exporters of American material have been able to secure an increasing volume of business. Sales to Japan and China are still rather limited, but galvanized sheets, wire and wire nails have been sold to South American markets and some small bar business is reported. Exporters here express the opinion that there may be a decided improvement in export of steel products from this country if the European price level continues as high as at present, which seems likely.

In addition to recent export business in sheets, wire and nails with South American markets, Japan has appeared as a buyer of gas pipe, the Tokio Gas Co. having closed in the past week on 975,000 ft. of black gas pipe, the order to be placed by the exporter with American makers. About 15 miles of 60-lb. rails for a Japanese railroad are reported to have gone to the Government Works in Japan. A few inquiries for wire rods are reported in the market from Japanese consumers, but offers are only about $37 per ton, c.i.f. Japan, while the current price of American mills is about $42 per ton, c.i.f. The Canadian interest which usually sells a fair tonnage of wire rods to Japan when there is any demand is reported well booked with business and temporarily quoting high prices.

Only a small tonnage of tin plate is in the market for Japanese consumers. With the exception of the leading American producer, which is reported to be in a position to offer some tin plate for movement this month, most mills are quoting August-September shipment to Japan. British tin plate makers are booked with business well into the fall and are unable to make early shipment, but exporters claim that brokers and exporters in the United Kingdom can offer practically any shipment required, although at prices higher than the current Welsh quotation.

German Domestic Market for Machinery Sustains Activity

WASHINGTON, June 12.—For the German machinery industry 1927 was a period of high-pitch activity, according to a report prepared by Consul-General C. B. Hurst, Berlin, made public by the Department of Commerce. Although total sales, amounting to 2,600,000 tons, were 600,000 tons smaller than during the prewar times, the improvement of economic conditions in Germany brought about an increase of domestic sales. In spite of considerable difficulties, German manufacturers succeeded in regaining their position in the international trade and in bringing about an increase in exports of machinery.

During the year German machinery exports ranked second after those of the United States. The value of the excess of German machinery exports over imports amounted to 7,500,000 m. ($1,800,000), thereby representing the highest export value of all German industries. These favorable results were reached although the cost of production rose considerably during 1927, while, owing to severe competition, an increase of prices was not possible. A lively demand existed for steam engines and particularly for steam engines for vessels, as efforts are being made to reorganize the German commercial fleet along modern lines.

Buyer Talks on Pressed Metal Selling

W. B. Calkins, General Purchasing Agent Willys-Overland Co., Discusses Prices and Other Factors at Meeting of Manufacturers of Stampings

THE Pressed Metal Institute, consisting of manufacturers of metal stampings, was addressed at its meeting in Toledo, Ohio, on June 7 by W. B. Calkins, general purchasing agent Willys-Overland Co., who discussed various selling methods, the making of prices and other subjects having to do with the relations between the purchasing department and the purveyor of stampings and other products used in the manufacture of automobiles.

"You are best known," he said to these manufacturers, "through the contact of your salesmen. Are they selected because of their detailed knowledge of your business and your products or because of their affability? Can they and do they convey your message clearly and briefly, or do they consume unnecessary time by general conversation on the topics of the day? Not that the buyer isn't interested, but if his office hours are to be successfully applied it must be through the securing of the greatest possible amount of information in the time available.

"From an advertising standpoint, your salesmen should give as interesting an outline of your affairs and the advantages of your service as it is possible to give. Fortunately, the so-called art of high-pressure salesmanship is becoming obsolete, but where it does exist it can be expected to have as much effect as the winds out on the prairie, as a buyer would not be suitable for the position he occupies if high-pressure selling were allowed to affect his judgment.

"When the salesman reaches the point where he is trying to close the business, he undoubtedly will make very strong claims that the prices quoted are the lowest that can be offered with any profit at all, and that if another concern offers lower prices it cannot successfully continue in business and will be unable to furnish satisfactory deliveries and a suitable quality. The salesman will finally wind up by asking, as a 'special favor,' what price he must quote to get the business. This information, if the buyer gave it to him, certainly would not increase the other bidders' confidence in the fair play of American business.

Some Reasons for Price Differences

"In numerous instances we have found that concerns which stated to us that they could not make lower prices have come back within a year and have quoted prices lower than the one which originally won the business. An outstanding reason is a difference of 10 or 15 per cent in the quality, kind or amount of the raw material which various concerns claim is required to produce the article. Do not overlook the fact that you are the buyer of this raw material and that it constitutes more than 50 per cent of your sales invoice price. You then wonder why the buyer often believes there is a similar difference in the other factors which go to make up the total price.

"Sometimes it may be that the buyer is unable to use a certain material unless the price is low enough. We have had such a condition, and after sales engineers have spent a month with our designers they have quoted a prohibitive price. Then we would invite in another concern, and upon receiving materially lower quotations have caused an inquiry to be made of the original bidder as to the care exercised in the study of the subject. Then the first bidder would request a little more time to reconsider before the business was placed; then quote a price about 30 per cent below the first price—and this without pressure on the part of the buyer or the creating of a so-called buyer's market. This situation clearly indicates that too many times a constructive study of the subject is not carried out in the first instance."

Mr. Calkins said that the question is often raised as to how a buyer decides who shall have the business when prices are equal. He answered that this sometimes depends on the location of the seller's plant, his reputation as to dependability, and, more frequently, on whether the seller has ever offered the buyer any constructive suggestions regarding the articles he produces, such as simplifying the design or any other point which would tend to improve quality or reduce costs or both.

Correct Cost Finding Prevents Revision of Quotations

The speaker also advocated better cost-finding methods for manufacturers of metal stampings. This is now done by estimating and planning departments, but frequently no comprehensive study is made and the seller does not know what his real costs are going to be until the job has gone through his shop. Correct cost finding in the first instance, before prices are quoted, would, according to Mr. Calkins, prevent a repetition of business calls and the revision of quotations, and the expense incurred would be no greater than under the present method.

"To develop cost finding," he said, "it is desirable that the manufacturing, estimating and sales departments collectively go over the subject and anticipate how new methods can be applied to the production of the article. In doing this you will establish a bond of sympathy and cooperative education of the various departments, thus producing a joint understanding as to what is required in the administration of your affairs, reaching down to your foremen. This will continually bring out from your organization suggestions as to improvements in methods, eliminations of waste and an ability to exceed your past performance in the use of the smallest amount of floor space and equipment with the least amount of handling (that by mechanical means if practical) in the shortest possible time from the receipt of your raw material at your receiving doors to the finished product in your shipping department.

"It has been found that concerns which do not have the best of equipment often exceed others by having well directed and loyal employees, who produce equal or better results by reason of a study of the problem of producing with the facilities which they possess; by the addition of special equipment they have secured final results and selling prices which competitors do not equal, thus causing the latter to make claims that such prices will not produce profits.

"The question has been asked as to how the stampings manufacturer can hold business that the buyer may be undertaking to produce for himself. This can only be accomplished by developing such advanced methods and economies of operation that the buyer, on analyzing the subject, will find no advantage in producing the article. This policy has been followed by one concern we know for at least 20 years; it has been almost their golden rule, and successfully so, even causing them to enter into the manufacture of their own basic materials, and in our opinion they are more firmly established today than ever."

The Columbia Tool Steel Co., Chicago Heights, Ill., has called attention recently to its trade mark Superdie, which was adopted for the modification of the high-carbon high-chromium tool steel it developed in 1926. The company at that time received registered trade mark No. 230,327 covering the use of the word "super" in conjunction with the word "die" on tool steels, metals, metal castings and forgings.

DISTRIBUTION CONFERENCE

Wider Application of Bolt, Nut and Rivet Plan to Be Discussed

IN response to the suggestion contained in a pamphlet issued by the Bolt, Nut and Rivet Manufacturers Association in April, a conference of manufacturers of products handled through hardware, jobbing and mill supply channels for a discussion of sales and distribution problems will be held at the Waldorf-Astoria Hotel, New York, June 28 and 29, under the auspices of the bolt, nut and rivet industry. In addition, all of the chairman of the 34 district committees of jobbers, formed to facilitate the distribution of bolts, nuts and rivets, are expected to be present.

A belief that wider application can be given the plan of the bolt, nut and rivet industry for the economical distribution of its products will form the basis of the discussions at the conference. The basic principle of the bolt, nut and rivet distribution plan, which incidentally has proved highly successful, is the elimination of the manufacturer as the leading competitor of the jobber.

The program of the conference calls for general meetings, morning and afternoon of both days, with a banquet scheduled for Thursday evening, June 28. C. J. Graham, who is chairman of the general committee of the 56 manufacturers of bolts, nuts and rivets, who are to be hosts to the gathering, will open the first general conference with an outline of the plan of the meeting, and detail the results which have attended its application in that industry. This is to be followed by an open discussion by manufacturers present, who will be asked to express their ideas on the practicability of this or some similar plan in their own particular industry. At the afternoon session, jobbers will be given a chance to present their ideas. On Friday morning, governmental representatives will be heard, and the afternoon is to be given over to organization of the plan. Charles M. Schwab has indicated his intention to be present and to make an address. It is expected that between 250 and 300 executives of the leading industries in the country will attend the conference. The chairmen of the jobbers' committees are as follows: R. H. Welton, Chase, Parker & Co., Boston; W. E. Hansen, Hansen & Yorke, New York; A. B. Paull, Beals, McCarthy & Rodgers, Buffalo; W. E. Bittenbender, Bittenbender Co., Scranton, Pa.; Fitzwilliam Sargent, Standard Supply & Equipment Co., Philadelphia; Louis Moller, Anderson & Ireland, Baltimore; Alvin M. Smith, Smith-Courtney Co., Richmond, Va.; Charles Nuchols, American Hardware & Equipment Co., Charlotte, N. C.; George Winship, Fulton Supply Co., Atlanta, Ga.; L. J. Larzelere, Farquhar Machinery Co., Jacksonville, Fla.; W. L. Rodgers, Pittsburgh Gage & Supply Co., Pittsburgh; H. H. Riddle, George Worthington Co., Cleveland; W. H. Basse, Joseph T. Ryerson & Sons, Inc., Detroit; F. T. Holliday, W. J. Holliday & Co., Indianapolis; George Puchta, Queen City Supply Co., Cincinnati; Brown Buford, Buford Brothers, Nashville, Tenn.; W. W. French, Moore-Handley Hardware Co., Birmingham, Ala.; James Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.; George K. Conant, Sligo Iron Store, St. Louis; A. M. Mueller, Joseph T. Ryerson & Son, Inc., Chicago; I. R. Shadbolt, Shadbolt & Boyd Iron Co., Milwaukee; William J. Dean, Nichols, Dean & Gregg, St. Paul, Minn.; W. E. Muir, Luthe Hardware Co., Des Moines, Iowa; Edward O. Faeth, Stowe Supply Co., Kansas City; S. E. Clarkson, Oklahoma City Hardware Co., Oklahoma City, Okla.; Alfred Weaver, Briggs-Weaver Machinery Co., Dallas, Tex.; D. D. Peden, Peden Iron & Steel Co., Houston, Tex.; J. B. Simmons, Woodward-Wight Co., New Orleans; P. R. Helm, Pratt-Gilbert Hardware Co., Phoenix, Ariz.; H. V. Waterman, Hendrie & Bolthoff Machinery & Supply Co., Denver; H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City; George W. Boole, A. M. Castle Co., Seattle; Henry Morris, 218 Chronicle Building, San Francisco; J. E. Webster, Ducommun Corporation, Los Angeles.

STEEL PRICE STABILIZATION

Movement Progressive, but Downward, Along With Fewer Producing Companies

PROGRESSIVE stabilization in steel prices, particularly stabilization at low prices, is indicated in the accompanying table. This shows recent yearly averages of THE IRON AGE finished steel composite price. Also it shows the extreme swing in each year between the high and low composite prices. What is outstanding is that, notwithstanding the higher prices obtaining in recent years as compared with those before the war, the swings are only a fraction of those in, say, 1912 and 1913. The fact is brought out in the last column, by expressing the swing as a percentage of the price.

Thus, while the composite prices for a period before the war averaged somewhat over $28 a net ton, or 1.40c. a lb., the fluctuations brought a range in a year of over $6.50 a ton, or a swing of 20 per cent, roughly. In 1926, on the other hand, the fluctuations had dampened to a maximum swing of 74c. a ton, or only 1½ per cent of the larger composite average of nearly $49 a ton. In other words, with prices in recent years two-thirds higher than before the war, the price swings, taking the last three years, have been only one-tenth to four-tenths of the pre-war price swings.

The number of companies making the bulk of the rolled steel has been reduced one-third in the last five years. In 1922 about 80 per cent of the steel bars produced came from 35 companies, while last year that percentage was supplied by 20 companies. Twelve companies today supply 80 per cent of the plates, against 21 in 1922. There are six companies accounting for 85 per cent of the structural shapes, against 9 six years ago. In like comparison, roughly 20 companies can turn out 70 per cent of the sheets, against 29 in 1922.

Counting the leading producers of bars, plates, shapes, sheets and wire, (although there has been little change in the number of companies making wire products), the total number of leading sources of supply in 1922 was 117 (If one company made three forms of steel, it is considered as providing three competitive sources of supply, etc.) and in 1927 it was 78, a loss, as by consolidations, of 39, or one-third. The figures show fewer companies, with progressive stabilization but lower prices.

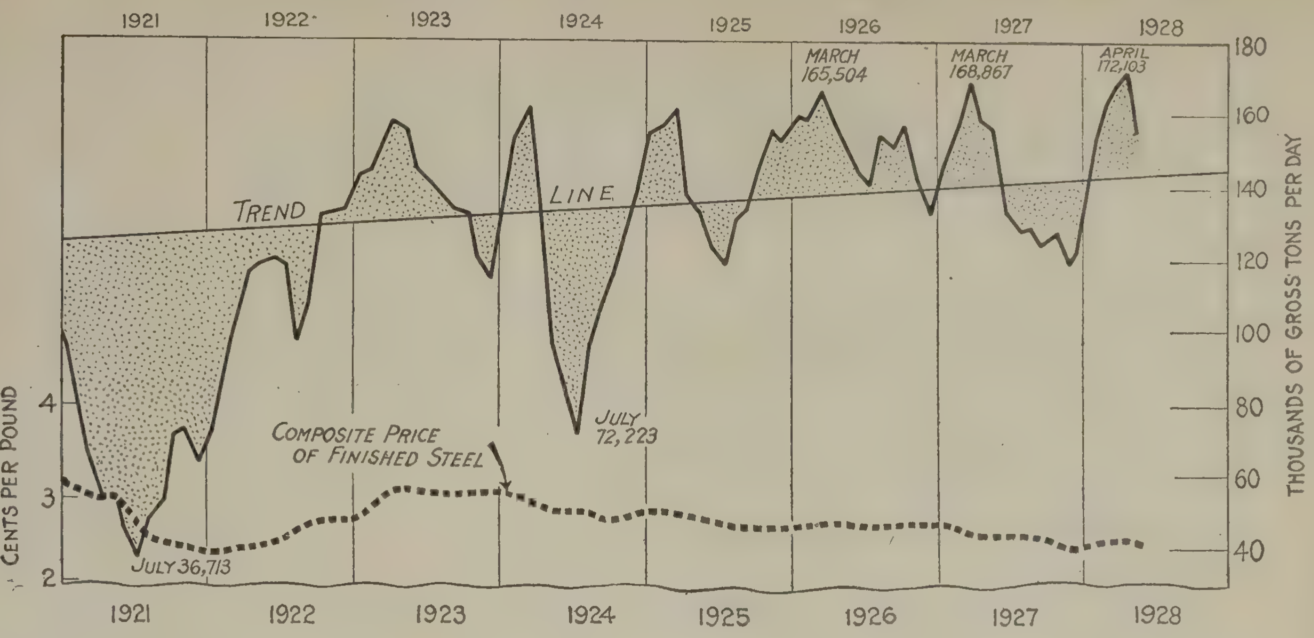
Fluctuations in Prices of Finished Steel

Year	Rolled Steel Produced Per Capita, Lb.	Composite Price Per Net Ton	Price Swing Per Net Ton	Per Cent of Swing
1912	540	$28.28	$6.62	21.6
1913	540	29.36	6.54	19.6
1919	515	57.94	7.34	11.8
1920	650	85.52	17.06	23.2
1921	315	50.64	19.00	37.5
1922	525	44.40	9.08	20.5
1923	650	54.76	6.90	12.6
1924	545	52.18	6.38	12.7
1925	645	49.30	3.26	6.6
1926	680	48.78	0.74	1.5
1927	620	47.14	2.66	5.5
1928 (5 mos.)	710	47.00	1.00	2,1

Trumbull Steel Co. Assets to Be Distributed

Final chapters are being written in the history of the Trumbull Steel Co., Warren, Ohio, whose properties were recently taken over by the Republic Iron & Steel Co., Youngstown, and now constitute the Warren plant of Republic. Proceeds of the sale of the Trumbull company's assets to Republic are now to be distributed. The Trumbull company has for distribution 296,000 shares of the common stock of Republic Steel and $296,000 in cash, the latter representing the $1 a share dividend on Republic common, which was paid June 1. Each holder of Trumbull preferred will receive 1 2/3 shares of Republic common for each share of preferred, while each holder of Trumbull common receives one-fifth of a share of Republic common for each share of Trumbull. With this distribution, the Trumbull company will become a corporate nonentity, without assets of any kind, and its corporate identity will be dissolved.

While Dropping 10 Per Cent from the Record-Breaking April Daily Rate, Production of Steel Ingots in May Was the Seventh Largest for Any Month We Have Yet Had. Prices, as measured by THE IRON AGE *finished steel composite price, were slightly lower*



Steel Ingot Production Less in May

Daily Output 9½ Per Cent Off from April, but Total Is Still High —Five-Month Tonnage Largest Ever Reached

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in May is calculated by the American Iron and Steel Institute at 4,203,190 gross tons, an average of 155,674 tons for each of the 27 working days. This shows a reduction from the April total of 4,302,573 tons in 25 days, or the record-breaking average of 172,103 tons a day. The May total has been exceeded only by April and March of this year, March, 1927, March, 1926, March, 1924, and May, 1923.

For the five months of the year the calculated output is 21,049,919 tons, which exceeds the corresponding figure for last year by 3.7 per cent. It is ahead of the 20,419,656 tons of the first five months of 1926—the previous record—by approximately 3 per cent. The operations are based on returns from companies which in 1927 made 94.68 per cent of the open-hearth and Bessemer ingot production of that year.

Production of Steel Ingots*

(Gross Tons)

	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	Approximate Daily Output All Companies
Months 1928	Open-Hearth	Bessemer		
Jan.	3,280,247	498,746	3,991,332	153,513
Feb. ...	3,308,728	521,366	4,045,304	161,812
March ..	3,700,411	567,309	4,507,520	166,945
April ...	3,509,637	564,039	4,302,573	172,103
May ...	3,397,631	581,949	4,203,190	155,674
5 Months	17,196,654	2,733,409	21,049,919	161,922
1927				
Jan.	3,042,133	545,596	3,789,874	145,764
Feb. ...	3,043,492	565,226	3,812,046	158,835
March ..	3,702,660	590,709	4,535,272	167,973
April ...	3,341,750	565,440	4,127,335	158,744
May	3,273,593	557,785	4,047,251	155,663
5 Months	16,403,628	2,824,756	20,311,778	157,456
June ...	2,823,107	486,053	3,495,609	134,446
July	2,596,349	436,883	3,204,135	128,165
Aug. ...	2,806,347	505,596	3,498,549	129,576
Sept. ...	2,622,977	471,548	3,268,881	125,726
Oct.	2,643,562	495,845	3,316,292	127,550
Nov. ...	2,478,627	481,599	3,127,015	120,270
Dec.	2,557,955	448,154	3,175,484	122,134
Total..	34,932,552	6,150,434	43,397,743	139,543

*Excluding crucible and electric steel ingots.

Further movement away from the use of Bessemer steel is shown by returns for the five months, in which the Bessemer tonnage reported was 3.2 per cent less than last year, whereas open-hearth production increased 4.8 per cent. But May showed a gain in Bessemer over April, and a decline in open-hearth steel.

Estimating production in April of electric and crucible steel ingots (no longer covered in the institute's monthly figures) at 1400 tons a day, the total April ingot output appears to have been at the rate of about 157,000 tons for each working day. Details of the past 17 months are given in the table.

Tin and Sheet Workers Scales Renewed Except for Minor Changes

The wage scales to be paid in sheet and tin mills operated under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers for the 1928-29 scale year will be substantially the same as in the year which ends June 30. The conference at Atlantic City between representatives of the manufacturers and the wage scale committee of the Amalgamated Association reached an agreement on a continuance of the 1927-28 scale, except that the manufacturers concede a 5 per cent increase for tin mill pair heaters on No. 28 gage and heavier and the screw boy on No. 27 gage and lighter, while in mills working on the three-part system, the crew, except the operator of the mechanical doubler, will receive the four-part system prices when working matched iron of Nos. 27, 28, 29 and 30 gages, and the single boy and screw boy are granted a 5 per cent increase on steel No. 27 gage and lighter.

Affirming a previous opinion that rates on pig iron from points in Alabama, Kentucky and Tennessee to Ansonia, Conn., are not unreasonable, the Interstate Commerce Commission upon reconsideration has handed down a second report holding that the rates are unduly prejudicial to the complainant, the Farrell Foundry & Machine Co., Ansonia, to the extent they exceed corresponding rates maintained from the same points of origin to Derby and Shelton, Conn.

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This Issue in Brief

Cuts labor cost 33-1/3 per cent by adoption of incentive plan. Working force in shipping department is almost halved, and wages of remaining employees are increased 25 per cent by paying group bonus.—Page 1676.

World output of iron is virtually at a standstill for first time in 150 years. The steady and high rate of progress to which the world has been accustomed ceased during the past decade, with attendant unsettlement of conditions in every producing country.—Page 1671.

"Excess capacity" is no excuse for insufficient profits, says banker. Practically every industry is over-expanded, yet many are enjoying adequate earnings. The craze for volume regardless of cost of getting business is the primary cause of unsatisfactory returns.—Page 1682.

Continued weakness in steel prices is likely to persist, says Dr. Haney. Steel output is too high in relation to demand, he believes.—Page 1691.

Should a bonus be paid for **regular attendance** at work? Before adopting a bonus system of this kind, the manufacturer should find out just how much tardiness or absence is costing him. He may find that the bonus system will cost more than it will be worth.—Page 1677.

Accelerated tests are not conclusive, and are frequently unreliable. Owing to variations in temperature, time, kind of solutions, position of specimen, etc. accelerated tests serve merely as an indicator. The best test is commercial usage. The experience of actual users, frequently overlooked, provides the manufacturer with a fund of concrete, definite data.—Page 1668.

Chromium-plating demands an almost perfect surface. Chromium plate will not flow as the softer deposits do, and will not only reproduce all defects, but actually seems to magnify them.—Page 1680.

Payment of bonus for saving of scrap and labor increases manufacturer's profits. Foremen are paid a bonus for performance as compared with predetermined standards. In computing the bonus allowance is made for meeting delivery promises and for reduction of complaints and rejections by customers.—Page 1678.

Reduces finished stock and stock in process 80 per cent and saves $59,000 by rearranging enameling department. Cash register manufacturer cuts floor space 30 per cent, gets parts through the department in one-fifth the time formerly consumed, and increases output one-third by installing conveying systems and re-routing work.—Page 1672.

World commodity prices are likely to fall irregularly for the next 20 years, says economist. Wages are not likely to do so, at least not immediately, owing to strength of labor groups in all countries. Yet, unless prices and wages move together, there will be extensive labor troubles or a sharply reduced rate of profit.—Page 1669.

Are there too many mergers? "It is time we got over the notion that any merger is a good merger," says banker. Merely putting two businesses together does not automatically improve them.—Page 1682.

Character of the gas reveals what is going on inside the blast furnace. Observing the character of the gas will enable the operator to keep the furnace under better control and so reduce the output of "off" iron.—Page 1686.

Decentralization of output of heavy commodities will increase, rather than tend to concentrate in certain countries and centers, as before the war, economist believes. This is due to protective tariffs and to the worldwide belief that safety lies in each country making everything possible in the way of necessary manufactured products.—Page 1669.

Drop of almost a half million tons in Steel Corporation's unfilled orders. At May 31 the unfilled tonnage was 3,416,822, the lowest since October, 1927.—Page 1729.

Should foremen use "school room" methods in training workers? No, says management association executive. Men cannot be trained out of a text book, he holds. Best results are obtained when the foremen bring their individual instruction problems into a joint conference of foremen and management.—Page 1678.

Group bonus distribution is put entirely in the hands of the foreman. Cash register manufacturer requires the foreman to turn out a certain number of pieces costing so much, and gives him full supervision of the distribution of the bonus to the men under him. Expressing incentive standards in decimal hours was not understood by employees, so the standards were changed to dollars, with satisfactory results.—Page 1676.

Seller's ignorance of costs weakens buyer's confidence. Purchasing agent of automobile manufacturing firm decries two-bid methods of sellers who do not know their costs. Tells pressed metal manufacturers that the best way to get business and to hold it is to get accurate cost data and then develop such advanced methods and economies that the buyer can find no advantage in producing the article himself.—Page 1697.

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New Steel Era—New Methods

A YOUNG industry has reached maturity. Iron and steel masters whose experience taught them to think in terms of rapid increases in production face a changed situation. No longer must they strain to keep abreast of consumption. No longer is demand forcing expansion of capacity. For several years world consumption of iron and steel has been virtually static. As pointed out by Edwin C. Eckel in an article in this issue of THE IRON AGE, it was only in 1927 that world production recovered the ground lost after 1913.

Undoubtedly the great economic losses suffered during the war had much to do with checking the expansion of steel trade, but whether arrested development is a post-bellum phenomenon or marks the passing of the industry's adolescent growth, the problem remains the same. The time has passed when steadily mounting demand can be taken for granted. Steel makers must take the initiative in uncovering and cultivating new and larger markets. Research departments and sales organizations must collaborate more effectively in discovering and promoting new uses for steel; financiers, economists and governments must be enlisted to accelerate the development of backward industries and districts, not to mention the almost untapped continents, South America and Africa. The task is a new one and calls for new ideas.

The keynote of this new period was sounded by Eugene G. Grace, one of the industry's forward-looking executives, who at a 1926 meeting of the American Iron and Steel Institute said, "We must be better merchants." Better merchandising means more than greater stability in prices, desirable as that end is. It implies a careful study of human wants and skillful publicity to stimulate their satisfaction. It involves the broadest conception of the economic development that is essential to continued growth of steel production. It must envision great potential markets that are waiting to be taken by the makers of steel.

The steel industry did not lack imagination in creating productive capacity. It will not be found wanting in solving its new problem. Before the war the steel maker had steel to *make;* today he has steel to *merchandise.*

Better Machine Tool Marketing

MACHINE tool manufacturers recently have shown a disposition to grapple with their problems in a way that not only promises concrete results but also points the way to other business groups. Some of the latter have long followed the familiar routine of discussing trade ills at conventions, and then passing resolutions, after which the members depart to their homes to do little or nothing until the next year's convention rolls around, when the same procedure is gone over again.

A besetting problem of the machine tool industry, as pointed out at the recent convention of the National Machine Tool Builders' Association in Chicago, by P. E. Bliss, president, is the great amount of free service demanded by tool users. Now the lathe group of the association has decided upon a per diem service charge, plus legitimate expenses, and if the plan succeeds other machine tool manufacturers will undoubtedly take a like stand.

Another enemy of profit with which the industry has wrestled until recently with doubtful results is that of the "trade-in" of used tools when new tools are purchased. Dealers operating second-hand tool departments were frequently disposed to allow an amount for an old tool that was considerably in excess of the price it would bring when resold. This plainly was tantamount to a cutting of prices. J. R. Porter, a Chicago dealer, told the machine tool builders at their convention that not so long ago his company, in one instance, allowed $300 more for an old machine than it actually brought at resale. The $300, of course, came out of the dealer's commission on the sale of the new tool. In Chicago and in New York an appraisal plan is now being applied in the trade-in of used tools that promises to eliminate most, if not all, of the abuses so long under complaint. A group of dealers in one center selects a second-hand machinery dealer as an appraiser for all used tools offered in exchange for new tools. The appraiser puts a price on the old machine, this price usually being one at which the appraiser is willing to buy the tool. Thus, all dealers who are quoting on the new machine use the same figure as the trade-in allowance.

According to Mr. Porter the new method is being accepted as "good business" by the trade in districts where it has been tried out. Formerly, there was a good deal of dickering by machine tool users on the valuation of the old machine, and not infrequently the dealer making the largest allowance got the order for the new machine. Under the plan adopted it is believed that much price haggling will be eliminated and that new tools will be bought to a larger extent on their merits and not because of the size of the trade-in allowance.

Congress Adjourned

IN the theory of our Government Congress represents the people. The founders supposed that it would act collectively in the interest of all the people. It was not foreseen that the country would become so big and would have so many diverse interests that the representatives of some sections would unite with representatives of others to pass utterly selfish legislation. It was not foreseen that political blocs with great power for mischief would develop; and it was not foreseen that political office holding would become quite so much a matter of professional business as it is. Fortunate is it, therefore, that the president was clothed with great power as the disinterested representative of all the people. It is of course just this that creates the hostility that comes into existence between all presidents and all congresses.

In the Congress that has just adjourned from one session the President was a great bulwark of the people. He stopped an outrageous Mississippi River flood control bill, vetoed an agrarian bill that was running over with folly, and pocketed the foolish Muscle Shoals bill for putting the Government into a commercial business. We may believe that he will also stand in the way of the selfish and reckless Boulder Dam bill if, when and as that ever reaches him.

Several important bills that were a mixture of good and bad he felt constrained to accept out of consideration that the good preponderated. Thus the shipping bill, although it would have been far better to have had a bill for the liquidation of that money-losing business. Likewise the bill reducing taxes, as regards which Congress bowed to the President in respect to reduction in the aggregate, but not in the manner of making it. The intermediate incomes, which have had but little relief, continue to be disregarded in spite of the administration, for envious congressmen believe in punishing competency; yet the tax on automobiles, which drew some payment for road building from those who use the roads, was rescinded. Anathema to a congressman is anything of the nature of a consumption tax that is bound to be of widespread incidence.

Congress all but perpetrated the atrocity of throwing all income tax returns open to public inspection. This illustrated its spirit. It is vexatious and unrepresentative. Yet those who have a sense of sardonic humor can find a certain amusement out of what is really sad. The Senate converts itself into a detective bureau, but does not intrigue us as Sherlock Holmes used to do, or even the Pinkertons. Congress raves over the nullification of a recent constitutional amendment, but is oblivious to what has happened to some older ones. Itself has been trampling upon an article of the constitution requiring the House of Representatives to reapportion its members after every decennial census.

Most humorous of all is the anxiety exhibited by members as election time approaches, to ascertain what their constituents want and to imagine that their constituents in mass know anything in respect to economic subjects beyond what in New York is symbolized by the five-cent fare, which is perhaps the finest lolly-pop that was ever invented in a country where democracy rules. Compared with that the recent congressional removal of taxation on amusement tickets up to $3 was kindergarten work.

An Unexpected Steel Record

PRODUCTION of steel ingots in the first half of 1928 will make a new high figure for any half-year. The present record is 24,153,809 tons, made in the first half of 1926. For the first half of 1927 the total was about 1½ per cent lower. No second half-year has come within 5 per cent of the 1926 first half in point of tonnage.

Returns for the first five months of 1928, as calculated by the American Iron and Steel Institute, showed 21,049,919 tons. Production in June, therefore, may fall as low as 3,105,000 tons and still the six months would have a new record. But production in June, with 26 working days, even assuming a drop of 20 per cent (which is most unlikely) from the May daily rate, would be about 3,239,000 tons, or 134,000 tons more than enough to establish the record. At 4,203,190 tons, May ranks as the seventh month in point of gross output in the history of the industry.

Building and automobile consumption of steel have had their part in bringing up production this year, whereas the railroads have been below their average consumption of the past five years. Probably no one whose judgment on the matter is entitled to have weight believed as this year came in that the steel industry would outdo itself in the first half of 1928. But it appears that the uncounted and steadily mounting minor uses of steel in a multitude of channels new and old have again gone beyond the ken of those best able to know of the movement and to take its measure.

Pittsburgh in Steel

INFLUENCED in part no doubt by the fact that in recent years not a few Pittsburgh business men have been doubtful of the Pittsburgh district retaining its supremacy in steel manufacture, President W. G. Clyde of the Carnegie Steel Co. has given an interview to the *Post-Gazette*, Pittsburgh's morning newspaper. Confidently he tells Pittsburghers that the district will remain in its important position in steel. Expenditures of more than $100,000,000 in improvements in a little over four years by the Carnegie Steel Co. alone, in the

Pittsburgh district alone, are referred to as crucial testimony to the faith of the United States Steel Corporation in the district's future. This leaves out of the reckoning expenditures of other Steel Corporation subsidiaries, also Carnegie expenditures at Farrell, New Castle, Youngstown and Mingo Junction.

Mr. Clyde refers to the large river fleet the Carnegie Steel Co. has been constructing, with an expenditure of $5,000,000 in four years. Pittsburgh has this freshly developed, and developing, means of cheap transportation; it has its good railroad facilities, and in Mr. Clyde's words it is "close enough to Baltimore and Philadelphia for a grip on the export business."

Pittsburgh's misgivings about her industrial future, which this interview is calculated to allay, arose nearly a quarter of a century ago. Previously there had been a complacency not altogether consistent with progress. Formation of the United States Steel Corporation in 1901, involving apparently a removal of ownership of a large part of the Pittsburgh district's steel making and steel finishing capacity, was followed in 1905 by announcement of the corporation's intention to build the Gary plant. Naturally enough the project received much attention, but this was partly due to the fact that this was apparently the first instance of a perfectly new steel plant of any such size being built from the ground up at one operation. Lackawanna was such a plant, but had appeared to the public as a removal. A train of thought started in the Pittsburgh mind which has continued to the present day.

It is very easy, on paper, to overrate or underrate the advantages or disadvantages of any producing district. Freight rates may be made to appear of paramount importance, for the thing is done on every working day of the Interstate Commerce Commission. The steel industry is largely a fixed thing. Plants cannot be moved, and the relative production of different districts can change only gradually, chiefly by growth at one point and decadence at another, a slow process at most.

For many years the steel industry's total tonnage grew rapidly, as for instance, from less than 5,000,000 tons of ingots and castings in 1892 to more than 10,000,000 tons in 1899, then to 20,000,000 tons in 1905, 31,000,000 tons in 1912 and 45,000,000 tons in 1917. It was in such times that important shifts in relationships could occur, and Pittsburgh readily survived, retaining a dominant position. In the last five years the country's total steel production has increased but little in point of tonnage. It is a simple matter for the Steel Corporation executives to pursue a policy of keeping its Pittsburgh district plants up to the point of maximum efficiency, and it is easy to show from the records that Pittsburgh is in a secure position.

WITH pith and point the *Business Conditions Weekly* of the Alexander Hamilton Institute says in its last issue:

> It is time that business men began to pay less attention to speculation and more to their own knitting.

Of like purport is this from the June letter of the National City Bank, New York, Vice-President George E. Roberts, editor:

> Never before has stock speculation involved so many people of all classes, and one hears the frequent complaint that one trouble with business is that business men are paying too much attention to the stock market and not enough to the conduct of their own establishments.

What has happened in Wall Street in the past week must have suggested to divers and sundry participants in the greatest bull market in all history that it is high time to heed the call of neglected business.

Our Estimates of Steel Output

OCCASIONAL comments come to THE IRON AGE on the statements made in our market summary relative to the rate at which the steel companies are producing. Some time ago one reader made this criticism: "On the day you printed Pittsburgh production at 75 per cent of capacity, the Clairton mills were running only one turn." Another comment said: "You estimate that the industry is producing ingots at 84 per cent of capacity, whereas every available furnace in my district is being crowded to its utmost."

In every instance the commentators fall into the error of thinking that the rate of production is uniform throughout the country (whereas all last year the Chicago district was several per cent nearer capacity than any other) or that ingot production and rolling mill activity are identical. Week after week estimates are given of ingot production, rail mill activity, sheet mill operations, and all such data as are available and worthy of comment. These figures are by no means identical. Sheet mills may be running strong the same day that plate mills are slack.

In order to convince himself on this point, a member of THE IRON AGE editoral staff who has never had a hand in collecting the market data, and who therefore could approach the problem with an unprejudiced mind, critically examined the statements of operation rates made in the 52 market summaries for 1927. In nearly every issue some estimate is given concerning the current production of ingots, either for the Pittsburgh, Youngstown, Chicago, or Southern district, or for the Steel Corporation and the independents. These are given in terms of percentage, thus: "Chicago ingot output has passed 95 per cent of capacity." In each month these published figures were weighted according to the ingots produced by the given district or organization during 1926, as taken from the annual statistical report of the American Iron and Steel Institute, and a weighted average secured for the month. Results are given in the second column of the following table:

Month, 1927	THE IRON AGE Average of Spot Estimates, Per Cent Capacity	Computed Ingot Production, Daily—Gross Tons	Actual Ingot Production, Daily—Gross Tons
January	75	140,000	145,764
February	82.5	154,000	158,835
March	90	168,000	167,973
April	87.5	163,000	158,744
May	80.5	150,000	155,663
June	73	136,000	134,446
July	65	121,000	128,165
August	66	123,000	129,576
September ...	64	119,000	125,726
October	63	117,000	127,550
November	62	114,000	120,270
December	63	117,000	122,134

To translate these percentages into tonnage, a knowledge of the ingot capacity of the whole country is necessary. According to the American Iron and Steel Institute the theoretical capacity of the Bessemer and open-hearth furnaces in the United States on Dec. 31, 1926, was 57¼ million tons per year. On Dec. 31, 1927, it was 58¾ million tons. Assuming 311 working days in 1927, all the steel plants could turn out about 186,500 tons of ingots per day. Multiplying the factors given in the percentage column by this figure gives the computed ingot production daily, as estimated by THE IRON AGE representatives from information gathered on the spot.

That these estimates are uncannily accurate is seen from a comparison of the actual production statistics, as gathered and checked much more leisurely by the American Iron and Steel Institute. The average error for the year is a little over 3 per cent low!

CORRESPONDENCE

"What Price Airplanes?"

To the Editor: The statistics quoted in the editorial "Flying Apace" in the June 7 issue of THE IRON AGE certainly reveal an interesting panorama of aviation in the United States today. To those of us intimately associated with or vitally interested in flying they also reveal a condition that is at least far from assuring. The most logical medium of comparison for the airplane is the automobile. And when we compare these two closely associated mediums of modern transportation we encounter a rather unusual situation.

The cryptic last sentence of the editorial "Who wants to walk?" may well be answered by a similar query, "What price airplanes?" When we note that there are listed 113 manufacturers of airplanes, we can quickly grasp why an airplane is so many more times as expensive as an automobile. The success of the modern automobile, unparalleled in the history of industry, may be directly traced to the mass production methods possible with metal construction. Obviously, the demand today for airplanes has not been sufficiently great for a single manufacturer to launch a program which would give production at a price comparable with automobile production, with its accompanying tremendous investment in machine tools.

Metal construction is advancing rapidly from an engineering viewpoint, but it is safe to say that the vast majority of the 113 airplane manufacturers listed still build a major portion of their structure of wood. Engineering design has advanced to a point where it is no longer the major competitive factor, but has been replaced by price. Until financial resources at present unheard of in aeronautics, and comparable with those in the automobile industry, are marshaled to the assistance of aeronautics, the factor of 113 manufacturers of airplanes indicates a weakness rather than a growing strength. Numbers of manufacturers mean diversity of design, which leads to high prices, since no single manufacturer or group of manufacturers has a volume sufficiently large to apply modern production methods. So, if the automobile analogy is followed out, a decrease in the number of airplane manufacturers rather than an increase will be an index of progress.

Another startling figure is that of 56 general service and repair firms to patch you up if you come to grief. Taken literally, this means only one service station for every two manufacturers. Even if we go to the other extreme and regard every other facility listed (such as manufacturers, ground schools, etc.) and regard them as a possible service station, the comparison with the automobile, with thousands of service stations for every manufacturer, is rather astounding. Next to modern machine tools as applied to metal construction, the next greatest factor in the vast distribution of the automobile has been the ease of service. No matter where you go, automobile service is readily and promptly available. Not so with the airplane. Many times a repair means weeks of waiting while a replacement part travels across the country to catch up with the disabled plane or engine.

Here lies the real future for every ambitious community that aspires to be air-minded. Rather than to lend local encouragement and capital to a local embryo manufacturer of airplanes, who is hopefully entering a field already overcrowded so far as mere numbers go, wouldn't it be far more logical to encourage a local air service station, with flying field, repair shop and general service facilities? The outlook for future success would at least be far more reasonable, and the contribution to the progress of aeronautics far more substantial and permanent.

JOHN F. HARDECKER,
Chief Draftsman.

Naval Aircraft Factory, United States Navy Yard,
Philadelphia, June 8.

Detroit-Windsor Tunnel Started; 13,000 Tons of Steel Awarded

Work on the international vehicular tunnel between Detroit and Windsor, Ont., was begun last week. It is expected the tunnel will be ready for use by June 1, 1930. Two-minute travel between the two cities will be made possible by the new roadway under the Detroit River, which will lack only a few feet of being a mile in length. The estimated cost of the new project exceeds $18,000,000. Speakers at the opening ceremonies on the American side included public officials of both the United States and Canadian Governments, Detroit city officials and prominent business men interested in the conduct of the tunnel enterprise.

The contract for the fabricated structural steel for the under-river portion of the tunnel, amounting to about 13,000 tons, has been awarded to the Canadian Bridge Co., Walkerville, Ont., a subsidiary of the United States Steel Corporation.

Baldwin Locomotive Works at Eddystone, Pa., to Be Formally Opened

To celebrate the completion of the transfer of its manufacturing departments and offices from Philadelphia to Eddystone, Pa., the Baldwin Locomotive Works has invited a large number of persons, including many from the steel trade, to visit its new plant on June 28. Special trains for guests will leave from Philadelphia. Among the speakers at the plant opening will be Secretary of Labor James J. Davis.

The Eddystone plant, comprising about 225 acres, was established in 1915 with the erection of two temporary buildings for the manufacture of war munitions, although the site had been owned by the company since 1905. In the past few months all of the machinery and equipment in the Philadelphia works has been moved to new buildings recently completed at Eddystone.

St. Louis Foundrymen Elect Officers

The St. Louis District Foundrymen's Club has elected the following officers: President, Roy A. Jacobsen, Commercial Foundry Co.; vice-president, Walter C. Raithel, Mound City Foundry; secretary-treasurer, Leo J. Filstead, John C. Kupferle Foundry Co.; all of St. Louis. The executive committee includes William J. Hall, Southern Manganese Steel Co., St. Louis; William J. Hommell, Banner Iron Works, St. Louis; F. T. O'Hare, Central Brass & Aluminum Foundry Co., St. Louis; C. R. Culling, Carondelet Foundry Co., St. Louis; George Mellow, Liberty Foundry Co., St. Louis; and Frank Rogers, Excelsior Foundry Co., Belleville, Ill. The club will hold its first annual picnic at Stolberg's Park, Belleville, Ill., on June 16.

Iron and Steel Markets

Steel Buyers Are Cautious

Little Interest Shown in Third Quarter Contracts, But Specifications Support Output at High Level—Prices of Semi-Finished Steel Weaker

STEEL buyers are increasingly cautious as mill output continues to decline. The opening of books for third quarter in finished products has found buyers unresponsive, and new business, as a rule, is too light to develop further changes in current prices.

The recent announcement of a price of 1.90c. a lb., Pittsburgh, on plates, shapes and bars for next quarter has not yet had the expected effect of driving in heavier specifications on current contracts. Buyers have until the end of the month to act, however, and many of the larger users have sufficient tonnage unspecified to carry them well through July. Meanwhile, the acceptance by some mills of additions to contracts at 1.85c. also tends to defer a real test of the $1 a ton advance. In contrast with the effort to advance prices at Pittsburgh, the market on plates, shapes and bars at Birmingham has declined $1 a ton.

In view of the conservative attitude of the trade, it is not surprising that shipping orders are in close step with the actual needs of consuming plants. What does command attention, however, is the fact that specifications are supporting so high a rate of production.

The drop of 455,311 tons in the unfilled orders of the Steel Corporation in May, following declines in the two previous months, is a better measure of the changed psychology of buyers than of the trend of consumption. Early in the year, when prices were advancing, users had an incentive to anticipate their requirements. Today, hand-to-mouth buying is again the rule.

Mill backlogs are being reduced still further this month, but operations remain at a high level. Ingot production in the Greater Pittsburgh district ranges from 70 to 75 per cent, against 70 per cent a year ago, while output at Chicago averages 87 per cent, compared with 80 per cent at this time in 1927.

It is evident that mill operations not only are maintaining their lead over last year, but also over 1926. While production this month will undoubtedly show a decline compared with May, output up to June 1 was 3 per cent ahead of the first five months of 1926, the previous record, and little doubt remains that there will be a new high half-year total by a fair margin.

Consumption of steel by makers of farm implements and tractors has shown no reduction. Specifications from the automotive industry are holding up well, and it is now predicted that there will be no decided slump in motor car production before August. Awards of fabricated steel are light, in contrast with the large volume of building contracts, but considerable structural steel work is being held in abeyance. The largest structural steel letting of the week, 13,000 tons for the Detroit vehicular tunnel, went to a Canadian shop. Railroad car buying continues light, but an inquiry has been issued by the Seaboard Air Line for 1000 box cars.

The sharp break in the price of basic pig iron in the Valleys a week ago and weakness in scrap are credited with adversely affecting the market on semi-finished steel. Sheet bars have been sold at the equivalent of $33, Pittsburgh, a decline of $1 a ton. Billets and slabs are down to $32, also a drop of $1 a ton.

An inquiry for 6000 tons of basic pig iron in the Pittsburgh district is said to have brought out a price of not less than $16, Valley, notwithstanding the fact that a much larger tonnage was recently sold at about $15.35, furnace. Other grades of iron made in that district have been weakened by the low price on basic, though no further reductions have occurred. Buying for third quarter has not assumed major proportions, but sales of 29,000 tons by Cleveland interests, 16,000 tons at St. Louis and 14,000 tons at New York, stand out in a generally quiet market.

Heavier American exports of steel are looked for as a result of continued price advances by European mills.

Both of THE IRON AGE composite prices remain unchanged at last week's levels, that for finished steel at 2.341c. a lb. and that for pig iron at $17.23 a ton—$1.73 lower than a year ago.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	June 12, 1928	June 5, 1928	May 15, 1928	June 14, 1927
No. 2, fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	16.75	16.75	17.25	18.00
No. 2, Southern, Cin'ti	19.69	19.69	19.19	21.69
No. 2, Birmingham	16.00	16.00	15.50	18.00
No. 2 foundry, Chicago*	18.00	18.00	18.00	20.00
Basic, del'd eastern Pa	19.00	19.00	19.00	20.75
Basic, Valley furnace	15.35	15.35	16.50	18.00
Valley Bessemer, del. P'gh	18.76	18.76	19.26	20.76
Malleable, Chicago*	18.00	18.00	18.00	20.00
Malleable, Valley	17.00	17.00	17.25	18.00
Gray forge, Pittsburgh	18.01	18.01	18.51	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	*32.00*	33.00	33.00	33.00
O.-h. billets, Pittsburgh	*32.00*	33.00	33.00	33.00
O.-h. sheet bars, P'gh	*33.00*	34.00	34.00	33.50
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	42.00	42.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.80
Steel bars Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.09
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	June 12, 1928	June 5, 1928	May 15, 1928	June 14, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.65	2.65	2.70	3.00
Sheets, black, No. 24, Chicago dist. mill	2.80	2.80	2.80	3.10
Sheets, galv., No. 24, P'gh.	3.50	3.50	3.60	3.85
Sheets, galv. No. 24, Chicago dist. mill	3.70	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh.	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.15	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	*2.60*	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$14.75	$14.75	$15.50	$14.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	12.75	12.75	13.00	12.00
Carwheels, Chicago	*13.00*	13.25	13.50	13.50
Carwheels, Philadelphia	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh	14.25	14.25	14.50	15.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	14.50
No. 1 RR. wrot. Phila	*13.50*	15.00	15.00	16.00
No. 1 RR. wrot. Ch'go (net)	11.50	11.50	11.75	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.87½	14.87½	14.37½	12.75
Electrolytic copper, refinery	14.50	14.50	14.12½	12.37½
Zinc, St. Louis	**6.15**	6.12½	6.05	6.30
Zinc, New York	**6.50**	6.47½	6.40	6.65
Lead, St. Louis	*6.15*	6.17½	6.00	6.15
Lead, New York	6.30	6.30	6.10	6.45
Tin (Straits), New York	*48.62½*	49.25	52.50	67.75
Antimony (Asiatic), N. Y.	*9.75*	10.50	11.25	12.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Production Sagging — Carnegie Takes Off Three Blast Furnaces

PITTSBURGH, June 12.—Production of steel ingots is sagging, in keeping with a lighter demand for practically all of the finished products. Reference is made frequently to the fact that both orders and steel plant engagement are heavier than they were at this time last year, but the explanation is simple. Business and output have been spread out more evenly this year and there has been a nicer balance between orders and production. Last year at this time output was declining at a faster rate than the actual consumption, as measured by shipments then. This was due chiefly to the fact that in the early months of 1927 ingot output for a time was in excess of actual business and much cold steel went on the banks to be later heated and rolled. There was little such building up of stocks this year.

Evidence still is lacking that the total production of automobiles has reached peak for the year, as the movement of steel to that industry still is large. While some automobile plants are slowing down as they develop new models, others are passing out of that stage and consuming enough more steel to counterbalance the lighter takings of other builders. But this industry usually does its best in the first rather than the last half of the year and indications suggest no change this year.

The railroads still are sparing buyers, although the report common to Presidential years is current that they will soon pour much business into the market. Important steel consuming industries are buying in strict accord with actual needs, which rarely are as heavy at this season as they are at some other periods of the year.

Ingot production for this and nearby districts averages between 70 and 75 per cent of capacity, but is probably nearer the lower than the higher figure. Dropping of three blast furnaces by the Carnegie Steel Co. in one week is indicative of the steel production trend, in spite of the fact that this company is figuring more prominently as a buyer of scrap. Companies, long free users of scrap, are largely out of the market and some are not pressing for deliveries of material they have purchased.

The pig iron market still is staggering from the steep break in the basic grade reported a week ago. There is greater interest in supplies on the part of melters, but they expect to buy Bessemer, malleable and foundry iron at prices a little nearer to normal relationship with basic iron than they are at present.

Weakness in semi-finished steel is credited in part to the low prices that now rule for scrap and basic iron. Both materials are at low levels and naturally occasion some fresh figuring of the cost of making billets, slabs and sheet bars. There does not seem to be much confidence in the efforts of mills to obtain the higher prices recently announced on bars, plates and shapes for third quarter, and as a rule buyers are in no hurry to sign contracts. There is uncertainty in strip prices and sheet prices are unimproved from the viewpoint of producers.

Pig Iron.—The idea that the recent break in basic pig iron might extend to other grades has stimulated interest in the market, but it is of a bargain hunting character and little business has developed. Merchant producers commonly regard the sale of basic iron at $15.35, Valley furnace, as having been made primarily to establish a settling price on iron moving on trade paper average prices to a steel plant recently acquired by the company which made the sale. Consequently they do not think it likely that another sale will be made at that low figure and are resisting efforts to depress the prices of other grades.

The Edgewater Steel Co., following the sale at $17.01, delivered Butler, Pa., entered the market for 6000 tons of basic iron. This inquiry is said to have brought out no lower price than $16, Valley furnace, but evidence is lacking that the business has been closed. The Carnegie Steel Co. has taken off blast furnaces at Duquesne, Braddock and Clairton and now has 31 of its 49 stacks in production. Three are on ferromanganese.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.35 to $15.50
Bessemer	17.00
Gray forge	16.25 to 16.50
No. 2 foundry	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Malleable	17.00 to 17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Large users of ferromanganese still hesitate about contracting for their last half requirements. They have no fears about being able to get all they want when they want it and see no reason for hurry about closing, since they do not expect the price to go higher. Deliveries of spiegeleisen against contracts continue heavy, but specifications for ferromanganese and ferrosilicon are lighter, in keeping with reduced steel works operations.

Semi-Finished Steel.—Instead of bringing up invoice prices to the published quotations, makers are finding it necessary to make concessions to interest non-integrated manufacturers. In addition to the extreme weakness in sheets and in most widths of strip steel, buyers are using the low prices of pig iron and scrap as an argument in favor of lower prices on billets, slabs and sheet bars. One maker of sheets is getting sheet bars at $34, delivered, which would mean approximately $33, f.o.b. Pittsburgh. The bars are coming from an outside source. Billets and slabs are commonly quoted at $33 for 4 in. and larger, but so far as sales are concerned, $32 is the prevailing price. Forging quality billets are selling at $38, base. On wire rods $44, base, is asked, but not often obtained.

Alloy Steel Bars.—Demand shows some decrease, but prices are holding well.

Bars, Plates and Shapes.—Manufacturers are more intent upon getting specifications against existing contracts than in trying to get buyers to sign up for third quarter tonnages. Altogether, there is not much confidence in the announced third quarter price of 1.90c. Buyers seem to look upon the advance as an effort to sustain the present price of 1.85c. Day-to-day orders reach a fairly large total, but there is little forward buying.

Rails and Track Supplies.—A fairly large sprinkling of releases of spikes and track supplies keeps business from being called dull. No new business of importance is reported in standard-section rails. Light-section rails are very dull.

Wire Products.—Scarcely enough business is developing to prove anything as to prices. Makers still call the market $2.65 per keg, base, Pittsburgh, for nails and $2.50, base, per 100 lb., for plain wire, but distributers still seem to be living off their stocks, as new business is very limited. There is no rush on the part of jobbers to sign up for third quarter.

Tubular Goods.—Business continues to make a disappointing showing. While buttwelded pipe is moving steadily, the demands are very easily met. Orders for lapwelded and seamless pipe for oil and gas wells still drag and the mills have little line pipe business before them. The price situation is described as steadier than it has been in two years; this is the satisfactory phase of the market, as costs must be high with only about 60 per cent of productive capacity engaged.

Sheets.—The market is said to be neither better nor worse from a price standpoint than it has been, but business is decreasing and orders have to be passed on promptly to the mills to maintain operating schedules. Makers here disclaim having encountered less than 2.65c., base, on black sheets and say that the 3.50c. base price on galvanized sheets refers to material for roofing and siding as distinct from that finding other uses. Mill operations range from 75 to 80 per cent of capacity.

Tin Plate.—Mill operations still are 90 per cent or more of capacity, but there is beginning to be some doubt that this rate will be held much longer. Already some August tin plate is in process and as the season is from two to three weeks late over most of the country, a good deal of production for packers' cans has not yet begun to move actively into consumption. The belief in generous yields persists, but there is also the condition that tin plate production has discounted them.

Cold-Finished Steel Bars.—Automobile parts makers are specifying steadily, but usually for small lots and not very far ahead of actual requirements. Orders from other sources are light. Not much interest yet is observed in third quarter tonnages. Prices are unchanged.

Bolts, Nuts and Rivets.—Makers are open for third quarter contracts at unchanged prices. Current demands are moderate, and there is not much urge to sign contracts for the next quarter.

Hot-Rolled Flats.—The market appears fairly steady on the very narrow widths and full quotations are reported on small-lot business. Generally, makers are

THE IRON AGE Composite Prices

Finished Steel

June 12, 1928, 2.341c. a Lb.

One week ago	2.341c.
One month ago	2.348c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

June 12, 1928, $17.23 a Gross Ton

One week ago	$17.23
One month ago	17.42
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.23,	June 5
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.90c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, 1 up to 3 tons, del'd Chicago,	3.30c. to 3.45c.
Strips, 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c. to 2.25c.

Box Annealed. One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.85c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.95c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.75c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.75c.
No. 24, del'd Cleveland	3.64c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.80c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
	Chromium Nickel Vanadium	1.50	4.15
	Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

not being called upon to quote on much new business, and most of the shipments are against contracts placed some time ago. Not much third quarter inquiry has developed. On contract business, large consumers enjoyed a preferential of as much as $3 a ton from what are regarded as the open market prices but which apply principally on small lots. Business, as measured by shipments, still is fairly active.

Old Material.—Prices are holding substantially where they were a week ago. Consumer interest in the market is low, but present prices are not conducive to the collection and sale of scrap and offerings are rather light. Dealers still are able to pick up small lots of heavy melting steel at $14.25 for shipment to one point, but generally $14.50 is the ruling minimum, while a quotation of $15 is supported by the fact that most of the steel in the Pennsylvania Railroad June list went at that price. The general tone of the market is weak on account of the limited demand, owing to decreasing steel works operations, but the lighter grades show more tendency to work down than the heavy grades.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$14.25 to	$15.00
Scrap rails	14.00 to	14.50
Compressed sheet steel		14.50
Bundled sheets, sides and ends		13.50
Cast iron carwheels	14.00 to	14.50
Sheet bar crops, ordinary	15.00 to	15.50
Heavy breakable cast	12.00 to	12.50
No. 2 railroad wrought	14.50 to	15.00
Heavy steel axle turnings	13.00 to	13.50
Machine shop turnings	9.00 to	9.50
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	15.50 to	16.00
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels	15.50 to	16.00
Low phosphorus billet and bloom ends	19.00 to	19.50
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	13.00 to	13.50
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	13.00 to	13.50
Blast Furnace Grades:		
Short shoveling steel turnings	10.50 to	10.75
Short mixed borings and turnings	10.50 to	10.75
Cast iron borings	10.50 to	10.75
No. 2 busheling	9.00 to	9.50
Rolling Mill Grades:		
Steel car axles	18.00 to	18.50
No. 1 railroad wrought	11.00 to	11.50
Sheet bar crops	16.50 to	17.00
Cupola Grades:		
No. 1 cast	14.25 to	14.75
Rails 3 ft. and under	15.50 to	16.00
Malleable Grades:		
Railroad	14.25 to	15.00
Industrial	13.75 to	14.50
Agricultural	13.25 to	14.00

Cold-Rolled Strips.—Specifications are beginning to show a noticeable decrease. Current requirements are being supplied largely by shipments against old orders, and new business for either prompt or third quarter shipment is light. There is some uncertainty in prices owing to the fact that the hot-rolled strip market is not very well defined at the moment.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Coke and Coal.—The market is dull and featureless. Beehive oven coke production has been scaled closely to contract requirements and spot offerings are moderate, but they are ample, and prices still are favorable to buyers. With a settlement of the Lake cargo coal freight rate, it is expected the demand for coal will pick up materially. Some development of this sort is necessary to give the coke market strength, since coal will go into coke in the absence of a broad outlet in its raw state. The market on both coke and coal is quotable at the prices of a week ago.

Detroit Scrap Market Reflects Weakness on Some Grades

DETROIT, June 12.—The market on old material has developed further weakness, with the result that borings, short turnings and long turnings registered a decline of 25c. per ton. Considerable tonnage is now being sold direct to the mills by the largest producers, so that very little waste material is being stocked. Indications are that producers will have less scrap to offer this month than for any similar period this year.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to	$11.50
Borings and short turnings	7.00 to	7.50
Long turnings	6.50 to	7.00
No. 1 machinery cast	14.00 to	15.00
Automobile cast	19.00 to	20.50
Hydraulic compressed sheets	9.75 to	10.25
Stove plate	11.00 to	12.00
No. 1 busheling	8.50 to	9.00
Sheet clippings	6.00 to	7.00
Flashings	9.25 to	9.75

Revise Conditions of Samuel Wylie Miller Welding Award

Revision of the conditions governing the award has been made by the board of trustees of the Samuel Wylie Miller Medal, which was established in 1927 by Mr. Miller, consulting engineer Union Carbon & Carbide Research Laboratories, Long Island City, N. Y., and past president of the American Welding Society. The revised conditions are as follows:

> The medal may be awarded annually for any meritorious achievement which, in the judgment of the board of trustees, has contributed conspicuously to the advancement of the art of gas fusion welding and cutting or the art of electric arc fusion welding and cutting.
>
> The award for any calendar year shall be announced and the medal, together with a suitable certificate, presented at an annual meeting or a fall meeting of the American Welding Society, as the board of trustees may elect.

The medal can now be granted for an achievement of any character which has contributed conspicuously to the advancement of either of the two branches of the welding art. The award may be made for a meritorious paper or an invention or a conspicuous application of welding in industry which has advanced the art either on account of unique technical features or important economic advantages. The award may even be made for conspicuous service of a non-technical character which distinctly advances the welding art.

Steel Mill Issue Features Many Articles

Steel mill service forms the major portion of the June number of *General Electric Review.* Articles and illustrations devoted to these topics cover the greater portion of the paper. Among the principal items so published are the following:

Electric Drive for the Iron and Steel Industry
Electric Drive for the Bethlehem Wide-Flange Structural Mill at Lackawanna
New 84-in. Tandem Plate Mill of the Lukens Steel Co.
Service Records of Auxiliary Motors in Steel Mills
Application of Synchronous Motor-Generator Sets to Steel Mill Reversing Drives
Cold-Rolled Strip Steel Reel for Central Alloy Steel Corporation
A Study in Welded Plate Girders

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$33.00 to $34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.25
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Ingot Output Declines to 87 Per Cent—Rollings of Rails, Plates and Shapes Off

CHICAGO, June 12.—No. 4 furnace at South works, Illinois Steel Co., was blown out June 9, leaving 19 stacks in blast at the plants of the leading producer. Other steel works account for eight active furnaces, making a total in blast of 27 out of 36 in this district. The lessened rate of steel works pig iron output is a reflection of the gradual slowing up in the Chicago iron and steel market. Rail mill operations have been cut closer, and there is a less insistent demand for plates and shapes, so that ingot output can be conservatively estimated at 87 per cent of capacity.

The downward trend in consumption is widespread, affecting practically all classes of users, with the possible exception of manufacturers of farm implements and tractors. Current specifications are in smaller volume, but with the adjustment in operations they still cling close to the rate of production. Sales, except in spot lots, are light.

For the most part, producers have withheld formal announcement of third quarter prices, though in some instances books are now open. Prices for finished steel are not clearly defined, owing primarily to concessions made to fabricators on specific jobs. It is reported that unusually low prices have been named to fabricators for the 3600 tons needed for the Denver, Colo., court house.

The railroad equipment market is quiet. The Southern Pacific is building 540 cars in its own shops and the Chicago, Milwaukee, St. Paul & Pacific, the Chicago & North Western and the Burlington have similar projects under way.

Pig Iron.—With two Iroquois, one Federal and the Duluth furnace in blast, shipments of Northern pig iron continue to exceed production, and stocks at furnaces, which are large, are steadily being reduced. New business is sluggish. Melters are showing less interest in third quarter and last half requirements, and it is believed that spot purchasing will assume large proportions during the next few months at the expense of the volume of business on contract for delivery in that period. Southern and charcoal iron are moving in carload lots. The silvery market is quiet, sales being confined to carloads, on which prices are not always held at the full schedule. A melter in western Michigan has closed for 6000 tons of malleable iron. Part of the business came to Chicago producers, who met competition from Lake Erie furnaces.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.51
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet. Sales of spiegeleisen are confined to carloads at $32, Hazard, Pa., for the 19 to 21 per cent grade. Specifications for ferrosilicon are lighter, following recessions in steel mill operations. Several additional last half ferromanganese contracts have been closed.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—After two rather dull weeks in specifications for steel from car shops, there has been released a fair tonnage for early shipment. In the absence of recent car orders of size, it is generally acknowledged that specifications from that source in June and the early part of July will be light. Steel producers have compiled figures to show that for the country as a whole there were ordered in the first five months of last year 33,942 freight cars and 1352 passenger cars, while in the corresponding period of this year the totals were 19,085 freight cars and 1058 passenger units. Of the total cars placed, Chicago district shops have taken their proportionate share. Notwithstanding the smaller requirements of steel for this purpose, local plate mills have been well engaged through the first half of the year, thus showing the increasing use made of this commodity by the general trade. Tank construction and boiler work have taken up part of the slack caused by a low rate of railroad car building, and, in addition, more manufacturers are working plates for various purposes than ever before. Backlogs are being reduced at a rapid rate and deliveries have improved markedly in the last 10 days, the range being three to five weeks in contrast with four to six weeks at the turn of the month. One producer has opened books for the third quarter at 2c. per lb., Chicago. Several of the larger sellers will announce their price policies before the end of the week. Although producers look forward to a 2c. market, their hopes are not without some misgivings for the reason that 1.95c. has prevailed at some points in the district.

Mill prices on plates, per lb.: 2.00c., base Chicago.

Structural Material.—The structural market has become quieter in the week. Pending lists are large, but there is a sluggishness in placing contracts that is causing some concern to the trade. Local shops are busy and will in all probability continue so for five or six weeks. To the west and northwest, shops are well supplied with work and are faring better in the matter of new business than is the case in and near Chicago. An apartment building requiring 1200 tons and 1600 tons for an office building, Chicago, are among the projects that may be closed this month. Prices for structural material remain at 2c., Chicago, to the general trade and for stocks at structural shops, but this level is shaded to fabricators who ask for prices on specific jobs.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bolts, Nuts and Rivets.—Specifications for these commodities, while a shade lighter, do not show the sharp tendency downward as was the case a week ago. Sellers are now submitting contracts to the trade at prices which have held during the second quarter. Large rivets are quoted at $3, base, per 100 lb., Chicago.

Reinforcing Bars.—The lack of awards this week is giving little concern to the trade, which is busily engaged in following up a goodly number of live projects. Shops, though operating 10 per cent below their rate of a year ago, are well engaged and prospects appear promising for a well sustained rate of output. Of special interest are the two projects sponsored by the Marshall Field Estate. An apartment development, which will come at a later date, calls for 1600 tons, and the Mercantile Mart, on which plans have been completed, will require 6000 tons. Prices for both hard and soft steel reinforcing bars are steady. Real tests are lacking on large tonnages, but on small orders quotations are holding firmly.

Bars.—Specifications for mild steel bars still run close to shipments, though the volume is not sufficiently large to prevent a slow but steady improvement in deliveries, which now range three to five weeks. New buying is quiet, though proportionately heavier than in other finished steel products. Most of the current shipments are going to the automobile trade. Miscellaneous users continue to take their requirements at practically an undiminished rate, but they show no interest in their needs beyond three to five weeks. Prices for soft steel bars are moderately steady at 2c. per lb., Chicago. Some mills have signified their willingness to accept third quarter business on the 2c. basis, but the larger producers have not yet announced their course in the matter of prices. There is a steady demand for alloy steel bars, but advance buying is of small proportions, it being the aim of most purchasers to take only immediate requirements. Prices and extras are unchanged. The local iron bar market is dull. Prices are steady at 2c., Chicago. Rail steel bar producers have opened third quarter books at 1.90c. per lb., Chicago Heights, an advance of $1 a ton. Specifications are fully equal to shipments, which have remained steady for several weeks. Forward contracting is slow. Spot orders are up to expectations of producers for this time of year.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.90c., base, Chicago Heights mill.

Wire Products.—Producers have opened third quarter books and Chicago delivered prices are set at 2.55c. per lb. for plain wire and $2.75, base, per 100 lb. keg for common nails. These levels show that second quarter prices for wire are to remain effective in the third quarter and that sellers will try to bring nail prices up to where they stood early in the year. Forward contracting is slow in getting under way, though some interest is being shown by the jobbing trade. Specifications from the manufacturing trade are steady. Mill stocks are well balanced in practically all lines except reinforcing mesh, which is now in heavy demand. Output for the district as a whole is close to 65 per cent of mill capacity. Well scattered rains throughout most of the agricultural sections of the country have improved the crop outlook, though the season is still somewhat backward because of cold weather.

Rails and Track Supplies.—Rail mill operations are not above 80 per cent of local mill capacity and the tendency is to reduce production still further. Taken as a whole, track accessory departments are producing at an unchanged rate, though there has been readjustment which has brought some departments to peak output for the year. Local mills have added close to 10,000 tons of standard-section rails to their books, the bulk of this tonnage coming from three Western railroads. The Pennsylvania inquiry for about 12,000 tons of track supplies has not been closed. Steel tie plates are steady at $43 a ton. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is low bidder at Chicago on 3300 tons of 6 and 8-in. class B pipe, at $40, Chicago, or $31.80 a ton, Birmingham. Miscellaneous orders of attractive size have brought $32, Birmingham, and smaller lots are selling at as high at $34. Placing of orders for 2500 tons by Roseville, Mich., has been deferred. Bids have been rejected by St. Paul, Minn., on 1100 tons, but this latter business will come up again, according to present plans. The Seig Construction Co., Waterloo, Iowa, has taken the general contract for laying 350 tons of 4, 6 and 8-in. pipe at Fox River Grove, Ill. Waukesha and Fond du Lac, Wis., will each take prices on 100-ton lots of pipe. The immediate Chicago territory is quiet from the viewpoint of municipal lettings. On the other hand, contractors are active and have ordered not less than 5000 tons in the week.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $40.20 to $41.20; 4-in., $44.20 to $45.20; Class A and gas pipe, $4 extra.

Cold-Finished Steel Bars.—Prices are steady at 2.20c., Chicago. Producers have not opened third quarter books.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Billets.—Prices for forging billets are $38 to $39 a gross ton in a quiet market.

Sheets.—Buyers continue to stay out of the market. Producers have not announced third quarter contract prices. Quotations vary over a wide range, and as low as 2.75c. for black, 3.70c. for galvanized, and 2.15c. for blue annealed sheets, all delivered Chicago, have been noted. Deliveries are prompt and schedules are at close range and uncertain.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.90c.; No. 24 galvanized, 3.75c. to 3.80c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Coke.—Shipments of by-product foundry coke are steady and prices are unchanged at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—A local steel mill has taken 15,000 tons of heavy melting steel at $13.25 a gross ton, delivered. The purchase tended at first to lend some support to a declining market, but late in the week prices for specialties again started to sag. Following a steel mill purchase last week of 1000 tons of hydraulic compressed bundles at $12 a gross ton, there has been an easing off in prices paid by dealers, it being not uncommon now to find broker transactions at $11 a gross ton. Over 5000 tons of rerolling rails have been purchased by a user at $15.25 a gross ton, delivered. This is a reduction of 25c. Available supplies of practically all grades are more plentiful and consumer demand is lighter than a week ago.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.75 to 16.25
Railroad tires, charging box size	16.00 to 16.50
Railroad leaf springs, cut apart	16.00 to 16.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	7.25 to 7.75
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.	15.50 to 16.00
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.75 to 10.25
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Pig Iron Demand Improved—Steel Market Unchanged

PHILADELPHIA, June 12.—Pig iron demand developed a slight impetus in the past week, but as yet there is only irregular and small tonnage inquiry for third quarter delivery. Prices of plates, shapes and bars are unchanged. Eastern Pennsylvania plate mills have in most cases adopted 2.05c. per lb., base Coatesville, for third quarter contracts. Consumers, however, show no inclination to enter into contracts and sellers are not pressing for new commitments in the present condition of the market. Shapes continue at 2c., Pencoyd, or 2.06c., Philadelphia, and 2c., Bethlehem, or 2.13c., Philadelphia. Operating rates of eastern Pennsylvania mills show no substantial change, as there is a fairly good volume of tonnage coming out on current contracts.

Bids will be opened June 15 by the Pennsylvania Railroad on 1,800,000 lb. of track spikes and 330,000 tie plates.

Pig Iron.—Inquiry improved slightly during the past week. Consumers in this district are beginning to show some interest in third quarter contracts, but only for small tonnages. Foundry iron is firm at $20 per ton, base. Sellers here believe there would be considerably more activity if it were not for the downward trend of prices in the Pittsburgh district. Local consumers are taking larger shipments on their contracts and apparently have only small stocks in reserve. The American Engineering Co., Philadelphia, which recently closed on two 100-ton lots of foundry grade, is in the market now for 300 tons of No. 3 and 200 tons of No. 1X foundry iron. The Consolidated Machine Tool Corporation is inquiring for 600 tons of foundry iron for its Hilles & Jones plant at Wilmington, Del. Two railroads are in the market for small tonnages, the Norfolk & Western for 350 tons of No. 2X and No. 1X and 300 tons of Bessemer iron for delivery over the remainder of the year, and the New York Central for 400 tons of foundry iron for third quarter delivery to Elkhart, Ind., and Frankfort, N. Y. Inquiry for low phosphorus is limited to small lots, with prices unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54
Virginia No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese.—Large inquiries for third quarter and second half have not yet appeared, but smaller consumers are buying 100 to 300 tons for delivery in the second half. The price is firm at $105 per ton, seaboard.

Bars.—Shipments against contracts continue in fair volume, but new business is limited and consumers show no interest in contracting for third quarter. Mills are prepared to quote 1.90c. per lb., Pittsburgh, on new contracts, but are not pressing consumers to enter into commitments. Current orders are at 1.85c. to 1.90c., Pittsburgh, or 2.17c. to 2.22c., Philadelphia.

Shapes.—Prices still show an undertone of weakness and eastern Pennsylvania mills have shown no intention of attempting to obtain contracts at an advance for third quarter delivery. Current sales are being made at from 2.06c. to 2.13c. per lb., delivered Philadelphia, and even the minimum price is shaded occasionally on desirable tonnage. Local fabricators have some good business in prospect, including the Reading Railroad terminal at Broad Street and some apartment buildings.

Plates.—Prices are being maintained at 2c. to 2.05c. per lb., Coatesville, for current delivery and mills are prepared to quote 2.05c., Coatesville, for third quarter contracts. As there may be some extension of uncompleted second quarter commitments, mills are not pressing for new contracts. Shipbuilders are reported to have some good business in prospect.

Old Material.—No important purchasing of scrap has been done in the past week. Although No. 1 heavy melting steel is still quoted at $13.50 to $14 per ton, delivered, no contracts have been made lately except by the leading independent consumer, which has not paid in excess of $13.50 per ton. Consumers of machine shop turnings have been able to buy all that they require for $10.50 per ton, delivered, and this is apparently the maximum of the present market. Stove plate is quotable at $11 on the basis of recent small purchases at that price. Eastern Pennsylvania consumers of yard grade of heavy melting steel have been able to buy recently at $11 per ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	10.50
Heavy breakable cast (for steel works)	15.50 to 15.75
Railroad grate bars	11.00
Stove plate (for steel works)	11.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	15.00 to 15.50
Rolled steel wheels	15.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

Sheets.—Blue annealed sheets are still quoted at 2.10c., Pittsburgh, or 2.42c., delivered Philadelphia, by eastern Pennsylvania mills. Competition is keen, however, and transactions are made at 2c. and 2.05c., Pittsburgh, or 2.32c. and 2.37c., delivered Philadelphia. Continuous mill sheets range from 1.90c. to 2c., Pittsburgh. Black sheets are quiet and the price is substantially unchanged at 2.60c. per lb., Pittsburgh, or 2.92c., delivered Philadelphia. Galvanized sheets continue to show a downward trend and 3.50c., Pittsburgh, or 3.82c., Philadelphia, is commonly quoted. Local automobile body builders are fairly well occupied with business, but are covered for the present on their sheet requirements.

Warehouse Business.—In an effort to bring jobbers' prices more in line with the mill quotation, local warehouses have announced $2 a ton advance, effective June

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

11, on mild steel bars, which brings the current price to 2.60c. per lb. A fair tonnage of steel products is moving from stock, but individual orders are small.

Imports.—In the week ended June 9, arrivals of ore at this port totaled 21,113 gross tons, divided as follows: 13,750 tons of Algerian and 253 tons of Spanish iron ore; 2000 tons of Portuguese African chrome ore; 5010 tons of British West African and 100 tons of United Kingdom manganese ore. Only 197 tons of pig iron arrived, all from Sweden. Steel imports were 1135 tons of skelp and 12 tons of steel bands from Germany, 113 tons of structural shapes, 30 tons of steel bars and 34 tons of steel bands from France and 249 tons of skelp from Belgium.

New York

Pig Iron Sales 14,000 Tons—Few Steel Contracts Made

NEW YORK, June 12.—Pig iron sales by local selling agents totaled 14,000 tons for the week, including 5000 tons for delivery to a plant outside this district. A large proportion of current business is made up of small orders, indicating that buyers are not committing themselves heavily. Melters' stocks are low as a rule, and furnaces find that shipping instructions are keeping up at the rate of recent weeks. There is no change of importance in the price situation, although there continues to be an effort to obtain a minimum of $16.50, base furnace, for Buffalo foundry iron. In many cases, however, pig iron is being shipped by water and the base price at furnace is uncertain in view of the variability of barge rates. The Richmond Radiator Co. has bought 5000 tons of foundry iron for shipment to Uniontown, Pa., during the next quarter. The General Electric Co. has placed some orders against its inquiries for Bayway, N. J., and its New England plants. There are few outstanding tonnages pending. The New York Central has entered the market for 400 tons of foundry iron for third quarter delivery at Frankfort, N. Y., or Elkhart, Ind. The New York Air Brake Co., Watertown, N. Y., is inquiring for 100 tons of low phosphorus iron, 50 tons of silvery and 25 tons of spiegeleisen.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Third quarter contracting for plates, shapes and bars has so far been of minor importance, but a few have been written at no advance in prices and also some at $1 a ton advance, a situation which reflects the lack of unanimity among the mills as to the possibility of getting a higher level. Nearly all large users have sufficient tonnage still unspecified to carry them well through July, at least, if they exercise their options before the end of this month, and this factor will defer a real test of the 1.90c. price. Eastern mills are selling plates and shapes on the bases of 2c., Coatesville, for plates and 2c., Bethlehem, for shapes, and, while they would quote 2.05c. on third quarter contracts, it has not yet been demonstrated that they can induce much contracting at that figure in view of the downward trend of demand. Sheet mills are not anxious to make third quarter contracts at the present low level of prices, so it is likely that sheet buying will remain largely on a spot basis. Second quarter sheet contracts have repeatedly been written down to conform to the decline in spot prices. Some cold-rolled strip makers are willing to take third quarter commitments at 2.75c., Pittsburgh or Cleveland, for lots of more than 3 tons and 3c. for smaller lots. Structural steel lettings in the week have been light. For May, the Structural Steel Board of Trade of New York reports a total of 46,002 tons booked by its members in the New York district, exclusive of bridges, subways, etc. April bookings were 28,200 tons and those in May, 1927, totaled 33,550 tons.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Following a protracted period of shading of prices of black and galvanized sheets, jobbers generally have reduced prices on sales in the metropolitan district by 20c. per 100 lb. to 3.80c. per lb., base, on black and 4.50c. per lb., base, on galvanized. In the local New Jersey market prices are still maintained at 4c. for black and 4.70c. for galvanized. Occasional shading on blue annealed sheets is reported, especially when competition from imported sheets is encountered, but no general reduction has appeared as yet. Most jobbers report a slight decline in business, so that June promises to be a rather quiet month.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20 lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Ferroalloys.—A large domestic producer of spiegeleisen has advanced its quotation $1 per ton to $33, f.o.b. furnace, for the 19 to 21 per cent grade, effective at once. Very little buying of ferromanganese is reported and the market for other ferroalloys is quiet.

Cast Iron Pipe.—Most of the inquiries in the market are for small tonnages. Prices continue unchanged, with Northern makers still maintaining $37.60 to $38.60 per net ton, delivered New York, and Southern foundries quoting $32 to $33 per ton, base Birmingham. Hamburg, Pa., opened bids June 5 on 360 tons of 12-in. classes A and B water pipe. Pen Argyl, Pa., has taken bids on 1500 tons of 8 and 12-in. pipe. Waynesboro, Pa., has opened bids on about 150 tons of 14-in. pipe. Water pipe in the contract at Raritan Township, N. J., reported last week to have been awarded to W. G. Fritz, West Orange, N. J., is understood to have been purchased from R. D. Wood & Co.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Coke.—Prices are unchanged and buying is confined to small lots for prompt shipment. Standard furnace coke continues at about $2.75 per net ton, Connellsville. Special brands of foundry coke are $4.85 per net ton at the ovens and delivered prices are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per net ton, New York or Brooklyn.

Old Material. — Dealers' buying prices of most grades of scrap show a slight decline. No. 1 heavy melting steel is being purchased at $13 per ton, delivered eastern Pennsylvania, and yard grade at $10.50 per ton, delivered. Stove plate for steel mill consumers is being bought by brokers at $10.50 per ton, delivered on a $3.52 per ton freight rate, and only $9.50 to $10 per ton, delivered, is offered for machine shop turnings and blast furnace scrap. No. 1 railroad wrought is off about $1 a ton on the basis of a recent sale to an eastern Pennsylvania consumer at $13.50 per ton. Plenty of scrap of all grades is apparently available. Eastern Pennsylvania users are not large buyers at present.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$9.75 to $10.35
Heavy melting steel (yard)	6.50 to 7.00
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.00 to 7.25
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Cast borings (blast furnace or steel works)	6.25 to 6.75
Mixed borings and turnings	6.00 to 6.75
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25
Forge fire	6.50 to 6.75
No. 1 railroad wrought	9.50 to 10.00
No. 1 yard wrought, long	8.00 to 8.50
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $15.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.85
No. 9 galvanized wire, per 100 lb	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Cleveland

Consumers Uninterested in Third Quarter Steel—Automobile Takings Still Large

CLEVELAND, June 12.—Consumers are as yet showing no interest in third quarter contracts. So that the recent advance of $1 a ton to 1.90c. on steel bars, plates and structural material is untested. A Cleveland mill, which is using a 1.85c. Cleveland base for steel bars, has not yet announced its price for the third quarter.

While orders are fair, the present advance has not had the effect of driving in specifications on contracts expiring this month, and orders for the most part are for small lots for early requirements. Bookings so far in June are a little below those during the corresponding period of May. The demand for plates shows quite a decline. A favorable feature of the market is that mills are not getting cancellations or suspensions.

Specifications for steel bars, sheets and strip steel from the automotive industry are not as heavy as last month, but they are holding up well and predictions are made that there will be no decided slump in this industry before August. However, motor car manufacturers are not carrying large inventories and as yet have placed very little business for delivery after July 1.

While there is little inquiry from the building field for round lots of structural steel, there is a good demand for small lots. Fabricating prices are weak. The Mahoning Valley Sanitary District has an inquiry out for 300 tons of sheet steel piling for a dam at Mineral Ridge, Ohio.

Pig Iron.—There is a fair amount of activity in foundry and malleable iron for the third quarter. Producers generally are declining to quote for more extended deliveries, although one round-lot sale made recently was for the entire last half. Sales by Cleveland furnaces during the week amounted to 8000 tons and the total amount of business taken by Cleveland interests was 29,000 tons. Prices are holding closely to recent levels. The Lake furnace price ranges from $16.25, for shipment to highly competitive points, to $17, which Cleveland furnaces are able to get in some cases for delivery to nearby non-competitive points. For Cleveland delivery, furnaces continue to hold to $18, although there is considerable pressure on the part of some buyers for concessions. In Michigan, $17.50 has become the common price, although $18 still prevails for shipments to some points. There is no activity in low phosphorus iron. Shipping orders from the automotive industry, while not as heavy as last month, are holding up well and June shipments are not expected to fall much below those of May.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	$15.35 to 15.50
Standard low phos., Valley furn'ce	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Lake Superior ore on Lake Erie docks June 1 amounted to 4,934,564 tons, compared with 4,756,173 tons on the same date a year ago. Receipts at these docks this season until June 1 were 2,848,088 tons, compared with 5,701,987 tons during the same period last year. Shipments from Lake Erie docks until June 1 were 2,804,848 tons, against 5,105,722 tons during the same period a year ago.

Bolts, Nuts and Rivets.—Present discounts have been reestablished on bolts and nuts for the third quarter. Present rivet prices have also been reestablished for the third quarter, these being $2.90 per keg, Cleveland and Pittsburgh, for large rivets and 70 and 10 per cent off list for small rivets. Bolts and nuts continue in fair demand, orders being more plentiful than in June last year. The demand for rivets shows a slight improvement.

Coke.—There is very little new demand for foundry coke, but specifications against contracts are fair. Some contracts are being closed for the last half. Prices are unchanged at $3.50 to $4.85 for Connellsville foundry coke and at $7.75, Painesville, for Ohio by-product foundry coke.

Alloy Steel.—Specifications from the automotive industry show some falling off, compared with last month. Some activity has developed in third quarter contracts at the quoted prices, which are the same as prevailed during the present quarter except on the one grade recently advanced.

Semi-Finished Steel.—One producer is quoting its present prices of $34, Pittsburgh, for sheet bars, $33 for large billets and slabs and $38 for forging billets for the third quarter. A Cleveland maker has not yet named prices for that delivery. Wire rods have been reestablished for the next quarter at $44, Cleveland, at which some business has been taken.

Strip Steel.—Specifications for hot and cold-rolled strip steel are not as heavy as last month. The hot-rolled strip market continues weak, with 1.75c., Pittsburgh, a common quotation for wide material. Mills are able to get 2.10c. for light hoops. Cold-rolled strip is steady at 2.75c., Cleveland, for 3 tons and over. Some mills are quoting current prices for the third quarter, but have booked very little business for that delivery.

Reinforcing Bars.—New inquiry is rather light, except for small lots, which are moving well. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—Orders show a gain over those of May, which was a slow month. With the exception of some irregularity on sheets, prices are well maintained. Jobbers are now making a concession of $3 a ton on sheet orders for 25 bundles or over.

Old Material.—Activity in steel-making scrap developed in the Valley district during the week. One consumer purchased a round tonnage, paying $15 for No. 1 heavy melting steel and $14.25 for compressed sheet steel. Another purchased several thousand tons of heavy melting steel, covering a month's requirements, at $14.60. Dealers are buying against these orders. Locally, the market is inactive and prices show little change. Dealers are buying steel-making grades against outstanding orders from Cleveland mills at quoted prices. Although some blast furnace scrap recently sold at as low as $9.15, the market seems now established at a minimum of $9.25.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.00 to $13.25
No. 2 heavy melting steel	12.50 to 12.75
Compressed sheet steel	12.50 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	11.50 to 11.75
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.25 to 16.75
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Cold-Finished Steel.—Several makers have opened their books for the third quarter at the present price of 2.20c., Pittsburgh, and 2.25c., Cleveland, but consumers are not yet making commitments. Specifications are very good, considerable demand coming from makers of screw machine parts that are doing work for the Ford Motor Co.

Sheets.— Although there has been some slowing down in the demand from the automotive industry, orders from that source are still good. Not much business is coming from other consumers. Most producers would take third quarter contracts, but consumers are as yet showing no inclination to buy for that delivery. Prices continue weak, and with the declining demand makers do not see much hope of getting prices on a firmer basis during the coming quarter. Blue annealed sheets range from 1.90c. to 2.10c., Pittsburgh, but mills are able to get the higher price only for small lots. Black sheets range from 2.65c. to 2.75c., Pittsburgh. Galvanized sheets are available at 3.50c., Valley mill.

Standards Yearbook, 1928

Activities of the United States Bureau of Standards during 1927 are covered in a 400-page book entitled "Standards Yearbook, 1928," which is the second issue of this work. This volume contains not only the outlines of the activities and accomplishments of the Bureau of Standards and of other agencies of the Federal Government and the States, counties and municipalities, but also standardizing activities of technical societies and trade associations. It lays special emphasis on their accomplishments during 1927 and on their programs for future work. A feature is made also of the results and current activities of various foreign, national and international standardizing agencies. There is a bibliography contributed by William A. Slade, chief of the division of bibliography, Library of Congress.

The closing paragraph of the introductory section reads: "The scope of standardization is clearly enlarging, and its key position in industrial and scientific progress entitles it to the fullest possible cooperation of all concerned. Standardization is more than the act of bringing the user and the maker together in a clear understanding on the quality of service. Its aim is also to satisfy the users' needs with increasing efficiency and economy. It conserves all gains achieved, while serving as the vehicle for further advance."

Fuel Engineering Courses Continued

A year ago Prof. Robert H. Fernald, director mechanical engineering department of the Towne Scientific School, instituted a post-graduate course in fuel engineering at the University of Pennsylvania, Philadelphia.

The success of the first year has been sufficient to warrant its continuance. For the academic year commencing next fall, the collaboration of a notable list of 41 men, prominent in the various industries engaged in the production of fuel and power, has been secured for special lectures. The entire course of study is knit together by six members of the faculty of the University of Pennsylvania.

Prospective students should be engaged in some work allied to fuel engineering, and should have a college degree. Upon completion of a year's work and a satisfactory thesis the degree "Master of Science in Fuel Engineering" will be conferred. Tuition and fees total $450.

Poland Threatens Competition in Cast Iron Pipe

LONDON, ENGLAND, May 26.—European cast iron pipe manufacturers—especially those of France, Germany and Poland—are anticipating keen competition from each other in the near future. The Polish works are forming an export association, with the support of their government, and are now granting 180 days' credit to foreign buyers. They have reduced their prices to less than before the war, when Russia consumed about 75 per cent of the output, against only about 10 per cent at present, and are now making a bid for both the North and South American trade.

Harry Benjamin Equipment Co., St. Louis, dealer in new and old material, whose president and founder, Harry Benjamin, died on Jan. 10 last, has been reorganized with Ed. Elson as president and general manager and Fred Fuld as secretary and treasurer. Mr. Elson was vice-president of Walter A. Zelnicker Supply Co. for 25 years, and for the last two years was in the rail business on his own account. Mr. Fuld has been connected with the Benjamin company for the last 12 years. The company has a yard at Carondelet, Mo., and offices at 710 Buder Building, St. Louis.

San Francisco

Southern Pacific Buys 3100 Tons of Steel for Equipment

SAN FRANCISCO, June 9 (*By Air Mail*).—A further recession in demand for iron and steel products on the Pacific Coast is noticeable. Few large awards are reported. While prices in some lines are weak, cast iron pipe quotations have advanced about $2 a ton. Among the week's lettings was 578 tons of structural steel for the Queets River bridge at Olympia, Wash., booked by the Virginia Bridge & Iron Co. The Southern Pacific Equipment Co., San Francisco, has placed with various Eastern mills approximately 3100 tons of plates and shapes for locomotives, tenders, gondola and caboose cars to be built in its Sacramento yards.

Pig Iron.—Sales of foundry pig iron were limited to small lots. Inquiries specified unimportant tonnages for prompt shipment. Foundry operations continue on a limited scale among the jobbing class. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

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*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Low out-of-stock prices continue to prevail in the San Francisco district, and while 2c., base, is the usual price, as low as 1.80c. has been quoted on desirable business. Awards included 155 tons for a garage in San Francisco and 102 tons for a dam at Vale, Ore., both placed with unnamed interests. Bids were opened this week on 525 tons for a dam, penstock and power house at Eugene, Ore. Bids will be called for shortly on 2300 tons for Drainage Improvement District No. 26 at Los Angeles.

Plates.—The largest plate award in over two months was placed this week by the Southern Pacific Equipment Co., San Francisco. This company has purchased material for eight locomotives, 18 tenders and 50 caboose and 50 gondola cars to be constructed at its Sacramento yards. Approximately 625 tons is involved in the locomotives and tenders and 500 tons in the cars. It is also reported that the company plans to build 500 flat cars. Only two projects are before the trade for figures. These involve 700 tons each for two car floats, one for the Santa Fe and the other for the Western Pacific. Prices are not firm, and while 2.30c. applies on the usual run of orders, 2.25c. and 2.20c., c.i.f., have been quoted on large lots.

Shapes.—Demand for structural material fell off this week and awards totaled less than 3500 tons. The largest letting was 2000 tons for locomotives, tenders and caboose and gondola cars for the Southern Pacific Equipment Co. at San Francisco. This material was placed with Eastern producers. New business is slow in coming forth for figures, although there is a considerable tonnage on architects' boards. Bids are now being taken on 800 tons for an apartment building in Oakland and on several hundred tons for the addition to the Robert Dollar Building in San Francisco. Prices continue firm at 2.35c., c.i.f.

Cast Iron Pipe.—Movement of cast iron pipe is not heavy. The Holdener Construction Co., Sacramento, Cal., took 887 tons of 10 to 14-in. class 150 pipe for Lovelock, Nev. The United Concrete Pipe & Construction Co., Los Angeles, took 600 tons of 4 to 12-in. class B pipe for the improvement of Stewart Street, Oceanside, Cal. An unnamed interest was awarded 113 tons of 18-in. class B pipe for a dredging project in San Diego Bay. Bids will be opened on June 25 for 102 tons of 4 and 6-in. class B pipe for the improvement of Market Street, San Diego. The American Cast Iron Pipe Co. was low bidder on 1044 tons of 8 to 24-in. class C pipe for Tacoma, Wash. Prices have been advanced about $2 a ton, and $37 to $38 a ton, delivered, are now being quoted on 6-in. and larger pipe.

Coke.—Sales and inquiries are confined to small lots. About 4500 tons of English beehive and by-product coke is scheduled to arrive on the Coast early next month.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Cincinnati

Pig Iron Buyers Hesitant on Third Quarter—Sheet Rollings Still Heavy

CINCINNATI, June 12.—Despite the fact that the opening of the third quarter is close at hand, pig iron buyers are hesitant about placing orders covering future requirements. This conservative policy is said to be dictated by the desire to find out what course business is likely to take before assuming further obligations, while the lack of strength in prices is another restraining factor. Sales in the past week include 750 tons of malleable for a Richmond, Ind., company and 2000 tons of foundry for an Ohio melter. The Norfolk & Western is inquiring for 800 tons of foundry iron and the Ford Motor Co. is in the market for 700 tons of 14 to 16 per cent ferrosilicon. Lake Erie furnaces are reported to be selling iron at a minimum of $16.25, base furnace. Tennessee and Alabama makers are holding to $16, base Birmingham, and southern Ohio foundry remains nominally at $19, base Ironton.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Steel.—Further improvement is noted in specifications and orders for steel sheets, an important district mill reporting that its unfilled tonnage is the largest in its history. The betterment, however, is not confined to sheets alone, for sales of bars and of structural steel have reflected a healthier demand from users. Prices show considerable variation. In bars, structural shapes and plates an attempt will be made to put third quarter contracts on a basis of 1.90c., base Pittsburgh, an advance of $1 a ton, while quotations for immediate delivery are firm at 1.85c. In the sheet market the situation is far less favorable. Although extremely low prices prevailing in other districts have not appeared in this section, schedules show a rather wide range, which is indicative of weakness. For the general run of miscellaneous orders, blue annealed is bringing 2c., base Pittsburgh, black 2.70c. to 2.80c. and galvanized 3.65c., but on large requirements quotations are shaded from $1 to $2 a ton. One of the most

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

encouraging signs is the well diversified demand from consuming industries. Electrical manufacturers are taking liberal tonnages of sheets, while automobile makers also continue a large factor. In addition, jobbing interests are steady buyers. Operations of district sheet mills are at about 90 per cent of capacity, and no change is expected for several weeks. Common wire nails are selling at $2.50 per keg, base Ironton, with low barge freight rates to Ohio River points. Plain wire is unchanged at $2.40 per 100 lb., base Ironton. Activities in structural steel still are quiet, although a pickup is expected in the next two weeks.

Reinforcing Bars.—The market has an undertone of strength, and manufacturers are predicting an advance of $1 a ton for third quarter. Current orders are being booked at 1.85c., base Pittsburgh, for new billet bars, and 1.80c., base mill, for rail steel stock.

Warehouse Business.—Orders continue in fair volume, but several jobbers declare that the total tonnage booked recently is somewhat disappointing for this time of the year. Reinforcing bars have been especially active. Prices are steady and unchanged.

Coke.—The largest sale of the past week was 3000 tons of beehive foundry coke to a melter in this district. Specifications and orders for by-product foundry coke have been only fair and shipments this month are likely to be slightly less than those in May. Prices of beehive foundry and furnace coke from the New River and Wise County fields are unchanged.

Foundry coke prices per net ton delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—While the market is tending toward softness, prices have not changed. Steel mills in this district are accepting normal tonnages on current contracts, but are not buying for forward deliveries. Considerable scrap is being offered by railroads this week, the Chesapeake & Ohio list totaling approximately 10,000 tons, the Louisville & Nashville, 13,000, and Southern, 9000.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to	$11.25
Scrap rails for melting	11.25 to	11.75
Loose sheet clippings	8.25 to	8.75
Bundled sheets	9.25 to	9.75
Cast iron borings	7.75 to	8.25
Machine shop turnings	7.25 to	7.75
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.00 to	10.50
Short rails	15.75 to	16.25
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.25 to	15.75
No. 1 railroad cast	12.75 to	13.25
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.00 to	11.50

Youngstown

Steel Orders Fall Below Shipments—Ingot Output Above 70 Per Cent

YOUNGSTOWN, June 12.—Incoming orders for finished steel products are not equaling the shipments of producers in this district, and the recent rate of ingot production is maintained with difficulty. While the average production rate can still be stated as between 70 and 75 per cent of capacity, independent capacity is not that fully engaged, and it is because the Carnegie Steel Co. has 13 of its 15 Ohio works open-hearth furnaces in production that it is possible to put the general average above 70 per cent.

Hot-rolled strips still are doing well for makers in this area in point of specifications and shipments, but in the other products of the district demand is considerably lighter than it was a few weeks ago. In pipe, more satisfaction is derived from the price situation than from the volume of orders. The higher prices established on butt-welded pipe early in April, through the withdrawal of an extra 5 per cent which previously had been allowed jobbers, are now regarded as fully established. Drill and drive pipe and casing are not moving with any considerable freedom, but the reasons are understood and there are no ideas that the cutting of prices would induce ordering.

In sheets, the situation is the reverse of that in pipe. While orders are as large as they ever are at this time of the year, the prices that have to be made to secure them, particularly in the districts of large consumption, are very low on the common finishes. Mills here have made sales of black sheets at 2.70c., base Pittsburgh, and of galvanized at 3.60c., base Pittsburgh, in the Pittsburgh district, but such prices are not readily obtainable in other markets to which they ship.

The effort to establish merchant bars at 1.90c., base Pittsburgh, on third quarter business is meeting with rather indifferent success. Much second quarter tonnage carrying 1.85c., base, remains to be shipped, and just now more attention is being given to securing shipping instructions on these old commitments than in trying to get third quarter contracts. Moreover, buyers are not yet keenly interested in supplies beyond their known needs, and are said to regard the higher asking prices as a move by manufacturers to hold the market at its present level.

The scrap market in this area has been helped sentimentally by the fact that shipments again are going to the Warren works, Republic Iron & Steel Co., after a period of limited takings incident to the passing of control of the Trumbull Steel Co. to the Republic company. Steel makers here are demanding better heavy melting steel and showing some inclination to reduce the use of the lighter grades of scrap. Low prices at Pittsburgh for machine shop turnings are believed to be partly due to the fact that they are no longer much wanted at Youngstown and eastern Ohio steel works.

In spite of the fact that a local steel company sold basic iron at $15.37, furnace, other producers say they would not go below $16, furnace, on that grade and are quoting Bessemer iron up to $17.50 and foundry malleable at $17. The Edgewater Steel Co. is in the market for 1000 tons of basic iron.

St. Louis

Basic Iron Sales of 16,000 Tons—Some Grades of Scrap Off 25c.

ST. LOUIS, June 11.—Basic iron, which has been dragging for some time, showed renewed activity this week, with the sale of 15,000 tons to one district melter for third quarter shipment, and 1000 tons for immediate shipment to another. Both melters cater to railroad trade. Both sales were made by the St. Louis Gas & Coke Corporation, which also sold about 1500 tons of foundry grades in lots up to 200 tons. A Southern interest sold about five carloads.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.		$19.00
Northern No. 2 fdy., delivered St. Louis		20.16
Southern No. 2 fdy., delivered	$19.92 to	20.42
Northern malleable, delivered		20.16
Northern basic, delivered		20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Coke.—Buying of domestic grades of coke by dealers is on a more liberal basis than prevailed at this time last year, by-product interests report. Foundry coke is in light demand, and consumers are reported to be behind their contract schedules.

Finished Iron and Steel.—A slight improvement in the volume of business in galvanized sheets is reported by the Granite City Steel Co. Specifications received were slightly heavier than the preceding week, and, in addition, buyers seemed to be showing real interest in third quarter requirements. A continued improvement is looked for especially from the South and Southwest. Orders for blue annealed and black sheets are reaching the company in satisfactory volume, and the tonnage in tin plate is satisfactory. Buying of plates is lighter, with prices unchanged. May warehouse business was about 5 per cent over April's. Structural steel demand is light. The contract for the J. C. Penney Co. warehouse, which will require approximately 2500 tons, is the principal reinforcing project pending.

Old Material.—The market for old material is easier, with miscellaneous standard-section rails, bundled sheets, cast iron carwheels and stove plate 25c. lower. Lack of buying by consumers and the fact that dealers are pretty well covered on existing contracts has caused the easier feeling. Relaying rails are in good demand, with buying mostly of 40-lb. and 70 to 90-lb. weights. Railroad lists: Pennsylvania Railroad, 45,630 tons; Louisville & Nashville, 12,781 tons; Wabash Railroad, 2663 tons; Kansas City Southern Railroad, 352 tons; New Orleans Great Northern, 125 tons; Ann Arbor, 72 tons; Great Northern, 99 carloads; Nickel Plate, 21 carloads; Chicago & Western Indiana, 14 carloads; Chicago & Eastern Illinois, 14 carloads; Frisco, 13 carloads; Pullman Co., 10 carloads; Nickel Plate Railroad (rail), 5 carloads.

Dealers' buying prices, per gross ton. f.o.b. St. Louis district:

Heavy melting steel	$11.00 to	$11.50
No. 1 locomotive tires	12.00 to	12.50
Heavy shoveling steel	11.00 to	11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.25 to	12.75
Railroad springs	13.50 to	14.00
Bundled sheets	8.50 to	9.00
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	9.75 to	10.25
Cast iron borings	9.00 to	9.50
Iron rails	13.00 to	13.50
Rails for rolling	13.00 to	13.50
Machine shop turnings	7.00 to	7.50
Steel car axles	17.50 to	18.00
Iron car axles	23.50 to	24.00
Wrought iron bars and transoms	21.00 to	21.50
No. 1 railroad wrought	10.00 to	10.50
Steel rails, less than 3 ft.	15.00 to	15.50
Steel angle bars	12.00 to	12.50
Cast iron carwheels	13.25 to	13.75
No. 1 machinery cast	13.00 to	13.50
Railroad malleable	11.50 to	12.00
No. 1 railroad cast	13.00 to	13.50
Stove plate	11.25 to	11.75
Agricultural malleable	12.00 to	12.50
Relaying rails, 60 lb. and under	20.50 to	23.50
Relaying rails, 70 lb. and over	26.50 to	29.00

Birmingham

Bars, Shapes and Plates Reduced $1—Open-Hearth Activity Lower

BIRMINGHAM, June 12.—Considering the nearness of the third quarter, pig iron buying has been dull and few signs of awakening interest have appeared. Small-lot selling continues. Some of the melters are running short on second quarter iron and a little fill-in tonnage is expected to develop within the next few days. The base price of $16 is being maintained on foundry iron. Shipping orders against contracts are holding up fairly well. Furnace operations have been the same during the past two weeks, 18 being in blast. Of this number, 10 are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	15.00

Finished Steel.—Quotations on bars, plates and shapes have been reduced $1 per ton and are now 2c. to 2.15c., f.o.b. Birmingham. Prices as a whole are unsteady. However, the market continues active and mills are being kept busy. Light business in railroad accessories has been compensated for by increase in some of the other important lines. Sheet stocks have been increased awaiting a buying movement expected to develop shortly. Some improvement is noted in the demand for fabricated structural steel. The Ingalls Iron Works Co. will furnish 425 tons for a bridge at Miami, Fla. The Virginia Bridge & Iron Co. has an order for 130 tons for a coal-handling plant for the Woodward Iron Co. The Tennessee company has reduced its active open-hearth furnaces at Ensley from eight to six. Five are still in operation at Fairfield and the Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—The unfilled tonnage of the pressure pipe makers has been fairly well supported during the past week by small orders ranging from a carload to 300 tons. No large orders were placed in the district. A fair amount of new business is to be up for bids within the next week. Moderate tonnages for Memphis, Tenn., and Pensacola, Fla., are included. Prices are gradually acquiring a firmer tone, with quotations continuing at $32 to $33. Shipments have been close to production for several weeks. Business is below normal for this time of the year.

Coke.—A moderate amount of activity is noted in forward buying, with some consumers covering their foundry coke requirements for the second half. Most of the buyers covered for the third quarter some time ago. Spot coke buying is almost at a standstill. Quotations of $5 for both spot and contract coke are being maintained.

Old Material.—Indifference continues to characterize the market. Demand is spotty and below normal. Prices are unchanged, but the tone is easy.

Prices per gross ton delivered Birmingham district consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Canada

Steel for Detroit-Windsor Tunnel Awarded—Pig Iron Shipments Larger

TORONTO, ONT., June 12.—Shipments of pig iron range from 10 to 15 per cent larger than those of a year ago. Pig iron business continues at a good level and orders ranging from 50 to 200 tons are appearing. Interest is almost entirely in foundry and malleable iron for immediate needs of melters, and little booking has been done for third quarter. The blowing in of the Victoria stack at Port Colborne, Ont., will augment the production of foundry iron in Canada by about 5000 tons per month, and should bring total output somewhat above record figures of the past two or three years. With strong outside competition, and the lower prices at which United States and British iron is offered in the Canadian market, there is little prospect of an early strengthening in local prices.

Prices per gross ton:

Delivered Toronto		
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to	23.60
Malleable	23.10 to	23.60
Delivered Montreal		
No. 1 foundry, sil. 2.25 to 2.75	24.50 to	25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to	25.00
Malleable	24.50 to	25.00
Basic		24.00
Imported Iron at Montreal Warehouse		
Sumerlee		33.50
Carron		33.00

Structural Steel.—The strike of structural steel workers which became effective about a month ago has depressed sales in this market. Negotiations for a settlement have been under way, but no agreement has been reached, with the result that operations are at a standstill on most of the larger structures in Ontario and Quebec. The strike has not only curtailed sales, but is holding up deliveries on old contracts. Building programs, however, continue to be announced, and at the present time there is prospective structural steel business in Toronto and Montreal districts alone involving between 35,000 and 50,000 tons. John W. Seems, president Canadian Bridge Co., Walkerville, Ont., announces that his firm has the contract to supply steel for the under-river work for the Windsor-Detroit tunnel, construction of which has just been started. The contract is said to total $2,000,000, and will keep the Walkerville plant running day and night for the next 15 months. Orders pending include 2000 tons structural steel and 1000 tons of reinforcing bars for new office building at Montreal for the Terminal Building Corporation; 1000 tons of structural steel and 400 tons of reinforcing bars for Regent Knitting Mills at St. Jerome, Que.; 5000 tons structural steel for factory at Windsor, Ont., for T. Eaton Co., Toronto; 1000 tons of structural steel and 500 tons of reinforcing bars for garage at Hamilton, Ont.; 6000 tons structural steel for 16-story building at Bay and Adelaide Streets, Toronto, for the Canada Permanent Mortgage Corporation; also a number of smaller contracts involving from 200 tons to 1000 tons of shapes and like tonnages of reinforcing bars for other proposed buildings and bridges throughout Ontario.

Old Material.—The demand for iron and steel scrap shows very little change. Sales are at a fairly good level. Prices are unchanged.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Buffalo

Third Quarter Steel Prices Held in Abeyance—Pig Iron Dull

BUFFALO, June 12.—The week has been one of inactivity in pig iron. No sizable inquiries have been presented, and it is doubtful if there is any large outstanding except the General Electric Co. tonnage. Buffalo furnaces continue to maintain quotations at $17 for No. 2 plain foundry and $17.50 for malleable in this district, and it is reported that prices for shipment eastward are assuming a firmer tone.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Prices for bars, shapes and plates for third quarter have not been announced by the leading interest in this district, but it is likely that they will be quoted at 2c., Lackawanna. Sheet demand is off slightly. There has been no announcement here on third quarter prices. Sheet bar buying has been in good quantity, but the billet demand has been light. Sheet piling demand is fair. The new Riverside High School, Buffalo, will require 1000 tons and School No. 61 600 tons of structural steel.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finishing flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Old Material.—No new large selling has taken place and shipments against current orders are being restricted. Scrap from Detroit continues to flow to one of the largest consuming plants. Some activity has taken place in stove plate, with a few small sales at about $13.25. Heavy steel axle turnings have softened to $12 to $12.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $14.75
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	13.50 to 14.00
Hydraulic compressed sheets	12.50 to 13.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.00 to 13.50
Heavy steel axle turnings	12.50 to 13.00
Machine shop turnings	8.00 to 8.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.00 to 15.50
Low phosphorus billet and bloom ends	16.50 to 17.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.25 to 9.75
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	16.00 to 16.50
Iron axles	21.00 to 22.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	16.50
Cast iron carwheels	12.50 to 13.00
Malleable Grades	
Railroad	15.00
Agricultural	15.00
Industrial	15.00

Boston

Pig Iron Prices Still Low—Scrap Market Dull

BOSTON, June 12.—The General Electric Co. this week will purchase 1100 tons of No. 2 plain and No. 1X iron for its New England plants. Business has dropped noticeably; sales made by Buffalo and other New York State furnaces and the Mystic Iron Works

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, round	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

in the past week were smaller than for some time. Competition between these three groups of stacks remains keen. Large tonnages have recently been sold on a delivered base equivalent to less than $16 a ton, Buffalo furnace, for No. 2X. Quite a little western Pennsylvania iron and some Alabama iron has been sold for mixture purposes at prices considerably above those prevailing for other irons. No open inquiry of importance is reported, but quite a few foundries are quietly negotiating with furnaces for lots ranging in size from 100 tons to 1000 tons, third quarter delivery generally, and some fourth quarter. There is no indication, however, when these tonnages will be purchased.

Prices of foundry iron per gross ton delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—No increase in the movement of by-product foundry coke from ovens to foundries is reported, which indicates that the New England melt of iron is no larger. Compared with a month ago, coke consumption is somewhat greater, but it is about on a par with a year ago. The price remains at $11 a ton, delivered within a $3.10 freight rate zone. Domestic coke is moving freely, and indications are that this year will see a new high record for sales by ovens.

Cast Iron Pipe.—The Boston Consolidated Gas Co. is reported to have purchased 1700 tons of 6-in. and 300 tons of 16-in. pipe, but the name of the maker is not mentioned. Maynard, Mass., has awarded 150 tons of 6 to 16-in. pipe to the Warren Foundry & Pipe Co., Beverly, Mass., opened bids today (June 12) on 150 tons of 12-in. pipe. Quite a little pipe business has been placed privately. Those foundries supplying this territory with pipe have backlogs sufficient to keep plants running at present capacity during the next three months. Prices on 6 to 16-in. pipe are firm at $40.50 to $42.50 a ton, delivered common Boston freight rate points. Concessions are still obtainable on larger pipe, but they are less than were possible a month ago.

Structural Fabrication.—While most of the current activity in the steel fabricating market is confined to small jobs, the outlook is more encouraging. A local engineer is expected to let 3000 tons of steel shortly; figures will soon be asked on 1500 tons for a Massachusetts industrial plant; a utility company is to put up a sizable addition, and several jobs involving 300 and 400 tons or larger amounts of steel give indication of becoming active before July 1. Competition for work among fabricators is still keen. There has been a turn in the labor situation, and it now looks as if this week will see fabricators granting iron workers $1.37½ per hour, compared with $1.25, the present wage.

Shapes and Plates.—Mills report improved third quarter buying. While 1.90c. per lb., base Pittsburgh, is asked for small tonnages of standard shapes, 1.85c. can be done on sizable lots. Prices for plates are the same.

Cold-Rolled Strip.—Third quarter buying is developing slowly. Consumers still have ample supplies in stock for needs running into July. The American Steel & Wire Co. quotes 3.30c. per lb., base Worcester, for 1 to 3-ton lots, while other rollers ask 3c. to 3.15c. per lb., base Pittsburgh.

Bars.—Steel bars are in fair demand for third quarter delivery, most mills asking 1.90c. per lb., base Pittsburgh. Mills are holding firmly to 1.90c., base Pittsburgh, for reinforcing bars, but local distributers still make no pretense of adhering to the list price of 2.90c. per lb., base, from stock. Domestic mills are still meeting active competition from imported steel, which accounts for the softness of domestic stock prices. Road mesh is generally bringing $75 a ton.

Warehouse Business.—Weekly warehouse sales are running larger than recently. Individual orders are small, however. An advance of $1 a ton on wire nails will soon be put into effect.

Old Material.—Aside from continued buying of No. 1 steel and yard steel for export, there is very little activity in old materials. Exporters are now paying $9.25 a ton, delivered at dock here, for No. 1 steel, and $8.75 a ton for yard steel. Rhode Island and Worcester, Mass., foundries are taking tonnages of malleable iron, prices for which have a wide range, $13.50 to $14 a ton delivered generally, with one lot going at $15.10. New England gray iron foundries show little interest in machinery cast. Prices for material suitable for steel mill use are generally easier. Chemical borings and rails for rerolling have dropped 50c. a ton.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.60 to $9.00
Scrap T rails	8.00 to 8.50
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.50 to 5.75
Cast iron borings (steel works and rolling mill)	5.50 to 5.75
Bundled skeleton, long	5.50 to 7.00
Forge flashings	6.00 to 7.00
Blast furnace borings and turnings	5.50 to 5.75
Forge scrap	6.00 to 6.25
Shafting	13.50 to 14.00
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.50 to 10.00
Cost iron borings, chemical	9.50 to 10.00

Prices per gross ton delivered consumers' yards:

Textile cast	$13.25 to $13.50
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

Refractories Manufacturers Charged With Suppressing Competition

WASHINGTON, June 12.—The Federal Trade Commission has issued a complaint against 55 manufacturers of refractories, representing the bulk of production of the United States, as well as four men associated with the industry, charging them with concerted action in fixing prices of base bricks and preparing classifications. It is charged that their action is in violation of the Federal Trade Commission Act, which prohibits unfair methods of competition.

The men named specifically include J. J. Brooks, Jr., assistant to the president of the Harbison-Walker Refractories Co.; Frederick W. Donahoe, as secretary of the Refractories Manufacturers' Association; H. H. Hopwood, secretary of the groups listed, and J. M. McKinley, vice-president and general manager of the Crescent Refractories Co. Mr. McKinley is designated as chairman of the classification committee of the manufacturers and as classification engineer is alleged to have originated, prepared and assisted in securing the adoption of the classification of fire clay refractories.

It is charged that the action of the respondents restricted, restrained and suppressed competition for the purpose of unduly enhancing prices. The charge is also made that the respondents, through concerted action, determined upon uniform methods of computing the sizes of the various refractories and the base brick equivalents and upon uniform terms and methods of sale. The complaint alleges that they hold meetings at which prices for base bricks are discussed; that there is an exchange of information as to what the prices from each of them are to be in the future and that the respondents notify each other of any changes to be made in the prices of the base bricks and when such changes are to become effective. The result, it is charged, has been to unduly enhance prices and to make them substantially uniform.

The commission has fixed July 23 as the date for a hearing, to be held in Washington.

Keystone Steel & Wire Co., Peoria, Ill., reports gross earnings of $1,149,410 for the first 10 months of its fiscal year, compared with $1,015,590 in the entire previous year. Earnings for April were $160,000, compared with $149,000 in the previous year.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	June 12	June 11	June 9	June 8	June 7	June 6
Lake copper, New York	14.87½	14.87½	14.87½	14.87½	14.87½	14.87½
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	48.62½	49.12½	....	49.00	49.75	49.37½
Lead, New York	6.30	6.30	6.30	6.30	6.30	6.30
Lead, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15
Zinc, New York	6.50	6.50	6.50	6.50	6.50	6.50
Zinc, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, June 12.—Strength in copper continues, with foreign buying the feature. The tin market has been active at substantially unchanged prices. Demand for lead is fairly large, with prices firm. Conditions in the zinc market are a little stronger.

Copper.—Buying by foreign consumers continues to be the feature thus far this month, total sales being estimated at over 20,000 tons. Today was one of the largest recently, with over 3500 tons the total for the first half of the day. England, Germany and France are the principal buyers, and the sales involve June, July and part of August delivery. Domestic consumers are by no means active. The anxiety aroused recently as to a possible scarcity has been allayed and apparently the large users are assured of being taken care of. Electrolytic copper is still quoted firm at 14.75c., delivered in the Connecticut Valley. Little is heard now of possible premiums for spot or other positions, but producers are having difficulty in meeting consumers' demands for metal. The quotation for Copper Exporters, Inc., is unchanged at 15c., c.i.f. European ports. Statistics for May, probably available tomorrow, are expected to show a decrease in stocks of refined metal and heavy shipments into consumption. Lake copper is quiet and firm at 14.87½c., delivered.

Tin.—Sales for the week ended June 9 were about 1700 tons. The most active day was June 6, when 700 tons changed hands. This total is large when it is considered that most of it was taken by dealers. Consumers participated only slightly and are holding back. They are expected, however, to have to buy July-August-September metal, and this fact may sustain the market against heavy selling in the Far East. The feature of the week has been the heavy sales in Singapore, which on June 7 were 600 tons, followed by 350 tons on June 8, 225 tons on June 9, 125 tons on June 11 and 350 tons today. Sales of 350 tons of Banca tin in Batavia were also made on June 7. These sales have tended to keep consumers out of the market and are considered a reflection of increased production in Singapore. Quotations in London today were £222 5s. for spot standard, £220 10s. for future standard, and £223 10s. per ton for spot Straits. The Singapore market today was £223 15s. In New York today the market was quiet, with spot Straits tin quoted at 48.62½c. Arrivals thus far this month have been 2520 tons, with 5405 tons reported afloat.

Lead.—Sales have been fairly large, particularly in the West. The leading interest continues to quote 6.30c., New York, as its contract price, but values in the West are a little lower at 6.15c., St. Louis. Inquiry recently is mostly for early shipment.

Zinc.—A firmer tone is in evidence and prime Western zinc can not be bought below 6.15c., St. Louis, or 6.50c., New York. This is owing partly to the continued strength of ore at Joplin, which last week sold at $40 and $41 per ton, with total sales again exceeding production and with stocks further reduced. The statistics for May, out today, were decidedly favorable, showing an increase in stocks of less than 500 tons, which is smaller than expected. Total shipments into consumption were over 53,000 tons, which also exceeded estimates in the trade. Another favorable feature was the reduction in the number of retorts operating on May 31 of about 2000 from the month before. Inquiry is not heavy, but a fair business is reported each day.

Nickel.—Ingot nickel in wholesale lots is quoted un-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	51.50c. to 52.50c.
Tin, bar	53.50c. to 54.50c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, casting	14.75c.
Zinc slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	58.00c.
Solder, ½ and ½	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets open	10.75c. to 11.25c.

Non-Ferrous Rolled Products

Effective June 7, zinc sheets have been advanced ¼c. per lb. to 9.25c., f.o.b. mill. Lead full sheets continue unchanged since the advance of ¼c. per lb. on May 29. Mill prices on bronze, brass and copper products are still on the bases established May 25.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.25c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

changed at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Chinese metal is lower at 9.75c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is available at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 12.—Business is dull throughout this territory. Prices for copper are steady, while quotations on tin and lead are lower. Sales in old metals are tapering, but prices are holding.

Prices, per lb., in carload lots: Lake copper, 14.62½c.; tin, 51c.; lead, 6.25c.; zinc, 6.30c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Brooklyn Sewer Award of 1600 Tons—St. Louis Warehouse Calls for 2500 Tons

REINFORCING steel awards in the week were close to 3700 tons, but 1600 tons of this was in one job, a Brooklyn sewer contract. In a total of about 4300 tons of new work up for bids is 2500 tons for a warehouse in St. Louis. Awards follow:

STATE OF CONNECTICUT, 350 tons, road mesh; 250 tons to Concrete Steel Co., 100 tons to American Steel & Wire Co.

QUINCY, MASS., 125 tons, bank building, to E. A. Tucker & Co.

LYNN, MASS., 100 tons, building for Lynn Gas & Electric Co., to McClintic-Marshall Co.

BROOKLYN, 1600 tons, sewers; Carozza Construction Co., general contractor, to Concrete Steel Co.

JAMAICA, N. Y., 125 tons, Krug Bakery Co. building, to Truscon Steel Co.

VALLEY STREAM, N. Y., 100 tons, high school, to Carroll-McCreary Co.

GREENWICH, CONN., 250 tons, printing building for Condé Nast Publications, Inc., to Concrete Steel Co.

STATE OF NEW JERSEY, 200 tons, State road work, to Concrete Steel Co.

BUFFALO, 160 tons, school No. 81, to a local maker.

URBANA, ILL., 300 tons, two buildings for University of Illinois, to Truscon Steel Co.

ST. LOUIS, 100 tons, piling for warehouse foundation for J. C. Penney Co., to Laclede Steel Co.

SAN FRANCISCO, 155 tons, garage on Sacramento Street, to J. Pasqualetti.

VALE, ORE., 102 tons, dam for United States Bureau of Reclamation, to an unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

LONG ISLAND CITY, N. Y., 275 tons, postoffice; general contract awarded to Merch Brothers, St. Louis.

NEW YORK, 200 tons, Pier No. 3, North River; general contract awarded to Allen Spooner & Son, Inc.

PHILADELPHIA, 125 tons, Walnut Lane apartments.

PHILADELPHIA, 325 tons, public school at Twenty-fourth and Christian Streets.

BUFFALO, 100 tons, Cleveland & Buffalo Transit Co. dock wall; bids taken this week.

PONTIAC, MICH., 200 tons, M. D. Hubbard commercial building and garage.

CLEVELAND, 100 tons, building for Northern Ohio Food Co.

CHICAGO, 260 tons, office building for Dearborn Lake Building Corporation.

CHICAGO, 100 tons, additions to three public schools.

HARVEY, ILL., 145 tons, building for Public Service Co. of Northern Illinois.

ST. LOUIS, 2500 tons, warehouse for J. C. Penney Co.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.625c.	14.00c.
Copper, heavy and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.25c.	7.75c.
Heavy machine composition	9.75c.	11.00c.
No. 1 yellow brass turnings	8.50c.	9.375c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

RAILROAD EQUIPMENT

Seaboard Air Line Issues Inquiry for 1000 Box Cars

THE chief item of interest in the railroad equipment market is an inquiry from the Seaboard Air Line for 1000 box cars. Details of the week's business follow:

Seaboard Air Line has issued an inquiry for 1000 box cars.

Southern Pacific will build in its own shops 500 flat cars, 50 gondola cars and 50 caboose cars.

Cambria & Indiana has ordered 625 hopper cars from Pressed Steel Car Co.

Missouri Pacific has ordered five locomotives from American Locomotive Co. This railroad will build 200 automobile cars in its own shops.

Forged Y-Alloy Pistons on Fastest Airplane

Some details of the Napier Lion engine of the airplane which won the Schneider trophy at Venice, Italy, last year were given recently by Capt. G. S. Wilkinson, the chief designer, before the (British) Royal Aeronautical Society. Compared with an engine speed of 2000 r.p.m. and a 5.3 to 1 compression ratio used for the aerial derby in 1919, the present engine has a speed of 3300, a 10 to 1 compression ratio, develops 875 hp. and weighs dry 930 lb., or 1.06 lb. per horsepower. This is a 12-cylinder engine, with three blocks of four cylinders each, one block vertical and the others on either side at about 60 deg. All piping, magnetos and other auxiliaries are placed within the engine fairings to give best streamline effects. Fuel is a 25 per cent benzol, 75 per cent gasoline mixture doped with tetra-ethyl lead; consumption is 50 gal. per hour and 3 gal. of oil.

On such a high-speed engine the reciprocating parts must be of lightest weight. Consequently pistons are of forged Y alloy, instead of aluminum castings. The oil sump is a very light magnesium alloy, since the main block and lower bearings are so designed that the sump carries none of the thrust from the propeller or cylinders. Inlet valves are a nickel-chromium steel, and the exhaust valves are a special heat and erosion-resisting steel of unstated composition.

The main crankshaft of the engine is geared to the propeller shaft (both on the same axis) through a jack shaft placed directly above, and forged-en-block gears with reduction ratio of 1 to 0.765. Bearings are interesting. Main bearings on the crankshaft are roller bearings; the lower half of the bearing housings are stiff enough to act as tie rods across the engine frame. The jack shaft also runs on roller bearings, as does also the rear bearing on the propeller shaft, while the front bearing is a duplex roller and ball bearing. The rear end of this shaft extends over the protruding end of the crankshaft: a plain white metal bearing is used here. White metal bearings are also on auxiliary shafting for water and oil pumps and valve cams.

FABRICATED STRUCTURAL STEEL

Detroit-Windsor Tunnel Award of 13,000 Tons —Total for Week 28,300 Tons

THE Detroit-Windsor vehicular tunnel, for which 13,000 tons of structural steel will be fabricated by the Canadian Bridge Co., accounts for about half of the 28,300 tons of fabricated work awarded during the week. Most of the other awards were small. Included in 14,000 tons of new work on which bids have been invited is 6000 tons for an athletic arena in Chicago. Awards follow:

State of Vermont, 200 tons, highway bridges, to Berlin Construction Co.

Cambridge, 585 tons, Langdell Hall, Harvard University, to New England Structural Co.

Boston, 155 tons, mercantile building on North Street, to New England Structural Co.

Boston, 100 tons, Diocesan House, 1 Joy Street, to Lehigh Structural Steel Co.

Andover, Mass., tonnage unstated, school library and hall, to New England Structural Co.

Stockbridge, Mass., 100 tons, bridge, to Boston Bridge Works, Inc., previously reported to Palmer Steel Co.

Stamford, Conn., 400 tons, building for Southern New England Telephone Co., to Bethlehem Fabricators, Inc.

New York, 16,000 tons, Lincoln Building on East Forty-second Street, to McClintic-Marshall Co.; reported last week as awarded to an unnamed fabricator.

Philadelphia, 325 tons, alterations to North Philadelphia bridges of Reading Railroad Co., to Shoemaker Bridge Co.

Philadelphia, 890 tons, apartment building, Fifteenth and Spruce Streets, to Easton Structural Steel Co.

Philadelphia, 110 tons, Cottman Avenue bridge, to Bethlehem Steel Co.

Allentown, Pa., 175 tons, steel arch centers for bridge, to Bethlehem Steel Co.

Baltimore, 800 tons, Russell Street bridge, to Jones & Laughlin Steel Corporation through Maryland Steel Products Co.

Baltimore, 500 tons, building for St. Mary's Seminary, to Dietrich Brothers.

Arlington, Va., 400 tons, coal storage building, to unnamed Richmond fabricator.

Weirton, W. Va., 2000 tons, Weirton Steel Co., open-hearth extension and smaller buildings, to McClintic-Marshall Co.

Creighton, Pa., 1000 tons, factory, to McClintic-Marshall Co.

Pittsburgh, 538 tons, building for American Metals Co., to McClintic-Marshall Co.

Polk, Pa., 230 tons, State School dormitory, to American Bridge Co.

Miami, Fla., 425 tons, Northwest Seventeenth Street bridge, to Ingalls Iron Works Co., Birmingham.

Birmingham, 130 tons, Woodward Iron Co. coal handling plant, to Virginia Bridge & Iron Co.

Shreveport, La., 300 tons, overpass for Kansas City Southern and Houston & Shreveport Railroads, to Orange Car & Steel Co.

Freeport, Tex., 465 tons, highway bridge over Brazos River diversion channel, to Orange Car & Steel Co., Orange, Tex.

State of Texas, 150 tons, highway bridges over Spring Creek and Neches River, to Orange Car & Steel Co.

Houston, Tex., 230 tons, underpass on Navigation Boulevard, to Orange Car & Steel Co.

Detroit, 930 tons, building for Argonaut Realty Co., to Whitehead & Kales Co.

Detroit, 13,000 tons, under-river construction of Detroit-Windsor vehicular tunnel, to Canadian Bridge Co., Walkerville, Ont.

Mansfield, Ohio, 400 tons, bank building for Farmers Savings & Trust Co., to Forest City Structural Steel Co.

Malinta, Ohio, 1550 tons, Detroit & Ironton bridge over Maumee River, to American Bridge Co.

Chicago, 100 tons, store and apartment building at Austin Boulevard and Twenty-second Street, to Midland Structural Steel Co.

Chicago, 200 tons, pumping station, to McClintic-Marshall Co.

Elgin, Ill., 140 tons, bank and office building, to McClintic-Marshall Co.

Joliet, Ill., 450 tons, store and office building, to Mississippi Valley Structural Co.

Olympia, Wash., 578 tons, Queets River bridge, to Virginia Bridge & Iron Co.

Scottsburg, Ore., 470 tons, Umpqua River bridge, to Clackamas Construction Co., Portland.

Oakland, Cal., 250 tons, school, Foothill Boulevard, to Herrick Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Vermont, 1000 tons, 11 State bridges.

State of New York, 400 tons, highway bridges.

New York, 1500 tons, office building, New Amsterdam Casualty Co., on John Street.

Reading Co., 800 tons, Broad Street station at Philadelphia, 500 tons, general contract to Irwin & Leighton; station platforms and tunnels, 300 tons, general contract to Hughes, Foulkrod Co.

Durham, N. C., 500 tons, building for Duke University.

Buffalo, 1000 tons, Riverside high school.

Buffalo, 600 tons, school No. 81.

Chicago, 1300 tons, apartment community development by Marshall Field Estate.

Chicago, 6000 tons, Harmon's sport arena.

Oakland, Cal., 800 tons, apartment building, Bellevue and Staten Avenues; bids being taken.

San Francisco, 125 tons, apartment building, Ninth Avenue and Judah Street; bids being taken.

Endurance and Other Properties of Rail Steel Investigated

The United States Bureau of Standards has just published the results of a cooperative investigation with the manufacturers rail steel committee, and the joint committee on stresses in track of the American Railway Engineering Association and the American Society of Civil Engineers in the study of rail failures with particular reference to transverse fissure failures. Transverse fissure failures in rails are known to the progressive, or fatigue failures, developing under repeated track stresses and starting from definite nuclei, the origin of which is not yet known. A knowledge of the endurance properties of rail steels, it was believed, should throw some light on this problem.

The quantitative endurance properties of rail steel before and after service have not heretofore been determined. Specimens from new 100-lb. rails made by standard methods and also from rails rolled from sink-head ingots have been tested in the usual rotary beam fatigue test. Specimens cut from the head of 100-lb. rails which passed the specification requirements of the American Railway Engineering Association gave endurance limits from about 41,000 to 59,000 lb. per sq. in. "Overstressing" was found to reduce the endurance limit and "understressing" to raise it. An endurance limit of 65,000 lb. per sq. in. was obtained by "understressing." The rail steels from sink-head ingots showed in general greater fatigue strength than specimens cut from the rails rolled from standard ingots.

It should be emphasized that the values for endurance limits given are for the steel in the rail only and do not necessarily apply to the rail in track. A greater knowledge of the stresses in track must be known before these laboratory tests and service data can be correlated.

Plans have been made to redetermine the endurance limits of specimens of rail steel from these same heats, now under observation in service, after they have been removed from track. It may be possible from these tests to determine whether the rail in service is being "understressed" or "overstressed."

Bar Iron Wage Scale Unchanged

The bar iron scale for year beginning July 1 will be unchanged from the previous 12 months as result of the annual wage conference at Atlantic City. Agreement was reached Saturday, June 9, after almost a week's conference. With a payroll of nearly $7,000,000, May established a high monthly record for this year.

PERSONAL

E. H. Weitzel, vice-president Colorado Fuel & Iron Co., has resigned, effective July 1, after nearly 21 years of service with the company. His advice will still be available to the company, although he will not be engaged on active duty. Mr. Weitzel joined the Colorado company in August, 1907, as chief engineer of the fuel department, in charge of the coal mines. On May 1, 1908, he became manager of that department, in which capacity he continued until March, 1922, when he was made general manager of the company. Later that year he was promoted to the position he now is relinquishing. In May, 1927, he took over also the control of the subsidiary companies, including the Colorado Supply Co., the Rocky Mountain Coal & Iron Co., the Colorado Realty Holding Co., and the Arkansas Valley Conduit Co. The latter unit supplies water to the steel plant. The duties which Mr. Weitzel has performed in these various capacities will be distributed in the different departments, without the appointment of a new vice-president to succeed him.

A. J. Wager, for nine years superintendent of power sales for the Milwaukee Electric Railway & Light Co., Milwaukee, has resigned, effective July 1, to establish himself in the practice of electrical heating engineering in Milwaukee. Mr. Wagner went to the Milwaukee utility from the Commonwealth Edison Co., Chicago. His new work will relate to the use of electricity for heating in industry, such as melting and heat-treating steels. The use of current for such purposes in Milwaukee is said to be great.

Charles B. Harter, general superintendent of the Fordson plant of the Ford Motor Co., has resigned. Mr. Harter started with the Ford Motor Co. in 1904 as a mechanic. At the age of 20 years he was a foreman at the Piquette Avenue Ford plant. When the Highland Park plant was completed he was made superintendent, which position he held until two years ago, when he was transferred to the Fordson plant.

Alfred V. Bodine, vice-president of the Dictaphone Corporation, Bridgeport, Conn., has resigned to become assistant to the president of the Raybestos Co. During the war Mr. Bodine was superintendent of production at the Winchester Repeating Arms Co.

Ludwig Kemper, formerly vice-president Otis Steel Co., Cleveland, has acquired a controlling interest in the Cincinnati Balcrank Co., Cincinnati, manufacturer of automotive lubricating joints and specialty tools, and will become president of the company. He will succeed Clifford Greene, who will become chairman of the board of directors.

Henry Dreses, president Dreses Machine Tool Co., Cincinnati, has left for a four-month tour of European countries.

Richard G. Jones, secretary and treasurer of Briggs & Turivas, Inc., Chicago, iron and steel merchants, has been elected a vice-president of the Foreman National Bank, Chicago. Mr. Jones was formerly connected with the Continental National Bank & Trust Co.

George E. Randles, president Foote-Burt Co., Cleveland, machine tool manufacturer, sailed a few days ago for Europe, where he will spend two months in France, Germany and England, largely on business.

A. G. Brown has been appointed district sales manager in San Francisco for the Republic Iron & Steel Co., Youngstown, with office in the Rialto Building.

Dr. R. P. Heuer, recently appointed director of research for the General Refractories Co., will make his headquarters at the general offices of the company in Philadelphia.

James B. Beyer has been appointed district sales manager in St. Louis for the Republic Iron & Steel Co. The office in St. Louis will be moved July 1 from the present quarters in the Federal Commercial Trust Building to the Shell Building.

George A. G. Wood, vice-president New England Fuel & Transportation Co., Boston, sailed from Boston June 10 for Europe, where he will spend a several-weeks' vacation.

T. M. Galbreath, manager of the Cleveland office of the Sharon Steel Hoop Co., Sharon, Pa., has been appointed assistant general manager of sales, with headquarters at Sharon. E. R. Garlick, special representative of the Sharon general office, will succeed him as Cleveland manager of sales, effective June 15.

N. H. Orr has been appointed contracting engineer junior beam division, steel construction department, Jones & Laughlin Steel Corporation, Pittsburgh.

J. F. Bauer, formerly connected with E. Arthur Tutein, Inc., has become associated with Hickman, Williams & Co., Inc., ferroalloys, coal, coke, etc., at its New York office.

Martin E. McKee has been appointed district sales manager in Cincinnati for the Republic Iron & Steel Co., Youngstown. His office will be in the First National Bank Building. Warner A. Peck becomes assistant district sales manager.

Charles F. Scherer, machine shop superintendent of the Davenport Machine & Foundry Co., Davenport, Iowa, and for 18 years an employee of the company, has been advanced to general manager of the plant. Dr. Henry Braunlich is president and Miss M. B. McGugin, secretary-treasurer.

Alvan Macauley, president Packard Motor Car Co., Detroit, has been elected president of the National Automobile Chamber of Commerce, succeeding Roy D. Chapin, chairman of the Hudson Motor Car Co., Detroit.

Jay C. McLauchlan, member of Pickands, Mather & Co., Cleveland, will sail June 22 for a two-month trip to Europe.

Charles Hart, president Delaware River Steel Co., Chester, Pa., has become active in an advisory capacity in the management of the Lebanon Iron Co., Lebanon, Pa.

Seventh Alvan T. Simonds Economics Contest

Prizes totaling $1,500 will be awarded in the seventh Alvan T. Simonds economics contest for essays on the subject, "Reducing the Costs of Distribution." The awards include a prize of $1,000 for the best essay by a business executive, and another of $500 for the best essay by a senior in college, a graduate student or an instructor of less than assistant professor grade. Papers must be in the hands of the managing director of the American Management Association, 20 Vesey Street, New York, on Dec. 31, 1928.

The awards were established by Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., for the following purposes:

1. To arouse a more genial interest in the subject of economics as related to individual and general welfare.
2. To increase the general understanding of the application of economic principles to business.

Average weekly earnings in representative New York State factories in April were $28.79, a sharp reduction from the $29.64 reported for March. Except for last November, the current figure is the lowest since May, 1926. With the further exception of February, 1926, it is the lowest since November, 1925.

OBITUARY

Frederick L. Jewett, former vice-president of the Paige-Detroit Motor Co., died at New London, Conn., on June 8. He was born in Elmira, N. Y., in 1868, and was educated at Notre Dame University. For several years he was connected with the Consumer's Ice Co., Chicago. About 15 years ago he became associated with the Paige-Detroit Motor Co., of which he was vice-president, until 1927, when the company was taken over by the Graham-Paige Motors Corporation.

Edmund D. Garfield died of pneumonia in St. Paul on June 5. For many years Mr. Garfield had been connected with Manning, Maxwell & Moore, Inc. He entered their service in 1904 and for a considerable period was manager of the office in Milwaukee, where he developed a wide acquaintance among the industrial and railroad interests in the Northwest. Since the Milwaukee office was consolidated with the Chicago office of the company, Mr. Garfield has been acting as special railroad representative, with headquarters in Chicago. He was born in Keesville, Essex County, New York, and was 54 years old.

R. R. Cuthbertson, formerly manager of the Chicago office of Manning, Maxwell & Moore, Inc., and later with Stocker, Rumely, Wachs Co., Chicago machine tool dealers, died May 31.

John T. Collins, inventor and chemist and for years associated with the Merrill Machine Mfg. Co., Hartford, Conn., died June 6 at his home in Sandwich, Mass., where he had resided the past eight years. He was in his sixty-sixth year.

Charles C. Ely, president and treasurer of the Trimont Mfg. Co., Boston, died June 7 at the Hotel Sheraton, Boston, where he resided. He was born in Owego, N. Y., 81 years ago. Upon the death of his brother in 1902, Mr. Ely went to Boston to assume the management of the Trimont Mfg. Co., maker of pipe cutters, chain, wrenches, etc.

Philip C. Smith, for over 20 years foundry superintendent for Ingersoll-Rand Co., Easton, Pa., died in that city on May 22 at the age of 75 years. He was born in Manchester, N. H., served his time in the foundry of the Amoskeag Mfg. Co., Manchester. His experience included work in several foundries on the Pacific Coast. He was for seven years superintendent of foundries for the Camden Iron Works, Camden, N. J., and later was general superintendent for a pipe foundry at Radford, Va., before going to Easton. He retired from active business in 1920.

Henry M. Garlick, 80, banker and industrial leader of Youngstown, Ohio, and a heavy stockholder in the Youngstown Sheet & Tube Co. and in the United Engineering & Foundry Co., Pittsburgh, died suddenly June 9 at Waverly, N. Y., while en route to his summer home at Alder Creek, N. Y. He was chairman of the board of directors of the First National Bank, Youngstown, and a director and former president of the Standard Textile Products Co. A son, Richard Garlick, is a director and member of the executive committee of the Sheet & Tube company. Henry Garlick established the Community Corporation at Youngstown. He was the first president of the First National Bank.

Samuel Higham, for many years president of the Fuller & Johnson Mfg. Co., Madison, Wis., manufacturer of gasoline engines, pumps, etc., died June 1 at the age of 80 years. He retired several years ago. Mr. Higham was born in Geneva, N. Y., Sept. 23, 1847, and joined the Fuller & Johnson company in 1881, later becoming vice-president and then president.

Theodore Disch, formerly superintendent of the Prescott Iron Works, Menominee, Mich., died June 3 at the age of 78. For the past eight years he had devoted his time to instructing in the vocational school at Marinette, Wis.

C. C. Eagle, Jr., Philadelphia district manager for the Bristol Co., Waterbury, Conn., died suddenly June 5 of heart disease on a train while bound for Wilmington, Del. Mr. Eagle was 44 years of age. He was a graduate in electrical engineering of the University of Wisconsin, and a member of the Phi Kappa Sigma fraternity. He entered the employ of the Bristol Co. in 1918 in the company's Chicago office. Previously he had been purchasing agent for the Western Electric Co. He was a native of Union Center, Wis. Mr. Eagle lived at 1226 Atwood Road, Overbrook, a suburb of Philadelphia, with his wife and four children. His body was taken to Chicago for interment.

Harold S. Brown, president National Pipe Bending Co., New Haven, Conn., died June 6 at his home in that city. A native of Brooklyn, he went to New Haven ten years ago to be general manager of the company and later was elected president.

Dwight Wheeler, for 45 years president of the Acme Shear Co., Bridgeport, Conn., died in that city June 6, at the age of 86.

Record Output of Portland Cement

Production of Portland cement in May is reported by the United States Bureau of Mines at 17,280,000 bbl., a seasonal gain from the 13,468,000 bbl. of April, and the largest total since last September. It represents the fourth greatest month's output in the history of the industry, having been exceeded only by July, August and September, 1927. For the first five months production has aggregated 59,536,000 bbl., making a new high record, displacing that of last year, which stood at 57,834,000 bbl. Last month was the highest May on record, exceeding May, 1927, by 3½ per cent.

Shipments in May, at 18,986,000 bbl., were the largest ever reported for that month. They compare with 16,865,000 bbl. last year, the previous high for May. Only June, August and September, 1927, and June, 1926, surpassed in total shipments the amount sent out last month. The total for five months was 55,532,000 bbl., exceeding the previous record (1927, with 55,014,000 bbl.) by about 1 per cent.

Higher Production of Trackwork

Shipments of trackwork for T-rails of 60 lb. and heavier are reported for May by the American Iron and Steel Institute at 14,141 net tons, a gain of nearly 5 per cent over the 13,511 tons of April, but about as far below the March output of 15,058 tons. Last year May provided 16,768 tons. Except for March, the May total was the highest since June, 1927.

For the first five months the shipments have aggregated 63,413 tons, against 79,712 tons last year and 89,904 tons in 1926.

Further Reduction in Standard Sizes of Woven Wire Fencing

The division of simplified practice, Department of Commerce, Washington, has sent to manufacturers, distributers and users of woven wire fencing a report of the changes made in recommendations for the elimination of sizes and stocks, and has asked them to indicate if they approve the revision. The latest meeting was in Chicago on May 2, when it was resolved to eliminate No. 14 gage wire, to avoid the necessity of carrying both 14 and 14½-gage stock.

The elimination made by the revision meeting effected further reduction in the stock varieties of woven wire fencing and packages as follows:

	Before Simplification	Simplified Practice Recommendation		Final Per Cent Reduction
		Original (July, 1923)	Revised (May, 1928)	
Woven wire fencing	552	69	62	89
Woven wire fence packages	2,072	138	117	94

Says Steel Producers Have Not Yet Learned to Advertise

W. W. Galbreath, President Youngstown Pressed Steel Co., Tells National Industrial Advertisers' Association, How Publicity Has Developed His Company's Business

THAT steel producers have not yet learned to advertise, largely because they do not yet believe in it, was substantially the charge made by W. W. Galbreath, president Youngstown Pressed Steel Co., Warren, Ohio, in an address before the National Industrial Advertisers' Association, now holding its seventh annual conference at St. Louis. Coming from the chief executive of a manufacturing company, what he had to say was accepted without discount, such as might follow the utterances of the advertising official of a company.

Without detailing how the company came into its separate existence, it may be mentioned that it went into a new plant early in the disastrous year 1921. The new works had five times the capacity of the old and bookings did not exceed 50 per cent of the old, so the first year's operations were at a 9 per cent rate. "You could imagine," said he, "the amount of red ink we used."

He dwelt at length on the company's success in broadening markets by discovering new applications for pressed metal and how advertising had been a prime element in the program. Yet with a $20,000 appropriation for advertising starting July 1, 1921, it was seven months before the first order was taken. Direct inquiries were rarely received, but by following up the few it was proved that customers had been made to think they had independently conceived what pressed metal might do for their own cases. Best results were obtained from papers going to administrative executives, particularly those responsible for profits.

The company is now beginning to get pay for engineering services and this, Mr. Galbreath asserted, is wholly the result of advertising efforts. It took the company two years to get out of red ink and two more to get on a thoroughly profitable basis.

To Increase Trade Expansion Work

(*Concluded from page* 1685)

from $14 to $20 a ton in the price of finished sheets. Mr. Hadly was of the opinion that the marketing of flat-rolled steel should be placed on a more intelligent basis and that lowering of prices is the greatest menace to the industry. He further stated that the lack of proper distribution is a reproach to the entire industry and urged all flat-rolled steel manufacturers to lend their full support to the association in its efforts to better conditions.

F. C. Gifford, vice-president Acme Steel Co., Chicago, brought out the fact that none of the flat-rolled steel companies has yet learned to turn down orders and not to let buyers of steel run its business.

Must Adjust Production to Market Conditions

Manufacturers of flat-rolled steel must produce judiciously or lose all prosperity and all profits, said George H. Charls, president National Association of Flat-Rolled Steel Manufacturers. He predicted that demand for steel during the third quarter would show a recession from that in the first and second quarters and wondered how many companies would be willing to adjust their production schedules to conform to market conditions. He especially urged flat-rolled steel makers to diversify their markets instead of allowing themselves to get into the undesirable position of being dependent upon one or two industries for their business.

The failure of flat-rolled steel manufacturers in selling and distributing their products is in sharp contrast with their success in meeting production problems and in solving them economically, stated Severn P. Ker, president Sharon Steel Hoop Co., Sharon, Pa.

Objects and purposes of the association were discussed at the closing session by Charles R. Hook, vice-president and general manager American Rolling Mill Co., Middletown, Ohio, who presented plans for the consideration of the members.

The activities and budget of the association were presented by E. Theodore Sproull, vice-president, secretary and treasurer National Association of Flat-Rolled Steel Manufacturers.

Mr. Hadly, Mr. Ker and Harry T. Gilbert, vice-president Republic Iron & Steel Co., Youngstown, Ohio, presided at the business sessions.

In addition to the general meetings, group meetings of the sheet steel, hot-rolled strip and cold-rolled strip divisions were held.

Oil Supply Distributers Merge; Jones & Laughlin Acquire Control

The Frick-Reid Supply Co. and the Frick & Lindsay Co., associated Pittsburgh companies, have been merged and control has been acquired by the Jones & Laughlin Steel Corporation from the John A. Roebling's Sons Co. The Frick-Reid Co. has long been a distributer of oil country pipe made by the Jones & Laughlin Steel Corporation and maintains 48 stores in the oil producing districts of the country. It also is engaged in the distribution of oil well supplies. All of the larger producers of pipe are interested in or control such companies as the Frick-Reid company, through which direct contact with the oil and gas industry is assured. The Frick & Lindsay Co. is engaged in the mill and mine supply business.

Lake Ore Shipments in May Very Small This Year

Lake Superior iron ore shipments in May at 5,362,815 tons were 2,389,656 tons or 30.82 per cent less than the 7,752,471 tons in May, 1927. Total shipments for the season to June 1, this year, were 5,368,761 tons or 42.35 per cent less than the 9,312,557 tons for the same period a year ago. Shipments by ports and for the season in 1928 and 1927 have been as follows in gross tons:

Port	May, 1928	May, 1927	To June 1	
			1928	1927
Escanaba	630,630	785,706	636,576	933,828
Marquette	317,036	411,482	317,036	471,313
Ashland	633,756	1,067,991	633,756	1,196,035
Superior	1,529,803	1,978,414	1,529,803	2,496,469
Duluth	1,669,888	2,628,920	1,669,888	3,175,426
Two Harbors	581,702	879,958	581,702	1,039,486
Total	5,362,815	7,752,471	5,368,761	9,312.557
Decrease	2,389,656	....	....	....
Decrease	....	....	3,943,796	....

Of the season's shipments this year Great Northern's proportion was 25.08 per cent against 23.62 per cent a year ago. Duluth's percentage this year was 31.10 per cent as compared with 34.10 per cent last year.

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Another Large Decrease in Unfilled Orders of Steel Corporation

Another sharp decline in the unfilled orders of the United States Steel Corporation took place in May. The total on May 31 was 3,416,822 tons, compared with 3,872,133 tons on April 30—a decline of 455,311 tons or about 11.8 per cent. This is the lowest total since Oct. 31, last year, and compares with 3,050,941 on May 31, a year ago. The table gives the reported figures for the past 29 months.

	1928	1927	1926
Jan. 31........	4,275,947	3,800,177	4,882,739
Feb. 28........	4,398,189	3,597,119	4,616,822
Mar. 31........	4,335,206	3,553,140	4,379,935
April 30........	3,872,133	3,456,132	3,867,976
May 31........	3,416,822	3,050,941	3,649,250
June 30........	....	3,053,246	3,478,642
July 31........	....	3,142,014	3,602,522
Aug. 31........	....	3,196,037	3,542,335
Sept. 30........	....	3,148,113	3,593,509
Oct. 31........	....	3,341,040	3,683,661
Nov. 30........	....	3,454,444	3,807,447
Dec. 31........	....	3,972,874	3,960,969

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Airplane Motor Order Totals $1,000,000

The Pratt & Whitney Aircraft Co., Hartford, Conn., has received an order for 105 500-hp. Hornet engines and 10 400-hp. Wasp engines, to cost $1,000,000, from the Boeing Air Transport Co., Chicago, San Francisco, Los Angeles and Seattle. This order is said to be the largest ever placed for commercial aviation engines.

Largest Monthly Construction Record Ever Reported

Building construction in May made the largest total ever reported, according to figures of F. W. Dodge Corporation. In the 37 States east of the Rocky Mountains the total was $668,097,000. This is nearly 4 per cent above the previous high record, which was that of the preceding month. The gain over May, 1927, was 21 per cent. Resulting from the succession of record-breaking months, the figure for the first five months of the year, at $2,796,301,000, is 9 per cent ahead of the corresponding period of last year and 7 per cent ahead of 1926.

Residential buildings continue to head the list, with 43 per cent of all construction in May. The amount was $288,826,000. Public works and utilities accounted for $150,223,000, commercial buildings for $91,200,000 and educational projects for $47,851,000.

May provided the largest monthly total ever reported from the New England States. It was the largest May ever reported for New York State and northern New Jersey, the largest May for the Middle Atlantic States and the highest for the Central West. Other districts did not report new high records last month.

Skilled and Common Laborers About One-Third of Total Immigrants

WASHINGTON, June 12.—Of the 30,709 immigrants admitted to the United States in April, 17,561 were males and 13,148 females, according to the Bureau of Immigration. Over three-fourths of the total were in the middle-age group, as 24,078, or 78.4 per cent, ranged in age from 16 to 44 years. Of the 4515 emigrant aliens leaving the United States in April, 3109 were males and 1406 females, and 3071 were from 21 to 44 years of age.

Mexico, with 6451 in April, led in the number of immigrants, while Canada sent 5205, nearly two-fifths of the total for the month coming from these two countries. From overseas, Germany continued to contribute the largest number of immigrants, 5207 coming from that country, while the Irish Free State sent 3586. Great Britain sent 2302; Scandinavian countries, 2086; Italy, 1354; Poland, 570; France, 406; and Czechoslovakia, 349. Of the April immigrants, 5889 were classed as skilled, and 3972 as common laborers, these two groups constituting 32 per cent of the total number admitted.

Reduction in Available Railroad Equipment

That there has been a decline in carrying capacity of freight cars and number and hauling power of locomotives in service on American railroads is stated by *Railway Age*. Locomotives on Class I roads at the end of 1924 numbered 65,358. Since then the number retired from service has far exceeded the number of new units installed. As a result the present number is about 61,000. Until May 1, 1927, the total tractive power of locomotives owned had increased, due to the high power of the new units. During the past year, however, in spite of high individual power, the total has gone lower than the maximum then reached, which was more than 2,616,000,000 lb.

At the end of 1925 the Class I railroads owned 2,357,234 freight cars. This number has declined by about 40,000 within the elapsed 30 months. New cars installed have been of greater capacity than those withdrawn, but the withdrawals have been so rapid of late that the present total capacity is about 1 per cent under the maximum of 106,000,000 tons, reached last October.

Small Number of Locomotives Shipped by Manufacturers

Railroad locomotives to the number of 41 were shipped by manufacturers in May, against 46 in April, according to the Department of Commerce. Of the May shipments, 39 locomotives were for domestic use, 29 being steam and 10 electric units. The two locomotives for foreign use were of the steam type. Unfilled orders at the end of May totaled 220 locomotives, against 188 at the end of April. Shipments for the first five months of the present year totaled 263 locomotives, against 481 for the corresponding period of last year.

Shipments in May were the lowest for any month in more than five years. The total compares with 109 in May, 1927, with 140 in May, 1926, and with 101 in May, 1925.

Sharp Reduction in Shipments of Sheet-Metal Ware

April shipments of enameled sheet-metal ware reported by 18 manufacturers to the Department of Commerce aggregated 350,544 dozens, valued at $1,326,165. This compares with 442,689 dozens in March, valued at $1,665,470, and with 337,181 dozens in April, 1927, valued at $1,192,808. For the first four months there has been a gain over last year, values reported having been $5,544,152 against $5,197,992 a year ago.

Shipments of galvanized sheet-metal ware amounted in May to 237,571 dozens, valued at $875,442, as reported by 15 concerns. This compares with 220,677 dozens in March, valued at $824,143, and with 232,496 dozens in April, 1927, valued at $841,902. For the first four months, the shipments this year have aggregated $3,118,190, a moderate gain over last year's total of $3,044,919.

Coal Production Increasing

Production of both bituminous and anthracite coal in May showed substantial gains over April, according to preliminary figures of the United States Bureau of Mines. The output of bituminous coal is given as 36,542,000 net tons, or 1,384,000 tons for each working day. This compares with 32,188,000 tons in April, or 1,303,000 tons for each of the smaller number of working days. Anthracite production in May was 8,117,000 tons, or 312,000 tons a day, against 6,909,000 tons in April, or 288,000 tons a day.

Estimates of the National Coal Association place the output of bituminous coal for the week ended June 2 at about 7,200,000 net tons.

Machinery Markets and News of the Works

BUYING IS SLOWER

Machine Tool Trade This Month Is Less Active

Prospective Purchases of General Electric Co. and Wright Aeronautical Corporation Will Run Large

JUNE trade in machine tools is unmistakably at a slower pace, compared with last month or April. Orders for single tools are in fair number and are coming from a good many different industries, but the total for the month, according to present indications, will be less than the general average for May. Railroad buying is conspicuously lacking and automobile companies are taking only a few machines for replacements.

The General Electric Co. has again added to its list of needs for the electric refrigeration department at Schenectady, N. Y., and orders are expected soon. The Wright Aeronautical Corporation, Paterson, N. J., is building a large addition to its machine shop and has another wing under contemplation. A list of machine tools required for these additions is now being prepared. The Wright company has bought a building at Paterson formerly occupied by the American Locomotive Co. and will utilize it for an aluminum foundry.

The bulk of the machine tool buying of Deere & Co. for its agricultural machinery plant at Moline, Ill., has been completed, but purchases are to be made soon for the Waterloo, Iowa, shops. Tractor manufacturers are among the most active buyers in the Chicago district.

Centerless grinding machines have been advanced in price about 10 per cent.

New York

NEW YORK, June 12.

WHILE purchases of machine tools so far this month do not make a very favorable comparison with sales records of recent months, outlook for the summer is considerably improved by the known requirements of two of the large buyers in this district, the General Electric Co. and the Wright Aeronautical Corporation. The General Electric Co. has sent out additional inquiries in the last week and now has an extensive list of tools before the trade. As most of this equipment is needed for the growing refrigeration department of the General Electric Co., early action on the list is expected. The Wright Aeronautical Corporation is buying single tools from day to day, but the trade's expectations of larger purchases are based on the fact that the company is completing an addition to its machine shop and another wing is in contemplation. An appropriation for a list of machine-tool requirements will probably soon be provided. The Wright Aeronautical Corporation has bought a building at Paterson, N. J., from the American Locomotive Co. and will utilize it for an aluminum foundry.

Nichols Copper Co., Laurel Hill, L. I., has acquired about 575 acres on North Loop Road, El Paso, Tex., as site for new electrolytic copper refinery. It will have capacity of close to 100,000 tons per annum and is reported to cost more than $3,000,000. Company recently disposed of bond issue to provide funds for project. C. Walter Nichols is president.

Ovens, power equipment, conveying and other machinery will be installed in three-story baking plant, 90 x 105 ft., to be constructed at Long Island City, for which plans are being drawn by G. R. Fennema, 114 Liberty Street, New York, consulting engineer, estimated to cost $120,000.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, are preparing plans for a one-story automobile service, repair and garage building, 100 x 236 ft., to cost about $100,000 with equipment.

Fire, June 7, destroyed a portion of building No. 10, United States Navy Yard, Brooklyn, used for manufacture of acetylene torches, hydrogen and oxygen gas tanks, etc., with loss reported at $50,000 with equipment. It is planned to rebuild.

Rockland Light & Power Co., Middletown, N. Y., is disposing of bond issue of $4,500,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

Consolidated Merchandising Corporation, New York, has been formed with capital of $25,000,000 to take over and consolidate Automatic Merchandising Corporation, an interest of United Cigar Stores Co., 44 West Eighteenth Street; Sanitary Postage Service Corporation, 285 Madison Avenue; and General Vending Corporation, affiliated with Hoff Vending Corporation of America, 200 Hudson Street, all manufacturers and distributers of vending machines and devices. Consolidated company will perfect a new "talking" vending machine to be manufactured by Remington Arms Co., 25 Broadway, which will give over a portion of plant at Ilion, N. Y., to such production. Albert C. Abram, executive vice-president, United Cigar Stores Co., will be an official of new organization; Saunders Norvell, president of Remington company, will be a member of board.

George W. Swiller, 4215 Third Avenue, New York, architect, has plans for a multi-story automobile service, repair and garage building, 75 x 185 ft., to cost about $300,000 with equipment.

Newmont Mining Corporation, 14 Wall Street, New York, has secured an option on all physical properties, plant, etc., of United Verde Extension Mining Co., Jerome, Ariz., and purposes to take over and expand facilities, including additional equipment. United Verde company will continue corporate existence and plans to develop other properties, with installation of mining, refining and other machinery. Sale will include present smelter plant at Clemenceau, Ariz.

E. H. Faile & Co., 441 Lexington Avenue, New York, architects and engineers, are asking bids on general contract for a three-story automobile service, repair and garage building at Larchmont, N. Y., to cost close to $90,000 with equipment.

Wright Aeronautical Corporation, Paterson, N. J., has acquired part of plant of Cooke Works of American Locomotive Co., comprising 15 acres and several one-story buildings aggregating 100,000 sq. ft. floor space. Property adjoins works of purchasing company and will be used for expansion. Wright company recently arranged for increase in capital from 250,000 to 500,000 shares of stock, and will dispose of 50,000 of new shares totaling $5,000,000.

Otis Elevator Co., Harrison, N. J., has begun construction of one-story addition, 200 x 400 ft., to cost in excess of $400,000 with equipment. Headquarters are at Eleventh Avenue and Twenty-sixth Street, New York.

Essex County Board of Vocational Education, 969 Broad Street, Newark, has plans for two-story boys' vocational school at Bloomfield, N. J., to cost about $75,000. Guilbert & Betelle, 24 Branford Place, Newark, are architects.

An isolated power plant will be built by Board of Trustees of Deborah Sanatorium, Lake Hopatcong, N. J., at new institutional buildings. Entire project will cost close to $1,000,000. Frank Grad, 1023 Broad Street, Newark, is architect.

Universal Metal Box & Products Co., 144 Bleecker Street, Newark, has leased former plant of Newark Metal Casting & Litho Co., Irvington, N. J. An addition will be built to provide total of about 20,000 sq. ft. floor space. Leasing company will remove to new location.

Thomas A. Edison, Inc., West Orange, N. J., has formed an affiliation with Splitdorf-Bethlehem Electrical Co., 392 High Street, Newark, for manufacture of electric radio receivers, electric talking machine apparatus and kindred products. Each company will continue plants as in the past, and will arrange for increased output under combined patents of both organizations. Walter Rautenstrauch, president of Splitdorf-Bethlehem Company, will become identified with Edison organization as consulting engineer.

Neolite Corporation of New York, 1819 Broadway, New York, has been incorporated as development organization of National Neolite Corporation, manufacturer of Neolite luminous tube products, for roof signs, airport beacons and airway markers. Directors are F. D. Mitchell, secretary-treasurer American Supply and Machinery Manufacturers' Association; H. D. Chadwick, president National Neolite Corporation, and H. H. Bizallion, formerly president Gotham National Bank.

Union Chandelier Co., Newark, N. J., has been incorporated with capital stock of $25,000 to manufacture lighting fixtures. Present operations will be confined to assembly of parts. Company may be addressed in care of Jacques H. Hecht, 207 Market Street, Newark.

S. A. M. Pump Corporation, 11 West Forty-second Street, New York, has been organized to manufacture pumps. It is ready to negotiate with companies in New York district equipped to manufacture pumps on contract. F. O. Willhofft is president.

Chapman Metal Products Co., 213 East 144th Street, New York, capitalized at $15,000, has been organized to manufacture steel frames, sheet metal work, roofing, etc. Leonard Chapman is president, William Smiley, secretary and treasurer. Incorporators are former employees of M. F. Westergren, Inc., and have bought plant and equipment owned by that company.

Orleans Mfg. & Sales Corporation, Albion, N. Y., has been organized with capital stock of $30,000 to manufacture ball-bearing casters. An output of 800 to 1000 casters per day will be arranged for on contract. Schuyler Hazard is secretary and treasurer.

Philadelphia

PHILADELPHIA, June 11.

GENERAL contract has been awarded by Franklin Motor Service Co., 1919-21 Brandywine Street, Philadelphia, to Conrad Construction Co., Collingswood, N. J., for a two-story addition to service, repair and garage building, to cost more than $85,000 with equipment. Richard B. Neeley, 2301 Spruce Street, is architect.

Philadelphia Gear Works, Inc., Richmond and Tioga Streets, Philadelphia, has taken title to about four acres on G Street, near Erie Avenue, and is said to be planning to use for expansion.

I. W. Levin, 1011 Chestnut Street, Philadelphia, architect, has awarded general contract to H. Alterman, 2731 West Somerset Street, for a two-story automobile service, repair and garage building, 100 x 110 ft., to cost about $90,000 with equipment.

Harry A. Reif, 4519 North Twelfth Street, Philadelphia, and associates have organized H. A. Reif Mfg. Co., with capital of $50,000, to operate a local plant for manufacture of tools, dies, screw machine products and metal stampings. H. Conwell Snoke, 130 East Fishers Avenue, will be an official of new company.

H. H. Kline, 709 Chestnut Street, Philadelphia, architect, will take bids before close of month for three-story and basement automobile service, repair and garage building, 65 x 125 ft., at Upper Darby, Pa., to cost more than $100,000 with equipment.

American Radiator Co., 40 West Fortieth Street, New York, is reported considering enlargements in its recently established plant at Gloucester, N. J., including installation of additional equipment.

In connection with proposed merger of 35 electric light and power companies in different counties of State, Pennsylvania Light & Power Co., Allentown, Pa., proposes to issue bonds in amount of about $100,000,000, a portion of fund to provide for acquisition and for expansion and improvements, including transmission line construction.

Board of Education, Elkland, Pa., is considering installation of manual training equipment in a two-story high school to cost close to $200,000, for which plans will be drawn by Howard L. Smith, Pershing Square Building, New York, architect.

Noe Co., Philadelphia, care of William R. McKinney, 4509 Spruce Street, Philadelphia, recently formed by Mr. McKinney, William M. Noe and associates, with capital of $25,000, plans operation of local works for production of structural and ornamental iron specialties.

Township Committee, Pensauken, N. J., is planning to purchase highway machinery, including street marking machine and spraying machine.

Lehigh Telephone Co., 723 Linden Street, Allentown, Pa., plans installation of service and repair shop, with garage, for company trucks and cars, in connection with new three-story headquarters building to cost about $150,000.

Airport committee of City Council, Carlisle, Pa., is planning establishment of a municipal airport, with hangar, repair shop, oil storage and distributing plant and other buildings. Local Chamber of Commerce is interested in project.

New England

BOSTON, June 11.

MACHINE-TOOL houses say that business in the past week was the dullest experienced in a long time. Inquiries also were scarce. Other New England centers report few orders of importance. The feeling persists, however, that sooner or later much of the pending business will close, and that the last half of 1928 will compare favorably with any similar period in several years.

Government has granted an appropriation of $75,000 for power plant improvements at Portsmouth Navy Yard. Plans are private.

Cape Ann Mfg. Co., Gloucester, Mass., has awarded contract for a three-story plant. Maurice H. Maney, 46 Cornhill, Boston, is architect.

Connecticut Light & Power Co., 66 Curtis Street, New Britain, Conn., has started work on a two-story, 120 x 220 ft. office, garage and shop. U. G. I. Construction Co., Broad and Arch Streets, Philadelphia, has plans.

Morton C. Tuttle Co., 31 St. James Avenue, Boston, general contractor, has started work on 10 plant units to cost $1,500,000 at Mystic Docks, Charlestown district, Boston, for United States Gypsum Co. J. H. Nold, 300 West Adams Street, Chicago, is engineer.

Worcester Taper Pin Co., 47 Lagrange Street, Worcester, Mass., has purchased Christianson Screw Co., Newton, Mass. New manufacturing quarters have been engaged at 10 May Street, Worcester, where business will be concentrated about July 1. Thomas Crabtree is president and treasurer of Worcester company.

New England Coal & Coke Co., subsidiary of Massachusetts Gas Co., is installing a new screening plant, to care for its wholesale coke business, at a cost of $400,000. Directors have just appropriated an additional $100,000 for a screening plant to care for its retail trade.

Steel foundry of General Electric Co., West Lynn, Mass., has been abandoned, and furnaces and equipment have been moved to company's Everett plant. Steel foundry will be used as an assembling plant.

Manley Mfg. Co., York, Pa., manufacturer of garage equipment, has removed its sales offices to plant of American Chain Co., Bridgeport, Conn. Change will not affect operation of sales force or service men and H. M. Smith will continue as sales manager.

Reliance Steel & Machinery Co., New Haven, Conn., has combined its offices and warehouse in new quarters at 106-08 Water Street. Company has also installed new squaring shear, 10 ft. x 3/16 in. capacity, to facilitate cutting sheet and strip steel.

Lenk Mfg. Co., Newton Lower Falls, Mass., is occupying its new factory building and has completed installation of machinery and equipment.

Kenney Mfg. Co., 609 Wellington Avenue, Auburn, R. I., manufacturer of metal curtain rods, etc., has awarded general contract to Bowerman Brothers, 70 Bath Street, for one-story and basement addition, 62 x 123 ft., to cost close to $50,000 with equipment.

Commanding officer, Springfield Armory, Springfield, Mass., will receive bids until June 20, for two 100-hp. return tubular boilers, with removal of present units to provide for installation, circular 87.

Charles Street Garage Co., 252 Cambridge Street, Boston, L. K. Morse, president, is asking bids on general contract for three-story addition, 82 x 100 ft., to cost in excess of $100,000. Lockwood, Greene & Co., 24 Federal Street, are architects and engineers.

Grafton Power Co., Lebanon, N. H., subsidiary of New England Power Associates, Worcester, Mass., has applied for permission for a hydroelectric power project on Connecticut River, near Littleton, N. H. It is proposed to construct power dams at Fifteen-Mile Falls and at Lake Connecticut,

The Crane Market

OVERHEAD crane inquiries in the market are in most cases for one or two small capacity cranes. Prospective buyers in the New York territory are rather inactive, but some good business is reported pending in the New England district. The General Electric Co. is about to close on six low headroom cranes for installation at Schenectady. In locomotive cranes no immediate action is expected on the four electrically driven cranes of about 65 tons capacity, inquired for by the Amtorg Trading Co. for export to Russia. The capacities are so large that it is generally doubted that builders here would be interested in executing the order.

Among recent purchases are:

Stevens & Wood, 120 Broadway, New York, 25-ton, 60-ft. boom locomotive crane for Deep Water, near Penns Grove, N. J., from Industrial Brownhoist Corporation.

New York New Haven & Hartford Railroad, 25-ton locomotive crane from American Hoist & Derrick Co.

British-American Metals Co., Plainfield, N. J., four 5-ton, 100-ft. span overhead cranes, reported purchased from an Eastern builder.

La Compagnie de Sable, Quebec, used 15-ton, 8-wheel Browning locomotive crane from A. R. Gelinas, Montreal.

Canada Sugar Refining Co., Ltd., Montreal, used McMyler Interstate Co. crawl-tread locomotive crane from A. R. Gelinas, Montreal.

Century Coal Co., Ltd., Toronto, two new 25-ton American locomotive cranes from A. R. Gelinas.

Dominion Bridge Co., Ltd., Lachine, Que., 40-ton Industrial locomotive crane from A. R. Gelinas.

E. I. dePont de Nemours & Co., Wilmington, Del., 22-ton, 8-wheel railroad type crane from Orton Crane & Shovel Co.

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150 and 100 ft. high, respectively, with corresponding power plants. Transmission system will be built. Entire project is estimated to cost $40,000,000. Output will be distributed by parent organization.

Royal Typewriter Co., New Park Avenue, Hartford, Conn., has asked bids on general contract for two five-story and basement additions, 68 x 190 ft., and 68 x 70 ft., to cost in excess of $200,000 with equipment. Greenwood & Noerr, 847 Main Street, are architects and engineers. Headquarters are at 316 Broadway, New York.

Rockville-Willimantic Lighting Co., Rockville, Conn., is arranging for increase in capital, comprising $100,000 in preferred stock, and 11,996 shares of common stock, no par value, a portion of proceeds to be used for extensions and improvements, including transmission line construction. Company is under direction of Eastern Gas & Electric Securities Corporation, Pine Orchard, Conn.

Board of Trustees, Masonic Home, Charlton, Mass., will ask bids at once for a three-story power plant, 38 x 140 ft., to cost more than $90,000. Walter T. Arnold, Meriden, Conn., is architect.

Hartz-Mason Rubber Mfg. Co., 270 Pleasant Street, Watertown, Mass., has awarded general contract to P. T. McMahon, 1081 Washington Street, West Newton, Mass., for a one-story plant unit, 78 x 150 ft., to cost upward of $80,000 with equipment.

Pratt & Whitney Aircraft Corporation, Capitol Avenue, Hartford, Conn., has taken over additional space at rear of present works and will carry out expansion program. Company has secured order from Boeing Airplane Co., Seattle, for 105 500-hp. Hornet airplane motors, and 10 400-hp. Wasp airplane engines, with contract said to total close to $1,000,000.

Greenwich Water & Gas Co., Greenwich, Conn., operating plants and systems in Connecticut, Vermont and New York, is disposing of bond issue of $750,000, a portion of fund to be used for expansion and improvements.

Buffalo

BUFFALO, June 11.

OFFICIALS of J. P. Devine Co., 1372 Clinton Street, Buffalo, manufacturer of vacuum drying apparatus, boilers, etc., have formed J. P. Devine Mfg. Co., Inc., with capital of $500,000, to take over and expand present plant and business. Clarence W. Reynolds is one of heads of new organization.

Continental Can Co., Syracuse, N. Y., and 100 East Forty-second Street, New York, has awarded general contract to Wells Brothers, 53 West Jackson Boulevard, Chicago, for new five-story plant, 192 x 200 ft., at Chicago, to cost about $400,000 with machinery. Francisco & Jacobus, 360 North Michigan Avenue, Chicago, are architects.

Board of Education, Malone, N. Y., plans installation of manual training equipment in two-story high school to cost $550,000, for which bids are being asked on general contract until June 18. Fuller & Robinson, 95 State Street, Albany, N. Y., are architects.

William E. Biggers, 388 Delaware Avenue, Buffalo, and associates have organized W. E. Biggers, Inc., capital 1000 shares of stock, no par value, to operate a local plant for manufacture of gasoline engines and kindred equipment. John D. Biggers and William D. Biggers, 1323 Book Building, Detroit, will be officials of new company.

George L. Barnard, Leavenworth Apartments, Syracuse, N. Y., and associates are planning construction of automobile service, repair and garage building, to cost approximately $150,000 with equipment.

State Department of Education, Albany, N. Y., is having plans prepared for three-story industrial and agricultural school at Industry, N. Y., to cost about $200,000 with equipment. William E. Haugaard, 353 Broadway, Albany, is State architect.

South Atlantic States

BALTIMORE, June 11.

PLANS have been filed by Bethlehem Shipbuilding Corporation, Baltimore, for two new units in connection with expansion program now in progress, comprising two-story steel fabricating shop and machine shop, 163 x 600 ft. and 80 x 100 ft., respectively, to cost $400,000 with equipment.

Carroll Independent Coal Co., Twenty-fifth Street and Hartford Avenue, Baltimore, has plans for extensions in storage and distributing plant to double present capacity, to cost $90,000 including mechanical conveying and handling equipment. William S. Austin, Maryland Trust Building, is consulting engineer.

Board of Awards, office of City Register, City Hall, Baltimore, will receive bids until June 27 for fully equipped two-story merchandise warehouse and distributing plant in connection with McComas Street terminal improvements, to be 90 ft. wide and 510 ft. long, with 10-ft. platform on west side, including elevators, spiral freight chutes, motor-truck scale, etc. Plans at office of J. E. Greiner Co., Lexington Building, consulting engineer. Work will be carried out under direction of Port Development Commission, James H. Preston, chairman.

G. N. Ray, 1219 Connecticut Avenue, N. W., Washington, architect, has completed plans for a three-story automobile service, repair and garage building, to cost close to $90,000 with equipment.

Quartermaster, Marine Corps, Washington, will receive bids until June 25 for three boilers, equipped with fuel-oil burners, smoke flue connections, etc., one water-heater, equipped with fuel-oil burner, one storage water tank, and one steel stack, schedule 697.

Great Northern Utilities Co., 3933 Drexel Boulevard, Chicago, A. J. Smith, head, is planning construction of artificial gas plant in vicinity of Gaffney, S. C., with pipe line system to serve about 45 communities in this district. Entire project will cost more than $3,000,000. Foundation Co., 120 Liberty Street, New York, is said to be interested in project.

Southern Loom & Reed Works, Inc., Campobello, S. C., manufacturer of textile equipment, plans rebuilding portion of plant destroyed by fire June 6, with loss reported at more than $80,000 including machinery.

International Harvester Co., 606 South Michigan Avenue, Chicago, has acquired property on Twenty-fifth Street, Baltimore, as site for service, repair and sales building for motor truck division, to cost close to $90,000 with equipment. William Price, company headquarters, superintendent of construction, will prepare plans.

Baker County Power Co., Newton, Ga., will proceed with construction of steam-operated electric power plant as an auxiliary to hydroelectric generating station. Contract has been let for Diesel engine of 675-hp. rating, as first unit, and orders will soon be placed for accessory equipment; other units will be installed later. Company is under direction of W. B. Foshay Co., 826 Second Avenue, South, Minneapolis, Minn.

Industrial Rayon Co., West Ninety-eighth Street and Walford Avenue, Cleveland, plans installation of power house and machine shop at new mill at Covington, Va. A housing development will be carried out for operatives. Entire project is reported to cost more than $4,000,000.

Lexington Water Power Co., Lexington, S. C., has contracted with Westinghouse Electric & Mfg. Co., East Pittsburgh, for four 40,825-kva. vertical water-wheel generators for its new hydroelectric power development on Saluda River, near Columbia, S. C., and will place orders soon for auxiliary equipment. A transmission line will be built. Entire project is reported to cost in excess of $1,000,000.

Casey & Faut, North Main Street, Anderson, S. C., architects, will take bids soon for two-story automobile service, repair and garage building, 55 x 140 ft., to cost close to $80,000 with equipment.

Virginia-Carolina Power Co., operated by Virginia Electric & Power Co., Electric Building, Richmond, Va., has applied for permission to construct and operate hydroelectric power plant on Roanoke River, Brunswick County, Va., with initial installation of 50,000 hp., to cost close to $1,000,000 with transmission system.

Cincinnati

CINCINNATI, June 11.

MACHINE-TOOL sales are not holding up to the level maintained during May but, nevertheless, local builders are booking a fair amount of business. Most of the orders consist of one or two tools for companies in the general industrial field, automobile manufacturers having purchased only a few machines for replacement purposes. Railroad buying has been practically at a standstill. Inquiries before the trade indicate that bookings the remainder of this month will be of moderate proportions.

Directors of Casey-Hedges Co. and Walsh & Weidner Boiler Co., both of Chattanooga, Tenn., manufacturers of boilers, cast iron pipe, mechanical draft appliances and plumbers' supplies, have approved a consolidation through organization of a holding company. If approved by stockholders, new corporation will be capitalized at approximately $3,500,000.

Plans are being considered by Lambert Art Metal Co., 182 Lorain Avenue, Columbus, Ohio, for a new one-story unit to cost more than $25,000 with equipment.

Broadway Garage Co., 519 Main Street, Cincinnati, has filed plans for a seven-story service, repair and garage building, to cost $375,000 with equipment. Rendigs, Panzer & Martin, Cincinnati, are architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until June 19 for one steel brake, one sheet metal cutter, one floor type grinder, four engine lathes and four cases hardening pots, circular 344; until June 20 for 18 engine gage assemblies, 168 engine gage assemblies, 87 engine gage units and four supercharge gage units, circular 20.

Stimpson Computing Scale Co., Louisville, has work under way on new plant, to cost approximately $100,000 with equipment.

Plough Chemical Co., Memphis, Tenn., has plans for multi-story addition to factory at 121 South Second Street, to cost in excess of $750,000 with machinery. Hanker & Caires, 123 South Court Street, are architects.

E. T. Hutchins, 416 South Fifth Street, Louisville, architect, has plans for three-story and basement automobile service, repair and garage building, 160 x 210 ft., to cost in excess of $225,000 with equipment.

Nashville, Chattanooga & St. Louis Railway Co., Nashville, Tenn., has plans for extensions in local engine house and shops to cost more than $50,000 with equipment.

Cincinnati Motor Coach Association, 1204 Exeter Place, Cincinnati, is planning a new bus terminal with service, repair and garage facilities, to cost more than $1,500,000 with equipment. G. W. Drach and C. H. Ferber, Union Trust Building, are associated architects.

City Council, Chattanooga, Tenn., is planning establishment of municipal airport, with hangars, repair shops, oil storage and distributing buildings, and other structures. Entire project is estimated to cost $250,000. Bond issue will be arranged.

Alabama Oolitic Stone Co., Fourth and First National Bank Building, Nashville, Tenn., W. F. Creighton, head, recently formed with capital of $25,000, has acquired about 150 acres, near Rockwood, Ala., and plans development, including installation of quarrying equipment, conveying machinery and other equipment.

Shuler Axle Co., N and Jones Street, Louisville, has work under way on an addition to cost about $21,000 with equipment.

Detroit

DETROIT, June 11.

ARRANGEMENTS are being made by Durant Motors, Inc., Lansing, Mich., for early installation of equipment in new unit now under way. Machinery will be removed from other points and purchased to total value of more than $400,000. Entire project will cost about $700,000. Headquarters are at 250 West Fifty-seventh Street, New York.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, has purchased plant and business of Michigan Smelting & Refining Co., 7885 Joseph Campeau Avenue, and will take over property in about a month. Acquired plant will be continued as branch works. Bohn company is arranging for sale of preferred stock to total $2,155,700, a portion of fund to be used for purchase and expansion.

Novi Stovecab Corporation, Novi, near Detroit, recently organized, has completed erection of new plant, 80 x 120 ft., and will begin production of patented domestic gas stove cabinets.

Sparks-Withington Co., Jackson, Mich., manufacturer of automobile appliances, radio equipment, etc., has acquired local plant of Jackson Motors Co. for expansion. Structure will be remodeled and placed in service in about 90 days.

Board of Education, Owosso, Mich., plans installation of manual training equipment in new high school to cost $400,000, for which bids will soon be asked on general contract. William B. Ittner, 911 Locust Street, St. Louis, is architect.

Continental Motors Corporation, 12801 East Jefferson Street, Detroit, has concluded agreement with Hydro Check Corporation, Monroe, Mich., for manufacture of hydraulic shock absorbers, heretofore carried out on limited scale in a local plant. Continental company will devote portions of both Detroit and Muskegon plants to new product, developing an output of about 6000 sets per day.

Ovens, power equipment, conveying and other machinery will be installed in new three-story baking and distributing plant, 110 x 225 ft., to be erected at Grand Rapids, Mich., by Kroeger Grocery & Baking Co., 817 Main Street, Cincinnati, to cost about $325,000 with equipment.

McCord Radiator Mfg. Co., 2587 East Grand Boulevard, Detroit, manufacturer of automobile radiators, is completing new branch plant at Walkerville, Ont., to have initial production of about 10,000 radiator units per month.

Board of Education, Hazel Park, Mich., contemplates installation of manual training equipment in new two-story high school to cost $450,000, for which plans will be drawn by Frank Eurich, Jr., 415 Brainard Street, Detroit, architect.

Owosso Foundry Co., Owosso, Mich., recently organized, has leased local plant formerly occupied by Standard Machine Co., and will remodel for production of gray iron castings, primarily for automotive service. Equipment to cost more than $40,000 will be installed.

Penberthy Injector Co., 1242 Holden Avenue, Detroit, manufacturer of injectors, ejectors and other power plant equipment, is reported planning an addition, to cost more than $100,000 with machinery.

Hill-Curtis Co., Kalamazoo, Mich., maker of polishing and grinding machinery, is erecting new factory building at Douglas Avenue and Michigan Central Railroad.

Cleveland

CLEVELAND, June 11.

MACHINE-TOOL sales in this territory are rather slow, but the volume of business is holding up well with last month. Buying is scattered among various industries. Heavy machines are inactive. Turret lathes continue in good demand, although few orders are for more than single machines. The Globe Machine & Stamping Co., Cleveland, during the week purchased a 3½-in. radial drill and a 6-in. vertical shaper. A local turret lathe manufacturer took an order for two large machines for the Seattle-Astoria Iron Works, Seattle, Wash., and another from a Michigan plant for three small machines. Little inquiry is coming from the railroads. Dealers are still working on the recent inquiry from the Erie Railroad.

Plans are said to be under way for extensions and improvements in refinery of Sun Oil Co., Toledo, Ohio, on 65-acre tract adjoining, recently acquired. Entire project will cost in excess of $800,000 with equipment. Headquarters are at South Penn Square, Philadelphia.

Steubenville Pressed Steel Co., Steubenville, Ohio, recently organized by E. M. Mentzer, Steubenville, and associates, is reported planning early purchase of equipment for local steel and iron fabricating plant.

City Council, Urbana, Ohio, is considering installation of a municipal electric light and power plant to cost more than $350,000 with equipment, replacing present service from other source. C. C. Craig, mayor, is at head of project.

Linde Air Products Co., 30 East Forty-second Street, New York, has awarded general contract to H. B. Walker, Canton, Ohio, for one-story branch plant at Canton, to cost close to $50,000 with equipment.

Hickok Oil Corporation, Toledo, Ohio, operating a local oil blending plant and oil properties in Texas, has arranged for bond issue of $1,500,000, a portion of proceeds to be used for expansion and betterments.

Small & Powley, Terminal Tower Building, Cleveland, architects, are preparing plans for a new service, repair and garage building for Shaker Garage Co., Marshall Building, for which bids will be asked soon on general contract, to cost upward of $90,000 with equipment.

Following recent discontinuance of its foundry division, Gogan Machine & Foundry Co., 1440 East Fifty-fifth Street, Cleveland, has changed its name to Gogan Machine Co. It will continue to specialize in production of heat-treating equipment.

Board of Education, Akron, Ohio, contemplates installation of manual training equipment in a new two-story high school to cost about $230,000, for which bids have been asked until June 16 on general contract. M. M. Konarski, Central High School Building, is architect.

Directors of Mahoning Valley Sanitary District, which is creating a sanitary water supply for Youngstown and Niles, Ohio, are beginning to award contracts for construction of a dam to hold back the waters of Meander Creek, six miles west of Youngstown. Project will involve an outlay of $9,000,000, and all preliminary engineering work has been completed. J. D. Waddell, a vice-president of Empire Steel Corporation, Mansfield, Ohio, is one of two directors of water project, representing Trumbull County interests. Directors have sold about $2,500,000 bonds and are ready to proceed with the work.

Pittsburgh

PITTSBURGH, June 11.

JUNE, so far, has not sustained the promise of May in machine-tool business. Inquiries still are fairly numerous, but sales are fewer than last week or the week previous.

Plans have been filed by West Penn Power Co., West Penn Building, Pittsburgh, for a one-story equipment storage and distributing plant, 85 x 150 ft., with service, repair and garage unit, to cost $90,000. Sanderson & Porter, 52 William Street, New York, are engineers.

Board of Education, Lewistown, Pa., contemplates installation of manual training equipment in two-story junior high school to cost $160,000, for which plans will be drawn by Hersh & Shollar, Commerce Building, Altoona, Pa., architects.

Officials of Aluminum Co. of America, Oliver Building, Pittsburgh, have organized Aluminum, Ltd., to take over and operate its properties in Canada and foreign lands. New organization has disposed of bond issue of $20,000,000, proceeds to be used for purchase of property from parent company, and for expansion. Arthur V. Davis is chairman of board of parent organization and head of subsidiary. Edward K. Davis has resigned as vice-president of parent concern to become president of Aluminum, Ltd.

Heppenstall Forge & Knife Co., 4620 Hatfield Street, Pittsburgh, has awarded general contract to Rust Engineering Co., American State Bank Building, for a one-story addition, 100 x 190 ft., to cost approximately $60,000 with equipment.

Universal Glass Products Co., Parkersburg, W. Va., manufacturer of machine-made milk bottles, etc., has approved plans for an addition, to cost about $160,000 with equipment.

Synchrophone Corporation, Pittsburgh, manufacturer of talking motion pictures and equipment, has leased property of Lincoln Motion Picture Co., Ridgefield, N. J., on site, 200 x 400 ft., for new Eastern branch plant.

Frick-Reid Supply Co., Pittsburgh, has been organized to take over and consolidate company of same name, with local works at Sandusky and Robinson Streets, devoted to equipment and supplies for oil and gas wells, pipe lines, refineries, etc., and Frick & Lindsay Co., with works at same location, devoted to similar apparatus. Consolidated company will operate group of 48 storage and distributing plants in different parts of country. A bond issue of $3,000,000 is being sold, a portion of fund to be used for expansion. W. E. Frick is president.

Borough Council, Sharpsburg, Pa., will receive bids until June 25 for new municipal boiler plant. Hudson & Myron, Wabash Building, Pittsburgh, are engineers.

Lally-McKelvy, Inc., Union Trust Building, Pittsburgh, has been appointed representative in Pittsburgh district for Chicago Nipple Mfg. Co.

Fitzsimmons & Cole Machinery Co., 1208 House Building, Pittsburgh, has changed its name to West Penn Machinery Co.

Pittsburgh Lamp & Art Craft, Inc., Monongahela, Pa., has been organized with capital of $25,000 to manufacture electric lamps, art metal furniture and metal specialties. Company will make its own patterns, molds, dies, etc., in a three-story building it has acquired and which is almost fully equipped.

Chicago

CHICAGO, June 11.

MACHINE-TOOL sales so far this month have been sluggish, with business confined almost wholly to individual items from widely scattered sources. Indications are that orders from tractor manufacturers in June will total large. Deere & Co. have closed for their Moline plant requirements, but still must buy for the Waterloo, Iowa, shops. The Caterpillar Tractor Co., Peoria, Ill., also has some items pending and the J. I. Case Threshing Machine Co., Racine, Wis., has a list against which it will buy. Railroad business is dull and the immediate future appears to hold nothing of interest from that source.

Centerless grinders have been advanced 10 per cent.

Contract has been let by Northwestern Barb Wire Co., Sterling, Ill., to Komman Co., 506 West Fourth Street, for rebuilding portion of plant recently destroyed by fire, to cost more than $200,000 with equipment.

Southern Malleable Iron Co., Twenty-first Street, East St. Louis, Ill., has awarded general contract to St. Louis Structural Steel Co., Syndicate Trust Building, for new one-story foundry, 85 x 280 ft., to cost in excess of $100,000 with equipment.

Board of Education, Decatur, Ill., plans installation of manual training equipment in new three-story junior high school to cost $325,000, for which bids will soon be asked on general contract. Brooks, Bramhall & Dague, National Bank Building, are architects.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of corrugated boxes and containers, boxboard products, etc., is disposing of bond issue of $6,000,000, a portion of proceeds to be used for expansion and improvements. Company recently acquired local mill of Chicago Coated Board Co., making 13th plant. Walter P. Paepcke is president.

Davis D. Meredith, 222 West Adams Street, Chicago, architect, has filed plans for a multi-story automobile service, repair and garage building, to cost more than $500,000 with equipment.

Board of Education, Minot, N. D., contemplates installation of manual training equipment in three-story addition to junior high school to cost about $200,000, for which bids will be asked in general contract before close of month. Bugenhagen & Molander, Union National Bank Annex, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, will soon take bids on general contract for two-story factory branch and distributing plant at St. Cloud, Minn., to cost about $150,000 with equipment. W. D. Price is superintendent of construction, Chicago headquarters.

Hart-Carter Co., Minneapolis, Minn., recently formed under Delaware laws, will take over and consolidate Carter-Mayhew Mfg. Co., manufacturer of agricultural disk separators, etc.; Twin City Separator Co., manufacturer of agricultural machinery, both of Minneapolis; and Hart Grain Weigher Co., Peoria, Ill. It is purposed to continue present plants in service, carrying out increased production. A new disk separator for use on combines and threshing machines is being perfected. Consolidated company is disposing of a preferred stock issue of about $4,480,000, a portion of proceeds to be used for expansion. A. J. Hartley is president.

Northern Utilities Co., Casper, Wyo., operating natural gas properties, has arranged for bond issue of $3,250,000, a portion of proceeds to be used for expansion, including pipeline construction.

Shaw-Enoch Tractor Co., Minneapolis, Minn., manufacturer of road-grading machinery, tractors, etc., will rebuild portion of plant destroyed by fire June 2, with loss reported more than $100,000 including equipment.

Common Council, Indianola, Iowa, is having plans drawn for rebuilding municipal electric light and power plant to cost about $27,000. Additional equipment will be installed. Dougher, Rich & Woodburn, Valley National Bank Building, Des Moines, Iowa, are architects.

Standard Calorimeter Co., East Moline, Ill., has been reorganized as Burgess-Parr Co., following acquisition of large block of its stock by C. F. Burgess, president Burgess Battery Co. and Burgess Laboratories, Madison, Wis. Increased capital will permit expansion of factory and new lines are to be added to calorimeters and special alloys made there.

McHugh Brothers, 222 Mill Street, Rockford, Ill., are erecting a new machine shop, 50 x 125 ft., at a cost of $25,000. It is expected to be ready for occupancy about Sept. 1.

Acme Oxy-Acetylene Co., East Chicago, Ind., will soon begin erection of an addition.

Gulf States

BIRMINGHAM, June 11.

OFFICIALS of Smith Brothers Properties, Inc., San Antonio, Tex., are organizing a company to construct and operate a cement mill on 700-acre tract about 10 miles from city, recently acquired. Initial unit is reported to cost in excess of $1,000,000, and will include power house, machine shop and other structures. J. H. Smith and J. W. Young, president and vice-president, respectively, of Smith company, will head new organization.

Goodall Semi-Metallic Hose Mfg. Co., Birmingham, has awarded general contract to Harrison Richardson, 2028 North First Avenue, for one-story plant, 50 x 120 ft. A portion of structure will be used for storage and distribution.

Commodore Point Terminal Co., 1949 East Adams Street, Jacksonville, Fla., has plans for a new cold storage and refrigerating plant, to cost about $100,000 with equipment.

Houston Cooperage & Tub Co., 3100 Canal Street, Houston, Tex., plans establishment of branch plant at San Antonio, Tex., for manufacture of tubs, kegs and kindred products, to cost close to $40,000 with equipment. Jacob Noodleman is president.

Western Power, Light & Telephone Co., Dallas, Tex., operating electric light and power properties, ice-manufacturing plants and other utilities, is disposing of a preferred stock issue to total about $1,000,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

Texas-Mexican Oil & Refining Co., Laredo, Tex., is planning extensions and improvements in refinery to cost more than $80,000 with equipment. Company has recently increased its capital from $150,000 to $250,000. M. T. Cogley is president.

City Council, Waco, Tex., plans installation of pumping machinery and power equipment in connection with new municipal waterworks, using Lake Bosque as source of supply. A bond issue of $3,500,000 has been approved for work. Floyd & Lockridge, Dallas, Tex., are engineers.

American Desk Mfg. Co., Temple, Tex., recently formed with capital of $75,000, will take over and operate local mill of W. C. Jackson for manufacture of desks and other school equipment. Expansion program will be carried out, including additional equipment.

Board of Regents, West Texas State Teachers' College, Canyon, Tex., is planning a manual training department at institution to cost about $30,000. An addition will also be constructed to power plant. A fund of $200,000 is proposed for a new science building.

E-Z Opener Bag Co., Decatur, Ill., has awarded general contract to C. A. D. Bayley & Co., New Orleans, for initial units for paper mill and bag-manufacturing plant at Tuscaloosa, Ala., consisting of three three-story units to cost more than $2,500,000 with machinery. Mill will be devoted to kraft paper production and first building is scheduled to be ready for machinery installation in the fall. A machine shop will be built. William E. Spink, New Orleans, is engineer.

Holly Hill Fruit Products, Inc., Davenport, Fla., Frank W. Crisp, head, plans construction of a cold storage and refrigerating plant in connection with new packing house. An ice-manufacturing plant is under consideration, as well as power plant. Entire project is reported to cost more than $165,000 with machinery.

Alabama By-Products Corporation, Birmingham, operating gas and by-product coke plants, is disposing of a bond issue of $987,000, a portion of proceeds to be used for expansion and improvements.

Board of Education, Cuero, Tex., plans installation of manual training equipment in new high school, for which plans have been approved, to cost $125,000. T. J. Galbraith, Slaughter Building, Dallas, Tex., is architect.

Southern Natural Gas Corporation, Dallas, Tex., organized to take over and expand Southeastern Gas Co., same city, is planning construction of pipe line in Louisiana, Alabama, Mississippi and adjacent States, totaling more than 750 miles, to cost in excess of $2,000,000. Company is affiliated with Oklahoma Natural Gas Co., Tulsa, Okla., and R. C. Sharp, general manager last noted company, will be in charge of project.

H. C. Minor Estate, Houma, La., has approved plans for a new cane sugar refinery, reported to cost more than $1,000,000 with machinery. A power house will be installed. Company will also make improvements in sugar mills at Billeaud and Laurel Grove, La., and install additional equipment.

Best Electric Co., Inc., 1001 Magazine Street, New Orleans, operating an electrical repair works, is planning erection of one-story addition, 30 x 50 ft., and will install considerable equipment, including coil and armature winding machinery, coil taping machines, under-cutting machines, portable electric blowers, soldering equipment, fuse testers, etc.

Indiana

INDIANAPOLIS, June 11.

PLANS are being drawn by United States Slicing Machine Co., 333 Carson Street, La Porte, Ind., for a one-story addition, to cost close to $50,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is architect and engineer.

Perfect Circle Co., Hagerstown, Md., manufacturer of oil-regulating piston and compression rings, has acquired plant and property of General Piston Ring Co., Tipton, Ind., and will continue operations as branch works. Purchasing company has arranged for increase in capital to $4,875,000, a portion of proceeds to provide for new acquisition and for expansion in output at all three plants, third unit being located at Newcastle, Ind.

Wayne Pump Co., Fort Wayne, formed under Maryland laws to take over and succeed to Wayne Co., with local plant for manufacture of gasoline dispensing pumps, air compressors, etc., is disposing of bond issue of $2,000,000, a portion of proceeds to be used for expansion and betterments.

Hartford City Paper Co., Hartford City, Ind., will soon take bids for an addition to cost in excess of $50,000. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are architects and engineers.

Atlas Plywood Corporation, 31 St. James Avenue, Boston, is establishing a new branch plant at Bloomington, Ind., to be used primarily for assembling, to cost in excess of $25,000.

Plans are being completed for merger of Central Indiana Power Co., Indianapolis, and Terre Haute, Indianapolis & Eastern Traction Co., Terre Haute, Ind., to be known as Indiana Electric Corporation. Consolidated organization plans expansion and betterment program, including transmission line construction.

Van Camp Hardware & Iron Co., 401 West Maryland Street, Indianapolis, has filed plans for one-story storage and distributing plant, to cost about $30,000 with equipment.

St. Louis

ST. LOUIS, June 11.

BIDS will soon be asked by Universal Cutter Co., 4567 Scott Avenue, St. Louis, for new two-story plant, to cost about $55,000 with equipment. A. H. Norris, 11 Dartford Place, Clayton, Mo., is architect.

Yukon Mill & Elevator Co., Yukon, Okla., is planning construction of new power house with Diesel engine units, to cost close to $100,000 with transmission lines.

City Council, Ponca City, Okla., G. E. Norton, city clerk, will discontinue municipal electric light and power plant and will dispose of complete equipment, including generators, Corliss engines, watertube boilers, etc., at public sale on June 28.

Carter & Carter, Commerce Building, Kansas City, Mo., have awarded general contract to Jewell Building Co., Kansas City, for two-story automobile service, repair and garage building, 100 x 150 ft., to cost close to $90,000 with equipment.

Gulf Refining Co., Griffin, Ark., will rebuild portion of storage and distributing plant destroyed by fire June 1, with loss reported at close to $50,000 including equipment.

Eldorado Refining Co., Eldorado, Kan., has begun work on a new local refinery, to cost close to $125,000 with equipment. I. A. Helling is general manager.

New State Ice Co., 2 West Third Street, Oklahoma City, Okla., has plans for a one-story ice-manufacturing and refrigerating plant at Guthrie, Okla., to cost about $65,000 with machinery.

City Council, Lincoln, Neb., is considering installation of municipal airport, including hangars, repair shops, oil storage and distributing plant, and other buildings, to cost close to $100,000. D. R. Erickson, City Hall, is city engineer.

Porter Oil Refining Co., 1434 Wittenburg Avenue, St. Louis, is planning an addition to storage and distributing plant, 26 x 110 ft., to cost more than $45,000 with equipment.

Quaker Oats Co., 80 East Jackson Boulevard, Chicago, will soon begin an addition to plant of its subsidiary, Aunt Jemima Mills, Inc., at St. Joseph, Mo., to cost more than $1,000,000 with machinery.

Union Pacific Railroad Co., Omaha, Neb., will make extensions and improvements in shops at Gering, Neb., including additions to engine house, machine shop, boiler plant and other buildings, to cost more than $125,000 including equipment.

Satanta Terminal Elevator Co., Satanta, Kan., has plans for a new grain elevator with capacity of about 125,000 bu., to cost approximately $100,000 with conveying, elevating and other equipment.

Board of Education, Stillwater, Okla., has awarded general contract to Tankersley Construction Co., Tradesmen's National Bank Building, Oklahoma City, Okla., for one-story manual training school, to cost about $75,000 with equipment. Philip Wilber, Stillwater, is architect.

Beehler Steel Products Co., manufacturer of steel, brass and aluminum stampings, is occupying a new building at 1500 Kingsland Avenue, St. Louis.

Pacific Coast

SAN FRANCISCO, June 6.

BIDS have been asked on general contract by Illinois-Pacific Glass Corporation, Fifteenth and Folsom Streets, San Francisco, for new plant units at Vernon, near Los Angeles, to cost approximately $400,000 with machinery. Engineering department of company, P. D. Burtt, chief engineer, is in charge.

Valley Body & Radiator Works, Fresno, Cal., manufacturer of automobile bodies, radiators, etc., will rebuild portion of plant destroyed by fire June 2, with loss reported at $55,000 including equipment.

Wenden Copper Mining Co., Wenden, Ariz., operating properties in Cunningham Pass district, about nine miles from city, has plans under way for a new mill and reduction plant, work to begin early in fall, to cost close to $100,000 with machinery.

Willys-Overland Co., Toledo, Ohio, has awarded general contract to J. V. McNeil Co., 5860 Avalon Boulevard, Los Angeles, for assembling plant in Laguna-Maywood industrial district. Main unit will be one story, 340 x 600 ft. A power plant, 50 x 100 ft., will be built. Entire project will cost in excess of $1,000,000 with equipment. Curlett & Beelman, Union Bank Building, are consulting architects in charge.

Webber Machine Works, Vancouver, Wash., has plans for a one-story addition to machine shop at 408 Columbia Street, to cost about $25,000.

Kenneth MacDonald, Spring Arcade Building, Los Angeles, architect, is completing plans for new multi-story automobile service, repair and garage building, 120 x 140 ft., to cost close to $500,000 with equipment.

Pacific Lumber Co., Scotia, Cal., has secured permission to use waters from Eel River, Humboldt County, for power and other service. Company contemplates a new pulp and paper mill in this section, using waste material from lumber mill. Entire project will cost in excess of $2,000,000 and is scheduled for completion within 12 months.

Western Oil & Refining Co., Los Angeles, operating an oil refinery in harbor district, is disposing of a preferred stock issue to total close to $5,000,000, a portion of proceeds to be used for expansion and improvements.

Alameda Airport, Inc., 550 Howard Street, San Francisco, C. Thompson, president, is considering plans for new airport at Oakland, Cal., including two hangars, repair shops, oil storage and distributing buildings, and other units. E. G. Burr, address noted, is company engineer.

People's Hydro-Electric Corporation, Alturas, Cal., is planning construction of new hydroelectric generating plant on Pine Creek, near city, to supplant present station. Extensions will be made in transmission lines. Entire project will cost about $125,000.

Ovens, power equipment, conveying and other machinery will be installed in two-story and basement plant to be erected by International Baking Co., San Francisco, to cost $160,000. MacDonald & Kahn, Financial Center Building, are architects.

Buffalo Foundry & Machine Co., manufacturer of dryers, evaporators and chemical plant equipment, has opened an office at San Francisco in charge of Charles O. Lavett.

Milwaukee

MILWAUKEE, June 11.

DEMAND for machine tools shows little change, although the trend is gradually becoming more favorable to companies whose volume showed some recession during May, as compared with April. Business is coming from widely diversified sources, with orders usually for one or two items. Most of the demand from automotive industries is for replacement, but inquiry is improving and the outlook for a larger volume from this group is regarded as promising.

Northern Conveyor & Mfg. Co., Janesville, Wis., manufacturer of material conveyors, hoists and other industrial and contractors' equipment, expects to undertake in the fall an enlargement program which last fall was indefinitely postponed. Plans have been completed for a new main shop, 150 x 190 ft., which will cost about $100,000, including equipment.

Northwestern Refrigerator Co., Baraboo, Wis., has plans for a shop addition, 30 x 150 ft., and a stencil cutting building, 20 x 40 ft. Work is to start late in June.

Cloverland Oil Co., Manistique, Mich., is taking bids through D. E. Anderson, architect, Marquette, Mich., for construction of an oil storage plant, 32 x 175 ft., part two stories and basement.

Bergstrom Paper Co., 225 West Wisconsin Avenue, Neenah, Wis., has placed general contract with C. R. Meyer & Sons Co., 50 State Street, Oshkosh, Wis., for construction of a new steam generating plant, 50 ft. sq., and a new boiler house, 50 x 110 ft. Engineers are Orbison & Orbison, 110 West College Avenue, Appleton, Wis.

Rundle Mfg. Co., Twenty-seventh and Cleveland Avenues, Milwaukee, manufacturer of plumbing goods, fixtures, materials, etc., is about to let contracts for construction of a factory addition, 25 x 100 ft., and a mezzanine floor addition to pattern shop, 20 x 120 ft. Project is in charge of Charles Cahill & Sons, consulting engineers, 214 Mason Street, Milwaukee.

Alwin Mfg. Co., Green Bay, Wis., has been incorporated with capital stock of $25,000 to manufacture machinery, mechanical devices, metal articles, etc. Incorporators are A. G. Krueger, 1015 Crooks Street; Erwin Prust, and G. W. Hay, 415 South Clay Street. A plant is being established.

Bucyrus-Erie Co., South Milwaukee, Wis., manufacturer of steam shovels, dredges, mining machinery, etc., has accepted bid of Paul Riesen's Sons, 1018 Humboldt Avenue, Milwaukee, for construction of a two-story pattern shop addition and storage vault, 65 x 180 ft. Project is in charge of Frank D. Chase, Inc., consulting engineer, 720 North Michigan Avenue, Chicago.

Foreign

OPPORTUNITY of increasing sales of road-making machinery in Western Australia is particularly promising because of urgent need for better roads in vast agricultural areas which are just being exploited, according to a report received by Industrial Machinery Division, Department of Commerce, Washington, from Trade Commissioner Charles F. Baldwin, Sydney. A considerable amount of money has been appropriated to support a road program which contemplates construction and improvement of roads in country districts, especially in wheat growing areas. The possibilities of this trade are attracting attention of British manufacturers of road-building machinery and at least one company, it is reported, is about to enter Western Australian market with a line of British equipment.

Plans are being considered by Inveresk Paper Co., Ltd., London, England, for new pulp mills for raw material supply for kraft paper production, to cost close to $10,000,000. Site has been selected tentatively on east coast of Scotland and negotiations are under way for lams to protect new industry.

Tokyo Electric Light Co., Ltd., Tokyo, Japan, is disposing of a bond issue of $70,000,000 in United States, a portion of proceeds to be used for expansion and improvements, including addition to one of steam-operated generating plants, power substations, transmission lines, etc. Shohachi Wakao is president.

Ministry of Communications, Kovno, Lithuania, is planning to ask bids soon for construction of Telsiu-Kretinga railroad, including rolling stock, shop facilities, etc., for which estimates of cost are being made. American Consulate, Kovno, Paul J. Reveley, vice-consul, has information regarding project.

Central Paper Trust, Petrograd, Russia, has work under way on new mill on Volga River, near Balakhna, Nijni-Novgorod district, scheduled for completion in 1929 or 1930.

Entire project is estimated to cost close to $16,000,000. Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, has information regarding project.

Brandenburg Electric Power Co., Brandenburg, Germany, is disposing of bond issue of $5,000,000 in United States, a portion of fund to be used for expansion and improvements in power plants and transmission lines. George Warrelmann and Herman Henney are managing directors.

A company at Ngoenost, East Java, is planning construction of a new cane sugar refinery in that district and will arrange equipment requirements, etc., in near future. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Java No. 66741; also at American Consulate, Batavia, Java; Thomas C. Barringer, trade commissioner.

Isotta Fraschini (Fabbrica Automobili Isotta Fraschini), Milan, Italy, manufacturer of automobiles, airplane motors, etc., is arranging for sale of common stock, of which 300,000 shares are available, a portion of fund to be used for expansion and improvements.

K. Sakai & Co., 6-Chome Itachibori, Osaka, Japan, inform THE IRON AGE that they are in the market for machines for manufacturing wood screws, also welding machine for tubes. The firm plans an initial output of 2,000,000 wood screws annually in sizes ranging from ¼ in. to 3 in. long. Buttwelded tubes from ¼ to 2 in. inner diameter will also be produced at the rate of about 500 tons a month.

Canada

TORONTO, June 11.

BUILDERS and dealers report a steady flow of new orders. Manufacturers are said to have a good volume of business ahead and most of them are operating at close to capacity. Demand for iron and steel working tools has been at a good level since the first of the year, and sales of woodworking tools have shown improvement. Taken as a whole, selling interests report business for the first five months of this year about 10 to 15 per cent better than that for the corresponding period of 1927.

Expansion of pulp and paper industry of New Brunswick involving an expenditure of between $30,000,000 and $40,000,000 is expected within a few years, according to Hon. J. B. M. Baxter, Premier of New Brunswick. Program includes two new mills to be erected by Canadian International Paper Co., and a 100-ton sulphite pulp plant to be erected next year on Miramichi River. These two projects will require an expenditure of at least $20,000,000. At Athol, on Restigouche River, near Campbellton, N. B., Fraser Co., Ltd., will build a sulphite pulp mill to cost $4,500,000, and at Millbank, it will erect either a 100-ton pulp mill or extend its present plant at a cost of approximately $2,500,000. Extensions under way at Edmundston will increase total production there from 40,000 tons to 117,000 tons a year. Bathurst Co., Bathurst, N. B., has under construction an addition to its mill which will double present capacity. These projects, with money necessary for development of Grand Falls for hydroelectric power, will bring expenditure for the industry in this Province up to $30,000,000 or $40,000,000.

Contract for an addition to Three Rivers, Que., plant of St. Lawrence Paper Mills, Ltd., Canada Cement Building, Montreal, has been awarded to Foundation Co. of Canada, Ltd., 746 Sherbrooke Street W., at a cost of approximately $3,000,000. H. S. Taylor, 1111 Beaver Hall Hill, is consulting engineer.

Negotiations for merger of Wettlaufer Brothers Machinery Co., Toronto, and L. & P. Mfg. Co., Ltd., Niagara Falls, Ont., have been completed, and a new company has been formed under name of Canadian General Machineries Co., with head office and factory at Hamilton, Ont., where future manufacturing operations will be carried on. Wettlaufer Brothers are manufacturers of concrete machinery, block and tile machines, etc., and the L. & P. company makes garage equipment, etc. New company will have a capital stock of $1,000,000. Provisional directors are: President, W. J. Southam, Hamilton; vice-president and general manager, W. LaBombard, Niagara Falls; treasurer, C. S. Watson; directors include J. L. and E. L. Wettlaufer, F. Leslie, Niagara Falls, and C. M. Doolittle, Hamilton.

Tenders are being received by J. W. Pugsley, secretary, Department of Railways and Canals, Federal Government, Ottawa, Ont., until June 26, for operating machinery and electrical equipment for lock-gates, taintor valves, regulating weirs and gate yard for Welland Ship Canal.

General Motors Corporation of Canada, Oshawa, Ont., is having plans prepared for an addition to its plant at Walkerville, Ont.

Victoriaville Furniture Co., Victoriaville, Que., has let contract to H. Levasseur, for a three-story factory, 60 x 130 ft., to cost $50,000; also an annex 40 x 90 ft.

Norton Co., Chippawa, Ont., manufacturer of abrasives, etc., has let contract to Smith Brothers Construction Co., Ltd., 1740 Ellen Avenue, Niagara Falls, Ont., for a two-story addition to its plant, 60 x 80 ft.

Henderson & Barwick, 5 Olier Street, Montreal, manufacturers of coal chutes, elevator buckets, etc., have awarded contract to James Shearer Co., Ltd., 225 St. Patrick Street, for erection of a factory, 80 x 188 ft., to cost $50,000. Architect is F. Robb, 1111 Beaver Hall Hill, Montreal.

Canada Metal Co., Ltd., Toronto, has acquired waterfront property formerly occupied by Dominion Shipbuilding Co., and will erect a plant which will be operated in connection with its other local works.

Randolph & Baker, Ltd., Randolph Street, St. John, N. B., contemplates erection of a lime plant to cost $100,000.

Canadian General Electric Co., Toronto, has under consideration an expansion program involving expenditure of $1,500,000 for buildings and equipment by 1930. This year two structures will be erected, one 100 x 328 ft., and another 90 x 100 ft., with total floor space of 41,800 sq. ft. Buildings will cost $300,000 and equipment $500,000.

Plans are under way by Sarnia Elevator Co., Sarnia, Ont., for a 1,000,000 bu. addition to its elevator. Construction work will be started immediately and it is expected that plant will be ready for operation next fall.

Western Canada

General Motors Corporation of Canada, Oshawa, Ont., is having plans prepared by Hutton & Souter, 6 James Street South, Hamilton, Ont., for erection of an assembly plant at Regina, Sask., to cost $1,000,000.

British Columbia Electric Co., Vancouver, B. C., will build a steam plant for generation of electric power on Burrard Inlet, Vancouver Island, to cost $2,500,000. Plant will be ready for operation by Sept. 1, 1932.

NEW TRADE PUBLICATIONS

Electric Meters.—Sangamo Electric Co., Springfield, Ill. Bulletin 75 of 8 pages illustrates and describes a maximum-demand register and a watthour meter, and tells the principle of operation.

Balanced Float Controllers.—Hagan Corporation, Pittsburgh. Bulletin 102 of 12 pages deals with a type of controller built for low-pressure control of combustion by means of the system known as compensated draft. It is illustrated with line cuts and halftones.

High-Alumina Brick.—General Refractories Co., 106 South Sixteenth Street, Philadelphia. Folder devoted to Arcofrax high-alumina brick and recording some of the results obtained from linings in cement plants. They are recommended for drier and boiler furnaces and other fire brick construction.

Single-State Double-Suction Pumps.—Economy Pumping Machinery Co., 3431 West Forty-eighth Place,

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Chicago. Bulletin 408 of 24 pages illustrates and describes a line of double-suction pumps driven by motor or turbine and designed for a variety of service. Many of the illustrations are from installations. Clearance and dimension diagrams are given, together with capacity tables for pumps from 30 to 3000 gal. a minute, under heads from 20 to 200 ft.

Hand-Power Crane.—Whiting Corporation, Harvey, Ill. Bulletin 185 of four pages illustrates and describes, with clearance dimensions, an overhead traveling crane operated by hand power from the floor. Ease of operation is facilitated by the use of roller bearings.

Gasoline Locomotive.—George T. Whitcomb Co., Rochelle, Ill. Bulletin 2824 of 20 pages illustrates and describes gasoline locomotives of 10 to 30 tons designed for narrow-gage plant operation. They have short wheel base and low center of gravity. All are of the four-wheel type.

Porcelain Pump Plungers.—Aldrich Pump Co., Allentown, Pa. Bulletin 57 of four pages describes an acid-resisting plunger for pumps, designed for use in a variety of liquids. They range from 1¾ to 14 in. in diameter and from 8 to 48 in. long.

Protection for Electric Motors.—Reliance Electric & Engineering Co., 1053 Ivanhoe Road, Cleveland. Bulletin 1087 of four pages stresses the value of protection in the shape of inclosures on electric motors. Numerous types are shown, for operation in plants where dust and dirt are largely in evidence.

Compound Air Compressor.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin 83-K of eight pages illustrates and describes angle compound air compressors of 8-in. stroke, designed for pressures of 50 to 1000 lb. to the square inch.

Direct-Current Motors.—Century Electric Co., 1806 Pine Street, St. Louis. Bulletin of four pages devoted to a recent addition to the Century line of motors. It is built in standard sizes from 1/6 to 1/2 hp., for direct-current use.

Special Control Valves and Governors.—Hagan Corporation, Pittsburgh. Bulletin 103 of 20 pages illustrates and describes a variety of equipment including the roto-reciprocating valve, the stoker governor, the venturi butterfly valve, the dual butterfly valve, the master pilot valve and hydraulic and chemical control valves.

Compressors and Vacuum Pumps.—Ingersoll-Rand Co., 11 Broadway, New York. Bulletin 3150 of 44 pages, well illustrated, covers compressors and vacuum pumps for handling either air or gas. The compressors are of the straight-line type, built single, two or three-stage. The discharge pressures vary from 50 to 160 lb. single-stage, running up to 1750 lb. with three stages.

Central Heating Plant.—Vapor Heating Co., York, Pa. Bulletin B-140 of 4 pages deals with a heating plant for domestic use and refers particularly to oil or gas as a fuel.

Counting Devices.—Bristol Co., Waterbury, Conn. Folder of 6 pages, illustrating and briefly describing a number of types of counters for industrial and other uses.

Mechanical Stokers.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Two 8-page publications devoted respectively to the design and application of traveling grate stokers and the design and application of forced draft chain grates. Both are in the form of technical papers and both were reprinted from recent issues of *Power*.

Multi-Stage Unit Pulverizers.—Grindle Fuel Equipment Co., Harvey, Ill. Bulletin 9 of 8 pages describes a unit pulverizer for coal, designed for feeding the fuel directly into the furnace or other point of application. Both halftones and line cuts give a good idea of the equipment and its characteristics. One illustration is from the plant of the Eastern Malleable Iron Co., Naugatuck, Conn., description of which was published in THE IRON AGE of March 1 last.

Foundry Equipment.—Whiting Corporation, Harvey, Ill. Bulletin 186 of 8 pages devoted to cupola charging and bulletin 187 of 4 pages describing helical-worm-geared ladles. The latter are built up to 35 tons capacity, all gears operating in an oil bath and with ball bearings in the rotating parts. The cupola charging system, known as the "Wish-Bone" system, includes equipment for running the charging bucket directly into the cupola shell and dropping its load.

Foundry Lighting and Ventilation.—David Lupton's Sons Co., Philadelphia. Bulletin of 4 pages illustrating and describing the Pond roof design with continuous windows for providing natural light and ventilation.

THE LAST WORD

(Contributed by the Reader Service Department of The Iron Age Publishing Co.)

WE will pay ten cents a line for a fifty-word story from C. S. Bell, Hillsboro, Ohio, telling how he happened to get into his present line of business. When he first felt the urge to make something, he might have embarked on the manufacture of belt buckles, bulldozers, bedsteads, bean bags, bridges or benzopurpurine. But he didn't. He makes bells.

The firm name is the C. S. Bell Mfg. Co., and so the word "bell" in the firm name serves two purposes. It might have been called the C. S. Bell Bell Mfg. Co. Which reminds us of *Judge's* recent joke about the little girl who asked her mother the meaning of the word cocoon. "Say colored man," answered her mother, "and don't stutter."

SPEAKING of bells, they seem to be out of place on the motor truck the neighborhood junk collector now uses as a successor to his horse and wagon. True, the string of bells is more closely associated with the profession than with the vehicle. But bells and motor trucks don't mix. In the old days, when you heard the jingle of the bells, you still had time to run down to the cellar, get the bag of assorted junk, and still be out in front before the wagon had passed.

The junk dealer, a solemn man who took his business seriously, would weigh our hoard on a scale which would justly collapse with fright at the approach of a sealer of weights and measures. With the air of a king conferring an earldom, Joe (all junk collectors are named Joe, or used to be) would painfully pull out of his pocket a dark, greasy cloth bag, from which he would carefully select for us a dime and two pennies.

Of course, we always complained about Joe's price. But Joe was no haggler. He named a price and that was all there was to it. Take it or leave it. He had no competition in that immediate neighborhood, so the price he named was the price he paid. Joe was the original one-bidder.

He was something of a metallurgist, too. If you rubbed the ends of insulated steel wire with bluestone, to make it look like copper, which commanded fabulous prices in those days, Joe always detected it through some uncanny sixth sense, and punished you by rejecting your entire collection. He knew, of course, he would get it on his next trip.

Now Joe rides in glory on a motor truck. The anemic, always tired nag is gone. But motor trucks move fast, and our fear is that by the time the small boy has dived into the cellar for his bag of junk and hauled it out into the street, Joe is out of hearing distance. Perhaps the answer is bigger and better bells, jangled automatically by direct connection with the drive shaft. Here is a problem for the best minds of the motor truck industry to solve.

"YOUR story about chaplets," writes L. C., "reminds me of an advertising salesman of my acquaintance who endeavored for almost a year to sell space in a trade catalog to a manufacturer of chaplets. One day he came into my office, wearing a smile of victory. "Well, I landed him," he said exultantly. "But, what a time I had with him! I've worked on him at least once a month for a whole year. I brought up every conceivable argument I could think of. Finally I convinced him I was right. But, say, Louis, what the h—[1]—[2]—l are chaplets anyway?"

A. H. D.

[1]e, [2]l.

THE IRON AGE

New York, June 21, 1928

ESTABLISHED 1855

VOL. 121, No. 25

Welding Ford Rear Axles

Electrical Resistance or Flash Welding Utilized to Make Light, Strong Axle Housing of Steel Sheet, Structural Channel and a Forging

BY FAY LEONE FAUROTE*

A NEW method of assembly has been introduced by the Ford Motor Co. in the manufacture of the Model A—a process of mechanical integration which will go far as soon as its value is recognized by other automobile manufacturers. This is electric welding, not for minor jobs and for petty parts, but for major operations on the motor car. Welding has, indeed, caused the advent of a new day in motor fabrication, a new and surer way of assembly, a method of building up several parts into a unified whole; no later loosening can possibly occur—the assembly is all one piece. A press produces a perfect stamping, the drop forge a perfect forging. There is an initial adjustment or two in a welding machine, pressure, a throw of the switch, a flash, an upset and a weld and lo! the job is done—a permanent combination of metal of finer form and greater strength and at a greater rate of production.

There are 1339 welding operations on the new Model A; 845 of them are spot welding, the rest are electrical resistance flash welds, arc welds and seam welds, with electric resistance flash welding leading in importance and speed. There are on the wheels 61 welds each, brakes 32 welds each, tire carrier two welds, bumper two welds, rear axle housing eight welds, differential housing two welds, radius rod four welds, torque tube two welds, muffler 37 welds, steering wheel four welds, battery support eight welds, equalizer rod one weld, foot pedals two welds, accelerator one weld, starter shaft one weld, breather pipe four welds, fan pulley 22 welds, radiator rod four welds, tie rod two welds, oil pan 23 welds, oil pump one arc weld, gas tank 28 welds, equalizer shaft four welds, body 16 welds. The several examples just given show the wide distribution of the process throughout the chassis, body and accessories.

Electric welding has been adopted only after much experimentation. Welding is the cheapest method of assembly known when using current at any reasonable cost. There is a half million horsepower available at Fordson. This power is being produced under ideal conditions and at a low price. The wide uses of electric welding and electric furnaces, therefore, are natural concomitants of this condition.

Electric resistance flash welding, as used quite widely by the Ford Motor Co., gives a joint which is clean, strong and mechanically well suited for the assembling of those parts which, under use, must maintain their physical integrity. This is merely a special type

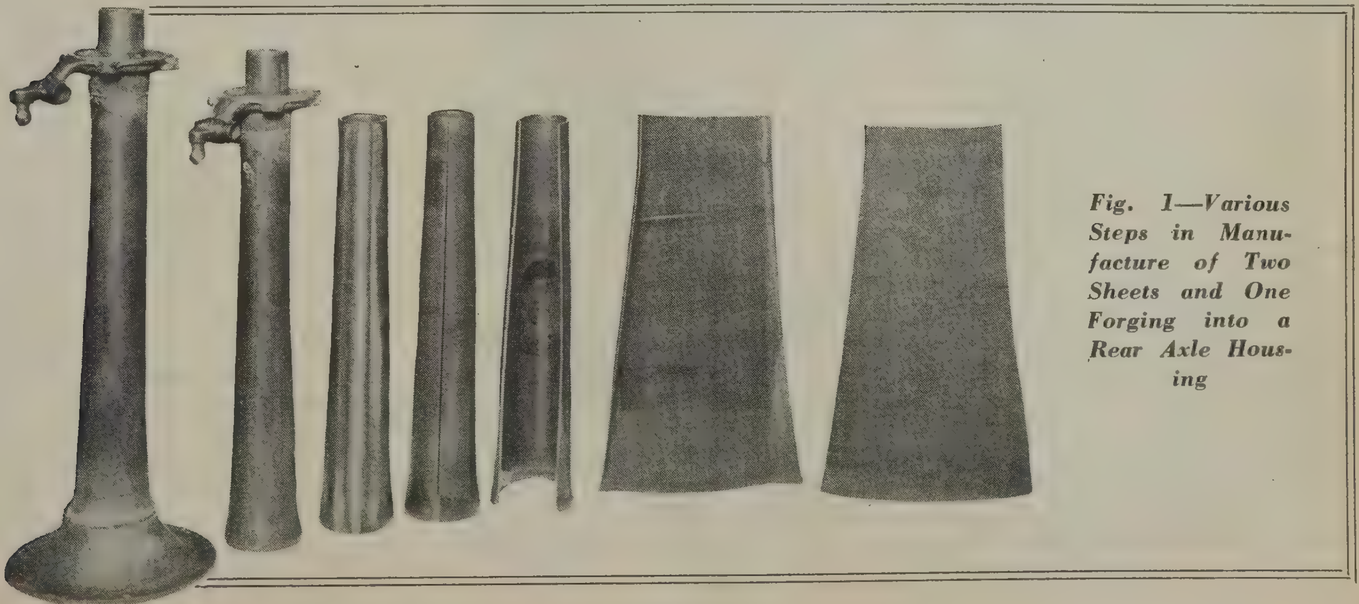

Fig. 1—Various Steps in Manufacture of Two Sheets and One Forging into a Rear Axle Housing

of resistance butt welding, wherein the parts to be welded are gripped in vises or fixtures and complete the secondary coil of an electric transformer. A current of low voltage but high amperage flows across the joint, heating it rapidly to the plastic condition. At this instant, suitably applied pressure forces the two parts together, the burned metal is pushed aside in a fin or flash and a true weld, comparable with that obtained from forge welding, results. The correct welding heat for a flash weld is from 100 to 200 deg. Fahr. less than the melting point of the steel. Under test the fracture occurs not at the weld but somewhere else in the metal of which the part is composed.

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*Mechanical engineer, New York.

Radical changes have been made in many of the Ford welding machines to make the process successful. Speaking generally, the resistance welders take their power from a 440-volt line. A comparatively high secondary voltage is used, the electrodes are unusually husky, the pressure is applied more quickly and many times automatically, there is provision for upsetting sufficient to squeeze out impure or oxidized metal and at the same time prevent further deep-seated oxidation. An upsetting pressure of 5 tons per square inch is used. On many jobs a self-indexing fixture is added. In some machines two welds are made at one time.

Welded Rear Axle Is Unique

Perhaps the rear axle housing is one of the most interesting and outstanding jobs assembled by welding. It is made up of three main parts: (a) the bell, a spun forging, (b) a sheet metal tube, rolled and seam welded, and (c) a combination brake and axle support, a welded forging. These three main units are combined so as to make a single piece of metal of varying physical characteristics suited to their needs, but nevertheless one piece. Then two of these axle housings are attached to the differential housing, in itself a welded part consisting of a bent channel and a forging.

Fig. 1 shows the various steps in the manufacture of the axle housing. A piece of sheet is cut the right shape, the edges are curled, then it is bent to a U shape, and next the U is closed into a tube. All these are press operations. Next the longitudinal joint is welded, then the wheel hub is butt-welded to the small end of the tube, and the bell butt-welded to the larger end. The latter two operations are done in a battery of flash welding machines, illustrated in Fig. 2, which utilize the electric resistance principle already described. (The bell end is an interesting piece, being spun from a hot disk of metal in the machine shown in Fig. 3.)

The differential housing bell weighs 9 lb.; the tube weighs 7 lb.; and the wheel hub weighs 4 lb. The finished job, completely welded with flash ground off, weighs 18½ lb.

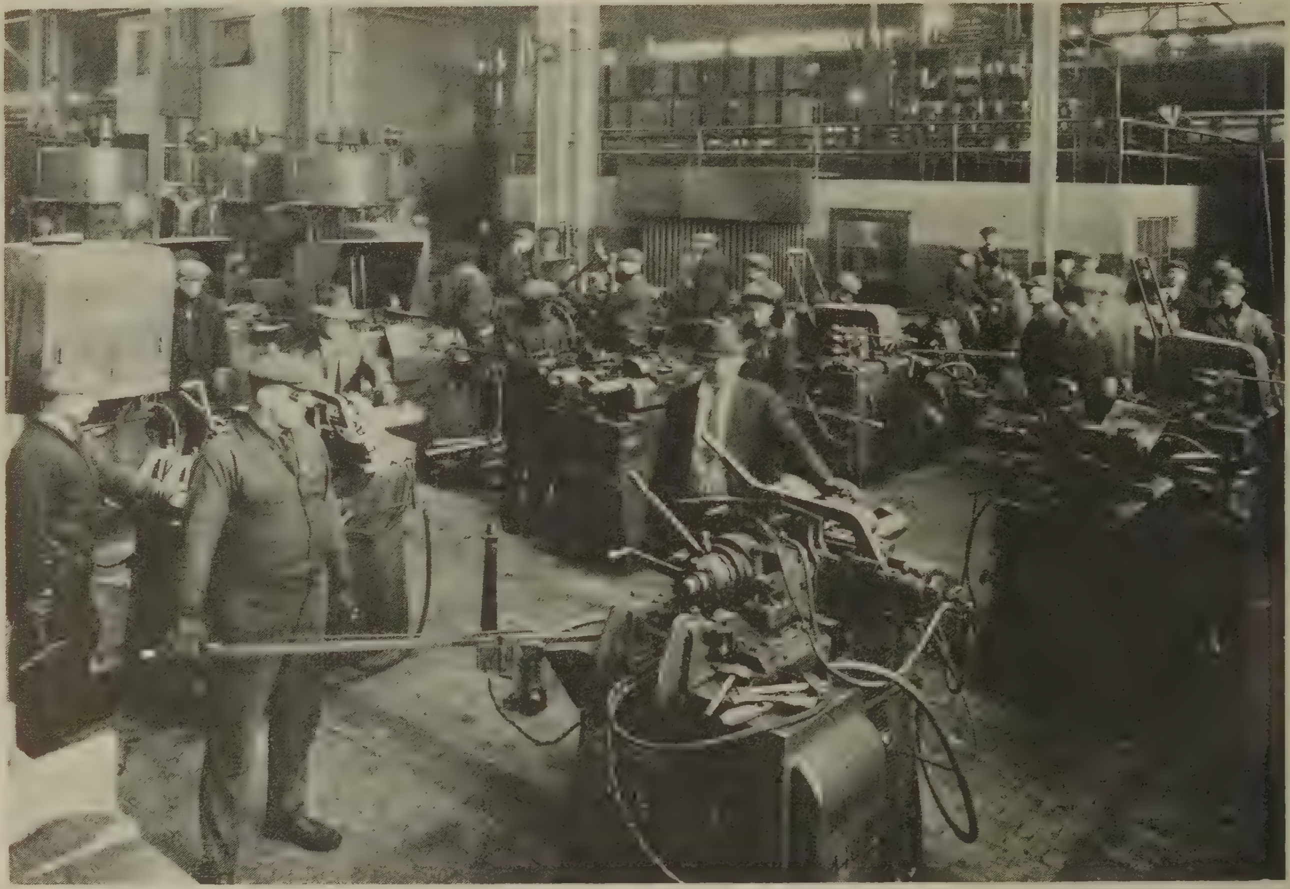


Fig. 2—Battery of Butt Welders for Joining Tapered Tube to Bell Flange and Hub Forging. Note guards attached to machines at rear to protect operators from flying sparks

Differential Housing Also a Fabricated Piece

As stated above, in the car assembly the differential housing is bolted between a right and left hand axle housing. As shown in Fig. 4, this is made of a bent structural shape and a forging. The small channel section is rolled in the Ford 14-in. merchant mill. Fig. 5 shows stock at the left. It passes first through an electrically driven shear and punch (not clearly shown, at the rear center) which blanks to size and pierces two holes in the web. The first die operation (shown at the left in Fig. 5) gives it a wave-like shape; the next machine, with die shown in detail in Fig. 6, curls it into an incomplete circle. Next, the holes previously punched in the web are heated by placing them upon a horizontal pipe and pushing them past a series of burners which heat seven rings at a time. This anneals the metal at those spots so the holes may be flanged inward in the press, shown in the center of Fig. 5, fitted with a punch and die. As shown in the illustration, the completed parts are carried forward to the next operation by hooking on an overhead endless chain conveyor.

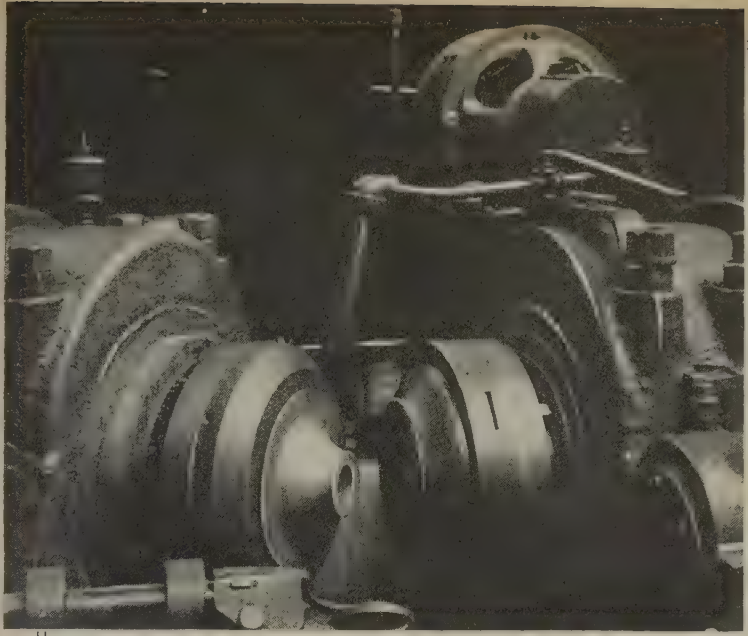


Fig. 3—Hot Spinning Machine for Making Bell End from a Flat Disk (at Left)

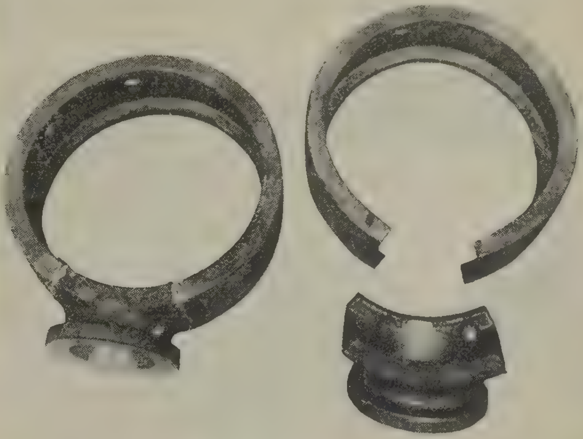


Fig. 4—Bent Channel and Drilled Forging Assembled by Butt Welding into Differential Housing (Below)

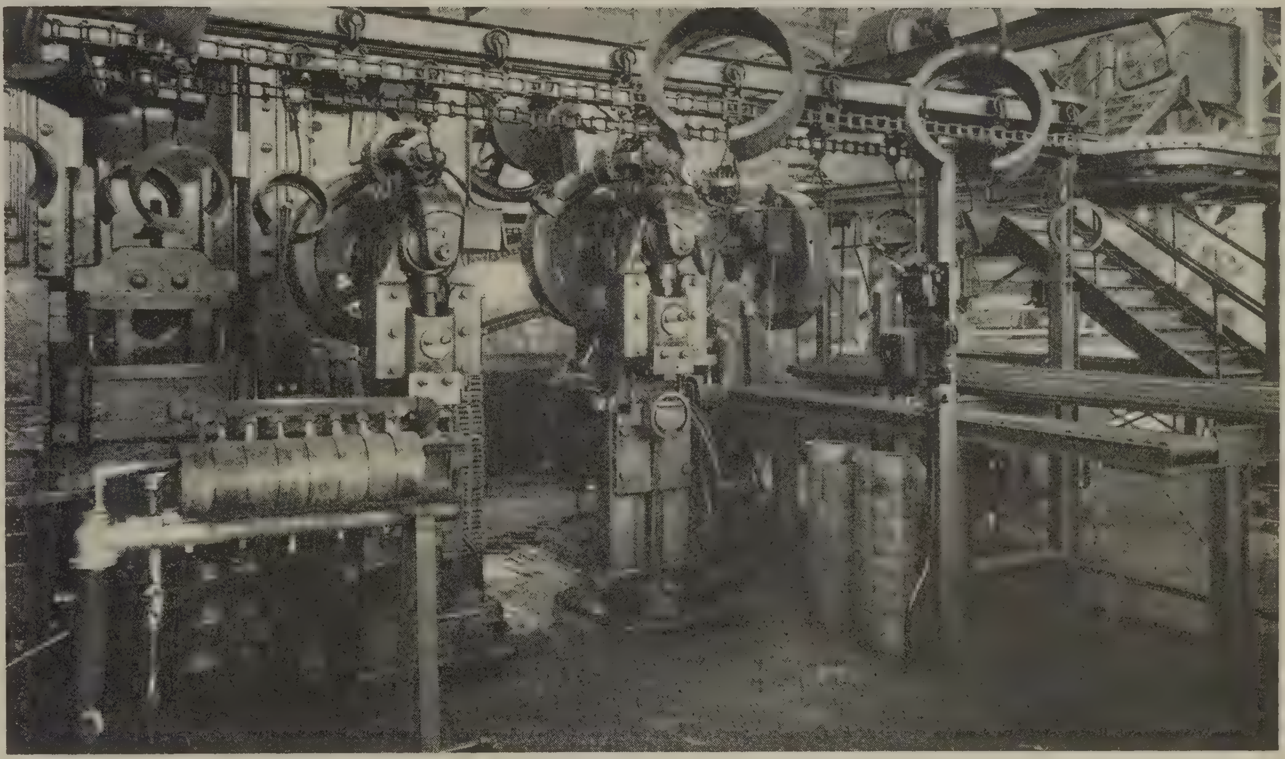
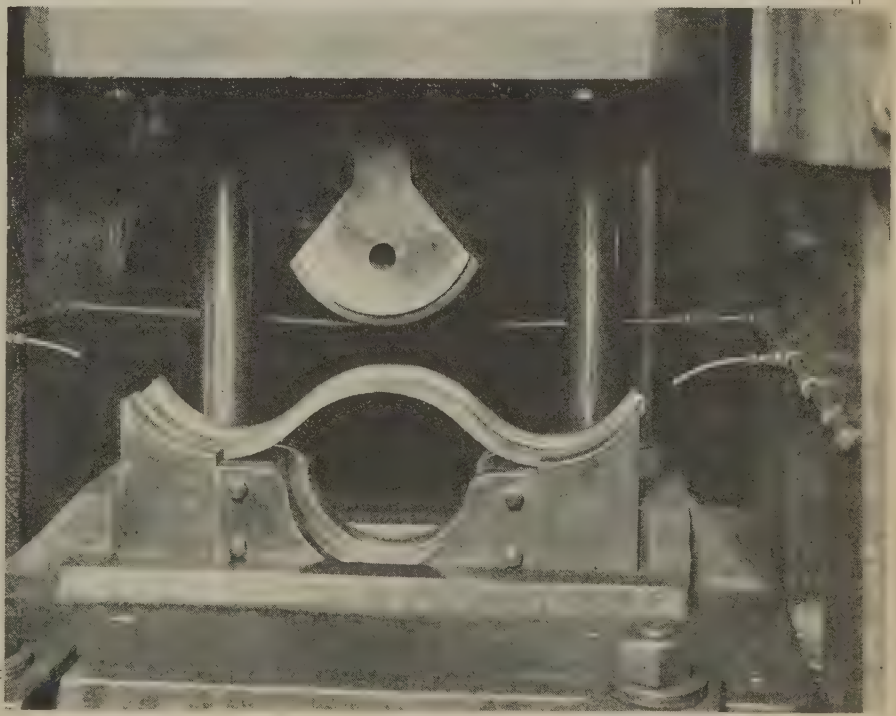


Fig. 5—Fabrication of Channel Rings. Flat stock at right, punch and cut off at rear center (not shown), wavy form pressed at left, curled to ring in press at left center, holes in web annealed in group of gas flames in foreground, flanged inward in punch at center, and completed rings transported on overhead conveyor (Above)

Fig. 6—Press for Curling Channel into Open Ring (at Right)



Differential neck and ring are assembled in a welder (Fig. 7) of Ford design and construction, built in the main tool room at Fordson. The view shows the guard open, ready for loading. The three-quarter circle of channel is placed between the jaws of the welding machine, and the forging is placed above them (just opposite the position of Fig. 4). Turning an air valve clamps the two rigidly in correct position. The door is closed and the handle at the side of the guard thrown down. This closes the transformer circuit; in 5 or 6 sec. the current has brought the pieces to a welding temperature, the machine automatically throws the correct pressure on the top piston, and the upset takes place, forcing out the impure metal and causing the two sections to be joined in the form and manner desired. During the first quarter of the upset the current is cut off. The welding cycle goes automatically to completion, opening the air valve at the end and releasing the clamps. The workman then opens the door, removes the completed part, and reloads the machine.

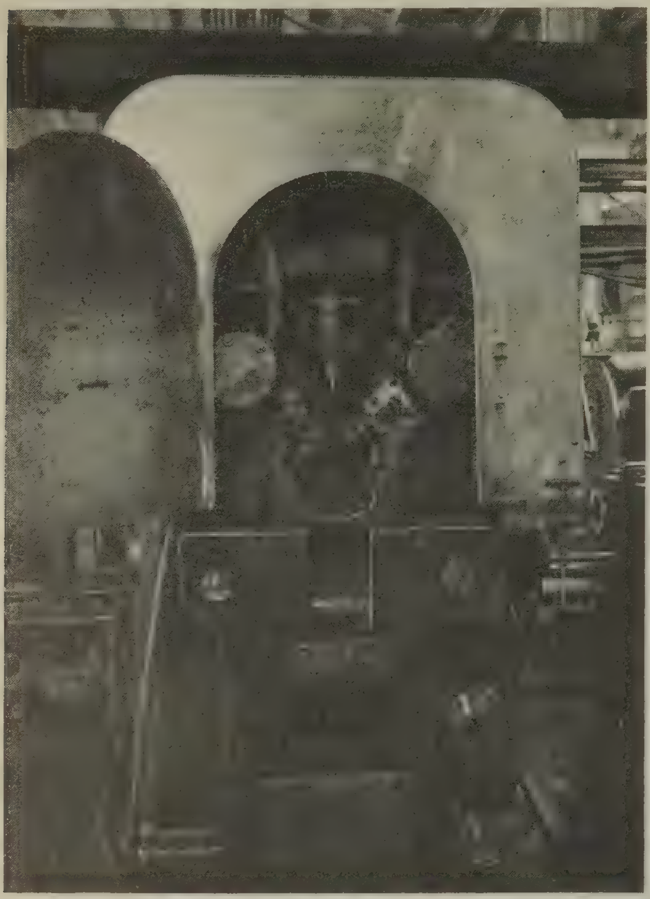


Fig. 7—Clamps on Resistance Welder for Making Two Welds Simultaneously on Differential Housing (above)

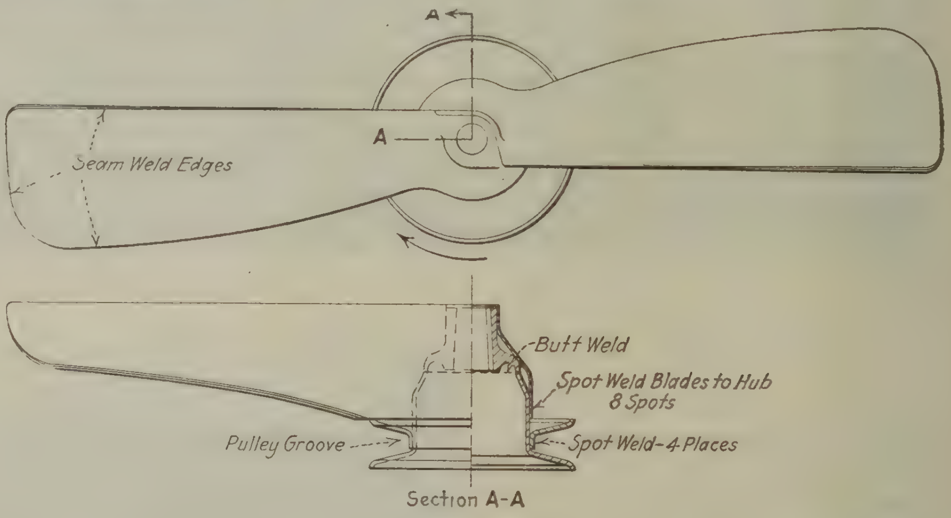


Fig. 8—Assembly Diagram of Fan. One forging and four sheet metal pieces (at Right)

Improvements in this automatic machine over a former type are:

1. Two men are eliminated—one operator runs the machine.
2. One hundred per cent increase in production—two welds made simultaneously on 50 to 60 pieces per hour.
3. Less floor space occupied per unit—75 per cent of the original machine.
4. Welding more uniform—the human element has been removed from the actual welding cycle.

This housing weighs 8 lb. 12 oz.; the area of weld is 2 1/16 sq. in., which is the largest weld in production on Model A at this time.

Muffler Made by Composite Method

An interesting example of composite construction is found on the muffler. In production the outer shell, made of 0.037-in. sheet, is blanked, formed into a tapered tube 30 in. long with a crimped flat side seam. A baffle plate at mid length is held with three rivets. At the large end a bell, which has meanwhile been formed on a punch press, is flash welded to the outer shell, and a small bell end is made and fixed on the other end in a similar manner. An inner perforated tube, 34½ in. long and 2 in. in diameter, is then inserted in a close sliding fit through the central hole in the small bell, central baffle and large end, and spot welded to the small end of the big bell, the other end of the inner shell being left free to expand as temperature rises with the exhaust gases. This inner tube has two interior baffles, properly placed and held in by crimping the tube and spot welding at four places. The inlet and outlet pipes are then flash welded to the bell ends and the muffler is complete. The total weight is 12 lb. 7 oz., and the entire job is done in a remarkably short time. Incidentally, because the muffler is welded into one piece, there is a complete absence of sympathetic vibration or ringing.

Precision Work on Fan

A fine piece of engineering, welded also, is the fan, designed on the principle of an aeroplane propeller, whose pitch, lead, balance and weight are so accurately figured that a precision job of unusual character for such large production is the result. The run-out allowed is only 0.005 in. The hub flange, the pulley body and the belt groove, as well as the two parts of the fan itself, are assembled by spot or seam welding. The fan blade is made of a double layer of 3⅛-in. cold-rolled strip, 16⅜ in. long and 0.0375 in. thick, with minimum elastic limit of 45,000 lb. per sq. in. Each strip is twisted over at its center; one end is formed with the correct curve for the face of one blade, and the other end into the back of the opposite blade. Two of these, assembled and seam welded along the edges, give blades of aerofoil section, with angles of incidence properly modified as the tip is approached. Assembly is as shown in Fig. 8. Seam welding the ends of the blades was illustrated in THE IRON AGE, April 19, page 1082.

Experience with resistance welding would seem to indicate that many of the old forms of assembly will soon be abandoned, and, instead of building up units and bolting them together, they will be designed for union by flash welding. Instead of starting with a large block of metal and cutting off the excess, the reverse is likely to occur. Lighter parts will be made possible, yet having greater strength. Of course, there is much room for further progress. Special welders will be constantly undergoing reconstruction as the development work progresses. But, with the coming of self-indexing automatic welders, the production welder takes an important place among the automatic machine tools of the modern factory.

Fatigue Resistance of Rail Steel

Endurance Ranges from 46,000 to 59,000 Lb. per Square Inch—Rail Steel Responds to Understressing and to Overstressing Like Mild Steel

BY JOHN R. FREEMAN, JR.*

ARRANGEMENTS were made in May, 1926, by the Gathmann Engineering Co., Baltimore, for the appointment of a research associate at the United States Bureau of Standards to study the comparative properties of rails made from rising steel in the standard big-end-down ingot molds and rails from fully piping (killed) steel made in the big-end-up sink-head ingot molds. A total of 21 heats made by the Carnegie and Algoma steel companies were studied. They were made to meet the specification requirements of the Baltimore & Ohio Railroad and the Canadian Pacific Railway respectively, which are substantially the same as the 1925 A.R.E.A. specification. Nine of the 21 heats were standard; the other 12 were killed with aluminum and cast in Gathmann molds.

In addition to the usual tests, which included drop tests, nick and break tests, tensile properties, hardness, impact, "M and O" analyses, macro- and microscopic studies, an extensive series of endurance or fatigue tests was made. All test sections were taken at the hot saw.

The comparative test data from the more usual tests confirmed previous investigations, and indicated that rail steel killed with aluminum can be poured free from pipe and excessive segregation in sink-head molds of the Gathmann type and that the distribution of carbon, phosphorus, sulphur and silicon occurs in the same manner in such ingots as in sink-head ingots of other types. The tensile properties of rails rolled from both types of ingots were found to be essentially the same, but were appreciably more uniform in rails rolled from Gathmann ingots, especially in the A rails. Details of these findings are given in Technologic Paper No. 363 of the Bureau of Standards, entitled "Endurance and Other

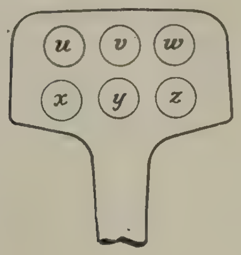
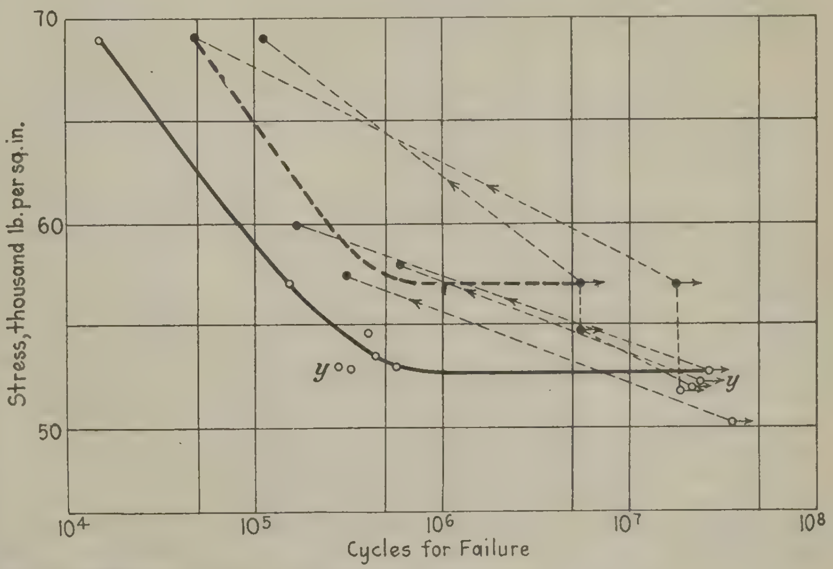


Fig. 1—*Location of Tests in Head of Rail. Two contiguous specimens taken at all positions, except y, served to establish fatigue limits*

Fig. 2, *Below.—Endurance of B Rail from Rising Steel Ingot. Full line for steel in original condition. Dotted line for steel after understressing*



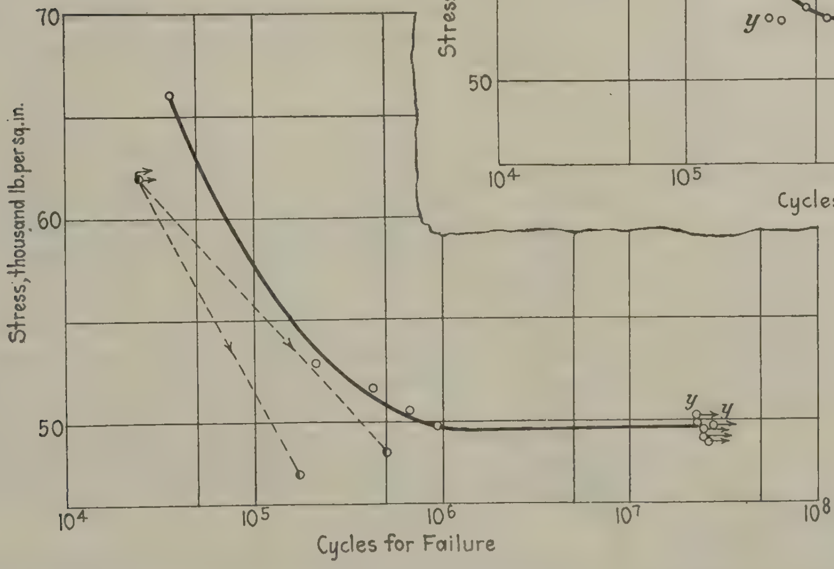


Fig 3, *Left.—Endurance of B C Rail from Rejected High-Phosphorous Ingot (Killed Steel). Full line for steel in original condition. Dotted lines for steel after overstressing*

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*Metallurgist Bureau of Standards, Washington. Publication approved by director.

Properties of Rail Steel," by R. L. Dowdell, William J. Berry and the present author.

Nature of Transverse Fissures

All students of transverse fissure failure agree that it is a special case of fatigue failure in which the crack starts from a nucleus inside the head of the rail and progresses from the inside to the outside, instead of from the outside to the inside, as is typical of most fatigue failures. Controvery centers about the existence of, nature of, and the causes for the nucleus of the fissure and not about the method of propagation of the failure. It was felt that some light would be thrown on this perplexing problem if the endurance properties of commercial rails were investigated—something which has not yet been done, so far as the writer is aware.

Endurance tests were therefore made on specimens from A and B rails representing 11 of the 21 comparative heats. Four of the 11 heats were poured according to standard practice; the other seven were killed with aluminum and poured in the sink-head molds of the Gathmann type. The rotating beam type of endurance test was used, and all tests were made on a 25,000,000-cycle basis.

Table I—Endurance Limit of Steel from B Rails

Heat No.	Endurance Limit B Rail, Lb. per Sq. In.	Rockwell Hardness B Scale	Tensile Strength Average A and C Rail, Lb. per Sq. In.	Endurance Ratio
8 S (a) ..	52,700	98.3	125,750	0.41
9 S	52,200	98.4	113,550	0.46
10 S	47,800	97.9	125,650	0.38
21 S	53,800	98.7	121,500	0.44
1 G (b) ..	50,400	98.5	119,900	0.42
2 G	57,600	99.4	133,200	0.43
3 G	54,200	99.7	131,880	0.41
17 G	49,600	95.5	120,250 (c)	0.40

(a)—S signifies standard ingot.
(b)—G signifies sink-head ingot.
(c)—Test on B rail.

The nature of endurance testing requires several independent specimens to determine the endurance curve. Since there was not sufficient material to take them contiguously along the length of the rail, two contiguous specimens were taken from each position indicated in Fig. 1, giving 12 specimens from each rail.

The specimen marked Y nearly corresponds to the "M" position, where drillings for analysis are taken. It might be expected to contain a greater concentration of inclusions and consequently have inferior fatigue-resistant properties, as it is a well known fact that inclusions may exert a profound influence on the behavior of metals when subjected to reversed cycles of stress. To determine the validity of this hypothesis the endurance curves were determined from the specimens other than the Y specimens. The latter were then run at stresses at or very near the endurance limit. Failure in a relatively low number of cycles indicated a relatively low fatigue resistance. This was more particularly true in specimens from sink-head ingots.

Figs. 2 and 3 are typical results. The maximum fiber stress is plotted as ordinate and the number of cycles for failure as abscissa, the latter to a logarithmetic scale for convenience. The original endurance curve is that designated in the figure by the open circles and full lines. Endurance limits of the rail steel studied, determined from similar curves, are given in Table I and II.

It has been established by many investigators that the endurance limit of steel is more closely correlated with the tensile strength than with any other physical property ordinarily determined. The ratio of the endurance limit to the tensile strength is commonly called the "endurance ratio." These values together with the values for tensile strength and Rockwell-B hardness are also given in Tables I and II for the B and A rails. respectively.

When all tests from both A and B rails rolled from standard ingots are plotted on one sheet, the relatively wide "scatter" of the individual test results indicates an apparently wide variation in endurance properties of rail steels made to meet the same specification requirements. In both standard and Gathmann ingots the minimum endurance values were found in A rails. The minimum value obtained on rails rolled from standard ingots is slightly less than for rails rolled from sink-head ingots. This minimum value of approximately 46,000 lb. per sq. in. represents the endurance limit of steel from 100-lb. section rail rolled from standard ingots. It is the maximum value of repeated stress to which the steel in the head of any A or B rail of the section and composition tested in this investigation may be subjected without danger of failure by fatigue. The maximum value of approximately 53,800 lb. per sq. in. shown by similar rail steel indicates what might be obtained under optimum conditions.

The rail steels tested that were rolled from sink-head ingots could not with safety be subjected to higher repeated stresses in service than the rail steels from standard ingots, because of a low endurance limit shown by one of the rails. It is evident, however, that the maximum value of approximately 59,000 lb. per sq. in. shown by these rail steels is considerably higher than was obtained on the steels from the standard ingot rails. This indicates that under optimum conditions of manufacture killed rail steel cast in sink-head ingots might have higher endurance properties than present-day standard rails made to the same specification requirements.

Effect of "Overstress"

It has been shown by several investigators that if a steel specimen is subjected to a number of reversals of stress *above* its endurance limit, but not sufficient to cause failure, the specimen will then fail in fatigue at a stress considerably below its true endurance limit. The ability of the material to withstand repeated stress has been decreased; its endurance limit has been lowered.

A test was made to determine if this were true for rail steel and the result is given in Fig. 3. Two specimens were first subjected to 25,000 cycles of stress at a stress value of approximately 62,000 lb. per sq. in.—which it was known would eventually cause failure at about 60,000 cycles. The specimens were then subjected to cycles of stress at stresses below the endurance limit, which stress, it was known, would never cause failure were the material in its original condition. But both specimens failed, proving that the repeated overstress had caused incipient damage sufficient to cause a distinct lowering of the fatigue resistance.

Table II—Endurance Limit of Steel from A and AB Rails (a)

Heat No.	Endurance Limit, Lb. per Sq. In.	Rockwell Hardness B Scale	Tensile Strength, Lb. per Sq. In.	Endurance Ratio
8 S (a) ..	(c)	101.4	......	...
10 S	46,200	98.6	132,400	0.35
1 G (b) ..	47,800	99.2	120,400	0.40
3 G	55,000	101.1	129,750	0.42
18 G	57,400	98.9	......	...
19 G	59,200	98.4	134,750	0.44
20 G	53,600	100.3	115,750	0.46

(a)—In view of the relatively large crop from sink-head ingots, one of the manufacturers designated the first rail the B rail instead of A rail. These rails have been called AB rails and classed as A rails.
(a)—S signifies heat poured in standard ingots.
(b)—G signifies heat poured in sink-head ingots.
(c)—Less than 50,000 lb. per sq. in. Insufficient material to complete the test.

Effect of Understress

It is also well known that, if a specimen is subjected to a relatively large number of reversals of stress at a value below its endurance limit, the ability of that material to resist fatigue stresses has been increased—its endurance limit is raised. This effect also holds for rail steels, as illustrated by the dotted curve in Fig. 2.

In determining the original endurance limit five of the test specimens did not fail in 25,000,000 cycles. These five specimens were then considered as a "new" material, and the endurance limit was redetermined. It was found to be approximately 4300 lb. per sq. in. greater than before. The "understressing" had increased the fatigue resistance about 8 per cent.

Relation to Service Stresses

These effects of overstressing and understressing may offer a possible method of determining whether rails in service are being subjected to stresses greater or less than their endurance limit, by determining their endurance limits before and after service. If the endurance limit has decreased, it would indicate that the material has been "overstressed" and, conversely, if it has increased, it would indicate that the material has been "understressed."

There are, of course, certain limitations to this theory, such as the effect of the total number of repetitions of stress in service, the magnitude of the stresses, and their direction, whether in tension or compression.

In cooperation with the Baltimore & Ohio Railroad and the Canadian Pacific Railway endurance tests are now running on specimens from rails that have been in service, made from heats whose edurance properties have been previously determined.

It should be remembered that these endurance limits are based on tests of practically random specimens of steel from certain rails and are not necessarily a representation of the endurance of the rail as a whole. In an endurance specimen of the rotating-beam type, the volume of material that is subjected to the maximum stress is extremely small; in a rail in track, comparatively large. The neutral axis of the test specimen might contain a serious flaw which would not affect the endurance of the small specimen (which fails from stresses at the surface), but, if existing in the rail in track, might seriously reduce its life.

Internal stresses in a rail will affect, also, its endurance properties. When small specimens are cut from a rail and machined, internal stresses present may be relieved or redistributed so that the endurance range of the steel in the specimen may not be the same as it would have been in the rail. Nevertheless, it is reasonable to begin the study of the endurance properties of rails by first determining the endurance properties of the steel in the rails, using the most common type of endurance test so that comparison may be made with available data on other types of steels. It may be desirable eventually to determine the endurance properties of rails, making the tests on the full section of the rail. Before such tests are made, a more complete knowledge should be had of the magnitude and distribution of stresses in rails under all conditions.

Economic Value of Safety Work

How It Pays in Direct Savings and Indirect Advantages—Morale an Important Factor

BY L. H. BURNETT*

TWENTY years ago Judge Gary, chairman of the United States Steel Corporation, called together the casualty managers of the larger subsidiary companies of that organization. These casualty managers were in daily contact with all the loss, suffering and sorrow caused by industrial accidents. They were thoroughly familiar not only with the direct results of industrial accidents but also the indirect results—loss of life and limb, loss of earning power of the bread winner, widows and children left without adequate support. The only thought at that meeting was that too many men were being hurt and killed in industry and that means must be found for preventing, or at least decreasing, the number of accidents.

It was well understood that such a campaign would be costly and expensive. But, whatever the cost, it was determined that such accidents should be prevented in so far as possible. And this has been the spirit of the safety campaign from its inception. It has been firmly based upon the humanitarian motive. There was no thought of economic gain or advantage until long after safety had been sold to thoughtful employers and employees. If our plea for safety had been based upon economic grounds it might have fallen upon deaf ears —it might not have received the hearty support of the press. But, based upon humanitarian and sentimental reasons, it naturally attracted the attention and support of the public.

It is difficult, if not impossible, completely to separate the humanitarian from the economic side of safety work. The two go hand in hand. The underlying motive has been and always will be the humanitarian side. But experience has taught us that many economic advantages inevitably flow from intensive safety work.

Considered solely from an economic standpoint, the advantages of safety work or accident prevention in industry are both direct and indirect. The direct advantages are obvious and the savings can be measured in dollars and cents.

Every accident prevented means a saving of just so much in compensation and necessary medical care and attention. Whether an employer carries compensation insurance, State insurance, or assumes his own risk, the benefits derived from prevention of accidents are substantial and immediate. The experience of a large foundry company with an average working force of 500 men affords an excellent example of money savings due entirely to intensive safety work.

Time lost due to accidents in 1925 was 62½ days for each 100 tons of castings shipped. The cost of accidents was 66c. out of every $100 of payroll. In 1926 the lost time was 30 days per 100 tons of castings shipped; the accident cost being 19c. per $100 of payroll.

In 1927 an intensive safety campaign was conducted. As a result the time lost was ½ day per 100 tons of castings shipped; costing 1c. per $100 of payroll. Actual reduction in total costs, due to accident prevention, is indicated by the following figures:

1925—cost of accidents was	$7,033.03
1926—cost of accidents was	3,132.88
1927—cost of accidents was	121.50

A public utility employing an average force of 1500 men, by reducing accidents, cut its compensation costs from 30c. per $100 of payroll in 1926 to 6½c. in 1927. A large steel works employing 5000 men cut compensation costs from $24,378.89 in 1926 to $10,407.45 in 1927, showing a saving of $13,971.44. These figures do not include savings due to decrease of medical and hospital service.

One of our largest car and foundry companies spent $1,000,000 for accident prevention in 14 years and saved $2,700,000 in losses and other costs. It is said that the United States Steel Corporation spent $9,763,063 in safety work in 10 years and showed an actual saving of $14,609,920.

In view of these records there can be no doubt that accident prevention work does pay from a purely economic standpoint. And let us not forget that these figures show only the direct savings in compensation. They do not reflect the many indirect benefits, not only to the employees but to the public at large.

Safety Work an Aid to Production

When intensive safety work was first begun there was a general feeling among industrial leaders that it would seriously interfere with and hamper production. Only after many years were safety engineers able to demonstrate that accident prevention work, far from being a hindrance to full production, was and is an aid. For the safety campaign has long since graduated from mere safeguarding of dangerous machinery to the position of an ever increasing and active educational force in industry. It demands the thought and attention of every man in the organization.

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*Vice-President, Carnegie Steel Co., Pittsburgh. This is abstract of an address before the Pennsylvania Safety Congress, at Philadelphia, on March 21.

A safe plant must be a clean and orderly plant, and cleanliness and orderliness have been found necessary for good production. A safe plant must be well lighted and have dark and dangerous places eliminated. It has been demonstrated time after time that good lighting is an actual aid—in fact, absolutely essential—to good production.

Absence of workers due to injuries causes changes in personnel requiring the hiring and training of new men. The bare cost of hiring a new man will run from $30 to $80. Such accidents disrupt the morale of an organization. Accident prevention conserves the time, energy and physical fitness of employees. It produces a more stable and contented working force, and "a stable, contented and highly efficient working force is the fondest dream of every manager, every department head and every foreman."

A recent survey of 14,000 industries employing 2,500,000 workers, comparing results of 1922 with 1925, shows 12 per cent increase in production and 18 per cent decrease in accidents. Blast furnaces show an increase in production of 60 per cent in the last 10 years and a 50 per cent decrease in accidents.

Today accident prevention is just as much a business proposition as production. No plant can truthfully be said to be on a sound business basis until safety is as much a matter of daily consideration and practice as quantity and quality of production. And the average mill worker today can buy life insurance at the same rate of premium as the office worker or other preferred risk. Before we had accident prevention, he was compelled to pay a much higher rate.

In fact, it is undoubtedly true today that, whether we look at accident prevention from the humanitarian standpoint or from the economic side, we can safely say that it pays; that it is worth while, and that it is worth much more than the effort and energy expended or the dollars and cents invested.

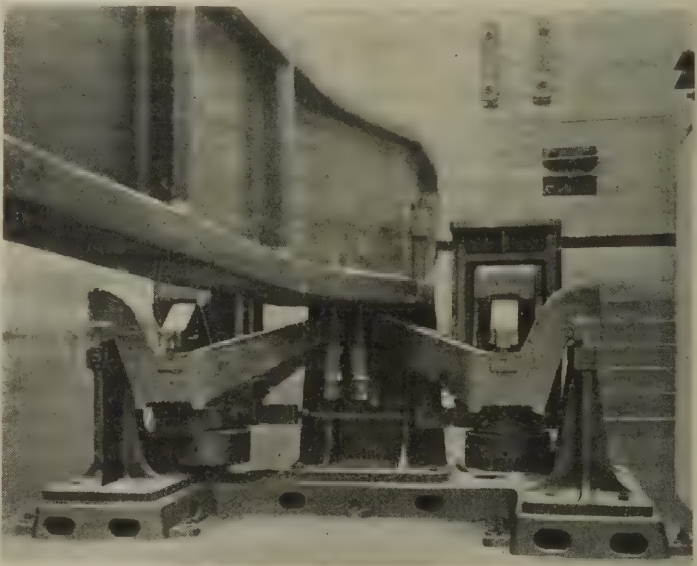
WEIGHING MOLTEN IRON

Heavy Track Scale for Hot-Metal Cars of Large Size

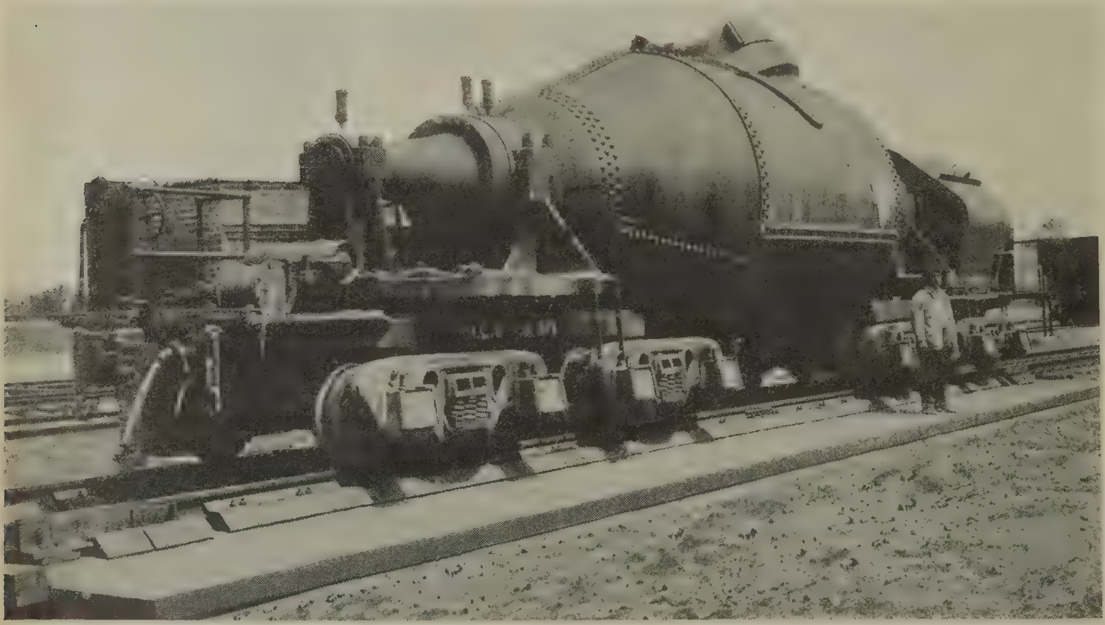
INSTALLATION of an 800,000-lb. beam capacity, two-section, knife-edge scale for weighing molten-iron cars has recently been completed at the plant of the Hamilton Coke & Iron Co., Hamilton, Ohio. Standard-gage track is used and the scale, which has a weigh rail 56 ft. long, is built in two sections. The rail stands are supported by steel cross ties. The deck of ⅜-in. steel plate is covered with firebrick and a special type of storm guard protects the openings made by the rail stand housings.

Four primary or main levers transmit the load to a transverse extension lever, which is connected to the weigh beam. The beam is type registering and double slides have been provided by the builder, Fairbanks, Morse & Co., St. Johnsbury, Vt., so that weights can be taken to an accuracy of 20 lb., if required.

Although this scale was built primarily to weigh molten iron, it will be used also for general service on inbound and outbound freight. Pugh-type hot-metal cars are used to transport molten iron a distance of 12 miles to open-hearth furnaces at Middletown, Ohio. Each car has a capacity of 150 tons and the weight of a car and its full load is 343 tons. This load is carried on a wheelbase of 45 ft. 6 in., with a maximum axle load of 85,600 lb. Each car is built with two eight-wheel trucks. In addition to providing transportation for hot metal, these cars also furnish hot-metal storage capacity.



Lever Construction (Above) Is Unusually Heavy. This scale is of the two-section, suspension bearing, knife-edge type



The Deck of This Scale (Left) Is Overlaid with Firebrick. The molten-metal car with full load weighs 343 tons

Ways to Improve Gray Iron Castings

High Strength of Super-Heat or "High-Test" Irons Points to Recapture of Lost Markets—High Malleability Attainable Also

BY DR. RICHARD MOLDENKE*

RECENT achievements in the improvement of cast iron, brought out more particularly by German metallurgists, at least partially explain why marked increases in strength are obtained without serious reductions in the carbon content of cast irons. The explanation is based upon the influence of temperature on the physical condition of the graphite precipitated during the change in the iron from the molten to the solid phase. It must be patent that the slower the cooling—or the interval of time between the liquid and the solid state—the larger the crystals formed in a solution of a given material sufficiently concentrated to contain nuclei of that material as starting points of such crystals. And, per contra, the faster the cooling rate, or the shorter the interval of time in setting, the smaller the crystals of the resulting solidified mass. Graphite forms no exception to the rule, for, under ordinary conditions of melting, with slow cooling of the molten carbon-iron solution when poured into dried or even heated molds of a low heat-conducting power—such as of sand—the crystals formed will be very coarse; whereas, the same iron poured into molds of high heat-conducting power—such as metal—will not contain any precipitated graphite as fine crystals.

Superheating Destroys Graphite Nuclei

Naturally, to obtain any graphite crystals at all, there must be present, or formed, graphite nuclei or starting points for crystals in the liquid metal either before or during the period of setting. The size of the crystals will depend upon how much time elapses between the commencement of crystal growth, out of the nuclei of graphite, and solidification. The importance of the recent research developments lies in there having been located in gray cast iron, melted under ordinary conditions of melting and superheating, an abundance of microscopically small graphite nuclei—nuclei which serve as the starting points of coarse crystal growth when the metal freezes and give a weak cast iron. Further, by superheating the molten metal to extremely high temperatures the graphite nuclei disappear completely by solution in the iron, and in the subsequent cooling the growth of large graphite crystals cannot take place with no nuclei present.

Only when considerably cooled—in fact, actually supercooled below normal freezing ranges—will graphite nuclei form again that could serve for the growth of large crystals, were there time to allow this before the metal is solid. As a matter of fact, when the graphite nuclei do form in such a super-cooled molten iron, the temperature will have dropped so close to the freezing point that there is time only for the formation of very fine crystals, and a strong metal results. Hence an iron melted under conditions of superheat, far beyond the ranges of ordinary practice, may give castings perhaps twice as strong as the same iron melted with the ordinary degree of superheat.

The above statement may be proved by melting a charge of gray cast iron in a crucible or in a resistance electric furnace. When just liquid, a test piece is poured with one end against a chill. Photomicrographs made of the hard and the soft ends of the casting will show the graphite nuclei in the white portion of the metal, and the large graphite crystals in the gray. If, now, the remainder of the charge is successively heated up a hundred or more degrees Fahrenheit, cooled down to the first pouring temperature, and corresponding test pieces and photomicrographs are made, the graphite nuclei in the chilled portions will be found gradually to disappear as the high temperature ranges are reached, whereas in the soft portions, similarly, the crystals of graphite will have become smaller and smaller. If enough metal is used to permit the making of tensile test specimens in sand molds in each case, the strengths will be found to go up as the degree of superheat rises.

There is doubtless an additional explanation for the strength increase incident to melting under conditions which give high superheat. At temperatures equal to those of molten steel, an iron containing over 2.50 per cent total carbon and possibly as much silicon, with manganese up to 1 per cent, can hardly tolerate the presence of dissolved iron oxide. This will certainly be reduced, just as when adding ferromanganese to a "blow" of Bessemer steel to deoxidize it; and a thoroughly deoxidized cast iron will gain correspondingly in quality. Even in ordinary foundry practice, it is known that melting very hot means less sulphur picked up from fuel, less chances for blow-holes and generally better castings. In fact, the rule is to pour as hot as the sand will stand it. Again, foundrymen know that the hotter the metal, the deeper the chill—especially when running low-silicon irons. Doubtless the disappearance of the graphite nuclei under conditions of extremely hot melting helps to retard the formation of large graphite crystals, and therefore the metal can chill deeper. It is gratifying to have at last an explanation of the phenomenon of higher combined carbon results from hotter iron, not only in the case of chilling irons, but in general foundry practice.

Hold Superheated Metal Before Pouring

It does not follow, however, that in cupola melting, when operating under low degrees of superheat, soft iron will result because of the ready growth of large crystals of graphite from the nuclei present in the molten metal. Melting cold may result from an unduly low fuel bed, and this causes an oxidation of the iron. This, in turn, results in a higher freezing point, reducing the normal interval of time for crystalline graphite growth before the metal solidifies. Hence hard iron. In the case of furnace melting, however, cold molten iron does mean softer metal, for in malleable castings practice, with air furnace melting, an iron with about 0.75 per cent silicon can give white cast iron when dipped from the hot surface of the bath, and gray iron when tapped out from the colder bottom. This occurs if the samples are taken just before the entire bath is hot enough for tapping out, and if the test pieces are of large enough cross-section.

A further point of practical importance is learned from the researches under consideration. Melting under conditions of extreme superheat on the part of the metal produced necessitates that it be held, before pouring into the molds, until it can cool to the desired pouring temperature. If the metal were poured into the molds at once, allowing the sand body to absorb and dissipate the surplus heat, not only would the sand surfaces suffer, but the added heat to be cared for by the sand would so retard the freezing of the iron that large crystals could grow from the nuclei finally formed during the cooling, even if the entire graphite of the mixture—that is, including the residual graphite nuclei—had been dissolved in the high-temperature melting. Hence this intensely superheated molten iron should be allowed to dissipate into the air all heat above regular pouring temperatures before being poured off into molds.

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*Watchung, N. J. Abstract of a paper presented at the European Foundrymen's Congress, Barcelona, Spain, in April.

In ordinary foundry practice, the molder, when he receives molten iron and he thinks it too hot to use, instead of holding it to cool, often adds a piece of scrap or some of the gates or sprues. This saves him time. Be it noted, however, that if the theory of crystal growth from graphite nuclei is correct, the molder, besides cooling his metal, will have a goodly quantity of graphite nuclei from the cold gray iron scrap added, which his now colder iron is not able to dissolve. The result will be that he has reduced the quality of his dearly won extremely superheated iron to that of an ordinary melt.

Composition of High-Test Irons

The foundryman, hearing of the wonderful strengths and other qualities in cast iron obtained as the result of the recent researches, naturally wishes to approach, if not actually duplicate, them in his own establishment. He first looks up the compositions of these high-test cast irons and finds them high in silicon, at the upper ordinary manganese limit, low in sulphur and phosphorus but with the total carbon quite low so far as ordinary means of obtaining this is concerned, 2.80 per cent total carbon for cast iron not being easily obtained from the cupola. It can just be done in the air furnace, using the maximum percentage of soft steel scrap—about 35 per cent. The open-hearth and the electric furnace can handle the situation readily.

Most foundrymen, however, have only the cupola to melt with, and when it is recalled that steel melted in the cupola absorbs about 2.75 per cent carbon from the fuel, to get the desired 2.80 per cent total carbon in the castings would mean a practically 100 per cent steel mixture. Since, however, with the aid of ferroalloys, particularly in the cement briquetted form—there are also other ways to protect the descending ferroalloys, such as mixing with clay and vitrifying, or mixing with cast borings and inclosing in steel containers—there is no reason why every foundryman should not at least improve his work by using high steel scrap mixtures, or by using steel altogether for his very special castings. With high steel percentages, it is necessary to have enough silicon and manganese available while melting, as, under the very high temperatures involved, there is a chance of oxidation from the carbon dioxide of the cupola gases and, without the deoxidizing action of the two elements in question, a sorry metal would come out over the spout.

To get somewhat closer to the melting details, the first question to consider is how to obtain from the cupola the very high temperatures desired for the molten metal. This involves a sacrifice in fuel, and perhaps the best example of actual operation is to be found in making large radiators, for which the molten iron required must be snow-white, to avoid heavy losses through "cold-shuts" in so thin a class of pressure castings. Here, melting has to be done with a moderate blast volume—say that giving about three-quarters of the normal hourly tonnage capacity. The fuel bed must be high enough to allow a time interval of 10 to 12 min. between putting on the blast and observing the molten metal running from the open tap-hole over the spout and into the receiving ladle or forehearth. Furthermore, even with the best of coke, the ratio of metal to fuel between charges should not be more than 8 to 1 and, with high ash cokes which are rather friable, this may have to drop to 6 to 1. The metal charges must be small enough to hold the intermediate coke charges down to a layer about 4 in. thick, and charging must be done carefully to get level layers. If, after the cupola has been fully filled, this can be let stand for an hour or more, to warm up well, the first iron will be hot enough to use, and, very shortly after starting, the molten metal will come out extremely hot.

Results of Alloy Additions

Until the recent developments in "high-test" cast iron, the only apparent avenue of betterment of gray iron castings seemed to lie in the addition of such metals as nickel, chromium, vanadium, etc., or the production of alloy cast irons. These could be produced either by direct addition to the ladle or cupola, or preferably as component elements of the pig irons charged. The quality of the castings was thus unquestionably improved either for strength or wearing qualities. However, the amount and condition of the graphite in cast iron will always have the most powerful effect upon its physical qualities, and giving this more weight when judging erratic alloy addition results will explain them more satisfactorily.

Some of the actual figures involved will be of interest. For very "high-test" cast iron, tensile strengths hovering around 60,000 lb. per sq. in. have been regularly attained. Transverse strengths almost double the normal, with more than double the deflection, are common. The addition of nickel, chromium, etc., has added another notch to these values, 65,000 lb. and even more being reputably reported. It would appear, then, that, with our present knowledge, cast iron can be made strong enough to recapture much of the market lost to the steel and the malleable casting, and the producer of iron castings should lose no time in doing so.

A Development Which Has Promise

But there is still another development in cast iron which should prove valuable to the foundryman. A considerable reduction in the silicon and manganese content of cast irons, leaving the total carbon, sulphur and phosphorus as given in the previous typical iron, together with the extremely high degrees of superheat given in melting, when poured into castings, gives a class of cast iron not quite so strong as those previously mentioned, but peculiarly amenable to an annealing process which converts the comparatively higher combined carbon contained to the temper-carbon variety without special interference by the finely crystalline graphite present. Thus, a fine-grained gray cast iron can be sent partly on the way of the malleable casting, and light castings with around 1.50 per cent silicon, over half their carbon as fine graphite and with low manganese can be readily twisted. In other words, the material has malleability and can be elongated. Large and heavy castings practically anneal themselves, since only a few hours at 1550 deg. Fahr. are required to accomplish the combined carbon conversion. Thus is another avenue opened to the gray iron founder to retrieve his losses.

Advances Summarized

Reviewing the achievements in the scientific control of cast iron for the last three decades, for they fall within practically that period, it would almost seem that the most important advances have been made only recently, and by scientists rather than men in active operation of foundries. The search for a cast iron which will not "grow" under alternating heat applications, and other problems of a similar nature, gave the necessary impetus which brought the highly important developments. This is an argument for more extended and, at the same time, cooperative research on cast iron in its various branches, and the several movements going on at the present time in a number of highly industrial countries should be encouraged and financed. At the same time, some method of information exchange should be arranged for which would limit duplication of effort and extend the usefulness of the discoveries that are certain to be made.

Safe Loads for Steels Working at High Temperatures

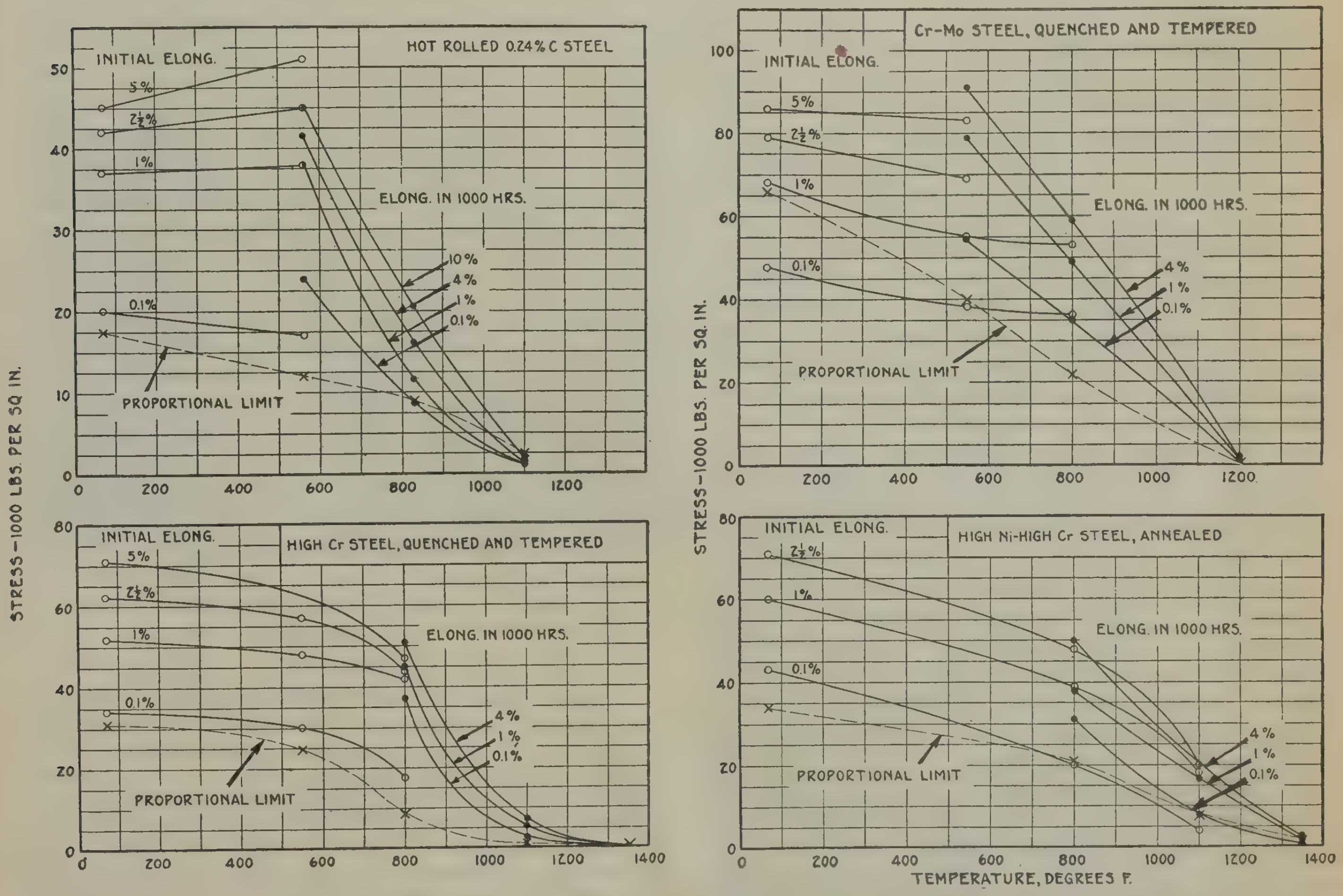
Bureau of Standards Publication Gives Data Whereby Superheated Steam or Chemical Equipment May Be Designed

It is generally understood that the tensile strength of steels as determined in the ordinary way at room temperature gives little information as to the ability of the metal to withstand stress at elevated temperatures. There has consequently been much study given to the tensile properties from 600 to 1400 deg. Fahr., in view of the decided trend in the power and chemical industries toward higher working pressures and temperatures. Two general types of tests have been performed. In one, the load is applied step by step as rapidly as the corresponding extension can be measured on the hot specimen; in the other, a quiescent load is left indefinitely, and observations are made at daily intervals to see whether gradual extension or "creep" is occurring.

Much work, done principally on the former plan, is reported by H. J. French, H. C. Cross and A. A. Peterson of the United States Bureau of Standards in Technologic Paper No. 362. Their equipment (described in Technologic Paper No. 296) was capable of maintaining the tension specimen at a uniform and stationary temperature to within plus or minus 5 deg. Fahr., and extensions were read to four millionths of an inch. Extreme accuracy is necessary for this work, because a variation of ½ deg. Fahr. will cause measureable changes over a 1-in. gage length. Furthermore, since the elastic limit is low at high temperatures (on the order of 1000 lb. per square inch), the total deformation over a 2-in. gage length is only 0.00002 in. The limit of proportionality between the observed stress at such a low strain can be determined only when the limit of error in each determination is very small.

Five steels were studied: a 0.24 per cent carbon boiler plate, a quenched and tempered chromium-molybdenum steel, an annealed low-tungsten high-speed steel, a quenched and tempered 20 per cent chromium steel and an annealed austenitic nickel-chromium steel. Results for four of these are shown in the diagrams.

It will be observed that each diagram has curves of two different families, one showing performance at relatively low temperatures (where the cold work done on the bar by stretching it past the elastic limit strain-hardens the steel and automatically raises its strength sufficiently to carry the imposed load indefinitely) and the other indicating the relationship between time and the loads which cause continuing creep. For instance, the proportional limit of boiler plate is about 12,500 lb. per square inch at 500 deg. Fahr. Any load below that will be carried indefinitely at that temperature and will not cause permanent set. If a boiler steel under a heat of 500 deg. is stressed at 17,500 lb. per sq. in., the curves show it will acquire a permanent set of 0.1 per cent, but it is still a stable structure. At 800 deg. Fahr., however, this steel must be stressed considerably below 10,000 lb. per square inch if it is to remain in service indefinitely; if it carries a load of 22,500 lb. per



Loads Required to Cause Either Permanent Sets or Continuing Creep in Steels at Elevated Temperature square inch at that temperature, it will stretch 10 per cent in 1000 hr.

The authors recommend that ample margins of safety be used for figures taken from these curves because the experimental work underlying them is none too extensive, and the high-temperature portions are based on the unproved assumption that creep as determined at relatively short time intervals continues indefinitely at the same rate. But the values are conservative when compared with results of other investigators. J. L. Cox, of the Midvale Steel Co., has recommended that 80 per cent of these figures be used for design values to allow for unavoidable variations in quality of metal and accuracy of machine work. He also thinks that a container which exhibits creep should be replaced when it acquires a permanent extension of 8 per cent. (See THE IRON AGE, Dec. 15, 1927, page 1662.)

Railroads Spent $432,604,000 for Iron and Steel

Nearly One-Fourth of It Went for Rails in 1927—Locomotives and Cars Cost $30,000,000 in First Quarter

WASHINGTON, June 16.—Class I railroads of the United States in 1927 directly expended $432,604,000 for iron and steel products, according to an annual statement issued by the Bureau of Railway Economics. This outlay was 31 per cent of total expenditures of these railroads last year for materials and supplies of all kinds. Only in the case of fuel were expenditures for iron and steel exceeded, the total for coal and fuel oil being $438,821,000, or 31.4 per cent of the total outlay of $1,395,928,000. The fuel purchased consisted of 130,190,000 net tons of bituminous coal, 3,199,000 net tons of anthracite and 2,765,259,000 gal. of fuel oil.

Expenditures for iron and steel last year, however, as in the case of other lines, were not so great as they were in 1926, when, out of a total of $1.559,032,000, purchases of iron and steel amounted to $507,302,000. In 1925, iron and steel purchases aggregated $419,255,000; in 1924, they were $365,610,000; in 1923, they amounted to $464,955,000. Detailed railroad expenditures for iron and steel in 1927 were as follows:

		Per Cent of all purchases
Steel rails (new and second-hand, except scrap)	$101,567,000	7.28
Wheels, axles and tires	47,435,000	3.40
Frogs, switches, crossings, track fastenings and bolts, spikes, tie plates, rail anchors, etc	72,032,000	5.16
Iron bridges, turntables, structural steel, bar iron and steel, forgings, fabricated and unfabricated shapes and pressed steel parts	51,267,000	3.67
Flues and tubes for locomotives and stationary boilers	8,191,000	0.59
Telegraph and telephone, interlocking and signal material	25,300,000	1.81
Bolts, nuts, washers, rivets, springs, etc.	19,064,000	1.37
Locomotive and car castings, beams, couplers, frames and car roofs	62,294,000	4.46
Machinery, boilers, repair parts and all other iron and steel products	45,454,000	3.25
Total iron and steel products	$432,604,000	30.99

The bureau quoted the estimate of THE IRON AGE (Jan. 5 issue) that the railroads in 1927 absorbed 6,125,000 tons of steel, amounting to 19 per cent of the total. Rail purchases by the carriers in 1927, the Bureau statement said, amounted to 2,278.000 gross tons, or 86.7 per cent of this class of distribution. With the exception of 1926, the 1927 rail purchases were greater than in any recent year, and were nearly 41 per cent of the steel tonnage bought by the railroads.

Growth in Heavier Rails

After quoting THE IRON AGE, showing percentages taken by the railroads in 1927 of each form of steel distributed, the bureau statement pointed out that during recent years heavier steel rails have been coming more and more into use to meet conditions improved by heavier and denser traffic. Rails of 100-lb. section and over rolled in 1927, the statement explained, were 68.8 per cent of the year's production. In 1926 the corresponding proportion was 61.12 per cent; in 1925, 58.76 per cent; in 1923, 50.47 per cent.

Recognizing the growing importance of extra heavy rail sections, it was pointed out, the American Iron and Steel Institute has made a separate grouping of rails weighing 120 lb. or over. The total for 1927 is given as 617,524 tons, or 22.01 per cent of all rails produced last year. This action, it is added, "recalls that of 13 years ago, when for the first time the 100-lb. rail was segregated from the 85-lb. and over classification, previously the heaviest reported."

Gross capital expenditure by the railroads during the first quarter of 1928, for new equipment and for additions and improvements to property, amounted to $128,428,000, a decrease of $26,594,000 from the corresponding quarter of 1927, and $37,327,000 less than that for the corresponding period of 1926. Of the capital expenditure during the first quarter of this year equipment made up $33,016,000, divided as follows: Locomotives, $10,493,000; freight train cars, $13,601,000; passenger train cars, $5,785,000; other equipment, $3,137,000. Expenditures for roadway and structures totaled $95,412,000, divided as follows: Additional track, $24,744,000; heavier rail, $9,621,000; additional ballast, $1,922,000; shops and engine houses, $7,964,000; all other improvements, $51,161,000.

For the various non-ferrous metal products needed in railroad operation, such as brass, copper, zinc, lead, etc., the railroads spent $55,668,000 in 1927, or 8.8 per cent less than in 1926.

Laboratory Tests of Railroad Bearing Bronzes Inadequate

No one of the selected laboratory tests, consisting of wear, tension, impact and pounding, can by itself be expected to yield information which is adequate for general comparisons of the various railroad bearing bronzes now in use. This is revealed by a study made by the Bureau of Standards, Department of Commerce. According to H. J. French, who was in charge of the work, the bronzes fall into certain general classes, as regards their wearing and mechanical properties, and each group shows superiority for certain types of service.

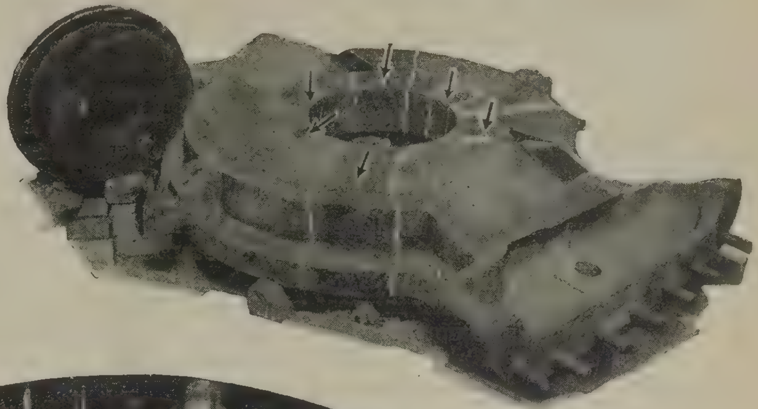
This work was undertaken by the bureau in an effort to secure data which would be necessary if any attempt were made to simplify these specifications, and also because it appeared highly desirable to study the properties of the various railroad bearing bronzes now in use. The study covered wear and mechanical properties at various temperatures.

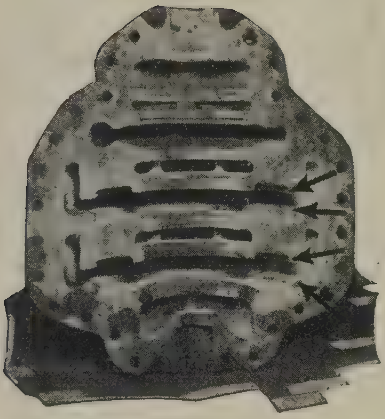
There are almost as many specifications for railroad bearing bronzes as there are railroads. So far as can be judged from laboratory tests, existing specifications can be simplified, Mr. French states.

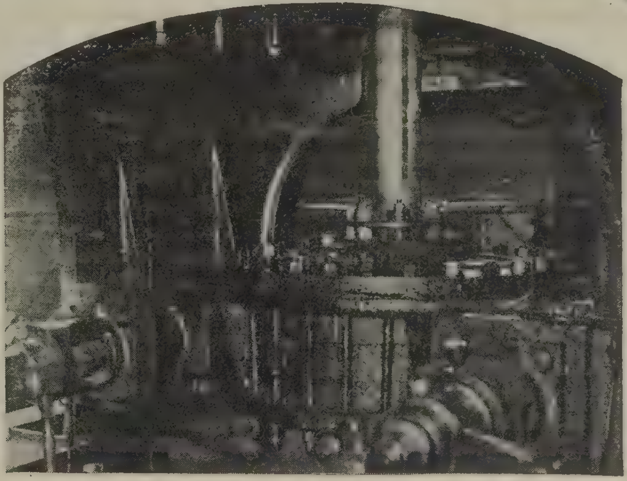
Standard specifications for lap-welded and seamless steel and lap-welded iron boiler tubes, as adopted by the American Society for Testing Materials, have been put out in a Spanish-English edition by the United States Bureau of Foreign and Domestic Commerce. The pamphlet, under the heading "Industrial Standards No. 63," may be obtained at 5c. from the superintendent of documents, Government Printing Office, Washington. It contains 18 pages, with the English text on left-hand pages and Spanish on right-hand.

Oxwelding Heavy Mill Engines

CONTINUOUS operation is the goal of steel mill operators; to reach it they install the most rugged equipment. But even this wears and breaks. Accidents which mean serious shutdowns become minor delays in those plants where first-aid from oxy-acetylene welding and cutting equipment is completely utilized.

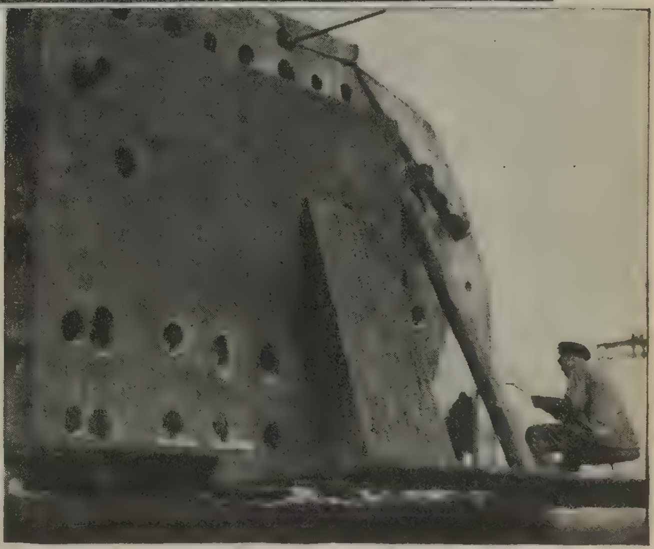






TWO Ways of Making Major Repairs by Oxy-Acetylene Welding: Above, a cylinder head so badly shattered that 600 lb. of cast iron welding rod was used in the cracks. At center is a scoured blowing engine cylinder rebuilt with bronze welding rod. Either type of weld is readily machined

Water Is Also Necessary to a Steel Plant. At left is a centrifugal pump casing, so badly scoured as to be worthless, but easily renewed with bronze welding rod



A Cutting Blowpipe Finds No Difficulty in Biting a Piece Out of an 18-in. Steel Counterweight to Improve the Balance of This Blooming Mill Engine

A Break in a 48-Ton Bed Plate Was Bronze-Welded Without Preheating During Removal of Rolling Mill Engine to New Site

EARLY-STRENGTH CEMENT

Made from Slag from Experimental Blast Furnace at Minneapolis

A THREE-WEEKS' campaign was recently run on the 6-ton blast furnace at the Minneapolis station of the Bureau of Mines, using a burden consisting of scrap iron, iron ore, iron-bearing bauxite, limestone and coke. About 70 tons of aluminous slag was obtained, suitable for grinding into "high early-strength" cement, and a somewhat smaller quantity of low-sulphur, low-silicon pig iron.

It is well known that normal blast furnace slag is used as a raw material for the production of standard Portland cement. The high early-strength cements which are attracting so much interest now (and which in France are made in amount equal to one-eighth of the Portland cement produced) are of the following composition:

SiO_2	9 to 12 per cent
Al_2O_3	40 to 48 per cent
CaO	35 to 40 per cent
S	less than 1 per cent

Such a material has a low fusion temperature, approximately 1350 deg. C. When smelting the above-mentioned burden a slag of the following composition was made:

SiO_2	8.5 per cent
Al_2O_3	47.2 per cent
FeO	1.4 per cent
CaO	39.6 per cent
TiO_2	2.1 per cent
S	0.7 per cent

According to a report by T. L. Joseph, supervising engineer for the Bureau of Mines, blast pressure was uniformly low, and an average blast temperature of 885 deg. Fahr. was carried. In his opinion it will be entirely feasible to smelt a bauxite charge in a large blast furnace, and produce a slag which needs only fine grinding to be marketed as a cement, and a pig iron suitable for open-hearth steel making. E. C. Eckel has obtained three patents on a process of making iron and cement in the blast furnace, and the Minneapolis experiment definitely proves that iron oxide in the charge can be reduced to metal. For this reason, a much less pure bauxite can be used than when making high early-strength cement in the rotary kiln or electric furnace, where a mixture of suitable raw materials is merely clinkered or melted.

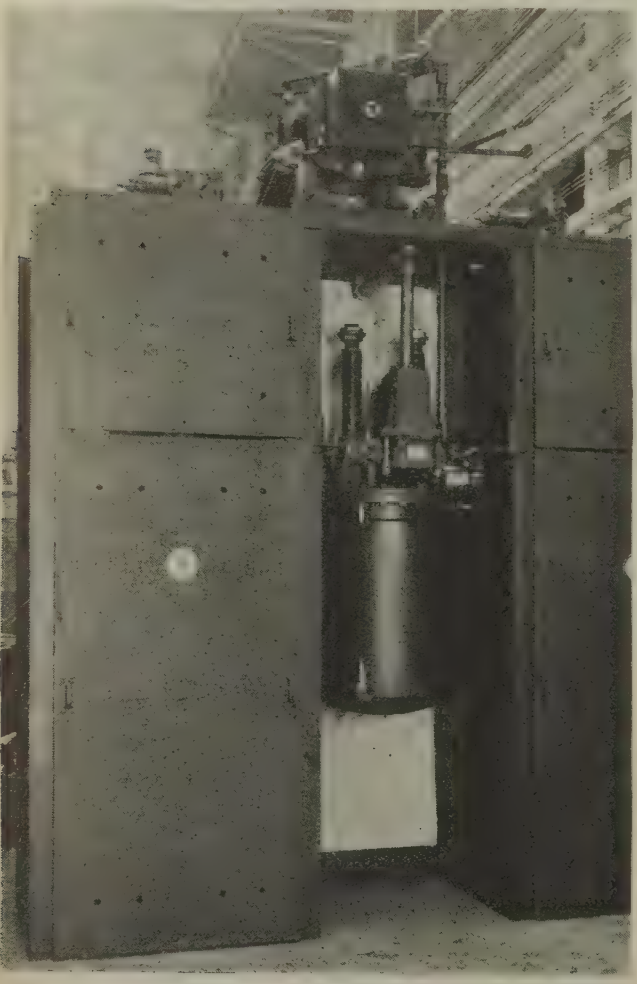
In view of the small amount of silica entering the furnace and the low formation temperature of the slag, little silicon is reduced in the shaft. In order to make pig iron with 0.8 to 1.0 per cent silicon it would be necessary to charge a certain amount of gray cast iron borings or scrap into the furnace. Mr. Joseph's calculations of the economics of such an ore-scrap burden are:

Material	Pounds per Ton of Iron	Tons per Ton of Iron	Cost per Ton	Material Cost per Ton of Iron
Bauxite	2,175	0.97	$6.00	$5.80
Limestone	1,865	0.83	1.50	1.25
Borings	1,245	0.56	11.00	6.15
Ore	1,245	0.56	6.00	3.35
Coke	2,240	1.12	6.00	6.70
Cost of smelting				2.90
				$26.15
Value of Products:				
Alumina cement (not pulverized), 1.1 tons @ $30				$33.00
Pig iron, 1 ton				20.00
				$53.00

This gives an apparent margin of 100 per cent to cover grinding the cement, sale of the products, overhead and profit, even allowing no credit for surplus gas.

Fabricated Steel Structure for Mounting Circuit Breaker

A circuit breaker mounted in a fabricated steel structure designed to replace concrete has been brought out by Westinghouse Electric & Mfg. Co., East Pittsburgh. As the circuit breaker is built complete at the factory, the time and expense of installation are materially reduced by using the steel structure. As the apparatus is shipped as a unit, the time of preparing it for service is much less. It is only necessary to put the breaker in place, bolt it down, remove the blocking, check the adjustments, connect it to the control circuits and the bus, put in the oil, and it is ready for service.



Compactness Features This Fabricated Structure

As the operation of the breaker imposes shocks on the supports, the steel structure is better suited for this service. Steel, by its elastic characteristics, absorbs the shocks easily with no damage to itself. Although the structure shown exactly replaces a concrete structure, it is possible to reduce the space occupied by taking advantage of the greater strength of the steel. As the steel frame is lighter than the concrete structure, an indirect saving may be had in that the floors and building can be lightened for the decreased load.

In the structure shown the circuit breaker only is supported. The use of steel can be extended to support the disconnecting switches and further yet to support the bus.

Packard Company Grants Vacations to 2500

Plant and offices of the Packard Motor Car Co., Detroit, are shut down all of this week and next for the annual inventory period, and to allow vacations to such of the employees as are entitled to vacations according to the rules of the company, numbering upward of 2500. The company is taking advantage of this idle period to install new machinery and additional equipment which will enable it to resume operations July 2 at a higher rate of production than ever before.

Colorado Fuel & Iron Co. rail mills, which were scheduled for a seasonal shutdown about June 1, have continued in operation an additional two weeks as a result of a receipt of an order from the Texas & Pacific Railway for 10,000 tons. The rail department shutdown will take place about 30 days earlier than last year.

Poppet Valves Made in One Piece

Chrome-Silicon Alloy Rods Put Through Heading, Coining and Other Operations—Only ½-Oz. Variation in Weight Between Blank and Finished Valve

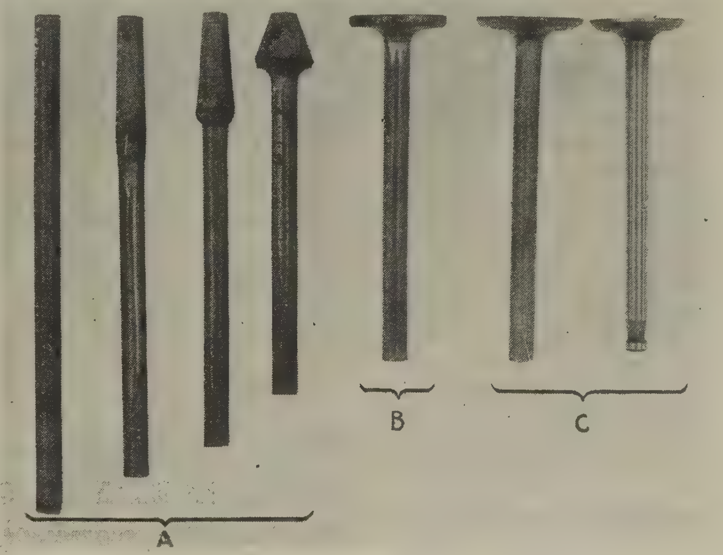
BY C. A. MC GRODER

HEADING machines and large coining presses are now employed by Dodge Brothers, Inc., Detroit, in producing a complete poppet valve from a single blank sheared from a drawn rod of chrome-silicon steel. Formerly the valve was made by electrically welding a stem of special alloy steel to a flat cast iron disk, which was also of special composition to resist the great heat to which the valves of internal combustion engines are subjected.

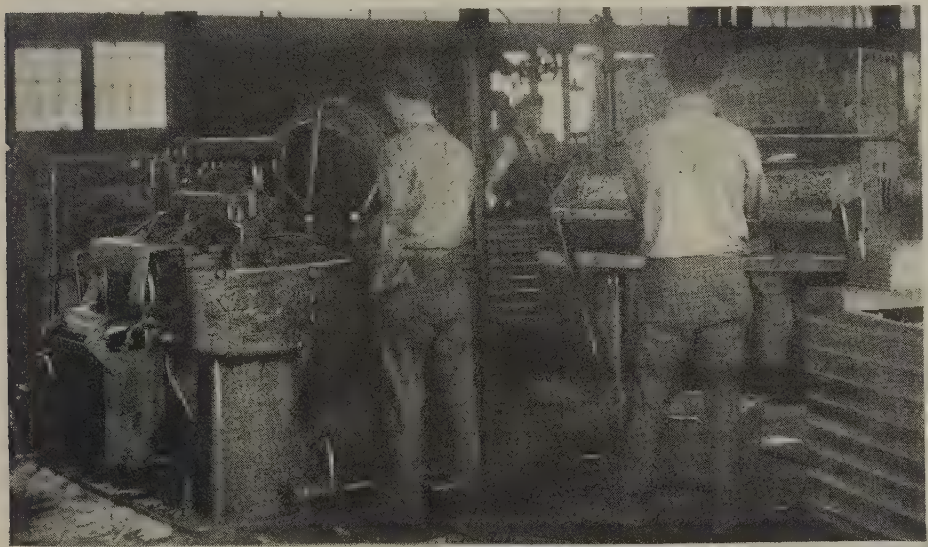
Now, the more recently developed chrome - silicon steel, known to the trade as "Silcrome," is used, the stem and the head being of the same heat-resisting material, and in one piece. Manufacture of the valves begins with heating the blanks at one end in a gas furnace and then feeding them, singly, by tongs, into a National heading machine which is equipped with four sets of dies and strikes four blows. The first three blows upset the stock which is to form the head, and prepare it for the final, flattening blow which completes the shape of the rough and slightly oversize valve.

It might be practical to machine or grind these rough blanks all over to the finished size of the valve were it not for the fact that chrome-silicon alloy is difficult to machine, even after annealing. It is in circumventing this difficulty that the new method effects its greatest economy in the next operation.

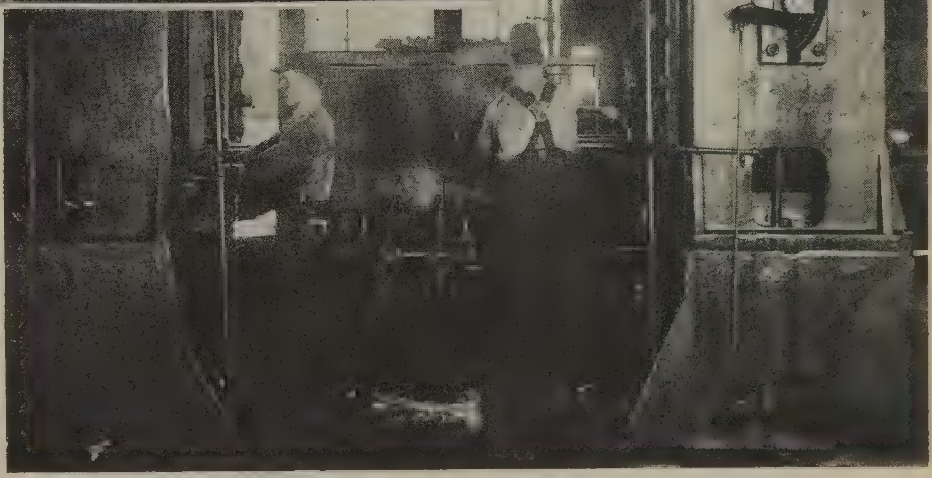
After being allowed to cool, the rough blanks are reheated in a gas furnace of the chain conveyor type which allows only the head of the valve to extend upward into the heated interior of the furnace. Coming out of this furnace at the correct temperature—somewhat lower than the 2300 deg. Fahr. required at the heading machines — the valve is dropped perpendicularly, with the head up, into the lower die of a



SEVEN Stages in the Manufacture of One-Piece Poppet Valves at the Plant of the Dodge Brothers, Inc. The sheared blank, at the extreme left in group A, is put through three upsetting operations, as indicated by the three pieces at the right of the sheared blank. The valve is then rough formed, as at B, by a fourth blow of the heading machine, the next operation being finish forming of the head of the valve in a coining press, the result of which is shown at the left in the group C. The finished valve, machined and ready for assembly, is at the extreme right, group C



IN Heading Machines, of the Type Shown at the Left, the Sheared Blanks Are Roughly Formed by Four Successive Blows, Preparatory to the Coining Press Operation Which Completes the Shaping of the Valves



TWO Large Coining Presses Compress the One-Piece Poppet Valve Almost to Size, the Beveled Under-Side of the Valve Being Formed in This Operation Also. Furnaces of chain conveyor type are used to heat the heads of the valves for the press operation large Hamilton coining press. The head of the valve, including the beveled lower edge of the head, which must fit against the seat in the cylinder block, is then completely formed by the action of the press. The production from each coining press is 5000 valves in a 9-hr. day, and a heading machine can turn out approximately 4300 rough blanks in the same time.

From the coining press the valves are carried by electric trucks to the heat-treating department, where they are subjected to two heat treatments, in which electric furnaces are used. Placed in alloy steel trays, which measure about 18 x 50 in., the valves proceed through the first furnace and, after attaining a temperature of 1650 deg. Fahr., are cooled in air. This is an annealing treatment which relieves the metal of forging strains, effects structural changes and accomplishes a refining action.

After they have cooled, the valves are given a drawing treatment in the second furnace, where a temperature of 1220 deg. Fahr. is maintained. Emerging from this furnace, they are immediately quenched in oil, having had very little contact with the outside air. This sudden quenching, because of the peculiar qualities of the chrome-silicon steel, has the effect of leaving practically no scale on the metal to interfere with subsequent machining processes. The temperatures of both furnaces are controlled automatically by thermostats to within 10 deg., plus or minus, of the proper figure. Recording pyrometers keep a permanent record of the furnace temperatures, which are checked regularly by the metallurgical department.

Straightening the stem of the valve by rolling it between a moving and a stationary plate is the first operation in the machining department. The next step is to rough-grind the stem and trim the head and, later, to semi-finish grind the stem. The end of the stem is then hardened. To accomplish this the valves are placed head down in a tank of water with the stems extending about ½ in. above the surface. While in this position, the end of each stem is heated with an oxy-acetylene torch and allowed to cool by conduction of the heat through the stem into the water. This treatment gives a hardness of 55 to 60 on the Shore scleroscope.

A centerless grinder is used to finish the stem to size, within limits of plus 0.0000 and minus 0.0005 in., after which the stem is rolled under high pressure between hardened steel surfaces to produce a high finish. The last operation is grinding the beveled valve face. Final inspection is made with dial gages set to a piece of hardened and ground stock of correct diameter as master.

Notwithstanding all this machining, and the unavoidable loss of material in the forging operations, there is found to be a variation of only 0.03 lb. between the weight of the sheared blank of bar stock entering the first furnace at the heading machine and the completely finished valve.

SOURCES OF PIG IRON

Imports in 1927 Came from Nine Countries and Through 21 Ports of Entry

DETAILS of imports of pig iron into the United States in 1927 by countries of origin and individual ports of entry are covered in a table of the Iron and Steel Division, Department of Commerce. In THE IRON AGE of April 5 (page 953) appeared a similar table, except that ports of entry were shown by grand divisions, including the Atlantic, Gulf, Pacific and "other" ports. Of the total pig iron importations of 133,068 gross tons in 1927, India supplied one-half, or 66,627 tons. Philadelphia led by far as the greatest receiving port, taking a total of 63,810 tons.

From the table showing, by months, the tonnages entered at the various ports from the several supplying countries it appears that, in many instances, at least as between a given source and a given port, the inflow was spasmodic. Thus, Germany sent 700 tons into Massachusetts in January and 300 tons in November, making the total of 1000 tons. In cases where there was a fairly steady flow throughout the year that fact is indicated in our table, which is made up from the table prepared in the Department of Commerce; (a) indicates that some material was received during each of at least 11 of the 12 months; (b) in at least six different months.

Heavy Increase in Farm Machinery

That there is a growing displacement of manual labor by farm equipment is indicated by a statement showing the increase in production of such equipment during the past two years. The Department of Commerce reports a 1927 output of tractors at 200,504, compared with 181,995 in 1926 and 167,553 in 1925. A much greater increase was shown in the number of harvester-thresher combination machines, which advanced from 5131 in 1925 to 11,760 in 1926 and to 18,307 in 1927. Among other items, the manufacture of which in 1927 showed increases over 1926, were various types of plows, including tractor plows, soil pulverizers and packers, grain drills, lime spreaders, potato-digging machines, hay rakes, hay loaders, ensilage cutters and silo fillers, corn shellers, lawn mowers and spray pumps.

IMPORTS OF PIG IRON INTO THE UNITED STATES—1927
(In Gross Tons)

		Source of Supply								
Port of Entry	Total	Belgium	France	Germany	Netherlands	Sweden	Great Britain	Canada	Mexico	India
Me. and N. H.	150	.....	.....	150	.....	.....	.....	.....	.....	.....
Massachusetts	13,700	.....	.....	1,000	5,306(a)	102	1,131	.....	.....	6,161(b)
Buffalo	225	.....	.....	.....	.....	.....	.....	225	.....	.....
New York	15,276	.....	.....	44	9,043(b)	448(b)	3	.....	.....	5,738
Philadelphia	63,810	100	3,000	3,637	6,112(a)	173	19,405(b)	.....	.....	31,383(b)
Maryland	13,185	.....	.....	1,200	3,883(b)	677	100	.....	.....	7,325(b)
Virginia	1,660	.....	.....	.....	450	.....	.....	.....	.....	1,210
North Carolina	1,000	.....	.....	.....	1,000	.....	.....	.....	.....	.....
Florida	250	.....	.....	250	.....	.....	.....	.....	.....	.....
New Orleans	750	.....	.....	750	.....	.....	.....	.....	.....	.....
Galveston	3,409	.....	.....	75	80	.....	100	.....	.....	3,154(b)
San Antonio	72	.....	.....	.....	.....	.....	.....	.....	72	.....
El Paso	25	.....	.....	.....	.....	.....	.....	.....	25	.....
Los Angeles	7,092	49	.....	685	2,832(a)	300	.....	.....	.....	3,226(b)
San Francisco	8,465	350	.....	610	250	.....	.....	.....	.....	7,255(b)
Oregon	867	.....	.....	100	300	.....	.....	.....	.....	467
Washington	1,498	.....	.....	710	124	.....	230	28	.....	406
Hawaii	1,002	200	.....	500	.....	.....	.....	.....	.....	302
Montana and Idaho	56	.....	.....	.....	.....	.....	.....	56	.....	.....
Michigan	416	.....	.....	.....	.....	.....	.....	416	.....	.....
St. Louis	160	.....	.....	.....	.....	.....	160	.....	.....	.....
Total	133,068	699	3,000	9,711(a)	29,380(a)	1,700(b)	21,129(b)	725(b)	97	66,627(a)

(a) Material coming in during practically every month of the year.
(b) Material received in at least six of the 12 months.

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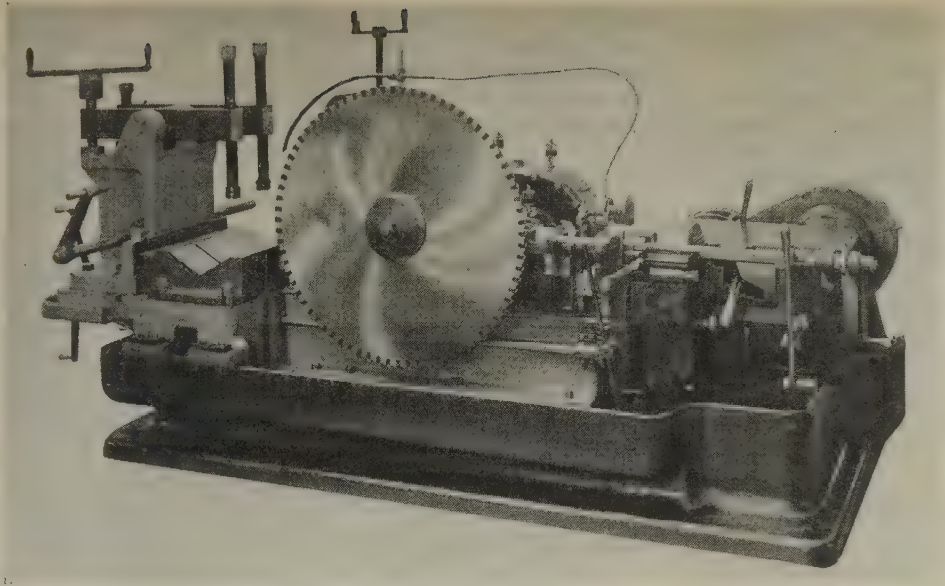


With a 42-In. Blade, 5/16-In. Kerf, 15-In. Low Carbon Steel Bars Were Cut in 10 Min. Twelve feed changes, ranging from ¾ to 3¾ in., and three speeds are obtainable. Either a 42 or 48-in. blade may be used

Sawing Machine Cuts 18-In. and Smaller Bars Without Turning

ACCURATE and economical cutting of bars up to 18 in. in diameter is claimed for a new metal sawing machine, which is being placed on the market by the Cochrane-Bly Co., Rochester, N. Y. The machine is designed to use either a 42-in. or a 48-in. blade; the former saw blade will cut through a 15-in. bar and the latter an 18-in. bar, without turning.

The arrangement of the machine, which is built to modern machine tool standards, may be noted from the accompanying illustration. The saw arbor is 6 in. in diameter, is hardened and ground and is fitted with adjustable taper gibs to compensate for wear. The bed of the machine is scraped to surface plates. The feed screw is mounted above the ways, in line with the center of the saw arbor and close up to the saw blade, to eliminate vibration due to cant or side pull.

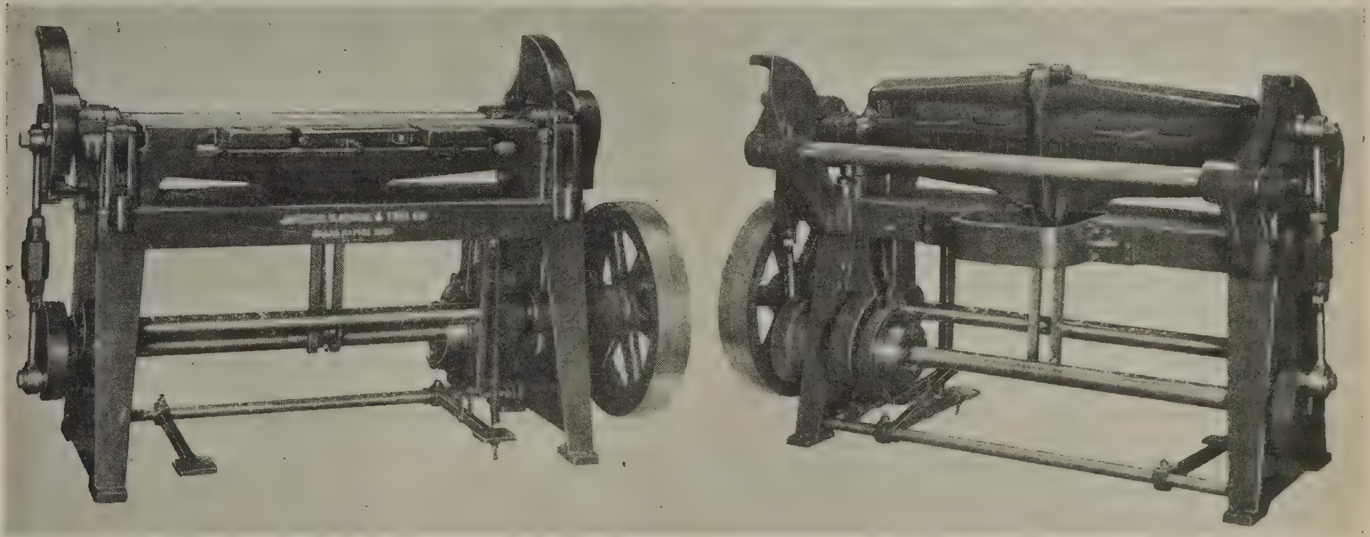
Feeds are geared and positive, and 12 changes of feed, ranging from ¾ to 3¾ in. per min., are obtainable. The machine is driven through a hardened nickel steel arbor gear and pinion having herringbone teeth and running in oil. The worm is of hardened steel and the worm wheel of phosphor bronze. Sliding gear transmission, using steel gears which run in oil, give speed changes of 45, 60 and 75 ft. per min. The initial drive of the machine is by a 25-hp. constant-speed motor through a friction clutch. The clutch is controlled by levers located both at the front and rear of the machine, adjacent to the levers and cranks for start, stop and reverse of feeds and adjustment of the carriage to and from the work. The friction clutch permits quick stopping of the saw blade without stopping the motor, and eliminates the chance of damaging the blade by moving a loose bar in the blade while the blade is in motion. Adjustable collars are provided to stop and reverse the feed automatically, giving quick return of the carriage to a point where the blade clears the bar being cut. The floor space required by the belt-driven machine is 69 x 141 in. and of the motor-driven machine, 84 x 141 in.

It is claimed that in recent tests of the machine 15-in. bars of low-carbon steel were cut in 10 min., 10-in. bars in 4½ min. and 6-in. bars in 1¾ min. The saw blade used was 42 in. in diameter with 5/16-in. kerf.

New Sheet Metal Folding Machine

A NEW power folder, designed for folding sheet metal up to No. 16 gage over the entire length of the machine, has been brought out by the Jarecki Machine & Tool Co., Grand Rapids, Mich.

A feature is the provision of a center bearing to take up spring of the machine, which is said to hit just as hard in the center of the sheet as it will on the ends close to the bearing. The machine is connected at both ends of the shaft so that an even distribution of power is obtained and twisting action while folding is eliminated. Material up to 42 in. in length can be folded on the standard machine, but machines for longer material can be furnished. In the larger machines a number of hinge bearings can be incorporated to offset springing of the machine. Either belt or motor drive arrangement can be furnished. The flywheel is 24 in. in diameter, weighs 250 lb. and runs at 100 r.p.m. The ratio of gearing is 3 to 1. The floor space occupied is 30 x 72 in. and the height of the machine is 42 in. The weight is approximately 2400 lb.



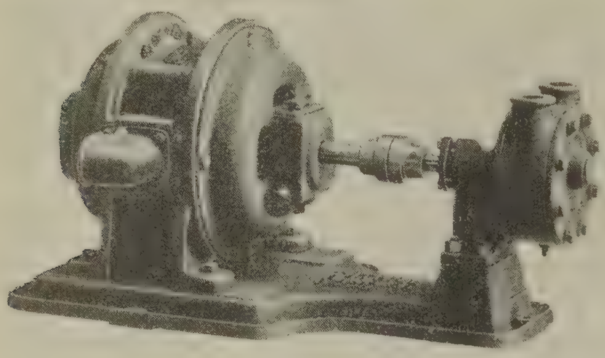
No. 16 Gage Sheets Up to 42 In. Long Can Be Folded on the Standard Machine. Provision is made to eliminate twisting action while folding

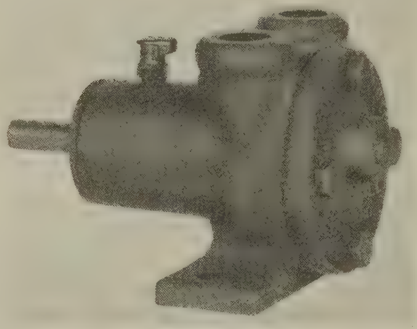
Small Pumps for Machine Tool Lubrication

A recent development in machine tool equipment is a small, high-pressure, packingless pump built by the Tuthill Pump Co., 131 West Sixty-third Street, Chicago. It is designed for pressure lubrication of machinery and for hydraulic feeds. Like all other Tuthill pumps, it operates on the internal gear principle. However, the new pump (Model B) includes a two-zone packingless feature, employing a new patented metallic seal which is said to insure freedom from leakage at pressures as high as 500 lb. per sq. in. and 28 in. of vacuum on lubricating oil.

Two sizes of Model B are available, 30 gal. capacity an hour, and 90 gal. at 1800 r.p.m. Either size may be obtained with either the foot mounting (illustrated) or the flange mounting. The flange mounting is convenient when the pump is built into the machine, and it also offers the possibility of a neat motor-drive unit. The body is about 4 in. long.

Another Tuthill model recently put into production, is the Model C pump. This is for pressures up to 200 lb. on lubricating oil and was designed to cover the demand for a reasonably priced high-pressure pump. Pumps of this model can be furnished for belt drive or direct motor drive in capacities of 1½ to 45½ gal. per minute.





Model B Pump (at Right) Is Exceptionally Compact, for Machine-Tool Lubrication. Above is shown Model C, a larger pump for high pressure

Welding Blowpipe Changed to Cutting Torch by Simply Turning Tip

A further simplification of oxyacetylene equipment has been made by the Alexander Milburn Co., 1416 West Baltimore Street, Baltimore, Md. Not long ago it was necessary to have two complete torches with separate kits of copper tips, one for welding, the other for cutting. A step in advance was an attachment whereby the welding blowpipe could be used for cutting, as occasion warranted.

The new Milburn combination cutting and welding torch, type TI, is still another step forward. To change this blowpipe from cutting to welding it is not even necessary to change the tip. A convertible feature of the tip changes it from a cutting to a welding tip or vice versa by a mere turn of the tip. In one position the gases are automatically conveyed through the preheating gas passages while the high pressure oxygen is carried through the central hole for cutting. In the next position, made by a quarter turn of the tip, the cutting oxygen is cut off and the welding gases are conveyed through the central passage of the cutting tip, making a correct welding flame.

Torch heads, valves, bases and other parts are bronze forgings. The seamless high-pressure tube is specially drawn with triple thick walls and is of nickeled silver, which has double the strength of brass tubing. As with all Milburn torches, flashback does not occur even though the tip should be inserted in molten metal.

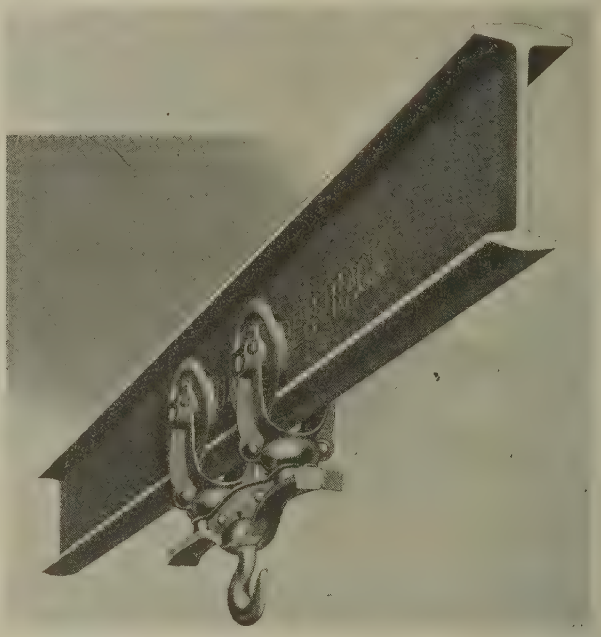
New Flux for Bronze Welding Steel and Cast Iron

A new combination of fluxes for bronze welding has been devised by Simplex Flux & Solder Co., 1965 East Sixty-sixth Street, Cleveland. By this method the joint in steel or cast iron is first heated with an oxyacetylene blowpipe to just above a black heat, and some "Lotan Powder" is sprinkled over the hot spot. Moderate heating is continued until this powder sparkles and adheres firmly to the hot surface. After the joint has been prepared in this manner, a bronze weld is made in the usual way, using "Lotan A. B. Flux," namely, by first tinning a portion of the surface and then puddling in molten metal from the rod until the joint is built up the required amount. This method is said to give a superior union between the iron or steel and the added bronze at the joint.

Overhead Track for Industrial Use

With a carrying capacity of 3000 lb., a new overhead trolley track of special section has been brought out by the Louden Machinery Co., Fairfield, Iowa. This is for use on monorail systems and is designated the Louden super-track. The section is about 6 in. deep, with a 3-in. flange at top and a 2-in. flange at bottom, as illustrated. Special features distinguish the new two-way, three-way, cross-track and turntable switches designed for use with this system.

It is emphasized that the track is not of ordinary I-beam, but is specially rolled from steel billets of 0.50 to 0.60 per cent carbon, and is unusually tough. The upper flange provides a gripping surface for supporting hangers, while the lower flange constitutes the track for twin trolley wheels.



Special Section Rolled for Monorail Track of Unusual Toughness

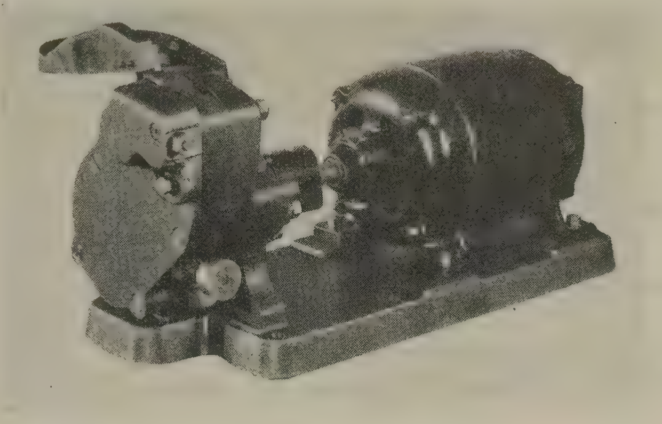
It is said that the form of the section eliminates in large measure the necessity for a supporting superstructure. The stiffness of the section permits the hangers to be spaced widely apart. There is sufficient space between hanger and trolley wheels to provide ample clearance on swinging loads.

Construction costs are estimated by the Associated General Contractors of America at about 96 per cent above the 1913 average. There has been no change through three months and only one change since the drop to 99 per cent was made in November.

Bench Machine for Shearing 10 Gage and Lighter Cold Rolled Sheets

A new shearing machine for straight, circular and irregular cutting of cold rolled steel up to No. 10 gage, 9/64 in., and softer materials in proportion, has been added to the line of the Unishear Co., 270 Lafayette Street, New York.

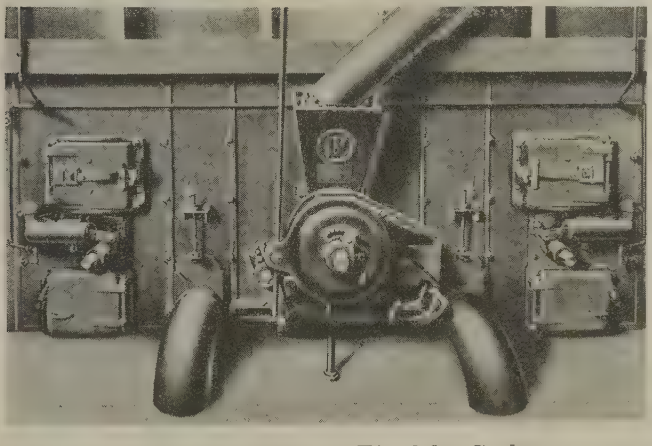
In principles of design the new machine, which is designated as the Model A-10 and is illustrated herewith, is the same as the company's former machines, previously described. On cold rolled steel, cutting speeds up to 10 ft. per min. are obtainable and it is claimed that the cutting is without burr or distortion, so that time lost in filing or trimming down the work is eliminated. Notches and angles may be cut conveniently.


The Cutting of No. 10 Gage Material Is at the Rate of 10 Ft. Per Min.

A ¾-hp. motor, either direct or alternating current as required, is employed, and suitable starters are available. The motor and shear unit are mounted on a baseplate, for bench mounting, and direct-connected by flexible coupling, as shown. A sheet stabilizing device, located adjacent to the shear blade, is regular equipment. Cutters are of special alloy steel and have straight edges, which facilitates sharpening. The net weight of the machine is 165 lb.

Underfeed Stoker for Annealing and Other Industrial Furnaces

A new single-retort underfeed stoker for industrial furnaces, developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has the flexible grate motion in combination with power-operated dumps which features its stokers for furnaces of wide dimensions. The illustration shows such an application to the side of an annealing furnace. The firebox extends practically the whole furnace length, thus insuring uniform heat distribution.


Annealing Furnace Fired by Stoker

An adjustable ratchet screw feed delivers coal to a center retort. An eccentric on the screw shaft imparts motion through a slotted sector lever and cross-connecting link to the grate rocker shafts located on each side of and adjacent to the retort. The motion on either side is independently regulated to any desired degree from minimum to maximum. The ratchet wheel and eccentric run in an oil bath in a dust-proof case.

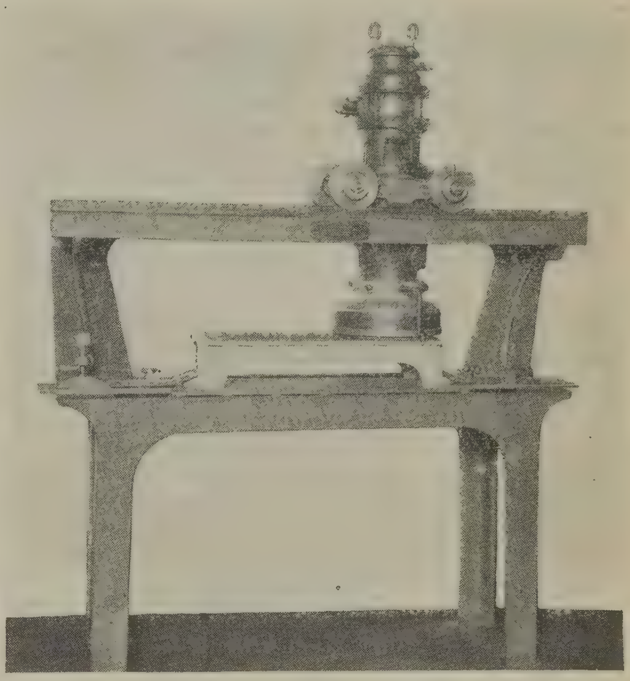
Furnaces for the heat-treating of steel essentially require a thick fuel bed. The flexibility of the grate motion of this stoker effectively handles a heavy fuel mass from the retort to the dump. The dumps are actuated by single-acting plungers operated by steam or air pressure. A weighted lever automatically unlocks the dump lever arm and, upon releasing the pressure, the dump is lowered. Disengaging the weight from the lever and again applying pressure raises the dump and automatically locks it in normal position.

Complete flexibility of coal feed and distribution, combined with an easy and expeditious means of dumping the refuse, enables the operator to maintain uniform temperature under the desired conditions of furnace atmosphere throughout the heating cycle.

Standard Machine for Grinding Cores

Equipment designed specifically for grinding cores, brought out recently by the Stoney Foundry Engineering & Equipment Co., 5101 Lakeside Avenue, Cleveland, is shown in the accompanying illustration.

The machine is of simple construction and resembles, in general appearance, a vertical surface grinder. It consists of a rigid cast iron bed to which is bolted an overhead member that has V-ways upon which the wheels of the grinding-head carriage ride. The grinding-head is equipped with a ½-hp. 900-r.p.m. motor which is connected by a shaft of special design, and with special bearings, to a 12-in. diameter cup-type grinding wheel. The cores are held in fixtures on the table of the machine, the fixtures being clamped by the strips shown at each side of the fixture. The clamping is by hand by means of the hand knobs shown. For the heavier classes of cores the fixtures are held by bolts in T-slots machined in the table.


With the Cores Loaded in the Fixture, Grinding Is Accomplished by Hand Traversing the Grinding-Head

With the fixture loaded the cores are ground by hand traversing of the grinding-head. The maximum length of travel of the grinding wheel head is 3 ft., within which distance at the left-hand end of the machine is located the device for dressing the grinding wheel. The minimum height from the table at which the cores may be ground is 4 in. and the maximum height is 6 in., but the latter may be increased to 10 in. by placing filler plates between the table and the brackets carrying the overhead ways.

Vertical adjustment of the head in increments of 0.005 in. is provided. The height of the table from the floor is 34 in. The carriage is mounted on roller bearings and is lubricated by means of Alemite fittings. Means are provided for convenient removal and mounting of grinding wheels.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output is likely, during June, to show more than the normal 6 per cent drop from May.

Unfilled orders showed in May a continuation of the heavy decrease registered in April and, except for last year, made the poorest May 31 showing in many years.

Pig iron production is in close adjustment with ingot output; prices are decidedly low.

Finished steel prices are in considerable maladjustment with semi-finished products; in common with the general level of commodity prices, no early improvement is indicated.

CHARACTER of demand continues to be the outstanding fact concerning the iron and steel industry. Production, though declining, is large and above normal. Consumption, thanks to heavy automobile and farm machinery activity and to a fair demand from building, is large, also, so that the quantity produced and the quantity consumed are apparently in rather close adjustment.

But prices are weak. The conclusion suggested is that the *intensity* of demand—the price which buyers are able and willing to pay for their requirements—has declined and is relatively low. In general, it seems that industrial activity is high compared with demand for products, resulting in severe competition and narrow margins of profit. This condition has been intensified recently by a downward trend in commodity price averages. It is not one that favors expansion and, while a well-sustained level of industrial activity, including steel production, is a possibility, a period of moderate but distinct recession is the probability.

June Ingot Decline May Be More Than Normal

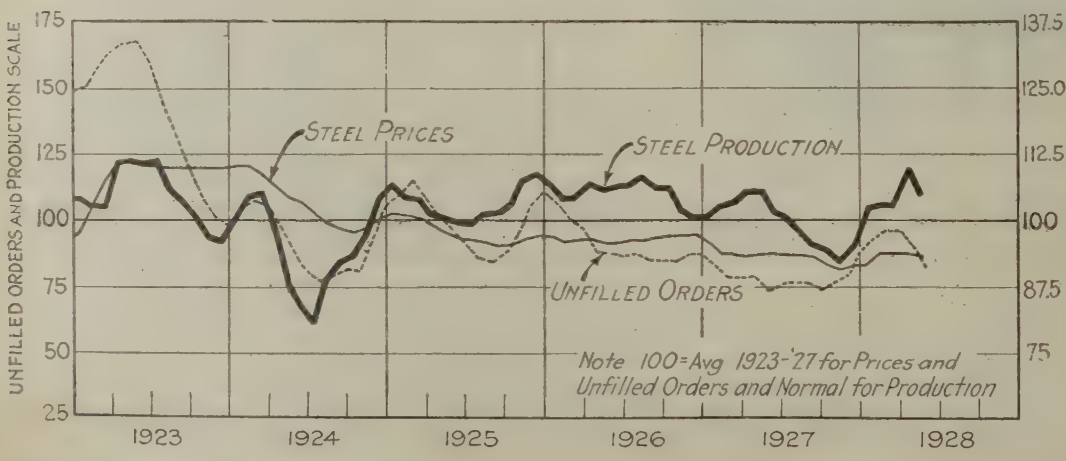
IN May the average daily ingot production fell off more than usual for the month. Consequently our adjusted index shows what may be called a sharp reversal of trend, the decline being so pronounced that, with production still above normal, a continuation of the trend toward curtailment is indicated. Anyhow, such movements have a certain momentum. A decline of about 6 per cent in the average daily output would be normal for June, and the reduction during the current month should be somewhat greater than that, bringing the average daily figure to some such rate (allowing for seasonal conditions) as obtained through the first quarter.

Aside from the general business uncertainty which now prevails, the foregoing conclusion is strengthened by the declining trend of our P-V line, and by the slackening in the volume of new business as reflected in the large decline in the unfilled orders of the Steel Corporation.

Steel production in May, according to our estimates, was about 10 per cent above the normal requirements of the country, the adjusted index being 110.3. Of course, the actual requirements may be above normal and such has been the case during the first half of 1928, owing to the considerable expansion in the output of automobiles and farm equipment and in building activity. Steel production, therefore, while 10 per cent above normal, has not been 10 per cent excessive. But our composite demand line, published last week, shows the existence of some over-production and the action of the unfilled orders and prices is conclusive to that effect.

Unfilled orders of the Steel Corporation, at 3,417,000 tons, were the lowest since last October and, except for a year ago (when the figure was 3,051,000 tons), were the lowest for the end of May in many years. It is the declining trend of the unfilled orders, however, that is most significant. The total decline of over 900,000 tons in April and May has been the sharpest since the same months in 1924.

Such declines indicate a recession in the volume of new business and usually bring curtailed production and weakness in prices. The situation today lacks some of the elements of weakness found in 1924: prices are not so high, the activity (and presumably the requirements) of the chief consuming industries has held up



Note 100=Avg 1923-'27 for Prices and Unfilled Orders and Normal for Production

Fig. 1—Steel Production in May Was 10 Per Cent Above Normal Requirements. Prices have been sagging. Unfilled orders are much lower, showing declining demand

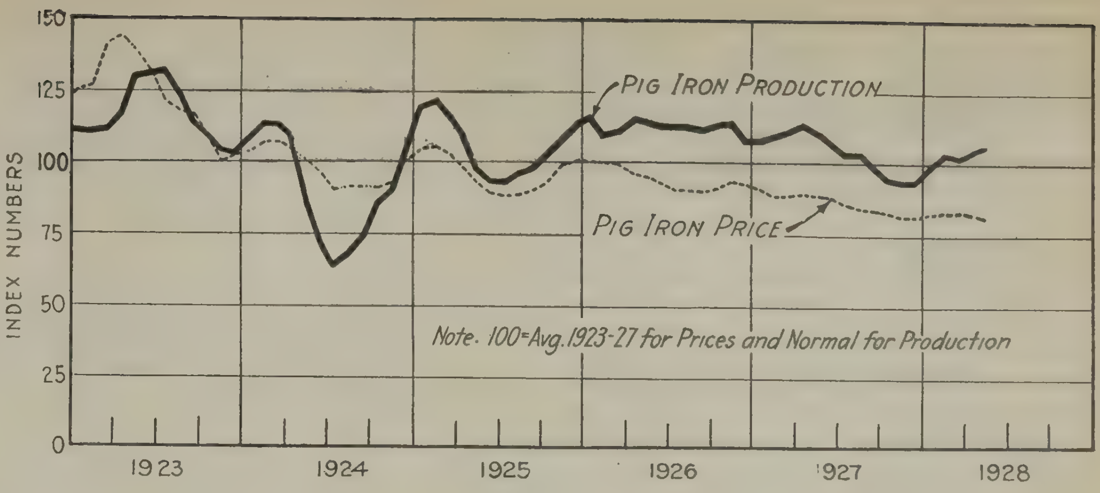


Fig. 2—Firmness in Pig Iron Prices Would Be Logical, with Pig Iron Output Relatively Below Steel. But pig iron is decidedly cheap and there is no indication of immediate improvement

better, and pig iron production is in better adjustment with steel production. But the existing situation, nevertheless, has the earmarks of a recession and already production and prices have declined.

During May the average price of finished steel was 2.350c., which compares with 2.359c. in April and 2.360c. a year ago. The May average is only 93 per cent of the average for the years 1923-1927. At this writing, THE IRON AGE composite price is 2.341c. and seems likely to go a little lower.

Broad Decline Continues in Pig Iron Prices

IT is notable that the trend of a 12-month moving average of pig iron prices continues steadily downward, showing no sustained interruption of the broad decline which has gone on during recent years. Each successive recovery has been less vigorous than its predecessor and has been followed by a new low point. At this writing THE IRON AGE composite average has fallen to $17.23, against a May average of $17.45. A year ago the May figure was $19.09.

At the same time, the annual rate of increase in pig iron production has become smaller; that is, the pig iron output has increased at a less rapid rate than formerly. In revising our trend line at the beginning of the year we noted this, and the reader will observe that the successive rises in production above the estimated normal line have been less marked of late. Evidently a broad change in the industry is reflected, less pig iron being used in proportion to the steel made, and this development may have something to do with the downward trend of pig iron prices.

In May, the average daily output of pig iron was 105,900 tons, against 106,200 tons in April. This small decrease was less than usually occurs between the two months and our adjusted index rose to 106.8 per cent of normal, against 105.2 per cent in April. A year ago the index was 111. Thus pig iron production is less than 7 per cent above normal, in comparison with a steel production which is over 10 per cent above normal. This means a low ratio of pig iron output to steel production and would ordinarily bring a stronger price for the former. There is no indication, however, of such a development in the near future.

For one thing, pig iron production increased in May and gained on steel production. The ratio of the average daily pig iron output to the average daily steel output was the highest since last December—too high, *considering the level of steel prices.* Pig iron is and has been rather cheap in comparison with finished steel prices, but judged by the standards of recent years its price is only about right in comparison with steel scrap. And in view of the decline in steel prices, and the weakness in scrap, no ground for strength in pig iron prices is to be found here.

Maladjustment Among Iron and Steel Prices

THE price structure in the iron and steel industry has recently been seriously out of adjustment. Not only billets but bars are too high, in comparison either with such items of finished steel as sheets and nails, or with such raw materials as coke and pig iron. Theoretically it would seem that either billets and bars must be marked down in price, or that both (1) sheets and nails and (2) coal and coke must be marked up.

Of course, technical conditions may have changed sufficiently in the last year or two to affect the normal spreads among these items, but insofar as we know the situation, advances in price do not seem probable either in finished steel or in the raw materials. Coal and

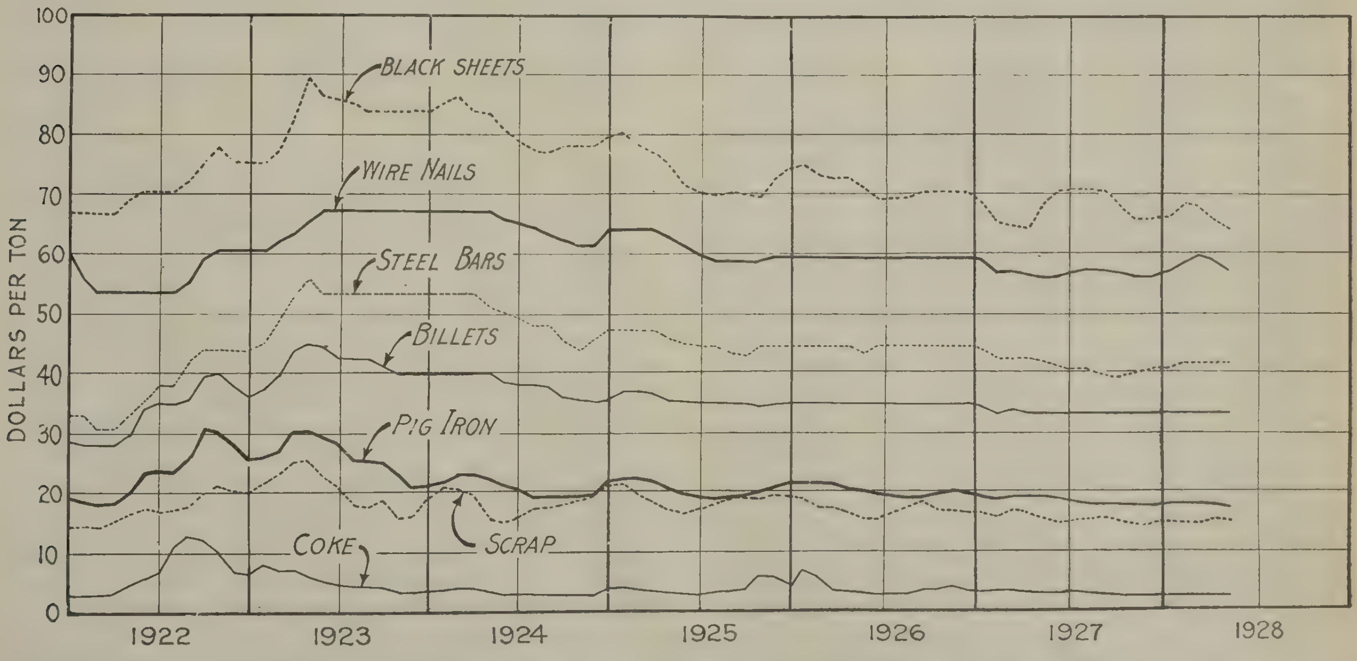


Fig. 3—Finished Steel Prices (in Particular, Sheets and Nails) Are Relatively Low, Compared with Semi-Finished and Raw Materials. But supplies are more abundant than demand and sustained improvement is not indicated

coke, it is true, are practically at bed rock figures, and so is pig iron. Any further decline must be very small.

But what reason is there to expect advances during the present quarter? We can see none. Supplies are abundant while demand is sagging. The general trend of commodity prices is downward. Much the same can be said of sheets and nails. The spread between the prices of pig iron and coke, on the one hand, and sheets, on the other, is about as small as can be expected, while nails can go little lower. But there appears to be no reason for an advance in these items of finished steel before September, at least. Thus a reduction in semi-finished steel appears to be in order.

It is pertinent to observe that rarely do sheets and nails decline, as they did in April and May, without a reduction in the prices of both bars and billets.

IRON AND STEEL INTO CUBA

American Supremacy Continues, Though Europe Is Making Gains on Price Basis

WHILE the United States is credited with supplying from 75 to 90 per cent of the importations of iron and steel products into Cuba, the United Kingdom, Germany, and Belgium in particular, are steadily increasing their proportionate share, according to a report transmitted by Charles F. Payne, vice-consul, Havana. The statement shows importations into the Havana district by metric tons for the calendar years 1924-1927, inclusive, and affords a good index of the total importations, because of the outstanding importance of this district and port in Cuban trade and industry.

Of the total Cuban importations of iron and steel in 1926, amounting to 118,342 tons, 88,558 tons or 74.8 per cent entered the Havana district, while in 1925 75 per cent went through the Havana district. The total importations for 1927 have not yet been received, but the movement through the Havana district was 90,836 tons, or 2 per cent ahead of 1926.

At one time, it is pointed out, all iron and steel imported into Cuba came from the United States. But the past three years have indicated an increasing tendency on the part of local consumers to import greater quantities from the principal European makers. The price of sugar is the barometer of the Cuban iron and steel trade, as well as for almost every other industry of the island. When this price is depressed, as it has been for some time past, the preferences of the local importers tend more and more to be determined by the price, while the advantage of prompt and accurately timed delivery, rapid shipment and sales service are waived in corresponding degree. At the moment the prices quoted in the Cuban market on European steel are reported to be, in several instances, as much as 25 per cent under American steel prices.

Imports of Iron and Steel Products into the Havana Consular District

(In Metric Tons)

Products	1927*	1926	1925	1924
Pig iron	1,352	1,326	478	354
Iron bars, beams, etc. (cast)	4,492	6,502	6,498	5,544
Other manufactures of iron (cast)	3,760	3,817	6,236	5,719
Iron and steel bars and rods	29,200	39,631	37,867	37,296
Plates and sheets	11,894	7,575	8,843	7,973
Wire and cable	3,154	3,233	3,112	2,426
Iron and steel (in pieces)	4,721	1,757	1,547	1,291
Galvanized sheets	4,684	2,755	5,803	5,460
Manufactures of galvanized iron	634	462	604	1,034
Metal screen	213	92	59	320
Pipe and fittings	7,699	5,940	6,896	4,329
Rails	5,686	2,500	3,484	5,989
Other manufacturers	13,347	12,968	16,381	17,239
Total	90,836	88,558	97,808	94,974
Total Cuban imports	....	118,342	130,195	176,395
Percentage through Havana	....	74.8	75.0	53.8

*Preliminary and subject to revision. Statistics for trade of all Cuban ports not yet available.

The Cuban tariff, which became effective Oct. 25, 1927, seems designed to protect and encourage home industries. Cuba, it is stated, already has important and rather well developed iron and steel working shops and foundries, and the local manufacture of a variety of products is increasing. The new tariff, while not expected materially to affect the trade in many lines, will probably strengthen the position of the existing industry at the expense of some products now imported.

In addition to affording protection to the local industry, the new tariff encourages the importation of a number of products, such as wrought pipe, bars and beams, by reducing the duties borne by them. This reduction, although affecting the importation from all sources, seems to favor products of the European steel industry to some extent, it is declared, although it still requires that goods imported from the Continent pay a higher duty than those received from the United States.

The report states that the Cuban market for cast iron pipe has been invaded by a type of pipe of Italian manufacture—consisting principally of cement and asbestos—which, it is held, enjoys the dual advantage of lower price than its competitor together with, it is claimed, a much longer life. Several installations of this pipe are said to have been made already.

Iron and steel bars and rods constitute the largest items of importation into Cuba, with plates and sheets in second position. These two made up about 45 per cent of the 1927 entry, against 53 per cent in 1926.

SHEET STEEL SALES

May Off 12 Per Cent from April and Unfilled Orders 15 Per Cent

SHIPMENTS of sheet steel during May held up close to the April rate, being 326,324 tons for the month as compared with 327,674 tons for April, according to the monthly report of the Sheet Division of the National Association of Flat Rolled Steel Manufacturers, 511 Terminal Tower Building, Cleveland. However, shipments exceeded sales by 76,008 tons. Sales for the month were 250,316 tons, a loss of 33,754 tons as compared with April, the decline evidently reflecting a slackening in the demand from the automotive industry. While sales fell off, production increased 21,458 tons and exceeded shipments by 23,043 tons. Unfilled orders on June 1 were 527,477 tons, a decrease of 44,284 tons from May 1. The May report and comparisons follow:

	May	April	March
Total number of mills	721	721	721
Capacity per month	506,000	464,422	492,150
Percentage reporting	72.2	72.2	72.3
Sales	250,316	284,070	399,441
Production	349,367	327,909	366,127
Shipments	326,324	327,674	359,532
Unfilled orders	527,477	571,761	675,196
Unshipped orders	112,664	109,200	110,702
Unsold stocks	54,047	53,853	53,144
Percentages of Capacity			
Sales	68.5	84.7	112.4
Production	95.6	97.8	103.0
Shipments	89.3	97.7	101.1
Unfilled orders	170.4	170.4	189.9
Unshipped orders	30.8	32.6	31.1
Unsold stocks	14.8	16.0	15.0

Fabricated Structural Orders in May Exceeded Only Once

WASHINGTON, June 19.—Orders for fabricated structural steel in May totaled 246,963 tons, according to reports received by the Department of Commerce from 196 firms with a monthly capacity of 294,435 tons, making operation at the rate of 84 per cent. This was a sharp increase over April, when reported orders were 189,873 tons, or 63 per cent of the 302,175-ton capacity of the 218 reporting firms. Computed bookings in May were 315,000 tons, against 236,250 tons in April. May shipments were computed at 266,250 tons, or 71 per cent of capacity, compared with 240,000 tons, or 64 per cent of capacity, during the preceding month.

May orders (computed) were the largest since last July; with that exception, they were the greatest ever reported. Shipments in May, however, were exceeded by those of August and September, 1927, and those of June, 1926, and were closely approached by the 265,350 tons of October, 1925.

Continental Prices Continue Strong

Consumers Cautious in Buying for Forward Delivery—Welsh Tin Plate Mills Operating Full—British Iron Dull

(*By Cable*)

LONDON, ENGLAND, June 18.

CLEVELAND pig iron business is at a low ebb, but makers' order books are well filled and prices are being maintained. Scottish output is to be reduced by blowing out more furnaces.

Hematite continues dull. The Consett Iron Co. has blown out one furnace and prices are sagging as a result of extensive stocks. Foreign ore is quiet but the price of Bilbao Rubio is well maintained through continuance of the Swedish strike and an advance appears likely.

Finished iron and steel is generally quiet with but little export demand of a substantial nature. Nasmyth, Wilson & Co., however, have secured a contract for 18 locomotives for India. New shipbuilding contracts are scarce, but constructors of dwellings and engineering plants are moderately active. Baldwins, Ltd., has announced a financial reconstruction plan, involving writing off nearly £4,000,000 of capital. This reorganization is believed to be the forerunner of other similar developments.

Tin plate continues active and with prices advancing many makers are refusing to sell for forward delivery at less than 18s. 6d. ($4.51) per base box, f.o.b. works port and 18s. 9d. ($4.58) per base box is being paid for prompt shipment. Demand is well distributed and works are operating at practically full capacity.

Galvanized sheets are quiet. Far Eastern demand for black sheets has slackened, but works are well sold ahead.

Demand in Continental iron and steel market is light and some prices are weakening slightly, but makers' order books are generally well filled for three to four months and consumers are cautious in making forward commitments. There is a heavy demand for Welsh tin plate bars and official prices are unchanged, but some sellers are asking up to £6 5s. ($30.44) per ton delivered and foreign bars are quoted at £5 12s. 6d. ($27.40), but deliveries are extended.

British Pig Iron Firm but Steel Market Is Depressed

LONDON, ENGLAND, June 8.—The iron and steel market has continued dull, and, with the exception of tin plate, which continues active, the volume of business is only meager. Business was curtailed by the Whitsun holiday and, since then, depression, particularly in pig iron, has become more acute. Production of pig iron is declining steadily, and the output on the Northeast coast in April was only 168,000 tons, with steel production at 142,800 tons, while exports from the Tees in May were 16,300 tons of pig iron and 55,000 tons of steel.

The producers of Cleveland pig iron are perhaps in a better position than their competitors, as their books are moderately well filled and their output is restricted, while competition from Continental makers is less severe, as European prices have been advanced. Nevertheless, purchasing by domestic foundries is small and demand for hematite iron by steel makers is at a minimum. Hematite stocks are large, one maker alone having 50,000 tons in his yards, so that there is not much stability to prices, but Cleveland producers of foundry and forge iron are able to hold their own.

In semi-finished material there has been some improvement, as the margin between the prices of British and foreign material has been reduced by increased Continental costs. Makers of Welsh tin plate bars, following the revival in the tin plate market, have booked a large tonnage, but, because of the dullness in the heavy steel trade, there is an acute shortage of scrap. This has made the tin plate bar market very strong, and, as a result, tin plate is firm, with prices likely to advance.

The volume of new shipbuilding contracts being placed is smaller than the amount of work being executed, and plate mills are feeling the depression. No

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.	to £0 17¾s.	$4.27	to $4.33
Bilbao Rubio ore*	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15,83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 5		15.83	
East Coast mixed	3 9	to £3 10s.	16.81	to $17.05
East Coast hematite.	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 5	to 6 15	30.44	to 32.88
Ferromanganese	13 15		66.97	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	6 0		29.22	
Tin plate, base box.	0 18½	to 0 18¾	4.51	to 4.58
Black sheets, Japanese specifications.	13 7½		65.14	
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 0	to 10 10	1.95	to 2.28
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	9 0	to 10 0	1.95	to 2.17
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Galv. sheets, 24 gage	13 5	to 13 7½	2.88	to 2.95
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	$15.34	to $15.83
France	3 3	to 3 5	15.34	to 15.83
Luxemburg	3 3	to 3 5	15.34	to 15.83
Basic pig iron (nom.)				
Belgium	3 0	to 3 1	14.61	to 14.85
France	3 0	to 3 1	14.61	to 14.85
Luxemburg	3 0	to 3 1	14.61	to 14.85
Coke	0 18		4.39	
Billets:				
Belgium	4 15		23.14	
France	4 15		23.14	
Merchant bars:			C. per Lb.	
Belgium	5 14	to 5 16	1.26	to 1.28
France	5 14	to 5 16	1.26	to 1.28
Luxemburg	5 14	to 5 16	1.26	to 1.28
Joists (beams):				
Belgium	4 18½	to 5 0	1.08	to 1.10
France	4 18½	to 5 0	1.08	to 1.10
Luxemburg	4 18½	to 5 0	1.08	to 1.10
Angles:				
Belgium	5 10	to 5 12½	1.21	to 1.23
⅛-in. plate:				
Belgium (a)	6 12½		1.45	
Germany (a)	6 12½		1.45	
3/16-in. ship plate:				
Belgium	6 8		1.41	
Luxemburg	6 8		1.41	
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

improvement is evident in the export markets. Although it is thought that a reduction in prices might induce more buying, mills decline to grant any further concessions. There is continued discussion of central selling as a remedy for the small volume of export trade, but makers seem to be unable to agree on such a plan.

INDIA BUYS MACHINERY

United States Proportion Growing Slowly, But Great Britain Dominates Market

Imports of industrial machinery into India, excluding railroad locomotives, electrical equipment, agricultural machinery, sewing and knitting machinery and typewriters, during the fiscal year ended with March, 1927, amounted to $36,656,146, of which $3,325,616, or 9.06 per cent, represented shipments from the United States and Canada, according to a statement prepared by R. G. Matthews of the Department of Commerce, Washington. It is estimated that less than one-third of 1 per cent of the latter amount came from Canada, while the portion from that country for the fiscal year 1925-1926 was less than one-half of 1 per cent. The value of imports from the United States and Canada in 1925-1926 was $3,651,164, or 8.63 per cent of the total value of $42,316,438.

Imports from the United Kingdom during 1926-1927 were valued at $29,106,588, or 79.44 per cent of the total, against $34,136,025, or 80.67 per cent, for the preceding year. Imports from Germany and Austria were valued at $2,551,252, or 6.95 per cent, in 1926-1927, against $2,420,183, or 5.72 per cent, during the preceding year.

In the classification of "prime movers," including oil engines, steam engines, gas engines and other forms of engines, exclusive of locomotives and their parts, the United State increased its total volume of business approximately $47,138 in 1926-1927 as compared with the preceding year. This came about through increases in the amount of steam engines and parts purchased, and in gas engines and parts. The United Kingdom lost about $362,000 in shipments of oil engines and parts to India, while Germany's gain was insignificant.

There was a decrease of $979,020 in imports of mining machinery, American shipments declining $507,640 and British shipments by practically the same amount. German equipment more than doubled, gaining approximately $271,770. Imports of refrigerating machinery made a gain of about $126,910, the United Kingdom more than doubling its contributions, which were increased $101,528, but American shipments increased only $616. Germany showed a slight gain.

The United States was able to increase its entry of metal-working machinery by $6,526, while the United Kingdom's amount dropped almost $181,300 and that from Germany decreased about $45,325. Imports of sawmill and wood-working machinery from the United States more than doubled, increasing by $29,153. The United Kingdom received practically five times as much business as the United States, but showed a decrease of $25,382, while German shipments dropped $18,855. Miscellaneous industrial machinery showed the greatest increase of imports from the United States—in all, approximately $249,468, while the United Kingdom had an increase of $38,073 and Germany, $67,071. This classification includes construction machinery, dredging machinery, excavators, etc.

DUTY ON SMALL SHAPES RAISED

Bar-Size Angles, Channels and Tees Reclassified as Subject to Bar Instead of Structural Rate

NEW YORK, June 19.—A decision of the United States Treasury Department, approved June 2, classifies bar-size angles, channels and tees under paragraph 304 of the tariff act, which covers bars, instead of under paragraph 312, relating to structural material. As a result, the duty is advanced from the former rate of 20c. per 100 lb. to the bar duty of 30c. per 100 lb.

It appears as the result of an investigation, says the decision, that angles, channels and tees in sizes less than 3-in. are distinguished in the trade from the larger sizes of the said articles and that the smaller sizes are known as angle bars or angles, bar size; as channel bars or channels, bar size; and as tee bars or tees, bar size. The decision, which is in the form of a letter to the Collector of Customs, continues: "The appraiser further states that the smaller sizes referred to are produced on a bar mill and are chiefly used as metal lath to support plastering and in other finishing and fireproof work and are in no way associated with structural sizes or employed in structural uses.

"In forwarding the letter from the appraiser you state that there were submitted, from several domestic firms, letters which support the view that steel angles, channels and tees in sizes less than 3 in. are bought and sold on a bar basis and not on the basis of structural shapes, and that an inspection of the price lists of the firms referred to shows a distinction is made therein between angles, channels and tees, structural, and angles, channels, and tees, bar sizes.

"In view of the appraiser's report and a perusal of the price lists submitted, the department is of the opinion that the articles under consideration, when in sizes less than 3 in., are not known as structural shapes as that term is used commercially, and in view of the well established principle that the commercial designation of an article ordinarily governs its tariff classification the department concurs in the opinion expressed by you that all of the articles enumerated, when less than 3 in. in size, are excluded from classification under paragraph 312 and are properly dutiable under paragraph 304 of the said act. However, as the rate of duty under paragraph 304 is higher than that under paragraph 312, the higher rate should not be imposed except upon merchandise entered for consumption or withdrawn from warehouse for consumption after 30 days after the date when this letter appears in the weekly Treasury Decisions."

While the decision makes no reference to the decision on reinforcing bars rendered early in February by Justice I. F. Fischer of the United States Customs Court, Second Division, it is perhaps noteworthy that in both cases the intended use of the materials in question is stressed. Justice Fischer said: "We are of the opinion that within all the prevailing decisions on the subject these deformed bars are structural shapes, since that is their chief, if not exclusive, use. Certain it is that they are *ejusdem generis* with the beams, girders, joists, angles, channels and other structural shapes enumerated in paragraph 312. We therefore sustain the claim alleged in the protest under the latter paragraph and reverse the decision of the collector in each instance as to this merchandise."

The decision on deformed steel bars, which classifies them as construction material under paragraph 312 with a duty of 0.2c. per lb., instead of paragraph 304

IMPORTS OF INDUSTRIAL MACHINERY INTO INDIA FROM THE PRINCIPAL SUPPLYING COUNTRIES

Country of Origin	1924-25		1925-26		1926-27	
	Per Cent of Total	Value of Imports *	Per Cent of Total	Value of Imports *	Per Cent of Total	Value of Imports *
United States and Canada	8	$3,131,932	8.63	$3,651,164	9.06	$3,325,616
United Kingdom	84	32,885,283	80.67	34,136,025	79.44	29,106,588
Germany and Austria	4	1,565,966	5.72	2,420,183	6.95	2,551,252
Japan	0.5	195,746	0.24	102,617	0.18	68,240
Other countries	3.5	1,370,220	4.74	2,006,449	4.37	1,604,450
	100	$39,149,147	100	$42,316,438	100	$36,656,146

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*American dollars.

with a duty of 0.3c. per lb., has been appealed by the Government and is expected to come before the Customs Court of Appeals on the fall calendar.

Importers of European steel may appeal from the decision of the Treasury Department on bar-sized angles, channels and tees, but no definite action has been taken as yet. In the first four months of this year a total of 58,395 gross tons of structural shapes and building forms were imported into the United States, with a value of $1,812,050. As the statistics of the Department of Commerce do not classify the smaller, bar-size shapes, separately, there is no method of determining how much of this total consisted of material that will be affected by the Treasury Department decision increasing the duty.

Poldi Steel Works Not Member of Steel Cartel

A report received by the Department of Commerce, which was published in THE IRON AGE, May 3, stated that the Skoda Steel Works and Poldi Steel Works had refused to pay a share of the International Steel Cartel fine on Czechoslovakian works for overproduction.

According to the Poldi Steel Corporation of America, 245 West Eighteenth Street, New York, this report was in error, as the Poldi Steel Works is not and never was a member of the steel cartel. Consequently, it is pointed out, the Poldi Steel Works was not bound to make any payments and, in fact, no overproduction fines whatever were assessed against it.

"The report," says the Poldi Steel Corporation, "is due to an error caused by the fact that, on the occasion of the allotments being assigned, the Czechoslovakian Iron Works arranged for the production of the Poldi Steel Works to be included in the Czechoslovakian steel production. The Czechoslovakian Iron Works did so upon its own risk and actually took charge of all obligations and payments resulting from this action.

"Some time ago the Czechoslovakian Iron Works requested the Steel Cartel to agree to the production of the Poldi Steel Works being exempt from the amount on the basis of which the quota was assigned. The Poldi Steel Works, however, had nothing to do with this matter."

To Concentrate Manufacturing at Two Plants in Place of Seven

Established by Oliver Ames in 1774, the Ames Shovel & Tool Co. for 154 years has been a leader in the shovel industry of the United States. Its present plant in North Easton, Mass., was built for the most part between 1850 and 1875. Its building and machinery cannot, in any sense, be considered modern. The company has for several years been making a comprehensive survey to determine the necessary steps to modernize the business.

At present the company has seven plants—four blade factories and three handle factories—located in North Easton, Mass., Cheltenham, Pa., St. Louis, Anderson, Ind., Cumberland, Me., New Albany, Ind., and Paris, Tex. After careful analysis the executives concluded to concentrate manufacturing at two points —the Eastern plant at North Easton, Mass., and one Western plant. This means that a complete new shovel plant will be built at North Easton and, by concentration of production at that point, output will be greatly increased.

No change in the policies of the company will be made and it is hoped that the quality of the Ames shovel can be improved by the new facilities. It is an interesting fact, in passing, that Ames shovels have been carried by soldiers of the Revolutionary War, the Civil War and the World War and have played a major rôle in the building of American railroads.

In connection with the expansion program at North Easton, new lines of manufacture, as feasible, will be added to shovel manufacturing. The company has as associates in building the new plant certain executives of Stone & Webster, Inc. The headquarters is being moved from Boston to North Easton, and all Eastern executives of the company will take up residence at North Easton.

EXPORT BUSINESS SMALL

Higher European Prices Help American Mills—Duty on Furring Channels Increased

NEW YORK, June 19.—A moderate volume of export business continues to be done with South America, which has been a rather consistent buyer of European material until recently, when Continental prices began to advance. The orders are small and generally for prompt shipment, mainly covering galvanized sheets, wire and wire products.

Exports to China show no improvement as yet and business with Japan is still limited. The Tokio subways have been inquiring for 370 tons of 100-lb. rails, Pennsylvania sections, and 160 tons of 90-lb. rails, A. R. A. Type E, with accessories, and about 50 tons of tie plates. Bids opened June 15.

New York importers of European steel report continued inactivity, with foreign prices at a high level. There have been no further advances by Continental mills, and on some small sizes they are evidently willing to accept orders for fairly early delivery. Plain steel bars cost importers about 1.79c. per lb., duty paid, New York, and sales are reported to have been made to consumers in the metropolitan district at 1.92c. per lb., ex-dock. Structural shapes cost importers about 1.70c. per lb., duty paid, and sell at 1.80c. to 1.85c. per lb. from the dock.

The recent decision of the Treasury Department classifying bar-size channels, angles and tees under the bar paragraph of the tariff act, instead of as structural material, will increase the cost to importers by $2 a ton. While imports in recent weeks have not been large, for a number of months there has been a fairly active business in furring channels from Continental mills and the new rate of duty may considerably curtail this trade, unless importers are able to absorb the increased duty and still have a profit.

Researches for British Navy Rapidly Expanding

Governmental research in Great Britain has had a marked growth over pre-war years. *Engineering*, June 8, analyzes appropriations for naval research which indicate this growth clearly. A bill providing for "scientific services" for the coming year includes scientific research, and appropriates £503,894, compared with £99,648 in 1914-15. Personnel is now 1207, compared with 128. In the former year the bulk of the money went for the Greenwich and Cape of Good Hope observatories, for the nautical almanac and for chronometers for the navy. The following important items have no counterpart in pre-war appropriations:

Experiments on ship propulsion	16 persons	£4,728
Staff subject to special assignments	177 persons	£89,057
Researches at National Physical Laboratory	75 persons	£14,941
Oil engine research	57 persons	£14,385
Electrical machinery research	27 persons	£6,709
Chemical warfare in the navy	58 persons	£16,131
Cordite investigation	8 persons	£4,187
Grants to other laboratories		£126,752
Mines and anti-submarine investigations	197 persons	£34,141
Wireless and signalling	179 persons	£29,883

The numbers include naval officers whose pay is carried in other accounts. Other appropriation bills have carried amounts for specific investigation as follows:

Armor and gun mounts	£79,000
Torpedoes, mines and explosives	£142,000
Extensions to laboratory equipment	£47,000

Excluding certain routine activities, and including money from other sources, our British contemporary estimates that during the next year at least 1000 persons will be engaged strictly in research work for the British navy, and will expend more than £625,000. Similar work in 1914 came to no more than £20,000. The sum was then about 1 per cent of the money spent on new ships; it now amounts to about 7 per cent, and is equivalent to the cost of two destroyers or submarines.

Little Change Shown in Productive Activity

Measurement of productive activity, based upon consumption of electric energy in about 3000 manufacturing plants, as collected by *Electrical World*, shows in May a fractional decline from April. With the index of 100 representing the average monthly activity of 1923-1925, the May index is 119 against 119.3 for April. For the first five months of the year the average index has been 120.5, against 117.3 for the first five months last year.

Taking the metal industries as a whole, May showed a slight gain over April, standing at 123.6 against 123.2 a month earlier, and comparing with 116.7 in May, 1927. For the first five months the metal industries index was 124.6 against 117.3 a year ago. The rolling mill and steel plant group, included within the metal industry, showed 125 for May against 125.4 for April. In the first five months it was 128 against 123.8 a year ago. Metal-working plants, both ferrous and non-ferrous, and excluding the rolling mill and steel plant group, made a gain in May, showing 122.7 against 121.7 in April, and both comparing with 109 in May, 1927. For the first five months the record was 121.4 against 110.4 a year ago.

Gain in British Iron and Steel Output in May

LONDON, ENGLAND, June 18 (*By Cable*).—Production of pig iron in May was 591,500 gross tons, and that of steel, including castings, was 752,700 tons.

A comparison of the May output with that of the four months of the year and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons.	Steel Ingots and Castings, Tons
1913—Average monthly......	855,000	638,600
1920—Average monthly......	669,500	755,600
1922—Average monthly......	408,500	490,100
1923—Average monthly......	620,000	706,800
1924—Average monthly......	609,900	685,100
1925—Average monthly......	519,700	616,400
1926—Average monthly......	203,500	296,700
1927—Average monthly......	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700

Portland Cement Production in 1927

Production of Portland cement in 1927 is given by the United States Department of Commerce at 173,206,513 bbl., the largest total in the history of the industry. It represents a growth of more than 5 per cent above the previous record of 164,530,170 bbl., made in 1926. Shipments were slightly below production in both years, the value of shipments in 1927 having been $278,854,647, at an average factory price of $1.62 a barrel, compared with $1.71 in 1926. Stocks on hand at the end of the year increased from 20,740,187 to 22,081,922 bbl. These are the final annual figures for the industry.

Increase in Mechanical Stokers Sold

Mechanical stokers sold in May numbered 130, of 38,705 hp., according to the Department of Commerce. This is a substantial gain over the 88 units of 31,043 hp. in April, but is otherwise the smallest since January. It compares with 97 units and 43,601 hp. in May, 1927, and with 129 units and 48,482 hp. in May, 1926. Total for the first five months aggregate 183,388 hp., compared with 201,411 hp. last year.

Shipments of enameled sanitary ware in April showed a seasonal increase, according to figures of the Department of Commerce. The total number of pieces shipped aggregated 407,705, compared with 381,395 in March and with 374,614 a year ago. Shipments of bath tubs were 105,718 in April, this being the largest number since last August.

Farm Machinery Production Remains High

Total production of farm equipment in the United States in 1927 was valued at $459,574,443, compared with $461,399,528 in 1926 and $391,812,436 in 1925, according to data collected by the Bureau of Census at the annual canvass of manufacturers. Tractors furnished more than 34 per cent of the total in 1927, with harvesting machinery, far lower, in second place at 12 per cent. Machines for preparing harvested crops, plows and listers, and planting and fertilizing machinery followed, in that order, each with between 5 and 8 per cent of the total.

British Exports Gain and Imports Decline

WASHINGTON, June 19.—Exports of iron and steel products from the United Kingdom in May totaled 359,017 gross tons, compared with 344,333 tons in April, an increase of 14,684 tons, or 4.1 per cent, while imports amounted to 236,852 tons, compared with 252,677 tons, a decrease of 15,825 tons, or 6.3 per cent, according to cablegrams received by the Department of Commerce from London.

The May export movement was the greatest of the current year except in March, when outgoing shipments aggregated 409,297 tons. Of the 22 classes, however, only 10 reflected gains in May compared with April. The principal increases were in pig iron, which gained 13,273 tons, mounting to 45,084 tons; tin plate, which increased by 9123 tons to 47,358 tons; plates and sheets, gaining 7715 tons to a total of 47,431 tons; wrought tubes, increasing by 6291 tons to 24,923 tons, and cast tubes, increasing by 3981 tons to 12,097 tons. Exports of rails declined sharply, falling 21,892 tons to a total of 22,206 tons.

The reduction in imports was confined to only seven of the 19 classes, the remaining 12 showing gains. The sharpest drop was in steel ingots and in semi-finished steel, which declined 24,361 tons to 95,590 tons.

The generally improved tone of export trade was reflected in the production of pig iron and steel. Blast furnace production of iron in May totaled 590,500 tons, compared with 555,000 tons in April and the monthly maximum of 592,000 tons in March. Ingot production was 752,700 tons, compared with 644,100 tons in April. At the end of May there was one less furnace in blast than in April, the total being 148. There was an increase of two open-hearth furnaces in operation, bringing the total to 261.

Wholesale Prices Advance Again

Wholesale prices in May, as reported by the United States Bureau of Labor Statistics, showed a substantial advance over April, standing at 98.6 per cent of the 1926 average, compared with 97.4 in the earlier month. Both were considerably above the 93.7 reported for May, 1927. The increases were participated in by most of the major subdivisions of the 550 prices comprised within the index. Some of these increases, however, were fractional. The largest was that in farm products, which advanced from 107.6 in April to 109.8 in May. Metals and metal products went up from 98.4 to 98.6, iron and steel showing a fractional decline, while non-ferrous metals and automobiles advanced slightly.

Finished products showed an advance from 95.9 to 97.1, compared with a gain from 97.9 to 98.6 for semi-manufactured articles and one of 100.1 to 101.4 for raw materials. The advance for non-agricultural commodities was from 94.7 in April to 95.6 in May. All of the groups mentioned in this paragraph were considerably higher in May, 1928, than they were a year earlier.

Total apparent consumption of babbitt metal in May, based on reports received by the Department of Commerce from 31 firms, was 4,606,899 lb., compared with 4,842,656 lb. in April and 4,945,705 lb. in May, 1927.

Organize to Secure Delegates to Engineering Congress in Tokio

A movement to marshal a large delegation of engineers from the United States to attend the first World Congress of Engineers to be held in Tokio, in October, 1929, has been organized under the chairmanship of George W. Fuller, 170 Broadway, New York. Elmer A. Sperry, Manhattan Bridge Plaza, Brooklyn, will lead the American delegation; Herbert Hoover is honorary chairman of the committee.

A special committee will organize local cooperative committees throughout the United States (which would include the local sections of the national engineering societies as well as independent engineering clubs and societies) to inform engineers generally of the aims and objectives of the World Congress.

Engineering colleges plan to raise by subscription among the alumni a testimonial fund to send members of their faculties whom the alumni would wish to honor for notable services to their institutions.

Baron K. Furuichi is president of the congress; the permanent address is Nihon Kogyo Club, Tokio, Japan. According to preliminary announcements from Japan, sectional meetings will be organized to cover all branches of engineering, applied science and engineering administration, and technical papers and topical discussions will be heard. Papers will be in either English or Japanese, limited to 8000 words, and must be submitted before April 1, 1929. General meetings will also be held, as well as an attractive group of social gatherings and excursions throughout Japan and Manchuria.

Detailed information may be had from Maurice Holland, 29 West Thirty-ninth Street, New York.

Conference on Human Relations in Industry

The eleventh annual conference on human relations in industry will be held at Silver Bay on Lake George, N. Y., Aug. 29 to Sept. 2, under the auspices of the industrial department of the National Council of the Young Men's Christian Associations. Among the speakers will be Howard Coonley, president Walworth Co., Boston; Bryce Stewart, Industrial Relations Counselors, Inc., New York; Prof. Michael Pupin, Columbia University, New York, and C. J. Hicks, assistant to president Standard Oil Co. of New Jersey, New York.

Edward D. Dee, Western Electric Co., New York, will be chairman of a sectional conference at which the topic for discussion will be "The Foreman as a Personnel Developer." Frank Whiting, general claims attorney New York Central Railroad, will lead a conference on "Pensions and Retirement Plans," and J. W. Dietz, Western Electric Co., Kearny, N. J., will preside over sessions on "Personal Service to Operating Departments." Other sessions will be devoted to "Economic Incentives," "The Scientific Approach to Industrial Relations" and "Personal Problems and Work Efficiency."

Arthur H. Young, Industrial Relations Counselors, Inc., New York, is chairman of the committee in charge of the Silver Bay conference.

Blast Furnace and Coke Oven Association Elects Officers

Continuing the policy of rotation in office, B. W. Winship, superintendent of coke works Bethlehem Steel Co., Steelton, Pa., who has been vice-president Eastern States Blast Furnace and Coke Oven Association, was elected president of the association at the annual meeting held at the Edgewood Country Club, Edgewood, Pa., June 12. W. A. Haven, superintendent northern furnace Republic Iron & Steel Co., Youngstown, Ohio, who has served the past year as secretary-treasurer, was elevated to the vice-presidency, and James E. Lose, assistant general superintendent Homestead works Carnegie Steel Co., was elected secretary-treasurer.

This meeting brought together approximately 150 men interested in the operation of blast furnaces and coke plants in the eastern half of the country. B. F. Fairless, president and general manager Central Alloy Steel Corporation, who was to have been the principal speaker following the banquet, was unable to be present, and in his stead Edward A. Portz, general superintendent of that corporation, made a plea for cooperation on the part of the coke oven and blast furnace men with the steel producers in the solution of the ever-growing problem of manufacturing steel of a quality which would meet the exacting demands now imposed by almost all consumers.

Mr. Portz's subject was "Importance of Coke and Pig Iron in the Production of Quality Steel." He stressed the importance of proper testing of coke as prerequisite in making good pig iron, stating that coke is the most important single factor in the production of iron. Uniformity in pig iron quality calls for uniformity in blast furnace operation, he said, and proper grading and testing of coke would be a big help in attaining that end.

John W. Hacker, superintendent of coke works Central Alloy Steel Corporation, chairman of the coke committee of the association, in his report suggested that members study and report on the relation between coke in the tumblers and in the furnace. He referred to a recent article in *Stahl und Eisen*, in which the author described a test in which the pressure in the furnace is duplicated. F. W. Sperr, Jr., Koppers Co., Pittsburgh, chairman of the committee on phenol determination and disposal, reviewed briefly the work of that committee and indicated that a printed report would be available for members later.

Mechanical Engineers to Hold Aeronautical Meeting

The American Society of Mechanical Engineers will hold its annual aeronautical session concurrently with the Air Olympics at Detroit next week. From 500 to 1000 aeronautical engineers are expected to attend. The convention opens June 28 and closes with the Air Olympics "field day" at Ford Airport on June 30. In addition to six technical sessions, at which papers will be read on transport, power plant, design, airways and airships, there will be a joint session with boy builders of airplane models, at which Prof. A. Klemin of New York University will demonstrate a 20,000-photographs-a-second motion picture film of the Japanese Aeronautical Institute.

Five major aeronautical events will feature the Air Olympics at Ford Airport, June 30. The National Air Tour, in which more than 25 ships will compete for the Edsel B. Ford trophy, will start from the airport at 10 a.m. in a 6000-mile reliability contest in which at least 30 cities will be visited, including San Antonio, Tex., Los Angeles, Cal., and Seattle, Wash. In the afternoon the seventeenth Gordon Bennett International Balloon Race, in which eight countries will be represented, will start from the same field.

Some 500 boys from all parts of the country are expected to attend the Air Olympics to exhibit their model airplanes in the Boys' Model Airplane Contest at the airport, sponsored by the Airplane Model League, an organization in which 150,000 boys are enrolled. Another feature of the Air Olympics program will be an exhibition of glider flying by the German champion glider team now in this country.

Second Canadian Steel and Power Show

Canada's second Steel and Power Show will be held at the University of Toronto Arena, Toronto, Ont., Sept. 4 to 7. Campbell Bradshaw, 24 Front Street, West, Toronto, is executive director of the exhibition.

Establishment of the Holland Institute of Thermology, to conduct researches into various phases of the relation of humidity, temperature and circulation of air to public welfare has been announced by A. H. Landwehr, president of the Holland Furnace Co., Holland, Mich. It will attempt to solve some of the heating and ventilating problems of the construction industry, study the effect of humidity upon various industrial products used in homes, and investigate problems connected with industrial housing and the efficiency and working conditions of workers in shops and offices.

TO LINK PLANES AND SHIPS

Combined Service at High Speed Insures Development of Our Merchant Marine

IT is inevitable that ships of the air and ships of the sea will work together. The Jones-White bill which President Coolidge signed recently makes it possible for American shipbuilders and operators to develop profitably American shipping which will coordinate air and ocean traffic. So writes Laurence R. Wilder, general manager of the Transoceanic Corporation of the United States, in the *American Mutual Magazine*, published by the American Mutual Liability Insurance Co., Boston.

Ships of new and distinctly American type, he states, will result from the enactment of the Jones-White law. The very fact that we have not built a single ship for foreign service in America in the past seven years, and that we have built only two important deep-water ships for coastwise service, becomes suddenly and unexpectedly an advantage. Our foreign competitors are committed by 8,000,000 tons of shipping to the present type of ship. We are not committed at all in any way.

For more than 15 years airplanes have been recognized as reliable, Mr. Wilder said, but ships have not yet been designed, for commercial service, to include aircraft in their operation. But the country which built the giant navy airplane carrier Saratoga will build commercial Saratogas to carry passengers, mail and express freight across the North Atlantic, and to accommodate airplanes. As on the Saratoga, the masts and funnels and the bridge of these new ships will be set to one side; the whole top deck will be clear to receive and send off airplanes.

By use of airplanes, today's mail will catch yesterday's ship out at sea, and tomorrow's mail, by flying ahead of the ship, will be delivered today.

Not only in the type of ship have the foreign nations been lagging. They have been offering bigger and more luxurious vessels, but they have not been increasing speed. The Mauretania, 21 years old, is still the fastest. Three-quarters of all those who travel across the North Atlantic are Americans. If they are given faster ships with greater comfort, they will ride on these ships. The Transoceanic Corporation is formed to supply that need. Its ships have been designed to maintain a speed of 33 knots at sea. Similar speeds have been attained by naval craft and the corporation proposes to do for peaceful commerce only what has already been done in preparation for war.

Bar Iron Wage Scale to Be Based on a 1.90c. Minimum Price

The agreement reached in the bar iron wage scale conference in Atlantic City, mentioned in THE IRON AGE of June 14, calls for a continuance of the 1927-28 rates for another year, but with the understanding that the minimum base will be on a 1.90c. card rate. As the last bi-monthly examination of sales records disclosed an average price of 1.85c. per lb. for bar iron, puddlers have been getting $11.05 per gross ton for boiling. They now are assured of $11.30, even if the next examination of the sales records does not show an increase in the average sales price. There is a corresponding adjustment in the wages of other men employed in bar iron plants.

One Means to Enhance Profits

In the June 15 issue of the "Monthly News Bulletin" of the commercial standards group of the Department of Commerce appeared the following case for adoption of standards in manufacturing:

"A well-known manufacturer of parts supplied a score or more of automobile companies. Each one bought from 10,000 to 500,000 parts a year, but each wanted some minor variation in the pattern. The constant change in machine set-up necessitated by these varying demands kept the parts manufacturer's plant in confusion. He was practically operating on a job-shop basis, although his total output was large enough to warrant quantity production economies.

"Careful figuring showed him that he could cut his price in half, improve his delivery service and yet make more money himself, if he could induce all his customers to accept the same pattern. He laid the facts before them. They accepted the proposal. One of them saved $4,000,000 a year, or $20 a part on 200,000 parts. This is what simplification means when business cuts off some of its unessential frills."

The transportation division, Department of Commerce, Washington, has undertaken a survey to ascertain the amount and kind of cargo available in every city and town along the Ohio and Mississippi Rivers between Pittsburgh and New Orleans. Similar surveys were recently completed by the transportation along the Mississippi, Warrior and Missouri Rivers. The present investigation is being made to determine the advisability of establishing contract barge transportation service along the route mentioned, catering to companies able to offer cargoes in 125, 250 and 500-ton lots.

To Conduct Course for Plant Conference Leaders

ROCHESTER, June 16.—Under arrangements made by the Industrial Management Council of the Chamber of Commerce, a course of instruction for plant conference leaders will be conducted for two weeks beginning June 18 in the Chamber building by A. L. Mann, supervisor of industrial education for the State Department of Education and formerly of the Eastman Kodak Co. of this city.

The course will include discussion of the various methods of foreman training and related subjects. Similar courses have been conducted by Mr. Mann in other cities.

Testing Stainless Steel on Ships

In order to test the action of sea water and sea air on steel, a plate made of a special stainless steel has been placed on the promenade deck of the Blue Star Liner Arandora, which recently left London for Buenos Aires. During the Arandora's 13,000-mile journey to South America and back the plate will not be cleaned or touched in any way. A day-by-day observance will be kept, and it is hoped to obtain valuable data on the use of stainless steel for ships' fittings.

Civil Service Examinations

The United States Civil Service Commission announces the following open competitive examinations: Chief engineering draftsman (ship), entrance salary, $2,600 a year; principal engineering draftsman (ship), $2,300; senior engineering draftsman (ship), $2,000; engineering draftsman (ship), $1,800. Applications must be on file with the Civil Service Commission, Washington, not later than July 18. The examinations are to fill vacancies in the Coast Guard, Treasury Department, Washington, and in positions requiring similar qualifications. Full information may be obtained from the Civil Service Commission, Washington, or the secretary of the civil service board of examiners at any post office or custom house.

Simplified practice Recommendation No. 57, for wrought iron and wrought steel pipe, has been reaffirmed, without change, for the year beginning June 1, according to the division of simplified practice of the Department of Commerce. A survey conducted prior to the revision conference indicated that the average degree of adherence to the recommendation was 95 per cent. This recommendation reduced the variety in sizes of valves and pipe fittings from over 20,000 to 19,238, and sizes of pipe from 62 to 49.

CARNEGIE LIBRARY OF ATLANTA

STEEL REINFORCING BARS

Standard Adopted Last Year Now Withdrawn, Due to Lack of Support

WASHINGTON, June 19.—Through George K. Burgess, director, the Bureau of Standards has formally announced withdrawal of its pamphlet entitled "Commercial Standard No. 1, New Billet Steel Concrete Reinforcement Bars." Doing away with this simplified practice recommendation, which adopted as standard the intermediate grade of new billet steel concrete reinforcement bars according to specifications of the American Society for Testing Materials, was attributed to lack of support from producers.

Conferences on the subject were called originally at the request of the Truscon Steel Co., made to the National Committee on Metals Utilization under date of Oct. 8, 1925. Strong support was given to the movement by distributers and their association, known as the Concrete Reinforcing Steel Institute, highway engineers, architects and others representing consumer interest. Following a survey of current practice and two general conferences held Jan. 26, 1926, and March 19, 1927, the program adopting the intermediate grade as the standard, and eliminating the hard and structural grades, was determined upon.

On Dec. 21, 1927, however, one of the largest producers withdrew its acceptance. An intensive campaign for obtaining producer acceptances was instigated by the Concrete Reinforcing Steel Institute, resulting in final action of the Association of American Steel Manufacturers which, at a meeting, went on record as neither approving nor disapproving the recommendation. The meeting held that the use of a particular grade of concrete reinforcement bars for various types of construction involves questions of engineering, safety and economy, which necessarily must be decided by the designing engineers or the users.

Since the procedure for the establishment of commercial standards requires written acceptances representing 65 per cent of producers by volume, and ample support from distributers and consumers, and because it is difficult to estimate accurately the percentage of consumption represented by distributer and consumer acceptances, the bureau considered that it was not desirable to modify the rules of procedure, or to continue its support for the project, without the definite approval of the producers. Doctor Burgess explained that the program is still actively supported by the Concrete Reinforcing Steel Institute, as well as many architects and highway engineers, and that, in the event the demand for the intermediate grade continues to grow and producers are disposed to lend their formal approval, the bureau will then cooperate and support the program upon request by the issuance of the pamphlet.

Withdrawal of the recommendation concerning the grade, however, in no way affects the recommendation, in effect, which reduced the sizes of reinforcing bars from 44 to 11. This reduction in sizes, according to O. W. Irwin, manager of reinforcing steel sales, Truscon Steel Co., Youngstown, Ohio, in a letter to Secretary of Commerce Hoover under date of April 24, 1925, means a saving in capital investment of about $4,500,000 for the industry.

Steel Must Advertise

Under the caption "Steel Must Advertise," *Printers' Ink* in its issue of June 7 commented on editorials in THE IRON AGE of April 19 and May 24, in part as follows:

"Premier Baldwin, speaking in London recently, said, 'It does look as though business and industry are groping toward a position in which businesses making the same kinds of goods will have to combine, at least for the purpose of pushing and advertising those goods and bringing new orders home. They are trying to do it in the coal trade. They will doubtless have a try at it in the steel trade.'

"THE IRON AGE, to which we are indebted for the quotation, recently published an editorial pointing out the need for consistent, logical advertising on the part of the steel industry. In this editorial was the following passage:

> Certain sections of the steel industry have attempted recently to place their products in a favorable light in the public prints. But the statement holds true that the industry generally—and its various units large and small—is the loser because for thirteen years it has postponed the use of well-considered publicity; such publicity as on the one hand would reach the ordinary citizen and tell him about steel and on the other hand would show the manufacturing consumer of steel why he would do well to use more of it.

"*Printers' Ink* has long maintained that the basic industries have as much or more reason and necessity for advertising as the so-called converting industries. The present century has seen great changes in the markets for basic commodities with the consequent shifting of volume from one industry to another. Only the fact that the country's capacity to consume has grown by leaps and bounds has made this shifting less noticeable and less pinching to certain industries than would have been the case if consumption had increased less rapidly of its own accord.

"Today the steel industry is faced by competition from the producers of copper and substitute products and only the fact that manufacturers outside of the industry have constantly been discovering new uses for steel has made it possible for the steel manufacturers to continue on their way blind to their lost opportunities.

"It is encouraging to note that leaders in the steel industry both at home and abroad are realizing the necessity for some kind of cooperative effort to increase the sale of steel. It is even more encouraging to *Printers' Ink* to note that they almost automatically consider advertising one of the means to increased sales."

Unusual Employment Guarantee

A steadily increasing program of employment at the plant of the Canadian Steel Corporation, Ojibway, Ont., for the next 10 years has been revealed in negotiations between the corporation and a special committee of the County Council, negotiating on the question of fixed assessment for the steel plant. Under tentative arrangements drawn up for assessment of the property upon which the steel plant stands, the corporation agrees that a minimum of 500 men shall be employed at the plant by the end of 1931. At the conclusion of the ensuing three years a minimum of 800 is guaranteed and for the following four years employment is guaranteed for 1000 men.

These guarantees are of particular significance, apart from the figures quoted, as displaying the intention of the steel company to increase its activities at Ojibway. At present slightly less than 200 men are employed at the plant. Details of the fixed assessment have not yet been worked out by the county committee. Warden A. A. Marentette stated, however, that it is probable an agreement would be reached which would be satisfactory to the county and to the steel company.

Great Increase of River Shipments

PITTSBURGH, June 19.—Shipments of iron and steel products from the Pittsburgh district plants on the Ohio River, which are a gage of the efforts of manufacturers to escape the high railroad freight rates and the incident localization of distribution, keep on mounting.

In May, the movement amounted to 112,818 net tons, the United States Engineers' Corps, Pittsburgh office, reports. This is a new high record mark and compares with 110,356 tons in April and 50,130 tons in May last year.

In the five months ended May 31, Ohio River shipments have amounted to 458,504 tons, compared with 181,516 tons in the same period last year.

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This Issue in Brief

Welding will supersede many old forms of assembly, engineer says. Instead of building up units and bolting them together, they will be designed for union by flash welding, he believes.—Page 1743.

Endurance limit of rail steel is increased if the rail is subjected to reversals of stress at a value below its endurance limit. If the reversals of stress are *above* the endurance limit, the rail will fail in fatigue at a stress considerably below its true endurance limit.—Page 1744.

Pig iron prices' downward trend may be due to less pig iron being used in proportion to steel made, says Doctor Haney. Evidently a broad change in the industry is reflected, as the annual rate of increase in pig iron production has become smaller. —Page 1759.

Forms poppet valves from a single piece of steel by upsetting process. Valve heads are then reheated and formed in a coining press.—Page 1754.

Wholesale prices continue to rise. May index figure covering 550 commodities was 98.6, as compared with 97.4 in April, and 93.7 in May, 1927. (Note: 1926 average equals 100.). —Page 1764.

Profits are increased by accident prevention work. Safety campaigns more than pay for themselves on a purely pecuniary basis, and, in addition, they keep down labor turnover and increase productivity of employees.—Page 1745.

Cuts assembly costs by flash welding. Automobile manufacturer secures a clean, strong joint, at low cost, for parts which, under use, must maintain their physical integrity. Tests reveal that fractures occur, not at the joint, but elsewhere in the part.—Page 1739.

Boiler plate will withstand a stress of 12,500 lb. per sq. in., at 500 deg. Fahr., without permanent deformation. But at 800 deg. the stress must not exceed 10,000 lb. per sq. in., if the boiler is to remain in service indefinitely.—Page 1749.

Doubles production by using new type of resistance welder. Labor cost in assembling differential neck and ring is cut 67 per cent by automatic welder designed and built by Ford. Air-operated clamps hold the pieces; current is turned on and off, pressure is applied and released, and clamps are separated, all automatically.—Page 1742.

Phenomenon of hotter iron and higher combined carbon is explained by Doctor Moldenke. The disappearance of graphite nuclei under conditions of extremely hot melting helps to retard the formation of large graphite crystals.—Page 1747.

New high record in steel ingot output for first half-year reveals that trade is not dull. Previous record will be passed by about 3 per cent. To equal 1927 output a producing rate of only 67 per cent will be required for the remainder of the year.—Page 1770.

Cast iron can recapture lost markets, says Doctor Moldenke. "High-test" iron (2.80 per cent total carbon), made from high steel scrap mixtures, can be produced in the ordinary cupola. —Page 1748.

Iron and steel prices are seriously out of adjustment, Doctor Haney declares. Finished steel, such as sheets and nails, and raw materials, such as coke and pig iron, are too low in comparison with billets and bars.—Page 1759.

Rail steel, killed with aluminum, can be poured free from pipe and excessive segregation, in sink-head molds of the Gathmann type. The distribution of carbon phosphorus, sulphur and silicon occurs in the same manner in such ingots as in sink-head ingots of other types. —Page 1743.

Best month on record, with one exception, for fabricated structural steel industry. May orders equalled 84 per cent of capacity, a sharp gain over April, and second only to July, 1927.—Page 1760.

Best way to control absenteeism is through good supervision, correspondent believes. The worker should be made to understand that punctuality and regular attendance are taken into consideration in raising salaries and making promotions.—Page 1772.

Almost one-third of railroads' total expenditures for materials and supplies is for iron and steel products. Class 1 roads bought $432,604,000 worth of goods from the metal-working industries in 1927.—Page 1750.

ESTABLISHED 1855

THE IRON AGE

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An Active Presidential Year

HALF of this year is virtually ended, and it has made a very fair showing, yet a little disposition is still seen to discuss whether or not presidential years are naturally "poor" years in trade. That the transaction of business might be impeded somewhat during the heat of the campaign is possible, but that is another matter, involving only a fraction of the calendar year. The tail end of the year, moreover, affords opportunity for recovery as to the calendar year totals. That is irrespective of the election outcome, for trade is in no danger from either candidate, and while as much cannot be said for some Congressional nominees, 1928 promises to be no healthier year for radicals than was 1924.

While a few days are lacking to complete half of the year by the calendar, more than half of a year's business is ordinarily transacted by this date. In the last three years the first-half steel ingot production has exceeded the second-half production by approximately 10 per cent, and this half-year is making a new first-half record by about 3 per cent. Portland cement shipments to June 1 made a new record by 1 per cent, though preceding years broke records by larger margins. Comparison of freight car loadings should exclude coal, as stocks were being accumulated early last year while this year stocks have been diminishing. Making that exclusion, other freight car loadings are off thus far this year by less than 1 per cent. Building contracts let in the year to date have made a new high record and the work involved must continue for months.

If political affairs should seriously injure trade, which is not to be expected, the results would be seen in the statistics of next year rather than this year. The year is half over and a large momentum exists, both as to the current pace and as to activity under contract. As to men being seriously minded during the relatively brief campaign, from the broader standpoint that should be to the advantage of trade in the long run. One cannot but feel that less interest is taken in governmental affairs than should be. Discussion should lead to enlightenment and that must conduce to progress in good government, which is to the advantage of trade.

As to the comparisons that are always being made between "now and a year ago," this year will henceforth be in luck, so to speak, for last year did not witness, in steel for instance, the revival in activity that usually comes after July. For the remainder of this year steel will have an easier pace to outdo. As a matter of statistical fact, it will require only a 67 per cent steel ingot producing rate, computed according to the accepted method, for the tonnage in the second half of this year to equal that for the second half of last year. Appearances that trade is dull must be carefully weighed, for the correct comparisons are likely to be favorable.

Brakes on in Stocks

LIQUIDATION and decline have come to the stock market, as the prophets foretold. When investment stocks had been bid up to prices on which their dividends figured only 5 per cent, while the interest rate on money was rising to 6 per cent, it was clear that stocks were being overpriced. When call money rose to 7 per cent the pools that were booming speculative issues and the public that was buying them like gambling chips both found that the handicap was becoming too heavy. Consequently readjustment was in order.

In the process a good many speculators have been converted into involuntary investors. They will have to wait patiently to see if in the course of time airships and radios and other new fancies will pay the dividends that would be the only justification for the prices lately quoted for the stocks.

The Federal Reserve Board discouraged the gambling that was becoming rampant. Probably this was unnecessary and probably it was uninfluential. The readjustment would have come anyway, as the economists had been forecasting for many months. Surely the amount of money that was being loaned on stock market collateral was no frightening factor or any sound reason for agrarian discontent. Call money does not deprive manufacturers, merchants and farmers of what they need, but is loaned on stocks owing to their not needing it, and is subject to instant return for their needs, no other form of loans being so liquid.

It is probable that after a good house-cleaning the stock market will again be bullish though more conservatively than in recent months, and that there will continue to be public participation. It is not discounting an economic depression, but is correcting itself. In such a process good stocks are bound to suffer along with the rest. Indeed it seems to be a curiosity of human nature that overextended speculators will sacrifice their good things in order to nurse their bad ones.

However, when a readjustment of this kind is completed it is the good securities that recover, while the bad ones do not. The true science of speculative investment is the discernment of conditions that are going to increase the earnings in certain industries and particularly of certain concerns engaged in them. Besides such discernment there must be imagination. Thus, the many persons who invested in the porphyry coppers 20 years ago and held them made great fortunes. Likewise did those who later went into automobiles and artificial silk. Without entering upon a long recital of such things, we may properly mention that those who early had faith in the United States Steel Corporation did well for themselves.

As our national economy progresses such opportunities recur more and more. The desire to take advantage of them is natural and praiseworthy. Even if this be overdone there is no widespread economic harm, if the enterprise itself be meritorious, although there may be individual misadventures and disasters. The deplorable speculation is when the surplus earnings of some people pass into the hands of others who consume them; or into the uses of labor and materials that become unproductive and perhaps eventually vanish.

Good Publicity Helps Public Relations

TO many minds publicity means advertising. In its present-day developments it means far more. A publicity director for a big organization or an organized industry finds that display space in newspapers and periodicals takes up a relatively small proportion of his time. Nevertheless, advertising pure and simple is an important factor in any campaign to educate the public on the advantages of a given material—steel, for example.

A publicity campaign for steel would involve much of such advertising; yet in the past only a few of the medium-sized producers have done anything in this line. Notable instances have been the campaigns for Armco products and for various special steels. Further good results cannot help flowing from the organized effort of the American Institute of Steel Construction.

Other industries certainly are not backward in this respect. Almost any issue of a metropolitan newspaper will clinch this point. Here, today, in the New York *World*, is a quarter-page advertisement by Westinghouse showing a welder at work on a building frame. It says, "Electrical Building Is Silent Buiding." Yet one might guess that the sales of welding equipment are an exceedingly small percentage of the entire Westinghouse business. Here's another quarter-page on pure copper screen cloth. Copper men generally agree that their joint publicity effort has done much to revive sales to the present high point. And a half-page by the New York Telephone Co.—a monopoly, with fixed rates! What have they to profit from advertising? A casual reader might think that this was money thrown away, even if he did not cynically and mistakenly refer it to an attempt to buy a paper's good will. Yet it is only part of a very astute policy for improving the public relations of this great and growing telephone industry.

It is time for the steel industry likewise to take thought of its public relations. As a group it complains that it cannot make a fair return on the money invested, but is not agreed on what to do about it. Whenever the Telephone company can prove it is not making a good return on its capital —and a good enough return to attract the vast amounts of additional money constantly needed for extensions—it presents its facts to the Public Service Commission and receives permission to raise the rates.

Not that the steel industry should invite governmental control. We only cite the Telephone company as an example of what a good publicity or public relations policy can do toward converting a natural antipathy to a monopoly into a friendly public feeling, even when the pocketbook is touched.

Steel could start without that handicap, for it is traditional that steel is a reliable material. "True as steel" grows out of centuries of satisfactory service. Such an asset could be easily expanded.

Brighter Prospects for Gray Iron

SIGNIFICANT changes in the gray iron industry are in the making. Along with the formation of the Gray Iron Institute has come a technical development of importance in the growing belief that improvement in the quality of cast iron lies in part at least in the perfection of methods of getting high temperatures. In recent months iron foundrymen have fully realized that the industry is facing a crisis. At the great convention in Philadelphia last month there was open discussion of the inroads of substitutes for gray iron and the grave necessity for improving the quality of the cupola product.

For the first time research on a large scale is to be applied to the industry. This will be part of the work of the new institute, which will also seek means of combatting substitutes and promulgating the advantages of gray iron castings. None too early is such organized research coming to the help of the iron foundry.

In his comprehensive paper of two months ago before the meeting of European foundrymen in Spain, published in part on other pages, Dr. Richard Moldenke ably reviews the situation and discusses in detail the benefits of superheating. This new development is the work of a leading German metallurgist whose thesis is that high temperatures destroy graphite nuclei so that the resulting metal on cooling has a finer structure and greater strength. In making the process commercial recourse naturally was had to new equipment for the cupola by which higher temperatures can be obtained. One of the most recent types, the powdered coal cupola, was described in THE IRON AGE of June 7, and others designed to secure hotter blast appeared in earlier issues.

Manufactures Gain in Foreign Trade

THAT American manufactures are holding their own in world markets is made apparent from returns of the first quarter of 1928. Exports of finished manufactures, semi-finished manufactures and manufactured foodstuffs all increased, while exports of crude materials and of crude foodstuffs decreased. The manufactured or partly manufactured products constituted 70.6 per cent of the total value of exports in 1928, against 66.3 per cent in 1927. At the same time, the manufactured groups rated almost precisely the same proportion of the import total in the two years, having been 47.7 per cent in 1928 and 47.5 per cent in 1927.

In studying the balance between exports and imports for these quarters, and averaging them, it is seen that exports of finished manufactures exceeded imports by about $300,000,000. This was partly offset by excess of imports of crude materials, $100,000,000, and of crude foodstuffs averaging $85,000,000, in the two quarters. There was a slight export excess of manufactured foodstuffs and a slight import excess of semi-finished manufactures, leaving a total export surplus of some $110,000,000.

Steel Capacity and Competition

RATHER invidious comparisons are sometimes made, usually by steel producers themselves, between the degree of competition in the sale of steel products and the "rate at which the steel industry is operating." We quote the words with a view to pointing out the fallacy of the conception they express when the connection refers to the sale of finished steel products.

The operating rate so often cited is a percentage obtained by dividing steel ingot production by assumed steel ingot making capacity. The American Iron and Steel Institute statistics showed operations at 91.29 per cent for April and at 82.58 per cent for last month.

But the steel mills do not sell their ingots. They finish the steel into various forms, or sell semi-finished steel to detached finishing mills. Only the two largest producers make all the important finished products. In some lines, particularly sheets, tin plate and strips, a large tonnage is produced by mills which make only the one product, or very few products.

Each finished steel product makes its own market, and that is where the competition is. A steel producer may find competition in one given finished product which he feels bound to meet, quite irrespective of whether his ingot production is at one percentage rate or another.

The fact which these references to general operating rates ignore, and improperly ignore, is that the finishing capacity of the steel industry materially exceeds its steel ingot producing capacity. Estimates of the excess commonly made are 20 to 30 per cent, there being no attempt at anything like a precise statistical statement.

If the steel industry were operating "full," as the term would go, i. e., producing all the ingot tonnage possible, the whole group of finishing departments could not be running full. As a corollary, if it were possible to determine accurately the total finishing capacity in each product, and divide that into the actual tonnage being produced, the weighted averages of these percentages would fall quite short of the percentage rate of ingot production. If there is an ingot producing rate of 83 per cent there is, presumably, a 20 per cent excess of capacity, but in such a circumstance some finishing departments would have more than a 20 per cent excess. Market history illustrates the matter. In the old days "steel," which meant ingots, sometimes became scarce, and all prices tended to rise. If there were a heavy demand for plates and a light demand for shapes, the latter would rise because the management would allocate ingots to the plate department rather than the shape department.

CORRESPONDENCE

Dropping Absentees from the Payroll

To the Editor: I would like to add a few thoughts on the above subject to those so well expressed in the editorial in THE IRON AGE of May 31. There is nothing more prejudicial to discipline and more disturbing to routine than repeated absences, and of the work factors it is one of the most difficult to control. The suggestion in the editorial that the worker's name be removed from the payroll after two weeks absence, for any cause whatsoever, is a good one, providing justice is shown the employee by having an investigation made to see whether he is under too much of a physical strain either in his work or at home.

Employers who have accomplished most in combating absenteeism put much faith in prompt investigation of cases. A nurse sent to the homes of absent employees to offer assistance to any who are ill also brings back a full report of each case.

The instance cited, of dropping the worker's name from the payroll, after two weeks absence, will not jeopardize the man's chance at his job if his services have been satisfactory. When he is ready to reenter he will be taken back. Absentees should be required upon their return to go through a physical examination at the employment office and make application as if they were new employees. This method will prove measurably effective and particularly beneficial in reducing absenteeism and bettering the attendance records.

Absenteeism takes on an added importance because of its more definite effect upon production and the efficiency of the organization as a whole. A high frequency of absence is merely a prelude to leaving.

Every effort should be made to alter home or working conditions that prevent a worker from being regular at his work, even if it is necessary to give him a short vacation out of season. Working on this same system, some companies reward regular attendance either by a small bonus or by an addition to the vacation period. Investigation will prove that the better type of workman is not voluntarily absent. An employee who is "soldiering" on his job should not be retained on the payroll.

Some companies resent the use of a bonus system as an incentive to regularity in attendance because it seems inconsistent. They feel that to engage a person for a position and then have to offer additional incentives to have him regular in his attendance is wrong in principle.

In my opinion, the better way to control absenteeism is through good supervision which understands its obligation to the management. Make the worker understand that punctuality and regular attendance reflect dependability, which is taken into consideration in raising salaries and making promotions. If the workman's record is unsatisfactory and he is content to let it remain so, the best solution ever found is removal from the payroll. H. K.

Philadelphia, June 4.

Need of Laboratories of Research on Marketing Problems

To the Editor: For the last year or two—or at any rate since the making of profits has become more difficult than the making of sales—the thoughtful men in the steel and allied industries have been pointing out the need for new methods of solving our commercial problems. E. G. Grace, president of Bethlehem Steel Co., some time ago advocated "better merchandising" for the steel industry. O. H. Cheney, banker, in a recent address to the Flat-Rolled Steel Executives said that "the two weapons in winning new markets are research and education." Charles F. Abbott, executive director of the American Institute of Steel Construction, has been talking to steel men and others all over the country on the need for viewing our commercial problems in a new light. In the June 14 issue of THE IRON AGE he was quoted as saying that "the problems of production and financing industry have been largely solved," but that the new conditions we are facing in business, owing to increased competition, call for "a radical readjustment of merchandising policies."

Business leaders are not worried as to the ability of the country to produce cheaply per unit of output, but they are worried—or should be—as to how they are going to market all that they can make and sell it at a profit. Individual companies, for the most part, have not found the way to solve their commercial problems as they have solved their production problems. There are some splendid examples of laboratory research as applied to commercial problems in such organizations as the General Motors Corporation, General Electric Co. and others, but the rank and file of American manufacturers, either individually or in groups, have done little on the commercial side of their business comparable with the research or experimental laboratory for the production department. One of the greatest weaknesses of American business today is its slowness to grapple with new problems and new conditions that have to do with merchandising.

Commercial problems require the same thorough analysis as those of production. A fundamental necessity in their solution is a laboratory of commercial research. Some of these problems usually command attention at sales or executive conferences, but conferences fall short of the ideal in that sales and other executives are usually too busy with the everyday affairs of getting and shipping orders to devote the time to a thorough study—research, if you like—of the matter at issue.

The work of a commercial research department should be constructive research into all the consumption and selling problems that affect the corporation's earning power and profits. The personnel should consist of men having a thorough understanding of business and economic laws, keen powers of analysis, the imagination to visualize consumption possibilities and an appreciation of all that is involved in the creation of profits. Such specalists should be free from duties of an executive or selling character, and should be in a position to give unbiased judgment, after thorough investigation, to the executive and sales departments.

A laboratory of commercial research, in addition to its own distinctive work, should act as a clearing house for information gathered by the various executive departments and should be able to sift and coordinate such information so that it will better assist the executives in separating essential profit-making factors from the non-essential.

Sales activities are too largely confined to current needs. It is a great mistake not to study concurrently market tendencies and to create a background for future earning power. Among the subjects to which a laboratory of commercial research should apply itself are these:

Determining the actual and potential demands for product within local and adjacent territories.

Remedy for failure to get orders or inquiries and to obtain volume of business desired.

Remedy for failure to appraise trends of business.

Remedy for failure to obtain price for product that will insure adequate return to stockholders.

Elimination of useless and unfair competition within the industry.

New methods of marketing.

New uses for products manufactured.

Developing consumer understanding of the merits of the product.

Forecasting and preparing data for future policies.

Many of these functions, it may be said, are now taken care of by one department or another. If research is handled by the department in which a problem originates, it may lack the right perspective and only represent the thoughts and traditional viewpoints of the head of the department. It would also divert the time of the head of the department from customary duties; or the work might be slighted and given only intermittent attention. The department is likely also to touch lightly on its own weak spots. Its objective may be to confirm the pre-determined opinions of the head of the department, when the aim should be to arrive at an independent analysis.

O. W. MASON.

29 Broadway, New York.

Leading Interests Combine for Steel Exports

United States and Bethlehem Steel Subsidiaries Become Members of Steel Export Association of America

WASHINGTON, June 19.—With the United States Steel Products Co. and the Bethlehem Steel Export Corporation as member companies, the Steel Export Association of America has filed papers with the Federal Trade Commission under the Webb-Pomerene act for exporting iron and steel products. Announcement was made today of the fact by the Commission.

The new association became automatically organized on the filing of the papers. It will have headquarters at 25 Broadway, New York. There will be four managers and a secretary and assistant secretary, according to the papers as filed. The managers are S. M. Bash and W. H. Stewart of the Bethlehem organization and G. C. Scott and Frank Adams of the Steel Corporation subsidiary. William J. Brown, who is assistant treasurer and assistant secretary of the Bethlehem Steel Corporation, is named as secretary, and Arthur C. Mundle, of the Steel Corporation, as assistant secretary.

The combined exports of rolled steel of the two members of the association account for 75 to 80 per cent of the total outgo from the country. No statements could be obtained from the two companies beyond unofficial observations that the move is experimental.

United States Patent No. 1,668,705 was issued May 8 to Thomas S. Wheelwright, Richmond, Va., for a method of rolling hollow steel bars from ingots or fagots. The patent has been assigned to the Old Dominion Iron & Steel Works, Richmond.

Seek Economies in Marketing

Two Leading Steel Producers Unite for Exports—Pig Iron Makers and Mills Make Greater Use of Inland Waterways—Steel Output Retains Lead Over 1927

THE week has brought out new evidences of the attention producers of iron and steel are giving to economies in marketing. To cultivate foreign trade more effectively the Steel Corporation and the Bethlehem company have formed a common export organization, thereby providing a single outlet for 75 to 80 per cent of the rolled steel shipped out of this country. In domestic business, makers of both pig iron and steel are using waterways more extensively in an effort to expand market zones fixed by railroad rate barriers.

The largest structural steel contract in weeks, 38,000 tons, for the Mercantile Mart, Chicago, was placed with the Bethlehem Steel Co. for fabrication at Buffalo and delivery by Lake vessel. Ohio River shipments of iron and steel from Pittsburgh district plants were the largest on record in May, and in the first five months of this year totaled 458,500 tons, or two and a half times the movement in the corresponding period last year.

In the East, water shipments of merchant pig iron are in increasing volume, and the Buffalo producers have acquired storage space at New Jersey ports to extend the advantages of barge rates through the winter months.

Steel production, although receding, is holding its lead over output last year. At Chicago, operations have declined to 83 per cent of capacity, against 80 per cent in the same week of 1927, and in the Greater Pittsburgh district a rate of 70 per cent compares with 65 per cent 12 months ago.

With output still on a relatively high plane, a good volume of bookings is indicated. The bulk of current business, however, is made up of releases against past commitments. Both specifications and new orders are growing individually smaller, at the same time calling for prompter shipment.

Consumers are showing little interest in third quarter requirements and, since current buying is limited principally to small fill-in tonnages, mill prices remain largely untested. Makers of plates, shapes and bars continue to take early shipment business at 1.85c., Pittsburgh, and are more concerned about getting specifications against existing contracts than forcing the issue on their recent advance of $1 a ton on third quarter business. In the Chicago district, where the sheet market has been particularly quiet, prices are off $1 and $2 a ton respectively on the black and galvanized finishes.

Producers of wire nails are finding it increasingly difficult to establish a price of $2.65 per keg, Pittsburgh or Cleveland, and $2.55 is more commonly quoted.

Makers of welded boiler tubes have announced a revision of supplementary discounts, advancing net prices on steel tubes about 5 per cent and on charcoal iron tubes nearly 2½ per cent.

Increased inquiry for pig iron in the Pittsburgh district, no doubt stimulated by the recent drop in the price of Valley basic, has been followed by stronger efforts by producers to stiffen prices, with the issue somewhat in doubt.

Scrap is weak, and at Pittsburgh and Chicago prices on heavy melting steel have declined 25c. a ton.

The placing of 50,000 tons of line pipe by the Empire Gas & Fuel Co. has enlivened a dull situation in tubular goods. A number of other large line-pipe projects still await financing, but early action is looked for on 12,000 tons of steel water pipe for the city of Denver.

Large individual projects feature the structural steel market. For one of them, the Mercantile Mart at Chicago, 38,000 tons was placed during the week, and two others in that city will call for a total of 150,000 tons more. Railroad grade elimination work at Cleveland will require 15,000 tons, and a store building at Philadelphia will take 10,000 tons.

Steel specifications from several of the automobile companies in the Detroit district are lighter, but forge shops and other makers of automotive parts in northern Ohio have made no curtailment in production. Chicago reports no recession in the operations of farm equipment makers, indicating that several did not interrupt production to take inventory. Road machinery builders are also very busy.

Orders for fabricated structural steel in May, at 315,000 net tons (computed), made the second highest monthly total ever reported, exceeded only by the 345,000 tons of last July. Computed shipments ran 49,000 tons behind orders, but made the fourth highest month's total.

At 46⅝c. a lb., New York, spot Straits tin sold today at the lowest level since Sept. 24, 1924. Large sales in the Far East and absence of consumer buying here and in London are given as prime causes.

Both of THE IRON AGE composite prices remain at the levels of the past two weeks. That for finished steel is at 2.341c. a lb., about 1 per cent lower than a year ago. That for pig iron, at $17.23 a ton, is 9 per cent below the $18.96 of last June.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jun.19, 1928	Jun.12, 1928	May 22, 1928	Jun.21, 1927
No. 2, fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	16.75	16.75	17.25	18.00
No. 2, Southern, Cin'ti	19.69	19.69	19.19	21.69
No. 2, Birmingham	16.00	16.00	15.50	18.00
No. 2 foundry, Chicago*	18.00	18.00	18.00	20.00
Basic, del'd eastern Pa.	19.00	19.00	19.00	20.75
Basic, Valley furnace	15.35	15.35	16.00	18.00
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	20.76
Malleable, Chicago*	18.00	18.00	18.00	20.00
Malleable, Valley	17.00	17.00	17.25	18.00
Gray forge, Pittsburgh	18.01	18.01	18.51	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	32.00	32.00	33.00	33.00
O.-h. billets, Pittsburgh	32.00	32.00	33.00	33.00
O.-h. sheet bars, P'gh	33.00	33.00	34.00	33.50
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	42.00	42.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.80
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jun.19, 1928 Cents	Jun.12, 1928 Cents	May 22, 1928 Cents	Jun.21, 1927 Cents
Sheets, black, No. 24, P'gh	2.65	2.65	2.70	3.00
Sheets, black, No. 24, Chicago dist. mill	*2.75*	2.80	2.80	3.10
Sheets, galv., No. 24, P'gh	3.50	3.50	3.55	3.85
Sheets, galv., No. 24, Chicago dist. mill	*3.60*	3.70	3.70	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.15	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.60	2.60	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$ *14.50*	$14.75	$15.00	$14.75
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	*12.50*	12.75	13.00	12.00
Carwheels, Chicago	13.00	13.00	13.50	13.50
Carwheels, Philadelphia	15.50	15.50	15.50	15.50
No. 1 cast, Pittsburgh	14.25	14.25	14.50	15.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	14.50
No. 1 RR. wrot, Phila.	13.50	13.50	15.00	16.00
No. 1 RR. wrot, Ch'go (net)	*11.25*	11.50	11.75	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.87½	14.87½	14.62½	12.62½
Electrolytic copper, refinery	14.50	14.50	14.25	12.25
Zinc, St. Louis	6.15	6.15	6.15	6.20
Zinc, New York	6.50	6.50	6.50	6.55
Lead, St. Louis	6.15	6.15	5.97½	6.10
Lead, New York	6.30	6.30	6.10	6.40
Tin (Straits), New York	*46.62½*	48.62½	51.50	67.37½
Antimony (Asiatic), N. Y.	*9.62½*	9.75	11.00	12.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Pipe Orders for 50,000 Tons—Steel Business Sustains 70 Per Cent Operations

PITTSBURGH, June 19.—Steel manufacturers in this district still report a good aggregate business, although also noting that demand shows the downward tendency common to this time of the year, and that only through sustained sales effort are orders kept flowing in. Buyers are not yet showing much interest in third-quarter requirements and the bookings are made up of a large number of small and miscellaneous tonnages, almost all of which carry prompt shipping instructions. Lack of interest in supplies beyond the end of the quarter probably is explained by the fact that important consumers are generally covered to the end of this month and have until that time to specify shipments that will meet their July needs. Steel ingot production is right around 70 per cent of capacity.

Distribution of orders among the different products is uneven. Common finishes of sheets appear to be doing a little better in point of releases on contracts than they did recently, and some makers of wire products note a gain in orders over the past week. Quotation of $2.55, base, per keg, Pittsburgh, on nails has become a little more common and probably has been accompanied by larger sales, and in sheets, buyers appear to believe that prices cannot go very much lower than they are now.

Not much structural steel business is coming out, but this is a natural condition at this time when work placed in the spring is well under way and it is early for much demand inspired by a desire to have the structure under cover before winter. The pipe market has been enlivened by an order for 50,000 tons of line pipe. Steel bars are doing fairly well and business is called good in reinforcing bars. There is no noticeable letdown in the specifications for tin plate.

The recent break in the price of basic pig iron has somewhat intensified interest in third-quarter requirements of that grade and stimulated the inquiry for other grades. Actual business, however, is limited by the fact that producers have stronger price ideas than buyers expected to pay in the face of a price around $15.25, furnace, for basic grade.

Scrap prices show a tendency to ease off on account of a lack of consumer interest. Except for some renewing of existing supply arrangements in coke, the fuel situation remains dull and uninteresting.

Pig Iron.—Melters are beginning to evince some interest in their requirements for third quarter, and in view of the recent break in prices the inquiries are for larger individual tonnages than usual. Not much actual business has been done because buyers are trying to do as well on basic iron as was done recently by two Pittsburgh district steel makers, but find not only the steel companies but the merchant producers resisting. Efforts to buy other grades at prices more in line with the market on basic iron also encounter opposition by producers, but at the same time attempts to stiffen the market have not succeeded. One company, which has bought 6000 tons of basic iron since a week ago, was able to buy at less than $16, which several makers quoted; this company is known to have rejected a bid of

$15.75, Valley furnace, and, while the exact price has not become known, it is commonly accepted that it was not far from basis of the last previous sales. Follansbee Brothers Co. has entered the market for 10,000 tons of basic iron for third-quarter delivery, and the Colonial Steel Co. is taking prices on 2500 tons. Difference of ideas on prices between buyers and sellers is keeping down foundry sales. A Uniontown, Pa., melter recently closed on approximately 6000 tons of foundry iron, dividing the business among Johnstown, Pa., Valley and Cleveland furnaces. The delivery price was about $18.75, or $17.11, Johnstown, $16.48, Valley, and $15.85, Cleveland. Several producers still want $17, Valley furnace, for No. 2 foundry, but find it necessary to shade that price, since a good deal of iron held by middle interests is being offered for less.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.35 to $15.50
Bessemer	17.00
Gray forge	16.25 to 16.50
No. 2 foundry	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Malleable	17.00 to 17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—With the approach of July 1, larger consumers of ferromanganese, who have been slow to sign second-half contracts, are swinging into line, and it is said that only one or two now remain uncovered for that period. At the same time, an effort to extend the former price as long as possible is seen in specifications against first-half contracts that are well in excess of current consumption. Makers of alloy steel are taking out spiegeleisen a little less freely, but the general movement of that alloy still is good. Ferrosilicon specifications are rather slow. Prices are unchanged.

Semi-Finished Steel.—Buyers of billets, slabs and sheet bars are exerting considerable pressure against prices and are meeting with some success, since sheet and strip prices still are weak and producers of semi-finished steel for the market appear to need business. Generally, $32, f.o.b. Pittsburgh, for large billets and slabs and $33 for sheet bars measures the limit of the price that has to be paid. Some producers with rather sizable yard stocks of billets have gone well under $32 to move or reduce them. There is a possibility that sheet bars will pass from the list of quotable steel products before a great while. Owners of the continuous mills are said to recognize that the market is not broad enough to take all the finished strips that could be produced and are figuring on selling a considerable tonnage of what may be designated as strip mill breakdowns (strips that have passed through the roughing rolls) to the makers of sheets and tin plate now rolling from sheet bars. Such a step would cheapen the cost of rolling sheets and black plate and incidentally delay obsolescence of present sheet and tin mills. Wire rods still are quoted at $44, base Pittsburgh, but are commonly selling at $2 a ton less.

Bars, Plates and Shapes.—An order for 50,000 tons of 10 in. and 20 in. line pipe, which has been placed with two local makers means an order for a like amount of plates and skelp. This will be a help to one of the market's quietest products, for while a fair tonnage is moving into river craft, the lack of railroad rolling stock orders has been felt. Structural steel lettings are showing the usual decrease common to this season and bar business is considerably lighter now than it was as recently as a month ago. While a good total tonnage of reinforcing bars is being booked in small lots, demands from bolt and nut makers and from makers of cold-finished bars are moderate. Buyers are having no difficulty in placing early shipment business in bars, plates and shapes at 1.85c., base Pittsburgh, and some shading of that price on plates is reported, probably to meeting strip competition. Mills still are more concerned about getting specifications against existing contracts than in forcing the issue with respect to third quarter contracts, on which most makers have announced a price of 1.90c.

Rails and Track Supplies.—Rail business continues to lag, but there is a fair amount of ordering of the track supplies. Prices are unchanged.

Wire Products.—So little success has attended the effort to establish nails at $2.65, base, per keg, Pittsburgh, that makers are getting a little more anxious for orders and $2.55 is becoming a more commonly quoted price. The products that move in price with nails likewise are seeking the minimum levels. But on plain wire, while there is some resistance to $2.50, base, per 100 lb., that price is ruling on a majority of the sales. Some producers report some improvement in business in the past week, but this is not the rule.

Tubular Goods.—The Empire Gas & Fuel Co. has divided between the National Tube Co. and Spang, Chalfant & Co. an order for 132 miles of 20 in. pipe and 14 miles of 16-in. welded pipe for a gas line and 362 miles of 10¾-in. seamless pipe for an oil line. The tonnage is estimated at 50,000 tons and constitutes the largest piece of business placed in several months. The Amarillo-Kansas City gas line for the Industrial Gas Co., Kansas City, is again being discussed; there are reports that the A. O. Smith Corporation, Milwaukee, has the order subject to financing, but another story is that a new company is under organization to make electrically welded pipe and is to get this line as its first order. Fair demand is reported for butt-welded pipe, but lapwelded goods still are dull.

Makers of welded steel and iron boiler tubes have announced a revision of the supplementary discounts in place of 7 fives beyond the card on steel tubes and 2 tens to 2 tens and five on charcoal iron tubes without much regard to the size of the order. The maximum supplementary discounts now entail purchases of at least 21,000 lb. For lots of 12,000 to 20,999 lb., the new supplementary discounts are 6 fives on steel tubes and 2 tens and two and one-half on iron tubes. On lots of 5000 to 11,999 lb., they are 5 fives and 2 tens, respectively, and for lots of less than 5000 lb., 4 fives and 1 ten, respectively.

Sheets.—While actual business leaves little to complain of as to volume, the price situation still is unfavorable from the manufacturers' viewpoint. On black sheets, 2.70c., base, is the limit on small lots and in this area, where prices seem to have held a little better than

THE IRON AGE Composite Prices

Finished Steel

June 19, 1928, 2.341c. a Lb.

One week ago	2.341c.
One month ago	2.348c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

June 19, 1928, $17.23 a Gross Ton

One week ago	$17.23
One month ago	17.34
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.23,	June 5
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, 1 up to 3 tons, del'd Chicago,	3.30c. to 3.45c.
Strips, 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c. to 2.25c.

Box Annealed. One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.70c.
No. 24, f.o.b. Chicago dist. mill	2.75c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.64c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.80c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium		1.50	4.15
Carbon Vanadium		0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 6 fives extra are given on lap welded steel tubes and 2 tens and 2½ on charcoal iron tubes on lots of 12,000 lb. and more.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

in other districts, 2.65c. now is the ruling price. On galvanized sheets, 3.50c., base, now is being quoted by several producers who hitherto have refrained from going under 3.60c., on the score that 3.50c. referred chiefly to sheets for roofing and siding, in which there was more or less "cheating" as to gages. Orders as a whole are numerous enough, but they usually are for small lots and in all cases are for quick rolling and shipment. Mill operations are off about five points and now are placed at 70 to 75 per cent of capacity.

Tin Plate.—The fact that the packing crops are two to three weeks late takes some of the urgency out of the demand for tin plate, but the expectations still are strong that the pack will be large and container manufacturers are taking shipments on contracts very steadily. Shipments of tin plate for all uses so far this year are sufficiently ahead of those for the same period last year to sustain early estimates that the year would run in shipments about half way between 1927 and 1926.

Cold-Finished Steel Bars and Shafting.—Demand still is more remarkable for its steadiness than its size. Viewed from the potential productive capacity, business is only fairly active, but the demand for several years has been below rather than abreast of full capacity. There are few deviations from 2.20c., base Pittsburgh.

Bolts, Nuts and Rivets.—Current demands are only moderately large, but are spread out well enough to maintain a steady flow of orders. Prices are well maintained.

Hot-Rolled Flats.—Producers in this district find that business so far this month is little, if any, behind that of the same period last month, and are well satisfied. There is little real change in prices. Those for third quarter will be largely the same as those that have ruled in this quarter. To the small tonnage buyers, they are 1.90c., base, for widths 6 to 12 in., 2.10c. for 3 to 6 in., and 2.20c. for widths under 3 in. Large tonnage buyers in the past quarter have had concessions of $2 to $3 a ton from these prices and there is no evidence in the business done so far that they will get any greater concessions in the coming quarter.

Cold-Rolled Strips.—Business is holding up fairly well with local producers and prices are quite steady.

Warehouse Business.—Prices have been cut $2 a ton on black and galvanized sheets in keeping with the recent decline in mill prices. The regular schedule on other products is being well observed by warehouses, but mill supply houses continue to do some shading. Business is fairly good as a whole.

Coke and Coal.—Foundries have been contracting for third-quarter and last-half requirements and most of them using beehive oven coke are now under cover for those periods. In the choice brands, the business has been at $4.50 to $4.85 per net ton at ovens. Blast furnaces also are understood to be renewing agreements with present sources of supply and continuing the present price of about $2.75 per net ton at ovens. Spot business does not amount to much and prices are unchanged. The coal market has not yet felt the stimulation of an increased large cargo demand that was expected to result from the confirmation by the Interstate Commerce Commission of the reduction of 20c. a ton made by Northern railroads. Lake shippers evidently are waiting to see whether the last word yet has been spoken in connection with rates before buying. There is now a differential of 45c. a ton between Northern and Southern rates and there is a possibility that Southern roads may take another step in reducing that spread in an effort to help the Southern mines.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.55c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.40c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Old Material.—Prices continue soft in this market, but as a rule this condition is due more to consumer indifference than to heavy offerings. The weakest grade is machine shop turnings, which the principal local user continues to buy at $9 and dealers with short contracts to cover are able to get at $9.25, although sales in the Detroit district are reported at $5.60, which would mean $9.60 if they were delivered into this district. There is a suspicion that sales are being made at a low price here to affect contract settlements based upon the price at Pittsburgh. On heavy melting steel $14.75 appears to be as high as can be done and some melters have turned it down at that price. Dealers are picking up small lots of ordinary heavy melting steel down to $14 for shipment to one point in the district, but purchases cannot be made that low for other deliveries.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.25 to $14.75
Scrap rails	14.00 to 14.50
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	13.00 to 13.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	14.50 to 14.75
Heavy steel axle turnings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	12.50 to 13.00
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	12.50 to 13.00
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 10.75
Short mixed borings and turnings	10.50 to 10.75
Cast iron borings	10.50 to 10.75
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	10.50 to 11.00
Sheet bar crops	16.50 to 17.00
Cupola Grades:	
No. 1 cast	14.25 to 14.50
Rails 3 ft. and under	15.50 to 16.00
Malleable Grades:	
Railroad	14.25 to 14.50
Industrial	13.75 to 14.00
Agricultural	13.25 to 13.50

Portable Testing Instruments

A new line of portable alternating current instruments designated as type PY5, applicable for general testing and laboratory work where high accuracy is required, is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The line includes voltmeters and single-phase wattmeters of the electrodynamometer type, and ammeters of the moving iron type, using vanes of non-residual metal. All instruments are shielded and are equipped with an improved design of air damper, making possible accurate measurements on fluctuating loads.

Production of bituminous coal in the week ended June 9 is reported by the United States Bureau of Mines at 8,412,000 net tons, making a total of 209,112,000 tons for the elapsed portion of the calendar year. The figures compare with 8,524,000 tons in the corresponding week of 1927 and 251,666,000 tons for the year to that date.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$33.00 to $34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Large Structural Jobs—Third Quarter Prices Not Yet a Fact—Operations at 83 Per Cent

CHICAGO, June 19.—Of outstanding interest in this market is the placing of 38,000 tons of fabricated steel with the Bethlehem Steel Co. for fabrication at Buffalo and delivery by water to the site of erection of the Mercantile Mart in Chicago. It is also now learned that the Starrett Building Co. has been awarded the general contract for the Apparel Mart, Chicago, which will contain 4,650,000 sq. ft. of floor space, covering two city blocks and extending upward 75 stories.

No. 11 blast furnace at Gary was blown out last Saturday, thus reducing to 18 the number of active stacks in blast at plants of the leading producer. The count for the district now stands 26 active and 10 out of service. At St. Louis the "A" furnace has been taken out of service, reducing by half the output of merchant iron in that district.

Sales of steel mill products in the week now closing show a decided improvement over the average for the early part of June, but individual orders are small and there is a general lack of interest in forward contracting. Producers recognizing this fact plus the uncertainty of trends in other territories are hesitating to name third quarter prices. Specifications are heavier, but when averaged with the two previous weeks show a total volume which warrants not more than 83 per cent of ingot capacity being used. The Omaha lines of the Chicago & North Western has placed an order for 250 stock cars.

Pig Iron.—Melt in this district is smaller by a small margin, and with lighter shipments and a general lack of interest in forward buying, the local trade has come to the opinion that hand-to-mouth buying and a quiet summer are in prospect. A 3000-ton inquiry is open in western Michigan and a 500-ton lot will be purchased by a northern Illinois user. Although there is a quiet tone to this market, nevertheless shipments so far this month compare favorably with June a year ago. Furnace stocks of Northern iron are steadily being reduced but can still be considered large for this time of the year and the general condition of the market.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	21.51
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Fluorspar.—Several carload inquiries are before the local trade. Asking prices are $16 a net ton, f.o.b. Illinois and Kentucky mines.

Ferroalloys.—Announcement is made by producers that third quarter prices on the 19 to 21 per cent grade of spiegeleisen will be $33, Hazard, Pa. The local market is quiet except for the resale of a carload at $32.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—The local plate market is quiet, largely as a result of the dullness in railroad equipment and oil storage tank buying. Specifications from the manufacturing trade are steady, and fabricators, whose shops are well filled, continue to take liberal quantities. Cheyenne, Wyo., has decided to buy cast iron water pipe and has withdrawn an inquiry for steel pipe which would have taken 6000 tons of plates. After some delay the way now appears to be clear for action on 12,000 tons of steel water pipe needed by the city of Denver. Western car shops are engaged on the last of the large equipment orders and at this moment there is no new business in sight that will sustain operations to mid-summer. The Missouri Pacific plans to build 200 automobile cars in its own shops. The Ohio Collieries Co. has ordered 250 mine cars from the American Car & Foundry Co. Western steel mills expect to participate in the steel required for 600 cars that will be built in the Southern Pacific shops, but they have little else to look forward to except 250 cars for the Omaha lines of the Chicago & North Western and a like number of gondola bodies for the Rock Island. Plate deliveries range three to six weeks. Local producers still hesitate to announce first third quarter prices and in the meantime the general market is quotable at 2c., Chicago.

Mill prices on plates, per lb.: 2.00c., base Chicago.

Structural Material.—The real support of this market, that is, jobs of average size, is being forgotten for the moment in the concern over three larger projects, which will require well toward 200,000 tons of steel. The mercantile mart, taking close to 45,000 tons of structural steel and 6000 tons of reinforcing bars, is active and it is entirely probable that contracts will be placed before the end of the week. Indications are that Eastern mills and fabricators are interested in tonnages of this size and that Western shops are not having clear sailing, merely because the building is to be located in Chicago. Some headway is being made with the plans for the agricultural mart. The third large project and the newest one of the three is a 75-story structure, housing a thousand room hotel, for which the promoters have obtained air rights over the river terminal of the Illinois Central Railroad. This building is to be known as the Apparel Mart. The Mississippi Valley Structural Steel Co. has taken 900 tons for two buildings for the University of Illinois, and the Hyde Park State Bank Building, Chicago, requiring 500 tons, has been awarded to the Union Foundry, a local shop. Fabricators in this district are comfortably booked and projects are quite numerous. Structural material prices are 2c., Chicago, to the general trade and to fabricators for stock, but the bulk of the tonnage going into steel frame buildings commands lower prices.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bolts, Nuts and Rivets.—Third-quarter contracting is progressing with little opposition to prices asked. Some improvement in specifications from the railroads is noted.

Reinforcing Bars.—The recession in reinforcing bar sales noted several weeks ago is still in evidence, though in the last few days an increased number of small orders has been taken by local dealers. Purchases are disproportionately small in comparison with the pending list. The scarcity of business results more from the slowness with which general contracts are placed than from delay by contractors in making purchases. Plans for the Palmolive-Peet Building, Chicago, are being revised to include a 20-story tower, which will add about 100 tons to the reinforcing bars required. Prices on concrete bars in and near Chicago are steady at the full schedule, but in central Illinois keen competition is bringing out low quotations. New orders and fresh projects are shown on page 1792.

Bars.—Although other heavy tonnage finished steel products are receding in demand, shipments for soft steel bars are going forward at an undiminished rate. As far as local producers can tell there is no letup in either the manufacture of automobiles or in accessories. Road machinery builders are busy and farm implement manufacturers are operating plants at capacity. It is said that several farm equipment builders did not take inventory, at least of such character as would necessitate curtailment of production. Reports from tractor builders indicate that orders continue to pile up. Prices in and near Chicago remain at 2c. on mild steel bars, but in outlying territory producers from other districts do not maintain this level. Railroads are taking larger quantities of iron bars and prices are steady at 2c., Chicago. Specifications for alloy steel bars afford output at mills' capacity. Prices are unchanged and third quarter books are open. Current purchases for the most part are for immediate requirements. The advance to 1.90c., Chicago Heights, on rail steel bars has failed and future business is being taken at the old quotation of 1.85c. Local mills are operating at capacity and are not able to make deliveries in less than three weeks except when orders match with rolling schedules. Demand for fence posts is brisk and shipments already made this month, plus specifications that are now in, foretell that deliveries in June will be the largest for any month so far this year.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—The jobbing trade is moving rather slowly and somewhat spotty except in woven wire fence. Rains throughout the Middle West have benefited crops, though in some sections of the Missouri River Valley hail storms have destroyed much wheat. New purchases by the manufacturing trade are in small volume, but specifications are steady and shipments to that class of buyers in the last two weeks average well above the last 14 days in May. Wire mill operations remain remarkably steady, close to 65 per cent of capacity still being engaged. Stocks in the hands of users are not oversized, while at mills readjustment of output is keeping stocks well balanced. Prices for wire and wire products are shown on page 1777.

Rails and Track Supplies.—Chicago district rail mill output has been cut to 80 per cent of capacity. Miscellaneous orders for track fastenings total 5000 tons, and inquiry, including the 12,000 tons required by the Pennsylvania Railroad, reaches to not less than 16,000 tons. The iron tie plate market is quiet, though several railroads are shaping inquiries for this commodity. Light rail business is confined to scattered carlot orders.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Hot-Rolled Strip.—Price cutting in the Detroit district is in evidence and as low as 2.15c., base, per lb., Chicago, has been named in this market for widths of less than 6 in.

Cast Iron Pipe.—This market is showing added life and prices are steady at $32 to $33, Birmingham, for 6-in. and larger diameters. The Lynchburg Foundry Co. has taken 350 tons of 6 and 8-in. pipe for Fond du Lac, Wis., at $42.45, delivered, or $31.95, Birmingham. The United States Cast Iron Pipe & Foundry Co. has taken 350 tons for Fox River Grove, Ill., and the McWane Cast Iron Pipe Co. has closed for 200 tons for Cynthiana, Ind. Fresh inquiry includes 1000 tons of 6 to 24-in. pipe for West Allis, Wis., 400 tons of 6 and 8-in. pipe for Winfield, Ill., 500 tons for Columbia, Ill., and 115 tons for Chillicothe, Ohio. Pending business at St. Paul, Chicago and at Roseville, Mich., is still open. The last named job may be closed in a day or two.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $40.20 to $41.20; 4-in., $44.20 to $45.20; Class A and gas pipe, $4 extra.

Sheets.—Prices for this commodity have given ground and even at the new low levels there is lack of strength. Chicago prices now are 2.80c. for black, 3.65c. for galvanized and 2.15c. for the blue annealed product. These prices are being used almost wholly for current business, which is of small proportions, and for contract tonnages when the buyer will make out a shipping schedule at the time of purchase. Local producers have not announced price policies for the third quarter. Hot mill output is at the low point of the year and schedules are difficult to maintain. Deliveries are prompt on all grades, except blue annealed sheets, which at this moment are in the best demand.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.80c.; No. 24 galvanized, 3.65c.; No. 10 blue annealed, 2.15c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Coke.—Producers of by-product foundry coke have announced second half prices at $8, f.o.b. local ovens, and $8.75, delivered in the Chicago switching district. Shipments in June are running behind those in May and forward contracting is only moderately active.

Old Material.—A steel mill has closed for 16,000 tons of heavy melting steel at $13 a gross ton, delivered, a cut of 25c. below the last large purchase of several weeks ago. Several thousand tons of hydraulic bundles have also been purchased at new low price levels. The entire structure of the scrap market is weak. Railroad shipments are heavy and the supply in all grades is ample for immediate requirements. Following the lower pace in some industries, there is a slackening in the rate of scrap shipments from that source. Buyers of specialties are moving cautiously, taking only small lots for immediate shipment and avoiding piling scrap against future use.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	15.75 to 16.25
Railroad leaf springs, cut apart	15.75 to 16.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.75 to 7.25
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.	15.50 to 16.00
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.25 to 11.75
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.75 to 10.25
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Few Third Quarter Pig Iron or Steel Contracts—Plate Market Active

PHILADELPHIA, June 19.—Specifications against steel contracts are in fair volume, but consumers still show but little interest in third quarter commitments. Mills are not seeking contracts, apparently believing that 1.90c., Pittsburgh, on bars, 2.05c., Coatesville, on plates, and 2.05c., Bethlehem, on shapes, might meet with opposition from buyers. At the same time there is no desire to seek business at the present contract level of $1 a ton less, as buyers might ask for further concessions on new contracts.

Eastern Pennsylvania mills are maintaining a fair rate of operation with an average of 60 to 65 per cent of capacity. Producers of shapes report irregular business and the market continues to show a considerable range of prices. Sheet prices are unstable, sizable tonnages bringing out concessions. Galvanized sheets are generally quoted at 3.55c., Pittsburgh, but 3.50c., Pittsburgh, has become quite common on all but the smallest orders.

Foundry consumers of pig iron are accepting regular shipments against contracts, but evidently intend to cover their future requirements as they arise. Iron and steel scrap prices show further weakness and several grades are off about 50c. a ton.

Pig Iron.—Most of the current buying of foundry iron is limited to 100 and 200 ton lots for shipment early in the coming quarter. The J. L. Mott Iron Works, Trenton, N. J., is asking for 100 tons of foundry grade. The American Engineering Co., Philadelphia, in the market for 500 tons of foundry, has not yet closed. Furnaces are maintaining $20, base, eastern Pennsylvania, except in the case of the usual equalization of freight rates, and there is no evident inclination to recede from this level. Steel foundries are rather inactive and low phosphorus sales in this district seldom total more than a carload. No basic has been closed, but some small buying seems to be expected soon.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.		$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.		21.26
East. Pa. No. 1X		21.76
Basic (delivered eastern Pa.)	$19.00 to	19.50
Gray forge	19.75 to	20.25
Malleable	21.00 to	21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to	23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to	24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.		24.54
Virginia No. 2X, 2.25 to 2.75 sil.		25.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese.—Small consumers are still seeking 100 and 200 ton lots for third quarter delivery at $105, seaboard, but the larger users evidently have sizable stocks bought at $100, seaboard, and are in no haste to enter into contracts.

Bars.—Specifications against contracts are good and there is a moderate volume of new business. Some consumers who have been rather steady users of foreign material have returned to the domestic product recently, as imported steel no longer represents much of a saving. Current prices range from 1.85c. to 1.90c., Pittsburgh, or 2.17c. to 2.22c., delivered Philadelphia. No third quarter contracting is reported as yet.

Plates.—Eastern Pennsylvania mills report a sizable tonnage of small orders for immediate requirements and on much of this business 2.05c., Coatesville, or 2.15c., Philadelphia, is the prevailing price. Shipments against second quarter contracts continue satisfactory, but consumers have shown no interest in contracting for the coming quarter. The Pusey & Jones Co., Wilmington, is fairly well occupied with shipbuilding contracts, principally on private yachts. The American Brown Boveri Electric Corporation is reported negotiating for the sale of its shipbuilding business at Camden, N. J. The Baldwin Locomotive Works has booked some new locomotive orders, but is only operating at 15 to 20 per cent of capacity. The Pennsylvania Railroad recently closed on a few hundred tons of plates with a Pittsburgh district mill, part of its third quarter requirements.

Shapes.—The price situation is unchanged, quotations ranging from 2c., Pencoyd, or 2.06c., Philadelphia, to 2c., Bethlehem, or 2.13c., Philadelphia. Fabricated projects are still being placed at low prices and the market shows no tendency toward improvement. About 2700 tons of steel for an apartment building at Rittenhouse Square has been awarded by the United Engineering Co. to the Shoemaker Bridge Co. An outstanding project in this district is the new store for Strawbridge & Clothier, estimated as requiring close to 10,000 tons of steel. The Pennsylvania Railroad has placed a small tonnage of shapes with a Pittsburgh mill, part of its third quarter requirements.

Track Material.—Third quarter requirements of the Pennsylvania Railroad, which included 342,000 track bolts, 1,800,000 lb. of spikes and 330,000 tie plates brought out the following bids on June 15: Standard spikes, 2.80c.; copper bearing, 2.95c.; standard tie plates, $43 per ton, and heavy duty, $51; track bolts, $4.05, all f.o.b. mill. Bids of all of the 12 bidders were uniform except in the case of the Wheeling Steel Corporation, which bid 2.84½c., f.o.b. Portsmouth, Ohio, with 19c. freight allowance on the spikes and $44 per ton, f.o.b. Portsmouth, with $3.80 freight allowance on the tie plates.

Sheets.—Blue annealed are still being maintained at 2.10c., Pittsburgh, for small lots, but 2c., Pittsburgh, or 2.32c., Philadelphia, is rather general. Black sheets are generally quoted at 2.65c., Pittsburgh, or 2.97c., Philadelphia, but concessions of $1 a ton are not uncommon. Galvanized sheets range from 3.50c. to 3.55c., Pittsburgh, or 3.82c. to 3.87c., Philadelphia, and the lower quotations are becoming more common. Sheet consumers are apparently well covered on present requirements and not interested in future contracts.

Warehouse Business.—Orders are small, but in fair volume, and prices are firm, except for a reduction of 15c. per 100 lb. in the prices of black and galvanized sheets, a revision which brings them more in line with the present mill schedule. The quantity bases on black and galvanized sheets continue effective.

Imports.—In the week ended June 16, imports included 6900 tons of Algerian iron ore and a total of 994 tons of pig iron. The pig iron arrivals consisted of 849 tons of Indian, 103 tons of Dutch and 42 tons of Swedish iron. Steel arrivals at this port were as follows: Belgium, 386 tons of structural shapes and 225 tons of steel bars; France, 172 tons of structural shapes and 64 tons of steel blooms; Germany, 313 tons of skelp and 29 tons of steel scrap; Sweden, 69 tons of steel bars, 4 tons of iron bars and 3 tons of steel blooms.

Old Material.—Prices of some grades have again receded and the market as a whole shows no firmness.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, 3/16-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to 3/16-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

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*For 50 bundles or more; 10 to 49 bundles, 4.10c. base; 1 to 9 bundles, 4.35c. base.

†For 50 bundles or more; 10 to 49 bundles, 4.95c. base; 1 to 9 bundles, 5.30c. base.

No. 1 heavy melting steel has not been bought lately by an eastern Pennsylvania mill, but $13.50 per ton seems to be the price idea of both buyers and sellers. Heavy breakable cast is off about 50c. a ton, based on a recent sale of about 3000 tons to a Coatesville consumer at $15 per ton and a smaller tonnage to a Harrisburg consumer at the same price. Yard grade of heavy melting steel has been sold to a Pottsville, Pa., company at $10.50 per ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel		$13.50
Scrap T rails	$13.00 to	13.50
No. 2 heavy melting steel	10.50 to	11.00
No. 1 railroad wrought	13.50 to	14.50
Bundled sheets (for steel works)		10.50
Machine shop turnings (for steel works)		10.50
Heavy axle turnings (or equivalent)	12.00 to	12.50
Cast borings (for steel works and rolling mill)		10.50
Heavy breakable cast (for steel works)	15.00 to	15.50
Railroad grate bars		11.00
Stove plate (for steel works)		11.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to	18.00
Couplers and knuckles	14.50 to	15.00
Rolled steel wheels		15.00
No. 1 blast furnace scrap	10.00 to	10.50
Machine shop turnings (for rolling mill)	11.00 to	11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to	12.50
Shafting	17.00 to	17.50
Steel axles	19.00 to	20.00
No. 1 forge fire	11.00 to	11.50
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chemical plant)	14.50 to	15.00
Steel rails for rolling	14.50 to	15.00

New York

Pig Iron Buying Subsided—Steel Specifications Hold Up

NEW YORK, June 19.—Pig iron buying has subsided, and sales in this territory totaled 7000 tons for the week. The price situation shows little change, but, with an increasing amount of business being placed for barge or barge-and-rail shipment, base quotations at furnace are more difficult to ascertain. Barge rates vary; the rate on shipments from Buffalo to New York harbor has recently ranged all the way from $1.50 to $2.50 a ton. Buffalo producers are following a consistent policy of shipping by barge and rail to New Jersey points taking a higher all-rail rate than $3.28 a ton. In many cases the all-rail rate to such destinations is $4.91. That pig iron makers propose to take advantage of the saving by the water route for winter deliveries is indicated by the fact that one Buffalo interest has arranged for storage space at Jersey City, N. J., and two others expect to store iron at Elizabethport, N. J. New England pig iron is also reaching New Jersey by water, several barge loads having recently docked at Jersey City. The American Steel & Wire Co. recently barged 3000 tons of steel-making iron from its Cleveland works to Beacon, N. Y., where it was transferred to cars for Worcester, Mass. In the past few years this company has moved 10,000 to 15,000 tons annually by this route. The General Electric Co. has closed against its inquiry for 2200 tons for Bayway, N. J., Elmira, N. Y., and its New England plants, and has also bought for Erie, Pa. The New York Central Railroad has bought 400 tons of foundry for Frankfort, N. Y., and Elkhart, Ind. The New York Air Brake Co. has placed 200 tons of low phosphorus, a carload of silvery and a tonnage of malleable for its Watertown, N. Y., plant. Silvery iron, in the 10 to 11 per cent grade, is reported to have been sold recently at $29 per ton, Buffalo.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to	$21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to	22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to	23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to	23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Steel.—Specifications for rolled steel, while no greater in total volume than obtained in early June, are a source of surprise considering general conditions. There is substantially no change from the situation a week ago. Chief promise at the moment in structural steel lies in further large buying for subway work.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Buying is rather well distributed among privately and publicly owned utilities and prices are unchanged. Southern foundries are quoting $32 to $33 per ton, base, Birmingham. Northern makers continue to quote $37.60 to $38.60 per net ton, delivered New York. The Department of Purchase, New York, will open bids June 29 on a tonnage of water pipe,

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage),	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	[illegible]
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*)

IC—20-lb. coating	$10.00 to	$11.00
IC—30-lb. coating	12.00 to	13.00
IC—40-lb. coating	13.75 to	14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

fittings, valves and hydrants. The Power & Light Corporation, Albany, N. Y., has closed on 60,000 ft. of 4 to 16-in. gas pipe. Wethersfield, Conn., has awarded 320 tons of 10-in. water pipe to the American Cast Iron Pipe Co. An inquiry in the market for export calls for 500 tons of water pipe for Hayti.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Coke.—Although buying of foundry coke is for the most part of carload lots, the total of such business is fairly large. Standard Connellsville foundry coke is quoted at about $3.75 per ton at the ovens and standard foundry at $2.50 to $2.75 per ton, Connellsville. Special brands of foundry grade are at $4.85 per net ton, ovens. By-product coke prices continue unchanged for foundry grade. Delivered prices of special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke contracts are being made for third quarter and second half and no change in price has been announced. Quotations continue at $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per net ton, New York or Brooklyn.

Warehouse Business.—Most jobbers in this district report a slight improvement in the number of orders, but purchases are still small. There is a moderate demand for small lots of structural material and galvanized sheets are quite active at 4.50c. to 4.70c. per lb., base. Only small lots of black sheets are being sold at 3.80c. to 4c. per lb., base.

Old Material.—Buying prices of some grades of scrap are off slightly, and others show a tendency to decline. No. 1 heavy melting steel is unchanged at $13 per ton, delivered eastern Pennsylvania. Yard grade has been sold at $10.50 per ton to a consumer at Pottsville, Pa., and some brokers are seeking to buy at $10 per ton, delivered, while others with old contracts are still offering $10.50 per ton. Yard grade is still being shipped to Weirton, W. Va., at $14 per ton, delivered on a $5.30 freight rate. As this is delivered on a No. 1 heavy melting steel contract it is subject to a reduction of $1 to $2 per ton, but still nets the seller as much or more than he would receive on shipment to eastern Pennsylvania. Heavy breakable cast is quoted at $14.50 per ton delivered to Coatesville or Harrisburg, Pa., both consumers having recently bought at $15 per ton.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$9.50 to $10.35
Heavy melting steel (yard)	6.50 to 7.00
No. 1 heavy breakable cast	11.00 to 12.00
Stove plate (steel works)	7.00 to 7.25
Locomotive grate bars	7.00 to 7.50
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Cast borings (blast furnace or steel works)	6.25 to 6.75
Mixed borings and turnings	6.00 to 6.75
Steel car axles	14.50 to 15.00
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25
Forge fire	6.50 to 6.75
No. 1 railroad wrought	9.50 to 10.00
No. 1 yard wrought, long	8.00 to 8.50
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $15.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.50

An addition of 15 ovens to the by-product coke plant of the Central Alloy Steel Corporation, Massillon, Ohio, will be built by the Koppers Construction Co., Pittsburgh. With the completion of the new ovens the plant will comprise 63 Koppers-Becker ovens.

E. Arthur Tutein, Inc., Boston and New York, broker in pig iron and coke, has closed its Philadelphia office.

Cleveland

Steel Specifications Lighter—Sheets Remain Notably Weak

CLEVELAND, June 19.—The demand for structural steel has slowed down somewhat but is holding up well for June. Specifications are lighter from several of the automobile companies in the Detroit territory, which are curtailing production. This retrenchment accounts in most part for the decreased demand as consuming industries in this territory are keeping up to recent fairly good operations. Forge shops and other makers of automobile parts in this territory have made no curtailment in production. Consumers are still refraining from taking interest in third-quarter contracts. Consequently the price advance to 1.90c., Pittsburgh, on steel bars, plate and structural material remains untested and buyers lack confidence that the advance will hold. Meanwhile Cleveland mills have taken some steel bar business for the third quarter at their current price of 1.85c., Cleveland, although they are not making this an open market quotation. Some business in sheets and strip steel for July shipment was placed by automobile companies in the Detroit territory during the week. These are adhering to the policy they have rather generally followed this year by buying only for a month's requirements. Orders against contracts from consumers in other fields are for small lots. Consumers are taking only what they need and the price advance has not yet had the effect of driving in specifications. Structural inquiry is fair. The Cleveland Union Terminals Co. interests today issued an inquiry for New York Central and Nickel Plate railroad bridge and grade crossing elimination work in Cleveland. This, it is estimated, will require 15,000 to 20,000 tons of structural steel.

Pig Iron.—There is a steady volume of sales of foundry and malleable iron for the third quarter, and orders recently taken include lots running up to 3000 to 4000 tons. Cleveland interests sold 23,000 tons during the week. While buying is well scattered, little third quarter business has as yet come from the automotive industry. Following pressure on local furnaces for lower prices and a weakening in the Valley district, Cleveland prices for local delivery have softened to the extent that foundry and malleable grades are now available at $17.50, or a concession of 50c. a ton. Valley iron at $16.75, furnace, costs the Cleveland consumer $18.51, delivered, or virtually the same as local iron bought at $18, furnace. The local market is inactive, and sellers state that they have as yet made no sales at the reduced price. One producer is still asking $18. The Lake furnace price for outside shipment is unchanged at $16.25 to $17, except in Michigan, where $17.50, furnace, is commonly quoted. While basic iron is untested, producers are making an effort to get the market back on a $16 basis. Shipments are holding up well. While one producer reports some falling off this month, shipments by other furnaces are holding up to the May volume. Another cargo of Cleveland iron was shipped by water to Milwaukee during the week. It is stated that this iron was sold before the recent price reduction in Chicago territory.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.00 to $18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.00 to 18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	$15.35 to 15.50
Standard low phos., Valley furn'ce	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—Specifications show a decline, particularly for sheet bars. A local maker is not yet naming prices for the third quarter. The open market quotation for sheet bars, billets and slabs is $33, Cleveland, but some concessions are being made in quoting delivered prices and absorbing freight charges.

Sheets.—There has been a moderate slowing down in the demand for sheets from the automotive industry. While a few contracts for blue annealed sheets have been taken for the third quarter at 2c., Pittsburgh, most consumers who are buying for future delivery are restricting their purchases to July requirements. The market in this territory is very dull. Prices continue weak but are no worse than they have been except possibly on galvanized sheets, which have been offered at as low as 3.45c., Valley mill. Jobbers are still asking 3.60c., mill, for car lots but are finding it increasingly difficult to get that price. Blue annealed sheets are rather commonly offered at 1.90c., Pittsburgh, although some producers will not shade 2c. Black sheets are holding rather steady at 2.65c., Pittsburgh. Auto body sheets continue to move well and are firm.

Strip Steel.—Some of the mills have arranged with larger consumers to take care of their requirements for the third quarter at the prices that prevailed during the first and present quarters, thus establishing the market at around 1.75c., Pittsburgh, for wide strip. The demand has slackened considerably and quite a number of consumers have enough strip coming on contracts to carry them well into the third quarter. The demand for cold rolled strip has declined. Users are willing to take third-quarter contracts at 2.75c., Cleveland, but consumers are as yet showing no interest in contracts.

Old Material.—The supply of scrap is more plentiful at the quoted prices than recently, and to that extent the market has a weaker tone. No new demand came from the mills during the week, and there is very little buying by dealers. Dealers who recently paid $15.75 for high-grade heavy melting steel for delivery to a Cleveland mill are now able to buy the same grade at $15.50 to $15.60. For other Cleveland mills they are paying $13.25. Blast furnace scrap seems plentiful at $9.25 to $9.35. No. 1 cast scrap on cars is not bringing above $16.50. With no local demand, machine shop turnings have shown a further decline of 50c. a ton.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.00 to	$13.25
No. 2 heavy melting steel	12.50 to	12.75
Compressed sheet steel	12.50 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	11.50 to	11.75
Machine shop turnings	6.50 to	7.00
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	9.25 to	9.50
Mixed borings and short turnings	9.25 to	9.50
No. 2 busheling	9.25 to	9.50
Cupola Grades		
No. 1 cast	16.25 to	16.75
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Reinforcing Bars.—Contracts for 1700 tons for the Cleveland Union Terminal Co. work, for which the Aronberg Fried Co., New York, has the general contract, was awarded during the week. It is understood that this business as well as some other lots placed recently have been taken at quite a concession from the 1.85c., Cleveland, price. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.85
No. 9 galvanized wire, per 100 lb.	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Alloy Steel Bars.—With the slowing down of the automotive industry, specifications have declined this month. Most consumers in this territory have placed contracts for the third quarter at the present prices, to which there seems to be very little objection.

Bolts, Nuts and Rivets.—Demand for bolts and nuts continues fair. Rivets are moving somewhat better than last month. Many buyers have placed contracts for the third quarter at the present price, which has been reestablished for that delivery.

Coke.—The foundry coke market is dull, new demand being confined to small lots. Prices are unchanged at $3.50 to $4.85, ovens, for Connellsville foundry coke. Ohio by-product coke is quoted at $7.75, Painesville, for June shipment.

Light-Weight Oil-Electric Locomotive in Service

Recently the Long Island Railroad put into service the first light-weight oil-electric switcher locomotive built in the United States. It is capable of producing 600 hp., weighs only 85 tons and burns the cheapest grades of fuel oil. It is said that what a steam engine will do on a ton of coal this new engine will do on 10 gal. of oil.

It has been recognized for some time that the oil engine can produce a given amount of power at a much lower cost than any other type of engine. This locomotive has not only that feature, but it is lighter and speedier than the oil-burning engines which have been in use previously. It operates at 800 r.p.m. maximum, and the weight per brake horsepower is 283½ lb.

The locomotive consists of two cabs normally coupled and operated as a single unit, but capable of individual service if desired. The combined unit, 47 ft. long, is geared for a maximum speed of 34 miles an hour, though speeds of more than 80 miles an hour can be secured with this type of motive power in passenger locomotives.

Each cab contains a 300-hp., six-cylinder oil engine, and each engine drives a 210-kw. electric generator, which furnishes power to two traction motors. The generator supplies direct current at 750 volts when operated at normal high speed. It not only supplies power for the traction motors, but also starts the oil engine, receiving 64-volt power from a storage battery, and charges the battery while idling.

The locomotive also solves one of the most difficult problems of oil-electric design, that of stalling when the demands upon the engine are too sudden. The use of a variable-speed governor and development of what is known as automatic torque-governor control permit all the power developed by the engine to be applied at all times, even when starting or pulling heavy loads at slow speeds. The engine and electric equipment were built by the Westinghouse Electric & Mfg. Co. and the mechanical parts were supplied by the Baldwin Locomotive Co.

C. O. Bartlett & Snow Co., Cleveland, manufacturer of conveying equipment, has opened a branch office at 505 First National Bank Building, Chicago, in charge of S. G. Artingstall, Jr., formerly chief engineer J. C. Buckbee Co., Chicago; vice-president and chief engineer United Engineering Co., and later district manager for the Stearns Conveyor Co., Cleveland.

Employment in May showed a 2 per cent gain over April, according to the Monthly Labor Barometer of the National Metal Trades Association, Chicago. This was in contrast with a drop of 3 per cent between April and May, 1927. Employees reported for May are given as 646,202, against 591,353 from the same establishments a year ago.

San Francisco

Heavy Awards of Cast Pipe—1144 Tons of Line Pipe Placed in East

SAN FRANCISCO, June 16 (*By Air Mail*).—Hand-to-mouth buying continues to prevail in the iron and steel markets on the Pacific Coast, and bookings this week were by no means heavy. Outstanding among the developments of the week were the placing of a carfloat by the Western Pacific Railroad in San Francisco, requiring 525 tons of plates and 275 tons of shapes, with the Moore Drydock Co. and the booking by the United States Cast Iron Pipe & Foundry Co. of 1800 tons of cast iron pipe for a sewer project in Los Angeles and 1044 tons for the city of Tacoma, Wash.

Building operations in the Los Angeles district continue on a par with activity last year. Up to and including June 6, permits issued numbered 688 with an estimated valuation of $2,747,245, compared with 664 permits and a valuation of $1,932,298 for the corresponding period in June, 1927. Total permits issued so far this year are approximately $5,000,000 behind the corresponding total last year, the total this year being $45,559,381, compared with $50,770,100 for 1927.

Pig Iron.—Little improvement is noted in the rate of foundry operations, and sales and inquiries are confined to small tonnages. No change in quotations has occurred.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Most reinforcing steel bar awards continue to consist of lots ranging from 20 to 40 and 50 tons. Larger awards include 150 tons for a cement plant at Seattle, Wash., taken by the Pacific Coast Steel Co., and 147 tons for a viaduct at Mount Vernon, Wash., booked by the Northwest Steel Rolling Mills. Bids were opened this week on 120 tons for the Cahe Creek bridge at Sacramento, Cal., and bids will be opened on July 5 for 400 tons for paving in Ventura County, California. Out-of-stock prices in the bay district have not improved and 1.80c. to 2c. is still the range. Demand for merchant bar material is not heavy, and most orders coming to hand call for carload lots comprising numerous sizes.

Plates.—Only one project of importance was reported this week. This was a carfloat for the Western Pacific Railroad, requiring 525 tons. Bids have been opened on a carfloat for the Santa Fe Railroad at San Francisco, calling for 525 tons of plates and 275 tons of shapes, the Moore Drydock Co. being low bidder. Demand for oil storage tanks and riveted-plate pipe lines is nil, and little contemplated tonnage is in sight. Quotations cannot be considered firm and range from 2.20c. to 2.30c., depending upon the desirability of the specification.

Shapes.—Structural shape awards fell off from the total of the previous week, less than 2600 tons being reported placed. Included among the lettings was 900 tons for a headframe for a mine in Nevada, booked by the Kansas City Structural Steel Co. New inquiries include 1500 tons for the Medico-Dental Building, Spokane, Wash. Plain material remains firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Pipe awards were the heaviest in over eight weeks and aggregated 2956 tons. An unnamed interest took 113 tons of 4 to 8-in. Class B pipe for Vancouver, B. C. The United States Cast Iron Pipe & Foundry Co. secured 1799 tons of 30 and 36-in. Class B pipe for the Venice outfall sewer at Los Angeles and 1044 tons of 8 to 24-in. Class C pipe for Tacoma, Wash. Pending business is of limited proportions, less than 800 tons being up for figures. The only new inquiry of the week is 300 tons of 4 to 10-in. Class B pipe for Burbank, Cal.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Steel Pipe.—Movement of standard tubular products and oil country goods during the past two or three months has been limited, and the market is quieter than it has been in years. The Smith-Booth-Usher Co. took 193 tons of ½ to 4-in. standard pipe for the city of Los Angeles. The Southern California Gas Co. has placed 1144 tons of 12-in. line pipe with an unnamed Eastern mill, the contract for the installation of the pipe going to the Virginia Pipe Line Contracting Co.

Coke.—Demand for foundry coke is limited and reflects the quiet condition noted in the pig iron market. A shipment of 4500 tons of English beehive and by-product coke is due to arrive early next month.

St. Louis

Pig Iron Buying Conservative—Plate Mill Running Full

ST. LOUIS, June 19.—Melters seem to lack confidence in the pig iron market and are buying in the smallest possible quantities. Carload orders were the rule during the last week. Of 1200 tons of foundry grades sold by the St. Louis Coke & Gas Corporation, the largest order was 500 tons. One company that ordinarily buys 1000 tons at a time placed an order for a carload. There is much pig iron to be purchased for third quarter consumption, and it is expected that demand will be more active soon. The Granite City company has blown out the older of its two furnaces for relining.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.16
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.16
Northern basic, delivered	20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Domestic grades are fairly active among dealers. Buying of foundry coke is light, following a lessening of the melt in the district.

Finished Steel.—Following the establishment of lower prices on sheets, the Granite City Steel Co. reports an improvement in demand, especially for galvanized sheets, and has found it necessary to put on another galvanizing pot. This mill continues to experience a fair demand for black sheets and blue annealed sheets, and business in plates is sufficient to permit 100 per cent operations in its plate department. Railroad buying is light. A building for the American Railway Express Co., St. Louis, requiring 1000 tons, is the only structural project of note pending.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material.—What little life there was in the market during the past week was accounted for by purchases of miscellaneous rails by a district mill at $13 per ton. The orders, estimated as totaling 3000 tons, were distributed among several dealers, and call for delivery through the next 60 days. Iron car axles, which are scarce, have advanced, now ranging from $25 to $25.50. Stove plate has declined 25c. Railroad lists include Rock Island, 5500 tons; Chicago, Milwaukee, St. Paul & Pacific, 2550 tons; Gulf Coast Lines, 1450 tons; Texas & Pacific, 1000 tons; Missouri-Kansas-Texas, 500 tons of 60-lb. relaying rails.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.00 to	$11.50
No. 1 locomotive tires	12.00 to	12.50
Heavy shoveling steel	11.00 to	11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.25 to	12.75
Railroad springs	13.50 to	14.00
Bundled sheets	8.50 to	9.00
No. 2 railroad wrought	11.25 to	11.75
No. 1 busheling	9.75 to	10.25
Cast iron borings	9.00 to	9.50
Iron rails	13.00 to	13.50
Rails for rolling	13.00 to	13.50
Machine shop turnings	7.00 to	7.50
Steel car axles	17.50 to	18.00
Iron car axles	25.00 to	25.50
Wrought iron bars and transoms	21.00 to	21.50
No. 1 railroad wrought	10.00 to	10.50
Steel rails, less than 3 ft.	15.00 to	15.50
Steel angle bars	12.00 to	12.50
Cast iron carwheels	13.25 to	13.75
No. 1 machinery cast	13.00 to	13.50
Railroad malleable	11.50 to	12.00
No. 1 railroad cast	13.00 to	13.50
Stove plate	11.00 to	11.50
Agricultural malleable	12.00 to	12.50
Relaying rails, 60 lb. and under	20.50 to	23.50
Relaying rails, 70 lb. and over	26.50 to	29.00

Birmingham

Seasonal Drop in Steel Demand Smaller Than Usual—Stack to Be Lighted

BIRMINGHAM, June 19.—Producers of pig iron have not yet opened their books for third quarter. Some consumers are extending present arrangements to fill out the quarter, all orders being in small lots. Only a small part of present bookings will extend into July. Shipments continue active and ahead of output. Quotations on No. 2 foundry remain on a $16 base. The Tennessee company plans to blow in one of its two new furnaces at Fairfield, Ala., this week. The other is to be blown in a little later. Each has a daily capacity of 600 tons. At present, furnace operations in the district are the same as for the past three weeks. Eighteen stacks are in blast, which includes 10 on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.		$16.00
No. 1 foundry, 2.25 to 2.75 sil.		16.50
Basic	15.00 to	16.00

Finished Steel.—New business continues to develop at an even rate. The recession toward a dull July is less pronounced than for several years. Forward bookings are in good volume. It is understood that one of the larger companies has placed a portion of its plant on double time. Quotations are unchanged, and some concessions are still being made from time to time. Demand for structural steel is below normal, and new business is light. Bar manufacturers are doing a fair amount of current business in small-lot orders of 15 to 75 tons. The Tennessee company is now operating seven open-hearth furnaces at Ensley, Ala., instead of six. Five are being worked at Fairfield, and the Gulf States Steel Co. continues to run four at Alabama City, Ala.

Cast Iron Pipe.—Demand has dropped slightly from the level of the past few weeks. There is little municipal business and no new projects of consequence have developed lately. The market is receiving its support from private lettings in small lots and, as a whole, is duller than at this time last year. Prices remain at $32 to $33 per net ton, Birmingham, for 6-in. and larger. Shipments have been large for several weeks, and unfilled tonnage is being reduced steadily.

Coke.—Foundry coke demand has declined. Foundries are reducing inventories for the end of the fiscal year. Shipments on contracts are off a little. Prices are unchanged, the quotations being $5 per net ton, Birmingham, for both spot and contract business.

Old Material.—Outside of a few inquiries for No. 1 cast and No. 1 railroad wrought, there is no interest in the market. Sales are the smallest in the past year or so. Quotations are unchanged, the market being too weak to afford any test of prices.

Prices per gross ton delivered Birmingham district consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chemical	13.50 to	14.00

Canada

Steel Business 10 Per Cent Ahead of Last Year—Scrap Prices Weaker

TORONTO, ONT., June 19.—Improvement in output and in business continues to feature activities in the iron and steel industry of this country. The betterment so far this year is slightly more than 10 per cent, compared with a year ago.

The value of iron and steel and their products manufactured in Canada during 1927 was $515,971,445, an increase of $10,782,596 over the previous year, at $505,188,849, according to a recent statement by the Dominion Bureau of Statistics. The value for 1927 was the highest since 1920.

Pig Iron.—Increased interest in this market is gradually making itself felt, especially with regard to the placing of advance delivery contracts. With only a few days to go before the beginning of third quarter, melters are inquiring for foundry and malleable iron to take care of needs for that period. Among contracts already closed are several for 1000 tons and a few of 500 tons for delivery during the second quarter. In a normal year the consumption of foundry and malleable pig iron in this country is distributed as follows: Ontario, 175,000 tons; Quebec, 50,000 tons; Nova Scotia, 10,000 tons; New Brunswick, 4000 tons; the other five Provinces, 5000 tons collectively. Except for the introduction of a spread of 50c. a ton on basic iron, prices are unchanged for the week.

Prices per gross ton:

Delivered Toronto		
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to	23.60
Malleable	23.10 to	23.60
Delivered Montreal		
No. 1 foundry, sil. 2.25 to 2.75	24.50 to	25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to	25.00
Malleable	24.50 to	25.00
Basic	23.50 to	24.00
Imported Iron at Montreal Warehouse		
Summerlee		33.50
Carron		33.00

Structural Steel.—The strike among structural steel workers in the Toronto and Montreal districts continues to retard building operations, but at the moment it appears that a settlement will shortly be brought about. The strike has not only affected sales for the past month but has also held up deliveries on a number of large structures. Building programs continue to be announced and those in prospect now involve approximately 25,000 tons of steel. Approximately 3000 tons of reinforcing bars will be required for a proposed 12-story structure in Toronto for Wellington Buildings, Ltd.; 3000 tons of structural steel and 1000 tons reinforcing bars are called for in a storage warehouse at Montreal, for which Perrault & Gadbois, Themis Building, are preparing plans; 1000 tons of structural steel will be required for a rink and exhibition building at Moncton, N. B., for the Moncton Exhibition Co.; 4000 tons of reinforcing bars are specified in a medicinal and dental block for Baker, Stevens & Co. at Vancouver, B. C.

Old Material.—Improvement in demand features the market. While some inquiry for third quarter is coming out, no large contracts have yet been placed, and the greater part of current business is for spot delivery. Montreal dealers have made a general revision in prices. Wrought iron and steel axles are being purchased at $1 a ton higher, and standard carwheels have advanced $1.50 per ton. With these exceptions, the Montreal market is weaker. Heavy melting steel, formerly purchased by dealers at $8, is down to $7; turnings have been reduced from $6 to $5, and other grades have declined $1 to $1.50 per gross ton. While Toronto prices remain unchanged, a spread of 50c. a ton has been introduced by local dealers in their purchases, the change being 50c. per ton under previous quotations on all grades.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Pig Iron Sales Lighter Than in May—Foundry Melt Receding

BOSTON, June 19.—Pig iron sales in New England in the first half of this month fell considerably short of those for the corresponding half of May. Those for the past week approximated 4500 tons, practically all for third quarter and largely for delivery from Buffalo, eastern New York and New England furnaces, with the major portion of the business going to the Mystic company. Included in the transactions was a small tonnage of Indian No. 2X iron at $21.75 a ton on dock here, duty paid, or $23.75 a ton, delivered, and odd lots of western Pennsylvania and Alabama irons at premiums over New York and New England brands. An unconfirmed report is that a Buffalo stack recently offered No. 2X iron at less than $16 a ton, furnace, to meet competition from Eastern producers. The Springfield Foundry Co., Springfield, Mass., is in the market for 100 tons of No. 1X iron for July delivery—the only new open inquiry. Several foundries, however, are privately negotiating for 500 tons to 600 tons for third and fourth quarter delivery, but give no intimation when purchases will be made.

Prices of foundry iron per gross ton delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, round	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Coke.—The outstanding feature of the situation in by-product foundry coke is continued activity in domestic sizes. Dealers are buying more heavily, and there is every indication 1928 will be a record-breaking year. Unquestionably, there is increasing public interest in coke and a decreasing use of anthracite coal. Specifications against foundry coke contracts are easing off, due to a seasonal letdown in the foundry melt of iron. Shipments are still being made at $11 a ton, delivered, within a $3.10 freight rate zone.

Shapes and Plates.—Some recession in contracting for third quarter is reported by mill representatives. Most mills are protecting preferred customers on tonnages, and the 1.90c. per lb., base Pittsburgh, is not obtained as often as 1.85c.

Bars.—Domestic steel bars continue in fairly good demand for third quarter, and there is a fair volume of spot business from small users. The general asking price is 1.90c. per lb., base Pittsburgh, but it is being shaded when competition is keen. Price stability is lacking on reinforcing bars, so far as local distributers are concerned, owing to offerings of imported stock at materially lower prices. An order at 2.40c. per lb., base, from stock is rare.

Fabricating Work.—As anticipated, most of the closed shops during the past week signed up with iron workers for $1.37½ per hour, contrasted with $1.25, heretofore. Now that the labor situation is clearer, steel fabricating jobs that were held back are beginning to come out. The first to appear have been small, yet numerous. Round tonnages are expected shortly, although common opinion is that big work is over temporarily for Greater Boston, at least. Despite the advance in wages, competition among fabricators is keen and low prices were quoted in the past week. In this connection, it should be noted that practically all of the bridge fabricators and many of the large ones specializing on other work are operated on the open shop basis.

Warehouse Business. — Business holds up rather well, but without an increase in the average size of orders. Foreign material is still a factor in this market, although less so than in January or February; yet, when prices are cut, it usually is on imported stock. The steadiness of domestic mill prices tends to stabilize stock prices; yet here and there a shading of list prices is reported by warehouses, when the tonnage is attractive or payment is prompt. Talk of an advance in wire nails appears to have disappeared.

Old Material.—The market is quiet, with the tendency of prices downward. Exports from Boston have been held up temporarily, owing to a lack of steamer space, and there is an accumulation of material on dock. Additional purchases of No. 1 steel are being made at $9 and $9.25 a ton, on dock, however, and of yard steel at $8.50 to $8.75, these prices being a shade easier. The market for yard steel for Pennsylvania delivery is decidedly soft, prices being 50c. to $1 a ton lower than a fortnight ago. This grade is selling at $5.50 to $5.85 a ton, on cars, shipping point. No. 2 steel, commonly shipped as yard steel, is around $7.30. The top price on heavy melting steel is $8.50 a ton on cars, shipping point, a decline of 50c. from last week. A Worcester, Mass., consumer is buying skeleton at $9 to $9.50 a ton, delivered, for which dealers are paying around $7 to $7.25, on cars, shipping point. In contrast with the general market, chemical borings are more active, owing to freer shipments to New Jersey.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.50
Scrap T rails	8.00 to 8.50
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.50 to 5.75
Cast iron borings (steel works and rolling mill)	5.50 to 5.75
Bundled skeleton, long	7.00 to 7.25
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.50 to 5.75
Forge scrap	6.00 to 6.25
Shafting	13.50 to 14.00
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton delivered consumers' yards:

Textile cast	$13.25 to $13.50
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

Detroit

Impressive Gain in Automobile Output—Record Volume of Building Contracts

DETROIT, June 19.—On the basis of figures of June 2, which covered only five of the automobile companies in this territory, it was shown that May production exceeded that for April by approximately 5 per cent. At that time it was expected that when all the figures were available a gain of at least 5 per cent would be shown for the entire group. This proved to have been quite conservative.

With figures now available for 12 motor car builders, including the Cadillac, Chevrolet, Dodge, Ford, Graham-Paige, Hudson-Essex, Hupp, Oakland-Pontiac, Olds, Packard, Reo and Studebaker companies, total production for May is shown to have been 325,055 units, against 298,283 for April, a gain of 26,772 units, or 9 per cent.

Eliminating those companies which did not show representative figures in 1927, May output this year made a gain of 43,595 units, or 23 per cent, over that of May, 1927.

The Cadillac and LaSalle units turned out in May, 1928, totaled 3772. This, incidentally, was the largest May production in the history of the Cadillac Motor Car Co., and, while retail deliveries for last month are not completely reported as yet, they are expected to run between 4500 and 4800—also a new record.

The Chevrolet Motor Co. set a new record for May, with production of 140,700 units, compared with 135,832 in April and 115,600 in May of last year. Output for the first five months of this year totaled 651,000 units, against 513,000 in 1927.

Production by Dodge Brothers, Inc., for the first five months of this year was 102,560 units—that for the same period of 1927, 83,781 units.

Output by the Ford Motor Co. in May was approximately 50,000 units, or 20,000 ahead of the month previous. Local plants of the Ford Motor Co. added 893 employees in the past week, bringing the total to 116,324, which sets a new high record and may be compared with 110,000 employees at peak production of Model T cars in 1926 and with 52,000 employees at the low point in the summer of 1927.

The Graham Paige Motors Corporation shipped its 30,000th car June 1, following a production of 8509 units in May. Output so far this year has been 2.8 times the total for the same period of last year and 8035 units in excess of the entire 1927 production.

The Oakland Motor Car Co., Pontiac, Mich., turned out 25,674 units last month, an increase of 265 over May of 1927, but a decrease of 1387 units from April of this year. The Oakland-Pontiac plant is one of the three organizations that showed a decline in May from the production of April, the other two being the Dodge and Studebaker companies. The Olds Motor Works, Lansing, Mich., produced 11,716 units in May, compared with 3485 for the same month in 1927 and 11,089 units in April of the current year. The Studebaker Corporation, South Bend, Ind., produced only 13,253 units in May, against 14,500 during the previous month and 11,902 units in May, 1927. May output of the Willys-Overland Co., Toledo, Ohio, was 44,559 units, compared with 27,564 for the same month in 1927.

The report of the Employers Association of Detroit shows still another increase in Detroit employment—a gain of 3138—bringing the total to 263,470. These figures cover the payrolls of companies whose employees constitute about two-thirds of the city's working population. The corresponding figure of 1927 was 204,966 persons, or 58,504 less than the present time.

May building contracts in Detroit amounted to $15,639,000, the highest May figure ever recorded. This is 20 per cent above the figure for April of this year and 24 per cent above that for May of 1927.

In the steel market, mill prices on automobile body sheets remain at 4c., Pittsburgh, and on blue annealed sheets at 2c., Pittsburgh. Cold-finished bars are bringing 2.20c., Pittsburgh. Hot-rolled strips, 3 in. and narrower, range from 2.20c. to 2.30c., Pittsburgh; hot-rolled strips, 3 to 6 in. wide, from 1.85c. to 2.10c., Pittsburgh, and 6 in. and wider strip, 1.75c. to 1.90c., Pittsburgh. Structural bars, plates and shapes remain at 1.85c. to 1.90c., Pittsburgh.

Prices on some grades of old material in this district registered further declines during the week, notably long turnings, which recorded a drop of 75c. per ton and flashings 25c. per ton. The market generally shows no sign of strength. The few sales recorded are made near the low of the range.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.00 to 7.50
Long turnings	5.75 to 6.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 6.50
Flashings	9.00 to 9.50

Cincinnati

Southern Ohio Pig Iron Sells $1 Off—Little Forward Steel Buying

CINCINNATI, June 19.—Dullness continues in pig iron and indications are that the market will be quiet during the remainder of the month. The largest sale in the past week was 300 tons of malleable for a Chattanooga foundry. With the exception of an inquiry for 474 tons of foundry iron for the Louisville & Nashville, pending business consists of lots ranging from single carloads up to 200 tons. Prices reflect the unsatisfactory situation in which producers have been placed. Northern Ohio interests are reported to be booking orders at as low as $16.25, base furnace, whereas Southern makers are moving little iron into the territory north of the Ohio River at $16, base Birmingham. At least one furnace at Ironton is understood to be liquidating the stock on its yards by accepting $1 a ton less than the nominal schedule of $19, base furnace, which has prevailed in recent weeks. There has been no

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

change in Jackson County silvery iron, which is steady at $25, base Jackson, for 8 per cent.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to	$20.89
So. Ohio malleable	$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25		19.69
Alabama fdy., sil. 2.25 to 2.75		20.19
Tennessee fdy., sil. 1.75 to 2.25		19.69
Southern Ohio silvery 8 per cent		26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Reinforcing Bars.—New billet bars continue to bring 1.85c., base Pittsburgh, and rail steel stock 1.80c., base mill.

Warehouse Business.—Shipments out of local warehouses have increased in the past week, and sales in the first half of June showed an improvement of 5 to 10 per cent over the same period in May. Cold-rolled steel bars and strip steel have been especially active, while the demand for wire products has been fair. Structural steel and reinforcing bars are moving in moderate volume. Prices are firm and unchanged.

Coke.—Shipments of by-product foundry coke are running about 10 per cent behind those in May, but domestic grades, on the other hand, are in slightly better demand. An order for 1000 tons of beehive foundry coke for a nearby consumer was the largest transaction of the week. By-product foundry coke at Detroit is reported to have been cut 50c. to $1 a ton, effective June 11, and the market at that point is very soft because of the determination of sellers to secure current business by making substantial concessions to buyers.

Foundry coke prices per net ton delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Consumers are showing slight interest. Steel plants are not contracting for future requirements, while foundries are making only small miscellaneous purchases. A company in this district bought 1000 tons of No. 2 busheling the past week. Despite the apparent indifference on the part of users, dealers paid approximately the same prices for scrap offered by railroads this month as in May. With the exception of No. 2 busheling, which is off $1 a ton, quotations are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to	$11.25
Scrap rails for melting	11.25 to	11.75
Loose sheet clippings	8.25 to	8.75
Bundled sheets	9.25 to	9.75
Cast iron borings	7.75 to	8.25
Machine shop turnings	7.25 to	7.75
No. 1 busheling	10.00 to	10.50
No. 2 busheling	6.00 to	6.50
Rails for rolling	12.50 to	13.00
No. 1 locomotive tires	12.75 to	13.25
No. 1 railroad wrought	10.00 to	10.50
Short rails	15.75 to	16.25
Cast iron carwheels	12.25 to	12.75
No. 1 machinery cast	15.25 to	15.75
No. 1 railroad cast	12.75 to	13.25
Burnt cast	7.50 to	8.00
Stove plate	8.25 to	8.75
Brake shoes	9.50 to	10.25
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.00 to	11.50

Finished Material.—A fair volume of steel has been ordered by buyers in the past week, although considerable hesitancy in making forward purchases is discernible among large consumers. The advance of $1 a ton in bars, structural shapes and plates has not had the desired effect of forcing in specifications against current contracts, and many users are not yet convinced that the new price of 1.90c., base Pittsburgh, will be sustained under a real test. There has been a slight upward turn in structural steel demand, but major projects are still scarce and fabricators are obliged to take numerous small jobs to keep their shops busy. Gas holder builders are operating their plants at about a normal rate, although work ahead must be augmented soon in order to insure the maintenance of present production levels. Conditions in the sheet market continue to reflect the flexibility of prices. For blue annealed stock the average quotation is 2c., base Pittsburgh, while galvanized sheets range from 3.50c. to 3.60c. Black sheets are selling at 2.65c. to 2.80c. District mills declare that the cold weather in the past month has retarded the usual buying movement in light-gage galvanized sheets for roofing purposes, particularly in the South. Unless there are unexpected developments, however, this business will be placed during the remainder of June and in July. Demand for common wire nails and for plain wire is sagging somewhat, with the former bringing $2.50 per keg, base Ironton, and the latter $2.40 per 100 lb., base Ironton. An exception is made in the case of spring wire, which is moving briskly. Cold-rolled bars and strip steel are more active than a few weeks ago.

Buffalo

Some Activity in Pig Iron—Black Sheets and Scrap Softer

BUFFALO, June 19.—Business has been good, with quite a bit of inquiry and considerable placing. The General Electric Co. has purchased, it is reported, about 6000 tons in all for its various plants, with considerable of this iron business coming to Buffalo. Two inquiries for foundry and malleable of 2000 tons apiece came out and one of these has been placed with a Buffalo furnace. Another inquiry in the East was for 1000 tons of foundry. The International Harvester Co. is seeking to buy foundry and malleable for its Auburn plant, with probable requirements of 500 to 1000 tons. The New York Central is reported to have placed 450 tons of foundry for the third quarter, and a Fitchburg, Mass., melter bought 100 tons. Another lot of 200 to 300 tons was placed in New England. An Erie, Pa., inquiry is for 500 tons of foundry. The Lackawanna Railroad will purchase for Scranton, Pa. A considerable volume of iron has been sold in small lots. The price in the district is holding firmly to $17, Buffalo, for No. 2 plain and $17.50 for malleable. Canal shipment iron for the East has figured back generally to about $16.50, Buffalo.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25		$17.00
No. 2 foundry, sil. 2.25 to 2.75		17.50
No. 1X foundry, sil. 2.75 to 3.25		18.50
Malleable, sil. up to 2.25		17.50
Basic	$16.50 to	17.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—Demand is fair. A local structural fabricator took 1000 tons for the new Riverside high school, and the New York Central has placed 600 tons of reinforcing steel for its track canopy and foundations at the new Buffalo terminal. Mill operations are being maintained, with prices of bars, shapes and plates unchanged. The black sheet price is reported softer.

Old Material.—Buying conditions have been very quiet though shipments to consumers have been heavy. An occasional sale of No. 1 machinery cast scrap and malleable at prices quoted is noted.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.25 to	$14.50
No. 2 heavy melting steel	12.50 to	13.00
Scrap rails	13.50 to	14.00
Hydraulic compressed sheets	12.50 to	13.00
Hand bundled sheets	8.50 to	9.00
Drop forge flashings	12.00 to	12.50
No. 1 busheling	12.50 to	13.00
Heavy steel axle turnings	12.00 to	12.50
Machine shop turnings	7.75 to	8.25
Acid Open-Hearth Grades		
Railroad knuckles and couplers		15.00
Railroad coil and leaf springs	15.50 to	16.00
Rolled steel wheels		15.00
Low phosphorus billet and bloom ends	16.00 to	16.50
Electric Furnace Grades		
Heavy steel axle turnings	12.00 to	12.50
Short shoveling steel turnings	10.00 to	10.50
Blast Furnace Grades		
Short shoveling steel turnings	10.00 to	10.50
Short mixed borings and turnings	9.50 to	10.00
Cast iron borings	9.50 to	10.00
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	15.50 to	16.00
Iron axles	20.00 to	20.50
No. 1 railroad wrought	12.00 to	12.50
Cupola Grades		
No. 1 machinery cast	14.50 to	15.00
Stove plate	13.00 to	13.25
Locomotive grate bars	11.50 to	12.00
Steel rails, 3 ft. and under		16.50
Cast iron carwheels	12.00 to	12.50
Malleable Grades		
Industrial		15.00
Railroad		15.00
Agricultural		15.00

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	June 19	June 18	June 16	June 15	June 14	June 13
Lake copper, New York	14.87½	14.87½	14.87½	14.87½	14.87½	14.87½
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	46.62½	47.50	.....	48.75	48.37½	48.25
Lead, New York	6.30	6.30	6.30	6.30	6.30	6.30
Lead, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15
Zinc, New York	6.50	6.50	6.50	6.50	6.50	6.50
Zinc, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, June 19.—Quotations for the major metals are all very firm except that for tin, which has sunk to new low levels of nearly four years. All the markets are only moderately active, buying of tin being possibly the heaviest.

Copper.—Statistics for May, which appeared early last week, are considered favorable by producers. They show a decrease of about 6000 tons in refined stocks and an increase of about the same amount in blister copper, one offsetting the other. Output at the mines showed an increase, which is considered favorable because more metal is needed in the near future. Very little change is noted in the general market. Demand from foreign countries continues the feature, total sales thus far this month being estimated at around 45,000 net tons. This is nearly on a par with the buying in May, which was of record proportions. Germany easily leads, her total purchases being about double those of either England or France. Prices are unchanged, the quotation for Copper Exporters, Inc., being 15c., c.i.f. European ports. Demand from domestic consumers is light, most of them being well covered for July and a large part of August. Small lots of July electrolytic copper have sold at a slight premium and there has been some buying of September metal. Lake copper is quiet but very firm at 14.87½c., delivered.

Tin.—Sales for the week ended Saturday, June 16, were about 1100 to 1200 tons, taken mostly by dealers. Consumers have not been active in many weeks and this holding back, combined with liberal sales of the metal in the Far East, has caused market values to fall away to new low levels in the last two or three weeks. Spot Straits tin today was quoted at 46.62½c., New York, which is the lowest price since Sept. 24, 1924, when it was 47c. London prices have also taken a sharp downward turn in the week of nearly £10 per ton. Spot standard today was quoted at £213 10s., future standard at £210 15s. and spot Straits at £214 10s. per ton. The Singapore price today was £215 5s. Sentiment in New York and London was very blue today and bulls in London have become disheartened and are throwing over the metal. European consumers are also holding back, thus increasing the backlogs of possible demand later. Arrivals thus far this month have been 3945 tons, with 5375 tons reported afloat.

Lead.—The market is without feature and practically unchanged, the quotation of the leading interest still standing at 6.30c., New York, with the outside market firm at 6.15c., St. Louis. These quotations apply to spot and June, but a small premium is asked for deliveries beyond June. The market is not active, sales being confined to carload and small lots.

Zinc.—The chief interest is in the ore situation, which has changed but little. Sales at Joplin on Saturday were about 9000 tons at $40 to $41. The production of ore was about 11,000 tons. Quotations for prime Western are strong at 6.15c., East St. Louis, or 6.50c., New York, with practically no metal for sale at lower levels. Buying is not heavy, but is of fair proportions and is confined to nearby delivery. Very little July metal is being sold, quotations in most cases being 6.20c., East St. Louis.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c., shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Chinese metal is available for all positions at 9.50c. to 9.75c., New York, duty paid.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	32.00c. to 33.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.00c.
Tin, bar	58.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	57.50c.
Solder, ½ and ½	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Prices of all non-ferrous products continue unchanged, the present bases having been established May 25 on brass and copper, May 29 on full lead sheets and June 7 on zinc sheets.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.25c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 19.—This market is quiet with lower prices for tin and zinc. Quotations for copper are higher, though sales show no more activity. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 14.75c.; tin, 50.50c.; lead, 6.25c.; zinc, 6.25c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Ohio Colleries Co. has ordered 250 mine cars from American Car & Foundry Co.

Chicago, St. Paul, Minneapolis & Omaha has ordered 250 stock cars from an unnamed bidder.

Central Vermont will buy 10 2-10-4 type locomotives.

Sanitary District, Chicago, will purchase two 0-6-0 and two 0-4-0 type locomotives.

Celebrates Ninety-second Year

Something of the history, service facilities and products of the Shaw-Crane Putnam Machine Co., of the Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, is given in an attractive booklet recently issued under the title of "To Help You See Us as We See Ourselves." Exterior and interior views of the Shaw and Putnam plants are shown, as well as illustrations of the products of those companies, both for railroad and industrial use. The booklet, which is attractively arranged, is dedicated to Salmon W. Putnam, John Putnam and A. J. Shaw, founders of two of the subsidiary companies and commemorates the ninety-second anniversary (1836 to 1928) of the Putnam works of the company. The Shaw Electrice Crane Co. was founded in 1891 with a plant at Muskegon, Mich.

Steel boilers ordered in May are reported by the Department of Commerce at 1572 units with 1,453,672 sq. ft. of heating surface. This is the largest monthly total in some time. It compares with 1325 boilers and 1,295,170 sq. ft. in April. For the first five months the sales have been 6172 units and 6,122,741 sq. ft., against 6502 and 6,906,471 last year.

A gain in factory employment in Chicago, and an upward trend in eight out of 13 other leading Illinois cities in May, is reported in the monthly review of the bureau of labor statistics of the Illinois Department of Labor. Chicago showed an increase of 1.1 per cent, due principally to improvement in the metal, meat packing and printing industries.

The Pittsburgh Foundrymen's Association will hold its annual field day and outing at The Pines, on Perry Highway, near Keown, Pa., on Saturday, June 30.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.625c.	14.00c.
Copper, heavy and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.25c.	7.75c.
Heavy machine composition	9.75c.	11.00c.
No. 1 yellow brass turnings	8.50c.	9.375c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

REINFORCING STEEL

Awards Total About 3800 Tons—New Projects Include 8000 Tons In Canada

AWARDS of about 3800 tons of reinforcing bars were practically on a par with those of a week ago. Included were 600 tons for the New York Central terminal at Buffalo and 600 tons for a Buffalo public school. There were about 5000 tons of new projects in the United States; three Canadian inquiries call for a total of 8000 tons.

BOSTON, 300 tons, Noyes-Buick Co. plant, to Truscon Steel Co.

CAMBRIDGE, 275 tons, Harvard Law School addition, to Concrete Steel Co.

BROOKLYN, 130 tons, Brooklyn Union Gas Co., plant building, to McClintic-Marshall Co.

NEW YORK, 200 tons, Pier No. 3, North River, to Faitoute Iron & Steel Co., Newark.

STATE OF NEW JERSEY, 350 tons, State road from Deans to Cranbury Turnpike, to Igoe Brothers.

STATE OF NEW JERSEY, 250 tons, road work from Linden to Union, to Igoe Brothers.

ELIZABETH, N. J., 200 tons, storage warehouse, to Joseph T. Ryerson & Son, Inc.

PATERSON, N. J., 100 tons, bakery, to Igoe Brothers.

BUFFALO, 600 tons, canopy and track foundations, New York Central Terminal, to a local maker.

BUFFALO, 600 tons, school No. 81, to a local maker.

CLEVELAND, 1700 tons, Cleveland Union Terminal buildings, to Bourne-Fuller Co.

ST. LOUIS, 300 tons, first district, S. W., joint sewer, to Missouri Rolling Mills Corporation.

SEATTLE, 250 tons, small jobs to Northwest Steel Rolling Mills.

SEATTLE, 150 tons, foundations for Pacific Coast Cement Co., plant, to Pacific Coast Steel Co.

MOUNT VERNON, WASH., 147 tons, viaduct, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

MONTREAL, 1000 tons, warehouse; Perrault & Gadbois, Themis Building, architects.

TORONTO, 3000 tons, for Wellington Buildings, Ltd.

PROVIDENCE, R. I., 1665 tons, Washington bridge.

PORT CHESTER, N. Y., 175 tons, road work, general contract awarded to Peter Luciano & Sons, White Plains, N. Y.

LARCHMONT, N. Y., 125 tons, road work, contract let to Patterson Rissi Co., Torrington, Conn.

BROOKLYN, 2500 tons, building for New York Dock Co., general contract placed with White Construction Co.

CHICAGO, tonnage not stated, Chicago Women's Club; Holabird & Root, architects.

CHICAGO, 200 tons, including a tower on Palmolive-Peet Building.

CLEVELAND, 150 tons, building for Great Lakes Cement Co.

ST. LOUIS, 250 tons, packing house for Swift & Co.; previously reported as a structural steel project.

VANCOUVER, B. C., 4000 tons, medicinal and dental block for Baker, Stevens & Co.

SACRAMENTO, CAL., 120 tons, Cache Creek Bridge, bids opened.

Reporting net earnings for six months $546,563 less than last year, the Crucible Steel Co. of America has cut its dividend rate from 6 per cent annually to 5 per cent. The balance sheet shows a reduction of $1,000,000 in inventories and of $1,423,000 in total current assets, about equaled by the drop of $1,364,000 in total current liabilities. Half a million dollars has been cut from "property" account.

FABRICATED STRUCTURAL STEEL

Awards of 60,000 Tons Include 38,000 Tons for Chicago Project—15,000 Tons for Grade Crossing Elimination

With 38,000 tons required for a Chicago Mercantile Mart, awards the past week totaled over 60,000 tons, the largest in several weeks. New projects, totaling 37,000 tons, include 15,000 tons for grade crossing elimination at Cleveland.

Burlington, Vt., 750 tons, Rutland Railroad bridge, to McClintic-Marshall Co.

Lunenberg, Vt., 450 tons, Maine Central Railroad bridge, to American Bridge Co.

State of Vermont, 150 tons, State bridges, to Palmer Steel Co.

State of Vermont, 400 tons, highway bridges, to American Bridge Co.

Exeter, N. H., 200 tons, baseball cage, to Boston Bridge Works, Inc.

Boston, 100 tons, Meisel Press addition, to New England Structural Co.

Boston, 250 tons, continuation school, to New England Structural Co.

Andover, Mass., 150 tons, building for Phillips Academy, to New England Structural Co.

New York, 1300 tons, three buildings for Tudor City, to Harris Structural Steel Co.

New York, 2500 to 3000 tons, loft building, to Levering & Garrigues.

New York, 400 tons, Union Indemnity Co., Maiden Lane, to Heddon Iron Construction Co.

Jersey City, N. J., 225 tons, addition to St. Francis Hospital, to Fagen Iron Works.

Wilkes-Barre, Pa., 1000 tons, for Wilkes-Barre Savings Bank, to local fabricators.

Philadelphia, 2700 tons, Rittenhouse Square apartment building, to Shoemaker Bridge Co.

Philadelphia, 2250 tons, Chateau Crillon apartments, to Bethlehem Fabricators, Inc.

Philadelphia, 125 tons, building for William Steel & Sons, to American Fabricated Steel Co.

Richmond, Va., 2500 tons, rayon mill for E. I. du Pont de Nemours & Co., to McClintic-Marshall Co.

Pennsylvania Railroad, 400 tons, bridges, to Shoemaker Bridge Co.

Reading Railroad, 100 tons, bridges, to McClintic-Marshall Co.

Washington, 270 tons, arches for the Arlington Memorial bridge, to McClintic-Marshall Co.

Buffalo, 1000 tons, Riverside High School, to Buffalo Structural Steel Co.

Oil City, Pa., 300 tons, theater, to Jones & Laughlin Steel Corporation.

Birmingham, 250 tons, towboat for Tennessee Coal, Iron & Railroad Co., to American Bridge Co.

Chicago, 38,000 tons, Mercantile Mart, to Bethlehem Steel Co.

Chicago, 400 tons, Hyde Park State Bank building, to Union Foundry, local.

Chicago, 155 tons, Catholic school, to Hansell Elcock Co., local.

Urbana, Ill., 900 tons, buildings at University of Illinois, to Mississippi Valley Structural Steel Co.

Long Beach, Cal., 300 tons, office building at Pine and Ocean Avenues, to Llewellyn Iron Works.

San Francisco, 275 tons of shapes and 525 tons of plates, carfloat for Western Pacific Railroad Co., to Moore Dry Dock Co.

San Francisco, 175 tons, apartment building, Franklin Street, near Washington, to McClintic-Marshall Co.

San Francisco, 160 tons, apartment building, Van Ness Avenue, near Lombard Street, to McClintic-Marshall Co.

Los Angeles, 118 tons, Union High School, to McClintic-Marshall Co.

State of Nevada, 900 tons, headframe and bins for a mine, to Kansas City Structural Steel Co.

Longview, Wash., 100 tons, telephone building, to Isaacson Iron Works.

Kettle Falls, Wash., 1100 tons, highway bridge, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Moncton, N. B., 1000 tons, rink and exhibition building for Moncton Exhibition Co.

Montreal, 3000 tons, warehouse; Perrault & Gadbois, Themis Building, architects.

New York, 500 tons, court house at 151st Street.

Atlantic City, N. J., 1500 tons, hotel for Providence Corporation.

Lehigh Valley Railroad, 500 tons, bridges.

Philadelphia, 500 tons, five cottages for Girard College; bids on general contract June 20.

Philadelphia, 10,000 tons, department store for Strawbridge & Clothier; general contract to Turner Construction Co.

Lockport, N. Y., 400 to 700 tons, Bewley Building; plans in preparation.

Cleveland, 450 tons, building for Ohio Bell Telephone Co.

Ashtabula, Ohio, 160 tons, Pennsylvania Railroad bridge.

Cleveland, 15,000 to 20,000 tons, New York Central and Nickel Plate railroad grade crossing elimination.

Cincinnati, 400 tons, theater.

Cincinnati, 250 tons, power house for Christ Hospital.

Big Four Railroad, 190 tons, two 110-ft. turntables.

Piqua, Ohio, 100 tons, bank building.

South Bend, Ind., 1000 tons, depot for New York Central Railroad; Walsh Construction Co., Davenport, Iowa, general contractor.

Chicago & North Western, 900 tons, bridge reinforcement.

Chicago, 1000 tons, bridges for sanitary district.

State of Illinois, 250 tons, highway bridges; Vincennes Bridge Co., Vincennes, Ind., low bidder.

State of Illinois, 500 tons, State highway bridges; Wickes Engineering Co., Des Moines, Iowa, low bidder.

St. Louis, 1000 tons, building for American Railway Express Co. at Union Station.

St. Louis, 500 tons, Marquette Building.

Kansas City, Mo., 130 tons, building No. 60 for Corn Products Refining Co.

Spokane, Wash., 1500 tons, Medico-Dental Building; bids being taken.

San Francisco, 250 tons, warehouse for A. M. Castle Co.; bids being taken.

Conference and Exhibit of Industrial Advertisers

Too often advertising is depended on to correct mistakes of the sales plans, said George D. Crain, Jr., publisher of *Class and Industrial Marketing*, Chicago, in an address on "Advertising as a Spur to Industrial Marketing" before the seventh annual conference of the National Industrial Advertisers Association, at St. Louis, June 11. The sales plan, he emphasized, should be so good that successful results could be realized even without advertising. It is unfortunate for a company to go into advertising merely because it hears of successful advertising, particularly if it is not prepared in all other details.

In connection with the conference there was an exhibition of industrial advertisements and the awards included the following:

For the best exhibit, to Frederick Heitcamp, Cincinnati Milling Machine Co., with honorable mention to the Kearney & Trecker Corporation, Milwaukee.

For the best exhibit of a campaign in publications, Bakelite Corporation, with honorable mention to the Sivyer Steel Casting Co., Milwaukee.

For the best institutional advertising, to the Dodge Mfg. Co., Mishawaka, Ind.

For the best use of color in industrial advertising, to the Warner & Swasey Co., Cleveland.

For the best series of not less than 12 pieces of industrial advertising featuring news, to J. R. Hopkins, Chicago Belting Co.

For the best series featuring performance, prize given by The Iron Age, to the Vacuum Oil Co.

Officers Elected

Officers of the National Industrial Advertisers Association for the ensuing year were elected as follows:

President, Nelson S. Greensfelder, Hercules Powder Co., Wilmington, Del.

First vice-president, George H. Corey, Cleveland Twist Drill Co., Cleveland.

Second vice-president, Allan Brown, Bakelite Corporation, New York.

Third vice-president, H. von P. Thomas, Bussman Mfg. Co., St. Louis.

Secretary-treasurer, B. H. Miller, Permutit Co., New York.

PERSONAL

James Cleary has been appointed general sales manager of Combustion Engineering Corporation, 200 Madison Avenue, New York. He has been associated with this company since 1921, at first as district manager of the Philadelphia and Detroit offices and for the past two years as assistant general sales manager. His early business experience was as erecting and operating engineer for Westinghouse-Church-Kerr Co. In this connection he was sent to England as erecting and operating engineer on the Metropolitan Railway Co., London, the Mersey Railway Co., Liverpool, and the Clyde Valley Electric Power Co., Glasgow. Returning to this country, Mr. Cleary entered the employ of the Westinghouse Machine Co. In the Spanish-American War he served as chief machinist and warrant officer in the United States Navy. During the World War he was in charge of the steam equipment of the "Old Hickory" Government plant.

JAMES CLEARY

A. B. Benson, formerly secretary and treasurer Conveyors Corporation of America, has been appointed general manager Joseph Harrington Co., subsidiary of Whiting Corporation, Harvey, Ill. The Harrington company is engaged in making an automatic stoker for heating and small power plant boilers. Mr. Benson's experience has been largely in the power plant field. His appointment will relieve Joseph Harrington, president, of much detailed administrative work and permit him to devote more of his time to the engineering features of the business.

J. Wohlfeld, production engineer, 10228 Woodward Avenue, Detroit, has been appointed sales representative in Detroit of the Siewek Tool & Die Co., manufacturer of "rapid safety" drill jigs. He has also been appointed exclusive distributer in Detroit for products of the Universal Standard Co. He was most recently associated with Copeland products, representing various automotive and other tools. He is an active member of the Detroit Engineering Society and of the engineering division of the Detroit Industrial Safety Council. He is now operating under the title J. Wohlfeld Tool Design & Sales Co.

William J. Myers, president Union Stove Works, New York, who has completed 50 years of uninterrupted service with the company, was the guest of honor at a dinner given June 8 at the Hotel Astor, New York, by employees. Mr. Myers started with the Union Stove Works in 1878 as an assistant bookkeeper and by various promotions reached the presidency. Other officers of the company and employees presented Mr. Myers with a gold watch.

Glenn Coley, who has been chief metallurgist of the Titusville Forge Co., Titusville, Pa., for several years, has resigned to accept a position in the power sales department of the Detroit Edison Co., Detroit.

Norman F. Robertson has been elected president of the John Robertson Co., Inc., 133 Water Street, Brooklyn, succeeding his father, the late Norman A. Robertson, who died on May 24. Mr. Robertson has been secretary of the company since 1924. Allan R. Hardie, treasurer, has now been made secretary and treasurer.

John D. Hurley, president Independent Pneumatic Tool Co., Chicago, will sail for Europe on July 12. While on the Continent Mr. Hurley will make a business tour of the company's foreign branches, returning to the United States the latter part of September.

Allen A. Johnson, formerly secretary and treasurer and general manager of sales Eagan-Johnson Steel & Iron Co., Crum Lynne, Pa., has become New York district sales agent for the Lebanon Steel Foundry Co., Labanon, Pa., with office at 55 West Forty-second Street. Mr. Johnson is a son of Gilbert H. Johnson, Sr., treasurer and general manager Isaac G. Johnson & Co., Spuyten Duyvil, New York, and received his early training in the foundry of that firm.

Thomas B. Frank, treasurer of the Cincinnati Planer Co., Cincinnati, has been elected a director of the National Association of Cost Accountants.

C. E. Lex, Jr., has become associated with the Cincinnati Shaper Co., Cincinnati, as sales engineer.

Dr. Samuel W. Stratton, president Massachusetts Institute of Technology, will be the speaker at the first meeting of the Worcester, Mass., Engineering Society. This will be a dinner-meeting on Friday, June 22, and will be held in the Sanford Riley Dormitory of the Worcester Institute of Technology.

Charles H. Upson, for the past 23 years district manager for the Dodge Manufacturing Co., has joined the sales organization of the Chain Belt Co., Milwaukee. With headquarters at Cincinnati, he will represent the company's complete line of Rex chain and transmission machinery. He will devote practically all of his time to the interests and advancement of Rex chain.

CHARLES H. UPSON

H. B. Hanley, metallurgist Whitehead Brothers, Rochester, N. Y., delivered an address before the New England Foundrymen's Association on Wednesday evening, June 13. His subject was "Molding Sand, Its Products and Uses."

Warner A. Peck, who, as announced in The Iron Age last week, has been appointed assistant manager of sales for the Cincinnati office of the Republic Iron & Steel Co., has been Cleveland district sales manager of the Trumbull Steel Co. for the past nine years. He has been connected with the Trumbull company for 15 years, two years of which he spent in the New York sales office.

Brice M. Mace, Jr., Lebanon, Tenn., has been appointed as trade commissioner at London. Until recently Mr. Mace was manager of the Kansas City office of the Department of Commerce.

Joseph Lang, who has represented the du Pont Co. in the New York City territory for 43 years, is to be relieved of such duties as he may desire to relinquish. Effective June 15, R. H. Nicol has been transferred to the New York territory for this purpose. Mr. Nicol has been in the organization for 25 years.

Willeby T. Corbett and Carroll O. Holmes have both been elevated to be vice-presidents of the United States Steel Products Co., New York. F. R. Sites, formerly attached to the office of chairman of the United States Steel Corporation, has been made assistant to the president of the Steel Products company.

OBITUARY

Norman A. Robertson, president John Robertson Co., 133 Water Street, Brooklyn, hydraulic press manufacturer, died May 24 at his summer home at Spring Lake, N. J., after a short illness. Mr. Robertson was born in Brooklyn in 1870, the son of the late John Robertson, who founded the company bearing his name, and known also as the Tubal Cain Iron Works. He was graduated from the Brooklyn Polytechnic Institute and at once entered the employ of the company, with which he was associated for 40 years. He was well known in the electrical cable, rubber hose, blue lead and metal-working industries, for which he developed and built much special machinery. He was a member of the Engineers' Club and the Machinery Club, New York. His son, Norman F. Robertson, succeeds him in the presidency of the company.

Charles T. Strawbridge, vice-president Bass Foundry & Machine Co., Fort Wayne, Ind., died at his home in that city on June 10 after an illness of several months. He was one of the pioneers in the industrial development of Fort Wayne, having been connected with the Bass company for 49 years, most of this time in an executive capacity. Mr. Strawbridge was born in Blooming Grove, Morrow County, Ohio, and received his early education in Bucyrus, Ohio. He was employed as a telegraph operator by the Pennsylvania Railroad from 1874 until 1879, in which year he entered the employ of the Bass company. He was elected secretary of the company in 1900 and a few years later was advanced to the position which he held at the time of his death. He served also as vice-president of the Rock Run Iron Co., Rock Run, Ala., and the Fort Wayne Foundry & Machine Co., both of which are interests of the Bass estate.

George Herbert Leaf, president and treasurer E. B. Leaf & Co., dealer in iron and steel scrap, Real Estate Trust Building, Philadelphia, died June 12 at his home in that city.

John A. Sherman, Worcester, Mass., manufacturer and inventor, long identified with the oil burner industry, died on June 13 at his home in that city, at the age of 56 years. He was president of the Sherman Oil Burning System.

William S. Goldsmith, formerly superintendent Central Works, American Steel & Wire Co., Worcester, Mass., but for the past 15 years superintendent of the Townsend Co., New Brighton, Pa., died at the home of his son, William F. Goldsmith, Worcester, on June 12.

Harvey D. Goulder, long prominently identified with the shipping industry on the Great Lakes, died June 14, at the age of 75 years. For many years up to 1925 he was counsel for the Lake Carriers' Association. At the time of his death he was a director of the Wilson Transit Co. and of the Cleveland & Buffalo Transit Co., and general counsel for the Great Lakes Protective Association.

John H. Grace, head of the railroad equipment company in Chicago which bore his name, died June 14, at Oak Park, Ill. Mr. Grace, who was 59 years old, was for 26 years assistant general appraisal agent for the Chicago & Northwestern Railroad.

William H. Bowman, Worcester, Mass., treasurer of the Warren Belting Co. of that city since 1919, and previously with the Graton & Knight Mfg. Co., died June 17, at the age of 61 years. He was a native of Elmira, N. Y.

Frederick H. Parke, Pittsburgh district general engineer, Westinghouse Air Brake Co., died at his home in Wilmerding, Pa., June 16. He was born in Oshkosh, Wis., and was graduated from Cornell University in the class of 1892. For the next six years he was with the Westinghouse Machine Co., and then joined the Air Brake company. Soon afterward he went to Russia and assisted in the construction of an air brake plant in St. Petersburg, and in the organization of the mechanical and engineering department.

David C. Hitchner, retired president of the H. B. Underwood Corporation, engineer and machinist, Philadelphia, died June 16 at his home in Elkins Park. He began more than 30 years ago at the Underwood plant as a machinist and worked his way to the presidency.

Paul R. Chubbuck, who died in Streator, Ill., May 29, was practically bankrupt 15 years ago when the old Halladay Automobile Co., Streator, failed. But he left an estate of nearly $500,000 when he died, his will revealed when filed for probate. He was founder of the Streator Metal Stampings Co. and his estate consisted chiefly of stocks and bonds in that company.

Arc-Welded Railroad Bridge

At the regular monthly meeting of the Pittsburgh chapter American Welding Society, at the William Penn Hotel, Pittsburgh, Wednesday evening, June 13, Gilbert D. Fish, consulting engineer Westinghouse Electric & Mfg. Co., described in detail the arc-welded railroad truss bridge erected at Chicopee Falls, Mass., for the Boston & Maine Railroad. In his talk, which was illustrated by a large number of lantern slides depicting the structure and its details, he recounted the design, details and execution of the work and pointed out its unconventional features.

Construction Institute Offers Services in Government Building Program

Charles F. Abbott, executive director, and Lee H. Miller, chief engineer, American Institute of Steel Construction, Inc., called at the White House June 13 to pay their respects to President Coolidge, and later appeared before James A. Wetmore, acting supervising architect, and his staff to explain the merits of steel-frame construction in connection with a $250,000,000 public building program just authorized. It was suggested that considerable savings on this work can be effected through adoption of the institute's standard specifications and code of practice.

In commenting on the conference, Mr. Abbott quoted William Gompert, superintendent of school buildings of New York, as stating that the city would have saved $540,000 in first costs if the institute's specifications had been applied to 50 school buildings contracted for in 1924. Mr. Abbott also called attention to the fact that the institute recently prepared standard specifications for fireproofing structural steel, which will make it possible to design as effectively against the fire hazard as against the stress of live and dead loads.

Russia Exports Scrap to France

Paris, France, June 15.—The official agency of the Russian Government in France has announced that there are immense supplies of metal scrap in Russia, which need reassembling and classification. While the larger part of these supplies will be utilized in Russia by local metallurgical works, a few lots which could not be consumed locally, but which were of sufficient value to warrant export sale, have been sold abroad. During the first half of this year Russia has shipped 180 tons of non-ferrous metal scrap to France, valued at 870,000 fr. ($34,191).

Flinn & Dreffein Co., Chicago, has obtained a contract to build a continuous billet-heating furnace, producer-gas fired, for the Acme Steel Co., Chicago. This furnace will be the third such unit at the Riverdale, Ill., plant of this steel company.

Machinery Markets and News of the Works

PURCHASES AT FAIR RATE

Equipment for Replacement Still the Major Source of Business

Harvester Company Contemplates Plant Addition—Boston Schools to Take Several Lathes

MACHINE tool orders booked so far this month compare favorably with those of the latter part of May. In the Chicago district, business taken by dealers may even exceed that of the last half of May, the increase being attributed to the placing of the bulk of the list for the Waterloo, Iowa, plant of Deere & Co. In some districts the steady flow of inquiry is taken to indicate that mid-summer buying may be at a better rate than usual.

The present status of equipment demand is accounted for in the monthly review of the National Machine Tool Builders' Association as follows: "The prevalence of low rates on borrowed capital is making it possible for all sound industries to borrow as much as they need for revamping their plants. Progressive companies seem to be doing this very thing. This would account in considerable measure for the present level of demand for various classes of equipment, including machine tools." In the index of machine tool orders for May, issued by the same association, the following comment is made: "Volume of orders for May slipped down somewhat from the point reached in April, but not enough to turn the three-months trend line downward. However, a seasonal falling off is usual over the summer months and it is likely that the trend line has reached its peak for a few months at least."

Railroad business has been quiet during the past week. The New York Central has placed a few tools, and the Santa Fe is reported to have closed for all of its requirements except some large special lathes. The Burlington railroad is expected to take action soon on a number of machine tools, previously inquired for, and there are indications that the New England railroads will come into the market within the next 10 days.

Automotive buying has been comparatively light and, for the most part, is for replacement purposes. One exception was the purchase of 12 automatic lathes by a Michigan company.

Contemplated additions to the tractor manufacturing facilities of the International Harvester Co. are expected to involve a number of new machine tools.

Bids on 15 lathes for the Hyde Park district high school have been requested by the city of Boston, which, within the next two weeks, will again make inquiries on the same number of lathes and later will get prices on a number of items of miscellaneous equipment.

Small tool sales have been at a moderately good rate.

New York

NEW YORK, June 19.

MACHINE-TOOL buying in this district continues at a moderately good rate, and it now seems likely that June sales may equal those of last month. Purchases have been mainly single tools. The New York Central has bought two or three tools, but otherwise railroad business has amounted to little. A fairly steady flow of inquiries seems to indicate that mid-summer buying may be at a better rate than usual.

Among sales of the week were 15 lathes by the Niles-Bement-Pond Co. to various companies. Some of them were sold in the West. This company also sold two used Niles 50-in. vertical drilling machines, a used Leblond No. 4 universal milling machine, an 8-in. rotary surface grinder, three 3-ft. radial drills, five Ransom grinders, a 30-in. x 28-ft. Time-Saver lathe, a used 42 x 42-in. x 10-ft. Pond planer. The Pratt & Whitney Division sold three 14-in. vertical surface grinders, three 13 x 30-in. lathes, two 16 x 36-in. lathes, three automatic lathes, three universal die sinkers, two jig borers and four Sigourney drilling machines and a number of single tools.

Plans are under way by Gulf Refining Co., 21 State Street, New York, for new refinery, storage and distributing plant at Mariners Harbor, Staten Island, comprising nine units, with power house, machine shop and other departments. Facilities will be provided for handling crude oil from seagoing tankers, including pumping machinery, etc. Entire project is estimated to cost in excess of $15,000,000. Headquarters of company are in Frick Annex, Pittsburgh; William M. Braybrooks is general manager.

Columbia Metal Box Co., 228 East 144th Street, New York, is having plans drawn for two-story addition, to cost close to $100,000 with equipment. George A. Bagge & Sons, 157 East Forty-fourth Street, are architects.

Excello Spring & Mfg. Co., 176 Grand Street, New York, has leased space in building at 161-63 Grant Street for expansion and will remove to new location.

Harry Silverstein, 26 Court Street, Brooklyn, architect, has plans for a two-story automobile service, repair and garage building, 120 x 150 ft., to cost close to $150,000 with equipment.

Northern Westchester Lighting Co., Ossining, N. Y., has approved plans for new automatic power substation to cost about $85,000 with equipment. Thomas E. Murray, Inc., 52 Duane Street, New York, is architect and engineer.

Board of Education, Yonkers, N. Y., is considering installation of manual training equipment in new three-story high school, to cost more than $650,000 with equipment. G. H. Chamberlain, 18 South Broadway, architect, is revising plans and will soon take bids on general contract. Clark, McMullen & Riley, 101 Park Avenue, New York, are mechanical engineers.

John Hoffman, Jr., 527 Hunts Point Avenue, New York, manufacturer of hod elevators, contractors' hoists, etc., has filed plans for one-story addition, 100 x 100 ft., to cost about $32,000. S. F. Oppenheim, Inc., 156 East Forty-second Street, is architect.

Albany Packing Co., Inc., Exchange Street, Albany, N. Y., plans installation of mechanical handling and conveying equipment, refrigerating machinery, etc., in three-story addition to cost in excess of $300,000, for which plans are being drawn by Henschien & McLaren, 1637 Prairie Avenue, Chicago, architects and engineers.

Manifold Supplies Co., 188 Third Avenue, Brooklyn, manufacturer of paper products, has plans for a three-story factory, including improvements in present plant, to cost about $50,000 with equipment.

Utility Oil Corporation, Bridge Plaza North, Long Island City, has leased property at Anable Avenue and Honeywell Street, totaling about 26,000 sq. ft. floor space, for a new service, repair and garage unit, with oil storage and distributing facilities.

Melrose Motor Co., 598 Bergen Avenue, New York, will soon ask bids on general contract for new two-story service, repair and garage building, to cost about $145,000 with equipment. George A. Bagge & Sons, 157 East Forty-fourth Street, are architects.

Smith-Hamburg-Scott Welding Co., Marion Place, Long Island City, has acquired adjoining property, 100 x 102 ft., and plans erection of new plant to occupy entire site. Present works are on leased site and it is understood that production will be concentrated in new unit.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has acquired property on Staten Island Sound, extending from Sewaren to Port Reading, N. J., as site for new electric generating plant, to cost more than $750,000 with transmission lines. No time has as yet been scheduled when work will begin. Company has also secured right-of-way for construction of new transmission line in Essex, Union and Middlesex Counties. Plans have been completed for two-story power substation at 271 Sip Avenue, Jersey City, to cost more than $85,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in a new three-story plant, 100 x 200 ft., to be erected by H. F. Runkel Bakery, 1141 East Grand Street, Elizabeth, N. J., to cost in excess of $350,000. Herman F. Runkel is head.

Board of Education, Oradel, N. J., is considering installation of manual training equipment in a new three-story junior high school to cost $350,000, for which plans are being drawn by Coffin & Coffin, 522 Fifth Avenue, New York, architect.

American Copper Products Corporation, Bayway, Elizabeth, N. J., manufacturer of copper and brass wire specialties, has awarded general contract to Wigton-Abbott Corporation, 552 West Twenty-third Street, New York, for a one-story addition, 105 x 475 ft., to cost about $80,000 with equipment.

Middlesex County Vocational School Board, New Brunswick, N. J., is considering an addition to local County vocational school No. 1, to cost more than $250,000 with equipment.

Radio Tube Corporation, 88 Eighth Avenue, Newark, has plans for a new three-story plant, to cost close to $65,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

Following recent termination of receivership and reorganization, DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., will carry out an expansion and improvement program at plant, including installation of equipment to replace old machinery for production of radio sets, tubes, etc. Company will be affiliated with Sonora Phonograph Co., 16 East Fortieth Street, New York, in production of products noted as well as talking machines and parts. James W. Garside is president, and Robert Buchanan, secretary and treasurer.

Betz Brothers, Inc., manufacturer of hollow metal doors and trim, is occupying its new factory building at Clifton, N. J., added facilities including 70,000 sq. ft. of floor space.

Key City Bolt & Spike Works, Bayonne, N. J., recently incorporated with a capital stock of $100,000 to manufacture bolts, nuts, etc., is erecting a plant at Hudson Boulevard and Morris Canal. Officers of company are: C. H. Carpenter, president and treasurer, S. C. Gartley, vice-president and general manager, and E. Zehner, secretary.

Norris Brush Works, River Edge, N. J., which has been engaged in manufacture of toilet brushes for several years, has been incorporated in anticipation of enlargement of business. Walter Randall is president, Howard E. Norris is treasurer.

Philadelphia

PHILADELPHIA, June 18.

PROPERTY at 1639-41 Hunting Park Avenue, Philadelphia, has been purchased by Philadelphia Indian Motorcycle Co., 4153 Germantown Avenue, as site for new service, repair and sales building to cost more than $50,000, for which plans will soon be drawn.

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of mechanical drying equipment, air conditioning machinery, etc., has awarded general contract to Austin Co. for two-story and basement addition, 50 x 146 ft., to cost upward of $65,000 with equipment. Day & Zimmermann, Inc., 1600 Walnut Street, is engineer.

Klein Stove Co., Trenton Avenue and Tioga Street, Philadelphia, has plans for a one-story addition.

Hess Iron Works, Philadelphia, recently formed by J. F. Hess, 2507 East Westmoreland Street, and associates, with capital of $25,000, is arranging for operation of local plant for manufacture of iron and metal products.

Ero Mfg. Co., 2234 Ogden Avenue, Chicago, manufacturer of automobile equipment and supplies, has leased space in building at Hope and Palmer Streets, Philadelphia, for new factory branch and distributing plant.

William Steele & Sons Co., 219 North Broad Street, Philadelphia, engineer and contractor, has plans for a four-story automobile service, repair and garage building to cost $450,000 with equipment.

Laurence R. Wilder and other officials of American Brown Boveri Electric Corporation, 420 Lexington Avenue, New York, have formed Transoceanic Corporation to purchase and operate shipbuilding branch of first-noted company at Camden, N. J. American Brown organization will retain portion of land and buildings for continuance of manufacture of heavy electrical machinery, including generators, etc. Purchasing company plans to expand shipyard operations for building electrically-propelled vessels. Moloney Electric Co., Seventh and Hickory Streets, St. Louis, manufacturer of transformers, a subsidiary of American Brown company, will also be sold. W. M. Flock, chairman of executive committee of parent organization, will be identified with new Transoceanic Corporation.

Borough Council, Beach Haven, N. J., has approved plans for extensions in municipal electric power plant, including installation of additional equipment, to cost $50,000, and has authorized appropriation in amount noted. W. H. Boardman is borough engineer, in charge.

Empire Tool Works, Gloucester, N. J., has taken over former local plant of Rogers Drill Works, and will begin operations for manufacture of tools and kindred products.

Samuel Winterbottom Sons, Liverpool Avenue and line of Philadelphia & Reading Railway, Egg Harbor City, N. J., manufacturer of knife handles, etc., plans rebuilding portion of plant destroyed by fire June 11, with loss reported at more than $30,000 with equipment.

Atlantic Refining Corporation, 260 South Broad Street, Philadelphia, is said to be planning construction of new oil storage and distributing plant at Jacksonville, Fla., where 6-acre tract has been secured adjoining property of Seaboard Oil Co. Project is reported to cost in excess of $100,000; all equipment will be electrically operated.

Cheming Telephone Co., 123 Lockhart Street, Sayre, Pa., will soon ask bids on general contract for two-story equipment storage and distributing plant, with repair facilities, etc., to cost more than $35,000. H. C. Child, 501 South Keystone Avenue, is architect.

City Council, Reading, Pa., has passed ordinance for establishment of municipal machine shop, and will arrange appropriation at early date.

Hinaman Aircraft Corporation, Williamsport, Pa., recently chartered, is completing plans for operation of a local plant. R. W. Howard, Williamsport, is head.

National Supply Co. of Delaware, Inc., Toledo, Ohio, will take over plant and property of Superior-Otto Engine Works, Thirty-third and Walnut Streets, Philadelphia, and Superior Gas Engine Co., Springfield, Ohio, an affiliated organization, and will consolidate. It is understood that both plants will be continued as heretofore. An expansion program for increased output is under consideration.

George K. Hale Mfg. Co., Third and Cumberland Streets, Philadelphia, manufacturer of buttons, etc., has acquired property at Mount Airy, N. C., and is reported planning establishment of new works to cost in excess of $50,000.

Following recent purchase of tube mill of Superior Pipe Co., Columbia, Pa., by Tyler Tube Co., Washington, Pa., new owner is planning removal of equipment to main plant at last noted place, where production will be concentrated and expansion carried out. Superior works have been idle for several years.

Overbrook Steam Heat Co., Woodbine and Upland Avenues, Philadelphia, has plans for addition to power house, and installation of boilers and auxiliary equipment.

Ford & Kendig Co., 1428 Callowhill Street, Philadelphia, jobber of steam, plumbing, mill, mine, railroad and contractors' supplies, has elected Leighton M. Ford, president to succeed his father, late Albert E. Ford, founder of company. Other new officers are: T. J. Williams, vice-president; T. B. Reeves, second vice-president, and H. K. Strickler, secretary-treasurer.

Buffalo

BUFFALO, June 18.

PLANS are being arranged by New York Central Railroad Co., Buffalo, for a new one and two-story car repair shop at local East Yards, to cost more than $85,000 with equipment. A two-story Pullman car shop is also planned at same location. F. B. Freeman, company headquarters, 466 Lexington Avenue, New York, is chief engineer, in charge.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, has taken over portion of neighboring building occupied by enameling works of American Radiator Co., and will equip for experimental work and manufacture of new type of naval bombing and patrol, all-metal, twin-motored monoplanes for Government, for which special contract recently has been secured. Extension will be known as Engineering Unit No. 2.

Buffalo, Niagara & Eastern Power Corporation, Buffalo, is disposing of a preferred stock issue to total $34,475,000, a portion of proceeds to be used for expansion and improvements and for consolidation of group of local utilities, including Buffalo General Electric Co., Niagara Falls Power Co., Tonawanda Power Co., and others. Company has work under way on new steam-operated electric generating station, designed for ultimate output of 100,000 hp. Extensions will be made in transmission lines.

American Radiator Co., Elmwood Avenue, Buffalo, has purchased Locke Pattern Works, Inc., 3224 East Jefferson Street, Detroit, and Ypsilanti Motor Casting Co., Ypsilanti, Mich., and will consolidate with its organization. Both companies have been producing castings for purchasing organization and plants will be continued in service as heretofore.

George A. and Edwin G. Guenther, 1281-85 Jefferson Avenue, Buffalo, operating a plumbing and heating works, and hardware business, respectively, have organized Guenther Mfg. Co., with capital of $150,000, to consolidate present works and develop a plant for manufacture of gas-burning equipment, radiators, etc.

Fairbanks Valve Co., Glenwood Avenue and Main Street, Binghamton, N. Y., has awarded general contract to A. W. Bowie, Inc., Press Building, for rebuilding portion of plant destroyed by fire recently to cost in excess of $125,000 with equipment. Headquarters are at Lafayette and Broome Streets, New York.

Syracuse Lighting Co., Syracuse, N. Y., will take over and consolidate Seneca River Power Co., Baldwinsville, N. Y., and vicinity. New owner plans expansion in that vicinity, including transmission line construction.

Percy H. Smith, 57 East Fourth Street, Dunkirk, N. Y., and associates have formed Thrasher Mfg. Co., with capital of $50,000 and headquarters at Perrysburg, N. Y., where it is planned to operate a plant for manufacture of tools, instruments and kindred products. James E. Bixby, Gowanda, N. Y., is also interested in new company.

J. P. Devine Mfg. Co. has been organized and has succeeded to business of J. P. Devine Co., Buffalo, manufacturer of vacuum dryers, evaporators, and chemical apparatus. Reorganization was brought about by purchase of a large interest in business of Mount Vernon Car Mfg. Co., Mount Vernon, Ill. Walter C. Arthurs, president Mount Vernon Car Mfg. Co., becomes chairman of board of J. P. Devine Mfg. Co. Other officers are: Joseph P. Devine, president; H. H. Cust and C. P. Devine, vice-presidents; C. W. Reynolds, secretary; D. P. Settlemire, treasurer; Graham Devine, assistant to president and plant manager. Company plans enlargement of its present works at 1372 Clinton Street, Buffalo, and will also expand its various technical and research departments. A part of this expansion is under way.

Gears & Forgings, Inc., Cleveland, manufacturer of gears, forgings, speed reducers and special machinery, has appointed Potter & Dugan, Inc., Erie County Bank Building, Buffalo, district sales representative for Buffalo and vicinity.

South Atlantic States

BALTIMORE, June 18.

A TRACT of 46 acres at Fairfield, Baltimore, with 1500 ft. water frontage on Patapsco River, has been purchased by Asiatic Petroleum Co., Ltd., 65 Broadway, New York, as site for new oil refinery, storage and distributing works, with asphalt division, to cost close to $1,000,000 with equipment.

Dixie Aircraft Corporation, care of I. L. Paisley, Frederick, Md., recently formed by Mr. Paisley and associates, has acquired 160 acres near Amherst Highway, Lynchburg, Va., as site for new aircraft assembling plant, to specialize largely in production of all-metal monoplanes. Initial works are reported to cost in excess of $50,000, with equipment.

Georgia Vineyard Co., American Railway Exchange Building, Savannah, Ga., is reported planning construction of packing, storage and distributing plants, including conveying, elevating and other mechanical equipment, warehouse trucks, etc., to cost in excess of $100,000.

General purchasing officer, Panama Canal, Washington, is asking bids until June 27 for one electrically-operated engine lathe; two power hack saws; one electrically-operated shaper; 12 pneumatic chipping hammers; pipe machine, and other mechanical and electrical equipment, Panama schedule 1882; until July 2 for pipe and fittings, railing fittings, foundry brushes, warehouse trucks, ladders, etc., Panama schedule 1883.

Wilson-Smith Veneer Co., Dillon, S. C., plans early purchase of tools and equipment in connection with mill expansion and improvement, including power-operated veneer clipper, double cut-off saw, glueing machinery, etc.

Board of Forsyth County Commissioners, Winston-Salem, N. C., is planning an expansion program at Miller municipal airport, including construction of hangars, repair shops and other units.

C. H. Braun & Sons, Willow Street, Mount Winans, Baltimore, manufacturers of fertilizers, etc., have acquired grinding division of plant of J. H. Cottman & Co., Weaver Street, manufacturers of chemicals, and will use in connection with expansion program.

United States Shipping Board, Washington, will receive bids until July 6 for fire brick refractories and fire clay for six months' period beginning Aug. 1, proposal 141.

Swift & Co., Chicago, meat packers, are said to be concluding negotiations for purchase of plant of Georgia Cotton Oil Co., Waterville Road, Macon, Ga., and will operate as branch factory. Company is also arranging for purchase of mill of Alabama Cotton Oil Co., Montgomery, Ala.

Lanier Furniture Co., Statesville, N. C., recently formed with capital of $150,000, has acquired local plant of Iredell Upholstered Furniture Co., and will remodel and install additional machinery. L. L. Lanier is head.

Thomas J. Blackburn, 500 West Trade Street, Charlotte, N. C., operating radio station WBT, plans early purchase of two 200-ft. steel radio towers, self-supporting type, hot galvanized, with and without insulated bases on each leg.

Capital Granite Co., Oxford, N. C., Robert G. Lassiter, president, plans installation of granite crushing mill in connection with granite quarry near Blairs, S. C., including electrically-operated crushers, hoisting and conveying machinery, etc.

Board of City Commissioners, Asheville, N. C., is considering construction of pipe line from South Mills River to West Asheville, in connection with extensions in municipal waterworks, to include pumping machinery and auxiliary equipment. Entire project is reported to cost in excess of $1,000,000. Howerton Engineering Co., Medical Building, is engineer.

J. E. Beaman, Lawyers' Building, Raleigh, N. C., contractor, has filed plans for two-story automobile service, repair and garage building, to cost close to $90,000 with equipment, to be operated by Perin W. Cower, Raleigh, and associates.

New England

BOSTON, June 18.

WITH the majority of New England machine-tool dealers business is almost at a standstill. Some dealers, however, have closed enough business, and have assurances that additional orders are within grasp, to give the general market a brighter aspect. One company reports the sale of a 16-in. lathe to a Massachusetts shop, a similar machine to a Rhode Island plant, a radial drill to a middle Massachusetts manufacturer and a 13-in. lathe to another Massachusetts plant, in addition to a 30-ton crane. The Pneumatic Drop Hammer Co., Boston, has sold three 600-lb. hammers in Indiana, one of the same size in North Attleboro, Mass., and a smaller one to a Detroit manufacturer, and expects an order from a New England plant for a battery of hammers varying in size. Another company has sold two new cutter grinders. A new gear cutter has been placed, together with a moderate amount of low-priced used equipment.

The city of Boston is asking bids on 15 lathes for its Hyde Park district high school, and within a week or two it will inquire for 15 additional lathes, and later for a quantity of miscellaneous equipment. New England railroads and several industrial plants are expected to close on inquiries within the next 10 days.

Based on industrial plant activity in New England, there seems to be little prospect of any sizable activity in the machine-tool market in the near future. Shops, collectively, are growing less rather than more active. An increase in unemployed skilled mechanics is reported this week. With shops, business is spotty, and the same is true of machine-tool builders. A Connecticut tool maker has just received a large order for 13-in. lathes, necessitating the calling in of exhibition tools on the floors of outlying representatives. This builder is operating 100 per cent of capacity. Small tool sales have tapered off, but in the weekly aggregate a good comparative showing is made.

A $40,000,000 electric power development on the Connecticut river at Dalton, N. H., and Lunenburg, Vt., including

The Crane Market

INQUIRIES for single installations of overhead equipment continue in fair volume, but only a small number of locomotive crane inquiries are in the market. In the past fortnight, one Eastern crane builder has booked orders for 15 cranes. Among current inquiries is a list of high speed, long lift electric hoists for Canada, inquired for by Fox Brothers & Co., 12 East Forty-fourth Street, New York. The inquiry calls for one electric hoist capable of lifting 10,000 lb. at 250 ft. per min., with 1000 ft. of cable on the drum and four electric hoists of 2500 lb. lifting capacity at the same rate.

Among recent purchases are:

Panama Canal Commission, Washington, 30-ton locomotive crane from Ohio Locomotive Crane Co.

Textile Machinery Corporation, Reading, Pa., seven 5-ton electric traveling cranes from Niles Crane Corporation.

Pennsylvania Railroad, Philadelphia, 20-ton, overhead crane for Wilmington shops, from Niles Crane Corporation.

New York Central Railroad, New York, 10-ton, 67-ft. 3¼-in. span. overhead crane with 3-ton auxiliary for West Albany from Niles Crane Corporation.

New York, New Haven & Hartford Railroad, New Haven, 30-ton, 47-ft. 2¾-in. span overhead crane for Van Ness shops from Niles Crane Corporation.

Westcott & Mapes, New Haven, Conn., 25-ton locomotive crane for United Illuminating Co., New Haven, from American Hoist & Derrick Co.

American Electrical Works, Providence, R. I., nine ½-ton electric hoists from an unnamed builder.

American Printing Co., Fall River, Mass., five ¼-ton chain blocks from an unnamed builder.

Aluminum Co. of America, Pittsburgh, two 100-ton overhead cranes with 15-ton auxiliaries for Calderwood, Tenn., power plant from Whiting Corporation.

Weirton Steel Co., Weirton, West Va., 10-ton bucket crane, 7½-ton charging machine and one 200-ton stripper crane from Morgan Engineering Co. and 10-ton dock crane from Alliance Machine Co.

University of Illinois, Urbana, Ill., overhead electric crane for the material testing laboratory from Cleveland Crane & Engineering Co.

Deere & Co., Waterloo, Iowa, a coal handling crane from Milwaukee Electric Crane & Mfg. Corporation, a power house crane from Whiting Corporation, and a sand handling and a foundry crane from Cleveland Crane & Engineering Co.

Harrison Engineering & Construction Co., Kansas City, Mo., 18-ton, 8-wheel gasoline-type crane from Orton Crane & Shovel Co.

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several power houses and a machine shop is contemplated. Details will be announced shortly.

Equipment of Standard Valve Mfg. Co., 81 Wareham Street, Boston, including a fairly large assortment of metal-working tools was sold June 13 at public auction at reasonable prices. Company is in process of liquidation.

New England High Carbon Steel Co., Millbury, Mass., has plans for a power house, 60 x 100 ft. Carl T. Lund, president Millbury Steel Foundry Co.; William Brierily, president A. D. Windle Co. and Richard French Iron Works, are interested in company.

Martin Trailer Co., Easthampton, Mass., is moving its business and machinery to plant formerly occupied by Planet Co., Westfield, Mass. Officers are Howard Swift, president; John R. King, vice-president, and Charles E. Harris, secretary and treasurer.

Plans are being arranged by American Writing Paper Co., Holyoke, Mass., for extensions and improvements, including new mill units and additional machinery, to cost close to $500,000.

Lynn Ornamental Iron Works, 966 Broad Street, Lynn, Mass., has asked bids on general contract for a one-story addition, to cost about $20,000 with equipment. Sanborn & Weed, Item Building, are architects.

Underwood-Elliott Fisher Co., 30 Vesey Street, New York, recently formed by merger of Underwood Typewriter Co., address noted and Hartford, Conn., and Elliott Fisher Co., Harrisburg, Pa., has arranged for purchase of Underwood Computing Machine Co., Hartford, heretofore owned by interests connected with Underwood Typewriter Co., and will consolidate with its organization. Purchasing company has engaged Lockwood, Greene & Co., 24 Federal Street, Boston, to prepare plans for new power house on Capitol Avenue, Hartford, to cost about $250,000 with equipment. Completion is scheduled by close of year.

Board of Selectmen, Hanover, N. H., has plans for two-story municipal automobile service, repair and garage building, 50 x 92 ft., to cost close to $65,000 with equipment. Wells & Hudson, Hanover, are architects.

Farrel Foundry & Machine Co., Waterbury, Conn., has plans for a three-story addition, 85 x 200 ft., to cost in excess of $100,000 with equipment. Fred A. Webster, Waterbury, is architect.

Providence Produce Warehouse Co., Providence, R. I., recently formed as a subsidiary of New York, New Haven & Hartford Railroad Co., Providence, plans construction of new terminal storage and distributing plant at Kinsley and Harris Avenues, with mechanical handling equipment, refrigerating apparatus, etc., to cost $750,000. Engineering department of railroad is in charge.

Hedstrom Union Co., Gardner, Mass., manufacturer of infant and juvenile vehicles, parts, etc., has asked bids on general contract for a three and four-story addition, 60 x 132 ft., and 40 x 60 ft., to cost close to $135,000 with equipment. G. A. Johnson, 16 Norwich Street, Worcester, Mass., is architect.

Haverhill Gas Light Co., Haverhill, Mass., will carry out an expansion and improvement program at artificial gas plant to cost about $270,000, including new gas holder with capacity of 3,000,000 cu. ft., and installation of equipment in plant. The sale of 9828 shares of stock is planned, a portion of proceeds to be used for work.

Package Machinery Co., Springfield, Mass., has purchased Ferguson & Haas, Inc., 515 Greenwich Street, New York, manufacturer of wrapping machinery and will consolidate with organization. Production will be concentrated at Springfield and equipment of acquired company removed to that location.

Public Electric Light Co., St. Albans, Vt., has applied for permission to issue additional stock to total about $45,000, practically entire proceeds to be used for expansion and improvements, including transmission line construction. Headquarters are at 161 Devonshire Street, Boston.

Chicago

CHICAGO, June 18.

WITH orders in the mail for the bulk of the large tool list for the Waterloo, Iowa, plant of Deere & Co., dealers in this district are counting on a two weeks' business that will better the last half of May. Miscellaneous orders are more numerous and new business in sight gives promise that June will be one of the best months so far this year. The Santa Fe has closed for all its requirements except several large special lathes, and it is probable that the Burlington Railroad will soon take action on a number of machine tools, inquiries for which have been issued over the last several months. The International Harvester Co. is contemplating additions to its tractor manufacturing facilities and will need a number of machine tools. The General Electric Co. has not taken action on the tools it needs at Chicago.

The Lapham-Hickey Co., Chicago, iron and steel warehouse, has contracted for 28,000 sq. ft. of land at Forty-seventh Place and South Turner Avenue, for erection of a one-story building.

Phillip Gollner Plumbing Supply Co., Chicago, suffered a loss of $200,000 when its plant recently was destroyed by fire.

Pheoll Mfg. Co., Chicago, manufacturer of screws, will build a one-story addition, 100 x 300 ft. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Hawkeye Tin Shop, 96 Second Avenue, Cedar Rapids, Iowa, manufacturer of furnaces, spouting and other sheet metal work, has been incorporated, but contemplates no other changes in its business. E. H. Gundling is proprietor.

Belmont Sheet Metal Works, 2341 Belmont Avenue, Chicago, will soon begin superstructure for new one-story and basement plant to cost about $30,000 with equipment. Olsen & Urbain, 228 North La Salle Street, are architects.

W. F. Meyers Co., Bedford, Ind., operating a local machine shop, has leased a two-story building at 2830-32 West Lake Street, Chicago, and will remove to that location where capacity will be increased.

State Mfg. Co., 4041 South Kedzie Avenue, Chicago, manufacturer of polishers' equipment and supplies, has awarded general contract to H. N. Samuel, 53 West Jackson Boulevard, for new one-story plant, 60 x 100 ft., to cost about $32,000 with equipment. A. Epstein, 2001 West Pershing Boulevard, is architect.

Adams Co., 111 West Sixth Street, Dubuque, Iowa, manufacturer of milling machines and other machine tools, has awarded general contract to W. L. Yokom, 730 Main Street, for one-story addition, 80 x 220 ft., to be used for foundry and machine shop to cost about $65,000 with equipment.

Marshalltown Trowel Co., Marshalltown, Iowa, manufacturer of hardware products, is planning an addition to cost close to $100,000 with equipment.

Duro Metal Products Co., 2649 North Kildare Avenue, Chicago, is beginning superstructure for a one-story and basement addition, to cost about $50,000 with equipment.

American Gas Co., Newton, Iowa, D. C. Tenney, president, is completing plans for early construction of new artificial gas plant and system at Willmar, Minn., to cost about $200,000.

Iowa Foundry Co., West Second and Cook Streets, Sioux City, Iowa, has taken out permit for a one-story machine shop, 50 x 63 ft.

Municipal Utilities Co., Des Moines, Iowa, is negotiating with City Council, Missouri Valley, Iowa, for franchise for new steam-operated electric power plant and system, reported to cost $225,000 with equipment.

Brook Electrical Supply Co., Chicago, recently organized, has leased one-story and basement building, 50 x 116 ft., at 213-17 South Peoria Street, and will establish new plant for manufacture of electrical equipment; portion of works will be used for assembling.

City Council, Ottumwa, Iowa, is considering construction of power dam and hydroelectric power plant on Des Moines River, for municipal service, to cost in excess of $500,000. A transmission line will be built. Brown & Cook, 1008 North Market Street, are consulting engineers; J. T. Brady is city engineer.

Chicago & North Western Railway Co., Casper, Wyo., has plans for one-story repair shop, 50 x 148 ft., for tank car repair service, to cost close to $40,000 with equipment. General offices are at 148 South Clark Street, Chicago.

Cleveland

CLEVELAND, June 18.

WHILE the machine-tool market is spotty sales are holding up to the May volume. Recently demand was largely from the automotive industry, but now that field is inactive and business is mostly from other sources. Inquiry shows a little improvement, several new inquiries having come out for lots of three to six machines. The New York Central Railroad during the week purchased a turret lathe from a Cleveland dealer for one of its Indiana shops. A local manufacturer of turret lathes reports that its single tool orders are holding up well and that its deliveries on some types of machines have been extended into late July or August.

Lake City Malleable Co. is name of a new foundry company recently organized in Cleveland to operate foundry department of Chisholm-Moore Mfg. Co. When this company's chain block, electric hoist and crane division was taken over recently by Columbus-McKinnon Chain Co. and a subsidiary was formed under name of the Chisholm-Moore Hoist Corporation, a separate company was formed to operate foundry under name of Chisholm-Moore Malleable Iron Co. This name has now been changed to Lake City Malleable Co.

Construction of initial unit of a plant at Preston, Canada, to cost $150,000, has been authorized by directors of General Fireproofing Co., Youngstown, Ohio, company to be known as General Fireproofing Co. of Canada. Board of directors and officers of subsidiary will be Canadians. Products will be similar to those at Youngstown plant.

Interests in Standard Slag Co., Youngstown, have purchased buildings and equipment of plant formerly used by Youngstown Boiler & Tank Co., which is now occupying property on Oak Street purchased from United Engineering & Foundry Co., Pittsburgh.

Plans are being prepared by Eaton Axle & Spring Co., East 140th Street and New York Central Railroad, Cleveland, for one-story forge shop addition, 43 x 190 ft., to cost close to $50,000 with equipment. G. S. Rider Co., Century Building, is engineer.

Fisher Brass Co., Bellefontaine, Ohio, with branch plants at Marysville and Delaware, Ohio, is disposing of a stock issue to total $397,000, a portion of proceeds to be used for expansion. Company specializes in manufacture of plumbers' brass goods and has recently arranged for new factory branch and distributing plant on West Forty-ninth Street, New York.

Ohio Electric Power Co., Ravenna, Ohio, has plans for a new automatic power substation at its Mill Road plant, to cost close to $60,000 with equipment.

Hertner Electric Co., 1905 West 114th Street, Cleveland, manufacturer of electrical products, is having plans drawn for a new one-story plant, 100 x 240 ft., to cost about $70,000 with equipment. Paul S. Schmidt, 4500 Euclid Avenue, is engineer.

Osgood Co., Marion, Ohio, manufacturer of steam shovels, mining dredges, etc., has arranged for merger with Commercial Steel Castings Co., operating a local foundry, under first noted name. Consolidated company has capital of 125,000 shares of stock, no par value, and has arranged for bond issue of $1,400,000, a portion of proceeds to be used for expansion in plant facilities.

Officials of Darlington Fireproofing Co., Lisbon, Ohio, manufacturer of hollow tile and kindred building products, are reported interested in project for construction of new plant between Youngstown, Ohio, and Smiths Ferry, Pa., including power house, machine shop and other buildings, to cost $350,000.

Kelley Mfg. Co., Bucyrus, Ohio, manufacturer of caskets, vaults, etc., has begun superstructure for two-story addition, 75 x 150 ft., to cost about $60,000 with equipment.

American Aircraft Corporation, Massillon, Ohio, has been organized to manufacture airplanes. Plans are being made for building a plant and company will be in market for materials and equipment. Paul R. Stewart is general manager.

Cincinnati

CINCINNATI, June 18.

BUSINESS booked by machine-tool builders in the first half of June compares rather favorably with that during the last two weeks of May, although there has been a slight decline in volume of orders. Manufacturers are anticipating a falling off in buying as the summer season draws near and therefore have been fairly well satisfied with the rate at which users have been making purchases. Automobile companies have confined their participation in the market principally to miscellaneous tools for replacement, the only exception having been a sale to a Michigan maker of 12 automatic and special production lathes. Aside from an order from the Boston & Albany for one or two machines, railroad buying has been inactive. The Midvale Steel Co., Philadelphia, has contracted for a 30-in. x 28-ft. heavy-duty engine lathe. Sizable purchases of used tools by large industrial companies are causing comment locally.

Following recent merger of Chrysler Corporation and Dodge Brothers, Inc., Detroit, plans are said to be under consideration for new automobile assembling plant for both interests at Cincinnati, to cost more than $1,000,000 with equipment. Mason Towle is local representative for Dodge automobiles.

Board of Education, Cincinnati, is asking bids on general contract until June 25 for new two-story automotive trade school, to cost in excess of $100,000 with equipment. B. L. Baldwin, Second National Bank Building, is architect.

Department of Public Welfare, Ninth and Oak Streets, Columbus, Ohio, has plans under way for one-story power house, 100 x 105 ft., to cost close to $75,000 with equipment. It is also proposed to build an addition to brick-manufacturing plant at Roseville State prison, to cost more than $50,000 with machinery, for which plans will be prepared under direction of engineering department, Ohio State University, Columbus. J. E. Harper is director of department.

Dard Hunter's Paper Mill, Chillicothe, Ohio, has purchased former iron foundry of Barnum & Richardson Co., Lime Rock, Conn., and will remodel for new branch mill for manufacture of fine papers. Entire project is reported to cost more than $100,000. Dard Hunter is head.

Mid-Continent Petroleum Corporation, Hazel and Dumesnil Streets, Louisville, will rebuild portion of oil storage and distributing plant, including pumping station, destroyed by fire June 8, with loss reported in excess of $80,000 including equipment.

Kentucky Utilities Co., Starks Building, Louisville, has concluded negotiations for purchase of electric light and power properties of General Power & Light Co., Chicago, at Calhoun, Rumsey, Sebree, Ky., and vicinity, and plans extensions, including transmission line construction.

Knoxville Gas Co., Knoxville, Tenn., plans extensions and betterments in artificial gas works, including installation of purifiers, sulphur extractors and other equipment, to cost close to $40,000.

Ohio Fuel Gas Co., 99 North Front Street, Columbus, Ohio, is said to be planning a new two-story equipment storage and distributing plant, with service, repair and garage unit for company motor trucks and cars, to cost about $125,000 with equipment.

Brandeis Machinery & Supply Co., 325 West Main Street, Louisville, is planning a new one-story storage and distributing plant, to cost about $35,000 with equipment.

State Highway Department, Frankfort, Ky., is said to have concluded an arrangement with F. B. Drew, McAlester, Okla., and associates, for construction of a new cement mill in Kentucky, site soon to be selected, to cost $1,500,000 with equipment. Plant will have initial daily output of 4000 bbl. and State guarantees to use 75 per cent of production for a term of years. Robert W. Hunt, Robert W. Hunt Co., 175 West Jackson Boulevard, Chicago, engineer, is said to be interested in project. Kentucky Progress Commission, Frankfort, C. Frank Dunn, secretary, has information regarding enterprise.

Pittsburgh

PITTSBURGH, June 18.

THE first half of the month has been marked by only moderate activity in machinery and tools. A fairly good sprinkling of orders against inquiries which originated some time ago is reported by some houses, but more commonly the report is that both sales and inquiries are few.

Youngstown Sheet & Tube Corporation, Youngstown, Ohio, has plans under way for a new coal-washing plant, with mining and distributing facilities at its properties at Nemacolin, Pa., to cost in excess of $750,000. Allen & Garcia, 322 South Michigan Avenue, Chicago, are consulting engineers.

American Zinc & Chemical Co., Clark Building, Pittsburgh, has awarded general contract to Rust Engineering Co., American State Bank Building, for one and two-story and basement addition to mill at Langeloth, Pa., to cost more than $300,000 with equipment.

Swissvale School Board, Swissvale, Pa., is asking bids until July 2 for woven wire fence for Newmyer school property, Hampton Avenue and St. Lawrence Street. Ida E. Wallace, secretary.

Allegheny County Steam Heating Co., 435 Sixth Avenue, Pittsburgh, is said to be planning establishment of new power operating unit, to cost in excess of $350,000 with equipment.

G. P. Fryling, St. Mary's, Pa., and G. G. Herrick, Erie, Pa., have organized Erie Resistor Corporation, with capital of $25,000, to operate plant at Erie for manufacture of electrical products for resistance service, including copper, brass, carbon and other specialties. G. Richard Fryling, St. Mary's, is also interested in new company.

A. L. Confer, Oil City, Pa., an official of Empire Oil Works, Inc., Oil City, and associates have purchased controlling interest in Tidioute Refining Co., Tidioute, Pa., and will assume active management of oil properties and refinery. Plans are under way for expansion.

Homestead Valve Mfg. Co., Sixth Avenue, Homestead, Pa., plans early call for bids on general contract for one-story addition to foundry, including improvements in present plant, to cost in excess of $40,000 with equipment.

Septic Tank Engineering Co., 1224 Seventh Avenue, Beaver Falls, Pa., has been incorporated with capital stock of $25,000 to manufacture "Black Ball" septic tanks made of Copperoid steel. Most of work will be done on contract. G. A. P. Bowman is president.

Detroit

DETROIT, June 18.

PLANS have been authorized by Fisher Body Corporation, General Motors Building, Detroit, for a one-story addition to plant at Saginaw, Mich., 400 x 460 ft., to cost in excess of $1,500,000 with equipment.

Officials of Ottawa Furniture Co., Holland, Mich., have organized as Chippewa Cabinet Co., a subsidiary, to take over local plant of American Cabinet Co., under lease. New company will specialize in production of radio cabinets and kindred products.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has plans for new one-story foundry, to cost in excess of $100,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Universal Products Co., Inc., Kingsley Avenue, Detroit, manufacturer of universal joints for automobiles, etc., is disposing of a stock issue to total $1,170,000, a portion of fund to be used for expansion and improvements.

Leadingbrand, Inc., Lansing, Mich., recently organized by S. E. Liedabrand, Lansing, and associates, has leased local factory space and plans early operation for manufacture of new types of pumps, water softeners, and kindred products.

Board of Education, Pontiac, Mich., is planning early call for bids on general contract for three-story industrial arts school on Central High School campus, to cost $120,000, for which plans are being drawn by Childs & Smith, 720 North Michigan Avenue, Chicago, architects.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has acquired property on East Warren Avenue, as site for five-story addition for metal body stampings, to cost in excess of $500,000 with equipment.

Fruehoff Trailer Co., Harper Avenue, Detroit, has asked bids on general contract for one-story addition, 100 x 150 ft., to cost more than $65,000 including equipment. It will be used largely for assembling automobile truck trailers. H. P. Stihler, 2931 Gray Avenue, is architect.

Victor Body Co., Lansing, Mich, is moving equipment from plants at Grand Rapids and Iona, Mich., to its local factory and plans early production of bodies for Reo Motor Car Co. Initial output will be given over primarily to commercial bodies, with intentions of developing manufacture of passenger car bodies later.

Central States Utilities Co., Monroe, Mich., has arranged an expansion and improvement program for artificial gas plants, including additional equipment for increased generating and storage capacities, to cost more than $85,000.

Hercules Forging Co., recently organized, has purchased plant and equipment of Cadillac Forged Products Co., 2962 Hart Avenue, Detroit, and will continue business with little or no change in office or shop personnel. J. J. Callahan, president and treasurer of new company, is also president and treasurer of General Tool & Engineering Co., Detroit. Transfer was made possible by settling of estate of late Louis J. Kraus, head of Cadillac Forged Products Co., who died May 3.

Keeler Brass Co., Grand Rapids, Mich., has succeeded to business of Pleasant Valley Brass Co. Officers of Keeler company are Miner S. Keeler, president; Isaac S. Keeler, vice-president; C. Norman Webb, secretary, and George E. Keeler, treasurer.

St. Louis

ST. LOUIS, June 18.

WORK will soon be started by St. Louis Smelting & Refining Co., International Life Building, St. Louis, on new mill at Quapaw, Okla., to cost close to $200,000 with machinery. Company is operating on Ballard lease, near Quapaw.

Polar Wave Ice & Fuel Co., 3638 Olive Street, Kansas City, Mo., has plans for new ice-manufacturing plant to cost more than $55,000 with equipment.

Samples Mining Co., McAlester, Okla., operating coal mines on property of Oklahoma State Penitentiary, plans rebuilding portion of tipple destroyed by fire June 11, with loss close to $25,000.

Linde Air Products Co., 30 East Forty-second Street, New York, has acquired property at Oklahoma City, Okla., and contemplates new branch plant to cost close to $45,000 with equipment.

Consolidated Gas Utilities Co., Blackwell, Okla., recently formed to take over and consolidate Blackwell Pipe Line Co., Midwest Gas Co., Oklahoma Northern Gas Co., and other natural gas properties, is disposing of stock issue to total $3,534,000, a portion of proceeds to be used for expansion and improvements, including pipe line construction.

Board of Managers, Missouri School for Deaf, Fulton, Mo., Herbert E. Day, superintendent, has asked bids on general contract for new manual training building, to cost in excess of $75,000 with equipment. Charles A. Smith, Finance Building, Kansas City, Mo., is architect.

Gilman Granite Co., 1302 Elmwood Avenue, Kansas City, Mo., will make extensions and betterments in plant at Fairfax Industrial District, to include new power house, 20 x 24 ft., and crane runway, 50 x 110 ft., to cost about $45,000 with equipment.

H. L. Skettler, South Arch Street, Tulsa, Okla., contractor, will soon begin work on one-story automobile service, repair and garage building, 87 x 200 ft., to cost close to $90,000 with equipment.

Citizens' Electric Co., Hot Springs National Park, Ark., has plans for extensions and improvements in local power house, to cost in excess of $75,000 with equipment. Boilers, pumping machinery, oil-burners, feed regulators and accessory equipment will be installed. S. E. Dillon is general manager.

Hillyard Chemical Co., 801 South Ninth Street, St. Joseph, Mo., has revised plans for new three-story plant, to cost close to $100,000 with equipment. Eugene Meier, Lincoln Building, is architect.

Scullin Steel Co., which has been located at 6700 Manchester Avenue, St. Louis, has changed its address to Security Building, Fourth and Locust Streets, St. Louis.

Stiles-Herman Mfg. Co., 1710 Russell Boulevard, St. Louis, has been incorporated to manufacture fender rollers for taking dents out of automobile fenders. Manufacturing will be done on contract. J. C. Stiles is president.

Indiana

INDIANAPOLIS, June 18.

GENERAL contract has been let by Perfection Windshield Co., 1340 North Capitol Avenue, Indianapolis, manufacturer of automobile windshields, to John R. Curry Construction Co., Empire Life Building, for new one-story and basement plant, 50 x 150 ft., to cost about $23,000 with equipment.

Ontario Mfg. Co., Muncie, manufacturer of cutlery, plated flat ware, etc., is disposing of a preferred stock issue of $600,000, a portion of fund to be used for expansion and improvements.

Connersville Cabinet Co., Connersville, Ind., recently organized, will take over portion of former local factory of Connersville Furniture Co., and will remodel for new plant to manufacture cabinets, cedar chests and kindred products, J. E. Meyer, Richmond, Ind., is one of heads of company.

Perry Township School Board, Southport, Ind., is said to be planning installation of manual training equipment in new two-story high school to cost $180,000, for which plans will be drawn by McGuire & Shook, 941 North Meridian Street, Indianapolis, architects.

City Council, Lebanon, is considering early establishment of municipal airport, with construction of hangars, repair shops, oil storage and distributing building, etc.

Board of Education, Kokomo, is considering installation of manual training equipment in new high school to cost $170,000, for which bids will soon be asked on general contract. H. B. Bartlett, 1050 North Delaware Avenue, Indianapolis, is architect.

Electric Shovel Coal Corporation, Clinton, has purchased properties of Ayershire Coal Co., Winslow, Ind., and will convert from shaft mining to stripping operations. Electric shovels and other machinery will be installed and steel tipple built. Company recently disposed of stock issue of $2,900,000, a portion of fund to be used for expansion.

Milwaukee

MILWAUKEE, June 18.

MODERATE activity prevails in the machine-tool market, with new business being booked relatively satisfactory. Employment reports state that the heaviest demand for labor comes from the metal and building trades. Several large shops manufacturing automotive units, parts and equipment are maintaining three 8-hour shifts.

Following consolidation of the Northwestern Malleable Iron Co., 756 Park Street, Milwaukee, with Rockford Malleable Iron Co., Rockford, Ill., as Rockford Northwestern Malleable Iron Co., Milwaukee foundry and its 8-acre site have been sold to International Harvester Co., the two sites being adjacent. No definite plans have been made for use of the property. International company has recently started work on a new steam generating plant costing about $500,000 and contemplates erection of a large unit for tractor division and later an addition to cream separator division. Equipment of Northwestern plant is being transferred to Rockford.

Beloit Pattern Works, Beloit, Wis., is establishing a branch plant at 1350 Burnham Street, Milwaukee, where a building with 12,000 sq. ft. has been acquired. H. W. Price will be manager.

Briggs & Stratton Corporation, 1047 Thirteenth Street, Milwaukee, manufacturer of electrical units, parts and accessories for automotive industries, has purchased controlling interest in Evinrude Motor Co., Twenty-seventh Street and Capitol Drive, Milwaukee. It is stated that two plants will be kept in operation under present managements. Stephen F. Briggs is president of Briggs & Stratton company, and August J. Petrie, president of Evinrude company. Briggs & Stratton company is adding a tenth story to its present building, 60 x 120 ft., to enlarge its own operation.

Milwaukee Department of Public Works, R. E. Stoelting, commissioner, is asking bids until June 29 for construction of a fire department repair shop for manufacture of motor fire apparatus and its maintenance. Investment in building and equipment will be about $250,000. Bids on tools and other machinery will be requested later.

Highway Trailer Co., Edgerton, Wis., manufacturer of trailers, dump bodies, etc., has increased its capital stock to $1,000,000, following consolidation with its subsidiary, Continental Axle Co., Edgerton. Entire output of axle company is absorbed by Highway company. Enlargement of both plants, which adjoin, has been going on for past year and equipment purchases are being made from time to time. James W. Menhall is president.

W. H. Martin, 5430 State Street, Milwaukee, will build a general machine and repair shop, 54 x 60 ft., at 5426-5428 State Street.

Invincible Metal Furniture Co., Twenty-sixth and Franklin Streets, Manitowoc, Wis., is establishing an aircraft division and will invest about $200,000 in building and equipment. Contracts have been placed for erection of a one-story brick and steel factory, 86 x 335 ft., adjacent to present plant. Architect is William J. Raeuber, local. J. A. Schuette is president.

Racine Screw Works, 1501 Clark Street, Racine, Wis., will proceed with construction and equipment of a new plant to replace shop wrecked by fire on Feb. 25. J. P. Welling & Co., 737 Elaine Boulevard, local, have contract to erect building, 120 ft. sq., one-story and part basement. New automatic screw machine equipment is being purchased.

Board of Public Works, Waukesha, Wis., has extended from June 11 to June 27 time of closing bids for construction and equipment of a municipal sewage disposal plant and pumping station to cost $190,000. A. R. Schuh is city engineer.

Atlas Engineering Co., Milwaukee, has completed removal of its plant and equipment to Clintonville, Wis., where it is occupying enlarged factory of Topp-Stewart Tractor Co., with which it recently was consolidated. Atlas company manufacture concrete mixers, wagon loaders, conveyors, etc., and will continue manufacture of the Topp-Stewart tractor, which is of quadruple drive type. C. W. Zimmerman is vice-president and manager.

Unit Corporation of America, Milwaukee, which has been operating its gear division 24 hr. a day for several weeks, is preparing to place its forging division, formerly known as the Obenberger Forge Co., on a similar schedule. Fuller transmission works, Kalamazoo, Mich., another division, is to start operating day and night on July 1 for at least one month and possibly several months, according to W. H. Schmidt, president and general manager.

Blair Foundry Co., 364 North Broadway, Waukesha, Wis., has been succeeded by Pioneer Foundry Co., which will continue manufacture of same line of products.

Gulf States

BIRMINGHAM, June 18.

ARRANGEMENTS have been completed by International Paper Co., 100 East Forty-second Street, New York, for purchase of plant and property of Southern Paper Co., Moss Point, Miss., comprising a recently completed pulp and kraft paper mill, for about $4,200,000. New owner will continue operations as branch mill and plans to carry out expansion program later. Purchasing company will make improvements in its mills at Camden, Ark., including installation of lime sludge disposal plant to cost close to $80,000.

Reed Roller Bit Co., Mack Street and Avenue Q, Houston, Tex., has awarded general contract to Houston Structural Steel Co., 3910 Washington Street, for one-story machine shop, 75 x 100 ft., sawtooth roof type, to cost about $24,000 with equipment.

J. A. Taylor, 2332 Indiana Street, Houston, Tex., engineer, has plans for two-story cold storage and refrigerating plant at Brownsville, Tex., 100 x 240 ft., to cost in excess of $200,000 with machinery. It will be increased to three stories later.

Southeastern Power & Light Co., Birmingham, operating Alabama Power Co., Georgia Railway & Power Co., Mississippi Power Co., and other utilities, has arranged for increase in capital from 7,000,000 to 8,000,000 shares of stock, a portion of proceeds to be used for expansion and improvements, including transmission line construction, totaling about 100 miles in different parts of State. Company has acquired plant and property of Mill Port Gin, Ice & Power Co., Mill Port, Tex., and plans expansion in that district.

Fisk Rubber Co., Chicopee Falls, Mass., manufacturer of automobile tires, has leased a two-story building to be erected on North Carrollton Avenue, New Orleans, for a new factory branch, storage and distributing plant, for Louisiana, Texas, Mississippi and Arkansas, to cost in excess of $125,000 with equipment.

City Council, Alabama City, Ala., has authorized plans for a new pumping plant for municipal waterworks, to cost $70,000 with equipment. A bond issue is being arranged.

United Producers Pipe Line Co., a subsidiary of Transcontinental Oil Co., Tulsa, Okla., and Fort Worth, Tex., is planning early construction of 10-in. pipe line from Cushing, Okla., to McCamey, Tex., in west Texas oilfields, 433 miles, to cost more than $2,000,000 with compressor stations, etc.

Louisville & Nashville Railroad Co., Louisville, has plans for new locomotive and car shops at Mobile, Ala., comprising engine house, machine shop, forge and blacksmith shop, boiler house and other units. Company will also construct new 12-track terminal yard at same place, with turntable, coaling station and other facilities. Entire project is reported to cost more than $400,000 with equipment. W. H. Courtenay is chief engineer.

Phillips Petroleum Co., Bartlesville, Okla., has plans for extensions and improvements in gasoline refinery at Pampa, Tex., to cost close to $100,000 with equipment. It is also planning construction of new gasoline refinery in Rock Creek district, Hutchinson County, Tex., to cost approximately $130,000 with machinery.

Southern Cities Supply Corporation, Bankers' Bond Building, Birmingham, has acquired property adjoining its brick-manufacturing plants at Fox Station, about 30 miles from city, and plans expansion and installation of additional equipment for clay mining, conveying, brick manufacture, etc., to cost in excess of $90,000. Company has acquired barge fleet now operating on Warrior River, and will operate in conjunction with brick plant. Arrangements have been made for sale of 300,000 shares of stock, considerable portion of fund to be used for expansion.

South Coast Co., 645 North Michigan Boulevard, Chicago, has approved plans for construction of new cane sugar refinery at Oaklawn plantation, St. Mary Parish, La., to cost in excess of $750,000 with machinery. Contracts for portion of machinery have been let and other awards will soon be placed. A 20-ton traveling crane will be installed.

Atchison, Topeka & Santa Fe Railway Co., Fort Worth, Tex., plans construction of locomotive shops in connection with new switching yards at Saginaw, near Fort Worth. Yards will have capacity for handling 2000 cars and will cost close to $1,000,000 with shop facilities. Main locomotive repair shops for this district will be continued at Cleburne, Tex., where an expansion and improvement program is now in progress, to cost more than $1,500,000 for new buildings and machinery.

Warren, Knight & Davis, Empire Building, Birmingham, architects, have plans for one-story automobile service, repair and garage building, 75 x 145 ft., to cost more than $75,000 with equipment.

Moran Corporation, Slattery Building, Shreveport, La., is planning construction of several artificial gas plants and will be in market soon for equipment, including boiler and power facilities.

San Antonio Portland Cement Co., San Antonio, Tex., plans early construction of addition to power house at Lakeview. Other structures will be built, including raw mill unit, 65 x 150 ft. Entire project will cost in excess of $100,000. W. E. Simpson, National Bank of Commerce Building, is engineer.

Pacific Coast

San Francisco, June 13.

PLANS are under way for one-story addition to plant of Lockheed Aircraft Co., Burbank, Cal., 50 x 200 ft., to cost close to $50,000 with equipment.

Union High School District, Tustin, Cal., has plans for one-story manual training shop addition at local high school to cost about $25,000. Mott M. Marston, Douglas Building, Los Angeles, is architect.

William Fox Film Co., 1401 North Western Avenue, Los Angeles, has plans for a one-story machine shop at motion picture plant, 62 x 75 ft., in conjunction with new laboratory unit, 75 x 145 ft., to cost about $85,000 with equipment. William Darling is company architect.

Elbridge Smith, secretary, West Stanislaus Irrigation District, Westley, Cal., is asking bids until July 14 for 17 electrically-operated pumping units, 11 discharge pipes and valves for future pumps, 18 transformers and six electric switching stations, outdoor type. W. F. Woolley, Patterson, Cal., is chief engineer for district.

Astoria Box & Paper Co., Astoria, Ore., has acquired property from city, adjoining present mill, and is reported planning construction of new pulp mill unit, to cost in excess of $250,000 with machinery.

K. Lane Johnson, Holtzinger Building, Yakima, Wash., and associates have plans for a new two-story and basement cold storage and refrigerating plant, 80 x 135 ft., at Prosser, Wash., to cost about $45,000 with equipment.

City Council, Ellensburg, Wash., has authorized bond issue for $35,000 for extensions and improvements in municipal electric light and power plant, including installation of additional equipment.

Seattle Pulp & Paper Mills, Inc., Seattle, care of Tom G. Taylor & Co., Dexter-Horton Building, recently organized by officials of last noted company and associates, has plans for new pulp and paper mill on 20-acre tract on Duwamish River, near Seattle, to include power house, machine shop and auxiliary structures, to cost in excess of $1,000,000 with machinery. Joseph Irving, head of Crescent Logging Co., Everett, Wash., is president; Allen B. Engle of Taylor company, noted, is secretary.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has authorized a new automatic power substation at San Jose, Cal., to cost $278,000, and has appropriated funds in that amount. J. D. Kuster is division manager at San Jose.

J. C. Palumbo Fruit Co., Payette, Idaho, has plans for a four-story and basement cold storage and refrigerating plant, to cost upward of $60,000 with equipment. Tourtellotte & Hummel, Boise, Idaho, are architects.

Great Western Power Co., 530 Bush Street, San Francisco, will soon break ground for new steam-operated electric power house on San Francisco Bay, South San Francisco, to cost more than $3,000,000 with transmission system. Additional units will be added later. Company is subsidiary of North American Co., Cleveland.

Foreign

A FUND of about 170,391,000 yen ($85,195,500) will be expended by Japanese Government Railways, Tokyo, during present year for expansion and improvement of operating facilities, including additional repair and reconditioning shops, replacing of light rails with heavier sections, electrification on several lines, rolling stock, etc. An appropriation of 51,560,000 yen ($25,780,000) will be used during this same period for construction of new railroad lines. American Consulate, Tokyo, J. H. Ehlers, assistant commercial attaché, has information regarding work.

Piedmont Hydro-Electric Co. (Societa Idroelettrica Piemonte), Turin, Italy, is disposing of a note issue in United States totaling $4,000,000, a portion of proceeds to be used for expansion and betterments, including construction and acquisition of new hydroelectric generating plants, power substations and transmission lines, etc.

International Petroleum Corporation, Ltd., 120 Broadway, New York, a subsidiary of Standard Oil Co. of New Jersey, 26 Broadway, is concluding arrangements with Government of Republic of Colombia, where company operates concessions, for authority to arrange for loan of about $200,000,000, a considerable portion of fund to be used for development of oil properties, storage and distributing facilities, etc., in Colombia fields. Operations are carried out in name of Tropical Oil Co., an affiliated organization.

Plans are under way for a consolidation of tire and rubber manufacturers in Germany, including Continental Rubber Co., Hanover; German Dunlop Co., Hanau; Excelsior Rubber Works, Ltd., Hanover; Peters Union Rubber Works, Frankfort; and Harzburger Rubber Factory, Phoenix. Amalgamated company plans to carry out expansion and improvement program, with increased production facilities.

Gesellschaft fur elektrische Unternehmungen, known as "Gesfurel" (Corporation for Electrical Enterprises), Berlin, Germany, is disposing of a bond issue of $5,000,000 in United States, a portion of fund to be used for extensions and improvements in electric generating and transmission line properties in Germany and other European countries.

American Smelting & Refining Co., 120 Broadway, New York, is said to be arranging for work on new refinery

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at Monterrey, Mexico, in connection with present lead smelting works at that point, for which authorization recently was granted by Mexican Government; smelter has a capacity of 10,000 tons per month and new refinery will have equipment to handle this output. It is reported to cost more than $1,000,000.

Canada

TORONTO, June 18.

BUSINESS the past week has consisted mostly of scattered orders for one or two tools. The automotive industry is buying for replacement needs, and two or three companies have lists in preparation for new works proposed or under construction. A large part of the orders recently closed were from the mining district of northern Ontario.

It is reported that Richardson Terminal Elevator & Grain Co., Port Arthur, Ont., is planning erection of elevator to have a capacity of 20,000,000 bu.

H. A. Brown, vice-president and general manager of General Motors of Canada, Ltd., Oshawa, Ont., has announced plans for an addition to company's plant at Windsor, Ont., for production of cab and car bodies.

E. G. M. Cape Co., 10 Cathcart Street, Montreal, has let a number of sub-trades in connection with an addition to plant of Simmons, Ltd., 400 St. Ambroise Street, Montreal, to cost $250,000. Architects are Ross & MacDonald, 1 Belmont Street.

N. O. Hipel, Ltd., Guelph Street, Preston, Ont., is making arrangements for the erection of a manufacturing plant there.

Bulk tenders are being received by J. R. W. Ambrose, chief engineer, Toronto Terminal Railways, New Union Station, Toronto, until June 26, for construction of a central power plant, 65 x 200 ft., to be erected by Canadian National and Canadian Pacific railroads, at a cost of $1,000,000.

Western Canada

General Motors of Canada, Ltd., Oshawa, Ont., will start work at once on erection of a $1,000,000 manufacturing and assembly plant at Regina, Sask. Hutton & Souter, Hamilton, Ont., are architects. Main building will be 400 x 800 ft.; office building, three-stories, 50 x 200 ft.; and power house 80 x 80 ft. It is expected to have plant ready for operation not later than Dec. 1.

Crow's Nest Pass Coal Co., Ltd., Fernie, B. C., has awarded Vancouver Machinery Depot, Ltd., Vancouver, B. C., contract for three Belliss & Morcom compound vertical-type, high-speed air compressors, with three 600-hp. Canadian General Electric synchronous motors. Canadian Ingersoll-Rand Co., Sherbrooke, Que., was awarded contract for one 1200-cu. ft. horizontal type, high-pressure machine.

New Trade Publications

Gasoline-Operated Locomotive Crane.—Orton Crane & Shovel Co., 608 South Dearborn Street, Chicago. Bulletin 56 of 16 pages and a 4-page folder illustrate and describe a line of locomotive cranes running up to 40-ton capacity. Turn tables give full swing around a circle. The folder is devoted to such cranes operated by one man, and rating up to 25 tons.

Installing Oil Heat.—Oil Heating Institute, 420 Madison Avenue, New York. Booklet of 36 pages detailing methods of installing heating equipment from the point of view of the architect. Nearly 20 types are illustrated in detail, in addition to 6 pages of general information regarding the equipment and its use. While the pamphlet is devoted primarily to residence units, practically all of these units are made in sizes suitable for industrial use.

Master Regulators.—Hagan Corporation, Pittsburgh. Bulletin 101 of 16 pages deals with apparatus developed for combustion control in steam boilers. It is illustrated with both halftones and line cuts, showing details of the equipment and installations.

Two-Cycle Diesel Engine.—Busch-Sulzer Brothers-Diesel Engine Co., St. Louis. Catalog of 16 pages featuring the type-E Diesel engine of high speed, light weight and compact design. These engines have been used in United States Navy submarines and for other marine equipment, and are used also for power plant purposes, particularly as stand-bys. They range from three to eight cylinders. The commercial type weighs about 100 lb. to the horsepower, compared with 55 lb. for the submarine type.

THE LAST WORD

(Contributed by the Reader Service Department of The Iron Age Publishing Co.)

This here younger generation! Tck! Tck!

"I was being given a sales talk on the merits of a certain brand of penetrating oil," writes de la Haye from Philadelphia, and was told that it was especially effective in promoting the "*osculation* of the wrist pins."

And we didn't even know he was sick

From the New York *Sun*, June 3, 1928:

> *Grave of Iron Age Chief Is Discovered*
>
> ROENNE, Island of Borholm (A. P.)—The elaborately furnished grave of a Burgundian chieftain of the iron age was discovered on the island and identified by the National Museum of Copenhagen as a relic of the third century.
>
> In the grave were two earthen vessels containing food for the long journey into the beyond.

"GRANDPA, what did you do in the great war and why didn't you have sense enough to get into the aircraft industry when it was in its infancy?" they will be asking us accusingly, forty years hence.

We shall be able to tell how we bravely stood guard over the wine vats in the Bordeaux section, but the aircraft part of the question will be harder to handle. We have a hunch it will be something like this:

"Children, back in the late 'twenties I can recall that there were as many as 113 aircraft builders. How many are there now? Less than 30, and that huge General Aircraft Co., with the slogan, 'a plane for every purse,' is getting most of the business. Instead of blaming your grandpop for lack of foresight, you ought to be grateful I kept my money in the old automobile business, for there were more that lost than won in the pioneer days of the airplane industry." Out of 190 makes of automobiles, there are now only about 50 left.

AN open letter to Messrs. Fairbairn, Wingfield & Wykes, chartered accountants, tel. address "Thriftily," 67 Watling Street, London, attention Mr. A. Dodds Fairbairn:

> Dear Dodds:
>
> Thanks for notifying us that the crash of our former subscriber, Williams & Norgate, Ltd., does not leave us entirely bereft, and that we have a certain sum coming to us on the unpaid subscription.
>
> To obtain this sum we must call at your office on Watling Street any day between the hours of 10 and 1 (except Saturday). We are booked solid with luncheon engagements for the next three weeks, and so can not get around your way. Besides, we dislike that Watling Street traffic.
>
> Therefore, we commission you to take the "blank pounds, blank shillings, and eight pence" due us and buy us a Dunhill pipe, which we understand can be purchased at reduced rates in your neighborhood. Thanks, Dodds. You can give me the pipe the next time you are over. Best regards to Doug Wykes and Ernie Wingfield.

"Have you had your copper today?" physicians are now asking, for it is reported that copper in the diet cures rickets, anemia and fallen arches. But if you have any of these ailments and find that swallowing pennies does not effect a cure, don't complain to us. For we have a suspicion that it is only some more propaganda put out by the copper interests, with the intention of crowding iron to the background.

Will this attempt to displace iron from its rightful position in medicine extend also to metaphor? Maybe our great-grandchildren will read, "He failed because he had too many coppers in the fire," or "He was a man of copper-silicon will." And the beauteous heroine will sob to her obdurate husband, "Why do you copper your heart against me?" A. H. D.

THE IRON AGE

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The Place of Overhead Conveyors

What Requirements Have to Be Covered to Meet the Dictum That Today's Plant Runs on Wheels

BY ALEX. R. PRIBIL

TWENTY-FIVE per cent for material handling! That's about what American industry spends out of its total payroll. The percentage would be still higher if the automotive industry alone did not already have $200,000,000 invested in material handling and conveying equipment.

Until five years ago, the principal object of efficiency and plant engineers was to lay out the plant and place the machinery according to the operations and allow each operator plenty of space for storing material on the floors. This method occasioned more or less delay in production and difficulties were encountered in the handling of material. Finally progressive production managers realized the necessity of using every available bit of floor space for manufacturing operations and began to utilize the ceiling or the overhead conveyor as a storage carrier and thus were able to keep the material moving correspondingly with the speed of production.

Early installations, however, were made in somewhat of a haphazard manner, the main object being to reduce trucking throughout the plant, as floor space for trucking material around a plant had become valuable.

The modern conveyor is laid out to suit a certain line-up of equipment and assembling operations, and the enormous saving which has been effected by its use has placed the overhead conveyor foremost in the modern plant. Buildings are now laid out with a definite routing of materials by conveyors and machines advantageously grouped. Material is not only carried through the building, but it is also carried from one building to another. This arrangement, of course, necessitates that overhead conveyors be built sufficiently high so that men can work underneath them and that

AS president of the Saginaw Stamping & Tool Co., Saginaw, Mich., which is a manufacturer for conveyor builders of conveyor trolleys, chain hoist trolleys, special trucks and industrial truck casters, Alex. R. Pribil approaches the subject of overhead conveyors and equipment for handling material as an expert. He came to this country when 21 years of age from Vienna, Austria, where he was educated as a mechanical engineer. For two years he was with the ordnance department of the Bethlehem Steel Co. and then in the next thirteen years was successively with the Wellman-Seaver-Morgan Co., Cleveland; Brown Hoisting Machinery Co., Cleveland; the Cambria Steel Co. as chief draftsman, the Ford Motor Co., Detroit, as chief designer and checker, the Penberthy Injector Co., Detroit, as general superintendent, the Bowen Products Co., Detroit, Auburn and Cleveland, as consulting engineer and with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., as general supervisor of tools. In 1915 he became general manager of the Carde Stamping & Tool Co., Saginaw, and since 1917 has been president and general manager of the Saginaw company. He admits to having issued to him over 150 patents covering machinery, tools and special equipment. He holds that overhead conveyors and special trucks save 10 to 25 per cent of labor costs for material handling.

ALEX. R. PRIBIL

only occasional dips be made in the conveyor line for loading or unloading material.

Considerable engineering thought has been given not only to the general layout for overhead tracks, but to their strength and permanency in order to make the conveyor free from vibration and give absolute safety to the worker underneath.

A conveyor is an endless chain supported by a single I-beam track, driven at one point at a speed ranging from 10 to 60 ft. per min. It is important that heavy parts carried on the conveyor be properly attached so they can be easily and quickly loaded and unloaded. An overhead conveyor is composed of four units:

A, Overhead track supported by structural work

B, Conveyor equipment, including trolleys and roller turns

C, Chain and drive sprocket wheel

D, Electric motor and speed reducer.

Only one sprocket should be used for the drive and roller turns used on every corner or bend, to allow for the necessary take-up in the chain. The driving mechanism should be designed to give a continuous and steady pull, which may be accomplished by so-called speed reducers, which should be amply proportioned. The opposite end of the drive-end of the conveyor is called the tail-end and is generally made adjustable to take up the slack in the chain. The bearings of the shaft should be mounted on a sliding guide, operated manually with a screw so that the tension of the chain can be adjusted to take up the slack in the chain.

This, of course, is accomplished by several means, almost all of which relate more to extremely accurate field work than to design, and among these are such items as having the straight runs of the I-beam absolutely straight and at the roller turns having the center line of the web of the beam exactly vertical with the center line of the chain.

In fabricating and erecting steel work for these overhead conveyors, the most successful contractors work to limits which are totally unknown to the structural iron shop and are, in fact, plus or minus 1/64 in. Every bit of this care is for the purpose of reducing chain reaction and undue wear of the various parts. One reason why the No. 458 rivetless chain manufactured by a number of chain manufacturers is so popular is that it has the property of telescoping somewhat on the driven side of the power plant.

In all cases, the conveyor should be driven by electric motors, and these electric motors should be controlled by push button switches. There should be as many push button switches as practical to stop the conveyor at an instant's notice and the conveyor should be started again only after a signal that everything is clear.

The conveyor should be properly guarded and must be properly installed to insure absolute confidence. All floor openings into the drive must be properly protected and, of course, the unloading of material from the conveyor must be carefully studied.

While the overhead conveyor is an absolute necessity for production at minimum cost, nevertheless there are a great many places where conveyors must be supplemented with trucks, as the "modern plant of today runs on wheels," in order to make the moving of material as flexible as possible.

All Iron and Steel Pipe Seriously Corroded by Some Soils

In 1922 the Bureau of Standards began an investigation of the corrosion of piping in soils wherein no stray electric currents existed. In cooperation with various manufacturers and public utilities, some 14,000 6-in. lengths of pipe were buried in soils at 46 locations selected by the Department of Agriculture's bureau of soils as typifying situations of existing pipe networks. Specimens were cut from stock material and, after identification, weighing and examination, were buried in a pipe trench in an approved manner, each trench containing five groups.

One group of specimens was removed from all locations in 1924; a second set in 1926; and the work will be continued at two-year intervals until 1932. Studies of the pipe after two and four years' burial are described in Technologic Paper No. 368 of the Bureau of Standards, by K. H. Logan, S. P. Ewing and C. D. Yeomans. This booklet also contains a full description of the nature of the covering soils.

When any one of the test locations is considered, welded iron and steel pipe of various manufacture differ little in loss of weight or extent of pitting after burial for four years. Wide differences do occur when corresponding specimens from the various localities are compared, ranging from practically no corrosion in a gravelly, sandy loam near Seattle, Wash., to a worm-eaten, deeply grooved appearanace in a sandy loam at Denver. It is evident that no one of the commonly used pipe materials is superior under all soil conditions and, further, that serious corrosion may occur in soil free from foreign matter and stray currents. Attempts have been made to correlate the amount of measured corrosion with various physical or chemical characteristics of the soil, such as the hydrogen ion concentration, soluble salt content, soluble salts in the ground water, and soil resistivity, but without success.

In certain of the soils, cast iron is seriously affected by pitting, developing the phenomenon of "graphitic corrosion," no different from the observed effects of electrolysis, even though it is certain that no electric currents existed in the soils in which the pieces have been buried.

Preliminary results have also been secured on the soil corrosion of iron and steel protected by various metallic and organic coatings, and of several non-ferrous metals.

Great Improvement in Safety at Bethlehem Plants

Safety education of employees of the Bethlehem Steel Corporation has helped to reduce lost-time accidents at Bethlehem plants 54 per cent in the last 10 years. This improvement was announced in connection with the company's fourteenth annual "First Aid and Mine Rescue Meet," held June 23, at Sparrows Point, Md.

Employees from all the Bethlehem steel plants and mines entered into competition in a contest of efficiency in first aid and mine rescue work. Cash prizes awarded by Eugene G. Grace, president of the company, totaled about $2,000.

Bethlehem now trains about 1000 men in safety and first aid every year. More than 8000 employees have received an intensive course of instruction in this work during the last 12 years.

Marked improvement in accident prevention was effected by the employees during the first quarter of 1928. The company as a whole improved its best previous record by 17.8 per cent. The steel plants alone bettered their safety record by 44 per cent.

Electrical Steel-Mill Developments

Large Number of Main-Roll Drives Installed—Some Units of Particular Interest Because of Methods of Control

BY W. H. BURR*

IN 1920, the electrical development committee reported 44 motors driving reversing mills and 113 mills of various types on which electric motors had been installed, making a total of 157 motors on main-roll drives at that time. In January, 1928, there were reported over 1500 main-roll drive motors in the United States and Canada.

During 1927 there were purchased 122 main-roll drive motors ranging in size from 300 hp. to 7000 hp. Of this number 63 were d.c. motors, 40 were 60-cycle, 17 were 25-cycle, and two were 50-cycle motors. More than half of the motors were d.c. motors, a condition quite different from that existing a few years ago. Eighty of these motors were used in connection with gear drives, which is evidence that the modern reduction gear has proved its reliability to the satisfaction of the steel mill industry.

Recent Main-Roll Drives

During the past year the American Sheet & Tin Plate Co. has placed in operation one of the heaviest power tandem hot-strip mills in the country. This mill is located in the Chicago district. The six finishing stands are driven by individual 2500-hp. 600-volt, adjustable-speed d.c. motors, running at 160 to 320 r.p.m. Power for these motors is supplied from three 3000-kw., three-unit synchronous motor-generator sets operating in parallel. One 3000-kw. set is used to start the six 2500-hp. motors by means of variable voltage control.

There is now under construction for the American Rolling Mill Co., in the Cincinnati district, a hot-strip mill which will be equipped with motors somewhat larger than those mentioned above, making it the largest capacity mill of this type in this country. The total main-roll drive power is 21,800 hp., which includes both a.c. and d.c. main-roll drive motors.

The roughing stands are driven by two 800-hp., one 1000-hp. and one 1200-hp. wound-rotor motors. The motors have been designed so that mechanically their individual parts are interchangeable. This arrangement necessitates only one spare rotor with shaft and one spare stator, due to the fact that these parts can be placed on any of the bases and bearings.

The three intermediate stands are driven by individual 2000-hp., 600-volt, direct current, adjustable-speed motors, operating at 300 to 500 r.p.m. Each of the four finishing stands is driven by a 3000-hp., 600-volt, d.c., adjustable-speed motor, running at 180 to 360 r.p.m.

The main-roll drive motors are supplied from three 4000-kw. three unit, synchronous motor-generator sets operating in parallel. The auxiliary motors are supplied from two 750-kw. synchronous motor-generator sets and the excitation for all main-roll drive d.c. motors and generators is supplied from a 300-kw. synchronous motor-generator set.

Close Control of Speeds

Two mills recently purchased for the Cleveland district include 11 main-roll-drive motors, ranging from 400 to 1200 hp. and a total of 6050 hp., continuous capacity for both mills. Due to the high delivery speeds, close center distance stands and wide speed range of the motors, it was necessary to incorporate special design features in both motors and control, to maintain the correct speed relation between adjacent stands, so that stretching and buckling of the metal between stands will be eliminated.

There have been purchased for the Birmingham district main-roll-drive motors for a rod mill installation, which include five 6600-volt, 60-cycle, synchronous motors ranging in size from 1300 to 2750 hp. and totaling 9650 hp. The synchronous motors, with the exception of a 2750-hp. motor, are all designed so that they can be started by applying full voltage to their terminals. To reduce to a satisfactory value the starting kva., taken from the power system, reactors are used in connection with the starting equipment for the 2750-hp. motor.

The finishing stand for the rod mill will be driven by a 1200-hp., 230-volt, d.c. adjustable-speed motor. Power for this motor is supplied from a 1000-kw. generator driven by a 2100-hp. motor, which also drives a portion of the mill stands. The combination generator and mill drive represents a new feature for this class of service. The synchronous motors purchased for this installation represent the first large synchronous motors to be applied on a mill of this class.

Replacing Steam with Electricity

There has been purchased by the Illinois Steel Co. a 6500-hp. single-unit reversing-mill motor for the electrification of an existing steam engine-driven mill. A new pinion housing and the motor will be installed on the opposite end of the mill from the present drive. This will reduce the shut-down period of the mill during the change-over to the minimum, due to the fact that the entire equipment can be installed with the mill in service.

One recent improvement in the mechanical features for electrical equipment has been incorporated in this equipment. The individual bedplates for both the reversing motor and the flywheel motor-generator set are of "built up" welded steel construction.

A 4600-hp. 700-volt, single-unit reversing-mill motor for driving a 35-in. roughing mill has been purchased for installation in India (Jamshedpur). The motor will be supplied by a flywheel motor-generator set which includes two 1900-kw., 490 r.p.m., d.c. generators. These generators indicate that continued progress is being made in developing larger generator capacity at higher speeds for reversing-mill service.

There has recently been placed in service by the Carnegie Steel Co., in the Youngstown district, a 4000-hp., 450 r.p.m. synchronous motor for driving a 24-in. continuous billet mill. The motor represents the latest design in synchronous motors for this class of service, in that the motor has a completely fabricated welded frame and bedplate.

New Strip Mills Electrically Driven

A cold-roll strip mill for production of wide material was placed in operation by the American Rolling Mill Co. during the last year. The mill is driven by five 600-hp., 230-volt, d.c., adjustable-speed motors, operating at 400 to 800 r.p.m. For use in connection with this installation there was developed and perfected a special screw-down drive, so that each screw can be motor driven independently of the other screw. If it is desired to operate both screws at the same time a magnetic clutch is energized, which causes both screws to turn at the same rate. An inching arrangement is provided which allows the screws to travel one revolution and then stop automatically.

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*Electrical superintendent, Lukens Steel Co., Coatesville, Pa., and chairman electrical development committee, Association of Iron and Steel Electrical Engineers. This is abstract of the committee's report presented at the association's Chicago meeting, June 25 to 28.

About the middle of last year the Trumbull Steel Co. completed remodeling its 16-in. hot strip mill, which was first placed in operation during 1918. The mill is now laid out for continuous rolling and will produce strip up to 36-in. wide. The driving power applied to the mill was increased by one new 5000-hp. adjustable-speed Scherbius-controlled induction motor, so that the total capacity of driving motors is now 13,000 hp. With the exception of one 300-hp. and two 100-hp. edger motors, which are adjustable-speed d.c. machines, all the driving motors are of the slip-ring induction type, with speed adjustment obtained by the Scherbius system. The four horizontal roughing stands are driven by a 1500-hp. motor, and each of the last three stands is driven by a 2000-hp. motor. The speed of each motor can be adjusted between 270 and 450 r.p.m.

The Scherbius speed-regulating set used with the 5000-hp. motor is of especial interest, as it is the first application using two a.c. commutator-type machines in series. This design permits the use of smaller and higher speed units, and the higher regulating voltage obtainable permits designing the induction motor with a lower secondary current.

Another large strip mill recently placed in operation is that of the Weirton Steel Co., at Weirton, W. Va. This mill will produce strip up to 48 in. wide. There are 11 driving motors, totaling 16,600 hp. The three motors on the roughing stands are 1500-hp., 6600-volt a.c. machines, one of which operates at 200 r.p.m. and the remaining two at 450 r.p.m. There are three edger motors, each 200 hp., 400 to 800 r.p.m. direct current.

The five finishing stands are individually driven by two 2000-hp., 200 to 400 r.p.m. and three 2500-hp., 200 to 400 r.p.m., 600-volt, d.c. motors. Power for the direct-current machines is obtained from two synchronous motor-generators, each consisting of two 1500-kw., 600-volt, d.c. generators driven by one 4200-kva., 6600-volt synchronous motor. The five d.c. motors are started simultaneously by control of the voltage of the four d.c. generators.

Continuous Skelp Mills

Two large mills of the continuous type for rolling skelp have been placed in operation during the past year. One is at the Benwood, W. Va., plant of the Wheeling Steel Corporation. This mill is provided with eight driving motors, all of which are adjustable-speed, d.c. machines. There are four edger motors, three of which are 50 hp. and one 150 hp. These machines are operated from the 230-volt machines, power being supplied to them from a three-unit motor-generator consisting of two 2000-kw., 600-volt generators driven by one 5600-kva., 4000-volt, 60-cycle, synchronous motor. The first two stands are driven by a 500-hp. motor and the remaining eight stands by three 2000-hp. machines.

The other skelp mill referred to is a 27-in.-24-in.-21-in. continuous mill installed by the Bethlehem Steel Co. at the Sparrows Point plant. In addition to producing skelp, this mill is designed to roll sheet bars also. There are four main driving motors. The first is a 4000-hp. 83 r.p.m., 6600-volt, synchronous motor which drives the roughing train. The intermediate train is driven by a second synchronous motor rated 6500 hp. at 187 r.p.m. The third is a 6700-hp. slip-ring induction motor with speed adjustment between 250 and 500 r.p.m., obtained by the Scherbius system. Incidentally, this is the largest Scherbius equipment in the world. The driving motor on the last stand is a 600-volt d.c. machine rated 2600 hp. at 275 to 320 r.p.m.

Rolling H-Beams in High-Power Mill

From the standpoint of total horsepower involved, the new electrically driven beam mill for the production of wide-flange structural shapes at the Lackawanna plant of the Bethlehem Steel Co. is one of the most highly powered mills in this country. The complete equipment consists of three units: a 54-in. reversing blooming mill, a 48-in. intermediate mill, and a 48-in. finishing mill. The finished sections are produced without reheating of the steel from the time the ingot is removed from the soaking pit.

The ingot is first rolled in the blooming mill to an H-shaped bloom with a web from seven to 12 times the thickness of the web of the finished section. This bloom then passes to the intermediate mill, which consists of two separately driven stands of rolls.

One stand, known as the supplementary mill, has two horizontal rolls, and the main stand has two horizontal and two vertical rolls. The H-shaped bloom enters this intermediate mill with the web horizontal. The supplementary rolls act only on the top and bottom edges of the flange. The horizontal rolls of the main mill effect the reduction in cross-section of the web, while the vertical rolls reduce the cross-sections of both flanges. In the main mill the driving power is applied only to the horizontal rolls, the vertical rolls rotating due to their contact with the beam.

After several passes back and forth through the intermediate mill, the beam passes on to the finishing mill, which also consists of two stands, a main and supplementary, where several finishing passes are made. [This is the same action as that illustrated and described on page 1381 of THE IRON AGE of May 17, in connection with the new Carnegie parallel-flange beam mill at the Homestead works. Editor.]

Unusually Large Motors

The motor for driving the 54-in. reversing blooming mill is the largest single-unit d.c. rolling mill motor which the General Electric Co. has ever built. It is rated 7000 hp. continuously, at 40 to 80 r.p.m. This motor is capable of exerting a maximum torque of 2,400,000 lb. at 1-ft. radius. Direct-current power is supplied from a flywheel motor-generator consisting of one 5000-hp., 275 r.p.m., 6600-volt induction motor, one 50-ton flywheel, and two 3000-kw., 750-volt generators which are operated in parallel. This 54-in. blooming mill is one of the two largest reversing blooming mills in this country.

The intermediate mill has two reversing motors, one of which drives the supplementary rolls and the other the main rolls. The main-roll motor is rated 7000 hp. continuously, at 65 to 125 r.p.m. The supplementary mill motor is rated 1500 hp. continuously, at 65 to 225 r.p.m. The flywheel motor-generator which furnishes power to these reversing motors consists of a 5000-hp., 375 r.p.m., 6600-volt induction motor (duplicate of that on the blooming mill set), two 3000-kw. generators for the main motor, one 3000-kw. generator for the supplementary motor, and one 50-ton flywheel.

This set is a duplicate of the blooming mill set, except that it has three generators instead of two. The finishing mill equipment is the same as that for the intermediate mill. The total capacity of the main equipment for the blooming, intermediate, and finishing mills is just about 71,000 hp.

Changing Over the Rail Mill

The Bethlehem Steel Co. placed an order for new electrical equipment for the Lackawanna rail mill. Engine drives will be discarded and the layout of the mill will be changed. It will consist of a 44-in. reversing blooming mill, the driving motor for which will be rated 7000 hp. continuously, at 50 to 120 r.p.m. Blooms from this mill will go direct to a 36-in. reversing roughing mill, which will be driven by a d.c. motor, rated 5000 hp., continuously, 50 to 120 r.p.m.

Power for these two reversing motors will be obtained from a single flywheel motor-generator consisting of one 8000-hp., 375 r.p.m., 6600-volt induction motor, two 3000-kw., 375 r.p.m., 750-volt generators operating in parallel, to supply power to the 7000-hp. blooming mill motor, two 2200-kw., 450-volt generators operating in series, to supply power to the 5000-hp. roughing mill motor, and one 75-ton flywheel.

More Synchronous Motors Being Used

Increasing use of synchronous motors for main roll drives is noteworthy. Seven motors sold by the General Electric Co. during 1927 totaled 12,600 hp. The largest of these is rated 5000 hp., continuously at 100 r.p.m., and 2200 volts, and is used to drive a 19-in.

continuous sheet bar mill at the Kokomo, Ind., plant of the Continental Steel Corporation.

A motor of the same horsepower rating but at 240 r.p.m. is used to drive a 51-in. piercing mill installed by the Standard Seamless Tube Co. at Ambridge, Pa. This is the largest seamless tube mill drive in the world.

The Standard Seamless Tube Co. has placed in operation also a 32-in. reversing bar mill which is driven by a 2150-hp., 43 to 85 r.p.m., 550-volt d.c. motor. Power is derived from a synchronous motor-generator consisting of a 4200-kva., 2200-volt synchronous motor, direct-connected to two 1000-kw., 275-volt, d.c. generators operating in series. This is the first installation of a reversing rolling mill motor deriving its power from a synchronous motor-driven generator.

At the Union plant of the Bourne-Fuller Co., Cleveland, a 10-in. merchant mill has recently been placed in operation which, from the standpoint of the electrical equipment, is of particular interest. The mill has eight driving motors totaling 3400 hp. Five are 500-hp., 267 to 800 r.p.m., 230-volt, d.c. machines and three are 300 hp., with the same range of speed adjustment.

The four stands driven by the three 300-hp. motors and one of the 500-hp. motors are in tandem and placed on very close centers, so that the metal being rolled is in all four stands simultaneously. For this reason, special provision has been made in the control provided for these four motors, to reduce the speed regulation (that is, the change in speed from no load to full load) of each machine to a minimum, and to maintain within close limits the relative speeds of all four machines.

STARTS USING HOT METAL

Improved Hamilton Furnace Now Connected with Armco Middletown Works

INAUGURATION of the movement of hot metal from the blast furnace of the Hamilton Coke & Iron Co., at Hamilton, Ohio, to the open-hearth furnaces of the East Side works of the American Rolling Mill Co., at Middletown, Ohio, was formally celebrated June 25 when a party of officials and guests of the two companies journeyed on special cars from Middletown over the newly-constructed tracks of the Baltimore & Ohio Railroad to Hamilton where they saw molten metal taken from the furnace and sealed in ladle cars. The return trip was made to the East Side works at Middletown, where the party inspected the plant. A luncheon was given by the officials of the American Rolling Mill Co., at which brief addresses were made by Daniel Willard, president Baltimore & Ohio Railroad; H. C. Blackwell, president Union Gas & Electric Co., Cincinnati; and H. B. Rust, president Hamilton Coke & Iron Co.

The plant of the Hamilton Coke & Iron Co., which originally consisted of a blast furnace owned by the Hamilton Furnace Co., has been enlarged and improved. The program of improvements included the remodeling of the blast furnace, hot blast stoves and gas cleaning system, installation of equipment suitable for the delivery of hot metal to Middletown, 12 miles distant, and the construction of a modern by-product coke plant comprising 45 14.8-ton Koppers ovens of the Becker type with a capacity of 1200 tons of coal each day.

The blast furnace with a rated capacity of 550 tons daily is equipped with a McKee revolving distributor. The hearth has been enlarged from 16 to 17 ft. in diameter. The gas cleaning system, after the dust catcher, is entirely new. The gas, after passing through the dust catcher, is cleaned by an A. B. C. vortex collector furnished by H. A. Brassert & Co. The collector removes by dry process a large percentage of the dust remaining in the gas and delivers hot gas of sufficient cleanliness to be suitable for use at the boilers. By centrifugal action the collector separates the dust from the gas, and the dust is collected in a receptacle at the bottom. At intervals of about 12 hr. the dust is dumped into railroad cars. The clean gas passes out at the top of the collector, part of it going to the boilers without further cleaning and the remainder going to a Feld five-stage scrubbing tower, 12 ft. in diameter, where it is wet washed for use at the stoves.

After leaving the Feld scrubber, the gas passes through an A. B. C. vortex eliminator and thence to the stoves. The action of the eliminator is similar to that of the collector, its function being to separate the gas from the entrained moisture and sludge.

Three of the four stoves were relined to provide the necessary increase in regenerative capacity required by the furnace. The stove shells, each of which is 20 ft. in diameter and 92 ft. high, have been left intact, but in the relining are said to represent an innovation in stove design from anything now in operation in this country. The arrangement of the gas passage, together with the center combustion chamber, conforms to the Diehl type stove. The checkers of the Brassert type, consisting of octagonal shapes with cylindrical openings in the center, result in a series of square and round openings from the top to the bottom of the checker work. Insert columns of specially shaped fire brick have been placed in these openings, the size of the inserts being varied to effect a somewhat higher and more uniform gas and blast velocity throughout the checkers than has been employed ordinarily in the past. It is estimated that an increase of 90 per cent in heating surface per stove is obtained with these checkers as compared with the type of stoves previously used at this furnace. Incidentally, the four stoves have been equipped with Steinbart pressure burners for economical and efficient gas burning.

The coke plant will produce furnace coke and also coke for industrial and domestic uses. The surplus gas from the ovens is delivered to a 5,000,000-cu.-ft. waterless gas holder, from which it is taken by the Columbia Gas Supply Co. A Koppers phenol recovery plant and a Bartlett-Hayward centrifugal benzol absorber are features of the by-product plant.

Three specially-designed mixer ladles of the Pugh type, each of 150 tons capacity, will carry the molten metal from the furnace to the open-hearth furnaces at Middletown. The ladles have been double-lined with fire brick and are capable of holding the metal for 48 hr. A view of one of the ladle cars was given on page 1746 of THE IRON AGE of June 21.

Because of the concentrated load of metal, plus the unusually heavy weight of the ladle cars, it was necessary for the Baltimore & Ohio Railroad to design and build a special bridge over the Miami River en route from Hamilton to Middletown. For a ladle car to make the round trip from the furnace to Middletown requires about 2½ hr. and it is estimated that an average of four trips every 24 hr. will be made.

The Hamilton Coke & Iron Co. is the successor to the Hamilton Furnace Co., which first built a blast furnace at Hamilton in 1907 to make foundry pig iron to be sold in the open market. Ten years later the blast furnace was rebuilt, but for a long period previous to its purchase by the Hamilton Coke & Iron Co. was idle. Today, under its new joint ownership by the American Rolling Mill Co. and the Koppers Co., it enables the former to reduce its steel production costs by using the hot metal for its open-hearth furnaces at Middletown instead of securing cold pig iron from the Armco furnaces at Columbus.

Foundry owners of Worcester, Mass., on Monday, June 25, met at the Hotel Bancroft, of that city, to form a foundry council of the chamber of commerce. Roscoe H. Goddard, general secretary of the chamber, presented the plan. Most of the foundrymen present were in favor of it and concrete developments are expected soon.

Magnets Control Welding Arc

Produce "Electronic Tornado" and Stabilize Carbon Arc—Joints Welded at High Speed Have Superior Ductility, Appearance and Strength

BY A. F. DAVIS*

IT has long been known that the electric arc is normally a difficult phenomenon for the welder to control. It creates its own magnetic field and the passage of the welding current through the parts being welded creates other magnetic fields of variable direction. The arc, therefore, tends to wander around seeking the path of least resistance. When studying this characteristic in an effort to stabilize the arc, research investigators in the Lincoln Electric Co.'s laboratory many months ago found that, after superimposing a strong magnetic field on the arc flame, the arc travels through variable fields without disturbance. This magnetic control appears to give the arc a gyratory motion and the controlled arc has been properly called an "electronic tornado."

At the time it was thought to be merely an interesting scientific phenomenon of no particular commercial value, but experimentation was continued. In December of last year a series of welds were produced of such extreme ductility and smoothness that more persistent efforts to apply it to commercial machines were justified.

To illustrate the kind of metal remaining after melting under a carbon arc controlled by a strong, induced magnetic field (the electronic tornado), some welds were made in ½-in. plate. In appearance these welds have a series of ripples shaped like fish mouths, characteristic of the highest uniformity in the joint. This is partly due to the higher speed of welding and, in part, is inherent in the process.

The welded joints were then sawed out in the form of long bars. Some of these resultant bars were twisted through 1080 deg., or three complete revolutions, without showing any indication of failure (Fig. 1). Other bars cut from welds were twisted cold and tied into knots without any sign of fracture. Welds on heavier plates were given bending and twisting tests which could not even be approached by welds made by ordinary methods. In a series of welded bars tested in tension there was not a single failure in or alongside the weld. It was quite apparent that there is no impairment of the strength of the parent metal by the new process.

The three microphotographs show common steel plate, metallic arc weld and electronic tornado carbon arc weld, respectively, all at the same magnification and etching. They show in the clearest possible manner the pronounced difference between the common arc weld and the new process. It will be observed that the grain size in the new process is exceedingly fine and uniform, whereas in the metallic arc weld it is irregular and coarse. The crystal structure of the electronic tornado weld is almost identical with that of original mild steel; the only discernible difference is in the refined size of the crystals themselves.

The structure of metal melted by this new process is very similar to that of a highly refined low-carbon steel brought about by rolling or forging and a suitable heat treatment.

Such success has been had in commercializing this invention that it is now being applied to the manufacture of pipe, tanks and the welding of structural steel. To illustrate the adaptations, an automatic machine for welding a special piece of oil field equipment is shown, with some of the work delivered.

These are corner clamps for oil well derricks, made of ordinary pipe instead of timber. Each clamp is made of three pieces; two of them are alike, a square plate with central portion bent into a 125-deg. arc and two

Fig. 1.—Welded Seam Cut from ½-In. Plate, Twisted Three Complete Times without Cracking

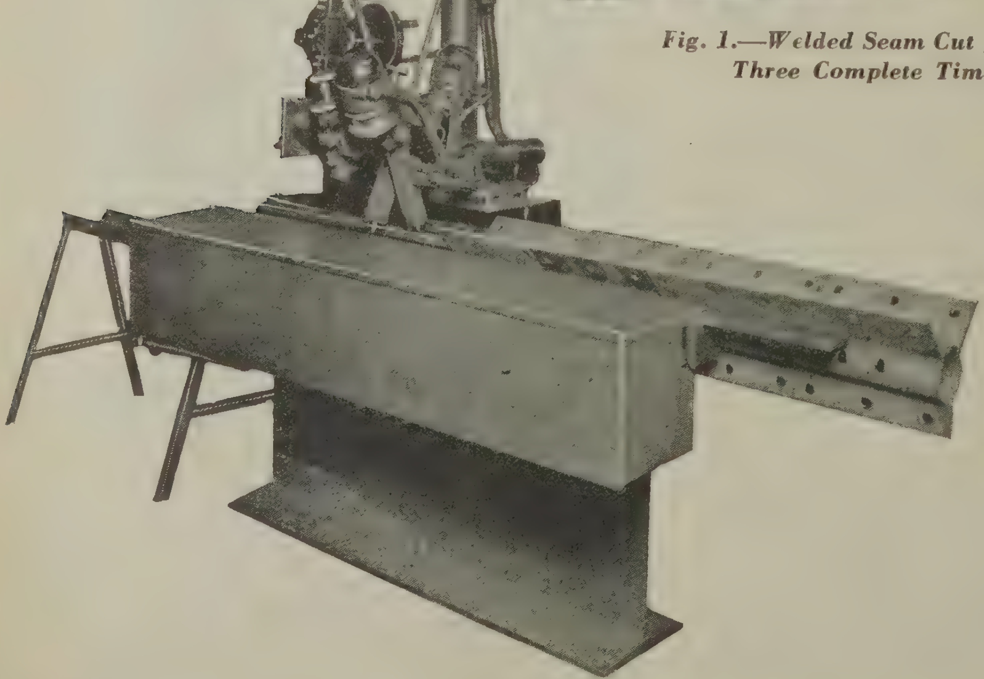

Fig. 5.—Automatic Machine for Making Angle Clamps for Oil Well Derricks

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*Vice-president Lincoln Electric Co., Cleveland.

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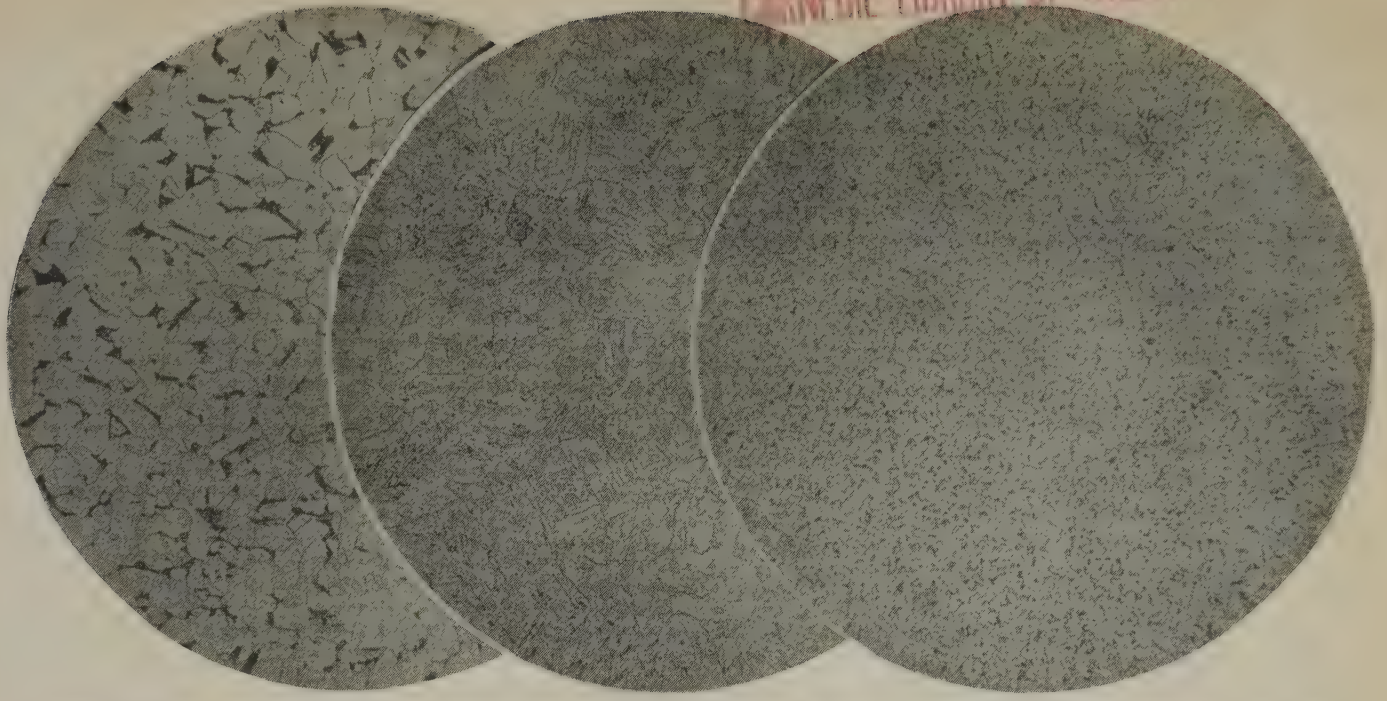

Figs. 2, 3, 4.—Microstructure, at 100 Diameters, of Steel Plate, Metallic Arc Weld and Electronic Tornado Carbon Arc Weld

wings back in radial direction. The third piece is a 90-deg. portion of the cylinder with short wings, resting on the two others in the assembly shown in Fig. 5.

The clamps thus assembled are fed into the welder and are carried under the arc in a continuous line by a chain drive on which there are dogs set at intervals. These devices are concealed by sheet-metal guards.

It will be noted that there are two of the new type welding heads with their electrode holders crossing each other at a sharp angle. This construction is of peculiar interest, for, with an uncontrolled arc, it would be impossible to operate two flames in such close proximity. One would continually blow the other out. With the electronic tornado welding head, however, they work smoothly and without conflict.

This new machine is placing double welds at the rate of better than 40 ft. an hour for each head, which is an exceptionally high speed. No filler rod is used; the arc from the carbon electrode fuses the wings of the top plate into the metal below.

In general the cost of welding ½-in. plates, including operators' time, electric current and carbon electrodes, will range from 3c. to 7c. per ft., depending principally upon the cost of setting up the work and the amount of it that is to be done. The cost of welding plates of other thicknesses will be in direct proportion.

Maintained Uniformity in Malleable Iron Castings

A notable showing in uniformity in high physical properties of malleable iron castings is disclosed by the record of the Fort Pitt Malleable Iron Co., Pittsburgh, covering a period of 15 months to and including March of this year. This record, part of the exhibit of the company at the last annual convention of the American Foundrymen's Association in Philadelphia, shows that in 1104 heats made during this period there was only one month in which the average of the tensile strength dipped under 58,000 lb. per sq. in.; that in all but three months the average yield point was above 38,000 lb. per sq. in., and only in two months did the percentage of elongation fall below 25 per cent. The machinability of the iron was, it is emphasized, in no way affected by the high physical properties.

Prizes Announced for Foundrymen's Apprentice Contests

Owing to some unexplained delay in transit, steel castings for the apprentice molding contest conducted by the American Foundrymen's Association at its Philadelphia convention in May did not arrive in time to be considered. This limited this feature of the convention and exhibition to an examination of the patterns and gray iron castings submitted.

All the patterns reflected credit on those who made them and all might be used with perfect propriety in commercial practice. First prize was awarded to No. 61, made by Frank F. Cuzzone, General Electric Co., Schenectady, N. Y. Second place was given No. 2, made by Arnold Behrens, Milwaukee Pattern & Mfg. Co., Milwaukee. Third place was awarded to No. 31, made by John Anderson, John Deere Harvester Co., Moline, Ill. The judges were Joseph Goostray, Hunt-Spiller Mfg. Co., Boston; Pat Dwyer, *Foundry*, Cleveland, and John D. McDonald, Bucyrus-Erie Co., Erie, Pa.

In the gray iron casting contest, first prize was given No. 94, made by Peter G. Bathgate, Brown & Sharpe Mfg. Co., Providence, R. I. Second place was given No. 74, made by George Shuster, Olney Foundry Co., Philadelphia, and third prize was awarded No. 75, made by Antillo Rocchi, Cresson-Morris Co., Philadelphia. The judges in this contest were J. F. Murphy, University of Pennsylvania, Philadelphia; B. D. Fuller, Whitehead Brothers Co., Cleveland, and Pat Dwyer, *Foundry*.

Officers of the Purchasing Agents' Association

At the thirteenth annual convention of the National Association of Purchasing Agents held at Kansas City, officers were elected as follows:

President, A. M. Bowman, general purchasing agent Humble Oil & Refining Co., Houston, Tex.

Vice-presidents: Leonard S. Leavy, purchaser of supplies, San Francisco; C. F. McAuliff, Texas Electric Railway, Dallas; J. R. Whitehead, Fairbanks, Morse & Co., Chicago; C. R. Ramage, Diamond Chain & Mfg. Co., Indianapolis; Christie T. Clark, Rolph-Clark-Stone, Ltd., Toronto; H. R. Cranford, Toledo Edison Co., Toledo, Ohio; W. M. Kerrick, Mengel Co., Louisville; T. W. Harris, Jr., E. I. du Pont de Nemours & Co., Wilmington; Paul R. Brennan, Stafford Co., Readville, Mass., and Lewis A. Jones, New York Power & Light Corporation, Albany, N. Y.

Uniformity in Duplex Steel

Quality Product Obtained by Controlling the Temperature of the Steel Bath and Fluidity of the Slag Just Before Molten Pig Iron Is Charged

BY FOLKE W. SUNDBLAD*

DUPLEXING has been given the least scientific attention of all steel-making processes, probably because the grade of steel that has been made in this way has satisfactorily filled its purpose. Keener competition, with subsequent demands for better quality, has forced steel makers to give the matter greater attention.

The advantage of the duplex process has been frequently mentioned, and is the saving in time, as it requires from 3 to 4 hr. to produce 200 tons of steel from a single furnace which can make only one-fifth as much using a cold charge. A poorer grade of pig iron can also be converted into a higher grade of steel at this rapid rate.

The disadvantages are the double conversion and handling costs; the decrease in yield, due to the increased oxidation and mechanical losses; and the variation in quality of the different heats.

While the duplex process can be worked in different ways, one common American practice is to pour enough full-blown metal into a tilting basic open-hearth furnace to be able to tap out about 200 tons of finished steel and still have 50 or 60 tons left in the furnace. When the required amount of blown metal is poured and enough scale and lime have been charged and melted to make a highly basic and oxidizing slag, a so-called "jigger" of raw basic iron is added from a cupola or mixer. The weight of the jigger depends upon the desired carbon content in the finished steel.

When this iron is introduced, a strong boiling and heat evolution takes place, due to reaction between iron oxide in the scale and carbon in the pig iron. Carbon monoxide is formed and passes up through the metal and slag, causing the charge to boil and foam, and thus forces the slag to overflow through cinder notches. While the bath is violently stirred the phosphorus in the metal is also eliminated and joins with the lime slag, much of which is ejected into the cinder boxes.

After this reaction, a test is generally sent to the laboratory for analysis, and, if the return is satisfactory and the temperature correct, the heat is tapped.

On the surface it seems a very simple matter from a practical standpoint to make a duplex heat. In reality each charge contains unstable conditions which influence the quality of the product. Consequently the manufacture of a duplex heat relatively free from gases is a rather complicated proposition.

The factors which vary for each charge (or "fill-up") are the temperature and the chemical composition of the blown metal. The temperature depends primarily upon the silicon in the converter charge. If the blown metal is too cold, it cannot be helped. If too hot, it can be cooled by judicious addition of scrap into the vessel.

If the temperature of the molten bath in the open-hearth furnace is too high at the time the iron is added, too wild a reaction, an uncontrollable foaming slag and a subsequent carbonless bath will result. While carbon can be added in the ladle, the metal will probably be too high in phosphorus, since phosphorus is eliminated best when carbon is present.

On the other hand, too low a bath temperature will delay the reaction, sometimes 8 to 10 min., but then it suddenly starts, and with such a violent boil that even a thin slag will be whipped into one too thick in a few seconds. This prevents the slag from overflowing, and such a heat is liable to be high both in phosphorus and sulphur.

From these considerations it is seen that the temperature of the bath at the time the jigger is added should be properly controlled.

Variable chemical composition in the blown metal is also important, since the furnace operator must adjust the nature and the fluidity of the slag to take care of the impurities to be eliminated. Fluidity of the slag depends upon the furnace temperature, and its content of basic and oxidizing agents.

Temperature and fluidity are directly proportional to each other; increase the temperature and fluidity also increases.

If the sulphur in the blown metal is above 0.06 per cent, one practice calls for adding manganese to the metal remaining in the furnace after pouring, but before filling up. Otherwise the fastest way to decrease the sulphur is to run the furnace with an extremely basic and oxidizing slag together with a very oxidizing flame. These conditions should prevail throughout the filling-up stage, except during the last few minutes just before the iron is added, when the flame is lowered somewhat, allowing the relatively thin slag to cool a little. This is done to avoid unnecessary foaming of the slag when the iron is introduced, at which time a full flame is again turned on. By producing a succession of reactions of moderate intensity, it is possible to run off quantities of slag rich in sulphur.

The proper way to add iron to a bath of average chemical composition, however, is to give it a sufficient amount to produce a reaction that raises the slag to overflowing without tilting the furnace much. When the bath is settled again, a second amount may be introduced, producing not quite so strong a boil. After this one a final jigger can be added to raise the carbon content of the bath, producing only a mild boil. The metal should then be sufficiently high in carbon so that no additional iron is needed before the preliminary test is reported, and in that way the heat is given proper time to settle.

To insure greater uniformity of the finished product it is necessary to find a point in the operation that can be made stable for all heats. This is possible if we control the temperature of the bath and the nature of the slag. In other words, if we can tell in advance what kind of reaction we are going to have, the problem is solved.

From a practical standpoint it is possible to regulate the operating conditions so that, by the time all the blown metal is poured into the furnace, the slag has a certain fluidity and the bath a certain temperature. It is thus possible to make this stage in the operation a stable point for all heats. In practice this depends a great deal upon the fuel. Tar, oil or producer gas are undoubtedly best. Coke oven gas in combination with any of these would make it much more difficult, if not impossible. Due to its lightness this latter gas has the tendency to raise the flame, and, when used in a duplex furnace with a bath of a big area, the result is too great a difference in the absorption of heat at the incoming and outgoing ends. In order to prevent such a flame from raising toward the roof, more air and steam must be used than otherwise; thus the operator is handicapped if conditions call for a less oxidizing flame.

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*Woodlawn, Pa

Available literature covering this process, while mentioning the variations encountered in operation, makes no attempt to state a cure. Some operators are satisfied that the working of a duplex heat and the subsequent result are not subject to scientific control but are solely dependent on their practical experience. Valuable results would undoubtedly be gained by some research work aiming to find a working relationship between different slags and the intensity of the reaction. It would then be possible, by taking a slag test immediately before the iron is introduced, to determine from its color and density of structure when the "stable point," as defined above, has been reached and the time is ripe for adding the molten pig iron.

Low-Manganese Plates for Shipbuilding Save 10 Per Cent

Lloyd's Register Approves "D-Quality" High-Tensile Steel Used By British Navy for All Important Hull Members

BY SIR WILLIAM J. BERRY*

THE first ships wholly of steel for the Royal Navy were 18-knot despatch vessels ordered in 1875, of 3730 tons displacement, and were built of steel produced by the open-hearth process. It was found that mild ductile steel of the kind required for shipbuilding purposes was produced with much greater uniformity by the open-hearth than by the other methods, and it was this process which, in the end, eclipsed all its rivals, as far as the shipbuilding supplies were concerned. In 1877 Lloyd's formally sanctioned the use of mild steel for mercantile vessels, and issued the standard tests for steel.

Mild steel has held almost undisputed sway for the last 40 years for shipbuilding purposes, and it is worthy of note that the standards adopted by the Admiralty and Lloyd's for mild steel have remained unaltered for that period. Ever since it became possible to compute with some degree of accuracy the stresses to which ship structures were subjected in service, it has been the aim to keep such stresses within what might be loosely termed the elastic range. The assumption had usually been in design work that an elastic limit of about half the ultimate strength could safely be taken, notwithstanding the fact that the figure was seldom determined. The attached table shows that the true limit of proportionality of mild steel is far less than ordinarily assumed.

Use 1.25 Per Cent Manganese Steel for High Strength

In the case of commercial structural steels as ordinarily produced, the proportional range of elasticity is extremely variable, and might almost be said to be an accidental property of the steel; but this feature is subject to control if, for a specific purpose, a definite proportional limit is desired. This point was investigated with great thoroughness at the time the Admiralty was drawing up the specifications for the steel for some of the recent warships. With the help of some of the foremost steelmakers in the country, a steel has been evolved for Admiralty use (now widely known as D quality), in which a proportional limit of 38,000 to 45,000 lb. per sq. in. is associated with an ultimate strength of 83,000 to 96,000 lb., without sacrificing to any appreciable extent the ability of the steel to withstand ordinary manipulative treatment in a shipyard. The tests actually specified are: (*a*) A minimum proportional limit of 38,000 lb. per sq. in.; (*b*) a minimum elongation of 17 per cent on 8 in.; (*c*) a bend through 180 deg. around a curve whose radius is one and one-half times the thickness of the specimen tested.

All these requirements are regularly exceeded in supplies obtained by the Admiralty under its contracts. To secure such results great care has to be paid in the first place to chemical composition, and in the second place to the choice and control of the finishing temperature at the rolls. As regards chemical composition, advantage is taken of the beneficial effect of increased percentages of manganese, in elevating the proportional range without detracting from ductility. A fairly representative composition would be carbon 0.33 per cent, manganese 1.1 to 1.4, silicon 0.12, sulphur and phosphorus being kept to about 0.03 or 0.04 per cent.

The temperature of finishing the rolling is all-important, as it enables a normalizing effect to be obtained without actually going through the procedure of a separate treatment. For steel of the composition given, a temperature of 830 deg. to 860 deg. C. (or rather above the critical range) is the one to be aimed at.

Rapid Method of Determining Proportional Limit

A word should be added as to the method stipulated for recording the proportional limit of elasticity. To do this with scientific precision would necessitate plotting a curve for each specimen tested, and locating the particular point at which the load-extension curve departed from the straight line. Obviously this is out of the question where thousands of tons of steel are passing under inspection at a rapid rate in the early stages of construction of a ship. After hundreds of specimens had been dealt with under extensometer test in the preliminary investigations mentioned, a simple and expeditious system was evolved which provided all the relevant information. The Ewing extensometer was the instrument and this registered with fair accuracy to 1/50,000th of an inch. To insure absence of slipping of the grips when the lower reading was taken with an ordinary commercial test bar, a load of 4500 lb. per sq. in. was first put on, and a reading taken; the load was then gradually increased to 38,000 lb. per sq. in., and a second reading taken. The load was then reduced to 4500 lb. per sq. in., and a third reading recorded. To meet the specification this final figure was not to exceed the original reading by more than 0.0004 in. This system, which is now in daily use at many of the largest steel works in the country, has given complete satisfaction to both the makers and the purchasers.

In 1925, Lloyd's issued a memorandum on the subject of "Special Quality Steel for Merchant Shipbuilding," sanctioning the use of steels similar in character to that adopted by the Admiralty. Another specification of a similar character is followed by Alfred Holt & Co. In both these cases, the elongation and bend tests are the same as for mild steel. The method of measuring the proportional limit follows in every particular that laid down by the Admiralty for D-quality steel. It is interesting to note that these new types of steel are also being adopted for merchant shipbuilding on the Continent.

D-Quality Steel Fabricated by Ordinary Methods and Equipment

While D-quality steel is of such great value for the pure strength girder in ships, it must not be supposed that the modern warship is wholly of this steel. For minor and partitional bulkheads, for the ends of a vessel where the bending-stresses are small, for unimportant flats and decks and for deck structures, the cheaper mild steel still fills its particular niche. In small vessels also, where longitudinal stresses are of little importance, the initial and subsequent cost of using the higher quality of steel could not be justified. It must also be remembered that steels of the types described suffer to some slight extent from the defects of their special qualities. Ease or difficulty in flanging and bevelling is dependent entirely on the low or high value of the yield point. Under the shearing, punching, and drilling machine, one cannot expect quite the same ease of operation as with mild steel. Owing also to the higher carbon and manganese content, heating and flame cutting, now so common in shipbuilding, have to be carried out with somewhat more circumspection. It is surprising, however, how quickly the building employees adapt themselves to the slightly modified materials and conditions, and, as far as the Admiralty is concerned, it is exceedingly rarely that any case is reported of failure in working.

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*An "Introductory Note" read before the Institution of Civil Engineers, London, June 6.

Discussion

In the discussion of this paper it was brought out that the first D-steel was normalized, but experience showed that with the proper attention to finishing temperatures the ductility and elastic limits were higher than the specified value. Such high-tensile steel is now used for all important parts of British warships, and no defects have developed in the vessels during service. Holt & Co. have built a commercial ship, 50 per cent of the structure being made of high-tensile steel, with a saving in weight of 10 per cent. A further 4 per cent saving is anticipated in future ships. One speaker was of the opinion that heat treatment would equalize the carbon content and improve transverse and longitudinal uniformity. He also felt that heat-treated mild steel would be less subject to brittleness than the high-carbon steel required. However, in the navy yards no trouble has been experienced with brittleness. Sir William Berry said that no studies of the fatigue properties have been made, because the alternating stresses in ship hulls are very slow, and he has never seen a fatigue failure in service.

Physical Properties of Shipbuilding Steels

Steel	Ultimate Strength lb. per sq. in.	Yield Point, lb. per sq. in.	Limit of Proportionality, lb. per sq. in.
"D"	83,000 to 96,000	56,000	38,000 minimum 45,000 average
"HHT"	83,000 to 96.000	About 50,000	.....
"Lloyds" (new)	74,000 to 85,000	.....	34,000
"HT"	74,000 to 85,000	45,000	.....
"Holts"	65,000 to 76,000	.....	34,000
Mild steel, old Liverpool Register	63,000 to 72,000	Average about 18,000	
Mild steel, old Admiralty	58,000 to 67,000		
Mild steel, old Lloyds Register	63,000 to 72,000		

What to Require in Foundry Coke

Physical Tests Held More Important Than Mere Chemical Qualifications—Foundrymen Discuss Coke Specifications

PRESENTING at the American Foundrymen's Convention at Philadelphia a review of the present status of coke specifications, W. A. Selvig, United States Bureau of Mines, Pittsburgh, and secretary of the committee on coke specifications of the American Society for Testing Materials, mentioned four items which have to be watched carefully. These are: (1) proper sampling; (2) chemical analysis, particularly with regard to sulphur and as to sulphur in the ash; (3) physical tests, with discrimination between what is needed and what is not needed; (4) behavior of the coke in service tests, particularly where it has to be handled several times.

These matters were taken up in the 1906 report of the coke committee of the A. S. T. M. Little has been done to amplify the study since that time, but the 1927 Book of Standards of the society contains sampling standards.

Under present sampling practice about 1 cu. ft. of coke is picked off the surface of each carload or two, by breaking off, from various locations all over the car, pieces about the size of a walnut. As a matter of fact, good sampling would mean much more than 1 cu. ft. and much more than a surface picking. Practical conditions, however, make this arrangement acceptable. Generally speaking, the volatile matter of the coke should not exceed 2 per cent; the fixed carbon should be at least 86 per cent; ash should be 12 per cent or less and sulphur not over 1 per cent.

Several specifications for coke, put together by various organizations for various purposes, differ markedly from the above. The maximum volatile matter varies from 1 to 3 per cent; carbon, from 85.8 to 87 per cent; ash from 10 to 12 per cent; sulphur has a maximum from 0.8 to 1.3 per cent and phosphorus has a maximum from 0.25 to 0.5 per cent. Moisture is variously limited from 0.5 up to 3 per cent.

It was pointed out that the by-product process has rendered available for coke production coals which previously had been considered unsuitable.

Physical tests must be correlated with the properties required under use. Porosity may vary from 40 to 60 per cent, with an average of 50. The apparent specific gravity should never be less than 0.8 and may go up to 1.5. The corresponding true specific gravity will lie between 0.8 and 2.1. As to the shatter test, a 50-lb. sample is dropped four times from a height of 6 ft. on a cast iron plate and the breakage determined. Under this condition from 44 to 77 per cent of the coke may remain on a 2-in. screen. One specification requires that at least 70 per cent stay on the screen. Right here a note of warning was thrown in, as to precise definitions in connection with all of these physical matters.

In the tumbler test, a 25-lb. lot of coke between 2 in. and 3 in. is revolved at 25 r.p.m. for 1400 revolutions in a drum. The breaking-up effect of this treatment is determined by passing the resultant coke over screens of varying mesh. Tests show that from 70.6 to 77.5 per cent will remain on a ¼-in. screen. The speaker believed that this test had no value not already taken care of by the shatter test.

The coke committee of the American Society for Testing Materials takes the view that the present coke standards are old and require modification to bring them up to date.

In the discussion of this report, which was read by James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, one speaker advocated buying coke by brand and leaving its qualities up to the coke manufacturer. He expressed the opinion that this man is as jealous of the reputation of his brand as the foundryman is anxious to secure the coke he wants. He raised the question of fusible ash, which might have a bad effect through cutting the cupola lining.

Practice of Large Users

Combustion tests made by the General Motors Corporation were referred to by Robert H. Wise, metallurgist Semet-Solvay Co., Syracuse, N. Y. This test shows the rate of burning of different cokes in the cupola. Specifications made from it require that 1 gram of a sample burn in 4 min. or less. It is the practice of the coke committee of the United States Steel Corporation to keep the character of the ash uniform at

(*Concluded on page* 1862)

How to Analyze an Export Market

Careful Survey of Trade Peculiarities Must Precede Sales Campaign in a Foreign Country—Export Associations and Commerce Department Help

BY C. M. PETER*

WHEN the manufacturer considers selling his goods abroad, he must decide, first of all, whether he really desires to do exporting on a permanent basis. "Shall I stay in or shall I stay out?" is the vital, preparatory conclusion that he should arrive at. Spasmodic attempts at anything do not bring results. If a manufacturer has an exportable product, as time goes on he will regret possibly that he did not seize the commercial opportunity that lies beyond our own shores.

When a selection has been made of a market considered likely to be suitable for the sale of your product, an analysis of that market is in order. To the large firm with traveling representatives covering the export field this is comparatively simple. A brief preliminary investigation will determine the advisability of sending a man to the market in question to work a survey and establish distributers.

This procedure is, of course, the ideal way to secure an analysis of the market as regards your particular product. As an example: One of our representatives is just returning from an extended trip through the Far East, analyzing markets and establishing distributers. Another representative is encircling South America on a similar mission. We observe nothing complex in this, we simply determined the markets we felt warranted a personal analysis, prepared our men and sent them out. They have amply fulfilled our expectations.

Fundamental Considerations in Analyzing a Foreign Market

In analyzing a new or untried market, consideration and careful scrutiny should be given the following fundamentals, which will determine the course to be followed in exploiting the market and the possible value to the manufacturer to his particular line:

Size.—An idea of the size of the country in question is an essential. A comparison of the area with a State or number of States of the United States of the same approximate area will give a fixed idea of size which will permit a more intelligent opinion of what can be expected from the country in question.

Language and Currency.—The commercial language used must be determined; also whether or not English is permitted or commonly used in business correspondence. A knowledge of the currency used and its stability is essential.

Population and Purchasing Power.—Population, while unquestionably a factor, will be found in many countries to be overshadowed by the question of the purchasing power of the individual. For instance, a motor car manufacturer in considering the possibilities in Mexico, Russia or China, obviously could not use the usual percentage of expectancy of so many cars per hundred of population. By the same token the purchasing power of the individual for your product must be carefully considered.

Principal Cities and Ports.—A study of the map or atlases of the principal cities and ports will aid in determining the most accessible and suitable points of attack on a new market.

Geographical and Climatic Conditions and Seasons.—A survey of the geographical and climatic conditions is very necessary, as in some countries it will be found that all principal ports on the coast are separated from interior cities by mountain ranges, making very difficult the transportation of heavy or bulky products. In a like manner, it is frequently found that sea level ports and cities have a climate which may provide an excellent market for some articles and be barren ground to others, while the interior or mountainous country will be the reverse. Seasons in foreign markets vary widely from our own and should be studied and considered in order to avoid writing customers complaining of poor business when it is their winter season and our summer.

Industries.—A survey of the principal industries of the country can be readily made, and is, of course, a determining factor as to what business you can expect from that market.

Local Competition.—An investigation should be made as to whether or not a competitive product is manufactured locally and, if so, its quality and price. Consideration should also be given as to quality and price of other American or foreign-made products with which you will have to compete in this market. In considering local or foreign competition, the thought should be kept in mind that American goods are usually high-priced, especially so in foreign markets, but they are also of high quality, and regardless of all things else there is always a market for quality merchandise. This is clearly demonstrated by the quantities of high-priced quality machinery and factory equipment being exported regularly to England, France, Germany and Italy, where in most cases a heavy duty is added, and the competition is with a local product with a much lower list price.

Trade Barriers.—Trade barriers are in effect in some countries and operate adversely to the import of certain American products. This should not be overlooked if your product is one so affected.

Channels of Distribution and Marketing Methods.—Channels of distribution are very important and merit your careful consideration. These practices vary widely in different markets, and it will be found in most instances better to adapt your product to the channels available and the prevailing customs, rather than attempt to require the market to conform to your ideas and practices or to those in vogue in other countries. In many markets you will have for your consideration large well established firms who import only for their own account and will demand exclusive rights to a large territory. You will also find available in most markets large importing firms or manufacturers' agents who will import your products for their own account and distribute them to various wholesale selling organizations.

Shipping Facilities and Interior Transportation.—Investigation should be made to determine the best and quickest method of transportation to the market under consideration. Your interest should not stop when you have determined that you can properly deliver your goods to the port of entry. In many countries inland transportation is by small boat up rivers, navigable only a portion of the year, or by burro pack trains over difficult mountain ranges. Roads and trucking facilities are also becoming more and more a considerable factor. If your product is heavy or bulky, these questions must all be carefully considered.

Marking and Packing Requirements.—The marking and packing requirements of the market should be investigated, as in many countries this regulation is very rigid and may require special preparation of your container or special printing of your wrapper or labels. Violation of these requirements often results in fines or high duties, or in the case of difficult interior transportation a serious delay or the repacking of an entire shipment.

Customs Regulations and Declarations and Duties.—Customs regulations, declarations and duties should be studied with a view of so preparing your product that it will take the lowest duty. Customs declarations should be made accordingly. A study of this regulation will enable you to determine the approximate landed cost of your product and probable selling price.

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*Export manager, Black & Decker Mfg. Co., Towson, Md. Abstract of address before National Foreign Trade Council at Houston, Tex.

Trademarks and Patents.—Consideration should be given the question of trademarks and patents, particularly so if you are investigating a country given to manufacturing. If, in such a country, trademarks and patents are not or cannot be protected, it will be found difficult to interest desirable distributers, as they will fear that when they have built up a distribution of your product it will be copied by a local manufacturer.

Price Control.—Price control is desirable in any market and can usually be maintained if your original arrangements are made to cover it. Some markets are particularly given to price cutting, which destroys profit and eventually loses the interest of your distributer. Care should be taken to determine this condition when entering a new market.

Advertising.—The subject of advertising should be thoroughly investigated in any market, for sooner or later it is bound to come up. The manufacturer should determine the value of his trade paper advertising in the market; also whether or not local dealers or distributers are accustomed to carry local advertisements, at their own or the manufacturer's expense, whether or not catalogs and literature must be furnished in a language other than English, and whether or not there is an excessive duty on printed and advertising matter. Trade paper advertising is not only essential, but it is helpful in many ways.

Sources of Information for Market Analyses

In considering the sources of information to which you can refer in conducting your market analysis, the following stand out in their respective fields and will yield you valuable information suggestions and assistance: Under export trade associations you have the National Foreign Trade Council, with its services and valuable yearly conventions, where your individual problems can be submitted to authorities on export practices. You will find the American chamber of commerce, located in many foreign countries, in a position to be exceedingly helpful. Membership in such associations as the International Chamber of Commerce, American Manufacturers Export Association and local export managers' clubs will give you contacts and information that will be found very useful. Export credit associations and international banking houses will give you credit and trade information that is very necessary in the handling of export trade.

Export trade papers of today are establishing themselves in a service not to be derived from any other source and invaluable to the exporter who would grow and keep abreast of the times. The use of the exporters' encyclopedias and various atlases will solve many of the everyday intricacies of exporting.

A proper contact with other manufacturers engaged in export, manufacturers' agents, export agents and brokers and forwarding agents, with their long and varied experience will often give you the answer to a most troublesome problem.

Department of Commerce Great Aid in Developing Export Trade

Last, but by no means least, I would call your attention to the various services and functions of the Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington. From our own experience, I would say it is impossible to estimate the value to us of this important department. The Commerce Year Book and the many bulletins and pamphlets published by the department are available to all, and I am sure our export department could not function efficiently without them.

Available to you through the department are the services of approximately 1000 men in Government service in practically every nook and corner of the globe. Many of these men are experts and authorities on promoting American trade. Compiled in the department at Washington are thousands of volumes of trade statistics, and 99 times out of 100 the department will be able to furnish you the information you desire. Branches of the department in charge of competent men are located in many of our principal cities. You will find them most eager to help you, and if you do not care to use their advice you are overlooking the most valuable information you have available.

Rail Extension to Connect Connellsville, Pa., With Pittsburgh District

WASHINGTON, June 26.—The Interstate Commerce Commission last week issued a certificate authorizing the Pittsburgh & West Virginia Railway Co. to construct an extension of its line, to be known as the Connellsville extension, running from a point near Cochran's Mill, Allegheny County, Pa., in a general southeasterly direction through Allegheny, Washington, Westmoreland and Fayette counties to Connellsville, Pa., a distance of about 38 miles. The proposed extension was urged by a number of iron and steel interests in the Pittsburgh district. Its purpose is to secure a substantial additional volume of traffic destined to or originating within the Pittsburgh district for the Pittsburgh & West Virginia. This road extends from Pittsburgh westward about 60 miles to Pittsburgh Junction, Ohio, where it connects with the main line of the Wheeling & Lake Erie Railway, and it also includes the lines of the West Side Belt Railroad in Pittsburgh. Some of the traffic, particularly that to and from eastern destinations, would be furnished by industries along the Monongahela River from Clairton, Pa., to Pittsburgh. It is also proposed to secure a share of the ore traffic from Lake Erie to the Monongahela Valley by way of the Wheeling & Lake Erie, as well as new traffic at points farther south on the Monongahela.

The proposed line will cross the Monongahela at Charleroi about midway between Monessen and Allenport, Pa., where the plants of the Pittsburgh Steel Co. are located. A plant of the American Steel & Wire Co. is located at Donora, Pa., on the west bank of the Monongahela about five miles from Charleroi. About 60,000 carloads of freight are received or forwarded at the Monessen plant during the year and about 11,000 at Allenport. The Donora plant, the commission said, is somewhat smaller than that at Monessen. Representatives of the Pittsburgh Steel Co., in supporting the application, announced the intention of the company to extend the lines of the Monessen Southwestern, its plant railroad, to connect the plants at Monessen and Allenport with the proposed line at or near Charleroi. It is proposed, the decision said, to place the Monessen Southwestern in position to perform as a common carrier a part of the through transportation to and from the industries of the Pittsburgh Steel Co. and to participate in the through rates on the traffic. It is also proposed that the line of the Donora Southern, a plant railroad controlled by the Union Steel Co., Donora, Pa., which connects now only with the Pennsylvania, shall be extended across the Monongahela to connect with the Monessen Southwestern, thus effecting connection with the proposed extension and diverting a portion of the traffic of the Donora plant to the new line. The cost of the new line, according to the application, will be $12,801,619.

The volume of freight traffic handled by the Class I railroads in the first four months of 1928 amounted to 147,296,210,000 net ton miles, according to the Bureau of Railway Economics, Washington. This was a decrease of 8,113,006,000 net ton miles, or 5.2 per cent, compared with the corresponding period last year. Railroads in the Eastern district for the four months period reported a decrease of 10.1 per cent, while the Southern district reported a decrease of 7.7 per cent. The Western district reported an increase of 3.4 per cent.

Refine Chrome Steel at Low Heat

Low Temperature Essential in Basic Open-Hearth Furnace If Chromium-Bearing Scrap Is Used and If High Ballistic Tests Must Be Met

BY NICOLAUS N. MENSHIH*

NEARLY all open-hearth metallurgists with whom the writer has discussed the question believe that chromium steel must be made synthetically (that is, without scrap, pig iron or ore containing chromium), if the highest quality is required. In the writer's opinion the deleterious effect of chromium, when present from the beginning of the heat, may be mitigated considerably if certain properties of the element and its slag-forming oxides are known and provided for.

When the author was employed at the basic open-hearth plant of the Nicopol Marioupol Works in South Russia from 1912 to 1916, the production of Krupp armor was begun. Its preferred analysis was:

	Per Cent
Carbon	0.35
Manganese	0.35
Silicon	0.15 or less
Phosphorus	less than 0.04
Sulphur	less than 0.04
Nickel	3.60
Chromium	1.80

It is obvious that when a heat is made from metal containing no alloying elements it is necessary to add enough ferrochrome before tapping to place the required amount in the ingots, plus enough to allow for the inevitable oxidation and slagging (about 20 per cent). But if the original charge contains chromium, this element is never oxidized and slagged completely during the working of the heat. Theoretically it should then be only necessary to add enough ferrochrome to bring the residual chromium up to the percentage required by specification. It would seem that a considerable quantity of ferroalloy might be saved in this way.

Residual Chromium Depends upon Furnace Practice

Additions must be made after laboratory returns on test ingots, if the analysis of the finished steel is to be held to reasonably close limits. The writer's experience convinces him that the amount of chromium remaining in the refined steel from the scrap is independent of the amount originally contained in the scrap, but depends entirely on the method of melting and the temperature of the bath reached during the refining period.

To prove the first part of this statement data from a long list of heats are available, showing the chromium and carbon in the charge and in the bath just before additions. Many other analyses show intermediate values; it can be seen that the relation between residual chromium and original chromium varies from 70 per cent to 19 per cent, independently of the carbon at the end of the refining period.

Typical Analysis of Cool Heats

Chromium in Charge	Chromium Before Additions	Carbon Before Additions
Per Cent	Per Cent	Per Cent
0.56	0.36	0.11
1.11	0.32	0.11
1.17	0.22	0.09
0.49	0.30	0.09
1.17	0.23	0.07
0.50	0.34	0.07
1.17	0.24	0.06
0.87	0.31	0.06
0.33	0.24	0.20

All the above mentioned heats were made strictly in accordance with instructions from the Krupp Works. They were by no means hot during the refining period. A soft steel bar, 1 in. square, inserted into the bath just before final additions were made, melted in 32 to 35 sec. A typical slag analysis at this same moment was as follows:

SiO_2	Al_2O_3	FeO	MnO	CaO	MgO	Cr_2O_3
22.8%	8.9%	13.1%	3.9%	36.4%	8.0%	5.0%

Heats made in the above manner produced armor all of which passed the Government's test successfully.

After this practice was firmly established, a new superintendent was placed in charge, and he insisted that all steel (alloy as well as plain carbon) be made in much hotter furnaces and at a faster rate. This change was not made in the armor plant at once, as the special open-hearth furnaces built according to Krupp's design did not permit a much higher temperature without endangering the ports. The new superintendent ordered these furnaces to be remodeled.

When this was done, production of chrome-nickel steel was resumed, and the bath temperature was much higher—the inserted rod melted in 25 to 27 (and even 23) sec. It was among my duties to calculate the alloy additions, and I noted immediately that the amount of chromium remaining in these hot heats was strikingly increased.

Typical Analyses of Hot Heats

Chromium in Charge	Chromium Before Additions	Carbon Before Additions
Per Cent	Per Cent	Per Cent
0.60	0.41	0.11
0.73	0.57	0.11
1.07	0.60	0.09
0.68	0.61	0.09
0.70	0.58	0.08
0.70	0.67	0.14
1.05	0.60	0.21
0.82	0.63	0.21

Slags on these heats were more basic, lime being up and iron and chromium down. A typical analysis is:

SiO_2	Al_2O_3	FeO	MnO	CaO	MgO	Cr_2O_3
24.7%	4.8%	9.7%	2.5%	41.9%	9.6%	3.1%

But the most important change was the fact that 32 of the 12-in. plates made from these heats could not pass final tests, and were rejected by the Government's inspectors. It was suspected that the changed steel-making practice was responsible, and consequently two heats were made with high temperatures during the refining period, but considerably lowered for the last 30 min. before making the additions. This change did not lower the amount of residual chromium, nor did it improve the quality of the hardened armor. Analyses of steel and slag at various times during one of these heats (which had 0.88 per cent chromium in the cold charge) were as follows:

	Charge Just Melted	Middle of Refining Period	Just Before Additions
Metal	Per Cent	Per Cent	Per Cent
Chromium	0.39	0.44	0.66
Carbon	0.74	0.57	0.17
Slag			
SiO_2	24.0	20.1	29.7
FeO	9.6	11.3	8.5
MnO	6.9	5.1	5.2
CaO	35.2	39.9	43.3
Cr_2O_3	7.3	6.5	2.3

Because the writer had opposed changing the furnace construction and the higher temperature melting, he was given authority to make several heats to demonstrate the correctness of his views. During these trial runs special attention was given to the temperature of the bath at all times, and the ratio between gas and air during the melting period. Data on the first four heats are assembled in Table I.

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*Houston Avenue and Ninety-first Street, South Chicago, Ill.

Heat A was quite hot during all the refining period, but not so high as the superintendent would have liked.

In heat B the temperature was kept relatively low until sample 7 was taken, whereupon the heat was increased.

Heat C started off as B, but the temperature was raised after sample 5, although not so much as in B.

In heat D the bath was relatively cool for the entire heat. Slag analyses during D were as follows:

	SiO_2 Per Cent	FeO Per Cent	MnO Per Cent	CaO Per Cent
Sample 1.......	27.7	10.4	6.8	31.6
Sample 3.......	22.9	14.0	6.2	32.2
Sample 8.......	22.4	12.0	6.2	36.4

It is plainly seen that high temperatures in the refining periods are associated with high residual chromium in the metal; further, that a bath with low chromium, melted relatively cold, picked up chromium from the slag as soon as the temperature was raised. Finally that working the entire heat at a low temperature gave a low residual chromium in the metal, unchanged for the most of the refining period, and a finishing slag almost exactly like those produced in the Krupp basic heats previous to the change. The demonstration was so convincing that Krupp's method was restored completely, and the resulting plates passed test successfully.

Soluble Chromium Oxide May Be Responsible

All above mentioned facts indicate that

1. There exists a connection between the amount of residual chromium (left in steel from that contained in scrap) and the temperature reached during the refining period in a basic open-hearth furnace.

2. If this critically high temperature is once reached, any subsequent cooling cannot reduce the amount of chromium in steel.

3. If a high proportion of chromium is left in the steel from that contained in the charge, the quality of steel is affected very seriously.

4. That the amount of chromium in the sample ingot taken before additions are made can serve as a perfect control.

Another interesting detail was noticed by the writer in connection with chromium left in steel from scrap. If the casting of an ingot were interrupted for some seconds, due to some accident with the stopper, a very deep horizontal crack developed, corresponding to this interruption, in steel with high residual chromium, and the ingot would break completely off at this plane when going through the first pass at the blooming mill. Such an interruption was not so dangerous for steel with a low amount of chromium left from the charge, even though the analysis of the finished steel was the same.

Table I—Data from Experimental Heats

Sample	A		B		C		D	
	Cr.	C	Cr.	C	Cr.	C	Cr.	C
Cold charge......	0.90	...	0.81	...	0.90	...	0.81	...
Just after melting	0.30	0.56	0.31	0.55	0.38	0.72	0.41	0.78
No. 2........	0.36	0.43	0.23	0.48	0.25	0.58	0.30	0.73
No. 3........	0.39	0.38	0.21	0.44	0.22	0.39	0.23	0.54
No. 4........	0.39	0.29	0.20	0.40	0.20	0.34	0.19	0.37
No. 5........	0.40	0.24	0.20	0.35	0.22	0.27	0.17	0.27
No. 6........	0.46	0.20	0.20	0.27	0.25	0.24	0.18	0.18
No. 7........	0.44	0.19	0.21	0.18	0.24	0.19	0.19	0.16
Before additions..	0.43	0.13	0.30	0.14	0.28	0.16	0.21	0.11

The only explanation of all these facts that the writer can give is that one of the chromium oxides is easily dissolved in the steel at a relatively high temperature. The amount of chromium found by analysis included this chromium. This oxide once dissolved in steel cannot readily be reduced or converted into another oxide which is practically insoluble in steel but soluble in the slag. Once in the steel this harmful oxide stays there.

Another Diesel-Electric Towboat for Use on the Warrior River

The Tennessee Coal, Iron & Railroad Co. has ordered a second Diesel-electric towboat for use on the Warrior River. The first, ordered last March, will be placed in service some time this summer, and the second is expected to be completed by early fall. Both boats are of the tunnel-stern, twin-screw type. They are being built by the American Bridge Co., and will be outfitted by the Carnegie Steel Co., while the electric equipment will be furnished by the General Electric Co.

The Tennessee company went to the Diesel-electric drive for the new boats to obtain higher efficiency and the better maneuvering qualities necessary on the Warrior River, which is a tortuous one, and has so many sharp bends that the length of tows is limited to seven barges.

With the exception of the galley and the heating facilities, the towboats will be completely electrically equipped. The power plant in each boat consists of two 550-hp. Diesel engines, made by the New London Ship & Engine Co., which are direct-connected to two 335-kw. 250-volt 250 r.p.m., d.c. generators. Each propeller will be driven by a double motor rated 400 hp. at 140 r.p.m., 250 volts, shunt wound.

Power for auxiliaries and lighting, as well as for excitation for the main generators and propelling motors, will be furnished by two 40-kw. 120-volt compound-wound d.c. auxiliary generators. These will be driven by the main engines and will be mounted directly on the shaft extensions of the main generators. Variable voltage control will be used, arranged for operation either from the pilot house or the engine room.

Screw Thread Commission and Gage Committee Visit Rochester

The National Screw Thread Commission and the American Gage Design Committee met in Rochester, N. Y., on June 21 and 22 and visits were made at the plants of the Taylor Instrument Companies, the Bausch & Lomb Optical Co. and the Eastman Kodak Co. The group was headed by Dr. George K. Burgess, director of the Bureau of Standards, Washington.

At a dinner held on June 21, James Ely, vice-president of the Taylor companies, presided and Dean Dexter Kimball of the college of engineering of Cornell University was the principal speaker.

Meeting of the Institute of Metals in Liverpool

The Liverpool, England, meeting of the Institute of Metals, to be held Sept. 4 to 7, is proving attractive. Already over 200 members—including many from overseas—have indicated their intention of taking part in the meeting. The papers to be presented include a series dealing with the die-casting of alloys, as well as the eighth report of the corrosion research committee. A "full-dress" discussion of corrosion problems will be a feature. It is particularly appropriate that this discussion should take place in a maritime center such as Liverpool. On the social side the gathering promises to be a pleasant one; a series of receptions, visits to places of interest and other functions are being arranged by the local reception committee.

Youngstown Seeks River Outlet

Briefs Filed in Application for Construction of Line to Connect Valley District With Ohio River—Trunk Lines Oppose "Duplication of Existing Facilities"

WASHINGTON, June 26.—Briefs were filed yesterday with the Interstate Commerce Commission in connection with the application of the Pittsburgh, Lisbon & Western Railroad to construct an extension which would connect the Youngstown district with the Ohio River and the application of the Montour Railroad to acquire control of the P. L. & W. by purchase of the latter's capital stock. Both lines are controlled by the Pittsburgh Coal Co.

In arguing for the proposed extension the brief of the applicant contended that the new line will be in the public interest and will serve the public convenience and necessity, "especially as it will extend the benefits of the Government's waterway system to important inland territory now unable to utilize that system and suffering severely by reason of that fact." The trunk line carriers, including the Pennsylvania, Pittsburgh & Lake Erie and the Baltimore & Ohio railroads, on the other hand, argued that the line would be a duplication of existing service and is not necessary. The Pittsburgh Coal Co., in its brief, contended that the Pittsburgh district is in need of a new outlet for its coal production and a more competitive basis of rates wherever possible. The inland waterway on the Ohio River system, it was declared, would furnish that outlet.

If construction by the P. L. & W. is authorized, it will consist ultimately of its present east-and-west line between New Galilee, Pa., and Lisbon, Ohio, and a new north-and-south line between the Ohio River on the south and Youngstown and Struthers, Ohio, on the north, by way of Negley and Mill Rock, Ohio, as junctions between the old and new lines. The southern terminus of the new line would be at Smith's Ferry, Pa., on the Ohio River. The bulk of tonnage would consist of coal from western Pennsylvania to the Youngstown district and iron and steel from that district to the Southern and Southwestern markets.

Youngstown Handicapped in Competing with Pittsburgh and Cleveland

The brief of the applicant pointed out that the Youngstown district, as a producer of iron and steel, is in keen competition with manufacturers in the Pittsburgh and Cleveland districts. Pittsburgh, it was declared, enjoys the advantage of river location, while the Cleveland group enjoys the advantage of Lake location. Both, it is pointed out, are in a position to utilize cheap transportation on the Government's inland waterways to a considerable extent, Pittsburgh on its fuel inbound and on a portion of its products outbound and Cleveland on its ore inbound and a portion of its products outbound. Youngstown, however, the brief said, is dependent on rail transportation for all inbound raw materials and all outbound manufactured goods. On inbound raw materials alone, it was stated, Youngstown today is paying $2.07 more per ton of pig iron production and $2.82 to $3.22 more per ton of finished steel production than in 1913. These increases were declared to be much greater than those borne by its Pittsburgh district competitors. A more recent development of river transportation, again to the great detriment of Youngstown, it was maintained, is in the movement of iron and steel articles from the Pittsburgh district down the Ohio and Mississippi rivers, and into the South and Southwest by reshipment. Pittsburgh is thus again enabled to utilize cheap water transportation on products moving, for instance, to the oil fields of the Southwest—products of which Youngstown was for years a prominent source of supply, said the brief. It was declared that Youngstown's inability to utilize the river for this tonnage is a particularly severe handicap just now, due to the fact that rail rates on such Mississippi Valley business were recently considerably increased.

Contend Landlocked Position Has Checked Youngstown's Growth

"It is to conditions such as those just recited that Youngstown attributes its decline as an iron and steel producer—from second to third place in the United States—in recent years," it was urged. "In such a situation the opportunity to utilize the river is vital to Youngstown. It has for years been endeavoring to obtain adjustments of freight rates on inbound raw materials, including the establishment of ex-river rates, that would tend to restore the previous parity with Pittsburgh. It has failed entirely along these lines. It has long sponsored the Lake Erie and Ohio River canal project, but sees no hope of relief in that way for many years to come. But it sees in applicant's proposal herein a measure that promises prompt and substantial relief in the way of lower transportation costs, and accordingly indorses these proposals."

The trunk line carriers have taken the position that they are fully able to transport either all-rail or, if necessary, river-and-rail over river transfer terminals to be located on the Pennsylvania near Beaver, Pa., and on the Pittsburgh & Lake Erie near Monaca, Pa., all coal traffic which the proposed P. L. & W. line expects to handle. The Baltimore & Ohio is not so located as to be enabled to participate in any such river-and-rail routes to Youngstown. The applicant contended that there is no assurance that any such river-and-rail routes would be established by the existing trunk lines and that there would be no greater convenience to the public in such routes than in the river-and-rail route proposed by the P. L. & W. It is pointed out that efforts to get such service for Youngstown have proved futile. The new line, the brief of the applicant said, would divert comparatively little tonnage from existing lines. The argument also was made that Congress by statute has encouraged development of waterways.

Railroads Condemn Move as Indirect Attack on Rate Structure

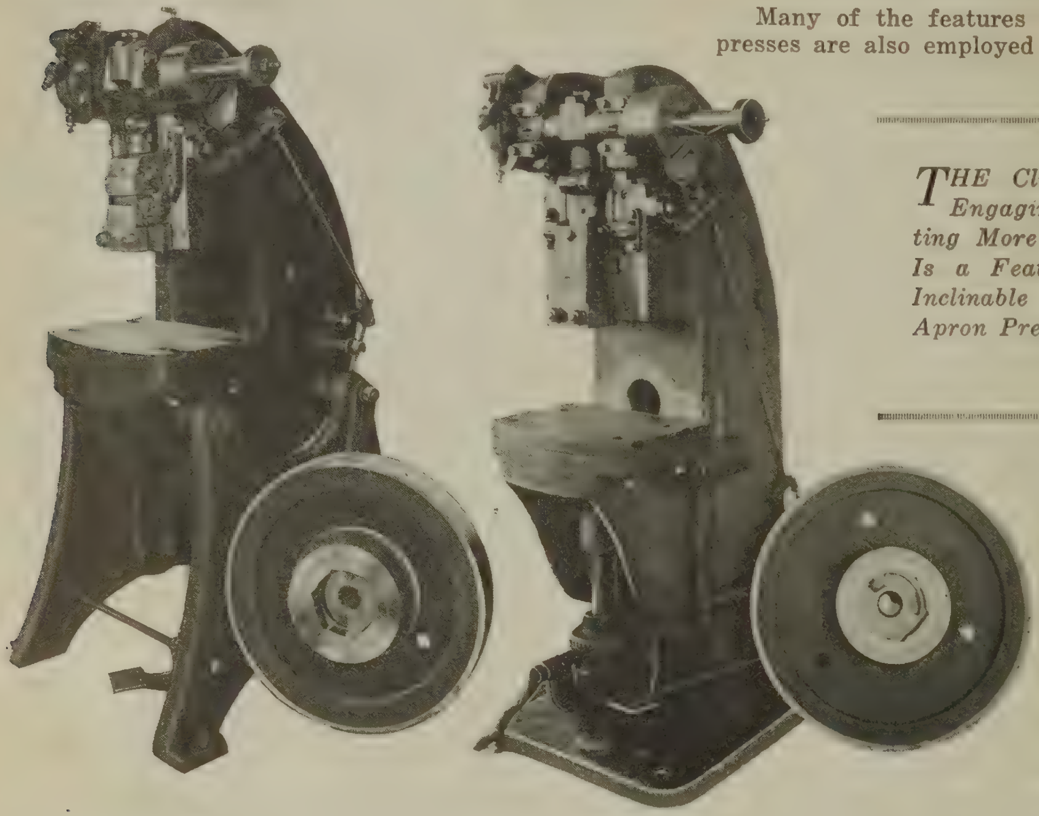
The railroads argued that public interest would not be served by construction of the extension and that it would only be a duplication of existing and adequate transportation facilities and would result in diversion of business by means of excessively low rates "or other artificial devices for the purpose, with the effect of developing one carrier or mode of carriage at the expense and to the detriment of existing carriers or modes of carriages," as stated in the Baltimore & Ohio brief. It was asserted that the Pittsburgh Coal Co. acted not because of a lack of railroad facilities, but because it wants lower rates in the hope that such rates would provide an outlet for its coal. The hope for lower rates is declared to be predicated upon assembling costs which the commission has condemned as a basis for rate making. Knowing that under these circumstances, it was pointed out, the railroads have been unwilling to reduce their rates and that the commission would not order a reduction, the applicant is seeking "by indirection to do what it may not lawfully obtain directly." Even if the existing railroads put in extensions from the Ohio River, it was declared, the new line would be favored by the steel industry in the Youngstown district. In an effort to support this statement the brief referred to testimony of different steel manufacturers. Establishing the new line, it was contended, would disturb the existing rate structure and would increase the burdens of the trunk lines in the execution of any consolidation plan.

NEW LINE OF POWER PRESSES

Open-Back Inclinable, Horn and Apron and Other Types Having Improved Features Made Available by the American Can Co.

OPEN-BACK inclinable, horn and apron, arch, screw and toggle presses, in a range of sizes in each type, have been placed on the market under the trade name of Canco by the Equipment Division of the American Can Co., 120 Broadway, New York. Strength, accuracy and speed, without sacrifice of safety, are general features of the machines, the general arrangement of which may be noted from the accompanying illustrations.

The open-back inclinable presses are available in plain and geared types and in standard and deep-throat styles. The frame of the machine is a semi-steel casting reinforced at vital points, and the crankshaft is of chrome-nickel steel, heat treated. All bearings are scraped in. An outstanding feature is the clutch, which in having six engaging points, permits more rapid operation of the machine, thereby providing increased output. A hardened steel block, actuated by a foot treadle, is arranged to engage one of the six driving surfaces of the clutch. Upon completion of the stroke a positive knock-out functions, but a lock is provided so that continuous operation may be secured when desired. The same mechanism includes a pawl by means of which the press may be turned backward if desired, such as in setting dies. The arrangement is such that when the press is started forward, the pawl, if engaged, is thrown out of engagement automatically. Either of two types of brakes, cam-actuated for presses operated intermittently or treadle release for machines operating continuously, can be provided.



THE Clutch, Having Six Engaging Points, Permitting More Rapid Operation, Is a Feature of Both the Inclinable and Horn and Apron Presses Shown at the Left

Positive knockout, finished surfaces for the application of attachments such as feeds, gages, etc., and the provision of three steps for inclining the frame, as well as inclining attachment, are among other features of the inclinable machines. Gibs and slides are long to assure accurate alinement, and increased die space is provided. Lubrication is by means of the Dot system. An improved punch holder of hardened steel. designed to give better purchase on the punch stem and eliminate marring and scoring, and the use of a webbed flywheel, are other details intended to contribute to the ruggedness, high production and safety of these presses. Tie rods, back gearing and motor drive arrangement are available if required.

Seven sizes of the standard throat flywheel press ranging in weight from 860 to 8413 lb. and six of the standard throat geared press, ranging in weight from 1170 to 9113 lb., complete, are available. The deep-throat plain unit is made in three sizes, from 1855 to 4650 lb. in weight, and the geared press in one size only, weighing 4950 lb. The standard length of stroke for all sizes of both types is 3 in. The maximum length of stroke ranges from 4 to 6 in. for the plain press.

Other specifications for the smallest and largest open-back inclinable press, respectively, with standard throat are as follows: Depth of throat, center of slide to frame, 4 to 11 in.; die space from top of bolster to slide (stroke down, adjustment down) 5¼ to 7½; size of bolster plate, 8 x 13 in. to 23 x 52 in.; and width of opening through the back, 6 to 18 in. Floor space requirements range from 25½ to 23 to 51 x 44 in. and the height from floor to top of flywheel, 66¼ to 100½ in. The flywheel ranges from 22 to 48 in. in diameter, weighs from 200 to 1575 lb. and operates at speeds up to 135 and 80 r.p.m.

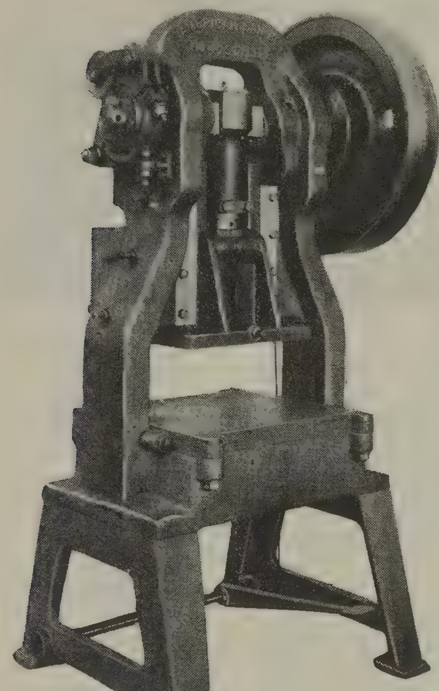
Horn and Apron Press Uses Same Clutch

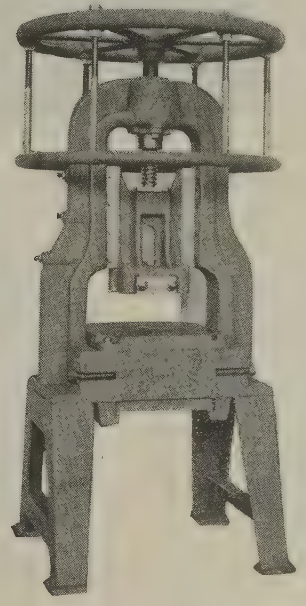
Many of the features of the open-back inclinable presses are also employed in the new horn and apron presses and the arch presses offered by the company.

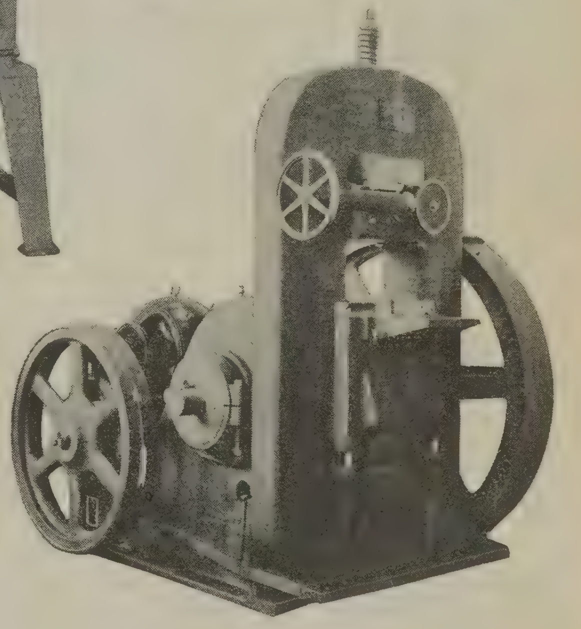
The frame of the horn and apron press is a semi-steel casting, reinforced, and the crankshaft is of chrome-nickel steel, heat treated. The same type of clutch, with six engaging points, is provided and the cam-actuated brake is also offered. The horn hole is large to permit use of horns with sturdy shanks. The punch holder is of hardened steel and is of the same design used on the inclinable machines. The apron is a semi-steel casting, clamped to the column of the press, and is provided with an efficient elevating device. The means of clamping the apron is said to provide a rigid but readily adjustable member. The apron can also be fitted with an anti-friction sliding bolster or table.

Six sizes of the plain style and two of the geared style are available. Specifications of the smallest and largest plain machine are, in part, as follows: Weight, 980 and 3715 lb.; standard length of stroke, 1½ in.; maximum length of stroke, 3½ and 6½ in.; and depth of throat (from center of slide to frame), 4 and 10 in. Horn holes range from 2½ to 5½ in. in diameter. Sizes of bolster at the widest points range from 8 x 13 in. to 18 x 23½ in. Floor space required for the smallest machine is 24 x 20½ in. and for the largest, 40 x 28 in.

The arch presses are intended for large blanking and forming operations. Increased die space is provided and this can be further increased by means of a removable front to the bed, making it adaptable for well type dies, etc. Two sizes of the machine are offered, one of which weighs 4300 lb. and the other 6000 lb. The slide adjustment of both machines is 3 in. Other specifications are: Distance between uprights, 28 and 30 in.; die space from top of bolster plate to face of the slide (stroke down, adjustment up) is 6 and 6⅝ in.; size of bolster plate with removable front, 26 x 27 in. and 28 x 29 in.; and size of bolster plates with solid fronts, 23 x 27 in. and 26 x 29 in. Both the plain and geared presses are available in either straight-leg or inclined-leg types and motor driven. The overall floor space occupied by the presses with straight legs is 40 x 45 in. and 42 x 51½ in. The geared machines, which weigh 4900 and 6700 lb., respectively, occupy floor space of 43 x 59½ and 48 x 70 in.







THE Arch Presses, for Large Blanking and Forming Operations, and the Screw Press, Which Is Adapted for Testing Dies, Also Have Improved Features

The Toggle Press, Below, Is of Compact and Powerful Construction

The screw press, which is adapted for testing dies, is fitted with an auxiliary handwheel as illustrated, which is intended to provide extra weight and also to eliminate the hazard from overhanging bars. Three sizes are available. The maximum stroke of the slide is 7½ and 8 in.; die space 11 and 11½ in. and bolster plate size, 19 x 20 in. to 24 x 27½ in. The distance between uprights is 20 and 28½ in.

Toggle Presses of Compact Design

Compact and sturdy construction is a feature of the company's toggle press, seven sizes of which, capable of exerting pressures from 150 to 1200 tons, have been made available. The main frame of this machine is a solid annealed casting of large section designed to provide rigidity and eliminate spring. The slide of the press is designed with the toggle lever at the bottom and the gearing close to the floor, which construction is emphasized as eliminating top heavy appearance, overcoming vibration and eliminating the necessity of placing the press on a foundation. Having the toggle lever at the bottom, the weight of the slide and the springs in the front of the press are said to take up lost motion so that there is no jar when the die strikes the work. The toggle lever is a steel casting and the toggle seats and pins are of tool steel, hardened and ground, to withstand the heavy pressures exerted by these machines.

Adjustment of the upper platen is obtained conveniently through the medium of a steel wedge regulated by a handwheel on the left-hand side of the press. Dial adjustment for the wedge permits keeping an accurate record of the setting of the dies, assuring uniformity of the work and saving considerable time in die setting. A shear pin, accessibly located to facilitate replacement, can be furnished. The machine can be arranged either for belt or motor drive.

The smallest of the seven sizes of the machine is of plain style and the others are of geared type. The smallest press weights 4460 lb. and the largest 34,000 lb. The stroke of the slide on all machines is 1½ in. Distance between uprights ranges from 11¼ to 20¼ in. and maximum die space ranges from 12½ to 14 in. Floor space occupied by the smallest press is 45 x 47 in. and by the largest, 100 x 105 in. Strokes per minute range from 85 to 35.

Foundry Equipment Orders Much Higher

Orders for foundry equipment as reported by 21 manufacturers of the Foundry Equipment Manufacturers' Association showed a great increase in May. The total was 335.6 per cent of the average monthly shipments in 1922 to 1924. This is much the highest figure for many years. It compares with 107.7 for April and with 134.8 for May, 1927. The largest previous month of the past three years was February, 1927, when the figure was 198, or not much more than half that of last month.

Shipments in May were 104.7, while unfilled orders at the end of the month, due to the great volume of orders received, were 344.5.

Expansion of Oliver Machinery Co.

Business and plant of Butterworth & Lowe, Grand Rapids, Mich., have been purchased, under date of June 15, by the Oliver Machinery Co. of Grand Rapids, manufacturer of woodworking machinery and machine tools. The Butterworth establishment has for years made band saws for cutting logs and saws for use by package manufacturers, veneer mills, etc. The company is manufacturing also a line of machinery for the stone industries, including rock crushers, nippers and crackers. The firm has made a specialty of equipment for gypsum mines, with complete equipment, including elevators, shafting, crushers and kettles. The Oliver company expects to continue all of these lines in addition to its own. No new manufacturing facilities or equipment are contemplated.

New Norton Cylindrical Grinder for Pieces Up to 14-In. in Diameter

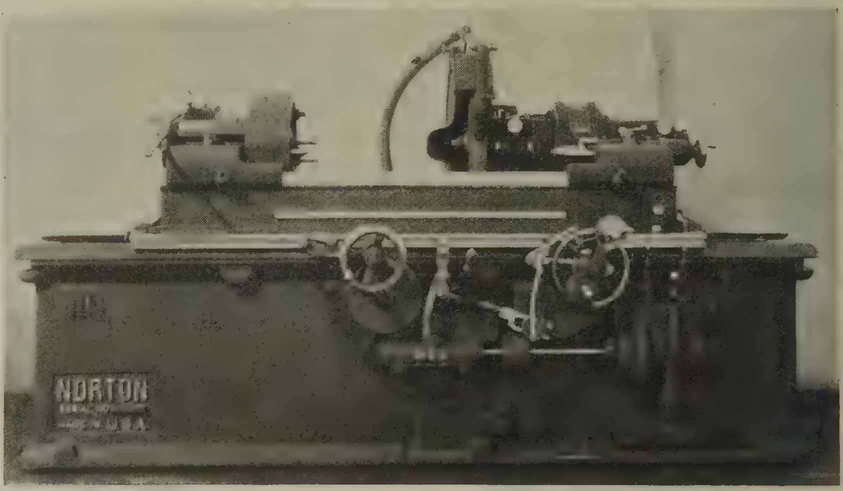
A new model cylindrical grinding machine, designed to swing work 14 in. in diameter and intended primarily to secure high production on car axles, crankshaft bearings and similar pieces, has been brought out by the Norton Co., Worcester, Mass.

The machine is said to have been developed to meet the demand created by experience with the company's type BA 10-in. machine, which has been on the market for a number of years. Ample space has been provided, up to the capacity of the machine, for work with flanges or other projections and when steadyrests are necessary pieces up to 6½ in. can be ground. Two standard sizes of the machine, 14 x 36 in. and 14 x 120 in., with all overhead or motor drive and with either hand or power table traverse, are available. Features common to both the new and the 10-in. machine include improved wheel spindle, ball-bearing wheel feed screw, chain-driven headstock, selective gear speed-change mechanism, and anti-friction countershaft bearings on overhead drive arrangements.

Simplicity of construction characterizes the wheel spindle, which is of heat-treated alloy steel and has large diameters and long bearings. It is adaptable to wide-wheel, straight-in cut as well as traverse grinding. Bearing adjustment may be made while the machine is in operation, the lower bearing being fixed while the upper and outer are adjustable by accessible thumbscrews. Flood lubrication, visible through glasses on the front of the wheel-slide is provided for the spindle.

The wheel-slide is massive and has long and wide ways. The wheel is driven through a downward pull of the belt, which, combined with the weight of the slide itself, prevents lifting under the pressure of a heavy cut. Delicate feed adjustments by means of a micrometric arrangement advance the wheel to the work in increments of one-eighth of a thousandth of an inch. The wheel feed has a large diameter screw, mounted on ball bearings and engaging a long half nut on the wheel-slide.

Convenient speed-changing device on machines with power-table traverse is featured as encouraging the use of proper speeds. Speeds are changed at the front of the machine through a selective gear speed mechanism, without stopping the table, work or wheel. An independent truing device permits truing of the wheel without disturbing the lever for regular table speed changes.



Crankshaft Bearings, Car Axles and Similar Work May Be Ground on a Production Basis. The swing is 14 in.

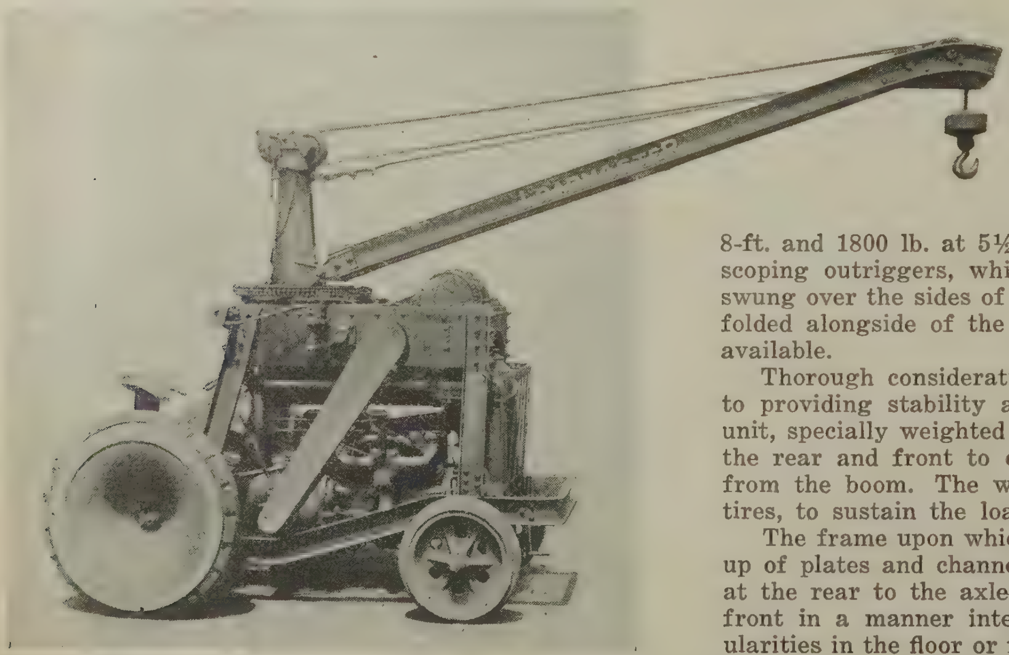
The work table is characteristic of the type A Norton machine and any of the attachments or mechanisms for the 14-in. type A may be used on the new model. Screw or lever types of footstock are ordinarily provided, but for special work air or crank-operated styles are available.

Gasoline-Powered Swing Crane for General Utility Work

A tractor-mounted swing crane which moves from place to place and lifts and swings its load by power derived from the tractor engine is being placed on the market by Frederick H. Poor, Inc., 50 Church Street, New York.

The machine, designated as the Loadmaster, is intended for general utility work in industrial plants, warehouses and storage yards. In addition to lifting, transporting and placing of material, the machine may be used to haul loads or trailers attached to the tractor upon which the crane is mounted.

With the tractor stationary the crane can handle loads over a swing of 240 deg., or 120 deg. either side of the forward position, at a radius of 10 ft. from the mast center. With the boom directly forward loads up to 2400 lb. can be handled at a 10-ft. outreach, and loads up to 3000 lb. at an 8-ft. and 5½-ft. outreach. The height of the load hook from the floor at these outreaches is 6 ft. 3 in., 10 ft. and 12 ft. respectively. With the boom swung at the side of the tractor, the lifting capacity is 1000 lb. at 10-ft. outreach, 1250 lb. at 8-ft. and 1800 lb. at 5½-ft. outreach. Adjustable telescoping outriggers, which permit heavier loads to be swung over the sides of the machine and which may be folded alongside of the machine when not in use, are available.



Traction, Boom Swing, Boom Lift and Other Operations Are by Power from the Tractor Engine

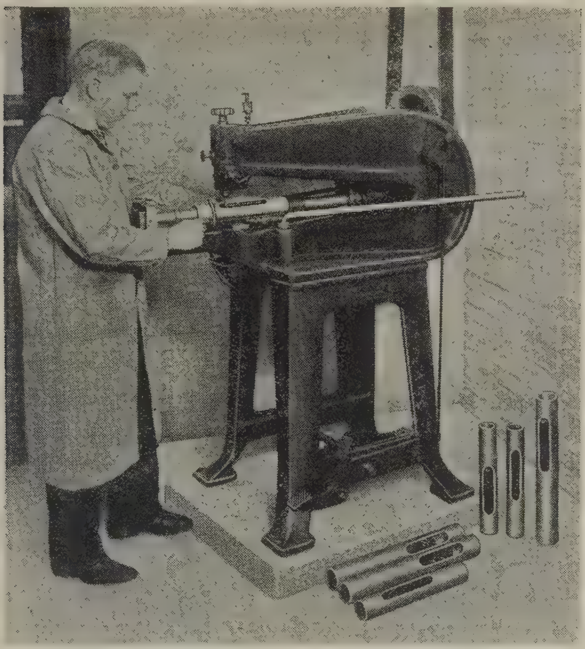
Thorough consideration is said to have been given to providing stability and sturdiness in this movable unit, specially weighted wheels being employed both at the rear and front to counterbalance loads suspended from the boom. The wheels are equipped with broad tires, to sustain the loads without undue tire loading.

The frame upon which the mast is mounted is made up of plates and channels, the structure being secured at the rear to the axle housing and suspended at the front in a manner intended to compensate for irregularities in the floor or roadbed over which the machine travels. The hoisting drum is connected to a self-locking worm gear and is power-operated through a clutch and bevel gears, operation of the drum being controlled by means of a lever within easy reach of the operator. When the drum is not in motion, the load is held in suspension on the boom by the worm gear, without the use of a friction brake. The swinging boom is made up of two steel channels and the bull wheel, by which the boom is swung about the mast, is power-driven through chain and sprocket. The bull wheel is equipped with an expanding brake of such design that the boom may be controlled in its swing, or when not under power may be set in any fixed position.

For conditions requiring higher lifts or long boom outreaches, special equipment can be furnished.

Nibbling Machine for Slotting Tubes

For the slotting of tubes used in the manufacture of oil burners and other products, Andrew C. Campbell, Inc., Bridgeport, Conn., is offering the adaptation of its model No. 1-B nibbling machine here illustrated. It is claimed that in cutting the holes in the sides of the tubes shown in the illustration the operating time was reduced from 16 min., necessary in the method previously employed, to 40 sec.



Means Are Provided for Convenient Mounting and Removal of the Tubes

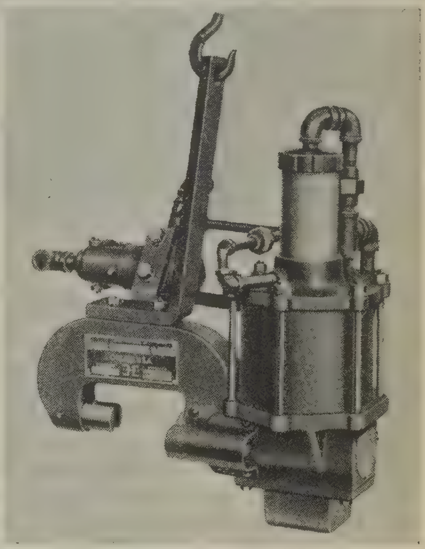
A mandrel, which fits closely the inside diameter of the steel tubing to be cut, is part of the equipment of the machine. The template used is made up of two half tubes hinged with a quick-acting clamp on the other side, which permits it to be attached quickly to the tube to be cut. The outboard bracket has a quick-acting swing clamp on the other side to hold the outboard support for the mandrel, enabling the tubes to be mounted and removed conveniently. The edge left by the slotting operation is said to be practically smooth and no finishing is necessary.

New Resistor and Fuse

A type-H combination potential transformer fuse and wire-wound resistor for 2500 to 25,000-volt service, intended for indoor application, and mountable on any flat surface or upon 1¼-in. pipe, is being made by the Westinghouse Electric & Mfg. Co. The resistors are placed in series with the fuses to limit the current effectively in case of short circuit. This permits the use of potential transformer fuses on any circuit, regardless of its short-circuit amperes, provided the voltage rating of the system is not more than that of the fuses and resistors. The latter are made up of coiled nichrome wire wound in the grooves of a heavy wet-process porcelain tube.

Portable Pneumatic Press for Automotive and Other Operations

A portable pneumatic press which exerts pressure of 8 tons and weighs only 95 lb. has been made available by the Hanna Engineering Works, 1765 Elston Avenue, Chicago. Work for which the machine is adapted includes the pressing of shackle pins into automobile chassis frames as the frames pass along the chassis assembly conveyor line. The tonnage exerted and the short stroke make the machine suitable for shackle pins that are serrated under the head and that have a threaded hole in the head which must not be marred.

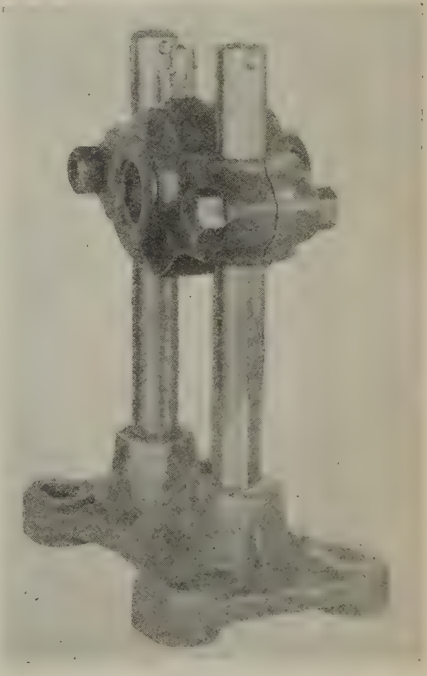


The Weight of the Machine Is Only 95 Lb., and the Pressure Exerted Is 8 Tons

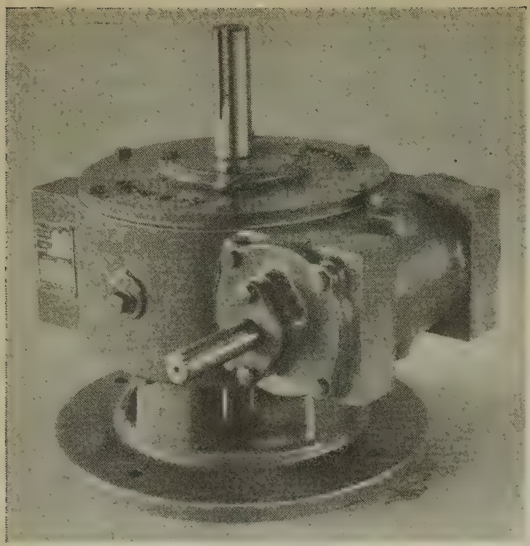
The press illustrated has a depth of throat, or reach, of 2 in., a gap of 6 in. and die stroke of ⅝ in., but several other sizes are available. The mechanism between the air piston and the die is of roller and wedge type, which provides a variable leverage or tonnage in conformity with the requirements of the work to be done. High frictional efficiency of the mechanism and low air consumption are claims for the machine.

Self-Alining Hangers for Use With Speed Reduction Units

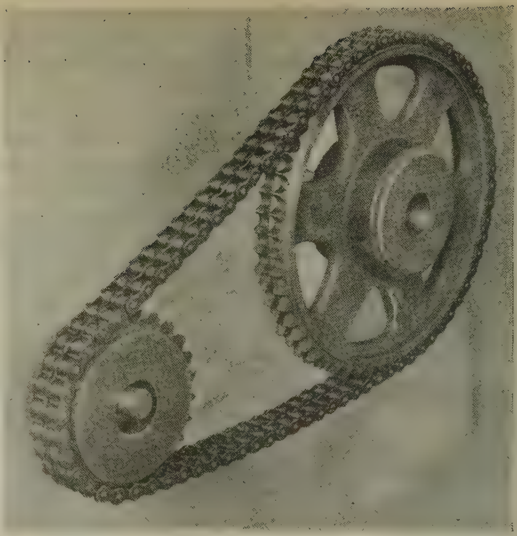
A line of self-alining hangers suitable for use as outboard bearings in connection with the operation of speed reducers and chain drives has been made available by the Boston Gear Works Sales Co., Norfolk Downs, Mass. The device illustrated herewith is arranged for height adjustment and is constructed to remain rigid after adjustments have been made. It can be fastened conveniently to the shaft at any point and is designed to prevent binding and heating of the shaft. The shaft bore is in fractional dimensions. The hanger is designated as the type BF.



The Hanger Is Adjustable for Height and Remains Rigid After the Adjustment Is Made



Tapered Roller Bearings Are Employed in the Vertical Speed Reducer, Which Is Built in a Range of Sizes. The standardized chain drive, at the right, is available for from 1 to 100-hp. drives



Offers New Gear Reduction Unit and Standardized Chain Drives

The Boston Gear Works Sales Co., Norfolk Downs, Mass., has placed on the market a new vertical speed reducer, designated as the type V, for use on mixers, agitators and other equipment requiring a vertical shaft reducing unit. The company is also adding to its line a series of Renold-Boston standardized silent and roller chain drives for industrial purposes.

Compact design and the use of tapered roller bearings throughout are features of the vertical speed reducers. The units may be fastened conveniently to the top of a machine, to a wall or to the floor, and are designed so that the driven shaft can project above or below, or both. Oil-tight construction, eliminating oil leakage, is followed. The worm gears are of phosphor bronze and the worms of hardened steel, with the threads ground and polished. The units are available in ratios from 9¾ to 1 to 50 to 1.

The standardized chain drives, shown in the separate illustration, are available from stock for from 1 to 100-hp. drives. This standardization of driving chains is emphasized by the company as of importance in that by consulting the company's handbook on the Renold-Boston chain drives, the correct size of chain for the particular job may be selected readily.

Mine Stripping with Largest Electric Shovel Ever Built

Stripping operations on a mine in northern Illinois are being carried out with the aid of a type 5480 electric shovel. Made by the Marion Steam Shovel Co., Marion, Ohio, this is said to be the largest shovel ever built. The shovel carries a 12-cu. yd. dipper on a 90-ft. boom and a 60-ft. dipper handle. It is mounted on crawling traction trucks and is operated electrically from power lines of the public utility company. A 750-hp. motor drives the motor-generator set for furnishing power to the various motions, and the working weight with ballast is approximately 850 tons.

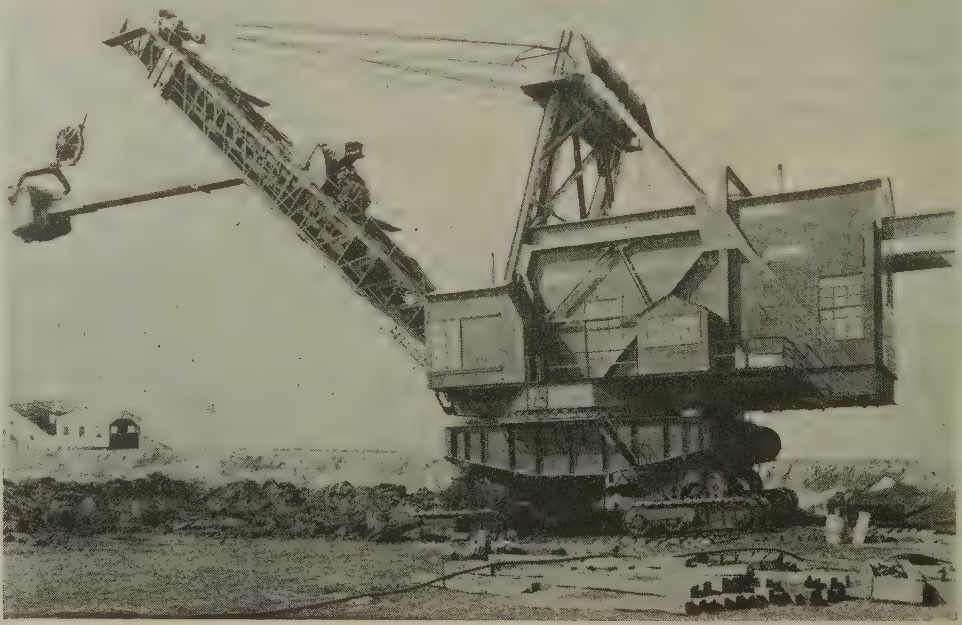
Operating three 8-hr. shifts each day, Sundays excepted, the shovel has, since being placed in operation, handled 15,481 cu. yd. in 24 hr. It is expected that in a calendar year it will handle from 2,000,000 to 3,000,000 cu. yd. of material.

Prior to the erection of the type 5480, the largest coal stripping unit had been the Marion Type 350, which carried an 8-cu. yd. dipper, a 90-ft. boom and a 58-ft. dipper handle. This machine operated effectively and economically in overburden up to 40 ft. in thickness, where the vein of coal averaged 5 ft. in depth.

More Coke Produced in May

By-product coke made in May is reported by the United States Bureau of Mines at 4,083,759 net tons, compared with 3,925,195 tons in April and with 3,788,164 tons in May, 1927. Adding 376,000 tons of beehive coke, the total May production of coke becomes 4,459,759 tons, or 1.358 net tons for each gross ton of pig iron produced. This last figure compares with 1.350 tons in April, and with 1.303 tons in May, 1927.

Exceptionally Large Stripping Shovel Operated by Electricity and Moving on Crawler Trucks. The shovel has a 12-cu. yd. dipper and great hourly capacity



Tape Hook Enables One Man to Measure Accurately

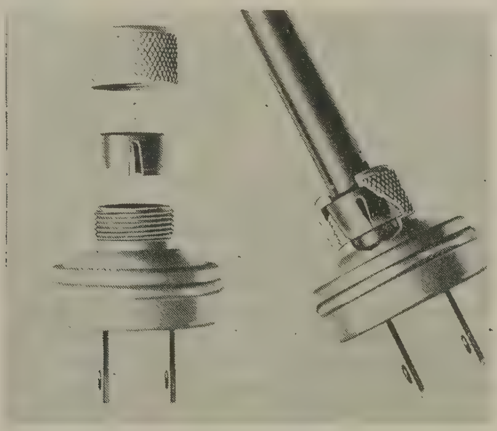
A hook for steel tapes recently brought out by the Lufkin Rule Co., Saginaw, Mich., enables one man unassisted to take long and short measurements accurately. It is easily slipped on and off the tape and yet cannot fall off. The hook has a toothed edge and takes a firm and square grip on the metal or other material as soon as tension is applied to the line, releasing itself when tension is released. It swings with the ring of the tape, thus guarding against breakage of the line and allowing the hook to fold against the case when the line is wound in. The hook is made of composition metal of light weight and is 2 in. long. It is suitable for standard steel tapes ⅜ in. wide.

Hook to Permit One Man to Use a Steel Tape

New Cord-Grip Plug Cap

An attachment plug cap with an improved type of cord grip, brought out by the Cutler-Hammer Mfg. Co., Milwaukee, is reported to be unbreakable. The cord grip acts as a positive strain relief and is designed particularly to lessen short-circuit hazards. Fastening the cord grip is a simple matter and can be done without the use of tools. It is only necessary to screw down on the knurled collar.

The knurled collar wedges a fiber bushing tightly against the cord. The parts are so designed that a natural pressure from the inside prevents loosening of the knurled collar and insures that a firm grip is maintained at all times. The fiber grip bushing serves to insulate the cord from metal parts and results in less damage to the cord, because it prevents contact between cord and metal. This bushing also acts as the clamp and is the only part that actually touches the cord.



Unbreakable Is the Claim Made for This Simple Plug Cap

A rustproof armored shell, made of heavy brass, prevents breakage when dropped on cement floors, etc. Sheet bakelite is used to hold the blades firmly in place. The cord grip cap can be obtained in either bakelite brown or zinc gray finish.

New Recorder Controller

A new recorder and contacting controller, now being offered by the Bristol Co., Waterbury, Conn., combines in one case the features of a rugged recorder and a thermometer controller, which makes a compact outfit. The equipment is a single-pen recording system with controller system and scale mounted directly above it.

Recording pen and moving contact of the controller are actuated by separate pressure elements, which are exactly alike in construction. These elements are connected through one capillary tube to the sensitive bulb. Arranged in this way the record is not impaired by retarding effect of the controller. And the recorder draws a true record both above and below the control point.

This recorder controller is arranged for a contact capacity of 1000 watts by equipping it with self-contained automatic switches. Terminals are supplied for making easy connections to line and control apparatus through conduit. All internal circuits are heavily insulated.

To use, it is only necessary to set the control to the desired temperature by moving an index pointer over a scale to the exact degree to be controlled. This index pointer is so long that it is possible to adjust it accurately and easily. Zero adjusters are provided for both recorder and controller pressure elements.

Boiler Plate Embrittled by Alkaline Feed Water

Prof. Samuel W. Parr and F. G. Straub of the University of Illinois have continued their studies on embrittlement of boiler plate. These extended investigations have been reported several times, as at the 1926 meeting of the American Society for Testing Materials (see THE IRON AGE, July 1, 1926, page 4). Bulletin No. 177 of the Engineering Experiment Station at Urbana, Ill., brings the researches up to date, and includes data on a number of cracked boilers recently examined. These particular failures occur in the rivet seams below water line, start from the outside of the plate, and are evidently intercrystalline corrosion cracks. The authors say the only common factor existing in these failures is an undue accumulation of sodium hydrate in the boiler, either due to hydrolysis of sodium carbonate or to water softening dosage or devices. The remedy is to keep the ratio between sulphates and carbonates in the feed water within specified limits.

Fabricated Steel Plate Orders Drop 16 Per Cent from April

WASHINGTON, June 22.—Orders for fabricated steel plates in May totaled 42,376 net tons, or 53 per cent of the capacity of the 51 firms reporting to the Department of Commerce, comparing with 50,347 tons, or 63 per cent of capacity, in April. May orders made the smallest total since January. Orders in May were distributed as follows: Oil storage tanks, 14,849 tons; refinery materials and equipment, 2012 tons; tank cars, 1909 tons; gas holders, 4636 tons; blast furnaces, 202 tons; stacks and miscellaneous, 18,768 tons.

Orders for the first five months of the current year aggregated 225,170 tons, against 236,134 tons for the corresponding period of last year. May, however, made a better record than last year, when the total was 37,883 tons.

Employment High in Ohio

Employment in the iron and steel industry of Ohio was the same during May as in April, but showed a 3 per cent gain over May, 1927. In Cleveland the number of workers was 4 per cent greater than in April and 26 per cent ahead of May, 1927. The index for May stood at 102, with an average month in 1923 taken as 100. In the machinery group employment during May was the highest of any month since June, 1927. It was 1 per cent greater than April, but 2 per cent less than in May, 1927.

Average employment in the first five months of 1928 was 5 per cent below that in the same period last year. Of the 183 reporting concerns, 83 revealed increases in May over April, 88 decreases and 12 no change. The index of 94 in the automobile and automobile parts group was 8 per cent greater than in April, although it was a drop of 9 per cent from May, 1927. The increase from April was shared by 29 of the 41 reporting companies. In the construction industry May employment was 13 per cent higher than in April and 11 per cent greater than in May, 1927. Reports from 592 concerns in all manufacturing lines showed that the number of wage earners was the highest since May, 1927. These figures are given in the current bulletin on employment issued by the Bureau of Business Research of Ohio State University.

BOOK REVIEWS

Metallurgy of Iron and Steel. By H. M. Boylston, professor of metallurgy, Case School of Applied Science, Cleveland. Pages, 571, 426 illustrations, 6 x 9 in. Published by John Wiley & Sons, Inc., New York. Price, $5.

Even a casual examination of this book reveals one of its notable excellences, namely, a wealth of excellent pictures. It may be a criticism of descriptive metallurgical literature generally that it is inadequately illustrated. Too much dependence is placed on sketches and mechanical drawings, which have meaning to the informed engineer, but which seldom erect a correct picture in the mind's eye of the student. A large proportion of the views in Professor Boylston's new book are halftones, collected from many sources.

Nearly all of the pictures have a "courtesy line," and a needless number of references to original authorities clutter up the text. Before many pages are passed the false impression grows that the author has compiled a series of abstracts, rather than distilling from a wide reading and a ripe experience the essence of his subject for the information of students. For instance, in the chapter on ingots and ingot making a series of 12 figures are "Courtesy Gathmann Engineering Co." If one did not know that the author in his younger days was Carnegie Research Scholar for the British Iron and Steel Institute and studied the relative merits of various agents for the deoxidation of steel, one might believe that his information on ingot quality came from commercial sources, more or less biased.

The preface gives a list of men in practice who have critically examined the chapters covering the respective specialties. So it would be difficult to find misstatements of fact. Lacking errors in detail (and since a book review would be a failure without finding some mistakes), it may not be amiss to point out at least one error in balance: Seventeen pages are used to describe the acid open-hearth process; three are made to suffice for the basic variety, while eight are devoted to Blaw-Knox patents on furnace details. This hardly seems in keeping with the facts, namely, that 40 times as much steel is made in the United States by the basic open-hearth as is made in the acid furnace.

Where the author really strikes his stride, however, is when he leaves behind him the smelting of ore, refining of steel and its mechanical treatment, and describes the inner structure and properties of metal as they are affected by heat treatment. In this latter third of the work a very clear exposition of metallography is given, as nearly up to date as a text book can be. Knowing the author's constant association with Professor Sauveur of Harvard University, and the latter's published views on the hardness of beta iron, the reviewer looked with interest for an exposition of the hardening theory. But alas, the question is neatly parried by referring the interested student to Sauveur's work published in 1920. This hardly seems fair to Professor Boylston's fellow townsmen, Messrs. Jeffries and Archer, who are widely credited with having proposed a very understandable and useful theory of hardening in more recent years. But it may be a justifiable course to pursue in an elementary text book.

E. E. T.

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The Engineering Index for 1927. Pages, 898, 6½ x 9 in. Published by American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. Price, $8.50.

Each year the Engineering Index grows in number of citations and in size of volume, which reflects not only the growing volume of technical literature, but the steadily increasing scope of the field included within the survey. During 1927 over 800 publications were regularly examined, and the present volume contains information about approximately 17,000 articles, each citation giving the title, author, publication, date and page, and a brief statement of the scope of the text. A commendable practice is the avoidance of cryptic abbreviations, which, while understandable to the indexer, are Greek to an engineer user of such a volume as this. While it would be easy to criticize the abstracting of articles, it would be hard to suggest any practicable machinery whereby this work could be improved at reasonable cost, considering the comprehensive field being covered.

Large as the present volume is, it is expected that next year the volume will be still larger. Carlos de Zafra, director of Engineering Index, has organized a staff which will mail index cards weekly to subscribers for the service, selecting all cards containing current information on the particular portions of the engineering field desired by the recipient. The number of publications (particularly those in foreign languages) will be increased to make this prompt review even more inclusive than former efforts.

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Aluminum — the Metal and Its Alloys (A Critical Descriptive Treatise). By M. G. Corson, including chapter on "Structurography" prepared in cooperation with J. R. Vilella. D. Van Nostrand Co., New York, 1926. Pages 291, with 117 plates. Price, $8.

This book is addressed to "readers interested in aluminum," but special reference is made to those connected with the industry. The book is divided into six parts, and subject matter is indicated by the following titles:

Part 1.—Properties of Metallic Aluminum.
Part 2.—Systematic Description of Binary Aluminum Alloy Series.
Part 3.—Technology of Aluminum Alloys.
Part 4.—Aluminum and Corrosion.
Part 5.—Aluminum Alloys in Engineering Work.
Part 6.—"Structurography" of Aluminum and Its Alloys.

There is some additional matter in appendices and also a four-page subject index.

This is an individualistic rather than an orthodox work, both as to subject matter and manner of treatment. It seems likely to be of more interest and use to the research worker than to those engaged in the practical manufacture or use of aluminum. Together with a considerable body of useful information and stimulative ideas is an unfortunate scattering of inaccurate or misleading information, so that the uninformed reader must regard the statements with some degree of caution. Furthermore, instead of presenting a complete and balanced picture of the subject, the author seems to have selected and emphasized the subject matter to a large extent in accordance with his own experience and interest.

Good judgments are strangely mixed with opinions which to the reviewer seem poor. For example, the last paragraph on page 106 presents a very good statement of the properties of aluminum-copper alloys of low copper content. This is immediately followed by a paragraph stating that "aluminide of copper . . . becomes comparatively weak at temperatures as low as 150 deg. C., thus injuring the strength of the alloy as a whole." As a matter of fact, this constituent ($CuAl_2$) is one of the most effective in maintaining the strength of aluminum at elevated temperatures.

Some of the author's advice to the users of aluminum must certainly be taken with reservation. It is suggested, for example, that in certain products it should be insisted that the iron content should not exceed 0.2 per cent. Those familiar with the industry know that this is not practical at the present time, and, as a matter of fact, it is very doubtful whether such a limitation would produce any desirable results in a majority of products, even if it were practical. The discussion of piston alloys contains a pertinent statement questioning the importance of strength at high temperatures, but proceeds with some statements regarding hardness which are at variance with the best informed present opinion. It is stated that the use of magnesium, "as recommended by some authors," serves no rational purpose and that it is better to have a piston material with 28,000 lb. strength and 1.5 ft. lb. impact than one with 38,000 lb. strength but 0.5 ft. lb. impact. The facts are that magnesium is now used in practically all commercial aluminum pistons, and that the production of pistons still further hardened by heat treatment is considered to have been one of the major developments of the last few years.

In general, the book may be recommended to the investigator and the student in search of ideas and data to be considered critically, but is not recommended to the engineer or manufacturer who is looking for well established facts and conservative opinions about aluminum. R. S. A.

Protective Metallic Coatings. By Henry S. Rawdon. American Chemical Society, Monograph No. 40, 277 pages, 6 x 9 in. Chemical Catalog Co., Inc., New York. Price, $5.50.

When books come to the Book Review Editor, he usually casts about in his mind for the name of some man in his acquaintance who is reasonably familiar with the subject matter, and sends him the book with the request that he write a notice which will appraise the scope and quality of the book. But before this routine matter was attended to, this book on metallic coatings had answered questions on such varied things as the rate of solution of iron in a galvanizing kettle, the Crapo process, cadmium plating, planishing and the salt spray test.

Evidently it is too valuable to give away!

Doubtless Doctor Rawdon would disclaim any authoritative knowledge on many of the obscure points touched by the literature he has examined, but throughout this entire book there is every evidence that the notations have been made with nice discrimination and in the light of broad knowledge of metallurgical fundamentals. So the book is far more than a compendium of abstracts. It is a mine of information and suggestion for anyone who deals with corrosion resistance and surface protection.

Cements, Limes and Plasters: Their Materials, Manufacture and Properties. Third revised edition. By Edwin C. Eckel. Pages 700, 6 x 9 in., 161 figures. John Wiley & Sons, Inc., New York. Price $7.

A first impression is of a very well printed book. Paging through less hastily reveals a comprehensive treatment of the plastic materials used in engineering. If one stops to read here and there, he quickly discovers a lucid text, evidently written by an author with clear-cut opinions on many and diverse matters, and with no hesitation about allowing those opinions to modify his views about technology of his subject and to state the conclusions so reached clearly and vigorously.

It so happens that, aside from chapters of close interest to men in iron and steel production, such as the utilization of blast furnace slag, the text has other points worthy of note. One such is where an analysis of the major elements of cost is given, and the conclusion (doubtless verified by experience) that, if a cement mill sells its product for only enough to cover the cost of getting the raw materials, the cost of manufacture and the administrative and selling costs, then the mill would pay its way, yet would not remain in the hands of the original owners, and the end of several such financial reorganizations would find an obsolete plant and exhausted quarries. Such observations, of course, do not exclusively apply to the cement industry.

Manufacture of cement is now going through an interesting stage. As Mr. Eckel points out, Portland cement is commonly regarded as the typical representative of the entire group of engineering plastics. As a matter of fact, it is the most modern of all the cementing materials, some of which date back 10,000 years or more. And in the few brief years of its existence Portland cement had become so standardized by uniform specifications that no progress in manufacturing and no additional requirement by the consumer had been made. During the war the demand for cement of high early strength—concrete that could be used in 24 hr. instead of 24 days—was successfully met. With this advance made, engineers and researchers turned their attention to the additional problem of making a cement which would permanently resist alkaline ground water and sea water. Consequently the present day is one of rapid development; many new ideas are being proved. Mr. Eckel says that somewhere in this mass of attempts will be found the processes and products which will serve as the bases for the next long period of utilization and standardization.

At present, the high early strength Portland cements are being made by giving better attention to the raw material, the burning and to a finer grinding. Alkali-proof cements, on the other hand, have such different chemical compositions that they have been called alumina cements, and are made by complete melting, ordinarily in a blast furnace or electric furnace, rather than sintering or clinkering in a rotating kiln. Mr. Eckel's survey of the raw materials available in great tonnage indicates that in the not distant future the blast furnace will be charged with an aluminous iron ore, so low in silica that the slag will be one of the new cements and the pig iron will be a valuable by-product.

New Books Received

Safety and Production. A report by the American Engineering Council. Pages 414, 6½ x 9½ in., illustrated. Published by Harper & Brothers, 49 East Thirty-third Street, New York. Price, $5.

Elements of Economic Geology. By J. W. Gregory. Pages 312, 5 x 7½ in., illustrated. Published by E. P. Dutton & Co., 681 Fifth Avenue, New York. Price, $3.25.

Patent Essentials. By J. F. Robb. Pages 446, 6 x 8¾ in., illustrated. Published by Funk & Wagnalls Co., 354 Fourth Avenue, New York. Price, $5.

Descriptive Geometry. By William H. Kirchner and Henry C. T. Eggers. Pages 183, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $2.25.

Abrasive Handbook. By Fred B. Jacobs. Pages 547, 6¼ x 9¼ in., illustrated. Published by Penton Publishing Co., Cleveland. Price, $5.

Employee Stock Purchase Plans in the United States. Pages 245, 6¼ x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $2.50.

Journal of the Institute of Metals, 1927. Vol. XXXVIII. Pages 813, 5½ x 8½ in., illustrated. Published by the Institute of Metals, 36 Victoria Street, London, S. W. 1, England.

Journal of the Iron and Steel Institute, 1927. Vol. CXVI. Pages 736, 5½ x 8½ in., illustrated. Published by the Iron and Steel Institute, 28 Victoria Street, London, S. W. 1, England.

Foundry Work. Second edition. By R. E. Wendt. Pages 236, 5 x 7¾ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $2.

Scientific Purchasing. By Edward T. Gushee and L. F. Boffey. Pages 196, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

Electric Heating. By Edgar A. Wilcox. Pages 469, 6¼ x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $5.

Engineering Abstracts. No. 35. Pages 236, 5½ x 8½ in., illustrated. Published by the Institution of Civil Engineers, Great George Street, Westminster, S. W. 1, London.

Le Molle. (A treatise on the manufacture and theory of springs, in Italian.) Four volumes. By Piero Gradenigo. Pages 800, 6¾ x 10¼ in., illustrated. Published by S. Lattes & Co., Via Garibaldi, 3, Turin, Italy.

A Metallographic Study of the Path of Fatigue Failure in Copper. By Herbert F. Moore and Frank C. Howard. Bulletin 176, University of Illinois Engineering Experiment Station, Urbana, Ill. Pages 27, 6 x 9 in., paper binding. Price, 20c.

Industrial and Railroad Amalgamations. By Sir Josiah Stamp, chairman London, Midland & Scottish Railway. Pages 32, pamphlet, 5½ x 8½ in. Published by London General Press, 3 Arundel Street, Strand, London, W. C. 2, England. Price, 2s.

Largest Exports in Seven Years

May Shipments of Iron and Steel 25 Per Cent Above April—Imports Slightly Higher Than in April—Heavy Scrap Exports

WASHINGTON, June 26.—Aggregating 267,890 gross tons, exports of iron and steel products from the United States in May were the highest for any month since February, 1921, when they totaled 393,328 tons. The May export movement increased 52,706 tons over that of April, when the total was 215,184 tons. Exports for the five months ended with May, amounting to 1,096,690 tons, made a gain of 147,910 tons over the corresponding period of last year, when the total was 948,780 tons. The daily average movement for the 31 days of May was 8890 tons, compared with a daily average of 7172 tons during the 30 days of April. While one outstanding reason for the sharp stimulus in exports of May was the heavy movement of scrap, amounting to 59,417 tons, the largest movement of any single product, gains were made in 28 of the 39 classifications when compared with April, while 10 showed declines and one, pig iron, was identical with that of April, at 3701 tons.

Imports in May totaled 72,106 tons, reflecting a gain of only 527 tons over April's total of 71,579 tons. For the five months ended with May, imports aggregated 324,076 tons, an increase of 9161 tons over the corresponding period of 1927. A feature of the May import movement was the sharp drop in incoming shipments of pig iron, which amounted to 9732 tons, against 20,845 tons in April. There were gains in 18 of the 27 import classifications, some of only a few tons, and losses in the remaining nine.

The outward movement of scrap in May, 59,417 tons, represented an increase of 18,801 tons over April's total of 40,616 tons. The sharp increase in exports of scrap during the past few months is attributed largely to the embargoes or prohibitory export duties in force against this product in a number of foreign countries. Of the May scrap exports, 18,972 tons went to Italy; 16,827 tons to Canada; 8785 tons to Japan; 8435 tons to Poland and Danzig and 4858 tons to Germany.

United States Imports of Iron and Steel Products in May

(In Gross Tons)

Austria	25	Canada	7,099
Belgium	19,951	Mexico	88
Czechoslovakia	25	Virgin Islands of U. S.	3
France	16,314	British India	3,326
Germany	10,839	China	1
Italy	26	Japan	1
Netherlands	2,101	Syria	13
Norway	45	New Zealand	1
Spain	1	Morocco	5
Sweden	3,058		
Switzerland	1	Total	72,106
United Kingdom	9,183		
Total Europe	*61,569*		

Imports of Iron and Steel into the United States

(In Gross Tons)

	May		Five Months Ended May	
	1928	1927	1928	1927
Pig Iron	9,732	17,164	63,496	47,322
Ferromanganese*	5,094	2,043	18,535	10,792
Ferrosilicon†	133	1,080	1,345	5,400
Ferrochrome‡	38	12	262	382
Scrap	3,958	6,750	15,126	27,930
Pig iron, ferroalloys and scrap	*18,955*	*27,049*	*98,764*	*91,826*
Steel ingots, blooms, billets and slabs	3,712	857	9,812	5,509
Iron blooms, slabs, etc.	....	....	4	....
Wire rods	1,824	1,388	8,298	6,002
Semi-finished steel	*5,536*	*2,245*	*18,114*	*11,511*
Rails and splice bars	863	1,139	6,364	6,876
Structural shapes	16,010	14,241	74,248	62,773
Boiler and other plates	482	79	942	2,255
Sheets and saw plates	3,247	1,507	12,729	6,124
Steel bars	9,681	9,788	44,570	41,615
Bar iron	117	153	932	2,118
Hoops, bands and cotton ties	1,368	3,375	9,306	12,259
Tubular products (wrought)	4,125	9,743	18,282	24,861
Nails, tacks, staples	821	683	3,155	2,471
Tin plate	384	750	550	850
Bolts, nuts, rivets and washers	39	11	126	97
Round iron and steel wire	239	646	1,678	1,925
Barbed wire	308	352	1,566	2,562
Flat wire; strip steel	318	268	1,059	1,206
Steel telegraph and telephone wire	82	2	128	27
Wire rope and strand	121	179	619	1,104
Other wire	46	26	277	229
Rolled and finished steel	*38,251*	*42,942*	*176,531*	*169,352*
Cast iron pipe	9,150	7,257	28,992	40,664
Castings and forgings	214	321	1,675	1,562
Total	72,106	79,814	324,076	314,915
Manganese ore*	16,283	18,340	70,811	111,131
Iron ore	211,270	186,208	1,079,521	1,048,941
Magnesite	1,869	2,736	19,646	22,980

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*Manganese content only.
†Silicon content only.
‡Chromium content only.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	May, 1928	January Through May	
		1928	1927
North and Central America and West Indies	*133,405*	*526,192*	*462,222*
Canada and Newfoundland	117,338	434,323	357,063
Cuba	4,255	25,891	34,889
Mexico	7,430	31,825	37,621
Guatemala	440	5,297	3,710
Panama	923	7,061	7,567
Salvador	351	1,217	2,489
British West Indies	902	3,356	6,726
Other West Indies	863	10,451	6,240
Other Central America	903	6,771	5,917
South America	*40,326*	*184,078*	*160,618*
Argentina	8,768	39,369	35,171
Brazil	8,840	39,677	35,919
Chile	7,894	34,157	11,774
Colombia	5,843	29,517	28,204
Peru	1,011	11,055	13,878
Uruguay	593	3,657	6,052
Venezuela	6,679	23,803	28,516
Other South America	698	2,838	1,104
Europe	*44,276*	*107,906*	*63,961*
Belgium	1,379	6,404	1,340
France	553	1,969	1,753
Greece	1,255	1,405	1,003
Italy	20,178	30,639	14,013
Netherlands	263	1,151	1,468
Russia	42	1,402	2,118
United Kingdom	4,904	21,503	29,861
Other Europe	15,702	43,433	12,405
Far East	*48,571*	*272,258*	*252,646*
British Malaya	629	3,281	5,214
China	6,702	50,666	29,923
Dutch East Indies	1,863	11,135	18,610
India and Ceylon	1,325	12,194	14,052
Japan and Chosen	28,007	141,185	131,151
Kwangtung	991	2,905	11,965
Philippine Islands	7,169	40,779	20,277
Australia	648	5,991	14,111
New Zealand	102	952	651
Other Asia and Far East	1,135	3,170	6,692
Africa	*1,312*	*6,261*	*9,333*
British South Africa	372	2,793	4,196
Egypt	881	2,456	2,178
Mozambique	12	320	2,421
Other Africa	47	692	538
Total	267,890	1,096,690	948,780

Exports of ingots and semi-finished steel in May, 18,823 tons, showed an increase of 11,165 tons over April, totaling 7657 tons. Plain shapes exported in May, 18,498 tons, made a gain of 4845 tons over April with a total of 13,653 tons. Canada took 15,433 tons in May and Chile, 902 tons. A gain of 3591 tons was made in exports of black steel sheets in May, with a total of 15,272 tons, against 11,681 tons in April. Canada was the destination of 7849 tons of these exports in May, while Japan took 5140 tons. Exports of tin plate in May, 22,462 tons, made a gain of 2653 tons over April, when the total was 19,809 tons.

Tin plate exports in May, consistent with their usual course, were widely distributed, shipments going to Japan, 5438 tons; Canada, 4183 tons; China, 2870 tons; Greece, 1220 tons; Brazil, 1097 tons; Argentina, 1081 tons; Mexico, 1058 tons, and Italy, 1037 tons. Exports of plates in May, 13,163 tons, showed a gain of 3120 tons over April. Canada took 11,695 tons last month. Of the 13,726 tons of steel bars exported in May, a gain of 1066 tons over April's 12,660 tons, Canada took 10,850 tons and the United Kingdom 1042 tons. Galvanized sheets to the quantity of 14,175 tons were exported in May, a gain of 1641 tons over April, with 12,534 tons. Canada took 4498 tons in May; the Philippine Islands, 1875 tons; and Mexico, 1134 tons.

Exports of rails represented the largest decline in May, 18,251 tons, as against 24,449 tons in April, a drop of 6198 tons. The markets of Canada and Japan are showing less demand for foreign rails because apparently, those countries are supplying their own rails in greater quantity. Of the May shipments of rails, Canada took 3201 tons and Japan 2775 tons. The largest foreign buyer was Chile, which took 6184 tons; Brazil took 1806 tons. Casing and oil line pipe exports in May were 10,193 tons. Venezuela took 2641 tons; Colombia, 2139 tons; Mexico, 1678 tons; Argentina, 1280 tons; and Canada, 1018 tons. Exports of black welded pipe in May totaled 6090 tons, of which 1310 tons went to Japan, 1177 tons to Canada and 597 tons to Argentina.

Canada took 116,634 tons, or approximately 43 per cent, of the total May exports. For the five months Canada took 432,278 tons, or approximately 39 per cent, of the total exported during that period. Exports to Japan in May amounted to 28,007 tons and during the five months they aggregated 141,185 tons.

Exports of Iron and Steel from the United States

(In Gross Tons)

	May		Five Months Ended May	
	1928	1927	1928	1927
Pig iron	3,701	4,115	19,655	17,767
Ferromanganese	1,060	101	4,523	218
Scrap	59,417	26,728	185,537	78,599
Pig iron, ferroalloys and scrap	*64,178*	*30,944*	*209,715*	*96,493*
Ingots, blooms, billets, sheet bar, skelp	18,823	7,165	51,732	27,239
Wire rods	3,501	1,065	13,661	6,987
Semi-finished steel	*22,324*	*8,230*	*65,393*	*34,226*
Steel bars	13,726	8,989	56,952	49,702
Alloy steel bars	1,877	457	6,216	2,297
Iron bars	255	297	1,660	2,029
Plates, iron and steel	13,163	15,925	57,197	60,226
Sheets, galvanized	14,175	12,538	64,656	71,847
Sheets, black steel	15,272	17,722	71,088	78,093
Sheets, black iron	1,203	1,228	5,876	7,239
Hoops, bands, strip steel	6,282	3,592	22,877	20,804
Tin plate; terne plate	22,462	18,597	102,823	134,224
Structural shapes, plain material	18,498	15,845	70,517	54,478
Structural material, fabricated	7,181	5,109	30,818	26,341
Steel rails	18,251	16,554	97,103	86,316
Rail fastenings, switches, frogs, etc	2,637	4,752	25,576	14,974
Boiler tubes, welded pipe and fittings	21,141	20,751	98,227	127,477
Plain wire	3,808	2,972	19,041	13,163
Barbed wire and woven wire fencing	7,156	5,085	31,427	18,245
Wire cloth and screening	119	234	677	959
Wire rope	402	415	2,148	1,999
Wire nails	1,830	619	7,307	2,991
Other nails and tacks	772	591	4,174	3,255
Horseshoes	37	53	179	202
Bolts, nuts, rivets and washers, except track	1,227	1,007	5,219	4,784
Rolled and finished steel	*171,474*	*153,332*	*781,758*	*781.645*
Cast iron pipe and fittings	3,447	2,427	14,261	10,805
Car wheels and axles	1,501	4,444	5,922	8,658
Iron castings	1,030	740	5,632	5,231
Steel castings	1,180	660	4,428	3,276
Forgings	1,379	634	3,677	2,391
Castings and forgings	*8,537*	*8,905*	*33,920*	*30,361*
All other	1,377	1,297	5,904	6,055
Total	267,890	202,708	1,096,690	948,780

Great Britain and India were the sources of the largest imports of pig iron in May, supplying 4556 and 3026 tons respectively. Of the 5094 tons of ferromanganese imported during that month, 3468 tons came from Canada and 1551 tons from the United Kingdom. Of the 16,283 tons of manganese ore imported in May, 7372 tons came from Soviet Russia, 6560 tons from Brazil and 2335 tons from India. Chile, supplying 141,800 tons, accounted for more than two-thirds of the iron ore imports in May, totaling 211,270 tons.

Of the 16,010 tons of structural shapes imported that month, 8758 tons came from Belgium, 4357 tons from France and 2739 tons from Germany. Belgium supplied 5199 tons of the 9681 tons of steel bars imported in May; France, 1964 tons; Sweden, 1213 tons and Germany, 1170 tons. France furnished 7524 tons of the 9150 tons of cast iron pipe imported, and Belgium, 1619 tons. Of the 4125 tons of "other pipe" imported, largely seamless tubes, 2599 tons came from Germany, 546 tons from France, 376 tons from the United Kingdom and 347 tons from Canada.

Belgium led as the source of the total May imports, furnishing 19,951 tons. France was second, with 16,314 tons, and Germany third, with 10,839 tons.

Railroads Save by Reclaiming Old Material

ATLANTIC CITY, N. J., June 26.—Through reclamation of old materials, in accordance with the general policy of the rail carriers to bring about greater efficiency and economy in operation, substantial savings are being realized by the railroads. This was shown by a report by the committee on control of shop manufacturing orders for stock material, submitted at the closing session here last Friday of the ninth annual convention of the Purchases and Stores Division of the American Railway Association. As a result of this reclamation work, the railroads are making use of practically every bit of old material so long as it is possible and economical to do so.

Hundreds of articles, such as bolts, mail track brackets, steel for locomotive cabs, coach steps, drills, signal blades for semaphores, tongs for handling rails and ties, track levels, hinges for gates, steel rods of all kinds, metal plates, materials for switches, chisels, springs, cylinder heads and many other articles needed in railroad operation, are being converted by the railroads from old iron and steel. Out of old metallic roofing, empty powder cans or carbide cans emerge bright new tin buckets, cups or other tinware. Second-hand rails are made into guide rails, while carwheels which have become flat are again restored to active use by grinding.

Further Gain in Steel Barrels

Production of steel barrels in May exceeded the record-breaking total of April, with an aggregate of 696,281 units from 27 companies, according to reports to the Department of Commerce. The excess over April's 667,827 units was 4¼ per cent. The figure compares with production in May, 1927, of 588,077 barrels.

Shipments in May were very close to production, as was the case in April and March, both of which showed exceptionally high figures. Unfilled orders at the end of May included 324,549 units for shipment within 30 days and 932,568 units for later shipment.

Members of the Steel Barrel Manufacturers' Institute shipped 410,390 barrels during the month, and had 572,443 on order as of June 1. Their business in May was reported at $1,219,566. Capacity was engaged at the average rate of 61 per cent, being 28 per cent for I. C. C. barrels and 70 per cent for light barrels.

Locomotive fuel costs in April for Class 1 railroads are reported at $2.57 a net ton. This represents an increase of 1c. over the average cost for March. For the three reported districts, the costs in April vary from $2.13 for the Southern district to $2.90 for the Western district.

Continental Prices Slightly Easier

Light Buying but Mills Are Filled—French Await Stable Franc —Steel Cartel May Increase Quotas

(By Cable)

LONDON, ENGLAND, June 25.

CLEVELAND pig iron is quiet and one more blast furnace has been blown out. The Tyneside holiday week is being observed and the Glasgow Fair holidays begin in July, so that little improvement in general conditions is expected until August.

Hematite iron is steadier as a result of decreased output, but demand is still poor. Foreign ore is quiet and there is no indication of a termination in the Swedish miners' strike, so that prices are maintained.

Heavy steel products generally are quiet, but light materials are moving more freely, particularly to domestic consumers. Export demand is poor and mills rolling plates and shapes are in need of orders. In the past week, the Prime Minister interviewed steel makers, who are asking for measures to safeguard the heavy steel industry, and stated that the Government policy will not be changed under the present Parliament. The Canadian-Pacific is about to place orders for two 20,000-ton liners with British yards.

Tin plate bars are active and the market strong, with makers facing a continued shortage of scrap. Some sellers for forward delivery are asking up to £6 5s. ($30.44) per ton, delivered, for Welsh bars.

Tin plate is quieter as a result of the recent decline in the price of tin and consumers are anticipating lower prices. Makers, however, are well sold for many weeks. The minimum agreed price for tin plate wasters is now 17s. ($4.15) per base box, f.o.b. works port, and some sellers are asking 6d. (12c.) more.

Galvanized sheets are strong, with higher costs, and the agreed minimum price for No. 24 gage corrugated sheets in bundles has been increased to £13 7s. 6d. ($65.14) per ton, f.o.b. works port. Demand is generally confined to small lots. Black sheets are quieter.

Continental iron and steel demand is quieter and some prices have become easier as a result of the return of more works as sellers, but prices have been restrengthened by the Antwerp dock strike. Luxemburg reports quotations of the European Rail Makers' Association unchanged.

STEEL CARTEL TO MEET

Production Quotas May Be Increased—Polish Membership Still a Problem

BERLIN, GERMANY, June 10.—The International Steel Cartel meets at Düsseldorf, June 25. Discussion is expected to center upon the total production quota for the third quarter. The present quota is at the rate of 29,287,000 metric tons a year and, according to report, the Western European members of the cartel will propose an increase of about 2,000,000 tons. Another possibility is a proposal to increase only the quotas of Belgium and France.

In the first quarter of this year, all member countries exceeded their quotas of production for the first time since establishment of the cartel. The excess production of France was only 12,000 tons, on which a penalty of $4 per ton was levied. In the last quarter of 1927, the French members were 144,000 tons under their total quota and received a premium of $4 a ton. In the first quarter of this year Belgium was 77,680 tons over the quota. In April, however, these countries were again producing less than the fixed quotas, and if this has continued to be the case for the second quarter, there may not be so much pressure for an increase of the allotment.

The German attitude on increase of quotas is expected to depend upon whether or not a change in the present system of penalties is suggested. German members pay $1 a ton on overproduction for the domestic market and $4 a ton on overproduction which goes for export. The recent ratio of domestic to export production has been 72 to 28. In the first quarter of this year, the German quota was fixed at 3,161,000 tons, a figure which was exceeded by 1,052,000 tons. Germany, having paid heavy penalties in the past for

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0 17½s.	to £0 17¾s.	$4.27	to $4.33
Bilbao Rubio ore*	1 2½		5.48	
Cleveland No. 1 fdy.	3 8½		16.56	
Cleveland No. 3 fdy.	3 6		16.07	
Cleveland No. 4 fdy.	3 5		15.83	
Cleveland No. 4 forge	3 4½		15.71	
Cleveland basic (nom.)	3 5		15.83	
East Coast mixed	3 9	to 3 10	16.81	to 17.05
East Coast hematite	3 10½		17.17	
Rails, 60 lb. and up.	7 15	to 8 0	37.75	to 38.96
Billets	6 5	to 6 15	30.44	to 32.88
Ferromanganese	13 15		66.97	
Ferromanganese (export)	13 0	to 13 5	63.31	to 64.53
Sheet and tin plate bars, Welsh	6 0		29.22	
Tin plate, base box.	0 18½	to 0 18¾	4.51	to 4.58
Black sheets, Japanese specifications.	13 7½		65.14	
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.66	to 1.77
Boiler plates	9 0	to 10 10	1.95	to 2.28
Tees	8 2½	to 8 12½	1.77	to 1.99
Channels	7 7½	to 7 17½	1.60	to 1.71
Beams	7 2½	to 7 12½	1.55	to 1.66
Round bars, ¾ to 3 in.	7 5	to 7 15	1.58	to 1.69
Steel hoops	9 0	to 10 0	1.95	to 2.17
Black sheets, 24 gage	9 15	to 9 17½	2.12	to 2.14
Gal. sheets, 24 gage	13 7½	to 13 10	2.90	to 2.93
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):				
Belgium	£3 3s.	to £3 5s.	$15.34	to $15.83
France	3 3	to 3 5	15.34	to 15.83
Luxemburg	3 3	to 3 5	15.34	to 15.83
Basic pig iron (nom.):				
Belgium	3 1	to 3 2	14.85	to 15.09
France	3 1	to 3 2	14.85	to 15.09
Luxemburg	3 1	to 3 2	14.85	to 15.09
Coke	0 18		4.39	
Billets:				
Belgium	4 15		23.14	
France	4 15		23.14	
Merchant bars:			C. per Lb.	
Belgium	5 14		1.26	
France	5 14		1.26	
Luxemburg	5 14		1.26	
Joists (beams):				
Belgium	4 18½	to 5 0	1.08	to 1.10
France	4 18½	to 5 0	1.08	to 1.10
Luxemburg	4 18½	to 5 0	1.08	to 1.10
Angles:				
Belgium	5 10	to 5 12½	1.21	to 1.23
⅛-in. plate:				
Belgium (a)	6 11		1.44	
Germany (a)	6 11		1.44	
3/16-in. ship plate:				
Belgium	6 7		1.40	
Luxemburg	6 7		1.40	
Sheets, heavy:				
Belgium	6 1		1.34	
Germany	6 1		1.34	

(a) Nominal.

overproduction, is not inclined to agree to any rearrangement designed to relieve the Western producing countries, which have been profiting by underproduction.

The question of Polish membership in the International Steel Cartel has undergone no material change. The chief obstacle is the amount of export quota to be placed at the disposal of Polish mills. Originally Poland demanded 500,000 tons a year and the cartel offered 300,000 tons. Later Poland reduced its demand to almost the level offered. It is pointed out that, although the difference of opinion as to the proper export quota would prove insignificant if the proposed cartel selling syndicates are established, Poland, as an outsider, might undersell whatever price was officially fixed. However, there is no present prospect of any action being taken toward the formation of such syndicates, as the recent rise in European prices has temporarily made such action of less importance. Another question is that of Poland's joining the European Rail Makers' Association. At present Poland has a heavy tonnage of rail orders and is not disposed to permit the association to establish a maximum production.

The question of special treatment of members in the Central European group, Austria, Czechoslovakia and Hungary, has apparently been settled for the present. For the first two quarters of 1928 the penalties of this group were reduced by one-half and a commission was appointed to suggest a permanent regulation. This commission will probably report at the Düsseldorf meeting.

BELGIAN PRICES STABILIZING

Buying of Steel Is Light but Market Is Firm—Inquiries Appearing from South China

ANTWERP, BELGIUM, June 8.—Prices of iron and steel are becoming stable at the present level, and, although buying is rather cautious, mills seem to experience no difficulty in obtaining their full schedule of prices. Despite the lack of buying, producers are well booked with orders for delivery during the next few months and appear to be in a position to withstand pressure for lower quotations for several weeks. The situation seems favorable both in the export and home markets, as stocks both here and abroad are apparently small, and prices, even at the present level, are still under the pre-war market and below British and American quotations.

Export trade promises well for the future. Both German and French domestic business continue active and new business is developing in foreign markets, notably South China, which is inquiring for some desirable tonnages of material.

Pig Iron.—Despite the strength in steel products, pig iron shows a tendency toward weakness. Prices are being maintained fairly well, but competition is keen and the pig iron syndicate is not uniformly successful in maintaining its prices. The export quotation on No. 3 phosphoric foundry iron continues at £3 2s. 6d. ($15.25) per gross ton, f.o.b. Antwerp.

Semi-Finished Material.—Buying is light, but the market continues firm, with only limited tonnages available for immediate delivery. Blooms are scarce and mills have no difficulty in maintaining the market at £4 7s. 6d. ($21.45) per ton for 8-in. to £4 15s. ($23.30) per ton for 4-in. blooms, f.o.b. Antwerp. Billets are also firm at £4 16s. ($23.50) per ton for 3-in. to £4 17s. 6d. ($23.90) per ton for 2-in. billets, f.o.b. Antwerp. Mills show slightly more interest in sheet bar business, but exhibit no inclination to offer concessions from the present market level.

Finished Material—Prices of all steel products are firm, despite the lack of any substantial buying by consumers. Mills are showing greater willingness to accept orders, but only at the prevailing price level, although buyers are actively seeking concessions. Steel bars, however, appear to be somewhat easier in price. Orders are still difficult to place for early delivery. The current market ranges from £5 15s. 6d. to £5 16s. 6d. per ton (1.28c. to 1.29c. per lb.) for normal specifications. On rounds as low at £5 14s. per ton (1.26c. per lb.) is reported to have been done, although the usual quotation is £5 15s. (1.28c. per lb.), f.o.b. Antwerp. Beams are in good demand, with prices firm at £5 per ton (1.10c. per lb.), f.o.b. Antwerp. Corrugated bars are quoted at £5 18s. 6d. per ton (1.31c. per lb.). There is a good export demand for hot-rolled steel hoops, and the market is firm at £6 17s. 6d. per ton (1.51c. per lb.), f.o.b. Antwerp.

CZECHOSLOVAK BUSINESS GOOD

Domestic Trade Shows Large Increase—Skoda Works Had Profitable Year in 1927

PRAGUE, CZECHOSLOVAKIA, June 7.—Activity in the iron and steel markets was well maintained throughout 1927, and in the first quarter of this year domestic orders for pig iron exceeded the total for the corresponding quarter of 1927 by 28 per cent, while purchases of rolled steel products were 20 per cent greater. Much of this activity has been contributed by increased building operations throughout the country. Thus far this year exports of pig iron and steel products have continued at about the same level as in 1927, but no official statistics are yet available except on steel ingot output, which was 25 per cent greater during the first quarter than in the first quarter of last year.

The automobile industry is active, although importation of cars in the first quarter of 1928 was 11 per cent greater than in the first quarter of 1927. Exports, however, were 60 per cent greater. Imports of motor cars increased from the United States, Germany, Austria and Belgium and decreased from Italy and France. In the first quarter of this year 313 cars were received from the United States, which was about double the arrivals in the first quarter of 1927.

The Skoda Steel Works A. G. at Pilsen has declared a dividend for 1927 of 56 cr. ($1.66) per share, which compares with 50 cr. ($1.48) per share in the preceding business year. Net profits were 43,000,000 cr. ($1,272,800). The corporation reports a good year of business, as a result of increased domestic buying and active exports. Export business, however, was taken at low prices and this was offset in part by reducing production costs. The Polish branch of the Skoda Steel Works, established in 1927, has developed so satisfactorily that it is planned to add several new lines of production. The corporation has acquired a majority interest in the Uzinele Metalurgice Co., Budapest, Hungary, and has strengthened its position in Moravia by acquiring works which are to be used for electro-technical operations. The Czechoslovakian Berg-und-Huetten Co. has decided to establish a new rolling mill for sheets in Trinetz.

Izett, New German Steel, Not Impervious to Caustic Embrittlement

In an attempt to discover some steel not subject to caustic embrittlement which could be used for boilers fed with certain Western alkaline waters, Prof. S. W. Parr and F. G. Straub of the University of Illinois secured samples of "izett," the new type of steel reported by Dr. Ad. Fry in *Kruppsche Monatshefte*, November, 1926, page 185. Izett is said to show no aging effects after cold work. This steel could be cold worked and still have a high impact value, while the ordinary boiler steel would lose its impact strength after cold work. Doctor Fry's theory is that boiler plate is cold worked and highly stressed and then reheated to around 200 deg. C., which lowers the impact value of the steel. A steel of low impact value would crack more easily; consequently, he concludes that the service cracks encountered in boilers are due to the aged steel. He also made the statement that the new steel would not become embrittled under steam and caustic attack, and showed the results of tests where the new steel did not crack in caustic solution.

The results of tests conducted at the University of Illinois on three samples of this steel and described in Engineering Experiment Station Bulletin No. 177 showed that it is not any more resistant to embrittlement than regular American boiler plate. Its chemical analysis is carbon 0.17 per cent, manganese 0.41 per cent, phosphorus 0.020 per cent, sulphur 0.031 per cent, silicon 0.053 per cent, and nickel 0.030 per cent (possibly residual from ore or scrap). Physical properties as received are as follows: yield point, 32,000 lb. per sq. in.; ultimate strength, 56,500 lb. per sq. in.; reduction of area, 67.5 per cent.

This steel cracked in 20 to 24 hr. when loaded to 40,000 lb. per sq. in. and exposed to boiler water with 300 gm. NaOH per liter and steam pressure of 500 lb. per sq. in.

French Cast Iron Pipe Maker Appoints New American Agent

The foremost French maker of cast iron bell and spigot pipe, the Société Anonyme des Hauts-Fourneaux et Fonderies de Pont-a-Mousson of Nancy, has appointed the Herbert Kennedy Co., Inc., 475 Fifth Avenue, New York, as general sales agent in the United States. The Herbert Kennedy Co. was the first agent for Pont-a-Mousson pipe, appointed in 1920 for the United States, Canada, Central and South America and Cuba. In 1924, B. Nicoll & Co., 294 Madison Avenue, New York, were appointed exclusive agents for the United States, the Herbert Kennedy Co. retaining its agency for Canada, Cuba and the South and Central American countries.

Slight Increase in Orders for Commercial Steel Castings

WASHINGTON, June 23.—Orders for commercial steel castings in May totaled 84,824 tons, or 59 per cent of the monthly capacity of the 144,800 tons of the 128 concerns reporting to the Department of Commerce. They compare with 83,737 tons, or 58 per cent of capacity, in April. Production in May aggregated 91,638 tons, or 63 per cent of capacity, against 85,669 tons, or 59 per cent of capacity, in April.

Of the May orders, 34,954 tons was for railroad specialties, being 52 per cent of this class of capacity, compared with 32,810 tons, or 49 per cent of capacity, in April. Orders for miscellaneous castings in May totaled 49,870 tons, or 64 per cent of this class of capacity, against 50,927 tons, or 66 per cent, in April. For the five months ended with May orders for commercial steel castings were 433,595 tons, compared with 446,291 tons for the corresponding period of last year.

Production for the five months of 1928 totaled 432,233 tons, against 460,456 tons for the corresponding period of 1927.

To Classify Character of Coal for Different Industries

In connection with the convention of the National Association of Purchasing Agents, held at Kansas City, a meeting was held of the National Coal Committee, presided over by B. L. Verner, purchasing agent, Interstate Iron & Steel Co., Chicago. T. W. Harris, Jr., of the Du Pont company, chairman of the committee, suggested that for the coming year the association employ capable engineering service to prepare specifications covering a series of combustion conditions which, as far as possible, would classify average purchasing requirements of various lines of industry, such as the proper coal to be used under certain conditions and with certain equipment. It is planned to send such a query blank to coal users in the association, stoker manufacturers and coal operators.

Standard Sample of Ferrophosphorus

The United States Bureau of Standards has prepared a standard analyzed sample of ferrophosphorus containing 26.17 per cent of phosphorus. This standard is No. 90 in the series and costs $2 per sample of 75 gm. The sample may be paid for in advance with order or be sent by parcel post c.o.d. in the United States and its possessions. All foreign shipments require prepayment, together with 20c. additional for postage.

FRENCH AWAIT STABLE FRANC

Mills Unwilling to Contract Ahead Until New Value Is Known—Prices Still Below 1913

PARIS, FRANCE, June 11.—As stabilization of the franc (probably at about 124.48 to the pound sterling) is considered imminent, most steel works are unwilling to commit themselves to contracts for deliveries beyond three months. Only in a few instances, as in the case of the De Wendel works, are producers willing to book business for longer deliveries. On such protracted deliveries, works are demanding price increases, which they consider justified by the fact that the exact level of stabilization is not known. Present prices of French metallurgical products will probably undergo a slight advance if the franc is stabilized at 125 to 126 fr. to the pound sterling, as seems to be expected in some quarters.

Pig Iron.—No change in prices or general market conditions has developed. Negotiations for establishment of a syndicate to control hematite iron seem to have entered the final stage.

Semi-Finished Material.—The market is quiet, but prices are strong, with blooms at £4 11s. ($22.16) per ton, compared with £4 10s. ($21.92) per ton on June 1 and £4 5s. ($20.60) per ton on May 1. The price on June 1, 1913, was, on the basis of the present value of the franc, £5 ($24.35) per ton, f.o.b. Antwerp. Billet prices are £4 16s. ($23.38) per ton, compared with £4 14s. ($22.90) on June 1 and £4 10s. ($21.92) per ton on May 1. The June 1, 1913, price was £5 6s. ($25.81) per ton, f.o.b. Antwerp.

Finished Material.—The export price of steel bars seems to be stabilizing at £5 15s. to £5 16s. per metric ton (1.28c. to 1.29c. per lb.), f.o.b. Antwerp. The domestic market is active and some good orders are being booked from the French railroads, the French Navy and for export. Order books are well filled for three to five months, so that the stabilization of the franc is not expected to have a serious effect. The present price of bars, which has been fairly stable since June 1, compares with £5 5s. 6d. per ton (1.16c. per lb.) on May 1 and £5 10s. per ton (1.21c. per lb.) on June 1, 1913. Beams are quoted at £4 19s. per ton (1.09c. per lb.), which compares with £4 13s. 6d. per ton (1.02c. per lb.) on May 1 and £5 15s. per ton (1.28c. per lb.) on June 1, 1913.

Rails.—The current price is £6 10s. ($31.66) per ton, f.o.b. Antwerp, which compares with the pre-war price on June 1, 1913, of £6 ($29.22) per ton, Antwerp. The State Railways of Jugoslavia have placed an order with the Central European Steel Syndicate for 30,000 tons of rails. This syndicate includes Austrian, Czechoslovakian and Hungarian steel works.

Rustless Iron for Decorations

The latest use found for rustless iron is for decorative purposes for buildings, exterior and interior. Lyons, Ltd., one of the largest caterers in the world, which makes a specialty of securing the most prominent corner sites in London, described as "corner houses," has just opened the latest of this group, which is known as the Oxford Corner House, situated at the corner of Oxford Street and Tottenham Court Road, London. The new restaurant, which is a particularly massive and handsome building, seating 1200 on one floor, has the whole of the metal enrichment on the entrance doors made of rustless iron. In addition all the fittings of the serving counters, show cases and cash desks, and the various window show fittings are made of the same material. It is also used in the kitchens for the serving and cutting up tables, hot plates, and many small ovens as well.

Cooperating in Canada's Steel and Power Show, Toronto, Sept. 4-7, are the following organizations: Montreal Chapter of the American Society for Steel Treating and the Canadian section of the American Welding Society.

Export Company All Inclusive

New Steel Association, Permissive Under Webb Act, Includes Practically 100 Per Cent of the Exporting Companies

PENDING an expected announcement from the Federal Trade Commission, no statements from steel companies are obtainable respecting the newly formed Steel Export Association of America, of which information was given in these columns June 21, page 1773. While the initiative was taken by the export subsidiaries of the Bethlehem Steel Corporation and the United States Steel Corporation, in the filing of papers covering the formation of the export combination under the provisions of the Webb-Pomerene act, it now appears that practically every sizable steel company doing any export steel business has joined the association. This means that every member company of the former Consolidated Steel Corporation, for example, is in the new organization, together with the United States Steel Products Co. and the Jones & Laughlin Steel Corporation, both of which have heretofore remained altogether independent. There is no understanding that all companies will not seek export outlets as before, but through the export association they may discuss and establish export prices as a single corporate entity. For all practical purposes the new arrangement is calculated to govern 100 per cent of the exports of rolled steel from the United States—and it naturally looks to increasing exports or making them properly profitable.

Some of the effects expected from the export association are these:

Foreign buyers, often working in a more or less tight organization, will have less opportunity than before, or perhaps none at all, of pitting one seller against another and thereby realizing prices below the world level.

Less extreme price cutting in the competition with European steel producers in so-called neutral markets, through the possibility of a wider and clearer understanding of prices and a conception that prices will not play an unduly large part in the closing of business.

A definition clearer than now obtained of areas, or so-called spheres of influence, regarded as belonging primarily to the producers of one nation as against those of another.

It is assumed that Canadian business will not come under the purview of the Steel Export Association and also, as intimated, that the export departments of all the steel companies will maintain offices, here or abroad, as before. It is doubtful that the plans include any allocation of orders, on the score that the association is not likely to operate as an order-taking agency but chiefly as a price stabilizing agency.

Exporters and importers of iron and steel have ointed out that with the International Steel Cartel and the European Rail Makers' Association operating among Continental steel producers, a combination as inclusive of American steel production as the new association might work to limit imports of steel to this country.

The Consolidated Steel Corporation, as was mentioned in THE IRON AGE at the time of its disbandment, had been the largest and most important of the companies formed under the Webb Act for cooperation by American producers in the marketing of their products in foreign countries. It was incorporated Jan. 2, 1919, and went out of business in September, 1922. In its membership was the Bethlehem Steel Corporation, and the Lackawanna and Midvale Steel & Ordnance Co., both acquired by Bethlehem; the Youngstown Sheet & Tube Co. and the Brier Hill Steel Co. absorbed by Youngstown; the Republic Iron & Steel Co., and the Trumbull Steel Co., now a part of the Republic organization; the Lukens Steel Co., the Whitaker-Glessner Co., now of the Wheeling Steel Corporation, and the Sharon Steel Hoop Co., and it handled the export business of the Railway Steel Spring Co., the Standard Steel Works Co. and the Edgewater Steel Co.

RAILROAD EQUIPMENT

Erie Orders 900 Freight Cars—500 Gondolas Wanted for Export

The Erie Railroad has ordered 500 box cars and 400 automobile cars, leaving only 100 furniture cars to be purchased against its recent inquiry. Several foreign roads have issued inquiries for equipment in the American market, the largest being 500 gondola cars for the South African Railways. Details of the week's business follow:

South African Railways are inquiring for 500 20-ton, four-wheel gondola cars.

Erie Railroad has ordered 500 steel-sheathed, steel-framed box cars from Pressed Steel Car Co. and 400 automobile cars from Standard Steel Car Co. Action has not yet been taken on this road's inquiry for 100 furniture cars.

Chicago, St. Paul, Minneapolis & Omaha has ordered 250 stock cars from Pullman Car & Mfg. Corporation. This order was previously reported to unnamed bidder.

Missouri-Kansas-Texas has ordered 10 air-dump cars from Western Wheeled Scraper Co.

Chicago, Milwaukee, St. Paul & Pacific has purchased two 200-ton flat cars from Standard Steel Car Co.

Aluminum Co. of America has ordered two four-wheel switching locomotives from American Locomotive Co.

Canadian National is inquiring for three steel baggage and mail cars.

Union Pacific has made inquiry for four gas-electric rail motor cars and eight trailers.

Pittsburgh & Shawmut is inquiring for six caboose cars.

Southern Pacific will build nine locomotive tenders at its Houston, Tex., shops.

Lehigh & New England has made inquiry for six caboose cars.

Manila Railroad, Manila, P. I., is inquiring for 100 30-ton box cars.

Pacific Electric has ordered 18 interurban cars and 10 passenger coaches from St. Louis Car Co. This road also plans to recondition 198 cars in its own shops.

Chicago Great Western will buy three baggage and mail cars.

Montevideo Post Administration, Montevideo, Uruguay, has made inquiry for 20 open-top cars.

Elk Horn-Piney Coal Mining Co. has purchased 150 mine cars from Enterprise Wheel & Mining Car Corporation.

Southern Pacific has purchased 10 street cars from St. Louis Car Co.

A. Milne & Co., with headquarters at 745 Washington Street, New York, have been appointed sole agents for the United States and Canada for the cutlery sheets, file steels and special sections made by S. & C. Wardlow, Ltd., Sheffield, England.

James B. Clow & Sons, Chicago, have acquired through purchase of a majority of the stock a controlling interest in the National Cast Iron Pipe Co., Birmingham.

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This Issue in Brief

Cut costs and save valuable floor space by utilizing overhead space as a storage carrier. Overhead conveyors, supplemented with trucks, are reducing the large amount American industry pays for material handling.—Page 1805.

Welds of superior strength and appearance are produced at high speed by use of "electronic tornado" carbon arc. Superimposing a strong magnetic field on the arc appears to give the arc a gyratory motion and controls the arc, says welding machine manufacturer.—Page 1810.

Duplexing steel is beset with difficulties owing to the unstable and varying factors of each charge. Valuable results would be gained by finding a working relationship between the different slags and the intensity of the reaction when raw iron is charged.—Page 1812.

Cuts Cost 10 per cent by using high-tensile, low-manganese plate for shipbuilding, in place of mild steel. The high strength of 1.25 per cent manganese steel permits a reduction in weight with no sacrifice of strength. British Navy now uses it for all important hull members.—Page 1813.

Good foundry coke should not exceed 2 per cent in volatile matter. Fixed carbon should be at least 86 per cent; ash should be 12 per cent or less, and sulphur not over 1 per cent, says member of A. S. T. M. committee on coke specifications.—Page 1814.

Go after foreign business if your product is exportable, but first make a thorough study of the market. Purchasing power, local competition, patents and advertising are points to be investigated. The Department of Commerce can give invaluable aid.—Page 1815.

Residual chromium in open-hearth steel bears no relation to the chromium contained in the scrap charged, metallurgist declares. The amount of chromium remaining in the refined steel depends entirely on the method of melting and the bath temperature during refining.—Page 1818.

Railroads fight proposal to connect Youngstown to Ohio River by means of railroad extension. They declare the move is an attack on the rate structure. Youngstown steel makers say that their land-locked position handicaps them in competition with other producers. Getting the benefit of low-cost river transportation is essential to their prosperity, they assert.—Page 1819.

Sharp gain in steel exports. In May 171,474 gross tons of finished steel left the country, a gain of 25 per cent over April and 12 per cent over May, 1927. Shipments for first five months now equal exports for same period of last year.—Page 1828.

Investigation is unsuccessful in correlating pipe corrosion with chemical and physical characteristics of soil. In some soils the pipe is practically free from corrosion, while in others serious corrosion results in a short time.—Page 1806.

Determines proportional limit of steel quickly, yet accurately, by check-test. To insure absence of slipping of the grips of extensometer when lower reading is taken, a load of 4500 lb. per sq. in. is put on and a reading taken. Then load is gradually increased to 38,000 lb. per sq. in. and a second reading is taken. Finally the load is reduced to 4500 lb. and a third reading taken. The last figure must not exceed the original figure by more than 0.0004 in.—Page 1813.

American boiler plate is just as good as new German steel for use with alkaline waters. "Izett," a new Krupp product, is said to show no aging effects after cold work, but tests reveal that it is no more impervious to caustic embrittlement than is American boiler plate.—Page 1831.

Makes double welds at rate of 40 ft. an hour for each head, using controlled arc. Electrode holders cross each other at a sharp angle, without blowing out either flame. Cost of welding ½-in. plates ranges from 3c. to 7c. a ft.—Page 1811.

To keep down repair costs on overhead conveyors see that erecting is done with extreme accuracy. Straight runs of I-beams must be absolutely straight, and at the roller turns the center line of the web of the beam should be exactly vertical with the center line of the chain.—Page 1806.

Nine hundred per cent gain in motor-driven rolling mill main drives in past eight years. In 1920 there were 157 motor-driven main drives, and now there are over 1500.—Page 1807.

Workers who absent themselves without sufficient reason do not hold jobs. The operator of a costly machine who takes a day off to go fishing, and thereby forces his machine to stand idle, is fast passing, for workers who do not report for work are called to strict account. The result is a much better attendance record than prevailed in the past. — Page 1838.

New May record for automotive vehicle production was established last month. The total number of vehicles made in the United States was 425,990.—Page 1839.

ESTABLISHED 1855

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Sheet Mill Vitality

WITH the successful advent of the continuous mill for rolling strips to sheet mill widths, the suggestion was frequent about a year ago that the days of the old type sheet mill were numbered. Since sheets would be produced in the new mill at a large saving the hint was rather generally given that stockholders in companies operating the old type mills would show wisdom by selling out before the asset became a liability. But a year has gone by without the scrapping of any of the old type mills; the statistics of operation have shown a need for a large percentage of them, and while there have been one or two consolidations there are just as many sheet mill units now as twelve months ago. Moreover, obsolescence of the old type mill appears now to be somewhat remote.

It is interesting to look into the causes. Various sheet producers in adopting the continuous mill did so not with an idea of using it to make a finished product, but as a means of doing the work preliminary to finishing in a more rapid and economical way. At a meeting of the iron and steel division of the American Society of Mechanical Engineers held in Youngstown, Ohio, last November the continuous and four-high mills were freely discussed and the suggestion came out that, as there are many products which must have a finish and a thinness beyond what the mechanically operated mill can give, there is good reason for the retention of the hand-operated mill to perform the exacting finishing operations. To make the old mill supplement the new, moreover, would solve the financial problem that would have developed from the forced scrapping of the older mills.

Quite significant is the taking up of the idea of supplementary operation, as indicated in the announcement of one company that is building a wide strip mill and of another that has such a mill in operation, that a considerable part of the production of these mills will be marketed as strip mill breakdowns rather than as finished sheets or strips. The decision indicates a realization that, with two wide strip mill installations already in operation, with a monthly capacity of 30,000 tons, another with 25,000 tons and one building with 30,000 tons or more, to say nothing of the mill operating at Ashland and the one in the St. Louis district, the market is not broad enough to absorb profitably the product of these mills fully finished. Marketing of strip mill breakdowns means a narrowing of the demand for sheet bars, but probably a reduction in the cost of making finished sheets and black plate, so that eventually costs for strips and sheets will be much nearer parity.

Incidentally, and quite apart from these considerations, some sheet makers have been busy on their own account in finding methods calculated to lengthen the tenure of the pack-rolling mill. One interesting plan now in the making is the application of tin mill methods to sheet mill practice through the working of two mills as a unit and the use of continuous heating furnaces for sheet packs.

Call It by Its Right Name

AN attractive booklet comes from a manufacturing company, describing a new product. It says that after more than a dozen years of research a new alloy has been achieved, which has unusual properties of wear resistance, machinability, strength and toughness.

We do not doubt that such material as is described will give excellent service in many places, as the makers recommend, such as cams, brake drums, pistons, cylinders and dies, for the microscopic views contained in the booklet show that the product is a pearlitic cast iron—it contains rather short, discontinuous graphite flakes, in a matrix of sorbite and pearlite. The physical properties quoted (ultimate strength and yield point in tension both 35,000 lb. per sq. in.) are about what would be expected from a gray cast iron with 1.0 per cent combined carbon.

But what should be vigorously protested against is the makers' determination to call such material *steel*. The microscope shows it is not steel. It has excess carbon as graphite, and it is not malleable. It does not therefore correspond to the essential characteristics of steel, for steel is a malleable alloy of iron and iron carbide. A non-malleable alloy of iron, iron carbide and graphite cannot be a steel.

We believe the makers would do well to revise their publicity. To those prospective customers who may be influenced by scientific terms which they do not understand, "pearlitic cast iron" would be just as impressive as any name that includes the word "steel," even though preceded by a restrictive adjective. And among the other customers is a large and growing number of metallurgists who know the difference between cast iron and steel and who might be disposed to discount any statement of properties ascribed to a misnamed material.

New Thought in Stock Operations

CRITICISM has been passed of late on what has happened in the stock market itself and on the course of business men, alleged to be unduly interested in stock speculation to the detriment of their commercial affairs. One cannot but notice that the critics judge these matters of the stock market by old standards or traditions. Indeed they usually emphasize this, saying that collapses invariably did come. The question arises whether there have not been changes in respect to speculation and investment, comparable with those in industry, that call for new judgments of the securities market.

Suppose we apply old ideas to present practices in commerce. Here we have a manufacturer with a very limited inventory of raw materials. He used to carry much larger stocks and yet sometimes get caught with an insufficient supply. Is he not in danger? Or another manufacturer, with a small stock of finished product. There may be a sudden rush of demand, as there used to be in the good old days, and then he is going to lose customers to competitors.

To such suggestions the ready and sufficient answer is that times have changed. Orders for raw materials can be placed easily and transportation is prompt. The seller knows his customers' requirements within close limits and is assured that customers will not take sudden notions to purchase more than they need.

We see a cumulative increase in negotiable securities. Also we have an increase in population, an increase in physical assets per capita, and an increase in the proportion of the total assets that is represented by negotiable securities. There is a double increase in the supply of capital at a given moment; the total amount of capital has increased and at the same time there is an increase in mobility. Thus it is natural that the volume of share trading should be greater. The ticker's falling behind is not a measure of excessive trading. The ticker was made for stocks, not stocks for the ticker.

In the last five years this country has grown much more mentally than it has physically, great as the growth has been there. With increased information and better judgment trade depressions have been avoided which by old standards should have come. Already there has been some readjustment in the stock market and of an orderly character. The volume of brokers' loans, so much questioned, was reduced nearly $300,000,000 in a fortnight. Estimates of the reduction desired by the Federal Reserve management range between a half billion and a billion. When the inception of liquidation produced no great disturbance, further progress should not. No one can predict the final outcome, but when it is all over it is likely to be seen that the business or art of share trading has made progress in recent years as has been the case with so many lines of human activity.

Steady Automobile Production

LAST month's automobile production made a new high record for the month of May, production of passenger cars and trucks in the United States and Canada being 459,932, against 429,823 in 1927 and 446,118 in 1926. Even five years ago May showed 412,527. This month's production may be forecast at 450,000, with a small probable error.

A discussion in this department of THE IRON AGE of April 26 showed that large gains in automobile production disappeared quite a while ago and that not much deficit in supply, relative to general demand, accumulated last year. Now we can compare figures for periods three months later and they make the showing even more pronounced. It seems likely that for a time the best pair of calendar years will remain 1925-6 and the best twenty-four-month period that through March, 1927, just before the disappearance of the Ford model T.

For light on the probable future, the best use of the latest statistics is to set up twelve-month totals through June, as shown below, and calendar year totals are given in a separate column for comparison:

Production of Passenger Cars and Trucks, United States and Canada

	Twelve Months Through	
	June 30	Dec. 31
1922	....	2,639,373
1923	3,572,658	4,166,693
1924	4,149,840	3,736,164
1925	3,876,106	4,427,093
1926	4,669,608	4,503,352
1927	4,215,046	3,573,185
1928	3,729,715	....

Thus the best calendar year was 1926, ended a year and a half ago, while the best twelve-month through June ended two years ago. The best first half production was in 1926, two full years ago, while the best second half production was in 1925, two and a half years ago. The best twenty-four consecutive months ended March 31, 1927, a year and a quarter ago.

For the calendar year 1928 to pass 1926 a second half production of 2,150,000 is required, which would be 8 to 9 per cent under the first half production, whereas usually there is a much greater decrease. Such production may easily occur, but 1927-8 combined would still be under 1925-6.

What interests the steel trade is this, that it cannot expect a measurably larger tonnage outlet into the automobile industry in future than it had two and three years ago; yet it can expect a steadier monthly demand, therefore less pressure in spells to ship a large tonnage and likewise less question about prices in the off periods of demand.

ONE measure of the sounder condition of the British steel industry this year is a marked shrinkage in imports of iron and steel. In 1927 over 4,406,400 gross tons, or 367,200 tons per month, went into British ports—an amount never before equalled. The imports even exceeded the exports. To May 1, this year, imports averaged

276,200 tons per month, a decline of about 25 per cent. The falling off has been chiefly in semi-finished steel and in pig iron, though in most finished products the movement has been distinctly less. Leaders in the British industry have done well in thus checking the inrolling wave of cheap iron and steel from the Continent; but it is evident that much must be done in the removal of labor union restrictions if British steel is to regain its former place either at home or abroad.

The Day of the Financial Engineer

EVOLUTION in engineering societies has been an example of multiplication by division. Military engineering split off the civil section, which in turn parted to form the mechanical branch. From the latter was cleaved the electrical. More recently, new engineering branches have been formed by derivation from two parents. When chemistry began to require manufacturing equipment, the chemical engineering profession had its rise. Efficiency in industrial production invited the development of industrial engineers. Now, the increasing importance of finance in industrial organization seems to require the training of a new branch, that of financial engineers.

From the financial point of view, industrial operations present various aspects. Some are "bankable," meaning that they require the use of money for a definite short time, to be repaid by the proceeds of notes or contracts, and meanwhile are secured against failure to pay by the borrower's ownership of quick assets in the form of accounts and salable goods. Others are not "bankable," regardless of the various degrees of risk that may be involved. If permanent assets are or will be available as security, such as profit-making structures and equipment, with production and distribution systems of known effectiveness, such propositions may be acceptable to investment houses and in some cases even to trust companies.

Only practically experienced men are in position to appraise correctly the character of product and of the average purchasers, and therefore the probable percentage of accounts receivable which will be promptly and fully paid; also the value of factory inventories and their salability when considered as quick assets. Without the support of such information, the banker can only divide the borrower's book figures by two or some other arbitrary figure, and trust to his good character and presumed ability to redeem his promises. In the investment class, it takes the experienced engineer to decide whether producing equipment is the latest and to judge whether methods, men and management are capable of effective competition at continued profit. On the other hand many engineers are not qualified to determine the amounts needed for permanent and temporary financing, to forecast market changes and adjust operations to meet them successfully, and to distinguish between the ordinary and expected hazards of business and the extraordinary uncertainties which may upset all expectations, in producing a novel and untried device or opening a market among a new class of purchasers.

Financial men and engineers alike must take unknown chances when dealing with affairs which lie outside of their particular experience. Financial engineers, with education and training also in sound investment, banking and accounting practice, and with experience in manufacturing and industrial management, can give useful service to banks, investment houses and industrial operators and promoters. The advice of engineers with such a combination of abilities is helping greatly in the development of useful new industries and products, and preventing the loss of banking and investment funds in ill-planned industrial projects, and in prolonging the use of obsolescent equipment and inadequate methods of production and marketing.

Absenteeism on the Decrease

IN well-managed American manufacturing plants the number of absentee employees has decreased to a marked extent in the past few years. To take the experience of one large metal-working company, whereas formerly 7 per cent of the working force was absent as an average, now 3 per cent is considered normal. The effect upon manufacturing costs is easy to see. Overhead is lowered, general efficiency is raised. The industrial machine operates more smoothly and with greater productivity.

Three per cent of absenteeism is evidently not the low limit, as is demonstrated by some recent records which are illuminating in the possibilities they suggest, for they run well under 1 per cent. One plant employing 1500 men operated one month with only 96 days of absenteeism from all causes, which was the equivalent of four men out for the whole month. In another establishment employing 2300 men, absenteeism totaled 226 days, or the equivalent of nine men out for the month. In still another case, where 500 men were employed, in three months absenteeism totaled 35 days, an average of 12 days a month, and the equivalent of only one man out for less than one-half of the three months' period. These examples are extreme, of course, and it is not likely that such records could be maintained year in and year out. Yet they illustrate the new trend that is the result of several causes, one of the most important of which, no doubt, is the increased desire of workers to avail themselves of all possible money-earning employment.

Absenteeism divides into two classes, the avoidable and the unavoidable. There will always be some people out of a plant because of illness, accident, bereavement and like causes. The factors of sickness and injury have decreased steadily under modern shop conditions. Wholesome surroundings are a preventive of first-class importance. Most effective also is the work of the shop physician, whose treatment in the earliest stages of sickness reduces materially the number of cases of so serious a nature as to compel idleness. Also, the campaign for accident prevention and the compulsory treatment of the most trivial injuries have resulted in a great decrease of disabling, otherwise termed lost-time, accidents. A metal-working plant employing 5000 men reduced the number of disabling accidents from 129 in 1920 to 51 in 1927, and the expectation is that the number will go even lower this year.

But the major part of the reduction in absenteeism in recent years has been in the avoidable class.

In the past a certain number of employees felt free to take a day or two off now and then to attend to their private affairs, of business or pleasure. The day of making garden or going fishing in employment hours has passed. Discipline has tightened up. Workers who do not report for work are called to strict account. Once it was not uncommon for a man who operated a costly machine to stay out for a day's pleasure and let the machine stand idle. Nowadays in such a case the idler is informed that the machine must be kept going, and if he is not to be depended upon some one else will be found who will take the task seriously.

LARGE AUTOMOBILE OUTPUT

May Showed Greatest Total Since August, 1925 —Only 4 Per Cent Behind Record

WASHINGTON, June 25.—Production of motor vehicles in the United States during May totaled 425,990, of which 375,798 were passenger cars and 50,192 were trucks, according to reports received by the Department of Commerce from 157 manufacturers. This was the sixth largest month's production on record, having been exceeded only by March, April and August, 1926, and April and October, 1925; the last-named, the record, provided 442,114 vehicles. Output in April totaled 410,189 units, of which 364,877 were passenger cars and 45,312 trucks.

For the five months ended with May the total production was 1,805,060, of which 1,609,223 were passenger cars and 195,837 were trucks. This compares with a production of 1,747,007 during the corresponding period of 1927, the passenger car output being 1,523,891 and that of trucks 223,116.

Canada Makes New Record

Canadian production of motor vehicles in May totaled 33,942, of which 29,764 were passenger cars and 4178 were trucks, comparing with a production of 24,240 in April, of which 20,546 were passenger cars and 3694 were trucks. May provided by a wide margin a new high record for Canadian output; the largest previous total in any month was 25,708, in May, 1927. For the first five months Canadian production totaled 96,627, of which 82,562 were passenger cars and 14,065 were trucks. For the corresponding period of last year Canadian production totaled 106,973 units, of which 88,541 were passenger cars and 18,432 were trucks.

Iron and Steel Scrap Association of Chicago

The Iron and Steel Scrap Association, Chicago, has elected the following officers: President, Morton Teller, Teller Iron Co.; first vice-president, Walter Bregman, Price Iron & Steel Co.; second vice-president, E. G. Howell, Erman, Howell & Co., and treasurer, R. L. Jeffrey, R. L. Jeffrey Co. The directors are Ben Colitz, B. Kaplin, D. R. Cohen, Frank Parker, Sam Posen, M. Patinkin and W. Ross.

Pacific Coast Steel Co. to Build Bolt, Nut and Rivet Plant

The Pacific Coast Steel Co., San Francisco, will begin work immediately on a new bolt, nut and rivet and specialty forging plant which will adjoin its steel plant at South San Francisco. Decision to build the plant came as a result of a study of market conditions in the Bay region of California which has been made by the Pacific Coast company in conjunction with the industrial engineers of the San Francisco Chamber of Commerce.

The plant will represent an investment of $600,000 and is expected to start operating in the fall of the present year. The manufacturing department will be housed in a steel building 450 ft. x 100 ft., part of which will be three stories high. The machine shop and electric tool heating department will be 150 ft. x 80 ft. A full line of standard bolt products will be manufactured and the line of specialty forgings will be cared for as the market develops. The steel consumed by the local plant in the manufacture of its products will be made in the Pacific Coast company's mills in San Francisco. Storage and shipping space will total 20,000 sq. ft., and a minimum of 2000 tons of finished product can be carried at all times. Because of good rail connections the company will make 24-hr. deliveries to San Francisco Bay points in carload lots, and a truck delivery of 30 min. or less will be maintained for less than carload lots.

John Stetter, who recently owned and operated the Muncie Cap & Set Screw Co., Muncie, Ind., manufacturer of bolt products for automobiles, gas engines and other machines, will supervise and direct operations in the new plant. He has also been connected in a consulting capacity with the Southern California Iron & Steel Co., Los Angeles, which is affiliated with the Pacific Coast Steel Co.

National Distribution Conference in New York

Charles M. Schwab will speak at the Thursday morning session of the National Distribution Conference, which will be held at the Waldorf-Astoria, New York, June 28 and 29. As has been indicated in these columns, the conference is under the auspices of the bolt, nut and rivet industry and has been widely promoted by Charles J. Graham, president of the Bolt, Nut and Rivet Manufacturers' Association. At the opening of the Thursday morning session Mr. Graham will give a brief history of the association and an outline of its distribution plan.

The Thursday afternoon session will be devoted to a general discussion by various manufacturing and distributing interests represented at the conference. The aim is to develop sentiment and lead to action that will tend to correct conditions that have long been complained of in the selling of iron and steel and secondary products.

At the dinner Thursday evening there will be an address on "The Era of Efficiency" by James Francis Burke, general counsel of the Bolt, Nut and Rivet Manufacturers' Association, and Magnus W. Alexander, president National Industrial Conference Board, will discuss "Production, Distribution and Social Progress." On the program of Friday is an address by Col. William J. Donovan, acting attorney general of the United States, on "The Relation of Government to Business," and one by Gilbert H. Montague, general counsel of the National Welded Chain Association of the United States, on "Recent Steps in Business Self-Government."

Optimistic on Electrical Industry

Stockholders of the Westinghouse Electric & Mfg. Co. have ratified a change in the fiscal year of the company, to make it conform with the calendar year. Discussing business conditions, President E. M. Herr said they had not changed materially in the past several months. "There is perhaps at present a slight drop in volume," he said, "but this is offset by indications that, as soon as the Presidential nominating conventions are over, the volume will increase.

"I look for a rather good business year, not materially better than last year, but with a sufficient improvement in view to warrant confidence. The electrical industry is in a most fortunate position, for we have a continuous development which ever broadens its field of usefulness. These new fields of usefulness create new electrical markets and so continue the steady growth of the industry, at times when business in staple products may be slightly under normal."

Iron and Steel Markets

Steel Output Gains at Pittsburgh

Third Quarter Advance on Plates, Shapes and Bars Stimulates Specifying—Steel Consumption Well Maintained—Price Situation Irregular

STEEL consumption, which is no longer easily measured in view of the growth of miscellaneous uses for mill products, is holding up better than had been expected. As a rule, both specifications and new orders call for quick delivery, indicating that steel is being placed for actual requirements and not for stock, and total mill bookings bulk large. In the Greater Pittsburgh area, in fact, output has increased to 72 per cent of ingot capacity, compared with 70 per cent last week. Operations in the Chicago district, on the other hand, have declined three points to an 80 per cent rate.

The improvement at Pittsburgh is attributed, in part, to heavier specifying against second quarter contracts, particularly those covering plates, shapes and bars. On those products mills are making a more determined effort to establish a price of 1.90c., Pittsburgh, for the coming quarter, and, while some buyers regard this move as a defensive one, primarily intended to hold the market at the present level of 1.85c., others are taking the precaution to release the steel still due them.

The volume of mill bookings and the rate of production leave but little to be desired, considering the season. Operations at Chicago and Pittsburgh are from five to seven points higher than a year ago.

The price situation, however, is not so favorable. In contrast with the advanced quotations on plates, shapes and bars, prices on cold-drawn bars have been reduced $2 a ton and sheets have shown further weakness. Black sheets at 2.65c., Pittsburgh, and galvanized sheets at 3.50c., which is now the maximum rather than the minimum going price, are at the lowest levels since March, 1916.

At Cleveland, third quarter business in cold-rolled strip has been taken at a concession of $2 a ton, and the final abandonment of efforts to advance hot-rolled strip is seen in the acceptance of forward commitments at the same prices that ruled on second quarter contracts.

In semi-finished and primary materials the price trend is irregular. Basic pig iron in the Valleys has rebounded after dipping to $15.37 a ton, furnace, having advanced to $15.75 on a sale of 2500 tons. Alabama and Tennessee foundry iron, on the other hand, have again declined to $15.50, Birmingham, after an advance to $16 late in May.

Scrap prices are weak in all markets, and heavy melting steel at Pittsburgh has receded 25c. a ton for the second time in two weeks, now being at the lowest level since early in 1922.

In semi-finished steel the re-establishment of base-size billets at $33, Pittsburgh, or $1 a ton above recent prices, is now a possibility, but sheet bars, under the threat of competition from strip mill breakdowns, have been sold at $32, Youngstown, a drop of $1 a ton.

Among the major outlets for steel, building is the most active. Of 38,200 tons of fabricated steel work placed in the week, 12,000 tons was for a New York hotel. In Greater New York alone large projects likely to be placed during the summer total more than 100,000 tons, of which 20,000 tons is for a Brooklyn department store.

Tin plate mills are booked for 45 to 60 days, following generous specifications from can manufacturers.

Some of the Michigan automobile builders have sharply curtailed production and others have shut down for inventories and changes in models. Steel orders from the automobile industry have declined, but the demand for sheets and strip steel from that source is still large for this season.

Automobile production in May was 425,990 units, the sixth greatest total for any month and less than 4 per cent below the record of 442,114 established in October, 1925.

The new steel export association includes nearly, if not all, of the producing companies interested in exporting, and aims in part to secure export price stabilization, to combat foreign cooperative buying and, indirectly, to develop favorable areas for exports and at the same time to strengthen world price levels.

Exports of iron and steel in May were 267,890 gross tons—the largest total since February, 1921.

Reaching the lowest level since 1915, the pig iron composite price of THE IRON AGE has dropped to $17.21 a ton, from $17.23 held for the three preceding weeks. It is now just $1.50 lower than a year ago. The finished steel composite remains at 2.341c. a lb. for the fourth week, against 2.367c. a year ago.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Jun.26, 1928	Jun.19, 1928	May 28, 1928	Jun.28, 1927
No. 2, fdy., Philadelphia..	$20.76	$20.76	$20.76	$21.26
No. 2, Valley furnace....	16.75	16.75	17.00	18.00
No. 2, Southern, Cin'ti....	*19.19*	19.69	19.69	21.69
No. 2, Birmingham......	*15.50*	16.00	16.00	18.00
No. 2 foundry, Chicago*..	18.00	18.00	18.00	20.00
Basic, del'd eastern Pa...	19.00	19.00	19.00	20.75
Basic, Valley furnace....	**15.75**	15.35	16.00	17.50
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	20.26
Malleable, Chicago*	18.00	18.00	18.00	20.00
Malleable, Valley	17.00	17.00	17.25	18.00
Gray forge, Pittsburgh...	18.01	18.01	18.26	19.26
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace.	105.00	105.00	105.00	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$43.00	$43.00	$43.00	$43.00
Light rails at mill.......	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh..	32.00	32.00	33.00	33.00
O.-h. billets, Pittsburgh...	32.00	32.00	33.00	33.00
O.-h. sheet bars, P'gh....	33.00	33.00	34.00	33.50
Forging billets, P'gh.....	38.00	38.00	38.00	39.00
O.-h. billets, Phila.......	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh....	42.00	42.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.80

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12
Iron bars, Chicago.......	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.85	1.85	1.85	1.80
Steel bars, Chicago.......	2.00	2.00	2.00	2.00
Steel bars, New York....	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh..	1.85	1.85	1.85	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	2.00
Tank plates, New York...	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York.......	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jun.26, 1928 Cents	Jun.19, 1928 Cents	May 28, 1928 Cents	Jun.28, 1927 Cents
Sheets, black, No. 24, P'gh	2.65	2.65	2.70	3.00
Sheets, black, No. 24, Chicago dist. mill.........	2.75	2.75	2.80	3.10
Sheets, galv., No. 24, P'gh	3.50	3.50	3.55	3.85
Sheets, galv., No. 24, Chicago dist. mill.........	3.60	3.60	3.70	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill.........	2.10	2.10	2.15	2.35
Wire nails, Pittsburgh...	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.60	2.60	2.70	2.55
Plain wire, Pittsburgh...	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh..	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill.........	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box. P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$14.25*	$14.50	$15.00	$14.75
Heavy melting steel, Phila.	*13.00*	13.50	13.50	14.00
Heavy melting steel, Ch'go	12.50	12.50	12.75	12.00
Carwheels, Chicago	13.00	13.00	13.25	13.50
Carwheels, Philadelphia ..	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh....	14.25	14.25	14.50	15.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	16.00
No. 1 cast, Ch'go (net ton)	*13.50*	14.00	14.00	14.50
No. 1 RR. wrot, Phila....	13.50	13.50	15.00	16.00
No. 1 RR. wrot, Ch'go (net)	*11.00*	11.25	11.50	11.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$2.60	$2.60	$2.60	$3.00
Foundry coke, prompt....	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	14.87½	14.87½	14.87½	12.62½
Electrolytic copper, refinery	14.50	14.50	14.50	12.37½
Zinc, St. Louis...........	6.15	6.15	6.12½	6.22½
Zinc, New York..........	6.50	6.50	6.47½	6.57½
Lead, St. Louis..........	6.15	6.15	6.07½	6.15
Lead, New York.........	6.30	6.30	6.20	6.40
Tin (Straits), New York..	*46.25*	46.62½	51.00	66.00
Antimony (Asiatic), N. Y.	9.62½	9.62½	11.00	12.25

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*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Higher Production, Price Uncertainty, Basic Iron Rally and Weak Scrap

PITTSBURGH, June 26.—Steel ingot production in this and nearby districts averages a point or two higher than it did a week ago, in keeping with the fact that total orders for finished products have shown a moderate upturn in the past week. The hot-rolled products have made a notable good showing in point of releases by consumers. Little fault is found with the size of the aggregate specification in sheets, and tin plate is being ordered freely enough to lead some makers to defer promises of delivery against new business to the middle of August, or the first part of September. Specifications for strips and other steel products going into motor cars are holding up in surprising fashion.

It is evident from the developments of the week that consumption of steel has not decreased as much or as rapidly as it has in the past five years at this particular time, or as manufacturers had expected it to, drawing conclusions from the experiences of those years. Orders and specifications individually have been of moderate size, but they have been numerous and calling for such quick delivery as to create the impression that they represented actual requirements. Both orders and mill operations average higher than at this time last year.

The picture, however, is not such a happy one on the side of prices. Not much stability yet has developed in strips or sheets, while a reduction of $2 a ton in cold-finished steel bars is disturbing. It has created a rather awkward situation for makers of hot-rolled bars, who have been making some effort to establish an advance of $1 a ton on third-quarter contract tonnages. These quarters no longer begin in January, April, July and October, but one month later, since buyers have until the end of the calendar quarter to specify, and by taking advantage of that condition can secure shipments for a month's needs. This is taken to be an explanation of the absence at this time of much of a drive for third-quarter contracts.

Prices of semi-finished steel are very indefinite, but there are signs of formal third-quarter prices that will place billets and slabs at a premium over sheet bars, reversing the usual price order.

There has been a rally in basic iron since a week ago, the break in which had an effect upon steel prices and has made steel companies a little less eager to sell. The market has dropped another 25c. a ton on heavy melting steel scrap and still shows a sagging tendency. Despite some consumer interest, that grade has been sold at $14.50, but also has been refused at that price, which is the lowest level reached since the early part of 1922, when the recovery from the depression of the year before was beginning to get under way.

Pig Iron.—The market has recovered some of its recent decline in basic grade, which on a lot of 2500 tons went to $15.75, Valley furnace, as compared with $15.37, the price done on the last previous sale of Valley basic iron. There were only a few bidders for this 2500-ton lot, as the specification called for extremely low sulphur content, and the quotation of the unsuccessful bidders was $16, Valley furnace. It is believed the 10,000 tons of basic inquired for recently by a Wheeling district sheet maker has been bought, and that it will be supplied by other steel companies having comparatively low freight charges to destinations. The National Malleable & Steel Casting Co., Sharon, Pa., is inquiring for a round lot of basic iron. The market is distinctly firmer on this grade, because the effect of the recent break upon the steel market was bad and there seems to be a little less anxiety on the part of steel companies with surplus supplies to market them. Not much activity is noted in other grades, although a fair-sized aggregate tonnage of foundry iron is moving. In this grade $16.75, Valley furnace, for No. 2 grade has become the top price, and while no less is being done in the Pittsburgh market, that price has been shaded by as much as 25c. on shipments beyond this district. Malleable and Bessemer iron continue to move at $17, Valley furnace.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.75 to $16.00
Bessemer	17.00
Gray forge	16.25 to 16.50
No. 2 foundry	16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Although steel works operations are lower than a month ago, specifications on contracts for ferromanganese remain heavy, presumably because of a desire by consumers to defer paying the last half price, which is $5 a ton above the first half price. Users also are specifying well against contracts for the other commonly used ferroalloys. New business is light.

Refractories.—There is not enough business in clay fire and silica brick to give manufacturers an operation of as much as 50 per cent of their capacity. Actual consumption of refractories is probably as high as it ever has been, but instead of stocking as they did formerly, producers of iron and steel now wait until there is a need before buying. Blast furnace linings are being placed steadily enough and there is a steady movement of silica brick to the steel works, but productive capacity is large and satisfactory operation is made difficult by the hand-to-mouth character of the demand. The product is giving longer service than it did a few years ago and that also tends to make purchases less frequent. There is some shading of prices of silica brick, but, in general, prices are holding well at levels of the past several months.

Bars, Plates and Shapes.—There has been some quickening in the releases against second-quarter contracts and the past week's business has been satisfactory to makers in this district. Ordinarily, the specifications increase in the last week or ten days of each month to cover the requirements of the early part of the ensuing month, but recent improvement seems to be due in no small measure to a more earnest effort by the mills to establish 1.90c. as the third-quarter contract price. It is a little discomforting to makers of hot-rolled bars that the price of cold-finished bars has weakened at this particular time, since producers of the latter, accounting for no small part of the hot-rolled bars production, naturally will try to escape paying any advance. Plate business still reflects the lack of large railroad car orders, but order books of one maker have been helped by the line pipe order placed last week with local mills. Fabricated steel business is rather dull in this district, but there is a fairly constant demand for plain material.

Rails and Track Supplies.—There is only a moderately active new demand and old orders are pretty well worked out. Inquiry for 250 tons of light-section rails, believed to be for export, is before the market.

Wire Products.—While not really active, business is better than it has been recently. In nails, the betterment is partly due to the fact that manufacurers are less rigid as to prices, with few now asking more than $2.55, base, per keg, Pittsburgh. There is some resistance to $2.50, base, per 100 lb., on plain wire, but that price still is the ruling one.

Tubular Goods.—Interest still centers on line pipe. The Texas Co. has an inquiry out for 175 miles of 12-in. pipe and smaller mileages of 10-in., 6-in. and 4-in. pipe, while a 136-mile gas pipe line has been projected by the Inland Gas Corporation, to convey gas from Kentucky to West Virginia. There is a fairly steady demand for standard-weight pipe for building and construction, but oil well drilling still is much curtailed and oil country pipe consequently is not much wanted.

Sheets.—Specifications are coming to makers in this district in good volume and excepting the car building and car repair companies, all consuming industries are represented in the releases. Demand from the automobile body makers and motor car builders shows some urgency, but there is no real pressure for shipments from other sources of consumption, and the mill suspensions common around the Fourth of July, and expected next week, will not seriously hamper manufacturers in keeping customers supplied. Prices are just about where they were a week ago. Galvanized sheets, however, are weak and in a general way 3.50c., base Pittsburgh, is the top of the market, with even less being done on roofing and siding material. Mill operations range from 70 to 75 per cent of capacity.

Tin Plate.—This product stands out as the really active one of the entire list of steel products. Can manufacturers continue to figure on a big pack of perishable foods and to order freely against contracts, with the result that most tin plate makers now are booked against probable production for the next 45 to 60 days.

Cold-Finished Steel Bars and Shafting.—Quite unexpectedly the price was reduced late last week $2 per ton to 2.10c., base Pittsburgh or Chicago, and 2.15c., Cleveland. In view of the proposed advance of $1 a ton in hot-rolled bars on third quarter contracts, the only explanation for the decline in cold bars seems to be that some producers believed a lower price would stimulate a rather laggard interest in needs for the quarter starting July 1. There seems to have been no consumer pressure against the former price.

Cold-Rolled Strips.—Uncertainty in hot-rolled strip

THE IRON AGE Composite Prices

Finished Steel

June 26, 1923, 2.341c. a Lb.

One week ago	2.341c.
One month ago	2.348c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

June 26, 1928, $17.21 a Gross Ton

One week ago	$17.23
One month ago	17.39
One year ago	18.71
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.21,	June 26
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.00c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.06c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

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*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.15c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh	3.00c. to 3.15c.
Strips, 1 up to 3 tons, Cleveland	2.90c. to 3.00c.
Strips, 1 up to 3 tons, del'd Chicago,	3.30c. to 3.45c.
Strips, 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

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*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 *Lb.*
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c. to 2.25c.

Box Annealed. One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.54c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20	25-lb. coating I.C.	$16.70
15-lb. coating I.C.	14.00	30-lb. coating I.C.	17.75
20-lb. coating I.C.	15.30	40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
	Chromium Nickel Vanadium	1.50	4.15
	Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 *Lb.*
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅛	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens and 5 on charcoal iron tubes on lots of 21,000 lb. and more.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ and 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

prices is reflected to some extent in cold-rolled strip prices, but it is seen in more numerous sales at the recent minimum price than in an outright decline. Specifications, although off from those of a month ago, are heavier than many expected they would be at that time.

Bolts, Nuts and Rivets.—Manufacturers report that third-quarter contracts are coming along well. Current buying and specifications are moderately heavy and sufficient to sustain plant operations at around 50 per cent of capacity. Prices show no change.

Semi-Finished Steel.—A strong effort is being made to reestablish base size billets to $33, Pittsburgh. Meanwhile, users are arguing for a lower price and holding back specifications on the ground that the price should be lower in view of the low levels on pig iron and scrap. Producers say that most of the billets and slabs now marketed go to strip makers, whose specifications are really for forging quality steel. It is probable that the third-quarter price will be set at $33. Sheet bars, on the other hand, are weak and recently sold at $32, Youngstown, and it is doubted that more could be obtained here. Indeed, in view of the probability that sheet bars are likely soon to face competition from strip-mill breakdowns, it is possible that, instead of sheet bars selling at more than billets and slabs, they will be lower when third-quarter contract prices are announced. On wire rods, $44, base Pittsburgh, appears to be out of the question, since they are available from more than one source at $42 and some business has been lost at that quotation.

Hot-Rolled Flats.—Viewed strictly from the angle of specifications, the market is quite satisfactory, but the price situation still leaves much to be desired by manufacturers. While the regular quotations rule on small lot orders, they do not mean much on the large tonnage business, particularly on widths of more than 3 in. There has been a report that another size bracket, taking in widths of 1½ in. and less, was to be set up, but investigation discloses that manufacturers are giving some attention to going to a single base size bracket.

Coke and Coal.—The market for spot coke still is very limited. With both wants and supplies very small, there is no occasion to change the prices that have ruled for several weeks. Quietly, there has been a fair amount of third-quarter contracting for furnace coke, and foundries have very generally renewed arrangements with regular sources of supply for the remainder of the year. The coal market shows neither real activity nor much strength. Lake cargo orders, which have been counted on to help the local situation, have not yet appeared in volume.

Old Material.—One steel maker in this district has bought a good-sized tonnage of heavy melting steel during the week. The material, which was of the better sort, was purchased at $14.50, representing a further recession of 25c. a ton. That price also is available for delivery to another Pittsburgh district point. Generally, however, steel makers are not much interested in the market, and, with short orders well covered, prices lack the support of dealer buying. On compressed sheets, $14 appears to be all that can be obtained, while $13 measures the limit on bundled sheet sides and ends. Machine shop turnings still are very weak, and, while dealers want more, $9 is all that can be obtained. Blast furnace scrap also is weak, with $10.50 now the top of the market. The steel foundry grades are sagging for want of demand, with railroad knuckles, couplers, springs and carwheels no longer quotable at more than $15.50 and some "distress" sales being made as low as $15. The low level to which basic iron has fallen has had an effect upon the value of heavy melting steel scrap. The belief that present prices of scrap would discourage collection of it has not been fulfilled, certainly not to the extent of narrowing the gap between supply and demand. Some liquidation of yard stocks by dealers also has helped to depress prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:		
Heavy melting steel	$14.00 to	$14.50
Scrap rails	14.00 to	14.25
Compressed sheet steel		14.00
Bundled sheets, sides and ends		13.00
Cast iron carwheels	14.00 to	14.50
Sheets bar crops, ordinary	14.50 to	15.00
Heavy breakable cast	12.00 to	12.50
No. 2 railroad wrought	14.25 to	14.50
Heavy steel axle turnings	12.50 to	13.00
Machine shop turnings		9.00
Acid Open-Hearth Furnace Grades:		
Railroad knuckles and couplers	15.00 to	15.50
Railroad coil and leaf springs	15.00 to	15.50
Rolled steel wheels	15.00 to	15.50
Low phosphorus billet and bloom ends	19.00 to	19.50
Low phosphorus, mill plate	17.50 to	18.00
Low phosphorus, light grade	16.50 to	17.00
Low phosphorus sheet bar crops	17.50 to	18.00
Heavy steel axle turnings	12.50 to	13.00
Electric Furnace Grades:		
Low phosphorus punchings	16.50 to	17.00
Heavy steel axle turnings	12.50 to	13.00
Blast Furnace Grades:		
Short shoveling steel turnings	10.00 to	10.50
Short mixed borings and turnings	10.00 to	10.50
Cast iron borings	10.00 to	10.50
No. 2 busheling		9.00
Rolling Mill Grades:		
Steel car axles	18.00 to	18.50
No. 1 railroad wrought	10.50 to	11.00
Sheet bar crops	16.50 to	17.00
Cupola Grades:		
No. 1 cast	14.25 to	14.50
Rails 3 ft. and under	15.50 to	16.00
Malleable Grades:		
Railroad	14.00 to	14.50
Industrial	13.50 to	14.00
Agricultural	13.00 to	13.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.55c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.40c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Pittsburgh District More Active Than Last Year

Business and industrial activity in the Greater Pittsburgh district in the first half of June was at slightly higher average rate than in June of last year, but showed some falling off compared with the previous month, according to a survey by the Bell Telephone Co. of Pennsylvania. Pig iron production, based upon the number of furnaces active in relation to the number available, is placed at 65.4 per cent for June this year, compared with 60.3 per cent a year ago. Steel ingot production is estimated at 76 per cent, against 74.2 per cent in June, 1927; coal mine operation at 52.5 per cent, against 49.4 per cent a year ago; and building at 71 per cent against 69.5 per cent a year ago.

The machinery trades are rated at 83 per cent, a loss of 1 point from June, 1927; beehive oven coke production, at 13.4 per cent, contrasts with 27.2 per cent a year ago; and the railroad equipment industry, at 71.5 per cent, is seven points poorer than a year ago. The general average is given as 62.9 per cent, which compares with 63.6 per cent in May and 62 per cent in June, 1927.

Shevlin Engineering Co., engineer and contractor, specializing in installations of mechanical and power plant equipment, has taken new offices at 227 Fulton Street, New York.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$33.00 to $34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base

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*Chicago mill base is $44 to $45. Cleveland mill base, $43 to $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.25
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	9.00
Foundry by-prod., del'd St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

Per 1000 *f.o.b. Works*

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 *f.o.b. Works*
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

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*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 *Lb.*
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Good Structural Outlook But Operations Off 3 to 4 Per Cent

CHICAGO, June 26.—Third-quarter prices for the heavy tonnage steel mill products are as yet unannounced and this delay is in some measure accountable for the lack of interest being shown by consumers in requirements for the next three months. Producers of cold drawn bars have made reductions in prices for the coming quarter and in some commodities, such as nails, efforts to hold quotations at previously announced levels are not meeting with success.

The common impression that July and August will be comparatively dull months in business generally is leading purchasers to buy in small lots and so prices now being obtained for practically all commodities must be gaged on that score. Sales in plates, shapes and bars are measurably below shipments, which now represent only 80 per cent of ingot capacity, a drop of 3 to 4 points in the week. On the other hand specifications, though lower than last week, still represent a total tonnage not far from the current rate of deliveries. Characteristics of bar orders are that individual releases are small and the variations in sizes so great that often deliveries are made in a considerably longer time than mill schedules would indicate as being possible.

One promising feature of the steel business is the outlook in the structural market. The New York Central has ordered 1000 tons for a depot at South Bend, Ind. Action may be taken on the Austin High School, Chicago, this week, and the Fine Arts Building, Chicago, taking 5000 tons, may be placed by the middle of July. At Kansas City, Mo., close to 2500 tons will be needed for an assembly plant for the Chevrolet Motor Co.

Pig Iron.—Forward buying continues to drag, while current sales for close by delivery are increasing. Melters, particularly those having small capacity, are cautious both as to the trend in their businesses and prices for merchant iron. Compilation of June shipments shows them to total less than for May, but larger than in the sixth month of 1927. A user in Joliet, Ill., will buy 700 tons of foundry iron. A foundry in western Michigan has closed for 700 tons of 8 per cent silvery at the full schedule. Southern iron has been reduced 50c. a ton at Birmingham.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	21.51
Southern No. 2 (barge and rail)	21.01
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Spiegeleisen in the 19 to 21 per cent grade has gained strength at $33, Hazard, Pa., or $40.76, delivered Chicago. Reduction in steel mill operations is further indicated by lighter specifications for ferrosilicon. The ferromanganese market is quiet.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—Little lies in promise for local plate mills except current tonnage from miscellaneous manufacturers. Car shops have practically completed issuing specifications against large equipment purchases, and with oil consumption gaining, the opinion is rather generally expressed that the stress of immediate storage facilities is at least temporarily relieved. Greater interest is being shown in the 12,000 tons of plates needed for a water line in Denver. The Marine Iron & Shipbuilding Co., Duluth, will require 1000 tons for three scows that it has under contract, and a boiler manufacturer in the Middle West will buy 5000 tons for third-quarter requirements. The 250 stock cars reported placed last week by the Omaha lines of the Chicago & North Western are now definitely known to have been taken by the Pullman Car & Mfg. Corporation. The Missouri, Kansas, Texas has ordered 10 air dump cars from the Western Wheeled Scraper Co., and the Chicago, Milwaukee, St. Paul & Pacific has closed for two 200-ton flat cars with the Standard Steel Car Co. Local producers figure that about 4000 tons of car materials will be needed for 400 cars which will be built in Western shops for the Erie Railroad. Plate deliveries have improved materially in the last month and most sizes can now be had in two to three weeks. The Chicago market is quotable at 2c., but this is being tested only by small tonnages. Third-quarter contracting is dull in the absence of stated price policies for the next three months.

Mill prices on plates, per lb.: 2.00c., base Chicago.

Structural Material.—Structural awards in miscellaneous orders total about 5000 tons for the week and fresh inquiry is for 3500 tons. At Chicago the largest single award was 3000 tons for the Harmon Sports Arena, and the Wisconsin Bridge Co. has taken 1000 tons for a bridge at Nelson, Ill., for the Chicago & North Western. Three fresh projects of 1000 tons each are before fabricators in the Omaha territory, and a bridge at Blair, Wis., calls for about 1000 tons. Taken as a whole, the structural steel market holds some promise that there will be a fair run of business, continuing well into midsummer. Inquiries are varied and it is quite noticeable that industrial projects are more numerous than for many months. Prices obtained by fabricators are not satisfactory from the standpoint of profits, but it can at least be said that prices bid by the shops are reasonably steady.

Mill prices on plain material, per lb.: 2.00c., base, Chicago.

Bolts, Nuts and Rivets.—Third-quarter contracting is near the end and there has been little opposition to prices. Total specifications are larger, as railroads' requirements grow and farm implement manufacturers find that stocks had been reduced below the practicable limit. The demand for small rivets is steady.

Reinforcing Bars.—Outstanding among awards for the week is 5000 tons of rail steel bars for the Merchandise Mart, Chicago. Smaller orders are also more in evidence, with purchases of 5 to 25 tons each unusually numerous. Shop backlogs have increased, though, because of the lateness of the season, it is improbable that operations will become heavier unless contractors press for deliveries. Fresh inquiries are increasing, lending added interest to a market that is showing more life. A printing press manufacturer in Chicago will erect a building requiring close to 600 tons of reinforcing bars. Prices are more stable than for many months past, though large-tonnage billet bar contracts are needed to give the market a real test. Orders and new inquiries are shown on page 1858.

Cold-Rolled Bars.—Local producers have announced a third quarter price of 2.10c., base, per lb., Chicago. Specifications for the first three weeks of June were fully up to the average in May. Forward contracting is actively under way.

Bars.—A sharp drop in specifications following two weeks in which orders entered at mills were unusually large gives further force to the thought that buyers having specified heavily against second quarter contracts are now in a strong position to hold out of the market at the time when third-quarter requirements should be given their attention. New buying in soft steel bars is accordingly dull. Improvement in delivery of mild steel bars is noteworthy, the range now being two to three weeks. The Chicago market is nominally at 2c. Sales are not large and orders at 1.95c., Chicago, are being taken. Readjustment in the automobile trade accounts for a smaller demand for alloy-steel bars. Prices for this commodity are steady and alloy differentials are holding. Several railroads have entered sizable orders for iron bars at 2c., Chicago. Both rail steel bar mills in this district are operating at capacity. Barn equipment manufacturers are especially busy and there is a better tone to the bed trade. It is now assured that June shipments will be the largest in the history of the local mills. Prices of rail steel are steady at 1.85c., while small tonnages bring 1.90c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—A spurt in specifications from the manufacturing trade indicates anxiety on the part of buyers to make use of second-quarter contracts to the limit and it is rather generally accepted by producers that shipments against second quarter contracts will be willingly extended well into July. While some progress is being made in forward buying, there is evidence in this market, as in others, that buying in the summer months will be at close range. The jobbing trade is only moderately active, though past specifications and orders are helping to hold mill output at a level close to 65 per cent of capacity. There is little or no change in the nail market. Buyers are quiet and prices range from $2.60, base, per keg, Chicago, to $2.70. Scattered rains throughout most of the Middle West have done much to relieve the crop situation, which for a time did not look favorable. In the South heavy rainfall has resulted in damage to crops from floods and has made fields unworkable. Prices for wire and wire products are given on page 1843.

Rails and Track Supplies.—Local steel mills have taken miscellaneous orders for a total of 1000 tons of standard section rails. The demand for light rails is heavier, new orders totaling close to 1500 tons. Releases against rail contracts are favoring mills to hold operations at 80 per cent of capacity through this week, though it is not improbable that output will be cut in the next ten days. A fair tonnage of spikes, bolts and angle bars has been purchased this week, but operations in these departments have fallen. Tie plate shipments are heavy and output is close to capacity.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Coke.—Shipments of by-product foundry coke, though running somewhat below May, will compare favorably with the sixth month of 1927. Prices are steady at $8, f.o.b. local ovens, and $8.75, delivered in the Chicago switching district.

Sheets.—Operating schedules continue unusually close and it is not improbable that since there is one holiday next week several hot mills will not be started in that week and so afford a little more time for tonnage to accumulate and assure better operating conditions for the following week. The new low level in prices given last week appears to be holding moderately well. Although all sellers are dissatisfied with the price situation, there seems to be little opportunity to improve conditions. Demand for black sheets and galvanized sheets is dull and even in the blue annealed commodity buyers show little or no inclination to anticipate requirements beyond the next few weeks. Blue annealed sheets may be had in two to three weeks, black sheets in seven to ten days and galvanized sheets in ten days to two weeks.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.80c.; No. 24 galvanized, 3.65c.; No. 10 blue annealed, 2.15c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 3.00c.
Reinforcing bars, hard steel	2.00c. to 2.70c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Cast Iron Pipe.—Buyers are showing more interest and prices are holding. The United States Cast Iron Pipe & Foundry Co. has taken 750 tons of pipe for West Allis, Wis., and 125 tons for Dayton, Ohio. The Lynchburg Foundry Co. has closed for 700 tons for Niles Center, Ill., and the McWane Cast Iron Pipe Co. will furnish 500 tons for Columbia, Ill. Chillicothe, Ohio, has ordered 115 tons from James B. Clow & Sons. Of special interest among fresh inquiries is 650 tons needed by the Santa Fe Railroad at Galesburg, Ill., and Morton Grove, Ill., will buy 1000 tons of 6 and 8-in. pipe. It is reported here that the 2500 tons wanted by Roseville, Mich., has been closed. New bids will be taken July 3 at St. Paul on 1100 tons of 6 to 16-in. pipe. Sellers are expecting a dull buying period in July and the first half of August.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $40.20 to $41.20; 4-in., $44.20 to $45.20; Class A and gas pipe, $4 extra.

Old Material.—The scrap market is more sluggish than in many weeks. Railroad shipments are heavy and match well with users requirements, so that both hold up orders, and requests for prompt delivery are the exception. Dealers are paying $12.75 a gross ton for heavy melting steel and $11 is a common price in dealer trades in hydraulic bundles. A producer of borings has sold 1500 tons to be delivered as made. Brokers are offering this grade to users at $9.50 a ton, but on the speculative possibilities of the 1500-ton purchase, the producer was paid $9.65, delivered. Railroad lists offered at 8000 tons by the St. Paul and 4000 tons by the Burlington.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails	13.25 to 13.75
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size	15.75 to 16.25
Railroad leaf springs, cut apart	15.75 to 16.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phosphorus punchings	14.50 to 15.00
Low phosphorus plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.	15.50 to 16.00
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Grate bars	11.25 to 11.75
Brake shoes	10.50 to 11.00

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*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Steel Buyers Not Contracting—Pig Iron Quiet but Firm

Philadelphia, June 26.—Mill operations in eastern Pennsylvania continue at about the same rate as in the past few weeks, from 60 to 65 per cent, and shipments against current contracts are in fair volume. New business, however, is decidedly small and consumers show no interest in making new contracts for the next quarter. Apparently there will be a considerable number of extensions of present contracts, and then consumers will satisfy any additional requirements as they arise. The Pennsylvania Railroad, which has usually issued a call for bids on its quarter's requirements by this time, has only asked for prices on track material and about 160 tons of various sizes of steel pipe.

Most mills are asking 1.90c., Pittsburgh, on bars, 2.05c., Coatesville, on plates, and 2.05c., Bethlehem, on shapes for third-quarter delivery and the leading independent in eastern Pennsylvania has established these as its third-quarter prices. Current sales of material which will be delivered into next month, however, are being made at $1 a ton less, the second-quarter contract price, and with further generous specifications regarded as allowable under present contracts, the $1 a ton advance is not yet taken as definitely firm. Shapes continue slightly weaker than bars or plates, although the leading independent in this district has established 2.05c., Bethlehem, for the next quarter and the Pencoyd, Pa., producer is understood to have advanced its price to 2.05c., Pencoyd. Sheets are quiet and prices still show weakness, especially on galvanized.

Pig Iron.—Consumers exhibit but little interest in third-quarter contracting, evidently finding that shipments against their present commitments are sufficient to provide a satisfactory supply on their yards for use in the early part of the coming quarter. The price of No. 2 foundry is unchanged at $20, furnace, despite the lack of tonnage being offered. Pusey & Jones Co., Wilmington, Del., has closed on about 500 tons of foundry iron. The Consolidated Machine Tool Corporation, Rochester, N. Y., has bought about 600 tons of foundry grade for its Hilles & Jones plant at Wilmington, and the inquiry for third quarter of the American Engineering Co., Philadelphia, is still open. No sales of basic are reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54
Virginia No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces

Bars.—Although 1.90c., Pittsburgh, is being quoted as the third-quarter contract price, business for delivery next month at 1.85c., Pittsburgh. Users of bars show but little interest in entering into further contracts, apparently believing that they can buy just as satisfactorily when their requirements arise during the coming quarter.

Shapes.—The leading independent in this district is asking 2.05c., Bethlehem, or 2.18c., Philadelphia, for next quarter, and the Pencoyd, Pa., mill is reported to have advanced its quotations $1 a ton to 2.05c., Pencoyd, or 2.11c., Philadelphia. Other eastern Pennsylvania sellers seem to be willing to accept business for current or future delivery at 2c., Bethlehem. The tonnage of fabricated steel in prospect is good, but prices are still low. Atlantic City, N. J., is the scene of considerable building activity.

Plates.—Current business is going in most cases at 2.05c., Coatesville, but this higher price is principally because of the small tonnage specified in most orders. Buyers believe that a desirable order would probably bring out a quotation of 2c., Coatesville, or 2.10c., delivered Philadelphia.

Sheets.—Blue annealed sheets range from 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., delivered Philadelphia, with new business mostly in carload lots or less. Black sheets are quiet at 2.65c., Pittsburgh, or 2.97c., Philadelphia, and concessions of $1 a ton are reported on desirable tonnages. Galvanized sheets are evidently being maintained at 3.50c., Pittsburgh, or 3.82c., delivered Philadelphia, despite reports of sales at concessions in other districts. Consumers seem to be fairly well covered in their requirements for the present and are not inclined to commit themselves for the future.

Warehouse Business.—Prices are being maintained unchanged and a moderate volume of small tonnage orders is reported. June will apparently rank among the good months of the year, but not the largest in point of tonnage.

Imports.—In the week ended June 23, pig iron arrivals at this port totaled 7224 gross tons, of which 6526 tons came from Great Britain, 49 tons from Norway and 649 tons from India. Steel imports consisted of 501 tons of steel skelp and 25 tons of wire rods from Germany, 41 tons of bars and 22 tons of bands from France, 1 ton of iron bars from Sweden and 35 tons of steel scrap from Great Britain.

Old Material.—Very little iron or steel scrap has been bought in the past week, but a tonnage of No. 1 steel has been purchased for shipment to Bethlehem, Pa., at $13 per ton, delivered. Recent purchases of No. 1 blast furnace scrap have totaled several thousand tons and were at $10 per ton, delivered to Steelton, Pa., and Sparrows Point, Md., and $9.50 per ton, delivered Bethlehem, Pa. All grades show a tendency toward weakness and sellers offer but little resistance to the efforts of buyers to obtain lower prices.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.00 to $13.50
Scrap T rails	12.50 to 13.00
No. 2 heavy melting steel	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	10.00 to 10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equivalent)	12.00
Cast borings (for steel works and rolling mill)	10.50
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars	11.00
Stove plate (for steel works)	11.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast furnace scrap	9.50 to 10.00
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.00 to 17.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, $\frac{3}{16}$-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to $\frac{3}{16}$-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

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*For 50 bundles or more; 10 to 49 bundles, 4.10c. base; 1 to 9 bundles, 4.35c. base.

†For 50 bundles or more; 10 to 49 bundles, 4.95c. base; 1 to 9 bundles, 5.30c. base.

New York

Large Structural Projects Call for 100,000 Tons—Foundry Operations Spotty

NEW YORK, June 26.—Pig iron sales in this district during the week totaled 9000 tons. This aggregate is fair, in view of the small size of most current orders and the apparent disinclination of melters to commit themselves into the future. Foundry operations are spotty and in many cases a dearth of forward bookings in castings accounts for the conservatism in pig iron buying. Sufficient business is developing on a short-time basis, however, to sustain a fair average melt, and certain lines, notably radiator plants, are in a very satisfactory position. Manufacturers of heating equipment have just announced advances of 10 per cent on radiators and 5 per cent on boilers, following an advance of 5 per cent on radiators about a month ago. Prices on Buffalo foundry iron are steadier, and on the smaller tonnages $16.50, base furnace, is a commoner quotation, although $16, base, has not disappeared. Efforts of sellers to take advantage of barge and barge-and-rail rates have so increased the demand for water craft that the transportation companies are taking a more independent attitude on rates. The Worthington Pump & Machinery Corporation is in the market for 445 tons of foundry iron for Holyoke, Mass., 500 tons for Buffalo and 40 tons for Harrison, N. J. The General Electric Co. is inquiring for 150 tons of low phosphorus for Schenectady, N. Y. A Bridgeport, Conn., melter is inquiring for 200 tons of foundry for August to November delivery. The Consolidated Machine Tool Corporation, Rochester, N. Y., has placed 600 tons of foundry for its Hilles & Jones plant, Wilmington, Del. The Buffalo producer of silvery plans to blow out the furnace making that product July 1. Foreign iron is not competitive with domestic pig iron on a price basis, but there continues to be an inflow of Dutch and Indian iron for mixture purposes. Dutch iron in the No. 1X and lower silicon grades is quoted at $21, duty paid, port of entry.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—There are a few inquiries for ferromanganese consisting of carload and 100-ton lots, but the market is generally very quiet. Sales of several carloads of spiegeleisen have been made in the past week, most of them at the higher price of $33, furnace. Specifications on contract are fairly satisfactory.

Finished Steel.—The close of the first half of the year finds this market in a rather spotty condition, the more favorable factors being a rather well sustained seasonal volume of specifications and orders for nearly all products and an unusually large amount of activity in fabricated structural steel. A Manhattan hotel placed during the week will take 12,000 tons of shapes and the volume of pending business has been increased by a department store building for Abraham & Straus in Brooklyn, which may require as much as 20,000 tons, a fifty-eight-story apartment building in Tudor City, New York, which will take about 10,000 tons, and another apartment project on the East River, which will take 7000 tons. These bring the prospective tonnage which will probably be placed during the summer for large projects alone well above the 100,000-ton mark. While prices on plain material are not all that might be desired, not much business is being placed at less than 2.14½c., New York, and some small jobs are being taken at figures ranging up to 2.19½c. When fabricated prices are unusually low it is often the fabricator's and not the mill's margin of profit that is reduced. The demand for standard pipe is good and the prices regular. The same might be said for tin plate. Plain wire is quiet, with 2.50c. per lb., Pittsburgh, the ruling price. In the nail market, however, there is weakness, and although some large producers are quoting 2.65c., Pittsburgh, 2.55c. is being done on a large amount of business. There is little activity in bars and plates and on the latter products some Eastern mills have not opened their third quarter books. It is expected, however, that 1.90c., Pittsburgh, will be quoted by all makers of both plates and bars, with little likelihood of an adequate test for the $1 advance for several weeks. Weakness in sheet prices continues to be the most unfavorable factor in the market, with quotations at the lowest levels in several years. Not since March, 1916, have black sheets been so low as 2.65c., Pittsburgh, the present ruling price in this territory. Some orders, nevertheless, are being placed at $1 and occasionally $2 higher, but the tendency seems toward weakness rather than strength. On the galvanized product, 3.50c., Pittsburgh, now represents the top of the market, with frequent concessions of

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage),	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

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*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

$1 and even $2 a ton. One must also go back 12 years to find this price equaled. Blue annealed sheets apparently have not dropped below 2c., Pittsburgh, although isolated instances are reported when $2 concessions were obtained. The narrower widths are still commanding 2.10c. in some cases. Strip prices are comparatively firm, with 1.85c., Pittsburgh or Cleveland, the minimum on the hot-rolled product, with a range extending to 2.30c. on the narrower widths. This territory is not compelled to meet the competition of the continuous sheet mills, which have brought out lower prices in some Western districts.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—The Kalman Steel Co. will furnish 2500 tons of bars on a job for the New York Dock Co. in Brooklyn. Outside of this project, which is one of the largest reported in recent weeks, the market has been rather inactive. The volume of small business is keeping up, but prospective work seems to be rather slow in developing. Prices are unchanged, although the generally quoted mill price of 2c., Pittsburgh, is admittedly weak on attractive tonnages.

Cast Iron Pipe.—Buying is confined to small lots, seldom in excess of 100 tons and principally by private users. Prices are apparently quite firm, with Northern makers maintaining the market at $37.60 to $38.60 per net ton, delivered New York, and Southern foundries quoting $32 to $33 per ton, base, Birmingham. An inquiry is in the market for the United States marine base at Paris Island, S. C., for 400 tons of 10-in., Class 250, centrifugal cast iron pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—The volume of shipments from stock in June will apparently compare favorably with May, but be smaller than April business, which was about the best since the first of the year. A meeting of jobbers in this district is scheduled for Thursday, at which the differential between the mill and warehouse price will probably be considered. Black and galvanized sheet prices continue to show a range of 3.80c. to 4c. per lb., base, on black and from 4.50c. to 4.70c. per lb., base, on galvanized.

Old Material.—All grades of scrap show a tendency to weakness. No. 1 heavy melting steel has been bought at $13 per ton, delivered Bethlehem, Pa., the purchase totaling several thousand tons. No. 1 blast furnace scrap has been bought at $10 per ton, delivered Steelton and Sparrows Point, Md., and $9.50 per ton, delivered Bethlehem, so that the range of dealers' buying prices is $9 to $9.50 per ton, delivered. Recent purchases of yard grade of heavy melting steel have been at $10.50 per ton, and dealers are offering $10 per ton, delivered, except to Conshohocken, Pa., for which $10.50 to $11 per ton is paid.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.50 to	$9.85
Heavy melting steel (yard)	6.25 to	7.00
No. 1 heavy breakable cast	11.00 to	12.00
Stove plate (steel works)	7.00 to	7.25
Locomotive grate bars	7.00 to	7.50
Machine shop turnings	6.00 to	6.50
Short shoveling turnings	6.00 to	6.50
Cast borings (blast furnace or steel works)	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles	14.50 to	15.00
Iron car axles	23.75 to	24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)		8.25
Forge fire	6.50 to	6.75
No. 1 railroad wrought	9.50 to	10.00
No. 1 yard wrought, long	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Cast iron carwheels	11.00 to	11.50
Stove plate (foundry)	8.50 to	9.00
Malleable cast (railroad)		10.00
Cast borings (chemical)	10.75 to	11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to	$15.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.00 to	13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to	12.50

Coke.—Operations in the Connellsville district have been curtailed to 20 to 25 per cent of the total capacity, but prices of both foundry and furnace grades continue unchanged at about $3.50 per ton, Connellsville, for standard foundry and $2.50 to $2.75 per ton, Connellsville, for furnace coke. Special brands of foundry coke are quoted at $4.85, f.o.b. ovens, and delivered prices are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke is unchanged at $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per net ton, New York or Brooklyn.

Cleveland

Firm Effort to Get Advance on Heavy Products But Weakness in Others

CLEVELAND, June 26.—Mills outside of this territory appear to be taking a firm stand on the establishment of a 1.90c. price on steel bars, plates and structural material for the third quarter, but so far have made little effort to close contracts. However, a few small contracts have been taken at the advance. Some of the smaller mills are holding back, awaiting the final test of the price advance. A few consumers have made unsuccessful efforts to extend existing contracts into the third quarter. With only four days remaining in the present quarter, there has been no rush to get in specifications on the expiring 1.85c. contracts, although some mills report a slight gain in specifications. Local mills have taken some steel bar business for third-quarter shipment at the current price of 1.85c., mill, and an Ohio mill is quoting forging bars at 1.90c. for the third quarter. While mills are holding to the advance on the heavier rolled products, new weakness has developed in some other lines. Cold-finished steel bars have declined $2 a ton and some makers have made a similar concession on cold-rolled strip. While orders from the automotive industry have declined, the demand from this source for sheets and strip steel is unusually well maintained for this season. Some of the Michigan automobile plants have greatly reduced production and others have shut down two weeks for inventories and changes in models. However, motor car builders are ordering considerable steel for July shipment. Structural inquiry is light in this territory, the only good inquiry pending being for grade crossing elimination work in connection with the Cleveland Union Terminal project. It has developed that the inquiry reported last week in this connection involves only a portion of the work taking 8000 tons. The remainder will come out a little later.

Iron Ore.—The ore market is very dull, sales being limited to an occasional small lot. The consumption of Lake ore during May was 4,947,768 tons, an increase of 166,553 tons over April and comparing with 5,012,782 tons in May last year. On June 1 there was 13,942,157 tons of ore on hand at furnaces. The amount at furnaces and at Lake Erie docks on that day was 18,876,721 tons, as compared with 22,970,576 tons on the same date a year ago. Central district furnaces in May consumed 2,474,325 tons, an increase of 109,546 tons for the month. Lake front furnaces used 2,272,222 tons, a gain of 51,966 tons. All rail furnaces used 122,959 tons, a gain of 3738 tons and Eastern furnaces, 78,262 tons, an increase of 1213 tons. There were 173 furnaces using Lake ore in blast May 31, or an increase of 5 for the month.

Pig Iron.—The market became more active the past week, during which Cleveland interests sold 38,500 tons of foundry and malleable iron. The business was widely distributed geographically and by industries and in-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	$2.85
No. 9 galvanized wire, per 100 lb.	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

cluded both early shipment and third-quarter tonnage. Some of the orders were for lots of 3000 to 4000 tons. They came in part from automobile foundries that had been rather slow in making third-quarter contracts. Prices are holding closely to recent levels with a Lake furnace range of $16.25 to $17 for foundry and malleable iron, except for Michigan delivery, for which $17.50, furnace, is being quoted. There was a limited amount of buying in Cleveland at the recently reduced price of $17.50, furnace. Efforts are being made to get $18 for small lots. Shipments this month are expected to show a slight gain over May. While the demand from the automotive industry has slackened, this seems to have been more than offset by larger shipping orders from other industries. Shipments are good to stove and furnace manufacturers and to pump makers. The demand from jobbing foundries is rather slow.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.00 to	$18.50
Southern fdy., sil. 1.75 to 2.25		21.50
Malleable	18.00 to	18.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace	15.35 to	15.50
Standard low phos., Valley furnace		26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Strip Steel.—Price irregularities on cold-rolled strip have developed with concessions of $2 a ton to 2.65c., Cleveland, for 3 tons or over by two or more mills. Some third-quarter business has been taken at the reduction. Fender stock is unchanged at 4.10c. Most consumers of hot-rolled strip have covered for the third quarter at the same prices that they had for this quarter, or 1.75c., Pittsburgh, for 6-in. and wider material and 1.85c. for 3-in. to 6-in. strip, or $3 a ton below regular quoted prices. Specifications are fairly good.

Cold-Finished Steel Bars.—Makers have reduced prices $2 a ton to 2.10c., Pittsburgh, and 2.15c., Cleveland. The reduction was unexpected and is understood to have resulted from a concession made by one producer to a large Michigan automobile company. Following the reduction most consumers have placed third-quarter contracts at the new price and specifications against second-quarter contracts are being accepted at the lower price. Specifications are very satisfactory.

Wire Products.—While some third-quarter nail contracts have been taken at 2.65c., Cleveland, a 2.55c. price still applies to the large jobbing trade. Wire is firm at 2.50c.

Reinforcing Bars.—The regular price on billet steel bars is not being firmly held in this territory and rail steel bars are being affected by the competitive situation. While the latter are still quoted at 1.75c. mill, this will be shaded $1 a ton on a fair inquiry.

Warehouse Business.—Sales are fair and June business may show a slight gain over May. Consumers are getting such prompt mill deliveries that many do not feel it necessary to buy from jobbers. Galvanized sheets have become more active. Sheet prices are irregular. Other prices are firm.

Semi-Finished Steel. — Shipments are still being made at $32.50 to $33, Cleveland, for sheet bars and $33 for billets and slabs. While prices that will apply against third-quarter specifications have not been definitely announced, there is no expectation that they will be any higher.

Sheets.—Current orders are light and few consumers are showing an interest in third-quarter contracts. Keen competition has brought out concessions from recent minimum prices on blue annealed and galvanized sheets. On the former a 1.85c. Pittsburgh price came out on a good lot inquiry for material that meets continuous mill competition. However, 1.90c. is the usual minimum quotation. On galvanized sheets 3.45c., Valley, is being quoted and in one case as low as 3.40c., Valley, although some business is being taken at 3.50c., Pittsburgh. Black sheets range from 2.60c. to 2.70c., Pittsburgh. Auto-body sheets are firm.

Fluorspar.—The output of gravel fluorspar has been reduced somewhat by the shutting down of mines, including one Kentucky mine that has been producing 18,000 tons a year and from which all the material has been taken. As a result the supply is less plentiful than recently and this has given the market a firmer tone. Sales are limited to car lots, as most consumers are under contract.

Alloy Steel.—While specifications have fallen off sharply, being now about 50 to 60 per cent of mill capacity, the demand is about normal for this season. Most consumers have placed contracts for the third quarter at the quoted prices.

Bolts, Nuts and Rivets.—Bolts and nuts are moving in fair volume. Rivet orders are rather irregular. Third-quarter contracts are coming in well.

Coke.—The present price of Ohio by-product foundry coke has been re-established at $7.75 per ton, Painesville. Specifications are fair, but there is not much new business. Connellsville foundry coke is unchanged at $3.50 to $4.85, ovens.

Old Material.—The curtailment in mill operations is being reflected in a little slowing down of orders for scrap shipments against contracts. Prices on steelmaking grades are holding to recent quotations. However, the market has a rather weak tone and blast furnace scrap is being freely offered at $9.25, the higher quotation having virtually disappeared. There is no new demand from the mills. July scrap lists issued by the Michigan automobile companies are fairly large in spite of the slowing down of the automotive industry, these lists including Chevrolet, 4650 tons; Buick, 3800 tons; Dodge Brothers, Inc., 2800 tons; Chrysler, 2700 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.00 to	$13.25
No. 2 heavy melting steel	12.50 to	12.75
Compressed sheet steel	12.50 to	13.00
Light bundled sheet stampings	11.50 to	11.75
Drop forge flashings	11.50 to	11.75
Machine shop turnings	6.50 to	6.75
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.00 to	11.25
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	9.25 to	9.50
Mixed borings and short turnings	9.25 to	9.50
No. 2 busheling	9.25 to	9.50
Cupola Grades		
No. 1 cast	16.25 to	16.75
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	16.75 to	17.25
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Little Activity in Detroit Scrap

Detroit, June 26.—There has been very little activity in the market on old material the past week and no strengthening factors are in sight. Prices are quoted without change.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to	$11.50
Borings and short turnings	7.00 to	7.50
Long turnings	5.75 to	6.25
No. 1 machinery cast	14.00 to	15.00
Automobile cast	19.00 to	20.50
Hydraulic compressed sheets	9.75 to	10.25
Stove plate	11.00 to	12.00
No. 1 busheling	8.50 to	9.00
Sheet clippings	6.00 to	6.50
Flashings	9.00 to	9.50

Plan for 1929 Machine Tool Exposition

With the recent appointment of a committee of five members, active planning of the details of the machine tool exposition, to be held in the fall of 1929 under the auspices of the National Machine Tool Builder's Association, has begun. J. Wallace Carrel, vice-president and general manager of the Lodge & Shipley Machine Tool Co., Cincinnati, is chairman of the committee. The other members are Henry Buker, vice-president Brown & Sharpe Mfg. Co., Providence; R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt.; R. M. Gaylord, vice-president Ingersoll Milling Machine Co., Rockford, Ill.; and James E. Gleason, president Gleason Works, Rochester, N. Y.

San Francisco

Larger Lettings of Structural Steel and Concrete Bars—Plate Demand Light

SAN FRANCISCO, June 23 (*By Air Mail*).—Consumers of iron and steel on the Pacific Coast are showing little interest in third quarter requirements and, as a result, both sales and inquiries have fallen off. The structural steel market is the most active one, and outstanding awards include 1700 tons for the Medico-Dental Building at Spokane, Wash., booked by the Hofius Steel & Equipment Co., and 1125 tons for the Kettle Falls, Wash., bridge, placed with the United States Steel Products Co.

During the first 12 days of June, Los Angeles building permits numbered 1276, with an estimated valuation of $4,580,907, as compared with 1280 permits and a valuation of $4,174,175 for the corresponding period in 1927. So far this year permits aggregate $47,393,043, compared with $53,011,977 for the same period last year.

Pig Iron.—Demand for foundry pig iron has shown no improvement, and few inquiries and sales are reported. Stocks on hand in foundry yards are apparently sufficient to take care of immediate requirements. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel awards were heavier this week and totaled slightly over 1000 tons, compared with less than 600 tons for the previous two weeks. The largest letting called for 485 tons for a penstock, powerhouse and dam at Eugene, Ore., and was placed with an unnamed interest. Pending business is not heavy, the bulk of the inquiries involving lots of less than 70 tons each. Bids will be opened on July 16 for 2288 tons for Drainage Improvement District No. 26 at Los Angeles. A school at Seattle will require 300 tons, bids having gone in. Little improvement in the out-of-stock price in the San Francisco district is noted, and 1.80c. to 2c. per lb., base, continues to represent the range.

Plates.—The only award of the week was 575 tons for a carfloat for the Santa Fe Railroad at San Francisco, and was placed with the Moore Drydock Co. Awards so far this year are one-third less than the total for the corresponding period last year, aggregating less than 16,000 tons. Sacramento, Cal., will open bids next week on 100 tons of 3/16-in, plates for a 24-in. riveted pipe line. Prices are weak and, as little tonnage is being offered, the market has not yet been tested. Mill quotations range from 2.25c. to 2.30c., c.i.f. Coast ports.

Shapes.—Demand for structural material is well sustained, and awards this week were the heaviest in over a month. In addition to tonnages reported above, the Llewellyn Iron Works secured 900 tons for a factory for the Illinois, Pacific Glass Co. at Vernon, Cal., and the Baker Iron Works took 470 tons for an apartment in Los Angeles. New inquiries include 450 tons for a clinker storage building for the Pacific Coast Cement Co. at Seattle and 350 tons for an apartment in Los Angeles. Plain material from mill continues unchanged at 2.35c., c.i.f.

Cast Iron Pipe.—Only one cast iron pipe award of over 100 tons was reported this week. Los Angeles placed 1260 tons of 20-in. Class B pipe with the Grinnell Co. and 884 tons of 6 to 12-in. Class 250 pipe with the American Cast Iron Pipe Co. C. G. Claussen & Co., Inc., was low bidder on 300 tons of 4 to 10-in. Class B pipe for Burbank, Cal., and quoted on French pipe. Bids open on July 6 at Seattle, Wash., for 271 tons of 48-in. Class B pipe for a sewer project on West Hanford Street. San Diego, Cal., will open bids next week on 102 tons of 4 and 6-in. Class B pipe for the improvement of Market Street. Wells, Nev., has received bids on 224 tons of 4 to 10-in. Class C pipe, but may decide to purchase ingot iron riveted pipe.

Steel Pipe.—Inquiries are small. Activity in the oil fields in the southern part of California has not increased, and, from present indications, there is little likelihood of large tonnages coming out for figures in the next two or three months.

Coke.—The quiet condition reported in the market for pig iron is also found in the market for foundry coke, and sales and inquiries continue to cover small tonnages.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{16}$-in. and over	3.15c.
Small angles, under $\frac{3}{16}$-in	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

St. Louis

Award of 3000 Tons of Concrete Bars for Warehouse—Pig Iron More Active

ST. LOUIS, June 26.—Third quarter buying of pig iron developed during the week. In addition to several large sales, a number of inquiries are pending. Shipments are being well maintained, and the melt is being increased among foundries catering to the stove and agricultural implement trade. The St. Louis Gas & Coke Corporation sold 1300 tons of foundry grades to a northern Illinois stove plant, 1000 tons to another northern Illinois industry and 500 tons to an Indiana melter, all for third quarter shipment, while prompt shipment sales included 300 tons of malleable to a Chattanooga, Tenn., melter, 150 tons of foundry to a Tulsa, Okla., user and 100 tons of foundry to a Denver company. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.16
Southern No. 2 fdy., delivered	19.92
Northern malleable, delivered	20.16
Northern basic, delivered	20.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of domestic grades of coke is light, and by-product ovens are urging dealers and apartment house owners to place their orders now. The present price of domestic is $11 a ton, delivered St. Louis, and $6.75 at the ovens. The present price of foundry coke is $9.75, delivered St. Louis, and $9 at the ovens. New prices are expected to be announced on July 1.

Finished Steel.—The award of 3000 tons of reinforcing bars for the J. C. Penney Co. warehouse to the

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	70
Less than 100 lb.	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Laclede Steel Co. and the Missouri Rolling Corporation was the largest concrete bar purchase in some time. A 350-ton reinforcing bar order for a sewer also went to the latter company. There is pending 500 tons of concrete bars for a building for the American Railway Express, which also will require 1000 tons of structural steel. Manufacturers of farm equipment requiring galvanized sheets are active and the improvement in buying, as reported by the Granite City Steel Co., has been sufficient to cause that company to operate its galvanizing department at 75 per cent of capacity this week. The price situation is more stable. Business in blue annealed sheets is slow. Tin plate is in very good demand, and local operations on tin plate are at 100 per cent.

Old Material.—The market is quiet and some items are lower. Dealers have covered almost all of their contracts, and mills have indicated no desire to buy soon. Prices are up 50c. a ton on iron car axles, for which the demand, although not very large, is greater than the supply. Steel angle bars and railroad malleable have declined 25c. a ton. Railroad lists include: Union Pacific, 7500 tons; Chicago, Burlington & Quincy, 4500 tons; St. Louis-San Francisco, 1000 tons of miscellaneous scrap and nine carloads; Nickel Plate, 27 carloads; Mobile & Ohio, 26 carloads.

Dealers' buying prices, per gross ton,. f.o.b. St. Louis district:

Heavy melting steel	$11.00 to $11.50
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.00 to 11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.25 to 12.75
Railroad springs	13.50 to 14.00
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	25.50 to 26.00
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.75 to 12.25
Cast iron carwheels	13.25 to 13.75
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.25 to 11.75
No. 1 railroad cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Birmingham

Foundry Pig Iron Reduced to $15.50—Mill Operations Maintained

BIRMINGHAM, June 26.—Pig iron producers reduced prices 50c. a ton on June 20 and are now quoting No. 2 foundry iron at $15.50, Birmingham. The reduction has stimulated interest in the market, and a fair tonnage has been booked. Although no real buying movement has developed, some consumers are covering their third quarter requirements, while others are buying through July and August. Most of the third quarter output of furnaces, however, is yet to be sold. Shipments continue active. The Tennessee company was scheduled to blow in one of its new furnaces at Fairfield, Ala., the early part of this week. The stack has a capacity of 600 tons per day. Otherwise furnace operations are unchanged, 18 being in blast. Of this number 10 are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$15.50
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	$15.00 to 16.00

Finished Steel.—The market continues active in most lines, and forward bookings show a slight margin of increase over those of the previous week. Inquiries are favorable. Prices are steadier, with plates, shapes and soft steel bars now being quoted at a flat price of 2.05c. per lb., base Birmingham. Structural steel fabricators and bar manufacturers report light bookings, though inquiries are fair. Plant operations are well sustained. No change has been made in the number of active open-hearth furnaces during the past week, 16 being in operation. Of this number, the Tennessee company is working 12 and the Gulf States Steel Co. four.

Cast Iron Pipe.—Pressure-pipe buying was off slightly during the week. Orders were placed with the United States Cast Iron Pipe & Foundry Co. for about 2000 tons for Rock Hill, N. C., and 400 tons for Miami, Fla. Inquiries are light. However, some good-sized projects are to be up for figures within the next six or eight weeks. Shipments are active. Prices continue fairly firm at $32 to $33 per net ton, Birmingham, for 6-in. and larger diameters. Soil pipe business is up to normal for this season. A controlling interest in the National Cast Iron Pipe Co. was sold last week to James B. Clow & Sons, Chicago. The local company will retain its corporate identity.

Coke.—The market, as a whole, is dull. A few more orders have been booked for the last half and, to a large extent, the requirements for that period have now been covered. Pitch coke shipments aggregating about 1000 tons are under way to points on the coast of France. By-product coke is being shipped from time to time for California points. Foundry coke quotations are still $5 per net ton, Birmingham, on both spot and contract business.

Old Material. —Demand is lacking in all lines and current transactions are hardly worthy of mention. Quotations have been unchanged during the past two weeks and are only nominal in view of unusual dullness of the market.

Prices per gross ton delivered Birmingham district consumers' yards:

Heavy melting steel	$8.50 to $9.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.50 to 8.00
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.25
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Canada

Canadian Pacific Buys 25,000 Tons of Rails—Good Demand for Building Steel

TORONTO, ONT., June 26.—Advance buying is beginning to develop in the Canadian pig iron markets. Several good-sized contracts have been closed for third quarter delivery. Local blast furnace representatives report a large volume of third quarter inquiries, calling for 300 to 2000 tons each. Spot sales continue good both in the Toronto and Montreal districts. Individual orders run from 50 to 200 tons, with occasional sales of as much as 500 tons. Water transportation is being featured in some contracts and delivery on this account is steadily becoming more popular. In keeping with the larger demand for pig iron in this country, production has advanced to the highest point since 1920, with eight blast furnaces active, or 63 per cent of total Canadian capacity. Stacks in blast include: Sault Ste. Marie, Ont., three; Hamilton, Ont., two; Port Colborne, Ont., one; Sydney, N. S., two. Canadian pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Rails.—The Canadian Pacific Railway has placed an order with the Algoma Steel Corporation, Sault Ste. Marie, Ont., for 25,000 tons of 100-lb. rails, with rail fastenings, etc. The Canadian National Railways have announced that they will purchase this year 160-000 tons of rails, with necessary fastenings, to cost approximately $9,000,000. At the present time rail mills at Sault Ste. Marie, Ont., and Sydney, N. S., have sufficient business on hand to keep them busy for a month or six weeks, and it is expected that the Canadian National orders will be awarded in time to assure continued operations almost to the end of the year.

Structural Steel.—While structural steel workers and employers have not entirely reached an agreement, men are back to work on a number of the larger structures in this city and it is expected that a final settlement will be reached shortly. Shipments of shapes are again being made against old contract, and buying has been resumed. A strong demand is reported for reinforcing bars throughout Ontario. For the MacLean Publishing Co. building addition, Toronto, 1500 tons of structural steel and 500 tons of reinforcing bars will be purchased within a few days; inquiries are also out for lots ranging from 200 to 1000 tons, which aggregate close to 15,000 tons for Toronto and Montreal alone.

Old Material.—Reductions recently announced in the Montreal market did not strengthen demand to any marked degree, but the advance in wrought iron and steel axles, carwheels and stove plate brought these grades into more prominence. In the Toronto district, dealers report a steady flow of small-tonnage orders; in addition inquiry is increasing for third quarter delivery and a few contracts have been closed. Old material prices are unchanged since a week ago.

Dealers buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$9.00	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Youngstown

Mill Operations Hold Around 70 Per Cent—Basic Iron Is Higher

YOUNGSTOWN, June 26.—The pace of steel buying and of plant operations does not vary much with manufacturers in this district. Steel ingot production at the outset of the month was around 70 per cent of capacity, and that is approximately the rate in the final week of the month. The automotive industry continues to take steel fairly freely, being one of the principal factors in the comparative steadiness of steel works engagement. Another sustaining influence is the good rate of operation of steel fabricating and stamping companies located in the district and depending entirely on local mills for their steel. Other important consuming industries, notably the oil fields, are not contributing as heavily as usual to the order books of the mills, although one of the local steel pipe makers is reported to be figuring on a gas pipe line, which, if ordered, will give pipe mill operations a brighter aspect. The needs in this line is said to amount to 50,000 tons, which would provide a good backlog for the maker understood to have the inside track on the order.

From the standpoint of bookings the pipe situation is the weakest of any of the products of the district. While hopes are revived by even the slightest signs of betterment in the oil industry, the fact remains that, outside of the California field, drilling is very light and in California the activities are chiefly deep drilling for the tapping of secondary wells. Only one such well is being sunk, whereas in former years it was common for as many as 100 wells to be in process of drilling in a field at one time. For drilling these deep wells, seamless casing is almost exclusively used and most of the pipe-making capacity of the district is for making welded pipe. A report that the advance in standard-weight and line pipe prices announced early in April is not being maintained is denied by local producers.

Bar business for local mills is at best only moderately active. Some third quarter contract business has been taken at 1.90c., base Pittsburgh, but, in view of the fact that current business is not readily obtained at more than 1.85c., base, and that rather than run the risk of losing specifications on existing contracts carrying that price some producers are extending second quarter contracts into the third quarter, doubts are expressed that the higher price can be established. In view of the reduction of $2 a ton on cold-finished steel bars, there is bound to be resistance on the part of makers to paying any higher price for hot-rolled bars.

Leading producers of black sheets here are holding to a minimum of 2.70c., base, and, while admitting that they are encountering lower prices, declare that 2.65c. or less usually refers to sales of special finishes carrying substantial extras that are profitable enough to make possible a reduction in the base price. On galvanized sheets 3.50c., base, is the common quotation but is not as low as some sales are being made. Hot-rolled strips are quoted at 1.90c., base, for 6-in. to 12-in. widths; 2.10c., base, for 3-in. to 6-in., and 2.20c., base, for less than 3-in. These prices, however, prevail on most sales, but on tonnage the large buyers still get concessions of $2 to $3 a ton, and even more if the net prices quoted on round lots of wide and narrow material were translated to a base price.

Efforts to stiffen the price of basic iron have met with some success, one fair-sized lot having been sold to an Ohio Valley steel maker at $15.75, Valley furnace, which represents an advance of 40c. a ton over the last previous sale. On this inquiry most producers quoted $16, Valley furnace. Local producers are not hopeful of getting any of the iron for the Follansbee Brothers Co. on account of lower freight charges enjoyed by Pittsburgh and Wheeling district furnaces.

The scrap market here is dull and soft. Heavy melting steel is quotable at $14.50 and compressed sheets at about 50c. a ton less, a decline of 50c. a ton from what could have been obtained a fortnight ago.

Pacific Northwest

Steel Rate War Looms—Concrete Bar Market Active

SEATTLE, June 23 (*By Air Mail*).—War threatens in freight rates on iron and steel for shipment to Pacific Coast points, following the action of the Illinois Central Railroad and the Redwood Steamship Lines putting into effect early this month a rate of 61c. from all points in Illinois and Indiana, as well as certain points in Kentucky, to San Francisco, Los Angeles, Alameda, Wilmington and Ashland, Cal. As yet the above rate applies only to the points named in California, and efforts to have the rate apply to all Pacific Coast points have brought a strong protest from Eastern railroads, and the matter is now in the hands of the Interstate Commerce Commission for adjudication.

The Illinois Central has made a rate of 31c. per 100 lb. from the points named above to New Orleans, and from there the Redwood Lines make a rate of 30c. via the Panama Canal to the California points, the same rate that is in effect from Eastern ports to all Pacific Coast points. The Eastern roads have attacked the 31c. rate, claiming it is contrary to law, and the matter is now in the hands of the Interstate Commerce Commission for settlement. If that body should decide that the rate is legal, and also allows it to apply to all Pacific Coast points, a cut in rates by the Eastern railroads, and also possibly by the Pacific Coast steamship lines, is almost certain to take place.

There has been a considerable falling off in new demand for iron and steel in the local market, and prices, too, are showing signs of weakness. Jobbers and consumers are buying only in small lots for immediate needs, and the threatened rate war on shipments of steel products to Pacific Coast points is helping to retard buying in any large quantities.

Plates.—Demand is very light. No large lots have been placed for some time, and no important business is in sight. The price range on plates for mill shipment is from 2.25c. for large lots to 2.30c. per lb. for small lots, c.i.f. Seattle.

Shapes.—The only large order in several weeks was 1620 tons for the Paulson Medico-Dental building, Spokane, Wash., taken by the Hofius Steel Equipment Co., Seattle. The Wallace Bridge & Structural Steel Co. has taken 200 tons for a clinker building for the new plant of the Pacific Coast Cement Co. The Wallace Falls Timber Co. is in the market for 200 tons for a bridge span at Index, Wash. Prices on shapes remain fairly firm at 2.35c. per lb., c.i.f. Seattle.

Pig Iron.—Foundry operations in the Seattle district are slow, and there is little demand for pig iron. Prices on Utah basic and No. 2 foundry are nominal at $25 to $26 per gross ton, delivered Seattle.

Rails.—An Eastern mill has taken 200 tons of 85-lb. sections for the Pacific Coast Railroad.

Bars.—There is some activity in reinforcing bars, but merchant bars are quiet. The Pacific Coast Steel Co. has taken 250 tons of reinforcing bars for the West Seattle Public School, 700 tons for the Lovejoy viaduct at Portland, Ore., and 150 tons for the Von Herberg building in Seattle. The Northwest Steel Rolling Mills, Inc., has taken 600 tons for the Peck & Wills warehouse in Seattle, 100 tons for a grain elevator in Vancouver, B. C., about 250 tons for State highway work along the Olympic peninsula and 150 tons for a viaduct at Mount Vernon, Wash. Bids are to be opened on July 6 for about 600 tons for the Beacon Hill tunnel in Seattle. We quote ordinary merchant steel bars at 2.30c. to 2.35c., base, per lb., c.i.f. Coast ports, and reinforcing bars at 2.20c. per lb. for large lots and up to 2.75c. and 3c. for small lots from stock and cut to lengths. Lower than 2.20c. per lb. on large lots is being done at southern California points.

Old Material.—There is little activity in foundry scrap, but there is a fair demand for steel melting scrap. Electric steel melting scrap is bringing $13 per gross ton, heavy melting steel scrap $11 per gross ton, and No. 1 cast iron scrap $12 to $13 per net ton, all f.o.b. Seattle. A recent sale of 300 tons of electric melting steel scrap was made at $13 per gross ton, delivered Seattle.

Buffalo

Sheets Weak—Scrap Offered Exceeds Consumption—Heavy Melting Lower

BUFFALO, June 26.—The only sizable pig iron transaction of the week was a sale of 2000 tons of foundry to an Erie, Pa., consumer. A slowing down in miscellaneous small orders was noted, although shipments continue good. The market in this district remains firm at $17, local furnace, for No. 2 plain, and at $17.50 for malleable. Eastern business is being quoted at prices figuring back to $16.50, Buffalo.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Steel.—The trade is quiet, with a fair volume of bars and shapes moving. Some sheet business is being placed, but prices are not so strong as recently. Structural and reinforcing bar lines have slowed down, but action on the material for the 26-story Rand building in this city is expected soon. Trade in bolts and nuts is fair, and wire mills report good operations and satisfactory bookings.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Old Material.—The market is weaker and less active. The only selling is an occasional car of malleable or No. 1 cast scrap. One of the larger consumers, it is reported, may suspend shipments from dealers for a month, because of heavy receipts of material, much of which is coming by boat. Scrap production is heavy, in excess of what the market will absorb. Railroad lists will close next week. Only two scrap yards in the district are active.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	13.50 to 14.00
Hydraulic compressed sheets	12.50 to 13.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.50 to 13.00
Heavy steel axle turnings	12.00 to 12.50
Machine shop turnings	7.75 to 8.25
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.00
Railroad coil and leaf springs	15.00 to 16.00
Rolled steel wheels	15.00
Low phosphorus billet and bloom ends	16.00 to 16.50
Electric Furnace Grades	
Heavy steel axle turnings	12.00 to 12.50
Short shoveling steel turnings	10.00 to 10.50
Blast Furnace Grades	
Short shoveling steel turnings	10.00 to 10.50
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	15.50 to 16.00
Iron axles	12.00 to 12.50
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	16.50
Cast iron carwheels	12.00 to 12.50
Malleable Grades	
Industrial	15.00
Railroad	15.00
Agricultural	15.00

Boston

Scrap Prices Weaken as Business Drops—Pig Iron Imports Light

BOSTON, June 26.—A Massachusetts foundry is reported to have purchased 1000 tons of No. 1X iron for third quarter delivery at a price almost equivalent to $16.50 a ton at Buffalo furnace. Otherwise sales in the past week comprised much smaller tonnages, with the aggregate approximating 4000 tons. Deliveries

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway round	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

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*Including quantity differentials.

range from prompt to fourth quarter, and the greater part of the iron sold is bringing the equivalent to $17 a ton, Buffalo furnace, for No. 2X. Reports that one stack is quoting unusually low prices are not substantiated by sales. There is no doubt, however, that furnaces are willing to shade prices on attractive tonnages, although holding on small lots. There are no open inquiries of importance in the market, and several large consumers who have been sounding out the market have decided to postpone buying, pending an improvement in their business.

Pig Iron Imports.—Low prices quoted on domestic pig irons are holding imports down to a minimum. Imports at this port during the first half of June totaled 396 tons, consisting of 346 tons of Indian and 50 tons of Scotch iron. This compares with 198 tons in the first half of May, this year; 1343 tons in the first half of June, last year; 2538 tons in the first half of June, 1926, and 3030 tons the first half of June, 1925.

Prices of foundry iron per gross ton delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.41 to 24.27
Alabama, sil. 2.25 to 2.75	22.91 to 24.77

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—Only a moderate amount of by-product foundry coke is moving. The melt of New England foundries is barely holding its own. Demand for domestic coke, however, is in large volume, as retail dealers are stocking up heavily. Unseasonably cool and wet weather in the past week helped to swell domestic coke deliveries. It is believed that the Connecticut Coke Co., New Haven, Conn., will start up its new ovens about Sept. 15.

Fabricated Steel.—With labor troubles adjusted and construction resumed, the local fabricated steel market appears more active. Most of the jobs coming up are small ones, however, ranging from 75 tons down to 5 tons. Competition among fabricators is keen. A New Jersey fabricator took 200 tons at Quincy, Mass., at a price approximately 12 per cent under that of the lowest New England bidder.

Warehouse Business.—The movement of material out of warehouses is not as large as it was earlier in June, and considerably less than in May. Despite the slackening of business, prices on domestic stock are generally well maintained. Consumers' interest in imported material is tapering off, owing to unsatisfactory adjustments for rust, etc.

Cast Iron Pipe.—Massachusetts has awarded a contract to the C. & R. Construction Co. for a job calling for 4000 tons of 30-in. pipe, but it is not known what foundry will supply the pipe to the contractor. Beverly, Mass., has let 100 tons of 12-in. pipe to the Warren Foundry & Pipe Co. Marlboro, Mass., is calling for bids July 2 on about 100 tons of pipe, and Chelsea, Mass., will open bids the same day on 100 tons of 6-in. and 8-in. Private business in pipe is only fair, it being the quiet season in the market. Prices on small pipe remain firm, 4-in. at $45.10 to $46.10 a ton, delivered common Boston freight rate points, and 6-in. to 12-in. at $41.10 to $42.10. Concessions are still offered on larger pipe. The usual $5 differential is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100	7.55
	Net per 100 Ft
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Old Material.—A further letdown in both buying and selling has developed, with accompanying weakness in prices. Pennsylvania mills are ordering little scrap, and the local export market has been at a standstill during the week. A steamer will load 5000 tons of steel for Danzig this week, however, and a similar amount is scheduled for shipment in July, which should liven up the market. Steel turnings, steel mill borings, skeleton, mixed borings and turnings and forged scrap are 25c. to 50c. a ton lower than a week ago. Prices on skeleton take a wide range. Material going to certain Pennsylvania points is $6.50 to $7 a ton on cars, shipping point, and to other points $5 to $5.50. Recent transactions include sales of cotton ties at $5.50 to $6 a ton on cars. About 250 tons of scrap rails will be required for the new local plant of the United States Gypsum Co. Buying of textile cast for New England delivery has stiffened prices on that grade.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.50
Scrap T rails	8.00 to 8.50
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.25 to 5.50
Cast iron borings (steel works and rolling mill)	5.25 to 5.50
Bundled skeleton, long	5.00 to 7.00
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	5.50 to 6.00
Shafting	12.00 to 12.50
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton delivered consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

Cincinnati

Little Forward Buying Comes with Fall in Southern Pig Iron

CINCINNATI, June 26.—A decline of 50c. a ton in the price of Tennessee and Alabama iron for third-quarter delivery is the outstanding development in the market. While the new schedule of $15.50, base, Birmingham, has brought out some business, it is not expected to stimulate forward buying to a marked extent, because prices are so weak that there is little likelihood of improvement in the situation during at least the next 60 days. Under the circumstances users find no incentive for anticipating their needs beyond current requirements. Furthermore under the pressure of competition, Northern iron has shown signs indicating a movement toward lower levels and northern Ohio furnaces are reported to be accepting orders in southern Ohio and in Indiana at $16 to $16.25, base, furnace. While the newly established quotations of $15.50, for Southern iron may not serve the purpose of broadening markets at points along and north of the Ohio River, it will insure customers in that territory of their ability to secure iron from the South at as low or possibly lower prices as those to be had from Northern makers. Transactions in the past week have not totaled more than 3000 tons, the largest covering 500 tons of malleable iron to a Springfield, Ohio, company. Aside from an inquiry from the Buick Motor Co. for approximately 2500 tons of 14 to 16 per cent ferrosilicon, pending business is negligible.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.89
So. Ohio malleable	20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.19
Alabama fdy., sil. 2.25 to 2.75	19.69
Tennessee fdy., sil. 1.75 to 2.25	19.19
Southern Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio, $3.69 from Birmingham.

Finished Material.—Even though the beginning of the third quarter is close at hand and the new price of

(*Concluded on page* 1859)

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	June 26	June 25	June 23	June 22	June 21	June 20
Lake copper, New York	14.87½	14.87½	14.87½	14.87½	14.87½	14.87½
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	46.25	46.50	....	46.00	45.62½	46.87½
Lead, New York	6.30	6.30	6.30	6.30	6.30	6.30
Lead, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15
Zinc, New York	6.50	6.50	6.50	6.50	6.50	6.50
Zinc, St. Louis	6.15	6.15	6.15	6.15	6.15	6.15

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, June 26.—Tin has been the only active market, demand for the other metals being exceedingly light. Price changes have been almost negligible, quotations being firm in all markets except tin.

Copper.—The week has been the quietest in several months. Demand from domestic consumers has been confined to small lots and buying for foreign consumption, which has been heavy for a long time, has tapered off decidedly. Domestic consumers are well covered for July, but a few are buying small lots for nearby shipment. Foreign users will probably have to buy more July metal and there still remains considerable August shipments to be sold both here and abroad. Electrolytic copper for June-July-August delivery is quoted firm at 14.75c., delivered in the Connecticut Valley. Very little is heard of premiums for prompt shipment. The quotation of Copper Exporters, Inc., is unchanged at 15c., c.i.f. European ports. The Lake copper market is quiet, but very firm at 14.87½c., delivered.

Tin.—Sales for the week ended Saturday, June 23, were heavy at not less than 1700 tons. Consumers took some of this metal, but the bulk was absorbed by dealers. June 20 was the most active day with prices higher and sellers shy. Between 400 and 500 tons changed hands. Another good day was June 22 when 400 tons was sold. Yesterday, Monday, was a quiet day with not over 150 tons changing hands. Today the market has been only moderately active with spot Straits tin quoted at 46.25c., New York. Interest in spot tin is more active, but not on a large scale, and this is taken to indicate that some consumers are not fully supplied. Prices in London today were as follows: Spot standard, £215; future standard, £214 17s. 6d., and spot Straits, £208 per ton. The Singapore price was £209 10s. Arrivals thus far this month have been 4775 tons, with 5835 tons reported afloat.

Lead.—Prices are firm and unchanged at 6.15c., St. Louis, in the outside market and 6.30c., New York, as the contract price of the leading interest. Consuming demand is only moderate.

Zinc.—A fair amount of inquiry is reported today, but in general the market is and has been quiet. Prices are unchanged at 6.15c., East St. Louis, or 6.50c., New York, for prime Western, for early delivery, with a slight premium asked for futures. Ore prices are unchanged at $40, Joplin, at which about 7000 tons changed hands last week. Output is reported at around 11,000 tons. Producers are not forcing sales, and it is generally realized that consumers, not being covered ahead, must soon come into the market.

Nickel.—Quotations for wholesale lots of ingot nickel are unchanged at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—In a quiet market Chinese metal is quoted at 9.50c. to 9.75c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 26.—This market is quiet and prices lack strength except in zinc and copper. Prices in the old metals are holding in a dull market.

Prices, per lb., in carload lots: Lake copper, 14.75c.; tin, 50.25c.; lead, 6.25c.; zinc, 6.25c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yel-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	31.50c. to 32.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.00c.
Tin, bar	56.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig	7.10c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	55.50c.
Silder, ½ and ½	30.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

No revisions in the mill prices of bronze, brass and copper products have been reported since May 25. Zinc sheets have not changed since the advance of June 7, and lead full sheets since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.25c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

low brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Chicago Mercantile Mart Takes 5000 Tons—Awards of 16,125 Tons

WITH 5000 tons for the Chicago Mercantile Mart, 3000 tons for a warehouse in St. Louis and 2500 tons for a dock building in Brooklyn, awards reported to THE IRON AGE in the last week amounted to 16,125 tons. New projects totaled less than 1900 tons. Awards follow:

STATE OF VERMONT, 400 tons, 15 bridges to various companies.

BROOKLYN, 2500 tons, building for New York Dock Co., to Kalman Steel Co.

PHILADELPHIA, 300 tons, building for William Steel & Sons, to Kalman Steel Co.

CLEVELAND, 100 tons, Jewish hospital, to Pollak Steel Co.

CHICAGO, 450 tons of rail steel bars, Hyde Park State Bank, to unnamed bidder.

CHICAGO, 600 tons of rail and billet steel bars, Horder warehouse, to Joseph T. Ryerson & Son.

CHICAGO, 100 tons, Eleanor Club, to Joseph T. Ryerson & Son.

CHICAGO, 5000 tons of rail steel bars, Mercantile Mart, to Inland Steel Co.

CHICAGO, 250 tons, steam tunnels for University of Chicago, to Joseph T. Ryerson & Son.

ST. LOUIS, 3000 tons, warehouse for J. C. Penney Co.; McAnulty-Klein Co., general contractor, to Laclede Steel Co. and Missouri Rolling Mills Corporation.

ST. LOUIS, 370 tons, Rocky Branch sewer, to Missouri Rolling Mills Corporation.

EUGENE, ORE., 485 tons, dam, penstock and power house, to A. Guthrie & Co., Portland.

PORTLAND, ORE., 700 tons, Lovejoy viaduct, to Pacific Coast Steel Co.

LOS ANGELES, 225 tons, loft building, 1206 Maple Street, to unnamed interest.

SACRAMENTO, CAL., 120 tons, Cache Creek bridge, Tulare County, to unnamed interest.

SEATTLE, 175 tons, loft building, Eighth and Spring Streets, to unnamed interest.

SEATTLE, 250 tons, West Seattle public school, to Pacific Coast Steel Co.

SEATTLE, 150 tons, Von Herberg Building, to Pacific Coast Steel Co.

SEATTLE, 600 tons, Peck & Wills warehouse, to Northwest Steel Rolling Mills.

STATE OF WASHINGTON, 250 tons, highway work on Olympic peninsula, to Northwest Steel Rolling Mills.

VANCOUVER, B. C., 100 tons, grain elevator, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

FALL RIVER, MASS., 300 tons, technical high school.

CHICAGO, 570 tons, building for Miehle Printing Press Co.

ST. LOUIS, 500 tons, building for American Railway Express Co., at Union Station.

SEATTLE, 600 tons, Beacon Hill tunnel.

The C. G. Claussen Co., Inc., has been organized by Carl G. Claussen, formerly Pacific Coast manager for B. Nicoll & Co., New York, to handle the Pont-a-Mousson line of cast iron pipe and fittings in Oregon, Washington, California and the Hawaiian Islands. The main office of the new company has been opened in the Rialto Building, San Francisco, and a branch has been established in the W. M. Garland Building, Los Angeles, in charge of W. S. Conner.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.625c.	14.00c.
Copper, heavy and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.25c.	8.50c.
Brass, light	6.25c.	7.75c.
Heavy machine composition	9.75c.	11.00c.
No. 1 yellow brass turnings	8.50c.	9.375c.
No. 1 red brass or composition turnings	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

FABRICATED STRUCTURAL STEEL

New York Hotel Award of 12,000 Tons in Total of 38,200 Tons

BOOKINGS of fabricated structural steel reported during the week totaled 38,200 tons, the largest being 12,000 tons for a New York hotel and 3000 tons for a mill building at Rome, Ga. New projects, amounting to 27,900 tons, included 7000 tons for an apartment building in New York and a number of jobs ranging from 1000 to 3000 tons. Awards follow:

BOSTON, 1800 tons, United States Gypsum Co. plant, to New England Structural Co.

SOMERVILLE, MASS., 350 tons, Boston & Maine Railroad bridge, to Boston Bridge Works, Inc.

QUINCY, MASS., 200 tons, Granite Trust Co. office building, to Harris Structural Co.

STATE OF VERMONT, 800 tons, several highway bridges; 200 tons to American Bridge Co. and remainder to several unnamed companies.

NEW YORK, 12,000 tons, New Yorker Hotel at Eighth Avenue, Thirty-fifth and Thirty-sixth Streets, to American Bridge Co.

NEW YORK, 760 tons in the following jobs as reported to the Structural Steel Board of Trade, Inc.: Cox bakery, Jamaica, to McClintic-Marshall Co.; Capital Club at 1260 Ocean Avenue, Brooklyn, and school at Bleeker and Vincent Streets, Maspeth, L. I., to George A. Just Co.

NEW YORK, 500 tons, Tammany Building at Union Square and Seventeenth Street, to Bethlehem Fabricators, Inc.

SYRACUSE, N. Y., 600 tons, mill building for Hoffmann Machinery Co., to American Bridge Co.

PHILADELPHIA 700 tons, State Theater, to Shoemaker Bridge Co.

PHILADELPHIA, 500 tons, North Broad Street Station, to McClintic-Marshall Co.

LANCASTER, PA., 500 tons, Fulton National Bank, to Shoemaker Bridge Co.

PENNSYLVANIA RAILROAD, 200 tons, bridges, to American Bridge Co.

ROME, GA., 3000 tons, mill building for American-Chatillon Co., to McClintic-Marshall Co.

DETROIT, 850 tons, Y. W. C. A. building; from F. R. Patterson Construction Co., general contractor, to Massillon Bridge & Structural Co.

DETROIT, 630 tons, building for Michigan Bell Telephone Co., to Whitehead & Kales Co.

DETROIT, 967 tons, Fort Road grade crossing separation for Pennsylvania, Wabash and Michigan Central railroads, to unnamed bidder.

LANSING, MICH., 300 tons, train sheds for Durant Motors, Inc., to Flint Structural Steel Co.

LANSING, MICH., 177 tons, municipal bridge over Grand River, to American Bridge Co.

GRAND RAPIDS, MICH., 150 tons, warehouse for Kroger Grocery & Baking Co., to Flint Structural Steel Co.

STATE OF MICHIGAN, 110 tons, highway bridges, to Massillon Bridge & Structural Co.

FAIRFIELD, OHIO, 400 tons, Government aerodome, to Pittsburgh-Des Moines Steel Co.

YORKVILLE, OHIO, 150 tons, plant extension for Wheeling Steel Corporation, to McClintic-Marshall Co.

AKRON, OHIO, 500 tons, Loew Theater, to Forest City Structural Co.

LUCAS COUNTY, OHIO, 350 tons, highway bridges, to American Bridge Co.

SOUTH BEND, IND., 1000 tons, passenger station, to McClintic-Marshall Co.

CHICAGO, 100 tons, garage at 868 North Clark Street, to Midland Structural Steel Co.

CHICAGO, 500 tons, St. Michael High School, to New City Iron Works, local.

CHICAGO, 100 tons, building for Interstate Iron & Steel Co., to American Bridge Co.

CHICAGO, 2700 tons, Harmon sports arena, to Duffin Iron Co.

NELSON, ILL., 1000 tons, bridge for Chicago & North Western Railroad, to Wisconsin Bridge Co.

KANSAS CITY, MO., 110 tons, warehouse for Corn Products Refining Co., to McClintic-Marshall Co.

SEATTLE, WASH., 200 tons, clinker building for Pacific Coast Cement Co., to Wallace Bridge & Structural Steel Co.

SPOKANE, WASH., 1600 tons, Paulsen Building, to Hofius Steel & Equipment Co.

SPOKANE, WASH., 1700 tons, Medico-Dental Building, to Hofius Steel & Equipment Co.

PULLMAN, WASH., 130 tons, home economics building for Washington State University, to Hofius Steel & Equipment Co.

EUGENE, ORE., 180 tons, dam, penstock and power house, to A. Guthrie & Co., Portland, Ore.

SAN FRANCISCO, 800 tons, 525 tons of plates and 275 tons of shapes, carfloat for Santa Fe, to Moore Dry Dock Co.

LOS ANGELES, 100 tons, factory, Sorenson Lane, to Llewellyn Iron Works.

LOS ANGELES, 470 tons, apartment building, 5930 Franklin Avenue, to Baker Iron Works.

LOS ANGELES, 170 tons, garage for Firestone Tire & Rubber Co., to McClintic-Marshall Co.

VERNON, CAL., 900 tons, factory for Illinois-Pacific Glass Co., to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARTFORD, VT., 200 tons, State bridge.

NEW YORK, 7000 tons, combination apartment building, warehouse and garage at Forty-eighth and Forty-ninth Streets and East River.

STATE OF NEW YORK, 500 tons, highway bridges.

ATLANTIC CITY, N. J., 500 tons, extension to Chalfont-Haddon Hall; alternate bids on arc welded.

ATLANTIC CITY, 350 tons, Hotel Morton.

ATLANTIC CITY, 1000 tons, Embassy Theater.

PHILADELPHIA, 2000 tons, loft building at Eighth and Arch Streets.

PHILADELPHIA, 1000 tons, apartment building.

WASHINGTON, 2000 tons, bascule lift section of Arlington Memorial bridge.

SPARTANBURG, S. C., 1000 tons, mill building; Lockwood, Greene & Co., Inc., engineer.

LOUISVILLE, KY., 14,000 tons, highway bridge; bids taken July 6.

PITTSBURGH, 1100 tons, tipples and other construction for Pittsburgh Coal Co.

MENASHA, WIS., 350 tons, bascule span over Government canal; bids close June 29.

BLAIR, WIS., 1200 tons, highway bridge.

DULUTH, 1000 tons, three scows to be built by Marine & Shipbuilding Works, local.

HARVEY, ILL., 150 tons, building for Bliss & Laughlin, Inc.

MINNEAPOLIS, 600 tons, Wesley Temple.

ST. PAUL, 600 tons, building for St. Paul Fire & Marine Insurance Co.

KANSAS CITY, MO., 2400 tons, assembly plant for Chevrolet Motor Car Co.

OMAHA, NEB., 3000 tons, three projects before local fabricators.

INDEX, WASH., 200 tons, bridge span for Wallace Falls Timber Co.

OAKLAND, CAL., 170 tons, Niles Canyon bridge; bids July 16.

SAN FRANCISCO, 170 to 265 tons, Dollar Building addition; bids opened.

LOS ANGELES, 250 tons, apartment building in Hollywood; bids being taken.

LOS ANGELES, 350 tons, apartment building, Second Street and Gramercy Place; bids being taken.

LOS ANGELES, 138 tons, apartment building, 840 South Hobart Street; bids being taken.

The Colorado Fuel & Iron Co., Denver, has adopted group life insurance for all its employees. The Equitable Life Assurance Society, New York, has been named to underwrite the program, which will take effect on July 1 and will probably involve $20,000,000 of insurance. By this action more than 11.000 employees, located in properties stretching from Wyoming to the Mexican border, are offered $1,000 to $2,000 of life and total permanent disability protection, varied according to length of service, at a low cost, by reason of the participation of the company in the premium. This protection also extends to workers employed by subsidiary companies.

Cincinnati Iron and Steel Market

(Concluded from page 1856)

1.90c., base Pittsburgh, is scheduled to go into effect on bars, structural shapes and plates, users are continuing to specify at only a fair rate against old contracts. Whether the effort to secure $1 a ton more for next quarter's requirements will have the effect of forcing in tonnages at the old price before the end of the month seems doubtful, for consumers are not yet of the opinion that producers will not accept future bookings at 1.85c. However, several district offices of steel companies report that a number of customers have signed new contracts at 1.90c. Despite this favorable development, mills are having difficulty in getting users to commit themselves to the new schedule. The prolonged quietness in the structural steel market in this district has helped to weaken the position of sellers, who are in need of additional tonnages to maintain operations at a satisfactory level. Furthermore, fabricators also are suffering from the scarcity of major jobs and, as a result, their shops have little work ahead. The situation in sheets from the standpoint of prices is worse than a week ago. Mills that have been refusing to sell black sheets at less than 2.75c., base Pittsburgh, have lowered quotations $2 a ton to 2.65c., but on the higher finishes attractive orders are being booked by several independent producers at concessions of $2 to $3 a ton from the accepted base of 2.65c., Pittsburgh. In galvanized sheets, roofing stock is being sold in the South at delivered prices which figure back to 3.30c. to 3.35c., base Pittsburgh. These low quotations have been made by Northern makers who are competing with a Southern mill having a freight advantage to Southern points. Blue annealed has become fairly well stabilized at 1.90c. to 2c., and automobile body stock, at 4c. District sheet companies are operating mills at a rate approaching full capacity, and unfilled orders insure a continuation of the present production schedule for two weeks.

Reinforcing Bars.—The volume of small miscellaneous orders is holding up well, despite the absence of sizable projects. Prices are firm, with new billet bars selling at 1.85c., base Pittsburgh, and rail steel bars at 1.80c., base mill.

Warehouse Business.—Sales continue to maintain a small marginal advantage over those in May, and, unless there should be an unexpected drop in orders the coming week, bookings in June will exceed those of the previous month. Bars and structural steel are the leading products in volume of business. Quotations are showing strength.

Coke.—Shipments of by-product foundry and domestic coke this month are expected to approximate closely those in May. Although no announcement has been made by coke makers, prices during July probably will remain unchanged in both foundry and domestic grades. A local dealer has sold 8000 tons of Wise County beehive foundry coke to a Wisconsin melter. Demand for New River foundry coke is light.

Foundry coke prices per net ton delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—There have been few transactions in the past week, the market being exceptionally quiet. Steel plants in this district are accepting a fair amount of material on current contracts. Prices given below are largely nominal, because of the absence of buying.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to $11.25
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	7.75 to 8.25
Machine shop turnings	7.25 to 7.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

PERSONAL

Franklin E. Bragg of N. H. Bragg & Sons, Bangor, Me., was elected president of the New England Iron and Hardware Association at the annual meeting held on June 19 in Boston. He has been vice-president of the organization and succeeds William A. Hopkins, Decatur & Hopkins Co., Boston, who has served two terms. William H. Bowe, Herrick Co., Boston, was elected vice-president to succeed Mr. Bragg. In addition to Messrs. Hopkins, Bragg and Bowe, the following directors were elected for the ensuing year: Charles A. Adams, John B. Varick Co., Manchester, N. H.; Charles W. Henderson, Jr., and R. H. Sanderson, E. P. Sanderson Co., Cambridge, Mass.; R. M. Boutwell, Standard Horse Shoe Co., Boston; Frank F. Chase, Chase, Parker & Co., Boston; F. Marsena Butts, Butts & Ordway Co., Boston; M. B. Damon, Fitchburg Hardware Co., Fitchburg, Mass.; C. C. Dodge, George F. Blake, Jr., & Co., Worcester, Mass.; George M. Gray, Peter Gray & Sons, Cambridge; G. M. Congdon, Congdon & Carpenter Co., Providence, R. I.; Quincy W. Wales, Brown-Wales Co., Boston, and C. D. Alexander, Emery, Waterhouse Co., Portland, Me. George J. Mulhall was reelected treasurer and clerk of the association.

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S. Wells Utley, president Detroit Steel Castings Co., Detroit, was elected president of the Detroit Board of Commerce at a meeting of the board of directors held on June 19. Mr. Utley has been president of the American Foundrymen's Association for the last two years.

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Herman Diederichs, director of Sibley School of Mechanical Engineering, Cornell University, has been made the first incumbent of a new professorship endowed by alumni of the University in memory of John E. Sweet, a member of the first faculty of Sibley College, one of the founders of the American Society of Mechanical Engineers and the inventor of the straight-line steam engine. Professor Diederichs is a graduate of Cornell, having received the degree of mechanical engineer in 1897.

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John A. Coleman, 1006 Washington Avenue, Houston, Tex., has been appointed Texas representative for the Roller-Smith Co., 233 Broadway, New York, maker of electrical instruments and circuit breakers. He has had wide experience in the electrical business and in his territory.

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Charles A. Terry, vice-president Westinghouse Electric & Mfg. Co., has been elected a director, taking the place left vacant by the death of Gen. Guy E. Tripp.

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B. J. Matteson, industrial relations chief and industrial representative of the president of the Colorado Fuel & Iron Co., Denver, is retiring from that office. His assistant, William I. Reilly, has resigned, also, according to a report from Denver.

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H. T. Weeks has been appointed representative in Colorado, Utah, Wyoming and northern New Mexico for the Roller-Smith Co., 233 Broadway, New York, maker of electrical instruments and circuit breakers. His headquarters are in the United States National Bank Building, Denver. He will handle the entire line of products put out by the company. He has had wide experience both in the electrical business and in the territory he will cover.

—

George Smith has been appointed vice-president of the Hanson-Van Winkle-Munning Co. (electro-plating equipment), Matawan, N. J. He will be in charge of the activities of the company in the Central and Western States. A native of New England, Mr. Smith entered business with the General Electric Co., Lynn, Mass. On Sept. 1, 1922, he joined A. P. Munning & Co., in charge of automatic electro-plating installations, directing the design of machinery. A year later he went to Roth Brothers & Co., Chicago, as vice-president and general manager, coming back now to the other organization under its present name.

Richard F. Grant has resigned as vice-president of the M. A. Hanna Co., Cleveland, and as president of the Susquehanna Collieries Co., anthracite division of the Hanna company, to become head of the newly formed sales corporation of the Lehigh Valley Coal Co. He has been succeeded as president of the Susquehanna company by James Prendergast, who has had charge of anthracite sales of the Hanna company.

—

J. M. Fuller, president Harrington & King Perforating Co., Chicago, is abroad on a vacation until September.

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Robert A. Gillies, assistant superintendent of blast furnaces at the South works, Illinois Steel Co., Chicago, has been made superintendent of the Steel Company of Canada, Ltd., Hamilton, Ont. Mr. Gillies was first employed in the chemical laboratories of the South works. He was made assistant superintendent in 1925.

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Robert L. Browne, 1425 Statler Office Building, Boston, has been appointed district sales representative of the Swift Electric Welder Co., Detroit, for the Eastern territory, comprising the State of New York and the New England States.

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Hyman Botwinik, treasurer Botwinik Brothers, Inc., machinery merchant, New Haven, Conn., is leaving for a three or four months' pleasure and business trip to Europe, where he will visit England, France, Germany, Russia, Italy and other countries.

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Raymond O. Abbott, who for three years has been secretary and treasurer of the National Pipe Bending Co., New Haven, Conn., has now been elected president and treasurer, succeeding H. S. Brown, who recently passed away. Wade G. Marks, sales promotion manager, was elected secretary. It is the aim and plans of the present officers to continue the company along the same general policy as under Mr. Brown's régime.

—

O. H. Davidson, president O. H. Davidson Equipment Co., 130 West Fourteenth Avenue, Denver, has been appointed district manager in the Rocky Mountain territory by the Oliver Iron & Steel Corporation, Pittsburgh. Mr. Davidson will represent the bolt, nut, rivet and pole line material departments of the Oliver company.

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L. F. Dolan, 27 Hancock Street, Dorchester, Mass., will handle sales in Massachusetts for the Hill Clutch Machine & Foundry Co., Cleveland.

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A. E. Woolam, Box 1089, Kalamazoo, Mich., is to handle Southern Michigan sales for the Hill Clutch Machine & Foundry Co., Cleveland.

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George D. Buckwell, for the past eight years Pittsburgh district manager for the M. A. Hanna Co., Cleveland, has resigned, effective July 1, to become associated with the Sharpsville Furnace Co., with blast furnaces at Sharpsville, Pa., and Neville Island, Pittsburgh. He will serve as manager of sales of pig iron, coke and by-products.

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George J. Lynch, who has been assistant district manager in the New York office of the Chicago Pneumatic Tool Co., has been appointed the company's district sales manager at St. Louis, with headquarters at 1931 Washington Avenue.

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H. G. Graham has been named head of the metallurgical and inspection department of the Jones & Laughlin Steel Corporation, Pittsburgh. He succeeds F. S. Slocum, who retires July 1.

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R. H. Clarke, vice-president and general manager of the Otis Steel Co., Cleveland, sailed a few days ago for an extended trip through Europe.

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Thomas J. O'Brien, secretary and director of purchases for the Fort Pitt Malleable Iron Co., Pittsburgh, has severed that connection, after an association of more than 25 years with that company.

OBITUARY

FRED H. MCISAAC, secretary and treasurer of the Lamson & Sessions Co., Cleveland, died suddenly June 20, aged 43 years. He had long been identified with the bolt and nut industry in the Central West and was an active participant in convention work of the American Hardware Manufacturers' Association and various other organizations. Mr. McIsaac was born in Detroit and began his business career with the Kirk-Latty Mfg. Co., Cleveland, in 1901. He was advanced through various positions, finally becoming president of that company in 1926. When the company was consolidated with the Lamson & Sessions Co. he was made secretary and treasurer of the consolidated company.

F. H. MC ISAAC

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SAMUEL RALPH JONES, a director and officer of the E. D. Jones & Sons Co., Pittsfield, Mass., paper mill machinery manufacturer, died June 21 at his home in that city, aged 50 years. He was well known in the New England pig iron and machine tool trade.

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WILLIAM H. PETERS, vice-president and director of purchases, Jaeger Machine Co., Columbus, Ohio, maker of gas engines, died on June 20.

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COL. CHARLES CLIFTON, chairman of the board, Pierce-Arrow Motor Car Co., Buffalo, died at his home in that city, June 21, after an illness of a week. He was in his seventy-fifth year. Mr. Clifton was born in Buffalo Sept. 20, 1853, and started his business career in 1871 as a clerk in the hardware store of Sidney Shepard & Co., Buffalo. His experience included work in the passenger department of the Erie Railroad and with other organizations, until, in 1897, he became secretary and treasurer of the George N. Pierce Co., Buffalo. When this company was reorganized in 1909 as the Pierce-Arrow Motor Car Co., he remained its treasurer until he was elected president in 1916. He had been chairman of the board since 1919. When the Automobile Manufacturers' Association was dissolved in 1904, giving place to the National Automobile Chamber of Commerce, Mr. Clifton became the first president and held that office for 23 years, resigning in March, 1927. Since that time he had been honorary president and director of the chamber. He was an officer of the National Guard from 1881 to 1893.

COL. C. CLIFTON

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GUSTAV H. KOVEN, president L. O. Koven & Brother, range boiler manufacturer, Jersey City, died on June 11.

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R. E. MOORE, sales manager for Gar Wood, Inc., motor boat manufacturer, died at the wheel of a speed boat which he was guiding on the Detroit River on June 17. In the boat with him at the time he collapsed were his wife and a party of friends; the boat ran wild for several minutes. Investigation showed that Mr. Moore, who was 37 years old, had suffered a heart attack.

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J. JACOB PIPPART, founder, president and general manager of the Genesee Tack Co., Mount Hope Avenue, Rochester, N. Y., died at his home in that city on June 20 after a long illness.

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WINFIELD S. BARNES, president Barnes Construction Co., Philadelphia, died on June 19 at the Frankford Hospital in that city, aged 48 years. He had been engaged in structural iron and steel fabricating for many years, and during the World War was head of the Winfield S. Barnes Engineering Corporation, which was active in the production of marine mines and depth bombs.

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JOHN S. ROBERTS, formerly connected with the United States Cast Iron Pipe & Foundry Co., died at his home in Cleveland on June 18. He was born Aug. 31, 1863, and had been connected with the pipe industry for 34 years. For the last 14 years he has served as resident manager of the Cleveland shop of the United States company. Mr. Roberts was identified with all civic projects in Cleveland and was well known in the waterworks industry.

May Canadian Output of Pig Iron and Steel

TORONTO, June 25.—The production of pig iron in Canada in May amounted to 87,811 gross tons, which was 18 per cent over the 74,736 tons produced in the preceding month and compares with 78,987 tons reported for May, 1927. While the production of foundry iron fell off sharply, it was more than offset by increased output of basic iron and malleable. Foundry iron dropped from 21,539 tons in April to 7667 tons in May; basic iron rose from 52,346 tons in April to 68,945 tons in May, and while only 851 tons of malleable iron was produced in April, 11,199 tons were made in May.

For the five months ended with May the cumulative production of pig iron was 370,634 gross tons, an increase of 11 per cent over the 334,276 tons produced during the corresponding period of 1927. This year's output included 286,762 tons of basic iron; 62,108 tons of foundry iron and 21,762 tons of malleable iron. The bulk of the basic iron was made for the further use of producers, while most of the foundry and all of the malleable iron was for direct sale.

The producing furnaces during the month had a daily capacity of 3150 tons per day.

The production of ferroalloys in Canada during May at 4049 tons was 10 per cent under the 4505 tons produced in April.

The production of steel ingots and castings in Canada in May amounted to 117,655 tons, an increase of 4 per cent over the 112,780 tons of the previous month, and 22 per cent greater than the 96,711 tons produced in May last year. The gain for the month was wholly accounted for by the increased output of basic open-hearth steel ingots, which advanced to 112,488 tons from 106,868 tons in April.

For the five months ended with May the cumulative production of steel ingots and direct steel castings totalled 531,808 tons, an increase of 24 per cent over the 427,370 tons produced during the corresponding five months of 1927. This year's output to date included 512,533 tons of steel ingots and 19,275 tons of direct steel castings.

The Dominion Bureau of Statistics' index for prices (1913 = 100) was practically unchanged, being 141.7 for May as compared with 141.5 in April.

The Phoenix Steel Products Co., Phoenix, Ariz., has been appointed exclusive agent in Arizona for the products of the Truscon Steel Co., Youngstown, Ohio. The Phoenix company will have access to the complete stock of building products carried in the Los Angeles warehouse of the Truscon organization.

BETTER EXPORTS IN PROSPECT

American Mills Compete for Barbed Wire—China More Active—Importers Here Plan Tariff Protest

New York, June 26.—Export business with Far Eastern markets continues rather small, but many exporters see evidences of improvement in the outlook for foreign trade in iron and steel products. Although the Japanese market is quiet, there has recently been a slight increase in the volume of inquiry from Chinese merchants, particularly those in South China, and trade in certain products has been increasing in South American markets. Chinese buyers are actively seeking large and small tonnages of tin plate waste and tin plate waste waste, and some sizable shipments are reported being made both to Hong Kong and Shanghai. Recent sales of wire shorts have been at $40 per ton, c.i.f. Hong Kong, and $41 per ton, Shanghai, and there are numerous offers to buy at $39 per ton, c.i.f., which exporters here consider too low to permit a profit. China is also buying bar crop ends and plate ends and cuttings, some recent sales of which have been at $19 per ton, f.o.b. Sparrows Point, Md., and other Atlantic ports. This material is classified as scrap, and it is noteworthy that the May exports of scrap were unusually large, at about 59,000 tons.

Business with South American buyers has increased recently, as a result of larger buying of barbed wire, on which mills in the United States are evidently selling at $1 to $2 per ton lower than the present Continental quotations. On a recent inquiry for 500 tons of 50-lb. rails for Callao, Peru, Continental mills are understood to have been $1 or more per ton higher in price than the leading export interest in the United States, despite the fact that the ocean freight rate from European ports was slightly less than the rate from this country.

Japanese Exporters May Combine

Exporters to Japan have recently been quoting on desirable tonnages of wire rods, some of which are understood to have gone to the Canadian maker, which is again in the market for wire rod business, following a brief period in which the mill was fully booked with Canadian rail orders. The recently reported combination of the United States Steel Products Co. and the Bethlehem Steel Corporation in a common export organization may result in a slight change in the present methods of trading with Japan. The two leading Japanese export houses are understood to have cooperated recently in certain instances, when a large order was under consideration, and it is believed that, with the two leading export interests combined, the two leading Japanese exporters in this country may find it profitable to work more closely than formerly, as they will have less competitive prices to submit to Japanese buyers.

Foreign Steel Prices Decline

Quotations of Continental steel mills to importers in the United States have declined slightly in the past week, but in most cases not to exceed 2c. to 3c. per 100 lb. Plain steel bars, which were quoted at the peak at about 1.90c. per lb., base, c.i.f. New York, have dropped to about 1.88c. per lb., and structural shapes range from as low as 1.58c. per lb. to 1.68c. per lb., c.i.f. New York, the price depending upon the tonnage involved, sizes specified and the country of origin. European mills are apparently beginning to seek tonnage again, following several weeks in which most of them evinced no special interest in selling except at premium prices.

Importers to Protest Tariff Decision

The decision of the United States Treasury Department that bar-size channels, angles and tees should be classified under paragraph 304, covering bars, instead of under paragraph 312, covering structural material and building forms, will evidently be protested by the importers affected by the ruling. The decision of the Treasury Department, reported in The Iron Age, June 21, page 1762, was that bar-size channels, angles and tees, when in sizes less than 3 in., are not known as structural shapes as that term is used commercially. The report further pointed out that these sizes are bought and sold on a bar basis and not on the basis of structural shapes.

The importers of steel who are affected by this ruling, however, point to the specific and inclusive wording of paragraph 312, which covers structural shapes, as follows:

> Paragraph 312. Beams, girders, joists, angles, channels, car-truck channels, tees, columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel, not assembled, manufactured or advanced beyond hammering, rolling or casting, one-fifth of 1c. per lb.; any of the foregoing machined, drilled, punched, assembled, fitted, fabricated for use, or otherwise advanced beyond hammering, rolling, or casting, 20 per cent ad valorem; sashes, frames and building forms, of iron or steel, 25 per cent ad valorem.

The importers claim that in this paragraph, the statement "building forms, together with all other structural shapes of iron or steel" covers the small, bar-size shapes in question.

What to Require in Foundry Coke

(*Concluded from page* 1814)

all times. This affects the slag, as ash with high alumina makes a very viscous slag.

Chemical analysis has little to do with the characteristics of coke, in the opinion of E. J. Lowry. This is particularly true of beehive coke. He cited a case in which 100 per cent Pocahontas coal, coked for 96 hr., made a poor product, as it was impossible to get the slag or the iron to run well with it. With by-product coke, he believes that best results are obtained when the cellular space is about 48 per cent of the volume.

That physical characteristics of coke are more important than the chemical analysis, however good an indication that may be, was the contention of another speaker. He called particular attention to the structure of the coke and to the shatter test. He expressed the opinion that fine material in a carload makes a lot of difference with the performance of the coke. Similar opinions were voiced by other speakers. Walter M. Saunders, Saunders & Franklin, Providence, R. I., believes the physical condition of coke is its most important characteristic, aside from the question of ash and sulphur. The piece should be large and strong and should burn readily.

Some Coke Breaks Up Readily

By-product coke appears to be especially sensitive to breaking up in handling, according to Mr. MacKenzie. He mentioned cases in which 2-in. coke generally gave better results than that graded as 3-in. coke; the larger piece broke up in going down to the melting zone and resulted in placing a greater quantity of small stuff down there.

Sulphur is present in coal in three forms—pyrites, sulphate and organic combinations—according to A. C. Porter, Lincoln Foundry Co., Lincoln, Neb. Whether this is true also of coke we do not know. There is room for investigation to learn about these forms of sulphur as regards coke. There is a great deal to be learned also about the connection between the chemical composition of the coke and its physical qualities. The amount and character of ash may affect the surface of the cellular openings and thus produce an effect upon the combustibility of the coke.

A plea for guidance was made by M. H. Moore, of the Piston Ring Co., Muskegon, Mich. He stated that his company turns out as much as 310,000 castings in a day and that 5 min. of poor operation of the cupola may result in 10,000 spoiled castings. For this reason, close control is essential.

In closing the discussion, Mr. Selvig spoke of means of obtaining correlation between laboratory tests and the practical results in the cupola. Among other things he mentioned a case in which by-product coke and beehive coke made from the same coal gave markedly different operating results. By-product coke produced a larger amount of clinker in the ash. The problem is squarely up to the foundrymen to tell the coke maker what properties in the coke they find most desirable.

Machinery Markets and News of the Works

SALES STILL AT GOOD RATE

Orders from Implement Makers Increase Bookings in Chicago District

More Equipment Required for Boston Schools —A Third List to Be Issued Later

MACHINE tool sales continue at the average rate of May, and in some centers, notably Chicago, there has been an increase in the volume of business. Orders placed by agricultural implement manufacturers have contributed to what appears will be one of the largest month's business in many years in the Chicago district.

The flow of new inquiry is fairly steady. A feature of the present activity is the widespread demand, both inquiries and orders coming from many different industries. This class of business is reported to have been the best in several years.

Stock taken of the volume of business placed during the first six months of 1928 indicates an increase of 15 to 20 per cent over the same period last year. The outlook for the last half of the year is regarded by some machine tool builders as fair, with possibly a slight let-down in July and August, due to the usual seasonal lull.

A second list of tools for the Hyde Park district school has been issued by the city of Boston. It comprises 25 items, including lathes, grinders and drilling machines. Another list, calling for milling machines and other comparatively large tools, is expected within a week.

Other inquiries include one from the General Electric Co., five turret lathes being among the machines required.

Sizable purchases have been made by the Caterpillar Tractor Co., Peoria, Ill., and the Case Threshing Machine Co., Racine, Wis. Deere & Co., Waterloo, Iowa, have practically closed their list.

New York

NEW YORK, June 26.

MACHINE TOOL business is expected by most sellers in this district to reach as large a total for June as in any previous month this year. There is also a fairly steady flow of new inquiries, promising continued activity. The Wright Aeronautical Corporation, Paterson, N. J., is still one of the outstanding buyers of tools in this territory. In addition to the substantial list of tools under inquiry for the extension to its plant on adjoining property, the company closed last week on a number of tools, including several engine lathes, a turret lathe and a tool grinder. The General Electric Co., Schenectady, is inquiring for a list of tools, including five turret lathes, and closed the past week on several lathes, boring mills and milling machines for its refrigerating machinery plant. Dwight P. Robinson & Co., New York, are in the market for a 10-in. and 16-in. engine lathes.

Recent machine-tool sales of Pratt & Whitney Co., have included 27 lathes, of which 18 13-in. engine lathes were in one order, five 16-in. lathes in another, and four 7-in. x 32-in. bench lathes in a third. Other recent sales by this company have included a No. 4 die sinker, two No. 1A and three No. 2 jig borers, 6-in. vertical shaper, 14-in. vertical surface grinder, 8-in. rotary surface grinder, two No. 3 bench universal milling machines and one 6-in. x 20-in. thread milling machine.

Niles-Bement-Pond Co., recently closed a No. 5 Newark gear cutting machine, 4-spindle Acme nut tapping machine, Ohio No. 2 universal milling machine, 32-in. shaper, No. 2 surface grinder, universal cutter grinder and three 3-ft. Morris radial drills.

Recent sales of squaring and gap shears by Kutscheid Mfg. Co., Chicago, totaled 16; buyers included Thompson-Starrett Co., New York; Fairchild Airplane Mfg. Co., Farmingdale, N. Y.; Sexauer & Lemke Co., Long Island City; Birmingham Fabricating Co., Birmingham; James Hunter Machine Co., North Adams, Mass.; Shull Co., Washington and Wadsworth-Core Machine & Equipment Co., Akron, Ohio.

General Cable Co., 114 Liberty Street, New York, manufacturer of electrical wires and cables, has acquired property at Mobile, Ala., and plans new works to cost more than $200,000 with equipment.

Nathan Langer, 81 East 125th Street, New York, architect, has plans for a two-story automobile service, repair and garage building, to cost about $110,000 with equipment.

F. R. Smith, 9219 New York Avenue, Jamaica, L. I., has plans for a storage and distributing plant at Creedmore, L. I., to include one-story machine shop, 65 x 80 ft. Morrell Smith, 161-10 Jamaica Avenue, Jamaica, is architect.

Decorated Metal Mfg. Co., 199 Sackett Street, Brooklyn, has awarded general contract without competition to Barney-Ahlers Construction Corporation, 110 West Fortieth Street, New York, for a six-story addition, to cost approximately $115,000 with equipment.

Cohen & Siegel, 45 West Fifty-seventh Street, New York, architects, have taken out permit for two-story automobile service, repair and garage building, to cost in excess of $300,000 with equipment.

Allen Air Appliance Co., Inc., Glens Falls, N. Y., recently formed by Edward J. McEwen, 262 Broadway, Fort Edward, N. Y., and associates, with capital of $200,000, is said to be planning early operation of plant for manufacture of compressed air equipment and other machinery. George S. Witham, 106 Main Street, Hudson Falls, N. Y., is interested in organization.

Louis J. and Fred Ziehm, 34 Clinton Avenue, Albany, N. Y., have awarded general contract to Jasper Myers, 90 State Street, for a three-story addition to their automobile service, repair and garage building, including improvements in present structure, to cost about $120,000 with equipment.

American Radiator Co., 40 West Fortieth Street, New York, has acquired about 3 acres at New Rochelle, N. Y., fronting on New York Central Railroad, improved with building of 80,000 sq. ft. floor space, and will establish a new factory branch and distributing plant.

Fairchild Airplane Mfg. Co., 270 West Thirty-eighth Street, New York, is reported planning a new aircraft factory and assembling plant at Farmingdale, L. I., to cost in excess of $75,000. A housing development for employees also is projected.

Farber & Kalkin, 1746 Pitkin Avenue, Brooklyn, architects, have plans for a two-story automobile service, repair and garage building, 120 x 175 ft., to cost close to $130,000 with equipment.

George B. Cortelyou, president Consolidated Gas Co., 130 East Fifteenth Street, Oscar H. Fogg, vice-president of same company and president American Gas Association, 420 Lexington Avenue, New York, and associates have organized Ensign-Reynolds, Inc., with capital of $250,000, to operate plant in New York district for manufacture of gas-fired appliances, primarily industrial heating apparatus. Operations will begin soon.

Board of Education, Union Free School District No. 5, Ticonderoga, N. Y., plans installation of manual traning equipment in new two-story high school, to cost $275,000, for which bids will be asked on general contract early in July. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Leon Dynkin and Harry Shapiro, Jersey City, N. J., have leased former local plant of American Wire Form Co., at 265-73 Grant Avenue, one-story, 100 x 100 ft., and will remodel for manufacture of metal novelties.

Columbia Store Fixture Co., Newark, has purchased former factory of Roseville Novelty Works, 367-71 North Fifth Street, comprising one and two-story building, on site, 75 x 125 ft., and will occupy for new plant.

D. W. May, Inc., 380 Central Avenue, Newark, manufacturer of electrical equipment and supplies, has awarded general contract to Becker Construction Co., 361 Grove Street, for two one-story factory units, to cost close to $50,000. Marshall N. Shoemaker, 15 Central Avenue, is architect.

Turner Machine Co., 28 Eagle Street, Newark, manufacturer of tanning machinery, etc., will begin work early in July on one-story machine shop, 60 x 92 ft., for which general contract recently was let to Enstice Brothers, Inc., 111 Academy Street, to cost about $25,000 with equipment.

Joseph Weber, 132 Twenty-sixth Street, Guttenberg, N. J., architect, is drawing plans for two-story and basement automobile service, repair and garage building, 100 x 105 ft., at West New York, to cost about $130,000 with equipment.

James T. Gordon Co., 11 Park Place, New York, has been appointed sales representative for Hill Clutch Machine & Foundry Co., Cleveland, in metropolitan New York territory.

Royal Plating & Polishing Co., formerly at 144 Bleecker Street, Newark, N. J., has moved to its new two-story plant at 152 Bleecker Street. Frank P. Barile is president. New chromium plating equipment is being installed.

New England

BOSTON, June 25.

MACHINE-TOOL business is better than it appears on the surface. Two of the largest local houses so far this month have done a very good business in high priced equipment, at least 15 machines having been sold. Two other firms also report good business and a fifth company states that it has booked larger sales this month than in May. Lathes, radial drills, milling machines, grinding machines and miscellaneous equipment are involved in current business. Used tools sold the past week include a heavy-duty Cincinnati miller, a gear cutter, several 14-in. and 16-in. lathes and a few small milling machines, most of them to shops near Boston.

The city of Boston has issued its second list of tools for the Hyde Park district school. It includes approximately 25 items, including lathes, grinding machines, upright and sensitive drills and hack saws. Another list calling for milling machines and large tools is expected within a week. Bids for the first lot of lathes are in. This business, together with buying by the Boston & Albany against its list of tools, and by other New England railroads, is expected to liven up the market. New inquiries from industrial plants are few. Demand for small tools has dropped off.

Business with New England machine-tool builders is spotty, yet collectively they are moderately busy. A Hartford plant is exceptionally busy and is operating night shifts in certain departments. One Worcester grinding machine maker is very busy, and another quite active, while a maker of miscellaneous tools in that city is more busy than it has been in some time. At least one Bridgeport shop is well engaged, and a Vermont plant is reported busier than it has been in months.

Edlund Co., Burlington, Vt., maker of can openers, has moved into larger quarters and is gradually taking on equipment.

Bryant Electric Co., Bridgeport, Conn., which recently acquired the Hemco Electric Mfg. Co., has tentative plans for new equipment.

Kesterman Brothers, Cranston, R. I., jewelry manufacturers, will build a new plant to cost $30,000 without equipment. Bench tools will be required later.

L. G. Balfour Co., Attleboro, Mass., jewelry manufacturer, has started on a construction program to enlarge its output. It also has under consideration new metal-working equipment.

Kidder Press Co., National Woodworking Machinery Co., Dover, N. H., and the United Printing Machinery Co., Boston, have consolidated as the U. P. M. Kidder Press Co., Inc. At a future date it is planned to consolidate plants and possibly to purchase new equipment.

Work is about to start on a one-story, 75 x 135 ft. plant for Froiland Chain & Mfg. Co., 2543 Main Street, Springfield, Mass. Paul Froiland is president. Plans are private.

Farrel Foundry Co., Waterbury, Conn., has plans for a three-story, 35 x 200 ft. addition.

An expansion program is being arranged by Holyoke Co., Holyoke, Mass., manufacturer of covered wire and cables, etc., at its Springdale plant, consisting largely of installation of additional machinery.

A. L. Adams Paper Co., Baldwinsville, Mass., has asked bids on general contract for two-story addition to mill, 82 x 100 ft., to cost close to $50,000 with equipment. Leo Shlick, 314 Beacon Street, Boston, is engineer.

Royal Typewriter Co., Hartford, Conn., has awarded general contract to Denis O'Brien & Sons, 118 Asylum Street, for two five-story additions, 68 x 190 ft., and 68 x 70 ft., respectively, to cost about $250,000 with equipment. Greenwood & Noerr, 847 Main Street, are architects and engineers. Headquarters are at 316 Broadway, New York.

Meisel Press Mfg. Co., 944 Dorchester Avenue, Dorchester, Boston, manufacturer of printing presses, parts, etc., has asked bids on general contract for one and two-story addition, 100 x 220 ft., to cost in excess of $150,000 with equipment. H. S. Cleverdon, 46 Cornhill Street, is architect.

Automatic Equipment Co., Attleboro, Mass., has leased space in a local factory and plans early establishment of plant for manufacture of an automatic fire extinguisher and patented oil burner.

Connecticut Light & Power Co., 36 Pearl Street, New Britain, Conn., has filed plans for two-story equipment storage and distributing plant, with mechanical repair shop, to cost close to $150,000 with equipment.

Chicago

CHICAGO, June 25.

MACHINE-TOOL orders in June from agricultural implement manufacturers will make the total volume for this month one of the largest in many years. Deere & Co. have practically closed their list for the Waterloo plant and the Caterpillar Tractor Co., Peoria, Ill., and Case Threshing Machine Co., Racine, Wis., are closing large purchases. The Santa Fe is reported also to have bought all but one item remaining on its list issued early in the spring.

Fresh inquiry for individual machines is more promising and there is a substantial volume of business coming from miscellaneous sources. Quotations on the large machines needed by the General Electric Co. at Chicago have been forwarded to Schenectady for final action. A Chicago forging plant has purchased a turret lathe.

Contract has been let by Aurora Foundry Co., 385 Spruce Street, Aurora, Ill., to Lylle & Frenier, 421 Fulton Street, for one-story addition, 45 x 140 ft., to cost close to $25,000 with equipment.

Master Planter Co., 800 North Clark Street, Chicago, manufacturer of tractors, agricultural equipment, etc., has filed plans for one and two-story plant, 75 x 126 ft., to cost about $60,000 with equipment.

Village Council, Truman, Minn., is asking bids until July 10 for a 75,000-gal. steel water tank on 100-ft. tower, including all incidental equipment, for municipal waterworks. Toltz, King & Day, Inc., St. Paul, Minn., is engineer

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, has awarded general contract to Burrell Engineering & Construction Co., 513 West Jackson Boulevard, for a new grain elevator at Council Bluffs, Iowa, to cost about $85,000 with conveying, loading and other equipment.

Barnes Drill Co., Chestnut Street, Rockford, Ill., manufacturer of honing machines and other machine tools, has awarded general contract to Security Building Co., 1016 Charles Street, for a one-story addition, 80 x 145 ft., to cost more than $50,000 with equipment. A. G. Eliel, Stewart Building, is architect.

Board of Education, Minneapolis, Minn., is considering installation of manual training equipment in extensions to Nokomis junior high school, to cost about $275,000. Schuett & Meier Co., Thorpe Building, are engineers.

George Brumlik, Chicago, operating an automobile service, repair and garage in local Engineers' Building, has awarded general contract to B-W Construction Co., 720 Cass Street, for a new ten-story service, repair and garage unit 80 x 150 ft., to cost in excess of $350,000 with equipment.

Phillip Gollner Plumbing Supply Co., Thirty-third Street and Archer Avenue, Chicago, is said to be planning early rebuilding of portion of plumbing and heating equipment plant destroyed by fire June 15, with loss close to $200,000 with equipment.

Metz Mfg. Co., Seventeenth and Elm Streets, Dubuque, Iowa, manufacturer of sash, doors and other millwork products, will soon take bids for a three-story addition to cost close to $65,000. C. I. Krajewski, 730 Main Street, is architect.

Board of Education, Dixon, Ill., plans installation of manual training equipment in new three-story high school to cost $375,000, for which bids have been asked on general contract. Royer, Danely & Smith, Urbana, Ill., are architects.

Hostler Coal & Coke Co., 417 South Dearborn Street, Chicago, recently appointed sales agent for Chattanooga Solvay by-product coke, manufactured by Tennessee Products Corporation, will distribute egg and nut size coke north of Ohio River.

Chicago Hardware Foundry Co., North Chicago, Ill., will spend $50,000 for improvements at its various properties. A new core room and a pattern room is to be erected at Elkhart plant.

Newton Mfg. Co., Newton, Iowa, manufacturer of novelties, is spending $40,000 for plant improvements.

Kutscheid Mfg. Co., Chicago, reports sales of squaring and gap shears to Zouri Drawn Metal Co., Chicago Steel Service Co., Belmont Sheet Metal Works, Caine Steel Co., Hanley & Co., and Triner Scale & Mfg. Co., all in Chicago; Durand Steel Locker Co., Chicago Heights, Cutler-Hammer Co., Milwaukee, Hastings Equity Grain Bin Mfg. Co., Hastings, Neb.

Philadelphia

PHILADELPHIA, June 25.

BIDS will soon be asked by M. Harrison Bonner, 1032 North Sixty-seventh Street, Philadelphia, architect, for a four-story automobile service, repair and garage building to cost in excess of $200,000 with equipment.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, is arranging for increase in preferred stock from $30,000,000 to $35,000,000, proceeds to be used for construction and improvements, including multi-story automobile service, repair and garage in connection with bus terminal; site has been purchased near Broad Street and Olney Avenue.

Board of Trustees, Drexel Institute of Arts, Science and Industry, Chestnut and Thirty-second Streets, has completed plans for new three-story engineering building, to cost more than $200,000 with equipment. Day & Zimmermann, Inc., 1600 Walnut Street, is construction engineer.

Robert N. Dippy, Medical Arts Building, Philadelphia, architect, has plans for a new cold storage and refrigerating plant, 50 x 168 ft., to cost in excess of $100,000 with equipment.

Philadelphia & Reading Railway, Reading Terminal, Philadelphia, has had plans approved by city for terminal yard at Logan, with car repair and reconditioning facilities, in connection with electrification of lines to Germantown and Chestut Hill.

Barbour Iron Works, Marion Street and Pennsylvania Railroad, Trenton, N. J., will soon begin superstructure for one-story addition, 76 x 150 ft., to cost more than $50,000 with equipment. Walter Hankin, 224 East Hanover Street, is architect.

South Williamsport School District, South Williamsport, Pa., is considering installation of manual training equipment in two-story high school to cost in excess of $225,000. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Parless Coal Co., Deiblers, Pa., has leased local coal washery and property of Mid-Anthracite Co., and will establish plant for production of coal briquettes. Additional equipment will be installed.

Department of Property and Supplies, State Capitol, Harrisburg, Pa., B. E. Taylor, secretary, is asking bids until July 9 for 129 cast iron lamp standards for installation in Capitol Park.

Susquehanna Collieries Co., Mount Carmel, Pa., has authorized electrification of its local Cameron colliery, to cost more than $65,000 with equipment. Headquarters are in Commercial Trust Building, Philadelphia.

Joint School Boards of Westgrove, Avondale and London Grove Townships, Westgrove, Pa., plan installation of manual training equipment in two-story junior and senior high school to be erected about midway between first two noted townships, to cost $250,000, for which general contract has been let to W. M. Francis, duPont Building, Wilmington, Del. E. W. Martin, duPont Building, is architect; Calvert & Barnes, 2114 Sansom Street, Philadelphia, are mechanical engineers.

South Atlantic States

BALTIMORE, June 25.

PLANS are being considered by Eastern Shore Public Service Co., Salisbury, Md., for extensions in steam-operated electric power plant at Vienna, Md., to double present capacity, to cost close to $500,000. Extensions are also planned in transmission lines.

Piedmont Corporation, Bona Allen Building, Atlanta, Ga., is completing plans for installation of rock-crushing plant in connection with quarry at Lithonia, Ga., to cost more than $250,000 with machinery. Standard gage railroad line will be built between quarry and plant.

Charlotte Paper Co., 214 South College Street, Charlotte. N. C., is reported planning new factory for manufacture of folding paper boxes, cartons, etc., to cost more than $85,000 with machinery.

Union Brothers, 37 West Cross Street, Baltimore, manufacturers of furniture, will soon take bids on general contract for first unit of new factory to cost upward of $75,000 with equipment. Benjamin Frank, 517 North Charles Street, is architect.

Nitrate Agencies Co., Wilmington, N. C., manufacturer of fertilizer products, has closed arrangements with Atlantic Coast Line Railroad Co., Wilmington, for rebuilding local plant recently destroyed by fire, to be occupied under lease. New unit will provide for about twice capacity of former plant and is estimated to cost $100,000 with machinery. It is scheduled for completion early in fall.

Georgia Power & Light Co., Atlanta, Ga., will issue bonds in amount of $2,700,000, and preferred stock totaling 11,300 shares, no par value, portion of proceeds to be used for expansion and improvements, including transmission lines.

Southern Metal Novelties Co., Greenville, S. C., recently formed by W. W. McIver, 40 Tindal Avenue, and associates, is reported planning early operation of plant for manufacture of metal goods.

General purchasing officer, Panama Canal, Washington, is asking bids until July 13, for one power shovel, pipe threading and cutting machines, metal bending machines, pneumatic hoist, journal jacks, bolts, nuts, rivets, rack castings, pumping machinery, etc., Panama schedule 1885.

Standard Looms, Inc., Spartanburg, S. C., care of Isaac Andrews, 519 East Main Street, president, recently formed by Mr. Andrews and associates with capital of $750,000, has purchased property in Fernwood Farms district, East Spartanburg, for a plant to manufacture textile looms and kindred equipment, for which plans are being drawn by Lockwood, Greene & Co., Charlotte, N. C., architects and engineers. Plant will consist of main machine shop, 70 x 500 ft.; foundry, 80 x 300 ft., and other units, to cost more than $250,000 with equipment.

Standard Fertilizer Co., Inc., Williamston, N. C., has begun an expansion program to double approximately present capacity. New machinery will be installed, including bagging equipment, conveying, loading and other handling apparatus. Company is a subsidiary of Standard Wholesale Phosphate Co., Continental Building, Baltimore.

P. H. Hanes Knitting Co., Winston-Salem, N. C., plans construction of power plant in connection with six-story mill addition, entire project to cost in excess of $175,000 with machinery. Mees & Mees, Kinney Building, Charlotte, N. C., are architects and engineers.

Buffalo

BUFFALO, June 25.

INSTALLATION of manual training equipment is planned by Board of Education, Potsdam, N. Y., in new high school, estimated to cost $300,000, for which plans will be drawn by Lansing & Green, Sherman Trust Building, Watertown, N. Y., architects.

DuPont Cellophane Co., Inc., River Road, Buffalo, manufacturer of special glazed paperized products under special process, has awarded general contract to duPont Engineering Co., Wilmington, Del., an affiliated organization, for one-story and three-story additions, reported to cost in excess of $200,000 with equipment.

Daniel C. Hungerford, 65 Ontario Street, Corning, N. Y., and associates have organized Standard Mfg. Co., with capital of $50,000, to operate a local iron and steel fabricating plant. Operations will begin soon. Francis C. Williams, 169 Cedar Street, is also interested in new company.

Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of automobile shock absorbers, will soon begin superstructure for a one-story addition to cost in excess of $85,000 with equipment.

H. E. Holbrook Co., Caledonia, N. Y., manufacturer of builders' hardware, etc., is considering rebuilding of portion of plant destroyed by fire June 15, with loss reported at more than $40,000 with equipment. Headquarters are at 89 Federal Street, Boston.

The Crane Market

OVERHEAD crane inquiry is still in fair volume, but users of locomotive cranes have been rather inactive recently. Most of the overhead inquiry is for single pieces of equipment with the exception of a sizable list for export to South Africa, specifications on which are available from the Department of Commerce, Washington, or Custom House, New York. Bids on this list are to be in by July 25. Sheffield Steel Corporation, Kansas City, Mo., will buy a 10-ton, 120-ft. overhead electric traveling crane. Few new inquiries have appeared for locomotive cranes, except for used equipment, business in which is slightly more active than in new cranes. About the largest outstanding list of cranes and steam shovels is the inquiry from Dwight P. Robinson & Co., New York, for export to Argentina. No action has been taken on this inquiry as yet.

Among recent purchases are:

Corson Construction Co., 1600 Bushwick Avenue, Brooklyn, 5-ton capacity truck crane from Browning Crane Co.

Hobbs, Peabody Co., Charlotte, N. C., 5-ton capacity truck crane from Browning Crane Co.

Dixie Fuel & Supply Co., Detroit, 18-ton, 8-wheel steam locomotive crane from Orton Crane & Shovel Co.

American Steel Foundries, East St. Louis, Ill., two 20-ton, 108-ft. span electric cranes from Manning, Maxwell & Moore, Inc.

Marquette Cement Mfg. Co., La Salle, Ill., a 30-ton, power house crane from unnamed bidder.

Northland Coal Co., Ltd., Buchan, Can., ¾ yard drag line from Northwest Engineering Co.

Weyerhaeuser Timber Co., Klamath Falls, Ore., crawler gasoline shovel crane from Northwest Engineering Co.

Farris Engineering Co., Pittsburgh, 15-ton gasoline crawler crane from Northwest Engineering Co.

The Power Corporation, New York, 1-yard gasoline crawler shovel for development work at Watertown, N. Y.

Thunder Lake Lumber Co., Rhinelander, Wis., ¾-yard gasoline crawler shovel from Northwest Engineering Co.

K. E. Treylor, Charleston, Miss., 1-yard drag line from Northwest Engineering Co.

W. S. Hardwick, Beardstown, Ill., 1¼-yard drag line from Northwest Engineering Co.

J. N. Pitts, Sturgus, Sask., 1¼-yard gasoline shovel from Northwest Engineering Co.

Missouri-Kansas-Texas, 33-ton locomotive crane from American Hoist & Derrick Co.

Bingham & Taylor Corporation, Buffalo, has been formed with capital of $150,000 to take over and expand company heretofore operating as Bingham & Taylor, with foundry at 575 Howard Street, specializing in production of electric steel castings. New organization will continue in same line. It is headed by James W. and William J. Gibney.

United States Hoffman Machinery Corporation, 329 Temple Street, Syracuse, N. Y., manufacturer of clothes-pressing machinery, has awarded general contract to Dawson Brothers Construction Co., Union Building, for two-story unit to cost about $75,000 with equipment. Portion of structure will be equipped as foundry.

Lincoln Radiator Corporation, Utica, N. Y., will remove to North Tonawanda, N. Y., on Aug. 1. W. S. Murray is general manager and Elmer S. Hering, treasurer.

Fitzgibbons Boiler Co., Inc., Oswego, is planning to erect a foundry on property adjoining its plant. Homer Addams, 570 Seventh Avenue, New York, is president of company.

Cleveland

CLEVELAND, June 25.

MACHINE-TOOL sales were light the past week and were confined to single machines. Little new inquiry developed. There are indications of a slowing down that usually occurs in the summer. However, the volume this month is expected to be about the same as in May. The market is dull in Detroit where several automobile manufacturers have sharply curtailed production previous to bringing out new models. The automotive industry is well equipped and only a moderate demand for machines for replacement and to fill in is expected from this source during the next few weeks.

Plans are being prepared by Ohio Foundry Co., 2469 East Seventy-first Street, Cleveland, for a one-story addition to No. 2 plant, 150 x 200 ft., to cost close to $100,000 with equipment. Carter-Richards Co., Engineering Building, is architect and engineer.

Electric Auto Light Co., Center Street, Fostoria, Ohio, manufacturer of automobile starting and lighting equipment, is reported planning an addition to cost more than $45,000 with equipment.

Snappy Radiator & Battery Service Co., 736 Cleveland Avenue, S.W., Canton, Ohio, will ask bids early in July for one-story addition, 40 x 85 ft., to cost about $30,000 with equipment.

Heller Brothers Co., Newcomerstown, Ohio, manufacturer of files, rasps, tools, etc., has awarded general contract to Burger Iron Co., Akron, Ohio, for one-story unit, totaling about 40,000 sq. ft. floor space, to cost more than $85,000. Company has been removing plant from Newark, N. J., to this location and carrying out expansion program.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, has plans for one-story ice-manufacturing plant to cost about $75,000 with equipment.

Thomas Larson, 433 Mead Street, Zanesville, Ohio, is at head of project to construct and operate a local automobile service, repair and garage building, to cost close to $150,000 with equipment.

Bluffton Mfg. Co., Bluffton, Ohio, manufacturer of washing machines, small gasoline engines, cream separators and stock founts, is moving its plant to Findlay, Ohio. H. D. Zehrbach is secretary-treasurer and general manager.

Cincinnati

CINCINNATI, June 25.

AS the end of June approaches, machine-tool builders, in checking over the volume of orders for first half of the year, find that business showed an increase of approximately 15 to 20 per cent over that in the same period of 1927. In fact, several important manufacturers report gains of as high as 30 per cent, but the experience of others brings the general average down somewhat. While a considerable percentage of the total sales was derived from the automobile industry, buyers in that field played a lesser part in purchasing machine-tools than in the previous year. Probably the outstanding feature has been the consistent sales to companies in many different industries, this class of business having been the best in several years. Machine-tool executives agree that the volume of orders placed in the past six months and the rate at which production has been sustained during that period have been especially satisfactory, in view of conditions prevailing in industry in general.

Builders are hesitant about venturing predictions for the last half of the year, but the general opinion is that buying should continue at a fairly steady pace during the next six months, possibly with a slight letdown in July and August because of the usual seasonal lull.

Sales in June are running about on a par with those of May. Several companies have had better business than last month, but these increases have been offset by the falling off in orders reported by other manufacturers. Foote Brothers Gear & Machine Co., Chicago, has contracted for a 16-ft. extension boring mill, and the Sante Fe has bought a 90-in. locomotive journal turning lathe. A local builder has sold two lathes for shipment to Russia.

Liebel-Flarsheim Co., 410 Home Street, Cincinnati, manufacturer of physical therapy and X-ray apparatus, has acquired a five-story building at Third and Plum Streets and will expend approximately $30,000 for improvements and additional equipment before removal.

Crane & Breed Casket Co., 1231 West Eighth Street, manufacturer of caskets, has purchased plant of O. Armleder Motor Truck Company, Central Parkway and will remove to this site. Approximately $100,000 will be spent in improvements.

O. Armleder Motor Truck Co., Central Parkway, Cincinnati, is preparing plans for erection of a new factory for manufacture of motor trucks.

May-Fiebeger Co., Newark, Ohio, has moved its plant to former factory of American Motor Truck Co. in that city.

Bids will soon be asked by Samuel Hannaford & Sons, Dixie Terminal Building, Cincinnati, architects, for construction of six-story automobile service, repair and garage building, to cost about $750,000 with equipment.

Board of Trustees, Wilberforce University, Xenia, Ohio, has plans for a one-story central power plant to cost $120,000, of which about $65,000 will be expended for equipment. Herbert B. Briggs, Ohio-Hartman Building, Columbus, Ohio, is State architect, in charge. Bids will be asked late in summer.

Inland Gas Corporation, Ashland, Ky., has awarded contract to Hope Engineering & Supply Co., Mount Vernon, Ohio, for installation of a pipe line for natural gas supply from fields in Knott and Floyd Counties, Ky., to Ashland and Olive Hill, Ky., about 140 miles. Project will include two compressor stations of 2000 hp. capacity.

Franciscan Fathers of Cincinnati, care of F. J. Sheblessy, Twelfth and Republic Streets, Cincinnati, architect, have plans for a three-story high school for boys on Carthage Pike, to be known as Roger Bacon High School for Boys, to cost $750,000 with vocational training department. Architect will soon take bids on general contract.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene gas apparatus, etc., has acquired property at Louisville, and plans early construction of branch plant, to cost about $40,000. Linde Air Products Co., Inc., an affiliated organization, has acquired adjoining site and is said to be arranging for immediate branch plant here, to cost close to like amount.

Sharondale Coal & Coke Co., Sharondale, Ky., is considering rebuilding of portion of plant, including tipple and head house, recently destroyed by fire, with loss reported at $60,000 including equipment.

Cardinal Fliers, Inc., Louisville, care of Hugh Nevin, Louisville, architect, has plans for airplane hangar, 80 x 200 ft., with repair and reconditioning facilities at Bowman Fields, to cost about $22,000 with equipment.

Monitor Sad Iron Co., Big Prairie, near Wooster, Ohio, is said to have plans for a one-story unit to replace portion of works recently destroyed by fire, with loss of about $25,000 including equipment.

Gulf States

Birmingham, June 25.

BOND issue of $4,000,000 will be sold by Palmer Corporation of Louisiana, Shreveport, La., N. C. McGowen, Shreveport, director, portion of proceeds to be used for extensions and improvements in natural gas properties at Monroe, Richland and Elm Grove, La., including pipe line construction.

City Council, Greenville, Miss., has plans for a municipal electric light and power house, to cost close to $40,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., are engineers.

Pure Oil Co., 35 East Wacker Drive, Chicago, has acquired four acres at Mobile, Ala., and plans construction of new storage and distributing plant, to cost in excess of $85,000 with equipment.

Public Utilities Co., Meridian, Miss., R. C. Heady, manager, has plans for a one-story ice-manufacturing plant to cost about $80,000 with machinery.

Texas Gulf Sulphur Co., Inc.. Gulf, Tex., has plans for a steam power station with initial capacity of 7500 hp., in connection with development of sulphur properties in this section; a one-story machine and repair shop, forge shop and other mechanical buildings will be built. Plans are in progress for a housing development for operatives. With machinery installation for sulphur mining and distribution, entire project is reported to cost in excess of $300,000. Headquarters are at 41 East Forty-second Street, New York.

Southern United Ice Co., Crystal Springs, Miss., will build an addition to ice-manufacturing plant, to cost more than $45,000 with equipment. It also plans construction of two-story cold storage and refrigerating plant at Jackson, Miss., to cost more than $50,000. G. E. Wells, Inc., 100 West Monroe Street, Chicago, is engineer in charge of both projects.

Corpus Christi Independent School District, Corpus Christi, Tex., has rejected bids recently received for new three-story high school, with manual training department, and will have revised plans drawn. It will cost upward of $200,000. Hardy & Curran, Nixon Building, are architects.

Board of Education, Montgomery, Ala., is considering installation of manual training department in three-story senior high school to cost in excess of $275,000, for which bids are being asked on general contract until July 31. Frederick Ausfeld, Shepherd Building, is architect.

City Commission, Denton, Tex., will soon begin plans for a municipal ice-manufacturing plant, approved by voters at special election June 16, to cost more than $45,000 with equipment.

Helium Division, Bureau of Mines, Department of Commerce, Washington, is said to have plans for new helium plant near Amarillo, Tex., for which a fund of close to $1,000,000 is available. Work will begin in fall., R. A. Cattell is chief engineer.

Bemis Brothers Bag Co., 601 South Fourth Street, St. Louis, is reported planning power house at burlap bag mill at Talladega, Ala. A machine shop will be built and an automobile service and garage. Entire project is estimated to cost more than $1,500,000. J. E. Sirrine & Co., Greenville, S. C., are engineers.

Moody Corporation, Esperson Building, Houston, Tex., W. L. Moody, 3d., president, has acquired oil properties in Howard and Glasscock Counties, and is reported planning early construction of pipe line. An oil refinery is also contemplated.

Pittsburgh

Pittsburgh, June 25.

THE appearance of the regular quarterly list of the Westinghouse Electric & Mfg. Co. has been the feature of the week. It contains about 50 items, calling for an expenditure of approximately $130,000. In general, inquiry has improved somewhat, but actual orders have not increased.

Bids will soon be asked by Pennsylvania Transfer Co., 298 Duquesne Way, Pittsburgh, for one-story automobile service, repair and garage building, to cost close to $90,000 with equipment. J. F. McWilliams, 127 North Highland Avenue, is architect.

Board of Education, 1500 Sixth Avenue, Altoona, Pa., is considering installation of manual training equipment in three-story and basement high school to cost $750,000, for which bids are being asked on general contract until July 23. Hersh & Scholler, Commerce Building, are architects.

Harry M. Waugh, Bluefield, W. Va., railroad contractor, is planning construction of a sand and gravel washing plant with capacity of about 750 tons per day, and will soon purchase screening bins, conveying equipment, washing equipment, loading machinery, etc.

Logan Bus Terminal, Inc., Logan, W. Va., has awarded general contract to G. C. Johnson Construction Co., Bluefield, W. Va., for a new motor bus terminal, with service and repair facilities, to cost about $85,000 including equipment.

Hubbard & Co., 6301 Butler Street, Pittsburgh, manufacturers of hardware, have filed plans for a one-story addition, 100 x 100 ft., to cost about $45,000, for which general contract recently was let to Rust Engineering Co., American State Bank Building.

T. L. Rose & Sons, 1104 House Building, Pittsburgh, have been appointed to handle sales in Pittsburgh territory for Hill Clutch Machine & Foundry Co., Cleveland.

Milwaukee

Milwaukee, June 25.

MACHINE-TOOL builders report a continuance of moderate activity, with order books holding their own. Much of the call for equipment is for replacement, but the aggregate is sufficient to keep shops busy at the average for the first five months of the year. June sales are expected to equal the May volume by most shops.

Kohler Co., Kohler, Wis., manufacturer of enameled sanitary equipment, self-contained electro-generating plants, etc., has contracted with Immel Construction Co., Bana Building, Fond du Lac, Wis., for a dry kiln addition, 125 x 500 ft. Building and equipment are estimated to cost about $250,000.

Armstrong Foundry Co., 1530 Junction Avenue, Racine, Wis., maker of gray iron castings, will take bids after July 2 for erection of a one-story shop addition, 75 x 80 ft., designed by J. Mandor Matson, local architect. An investment of about $35,000 is planned.

Pelton Steel Casting Co., 832 Elliott Place, Milwaukee, has increased its capitalization from $50,000 to $200,000 and contemplates additions and general improvements in plant. Arthur J. Ehne is president and general manager.

Appleton Machine Co., 618 South Oneida Street, Appleton, Wis., closes bids this week for erection of a new foundry, 80 x 100 ft., designed by W. F. Dolke, engineer, Evanston, Ill. It will cost about $75,000 complete.

Manitowoc Engineering Works, division of Manitowoc Shipbuilding Corporation, Manitowoc, Wis., has acquired manufacturing and selling rights of Speedcrane, formerly marketed by Moore Speed Crane Co., Chicago. Manitowoc company's representatives in New York are Forsythe Brothers, 30 Church Street. The Moore Speed Crane Co., 2916 West Twenty-sixth Street, Chicago, will continue as sales representative in that territory.

Indiana

INDIANAPOLIS, June 25.

WORK will be started by Van Camp Hardware & Iron Co., 401 West Maryland Street, Indianapolis, on one-story pipe shop, 80 x 180 ft., for storage and distribution, threading and cutting, to cost close to $30,000 with equipment.

J. B. Bayard, Vincennes, architect, has plans for a one-story automobile service, repair and garage building, 150 x 275 ft., to cost in excess of $125,000 with equipment.

Neal Coal Co., Littles, Pike County, is said to plan early rebuilding of tipple and buildings at local mines destroyed by fire June 19, with loss close to $90,000 including machinery.

Peabody Seating Co., North Manchester, recently formed with capital of $300,000, will take over and expand local plant and business of Peabody School Furniture Co. It is proposed to provide additional facilities for manufacture of school seats, as well as seats for public halls, etc. New company is headed by J. P. Peabody and J. J. Wolfe.

Crown Machine Co., Tuxedo Street and Newton Avenue, Indianapolis, will rebuild portion of plant destroyed by fire June 17, with loss reported at $35,000 including equipment.

St. Louis

ST. LOUIS, June 25.

BIDS will be received by David Stroud, city clerk, Kennett, Mo., until July 17 for equipment for municipal electric light and power plant, including one 120-hp. Diesel oil engine unit, direct-connected to 80-kw. generator, with exciter; and for two 240-hp. Diesel oil engine units, each connected to a 160-kw. generator, with exciters, switchboard and accessory equipment; also for complete power plant building. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Central Hardware Co., 811 North Sixth Street, St. Louis, is completing plans for one-story and basement storage and distributing plant to cost upward of $80,000 with equipment. Leo F. Abrams, Chemical Building, is architect.

Oklahoma Railway Co., Terminal Building, Oklahoma City, has plans for one-story repair shop, 100 x 175 ft., to cost close to $80,000 with equipment. G. B. Treat is company engineer.

Following recent stock issue of $3,534,000 by Consolidated Gas Utilities Co., Blackwell, Okla., a portion of fund to be used for extensions and improvements in natural gas lines and properties, company has authorized sale of bond issue in amount of $8,000,000, a considerable portion of fund to be used for purchase of plant and system of Larutan Gas Corporation, and for construction of 14-in. pressure pipe line from Amarillo, Tex., gas field to Enid, Okla.

Board of Education, Oklahoma City, Okla., plans installation of manual training equipment in new Capital Hill Senior High School, for which general contract has been let to Tankersly Construction Co., Tradesmen's National Bank Building, at $425,940. Layton, Hicks & Forsyth, Braniff Building, are architects.

Page Milk Co., Merrill, Wis., is said to be planning installation of boiler plant and machine shop at milk condensery at Coffeyville, Kan. Entire project will cost close to $180,000.

C. M. Conoway, Dallas, Tex., and associates, have plans for an ice-manufacturing plant, cold storage and refrigerating plant at Hoisington, Kan., reported to cost upward of $200,000. Herman Brand, Hoisington, will be in charge of general construction.

Arkansas Airports Co., Pine Bluff, Ark., recently formed by Felix G. Smart, 309 West Second Street, and associates, is arranging for bond issue of $75,000 and preferred stock issue of like amount, a portion of proceeds to be used for construction of airport, including hangar, repair and reconditioning shop, and oil storage and distributing station.

Board of Trustees, University of Arkansas, Fayetteville, has completed plans for one-story machine and pattern shop, 40 x 202 ft., and one-story foundry and forge shop, 30 x 152 ft. William N. Gladson, dean, school of engineering, is in charge.

McGraw Electric Co., Omaha, Neb., manufacturer of electrical products, has purchased business and property of Clark Electric Water Heater Co., heretofore owned and operated by Stoughton Mfg. Corporation, Stoughton, Wis. New owner will consolidate with its organization, and will develop facilities at Omaha plant for manufacture of Clark electric heaters and parts.

Ramsey Accessories Mfg. Corporation, manufacturer of piston rings and pistons, Holland, Mich., has purchased building formerly occupied by Davis Boring Tool Co., Spring and Forest Park Avenues, St. Louis, and will remove its factory and general offices to St. Louis. Company's branch at 4373 Duncan Avenue will be consolidated with main factory.

McNeal Machinery Co., Joplin, Mo., will handle sales in Kansas, Missouri and Oklahoma for Hill Clutch Machine & Foundry Co., Cleveland.

Detroit

DETROIT, June 25.

PLANT formerly operated by Alboy Mfg. Co., St. Clair, Mich., has been secured under lease by Pouliot Boat Co., Detroit, care of Russell J. Pouliot, 2968 Newport Street, and will be operated by new owner following remodeling and repairs. It is understood that considerable portion of initial production will be given over to speedboats.

Standard Oil Co. of Indiana, 1011 Fourth Avenue, Detroit, has awarded general contract to A. R. Crowe, 6658 Wagner Avenue, for a new storage and distributing plant at Pontiac, Mich., consisting of main three-story unit, and one-story automobile service, repair and garage building, adjoining, to cost about $150,000 with equipment.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has completed plans for new plant at Saginaw, Mich., comprising foundry group for finished castings, with main one-story foundry, 280 x 530 ft.; one-story cleaning building, 110 x 320 ft.; two-story pattern shop, 100 x 183 ft.; one-story sand storage building, 100 x 220 ft., office, etc., to cost in excess of $1,000,000. Albert Kahn, Marquette building, is architect. Contract for sand molds, conveying equipment, etc., has been let to C. O. Bartlett & Snow Co., Cleveland

Evans Auto Loading Co., Dime Bank Building, Detroit, manufacturer of automobile loading equipment and devices, is said to be planning early erection of new branch factory at Eureka, Cal., for production of battery separators and kindred products. Initial plant will cost in excess of $50,000.

In connection with expansion program at Lansing plant, now under way, Durant Motors, Inc., 250 West Fifty-seventh Street, New York, has approved plans for an addition to power station, 30 x 160 ft., to cost approximately $200,000 with equipment. New boiler units of 2000 hp. capacity and other equipment will be installed. An air compressor plant will be erected on adjoining site.

Standard Automotive Parts Co., Muskegon, Mich., has plans for new one-story foundry, with laboratory building adjoining, to cost in excess of $40,000 with equipment. Frank P. Allen & Son, Grand Rapids, Mich., are architects.

Officials of Chrysler Corporation, Detroit, have formed De Sota Motor Corporation of Canada, Ltd., to operate a plant in Canada, likely in vicinity of Windsor, Ont., for manufacture of De Sota motor cars, soon to be marketed by parent company in United States.

R. B. Frantz, 116 North Washington Avenue, Saginaw, Mich., architect, has plans for a three-story automobile service, repair and garage building, to cost about $90,000 with equipment.

Rodgers Boiler & Burner Co., Muskegon, Mich., is said to be planning early rebuilding of portion of plant recently destroyed by fire, with loss close to $40,000 including equipment.

Pacific Coast

SAN FRANCISCO, June 20.

BIDS will be received by contracting officer, Quartermaster Corps, Fort Winfield Scott, Cal., until July 9 for Diesel engines for marine service, circular 1.

Yellow Cab Co., 1290 Bush Street, San Francisco, has plans for a three-story automobile service, repair and garage building, to cost about $300,000 with equipment. Powers & Ahnden, 605 Market Street, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, has asked bids on general contract for a one and two-story factory branch and distributing plant, 80 x 185 ft., at Los Angeles, to cost close to $100,000 with equipment. Curlett & Beelman, Union Bank Building, Los Angeles, are architects. Local offices of company are at 1165 Figueroa Street.

Union Pacific Railroad Co., Pittock Block, Portland, has plans for a grain elevator on Swan Island, to cost $700,000 with screening, conveying, loading and other equipment. Engineering department is in charge.

Richfield Oil Co., 803 Savoy Hotel, Seattle, has plans for a new oil storage and distributing plant, to cost about $80,000 with equipment.

Utah Gas & Coke Co., Salt Lake City, Utah, operated by Middle West Utilities Co., 72 West Adams Street, Chicago, has purchased gas manufacturing and distributing plants of Utah Power & Light Co., at Salt Lake City and Ogden, Utah. New owner will take possession July 1 and contemplates extensions and improvements, with installation of additional equipment.

Oregon Packing Co., Portland, plans construction of power house, 30 x 40 ft., in connection with new one-story canning plant, 165 x 275 ft., at Yakima, Wash., entire project to cost about $50,000. L. T. Tennant, Yakima, is local manager, in charge.

Jacumba Land & Cattle Co., Jacumba, Cal., has plans for a new power plant at Jacumba Hot Springs, to cost about $50,000 with machinery. C. E. Shattuck, Stack Building, Los Angeles, is architect.

Verde Central Mines, Jerome, Ariz., has approved plans for a new mill and concentrator plant, 70 x 160 ft., to cost in excess of $175,000 with equipment.

Los Angeles Compress & Warehouse Co., San Pedro, Los Angeles, has plans for a new one-story cotton compress and distributing plant, 150 x 750 ft., to cost about $400,000 with machinery. Site has been purchased on Twenty-second Street. R. J. Cummings, Bankers' Mortgage Building, Houston, Tex., is engineer.

Canada

TORONTO, June 25.

ORDERS are appearing from widely scattered sources and cover a diversified line of tools. Taken as a whole, current business is slightly off and sales are below those of a month or six weeks ago. Local dealers and builders, however, look upon the lull as a seasonal let up and believe that business will again become active after the summer holiday. A good demand is reported for small tools.

Imperial Oil Co., head office Church and King Streets, Toronto, is inquiring for complete equipment for its proposed new repair shops at London, Ont. Building will be one story, 50 x 50 ft.

Standard Diamond Drill Co., New Liskeard, Ont., will start construction work immediately on a plant, 100 x 100 ft., for manufacture of diamond drills, etc. Company is inquiring for machinery. Hill, Clark & Francis, have general contract for erection.

Dominion Bridge Co. is arranging for erection of an addition to its plant on Sorauren Avenue, Toronto, for fabricating structural steel of a heavier type than is possible at present. When completed company will be in a position to handle all kinds of structural steel from its local shops.

Town Council, Antigonish, N. S., will make additions to its plant and equipment to supply additional electric light and power. Plans call for installation of an oil engine of 120-hp., generating unit, etc., to cost $15,000. John F. MacLellan is chairman of Council.

Link-Belt, Ltd., Toronto, has commissioned Ewart, Armer & Byam, Ltd., architect and engineer, Toronto, to prepare plans for a machine shop adjoining present plant. New unit will be 120 or 160 x 105 ft., arranged in a 45-ft. centre bay and two 30 ft. side bays. Connecting this unit and present factory will be a shipping building, 50 x 50 ft. Crane equipment includes a 10-ton and 3-ton bridge crane and a 5-ton overhead crane. Tenders will be called by middle of July, and construction is expected to start about Aug. 1.

Reid Brothers, 511 St. Catharine Street West, Montreal, have contract for an addition to cost $25,000 for Canadian Tube & Steel Products, Ltd., 107 Hamilton Street, Montreal.

Arco Co., Ltd., 16 Liberty Street, Toronto, has appointed Chapman & Oxley, Northern Ontario Building, Toronto, to prepare plans for erection of a factory at Weston, Ont., to cost $150,000.

Soper & Kent, 39-41 McNab Street North, Hamilton, Ont., are having plans prepared by W. L. Walsh, 304 Terminal Building, for erection of a three story and basement factory and office building, to cost $40,000.

Hydro Electric Power Commission of Ontario, University Avenue, Toronto, has approved construction of a third power development unit for Nipissing system at Elliott Chutes. Total installation will be about 1800 hp., and construction will be undertaken this summer.

Western Canada

Contract has been awarded by British Columbia Electric Railway Co., to C. C. Moore & Co., Vancouver, B. C., and San Francisco, for the construction of a $2,500,000 steam generating plant on Burrard Inlet, to be completed by September, 1932. Contract is for first 20,000-kw., turbo-generating units of a station which, it is expected, will ultimately contain four similar units.

Western Dominion Colleries, Ltd., 305 Trust & Loan Building, Winnipeg, will start work soon on construction of a briquetting plant at Bienfait, Sask., to cost $500,000.

Calgary Power Co., 315 Herald Building, Calgary, Alta., has started work on construction of a power development plant at Ghost River, Alta., to cost $2,500,000.

Foreign

A COMPANY in Porto Rico has plans for a hydroelectric power project on Rio Blanco River in Luquillo Mountain district in eastern part of island, to include construction of power dam and installation of 42-in. penstock, 14,000 ft. long. Entire project will cost about $800,000 with transmission line. Information regarding enterprise can be had at office of Bureau of Foreign and Domestic Commerce, Washington, reference Porto Rico No. 68612; also at office of American Consulate, San Juan, Porto Rico, J. R. McKey, assistant trade commissioner.

J. G. White Engineering Corporation, 43 Exchange Place, New York, will prepare plans and supervise construction of electrically-operated smelting plant and power station in Valdivia Lake section, Chile. New company has been formed to carry out project under name of Electro-Siderurgical de Valdivia. Generating station will have initial capacity of 30,000 hp., and smelter will occupy site of former steel mill at Port of Corral, on Pacific Ocean. Arrangements have been made with Bethlehem Steel Corporation for supply of iron ore from its properties at Tofo, vicinity of Valparaiso. Entire project is estimated to cost in excess of $6,000,000 and bond issue of $4,000,000 will soon be sold by new company in United States to provide part of sum.

East Prussian Power Co., Königsberg, East Prussia, Germany, is disposing of bond issue of $3,500,000 in United States, a portion of proceeds to be used for extensions and improvements in power plants and transmission system, including completion of new steam-operated generating plant at Elbing, now under way.

A cement manufacturing company at Ketton, England, plans construction of new mill on local site, to cost more than $1,400,000 with equipment. Information at office of Bureau of Foreign and Domestic Commerce, Washington; also at American Consulate, London, William L. Cooper, commercial attaché.

New Trade Publications

Small Pumps.—Tuthill Pump Co., 131 West Sixty-third Street, Chicago. Two folders of four pages each, illustrating and describing Typhoon pumps of model B and model C. Model B, designed for pumping oil to machine tools, is in two sizes, with capacities 30 and 90 gal. an hour. Model C is in six sizes, with capacities from ½ to 75 gal. a minute.

Chucks.—Union Mfg. Co., New Britain, Conn. Catalog No. 60, 64 pages, 5¼ x 7½ in. Independent chucks, three and four jawed, extra heavy, heavy and light pattern, iron body and all-steel, are described and illustrated. Faceplate jaws are included and sections are also devoted to geared scroll and geared screw chucks of universal and combination types. Boring machine, planer, milling machine, drill and a number of special chucks are shown. Dimensional data are given and price lists of complete units and parts.

Unit Air Conditioner.—Carrier Engineering Corporation, Newark, N. J. Bulletin of 16 pages describing in some detail, with illustrations, a unit air conditioner for industrial use. It is of a size which fits it for small factories. It is portable, requiring only simple water, steam and electric connections. It is driven by a motor of 1 hp.

Caterpillar Tractor. — Monarch Tractors Corporation, Springfield, Ill. Folder of four pages, illustrating and describing a gasoline-driven tractor weighing 13,500 lb. and designed for heavy work. The motor is of 60 hp., with a rated load capacity on the drawbar equivalent to 40 hp.

Packingless Valves.—International Oxygen Co., Newark, N. J. Folder of four pages illustrating and describing a valve for high pressure, which dispenses with the use of packing. It is of drop forged brass and has a safety device operating at 2600 to 2800 lb.

Direct-Drive Pump.—Lowville Machine & Vise Co., Lowville, N. Y. Folder of four pages illustrating and describing a new pump mounted with engine as a unit on one base and designed for isolated use. It is driven by a four-cycle engine of ¾ to 1½ hp. in the three sizes, and is rated from 22 to 75 gal. a minute.

Semi-Portable Air Compressor. — Pennsylvania Pump & Compressor Co., Easton, Pa. Bulletin 140 illustrating and describing a single-stage, double-acting air compressor driven from motor by multiple belts. The piston displacement is 65 cu. ft. of free air a minute.

Unit System for Pulverized Fuel.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Catalog U-3 of 28 pages illustrates and describes the Lopulco unit system for burning pulverized coal. Several installation views are given, together with detailed description of the mill and its operation, the burner and furnace design.

Electric Furnace for Cyanide Hardening.—General Electric Co., Schenectady, N. Y. Bulletin GEA-972 of four pages illustrates a pot-type furnace for cyanide hardening at temperatures up to 1650 deg. Fahr. Four sizes are listed, with capacities ranging from 65 to 180 lb. of steel an hour. Inside dimensions of the pot vary from 8 to 16 in. in diameter and 12 to 24 in. in depth.

Steam Turbines.—General Electric Co., Schenectady, N. Y. Bulletins GEA-953 and GEA-957 illustrate and describe two types of steam turbines. The first is of a condensing and extraction type fitted with generator and ranging from 2000 to 7500 kw. The other is a mechanical-drive turbine, condensing or non-condensing, up to 600 hp. and up to 6000 r.p.m.

Thermaload Starter.—Monitor Controller Co., Baltimore. Loose-leaf folder (4 pages) describing standard sizes and junior sizes of motor starters, with illustrations of parts and price list for the equipment.

Flood Lighting.—Holophane Co., 342 Madison Avenue, New York. Folder describing a widespread light of 200 watts for general outdoor use. It is water-proof and dust-proof and is designed particularly for factory entrances, watchmen's gates, shipping platforms, warehouses, etc.

Electric Motors.—Louis Allis Co., Milwaukee, Wis. Bulletins 504, 505, 506 and 502A describing respectively, ship-ring motors, squirrel-cage motors, single-phase squirrel-cage condenser motors and inverted rotary converters. The bulletins are illustrated with installation views and sections and carry descriptions of the units covered.

Plugs and Receptacles.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2111 of 16 pages illustrates and describes a wide variety of plugs and receptacles for making electric connections, particularly for portable machines and equipment. Prices and other particulars of the units are carried in the bulletin.

Dies and Taps.—National Acme Co., Cleveland. Booklet of 24 pages, devoted to the features of the company's line of self-opening die heads and collapsible taps and a chaser grinding fixture. Dimensional tables are included, and also tables showing thread sizes.

Portable Flood Lights.—Oxweld Acetylene Co., 30 East Forty-second Street, New York. Booklet describing the carbic light, which contains a carbide generator in the base, and a swivelled standard, holding or burner and reflector which can be pointed in any direction. Various styles operate from 5 to 12 hr. on one charge, at a reported cost of four to six cents per hour.

Concrete Roof Slabs.—Federal Cement Tile Co., 608 South Dearborn Street, Chicago. Bulletin of four pages illustrating and describing the use of long-span roof slabs of pre-cast concrete. The slabs are cast indoors under controlled conditions of temperature and moisture. They are designed particularly for industrial use and are recommended for roofs which are nearly flat.

Chain Hoists.—Union Manufacturing Co., New Britain, Conn. Folder of 16 pages illustrating and describing differential chain hoists together, with trolleys designed to run on I-beam rails. The price list covers units with capacities from ½ ton to 20 tons.

Steel Building Products.—Milwaukee Corrugating Co., Milwaukee. The Milcor Manual No. 20-E of 96 pages covers a wealth of material on steel products designed for various purposes in building construction. The manual is a data book on both materials and methods, and features expanded metal lath, interior metal trim and steel channels for partitions and ceiling supports. Engineering data on the use of these materials in conjunction with concrete, and data covering steel dome construction for concrete floors, are features of the book.

Electric Hoists.—Box Crane & Hoist Corporation, Station E, Philadelphia. Six-page folder illustrating and describing hand-operated traveling cranes fitted with electric hoisting equipment. Electric traveling cranes are included also. The sizes range from ¼ ton to 50 tons. The company is celebrating its fiftieth anniversary.

Insulation of Breechings and Stacks.—Celite Products Co., Los Angeles. Bulletin 141 of two pages illustrates and describes the method of applying insulation of breechings and stacks of boilers and furnaces generally. Sections showing successive layers of insulation or other material explain the method.

THE LAST WORD

(Contributed by the Reader Service Department of The Iron Age Publishing Co.)

IN his autobiography, Andrew Carnegie relates a conversation with William Borntraeger, who succeeded Andrew Kloman as superintendent of the mills.

When he came to the mills as shipping clerk, at $6 a week, Borntraeger had not a particle of mechanical knowledge, but he worked hard and before long so deep was his interest in steel-making that all of his expressions were based on mill practice. For example, one day he asked for a leave of absence, in order that he might visit Germany to marry his affianced and bring her to America.

"Of course, you may go," said the steel magnate, adding, "I suppose your sweetheart is a beautiful, tall, young German lady."

"Vell, Mr. Carnegie," was the response, "she is a leetle stout. *If I had the rolling of her I give her yust one more pass.*"

MIKE has been tending the lawn, trimming the hedge and sweeping the walks in front of the Packard plant for 25 years. Twenty years ago an attack of pneumonia kept him home for three weeks, but he hasn't been late or absent since.

Twelve years ago Mike's oldest son started with Packard, and nine years later young Mike, the second son, followed suit. Like their father, they rival the clock in punctuality.

But Mike is not entirely happy. He has a skeleton in his closet. If you get to know him well, he may tell you in poor English or good Polish about his third son, the "black sheep" of the family. He started with Packard in the family fashion, and for five years all went well. But temptation came. He joined the factory baseball team, made good, and turning his back on parents, Packard and prosperity, signed on a minor league team. Now he is distinguishing himself with the Philadelphia Athletics.

It's no use to explain to Mike that the boy makes more in a few months of "play" than the remainder of the family combined makes in a year of labor. For the boy is the "black sheep" who strayed from the Packard fold, and, as Mike shakes his head and sighs, you know you will never get him to believe that his third son is other than a failure.

CANNED smoke (see The Last Word, May 31) is no joke, we are informed by R. F. Sherfy, engineer, Columbus, Ohio, but is a synthetic substitute for the historic smoke house. In other words, canned smoke is used in curing hams, bacon, fish, etc. "Unfortunate being he," rhapsodizes Mr. Sherfy, "who never cautiously and fearsomely entered that small, isolated, dark and smelly smoke house, got salt in a fresh cut in his bare foot, escaped without getting scalped and ran frantically to the horse trough for relief."

Mechanically operated assembly lines are forbidden in Australia. The assembly line itself is permissible, but it must not be power-driven. In other words, the worker sets the pace. Nor are piece work rates allowed.

You might think that such restrictions as these would make the cost of manufactured goods high in Australia. They do.

Charles L. Wood is general manager of sales for the Carnegie Steel Co. His assistant is John E. Woods.

If your life has not been as stainless as it might be, and if you can't stand the heat, place your order now with the Asbestos Burial Casket Co., Lowville, N. Y.

Herbert Hoover makes a strong bid for the business paper vote, for recently he said, *"Only those may hope to succeed who are informed."* Which is another way of saying, "Read your trade paper if you want to get along."

A. H. D.

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